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STATE OF CALIFORNIA  
DEPARTMENT OF PUBLIC WORKS  
DIVISION OF ENGINEERING AND IRRIGATION

TC 824  
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no. 5

BULLETIN No. 5

# FLOW IN CALIFORNIA STREAMS

BEING

APPENDIX "A"

TO

## Report to the Legislature of 1923

ON THE

## Water Resources of California

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## FOREWORD.

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The legislature of 1921 appropriated \$200,000 for an investigation of California's water resources by the State Department of Public Works, Division of Engineering and Irrigation. Accordingly, an engineering investigation has been completed and a report transmitted to the legislature on January 1, 1923. The great mass of data collected and the complex analyses thereof made it advisable to present much of this information in separate volumes. Four of these are in print, entitled:

APPENDIX "A" "Flow in California Streams." Bulletin No. 5, State Department of Public Works.

APPENDIX "B" "Irrigation Requirements of California Lands." Bulletin No. 6, State Department of Public Works.

APPENDIX "C" "Utilization of the Water Resources of California." Bulletin No. 7, State Department of Public Works.

APPENDIX "D" "Relation of Settlement to Irrigation Development." Bulletin No. 8, State Department of Public Works.

Chapter 889 of the 1921 Statutes, which authorized this investigation, provided for the appointment by the Governor of a Consulting Board to advise with the Department in their endeavors. The following were appointed by Governor Stephens:

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## CHAPTER I.

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**MOUNTAINS.**

Three-fifths of the land expanse of California is a rugged, upturned, mountainous region. Although comprising an area of 100,000 square miles, upheaved into waves of earth through which the jagged rocks protrude in peaks that attain to elevations of two and three-quarter miles, they are but wrinkles and creases of the crust on the vast surface of the earth. The foldings extend in a general northwesterly and southeasterly direction, with the highest ridges forming the crests of the state's principal mountain ranges. The innumerable parallel ridges and folds of lesser elevation give breadth to the massive mountain structure that rises out of the sea or up from the valley plain and covers the major portion of this state. Folded into parallel corrugations, the bases of which extend half the width of the state, these mountains are deeply cut by transverse grooves that shape and isolate their apexes into angular peaks and rounded domes.

The mountains extend from the ocean's edge to the state's eastern boundary, and from the Oregon line to the Mexican border. So vast is this mountainous expanse and so dense is the distribution, that the flat lands, excepting the long central valley of the Sacramento and San Joaquin, occur as scattering patches, sprinkled along the ocean margin to the west or sparsely apportioned through mountain plateau, or in the barren desert on the eastern border of the state. Most of the mountainous region is non-tillable, being deficient in soil or too steep of slope. A tenth of it, however, is agricultural, and this lies in the mountain valleys and on the sloping, rolling foothills which effect the compromise between the flat valley lands and the labyrinth of ridges and tangle of gorges, constituting the highland area of this state. The fretwork of wrinkles, folds, and creases that compose the relief work of the mountain structure, is so disposed that the greater part of California's mountains is comprised within two ranges. These ranges traverse the state from the northwest to the southeast and are approximately parallel to each other and to the state's western border.

The two ranges diverge in their southerly course at Mount Shasta, within forty miles of the Oregon line. In their deviation from each other they leave between their bases a long, flat valley. This valley, one-quarter the breadth of the state and half its length, lies on the state's median line and includes two-thirds of California's flat land. The two mountain ranges skirt this central valley, proceeding in long, sweeping curves to a convergence at Tehachapi Pass, three-quarters the way down the state from its north boundary. From this point on to the Mexican border, the mountains are grouped in a complex aggregation which apportioned the south part of this state between the Pacific slope and the desert expanse that is the southeast corner of California.

Undifferentiated at the state's northern and southern extremities, the two ranges are definitely separated in the middle of their course, where they enclose the nearly sea-level valley within a rock wall which is cleft in but one place to valley-floor level. Through this cutting the interior drainage issues, flowing westwardly, and mingles with the waters of the Pacific Ocean. Exit from this mountain-engirdled valley by other than this sea-level cut is over passes that traverse the mountain chains. These passes, limited in number, are approached by tortuous ascents to attain their elevation, for the lowest of these notches that give egress to the east is 5200 feet in elevation.

The easterly mountains, the Sierra Nevada Range, originating toward Mount Shasta and terminating at Tehachapi Pass, have a long and somewhat uniform slope from their crest toward the west. This westerly slope is broken by a series of ridges forming crests secondary to the main crest of the range. These subsidiary ridges, paralleling the course of the dominating heights of the mountain chain, have crumpled crests, are broken down in places and cross-cut by surface drainage, and are monumented by erosion-resisting peaks. The westerly slope occupies from a quarter to a third of the breadth of the state in descending to the plains level of the great central valley, from the line of crests on the axis of the range. To the east the Sierra Nevadas present a steep escarpment composed of abruptly rising rock walls, precipitous cliffs and talus slopes with few discernible foldings, secondary to the main ridge. The crests of this range increase in altitude from north to south. Lassen Peak, in the northern quarter of this range, the one active volcano in the United States, overlooks the adjacent mountains, and is 10,580 feet high. To the south, the crest of the range, increasing in height culminates the upheaved crust of the earth in Mount Whitney in the southern quarter of the range, at 14,500 feet high, the highest mountain in the United States, excluding Alaska.

The Sierra Nevada Range is very diverse in surface features. The crests are serrated, rocky, soilless and precipitous. The slopes are generally tree-covered wherever soil has found lodgment. The troughs between the successive folds of the earthen crust form mountain meadows, marshy flats and upland lakes, and intricately interlaced throughout the entire extent of this range are brooks, streams and rivers.

The main drainage channels cross the secondary ridges in the water's descent from the crest of the range, while the tributary streams largely traverse the grooves between the successive folds that parallel the axis of the range. The main-stream channels, in crossing the subsidiary corrugations of the mountain chain and cutting through the intervening ridges, are deeply eroded into the mountain structure, and flow through water-worn canyons and gorges that expose the seams and layers of the mountain stratification as etchings on their precipitous cliffs. The beds of the cross channels are cut and lowered until they are often far below the beds of the tributary channels which empty the lateral drainage from the troughs between the lines of the secondary crests that corduroy the mountain slopes. The abrupt descent of the tributary waters that flow into the cross-cut gorges, forms cascades and waterfalls, and of these, the Yosemite Falls in the heart of the Sierra Nevadas, is the highest in the world, leaping 2500 feet from the mouth of a tributary valley into the Merced River gorge. So



potent has been the eroding force in cutting these canyons and gorges across the folds of the mountain structure, that many of these deeply incised channels have cut back to the very base of culminating peaks of the range, where their low-lying beds at the bottom of the chasms are but half as high as the dominating peaks that tower above them.

The streams in the Sierra Nevadas, except where flowing in the valleys and meadows between the mountain folds, are turbulent waters, flowing over boulder-strewn beds, through shadowy gorges, swirling down steep descents in foaming cascades until, approaching the valley floor, they sweep out upon the plains to pursue their oceanward journey over gravelly beds of more moderate gradients. The drainage of the westerly slope of this range collects into the Sacramento and San Joaquin rivers, the two largest rivers in the state. These rivers, two meandering channels with tree-covered banks, sandy beds, and swampy flats of tule growth, follow the axis of the great central valley that is fenced by the mountain ranges. One river originating in the north and flowing southerly, and the other rising in the south and flowing northerly, unite to the eastward of the sea inlet, through which their combined waters enter the Pacific Ocean through the Golden Gate.

The easterly slope of the Sierra Nevadas presents a rocky rampart of abrupt acclivities and precipitous walls which has, because of its greater steepness, a smaller water collecting area than the opposite slope on the west. So much smaller is this area in the greater water-producing regions of the high altitudes, that no rivers are formed on the eastern slopes of the Sierra Nevadas that compare in magnitude to those on the west. This easterly slope of the Sierra Nevadas is but a twentieth to a tenth of the width of the state, in descending from the predominating crests along the axis of the range to the agricultural valleys that skirt the mountain edges and fringes of the talus slopes along the easterly border of the state. These agricultural valleys are located at from four to seven thousand feet in elevation and are on the westerly margin of the Great Basin which extends easterly from the Sierra Nevadas to the Rocky Mountains. The waters of the streams draining the eastern slope of the Sierra Nevadas collect for a quarter of the length of the mountain chain by flowing into Owens River in Owens Valley, which parallels the range along its eastern toe. Beyond this confluence of waters, there is no great collection of drainage into large rivers, and none of these waters reach the ocean, but instead, lose themselves in sinks or by entering land-locked lakes where they are dissipated through evaporation.

The westerly of the two mountain chains, called the Coast Range Mountains, after separating at Mount Shasta from the mass of mountains in the northern part of the state, parallels the Pacific Ocean's margin and takes a narrower and straighter path in its southerly course than does the Sierra Nevada range. These Coast Mountains do not attain the elevations reached by the Sierra Nevada Mountains, neither are they so diverse or massive in structure. The highest peaks between the Oregon line and the Tehachapi are less than 9000 feet in elevation, and the peaks above 5000 feet are but few in number. A third of the way down the state from the Oregon line, Mount Diablo and Mount Hamilton surmount the range at 3850 and 4210 feet, respectively. Two-thirds the way down the state, Pinos Mountain reaches to 8826 feet in height, and from this the range continues east-

erly with occasional crests almost as high until reaching Tehachapi Pass, 4000 feet above sea level. The traveled passes in the Coast Range Mountains are considerably lower than those of the Sierra Nevadas. They are located at elevations of from 750 to 4200 feet and are passable throughout the year, while through the Sierras the lowest pass is 5200 feet, and railroad communication only, is maintained through tunnels and snowsheds.

The Coast Range Mountains are largely composed of sedimentary rocks. The igneous rocks, where they exist, are seamed, friable and easily broken down. The crests of this range present a more rounded profile and the hills are more rolling and less rugged than the Sierra Nevadas. In the northern parts these mountains are forest-clad, but are only scatteringly timbered in the south. The base of this range is a quarter to a third of the width of the state, being broader toward the northerly end.

This range is penetrated by a salt water inlet at about its middle point between Mount Shasta and Tehachapi Pass and one-third the distance down the state from its north boundary. This inlet is cut to depths below sea level and admits salt or brackish water almost into the state's central valley. Land-locked and encircled by hills and mountains, the bays of San Francisco and San Pablo make this inlet one of the great harbors of the world. Through this cutting in the Coast Range Mountains, the drainage of the great central valley, the east slope of the Coast Range Mountains, the west slope of the Sierra Nevada Mountains, and the plateau regions in the northeastern corner of the state finds its way to the Pacific Ocean. These waters, the drainage of one-third the area of California, comprise a half of all the waters of the state.

The folds of the earth's crust which form the Coast Mountains are approximately parallel to each other and to the axis of the range. These corrugations in the earth's crust are clearly defined, and compared to the Sierra Nevadas, the valleys between the folds are of a more regular surface conformation and of an extended length. The agricultural lands of the Pacific region are located in these valleys and on the detrital flats near the ocean margin.

Exclusive of Klamath River, the main drainage channels of the Coast Range follow the troughs between the mountain folds and receive the waters of streams which drain the slopes of the ridges to either side. These waters flowing in the major channels of the valleys all drain northward and northwesterly, excepting Russian River, which flows southward throughout most of its course until it turns west and cuts the axis of secondary ridges of the Coast Mountains to empty its waters into the Pacific Ocean. The Coast Range has fewer crosscut water channels transverse to the secondary ridges than the Sierra Nevadas, but the principal axis of the chain is deeply cut in two places: at the salt water inlet through the Golden Gate, and at Klamath River which enters the state from the north, cuts through the main axis of the Coast Mountains west of Mount Shasta, and carries the drainage of the eastern slope of the Coast Mountains in California and Oregon, across the main mountain range and into the Pacific Ocean.

Between the Pacific littoral and the western foldings of the Coast Mountains are coastal plains, deltas, and detrital flats, formed from the

attrition of the mountain structure. These coastal flats are located at the ocean outlet of the streams and are scattered rather meagerly along the Pacific margin from the Oregon line to the Santa Barbara Channel. Their continuity is interrupted by extensive stretches of precipitous shore line that rises abruptly from the water's edge. South-erly from the Santa Barbara Channel, these coastal plains are more extensive and proceed almost continuously from near Los Angeles to the Mexican border, a strip one-sixth the length of the state.

The streams draining the west slope of the Coast Mountains are mostly perennial, but the eastern slope of this range is drained by water courses which seldom flow continuously throughout the year. In that portion of the Coast Range that lies between the Golden Gate and Tehachapi Pass, the water in the eastwardly flowing streams is so meagre during the summer season that few have surface water, and none of them ever maintain a continuous thread of water in their channels to a confluence with the great river of the central valley.

All the streams of this westerly range have a more moderate gradient than do the water channels of the Sierra Nevada Mountains. Arising in mountains of lesser elevation and flowing over a rocky formation that is more easily eroded, the streams pass through their detrital-filled valleys and wend their way toward the sea following a more dilatory course than the deeply cut major channels of the Sierras.

The slopes of the Coast Mountains toward the Pacific Ocean that lie north of the Golden Gate are generally heavily forested, but back from the coast the timbering is less dense. This range north of Clear Lake and particularly the region west of Mount Shasta, is clothed in almost continuous forest. Northerly from the Golden Gate the agricultural areas are relatively small in size. The largest of the coastal valleys, the Eel River Valley, at the mouth of the Eel River, contains 90 square miles of agricultural land. In the interior the agricultural areas are in the valleys adjacent to Clear Lake, and between that lake and San Francisco Bay. The most extensive area of agricultural land is in the group of valleys contiguous to Santa Rosa and comprises 140 square miles of tillable land. Between San Francisco Bay and Tehachapi Pass the timbering is often sparse and the forests there are entirely confined to the Pacific slope of the range.

The assemblage of mountains in the northern part of the state, which include the conjunction of the Coast Range and Sierra Nevada Mountains, extends from the sea coast to the Nevada line and from Honey Lake to the Oregon boundary. They are interspersed with peaks and cones, having sharply cut notches and scalloped slopes, and so dense are they aggregated in the region between Mount Shasta and the Pacific Ocean that there are almost no flat areas. East of Mount Shasta, and extending a fifth of the way down the state from the north border, is a lava cap that forms a mountain plateau on the easterly side of the Sierras, 4000 to 6000 feet in elevation. Divided by Pit River and extending northerly to Oregon and southerly to Lake Almanor and Honey Lake, this region presents a surface of hummocks and hills of lava, irregularly interspersed over an extensive plain-area of lava soil. This lava is shattered into angular-shaped, jagged chunks, and covers the surface of the region to undetermined depths. These beds of eruptive rock have been cleft into fissures that extend many miles in length. Spread over this region are cinder cones, extinct craters, steam vents and hot springs.

On this area the precipitation easily penetrates the absorptive covering of lava and the interstices and apertures between the rock fragments, or into the cellular honeycomb structure of the steam blown volcanic rock. This portion of the state contrasts itself with the remainder of California in having an abundance of subterranean waters that appear as springs. These furnish a substantial and perennial supply of water to the streams draining the region; some of the springs pouring out their waters uniformly and in volumes of one hundred cubic feet per second or more, give immediate and considerable flow to the water channels having them as their source. The largest of these streams, Pit River, which drains half of this lava cap, rises in the extreme northeastern part of the state, crosses the axis of the Sierra Nevada Mountains to a confluence with the Sacramento River, and is the only stream that carries any drainage from the easterly slope of this range into the long, central valley which lies between the Coast Range and the Sierras.

Klamath River, which drains the mountainous region north and west of Mount Shasta, is one of the few rivers of the United States that carries any drainage of the Great Basin through the axis of a mountain range. It has its source in Oregon where it drains a portion of the eastern slope of the Cascades, flows southerly into California to the northward of the Pit drainage and thence westerly, crossing the axis of the Coast Mountains through the Klamath Gorge, and empties its waters into the Pacific Ocean within 35 miles of Oregon.

Strung chain-like from the lower end of Goose Lake along Pit River is a group of agricultural valleys. The tillable lands are on the floors of the valleys and on the slopes rising from them. Between this cordon of valleys and Honey Lake are located Madeline Plains, Round and Honey Lake valleys. The largest of these, Honey Lake Valley, contains 320 square miles of tillable land. East of the Pit River chain of valleys is Surprise Valley, which contains Upper, Lower and Middle Lakes on the margins of which agricultural lands are located.

Covering the major portion of Southern California is the southward continuation of the state's two main mountain ranges, which after their convergence at Tehachapi Pass proceed in a diversified aggregation of mountains that extend to the Mexican border. These partake of the characteristics of both the Coast Range and Sierra Nevada Mountains, as some are angular protusions of rock; others are rounded, soil-covered and rolling. Usually steep of slope, almost precipitous, these mountains are deeply furrowed by sharp-cut gullies and ravines, and have canyons filled with underbrush, and water courses lined with alders, sycamore and willows. A dense brush cover clothes their rugged slopes, but timber grows only at the higher elevations.

The crest of this range is lower than that of the Sierra Nevada Mountains, with less continuity of arrangement. A few dominating peaks rise to heights of more than 10,000 feet, but their general altitude is comparable to that of the Coast Range. The passes over them are intermediate in elevation between those of the Coast Range and Sierra Nevada Mountains, are snowless except at intervals, and traversible throughout the entire year. This mountain range divides, and the routes through the passes connect, two diverse regions. To the west, the Pacific slope, the agricultural lands of which extend from the ocean margin well up to the mountain flanks, is a developed,

fertile, productive area of moderate climatic fluctuation: to the east is the desert, an undeveloped region of great extent, almost rainless and non-productive through lack of an accessory water supply. The only extensive productive areas are the Imperial, Palo Verde and Coachella valleys which have acquired irrigation supplies and are realizing on the great fertility of the desert soil. In this expanse of rainless desert is Salton Sink, an inland sea, the surface of which is more than 250 feet below the ocean level. Its surface is gradually lowering through evaporation.

The stream channels draining into the desert from the mountains that separate it from the Pacific region, are dry throughout most of the year. Excepting those streams that have their source at high elevations, flow in the water channels occurs only after an appreciable precipitation has fallen upon the slopes of the tributary drainage basins. No large streams are formed by the waters drained from this eastern slope and none of its drainage reaches the ocean; instead, it is lost by seeping into the arid, desert soil and through evaporation. The streams draining the western slope of these mountains are perennial and, after descending the steeper mountain slopes, pass through broad, detrital-filled valleys, pursuing generally a direct course to the ocean. Large areas of fertile agricultural land border the streams in these valleys and extend to the ocean's shore which the streams approach between banks but slightly above their beds.

With three-fifths of the surface of California disposed in mountains, the extreme range of altitude is from 275 feet below sea level in Death Valley, to 14,500 feet above, attaining this elevation at Mount Whitney but seventy-five miles distant from the lowest depression. The greater part of the flat lands of the state, or about one-fifth of its total area, lies between the elevation of the ocean's edge and 500 feet above. They comprise the gently sloping ocean littoral, an extensive mountain-girdled valley known as the Sacramento-San Joaquin, and desert areas in the southeastern part of the state. This region, 33,000 square miles in extent, includes the bulk of California's agricultural area. Higher in elevation than these flat lands, are gentle slopes lying between the plain-like areas and the base of the mountains. These are the rolling foothills and detrital-filled valleys, lands that are transitional to plain and highland regions. These are located mostly between 500 and 2500 feet above sea-level, and 53,000 square miles, or about one-third the area of the state, lie between these elevations. One-quarter of the agricultural land of the state is in this region and only the scattered parcels in high mountain valleys and that on the plateau of northeastern California lie above it.

The area above the 2500-foot elevation, 72,000 square miles in extent or about half the state's area, the mountains proper, comprise the rock-strewn slopes, steep acclivities, sheer cliffs, rocky extrusions, serrated ridges, and mountain crests—surmounted by storm-swept pinnacles. Of this region, 35,000 square miles or one-fifth the surface of California, lies above 5000 feet. The mountain and foothill regions together, are over triple the area of the agricultural lands and receive a greater precipitation. This mountain water-producing area sheds its run-off into streams and rivers which traverse the valley and plains areas in their course to the water channel's mouth at the ocean margin.

## CHAPTER II.

**PRECIPITATION.**

Man, in common with all other life on this earth, is born, passes his entire existence and dies without ever emerging from water in which he is surrounded. Covering the earth from pole to pole and extending from the ocean's greatest depths to far over the tops of the highest mountains, even penetrating to a considerable distance the soils and rocks upon which it rests, this fluid fills the lower depressions of the earth's surface in the liquid form; but above the sea and the land, it wraps the entire globe in an all-pervading sheath of water-vapor that mingles with the atmosphere. Although invisible, this sea of water-vapor extends many miles upward from the surface of the earth; in sensible concentrations, however, it is confined within the lower five miles. The liquid water, one eighth-hundredth the bulk of the earth, is of sufficient volume to blanket the globe with a continuous sheet of water that submerges three-quarters of the solid crust. In the cold of the polar regions this water-blanket is rigid and solid, and mantles the earth with ice floes which attain the dimensions of continents.

Ceaselessly changing, one into another, the liquid and solid waters of the earth evaporate and enter the invisible vapor-envelope, and at all times, somewhere, atmospheric waters are precipitating from this vapor-envelope to rejoin the bulk of the waters of this planet in the liquid or solid state. This interchange between the visible and the invisible waters is in progress continually, differing in degree of activity, but ever striving to effect an equilibrium between the natural tendencies of the liquid and solid water to diffuse as vapor, and the vaporized waters to liquify or congeal.

The physical phenomenon inciting the interchange between the visible and invisible waters of the globe, is the temperature of the atmosphere and of the lithosphere which the vaporous waters contact. Fluctuating with the rotation of the earth, these temperatures pass through a daily cycle of alternate warmth and coolness. With the rising and setting of the sun, all parts of the earth are subject to cyclic changes of temperature, and these fluctuations progress around the globe as the sun's rays sweep over its surface. The atmosphere and lithosphere are warmed by the heat of sunshine during the day, and cooled by the radiation of heat during the darkness of night hours. Varying quantities of heat are absorbed by the air, the water, and the soil and rocks of the earth's crust, as the sun's rays pierce the enshrouding gas envelope and penetrate to the bottom of the atmospheric ocean. The rocks and soils, endowed with a greater capacity for absorbing heat, rise in temperature more slowly than the gases of the air, but the liquid waters of the lakes and oceans, having a still larger absorptive power than either, are the most sluggish in their thermal change. In the absence of the warming rays of the sun, the atmosphere is lowered in temperature the more rapidly, having less heat to radiate, the soil and rocks next, and the waters of the earth the least rapidly of all.

It thus occurs that the air, the earth, and the sea are constantly in the process of thermal change, ever endeavoring to reach like temperature to the heat of day or the cold of night. With each temperature rise, the ability of the atmosphere to occlude water-vapor becomes greater and the tendency for solid or liquid water to vaporize increases, so that as temperatures rise, the liquid and solid waters tend to diffuse into the air as aqueous vapor; but as the temperatures fall, vaporized waters of the air tend to liquidize or congeal. The daily thermal cycle, therefore, in sweeping around the surface of the earth at the rate of 1500 feet per second, leaves behind it a riotous endeavor on the part of the earthly elements to adjust themselves to their ever changing heat environment and to reconcile the disturbed balance between the visible and invisible waters of the globe. These interchanges, continuing unceasingly, are called dews, fogs, mists, rain, downpours, or cloudbursts as the precipitation of condensed moisture from the invisible vaporous envelope becomes more intense; but as the visible liquid or solid waters diffuse to join the vaporous envelope the interchanges are called evaporation, and this is said to be slow or rapid in accord with the readines of diffusion.

Coincident with these thermal agitations, areas of low pressure appear in the atmosphere as this swirls with the rotation of the earth. Meteorological observations of the United States Weather Bureau show that areas make their appearance along the Alaskan Coast, in which the pressure of the atmospheric envelope surrounding the earth is less than in adjacent regions. Successive observations, taken subsequently, reveal these low pressure areas in movement southeasterly across the continent, to be finally dissipated by equalization of pressure through air movements, or to endure and pass out into the ocean from the Atlantic shore of this continent. With the formation and progress of these areas of low pressure, winds arise that are directed toward them, and the air flows from hundreds of miles distant to equalize the variant pressures.

In California the prevailing winds are from the south, southwest, and west, rushing toward the areas of low pressure as these pursue their diagonal course across the continent. Sometimes, however, centers of low pressure enter the state from off the Pacific Ocean at which times easterly or northerly winds may blow over parts of the state. These air movements may be concentrated in volume or altered in direction locally, by hills or mountains or the passes between them, so that the winds of the lower atmosphere may often be at variance with the direction of the more widespread air movements.

The winds may blow as gentle breezes or attain to the velocity of gales, in accord with their nearness to the low pressure areas or the degree to which their pressures are below those of the surrounding regions, and they are called zephyrs, breezes, winds, gales, or cyclones as they have greater speed of movement. Velocities of air movement have been recorded as great as 130 miles per hour before the instruments of observation were demolished, but velocities exceeding thirty miles per hour are unusual.

This movement of air from one locality to another to equalize differences of barometric pressure in the earth's atmosphere, is the primary feature of storms. Transporting air from one area to another exposes it to new temperature conditions, and as adjustment takes place by

the flow of heat from the warmer element to the cooler, if the temperature of the air is reduced, its vapor content for the lowered temperature may exceed its new holding-capacity, and the excess moisture may then be expelled from the atmosphere and fall to the earth's surface as rain or snow. It is the lowering of the temperature of the atmosphere so much, that at its new temperature it is unable to hold all the water-vapor present, that creates the change of the invisible waters of the earth to the visible. When this change attracts the attention of man, because of the inconvenience caused him in his daily pursuits by the wetting of his environment, it is commonly named a "storm," but minor precipitations are continually in occurrence from similar causes and, not being culminations of aerial disturbances nor violent in their intensity, they pass unnoticed. The daily fluctuation of temperature in one locality is often sufficient to lessen the water-vapor holding-capacity of the atmosphere at the coldest phase of the cycle; then the cold of the night may cause slight precipitation, and dew, fog, or frost may form, but for precipitation to occur in volume, a movement is necessary of vapor-saturated air to localities of a cooler temperature.

California, spread out along the shore of the Pacific Ocean for a length of 900 miles, experiences favorable meteorological conditions for precipitation in sufficient volume to be called a "storm," only during the season when vapor-saturated air from off the ocean is carried overland to contact with the cooler lithosphere. This season is winter, being one part of the annual cycle of exchange of heat between the sun, earth, sky, rocks, and sea, which gives variance to the daily cycle of exchange from day to night. This annual cycle is caused by the changing inclination of the earth's axis of daily rotation in circling its yearly orbit.

Throughout the summer season, quantities of heat reach the surface of the earth, and this warms the rocks, the soil, and the water. The rocks and soil, requiring as they do a less amount of heat than does water to increase their temperature to an equivalent degree, soon become the warmer. With the coming of the winter season, less quantities of heat penetrate the atmosphere to the earth's crust and a radiation of heat occurs from both land and water. As the rocks and soil readily give up their heat and, having less stored heat than the waters of the ocean, the land area soon reaches a condition of temperature that is lower than that of the water. It is only at this time of the year that the translation of the ocean air to contact with the cooler land, lowers its temperature enough to produce over-saturation. Thus conditions favorable to precipitation occur as this air, heavy in water-vapor, is moved over the cooler land by the winter winds. Of the seasons intermediate between summer and winter, it may be observed that rains generally fall over the land during the cold of night, since at this time only, is there sufficient contrast in temperature with the inflowing ocean air, to cool the winds enough for precipitation to occur. Even in the dead of winter the heaviest showers occur more frequently at night.

The warmer temperature of the ocean air during winter, compared to the inland atmosphere, is easily perceptible when traveling from San Francisco on the ocean's shore, to Sacramento which is eighty-five miles inland. The United States Weather Bureau records show the mean temperature for January, the mid-winter month, to be 3 degrees higher in San Francisco than in Sacramento, but the temperature



changes of ocean winds traveling northerly and landward would be still greater than this. It thus comes about that the rain-producing winds of California are generally from the southwest and south. Flowing off the Pacific, where the air has become heavy with water-vapor through contact with the ocean, the winter winds traveling northward and inland, enter regions of lower temperature, and the capacity of the moving air to hold moisture is reduced, so, heavy with moisture for their temperature as they leave the ocean, clouds are formed as the winds progress inland. If the change is sufficiently pronounced, the watery particles coalesce and are precipitated earthward as rain, snow or hail.

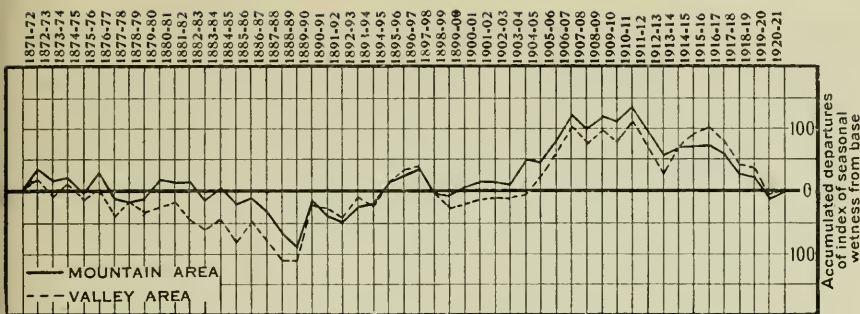
Winds blowing from a land area are not favorable to precipitation, even though their temperature may be reduced on entering a cooler region, for the usual variation of temperature between night and day over the continent, where the air begins its movement, is greater than over the ocean and prohibits its being so nearly saturated with moisture as it starts on its journey. For this reason, in California the southeasterly winds usually produce lighter showers, while southerly and southwesterly winds produce the heavy downpours. Westerly winds may produce light showers but, without northward travel, variations of temperature great enough to discharge large volumes of water from the atmosphere, are not apt to be experienced. Similarly, easterly and especially northerly winds are dry and, except under special local circumstances, they would never undergo a lowering of temperature sufficient to cause precipitation of even a small portion of their moisture. For a like reason, the southerly and southwesterly winds of summer, blowing from off the cooler ocean to the warmer land, do not experience a lowering of their capacity to hold moisture, so that no precipitation occurs. On the contrary, these inflowing winds, warmed by contact with the land, may have their water-vapor holding-capacity increased and become dry winds.

All these air movements toward the low-pressure areas, in sweeping in from long distances, are extensive as to the areas traversed. Impelled by the same power and rushing to the same low-pressure area, similar winds blow over areas of thousands of square miles. In passing over the land, varying quantities of moisture are precipitated along the way, as the winds are cooled to varying degrees, or deflected or diverted by local topography. So rain gages in adjacent locations may register different quantities of rain, all produced from the same widespread storm. The shelter of knolls, of hills or mountains, or of ridges or spurs, may lessen the quantity precipitated on leeward areas, while the more exposed regions may receive an increased rainfall. The greater cooling of the air on moving up slopes and arriving at higher elevations, usually increases the precipitation as well. Since these variations in quantity of precipitation vary with topography and elevation, which are fixed in their influence and unchanged with the arrival of new storms in future years, the precipitation taking place in adjacent areas and over which the same storm winds customarily sweep, while not alike in quantity falling, is quite similar in magnitude relative to the precipitation of other years. So the magnitude of precipitation, relative to that of other years, is found to be very nearly alike over whole regions, so much so, that the term "index of seasonal wetness" has been evolved to express this magnitude of the total rain-

fall for a season relative to the magnitude of other seasons, and this index has like values over entire sections of the state.

The numerical value for the "index of seasonal wetness" at any rainfall station, is the total rainfall for that season expressed in per cent of its annual mean. This mean is the average value for several years of record, and the number of years should be extensive enough that their average approaches a value, which the rains of succeeding years exceed and fall short of in like amounts. The index of seasonal wetness, computed from such a mean, expresses the degree of wetness of the rainfall experienced that season by any locality, in terms of their customary or normal precipitation. These indices for successive years form a series of numbers which bear a relation, one to the other, identical to that of the actual values of seasonal rainfall, but instead of expressing volumes of water as do the precipitation records themselves, they express the degree of normalcy of each season's rainfall. To convert the indices to actual volumes of water, they must be multiplied by the value of the mean seasonal rainfall.

Plate I, "Comparison of Index of Seasonal Wetness in Mountain and Valley Areas," illustrates the similarity in value of relative precipitation in adjacent areas. A mountain area in the Sierra Nevadas is here compared to a portion of the Sacramento Valley which, although several thousand feet lower in elevation, is located in the same storm paths. The indices for six stations of the United States Weather Bureau in each of these areas are averaged and plotted on the diagram. To accentuate any cumulative difference in the values of these compared average indices for the mountain and valley areas, as the years succeed themselves, they are plotted as sums; each value plotted being the sum of all indices for its area, beginning with the initial year and including the value of each successive year up to the one for which the value is plotted. In originally expressing these indices in per cent, each one contains the number 100, which represents the wetness of a year of normal rainfall; the years that had a precipitation above normal are represented by numbers greater than 100; and those that had less, by numbers smaller than 100. In the diagram, Plate I, the transverse heavy line about midway between the top and bottom lines, represents this datum of 100, and this heavy line is intercepted by lightly drawn lines at right angles to it in direction, one to a year, on which are plotted the successive accumulated sums above or below the datum line. But since, in summing the indices of successive years to obtain values for plotting on this diagram, the adding into the sums of the value 100 contained in every index would serve no useful purpose, all the indices had their numerical values decreased by subtracting 100 from them before the additions were made. This, in effect, makes the general direction of the lines on the graph, progress transversely across the paper from left to right, instead of continuously inclining upward as the multiple additions of 100 would have caused them to do, if the 100 had not been first subtracted from each value. The sum plotted on each yearly line becomes greater than the sum plotted for the previous year, if the index representing the intervening season is larger than 100; and similarly the sum becomes less than that plotted for the previous year, when the index of the intervening season is smaller than 100. So the plotted lines traverse the chart parallel to the datum line when the precipitation for the year is normal, slope upward with



Season	Mountain Area—Auburn, Grass Valley, Colfax, Nevada City, Summit, Truckee		Valley Area—Davis, Sacramento, Woodland, Folsom, Willows, Marysville	
	Mean precipitation at stations, inches	Mean index of seasonal wetness*	Mean index of seasonal wetness*	Mean precipitation at stations, inches
1871-1872	55.50	137	120	24.66
1872-1873	30.87	75	70	13.73
1873-1874	45.20	107	120	23.28
1874-1875	33.44	77	76	14.49
1875-1876	55.48	130	117	22.95
1876-1877	25.70	60	51	9.47
1877-1878	41.21	95	128	24.06
1878-1879	45.39	103	85	16.98
1879-1880	56.95	133	108	20.53
1880-1881	40.86	94	106	20.08
1881-1882	42.55	102	71	13.59
1882-1883	33.57	75	84	16.13
1883-1884	49.55	116	116	22.08
1884-1885	32.03	74	59	11.12
1885-1886	48.16	110	137	26.07
1886-1887	33.67	80	70	13.39
1887-1888	27.96	63	68	12.81
1888-1889	32.63	74	102	19.25
1889-1890	76.98	178	188	35.68
1890-1891	32.80	77	94	17.63
1891-1892	38.43	89	88	16.76
1892-1893	53.46	125	133	24.98
1893-1894	45.48	107	79	15.14
1894-1895	57.08	132	142	26.88
1895-1896	49.90	114	123	23.05
1896-1897	47.33	110	105	19.99
1897-1898	25.85	60	51	9.66
1898-1899	39.43	92	81	15.39
1899-1900	49.95	114	104	20.01
1900-1901	47.83	109	109	20.63
1901-1902	44.24	100	104	19.67
1902-1903	41.56	97	97	18.45
1903-1904	60.04	140	108	20.35
1904-1905	40.91	98	134	25.05
1905-1906	57.25	132	136	25.88
1906-1907	63.50	148	141	27.05
1907-1908	29.49	72	73	13.68
1908-1909	53.61	123	122	23.12
1909-1910	38.98	90	81	15.43
1910-1911	55.32	124	132	25.29
1911-1912	24.39	56	57	10.85
1912-1913	28.01	61	59	11.22
1913-1914	49.71	115	143	26.77
1914-1915	44.65	102	124	23.55
1915-1916	45.18	102	108	20.67
1916-1917	38.04	87	77	14.75
1917-1918	28.34	66	61	11.65
1918-1919	39.90	93	97	18.44
1919-1920	28.59	65	53	10.21
1920-1921	51.42	114	108	20.62
Mean	43.23	-----	-----	19.06

\*Mean index of seasonal wetness is the mean of the indices of the several stations in the group.

MASS DIAGRAMS OF INDICES OF WETNESS  
SHOWING  
COMPARISON OF INDEX OF SEASONAL WETNESS  
IN MOUNTAIN AND VALLEY AREAS

above normal season precipitation, and downward with subnormal precipitation. The steepness of the upward inclinations and the sharpness of descent of the downward slopes, indicate the degree of wetness compared to the mean or normal, of these two areas. The plotted lines pass above the heavy datum line or below it, as the accumulated precipitation, beginning with the initial year, is greater or less than it would have been had all seasons for which the indices are summed, been normal; and the passage across the heavy datum line is without relation to the normality of the year in which the line crosses the datum.

These plotted lines on Plate I, one for a mountain area and one for a valley area several thousand feet below, picture the sequence in values of the indices for the two areas as the lines progress from left to right. The downward slope of a section of a line, where values for successive years continually plot lower and lower approaching the bottom of the chart, indicates a period of consecutive years during which the precipitation is less than normal; in an analogous manner, the oppositely directed sections that pursue a course continually directed upward, show the occurrence of wet periods. Of these inclined sections, their length, distinguished by the number of yearly lines intercepted, represent the duration of these periods and their steepness shows the degree of their departure from normal.

Should it be that the magnitude of the precipitation was not proportional in these two regions which are here compared; that the sequence of values of seasonal precipitation in the one was not duplicated by a like sequence in the other; or that with the appearance of a group of wet years in one area, a group of equally wet years did not appear in the other; then these two lines, one representing a mountain region, the other a valley area, would have deviated from each other as they cross the chart, and as unlike rainfall continued to have occurred in the two regions during the same years, the lines would have departed wider and wider. Instead, the approximate coincidence of the two lines throughout their entire course across the diagram, shows that the slight numerical differences in values of sums, plotted for the two areas in the same seasons, are variables that are wholly circumstantial and are greater or less than zero without preference. The close proximity of these two diagrammatic lines as the precipitation occurrences over one area are duplicated over the other area several thousand feet lower on the valley floor and some fifty miles distant, shows how widespread are the rain-producing meteorological phenomena and how they cause proportionally like events to occur at widely separated places, diversely situated both topographically and geographically and one receiving almost twice the total precipitation of the other.

By constructing like diagrams to present the cumulative sums of the indices of seasonal wetness for every one of the 277 rainfall stations that the United States Weather Bureau has maintained in California for more than ten years, the sequence of magnitude of seasonal precipitation relative to its mean, has been compared over all the state. In so doing, it was found that, although the indices of wetness in all parts of the state tend toward like values, there were groups into which the stations naturally fell. By superimposing these lines in all the various possible combinations of station comparison, it was disclosed that the lines of certain groups were in approximate coincidence, while they diverged, often widely, from the lines of other stations outside the

group. Twenty-six natural groups were so distinguished, each with the diagrammatic lines in the group approaching coincidence with the mean line of the group, more closely than they approached, with similar coincidence, the diagrammatic lines of the stations in other groups. These twenty-six groups, segregated solely by the similarity in shape of the diagrammatic lines of adjoining rainfall stations, then, represent the aggregate precipitation records on twenty-six areas, each customarily swept by the same storms. The magnitude relative to the mean, of the rainfall in successive seasons over each of these areas, is alike. The average index for all the stations of a group also represents, with a close degree of approximation, the magnitude of the precipitation at all the stations within the group. This average magnitude relative to the mean, of the seasonal precipitation over the area represented by each of the twenty-six groups of rainfall stations, is set forth in Table 1, "Indices of Seasonal Wetness for Twenty-six Precipitation Divisions." These indices of seasonal wetness express this magnitude of seasonal precipitation in all parts of the state for each of the fifty years tabulated and for each area of the state customarily swept by the same storms.

Plates II to X, "Mass Diagrams of Indices of Wetness Showing Comparison of Station Precipitation to Mean Sequence of Division," present diagrammatic lines similar to those just described, for each of two hundred and sixty United States Weather Bureau Stations that have more than ten years of record. These diagrammatic lines are superimposed one on the other, for all the stations in a group. Twenty-six plats are so presented in these nine plates, one plat to a group or division of the state, and the mean diagrammatic line for each group is shown thereon as a heavy black line. Each group or division of the state has been named for its locality and labeled with a letter of the alphabet, while each rainfall station bears a reference number. The name of each division and its letter symbol are tabulated in Table 1.

Table 4, "Alphabetical List of Rainfall Stations and Summary of Precipitation Data," records every rainfall station used in these comparisons, together with its reference number, its precipitation division, elevation above sea-level, years of record, mean of the years of record, and the fifty year mean obtained by proportional comparison with the longer records at other stations in the same precipitation division.

This table also contains references to Tables 5 to 30, "Records of Precipitation and Table of Computed Indices of Seasonal Wetness for Precipitation Divisions." This series of twenty-six tables, one each to a precipitation division, lists the names of the rainfall stations falling in the group within the limits of each division. The measured seasonal precipitation is there tabulated and alongside is shown the index of seasonal wetness computed from the records of that station. The index is tabulated for each one of fifty years, including those in which no precipitation measurements were made. These indices were all obtained by dividing the seasonal precipitation, either measured, or computed when no measurements existed, by the mean seasonal rainfall for the fifty year period. The rainfall for the years of missing record at each station was computed through simple proportion, by comparing it to the rainfall of other stations in the same group that had

TABLE 1.

TABLE 1. INDICES OF SEASONAL WETNESS FOR 26 PRECIPITATION DIVISIONS.  
 (See Plate XII, Map showing boundaries of 26 Precipitation Divisions.)

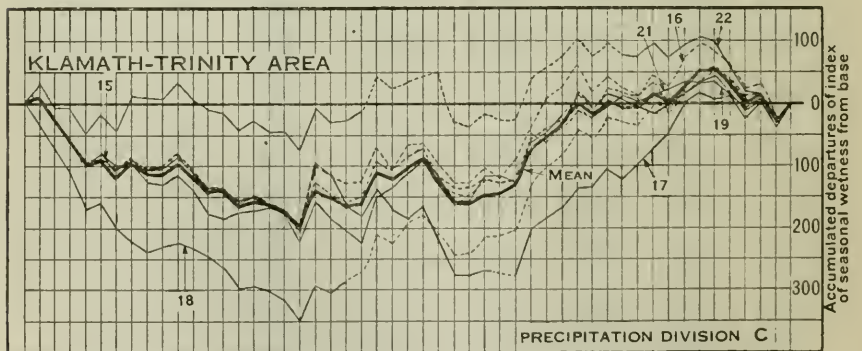
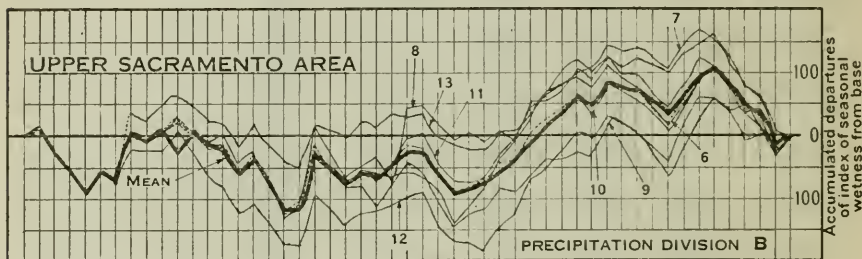
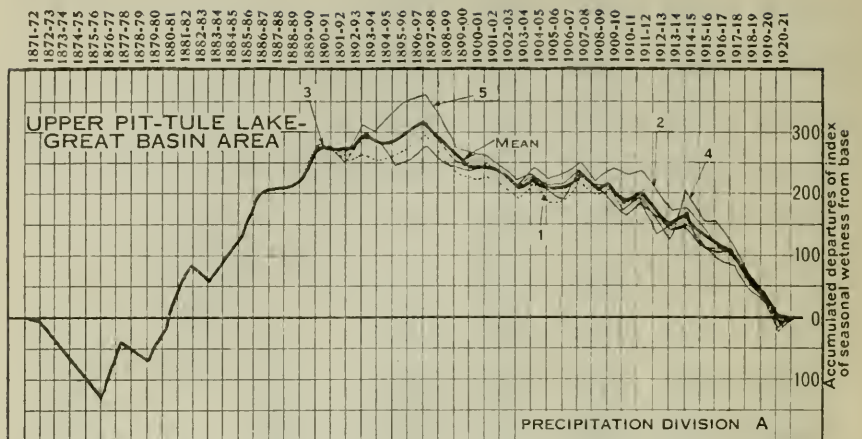
	Z	Y	X	W	V	U	T	S	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A
	Owens Valley Area . . . . .	San Diego Area . . . . .	Riverside-Santa Ana Area . . . . .	Los Angeles Area . . . . .	Tehachapi Area . . . . .	Santa Barbara-Santa Monica Coast Area . . . . .	Salinas-Santa Maria Area . . . . .	Southwestern San Joaquin Valley Area . . . . .	Kern River Area . . . . .	San Joaquin-Kings River Area . . . . .	Los Banos-Modesto Area . . . . .	Monterey Bay Area . . . . .	Santa Clara-Coast Area . . . . .	Marin-Napa-Woodland Area . . . . .	Mt. Diablo Area . . . . .	Mokelumne-Merced Area . . . . .	American River Area . . . . .	Tahoe-Carson Area . . . . .	Yuba-Bear River Area . . . . .	Feather River Area . . . . .	West Central Sacramento Area . . . . .	Upper Eel-Russian River Area . . . . .	North Pacific Coast Area . . . . .	Klamath-Trinity Area . . . . .	Upper Sacramento Area . . . . .	Upper Pit-Tule Lake-Great Basin Area . . . . .
1871-72	155	72	56	69	79	79	125	119	120	119	119	127	129	124	130	122	120	123	141	126	116	125	104	110	111	81
1872-73	46	65	94	72	56	56	59	74	75	74	91	69	76	79	79	86	65	65	74	63	79	62	62	54	53	75
1873-74	162	170	148	134	84	84	85	100	101	100	87	87	87	101	86	100	100	118	118	105	120	103	100	83	85	71
1874-75	90	58	81	79	96	96	79	64	64	64	83	73	52	72	69	61	64	74	72	66	82	66	69	51	51	62
1875-76	124	102	123	117	125	125	147	124	125	124	123	147	129	112	131	154	124	124	124	122	112	110	118	118	154	73
1876-77	43	46	59	44	98	27	35	43	53	60	30	32	32	52	43	34	62	53	63	61	60	59	92	73	69	197
1877-78	125	129	137	140	147	116	108	100	140	109	108	149	128	129	129	112	129	81	98	96	142	154	132	154	182	81
1878-79	38	56	52	75	56	63	51	36	41	25	59	41	100	100	79	78	104	85	104	105	116	116	105	116	92	81
1879-80	123	112	112	134	145	128	106	90	137	134	98	103	91	103	99	105	125	125	125	123	123	125	131	118	107	150
1880-81	73	81	73	86	66	73	97	118	97	122	94	103	82	111	107	87	108	80	112	110	83	104	113	110	127	181
1881-82	69	82	63	68	44	76	87	56	83	69	65	86	70	70	69	85	120	120	83	95	80	78	101	103	85	121
1882-83	62	82	63	68	44	69	87	52	85	89	65	86	83	83	87	88	82	80	79	95	70	80	78	90	75	75
1883-84	51	225	229	251	204	218	178	181	138	178	158	124	158	107	135	125	118	123	112	113	99	113	112	113	92	158
1884-85	33	68	78	61	65	65	61	66	71	78	71	66	72	62	66	67	67	68	92	77	51	77	92	66	55	51
1885-86	61	150	147	147	167	141	150	110	123	169	133	123	128	128	115	129	115	93	114	116	125	119	142	107	142	165
1886-87	72	70	74	92	120	83	72	72	86	88	50	60	77	71	70	68	70	96	72	63	64	63	64	63	64	80
1887-88	111	110	111	110	134	118	134	74	60	60	59	84	85	73	78	73	85	43	61	54	66	66	64	54	55	118
1888-89	97	128	129	128	146	118	146	89	78	92	74	81	96	92	98	74	98	46	76	73	97	100	73	46	76	81
1889-90	99	97	99	97	180	166	180	130	119	153	178	191	201	193	193	174	192	227	182	182	177	180	182	227	169	177
1890-91	150	130	117	130	91	89	89	83	87	79	80	81	95	85	86	86	77	101	77	93	93	66	81	82	66	81
1891-92	89	111	78	88	104	70	104	96	107	102	93	87	87	90	91	90	90	97	83	103	95	92	103	81	95	89
1892-93	137	98	117	137	107	139	107	95	128	139	130	129	146	117	139	132	132	162	121	138	138	129	138	129	138	128
1893-94	57	58	58	58	54	41	52	58	45	41	81	87	81	96	84	87	81	115	95	89	89	80	89	95	110	110
1894-95	93	130	138	130	126	110	139	122	110	139	137	138	138	147	148	147	138	123	136	123	148	149	123	138	148	149
1895-96	53	58	58	53	70	65	90	81	91	82	100	93	97	115	106	104	114	120	125	131	117	117	99	111	117	116

TABLE 1.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1896-97	113	97	112	101	105	110	106	111	109	110	124	112	110	105	102	111	107	125	114	99	107	96	102	116	117	117
1897-98	67	60	60	72	67	54	66	60	69	59	62	57	62	50	49	48	56	54	62	34	38	33	49	56	64	64
1898-99	71	68	68	75	87	80	74	84	108	86	89	81	82	89	86	86	82	83	81	71	51	39	40	47	54	59
1899-00	93	112	99	118	100	110	117	109	106	111	103	104	94	86	106	106	102	82	101	73	58	64	58	58	72	77
1900-01	102	102	121	97	100	108	114	106	111	112	129	121	105	117	109	134	137	119	127	142	86	103	111	102	96	135
1901-02	85	131	95	120	122	129	107	95	83	100	97	91	113	96	93	86	75	97	96	89	83	87	63	69	79	87
1902-03	77	108	105	114	101	95	95	94	86	99	108	99	95	94	91	100	81	97	78	78	114	84	110	116	110	46
1903-04	118	144	173	147	151	126	140	139	106	137	108	105	128	98	89	73	81	71	78	73	61	63	56	61	51	65
1904-05	80	121	115	92	116	141	109	103	79	100	108	124	122	115	126	135	132	118	147	130	148	140	123	140	143	148
1905-06	99	117	118	91	119	132	130	133	121	138	139	120	122	121	125	144	148	169	189	113	124	154	125	135	147	122
1906-07	131	123	135	110	126	119	153	138	171	150	148	144	131	137	164	160	131	123	131	147	160	140	139	138	115	122
1907-08	73	85	82	79	78	75	73	71	66	71	64	72	73	73	82	74	81	90	109	93	97	81	78	88	84	131
1908-09	102	147	123	117	145	126	136	130	113	124	119	124	135	133	145	114	113	165	142	144	158	117	128	117	111	145
1909-10	77	82	83	94	88	83	87	99	106	95	98	93	85	84	103	99	95	102	104	101	102	63	87	97	98	123
1910-11	113	100	97	79	88	110	126	127	150	129	133	121	110	133	122	125	132	103	117	152	154	119	113	105	98	144
1911-12	65	76	118	89	72	61	59	60	57	60	62	64	59	64	76	65	73	76	85	77	79	101	75	81	92	87
1912-13	80	81	90	84	87	79	77	72	71	67	58	52	68	45	49	48	66	67	79	46	78	85	74	61	66	103
1913-14	123	140	135	109	141	156	130	120	135	120	117	128	152	125	142	152	123	135	131	140	163	96	156	141	103	257
1914-15	62	130	115	122	132	143	99	101	104	111	114	126	128	128	141	145	124	111	174	147	128	128	110	136	148	117
1915-16	80	106	102	103	102	105	99	104	121	104	94	120	109	165	122	136	123	153	121	118	136	135	129	146	151	209
1916-17	88	76	80	75	78	81	83	87	84	89	82	78	75	82	82	83	88	98	107	108	111	111	94	91	97	131
1917-18	58	66	65	68	59	66	58	61	67	67	77	53	54	51	54	94	91	62	80	84	117	117	83	86	86	92
1918-19	69	86	116	109	109	80	80	85	92	91	89	105	90	111	114	100	81	88	109	82	75	75	61	73	77	91
1919-20	60	48	56	55	51	57	54	64	64	70	76	66	53	65	76	82	91	99	106	71	80	80	99	111	105	89
1920-21	108	119	133	129	128	133	105	112	111	110	110	98	107	104	104	120	95	92	119	85	89	89	101	93	69	60

Note.—The index of seasonal wetness for a division is the mean of the indices of the individual rainfall stations included within the division. See Tables 5 to 30, inclusive, for detail data on precipitation and index of seasonal wetness for the individual stations within the division boundaries.

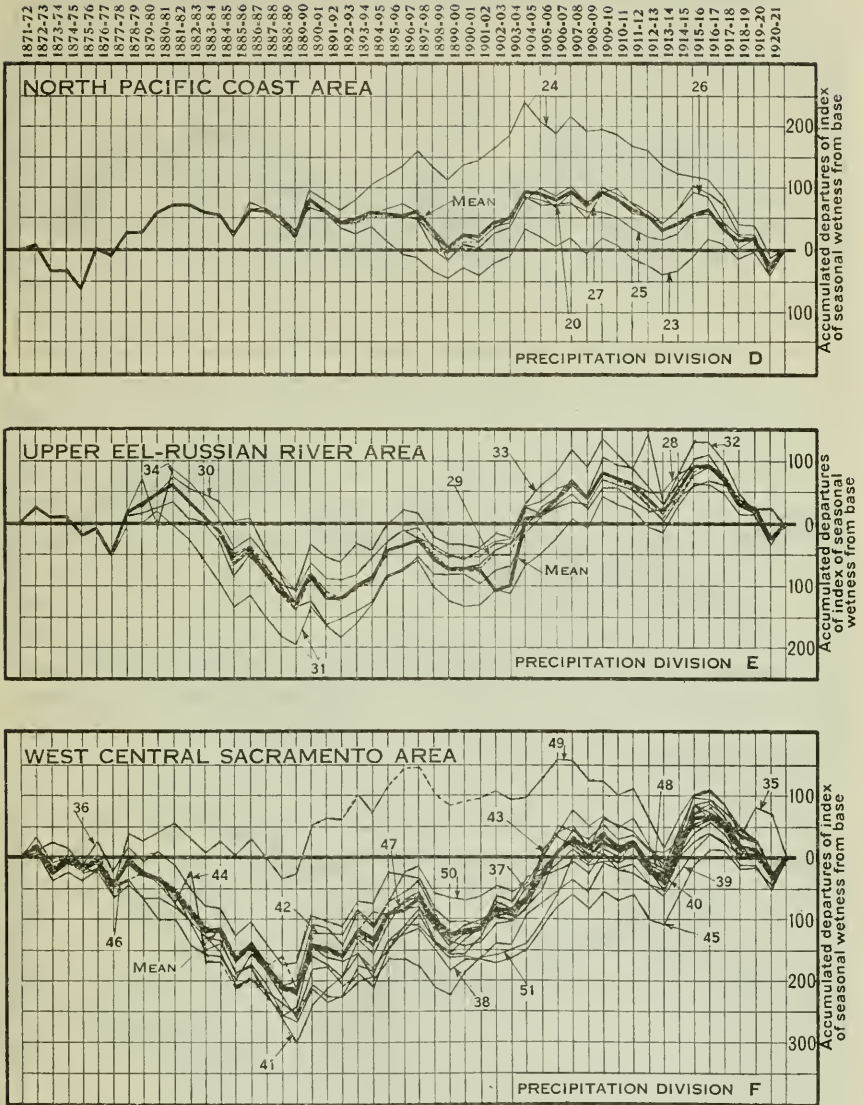
PLATE II.



MASS DIAGRAMS OF INDICES OF WETNESS  
SHOWING COMPARISON OF SEQUENCE OF STATION PRECIPITATION  
TO MEAN SEQUENCE OF DIVISION

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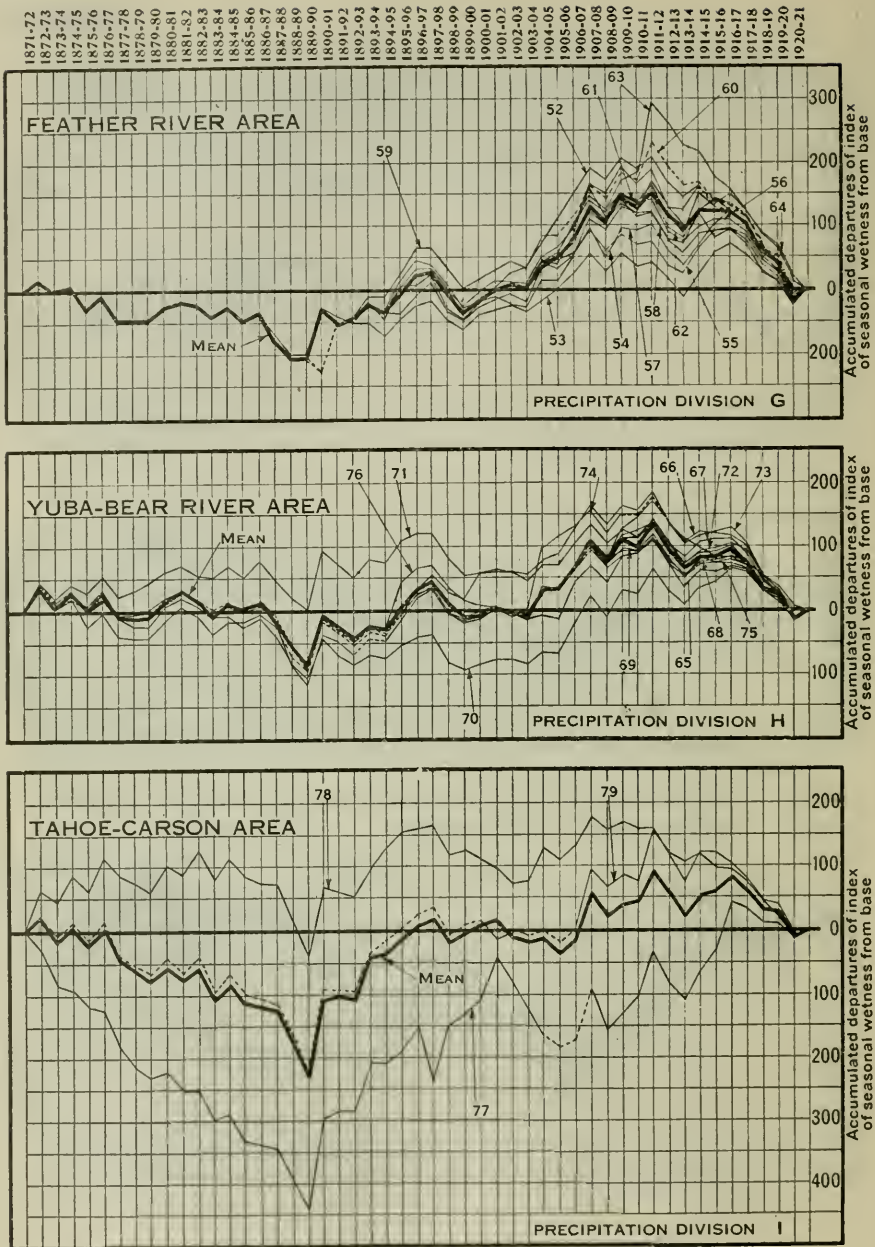




MASS DIAGRAMS OF INDICES OF WETNESS  
 SHOWING COMPARISON OF SEQUENCE OF STATION PRECIPITATION  
 TO MEAN SEQUENCE OF DIVISION

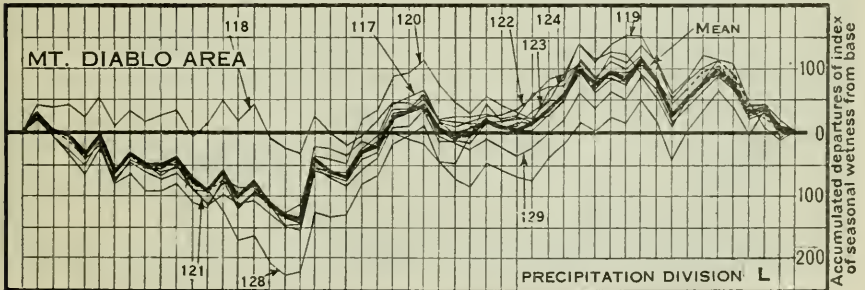
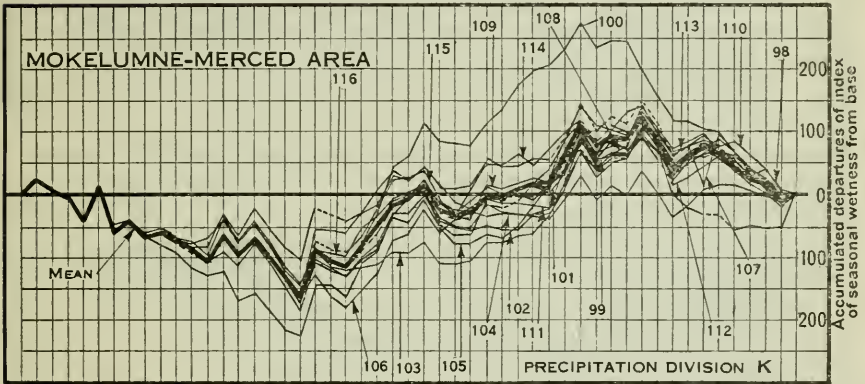
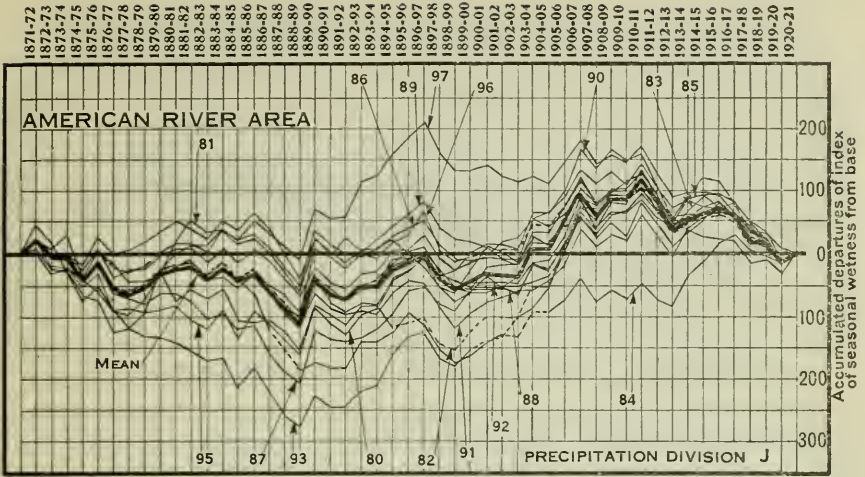
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PLATE IV.



MASS DIAGRAMS OF INDICES OF WETNESS  
 SHOWING COMPARISON OF SEQUENCE OF STATION PRECIPITATION  
 TO MEAN SEQUENCE OF DIVISION

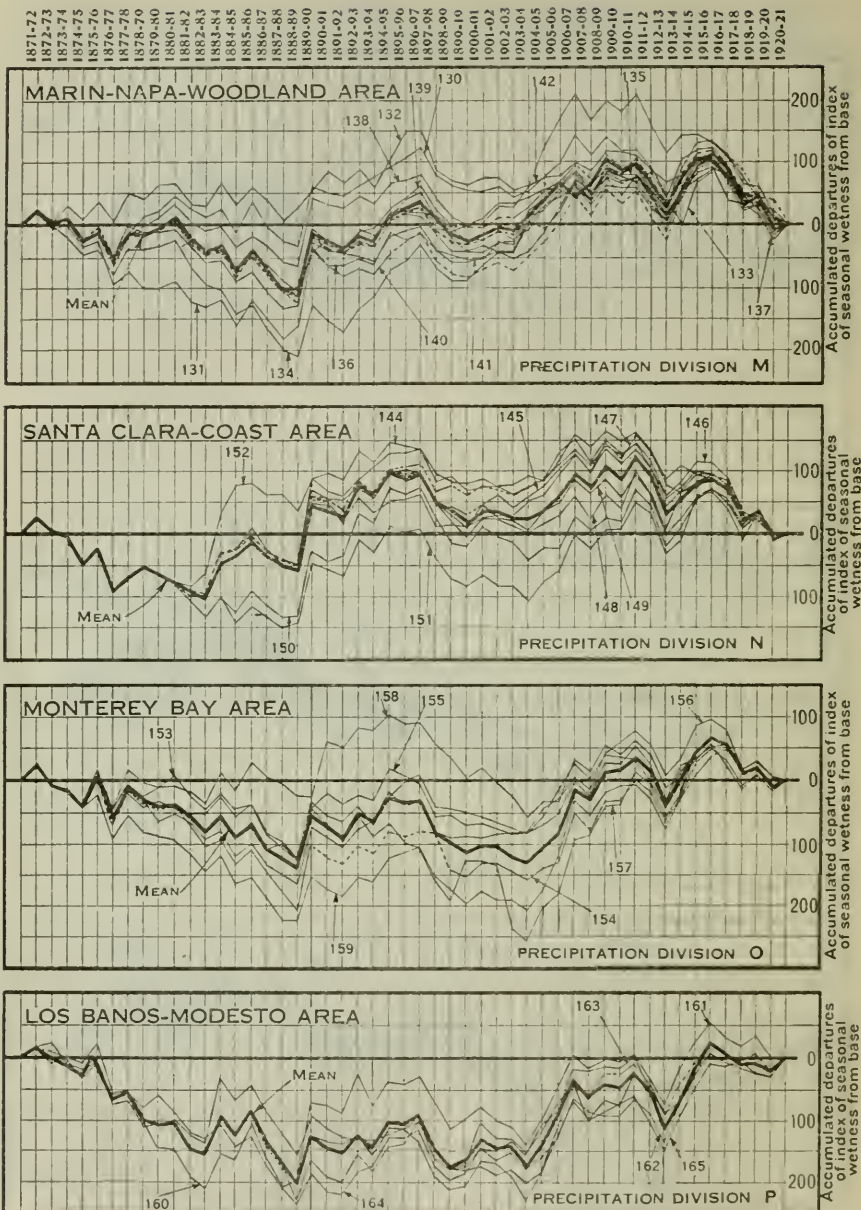
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MASS DIAGRAMS OF INDICES OF WETNESS  
SHOWING COMPARISON OF SEQUENCE OF STATION PRECIPITATION  
TO MEAN SEQUENCE OF DIVISION

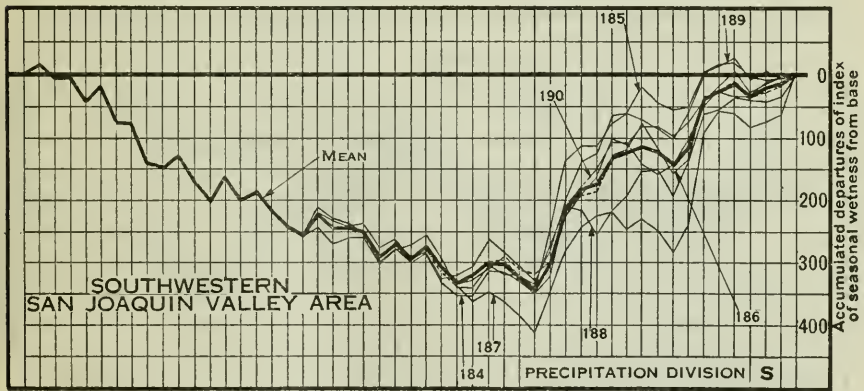
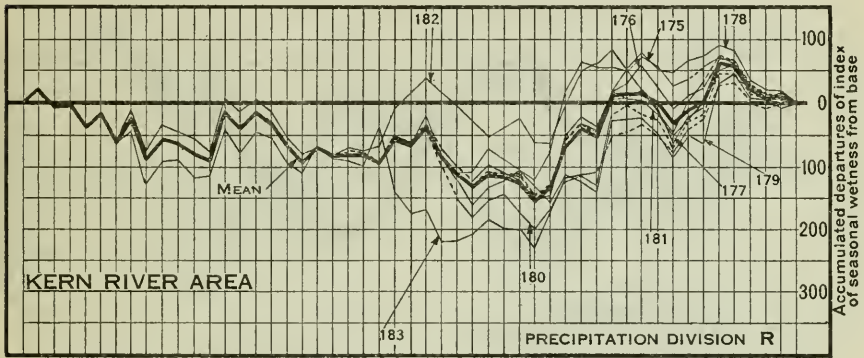
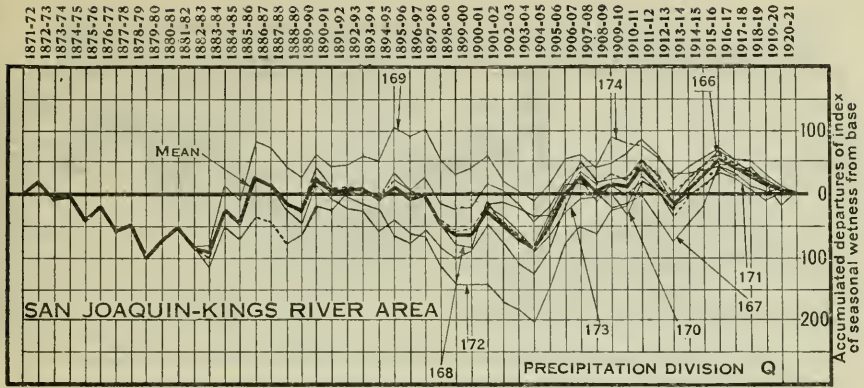
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DIVISION OF ENGINEERING AND IRRIGATION  
CALIFORNIA WATER RESOURCES INVESTIGATION  
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PLATE VI.



MASS DIAGRAMS OF INDICES OF WETNESS  
SHOWING COMPARISON OF SEQUENCE OF STATION PRECIPITATION  
TO MEAN SEQUENCE OF DIVISION

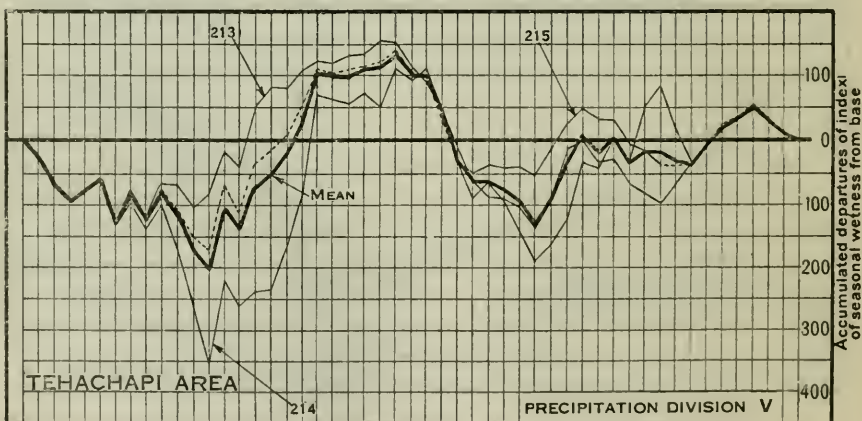
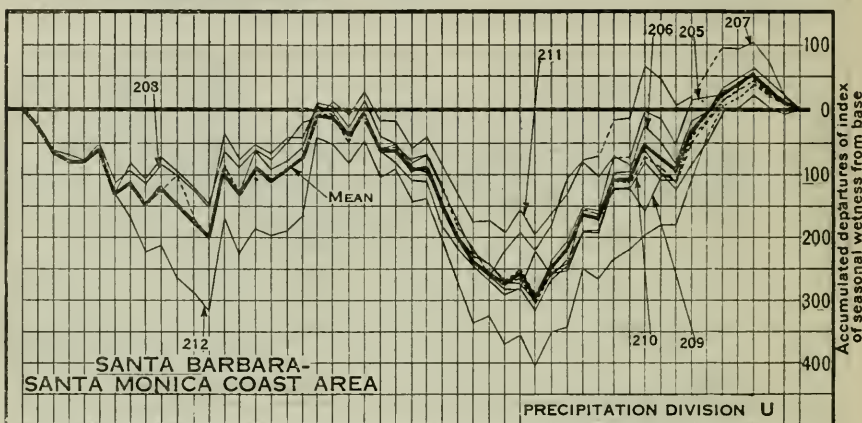
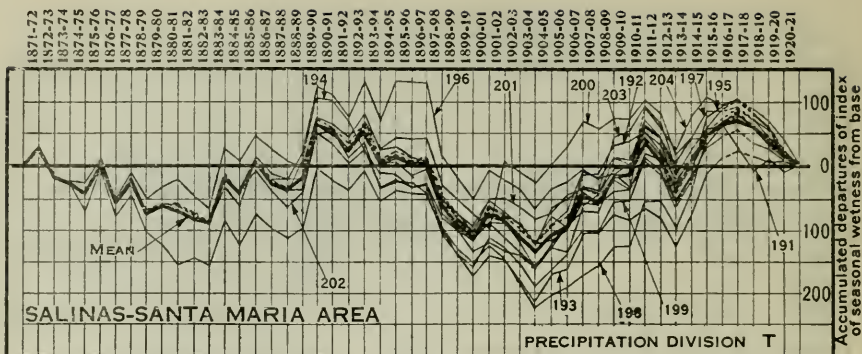
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MASS DIAGRAMS OF INDICES OF WETNESS  
SHOWING COMPARISON OF SEQUENCE OF STATION PRECIPITATION  
TO MEAN SEQUENCE OF DIVISION

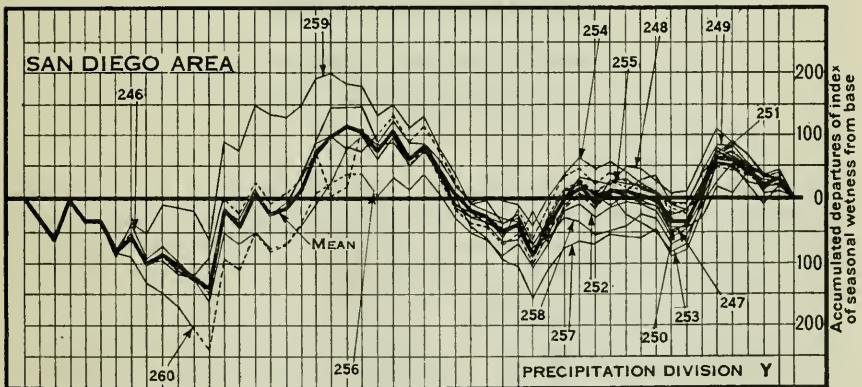
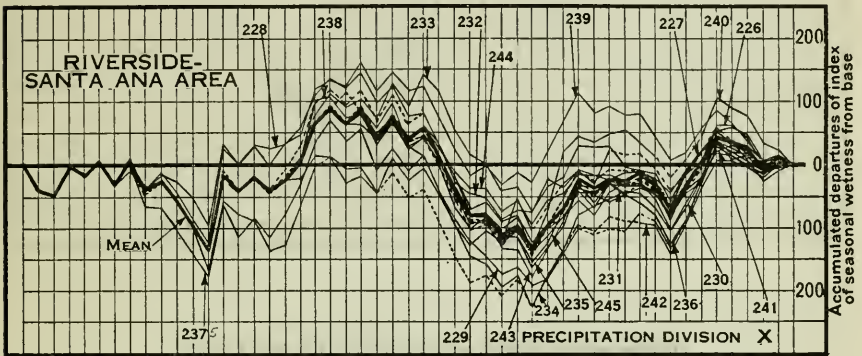
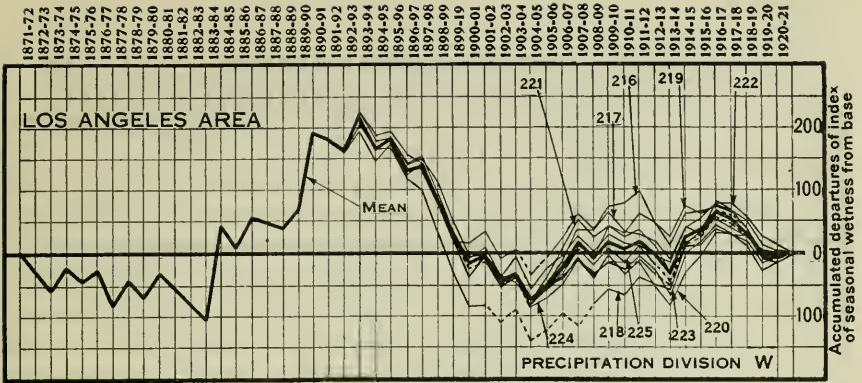
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CALIFORNIA WATER RESOURCES INVESTIGATION  
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PLATE VIII.



MASS DIAGRAMS OF INDICES OF WETNESS  
SHOWING COMPARISON OF SEQUENCE OF STATION PRECIPITATION  
TO MEAN SEQUENCE OF DIVISION

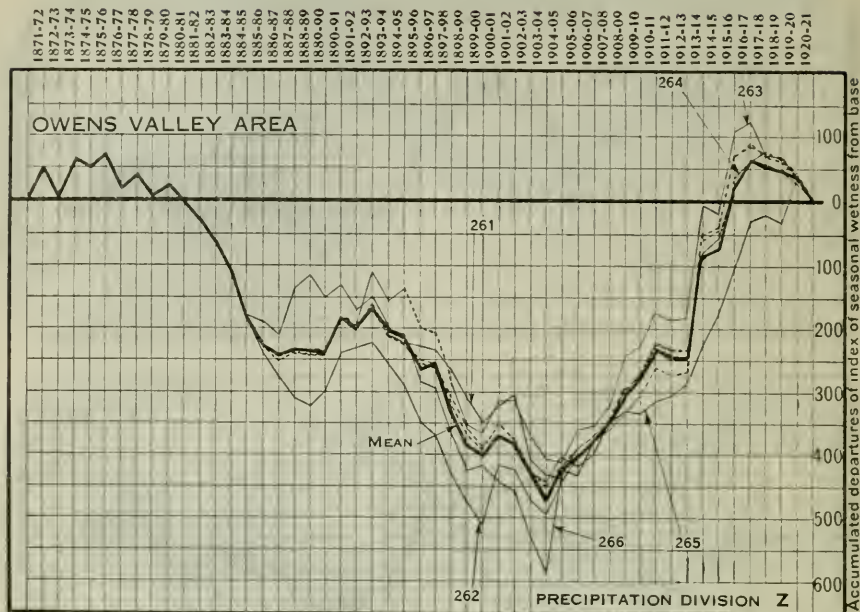
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DIVISION OF ENGINEERING AND IRRIGATION  
CALIFORNIA WATER RESOURCES INVESTIGATION  
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MASS DIAGRAMS OF INDICES OF WETNESS  
 SHOWING COMPARISON OF SEQUENCE OF STATION PRECIPITATION  
 TO MEAN SEQUENCE OF DIVISION

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 DIVISION OF ENGINEERING AND IRRIGATION  
 CALIFORNIA WATER RESOURCES INVESTIGATION  
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## PLATE X.



MASS DIAGRAMS OF INDICES OF WETNESS  
SHOWING COMPARISON OF SEQUENCE OF STATION PRECIPITATION  
TO MEAN SEQUENCE OF DIVISION

STATE DEPARTMENT OF PUBLIC WORKS  
DIVISION OF ENGINEERING AND IRRIGATION  
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a greater number of years of record. The precipitation for the season of missing record in each case was taken to bear the same ratio to the precipitation for the same season at the stations of longer record, that the average precipitation for the years of record at the short time station bore to the average precipitation for the same period of years, at all the stations of longer record. The fifty year mean seasonal precipitation here used is the average of the fifty seasonal quantities so obtained. It includes all the measured values as well as those computed for the years that lacked a record. The extreme right hand column of each of these twenty-six tables lists the average value for each season, of the indices of wetness of all the rainfall stations in the group. This average value is the index of seasonal wetness for the precipitation division tabulated in Table 1, "Index of Seasonal Wetness for Twenty-six Precipitation Divisions," and used in constructing the diagrammatic lines showing the sequence of precipitation in the division on Plates II to X.

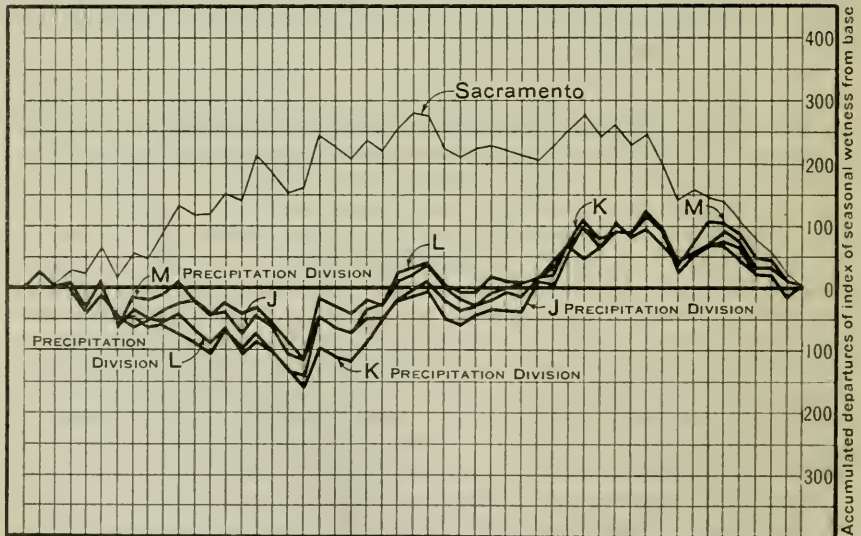
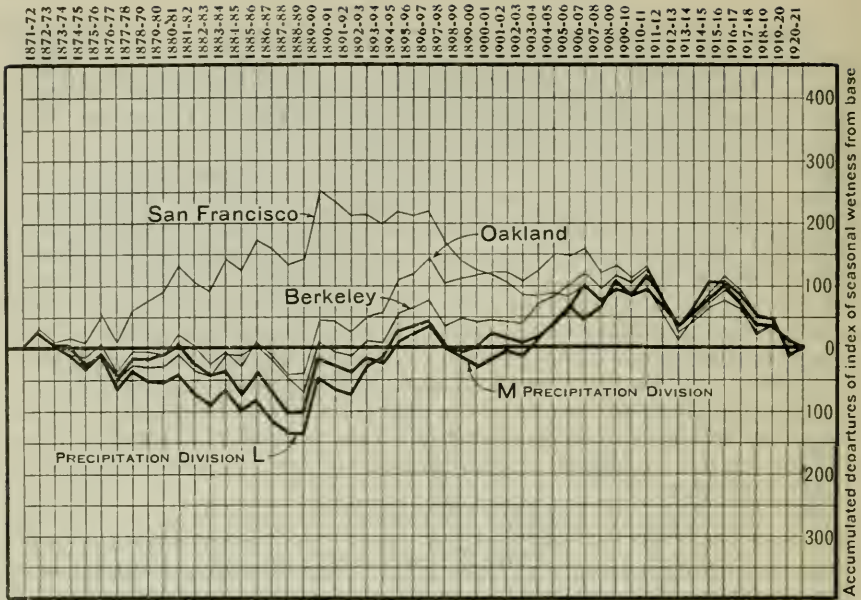


Table 31, "Miscellaneous Precipitation Records, U. S. Weather Bureau," tabulates the precipitation for all stations of the United States Weather Bureau with more than ten years of record, not used in the compilation of indices of seasonal wetness. Excepting those located in the desert region in the southeastern corner of the state, for which no study was made, Tehama, Sacramento, San Francisco, Oakland, Berkeley, and Point Reyes are the only ones omitted. Plate XI, "Comparison of Sequences of Precipitation at San Francisco, Oakland, Berkeley and Sacramento with Mean Sequence of Adjacent Precipitation Divisions," shows why these stations were not included in the study. Although having long years of record, these stations are not like adjoining ones. The decided difference in shape of their diagrammatic lines from those of adjacent stations, of which there are many, and the divergence of these lines from the average lines of adjoining stations as they cross the plat from left to right, show that the sequence of measured precipitation from season to season at these stations is out of harmony with that at the large number of adjacent rainfall stations.

The twenty-six precipitation divisions of the state, developed through the analysis of all the precipitation data of the United States Weather Bureau, are delineated on Plate XII, "Map Showing Boundaries of Precipitation Divisions." The location of all the rainfall stations is shown on this map by red dots and the number close to the dot is the station reference number. On the map, and at the top, the names of all these stations are listed opposite the station reference numbers, which are arranged in numerical order.

This map sets forth the boundaries of these areas of the state, twenty-six in number, which are swept by the same storms. Dissimilar in topography but alike in being customarily traversed by the same moisture laden winds, the land in each area enjoys wet seasons or suffers droughts, in unison. With startling differences in the magnitude of precipitation at the several stations within each area, still their relative magnitude in succeeding years is so much alike that it can be expressed quite accurately by one index number for all the stations within the area. These indices, named "indices of seasonal wetness" show the relation of the seasonal precipitation to the long time mean for every part of the division and for each year of the past, and are a measure of the degree of conformity of each season to the mean. Seasons having indices greater than 100 are wet years, and are wetter the higher the value of the index. Occasionally, years of extremely heavy precipitation have values as high as 200. The dry years have indices falling below 100, and extreme droughts have values of 50 to 60.

Here then, encompassed within the small limits of Table 1, "Indices of Seasonal Wetness for Twenty-six Precipitation Divisions," and Plate XII, "Map Showing Boundaries of Precipitation Divisions," is recorded the history of the variation of seasonal rainfall during the past half century and in every part of the state.



MASS DIAGRAMS OF INDICES OF WETNESS  
SHOWING  
COMPARISON OF SEQUENCE OF PRECIPITATION  
AT SAN FRANCISCO, OAKLAND, BERKELEY AND SACRAMENTO  
WITH MEAN SEQUENCE OF ADJACENT PRECIPITATION DIVISIONS

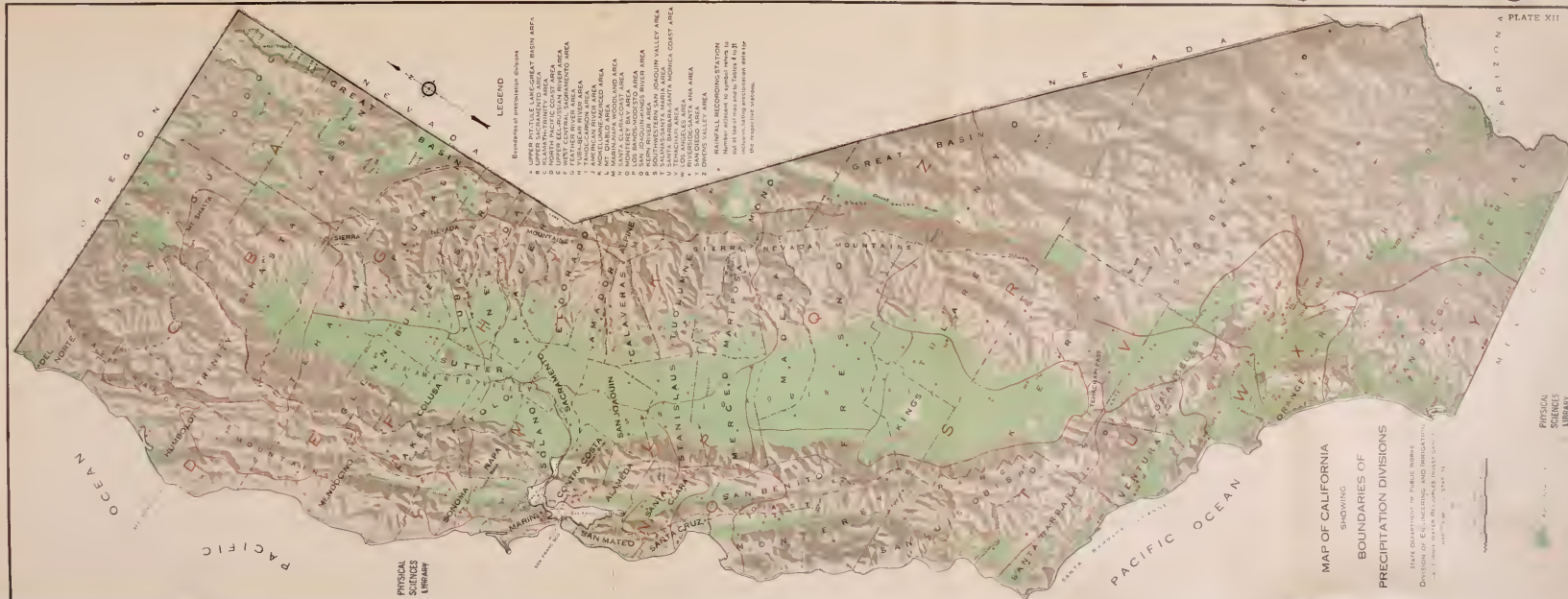
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CALIFORNIA WATER RESOURCES INVESTIGATION  
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- 1 Fort Bidwell
- 2 Marysville
- 3 Astoria
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- LEGEND**
- Boundaries of precipitation divisions
- A UPPER PIT-TULE LAKE-GREAT BISHOP AREA
  - B UPPER SACRAMENTO AREA
  - C Klamath-Trinity Area
  - D UPPER Klamath-Trinity River Area
  - E WEST CENTRAL SACRAMENTO AREA
  - F YUBA-RIVER AREA
  - G TAOLO-CARSON AREA
  - H AMERICAN RIVER AREA
  - I MT. DIABLO AREA
  - J MARIN-ANAPA WOODLAND AREA
  - K MONTEREY BAY AREA
  - L LOS BANOS-MOJESTO AREA
  - M KEEN-INDIENAS RIVER AREA
  - N SOUTHWESTERN SAN JOAQUIN VALLEY AREA
  - O SALINAS-SANTA MARIA AREA
  - P TACHAHAPI AREA
  - Q LOS ANGELES AREA
  - R SAN DIEGO AREA
  - S DOWNS VALLEY AREA
- Number adjacent to symbol refers to map at top of map and to Tables 4 to 21 inclusive, having precipitation data for the respective station.

**MAP OF CALIFORNIA**  
SHOWING  
**BOUNDARIES OF**  
**PRECIPITATION DIVISIONS**

STATE DEPARTMENT OF PUBLIC WORKS  
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CALIFORNIA WATER RESOURCES INVESTIGATION  
REPORT NO. 11  
MAY 1931

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## CHAPTER III.

**RUN-OFF FROM THE MOUNTAIN AREA.**

The water-bearing winds that traverse California during the rainy winter season precipitate three hundred billion tons of water annually upon the surface of the State. Most of this falls as rain or snow upon the mountain area. Higher in elevation and cooler in temperature, the mountains are more effective in reducing the moisture holding-capacity of the vapor-laden winds than are the flat lands, so that these winds in rushing toward the low pressure areas, give up much more water to the mountains than to the lower regions. This precipitation, as rain, strikes the surface of their slopes to flow toward lower elevations; as snow, it mantles the earth's surface or collects in wind-blown drifts to await warmer temperatures for conversion to mobile, liquid water that may pursue a like downhill course toward the ocean.

The moving waters, ever journeying to lower elevations, concentrate in the ravines and gullies toward which the surfaces slope. Continually enhanced in volume by confluence with the like accumulations in intercepted channels, they restlessly pursue their downward course, following the most deeply cut depressions or the steepest gradients, until they finally become engulfed in the earth's vast reservoir of waters, the ocean. These ever-journeying waters, falling on the drainage area as precipitation, concentrated on the land surface as run-off, and coursing down the water-channels as stream-flow, reach the ocean as drainage; and so by returning to the storehouse of waters from which they were first vaporized and carried to the mountainous area by the moisture laden winds, they have completed their circuit of travel.

California's water producing area, the mountains, although nearly state-wide, is not uniform in water yield. Influenced by the topography, the elevation, and the exposure of the divers localities, varying amounts of precipitation fall on the collecting areas, and the run-off derived from it also varies in a similar manner. Generally, the run-off is least from the regions near the Mexican border, and greatest in those northward areas of the Coast Range Mountains that are contiguous to the Oregon line. It ranges from less than an inch in depth over the land annually from the least productive regions of the south, to over a hundred inches in depth from the greatest water-producing areas of the north. Between these two extreme regions separated by the length of the state, is the water-producing mountain area, three-fifths the surface of the state.

The variation of run-off in the geographical divisions of this water-producing area, however, is quite similar to the variation in elevation above sea-level, for the higher altitudes, in being most effective in intercepting and cooling the moisture laden winds, are recipient of the largest amounts of precipitation. The cold of their great heights precipitates excess atmospheric water-vapors as snow, solid crystalline water; while the lower regions, warmer in temperature, are recipient of liquid water only, as rain. Distinguishable by the form in which the



## CHAPTER III.

**RUN-OFF FROM THE MOUNTAIN AREA.**

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waters are precipitated upon them, the surface of the State may be divided into three regions. These regions differ in their altitude above sea-level. The lowest of these receives its precipitation entirely as rain, and the highest as snow. Intermediate between the two, precipitation occurs as snow or at other times as rain. Water production in large volumes is confined to the two higher regions which occupy two-fifths of the total area of the state.

The most elevated of the two great water-producing regions lies above altitudes of 5000 feet, and comprises the peaks and slopes of the highest mountains and the highland flats and meadows. Through receiving a greater precipitation and almost wholly in the form of snow, this region yields the largest volumes of water and sustains the flow in the streams for a more protracted period of time than do the other portions of the State. This water-producing expanse of high mountains, 22,400,000 acres in extent, lies between the 5000 foot contour and its highest elevation, the tip of Mount Whitney, United States' culminating peak, 14,500 feet above the sea. Most of this elevated region lies in the Sierra Nevada Mountains, between Tehachapi Pass and Mount Shasta. Other portions, far less extensive, lie in the Coast Mountains between Clear Lake and the Oregon boundary, and small areas lie in the mountains south of the Tehachapi Pass.

The precipitation on these areas is almost entirely snow, and this, beginning earlier, extends throughout the winter and continues later into the spring months than it does in other regions. Through the dead of winter the entire surface is clothed in a mantle of snow, and huge drifts collect in the more sheltered recesses of the mountain flanks to smooth their outlines and throw the protruding rocks into high relief. Nestling among the crags and crests and filling pockets eroded in their sides, are sixty-five glaciers. These bodies of perennial ice grow in size during the winter months, through the consolidation of the snow falling and drifting on them, but shrink during the summer and deplete their mass, yielding the melted ice and snow waters that give source to the streams which issue from them. The waters of this region remain congealed until the summer warmth melts them, and so, retarded in their run-off, they do not reach the stream channels until May, June and July. Since large amounts of heat are required to release these waters from their chill bondage, the run-off from these areas does not contribute to large floods, but rather enhances the stream flow with fair uniformity during the melting period, fluctuating with the alterations of warm and cool weather.

Below these highland regions, but more than 2500 feet above the sea, is an area 23,700,000 acres in extent, mountainous and rugged of structure, and comprising about one-half the upland area of the state. This expanse includes the eminences of foothills, the secondary ridges, the sloping sides of major mountain chains, the smaller ranges in their entirety, and most of the plateaus and mountain valleys of California. The precipitation over these lands occurs both as snow and rain, though the mantle of snow is of but short duration. Elevated and generally receiving a large precipitation, the wide expanses of this region yield large volumes of run-off. Sometimes melting with subsequent warm rains, the snows of this region join with the run-off of heavy rain-storms and swell the streams to extreme flood height. But since most of the precipitation falls as rain, run-off usually follows quickly after



the storms. Streams attain their flood stage during or shortly after the heavier downpours. Most of the run-off occurs during the months of heavy rain, December, January, February and March, but the flow is usually well sustained, nevertheless, from lesser showers and drainage from water-soaked portions of the region, during April and May.

The third region, entirely below elevation 2500, includes the low-lying flat lands of the State, the foothills and rolling slopes of the marginal lands, and the lower mountains. Much of this area is agricultural. Except for occasional light snow storms, the precipitation falling here is entirely rain. Receiving a lighter precipitation and being soil covered and less steep of slope, this region contributes the least to the State's run-off. Its flat lands, lacking the surface inclination to put the water in motion, largely absorb the rains falling upon them, or detain them in pools and puddles or in the saturated top-soil, to be evaporated back into the atmosphere. Only during extremely heavy downpours of infrequent occurrence, do the flat lands contribute run-off to the stream channels. The rains falling on the foothill and mountainous areas of this region, however, usually find their way quickly into the stream channels after the ground surface has become wet. But with a third of the seasonal rainfall often required to soak the surface soil before appreciable run-off may occur, the contribution to stream flow from this area is much less than from the higher regions, it does not begin until mid-winter, and is confined principally to the months of January, February and March. Most of the run-off from this lower region takes place on lands too low in elevation for the shed waters to be caught in mountain reservoirs and, being of short duration and coming at times when all the agricultural lands are soaked with water, is of little value, but rather it is an inconvenience, especially on the flats, where often the construction of flood control or drainage works is required to relieve farming lands of a surfeit of water.

The storms traversing California precipitate varying quantities of water upon all of these regions, but in each area a portion only of the falling waters reach the stream channels; the rest is dissipated through evaporation to the atmosphere. This division of waters takes place as soon as precipitation starts and continues throughout the entire course of the water movement. Moisture is evaporated from the falling particles of rain or snow, from the surface of pools or puddles, or snow fields, and from wetted soil areas. Water is also vaporized from the vegetation that grows on the watershed slopes. Much of the water that wets the surface soils is absorbed by the root systems of vegetation so that where trees, bushes and undergrowth are dense, large volumes of water are vaporized into the atmosphere through transpiration from the plant-surfaces. Evaporation from fallen snow may also be large, as it often lies upon the ground for months, exposing vast surfaces from which vapor may enter the atmosphere. Even while the run-off is collecting in the stream channels, and continuing throughout the river's course, additional fractions of these waters are dissipated through evaporation. The aggregate precipitation which may be returned to the atmosphere without becoming stream flow in the lower reaches of the channels, may therefore be as small as one-fourth or as large as three-fourths of the total, according to the contingencies of the season's

weather and the circumstances of topography and geology of the area upon which it falls.

Except as it falls on frozen or non-absorbent surfaces, precipitation upon striking the earth must first moisten its top-covering, and it is only after this has become saturated that water gathers on the surface to journey down the slopes of the catchment area. The first rains of the season, less continuous and less intense, are usually taken up in wetting the surface upon which they fall, and run-off occurs only after several inches of moisture have been precipitated. Collecting in puddles and pools or moving down the slopes in streamlets, some of the run-off trickles into seams and cracks of the mountains' rocky structure while other quantities are absorbed by pervious soil coverings. Advancing by the attractions of gravity and capillarity and filling the pores and interstices of the earth's crust, this percolating moisture penetrates to great depths. It finds its way into the rocks, working slowly through the seams and along the faults, sometimes penetrating to the heart of the mountainous structure. Although usually a small portion of the total, these percolating waters are especially valuable to man in their reappearance at lower elevations as perennial springs to moisten meadow lands or to increase the waning summer flow of brooks and streams. For these tardy waters, in penetrating the subsurface regions and pursuing a more dilatory underground course, wet the beds of the stream channels the year round and furnish all or a large part of the dry season flow: they fill the subterranean gravels and reservoirs, and are the principal waters available, excepting in lakes and reservoirs, when the great volumes of run-off that pass in flood flows have subsided. They thus carry over volumes of water, for deferred use during the hot, dry summers, that would otherwise pass down the water channels at a time when not needed. The aggregate run-off from all these regions, however, appears in the stream channels in fluctuating flows having a striking similarity to the periodic occurrence of seasonal precipitation in California. Plate XIII, "Characteristics of Run-off from California Mountains," presents the hydrographs of five streams, each typical of a separate section of the State. These hydrographs show the run-off in each of the five streams, month by month, for a year of maximum flow and for one of minimum flow, as well as the hydrograph of the mean monthly flow of all the years of record. For convenience of comparison, these hydrographs are plotted to show the monthly run-off in per cent of the annual mean. The hydrographs show that in all streams of the State, the bulk of the run-off occurs during the winter months, with meagre quantities flowing in the middle and late summer. The extreme variation between the run-off of the maximum and minimum years, shows the wide limits between which the seasonal run-off occurs in successive seasons, and how, in the minimum year, the usual scanty summer flow is much reduced, and that this takes place much earlier in the season. In general, the water-production of very wet seasons may be as great as four times that of the years of drouth; the average season producing about one-half the run-off of maximum years; and of all the water which wets the stream channels of the State, only one-sixth flows during the five months of August to December, and but one-third during May, June and July, while one-half of all the waters

course down the stream channels to empty into the ocean during the four months of January, February, March and April.

This run-off, in draining from the mountains, concentrates at the lowest parts of the many topographic basins comprising their vast expanse. For convenience of study, the smallest of these have been united in groups, and Plate XV, "Map Showing Boundaries of Drainage Basins," delineates the boundaries of these drainage basins or groups of minor basins. Each basin bears a number on this map referring to a table at the side, which gives the name of the stream draining it, or the group of small basins.

Table 32, "Drainage Areas of California," presents a detailed enumeration of the areas in all these drainage basins. These are arranged in the table in the order of their geographic location, grouped in six large topographic divisions of the State. In addition to the total area in each basin, the area draining into each tributary stream is also given, as well as the total area draining to the point of confluence of each tributary with the main stream.

The water production of all these areas has been determined and, of the total run-off from this 52,000,000 acres, two-thirds passes down the channels of the three largest rivers of the State, the Sacramento, the Klamath and the San Joaquin. One half of the remaining waters flow in the six next largest streams.

The State's total water production sufficient in volume to cover 73,000,000 acres one foot in depth, is nearly one-half (forty-eight per cent) derived from the western slope of the Sierra Nevada Mountains. This runs off to join the two large rivers of the State, the Sacramento and San Joaquin. The eastern slope of the Sierras produces only one-tenth as much as the western, or five per cent of the total waters of the State. Similarly, the Coast Range Mountains shed nine-tenths of their run-off on the western side, but their total production is slightly less than that of the Sierras, being forty-five per cent of that for the whole State. The remaining two per cent of the total waters of the State runs off the mountains south of the Tehachapi Pass and this is likewise apportioned, nine-tenths to the western slope and one-tenth to the eastern.

These waters, copious enough to submerge California's agricultural lands to a depth of three and one-quarter feet each year, are shed from mountain slopes replete with moisture, to rush through canyons and to course by agricultural lands of the valleys where they would be invaluable for irrigation if the flow occurred during the dry season. But derived from precipitation, the run-off closely follows the storms and culminates during the rainy season or shortly thereafter, and these waters largely flow past the farming lands while they are surfeited with moisture from the winter rains, to pass into the ocean unused.

## CHAPTER IV.

**MEAN SEASONAL RUN-OFF FROM THE MOUNTAINS.**

Varying from the rush of winter's inundating floods to the meagre flow of summer waters that exude from the pores, seams and crevices, or shallow earth or gravel covering of the mountain structures, the run-off from the mountainous areas of the State concentrates in stream channels, usually in a continuous flow but capriciously periodic in volume. In fluctuating annually with California's wet and dry seasons, the precipitation of meteoric waters to the earth not only furnishes volumes of water to the streams at yearly intervals, but, wave-like, the run-off during each season journeys to regions of lower altitude, swelling the stream channels subsequent to each culmination in intensity and dwindling with each cessation of rainfall. These surface waters moving down the stream channels, are a concentration of precipitation that has fallen on drainage basins many times the areas of the stream beds, so that their gathering in the constricted channels accentuates the varying intensities of precipitation with wave-like swells in the flowing streams.

These waves move down the stream channels as long, slim wedges of water each sliding on a base of length, many times its height. The downstream toes of these wedges are the first storm-waters which find their way into the channels, and the climax in intensity of run-off forms their apex-height, while their upstream edges are the last of the storm's waters draining off the collecting areas. The inclination of their advancing fronts increases with the rapidity of arrival of the culminating intensity of precipitation, and the apex-height of a wedge is proportional to this culminating intensity and the base-length is proportional to the duration of precipitation. In passing down the water channels, these wedges have their speed of movement retarded by the friction of sliding on the bottom and sides of the water courses. With increasing roughness, the advancing front of the wedge becomes steeper and steeper as it progresses downstream and the faster moving waters of the apex-height rush and tumble onward to pile up over the toe-waters of the wedge struggling in their shallower depth to make progress down the rough stream bed. Thus, in extreme instances, "walls of water" appear in rough channels of steep slope after sharp, heavy down-pours.

A new wedge being launched with each fluctuation in intensity of precipitation during a storm, and with each new storm, the seasonal flow occurring in the state's streams is composed of many wedges of water sliding down toward the ocean: some closely superimposed on the rearward slopes of preceding wedges, others separated by wide intervals of time, and all having apex-heights and lengths of base whose magnitude range between wide limits. Increasing variety is also given to the size and sequence of successive water-wedges by the vastly innumerable meteoric occurrences that enhance or restrict the portion of the total precipitation reaching the stream channels. Fall-

ing as rain, on water-soaked earth precipitation quickly fills the stream channels but, falling on mountain covering parched by sunshine or dry winds of preceding days, lesser portions of the total precipitation reach them and that more slowly. Falling as snow, but little or none of the precipitation may immediately find its way into streams but rather may be held in banks and drifts, or in fields of ice or snow, until later warm rains or the melting summer sun releases it to start on its oceanward journey. So, the chaotic sequence of rain, snow or hail, winds and storms, or clouds or sunshine, with their changeable intensities and manifold durations, produce successive waves of flow in the stream channels of infinite variation. The average rate at which the volumes of water in these multiformed waves or water-wedges course down the stream channels in any season, including the dwindling, diminutive summer flow after precipitation has ceased or the season's snow is largely melted, is called the mean flow of the stream for the season.

This mean flow for a season, while comprised of many variable wave-like rushes of water, is nevertheless above all, distinguished throughout California by its marked periodic characteristic which recurs regularly each year. Stream flow, derived from precipitation, varies in volume following an annual cycle much like that of the rains with their distinctly wet season and equally pronounced dry season. Plate XIII, "Characteristics of Run-off from California Mountains," presents the average flow, month by month, for five typical California streams. The monthly flow of each stream being expressed on this plat in per cent of the mean annual flow, permits the five graphs to be compared, and their singular likeness in shape for not only the mean year, but also for the year of maximum and the year of minimum run-off, well illustrates the annual cyclic characteristic of the run-off from the state's mountain area.

The general semblance of shape of the hydrographs of the many streams of the State, which are exemplified by those of the five typical streams on Plate XIII, is given variety by minor irregularities caused principally by the geographical position of the catchment area and its elevation above sea level. The drainage basins sheltered by mountain ranges likewise those of lower elevation, in receiving a smaller precipitation, have a greater proportion used in wetting their surface covering so that run-off does not follow precipitation so quickly, especially in early winter, as on the more exposed and elevated areas. However, in the very high altitudes, the snowfall remains congealed in banks and drifts until the occurrence of melting temperatures, so that much of the precipitation on such drainage areas does not run off until several months after its fall, and it is only in stream channels draining these areas high in elevation or those of extensive area that flow persists in large volume for an interval subsequent to the cessation of the winter's storms; but the flow in all streams soon diminishes with the ending of the wet season and the coming of the period during which no moisture is precipitated on the catchment area, and reaches the low flow generally, by the first of August. This extreme depreciation in volume of flow down the stream channels of the state during the late summer is statewide, and is the characteristic of the annual stream flow cycle in California equally marked to the usual great increase in volume of flow during the mid-winter and spring months.

Seasons of heavy precipitation as well as of light precipitation have water running down the stream channels with this same general periodic variation in volume, but the total volume is widely different in succeeding years. The exceedingly great variety of sequences of rain or snow, winds, and clouds or sunshine, their differing intensities and uneven durations in each winter season, all combine in diverse relations to make each season's run-off variant. In this irregularly varying volume of total seasonal run-off, that of extremely wet years may be four to six times as large as in seasons of small run-off and the recurring order of sequence of the waves of run-off may never be twice alike as the years succeed themselves.

The average or mean seasonal flow of any drainage basin is the average value of this variable seasonal run-off and is an expression for the water-yield of drainage basins. That this expression may truly represent the average water-production, it is requisite that a sufficiently large number of years of record should be grouped for averaging, that the extreme irregularity in the fluctuation of successive seasonal values may be suppressed; for the mean value obtained from a small number of years of record may alter as additional annual records are included in the group for which the average is taken. A true expression of the water-yield will therefore include so many years in the average, that the inclusion of additional years will not greatly change the mean value. However desirable it may be to encompass long periods of time in this determination of the mean seasonal volume of water running down the stream channels, the number of years of record available is limited by the years during which measurements of the flow in the streams have been made.

The United States Geological Survey through its Water Resources Branch began the measurement of flow in California streams as early as 1894, but observations of flow were made only on the larger streams and not very many gaging stations were established and maintained prior to 1903. In this year, regular measurements were being made on fifty-five streams of the State. Since 1903, this number has been increased to more than 200 stream gaging stations regularly maintained at the present time, and some records are available at about 500 stations. Table 33, "Publications of the United States Geological Survey Containing California Stream Flow Data," sets forth the references to all these data on stream flow observations. In addition to the Survey's gagings, there are many records of flow in various streams throughout the State that have been made by parties other than the United States Geological Survey, but most of the observations made, either appear in the publications of the Survey, or the chronicles are of such short duration that they are of small utility.

The years of stream flow record at each of these gaging stations is graphically portrayed on Plate XVI, "Stream Measurements in California by United States Geological Survey." Here the black cross-bars, opposite the name of each gaging station, are drawn transverse to the lines that extend from the top to the bottom of the page, one to each year. The transverse bars, in intercepting the yearly lines, present pictorially the periods of years through which stream gaging records have been maintained at every station. The longer bars, in intercepting a larger number of yearly lines, represent a longer period

of record than the shorter bars, and the years of the calendar during which the stream gagings were made are denoted at the extremities of the intercepted yearly lines. Upon scanning the columns of years on this plate, it may be observed that only sixteen records comprise a period of more than twenty years and that the longest is twenty-eight years. It is also noticeable that there are a large number of records from ten to fifteen years in length.

The vicissitudes of precipitation, and of the meteoric phenomena which determine the amount of water that will run off a collecting area when precipitation falls upon it, are too great for it to be probable that these measurements covering but little more than a decade, would include years representative of all possible values. Their average, therefore, would not truly express the mean annual water-production of their drainage area. That greater numbers of values of seasonal fluctuation might be included in the groups to be averaged, resort was had to the chronicles of precipitation which extend over many more years than the measurements of stream-flow. The United States Weather Bureau has maintained precipitation gages at one hundred and fourteen stations for more than thirty years, at sixty-two stations for more than forty years, and the records of sixteen stations extend to fifty years while three comprise a period of over seventy years. Besides, there are many more with records less than thirty years in length. Of those greater than ten years, there are two hundred and seventy-four.

Plate XVII, "Precipitation Records of the United States Weather Bureau," depicts graphically the years comprised in the record of each station and when it began. The continuance of these measurements through the years is shown by means of black bars opposite the name of the station at which they were made in a manner similar to the display of stream gaging records on Plate XVI. These bars extend transversely across the page from left to right and mark between their extremities on the intercepted yearly lines, the interval during which the precipitation observations were made.

Since the origin of all stream flow is in the precipitation on the drainage areas, its annual volume bears a relation to the annual volume of precipitation. However, the proportion of the precipitation reaching the water channels is not always the same. In years of many light showers, especially if drying winds blow during the intervals between them, a greater fraction of the total evaporates back to the atmosphere than in years of more concentrated precipitation and of dark, dull days separating the storms. Evaporation from snow fields may be great if weather conditions favor it because of their vast areas exposed to the drying atmosphere, and it is apt to be greater if the arrival of melting temperatures is deferred by a long winter season. Also, the division of the precipitation between stream flow and water that never reaches the drainage channels, is influenced by the porosity of the earth's crust and the ease with which precipitation, striking its surface, may percolate to depths beyond the reach of vegetation or of the capillary powers of the soil to bring it back again to be evaporated to the atmosphere. But the waters, which sink into the earth's surface-cover to follow the minute conduits formed by connecting pore spaces in soils or gravels or to traverse the devious seams and fissures in the rocky formation of

the earth's outer crust, later appear as hillside springs or seepage at lower elevations and much of them find their way into the stream channels. Because of many such variable influences dissipating precipitation, the portion of the total finally reaching the stream channels may be practically zero in some regions of light rainfall or as large as nine-tenths in areas where the rains are very heavy. A comparison of stream flow measurements with precipitation data reveals that this fractional part of the seasonal precipitation which finally becomes stream flow, varies principally with the total amount falling and that there is a distinct relation between this amount and the quantity running off each drainage area, which differs from that of adjoining areas largely in the degree to which mountain ranges shelter or expose them to storm winds or to which their elevation causes precipitation as snow or rain. This relation is so predominant that it suppresses to a great extent the minor variations in this division of total seasonal precipitation occasioned by the changing manner and order of occurrence during each season of storms and clear weather.

It so becomes possible to develop graphically this relation between the fluctuating values of seasonal precipitation and the amount of run-off from each drainage basin. A ready means of expressing the fluctuating values of precipitation on each drainage basin is afforded by the "indices of seasonal wetness" developed for all parts of the State in Chapter II, "Precipitation." This presentation shows how the precipitation on California lands occurs mostly in storms that sweep over wide areas, and the water-producing region of the State is there divided into twenty-six parts, called precipitation divisions, over which these storms sweep and precipitate annually proportional amounts of rain or snow throughout each division, which are approximately alike through succeeding years. The series of numbers named "indices of seasonal wetness," express this amount of rain or snow for each of the twenty-six divisions of the state in terms of the normal or customary precipitation occurring in that division, and these numbers are tabulated for each of the past fifty years. These series of numbers then represent the numerical relation between the fluctuating values of seasonal precipitation during the half century just past and, in their being a series of numbers proportional to the actual values falling in each of the divisions, are equally as useful as the actual precipitation records for studying their relation to the amount of water running off the drainage basins in each season.

Plates XVIII to LIII, entitled "Curves of Probable Run-off," are graphs of the relation between the wetness or normality of the season's precipitation and the amount of run-off on each of the one hundred and forty major drainage basins or groups of minor drainage basins in California. In constructing these run-off curves the margins of cross-lined paper were numbered beginning at the lower and left corners. On the upper margin they proceed in increasing values transversely across the sheet and represent the values of the "index of seasonal wetness." They extend upward on the side margin and represent the depth of seasonal run-off in inches flowing off the drainage areas. For each simultaneous value of measured seasonal run-off from a drainage basin and of the "index of seasonal wetness" for the precipitation division in which the drainage basin is located, a



point was plotted on one of these cross-ruled sheets which is at a distance across the paper equal to the value of the "index of seasonal wetness" on the upper margin scale, and at a distance upward from the lower margin equal to the value of the seasonal run-off on the side margin scale. Points were so plotted on these cross-lined sheets for every available measurement of seasonal stream flow in every one of the hundred and forty major streams or groups of minor streams, and smooth curves were drawn which, passing among the points, average their departures from exact positions upon the curves drawn. Numbers adjacent to the plotted points indicate the calendar year of the last part of the season during which that run-off was measured.

These curves show the trend of the relation between the "index of seasonal wetness" and the run-off from each drainage basin. They pass through many of the plotted points, but due to the variable weather in successive seasons which causes different fractions of the precipitation to evaporate before running off the collecting area into the stream channels, some of the points fall to the side of the mean curves. The sequence of the storms, their intensity, the weather conditions between the occurrence of storms, and the character of successive seasons, all influence this relation to an indeterminate degree. For seasons in which these conditions favor a greater fractional part of the meteoric waters evaporating to the atmosphere, the points tend to lie on the lower side of the mean curve, and for seasons favoring a small evaporation, the points tend to lie on the upper side. Successive seasons of drought or heavy floods may also influence the position of the points, for the quantity of ground water feeding the streams does not change immediately with variations in the annual precipitation. Instead, there is a certain tardiness in response which places these points on either side of the mean curve, according to very recon-dite relations that obtain in the sequence of seasonal rains and snows, and any one seasonal precipitation may affect the quantity of ground water reaching a stream for a period as long as three years.

Although there are these minor influences which tend to make the relation between the "index of seasonal wetness" and run-off an approximate one, nevertheless the data reveal that when a reasonable number of measurements of seasonal run-off are at hand, a mean curve may be drawn which will not change much in position by procuring and plotting additional measurements.

On this series of plates, XVIII to LIII, which exhibits the amounts of run-off entering all the stream channels of the State in seasons having different "indices of seasonal wetness," some streams have many points on their diagrams indicating that records of their flow have been kept for as many years; whereas others, on which the records are short, have but few points, and a large number of the small streams have no points at all. There are, however, sufficient points on the diagrams to define curves for streams in which seven-eighths of the entire run-off of the mountainous area of the State drains off into the ocean.

For the large number of small streams on which measurements have never been made, and for those on which the measurements have been made for too few years to define a curve among the small number of points on their diagrams, the run-off curves were developed through

comparison of the characteristics of their drainage areas with the characteristics of the areas for which there are ample records to construct curves. The effect of the magnitude of mean seasonal precipitation, of the usual storm intensities, of the elevation of watershed, and of the absorbency of its surface, upon the shape and position of these run-off curves was investigated, and the comparison of these characteristics of each drainage area provided the means for locating estimated run-off curves on the diagrams for areas from which the run-off had either not been measured at all, or had been measured only for a year or two.

These curves for drainage basins in all parts of the State are generally similar to each other in shape and somewhat similar in position on the diagrams. Because of the unit of value selected to represent rainfall, the index of seasonal wetness, and to represent run-off, the inches in depth over the land; these diagrams as drafted are comparable one with the other and may be superimposed to study the effect of the characteristics of their several drainage areas upon the shape and position of their curves. For purpose of comparing this effect of their characteristics, several plates were prepared which assemble the curves superimposed on each other in different groupings. Plate LIV, "Comparison of Run-off Curves Grouped Geographically," (run-off plotted to inches depth on drainage basin), makes an assembly, placing on one diagram those curves whose drainage basins lie in adjacent localities. Plate LV, "Comparison of Run-off Curves Grouped by Types," (run-off plotted to inches in depth on drainage basin), makes a second comparison of the run-off curves assembling on one diagram those curves which are most alike in shape and position. Comparisons are again made of these curves, first by locality groups and second by similarity of shape and position, on Plates LVI and LVII, but on these plates the unit of value representing the run-off from the drainage basins was changed from inches in depth, used on the two other comparison plates and on all the run-off curves, to percent of the mean seasonal run-off. By making this change in the unit to which the data are plotted, the resulting curves have an altered relation one with another which affords added means of studying the effect of the characteristics of their drainage areas in changing their shape and position relative to one another on the diagrams.

It was by making the comparisons afforded by these four plates that the run-off curves were developed for every drainage basin in the State of California. Those curves constructed directly from measurements of run-off are for streams which have an aggregate drainage area of two-thirds of the entire mountainous area of the state and which have an aggregate run-off of seven-eighths of the total from the state's water-producing area. The curves developed by comparison are greater in number than those constructed directly from measurements, but their drainage areas are the smaller ones and have the lesser run-off. The curves developed by comparison were all obtained by following a uniform procedure and identical scientific principles, and they are based not only on all the information available concerning their own drainage areas, but also upon the knowledge gained from the gagings of run-off on all the measured streams of the State.

These curves indicate the depth of run-off from their respective drainage areas which may occur in a season having a precipitation bearing a relation to the mean, indicated by the "Index of Seasonal Wetness." By the use of the "Indices of Seasonal Wetness" derived for all divisions of the state and presented in Chapter II, the amount of run-off in every stream was obtained from these curves for each year that the flow was not measured, of the fifty for which indices were developed. In Tables 34 to 173, "Seasonal Run-off Data," the values of seasonal run-off for every drainage area in the State are tabulated for the full fifty-year period. The "Indices of Seasonal Wetness" for the precipitation division in which each stream is located, are also tabulated there. In addition, in the column to the right, are printed the values of seasonal run-off measured at the stream-gaging stations and the average fraction of this expressed in per cent, that occurs in each of the twelve months of the year. Footnotes to the tables show in what way the measured quantities were altered to obtain the total run-off above the main body of agricultural land on the stream, for in many instances the entire drainage area is not tributary to the stream at the gaging station and in others water has been diverted at points upstream. For all seasons in which no measurements were made, the run-off was obtained by entry on the run-off curve with the index of seasonal wetness for that season.

In these tables, 140 in number and one to a stream or group of small streams, is assembled the seasonal flow, either measured or determined by comparison, for fifty years and for the entire water-producing area of the State. The mean value for this fifty-year period is presented as the mean seasonal flow of the stream, since so far as is known the inclusion of additional records would not materially alter this average. The only direct information on this is the rainfall records at Sacramento, San Francisco and San Diego. At these points only, have precipitation records been kept much longer than fifty years and these are for over seventy years. The average value for fifty years in Sacramento is one per cent greater than that for seventy-three years, in San Francisco it is two per cent greater, and in San Diego it is three per cent less.

Table 2, "Mean Seasonal Run-off in California Streams," which follows herewith, presents the values of mean seasonal flow summarized from tables 34 to 173, and gives for each stream or group of streams the reference to the table number in which the detail information is tabulated, and the plate number of the run-off curve used in developing the tabular detail is given in the tables of seasonal run-off data. These values of mean seasonal run-off average the widely fluctuating values of successive years and represent the average quantity to be expected year in and year out, including the large floods of unusual occurrence as well as the floods of lesser magnitude which occur frequently, and also the diminutive flow of the seasons of drought. This is a comprehensive statement of the volumes of water in all the rivers and streams of the state without exception. The geographic location of their drainage basins is shown on Plate XV, "Map Showing Boundaries of Drainage Basins."

TABLE 2. MEAN SEASONAL RUN-OFF OF CALIFORNIA STREAMS.

Run-off table number.	Name of drainage basin.	Drainage area, in square miles.	Mean seasonal run-off.		
			Acre-feet.	Acre-feet per square mile.	Depth in inches.
34	Sacramento River (Upper) above Pit River.....	568	1,486,300	2,616	49.1
35	Pit River.....	5,346	4,204,600	786	14.7
36	McCloud.....	669	1,591,200	2,378	44.6
37	Churn Creek Group.....	100	83,100	828	15.5
38	Cow Creek.....	444	510,200	1,150	21.6
39	Bear Creek.....	137	103,700	756	14.2
40	Battle Creek.....	366	421,800	1,151	21.6
41	Ink's Creek.....	34	28,200	825	15.5
42	Payne's Creek.....	80	84,200	1,048	19.6
43	Backbone Creek Group.....	178	207,500	1,166	21.8
44	Clear Creek.....	251	294,900	1,175	22.0
45	Cottonwood Creek.....	937	913,300	974	18.3
46	Sacramento River at Red Bluff*.....	9,258	9,029,000	1,072	20.1
47	Mill Creek Group.....	971	1,157,400	1,192	22.4
48	Bulte Creek Group.....	251	358,400	1,427	26.8
49	Feather River.....	3,627	5,283,500	1,456	27.3
50	Honcut Creek Group.....	314	199,400	636	11.9
51	Yuba River.....	1,200	2,652,600	2,210	41.4
52	Dry Creek.....	79	49,700	627	11.8
53	Bear River.....	262	412,500	1,574	29.5
54	Coon Creek Group.....	210	34,100	162	3.0
55	American River.....	1,919	3,181,900	1,658	31.1
56	Red Bank Creek Group.....	109	73,000	672	12.6
57	Elder Creek Group.....	414	213,000	515	9.7
58	Stony Creek.....	710	555,000	782	14.6
59	Willow Creek Group.....	394	92,200	234	4.4
60	Cache Creek.....	1,195	586,000	490	9.2
61	Putah Creek.....	655	421,800	644	12.1
62	Orestimba Creek Group.....	1,340	110,800	83	1.6
63	Panoche Creek.....	295	27,100	92	1.7
64	Cantua Creek Group.....	208	12,500	60	1.1
65	Los Gatos Creek.....	119	9,750	82	1.5
66	Tejon Creek Group.....	1,341	95,600	71	1.3
67	Caliente Creek.....	471	45,000	96	1.8
68	Kern River.....	2,410	760,400	316	5.9
69	Poso Creek Group.....	576	47,200	82	1.5
70	Deer Creek.....	110	20,650	187	3.5
71	Tule River.....	390	141,500	363	6.8
72	Yokohl Creek Group.....	98	14,800	151	2.8
73	Kaweah River.....	514	407,900	794	14.9
74	Limekiln Creek Group.....	201	62,200	310	5.8
75	Kings River.....	1,694	1,025,100	1,136	21.3
76	Dry Creek.....	48	4,500	94	1.8
77	San Joaquin River (Upper).....	1,631	2,056,900	1,261	23.6
78	Cottonwood Creek.....	28	2,300	81	1.5
79	Fresno River.....	270	68,300	253	4.7
80	Daulton Creek Group.....	66	5,200	78	1.5
81	Chowchilla River.....	238	67,700	284	5.3
82	Dutchman Creek Group.....	72	8,300	115	2.2
83	Mariposa Creek.....	103	12,800	125	2.3
84	Owens Creek.....	66	6,500	98	1.8
85	Bear Creek.....	71	7,500	105	2.0
86	Burns Creek Group.....	171	24,400	143	2.7
87	Merced River.....	1,054	1,133,500	1,075	20.2
88	Tuolumne River.....	1,543	2,055,800	1,332	24.9
89	Wildcat Creek Group.....	59	8,850	151	2.8
90	Stanislaus River.....	983	1,376,000	1,400	26.2
91	Littlejohns Creek.....	41	8,150	201	3.8
92	Martells Creek Group.....	122	14,300	117	2.2
93	Calaveras River.....	391	316,500	803	15.1
94	Mokelumne River.....	632	898,100	1,421	26.7
95	Sutter Creek Group.....	285	93,200	327	6.1
96	Cosumnes River.....	534	482,000	903	16.9
97	Petaluma Creek Group.....	139	75,300	542	10.2
98	Sonoma Creek Tributaries.....	78	35,600	455	8.5
99	Napa River Tributaries.....	226	115,200	510	9.6
100	Suisun Creek Group.....	125	52,500	421	7.9
101	Mt. Diablo Creek Group.....	200	69,800	350	6.6
102	San Pablo Creek.....	41	17,200	421	7.9
103	San Leandro Creek.....	44	18,900	433	8.1
104	Claremont Creek Group.....	83	24,600	297	5.6
105	San Lorenzo Creek.....	38	16,700	441	8.3
106	Alameda Creek.....	654	140,900	215	4.0
107	Mission Creek Group.....	77	25,000	321	6.1
108	Penitencia Creek.....	22	5,200	232	4.4
109	Coyote River.....	197	80,100	407	7.6
110	Guadalupe River.....	52	22,000	421	7.9
111	Los Gatos Creek Group.....	121	68,500	566	10.6

\*Includes all streams listed above and also 145 square miles of agricultural land.

TABLE 2—(Concluded). MEAN SEASONAL RUN-OFF OF CALIFORNIA STREAMS.

Run-off table number.	Name of drainage basin.	Drainage area, in square miles.	Mean seasonal run-off.		
			Acre-feet.	Acre-feet per square mile	Depth in inches.
112	San Francisco Creek	38	20,700	550	10.3
113	San Mateo Creek Group	84	37,100	439	8.2
114	Smith River	627	3,406,200	5,433	101.9
115	Klamath River	2,320	3,410,700	1,470	27.6
116	Shasta River	803	242,600	302	5.7
117	Scott River	813	521,100	641	12.0
118	Salmon River	734	1,256,400	1,712	32.1
119	Trinity River	2,965	4,447,700	1,500	28.1
120	Redwood Creek	275	837,400	3,042	57.1
121	Mad River	457	1,182,500	2,588	48.5
122	Eel River	3,547	6,040,000	1,703	31.8
123	Bear Creek	82	227,000	2,785	52.2
124	Mattole River	264	1,060,600	4,017	75.3
125	Noyo River Group	780	1,305,300	1,674	31.4
126	Navarro River	273	391,600	1,435	26.9
127	Gualala River Group	623	849,700	1,364	25.6
128	Russian River	1,508	1,416,600	940	17.6
129	Lagunitas Creek	84	89,200	1,062	19.9
130	Salmon Creek Group	230	113,900	495	9.3
131	Bolinas Creek Group	158	36,600	232	4.3
132	San Diego River	207	35,400	171	3.2
133	Santa Ysabel Creek	126	33,000	262	4.9
134	San Luis Rey River	325	59,400	183	3.4
135	Santa Margarita River	690	31,900	46	0.9
136	San Jacinto River Tributaries	330	48,600	148	2.8
137	Santa Ana River Tributaries	460	253,400	551	10.3
138	San Gabriel River Tributaries	280	150,200	536	10.1
139	Los Angeles River Tributaries	167	71,000	426	8.0
140	Malibu River Group	379	54,700	144	2.7
141	Santa Clara River Tributaries	911	222,100	244	4.6
142	Ventura River	226	66,200	293	5.5
143	Jalama Creek Group	242	48,000	198	3.7
144	Santa Ynez River	797	205,500	258	4.8
145	San Antonio Creek	138	22,600	163	3.1
146	Santa Maria River	1,634	207,200	127	2.4
147	San Luis Obispo Creek Group	1,019	227,700	219	4.1
148	Salinas River Tributaries	4,042	961,900	238	4.5
149	Pajaro River Tributaries	1,070	278,800	261	4.9
150	Soquel Creek Group	324	279,900	864	16.2
151	Pescadero Creek Group	222	189,300	853	16.0
152	Tule Lake Group	901	275,200	305	5.7
153	Goose Lake Group	275	32,200	117	2.2
154	Cowhead Lake Basin	24	5,400	222	4.2
155	Surprise Valley Group	379	84,900	224	4.2
156	Madeline Plains Group	548	110,600	202	3.8
157	Smoke Creek Group	188	37,600	200	3.8
158	Eagle Lake Group	498	91,000	183	3.4
159	Honey Lake Group	1,507	330,800	220	4.1
160	Lake Tahoe Basin	499	261,000	523	9.8
161	Truckee River	447	506,000	1,133	21.3
162	West Fork Carson River	67	115,200	1,714	32.1
163	East Fork Carson River	323	309,000	957	17.9
164	West Walker River	405	313,800	775	14.5
165	East Walker River	411	312,300	759	14.2
166	Mono Lake Group	166	215,650	1,301	24.4
167	Adobe Meadows Group	453	59,100	117	2.2
168	Owens River (Upper)	524	278,100	531	10.0
169	Bishop Creek Group	446	341,500	766	14.4
170	Owens Lake Group	216	83,600	388	7.3
171	Mojave River	211	98,200	466	8.7
172	Antelope Valley Group	119	29,700	249	4.7
173	Whitewater River	269	13,500	50	0.9

## SUMMARY OF MEAN SEASONAL RUN-OFF OF CALIFORNIA STREAMS.

Name of Drainage Area.	Drainage area, in square miles.*	Mean seasonal run-off, in acre-feet.
SACRAMENTO BASIN	21,420	25,199,500
SAN JOAQUIN BASIN	18,178	12,331,300
SAN FRANCISCO BAY BASINS	2,219	825,300
NORTH PACIFIC BASINS	16,543	26,835,100
SOUTH PACIFIC BASINS	13,583	3,441,800
GREAT BASIN	8,876	3,898,350
Totals	80,825	72,531,350

\*These are the sums of the water-producing drainage areas of their streams and groups of streams and are not the total areas of the basins named.

## CHAPTER V.

**FLOOD FLOW IN STREAMS**

Coincident with the progress of civilization, growth of industry, and extension of agriculture that accompanies increase in population, man and his improvements encroach upon new lands hitherto unoccupied. On areas of recent encroachment, attracted there by the superior fertility of the farming lands, man is now waging a contest with the waters of nature for occupancy of hundreds of thousands of acres of river-bottom soil. The conflict, more hazardous in not being continuous, rages at irregular intervals of time, and often several entire seasons pass with man and his works left in peaceable possession of these areas, undisturbed by rising floods. But always, though at intervals, huge volumes of water are poured into the stream-channels from climaxes of precipitation, both prolonged and severe, and these waters, too great to be confined between the low banks of the river-bottom lands, renew the strife with man for occupancy by threatened inundation of these areas. In the contest for occupancy of these regions, man has constructed many miles of earth dykes to stem the overflowing waters; river channels have been enlarged, their crooked courses straightened, relief channels excavated, and divers works built to combat the attacking waters and prevent them from spreading out over the river-bottom lands in the way of the past. In the more advanced communities, these works protect well-kept orchards and acres of high-priced vegetable crops whose wealth-producing powers, abetted by the unusual fertility of the soils, have created many beautiful homes, villages, and towns with substantial public improvements; and well-paved highways interconnect all. Secure in having successfully withstood many attacks, these regions are nevertheless imperiled at times by the rise of waters to heights but rarely experienced, for the occurrence of floods, their size and duration, are the resultant of varying sequential combinations of weather occurrences which produce at their climax, precipitation of unusual intensity or of continuance for protracted periods of time. That these flood-producing precipitations may occur, the atmosphere must be lowered in temperature so much that it becomes greatly oversaturated with water-vapor and precipitates the excess earthward as rain. Unless this temperature is markedly reduced below that at which the atmosphere is saturated, the resulting showers are light and of short duration. Marked reductions in atmospheric temperature take place only when the warm air from the ocean is transported over the cool land by winter winds, and for strong thermal contrasts to occur, air off the ocean is usually transported many miles. To have these winds blow over vast areas and follow previous occurrences of sunshine and clouds in proper order to induce strong temperature contrasts requires such a coordinated sequence of these many meteorological phenomena, that it seldom happens. For every increased degree of thermal contrast produced coincident to widespread wind move-

ments from off the ocean, a more extraordinary coordination of the weather must occur over a large territory for months preceding.

So to create storms of flood-producing magnitude, the sequence of atmospheric disturbances over many localities must have coincidence for considerable periods of time. With the extension of the locality wet by storms, and their increasing intensity, a more complete coordination of weather is required over greater areas for a longer time, and so the less likely is it to occur. Also, the rain-producing tendencies in the atmosphere during the storms must predominate over the influences tending toward their dispersal or toward abatement of their violence, in order that the storms may be exceedingly great in intensity or of long duration, and these are least apt to occur in the most complete predominance. Therefore the chance that meteoric events occurring over large areas will unite in harmonious combination to produce great storms, becomes smaller and smaller as the storms become greater. So it is that the storms of great magnitude visit a drainage area at but infrequent intervals, and so it is that precipitations, in visiting the drainage basins in all variations from the almost insignificant summer showers that barely dampen a few acres of ground before again becoming vapor of the air, to the driving, widespread storms that continue in fluctuating intensity through a fortnight or more and drench thousands of square miles of the mountain area, are separated in time by intervals increasingly long on the average as the storms become greater in magnitude. For these reasons, the waters of flood-creating storms pass down the stream channels less frequently as their volumes increase, for generally the magnitude of floods corresponds to the magnitude of the storms creating them.

However, to further complicate the occurrence of conditions that increase the volume of flood waters, the portion of the precipitation shed to the stream channels is not alike for all storms. The absorbency of the surface-covering of the drainage area at the time when the storm waters are precipitated upon it, is most important in determining the apportionment. Often heavy storms have such a large fraction of their waters used in wetting the catchment area, that they do not contribute excessively to stream flow. It is only when a sodden soil, wet to saturation from previous downpours, or when the earth's crust is frozen, that all of the rainfall reaching the earth's surface runs off to the waterways. If, falling instead, on a dry soil or on a surface that is absorbent because of an open and porous structure and whose interstices are not already filled with rain or snow-water, large portions and sometimes all of the precipitation are taken up by the earth's covering and little or none reaches the stream channel to produce floods. But with long-continued storms, even the more porous coverings may become moisture-saturated before their cessation and shed great quantities of water to the drainage channels during the latter part of the downpour. In other instances, when warm rains fall on snow-covered regions, the rain-water may be joined by melting snow to further swell the rising streams and a volume of water may pass down the channels greater than the entire rainfall. These conditions of the earth's surface-covering at the time of the storm, favorable or unfavorable to shed the meteoric waters cast upon it, are largely resultant from the previous weather happenings in the locality; so that to produce large floods,

the preceding weather occurrences must not only coordinate to make heavy downpours, but must also coordinate to render the earth's surface on the collecting area capable of quickly turning off nearly all the water it receives. The simultaneous culmination of weather conditions on the drainage area favorable to large and rapid run-off, may be reached in all conceivable degrees of value and so result in floods varying in severity and frequency of occurrence between equally wide limits.

That the long series of meteorological storm-inciting events should so transpire that their climax may precipitate waters on a drainage basin at the time its surface is in favorable condition to shed nearly all the precipitation falling upon it, is an expectancy of still more remote occurrence than that the flood-producing storm should occur. The likelihood of precipitation falling on and running off a drainage area in flood volumes is therefore unusual and the greater the magnitude of the flood, the less usual may be its occurrence. This frequency with which floods of the varying magnitudes may be expected, is therefore of prime interest to man who wages contest with nature for occupancy of the river-bottom lands.

To view the frequency of occurrence of floods in their various volumes and to draw deductions therefrom, special diagrams were prepared to display all the flood-measurements from the records of the United States Geological Survey. These diagrams are Plates LVIII to XCIII, "Probable Frequency of Flood Discharge," and there is one for each of the one hundred and forty streams or groups of minor streams in the state. Points are plotted on these diagrams in such a manner that their position indicates the frequency during the period of stream measurement with which floods passed down the channels, in volumes exceeding certain magnitudes. The scale on the side or longer margin, numbered consecutively from 0.4 to 800, expresses this frequency as the average number of occurrences during one hundred years. While number 1.0 stands for an average occurrence of once a century, the extreme number of 0.4 represents an occurrence once in two hundred and fifty years, and the extreme of 800 represents an occurrence of eight hundred times a century, the equivalent of eight times in one year. The top or shorter margin scale of these diagrams has divisions expressing the magnitude of flood flows in terms of inches of depth to which the volume of water running off in twenty-four hours would submerge the drainage area if spread evenly over its surface. The scale divisions are numbered consecutively from 0.1 inch to 10.0 inches in depth. These values may be converted to the more usual terms of cubic feet per second through their multiplication by the conversion factor that is on the diagrams immediately adjacent to the top margin scale. The less usual unit of inches in depth on the drainage area running off in twenty-four hours was employed to express the volume of flood flows, however, so that all the one hundred and forty streams in the state would have diagrams with scale divisions which are equal in value and numbered alike. This makes all the diagrams comparable, one with another.

The cross-ruled lines on these diagrams have not the equal spacing customarily used for technical exposition, but instead, are separated by intervals growing progressively smaller for each successive unit of the scale. The rate of progression by which these intervals become



smaller is uniform on all diagrams and is known mathematically as the "logarithmic scale." The artifice of using this special scale is of great value in drawing the curved lines on the diagrams in a mean position to the plotted points and in extending the extremities of the curves to the parts of the sheets where no points are found.

Each point plotted on the diagrams stands for all the flood flows which crested at volumes greater than that shown by the top margin scale, and which occurred a number of times during the period of measurement equivalent to the number of times in one hundred years indicated on the side margin scale. These points cluster on the lower part of the diagrams since the records disclose only the floods which occurred once or more during the period of measurement, and the longest record is twenty-eight years. The point nearest the top on any of the diagrams therefore lies close to the line numbered 4.0 which is an expectancy of four times within one hundred years or once in twenty-five years. Flood occurrences that may not be expected as often as this, are indicated by the parts of the smooth curves extending beyond the positions of the uppermost points. It was to enable the accurate extension of these curves through the mean positions of the points, to parts of the diagrams depicting frequencies of once in one hundred to once in two hundred and fifty years, that the "logarithmic scale" was adopted in spacing the cross-ruled lines. It may be observed that the employment of this scale causes all the curves to take the conformation of a parabola, and that the portion of sharper curvature is well defined by points representing measurements on the diagrams of measured streams, while the extended portion of the curves is gentle in its change of direction and approaches a straight line. Therefore the extension of the curves to the parts of the diagrams without points was accomplished with precision.

Because of the great similarity in shape of the curves when plotted on logarithmic scales, and their comparability resulting from the expression of the volume of flood flows in terms of inches in depth on the drainage area, curves could be developed for streams which have not been measured. Such curves were developed through comparison of the physical and precipitation characteristics of the drainage areas throughout the state. To reveal the effect of these physical characteristics and the usual storm features of the drainage areas, upon the shape of the curve and its position on the diagram, Plate XCIV, was prepared. This plate, "Comparison of Curves of Probable Frequency of Flood Discharge," compares on one sheet, the curves of all the streams. By means of these comparisons, curves were developed for the many smaller streams of California on which no measurements have been made. The curves prepared from measurements as well as all the interpolated curves, are shown on this comparison plate.

All of these curves sweep upwardly from the lower left hand corners of the diagrams, first bearing to the right but rapidly swerving towards the tops of the sheets. Although they approach positions parallel with the up-and-down margin, none of them become vertical even at their upper extremities. Should they have arrived at vertical directions, the values of the flood volumes intersected by them on the upper margin scales would represent the maximum floods which might ever occur regardless of their infrequency. As the curves ap-

proach the vertical, their further extensions become so nearly the direction of the side margin scales which are marked off to indicate frequency of floods, that their values on the top margin scales do not alter much as the curves advance on the frequency scales; so that the more nearly vertical these curves become, the less do the infrequent floods exceed the more usual ones in magnitude. The broad swing to the right at the lower end of these curves, in having direction well apart from the vertical, show that the smaller floods mount rapidly in size for slightly lengthening average lapses of time between them.

The continued slight inclination to the right of all these curves at their extreme upper ends and their failure ever to become straight up and down, reveals that the maximum flood flow has not occurred in any stream of the state since white man has resided here, and that the greatest flood yet observed in any of the streams may be exceeded at any time, but only at average intervals that are increasingly long as the magnitude of the flood is greater. The diagram representing the flood flows on Sacramento River at Red Bluff shows that the expectancy of a flood flow having a volume exceeding 250,000 cubic feet per second, is four times in a century; of one exceeding 300,000 cubic feet per second, is once in a century; and a flood exceeding 330,000 cubic feet per second has an expected occurrence of but once in two hundred years; and that still larger volumes may flow down the channel at average intervals greater than this. In general, the diagrams show that floods will occur once in four years in more than double the size that is not exceeded on an average more often than once a year; more than treble this volume once in twenty years; exceeding quadruple this volume once in two hundred years; and at intervals of a few thousand years a flood may be expected in at least quintuple the volume which is exceeded not oftener on the average than once yearly, for even at times of occurrence that are as infrequent as once in two centuries, the curves depicting these natural laws, in still progressing on the diagrams farther and farther into the region of greater floods, indicate that most extraordinary floods may occur at average intervals of once in many thousands of years.

Table 175, "Flood Flow in California Streams," tabulates the greatest flood flows which have been measured, giving the name of the stream, date of measurement, and allied information. The table also gives estimates of the "maximum" flood flow in various streams and presents all the information on measurements and estimates of the larger floods which could be collected.

## CHAPTER VI.

**EQUALIZATION OF THE PERIODIC RUN-OFF FROM THE MOUNTAINS.**

Three-fourths of California's waters run off their mountainous catchment areas to concentrate in the stream channels, hurry down their courses, and pass by the low-lying agricultural lands within forty-five days after their precipitation from the atmosphere. Following the sporadic precipitation so closely, run-off is also irregular in its occurrence but much less so. The lapse of time between precipitation and almost complete run-off, although not long, is still sufficient to merge the stream flow derived from successive storms and run-off passes wave-like down the stream channels, and is fairly continuous through the winter months. However, the long dry summers without rain to replete the supply, cause interruptions in the flow at regular yearly intervals so that run-off is periodic in its occurrence. Still, much of the precipitation on the collecting areas does not join the stream flow quickly, but is withheld by wetting the earth's crust and covering, and were it not that the ever-acting process of evaporation so reduces the volume of retarded waters, their quantities would be sufficient to largely equalize the periodicity of flow. Instead, only minor parts of these retained waters ever reach the stream channels and these are so small in quantity that they do not nearly equalize the floods that quickly follow precipitation.

Of the storm waters that do not immediately collect in the ravines and gullies to start on their oceanward journey, some wet the earth's surface or sink into its porous structure, some are absorbed by the cover of vegetation finding support in the shattered rocks and top-soil, while others remain frozen in snow fields, drifts, or banks until release comes with warmer weather, and they all have continuous contact with the atmosphere except those that percolate to depths belows the earth's surface. This contact with the atmosphere is uninterrupted during the entire period of the water's detention on its catchment area. It occurs over surfaces vastly greater in area than that of the earth upon which the waters were precipitated; for the atmosphere, in adapting its shape with facile consonance to minute irregularities of contacting solids, not only envelops every protruding rock or clod, mound of soil or snow, and every branch, stem or leaf of the grass and trees, but even penetrates the pores separating the structural particles of the snow, soil, and rocks, to still further enlarge the contacting areas. All these surfaces when wet by rain or snow, contact liquid or solid water with the air, and evaporation takes place unless the air be already saturated with water vapor. The saturation in the zones of contact for any but limited periods of time, is prevented however, by the continually moving zephyrs and breezes which mix the atmosphere about and, should any of these surfaces become dry, the moisture within the pores of the soils or rocks, and grass or trees, is drawn to the surface by their capillary powers and remoistens the solid surfaces in contact with the air.

In this way moisture may be brought back to the surface to be evaporated, even after penetrating several feet into the earth's crust. So evaporation is persistently in progress and, effectively and without respite, is reducing the volume of waters delayed in running off the catchment area, and from one-fourth to three-fourths of all the waters that fall from the atmosphere are evaporated.

Evaporation is so active everywhere and at all times, that even the percolating waters, which penetrate below the earth's surface too far for the capillary powers of its covering to draw them back and which are the only delayed waters not subject unceasingly to evaporation, are finally exposed to the air at the springs, meadows, and marshes where they again make their appearance, and give up moisture to the atmosphere. Therefore, although the waters that are delayed more than forty-five days from completing their journey to the ocean's shore, are often large portions of the total precipitation on the drainage basins, they are so immensely depleted in volume before reaching the stream channels, that those finally becoming run-off constitute only one-fourth of the state's waters.

The storms that precipitate these waters on California's mountains in billions of tons annually, especially the large ones in which the greatest volumes of water are ejected from the atmosphere, extend over regions of thousands of square miles and give up proportional amounts of their vaporous burden to the localities traversed. Data are presented in Chapter II, "Precipitation," to show how these storms sweep over great areas including both mountains and valleys alike, and Plate I, "Comparison of Seasonal Index of Wetness in Mountain and Valley Areas," shows how proportional amounts of storm waters fall both upon the low-lying agricultural lands of the Sacramento Valley and upon the mountains thousands of feet higher and distant many miles to the east. So the bulk of the run-off from the mountain area, in occurring within forty-five days after the storms originating it, passes down the waterways at a time when the state's agricultural lands are already replete with moisture, for the same wide-spread storms that drench the mountains precipitate some of their waters upon the lower flat-lands. Therefore the state's waters in the natural regimen of the streams, are largely unavailable for use on the agricultural lands, which need them, but not within forty-five days after the winter rains.

To detain these waters on their catchment area until the summer drouth arrives and then release them to augment the waning stream flow, requires that reservoirs be provided to temporarily store them. With space provided to capture the storm waters which would otherwise immediately hurry down the stream channels, the rapid rush of the state's waters back to the ocean may be arrested. The winter floods may thus be reduced and their useless volumes of water subjected to man's direction in flowing down the water courses. In this way they may be used to wet the dry agricultural lands during the long California summers, or for industrial and domestic purposes that require water during the months of the year in which the stream flow is naturally small.

Artificial storage capacity may thus be made to equalize the erratic flow in the state's water courses for the convenience of man's industrial enterprises, although nature, in retaining large portions of the precipi-

tation on the catchment area, does not substantially alter the periodicity of flow; and should storage be provided in adequate amounts, the entire annual water-production could be made to flow at times useful to man if it were not that some of the waters artificially retarded, return to the atmosphere even as those detained by nature do. However, by providing storage space in concentrated volumes and with small water-surface exposure, man may limit the part evaporated to less than ten per cent. This is very much smaller than the evaporation losses from the vastly greater surfaces of nature's delayed waters; but if floods are held in storage on the collecting areas for more than one season amounts larger than ten per cent may diffuse into the earth's gaseous envelope, although even then they are never as large as from the waters detained by nature.

With the run-off of very wet years as much as four times that of dry ones and the succeeding seasons attaining all manner of intermediate values, the excess waters of very copious winters must often be carried over several years to supplement the flow of deficient seasons in order to completely equalize the periodic run-off. Since the percentage evaporated becomes larger and larger with the lengthening time of detention, the fraction of the total waters of a drainage basin which may be made subservient to man, becomes smaller and smaller as the stream-flow is more erratic in occurrence. In very erratic streams therefore, even when unlimited storage space is provided, not more than fifty per cent of its total waters may be made to subserve man, while in streams of uniform discharge as much as ninety per cent may be utilized.

The degree to which the waters in all the streams of the state appear in erratic volumes, has been analyzed and the amounts made available to man by filling various volumes of storage capacity with flood waters for deferred use, have been determined. To do this, fifty-four plates were prepared, Plates XCV to CXLVIII, "Mass Diagrams of Run-off."

The monthly flow in every stream or group of streams is delineated on these plates for the past fifty years and in such a manner that the sequence of their fluctuating volumes is pictured by the inclinations and curvatures of lines drawn across the diagrams from left to right. These sinuous lines in their cross-wise progress, incline upward during periods of run-off greater than normal and turn downward during times that are below normal run-off; the steepness of their slopes in either case indicates the extent of departure from the average rate for a mean season. Sections that parallel the heavy-drawn zero lines and incline neither up nor down, are periods which have exactly the average monthly rate of mean seasonal flow. These lines sometimes mount higher and higher toward the tops of the diagrams as the accumulated run-off of successive above-normal seasons becomes greater than the simultaneous accumulation would have been with average flow all the while. At other times they turn downward and during series of below-normal years, approach the lower margins. In pursuing these flexural paths, the sinuous lines cross the heavy zero lines whenever the summation of run-off, accumulated since the first year of the diagrams, exactly equals the accumulation had the rate of run-off always been average; and this may occur on either upward or downward inclinations.

To give values to these departures from the average rates of stream flow, the plates have numbers spread along their margins. The upper margins represent time and the fifty equal intervals intercepted by the heavier up-and-down lines, are each a season of the half century of run-off portrayed on them. The years of the successive seasons are printed along these margins, starting from the left border. Also, each seasonal space is divided into three-month periods by lightly drawn up-and-down lines. The side margins of the plates have numbers increasingly large as they extend above and below the heavy zero lines which cross the sheets. In multiples of ten, one for each equally spaced cross line, these numbers denote volumes of water and the space between their lines represents ten per cent of the mean annual flow in the streams.

Beginning at the left in the first of the fifty years, the values of the successive total accumulations of water were plotted month by month, and the sinuous lines of the diagrams drawn through them. These values were summed progressively while expressed for each month in per cent of the mean seasonal run-off, but instead of retaining the superfluously cumbersome number one hundred in the summations of these percentages, one-twelfth of it was subtracted from each progressive monthly sum. Then, the actual net value added in each instance, was the departure during each month from one-twelfth of the mean seasonal run-off which is the average monthly rate of flow for the mean season. This mode of expressing amounts of accumulating waters in percentage values of their departures from amounts that would have accumulated at the average rate of flow, is a technical device to reduce labor in the arduous study of equalizing the periodic stream flow, which would otherwise be so voluminous in figures by the time computations were made for all the streams of the state and for every desired location on each stream, that years of labor would be required to complete it. The artifice in effect, so reduces the size of plates necessary to delineate the mass diagrams that it has become possible to print them in this volume, and it so decreases their total number, that only one-sixth as many diagrams had to be drafted as would have been necessary if the customary method of technical expression had been employed.

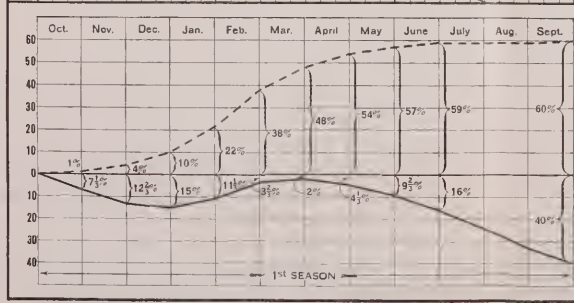
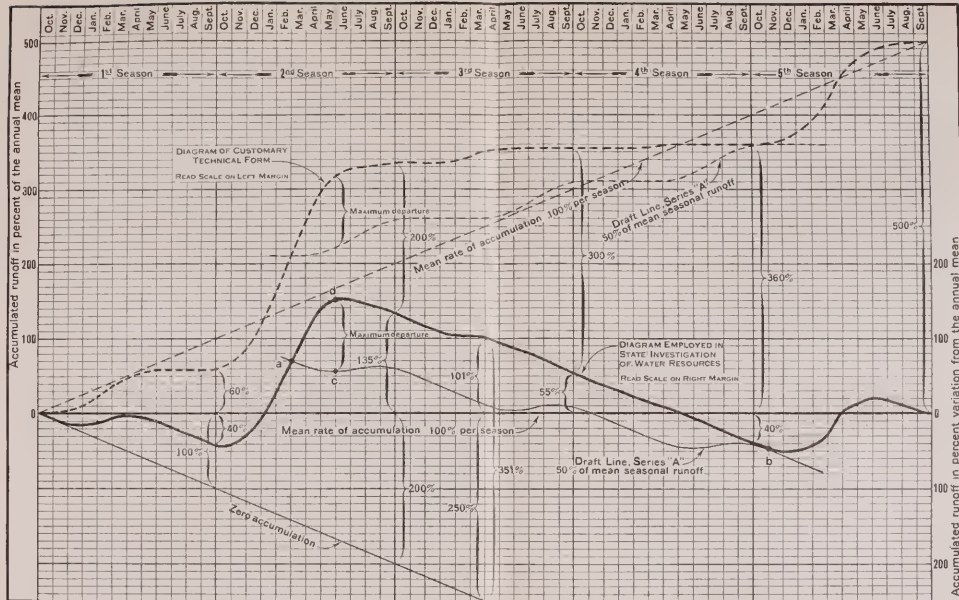
Plate XIV, "Construction and Interpretation of Mass Diagrams of Run-off," graphically compares the diagram of accumulating masses of water resulting from this adopted mode of expression, to the form of the mass diagram of customary technical procedure. In both cases, however, the monthly run-off is expressed in per cent of the mean seasonal; but in the mass diagram of usual construction, the values do not have the one hundred per cent eliminated from the sums, so that its form is identical to the ones of common practice which are constructed in standard units of run-off such as the acre-foot or gallon. The plate has dimension lines and figures which show the relation between the two mass diagrams and their component parts, and how they were both drafted from values of monthly run-off which are tabulated to one side of the sheet. Although the standard diagram is not in the usual unit of volume, it will be readily recognized as customary graphics and the perusal of Plate XIV will show that the form of diagram used in these investigations is identical in principle to the usual form and differs from it only in mode of expression, and that both may be employed in the art in exactly the same way.



PLATE 10  
 HULL OF THE U.S.S. ALBATROSS  
 U.S. NAVAL ARCHITECTURE

Month	Monthly run-off in acre-feet.	Monthly run-off in per cent of mean seasonal run-off.	Progression monthly summations of actual run-off, in per cent of mean seasonal run-off. (Summation of columns 2.)	Progressive assembly which would have accumulated at this rate of run-off, in per cent of mean seasonal run-off.	Departure of progressively accumulated actual run-off from amount at the average rate of run-off, in per cent of mean seasonal run-off. (Difference of columns 4 and 5.)
1	2	3	4	5	6
<b>First season—</b>					
October.....	1,200	1	1	81%	-71%
November.....	3,600	3	4	16%	-12%
December.....	7,200	10	10	25%	-15%
January.....	14,400	22	16	38%	-14%
February.....	19,200	16	38	41%	-25%
March.....	12,000	10	48	50%	-40%
April.....	7,200	5	54	58%	-41%
May.....	3,600	3	57	66%	-9%
June.....	2,400	2	59	75%	-16%
July.....	0	0	59	83%	-24%
August.....	0	0	59	81%	-22%
September.....	1,200	1	60	100	-40%
<b>Second season—</b>					
October.....	9,600	8	68	108%	-40%
November.....	22,800	19	87	116%	-29%
December.....	37,200	31	118	125%	-7%
January.....	52,800	44	162	133%	-28%
February.....	54,000	45	207	141%	-65%
March.....	57,600	48	255	150%	-10%
April.....	50,400	42	297	158%	-12%
May.....	23,200	21	318	166%	-13%
June.....	10,800	9	327	175%	-12%
July.....	3,600	3	330	183%	-15%
August.....	2,400	2	332	191%	-14%
September.....	3,600	3	335	200	-13%
<b>Third season—</b>					
October.....	0	0	335	208%	126%
November.....	0	0	335	216%	113%
December.....	1,200	1	336	225%	111%
January.....	2,400	2	338	233%	104%
February.....	6,000	5	343	241%	101%
March.....	9,600	8	351	250%	101%
April.....	4,800	4	355	258%	96%
May.....	0	0	355	266%	89%
June.....	0	0	355	275%	89%
July.....	0	0	355	283%	71%
August.....	0	0	355	291%	63%
September.....	0	0	355	300	55%
<b>Fourth season—</b>					
October.....	0	0	355	308%	46%
November.....	0	0	355	316%	38%
December.....	0	0	355	325%	30%
January.....	1,200	1	356	333%	22%
February.....	1,200	1	357	341%	15%
March.....	2,400	2	359	350%	9%
April.....	1,200	1	360	358%	+7%
May.....	0	0	360	366%	+6%
June.....	0	0	360	375%	-1%
July.....	0	0	360	383%	-9%
August.....	0	0	360	391%	-17%
September.....	0	0	360	400	-40%
<b>Fifth season—</b>					
October.....	3,600	3	363	408%	-43%
November.....	3,600	3	366	416%	-50%
December.....	10,800	9	375	425%	-50%
January.....	20,400	17	392	433%	-41%
February.....	28,400	22	414	441%	-27%
March.....	45,600	38	452	450%	+2%
April.....	24,000	20	472	458%	13%
May.....	18,000	15	487	466%	20%
June.....	8,400	7	494	475%	19%
July.....	3,600	3	497	483%	13%
August.....	1,200	1	498	491%	6%
September.....	2,400	2	500	500	0

Mean seasonal run-off, 120,000 acre-feet.



CONSTRUCTION AND INTERPRETATION OF MASS DIAGRAMS OF RUNOFF

STATE DEPARTMENT OF PUBLIC WORKS  
DIVISION OF ENGINEERING AND IRRIGATION  
CALIFORNIA WATER RESOURCES INVESTIGATION  
CHAPTER 89 - 1921 STATUTES



These mass diagrams, Plates XCV to CXLVIII, in expressing the manner of occurrence of flow in all the streams of the state during the past fifty years, are emblematic of its irregularities and were used to determine the part of the entire flow that might be equalized by providing various volumes of storage capacity on each stream. That such uniform equalization might be attained and so completely that it would, without question, be of the greatest service to man, waters flowing at irregular intervals were not included in that part of the stream flow which was regarded as equalized. Instead, with the storage in operation, only the fraction of all the waters in the streams was regarded as equalized that would have passed down the channels apportioned among the months of the year in accordance with irrigation needs, year after year, without fail, throughout the entire fifty seasons. These irrigation needs have been taken from Appendix B<sup>1</sup> of this report, in which the seasonal water requirements for all localities of the state have been apportioned among the months of the year. From these apportionments, expressed in per cent of the requirements for the entire season, five typical monthly divisions have been evolved. These were selected so that the needs of every locality are closely represented by one of the five types.

Plate CXLIX, "Irrigation Draft Lines for Storage Studies," presents these five typical monthly divisions of the total seasonal waters needed for irrigation. They are expressed as drafts or demands on the streams for waters to supply them. For each one, a series of lines graphically delineates the way masses of water would accumulate if the rates of accumulation were always adequate to supply these demands. Each series of lines is labeled with one of the letters A to E and they are all plotted in identical units and to the same scales as plates XCV to CXLVIII, "Mass Diagrams of Run-off." The several lines in each series represent different total seasonal drafts but have the same apportionment of water among the months. Since the total seasonal drafts are always less than the average stream flow, the draft lines have a general slope downward to the right and away from their zero lines; for their accumulating masses of water differ by ever increasing amounts from the simultaneous accumulations of average stream flow.

The draft lines were successively superimposed on the mass diagrams to compare them with the various sections of the sinuous lines depicting run-off, and to see how the actual manner of passing of the waters down the streams is like the manner which would have been necessary to put portions of the flow to complete use. Comparisons were made on the diagrams of every stream in the state and the differences noted between the erratic orders of actual stream flow and the uniform orders of flow that would enable complete use to be made of specific portions of their waters. In these comparisons, only one series of draft lines was superimposed on the diagram of each stream and the series was used which has a monthly division of the seasonal supply most nearly fitting the needs of the areas irrigable from that stream.

When placed on the mass diagrams, the draft lines, in taking more regular courses on the sheets, intersect the windings of the sinuous lines representing the run-off. The distances between successive points of

<sup>1</sup>Irrigation requirements of California lands.

Project Description	Status	Priority	Owner	Notes
Project A: New Product Development	On Track	High	John Doe	Review progress weekly.
Project B: System Upgrade	Delayed	Medium	Jane Smith	Identify root cause of delay.
Project C: Marketing Campaign	Completed	Low	Mike Johnson	Final report due next week.
Project D: Infrastructure Upgrade	On Hold	High	Sarah Lee	Re-evaluate budget and scope.

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Plate CXLIX, "Irrigation Draft Lines for Storage Studies," presents these five typical monthly divisions of the total seasonal waters needed for irrigation. They are expressed as drafts or demands on the streams for waters to supply them. For each one, a series of lines graphically delineates the way masses of water would accumulate if the rates of accumulation were always adequate to supply these demands. Each series of lines is labeled with one of the letters A to E and they are all plotted in identical units and to the same scales as plates XCV to CXLVIII, "Mass Diagrams of Run-off." The several lines in each series represent different total seasonal drafts but have the same apportionment of water among the months. Since the total seasonal drafts are always less than the average stream flow, the draft lines have a general slope downward to the right and away from their zero lines; for their accumulating masses of water differ by ever increasing amounts from the simultaneous accumulations of average stream flow.

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When placed on the mass diagrams, the draft lines, in taking more regular courses on the sheets, intersect the windings of the sinuous lines representing the run-off. The distances between successive points of

<sup>1</sup>Irrigation requirements of California lands.

intersection of these two lines, referred to the upper margin scales, are the periods of time during which total run-off and total drafts are exactly equal. That the two lines depart from each other between the intersection points, shows that the run-off during these periods of equal totals did not occur at the draft rates but at other rates either greater or less. When greater, the sinuous lines of run-off climb upward above the draft lines and when less, descend toward them. The departures of these two lines from one another then represent total volumes of water that the natural regimen of the streams may be in excess of, or in deficiency to, the total drafts since the beginning of the period; and the maximum departures, when the run-off is in excess, represent the amounts of water which would have to be caught in storage on the upper course of the stream and released later for augmenting deficient natural flows, in order to equalize the run-off during this period of time with complete uniformity. By superimposing the draft lines on the mass diagrams so that they just touch the sinuous lines at the lowest part of their long downward inclinations to the right where they are about to turn upward, the draft lines intersect, somewhere off to the left, steep upward inclinations of the sinuous lines. The periods of equal total flow and draft represented by the space between these two intersections, then close at times when the stream flow is changing from below normal to above normal, for the run-off lines ascend upward from the draft lines for distances to the right. The equalization of stream flow through all periods which have such closures, completes the equalization for the entire fifty years of diagrammed run-off except for occasional time intervals during which the run-off was greater than normal and consequently in excess of the draft and not requiring equalization.

Plate XIV, "Construction and Interpretation of Mass Diagrams of Run-off," shows a draft line superimposed on a mass diagram of run-off so that it is just tangent at one of these lower points of contraflexure, marked "b." The intersection to the left is marked "a." The maximum departure of the run-off line from the draft line is labeled "ed." Then, if storage capacity in the amount of "ed" to the scale of the drawing, is provided on the stream, the flow during the period of time "ab" may be equalized by it to yield the uniform demand represented by the draft line which is superimposed on the mass diagram. Since the sinuous line turns upward to the right at the point "b" and continues above the draft line for times after, the run-off will be more than sufficient to supply the draft following the close of the period "ab."

Superimposing in this way, the various draft lines on the mass diagrams so that they touch the sinuous lines at all the lower points of contraflexure, the greatest departures between their intersections were scaled. The largest of these departures for all trials of one draft line, was recorded as the storage capacity required to equalize the run-off sufficiently to yield the draft according to the line used. In being adequate to equalize the flow during the period in which the actual stream flow departed most widely from the uniform draft, this capacity would be more than adequate for all other periods between intersections and so through its operation, would make possible without fail, a uniform draft on the stream throughout the entire fifty years in accordance with the rates expressed by the draft line which was superimposed on the mass diagram.

The findings from all the superimpositions, made in this way for all the streams and for all rates of draft, are plotted on thirty-six plates, CL to CLXXXV, "Storage Development Curves." On them, is one diagram for each stream or group of minor streams which show by curved lines, the fractions of the average flow in the streams that may be equalized by constructing storage capacities in any volumes. The fractions of the average flow are expressed in per cent of the mean seasonal run-off by the numbers on the left margins. The numbers on the upper margins express the storage capacity also in per cent of the mean seasonal run-off. The values on these two scales corresponding to the same point on a curve, define that part of the run-off which will be made available for irrigation draft in uniformly equalized flow by construction of the storage capacity indicated on the upper margin.

These curves are seen to be parabolic in shape and much alike for all streams. As they mount upward to show yields of larger portions of the total run-off, they become flatter and spread out more to the right and make continually greater advances in the direction representing greater storage for each unit advance on the run-off scale. The flatter these curves become as they approach the top of the sheets, the more storage capacity must be provided to obtain each unit increase in equalized flow. On the streams of very erratic flow, the curves become quite flat near the top; for much more storage capacity must be provided to hold their excess waters over from the years of plenty to those of need, than on the streams with a steady flow. So on the steadier streams, the curves rise the more directly toward the top of the sheets.

The full lines on the diagrams indicate these relations taken directly from the mass diagrams. However, evaporation would be ever active from the surfaces of the reservoired waters, so that to secure the net per cent of run-off that would be available for use, certain deductions must be made from it for losses by evaporation. To evaluate these deductions, the average area of surface exposed to the atmosphere was determined for several hundred reservoirs and, from statistics on evaporation, the average annual loss was obtained for all localities. Curves of dashed lines were then drafted on the diagrams; these fall below the full line curves. The ordinates parallel to the run-off scale, which are intercepted between these dashed and the full curves, are the values of these evaporation losses from the reservoired waters. The storage capacity and available run-off, disclosed by these dashed curves, are then the ones for practical use for they show the net quantities of water which could be diverted from the streams for irrigation use. Both the storage capacity and the equalized flow made available by constructing it, are in terms of per cent of the mean annual run-off. To evaluate them in acre-feet, the per cent obtained from the diagrams should be multiplied by the mean annual run-off of the stream, and this is printed on each diagram. Then, these one hundred and forty storage development curves set forth the quantities of water made available for irrigation use through the construction of any volume of storage that might be desired on California's streams.

## CHAPTER VII.

**WATER RESOURCES OF THE STATE.**

Only one-half of the wide expanse of California contributes to the waters of its streams. The other half, lower in altitude and more even of surface, is favorably disposed for the occupancy of man, and its populated sections need water in order that their industrial expansion may continue and communal civilization progress steadily onward. The production of food, the generation of power, and the supply of water for domestic use, in the drier half of the state, are largely dependent upon the waters of the streams which have their source in the more elevated regions. The farmer relies upon the streams during the warm, dry summers for supplementary moisture to mature his crops and upon their hydro-electric energy to pump his irrigation waters. The electric energy, generated by the waters of the streams as they descend the mountain's slopes, furnishes power and illumination to the industrial centers, and light and heat and means of operating many conveniences, to the entire social organization. But most of all, the cities, towns, and villages, the pleasures and comforts of their congregated people, require these waters in abundance for drinking and washing purposes, and the expansion of all these benefits to include larger populations, demands increased supplies for the future and the uninterrupted service of water in purity and plenty, at all times of the year, and in all successive years alike.

However, California's waters, fluctuating in amount not alone throughout the year, but markedly from one year to another, drain off its mountain lands in concentrated winter floods or in dwindling and meager summer flows. This erratic behavior of the state's streams, whereby their courses are intermittently deluged by rising floods or emptied by vanishing waters, necessitates that their regimen be rectified if man is to utilize their powers in accelerating his advancement. The capricious irregularity of natural flow has to be equalized to make waters available at the times and in the quantities needed.

To discern the reliable amounts which may be made available by equalizing these variable supplies, as well as to discover the most favorable sources from which waters may be transported, are equally important in planning works to accomplish man's desires. For these purposes, it is imperative that full knowledge be gained of the location of the state's waters, their amounts, and the variability of their production. That these features might be revealed Table 3, "Water Resources of California," lists hydrographic quantities concerning every stream of the state. In this table, one hundred forty streams or groups of minor streams are arranged in geographic order and segregated by the six large topographic divisions of the state: the basins of the Sacramento and San Joaquin; and the regions of San Francisco Bay, of the north and south Pacific coasts, and of the Great Basin. The location of each one of these streams or groups of minor streams, is shown on the map of California, Plate XV, "Map Showing Boundaries of Drainage Basins."



TABLE 3. WATER RESOURCES OF CALIFORNIA.

Main data table with columns for Basin, Year, Area, Annual runoff, and various yield metrics. Includes sub-sections for Sacramento Basin, San Joaquin Basin, and San Francisco Bay Basins.



No.	Name	Q	S	D	North Pacific Basins		M	S	D	M	S	D	M	S	D	M	S	D	M	S	D	M	S	D	M	S	D	M	S	D	M	S	D	M	S	D	M	S	D
					Q	S																																	
2319		2,249	11,724	22	70	1,401	26.3																																

NORTH PACIFIC BASINS																																												
327		3,186,220	4.5	108	9	3,311,639	9,359	120	8	3,222,911	1,057	47.5	64,760	136,269	26,551	42,899	37,189	19,203	3,097,160	94	5,518,980	1.34	1,362,459	1,128,074	0.93	1,703,107	1,429,710	0.93	2,443,720	1,944,550	0.95	2,194,250	2,267,705	1.09	875	809,500	191	119,761	203	128,636	264	128,220	308	117

SOUTH PACIFIC BASINS																																										
14		31,401	171	5	212,949	1,228	20.0	1,301	3	1,185	3	1	15,222	2,391	19	441	1,853	0	66,641	47	341,551	5.9	14,805	70,990	5.89																	

GREAT BASIN																																										
90		375,300	5.7	1,134,990	1,281	23.7	43,243	48	9	1,169	4,991	280	1,109	6,699	308	129,180	17	1,860,800	0.92	110,928	412,639	3.70																				

No.	Name	Q	S	D	North Pacific Basins			South Pacific Basins			Great Basin			North Pacific Basins			South Pacific Basins			Great Basin																					
					Q	S	D	Q	S	D	Q	S	D	Q	S	D	Q	S	D	Q	S	D																			
27	Chico Creek, Rialto Creek	18	2,249	22	70	1,401	26.3																																		



The features of all these streams, the amounts of their waters, and the variability of their production, are characterized in Table 3, by values listed in forty columns extending out to the right from the first two, which contain their names and reference numbers. Through these reference numbers, information may be traced in the diagrams and tables of the previous chapters, which is too voluminous to incorporate in this summary tabulation. The values which are listed in the forty columns, all concern the run-off from the drainage areas lying upstream from the main bodies of agricultural land along their lower reaches. The areas of these drainage basins are printed in the third column and in the fourth to the twelfth are values of their run-off expressed in several different units. These entries include the quantity of water running off their collecting areas in an average season, and also in the seasons of greatest and least run-off. The quantities affixed to each stream, definitely locate all the state's waters and show between what limits the flow of successive seasons may vary. The mean seasonal quantities express the average amounts in which they may be expected to appear and constitute a statement of all existent waters.

While the average annual water production of all these streams is 72,500,000 acre-feet, this invoice of California's waters shows that the maximum yield is two and three-quarters times this amount, and that the least season's yield is but three-eighths as much. The total run-off in successive seasons, then, fluctuates between limits, one seven times the other, and the value of any one season lies at random between them.

In addition to changing from year to year, all the streams of the state have a fluctuating daily flow. Inclusions have been made in columns 13 to 18, and 35 to 42, of Table 3, to define the extremes between which the daily flows are accustomed to range. Columns 13 to 18 give values to the run-off during the months of July and August. These two mid-summer months are times of the year of nearly the least flow and in which water is of much value agriculturally. The quantities include the entire month's run-off, and when divided by sixty, afford values of the average daily flow during the low water periods in cubic feet per second. Contrasting them, are the values of flood flows in columns 35 to 42. These entries are of especial import in not only indicating the upper limits of variability in stream flow, but also in indicating the maximum volumes of water which flood protection works may have to withstand. Comparisons of these flood values with the low water flows of July and August, disclose a surprisingly great range in the rate of flow in California's streams.

As an average over the whole state, the greatest daily flow exceeds five hundred times the least. In taking values between these wide limits for all the days of successive years, the greater flows exceed the least in all degrees of magnitude, but the very large ones are the most infrequent in occurrence. To give perspective to the occurring frequency of exceedingly great flows, the sizes that may be surpassed within intervals of twenty-five, fifty, seventy-five, and one hundred years, are tabulated in columns 35 to 42. These greatest values of mean daily flow constitute the floods of California's streams and it is to be observed in general, that once in twenty-five years the extraordinary values of daily flow swell at least forty-fold, the average volume in their channels; and that once in one hundred years, even these may be exceeded by flows that are one-quarter larger.

So large are the volumes of water that pass down the state's waterways during these great floods, that the rate, which would only be exceeded on an average of four times a century, would send a plethora of waters into the ocean within four days whose aggregate is equivalent to the entire production of every drainage basin in the state for their seasons of least flow. During but one of these days, the total flow would be ample to supply an urban population of seventy millions of people with domestic water for a year, or to irrigate four million acres of agricultural land through an entire season, or still, to generate one hundred thousand horsepower continuously for twelve months when dropping through a height of one hundred feet. Nevertheless, these volumes of water are useless to man because of their extremely infrequent appearance in the stream channels. The waters of lesser floods, however, may be caught by storage works constructed in the mountainous regions and be detained for later release to supplement the waning natural flow in the streams. By such detention of the flood waters for subsequent use, the erratic run-off may be equalized and made available to man at times convenient to his special purposes.

The greatest fractions of the mean seasonal flow which may be constrained to man's service through retention in storage reservoirs, are set forth for all the streams, in column 20 of Table 3, and in column 21 are found the storage capacities required to do this. The yields from lesser amounts of storage are given in columns 23 to 34. The maximum yield possible from the entire water-producing areas of the state is 58,300,000 acre-feet annually, or 80 per cent of the mean seasonal run-off. To secure this maximum yield would require storage of 184,900,000 acre-feet total capacity. This volume is slightly greater than three times the annual equalized yield. Such large proportional amounts of storage are not needed if smaller fractions only, of the mean seasonal flow are equalized. Capacity for storage of two times the net annual yield, will develop 70 per cent of the mean annual run-off from the state's drainage areas, and when this capacity is just equal to the yield in volume, it will develop 40 per cent of the mean annual run-off.

All these hydrographic quantities of Table 3, while having characteristics which qualify the state's waters as a whole, vary considerably for the separate drainage basins. Nevertheless, adjacent basins are sufficiently alike to render distinction to whole regions by reasons of their special values. These regional values, in departing from those for the entire state, are still only indicative of the predominating characteristics of the region, and individual basins may have features widely different from the predominant ones.

The six large topographic divisions of the state have such predominant regional characteristics. Of these, the Sacramento Drainage Basin is the largest. It comprises not only all the area lying between the Coast Range and Sierra Nevada mountains as far south as Suisun Bay, but also the drainage area of Pit River to the east of the mountains in the northeastern corner of the state. This large basin contains one-quarter of the state's water-producing area, and with the exception of the north Pacific Coast region, it produces more than any other of the six divisions and one-third of all California's waters.

The San Joaquin drainage basin is second largest of the six topographic divisions, but only produces one-sixth of the waters. This

basin comprises all the area between the Coast Range and Sierra Nevada mountains, southerly from Suisun Bay to Tehachapi Pass. The third largest division is the north Pacific Coast region which includes all the streams draining into the Pacific Ocean northward from San Francisco Bay. It contains only one-fifth of the water-producing area, but over one-third of all the waters of the state run off its drainage area. This is a greater yield than in any other of the divisions. For equal area, it produces one-third more water than the Sacramento Basin and over twice that of the San Joaquin. This region contains the most productive drainage basin in the state, the Smith River. Although it is only 627 square miles in extent, the mean annual run-off is nearly three and one-half million acre-feet.

The region southward from San Francisco Bay which drains into the Pacific Ocean, is called the south Pacific Basin and is the region of smallest water yield. Although containing one-sixth of the drainage area, but one-twentieth of the state's waters run off its slopes. Next in size, is the region of the Great Basin which comprises the areas easterly from California's principal mountain system, and whose waters do not reach the ocean. One-tenth the water-producing area of the state is in this region but it yields only one-twentieth of the waters; its increment is about equal to that of the South Pacific region. The smallest of the six topographic divisions is the area draining into San Francisco Bay which contributes only one per cent to the total waters of the state.

There is a great difference between these six regions in the manner in which their waters run off the collecting areas. Generally, the regions of least total production have the greatest variability in run-off and demand more capacity in storage works to equalize their stream flow. The south Pacific region, the least productive of the six, requires three times the capacity necessary on the Sacramento and San Joaquin streams, to obtain equal effects. The north Pacific region, the most productive of the six, requires slightly more storage than in the Sacramento and San Joaquin basins since it has a smaller summer flow in its streams. The San Francisco Bay region has the least summer flow of the six divisions, but, having a smaller annual fluctuation than the south Pacific region, it falls intermediate in the effectiveness of storage on its streams, between the south Pacific region and the three largest water-producing regions for which storage capacity is nearly equally effective. Almost twice as much capacity is required to gain equal results in the San Francisco Bay region as on the Sacramento and San Joaquin rivers.

The amounts of storage required to equalize the flow, relate largely to the variation between years of maximum and minimum runoff and to the apportionment of the annual run-off between the winter and summer months. The North Pacific region has the smallest variation in annual run-off, and there the maximum is only five times that of the minimum season. The maximum year in the Sacramento Basin is six times the least, while in all the other regions the variation is much larger than in these two: in the San Joaquin it is fifteen times the least, in the San Francisco Bay region it is seventy times the least, and in the south Pacific, the year of maximum run-off is one hundred times the least year. While the San Francisco Bay region has the smallest portion of its waters wetting the stream channels during the summer months,

the Great Basin drainage is distinguished by having the largest apportionment of summer flow of any of the six regions. The streams of the San Joaquin Basin are next in order and those of the Sacramento not far behind. The north Pacific region has an intermediate apportionment in the summer months between that of the San Joaquin and that of the South Pacific region.

Similar comparisons may be made between any of the individual drainage basins in the state by entering Table 3 in the proper columns. The flow in all streams during the largest, the smallest, and the average season, as well as during the midsummer months, is there. Also the storage capacity required to equalize their variant flows and the size of extreme floods are enumerated. So, comprised within Table 3, is a complete inventory of all the waters of the state which includes their locations, their quantities, and their variabilities. The values entered in the table are averages for the past half century and should be indicative of future expectancies, so that this table presents in full the water resources of the State of California with their characterizations.

TABLE 4. RAINFALL STATIONS AND SUMMARY OF PRECIPITATION DATA.

This table presents, in alphabetical order, the rainfall stations of the United States Weather Bureau which have records of precipitation covering periods of ten years or longer.

The reference numbers appearing in the first column identify the stations in Tables 2 to 31, inclusive, and on Plates II to XII, inclusive, and XVII. The stations are listed in numerical order on Plates XII and XVII.

The table number in column four refers to Tables 2 to 30, inclusive, Records of Precipitation and Table of Computed Indices of Wetness, and Table 31, Miscellaneous Precipitation Records of U. S. Weather Bureau. These tables present the measured seasonal precipitation at the stations listed, and the computed index of seasonal wetness for each season of the 50-year period from 1871-72 to 1920-21.

In column five is given the designating letter of the precipitation division in which the respective stations are located, the boundaries of which are shown on Plate XII, Map Showing Boundaries of Precipitation Divisions.

In column eight is presented the mean precipitation for the 50-year period for the respective stations. This value is computed for those stations having less than fifty years of record.

Reference number.	Rainfall station.	County.	Table number.	Precipitation Division.	Years of record.	Mean precipitation in inches.		Elevation above sea level in feet.
						Period of record.	50 year period.	
247	Aguanga . . . . .	Riverside . . . . .	29	Y	13	13 76	13 8	1,986
3	Alturas . . . . .	Modoc . . . . .	5	A	15	12 34	14 2	4,460
237	Anaheim . . . . .	Orange . . . . .	28	X	29	11 80	12 0	134
186	Angiola . . . . .	Tulare . . . . .	23	S	15	6 51	6 2	208
128	Antioch . . . . .	Contra Costa . . . . .	16	L	42	12 52	12 4	46
155	Aptos . . . . .	Santa Cruz . . . . .	19	O	30	28 12	26 8	102
227	Arrowhead Springs . . . . .	San Bernardino . . . . .	28	X	7	24 30	22 7	2,000
90	Auburn . . . . .	Placer . . . . .	14	J	50	33 72	33 7	1,360
220	Azusa . . . . .	Los Angeles . . . . .	27	W	22	19 63	20 4	540
269	Bagdad . . . . .	San Bernardino . . . . .	31		18	2 17		784
188	Bakersfield . . . . .	Kern . . . . .	23	S	31	5 58	5 2	394
268	Barstow . . . . .	San Bernardino . . . . .	31		24	4 26		2,105
190	Bear Valley . . . . .	Kern . . . . .	23	S	13	20 02	16 0	4,400
229	Bear Valley Dam . . . . .	San Bernardino . . . . .	28	X	22	35 96	36 4	6,500
242	Beaumont . . . . .	Riverside . . . . .	28	X	16	19 22	18 5	2,558
241	Beaumont (near) . . . . .	Riverside . . . . .	28	X	10	23 34	22 8	3,045
145	Ben Lomond . . . . .	Santa Cruz . . . . .	18	N	16	55 55	54 4	300
127	Berkeley . . . . .	Alameda . . . . .	31		34	25 72		320
47	Biggs . . . . .	Butte . . . . .	10	F	17	22 20	20 0	98
262	Bishop . . . . .	Inyo . . . . .	30	Z	31	5 43	5 5	4,450
263	Bishop Creek . . . . .	Inyo . . . . .	30	Z	7	14 09	15 3	8,500
28	Blocksburg . . . . .	Humboldt . . . . .	9	E	11	67 37	63 1	1,700
83	Blue Canyon . . . . .	Placer . . . . .	14	J	22	66 17	64 6	4,695
275	Blythe . . . . .	Riverside . . . . .	31		9	4 34		268
77	Boca . . . . .	Nevada . . . . .	13	I	44	21 05	21 1	5,531

TABLE 4—(Continued). RAINFALL STATIONS AND SUMMARY OF PRECIPITATION DATA.

Reference number.	Rainfall station.	County.	Table number.	Precipitation Division.	Years of record.	Mean precipitation in inches.		Elevation above sea level in feet.
						Period of record.	50 year period.	
261	Bodie.....	Mono.....	30	Z	11	14 58	17.3	8,248
141	Boulder Creek.....	Santa Cruz.....	18	N	28	55 59	53.0	470
74	Bowmans Dam.....	Nevada.....	12	H	39	74 38	73.0	5,500
29	Branscomb.....	Mendocino.....	9	E	21	85 25	82.4	2,600
243	Cabezon.....	Riverside.....	28	X	11	11 60	12.0	1,779
277	Calexico.....	Imperial.....	31		16	2 91		0
182	Cahente.....	Kern.....	22	R	39	10 94	10.8	1,290
134	Calistoga.....	Napa.....	17	M	48	36 50	36.5	363
149	Campbell.....	Santa Clara.....	18	N	24	15 39	16.1	217
260	Campo.....	San Diego.....	29	Y	31	20 50	20.3	2,543
66	Camptonville.....	Yuba.....	12	H	14	68 17	74.0	3,500
2	Cedarville.....	Modoc.....	5	A	27	13 13	14.7	4,675
45	Chico.....	Butte.....	10	F	50	23 78	23.78	189
21	China Flat.....	Humboldt.....	7	C	12	45 92	46.5	600
235	Chino.....	San Bernardino.....	28	X	22	15 71	16.3	714
81	Ciseo.....	Placer.....	14	J	46	50 57	50.9	5,939
223	Claremont.....	Los Angeles.....	27	W	30	18 10	19.3	1,200
32	Cloverdale.....	Sonoma.....	9	E	21	41 73	39.6	340
87	Colfax.....	Placer.....	14	J	51	47 81	48.2	2,421
69	Colgate.....	Yuba.....	12	H	12	42 77	45.0	700
49	Colusa.....	Colusa.....	10	F	40	16 12	16.4	60
44	Corning.....	Tehama.....	10	F	34	20 59	19.9	277
236	Corona.....	Riverside.....	28	X	12	13 06	13.0	615
232	Craftonville.....	San Bernardino.....	28	X	17	14 10	14.9	1,759
23	Cresecent City.....	Del Norte.....	8	D	30	75 95	73.9	50
109	Crocker's.....	Tuolumne.....	15	K	13	54 97	50.9	4,452
254	Cuyamaca.....	San Diego.....	29	Y	33	38 95	38.8	4,667
131	Davis.....	Yolo.....	17	M	49	17 04	17.1	51
72	Deer Creek.....	Nevada.....	12	H	14	68 07	73.9	3,700
183	Delano.....	Kern.....	22	R	32	6 38	6.6	319
9	Delta.....	Shasta.....	6	B	39	63 93	64.0	1,138
114	Denair.....	Stanislaus.....	15	K	18	10 39	9.8	126
55	De Saba.....	Butte.....	11	G	17	67 37	69.2	2,500
255	Descanso.....	San Diego.....	29	Y	12	22 72	25.4	3,400
68	Dobbins (near).....	Yuba.....	12	H	17	43 76	44.7	1,650
65	Downieville.....	Sierra.....	12	H	13	63 55	67.8	3,150
50	Dunnigan.....	Yolo.....	10	F	39	20 27	19.7	65
8	Dunsmuir.....	Siskiyou.....	6	B	32	53 82	51.8	2,285
46	Durham.....	Butte.....	10	F	24	24 96	24.0	160
40	East Park.....	Colusa.....	10	F	10	16 98	17.3	1,200
189	Edison.....	Kern.....	23	S	16	11 21	9.4	2,500
59	Edmanton.....	Plumas.....	11	G	13	73 28	66.5	4,750
257	El Cajon.....	San Diego.....	29	Y	22	13 75	13.7	482
101	Electra.....	Amador.....	15	K	17	32 44	32.7	725
240	Elsinore.....	Riverside.....	28	X	22	13 16	13.5	1,234
82	Emigrant Gap.....	Placer.....	14	J	41	52 91	54.5	5,230
252	Esccondido.....	San Diego.....	29	Y	24	16 00	16.6	650
24	Eureka.....	Humboldt.....	8	D	34	42 52	42.3	64
246	Fallbrook.....	San Diego.....	29	Y	27	17 27	17.2	700
116	Farmington.....	San Joaquin.....	15	K	38	16 49	15.9	111
146	Felton.....	Santa Cruz.....	18	N	26	46 88	44.7	275
95	Folsom.....	Sacramento.....	14	J	50	24 37	24.4	252
76	Fordyce Dam.....	Nevada.....	12	H	27	68 43	67.8	6,500
1	Fort Bidwell.....	Modoc.....	5	A	36	18 31	17.2	4,640
27	Fort Bragg.....	Mendocino.....	8	D	21	38 66	40.7	74
20	Fort Gaston.....	Humboldt.....	8	D	25	50 45	50.3	397
34	Fort Ross.....	Sonoma.....	9	E	45	53 87	53.2	100
169	Fresno.....	Fresno.....	21	Q	40	9 78	9.6	293
42	Fruto.....	Glenn.....	10	F	22	21 67	19.5	624
104	Galt.....	Sacramento.....	15	K	42	18 26	18.1	49
89	Georgetown.....	El Dorado.....	14	J	46	57 92	57.3	2,650
153	Gilroy.....	Santa Clara.....	19	O	47	19 90	19.8	193
221	Glendora.....	Los Angeles.....	27	W	11	23 66	23.2	740
267	Glen Rutch.....	San Bernardino.....	31		16	35 40		3,256
181	Glennville.....	Kern.....	22	R	12	20 96	21.2	5,500



TABLE 4—(Continued). RAINFALL STATIONS AND SUMMARY OF PRECIPITATION DATA.

Reference number.	Rainfall station.	County.	Table number.	Precipitation Division.	Years of record.	Mean precipitation in inches.		Elevation above sea level in feet.
						Period of record.	50 year period.	
85	Gold Run	Placer	14	J	20	51.09	49.3	3,222
192	Gonzales	Monterey	24	T	16	12.60	11.6	127
70	Grass Valley	Nevada	12	H	46	53.00	52.8	2,490
60	Greenville	Plumas	11	G	20	43.66	39.7	3,600
48	Gridley	Butte	10	F	10	22.31	21.9	97
108	Groveland	Tuolumne	15	K	8	43.96	38.0	1,400
133	Guinda	Yolo	17	M	20	21.92	21.0	350
173	Hanford	Kern	21	Q	19	8.49	8.5	249
67	Head Dam	Yuba	12	H	14	54.23	58.8	1,500
33	Healdsburg	Sonoma	9	E	44	41.84	41.4	52
35	Helen Mine	Lake	10	F	21	87.67	83.0	2,750
159	Hollister	San Benito	19	O	47	13.19	13.1	284
15	Hornbrook	Siskiyou	7	C	28	14.74	13.6	2,154
178	Hot Springs	Tulare	22	R	10	25.65	23.5	3,300
39	Hullville	Lake	10	F	14	51.23	52.3	2,250
245	Idyllwild	Riverside	28	X	10	27.80	26.1	5,250
264	Independence	Inyo	30	Z	30	4.87	4.3	3,957
272	Indio	Riverside	31	43	43	2.91		—20
57	Inskip	Butte	11	G	14	80.08	88.5	4,975
103	Ione	Amador	15	K	43	20.39	20.2	287
86	Iowa Hill	Placer	14	J	31	52.63	50.1	2,825
180	Isabella	Kern	22	R	13	10.62	10.3	2,500
196	Jolon	Monterey	24	T	37	18.09	17.7	960
253	Julian	San Diego	29	Y	22	32.85	32.1	4,500
266	Keeler	Inyo	30	Z	24	3.01	3.2	3,620
100	Kennedy Mine	Amador	15	K	29	32.14	30.9	1,500
10	Kennett	Shasta	6	B	14	63.35	66.3	730
141	Kentfield	Marin	17	M	33	48.25	46.7	65
179	Kernville	Kern	22	R	27	10.30	10.0	2,600
194	King City	Monterey	24	T	32	11.12	11.0	330
36	Kono Tayce (Lakeport)		10					
113	La Grange	Stanislaus	15	K	36	16.46	16.8	293
36	Lakeport	Lake	10	F	21	22.77	23.6	1,325
75	Lake Spaulding	Nevada	12	H	27	70.25	69.6	4,600
63	La Porte	Plumas	11	G	25	76.62	77.5	5,000
147	Laurel	Santa Cruz	18	N	25	49.10	48.2	910
165	Le Grand	Merced	20	P	21	12.67	12.0	255
175	Lemon Cove	Tulare	22	R	21	14.66	14.0	600
152	Lick Observatory	Santa Clara	18	N	40	30.60	30.0	4,209
120	Livermore	Alameda	16	L	50	15.30	15.30	485
117	Lodi	San Joaquin	16	L	24	19.46	17.9	35
265	Lone Pine	Inyo	30	Z	16	5.70	4.3	3,728
221	Lordsburg	Los Angeles	27	W	14	21.00	19.4	1,320
222	Los Angeles	Los Angeles	27	W	44	15.50	15.2	361
160	Los Banos	Merced	20	P	39	7.95	8.2	121
148	Los Gatos	Santa Clara	18	N	36	33.09	32.8	600
216	Lowe Observatory	Los Angeles	27	W	21	27.50	28.9	3,420
226	Lytle Creek	San Bernardino	28	X	16	38.40	36.0	2,250
4	Madeline	Lassen	5	A	13	14.60	17.5	5,270
54	Magalia	Butte	11	G	13	85.24	81.5	2,321
51	Marysville	Yuba	10	F	50	19.71	19.71	67
6	McCloud	Siskiyou	6	B	10	46.72	50.0	3,270
273	Mecca	Riverside	31	16	13	3.22		—185
168	Mendota	Fresno	21	Q	16	6.54	6.3	177
164	Merced	Merced	20	P	49	11.02	11.1	173
112	Merced Falls	Merced	15	K	11	15.87	16.2	351
251	Mesa Grande	San Diego	29	Y	13	30.39	30.4	3,350
98	Mill Creek No. 1	Amador	15	K	14	44.42	48.0	2,450
231	Mill Creek No. 2	San Bernardino	28	X	18	24.36	23.0	2,950
124	Mills College	Alameda	16	L	21	26.41	24.8	200
176	Milo	Tulare	22	R	20	22.85	21.3	1,600
106	Milton	Calaveras	15	K	33	21.56	20.7	660
163	Modesto	Stanislaus	20	P	44	10.66	10.7	90
211	Mojave	Yuba	26	V	37	4.93	4.8	2,751
102	Mokelumne Hill	Calaveras	15	K	36	31.93	31.0	1,550

TABLE 4—(Continued). RAINFALL STATIONS AND SUMMARY OF PRECIPITATION DATA.

Reference number.	Rainfall station.	County.	Table number.	Precipitation Division.	Years of record.	Mean precipitation in inches.		Elevation above sea level in feet.
						Period of record.	50 year period.	
17	Montague	Siskiyou	7	C	30	12.26	11.6	2,450
157	Monterey	Monterey	19	O	41	16.25	16.3	15
215	Monterey	Kern	26	V	13	17.87	18.0	4,500
142	Mt. Tamalpais	Marin	17	M	22	26.80	26.8	2,375
217	Mt. Wilson	Los Angeles	27	W	17	33.30	31.8	5,850
138	Napa	Napa	17	M	41	23.66	23.4	20
270	Needles	San Bernardino	31		29	4.28		477
249	Nelle	San Diego	29	Y	13	48.38	45.4	5,350
71	Nevada City	Nevada	12	H	57	53.89	52.21	2,580
92	New Castle	Placer	14	J	14	34.27	29.7	970
212	Newhall	Los Angeles	25	U	38	17.87	17.5	1,268
161	Newman	Stanislaus	20	P	32	10.83	10.2	91
121	Niles	Alameda	16	L	42	19.05	18.7	87
73	North Bloomfield	Nevada	12	H	43	53.98	54.6	3,200
166	North Fork	Madera	21	Q	12	35.52	35.9	3,000
37	North Lakeport	Lake	10	F	18	30.40	28.5	1,450
115	Oakdale	Stanislaus	15	K	34	14.27	14.0	156
126	Oakland	Alameda	31		47	23.84		36
250	Oceanside	San Diego	29	Y	10	12.87	12.8	60
209	Ojai Valley	Ventura	25	U	16	23.87	20.6	900
43	Orland	Glenn	10	F	38	18.02	17.5	254
19	Orleans	Humboldt	7	C	18	50.00	46.8	5,200
53	Oroville	Butte	11	G	36	28.03	27.7	250
204	Ozema	Ventura	24	T	15	17.10	15.8	3,680
52	Palermo	Butte	11	G	23	23.98	22.0	213
271	Palm Springs	Riverside	31		26	4.50		584
197	Parkfield	Monterey	24	T	11	17.64	16.8	2,800
218	Pasadena	Los Angeles	27	W	22	18.52	19.8	827
199	Paso Robles	San Luis Obispo	24	T	34	16.35	16.3	800
137	Peachland	Sonoma	17	M	25	41.11	41.4	190
140	Petaluma	Sonoma	17	M	29	23.93	24.2	10
88	Pilot Creek	El Dorado	14	J	20	69.21	65.9	4,000
205	Pine Crest	Santa Barbara	25	U	17	27.95	25.3	1,000
97	Placerville	El Dorado	14	J	43	42.65	42.5	1,875
258	Point Loma	San Diego	29	Y	17	11.20	10.7	302
143	Point Reyes	Marin	31		38	20.98		490
184	Porterville	Tulare	23	S	32	10.13	9.4	464
256	Poway	San Diego	29	Y	24	13.96	13.9	460
195	Priest Valley	Monterey	24	T	19	21.54	20.3	2,240
61	Quincy	Plumas	11	G	26	42.14	42.0	3,400
13	Red Bluff	Tehama	6	B	44	25.19	24.7	307
12	Redding	Shasta	6	B	46	38.52	37.7	552
233	Redlands	San Bernardino	28	X	32	14.64	14.7	1,352
171	Reedley	Fresno	21	Q	20	11.65	11.5	347
129	Rio Vista	Solano	16	L	24	17.87	17.3	35
234	Riverside	Riverside	28	X	40	10.89	10.7	851
93	Roekhn	Placer	14	J	48	22.01	22.4	249
25	Rohnerville	Humboldt	8	D	19	42.86	42.8	75
94	Sacramento	Sacramento	31		72	18.72		71
135	St. Helena	Napa	17	M	13	35.42	37.0	255
158	Salinas	Monterey	19	O	47	14.05	14.0	40
274	Salton	Riverside	31		18	2.66		-263
228	San Bernardino	San Bernardino	28	X	51	16.11	16.15	1,054
259	San Diego	San Diego	29	Y	71	9.66	9.94	87
125	San Francisco	San Francisco	31		72	22.49		207
170	Sanger	Fresno	21	Q	25	10.66	10.3	371
244	San Jacinto	Riverside	28	X	28	12.98	13.4	1,550
150	San Jose	Santa Clara	18	N	47	15.11	15.1	95
123	San Leandro	Alameda	16	L	14	23.77	22.7	48
201	San Luis Obispo	San Luis Obispo	24	T	52	21.27	21.62	201
122	San Mateo	San Mateo	16	I	47	20.61	20.6	22
198	San Miguel	San Luis Obispo	24	T	28	11.84	11.6	616
207	Sau Miguel Island	Santa Barbara	25	U	23	13.40	13.5	500
238	Santa Ana	Orange	28	X	11	12.98	12.6	133
206	Santa Barbara	Santa Barbara	25	U	51	18.54	18.82	130

TABLE 4—(Concluded). RAINFALL STATIONS AND SUMMARY OF PRECIPITATION DATA.

Reference number.	Rainfall station.	County.	Table number.	Precipitation Division.	Years of record.	Mean precipitation in inches.		Elevation above sea level in feet.
						Period of record.	50 year period.	
151	Santa Clara.....	Santa Clara.....	18	N	38	16.19	15.9	90
156	Santa Cruz.....	Santa Cruz.....	19	O	43	27.23	27.1	20
200	Santa Margarita.....	San Luis Obispo.....	24	T	27	28.32	27.4	996
202	Santa Maria.....	Santa Barbara.....	24	T	30	14.16	14.2	220
211	Santa Monica.....	Los Angeles.....	25	U	36	14.99	14.4	110
136	Santa Rosa.....	Sonoma.....	17	M	33	30.38	29.4	181
172	Selma.....	Fresno.....	21	Q	29	9.11	9.0	311
230	Seven Oaks.....	San Bernardino.....	28	X	10	28.26	27.6	5,000
11	Shasta.....	Shasta.....	6	B	17	53.80	51.2	1,049
96	Shingle Springs.....	El Dorado.....	14	J	35	33.72	34.1	1,415
219	Sierra Madre.....	Los Angeles.....	27	W	24	24.22	25.7	1,400
64	Sierraville.....	Sierra.....	11	G	12	23.12	26.2	5,000
203	Sisquoc Ranch.....	Santa Barbara.....	24	T	10	19.92	17.6	600
7	Sisson.....	Siskiyou.....	6	B	32	36.56	35.2	3,555
193	Soledad.....	Monterey.....	24	T	45	9.48	9.4	188
139	Sonoma.....	Sonoma.....	17	M	17	28.46	26.5	30
107	Sonora.....	Tuolumne.....	15	K	26	33.96	32.5	1,825
191	Spreckles.....	Monterey.....	24	T	16	13.98	13.2	43
177	Springville.....	Tulare.....	22	R	14	35.14	34.3	4,000
62	Stanwood.....	Butte.....	11	G	15	67.66	65.1	2,140
276	Sterling.....	Imperial.....	31		43	2.32		255
58	Stirling City.....	Butte.....	11	G	14	75.85	70.5	3,525
118	Stockton.....	San Joaquin.....	16	L	54	14.08	14.18	23
167	Storey.....	Madera.....	21	Q	21	9.63	9.4	296
130	Suisun.....	Solano.....	17	M	46	19.66	19.8	20
111	Summerdale.....	Mariposa.....	15	K	14	55.00	51.3	5,000
80	Summit.....	Placer.....	14	J	50	46.38	46.38	7,017
5	Susanville.....	Lassen.....	5	A	28	20.70	21.9	4,195
79	Tamarack.....	Alpine.....	13	I	18	49.02	49.6	8,030
213	Tehachapi.....	Kern.....	23	V	37	10.69	10.4	3,964
14	Tehama.....	Tehama.....	31		44	20.53		220
84	Towle.....	Placer.....	14	J	30	57.36	56.4	3,704
119	Tracy.....	San Joaquin.....	16	L	40	10.13	9.8	64
78	Truckee.....	Nevada.....	13	I	50	26.13	26.3	5,819
185	Tulare.....	Tulare.....	23	S	44	8.39	8.4	289
239	Tustin (near).....	Orange.....	28	X	44	13.13	13.0	200
31	Ukiah.....	Mendocino.....	9	E	44	36.82	36.4	620
225	Upland.....	San Bernardino.....	27	W	20	21.00	23.1	1,750
38	Upper Lake.....	Lake.....	10	F	28	28.25	26.8	1,350
26	Upper Mattole.....	Humboldt.....	8	D	33	85.04	84.1	244
105	Valley Springs.....	Calaveras.....	15	K	26	24.37	22.5	673
208	Ventura.....	Ventura.....	25	U	35	15.94	16.5	50
174	Visalia.....	Tulare.....	21	Q	41	9.89	9.6	334
18	Walla Walla Creek.....	Siskiyou.....	7	C	34	25.32	30.6	2,570
248	Warner Springs.....	San Diego.....	29	Y	15	17.67	17.7	3,165
187	Wasco.....	Kern.....	23	S	18	6.43	5.4	336
154	Watsonville.....	Santa Cruz.....	19	O	31	21.71	21.1	23
22	Weaverville.....	Trinity.....	7	C	31	37.81	39.2	2,162
56	West Branch.....	Butte.....	11	G	14	72.35	80.0	3,216
162	Westley.....	Stanislaus.....	20	P	26	10.70	10.0	90
99	West Point.....	Calaveras.....	15	K	24	41.85	40.2	2,326
210	West Saticoy.....	Ventura.....	25	U	19	14.72	15.1	150
91	Wheatland.....	Yuba.....	14	J	29	22.21	21.3	84
30	Willits.....	Mendocino.....	9	E	29	55.91	54.9	1,364
41	Willows.....	Glenn.....	10	F	42	16.65	16.6	136
132	Woodland.....	Yolo.....	17	M	48	17.49	17.5	63
110	Yosemite.....	Mariposa.....	15	K	15	32.68	35.1	3,945
16	Yreka.....	Siskiyou.....	7	C	40	17.57	18.1	2,625

TABLE 5.

TABLE 5. RECORDS OF PRECIPITATION AND TABLE OF COMPUTED INDICES OF SEASONAL WETNESS—PRECIPITATION DIVISION A—UPPER PIT-TULE LAKE-GREAT BASIN AREA.

Rainfall stations, depth or precipitation in inches and index of seasonal wetness.

Season.	Fort Bidwell.		Cedarville.		Alturas.		Madeline.		Susanville.		Index of seasonal wetness, Division A.
	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	
1871-1872.....	13.94	81	.....	81	.....	81	.....	81	.....	81	81
1872-1873.....	12.95	75	.....	75	.....	75	.....	75	.....	75	75
1873-1874.....	12.27	71	.....	71	.....	71	.....	71	.....	71	71
1874-1875.....	10.63	62	.....	62	.....	62	.....	62	.....	62	62
1875-1876.....	12.64	73	.....	73	.....	73	.....	73	.....	73	73
1876-1877.....	34.02	197	.....	197	.....	197	.....	197	.....	197	197
1877-1878.....	14.55	84	.....	84	.....	84	.....	84	.....	84	84
1878-1879.....	13.98	81	.....	81	.....	81	.....	81	.....	81	81
1879-1880.....	25.94	150	.....	150	.....	150	.....	150	.....	150	150
1880-1881.....	31.29	181	.....	181	.....	181	.....	181	.....	181	181
1881-1882.....	20.94	121	.....	121	.....	121	.....	121	.....	121	121
1882-1883.....	12.84	74	.....	74	.....	74	.....	74	.....	74	74
1883-1884.....	27.16	158	.....	158	.....	158	.....	158	.....	158	158
1884-1885.....	20.46	119	.....	119	.....	119	.....	119	.....	119	119
1885-1886.....	28.45	165	.....	165	.....	165	.....	165	.....	165	165
1886-1887.....	20.41	118	.....	118	.....	118	.....	118	.....	118	118
1887-1888.....	15.63	91	.....	91	.....	91	.....	91	.....	91	91
1888-1889.....	20.02	116	.....	116	.....	116	.....	116	.....	116	116
1889-1890.....	27.30	158	.....	163	.....	163	.....	163	36.26	166	162
1890-1891.....	16.80*	98	.....	95	.....	95	.....	95	20.31	93	95
1891-1892.....	14.38*	83	.....	89	.....	89	.....	89	20.32	94	89
1892-1893.....	18.79*	109	.....	129	.....	129	.....	129	31.55	144	128
1893-1894.....	.....	94	.....	93	.....	93	.....	93	20.23	93	93
1894-1895.....	.....	104	9.18	62	.....	103	.....	103	28.07	129	100
1895-1896.....	.....	117	16.37	112	.....	116	.....	116	25.70	118	116
1896-1897.....	.....	114	17.54	120	.....	113	.....	113	23.59	108	113
1897-1898.....	.....	68	10.91	74	.....	67	.....	67	13.41	61	67
1898-1899.....	.....	70	13.10	89	.....	70	.....	70	12.24	56	71
1899-1900.....	.....	94	14.22	97	.....	93	.....	93	19.59	90	93
1900-1901.....	.....	103	16.01	109	.....	102	.....	102	21.05	96	102

TABLE 5.

1901-1902	86	12.50	85	85	18.31	84	85
1902-1903	78	12.48	85	77	15.65	71	77
1903-1904	119	18.62	127	118	24.27	111	118
1904-1905	77	12.20	83	12.58	89	71	80
1905-1906	99	15.63	107	14.18	100	90	99
1906-1907	137	17.21	117	17.05	120	148	131
1907-1908	74	9.88	67	10.28	73	76	73
1908-1909	100	18.26	124	11.71	83	96	102
1909-1910	75	13.60	93	10.26	72	61	77
1910-1911	114	15.04	103	17.05	120	119	115
1911-1912	12.73	74	9.21	63	10.71	76	65
1912-1913	12.96	71	10.63	73	11.92	84	70
1913-1914	17.86	104	15.63	106	14.61	103	100
1914-1915	12.39	73	10.21	69	9.32	66	62
1915-1916	13.36	77	10.02	68	12.39	87	86
1916-1917	14.58	85	12.80	87	15.08	106	88
1917-1918	10.41	60	9.22	63	7.77	55	58
1918-1919	13.57	79	9.34	63	10.13	71	69
1919-1920	11.85	69	11.36	77	5.98	34	60
1920-1921	19.11	111	13.33	91	111	127	108
Years of record	36	27	15	13	28		
Mean of record	18.31	13.13	12.34	14.60	20.70		
50-year mean	17.20	14.70	14.20	17.50	21.90		
County	Modoc	Modoc	Modoc	Lassen	Lassen		
Elevation	4,640	4,675	4,460	5,270	4,195		
Station reference number	1	2	3	4	5		

Precipitation data are from U. S. Weather Bureau records unless otherwise noted.

\*From Water Supply Paper No. 81

Streams within boundaries of Precipitation Division A: Pit River, Sacramento River, Tule Lake Group, Goose Lake Group, Cowhead Lake Group, Surprise Valley Group, Madeline Plains Group, Smoke Creek Group, Eagle Lake Group, Honey Lake Group.

TABLE 6.

TABLE 6. RECORDS OF PRECIPITATION AND TABLE OF COMPUTED INDICES OF SEASONAL WETNESS—PRECIPITATION DIVISION B—UPPER SACRAMENTO AREA.

Rainfall stations, depth of precipitation in inches and index of seasonal wetness.

Season.	McCloud. Inches, Index.	Sisson. Inches, Index.	Dunsmuir. Inches, Index.	Delta. Inches, Index.	Kennett. Inches, Index.	Slasta. Inches, Index.	Redding. Inches, Index.	Red Bluff. Inches, Index.	Index of seasonal wetness, Division B.
1871-1872.....	111	111	111	111	111	111	111	111	111
1872-1873.....	53	53	53	53	53	53	53	53	53
1873-1874.....	85	85	85	85	85	85	85	85	85
1874-1875.....	51	51	51	51	51	51	51	51	51
1875-1876.....	154	154	154	154	154	154	154	154	154
1876-1877.....	69	69	69	69	69	69	69	69	69
1877-1878.....	181	181	181	181	181	181	181	181	181
1878-1879.....	93	93	93	93	93	93	93	93	93
1879-1880.....	107	107	107	107	107	107	107	107	107
1880-1881.....	128	128	128	128	128	128	128	128	128
1881-1882.....	75	75	75	75	75	75	75	75	75
1882-1883.....	76	76	76	55.27	86	76	22.01	18.58	75
1883-1884.....	99	99	99	71.48	112	99	29.09	24.01	97
1884-1885.....	58	58	58	34.71	54	58	24.35	14.69	58
1885-1886.....	123	123	123	75.84	118	123	44.83	35.16	124
1886-1887.....	60	60	60	35.50	55	60	25.44	15.72	63
1887-1888.....	54	54	54	25.10	40	54	25.10	17.27	55
1888-1889.....	105	105	105	73.82	115	105	35.86	23.41	104
1889-1890.....	200	200	200	119.02	230	200	68.55	41.87	198
1890-1891.....	65	19.64	25.74	43.81	68	65	27.20	22.44	66
1891-1892.....	76	28.03	38.04	42.97	67	76	29.71	21.57	77
1892-1893.....	116	43.02	60.74	66.28	105	116	45.53	32.32	117
1893-1894.....	192	30.98	60.38	43.75	68	192	38.21	22.21	192
1894-1895.....	128	34.71	38.79	86.89	136	128	41.74	29.71	125
1895-1896.....	122	38.58	64.98	82.32	120	122	43.53	23.56	120
1896-1897.....	97	30.54	51.36	54.30	85	97	39.58	25.44	97
1897-1898.....	60	28.31	39.38	35.90	56	60	25.37	15.18	61
1898-1899.....	68	15.97	45.24	74.39	61	68	35.19	21.08	68
1899-1900.....	113	48.21	137.59	114.76	119	113	52.93	37.67	112
1900-1901.....	102	45.17	43.11	67.32	105	102	33.22	24.64	102

TABLE 6.

1901-1902	131	49.63	141	59.68	115	85.31	133	.....	131	70.72	138	50.72	135	31.74	128	131
1902-1903	107	44.62	127	48.53	93	60.04	94	.....	107	61.05	119	45.33	120	24.22	98	108
1903-1904	145	50.14	142	51.31	157	83.16	130	.....	145	78.60	153	59.04	157	31.50	127	144
1904-1905	121	48.71	138	52.45	101	80.23	125	.....	121	62.02	121	45.12	120	33.82	137	121
1905-1906	115	38.76	110	59.51	115	63.69	99	.....	115	59.38	116	48.07	127	34.59	140	117
1906-1907	122	42.30	120	71.65	138	71.57	112	.....	122	58.36	114	47.60	126	27.97	113	123
1907-1908	85	37.24	106	38.20	74	55.77	87	48.00	72	44.36	86	36.08	96	20.08	81	85
1908-1909	142	49.70	141	73.77	142	104.99	164	99.02	150	67.99	132	49.57	131	31.13	126	147
1909-1910	82	30.19	85	42.99	83	50.29	79	56.96	86	40.81	79	33.19	88	17.64	71	82
1910-1911	95	38.61	109	58.68	113	61.19	96	54.56	82	40.96	80	31.42	83	24.70	100	100
1911-1912	36.15	27.99	79	44.84	86	44.79	70	51.63	78	35.17	68	29.76	79	16.81	68	76
1912-1913	40.64	81	30.23	86	48.48	93	40.21	63	47.99	72	.....	79	30.30	80	18.95	77
1913-1914	70.34	140	48.66	138	68.97	133	95.27	149	97.98	148	.....	143	58.82	156	34.48	139
1914-1915	65.30	131	42.59	121	60.67	117	98.81	154	95.07	144	.....	137	54.86	146	34.79	141
1915-1916	59.39	119	33.85	96	58.84	113	79.04	123	73.09	110	.....	108	38.00	101	21.35	86
1916-1917	32.31	65	22.86	65	28.07	54	52.18	81	43.84	66	.....	71	29.15	77	19.25	78
1917-1918	34.19	68	18.47	52	32.48	63	72.37	113	36.58	55	.....	73	21.36	57	12.11	49
1918-1919	42.02	84	29.44	83	41.03	79	41.03	64	56.52	85	.....	84	41.33	110	26.19	106
1919-1920	25.42	51	15.99	45	15.02	29	31.95	50	35.73	54	.....	47	25.78	68	11.27	45
1920-1921	61.46	123	33.33	94	57.84	112	85.47	133	89.86	136	.....	118	47.18	125	27.92	113
Years of record	10	32	32	32	32	39	39	14	14	17	17	46	46	44	44	
Mean of record	46.72	36.56	53.82	53.82	63.93	63.93	63.93	63.35	63.35	53.80	53.80	38.52	38.52	25.19	25.19	
50-year mean	50.00	35.20	51.80	51.80	64.00	64.00	64.00	66.30	66.30	51.20	51.20	37.70	37.70	24.70	24.70	
County	Siskiyou	Siskiyou	Siskiyou	Siskiyou	Siskiyou	Shasta	Shasta	Shasta	Shasta	Shasta	Shasta	Shasta	Shasta	Tehama	Tehama	
Elevation	3,270	3,555	2,285	2,285	1,138	1,138	730	730	730	1,049	1,049	552	552	307	307	
Station reference number	6	7	8	8	9	9	10	10	10	11	11	12	12	13	13	

Precipitation data are from U. S. Weather Bureau records unless otherwise noted.

† From records of Southern Pacific Railroad.

Streams within boundaries of Precipitation Division B: Sacramento River (Upper), Pit River, McCloud River, Churn Creek Group, Cow Creek, Bear Creek, Battle Creek, Ink's Creek, Payne's Creek, Backbone Creek Group, Clear Creek, Cottonwood Creek, Sacramento River (at Red Bluff).

TABLE 7.

TABLE 7. RECORDS OF PRECIPITATION AND TABLE OF COMPUTED INDICES OF SEASONAL WETNESS—PRECIPITATION DIVISION C—KLAMATH—TRINITY AREA.

Rainfall stations, depth of precipitation in inches and index of seasonal wetness.

Season.	Hornbrook.		Yreka.		Montague.		Walla Walla Creek.		Orleans.		China Flat.		Weaverville.		Index of seasonal wetness. Division C.	
	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.
1871-1872	111	111	111	111	111	111	23.21	76	111	111	111	111	54.57	139	110	
1872-1873	53	66	12.04	66	53	53	13.82	45	53	53	53	53	21.06	54	54	
1873-1874	85	12.77	70	85	85	85	21.81	71	85	85	85	85	40.24	103	83	
1874-1875	51	10.30	56	51	51	51	12.72	42	51	51	51	51	21.72	55	51	
1875-1876	118	22.04	122	118	118	118	31.13	102	118	118	118	118	51.13	131	118	
1876-1877	73	14.02	77	73	73	73	19.12	62	73	73	73	73	32.24	82	73	
1877-1878	117	18.73	103	117	117	117	23.47	77	117	117	117	117	60.70	152	115	
1878-1879	88	13.42	74	88	88	88	26.05	85	88	88	88	88	38.21	97	87	
1879-1880	109	17.37	67	109	109	109	33.31	109	109	109	109	109	37.70	94	100	
1880-1881	119	20.43	113	119	119	119	31.37	103	119	119	119	119	49.72	127	115	
1881-1882	81	13.08	72	81	81	81	28.08	92	81	81	81	81	28.93	74	80	
1882-1883	77	12.16	67	77	77	77	24.36	80	77	77	77	77	31.32	80	76	
1883-1884	92	16.20	89	92	92	92	26.41	86	92	92	92	92	38.09	97	92	
1884-1885	81	19.08	109	81	81	81	22.49	73	81	81	81	81	29.41	75	83	
1885-1886	108	18.95	104	108	108	108	30.92	101	108	108	108	108	44.96	115	107	
1886-1887	88	19.03	105	88	88	88	27.42	90	88	88	88	88	31.35	80	90	
1887-1888	89	15.70	87	89	89	89	25.20	82	89	89	89	89	37.54	96	88	
1888-1889	11.50	84	10.42	57	7.37	64	20.24	66	70	70	70	70	29.74	76	69	
1889-1890	25.65	189	30.42	168	24.19	210	49.97	163	174	174	174	174	67.04	171	178	
1890-1891	12.42	89	12.92	71	9.87	85	26.51	87	81	81	81	81	30.18	77	81	
1891-1892	11.85	87	14.12	78	5.62	49	36.72	120	93	93	93	93	36.51	93	88	
1892-1893	12.96	95	16.53	91	9.26	80	110	110	105	105	105	105	46.16	118	101	
1893-1894	21.15	155	30.50	168	17.27	149	166	166	159	159	159	159	81	153	153	
1894-1895	9.80	72	19.75	109	7.05	61	109	109	88	88	88	88	81	81	83	
1895-1896	18.77	138	23.28	129	10.35	88	126	126	121	121	121	121	116	116	120	
1896-1897	13.71	101	20.84	115	13.99	121	116	116	112	112	112	112	107	107	112	
1897-1898	9.17	67	13.05	72	4.22	36	64	64	61	61	61	61	59	60	60	
1898-1899	10.87	80	12.41	68	6.31	54	71	71	68	68	68	68	66	68	68	
1899-1900	13.18	97	18.11	100	11.42	99	103	103	99	99	99	99	95	99	99	
1900-1901	15.63	115	23.55	130	113	113	126	126	121	121	121	121	117	117	121	



TABLE 7.

1901-1902	11.69	86	19.34	107	89	100	96	96	92	95
1902-1903	17.63	130	16.12	89	97	109	104	104	100	106
1903-1904	21.49	158	31.29	173	21.71	187	81.93	173	166	173
1904-1905	18.48	138	20.28	112	12.68	109	44.10	94	115	115
1905-1906	16.09	118	22.10	122	13.17	114	52.96	113	115	118
1906-1907	18.68	137	15.16	131	15.16	131	61.75	132	131	135
1907-1908	7.46	55	12.05	104	12.05	104	44.94	96	75	82
1908-1909	16.98	125	14.37	124	14.37	124	52.28	112	121	123
1909-1910	11.95	88	10.11	87	10.11	87	54.49	117	85	93
1910-1911	11.21	82	13.89	120	13.89	120	42.01	90	96	97
1911-1912	16.27	120	14.97	129	14.97	129	51.11	109	120	118
1912-1913	6.85	50	13.69	118	13.69	118	50.45	108	80	90
1913-1914	17.98	132	19.04	164	19.04	164	51.98	111	118	135
1914-1915	16.91	124	12.99	112	12.99	112	46.18	99	112	115
1915-1916	16.63	122	17.29	95	11.03	95	49.20	105	88	102
1916-1917	80	12	67	70	11.07	96	41.20	88	67	80
1917-1918	64	11	08	61	7.93	68	32.95	71	57	65
1918-1919	114	19	63	108	14.12	122	50.60	108	98	110
1919-1920	54	9	25	51	6.84	59	29.01	62	52	56
1920-1921	129	21	96	121	16.16	139	62.79	135	129	133
Years of record	28	40	30	34	18	12	31	12	31	
Mean of record	14.74	17.57	12.26	25.32	50.00	45.92	37.81	45.92	37.81	
50-year mean	13.60	18.10	11.60	30.60	46.80	46.50	39.20	46.50	39.20	
County	Siskiyou.	Siskiyou.	Siskiyou.	Siskiyou.	Siskiyou.	Humboldt.	Humboldt.	Humboldt.	Trinity.	
Elevation	2,154	2,625	2,450	2,570	520	600	2,162	600	2,162	
Station reference number	15	16	17	18	19	21	22	21	22	

Precipitation data are from U. S. Weather Bureau records.  
Streams within boundaries of Precipitation Division C: Klamath River, Shasta River, Scott River, Salmon River, Trinity River.

TABLE 8.

TABLE 8. RECORDS OF PRECIPITATION AND TABLE OF COMPUTED INDICES OF SEASONAL WETNESS—PRECIPITATION DIVISION D—NORTH PACIFIC COAST AREA.

Rainfall stations, depth of precipitation in inches and index of seasonal wetness.

Season.	Fort Gaston.		Crescent City.		Eureka.		Rionerville.		Upper Mattole.		Fort Bragg.		Index of seasonal wetness, Division D.
	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	
1871-1872	52.21	104	104	104	104	104	104	104	104	104	104	104	104
1872-1873	31.09	62	62	62	62	62	62	62	62	62	62	62	62
1873-1874	50.30	100	100	100	100	100	100	100	100	100	100	100	100
1874-1875	34.71	69	69	69	69	69	69	69	69	69	69	69	69
1875-1876	83.46	166	166	166	166	166	166	166	166	166	166	166	166
1876-1877	46.05	92	92	92	92	92	92	92	92	92	92	92	92
1877-1878	66.57	132	132	132	132	132	132	132	132	132	132	132	132
1878-1879	52.53	105	105	105	105	105	105	105	105	105	105	105	105
1879-1880	65.72	131	131	131	131	131	131	131	131	131	131	131	131
1880-1881	56.64	113	113	113	113	113	113	113	113	113	113	113	113
1881-1882	50.93	101	101	101	101	101	101	101	101	101	101	101	101
1882-1883	45.50	90	90	90	90	90	90	90	90	90	90	90	90
1883-1884	46.22	92	92	92	92	92	92	92	92	92	92	92	92
1884-1885	34.84	69	69	69	69	69	69	69	69	69	69	69	69
1885-1886	69.85	139	139	139	139	139	139	139	139	139	139	139	139
1886-1887	52.26	104	79	62	96	99	99	99	99	99	99	99	99
1887-1888	41.20	82	65	21	86	34	47	79	86	79	86	86	85
1888-1889	37.17	74	53	83	71	24	14	79	74	63	69	74	74
1889-1890	77.01	153	113	06	149	74	10	173	156	134	92	157	157
1890-1891	43.84	87	64	63	85	35	41	82	81	63	81	81	82
1891-1892	81	58	56	77	38	14	88	81	81	69	13	80	81
1892-1893	103	71	14	94	49	15	114	103	103	91	98	107	103
1893-1894	109	79	39	105	50	20	127	109	109	88	09	102	109
1894-1895	100	61	40	81	45	97	106	100	100	98	62	115	100
1895-1896	98	59	04	78	52	45	121	98	98	90	01	105	99
1896-1897	99	72	29	96	51	10	118	99	99	79	12	92	99
1897-1898	74	57	61	76	35	12	81	72	72	59	96	70	72
1898-1899	74	66	95	88	35	72	82	74	74	48	38	56	78
1899-1900	118	87	35	115	51	73	119	118	118	103	25	120	118
1900-1901	96	66	88	88	47	58	110	96	96	82	98	96	97

TABLE 8.

1901-1902.....	119	89.42	118	51.96	120	55.26	126	103.60	120	.....	119
1902-1903.....	114	86.87	115	51.73	119	48.35	110	95.86	111	.....	114
1903-1904.....	148	107.70	142	65.21	150	61.49	140	130.64	152	.....	148
1904-1905.....	94	64.71	85	32.74	76	41.19	94	95.49	111	39.30	94
1905-1906.....	89	66.73	88	39.04	90	41.83	95	77.21	90	39.28	94
1906-1907.....	114	86.70	115	50.54	116	43.91	100	96.34	112	43.65	105
1907-1908.....	78	60.54	80	35.99	83	36.70	84	63.23	73	32.10	77
1908-1909.....	117	.....	117	42.96	99	45.88	104	108.97	126	50.88	136
1909-1910.....	91	.....	91	40.36	93	39.06	89	77.72	90	44.44	107
1910-1911.....	80	.....	80	32.09	74	35.08	80	72.04	84	32.60	78
1911-1912.....	91	.....	91	38.70	89	39.84	91	79.29	92	34.14	82
1912-1913.....	82	.....	82	36.03	83	38.85	89	70.25	82	35.50	85
1913-1914.....	106	.....	106	37.32	86	47.95	109	100.75	117	52.86	127
1914-1915.....	120	80.74	119	42.42	98	56.37	129	113.89	132	56.07	135
1915-1916.....	103	97.56	129	39.99	92	46.63	106	77.75	90	38.85	93
1916-1917.....	73	69.73	92	31.36	72	35.16	80	49.48	57	31.44	75
1917-1918.....	74	63.50	84	24.34	56	27.48	63	74	22.33	53	68
1918-1919.....	100	78.62	104	39.80	92	47.80	109	86.44	100	42.42	102
1919-1920.....	57	48.47	64	23.95	55	25.49	58	43.73	51	19.45	47
1920-1921.....	131	107.77	142	48.81	113	.....	130	111.50	130	52.42	126
Years of record.....	25	30	34	34	34	19	33	33	21	21	29
Mean of record.....	50.45	75.95	42.52	42.86	85.04	42.86	85.04	85.04	38.66	38.66	41.67
50-year mean.....	50.27	75.70	43.37	43.85	86.11	43.85	86.11	86.11	41.67	41.67	41.67
County.....	Humboldt.	Del Norte.	Humboldt.	Humboldt.	Humboldt.	Humboldt.	Humboldt.	Humboldt.	Mendocino.	Mendocino.	Mendocino.
Elevation.....	397	50	64	75	244	75	244	244	74	74	74
Station reference number.....	20	23	24	25	26	25	26	26	27	27	27

Precipitation data are from U. S. Weather Bureau records.

Streams included within boundaries of Precipitation Division D: Smith River, Redwood Creek, Mad River, Bear Creek, Mattiola River, Noyo River Group, Navarro River, Gualala River Group, Lagunitas Creek, Salmon Creek Group, Bolinas Creek Group.



TABLE 9.

1901-1902	122	101.00	122	65.43	119	45.07	124	122	52.22	126	63.63	120
1902-1903	102	89.07	108	55.50	101	34.55	95	38.20	96	37.17	95	59.37
1903-1904	153	132.62	161	86.60	158	54.73	150	53.78	136	63.20	153	79.17
1904-1905	112	72.62	88	57.53	105	42.93	118	50.60	128	52.98	128	69.14
1905-1906	72.68	115	90.80	110	65.74	120	44.75	123	46.28	117	52.12	118
1906-1907	81.41	129	101.09	123	61.48	112	48.64	134	50.56	127	67.55	127
1907-1908	57.42	91	66.86	81	.....	74	29.67	81	73	28.83	70	39.07
1908-1909	77.92	123	111.09	135	.....	147	57.39	158	64.86	164	61.07	148
1909-1910	62.20	98	76.84	93	.....	85	29.80	82	34.81	88	30.27	73
1910-1911	55.88	89	70.22	85	.....	85	32.99	91	38.96	98	32.86	79
1911-1912	59.00	93	67.95	82	.....	67	25.73	71	24.85	63	24.73	60
1912-1913	63.32	100	84.54	103	.....	83	33.40	92	29.33	74	30.27	73
1913-1914	81.96	130	97.90	119	.....	143	54.85	151	64.25	162	60.28	146
1914-1915	71.70	114	98.01	119	.....	138	49.28	135	56.73	143	56.94	138
1915-1916	57.55	91	88.39	107	.....	105	34.80	96	38.26	96	44.55	108
1916-1917	80	75.09	92	.....	77	30.23	83	27.37	69	27.39	66	81
1917-1918	61	58.51	71	.....	60	23.43	64	17.17	43	23.22	56	81
1918-1919	80	71.50	87	.....	90	37.23	102	33.88	85	33.58	81	46.06
1919-1920	82	46.12	86	.....	51	19.05	52	19.04	48	19.25	40	28.48
1920-1921	128	104.23	127	.....	130	47.94	132	48.23	122	55.40	134	66.26
Years of record	11	21	29	44	21	44	44	21	44	44	45	45
Mean of record	67.37	85.25	55.91	36.82	41.73	41.84	41.84	41.73	41.84	41.84	53.87	53.87
50-year mean	63.10	82.40	54.90	36.40	39.60	41.40	41.40	39.60	41.40	41.40	53.20	53.20
County	Humboldt	Mendocino	Mendocino	Mendocino	Mendocino	Mendocino	Mendocino	Mendocino	Sonoma	Sonoma	Sonoma	Sonoma
Elevation	1,700	2,000	1,364	620	340	52	52	340	52	52	100	100
Station reference number	28	29	30	31	32	33	33	32	33	33	34	34

Precipitation data are from U. S. Weather Bureau records.  
Streams included within boundaries of Precipitation Division E: Mad River, Eel River, Russian River.



TABLE 10.

1901-1902.....	126.70	152	26.03	110	84.44	121	31.13	116	.....	127	.....	127	21.67	137	25.31	145
1902-1903.....	75.35	91	22.53	95	26.30	92	25.84	96	.....	95	.....	95	17.10	103	17.33	99
1903-1904.....	114.54	138	28.94	123	43.15	151	39.73	129	.....	129	.....	129	20.28	123	21.59	123
1904-1905.....	94.36	114	.....	136	36.27	127	33.19	124	.....	136	.....	136	24.55	148	34.40	167
1905-1906.....	104.71	126	.....	144	37.33	131	31.70	118	.....	131	.....	131	19.85	120	25.80	133
1906-1907.....	117.94	142	.....	128	34.33	120	30.73	115	.....	123	.....	123	17.88	108	21.30	85
1907-1908.....	54.55	66	.....	75	21.65	76	21.80	81	30.94	59	.....	72	13.44	81	14.28	71
1908-1909.....	126.29	152	.....	113	44.47	156	39.31	146	62.53	120	.....	130	22.00	133	22.61	127
1909-1910.....	66.56	80	.....	86	23.22	82	24.83	93	37.71	72	.....	82	14.03	85	13.83	83
1910-1911.....	77.16	93	.....	116	25.99	91	28.15	103	52.04	99	.....	106	19.00	118	21.52	119
1911-1912.....	56.28	68	.....	52	19.22	68	17.99	67	40.42	77	.....	60	11.26	68	.....	65
1912-1913.....	68.61	83	.....	70	23.47	83	24.86	93	43.82	84	.....	77	10.44	60	.....	59
1913-1914.....	123.19	148	.....	154	44.56	157	45.48	170	78.47	150	.....	110	11.03	64	13.18	77
1914-1915.....	108.84	131	.....	132	40.37	142	.....	144	69.72	133	.....	133	31.09	179	27.19	104
1915-1916.....	97.48	117	.....	110	26.25	92	.....	104	59.59	114	.....	114	18.04	104	18.11	99
1916-1917.....	69.45	84	.....	84	21.75	76	.....	81	48.98	94	.....	74	11.43	69	.....	70
1917-1918.....	49.38	60	.....	65	17.49	61	.....	67	35.52	68	.....	68	11.74	68	11.90	72
1918-1919.....	71.38	86	.....	98	27.02	95	.....	95	56.61	108	.....	87	12.90	78	.....	89
1919-1920.....	45.23	55	.....	63	.....	58	.....	60	27.80	53	.....	8.63	50	7.70	47	47
1920-1921.....	104.37	126	.....	132	35.99	152	.....	134	73.05	140	.....	22.15	128	21.28	129	130
Years of record.....	21	21	21	18	28	14	10	42	22	38	.....	22	38	.....	.....	.....
Mean of record.....	87.67	22.77	30.40	28.25	51.23	16.98	16.65	21.67	18.02	.....	.....	.....	.....	.....	.....	.....
50-year mean.....	83.00	23.60	28.50	26.80	52.30	17.30	16.60	19.50	17.50	.....	.....	.....	.....	.....	.....	.....
County.....	Lake.	Lake.	Lake.	Lake.	Lake.	Cobusa.	Glenn.	Glenn.	Glenn.	Glenn.	.....	.....	.....	.....	.....	.....
Elevation.....	2,750	1,325	1,450	1,350	2,250	1,200	136	624	254	.....	.....	.....	.....	.....	.....	.....
Station reference number.....	35	36	37	38	39	40	41	42	43	.....	.....	.....	.....	.....	.....	.....

Precipitation data are from U. S. Weather Bureau records.

TABLE 10.

TABLE 10—(Concluded). RECORDS OF PRECIPITATION AND TABLE OF COMPUTED INDICES OF SEASONAL WETNESS—  
PRECIPITATION DIVISION F—WEST CENTRAL SACRAMENTO AREA.

*Rainfall stations, depth of precipitation in inches and index of seasonal wetness.*

Season.	Corning.		Cliteo.		Durham.		Biggs.		Gridley.		Colusa.		Dunnigan.		Marysville.		Index of seasonal wetness, Division F.
	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	
1871-1872	116	31.32	132	69	116	60	116	60	116	60	102	60	116	60	12.16	62	60
1872-1873	63	14.64	62	146	63	142	63	142	63	142	62	142	63	142	23.74	120	142
1873-1874	120	28.30	106	78	120	78	120	78	120	78	115	86	120	78	15.76	80	78
1874-1875	82	18.76	79	82	82	91	82	91	82	91	87	86	82	91	18.93	96	91
1875-1876	112	24.70	104	74	112	83	112	83	112	83	118	110	112	83	17.43	88	83
1876-1877	60	16.32	69	60	60	60	60	60	60	60	74	77	60	60	14.38	73	65
1877-1878	142	34.72	146	71	142	70	142	70	142	70	66	77	142	70	15.25	77	70
1878-1879	78	19.47	82	90	78	98	78	98	78	98	86	86	78	98	16.23	82	78
1879-1880	91	17.55	74	91	91	54	91	54	91	54	71	71	91	54	10.28	78	99
1880-1881	9.55	48	17.62	74	83	125	83	125	83	125	113	113	83	125	11.69	59	8.15
1881-1882	12.14	61	16.93	71	65	65	65	65	65	65	71	71	65	65	11.69	59	8.15
1882-1883	11.94	60	17.20	72	70	70	70	70	70	70	66	64	70	70	11.69	59	8.15
1883-1884	19.10	96	21.44	90	98	98	98	98	98	98	54	54	98	98	29.50	150	125
1884-1885	55	12.97	54	113	54	125	54	125	54	125	125	125	54	125	22.27	113	125
1885-1886	14.35	72	15.76	66	64	64	64	64	64	64	64	64	64	64	13.96	70	65
1886-1887	15.38	77	12.97	54	66	66	66	66	66	66	66	66	66	66	14.35	73	64
1887-1888	17.21	86	20.22	85	91	91	91	91	91	91	108	108	91	108	14.28	65	66
1888-1889	34.64	174	37.39	157	176	176	176	176	176	176	176	176	176	176	23.28	118	91
1889-1890	20.79	104	18.81	79	92	92	92	92	92	92	92	92	92	92	18.83	45	197
1890-1891	13.40	67	25.43	107	92	92	92	92	92	92	92	92	92	92	19.31	94	93
1891-1892	24.16	121	34.42	145	137	137	137	137	137	137	137	137	137	137	14.85	75	96
1892-1893	15.79	79	21.54	91	81	81	81	81	81	81	10.98	10.98	81	10.98	22.93	116	128
1893-1894	33.90	170	37.23	156	150	150	150	150	150	150	150	150	150	150	20.27	132	80
1894-1895	25.25	127	27.33	115	26.01	108	108	108	108	108	117	117	108	117	26.83	136	149
1895-1896	25.15	126	26.44	111	25.01	104	104	104	104	104	110	110	104	110	15.72	80	93
1896-1897	9.11	46	15.80	67	19.31	98	98	98	98	98	55	55	98	55	18.90	96	92
1897-1898	10.34	52	13.85	79	17.38	73	73	73	73	73	80	80	73	80	14.28	65	54
1898-1899	23.73	129	23.72	100	28.12	117	117	117	117	117	105	105	117	105	16.82	85	80
1899-1900	25.76	129	23.72	100	28.12	117	117	117	117	117	105	105	117	105	16.82	85	80
1900-1901	23.76	119	22.12	93	25.39	106	106	106	106	106	107	107	106	107	24.02	122	108



TABLE 10.

1901-1902.....	26.65	134	99	28.53	119	23.17	116	127	110	23.28	118	20.54	104	120
1902-1903.....	18.65	94	24.27	102	22.78	96	19.16	95	14.83	90	17.92	91	21.26	108
1903-1904.....	24.35	122	27.74	117	32.46	135	22.95	115	16.99	103	22.74	115	22.50	108
1904-1905.....	32.30	162	33.00	139	32.11	134	29.06	145	136	21.42	130	29.12	147	141
1905-1906.....	29.30	147	30.99	130	30.59	127	28.09	141	131	21.08	128	27.34	137	132
1906-1907.....	19.05	96	28.61	120	29.52	123	23.14	116	123	16.26	99	26.46	134	119
1907-1908.....	16.75	84	18.46	78	17.98	75	13.74	69	16.37	75	11.36	69	14.14	72
1908-1909.....	25.03	125	30.61	129	29.31	122	27.35	137	25.76	118	16.67	101	23.00	117
1909-1910.....	15.32	77	21.05	89	21.71	91	16.30	82	19.04	87	12.24	75	16.27	82
1910-1911.....	20.94	105	24.93	105	23.75	99	22.85	114	25.29	115	18.64	113	23.97	121
1911-1912.....	14.45	72	14.26	60	15.30	64	12.29	62	12.78	58	7.18	44	8.45	43
1912-1913.....	16.29	85	21.55	91	24.31	101	16.76	84	19.14	87	9.68	59	11.07	56
1913-1914.....	26.63	134	38.19	161	35.44	148	31.20	156	33.81	152	27.00	165	30.16	153
1914-1915.....	32.97	165	32.73	138	32.48	135	24.09	121	30.63	144	20.21	123	26.16	132
1915-1916.....	13.55	68	28.91	122	26.70	111	22.25	111	22.22	101	17.44	106	21.01	106
1916-1917.....	.....	82	23.88	100	20.79	87	.....	82	18.10	83	11.11	68	.....	83
1917-1918.....	.....	67	16.55	70	15.64	65	.....	67	.....	65	9.72	59	.....	70
1918-1919.....	.....	96	23.66	99	21.36	89	.....	95	.....	95	15.01	91	.....	96
1919-1920.....	.....	61	18.17	76	.....	60	.....	60	.....	58	7.59	46	.....	61
1920-1921.....	.....	136	33.78	142	.....	135	.....	135	.....	133	20.30	124	.....	132
Years of record.....	34	50	24	24	17	10	40	39	50	50	50	50	50	50
Mean of record.....	20.59	23.78	24.96	22.20	22.31	16.12	19.71	19.71	19.71	19.71	19.71	19.71	19.71	19.71
50-year mean.....	19.90	23.78	24.00	20.00	21.90	16.40	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70
County.....	Tehama.	Butte.	Butte.	Butte.	Butte.	Colusa.	Yolo.	Yuba.	Yuba.	Yuba.	Yuba.	Yuba.	Yuba.	Yuba.
Elevation.....	277	189	160	98	97	60	65	67	67	67	67	67	67	67
Station reference number.....	44	45	46	47	48	49	50	51	51	51	51	51	51	51

Precipitation data are from U. S. Weather Bureau records.  
Streams within boundaries of Precipitation Division F: Red Bank Creek Group, Elder Creek Group, Stony Creek, Willow Creek Group, Coachee Creek, Putah Creek.

TABLE 11.

TABLE 11. RECORDS OF PRECIPITATION AND TABLE OF COMPUTED INDICES OF SEASONAL WETNESS—PRECIPITATION DIVISION G—FEATHER RIVER AREA.

Rainfall stations, depth of precipitation in inches and index of seasonal wetness.

Season.	Palermo.		Oroville.		Magalia.		De Sabla.		West Branch.		Inskip.		Stirling City.	
	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.
1871-1872.....	126	.....	126	.....	126	.....	126	.....	126	.....	126	.....	126	.....
1872-1873.....	74	.....	74	.....	74	.....	74	.....	74	.....	74	.....	74	.....
1873-1874.....	106	.....	106	.....	106	.....	106	.....	106	.....	106	.....	106	.....
1874-1875.....	66	.....	66	.....	66	.....	66	.....	66	.....	66	.....	66	.....
1875-1876.....	122	.....	122	.....	122	.....	122	.....	122	.....	122	.....	122	.....
1876-1877.....	61	.....	61	.....	61	.....	61	.....	61	.....	61	.....	61	.....
1877-1878.....	96	.....	96	.....	96	.....	96	.....	96	.....	96	.....	96	.....
1878-1879.....	104	.....	104	.....	104	.....	104	.....	104	.....	104	.....	104	.....
1879-1880.....	123	.....	123	.....	123	.....	123	.....	123	.....	123	.....	123	.....
1880-1881.....	107	.....	107	.....	107	.....	107	.....	107	.....	107	.....	107	.....
1881-1882.....	95	.....	95	.....	95	.....	95	.....	95	.....	95	.....	95	.....
1882-1883.....	80	.....	80	.....	80	.....	80	.....	80	.....	80	.....	80	.....
1883-1884.....	113	.....	113	.....	113	.....	113	.....	113	.....	113	.....	113	.....
1884-1885.....	77	.....	77	.....	77	.....	77	.....	77	.....	77	.....	77	.....
1885-1886.....	116	.....	116	.....	116	.....	116	.....	116	.....	116	.....	116	.....
1886-1887.....	63	.....	17.44	.....	63	.....	63	.....	63	.....	63	.....	63	.....
1887-1888.....	64	.....	17.76	.....	64	.....	64	.....	64	.....	64	.....	64	.....
1888-1889.....	100	.....	27.56	.....	100	.....	100	.....	100	.....	100	.....	100	.....
1889-1890.....	180	.....	49.64	.....	180	.....	180	.....	180	.....	180	.....	180	.....
1890-1891.....	77	.....	21.37	.....	77	.....	77	.....	77	.....	77	.....	77	.....
1891-1892.....	84.02	.....	26.90	.....	103	.....	103	.....	103	.....	103	.....	103	.....
1892-1893.....	27.02	.....	28.46	.....	126	.....	126	.....	126	.....	126	.....	126	.....
1893-1894.....	16.32	.....	21.86	.....	91	.....	91	.....	91	.....	91	.....	91	.....
1894-1895.....	32.10	.....	34.48	.....	123	.....	123	.....	123	.....	123	.....	123	.....
1895-1896.....	23.22	.....	34.22	.....	133	.....	133	.....	133	.....	133	.....	133	.....
1896-1897.....	25.68	.....	117	.....	106	.....	106	.....	106	.....	106	.....	106	.....
1897-1898.....	10.94	.....	17.97	.....	66	.....	66	.....	66	.....	66	.....	66	.....
1898-1899.....	17.70	.....	23.47	.....	74	.....	74	.....	74	.....	74	.....	74	.....
1899-1900.....	27.86	.....	34.71	.....	116	.....	116	.....	116	.....	116	.....	116	.....
1900-1901.....	25.90	.....	30.17	.....	114	.....	114	.....	114	.....	114	.....	114	.....

TABLE 11.

1901-1902.....	26.75	122	29.73	107	94	107	107	107	107	107	107	107	107	107	107	107	107	107	107
1902-1903.....	25.17	115	24.25	88	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94
1903-1904.....	28.99	132	29.69	118	142	142	142	142	142	142	142	142	142	142	142	142	142	142	142
1904-1905.....	32.77	146	33.44	121	73.20	90	67.36	97	106	106	106	106	106	106	106	106	106	106	106
1905-1906.....	29.51	134	33.47	121	98.78	121	79.62	115	130	130	130	130	130	130	130	130	130	130	130
1906-1907.....	31.67	144	37.03	134	112.42	138	94.50	137	153	153	153	153	153	153	153	153	153	153	153
1907-1908.....	18.12	83	19.43	70	145.61	57	45.80	66	60.81	60.81	60.81	60.81	60.81	60.81	60.81	60.81	60.81	60.81	60.81
1908-1909.....	28.47	130	34.11	123	122.51	130	88.02	127	115.35	115.35	115.35	115.35	115.35	115.35	115.35	115.35	115.35	115.35	115.35
1909-1910.....	19.69	87	22.53	82	76.90	35	57.92	84	79.49	88	81	81	81	81	81	81	81	81	81
1910-1911.....	25.64	117	29.06	105	86.21	106	72.57	105	83.89	105	89.12	101	73.13	104	104	104	104	104	104
1911-1912.....	13.55	62	19.50	71	49.86	61	43.95	63	45.60	57	52.64	59	41.51	59	59	59	59	59	59
1912-1913.....	16.45	75	21.05	76	60.68	74	59.75	86	61.68	77	67.07	76	64.00	91	91	91	91	91	91
1913-1914.....	24.59	112	38.90	141	106.63	131	97.88	142	99.96	125	113.11	130	99.91	142	142	142	142	142	142
1914-1915.....	.....	72	36.82	133	170.55	136	86.33	125	87.83	110	93.97	106	94.40	134	134	134	134	134	134
1915-1916.....	.....	95	31.33	113	100.54	123	70.96	103	80.42	100	92.17	104	80.82	72	72	72	72	72	72
1916-1917.....	.....	80	23.81	86	63.23	78	62.19	90	69.46	87	80.16	90	61.87	88	88	88	88	88	88
1917-1918.....	.....	55	18.38	66	.....	56	39.37	57	47.11	59	52.69	59	.....	56	56	56	56	56	56
1918-1919.....	.....	81	22.95	83	.....	80	57.72	83	61.38	77	71.64	81	.....	79	79	79	79	79	79
1919-1920.....	.....	53	17.79	64	.....	54	36.97	53	42.01	52	51.27	58	.....	54	54	54	54	54	54
1920-1921.....	.....	102	35.24	128	.....	105	84.33	122	92.32	115	101.74	115	.....	102	102	102	102	102	102
Years of record.....	23		36		13		17		14		14		14		14		14		14
Mean of record.....	23.98		28.03		85.24		67.37		72.35		80.08		75.85		75.85				
50-year mean.....	22.00		27.70		81.50		69.20		80.00		88.50		70.50		70.50				
County.....	Butte.		Butte.		Butte.		Butte.		Butte.		Butte.		Butte.		Butte.				
Elevation.....	213		250		2,321		2,500		3,216		4,975		3,525		3,525				
Station reference number.....	52		53		54		55		56		57		58		58				

Precipitation data are from U. S. Weather Bureau records.

TABLE 11.

TABLE 11—(Concluded). RECORDS OF PRECIPITATION AND TABLE OF COMPUTED INDICES OF SEASONAL WETNESS—PRECIPITATION DIVISION G—FEATHER RIVER AREA.

Rainfall stations, depth of precipitation in inches and index of seasonal wetness.

Season.	Edmonton.		Greenville.		Quincy.		Stanwood.		La Porte.		Sierraville.		Index of seasonal wetness. Division G.
	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	
1871-1872	126	126	126	126	126	126	126	126	126	126	126	126	126
1872-1873	74	74	74	74	74	74	74	74	74	74	74	74	74
1873-1874	106	106	106	106	106	106	106	106	106	106	106	106	106
1874-1875	68	68	68	68	68	68	68	68	68	68	68	68	68
1875-1876	122	122	122	122	122	122	122	122	122	122	122	122	122
1876-1877	61	61	61	61	61	61	61	61	61	61	61	61	61
1877-1878	96	96	96	96	96	96	96	96	96	96	96	96	96
1878-1879	104	104	104	104	104	104	104	104	104	104	104	104	104
1879-1880	123	123	123	123	123	123	123	123	123	123	123	123	123
1880-1881	107	107	107	107	107	107	107	107	107	107	107	107	107
1881-1882	95	95	95	95	95	95	95	95	95	95	95	95	95
1882-1883	80	80	80	80	80	80	80	80	80	80	80	80	80
1883-1884	113	113	113	113	113	113	113	113	113	113	113	113	113
1884-1885	77	77	77	77	77	77	77	77	77	77	77	77	77
1885-1886	116	116	116	116	116	116	116	116	116	116	116	116	116
1886-1887	63	63	63	63	63	63	63	63	63	63	63	63	63
1887-1888	64	64	64	64	64	64	64	64	64	64	64	64	64
1888-1889	100	100	100	100	100	100	100	100	100	100	100	100	100
1889-1890	180	180	180	180	180	180	180	180	180	180	180	180	180
1890-1891	77	77	77	77	77	77	77	77	77	77	77	77	77
1891-1892	103	103	103	103	103	103	103	103	103	103	103	103	103
1892-1893	91.18	137	126	126	126	126	126	126	126	126	126	126	125
1893-1894	66.99	101	91	91	91	91	91	91	91	91	91	91	89
1894-1895	88.63	134	57.05	144	123	123	123	123	74.29	96	123	123	125
1895-1896	95.01	143	52.81	133	58.85	140	133	133	101.65	131	133	133	131
1896-1897	67.13	101	37.95	95	42.56	101	106	106	87.93	113	106	106	106
1897-1898	42.04	64	30.30	75	32.05	75	66	66	48.12	62	66	66	66
1898-1899	47.65	72	23.30	59	28.33	68	74	74	64.05	83	74	74	74
1899-1900	73.52	111	42.64	105	50.84	121	116	116	90.60	117	116	116	117
1900-1901	77.64	117	43.34	109	48.90	116	114	114	88.19	114	114	114	114

TABLE 11.

1901-1902	110	36.36	92	42.04	100	107	86.13	111	107	107
1902-1903	93	36.56	92	41.95	100	94	69.38	90	94	95
1903-1904	61.68	56.75	143	57.78	138	91.87	141	113.35	142	140
1904-1905	101.30	100	39.80	100	46.64	111	73.49	111	106	109
1905-1906	66.65	130	51.05	129	54.75	130	87.65	135	130	130
1906-1907	151	67.34	169	73.22	174	97.78	150	119.07	151	153
1907-1908	79	32.00	81	34.92	83	49.56	76	64.27	83	73
1908-1909	135	53.98	136	59.67	142	87.27	134	110.50	143	136
1909-1910	93	35.73	90	29.73	71	55.78	86	88.39	114	87
1910-1911	159	59.91	151	52.80	126	75.43	116	165.05	213	126
1911-1912	61	22.61	57	20.25	48	32.32	49	52.28	67	59
1912-1913	66	36.77	93	26.01	62	52.67	81	50.13	64	77
1913-1914	107	56.88	143	51.45	123	89.15	127	69.45	90	130
1914-1915	71	75	24.21	58	81.80	126	43.58	59	20.89	89
1915-1916	94	94	47.18	112	37.80	89	63.11	81	28.86	99
1916-1917	79	80	34.93	83	80	60.85	78	19.96	76	83
1917-1918	54	56	22.04	52	56	42.04	54	17.73	67	58
1918-1919	80	81	36.06	86	44.34	68	61.98	80	21.55	80
1919-1920	52	50	28.83	68	38.99	60	32.20	41	12.83	54
1920-1921	101	99	49.53	118	102	66.88	86	18.81	72	105
Years of record	13	20	26	15	25	12				
Mean of record	73.28	43.66	42.14	67.66	76.62	23.12				
50-year mean	66.50	39.70	42.00	65.10	77.50	26.20				
County	Plumas,	Plumas,	Plumas,	Butte,	Plumas,	Sierra,				
Elevation	4,750	3,600	3,400	2,140	5,000	5,000				
Station reference number	59	60	61	62	63	64				

Precipitation data are from U. S. Weather Bureau records.  
 Streams within boundaries of Precipitation Division G: Mill Creek Group, Butte Creek Group, Feather River, Honey Creek Group.





TABLE 12.

TABLE 12—(Concluded). RECORDS OF PRECIPITATION AND TABLE OF COMPUTED INDICES OF SEASONAL WETNESS—  
PRECIPITATION DIVISION H—YUBA RIVER AREA.*Rainfall stations, depth of precipitation in inches and index of seasonal wetness.*

Season.	Deer Creek.		North Bloomfield.		Bowmans Dam.		Lake Spaulding.		Fordyce Dam.		Index of seasonal wetness, Division H.
	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	
1871-1872.....	141	74.53	137	101.34	139	141	141	141	141	141	141
1872-1873.....	74	38.65	71	56.27	77	74	74	74	74	74	74
1873-1874.....	118	62.62	115	88.23	121	118	118	118	118	118	118
1874-1875.....	72	27.89	51	49.95	68	72	72	72	72	72	72
1875-1876.....	124	64.56	118	92.14	126	124	124	124	124	124	124
1876-1877.....	63	37.82	69	45.65	62	63	63	63	63	63	63
1877-1878.....	98	52.59	96	64.50	88	98	98	98	98	98	98
1878-1879.....	105	55.52	102	73.67	101	105	105	105	105	105	105
1879-1880.....	125	69.28	127	95.75	131	125	125	125	125	125	125
1880-1881.....	112	63.51	116	81.55	112	112	112	112	112	112	112
1881-1882.....	88	50.41	92	66.67	91	88	88	88	88	88	88
1882-1883.....	79	40.38	74	53.52	73	79	79	79	79	79	79
1883-1884.....	112	61.65	113	84.09	115	112	112	112	112	112	112
1884-1885.....	92	55.44	102	70.34	96	92	92	92	92	92	92
1885-1886.....	114	61.62	113	79.37	109	114	114	114	114	114	114
1886-1887.....	72	42.86	78	50.79	70	72	72	72	72	72	72
1887-1888.....	54	31.51	51	29.40	40	54	54	54	54	54	54
1888-1889.....	73	45.79	63	53.73	63	73	73	73	73	73	73
1889-1890.....	182	131.93	185	131.93	185	182	182	182	182	182	182
1890-1891.....	77	57.77	77	62.83	86	77	77	77	77	77	77
1891-1892.....	83	57.75	79	57.75	79	83	83	83	83	83	83
1892-1893.....	121	121	122	122	122	121	121	121	121	121	121
1893-1894.....	95	35	96	96	96	95	95	95	95	95	95
1894-1895.....	136	136	136	98.99	136	136	136	136	136	136	136
1895-1896.....	125	77.02	141	99.21	136	125	125	125	125	125	125
1896-1897.....	111	67.01	123	85.62	117	111	111	111	111	111	111
1897-1898.....	60	40.71	74	41.35	57	60	60	60	60	60	60
1898-1899.....	84	49.88	91	64.45	88	84	84	84	84	84	84
1899-1900.....	109	75.63	138	80.17	110	109	109	109	109	109	109
1900-1901.....	106	57.38	105	79.48	109	106	106	106	106	106	106



TABLE 12.

1901-1902	95	52.26	96	65.92	90	66.83	95	65.76	97	95
1902-1903	94	51.97	95	76.16	104	63.73	91	59.57	88	94
1903-1904	139	69.93	128	142.07	195	102.56	148	70.90	105	139
1904-1905	103	58.71	107	89.88	123	65.55	94	64.78	96	103
1905-1906	133	73.13	134	85.16	117	94.15	135	104.62	154	133
1906-1907	138	77.84	143	91.32	125	99.75	143	88.93	131	138
1907-1908	55.72	75	58.85	71	48.22	66	51.63	74	48.26	71
1908-1909	99.94	135	70.24	129	92.93	127	94.26	136	94.80	140
1909-1910	71.29	97	48.53	89	73.17	105	73.89	109	99	99
1910-1911	89.80	122	73.81	135	.....	129	80.27	116	79.54	117
1911-1912	44.99	61	29.49	54	.....	60	41.75	60	44.06	65
1912-1913	50.32	68	54.44	62	53.14	73	44.91	64	52.95	78
1913-1914	94.12	128	89.51	109	64.22	88	57.13	125	89.84	133
1914-1915	77.12	105	89.17	108	57.91	79	59.16	85	69.00	102
1915-1916	76.22	103	57.92	106	.....	107	71.93	103	67.96	100
1916-1917	66.96	91	41.64	76	.....	88	62.93	91	62.22	92
1917-1918	44.09	60	30.14	55	.....	65	43.94	63	52.21	77
1918-1919	58.17	79	40.57	74	.....	87	63.16	91	57.79	85
1919-1920	47.08	64	32.30	59	.....	64	46.45	67	43.31	64
1920-1921	77.18	105	58.96	108	.....	111	76.39	110	65.26	96
Years of record.....	14	43	39	27	27	27	27	27	27	
Mean of record.....	68.07	53.98	74.38	70.25	68.43					
50-year mean.....	73.90	54.60	73.00	69.60	67.80					
County.....	Nevada.	Nevada.	Nevada.	Nevada.	Nevada.	Nevada.	Nevada.	Nevada.	Nevada.	
Elevation.....	3,700	3,200	5,500	4,600	6,500					
Station reference number.....	72	73	74	75	76					

Precipitation data are from U. S. Weather Bureau records, Sireams within boundaries of Precipitation Division H: Yuba River, Dry Creek, Bear River

TABLE 13.

TABLE 13. RECORDS OF PRECIPITATION AND TABLE OF COMPUTED INDICES OF SEASONAL WETNESS—PRECIPITATION DIVISION I—TAHOE-CARSON AREA.

Rainfall stations, depth of precipitation in inches and index of seasonal wetness.

Season.	Boca.		Truckee.		Tamarack.		Index of seasonal wetness, Division I.
	Inches.	Index.	Inches.	Index.	Inches.	Index.	
1871-1872	15.50	73	44.35	168	.....	126	123
1872-1873	9.65	46	21.67	82	.....	66	65
1873-1874	19.00	90	37.67	143	.....	120	118
1874-1875	15.10	72	19.86	75	.....	74	74
1875-1876	19.93	94	39.87	152	.....	126	124
1876-1877	7.60	36	18.06	69	.....	54	53
1877-1878	14.77	70	23.85	91	.....	81	81
1878-1879	18.56	88	21.53	82	.....	85	85
1879-1880	21.96	104	37.72	143	.....	126	125
1880-1881	16.12	76	21.97	84	.....	80	80
1881-1882	21.00	99	36.55	139	.....	121	120
1882-1883	10.05	48	12.86	40	.....	48	48
1883-1884	23.15	112	33.52	135	.....	124	123
1884-1885	12.00	57	20.54	78	.....	69	68
1885-1886	20.78	98	25.31	89	.....	93	93
1886-1887	20.10	95	25.58	97	.....	96	96
1887-1888	10.86	51	9.35	36	.....	43	43
1888-1889	9.77	46	13.08	50	.....	48	46
1889-1890	52.15	247	54.84	269	.....	226	227
1890-1891	23.25	110	24.20	92	.....	100	101
1891-1892	21.45	102	24.38	93	.....	97	97
1892-1893	37.50	178	38.70	147	.....	161	162
1893-1894	21.70	103	33.21	126	.....	116	115
1894-1895	24.52	116	34.07	130	.....	124	123
1895-1896	29.41	139	27.16	103	.....	119	120
1896-1897	23.85	113	27.87	106	.....	109	109
1897-1898	18.22	86	14.20	54	.....	68	69
1898-1899	24.11	114	26.76	102	.....	107	108
1899-1900	26.25	125	23.35	89	.....	105	106
1900-1901	35.30	167	24.19	92	.....	36.20	73

TABLE 13.

1901-1902	12.80	60	20.29	77	55.44	112	83
1902-1903	13.77	65	25.91	99	47.06	95	86
1903-1904	11.68	55	40.26	153	.....	110	106
1904-1905	.....	79	20.68	79	.....	79	79
1905-1906	.....	121	31.93	121	.....	121	121
1906-1907	35.84	170	40.17	153	93.99	189	171
1907-1908	31.32	44	20.22	77	39.00	78	66
1908-1909	24.82	118	28.01	107	56.25	113	113
1909-1910	26.93	127	25.01	95	47.04	95	106
1910-1911	36.59	174	25.95	99	87.66	177	150
1911-1912	10.82	51	14.30	54	33.36	67	57
1912-1913	14.13	67	15.52	59	42.49	86	71
1913-1914	31.29	149	38.15	145	54.42	110	135
1914-1915	28.39	135	25.81	98	39.23	79	104
1915-1916	37.55	178	23.16	88	48.41	97	121
1916-1917	.....	92	19.61	74	42.53	86	84
1917-1918	.....	72	17.60	67	30.87	62	67
1918-1919	.....	98	25.74	98	39.83	80	92
1919-1920	.....	71	13.48	51	34.13	69	64
1920-1921	.....	121	.....	101	54.50	110	111
Years of record	44		50		18		
Mean of record	21.05		26.13		49.02		
50-year mean	21.10		26.30		49.60		
County	Nevada.		Nevada.		Alpine.		
Elevation	5,531		5,819		8,030		
Station reference number	77		78		79		

Precipitation data are from U. S. Weather Bureau records.  
Streams within boundaries of Precipitation Division I: Lake Tahoe Basin, Truckee River, West Fork Carson River, East Fork Carson River, West Walker River, East Walker River.

TABLE 14.

TABLE 14. RECORDS OF PRECIPITATION AND TABLE OF COMPUTED INDICES OF SEASONAL WETNESS—PRECIPITATION DIVISION J—AMERICAN RIVER AREA.

Rainfall stations, depth of precipitation in inches and index of seasonal wetness.

Season.	Summit.		Ciseco.		Emigrant Gap.		Blue Canyon.		Towle.		Gold Run.		Iowa Hill.		Collfax.		Pilot Creek.		
	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	
1871-1872.....	68.10	147	62.94	124	.....	120	.....	120	.....	120	.....	120	.....	120	.....	46.85	97	.....	120
1872-1873.....	35.22	76	37.59	74	48.77	90	75	75	75	75	75	75	75	75	75	33.58	70	.....	75
1873-1874.....	22.33	48	52.20	103	65.58	120	101	101	101	101	101	101	101	101	101	53.62	111	.....	101
1874-1875.....	26.13	56	28.19	55	17.35	32	64	64	64	64	64	64	64	64	64	36.21	75	.....	64
1875-1876.....	57.33	124	75.40	148	45.80	84	.....	125	.....	125	.....	125	.....	125	.....	59.53	124	.....	125
1876-1877.....	27.29	59	43.04	85	34.20	63	.....	63	.....	63	.....	63	.....	63	.....	27.61	57	.....	63
1877-1878.....	33.54	72	35.87	70	51.54	95	92	92	92	92	92	92	92	92	92	42.83	89	.....	92
1878-1879.....	54.71	118	49.56	97	68.35	125	106	106	106	106	106	106	106	106	106	45.46	94	.....	106
1879-1880.....	80.10	173	54.59	107	75.65	139	126	126	126	126	126	126	126	126	126	56.14	117	.....	126
1880-1881.....	22.65	49	78.34	154	59.82	110	.....	109	.....	109	.....	109	.....	109	.....	48.03	100	.....	109
1881-1882.....	55.35	119	69.95	137	57.52	105	.....	105	.....	105	.....	105	.....	105	.....	42.83	89	.....	105
1882-1883.....	40.69	88	41.20	81	39.49	72	.....	82	.....	82	.....	82	.....	82	.....	32.73	68	.....	82
1883-1884.....	52.29	113	55.09	108	58.57	107	.....	118	.....	118	.....	118	.....	118	.....	52.61	109	.....	118
1884-1885.....	27.39	48	39.75	78	44.70	82	.....	74	.....	74	.....	74	.....	74	.....	35.61	74	.....	74
1885-1886.....	47.10	102	85.92	110	68.42	125	.....	113	.....	113	.....	113	.....	113	.....	51.01	106	.....	113
1886-1887.....	47.25	102	41.50	82	44.64	82	.....	74	.....	74	.....	74	.....	74	.....	27.92	58	.....	74
1887-1888.....	38.87	84	34.02	67	47.44	87	.....	69	.....	69	.....	69	.....	69	.....	31.20	65	.....	69
1888-1889.....	31.42	68	32.71	64	36.15	66	.....	74	.....	74	.....	74	.....	74	.....	40.89	85	.....	74
1889-1890.....	78.60	170	67.63	132	83.01	163	.....	168	.....	168	.....	168	.....	168	.....	80.80	187	.....	168
1890-1891.....	33.50	72	41.79	82	29.46	54	.....	77	.....	77	.....	77	.....	77	.....	33.99	83	.....	77
1891-1892.....	38.25	82	43.26	85	43.38	80	.....	89	.....	89	.....	89	.....	89	.....	45.70	95	.....	89
1892-1893.....	61.30	132	48.85	96	65.12	119	.....	123	.....	123	.....	123	.....	123	.....	52.85	110	.....	123
1893-1894.....	56.75	110	53.05	104	52.20	96	.....	105	.....	105	.....	105	.....	105	.....	53.68	112	.....	105
1894-1895.....	68.50	148	60.10	118	36.70	67	.....	125	.....	125	.....	125	.....	125	.....	62.31	130	.....	125
1895-1896.....	54.40	117	37.00	73	54.90	101	.....	113	.....	113	.....	113	.....	113	.....	65.25	135	.....	113
1896-1897.....	56.28	121	43.70	86	.....	109	.....	109	.....	109	.....	109	.....	109	.....	51.65	107	.....	109
1897-1898.....	30.28	65	31.90	63	.....	62	.....	62	.....	62	.....	62	.....	62	.....	32.10	67	.....	62
1898-1899.....	50.20	108	47.19	93	.....	93	.....	93	.....	93	.....	93	.....	93	.....	45.43	94	.....	93
1899-1900.....	61.52	133	71.31	140	.....	128	.....	95	.....	95	.....	95	.....	95	.....	63.36	132	.....	95
1900-1901.....	51.60	111	71.73	141	.....	122	.....	101	.....	101	.....	101	.....	101	.....	65.33	136	.....	101

TABLE 14.

1901-1902.....	46.70	101	43.49	85	.....	102	65.25	116	44.68	91	49.01	98	50.34	105	62.57	95	
1902-1903.....	42.70	92	40.45	79	.....	99	58.98	91	52.85	107	48.74	97	49.22	102	62.61	95	
1903-1904.....	73.28	158	89.57	176	.....	146	98.94	153	77.55	157	65.03	130	71.56	148	95.54	145	
1904-1905.....	47.71	103	46.12	91	.....	102	58.32	90	48.05	100	46.82	93	48.78	101	58.41	89	
1905-1906.....	56.57	122	58.21	114	85.60	157	93.26	144	68.70	122	71.93	146	69.29	144	94.28	143	
1906-1907.....	66.76	144	67.99	134	94.30	173	100.47	156	63.29	128	75.99	152	66.10	137	94.89	144	
1907-1908.....	36.78	79	40.92	80	50.54	93	49.05	76	37.83	67	39.36	78	32.31	67	45.87	70	
1908-1909.....	55.16	119	62.94	124	67.63	124	87.07	135	60.75	123	59.48	119	58.76	123	90.37	137	
1909-1910.....	35.15	76	58.85	116	56.28	103	64.11	99	48.34	98	50.69	101	49.69	103	67.63	103	
1910-1911.....	65.11	140	58.30	115	62.39	114	73.86	115	60.90	124	.....	129	61.56	128	81.03	127	
1911-1912.....	24.85	54	30.93	61	35.48	65	41.17	64	40.27	71	34.65	70	27.96	58	43.77	66	
1912-1913.....	32.76	70	35.87	70	32.59	60	52.59	82	50.38	89	43.20	88	21.65	51	47.82	73	
1913-1914.....	52.39	113	52.86	104	65.32	120	82.77	128	85.86	152	70.00	143	52.10	107	75.30	113	
1914-1915.....	42.28	91	51.16	101	66.50	122	78.89	122	68.30	121	53.79	109	53.68	111	.....	109	
1915-1916.....	48.93	105	53.00	104	54.01	99	65.12	101	72.84	129	40.56	82	50.27	105	.....	106	
1916-1917.....	38.15	82	.....	88	56.80	104	55.09	85	62.30	111	45.76	93	49.60	103	.....	91	
1917-1918.....	29.83	64	.....	67	31.81	58	40.78	63	42.35	75	36.35	74	31.39	66	.....	67	
1918-1919.....	42.57	92	.....	93	53.77	99	49.34	76	50.30	102	37.01	75	43.15	89	.....	93	
1919-1920.....	34.30	74	.....	68	39.43	72	36.26	56	52.23	93	.....	70	69	32.65	66	72	
1920-1921.....	49.29	100	.....	114	49.06	90	77.44	120	.....	110	.....	110	53.25	110	.....	109	
Years of record.....	50	.....	46	.....	40	.....	22	.....	30	.....	20	.....	31	.....	51	.....	20
Mean of record.....	46.38	.....	50.57	.....	52.91	.....	66.17	.....	57.36	.....	51.09	.....	52.63	.....	47.81	.....	69.21
50-year mean.....	46.38	.....	50.90	.....	54.50	.....	64.60	.....	56.40	.....	49.30	.....	50.10	.....	48.20	.....	65.90
County.....	Placer.	.....	Placer.	.....	Placer.	.....	Placer.	.....	Placer.	.....	Placer.	.....	Placer.	.....	Placer.	.....	El Dorado.
Elevation.....	7,017	.....	5,939	.....	5,280	.....	4,695	.....	3,704	.....	3,222	.....	2,825	.....	2,421	.....	4,000
Station reference number.....	80	.....	81	.....	82	.....	83	.....	84	.....	85	.....	86	.....	87	.....	88

Precipitation data are from U. S. Weather Bureau records.

TABLE 14.

TABLE 14—(Concluded). RECORDS OF PRECIPITATION AND TABLE OF COMPUTED INDICES OF SEASONAL WETNESS—PRECIPITATION DIVISION J—AMERICAN RIVER AREA.

*Rainfall stations, depth of precipitation in inches and index of seasonal wetness.*

Season.	Georgetown.		Auburn.		Wheatland.		Newcastle.		Rocklin.		Folsom.		Shingle Springs.		Placerville.		Index of seasonal wetness.	
	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.
1871-1872	120	39.98	119		120		120		23.90	107	28.77	118		120		120		120
1872-1873	75	25.19	75		75		75		15.80	70	15.69	64		75		75		75
1873-1874	63.67	111	34.55	102	101		101		22.78	102	24.46	100		101		101		100
1874-1875	47.08	82	27.73	82	64		64		11.94	53	15.70	64		64		33.76		64
1875-1876	80.47	140	44.15	131	125		125		20.92	93	30.24	124		125		61.25		124
1876-1877	41.25	72	18.86	56	63		63		10.71	48	10.19	42		63		63		62
1877-1878	61.31	107	36.11	107	92		92		24.21	108	25.00	103		92		92		93
1878-1879	60.06	106	34.94	104	106		106		19.05	89	21.01	90		106		106		104
1879-1880	70.40	123	41.55	123	126		126		21.52	96	25.09	103		126		126		125
1880-1881	65.82	115	37.18	110	109		109		21.32	95	25.91	107		109		48.04		108
1881-1882	54.13	95	33.60	100	105		105		18.52	83	18.68	77		105		42.46		103
1882-1883	45.94	80	25.64	76	82		82		19.24	86	22.22	91		82		36.56		82
1883-1884	72.65	127	40.96	121	118		118		22.66	101	31.02	127		118		57.36		118
1884-1885	49.90	87	25.56	76	74		74		12.57	56	13.58	56		74		36.56		73
1885-1886	73.08	128	42.32	126	113		113		27.81	124	34.75	143		113		54.63		115
1886-1887	41.32	72	27.50	82	74		74		17.33	77	20.11	82		74		33.32		75
1887-1888	33.47	58	21.08	64	52		52		12.21	54	16.28	67		52		32.83		68
1888-1889	36.83	64	26.75	79	74		74		17.44	78	20.43	84		74		35.77		76
1889-1890	95.27	166	48.08	144	158		158		34.12	152	43.31	178		158		78.13		168
1890-1891	59.82	69	24.78	73	77		77		17.45	78	20.14	82		77		34.80		77
1891-1892	44.07	70	32.17	95	100		100		22.44	100	21.21	87		100		44.43		90
1892-1893	74.93	131	40.79	121	133		133		29.30	130	30.38	125		133		63.54		123
1893-1894	65.93	115	35.31	105	104		104		29.95	101	24.21	108		104		52.13		104
1894-1895	72.09	126	44.42	132	136		136		42.09	142	32.13	143		136		59.68		128
1895-1896	65.31	114	35.78	106	115		115		30.63	103	29.90	110		115		51.79		114
1896-1897	70.94	124	39.89	118	121		121		32.54	109	24.24	108		121		45.72		119
1897-1898	31.94	56	20.36	60	58		58		14.00	62	12.76	52		58		14.60		59
1898-1899	46.56	81	29.77	88	15.83		15.83		18.61	83	19.38	79		88		31.96		86
1899-1900	55.73	97	37.32	111	24.08		24.08		107	103	125	27.85		111		41.67		111
1900-1901	51.28	90	36.96	110	25.43		25.43		119	103	117	24.66		110		46.70		112

TABLE 14.

1901-1902	49.08	86	45.53	120	22.73	107	100	107	25.69	106	100	34.08	80
1902-1903	55.12	96	36.30	108	23.30	109	98	29.61	132	55.16	103	37.21	87
1903-1904	79.48	139	44.72	133	22.20	104	37.61	25.37	113	25.66	105	39.39	117
1904-1905	49.32	86	35.35	105	24.43	115	33.66	27.61	123	26.20	107	36.60	86
1905-1906	76.31	133	46.57	138	28.23	132	41.49	36.13	161	33.93	140	54.19	128
1906-1907	82.76	144	57.73	168	32.59	153	48.05	38.63	172	39.65	163	59.85	141
1907-1908	38.06	66	22.66	67	15.46	72	20.78	16.70	74	15.37	64	20.59	64
1908-1909	72.19	126	44.44	132	25.38	119	37.59	32.49	145	29.06	120	37.09	110
1909-1910	57.73	101	29.04	83	19.51	91	26.90	21.06	94	20.20	83	32.35	91
1910-1911	79.08	138	35.15	104	29.95	140	.....	35.46	158	38.21	157	43.54	130
1911-1912	34.78	61	16.61	49	13.76	65	.....	12.25	54	15.21	62	18.24	51
1912-1913	35.53	62	18.77	56	14.04	66	.....	13.99	62	14.75	61	.....	60
1913-1914	66.51	116	26.43	78	31.37	147	.....	30.46	136	30.01	123	.....	107
1914-1915	59.41	104	29.52	88	25.59	120	.....	29.62	132	31.39	129	.....	98
1915-1916	60.23	105	32.77	97	22.70	106	.....	21.75	97	29.67	122	.....	101
1916-1917	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1917-1918	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1918-1919	52.28	91	34.95	104	.....	93	.....	19.00	85	22.88	94	.....	86
1919-1920	40.02	70	25.61	76	.....	72	.....	11.42	51	14.99	61	.....	71
1920-1921	63.10	110	45.10	134	.....	110	.....	24.37	108	27.20	112	.....	109
Years of record	46	.....	50	.....	29	14	.....	48	50	.....	35	43	.....
Mean of record	57.92	.....	33.72	.....	22.21	34.27	.....	22.01	24.37	.....	33.72	42.65	.....
50-year mean	57.30	.....	33.70	.....	21.30	29.70	.....	22.40	24.40	.....	34.10	42.50	.....
County	El Dorado,	Placer,	Placer,	Yuba,	.....	Placer,	.....	Placer,	Sacramento,	.....	El Dorado,	El Dorado,	.....
Elevation	2,650	1,360	.....	84	970	.....	249	.....	252	.....	1,415	1,875	.....
Station reference number	89	90	90	91	92	92	93	93	95	95	96	97	.....

Precipitation data are from U. S. Weather Bureau records.  
Streams within boundaries of Precipitation Division J: Coon Creek Group, American River.





TABLE 15.

1901-1902	96	38.02	95	37.55	121	.....	96	28.18	91	20.19	100	18.71	104	21.94	98	17.84	86	28.45	87
1902-1903	108	.....	109	43.10	139	.....	108	31.28	101	22.39	111	18.05	100	26.03	116	19.62	95	33.04	102
1903-1904	110	52.68	131	37.74	122	.....	110	38.06	123	21.42	106	17.74	98	30.02	134	20.27	98	34.45	106
1904-1905	104	38.19	95	33.27	108	.....	94	35.35	102	25.95	128	19.83	110	29.89	133	20.39	98	32.85	101
1905-1906	142	57.06	142	37.22	121	.....	130	42.97	139	30.93	153	24.37	135	28.52	127	26.59	129	.....	139
1906-1907	146	58.39	145	46.15	149	.....	150	50.97	159	33.82	168	27.19	151	35.76	159	28.88	140	.....	158
1907-1908	33.75	50	22.71	56	18.94	61	19.59	60	18.93	61	14.27	13.40	74	14.32	64	13.00	63	.....	66
1908-1909	51.25	107	46.68	116	33.43	108	38.95	119	37.71	122	26.01	21.97	122	25.53	113	25.03	121	35.98	111
1909-1910	48.11	100	39.56	98	29.96	97	33.50	103	33.03	107	20.39	101	.....	101	.....	97	17.13	83	29.86
1910-1911	66.37	138	57.54	143	17.38	56	47.82	146	44.58	144	30.46	151	26.27	145	34.47	153	29.88	144	43.37
1911-1912	32.73	68	25.17	62	18.41	59	20.18	62	20.50	66	12.68	63	13.11	73	13.35	59	13.19	64	19.72
1912-1913	33.53	70	28.27	70	17.57	57	21.73	66	20.56	66	14.26	71	9.05	50	13.19	59	11.77	57	18.38
1913-1914	37.87	129	48.91	122	30.91	100	38.00	117	36.44	118	22.86	113	23.18	128	26.37	117	26.59	129	38.51
1914-1915	49.54	103	44.16	110	28.42	92	34.43	105	36.57	118	22.80	113	22.31	124	25.95	115	23.47	113	122
1915-1916	51.32	107	41.90	104	28.89	93	34.69	106	30.65	99	12.10	60	20.12	111	.....	90	23.09	111	87
1916-1917	46.41	97	.....	79	21.27	69	29.14	89	24.77	80	16.20	80	13.74	76	.....	81	20.61	100	78
1917-1918	36.79	77	.....	75	22.56	73	20.51	84	23.51	76	14.65	72	11.38	63	.....	75	18.68	90	73
1918-1919	38.97	81	30.40	75	26.18	85	24.48	81	.....	89	18.35	91	20.26	112	.....	90	16.55	94	58
1919-1920	35.20	73	31.03	77	21.99	71	24.81	76	.....	68	16.10	.....	9.21	52	.....	75	16.95	82	31.89
1920-1921	50.09	104	46.56	116	31.62	102	31.79	97	.....	112	23.37	116	19.55	108	.....	111	25.27	122	31.60
Years of record	14 *	24	29	29	36	43	42	26	33	26	33	26	33	26	33	26	33	26	33
Mean of record	44.42	41.85	32.14	32.44	31.93	20.39	18.26	24.37	21.56	33.96	21.56	33.96	21.56	33.96	21.56	33.96	21.56	33.96	21.56
50-year mean	48.00	40.20	30.90	32.70	31.00	20.20	18.10	22.50	20.70	32.50	20.70	32.50	20.70	32.50	20.70	32.50	20.70	32.50	20.70
County	Amador.	Calaveras.	Amador.	Amador.	Calaveras.	Amador.	Calaveras.	Amador.	Calaveras.	Amador.	Calaveras.	Sacramento.	Calaveras.	Calaveras.	Calaveras.	Tuolumne.	Calaveras.	Calaveras.	Calaveras.
Elevation	2,450	2,326	1,500	725	1,550	287	49	673	381	1,825	381	1,825	381	1,825	381	1,825	381	1,825	381
Station reference number	98	99	100	101	102	103	104	105	106	107	106	105	104	105	106	107	106	107	106

Precipitation data are from U. S. Weather Bureau records unless otherwise noted.  
 †From records of Southern Pacific Railroad.

TABLE 15.

TABLE 15—(Concluded). RECORDS OF PRECIPITATION AND TABLE OF COMPUTED INDICES OF SEASONAL WETNESS—  
PRECIPITATION DIVISION K—MOKELUMNE-MERCED AREA.  
*Rainfall stations, depth of precipitation in inches and index of seasonal wetness.*

Season.	Groveland.		Crockers.		Yosemite.		Summerdale.		Merced Falls.		La Grange.		Denair.		Oakdale.		Farmington.		Index of seasonal wetness, Division K.
	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	
1871-1872	122	122	122	122	122	122	122	122	122	122	20.48	122	122	122	122	122	122	122	122
1872-1873	86	86	86	86	86	86	86	86	86	86	14.35	86	86	86	86	86	86	86	86
1873-1874	87	87	87	87	87	87	87	87	87	87	17.63	87	87	87	87	87	87	87	87
1874-1875	61	61	61	61	61	61	61	61	61	61	10.29	61	61	61	61	61	61	61	61
1875-1876	154	154	154	154	154	154	154	154	154	154	25.87	154	154	154	154	154	154	154	154
1876-1877	34	34	34	34	34	34	34	34	34	34	5.74	34	34	34	34	34	34	34	34
1877-1878	112	112	112	112	112	112	112	112	112	112	18.90	112	112	112	112	112	112	112	112
1878-1879	78	78	78	78	78	78	78	78	78	78	11.54	78	78	78	78	78	78	78	78
1879-1880	105	105	105	105	105	105	105	105	105	105	19.50	105	105	105	105	105	105	105	105
1880-1881	87	87	87	87	87	87	87	87	87	87	15.12	90	87	87	87	87	87	87	87
1881-1882	85	85	85	85	85	85	85	85	85	85	14.51	87	85	85	85	85	85	85	85
1882-1883	87	87	87	87	87	87	87	87	87	87	15.98	95	87	87	87	87	87	87	87
1883-1884	135	135	135	135	135	135	135	135	135	135	25.01	149	135	135	135	135	135	135	135
1884-1885	67	67	67	67	67	67	67	67	67	67	11.89	71	67	67	67	67	67	67	67
1885-1886	129	129	129	129	129	129	129	129	129	129	24.09	144	129	129	129	129	129	129	129
1886-1887	68	68	68	68	68	68	68	68	68	68	11.01	66	68	68	68	68	68	68	68
1887-1888	64	64	64	64	64	64	64	64	64	64	14.45	68	64	64	64	64	64	64	64
1888-1889	74	74	74	74	74	74	74	74	74	74	14.45	86	74	74	74	74	74	74	74
1889-1890	172	172	172	172	172	172	172	172	172	172	30.34	181	172	172	172	172	172	172	172
1890-1891	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
1891-1892	90	90	90	90	90	90	90	90	90	90	91	91	90	90	90	90	90	90	90
1892-1893	132	132	132	132	132	132	132	132	132	132	19.37	116	132	132	132	132	132	132	132
1893-1894	122	122	122	122	122	122	122	122	122	122	22.77	130	122	122	122	122	122	122	122
1894-1895	148	148	148	148	148	148	148	148	148	148	22.36	133	148	148	148	148	148	148	148
1895-1896	104	104	104	104	104	104	104	104	104	104	14.28	85	104	104	104	104	104	104	104
1896-1897	124	124	124	124	124	124	124	124	124	124	20.23	121	124	124	124	124	124	124	124
1897-1898	61	61	61	61	61	61	61	61	61	61	10.57	63	61	61	61	61	61	61	61
1898-1899	88	88	88	88	88	88	88	88	88	88	12.81	76	88	88	88	88	88	88	88
1899-1900	101	101	101	101	101	101	101	101	101	101	15.68	93	101	101	101	101	101	101	101
1900-1901	133	133	133	133	133	133	133	133	133	133	85.46	167	133	133	133	133	133	133	133

TABLE 15.

1901-1902	96	48.52	95	96	45.84	89	96	100	9.85	100	13.35	95	15.31	96	97
1902-1903	108	55.46	109	108	49.83	97	108	105	11.14	114	15.49	111	16.41	103	108
1903-1904	110	55.09	108	110	49.38	96	110	100	8.20	83	14.50	104	15.11	95	108
1904-1905	34.48	91	48.73	96	36.23	103	50.24	98	120	12.48	127	16.52	118	19.40	120
1905-1906	55.46	146	83.54	104	112	84.34	105	98	137	12.36	126	20.72	148	19.46	123
1906-1907	45.55	120	66.51	131	148	71.70	140	146	158	11.42	116	22.62	162	24.37	154
1907-1908	65	31.79	62	21.66	62	42.28	82	11.34	70	5.93	60	8.41	60	10.04	63
1908-1909	48.62	128	61.20	120	49.55	141	66.56	130	18.50	114	127	10.42	106	13.75	98
1909-1910	41.68	110	77	42.75	122	49.93	97	12.54	77	15.17	90	97	13.20	94	16.45
1910-1911	59.75	157	.....	131	38.18	109	.....	137	22.65	135	125	17.08	126	20.20	127
1911-1912	62	.....	62	20.39	58	.....	62	10.46	62	.....	62	8.10	58	7.93	50
1912-1913	18.82	48	.....	60	25.08	71	.....	60	9.63	57	3.26	33	6.42	46	8.31
1913-1914	47.88	126	.....	119	39.47	112	.....	111	20.44	122	8.30	84	17.40	125	21.22
1914-1915	113	.....	115	38.08	109	.....	115	19.69	122	19.42	116	8.85	90	18.52	132
1915-1916	93	.....	93	32.05	91	.....	93	18.69	115	.....	93	10.51	75	.....	84
1916-1917	82	.....	79	37.30	106	.....	79	.....	82	.....	79	10.48	75	.....	78
1917-1918	76	.....	75	27.36	78	.....	76	.....	78	.....	79	10.28	105	12.94	93
1918-1919	86	.....	87	25.52	73	.....	87	15.17	94	.....	101	9.51	97	12.31	88
1919-1920	75	.....	75	24.39	70	.....	75	14.80	92	.....	66	9.98	102	10.32	74
1920-1921	109	.....	111	32.13	92	.....	111	15.08	93	.....	112	15.20	155	15.91	114
Years of record	8	13	15	14	14	11	36	18	34	38	18	34	38	38	38
Mean of record	43.96	54.97	32.68	55.00	15.87	16.46	10.39	14.27	16.49	16.49	10.39	14.27	16.49	16.49	16.49
50-year mean	38.00	50.90	35.10	51.30	16.02	16.80	9.80	14.00	15.90	15.90	9.80	14.00	15.90	15.90	15.90
County	Tuolumne	Tuolumne	Mariposa	Mariposa	Mariposa	Merced	Stanislaus	Stanislaus	Stanislaus	Stanislaus	Stanislaus	Stanislaus	San Joaquin	San Joaquin	San Joaquin
Elevation	1,400	4,452	3,945	5,000	351	293	126	156	111	111	126	156	111	111	111
Station reference number	108	109	110	111	112	113	114	115	116	116	114	115	116	116	116

Precipitation data are from U. S. Weather Bureau records unless otherwise noted.

†From records of Southern Pacific Railroad.  
Streams within boundaries of Precipitation Division K: Chowchilla River; Dutchman Creek Group, Mariposa Creek; Owens Creek; Bear Creek; Burns Creek Group, Merced River; Tuolumne River; Martelli's Creek Group; Wildcat Creek Group, Stanislaus River; Littlejohns Creek, Calaveras River; Mokelumne River, Sutter Creek Group, Cosumnes River, Mono Lake Group.



TABLE 16.

1901-1902	16.36	91	14.03	99	7.72	78	12.48	82	17.47	93	21.27	103	21.03	93	23.48	05	10.88	88	14.94	87	91
1902-1903	19.26	108	14.54	102	10.28	105	14.25	92	17.17	92	23.53	116	22.67	100	25.60	104	11.97	91	14.34	86	99
1903-1904	17.69	99	8.68	100	8.68	88	13.33	92	18.53	96	23.14	112	26.80	128	32.10	130	11.57	94	20.17	117	105
1904-1905	21.19	119	18.19	128	15.15	154	15.81	103	23.47	126	26.64	129	25.59	113	27.80	112	16.77	136	21.01	122	124
1905-1906	24.42	137	18.68	132	11.77	120	19.32	126	23.89	128	21.76	105	23.44	103	26.28	106	14.99	121	21.14	123	120
1906-1907	25.98	145	22.49	159	15.73	160	22.99	150	28.35	152	24.02	117	.....	142	33.05	134	17.05	138	.....	144	144
1907-1908	12.81	72	7.00	78	7.00	71	9.93	65	12.90	69	13.33	66	.....	72	17.80	72	10.63	86	.....	.....	72
1908-1909	15.37	104	15.89	112	12.26	125	16.38	121	22.64	121	29.91	143	29.92	132	31.78	129	15.25	123	21.83	127	124
1909-1910	13.44	86	13.81	98	10.81	110	14.30	95	18.33	98	18.02	90	19.35	85	21.82	88	11.03	89	15.39	89	93
1910-1911	24.49	137	9.93	70	10.07	102	21.28	139	20.58	110	27.27	132	28.99	128	30.28	122	16.75	136	23.73	138	121
1911-1912	11.34	63	9.06	64	5.55	56	9.60	63	12.37	66	14.69	71	.....	65	.....	65	7.66	62	11.58	67	64
1912-1913	.....	.....	7.30	51	4.60	47	8.23	54	.....	53	11.15	54	.....	53	14.87	60	5.60	45	8.86	51	52
1913-1914	.....	126	17.89	126	12.35	126	17.20	112	.....	123	26.15	127	.....	127	29.88	121	18.07	146	24.51	142	128
1914-1915	.....	127	17.46	123	11.45	117	19.51	128	.....	127	26.58	129	.....	126	.....	126	16.63	135	20.95	122	126
1915-1916	.....	118	18.04	127	11.07†	113	20.42	134	.....	117	20.01†	97	.....	118	26.30	107	15.79	128	23.69	137	120
1916-1917	.....	78	10.87	77	.....	80	10.58	69	.....	80	18.75†	91	.....	78	.....	78	8.32	67	.....	.....	78
1917-1918	.....	52	8.79	62	.....	50	8.73	57	.....	50	7.31†	35	.....	52	.....	52	7.82	63	.....	.....	52
1918-1919	.....	103	15.89	112	10.13†	103	17.99	117	20.27	108	11.86†	58	.....	103	.....	103	17.16	139	18.02	104	105
1919-1920	.....	69	7.79	55	6.63†	68	8.82	58	.....	70	18.23†	88	.....	67	.....	67	7.88	64	9.33	54	66
1920-1921	.....	99	15.06	105	8.37†	85	13.28	87	.....	101	22.16†	108	.....	99	.....	99	12.28	99	17.17	99	98
Years of record	24	.....	54	.....	40	.....	50	.....	42	.....	47	.....	14	.....	21	.....	42	.....	24	.....	.....
Mean of record	19.46	.....	14.08	.....	10.13	.....	15.30	.....	19.05	.....	20.61	.....	23.77	.....	26.41	.....	12.52	.....	17.87	.....	.....
50-year mean	17.90	.....	14.18	.....	9.80	.....	15.30	.....	18.70	.....	20.60	.....	22.70	.....	24.80	.....	12.40	.....	17.30	.....	.....
County	San Joaquin.	.....	San Joaquin.	.....	San Joaquin.	.....	Alameda.	.....	Alameda.	.....	San Mateo.	.....	Alameda.	.....	Alameda.	.....	Contra Costa.	.....	Solano.	.....	.....
Elevation	35	.....	23	.....	64	.....	485	.....	87	.....	22	.....	48	.....	200	.....	46	.....	35	.....	.....
Station reference number	117	.....	118	.....	119	.....	120	.....	121	.....	122	.....	123	.....	124	.....	128	.....	129	.....	.....

Precipitation data are from U. S. Weather Bureau records unless otherwise noted.

†From records of Southern Pacific Railroad.

Streams within boundaries of Precipitation Division L: Orestimla Creek Group, Mt. Diablo Creek Group, Claremont Creek Group, San Pablo Creek, San Leandro Creek, San Lorenzo Creek, Alameda Creek, Mission Creek Group, Penitencia Creek, San Francisco Creek, San Mateo Creek Group, Peseadero Creek Group.

TABLE 17.

TABLE 17. RECORDS OF PRECIPITATION AND TABLE OF COMPUTED INDICES OF SEASONAL WETNESS—PRECIPITATION DIVISION M—MARIN-NAPA-WOODLAND AREA.

Rainfall stations, depth of precipitation in inches and index of seasonal wetness.

Season.	Suisun.		Davis.		Woodland.		Guinda.		Calistoga.		St. Helena.		Santa Rosa.	
	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.
1871-1872	124	124	124	124	124	124	124	124	124	124	124	124	124	124
1872-1873	17.06	86	11.95	70	79	79	79	79	79	79	79	79	79	79
1873-1874	18.43	93	18.30	107	23.00	131	23.00	131	30.82	84	30.82	84	100	100
1874-1875	15.18	77	11.18	65	14.18	81	14.18	81	24.60	67	24.60	67	72	72
1875-1876	113	113	18.72	109	22.14	126	22.14	126	111	111	39.48	108	111	111
1876-1877	53	53	5.12	30	10.67	61	10.67	61	53	53	22.00	60	53	53
1877-1878	26.73	135	20.00	117	26.69	152	26.69	152	143	143	50.40	138	143	143
1878-1879	26.18	132	12.93	75	15.93	91	15.93	91	100	100	36.32	100	100	100
1879-1880	21.96	111	17.63	100	21.67	124	21.67	124	108	108	38.10	104	108	108
1880-1881	24.52	124	18.85	110	17.87	102	17.87	102	111	111	40.48	111	111	111
1881-1882	15.93	80	11.63	68	12.05	69	12.05	69	70	70	22.85	63	70	70
1882-1883	17.57	89	15.78	92	16.95	97	16.95	97	82	82	24.98	68	82	82
1883-1884	21.17	107	18.80	110	23.74	136	23.74	136	106	106	33.62	92	106	106
1884-1885	12.65	64	9.79	57	10.82	62	10.82	62	62	62	22.45	61	62	62
1885-1886	29.30	148	24.50	143	23.20	132	23.20	132	127	127	41.72	114	127	127
1886-1887	12.29	62	12.23	71	13.07	75	13.07	75	71	71	23.00	63	71	71
1887-1888	14.55	73	12.00	70	12.79	73	12.79	73	73	73	24.50	67	73	73
1888-1889	17.96	91	20.13	118	21.42	122	21.42	122	94	94	31.63	87	94	94
1889-1890	39.38	199	37.41	218	30.69	175	30.69	175	194	194	67.51	185	194	194
1890-1891	17.68	89	21.38	125	13.80	79	13.80	79	83	83	26.79	73	83	83
1891-1892	19.39	98	12.42	72	13.92	79	13.92	79	91	91	30.07	82	91	91
1892-1893	22.62	114	24.31	142	21.03	120	21.03	120	115	115	48.43	133	115	115
1893-1894	19.20	97	15.16	89	12.80	73	12.80	73	97	97	44.75	123	97	97
1894-1895	26.35	133	22.58	132	25.88	148	25.88	148	139	139	52.22	143	139	139
1895-1896	22.83	115	21.71	127	24.65	141	24.65	141	113	113	40.95	112	113	113
1896-1897	22.94	116	18.82	110	17.91	102	17.91	102	102	102	46.86	129	102	102
1897-1898	11.38	57	9.96	52	6.43	37	6.43	37	95	95	24.64	67	95	95
1898-1899	17.37	88	13.19	77	15.15	87	15.15	87	77	77	27.52	75	77	77
1899-1900	17.40	88	13.20	78	13.53	89	13.53	89	83	83	37.37	102	83	83
1900-1901	19.32	97	17.79	104	19.63	112	19.63	112	101	101	45.15	124	101	101

TABLE 17.

1901-1902.....	21.30	108	15.72	92	17.12	98	22.94	110	42.76	117	115	33.93	115
1902-1903.....	16.49	83	16.19	95	14.34	82	18.21	87	37.09	102	96	29.21	99
1903-1904.....	21.23	107	18.47	108	18.30	105	24.72	118	52.97	145	133	34.11	130
1904-1905.....	24.32	123	22.75	133	28.29	162	28.88	138	34.47	95	118	35.99	122
1905-1906.....	25.02	126	24.46	143	25.33	145	26.03	124	46.17	124	121	33.18	113
1906-1907.....	14.4	70	23.93	140	24.53	140	28.20	134	53.77	148	129	34.44	117
1907-1908.....	13.97	70	13.16	77	10.79	62	13.71	75	27.00	74	73	20.33	71
1908-1909.....	25.93	131	22.97	129	23.00	131	26.70	127	54.43	149	51.03	38.75	132
1909-1910.....	13.17	76	11.77	69	14.32	85	15.42	74	33.00	92	31.62	29.00	98
1910-1911.....	20.01	101	23.18	135	22.37	128	25.39	121	41.00	111	36.64	29.54	100
1911-1912.....	13.80	70	9.46	55	7.85	45	10.08	48	20.52	56	20.16	18.44	63
1912-1913.....	11.19	56	8.74	51	8.86	51	12.78	61	28.40	78	26.88	72	24.01
1913-1914.....	31.00	160	28.70	108	23.62	135	36.90	176	59.51	163	58.94	42.83	146
1914-1915.....	22.35	113	20.05	117	17.92	102	24.26	116	50.42	138	49.95	134	42.56
1915-1916.....	20.66†	104	20.88	122	15.35	88	26.27	125	39.00	107	42.67	115	31.58
1916-1917.....	12.99†	66	14.11	83	13.05†	75	.....	75	27.46	75	29.81	80	22.44
1917-1918.....	8.59†	43	9.66	56	9.67†	55	.....	56	21.15†	58	18.26	49	18.18
1918-1919.....	21.54†	109	19.40	113	16.72†	96	.....	98	27.93†	76	33.51	90	27.21
1919-1920.....	11.80†	60	8.94	52	7.85†	45	.....	53	15.92†	43	18.84	51	13.25
1920-1921.....	19.13†	97	17.17	100	16.20†	92	.....	108	40.02†	110	42.48	115	35.70
Years of record.....	46	49	48	48	48	48	20	48	13	33	33	30.38	33
Mean of record.....	19.66	17.04	17.49	17.49	17.49	17.49	21.92	17.49	36.50	36.50	35.42	30.38	30.38
50-year mean.....	19.80	17.10	17.50	17.50	17.50	17.50	21.00	17.50	36.50	36.50	37.00	29.40	29.40
County.....	Solano.	Yolo.	Yolo.	Yolo.	Yolo.	Yolo.	Yolo.	Yolo.	Napa.	Napa.	Napa.	Sonoma.	Sonoma.
Elevation.....	20	51	63	63	63	63	350	363	255	181	181	136	136
Station reference number.....	130	131	132	132	132	132	133	134	135	135	135	136	136

Precipitation data are from U. S. Weather Bureau records unless otherwise noted.

†From records of Southern Pacific Railroad.

Streams within boundaries of Precipitation Division M: Petaluma Creek Group, Sonoma Creek Tributaries, Napa River Tributaries, Suisun Creek Group.

TABLE 17.

TABLE 17—(Concluded). RECORDS OF PRECIPITATION AND TABLE OF COMPUTED INDICES OF SEASONAL WETNESS—  
PRECIPITATION DIVISION M—MARIN-NAPA-WOODLAND AREA.*Rainfall stations, depth of precipitation in inches and index of seasonal wetness.*

Season.	Foothland.		Napa.		Sonoma.		Petaluma.		Kentfield.		Mt. Tamalpais.		Index of seasonal wetness.	
	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.
1871-1872.....	124	.....	124	.....	124	.....	124	.....	124	.....	124	.....	124	.....
1872-1873.....	79	.....	79	.....	79	.....	79	.....	79	.....	79	.....	79	.....
1873-1874.....	100	.....	100	.....	100	.....	100	.....	100	.....	100	.....	100	.....
1874-1875.....	72	.....	72	.....	72	.....	18.18	75	72	.....	72	.....	72	.....
1875-1876.....	111	.....	111	.....	111	.....	25.89	106	111	.....	111	.....	111	.....
1876-1877.....	53	.....	53	.....	53	.....	12.70	53	53	.....	53	.....	53	.....
1877-1878.....	143	.....	34.69	148	.....	143	39.23	192	143	.....	143	.....	143	.....
1878-1879.....	100	.....	28.15	112	.....	100	21.62	89	100	.....	100	.....	100	.....
1879-1880.....	108	.....	26.49	114	.....	108	25.00	103	108	.....	108	.....	108	.....
1880-1881.....	111	.....	28.19	121	.....	111	24.55	102	111	.....	111	.....	111	.....
1881-1882.....	70	.....	17.08	73	.....	70	17.04	71	70	.....	70	.....	70	.....
1882-1883.....	82	.....	19.94	85	.....	82	18.09	77	82	.....	82	.....	82	.....
1883-1884.....	106	.....	24.53	105	.....	106	24.64	102	106	.....	106	.....	106	.....
1884-1885.....	62	.....	15.16	65	.....	62	15.03	62	62	.....	62	.....	62	.....
1885-1886.....	127	.....	28.22	121	.....	127	28.96	120	127	.....	127	.....	127	.....
1886-1887.....	71	.....	19.51	83	.....	71	16.42	68	71	.....	71	.....	71	.....
1887-1888.....	73	.....	17.39	74	.....	73	18.10	75	73	.....	73	.....	73	.....
1888-1889.....	94	.....	22.16	95	.....	94	22.44	85	94	.....	94	.....	94	.....
1889-1890.....	194	.....	48.29	206	.....	194	46.04	192	194	.....	194	.....	194	.....
1890-1891.....	83	.....	21.30	91	.....	83	22.20	84	83	.....	83	.....	83	.....
1891-1892.....	91	.....	22.98	98	.....	91	23.60	89	91	.....	91	.....	91	.....
1892-1893.....	115	.....	26.75	114	.....	115	26.91	111	115	.....	115	.....	115	.....
1893-1894.....	97	.....	21.49	92	.....	97	22.15	92	97	.....	97	.....	97	.....
1894-1895.....	139	.....	30.35	130	.....	139	30.99	128	139	.....	139	.....	139	.....
1895-1896.....	113	.....	24.92	107	.....	113	.....	119	113	.....	113	.....	113	.....
1896-1897.....	40.49	.....	25.49	109	.....	40.49	.....	117	40.49	.....	40.49	.....	40.49	.....
1897-1898.....	24.89	.....	13.30	57	.....	24.89	.....	56	24.89	.....	24.89	.....	24.89	.....
1898-1899.....	33.32	.....	81	17	.....	33.32	.....	80	33.32	.....	33.32	.....	33.32	.....
1899-1900.....	40.83	.....	20.65	88	.....	40.83	.....	92	40.83	.....	40.83	.....	40.83	.....
1900-1901.....	41.12	.....	24.95	107	.....	41.12	.....	112	41.12	.....	41.12	.....	41.12	.....



TABLE 17.

1901-1902	47.68	115	29.42	126	29.52	111	107	57.88	124	34.88	130	113
1902-1903	49.61	103	23.38	100	25.85	97	.....	92	46.27	99	25.45	95
1903-1904	63.65	154	25.97	111	32.77	123	.....	122	69.48	148	36.92	138
1904-1905	48.07	116	26.06	111	32.58	123	.....	121	50.33	108	29.48	110
1905-1906	49.47	119	23.04	101	28.20	106	.....	132	59.89	128	28.25	106
1906-1907	46.65	113	30.96	132	36.98	139	.....	144	53.48	114	30.13	113
1907-1908	29.95	72	14.92	64	.....	70	.....	71	34.10	73	24.99	93
1908-1909	58.40	141	30.35	130	.....	136	.....	138	65.40	140	35.02	133
1909-1910	36.77	89	20.65	88	.....	84	.....	83	41.55	89	26.26	98
1910-1911	36.73	89	25.16	107	.....	116	.....	117	52.33	112	25.35	95
1911-1912	21.48	59	14.92	64	.....	58	.....	57	30.47	65	19.39	72
1912-1913	32.29	78	16.95	73	.....	64	.....	63	33.71	72	21.36	80
1913-1914	61.63	149	34.51	148	.....	157	40.29	167	66.83	143	29.11	109
1914-1915	55.09	133	.....	128	.....	128	36.51	151	60.97	130	34.71	130
1915-1916	43.85	106	.....	109	.....	109	29.24	121	51.59	111	24.95	93
1916-1917	31.96	77	.....	75	.....	75	18.16	75	32.77	70	20.56	77
1917-1918	26.10	63	13.10	56	.....	54	12.33	51	24.87	53	12.81	48
1918-1919	39.58	88	26.86	115	.....	98	23.65	98	51.78	111	29.08	109
1919-1920	23.83	57	12.40	53	.....	50	11.67	48	31.07	67	16.91	63
1920-1921	51.22	124	23.91	102	.....	104	27.31	115	45.89	98	.....	108
Years of record.....	25	41	41	17	17	29	33	22	22	22	22	107
Mean of record.....	41.11	23.06	28.46	23.93	23.93	23.93	48.25	26.80	26.80	26.80	26.80	131
50-year mean.....	41.40	23.40	26.50	24.20	24.20	24.20	46.70	26.80	26.80	26.80	26.80	131
County.....	Sonoma.	Napa.	Sonoma.	Sonoma.	Sonoma.	Sonoma.	Marin.	Marin.	Marin.	Marin.	Marin.	131
Elevation.....	190	20	30	10	10	10	65	2,375	2,375	2,375	2,375	131
Station reference number.....	137	138	139	140	140	140	141	142	142	142	142	131

Precipitation data are from U. S. Weather Bureau records.

TABLE 18.

TABLE 18. RECORDS OF PRECIPITATION AND TABLE OF COMPUTED INDICES OF SEASONAL WETNESS—PRECIPITATION DIVISION N—SANTA CLARA—COAST AREA.

Rainfall stations, depth of precipitation in inches and index of seasonal wetness.

Season.	Boulder Creek.		Ben Lomond.		Felton.		Laurel.		Los Gatos.		Campbell.		San Jose.		Santa Clara.		Lick Observatory.		Index of seasonal wetness. Division N.
	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	
1871-1872	129		129		129		129		129		129		129		129		129		129
1872-1873	76		76		76		76		76		76		76		76		76		76
1873-1874	80		80		80		80		80		80		80		80		80		80
1874-1875	52		52		52		52		52		52		52		52		52		52
1875-1876	129		129		129		129		129		129		129		129		129		129
1876-1877	32		32		32		32		32		32		32		32		32		32
1877-1878	128		128		128		128		128		128		128		128		128		128
1878-1879	109		109		109		109		109		109		109		109		109		109
1879-1880	91		91		91		91		91		91		91		91		91		91
1880-1881	82		82		82		82		82		82		82		82		82		82
1881-1882	87		87		87		87		87		87		87		87		87		87
1882-1883	97		97		97		97		97		97		97		97		97		97
1883-1884	162		162		162		162		162		162		162		162		162		162
1884-1885	109		109		109		109		109		109		109		109		109		109
1885-1886	123		123		123		123		123		123		123		123		123		123
1886-1887	77		77		77		77		77		77		77		77		77		77
1887-1888	85		85		85		85		85		85		85		85		85		85
1888-1889	93		93		93		93		93		93		93		93		93		93
1889-1890	233		208		100		208		67		205		208		30		197		204
1890-1891	115		97		41		97		93		98		97		12		85		95
1891-1892	47		86		44		33		23		11		86		16		51		88
1892-1893	77		142		52		117		66		46		142		25		167		146
1893-1894	43		84		38		87		37		67		84		12		86		84
1894-1895	69		133		63		141		55		92		133		23		155		136
1895-1896	50		98		102		49		44		102		98		13		92		97
1896-1897	51		104		49		70		32		49		104		16		109		105
1897-1898	24		46		24		84		15		18		46		7		86		50
1898-1899	55		95		50		50		74		105		55		11		29		89
1899-1900	43		90		81		48		87		90		43		10		71		86
1900-1901	54		114		113		53		41		110		54		18		79		117

TABLE 18.

1901-1902.....	54.52	102	59.27	109	.....	96	51.90	107	33.23	101	87	12.98	86	13.23	83	27.62	92	96	
1902-1903.....	47.68	90	46.21	85	.....	98	57.80	99	28.98	88	13.74	98	13.89	92	15.66	99	30.29	101	84
1903-1904.....	57.90	109	64.12	118	48.23	108	58.89	122	29.58	89	12.55	78	10.47	69	12.85	81	33.78	113	98
1904-1905.....	60.34	114	60.83	112	52.62	117	53.58	111	35.88	110	20.98	131	17.96	119	20.13	127	28.55	95	115
1905-1906.....	73.58	139	70.95	130	52.56	117	65.69	136	38.13	116	17.51	169	15.12	100	18.71	117	38.43	128	121
1906-1907.....	65.25	123	65.01	119	56.94	127	63.87	132	43.42	132	23.38	146	22.71	151	25.19	159	43.34	144	137
1907-1908.....	33.73	62	37.63	69	33.30	74	33.05	68	22.38	68	12.46	77	11.69	77	12.77	80	23.92	80	73
1908-1909.....	73.03	137	78.49	144	63.06	141	69.92	145	44.75	137	18.52	115	18.31	121	20.39	128	37.42	125	133
1909-1910.....	43.15	81	41.26	76	37.20	79	38.30	79	25.78	76	12.51	78	14.52	96	15.89	100	26.02	87	84
1910-1911.....	59.91	113	69.55	128	51.51	115	68.64	142	52.63	161	21.89	136	22.65	150	22.66	143	33.29	111	133
1911-1912.....	29.49	56	34.84	64	28.55	64	29.55	61	19.46	59	10.74	67	10.58	70	12.21	77	18.24	61	64
1912-1913.....	21.37	40	27.96	51	19.44	43	25.65	53	15.53	47	5.29	33	6.35	42	6.57	41	19.48	65	45
1913-1914.....	67.54	127	67.33	124	59.78	133	41.58	86	52.98	161	19.87	124	19.45	129	19.50	123	35.61	119	125
1914-1915.....	67.47	127	63.76	117	56.21	125	56.31	117	36.81	112	21.93	137	22.71	151	26.97	170	27.75	92	128
1915-1916.....	49.70	94	52.69	97	44.64	100	54.15	112	38.53	118	17.87	111	16.31	108	17.46	110	29.48	98	105
1916-1917.....	.....	84	.....	82	34.81	78	.....	83	29.29	89	12.58	78	12.63	84	12.58	79	24.58	82	82
1917-1918.....	.....	52	.....	50	19.26	43	.....	50	14.53	44	7.39	46	9.36	62	9.06	57	15.96	53	51
1918-1919.....	.....	108	.....	108	39.83	89	.....	101	34.55	105	22.43	140	18.89	125	20.84	131	27.40	91	111
1919-1920.....	.....	63	.....	67	33.13	74	.....	67	20.55	62	9.63	60	8.81	58	9.77	62	21.48	72	65
1920-1921.....	.....	103	.....	104	46.44	103	.....	103	33.62	103	17.55	109	15.01	100	16.24	102	31.54	105	104
Years of record.....	28	.....	16	.....	26	.....	25	.....	36	.....	24	.....	47	.....	38	.....	40	.....	.....
Mean of record.....	55.59	.....	55.55	.....	46.88	.....	49.10	.....	33.09	.....	15.39	.....	15.11	.....	16.19	.....	30.60	.....	.....
50-year mean.....	53.00	.....	54.40	.....	44.70	.....	48.20	.....	32.80	.....	16.10	.....	15.10	.....	15.90	.....	30.00	.....	.....
County.....	Santa Cruz.	.....	Santa Cruz.	.....	Santa Cruz.	.....	Santa Cruz.	.....	Santa Clara.	.....	Santa Clara.	.....	Santa Clara.	.....	Santa Clara.	.....	Santa Clara.	Santa Clara.	.....
Elevation.....	470	.....	300	.....	275	.....	910	.....	600	.....	217	.....	95	.....	90	.....	4,209	.....	.....
Station reference number.....	144	.....	145	.....	146	.....	147	.....	148	.....	149	.....	150	.....	151	.....	152	.....	.....

Precipitation data are from U. S. Weather Bureau records unless otherwise noted.

From records of Southern Pacific Railroad.

Streams within boundaries of Precipitation Division N: Coyote River, Guadalupe River, Los Gatos Creek Group, Sequel Creek Group.

TABLE 19.

Season.	Gilroy.		Watsonville.		Aptos.		Santa Cruz.		Monterey.		Sahamas.		Hollister.		Index of seasonal wetness.	
	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.
1871-1872	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127
1872-1873	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69
1873-1874	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87
1874-1875	15.12	76	73	73	73	73	73	73	73	73	73	73	73	73	73	73
1875-1876	31.04	157	148	148	148	148	148	148	148	148	148	148	148	148	148	148
1876-1877	6.53	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
1877-1878	28.03	141	149	149	149	149	149	149	149	149	149	149	149	149	149	149
1878-1879	16.76	85	78	78	78	78	78	78	78	78	78	78	78	78	78	78
1879-1880	22.38	113	93	93	93	93	93	93	93	93	93	93	93	93	93	93
1880-1881	23.42	118	104	104	104	104	104	104	104	104	104	104	104	104	104	104
1881-1882	14.09	71	15.26	72	81	23.83	84	15.16	93	12.93	93	12.93	93	10.44	79	82
1882-1883	15.19	77	13.82	65	76	19.62	72	16.49	102	10.74	77	10.74	77	9.62	73	77
1883-1884	24.60	124	21.20	103	122	30.68	113	21.38	131	21.29	152	16.34	126	16.34	126	124
1884-1885	14.74	75	12.73	60	64	6.50	61	11.18	69	9.48	68	6.95	53	6.95	53	64
1885-1886	21.45	108	27.00	128	34.62	129	32.75	121	18.50	114	20.81	149	14.34	110	123	123
1886-1887	11.11	56	12.85	61	15.40	57	17.17	63	9.16	56	9.88	71	7.47	57	60	60
1887-1888	16.78	85	14.13	67	28.65	107	22.91	84	12.78	78	12.70	91	10.12	77	84	84
1888-1889	14.43	73	14.97	71	20.34	76	23.35	86	12.87	79	11.66	83	12.81	98	81	81
1889-1890	37.75	190	44.90	212	49.07	183	54.68	201	28.32	180	27.59	197	23.48	171	191	191
1890-1891	14.84	75	76	33.30	124	19.21	71	12.30	76	12.19	87	12.19	87	10.10	77	84
1891-1892	18.91	95	95	88	21.89	81	24.43	90	11.90	73	12.93	93	11.58	88	87	87
1892-1893	24.50	124	30.31	116	34.89	129	22.87	84	18.03	141	18.03	139	17.42	133	129	129
1893-1894	12.91	65	88	25.35	94	29.90	110	10.62	65	13.70	98	12.01	92	12.01	92	87
1894-1895	28.81	145	138	39.83	149	39.91	147	20.17	124	17.25	133	18.53	141	138	138	138
1895-1896	24.70	125	93	23.88	89	21.90	81	11.51	69	12.42	89	14.06	107	93	93	93
1896-1897	21.82	110	104	24.29	90	28.77	106	15.29	94	14.02	100	14.02	100	14.02	100	102
1897-1898	10.44	53	50	11.51	43	12.49	46	6.95	43	8.07	58	7.15	54	46	46	46
1898-1899	19.44	98	85	26.79	100	25.04	92	10.33	62	12.18	87	9.88	75	86	86	86
1899-1900	14.54	73	19.88	94	24.01	89	28.43	105	12.47	76	9.65	69	10.92	83	86	86
1900-1901	23.17	117	24.95	118	26.52	99	26.27	97	16.00	98	15.98	114	15.76	120	109	109

Rainfall stations, depth of precipitation in inches and index of seasonal wetness.

TABLE 19.

1900-1902	18.41	93	21.35	101.1	24.40	91	29.35	108	14.98	92	10.60	76	11.47	87	93
1902-1903	17.48	88	18.54	88	24.80	93	26.70	99	15.22	95	11.05	79	12.64	96	91
1903-1904	18.20	92	18.31	87	27.17	101	28.40	105	12.75	78	9.60	69	11.79	90	89
1904-1905	23.25	117	24.69	117	29.46	110	35.88	132	25.25	135	16.57	119	17.24	131	126
1905-1906	29.42	148	23.58	112	31.56	118	32.26	119	20.19	124	14.14	101	20.45	150	125
1906-1907	28.98	146	37.41	177	42.04	157	35.85	132	29.80	183	23.99	172	23.80	181	164
1907-1908	14.25	72	14.00	66	20.17	75	23.47	86	17.78	109	11.41	82	10.94	83	82
1908-1909	27.81	140	31.99	151	40.94	153	41.63	154	23.43	144	18.99	136	17.63	134	145
1909-1910	19.47	98	22.04	104	25.02	93	31.25	115	17.78	109	12.10	87	14.67	112	103
1910-1911	19.41	98	28.19	134	35.08	131	33.50	123	24.39	150	16.42	118	13.39	102	122
1911-1912	13.87	70	16.73	79	18.94	71	19.88	73	13.28	82	.....	79	10.06	76	76
1912-1913	9.75	49	10.79	51	12.70	47	14.09	52	8.13	50	7.03	50	6.73	51	49
1913-1914	33.70	170	30.61	145	37.87	141	34.65	128	23.17	142	15.99	114	19.85	151	142
1914-1915	21.22	107	31.49	149	36.68	137	42.42	156	26.28	162	19.07	137	18.20	138	141
1915-1916	23.94†	121	26.73	127	.....	.....	29.57	109	.....	119	17.21	123	17.38	132	122
1916-1917	21.88†	110	18.02	85	.....	86	19.17	71	.....	86	8.98	64	14.18	108	87
1917-1918	9.35†	47	11.65	55	.....	53	12.03	44	.....	53	8.30	59	9.32	51	54
1918-1919	23.80†	120	23.50	111	.....	112	27.71	102	.....	113	17.01	122	15.17	115	114
1919-1920	14.53†	73	18.82	89	.....	77	20.85	77	.....	74	11.22	80	8.38	64	76
1920-1921	19.02†	96	22.78	108	.....	104	29.39	108	.....	104	15.48	111	12.94	99	104
Years of record.....	47		31		30		43		41		47		47		
Mean of record.....	19.90		21.71		28.12		27.23		16.25		14.05		13.19		
50-year mean.....	10.80		21.10		26.80		27.10		16.30		14.00		13.10		
County.....	Santa Clara.		Santa Cruz.		Santa Cruz.		Santa Cruz.		Monterey.		Monterey.		San Benito.		
Elevation.....	193		23		102		20		15		40		284		
Station reference number.....	153		154		155		156		157		158		159		

Precipitation data are from U. S. Weather Bureau records unless otherwise noted.  
 †From records of Southern Pacific Railroad.  
 Streams within boundaries of Precipitation Division O: Pajaro River, Soquel Creek Group.

TABLE 20

TABLE 20. RECORDS OF PRECIPITATION AND TABLE OF COMPUTED INDICES OF SEASONAL WETNESS—PRECIPITATION DIVISION P—LOS BANOS—MODESTO AREA.  
Rainfall stations, depth of precipitation in inches and index of seasonal wetness.

Season.	Los Banos.		Newman.		Westley.		Modesto.		Merced.		Le Grand.		Index of seasonal wetness. Division P.
	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	
1871-1872.	119	119	119	119	119	119	12.71	119	119	119	119	119	119
1872-1873.	91	91	91	91	91	91	7.65	72	12.21	110	110	110	91
1873-1874.	7.56	93	86	86	86	86	11.36	106	6.94	63	63	63	86
1874-1875.	7.36	90	83	83	83	83	7.40	69	10.00	90	90	90	83
1875-1876.	10.48	128	122	122	122	122	13.39	125	12.68	115	115	115	122
1876-1877.	1.60	20	31	31	31	31	4.45	42	3.20	29	29	29	31
1877-1878.	8.92	109	108	108	108	108	11.51	108	11.81	107	107	107	108
1878-1879.	3.49	43	60	60	60	60	8.48	79	5.83	53	53	53	60
1879-1880.	4.91	60	99	99	99	99	12.88	121	11.89	107	107	107	99
1880-1881.	8.00	98	94	94	94	94	8.40	79	11.59	105	105	105	94
1881-1882.	4.31	53	65	65	65	65	6.64	62	8.58	77	77	77	65
1882-1883.	7.52	92	92	92	92	92	10.03	94	9.81	89	89	89	92
1883-1884.	12.52	153	159	159	159	159	12.87	120	22.08	200	200	200	158
1884-1885.	7.32	90	70	70	70	70	6.40	60	7.18	65	65	65	70
1885-1886.	13.08	160	131	131	131	131	12.79	120	13.43	122	122	122	133
1886-1887.	3.24	40	51	51	51	51	5.72	53	6.20	56	56	56	51
1887-1888.	4.20	51	60	60	60	60	6.58	62	7.08	64	64	64	59
1888-1889.	9.77	112	73	73	73	73	4.60	40	7.61	71	71	71	74
1889-1890.	14.21	174	233	233	233	233	17.01	169	16.40	154	154	154	178
1890-1891.	7.01	86	9.68	95	7.09	71	7.49	70	8.51	77	77	77	80
1891-1892.	8.16	100	9.08	89	8.98	89	10.35	97	9.64	87	87	87	93
1892-1893.	9.04	111	16.28	160	14.65	146	14.17	133	10.98	99	99	99	130
1893-1894.	6.29	77	4.88	48	7.62	76	11.40	107	10.86	98	98	98	82
1894-1895.	11.49	141	14.11	139	13.92	138	16.40	154	12.63	114	114	114	137
1895-1896.	7.51	92	10.23	101	10.44	104	10.30	96	11.83	107	107	107	101
1896-1897.	6.71	82	11.27	111	14.06	140	11.93	112	12.08	109	109	109	111
1897-1898.	4.33	53	5.67	56	4.18	42	3.87	36	5.76	52	52	52	48
1898-1899.	5.89	72	6.27	61	7.84	78	9.35	87	7.68	69	69	69	74
1899-1900.	8.80	108	11.58	114	10.14	101	11.91	112	11.39	103	103	103	106
1900-1901.	11.37	139	12.08	119	13.71	136	14.62	137	11.42	103	103	103	134

TABLE 20.

1901-1902	7.82	96	8.27	81	7.87	78	10.10	94	9.98	90	9.29	77	86
1902-1903	6.34	78	9.26	91	11.08	110	12.23	114	11.89	107	11.91	99	100
1903-1904	4.93	60	7.04	69	7.68	76	8.72	81	8.26	75	9.16	76	73
1904-1905	11.96	147	14.85	146	11.65	116	15.77	148	13.30	120	16.09	134	135
1905-1906	13.23	162	14.73	145	13.18	131	12.55	117	17.76	161	17.42	146	144
1906-1907	14.41	177	15.99	157	16.87	168	19.04	178	16.38	148	15.66	131	100
1907-1908	6.80	83	7.68	75	7.64	76	9.79	91	8.41	76	4.87	41	74
1908-1909	11.21	137	11.50	113	9.78	97	11.16	104	14.38	130	13.81	115	114
1909-1910	.....	97	9.83	97	.....	97	10.63	102	10.19	92	12.91	108	99
1910-1911	9.74	119	11.36	112	12.84	128	12.69	119	17.12	155	14.14	118	125
1911-1912	5.15	63	6.72	66	8.47	84	5.81	54	7.96	71	6.55	55	65
1912-1913	4.14	51	5.52	54	3.96	39	3.88	33	6.54	59	6.34	58	48
1913-1914	.....	146	16.38	161	17.23	173	16.99	152	14.07	127	.....	.....	152
1914-1915	.....	141	14.00	138	15.60	155	13.29	143	15.77	143	17.68	148	145
1915-1916	.....	134	13.67	134	.....	134	.....	136	14.62	132	17.16	143	136
1916-1917	.....	80	7.43	73	.....	82	.....	81	9.35	84	11.52	96	83
1917-1918	.....	91	8.72	86	.....	93	.....	92	10.49	95	12.89	107	94
1918-1919	.....	105	12.22	121	.....	100	.....	106	9.90	89	9.65	81	100
1919-1920	.....	179	6.65	59	.....	85	.....	79	10.55	95	11.49	96	82
1920-1921	.....	117	10.34	102	.....	122	.....	118	14.36	130	15.72	131	120
Years of record	39	.....	32	.....	26	.....	44	.....	49	.....	21	.....	.....
Mean of record	7.95	.....	10.83	.....	10.70	.....	10.66	.....	11.02	.....	12.67	.....	.....
50-year mean	8.20	.....	10.20	.....	10.00	.....	10.70	.....	11.10	.....	12.00	.....	.....
County	Merced.	Stanislaus.	Stanislaus.	Stanislaus.	Stanislaus.	Stanislaus.	Stanislaus.	Stanislaus.	Merced.	Merced.	Merced.	Merced.	.....
Elevation	121	.....	91	.....	90	.....	90	.....	173	.....	255	.....	.....
Station reference number	160	.....	161	.....	162	.....	163	.....	164	.....	165	.....	.....

Precipitation data are from U. S. Weather Bureau records.  
 Note—Indices of this Division are used in the computation of run-off of Orestimba Creek Group, in combination with Indices of Precipitation Division I.





WATER RESOURCES OF CALIFORNIA.

TABLE 21.

1901-1902.....	76	9.81	104	3.62	57	6.15	64	6.49	63	8.24	72	6.48	72	6.73	79	8.83	92	75
1902-1903.....	82	8.36	89	5.84	80	8.15	84	7.19	70	9.97	87	7.82	86	6.49	76	7.56	79	81
1903-1904.....	80	8.32	88	5.84	92	8.04	83	8.88	86	8.47	74	7.57	84	5.99	70	6.74	70	81
1904-1905.....	132	9.59	102	9.53	150	12.09	125	13.76	134	18.12	158	12.83	142	10.47	122	11.49	120	132
1905-1906.....	149	13.69	145	7.95	125	13.52	140	17.79	173	17.31	150	15.23	169	11.72	137	13.85	144	148
1906-1907.....	130	10.21	108	9.74	154	10.85	113	15.93	155	15.28	133	12.26	136	10.76	126	11.85	123	131
1907-1908.....	29	8.24	97	4.25	67	7.64	70	7.36	72	8.00	69	8.27	91	8.47	99	10.01	104	81
1908-1909.....	43	6.83	72	.....	110	9.87	103	10.23	106	11.92	101	12.13	124	9.89	116	13.83	144	113
1909-1910.....	34	5.88	102	.....	92	10.99	114	5.83	57	11.59	101	5.83	109	7.61	89	18.87	92	96
1910-1911.....	33	4.48	116	.....	133	11.82	123	16.52	162	15.26	133	13.27	147	11.06	129	9.57	100	132
1911-1912.....	23	6.18	65	.....	78	7.34	76	.....	78	7.01	60	7.20	80	6.39	75	.....	80	73
1912-1913.....	67	6.39	68	.....	68	6.28	65	7.21	70	7.22	63	6.01	66	5.37	65	6.90	72	66
1913-1914.....	48	5.54	135	.....	122	11.04	115	14.47	141	13.44	117	12.11	134	.....	122	9.54	99	123
1914-1915.....	124	12.19	139	.....	124	10.92	113	13.95	136	13.48	117	12.83	142	.....	125	10.08	105	124
1915-1916.....	42	07	117	.....	115	11.75	122	.....	115	13.80	120	.....	115	.....	130	10.38	108	123
1916-1917.....	33	87	94	.....	84	7.25	75	.....	84	10.65	92	.....	84	7.35	86	8.95	93	88
1917-1918.....	26	96	75	.....	92	10.26	106	.....	92	9.29	81	.....	92	9.30	109	7.44	77	91
1918-1919.....	31	49	88	.....	79	6.90	72	.....	79	10.22	89	.....	79	6.29	74	8.35	87	81
1919-1920.....	31	30	87	.....	94	8.24	85	.....	94	12.43	108	.....	94	8.13	95	9.82	102	91
1920-1921.....	33	98	94	.....	90	8.19	85	.....	90	11.26	98	.....	90	7.83	92	9.14	95	95
Years of record.....	12	21	.....	13	40	25	20	29	19	41	.....	.....	.....	.....	.....	.....	.....	.....
Mean of record.....	35.52	9.63	.....	6.54	9.78	10.66	11.65	9.11	8.49	9.89	.....	.....	.....	.....	.....	.....	.....	.....
50-year mean.....	35.90	9.40	.....	6.30	9.60	10.30	11.50	9.00	8.50	9.60	.....	.....	.....	.....	.....	.....	.....	.....
County.....	Madera.	Madera.	.....	Fresno.	Fresno.	Fresno.	Fresno.	Fresno.	Fresno.	Fresno.	.....	.....	.....	.....	.....	Tulare.	.....	.....
Elevation.....	3,000	296	.....	177	293	371	347	311	249	334	.....	.....	.....	.....	.....	.....	.....	.....
Station reference number.....	166	167	.....	168	169	170	171	172	173	174	.....	.....	.....	.....	.....	.....	.....	.....

Precipitation data are from U. S. Weather Bureau records.  
Streams within boundaries of Precipitation Division Q: Kings River, Dry Creek, San Joaquin River (upper), Cottonwood Creek, Fresno River, Daulton Creek Group, Owens River (upper), Bishop Creek Group.



TABLE 22.

1901-1902	11.04	79	18.08	85	95	11.17	112	11.49	111	05	12.08	112	5.72	87	97
1902-1903	12.89	92	19.76	93	97	11.24	113	7.77	75	97	12.39	115	6.40	98	97
1903-1904	11.09	79	14.14	67	71	7.70	71	7.16	70	71	7.01	65	4.45	98	71
1904-1905	19.71	141	22.72	107	116	7.88	79	12.50	124	116	11.13	103	10.52	160	118
1905-1906	27.58	197	42.06	197	173	13.87	139	15.77	153	173	17.01	157	10.10	154	169
1906-1907	20.65	148	27.10	127	125	9.27	93	11.28	109	125	16.11	149	7.05	107	123
1907-1908	13.29	85	19.11	60	95.99	8.12	82	8.09	78	87	12.34	114	6.89	105	90
1908-1909	14.62	100	33.43	157	57.45	10.22	214	23.60	228	162	13.42	124	.....	156	165
1909-1910	13.22	94	23.49	110	34.27	20.04	85	10.95	101	30.50	7.73	72	.....	104	102
1910-1911	17.17	123	27.29	128	38.23	111	23.24	99	8.96	25.97	6.64	61	.....	114	103
1911-1912	12.11	86	13.65	64	22.60	66	18.50	79	8.52	14.74	7.85	73	.....	81	76
1912-1913	9.67	69	14.21	67	14.29	42	14.46	62	6.29	21.06	7.06	65	.....	72	67
1913-1914	15.27	109	27.01	127	51.91	151	31.21	133	13.83	25.38	16.35	151	.....	139	135
1914-1915	.....	115	22.54	108	38.04	111	28.25	121	8.52	110	13.75	127	.....	116	111
1915-1916	16.73	119	29.53	139	62.65	183	36.46	155	19.57	25.14	.....	142	.....	155	153
1916-1917	12.51	89	.....	55	31.48	92	25.22	108	11.16	18.77	88	93	.....	104	98
1917-1918	9.20	66	.....	61	21.85	64	.....	63	6.19	11.16	53	61	.....	67	62
1918-1919	11.64	83	18.29	86	28.21	82	.....	87	9.95	17.77	84	85	.....	93	88
1919-1920	14.18	101	19.40	91	34.15	99	.....	98	10.48	20.52	97	94	.....	104	99
1920-1921	12.58	90	21.89	103	30.88	90	.....	93	8.58	17.36	82	93	.....	101	92
Years of record.....	21	20	20	14	10	27	13	12	39	32	32	32	.....	32	.....
Mean of record.....	14.66	22.85	22.85	35.14	25.65	10.30	10.62	20.96	10.94	6.38	6.38	6.38	.....	6.38	.....
50-year mean.....	14.00	21.30	21.30	34.30	23.50	10.00	10.30	21.20	10.80	6.60	6.60	6.60	.....	6.60	.....
County.....	Tulare.	Tulare.	Tulare.	Tulare.	Tulare.	Kern.	Kern.	Kern.	Kern.	Kern.	Kern.	Kern.	.....	Kern.	.....
Elevation.....	600	1,600	1,600	4,000	3,300	2,600	2,500	5,500	1,200	319	319	319	.....	319	.....
Station reference number.....	175	176	176	177	178	179	180	181	182	183	183	183	.....	183	.....

Precipitation data are from U. S. Weather Bureau records.

Streams within boundaries of Precipitation Division R: Kern River, Poso Creek Group, Deer Creek, Tule River, Yokohi Creek Group, Kaweah River, Limekiln Creek Group, Owens Lake Group.

TABLE 23.

TABLE 23. RECORDS OF PRECIPITATION AND TABLE OF COMPUTED INDICES OF SEASONAL WETNESS—PRECIPITATION DIVISION S.—SOUTHWESTERN SAN JOAQUIN VALLEY AREA.  
Rainfall stations, depth of precipitation in inches and index of seasonal wetness.

Season.	Porterville.		Tulare.		Angiola.		Wasco.		Bakersfield.		Edison.		Bear Valley.		Index of seasonal wetness, Division S.
	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	
1871-1872.....	119	.....	119	.....	119	.....	119	.....	119	.....	119	.....	119	.....	119
1872-1873.....	74	.....	74	.....	74	.....	74	.....	74	.....	74	.....	74	.....	74
1873-1874.....	100	.....	100	.....	100	.....	100	.....	100	.....	100	.....	100	.....	100
1874-1875.....	64	.....	64	.....	64	.....	64	.....	64	.....	64	.....	64	.....	64
1875-1876.....	124	.....	124	.....	124	.....	124	.....	124	.....	124	.....	124	.....	124
1876-1877.....	43	3.65	43	.....	43	.....	43	.....	43	.....	43	.....	43	.....	43
1877-1878.....	100	8.41	100	.....	100	.....	100	.....	100	.....	100	.....	100	.....	100
1878-1879.....	36	3.07	36	.....	36	.....	36	.....	36	.....	36	.....	36	.....	36
1879-1880.....	90	7.62	90	.....	90	.....	90	.....	90	.....	90	.....	90	.....	90
1880-1881.....	118	9.98	118	.....	118	.....	118	.....	118	.....	118	.....	118	.....	118
1881-1882.....	56	4.71	56	.....	56	.....	56	.....	56	.....	56	.....	56	.....	56
1882-1883.....	72	6.07	72	.....	72	.....	72	.....	72	.....	72	.....	72	.....	72
1883-1884.....	138	11.65	138	.....	138	.....	138	.....	138	.....	138	.....	138	.....	138
1884-1885.....	66	5.56	66	.....	66	.....	66	.....	66	.....	66	.....	66	.....	66
1885-1886.....	110	9.25	110	.....	110	.....	110	.....	110	.....	110	.....	110	.....	110
1886-1887.....	72	6.06	72	.....	72	.....	72	.....	72	.....	72	.....	72	.....	72
1887-1888.....	74	6.97	74	.....	74	.....	74	.....	74	.....	74	.....	74	.....	74
1888-1889.....	89	7.55	89	.....	89	.....	89	.....	89	.....	89	.....	89	.....	89
1889-1890.....	12.63	1.92	131	.....	131	.....	131	.....	5.67	109	131	.....	131	.....	130
1890-1891.....	8.26	88	6.77	80	83	.....	83	.....	4.00	77	83	.....	83	.....	83
1891-1892.....	8.58	91	7.88	93	95	.....	95	.....	5.51	106	95	.....	95	.....	96
1892-1893.....	9.77	104	6.49	77	94	.....	94	.....	5.42	104	94	.....	94	.....	95
1893-1894.....	5.57	59	4.95	59	58	.....	58	.....	2.77	53	58	.....	58	.....	58
1894-1895.....	10.97	117	10.62	126	122	.....	122	.....	6.44	124	122	.....	122	.....	122
1895-1896.....	5.99	64	6.43	76	79	.....	79	.....	5.67	109	79	.....	79	.....	81
1896-1897.....	10.35	110	9.64	114	114	.....	114	.....	6.23	119	114	.....	114	.....	114
1897-1898.....	5.51	59	5.51	65	62	.....	62	.....	3.20	61	62	.....	62	.....	62
1898-1899.....	7.06	75	9.03	107	82	.....	82	.....	2.80	54	82	.....	82	.....	81
1899-1900.....	9.24	99	9.83	116	7.77	.....	126	4.16	76	5.21	100	.....	105	.....	104
1900-1901.....	12.76	136	11.30	134	135	.....	115	6.27	115	.....	123	.....	123	17.95	113

TABLE 23.

1901-1902	9.37	100	6.92	87	90	4.59	84	4.51	86	.....	103	20.52	128	96
1902-1903	8.25	88	6.49	77	51	4.31	79	4.98	96	.....	78	.....	78	78
1903-1904	7.47	86	6.62	78	4.50	4.71	76	4.33	83	.....	78	.....	78	78
1904-1905	11.86	126	13.42	159	.....	8.37	154	8.40	161	14.28	152	21.05	132	147
1905-1906	17.90	191	15.31	181	.....	9.08	167	8.72	167	22.92	244	30.32	190	189
1906-1907	13.44	143	12.69	150	.....	.....	134	4.85	93	.....	134	21.35	133	131
1907-1908	11.70	125	9.45	112	.....	6.75	124	3.31	64	9.84	195	20.44	128	109
1908-1909	14.55	159	13.70	162	.....	5.79	106	7.39	142	12.34	132	22.32	140	142
1909-1910	8.96	95	8.94	106	7.01	4.25	78	6.19	119	11.23	120	15.51	97	104
1910-1911	12.06	129	11.65	138	8.89	6.21	114	7.27	140	8.29	89	10.21	64	117
1911-1912	8.75	93	6.71	79	3.49	.....	83	5.19	100	8.47	90	14.70	92	85
1912-1913	8.34	89	7.37	87	4.12	3.30	61	3.05	59	7.53	80	17.92	112	79
1913-1914	11.32	121	8.84	105	7.20	7.59	140	7.92	152	12.83	137	22.79	143	131
1914-1915	12.62	135	.....	150	11.68	13.50	248	9.30	178	15.06	161	25.23	158	174
1915-1916	11.60	124	9.62	114	7.93	7.46	137	5.60	107	10.87	116	.....	122	121
1916-1917	11.65	124	9.06	107	5.06	5.19	96	6.27	120	10.82	116	.....	107	107
1917-1918	6.20	66	6.43	76	6.16	.....	81	4.95	95	6.06	65	.....	81	80
1918-1919	10.69	114	8.35	99	7.72	.....	109	4.97	95	10.32	110	.....	109	109
1919-1920	10.74	115	8.50	101	6.46	105	109	5.84	112	8.65	92	.....	108	106
1920-1921	9.49	101	8.75	104	6.46	105	164	7.02	135	9.84	105	.....	117	119
Years of record	32	41	41	15	18	31	16	13	13	16	13	13	13	13
Mean of record	10.13	8.39	8.40	6.51	6.43	5.58	11.21	20.02	20.02	20.02	20.02	20.02	20.02	20.02
50-year mean	9.40	8.40	8.40	6.20	5.40	5.20	9.40	16.00	16.00	16.00	16.00	16.00	16.00	16.00
County	Tulare.	Tulare.	Tulare.	Tulare.	Kern.	Kern.	Kern.	Kern.	Kern.	Kern.	Kern.	Kern.	Kern.	Kern.
Elevation	464	289	289	208	336	394	2,500	4,400	4,400	4,400	4,400	4,400	4,400	4,400
Station reference number	181	185	185	186	187	188	189	190	190	190	190	190	190	190

Precipitation data are from U. S. Weather Bureau records unless otherwise noted.  
 †From records of Southern Pacific Railroad  
 NOTE.—Indices of Precipitation Division S were not used in computation of stream run-off.

TABLE 24.

TABLE 24. RECORDS OF PRECIPITATION AND TABLE OF COMPUTED INDICES OF SEASONAL WETNESS—PRECIPITATION DIVISION T—SALINAS—SANTA MARIA AREA.  
Rainfall stations, depth of precipitation in inches and index of seasonal wetness.

Season.	Spreckels.		Gonzales.		Soledad.		King City.		Priest Valley.		Jolon.		Parkfield.		San Miguel.	
	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.
1871-1872.....	125		125		125		125		125		125		125		125	
1872-1873.....	59		59		59		59		59		59		59		59	
1873-1874.....	95		95		95		95		95		95		95		95	
1874-1875.....	80		80		5.01	53	80		80		80		80		80	
1875-1876.....	146		146		15.34	163	146		146		146		146		146	
1876-1877.....	35		35		2.65	28	35		35		35		35		35	
1877-1878.....	138		138		12.22	130	138		138		138		138		138	
1878-1879.....	51		51		4.15	44	51		51		51		51		51	
1879-1880.....	107		107		7.38	78	107		107		107		107		107	
1880-1881.....	98		98		6.78	72	98		98		98		98		98	
1881-1882.....	86		86		9.74	103	86		86		86		86		86	
1882-1883.....	85		85		8.64	91	85		85		85		85		85	
1883-1884.....	179		179		16.26	172	179		179		179		179		179	
1884-1885.....	73		73		5.89	62	73		73		73		73		73	
1885-1886.....	150		150		14.43	153	150		150		150		150		150	
1886-1887.....	72		72		6.76	71	72		72		72		72		72	
1887-1888.....	88		88		8.15	86	8.83	80	88		88		88		88	
1888-1889.....	112		112		10.68	113	16.12	146	112		112		112		112	
1889-1890.....	191		191		18.94	201	23.59	214	191		191		191		191	
1890-1891.....	89		89		7.50	79	9.08	82	89		89		89		89	
1891-1892.....	72		72		8.15	86	7.76	70	72		72		72		72	
1892-1893.....	132		132		12.02	127	5.63	51	132		132		132		132	
1893-1894.....	45		45		5.20	55	4.81	43	45		45		45		45	
1894-1895.....	111		111		10.84	115	12.22	111	111		111		111		111	
1895-1896.....	90		90		8.95	95	10.65	97	90		90		90		90	
1896-1897.....	99		99		9.21	98	9.59	87	99		99		99		99	
1897-1898.....	33		33		4.26	45	3.97	36	33		33		33		33	
1898-1899.....	72		72		5.39	57	7.07	64	72		72		72		72	
1899-1900.....	73		73		8.69	75	8.57	78	15.70	77	12.00	68	73		73	
1900-1901.....	145		145		13.29	144	16.32	148	31.73	156	26.12	148	145		145	

TABLE 24.

1901-1902.....	90	85	8.74	92	9.21	83	17.11	84	14.77	83	.....	90	9.08	78
1902-1903.....	80	9.32	6.45	68	8.19	74	15.71	77	14.74	83	.....	80	7.45	64
1903-1904.....	75	8.05	6.21	66	7.07	64	13.83	68	12.49	71	.....	75	6.47	56
1904-1905.....	129	15.17	13.01	140	14.33	130	21.82	107	23.83	135	.....	129	13.67	118
1905-1906.....	15.92	14.74	10.28	109	12.91	117	23.16	114	18.41	104	.....	113	12.59	109
1906-1907.....	21.57	22.29	19.1	15.08	20.54	186	32.57	160	21.84	124	.....	144	14.61	126
1907-1908.....	11.80	11.57	9.9	9.52	10.1	12.92	17.06	84	14.60	82	.....	91	11.89	103
1908-1909.....	17.81	13.5	18.30	15.7	12.11	128	13.51	123	23.94	136	.....	162	16.76	145
1909-1910.....	16.74	11.68	10.0	8.91	9.5	9.17	83	20.09	99	15.49	.....	15.70	11.79	102
1910-1911.....	15.99	13.26	11.4	10.93	11.6	17.41	158	31.60	156	31.04	.....	27.42	19.69	170
1911-1912.....	11.30	8.68	7.5	8.18	8.7	9.69	88	.....	77	12.45	.....	12.50	12.41	107
1912-1913.....	6.50	4.9	5.60	4.8	5.54	5.9	3.97	3.6	8.66	43	.....	8.11	4.8	46
1913-1914.....	14.51	11.0	15.47	13.3	13.61	14.4	15.40	14.0	30.82	152	.....	26.03	18.53	160
1914-1915.....	19.43	14.7	15.60	13.4	16.26	17.2	21.87	198	28.53	140	.....	23.89	14.2	185
1915-1916.....	15.19	11.5	.....	12.4	11.21	11.9	11.94	108	24.23	119	.....	22.81	16.76	125
1916-1917.....	8.95	6.8	.....	11.1	.....	11.1	.....	11.1	.....	11.1	.....	.....	.....	111
1917-1918.....	7.31	5.3	.....	8.6	.....	8.6	.....	8.6	.....	8.6	.....	.....	.....	86
1918-1919.....	13.66	11.9	.....	8.36†	8.9	.....	16.84	83	12.97	73	.....	11.19	6.7	79
1919-1920.....	10.40	7.9	.....	7.9	9.51†	10.1	5.29	48	15.08	74	.....	13.38	7.4	69
1920-1921.....	14.56	11.1	.....	8.7	9.00†	9.6	.....	8.4	19.77	97	.....	12.93	7.7	85
Years of record.....	16	16	45	32	32	19	37	11	28	11	.....	11	28	11
Mean of record.....	13.98	12.60	9.48	11.12	21.54	18.09	17.64	11.84	11.84	11.84	.....	11.84	11.84	11.84
50-year mean.....	13.20	11.60	9.40	11.00	20.30	17.70	16.80	11.60	11.60	11.60	.....	11.60	11.60	11.60
County.....	Monterey.	Monterey.	Monterey.	Monterey.	Monterey.	Monterey.	Monterey.	Monterey.	Monterey.	Monterey.	.....	Monterey.	San Luis Obispo.	San Luis Obispo.
Elevation.....	43	127	188	333	2,240	960	2,800	616	616	616	.....	2,800	616	616
Station reference number.....	191	192	193	194	195	196	197	198	198	198	.....	197	198	198

Precipitation data are from U. S. Weather Bureau records unless otherwise noted.

†From records of Southern Pacific Railroad.

TABLE 24.

TABLE 24—(Concluded). RECORDS OF PRECIPITATION AND TABLE OF COMPUTED INDICES OF SEASONAL WETNESS—  
PRECIPITATION DIVISION T—SALINAS-SANTA MARIA AREA.*Rainfall stations, depth of precipitation in inches and index of seasonal wetness.*

Season.	Paso Robles.		Santa Margarita.		San Luis Obispo.		Santa Maria.		Sisquoc Ranch.		Ozena.		Index of seasonal wetness. Division T.
	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	
1871-1872	125		125		27.02	125		125		125		125	125
1872-1873	59		59		12.79	59		59		59		59	59
1873-1874	95		95		20.52	95		95		95		95	95
1874-1875	80		80		19.69	91		80		80		80	79
1875-1876	146		146		30.12	139		146		146		146	147
1876-1877	35		35		8.15	38		35		35		35	35
1877-1878	138		138		30.60	143		138		138		138	138
1878-1879	51		51		11.66	54		51		51		51	51
1879-1880	107		107		23.82	119		107		107		107	106
1880-1881	98		98		23.69	110		98		98		98	97
1881-1882	86		86		17.03	79		86		86		86	87
1882-1883	85		85		17.01	79		85		85		85	85
1883-1884	179		179		42.40	196		179		179		179	178
1884-1885	73		73		17.59	82		73		73		73	72
1885-1886	150		150		29.30	135		148		137		150	150
1886-1887					16.54	77		9.36		66			72
1887-1888	14.30		88		18.35	85		11.77		82		88	88
1888-1889	15.84		97		11.2	90		16.04		113		112	113
1889-1890	30.57		188		38.73	179		27.81		195		191	192
1890-1891	16.42		101		23.77	87		19.51		85		89	89
1891-1892					20.52	75		16.33		76		72	72
1892-1893	22.55		139		41.68	152		30.40		140		132	128
1893-1894	5.94		36		12.95	47		9.81		45		45	45
1894-1895	16.93		104		24.58	126		22.82		105		111	110
1895-1896	13.14		81		25.87	94		17.75		82		90	90
1896-1897	17.96		111		27.25	99		20.75		96		99	99
1897-1898	4.77		29		8.44	31		7.20		33		33	34
1898-1899	11.53		71		19.19	70		17.33		80		72	71
1899-1900	11.66		72		19.62	72		17.21		80		73	73
1900-1901	22.80		140		48.82	178		31.40		145		145	142



TABLE 24.

1901-1902	12.75	78	29.80	109	21.96	102	12.32	86	90	89
1902-1903	11.24	69	23.85	87	18.49	86	12.79	90	80	78
1903-1904	14.51	89	24.00	88	16.99	79	11.18	78	75	73
1904-1905	19.89	122	34.00	124	23.56	109	20.65	145	27.47	156
1905-1906	15.23	94	34.86	127	28.11	130	17.86	135	19.68	112
1906-1907	22.00	136	39.17	143	24.89	115	18.02	127	21.96	125
1907-1908	15.31	94	22.92	84	18.06	84	13.96	98	14.92	85
1908-1909	24.21	140	33.27	121	31.38	145	22.81	160	24.52	106
1909-1910	17.09	105	26.53	97	20.85	97	16.58	117	18.29	103
1910-1911	26.04	164	30.83	135	34.42	159	20.69	145	25.98	147
1911-1912	12.37	76	18.00	66	17.14	79	9.53	67	10.16	58
1912-1913	8.06	50	10.78	39	8.58	40	.....	43	6.44	37
1913-1914	22.02	136	35.01	128	31.21	144	.....	143	19.85	113
1914-1915	24.96	154	29.34	107	28.17	130	.....	152	.....	141
1915-1916	22.02	136	33.76	123	26.93	135	.....	126	.....	121
1916-1917	18.51	114	.....	111	23.03	106	.....	112	.....	111
1917-1918	34.37	88	.....	86	18.06	83	.....	87	.....	86
1918-1919	11.91	73	.....	79	18.09	83	.....	80	.....	80
1919-1920	12.81	79	.....	69	14.86	68	.....	69	.....	69
1920-1921	13.70	84	.....	85	19.27	89	.....	77	.....	84
Years of record	34	.....	27	.....	52	.....	30	.....	10	.....
Mean of record	16.35	.....	28.32	.....	21.27	.....	14.16	.....	19.92	.....
50-year mean	16.30	.....	27.40	.....	21.62	.....	14.20	.....	17.60	.....
County	San Luis Obispo.	San Luis Obispo.	San Luis Obispo.	San Luis Obispo.	San Luis Obispo.	San Luis Obispo.	Santa Barbara.	Santa Barbara.	Santa Barbara.	Ventura.
Elevation	800	996	201	201	201	220	600	600	3,680	204
Station reference number	199	200	201	201	202	202	203	203	15	15

Precipitation data are from U. S. Weather Bureau records.  
 Streams within boundaries of Precipitation Division T: Tejon Creek Group, Pajaro River Tributaries, Cantua Creek Group, Panoche Creek, Los Gatos Creek, Santa Maria River, San Luis Obispo Creek Group, Salinas River.

TABLE 25.

TABLE 25. RECORDS OF PRECIPITATION AND TABLE OF COMPUTED INDICES OF SEASONAL WETNESS—PRECIPITATION DIVISION U.—SANTA BARBARA—SANTA MONICA COAST AREA.

Rainfall stations, depth of precipitation in inches and index of seasonal wetness.

Season.	Fine Crest.		Santa Barbara.		San Miguel Island.		Ventura.		Ojai Valley.		West Saticoy.		Santa Monica.		Newhall.		Index of seasonal wetness. Division U.
	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	
1871-1872	79	14.94	79	14.94	79	14.94	79	14.94	79	14.94	79	14.94	79	14.94	79	14.94	79
1872-1873	56	10.52	56	10.52	56	10.52	56	10.52	56	10.52	56	10.52	56	10.52	56	10.52	56
1873-1874	84	14.44	77	14.44	84	15.02	84	15.02	84	15.02	84	15.02	84	15.02	84	15.02	84
1874-1875	96	18.71	100	18.71	96	15.24	93	15.24	96	15.24	96	15.24	96	15.24	96	15.24	96
1875-1876	125	23.07	123	23.07	125	21.00	128	21.00	125	21.00	125	21.00	125	21.00	125	21.00	125
1876-1877	27	4.40	24	4.40	27	5.22	32	5.22	27	5.22	27	5.22	27	5.22	27	5.22	27
1877-1878	116	29.51	157	29.51	116	20.22	123	20.22	116	20.22	116	20.22	116	20.22	116	20.22	116
1878-1879	63	13.58	72	13.58	63	12.70	78	12.70	63	12.70	63	12.70	63	12.70	63	12.70	63
1879-1880	128	25.64	136	25.64	128	22.06	134	22.06	128	22.06	128	22.06	128	22.06	128	22.06	128
1880-1881	73	15.23	81	15.23	73	13.31	85	13.31	73	13.31	73	13.31	73	13.31	73	13.31	73
1881-1882	76	14.27	76	14.27	76	11.98	73	11.98	76	11.98	76	11.98	76	11.98	76	11.98	76
1882-1883	69	13.41	71	13.41	69	11.31	70	11.31	69	11.31	69	11.31	69	11.31	69	11.31	69
1883-1884	24	34.37	183	34.37	24	36.13	219	36.13	24	36.13	24	36.13	24	36.13	24	36.13	24
1884-1885	58	13.08	70	13.08	58	9.46	58	9.46	58	9.46	58	9.46	58	9.46	58	9.46	58
1885-1886	140	24.24	129	24.24	140	20.22	123	20.22	140	20.22	140	20.22	140	20.22	140	20.22	140
1886-1887	83	12.99	69	12.99	83	14.75	90	14.75	83	14.75	83	14.75	83	14.75	83	14.75	83
1887-1888	118	21.71	115	21.71	118	20.31	123	20.31	118	20.31	118	20.31	118	20.31	118	20.31	118
1888-1889	118	21.58	115	21.58	118	16.85	102	16.85	118	16.85	118	16.85	118	16.85	118	16.85	118
1889-1890	168	32.43	172	32.43	168	25.65	156	25.65	168	25.65	168	25.65	168	25.65	168	25.65	168
1890-1891	99	17.36	92	17.36	99	15.39	93	15.39	99	15.39	99	15.39	99	15.39	99	15.39	99
1891-1892	69	10.76	57	10.76	69	11.10	67	11.10	69	11.10	69	11.10	69	11.10	69	11.10	69
1892-1893	139	26.97	143	26.97	139	23.49	143	23.49	139	23.49	139	23.49	139	23.49	139	23.49	139
1893-1894	41	7.02	37	7.02	41	6.39	39	6.39	41	6.39	41	6.39	41	6.39	41	6.39	41
1894-1895	99	16.34	87	16.34	99	13.00	96	13.00	99	16.01	106	16.01	106	14.75	102	19.86	114
1895-1896	65	13.37	71	13.37	65	11.60	86	9.90	65	10.37	68	10.37	68	8.30	57	8.76	50
1896-1897	106	18.50	98	18.50	106	15.89	96	15.89	106	17.43	115	17.43	115	17.10	118	18.42	106
1897-1898	37	4.99	27	4.99	37	5.65	42	6.44	37	5.25	35	5.25	35	7.93	55	5.02	32
1898-1899	56	12.35	66	12.35	56	10.13	55	10.13	56	7.91	52	7.91	52	7.00	48	5.44	31
1899-1900	16	9.1	6	9.1	16	7.59	56	9.48	58	8.45	56	8.45	56	8.60	60	7.59	43
1900-1901	22.57	89	13.40	82	22.57	7.56	56	14.05	87	12.32	81	12.32	81	14.70	102	19.08	109

WATER RESOURCES OF CALIFORNIA.

TABLE 25.

1901-1902.....	17.73	70	14.21	76	19.48	144	12.69	77	80	11.65	77	11.70	81	9.89	56	83
1902-1903.....	25.43	101	20.74	110	17.36	128	16.26	99	112	113	19.36	134	19.64	113	114	114
1903-1904.....	16.20	64	11.58	61	9.72	72	10.64	65	61	59	9.06	63	8.92	47	61	61
1904-1905.....	41.60	164	29.64	158	18.78	139	24.30	147	149	20.50	135	18.80	130	27.57	158	148
1905-1906.....	32.92	130	22.70	120	22.52	167	19.23	117	23.71	115	16.33	108	18.38	129	18.39	124
1906-1907.....	39.38	156	27.72	147	18.43	136	17.31	160	37.44	182	24.02	158	21.84	151	33.06	189
1907-1908.....	24.68	98	19.21	102	14.62	108	17.31	105	18.05	92	15.72	104	11.89	82	15.31	80
1908-1909.....	44.15	174	36.90	193	15.50	159	28.73	174	29.24	143	23.32	167	18.08	123	22.63	130
1909-1910.....	103.19	103	19.62	104	13.88	103	17.02	102	19.64	95	14.86	98	13.43	93	19.85	114
1910-1911.....	45.38	179	31.94	170	25.49	189	19.23	138	33.91	165	21.88	145	17.36	120	22.22	127
1911-1912.....	21.25	85	14.25	76	10.17	75	11.34	84	13.34	65	10.71	71	9.21	64	20.03	115
1912-1913.....	15.44	61	12.58	67	6.82	50	7.99	79	18.12	88	15.40	103	10.71	74	17.79	102
1913-1914.....	43.48	172	31.52	167	16.78	124	15.40	161	39.60	192	26.44	142	31.24	179	163	163
1914-1915.....	26.00	103	21.25	113	11.38	134	13.24	132	24.02	117	13.84	136	27.50	158	128	128
1915-1916.....	27.08	109	25.90	138	14.00	140	16.50	140	28.32	137	19.41	128	21.27	147	146	136
1916-1917.....	112.00	112	22.56	120	13.41	99	11.34	113	22.15	107	11.40	106	15.30	106	117	111
1917-1918.....	117.00	117	21.68	115	14.37	106	11.34	117	24.99	121	11.90	122	17.62	122	122	117
1918-1919.....	76.00	76	14.46	77	9.05	67	7.77	77	13.55	66	7.77	77	11.12	77	80	75
1919-1920.....	80.00	80	14.68	78	6.69	49	8.40	84	16.64	81	8.40	85	13.46	93	87	80
1920-1921.....	88.00	88	14.31	76	10.69	79	8.40	89	18.30	89	8.40	90	15.54	108	92	89
Years of record.....	17	54	23	23	35	208	19	16	36	38	36	36	36	38	38	38
Mean of record.....	27.95	18.54	13.40	15.94	23.87	17.87	14.72	14.99	17.87	17.87	17.87	17.87	17.87	17.87	17.87	17.87
50-year mean.....	25.30	18.82	13.50	16.50	20.60	17.50	15.10	14.40	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50
County.....	Santa Barbara	Santa Barbara	Santa Barbara	Santa Barbara	Ventura	Ventura	Ventura	Ventura	Ventura	Ventura	Ventura	Los Angeles	Los Angeles	Los Angeles	Los Angeles	Los Angeles
Elevation.....	1,000	130	500	500	900	1,268	150	110	1,268	1,268	1,268	1,268	1,268	1,268	1,268	1,268
Station reference number.....	205	206	207	207	208	209	210	211	212	212	212	212	212	212	212	212

Precipitation data are from U. S. Weather Bureau records.  
Streams within boundaries of Precipitation Division U: Malibu River Group, Santa Clara River Tributaries, Ventura River, Jalama Creek Group, Santa Ynez River, San Antonio Creek.

TABLE 26.

TABLE 26. RECORDS OF PRECIPITATION AND TABLE OF COMPUTED INDICES OF SEASONAL WETNESS—PRECIPITATION DIVISION V—TEHACHAPI AREA.

Rainfall stations, depth of precipitation in inches and index of seasonal wetness.

Season.	Tehachap.		Mojave.		Monterio.		Index of seasonal wetness. Division V.
	Inches.	Index.	Inches.	Index.	Inches.	Index.	
1874-1875	79	79	79	79	79	79	79
1875-1876	56	56	56	56	56	56	56
1876-1877	84	84	84	84	84	84	84
1877-1878	96	96	96	96	96	96	96
1878-1879	125	125	125	125	125	125	125
1879-1880	98	98	98	98	98	98	98
1880-1881	16.40	157	6.42	124	150	147	147
1881-1882	5.84	56	2.67	36	56	56	56
1882-1883	13.53	149	6.79	141	147	145	145
1883-1884	10.20	98	1.27	26	75	66	66
1884-1885	7.08	68	.63	13	51	44	44
1885-1886	12.00	115	T	0	79	65	65
1886-1887	18.09	174	11.64	242	195	204	204
1887-1888	7.16	69	2.84	59	66	65	65
1888-1889	20.89	200	5.37	124	176	167	167
1889-1890	13.68	131	5.07	106	123	120	120
1890-1891	10.43	100	8.50	177	124	134	134
1891-1892	13.24	127	8.22	171	141	146	146
1892-1893	12.35	118	12.47	260	162	180	180
1893-1894	9.86	95	4.40	92	94	94	94
1894-1895	11.75	113	4.46	63	106	104	104
1895-1896	10.51	101	5.48	114	105	107	107
1896-1897	12.56	121	3.65	76	106	101	101
1897-1898	10.08	97	7.88	164	118	126	126
1898-1899	6.30	60	3.92	82	67	70	70
1899-1900	8.20	79	5.66	118	91	96	96
1900-1901	5.21	50	6.00	112	38	33	33
1901-1902	3.70	35	1.14	24	32	30	30
1902-1903	6.05	58	2.81	58	13.60	76	64
1903-1904	7.77	74	5.85	122	20.47	114	103

TABLE 26.

1901-1902	9.68	93	3.51	73	17.35	96	87
1902-1903	9.29	89	2.92	81	18.53	103	84
1903-1904	6.64	64	1.96	41	15.20	84	63
1904-1905	15.86	152	6.10	127	23.43	141	140
1905-1906	18.61	179	6.75	141	25.64	143	154
1906-1907	11.29	108	9.09	189	22.13	123	140
1907-1908	7.08	68	4.28	89	15.51	86	81
1908-1909	10.98	109	7.53	149	17.27	95	117
1909-1910	6.43	62	2.97	62	11.68	65	63
1910-1911	8.21	79	9.12	190	15.68	87	119
1911-1912	9.35	90	6.50	135	13.81	77	101
1912-1913	13.99	134	1.10	23	.....	99	85
1913-1914	13.49	129	2.53	53	.....	105	96
1914-1915	.....	128	.....	128	.....	128	128
1915-1916	.....	135	.....	135	.....	135	135
1916-1917	.....	111	.....	111	.....	111	111
1917-1918	.....	117	.....	117	.....	117	117
1918-1919	.....	75	.....	75	.....	75	75
1919-1920	.....	80	.....	80	.....	80	80
1920-1921	.....	89	.....	89	.....	89	89
Years of record	37	37	37	13	.....	.....	.....
Mean of record	10.69	.....	4.93	.....	17.87	.....	.....
50-year mean	10.40	.....	4.80	.....	18.00	.....	.....
County	Kern.	.....	Kern.	.....	Kern.	.....	.....
Elevation	3,964	.....	2,751	.....	4,500	.....	.....
Station reference number	213	.....	214	.....	215	.....	.....

Precipitation data are from U. S. Weather Bureau records.  
Streams within boundaries of Precipitation Division V: Caliente Creek, Antelope Valley Group.

TABLE 27.

TABLE 27. RECORDS OF PRECIPITATION AND TABLE OF COMPUTED INDICES OF SEASONAL WETNESS—PRECIPITATION DIVISION W—LOS ANGELES AREA.  
Rainfall stations, depth of precipitation in inches and index of seasonal wetness.

Season.	Lowc Observatory. Inches, Index.	Mount Wilson. Inches, Index.	Pasadena. Inches, Index.	Sierra Madre. Inches, Index.	Ana- hualta. Inches, Index.	Lordsburg. Inches, Index.	Los Angeles. Inches, Index.	Claremont. Inches, Index.	Glendora. Inches, Index.	Upland. Inches, Index.	Index of seasonal wetness. Division W.
1871-1872.....	69	69	69	69	69	60	69	69	69	69	69
1872-1873.....	72	72	72	72	72	72	72	72	72	72	72
1873-1874.....	134	134	134	134	134	134	134	134	134	134	134
1874-1875.....	79	79	79	79	79	79	79	79	79	79	79
1875-1876.....	117	117	117	117	117	117	117	117	117	117	117
1876-1877.....	44	44	44	44	44	44	44	44	44	44	44
1877-1878.....	140	140	140	140	140	140	140	140	140	140	140
1878-1879.....	75	75	75	75	75	75	75	75	75	75	75
1879-1880.....	134	134	134	134	134	134	134	134	134	134	134
1880-1881.....	86	86	86	86	86	86	86	86	86	86	86
1881-1882.....	68	68	68	68	68	68	68	68	68	68	68
1882-1883.....	80	80	80	80	80	80	80	80	80	80	80
1883-1884.....	251	251	251	251	251	251	251	251	251	251	251
1884-1885.....	61	61	61	61	61	61	61	61	61	61	61
1885-1886.....	147	147	147	147	147	147	147	147	147	147	147
1886-1887.....	92	92	92	92	92	92	92	92	92	92	92
1887-1888.....	91	91	91	91	91	91	91	91	91	91	91
1888-1889.....	127	127	127	127	127	127	127	127	127	127	127
1889-1890.....	229	229	229	229	229	229	229	229	229	229	229
1890-1891.....	88	88	88	88	88	88	88	88	88	88	88
1891-1892.....	77	77	77	77	77	77	77	77	77	77	77
1892-1893.....	154	154	154	154	154	154	154	154	154	154	154
1893-1894.....	52	52	52	52	52	52	52	52	52	52	52
1894-1895.....	116	116	116	116	116	116	116	116	116	116	116
1895-1896.....	53	53	53	53	53	53	53	53	53	53	53
1896-1897.....	27 93	27 93	16 64	102	102	102	102	102	102	96	102
1897-1898.....	13 63	49	7 93	40	49	49	49	49	49	50	49
1898-1899.....	10 72	37	6 64	33	35	35	35	35	35	37	40
1899-1900.....	28 02	97	8 54	43	60	60	60	60	60	52	58
1900-1901.....	34 11	118	21 85	110	123	111	107	107	107	107	111
.....					22 49	111	21 02	21 02	109	23 63	103
.....					12 20	111	10 65	10 65	55	12 93	56
.....					7 11	60	7 85	7 85	41	8 37	36
.....					12 20	60	10 65	10 65	55	12 93	56
.....					11 54	45	11 03	11 03	46	12 75	55
.....					9 54	37	9 54	9 54	27	8 37	36
.....					12 88	50	12 88	12 88	50	12 93	56
.....					30 65	123	21 02	21 02	109	23 63	103
.....					102	102	22 23	22 23	96	24 99	108
.....					45	45	11 03	11 03	50	12 75	55
.....					37	37	6 39	6 39	27	8 37	36
.....					60	60	10 65	10 65	52	12 93	56
.....					111	111	16 29	16 29	107	23 63	103
.....					22 49	110	21 02	21 02	109	23 63	103

TABLE 27.

1901-1902	18.77	65	63	64	16.23	63	58	63	10.60	70	12.45	64	14.08	61	63
1902-1903		110	110	110	28.17	113	113	110	19.32	127	18.81	98	25.15	109	116
1903-1904		57	56	57	13.22	51	53	56	8.72	57	10.80	56	13.32	58	56
1904-1905	36.94	128	125	118	32.11	125	130	126	19.52	128	22.75	118	26.32	111	123
1905-1906	36.89	128	139	122	32.66	127	109	28.22	18.65	123	21.65	112	30.23	131	123
1906-1907	40.51	140	145	134	37.74	147	138	29.09	19.30	127	26.29	136	33.07	142	139
1907-1908	21.35	74	31.83	100	29.57	80	13.74	67	14.33	74	13.64	81	17.39	75	78
1908-1909	41.04	142	131	134	38.86	131	25.87	127	22.46	116	22.28	116	29.48	127	128
1909-1910	29.26	101	24.13	76	17.99	91	19.35	95	16.58	85	12.63	83	17.18	89	87
1910-1911	30.95	107	31.51	99	24.15	122	32.63	127	20.92	102	21.56	111	28.30	122	113
1911-1912	15.83	55	26.96	85	17.80	90	13.08	64	13.38	69	11.60	76	14.06	73	75
1912-1913	20.95	72	21.28	67	18.04	91	18.52	72	11.02	57	13.42	88	13.28	69	74
1913-1914	43.45	150	48.92	154	32.12	162	40.16	156	32.85	161	29.07	150	37.65	160	156
1914-1915	29.54	103	30.43	95	22.02	111	21.95	85	24.38	119	22.59	116	17.05	112	110
1915-1916	31.68	110	36.70	115	25.02	126	29.73	115	28.96	142	29.03	131	26.06	135	129
1916-1917	28.08	97	28.44	89	19.08	96	24.94	97	19.67	96	17.23	89	15.26	100	94
1917-1918	19.88	69	28.16	88	19.83	100	20.38	79	18.31	89	13.11	68	13.86	91	83
1918-1919	17.51	60	20.62	65	13.61	68	15.09	59	12.93	63	.....	61	8.58	56	61
1919-1920	.....	99	31.19	98	19.39	98	23.67	92	23.28	114	.....	99	12.52	82	99
1920-1921	.....	102	34.06	107	19.41	98	24.32	94	.....	101	.....	102	13.65	90	101
Years of record	21	17	22	24	22	22	22	14	44	30	11	20	20	20	20
Mean of record	27.50	33.30	18.52	24.22	19.63	21.00	15.50	18.10	15.50	18.10	23.66	21.00	21.00	21.00	21.00
50-year mean	28.90	31.80	19.80	25.70	20.40	19.40	15.20	19.30	15.20	19.30	23.20	23.10	23.10	23.10	23.10
County	Los Angeles.	Los Angeles.	Los Angeles.	Los Angeles.	Los Angeles.	Los Angeles.	Los Angeles.	Los Angeles.	Los Angeles.	Los Angeles.	Los Angeles.	Los Angeles.	Los Angeles.	San Bernardino.	San Bernardino.
Elevation	3,420	5,850	827	1,400	540	1,320	361	1,200	740	1,200	740	1,750	1,750	1,750	1,750
Station reference number	216	217	218	219	220	221	222	223	224	223	224	225	225	225	225

Precipitation data are from U. S. Weather Bureau records.  
Streams within boundaries of Precipitation Division W; San Gabriel River, Los Angeles River Tributaries.





TABLE 28.

1901-1902	70	26.68	73	70	8.80	6.50	12.27	75	70
1902-1903	114	40.42	111	114	15.82	108	12.74	119	114
1903-1904	63	25.15	69	63	8.45	58	7.82	48	63
1904-1905	137	54.36	122	137	20.53	140	16.52	154	137
1905-1906	44.29	48.25	133	134	16.61	113	15.14	141	134
1906-1907	46.21	23.17	143	137	21.85	149	16.31	152	137
1907-1908	27.52	15.92	97	138	14.36	98	11.04	111	88
1908-1909	48.16	17.36	107	118	14.47	90	12.02	112	96
1909-1910	42.71	15.02	93	107	10.57	71	11.93	111	104
1910-1911	42.01	16.34	101	109	13.93	55	10.73	100	96
1911-1912	29.56	83	13.84	86	14.25	97	8.37	78	74
1912-1913	21.71	17.75	78	113.73	7.96	54	7.16	67	57
1913-1914	57.98	35.98	158	140	20.44	140	14.89	139	144
1914-1915	39.12	29.83	131	151	19.77	124	15.07	140	147
1915-1916	57.46	25.50	117	156	18.20	124	16.88	157	190
1916-1917	36.76	24.26	107	172	14.07	96	9.11	85	102
1917-1918	26.64	17.75	86	20.03	11.90	81	8.92	83	91
1918-1919	19.57	15.14	67	19.87	12.22	83	9.85	92	56
1919-1920	37.00	110	19.28	111	15.82	108	12.00	112	103
1920-1921	37.75	93	16.46	91	13.29	91	9.93	93	88
Years of record	16	7	51	10	32	40	22	12	
Mean of record	38.40	24.30	16.11	28.26	14.64	10.89	15.71	13.06	
50-year mean	36.00	22.70	16.15	27.60	14.70	10.70	16.30	13.00	
County	San Bernar- dino.	San Bernar- dino.	San Bernar- dino.	San Bernar- dino.	San Bernar- dino.	Riverside.	San Bernar- dino.	Riverside.	
Elevation	2,250	2,000	1,054	5,000	1,352	851	714	615	
Station reference number	226	227	228	230	232	234	235	236	

Precipitation data are from U. S. Weather Bureau records.

TABLE 28.

TABLE 28—(Concluded). RECORDS OF PRECIPITATION AND TABLE OF COMPUTED INDICES OF SEASONAL WETNESS—  
PRECIPITATION DIVISION X—RIVERSIDE-SANTA ANA AREA.

*Rainfall stations, depth of precipitation in inches and index of seasonal wetness.*

Season.	Anaheim.	Santa Ana.	Tustin.	Elsinore.	Beaumont, (near)	Beaumont.	Cabezon.	San Jacinto.	Idyllwild.	Index of seasonal wetness, Division X.
	Inches. Index.	Inches. Index.	Inches. Index.	Inches. Index.	Inches. Index.	Inches. Index.	Inches. Index.	Inches. Index.	Inches. Index.	
1871-1872.....	56	56	56	56	56	56	56	56	56	56
1872-1873.....	94	94	94	94	94	94	94	94	94	94
1873-1874.....	148	148	148	148	148	148	148	148	148	148
1874-1875.....	84	84	84	84	84	84	84	84	84	84
1875-1876.....	123	123	123	123	123	123	123	123	123	123
1876-1877.....	59	59	59	59	59	59	59	59	59	59
1877-1878.....	137	137	137	137	137	137	137	137	137	137
1878-1879.....	36	53	57	53	53	53	53	53	53	52
1879-1880.....	11.31	95	117	117	117	117	117	117	117	117
1880-1881.....	7.08	59	73	73	73	73	73	73	73	73
1881-1882.....	7.12	59	63	63	63	63	63	63	63	63
1882-1883.....	8.60	72	54	54	54	54	54	54	54	54
1883-1884.....	96.17	218	229	229	229	229	229	229	229	229
1884-1885.....	5.76	48	68	68	68	68	68	68	68	68
1885-1886.....	14.75	123	120	120	120	120	120	120	120	120
1886-1887.....	8.68	72	74	74	74	74	74	74	74	74
1887-1888.....	16.94	142	127	127	127	127	127	127	127	127
1888-1889.....	18.14	151	135	135	135	135	135	135	135	135
1889-1890.....	20.00	167	24.97	198	22.21	171	165	161	161	164
1890-1891.....	15.93	133	12.86	102	14.76	113	119	117	117	117
1891-1892.....	7.42	62	12.13	93	78	79	14.92	81	79	78
1892-1893.....	13.95	116	13.95	111	124	118	19.30	104	118	117
1893-1894.....	4.42	37	6.42	49	50	59	9.46	51	59	58
1894-1895.....	16.07	134	16.86	136	136	138	16.67	125	138	138
1895-1896.....	7.73	65	63	63	63	63	63	63	63	58
1896-1897.....	14.52	121	14.28	113	114	114	15.51	116	114	116
1897-1898.....	5.65	47	49	5.82	45	46	49	5.70	48	56
1898-1899.....	5.45	45	49	6.64	51	46	49	5.70	48	47
1899-1900.....	8.37	70	55	7.29	56	58	55	6.56	55	58
1900-1901.....	14.65	122	108	15.46	119	108	11.32	95	13.40	102

TABLE 28.

1901-1902.....	10 08	84	.....	71	8 84	68	9 65	71	.....	70	.....	71	7 70	64	8 24	61	19 43	75	69
1902-1903.....	19 47	163	.....	125	15 85	122	16 08	119	.....	114	.....	125	11 62	57	15 75	118	26 48	102	116
1903-1904.....	6 45	54	.....	59	10 56	81	6 65	49	.....	63	.....	59	6 67	56	7 90	59	14 95	57	61
1904-1905.....	.....	136	.....	143	18 78	144	21 47	159	.....	137	.....	143	17 88	150	18 59	139	35 01	134	140
1905-1906.....	.....	133	.....	147	19 00	146	25 96	192	.....	134	.....	147	18 36	151	14 79	111	41 66	159	135
1906-1907.....	15 00	125	.....	141	19 68	151	18 02	133	.....	137	.....	141	16 64	139	18 02	135	30 66	118	138
1907-1908.....	9 32	78	.....	88	9 04	69	11 90	88	.....	88	.....	88	8 40	70	12 67	95	21 31	82	88
1908-1909.....	18 79	157	.....	119	14 45	111	15 03	112	.....	118	.....	119	16 67	140	13 76	103	35 34	135	117
1909-1910.....	.....	92	.....	98	11 87	91	14 14	105	.....	97	.....	98	.....	95	12 52	94	25 35	97	97
1910-1911.....	.....	101	.....	98	13 05	100	11 63	86	.....	109	.....	98	.....	108	15 44	116	27 82	107	105
1911-1912.....	.....	74	.....	80	7 89	60	10 47	77	.....	77	.....	80	19 34	85	17 56	95	.....	82	81
1912-1913.....	.....	66	.....	64	8 11	62	.....	66	.....	66	.....	66	11 91	52	10 23	55	.....	60	61
1913-1914.....	.....	127	.....	134	15 66	120	.....	129	.....	129	.....	132	31 90	140	27 48	148	.....	140	141
1914-1915.....	.....	130	.....	137	18 31	141	.....	132	.....	132	.....	132	27 90	123	28 61	154	.....	139	136
1915-1916.....	.....	139	.....	147	15 87	122	22 71	167	.....	167	.....	137	31 95	140	26 19	141	.....	148	145
1916-1917.....	.....	83	.....	88	10 38	80	11 49	85	.....	85	.....	88	19 44	105	.....	89	11 45	86	91
1917-1918.....	.....	78	.....	8 48	9 49	73	11 97	88	.....	88	.....	88	12 27	92	.....	88	12 27	92	86
1918-1919.....	.....	76	.....	7 86	62	8 47	65	7 44	.....	55	.....	14 98	66	15 68	85	79	.....	78	73
1919-1920.....	.....	111	.....	115	35	122	13 03	100	.....	122	.....	119	23 03	124	.....	111	14 61	109	111
1920-1921.....	.....	98	.....	13 40	106	12 23	94	9 64	.....	71	.....	23 65	104	16 88	91	.....	90	10 82	93
Years of record.....	29	.....	11	44	.....	22	.....	10	.....	16	.....	11	.....	28	.....	10	.....	.....	.....
Mean of record.....	11 80	.....	12 98	13 13	.....	13 16	.....	23 34	.....	19 22	.....	11 60	.....	12 98	.....	27 80	.....	.....	.....
50-year mean.....	12 00	.....	12 60	13 00	.....	13 50	.....	22 80	.....	18 50	.....	12 00	.....	13 40	.....	26 10	.....	.....	.....
County.....	Orange.	.....	Orange.	Orange.	.....	Riverside.	.....	Riverside.	.....	Riverside.	.....	Riverside.	.....	Riverside.	.....	Riverside.	.....	.....	.....
Elevation.....	134	.....	133	200	.....	1 234	.....	3 045	.....	2 558	.....	1 779	.....	1 550	.....	5 250	.....	.....	.....
Station reference number.....	237	.....	238	239	.....	240	.....	241	.....	242	.....	243	.....	244	.....	245	.....	.....	.....

Precipitation data are from U. S. Weather Bureau records.  
Streams within boundaries of Precipitation Division X: San Jacinto River Tributaries, Santa Ana River Tributaries, Mojave River, Whitewater River.

TABLE 29.

TABLE 29. RECORDS OF PRECIPITATION AND TABLE OF COMPUTED INDICES OF SEASONAL WETNESS—PRECIPITATION DIVISION Y—SAN DIEGO AREA.

Rainfall stations, depth of precipitation in inches and index of seasonal wetness.

Season.	Fallbrook, Inches, Index.	Aguanga, Inches, Index.	Warner Springs, Inches, Index.	Nellie, Inches, Index.	Oceanside, Inches, Index.	Mesa Grande, Inches, Index.	Escondido, Inches, Index.	Julian, Inches, Index.
1871-1872	72	72	72	72	72	72	72	72
1872-1873	65	65	65	65	65	65	65	65
1873-1874	170	170	170	170	170	170	170	170
1874-1875	58	58	58	58	58	58	58	58
1875-1876	102	102	102	102	102	102	102	102
1876-1877	8.67	46	46	46	46	46	46	46
1877-1878	24.84	128	128	128	128	128	128	128
1878-1879	7.70	55	55	55	55	55	55	55
1879-1880	20.45	111	111	111	111	111	111	111
1880-1881	13.47	81	81	81	81	81	81	81
1881-1882	12.24	82	82	82	82	82	82	82
1882-1883	13.32	87	87	87	87	87	87	87
1883-1884	40.77	222	222	222	222	222	222	222
1884-1885	12.70	78	78	78	78	78	78	78
1885-1886	26.23	150	150	150	150	150	150	150
1886-1887	10.82	63	70	70	70	70	70	70
1887-1888	20.10	110	110	110	110	110	110	110
1888-1889	23.46	129	129	129	129	129	129	129
1889-1890	26.91	157	153	153	153	153	153	153
1890-1891	19.68	115	132	132	132	132	132	132
1891-1892	13.49	78	111	111	111	111	111	111
1892-1893	21.27	124	98	98	98	98	98	98
1893-1894	9.81	57	66	66	66	66	66	66
1894-1895	23.85	139	130	130	130	130	130	130
1895-1896	9.27	54	59	59	59	59	59	59
1896-1897	21.58	126	116	116	116	116	116	116
1897-1898	10.98	64	65	65	65	65	65	65
1898-1899	8.70	51	54	54	54	54	54	54
1899-1900	13.47	78	72	72	72	72	72	72
1900-1901	16.60	98	97	97	97	97	97	97

TABLE 29.

1901-1902	12.45	72	82	82.45	94	82	82	82	11.66	70	75
1902-1903	23.49	137	109	109	109	109	109	109	17.60	107	117
1903-1904	57	52	52	52	52	52	52	52	8.15	49	50
1904-1905	149	142	142	54.01	119	142	142	142	23.49	142	149
1905-1906	146	149	149	77.40	171	149	149	149	25.43	154	144
1906-1907	115	116	116	23.23	131	116	116	116	17.89	108	118
1907-1908	80	83	83	15.91	90	82	83	83	13.52	82	82
1908-1909	115	111.94	86	17.68	100	115	113	113	18.21	110	115
1909-1910	89	15.42	112	22.45	127	97	87	11.12	18.83	114	74
1910-1911	91	13.33	97	17.49	99	99	96	27.75	15.44	93	88
1911-1912	88	12.83	93	14.06	80	86	92	27.60	14.70	89	83
1912-1913	76	8.19	50	13.83	78	87	6.50	25.64	10.31	62	65
1913-1914	92	15.43	112	18.48	104	100	14.15	31.77	105	115	111
1914-1915	145	20.69	150	27.16	154	148	22.12	44.46	25.37	153	163
1915-1916	143	22.92	166	26.14	148	144	17.42	48.27	27.94	169	168
1916-1917	103	10.89	79	13.19	74	98	14.29	27.08	17.04	103	96
1917-1918	77	14.02	102	14.77	83	68	10.50	19.47	13.87	84	69
1918-1919	80	10.17	74	11.62	66	64	8.62	21.05	12.28	74	75
1919-1920	101	15.02	109	17.32	98	112	107	33.20	15.17	92	123
1920-1921	71	8.10	59	11.65	66	70	70	24.76	11.40	69	81
Years of record	27	13	15	13	13	10	13	24	22	22	22
Mean of record	17.27	13.76	17.67	48.38	12.87	30.39	16.00	32.85	32.10	32.85	32.85
50-year mean	17.20	13.80	17.70	45.40	12.80	30.40	16.60	32.10	32.10	32.10	32.10
County	San Diego.	Riverside.	San Diego.	San Diego.	San Diego.	San Diego.	San Diego.	San Diego.	San Diego.	San Diego.	San Diego.
Elevation	700	1,986	3,165	5,350	60	3,350	650	4,500	4,500	4,500	4,500
Station reference number	246	247	248	249	250	251	252	253	252	252	253

Precipitation data are from U. S. Weather Bureau records.



WATER RESOURCES OF CALIFORNIA.

TABLE 29.

1901-1902.....	35.00	93	21.57	85	9.88	71	9.19	67	.....	82	6.17	62	17.44	86	79
1902-1903.....	37.60	97	.....	111	16.35	119	11.46	83	.....	109	11.76	118	20.00	99	110
1903-1904.....	25.37	60	.....	53	8.24	59	5.71	42	.....	52	4.40	44	8.79	43	51
1904-1905.....	37.89	149	.....	149	19.84	142	20.50	149	13.46	126	14.32	144	31.61	156	143
1905-1906.....	56.24	145	.....	144	21.77	156	18.62	136	13.07	128	14.68	148	27.07	134	147
1906-1907.....	44.91	116	.....	117	16.73	120	15.24	111	10.14	95	10.62	107	25.42	125	115
1907-1908.....	30.35	78	.....	81	12.69	91	13.52	98	8.68	82	8.55	86	15.57	77	84
1908-1909.....	45.65	118	.....	116	18.02	129	15.50	113	11.32	106	10.23	103	22.87	113	111
1909-1910.....	33.40	86	.....	108	13.29	97	11.13	104	9.79	104	9.79	98	17.42	86	98
1910-1911.....	32.15	83	.....	85	.....	101	13.75	100	12.84	120	11.99	121	20.39	101	98
1911-1912.....	31.90	82	.....	92	.....	95	15.10	110	10.27	96	10.72	103	19.07	94	92
1912-1913.....	31.02	80	.....	63	.....	67	8.04	58	5.92	56	5.87	59	12.83	63	66
1913-1914.....	34.82	90	.....	92	.....	96	15.25	111	11.86	112	9.83	99	20.02	99	103
1914-1915.....	55.79	144	.....	146	.....	132	21.71	158	16.06	151	14.41	145	23.23	115	148
1915-1916.....	50.87	147	.....	151	.....	133	24.52	178	15.17	142	12.55	136	30.79	152	151
1916-1917.....	39.82	103	.....	96	.....	94	13.40	98	13.32	125	10.13	102	16.52	82	97
1917-1918.....	29.53	76	.....	89	.....	109	10.62	77	9.36	88	8.04	81	30.18	149	86
1918-1919.....	29.93	77	.....	79	.....	82	12.44	90	9.01	85	8.74	88	16.56	82	77
1919-1920.....	40.15	103	.....	108	.....	104	14.62	106	10.60	100	8.91	90	22.98	113	105
1920-1921.....	27.18	70	.....	69	.....	62	10.39	76	7.62	72	7.08	71	10.17	50	69
Years of record.....	33	.....	12	.....	24	.....	22	.....	17	.....	71	.....	31	.....	.....
Mean of record.....	38.95	.....	22.72	.....	13.96	.....	13.75	.....	11.20	.....	9.66	.....	20.50	.....	.....
50-year mean.....	38.80	.....	25.40	.....	13.90	.....	13.70	.....	10.70	.....	9.94	.....	20.30	.....	.....
County.....	San Diego.	.....	San Diego.	.....	San Diego.	.....	San Diego.	.....	San Diego.	.....	San Diego.	.....	San Diego.	.....	San Diego.
Elevation.....	4,667	.....	3,400	.....	460	.....	482	.....	302	.....	87	.....	2,543	.....	.....
Station reference number.....	254	.....	255	.....	256	.....	257	.....	258	.....	259	.....	260	.....	.....

Precipitation data are from U. S. Weather Bureau records.  
Streams within boundaries of Precipitation Division Y: San Diego River, Santa Ysabel Creek, San Luis Rey River, Santa Margarita River.

TABLE 30.

TABLE 30. RECORDS OF PRECIPITATION AND TABLE OF COMPUTED INDICES OF SEASONAL WETNESS—PRECIPITATION DIVISION Z—OWENS VALLEY AREA.  
Rainfall stations, depth of precipitation in inches and index of seasonal wetness.

Season.	Bodie.		Bishop.		Bishop Creek.		Independence.		Lone Pine.		Keeler.		Index of seasonal wetness. Division Z.
	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	Inches.	Index.	
1871-1872	155	.....	155	.....	155	.....	6.66	155	.....	155	.....	155	155
1872-1873	46	.....	46	.....	46	.....	1.98	46	.....	46	.....	46	46
1873-1874	162	.....	162	.....	162	.....	6.96	162	.....	162	.....	162	162
1874-1875	90	.....	90	.....	90	.....	.....	90	.....	90	.....	90	90
1875-1876	124	.....	124	.....	124	.....	.....	124	.....	124	.....	124	124
1876-1877	43	.....	43	.....	43	.....	.....	43	.....	43	.....	43	43
1877-1878	126	.....	126	.....	126	.....	.....	126	.....	126	.....	126	126
1878-1879	58	.....	58	.....	58	.....	.....	58	.....	58	.....	58	58
1879-1880	123	.....	123	.....	123	.....	.....	123	.....	123	.....	123	123
1880-1881	73	.....	73	.....	73	.....	.....	73	.....	73	.....	73	73
1881-1882	69	.....	69	.....	69	.....	.....	69	.....	69	.....	69	69
1882-1883	62	.....	62	.....	62	.....	.....	62	.....	62	.....	62	62
1883-1884	51	.....	2.86*	51	.....	.....	.....	51	.....	51	.....	51	51
1884-1885	33	.....	1.81*	33	.....	.....	.....	33	.....	33	.....	33	33
1885-1886	61	.....	2.28*	41	.....	.....	.....	61	.....	61	.....	3.00	64
1886-1887	71	.....	3.68*	66	.....	.....	.....	71	.....	71	.....	2.42	72
1887-1888	100	.....	3.69*	66	.....	.....	.....	100	.....	100	.....	5.76	114
1888-1889	97	.....	4.80*	87	.....	.....	.....	97	.....	97	.....	3.58	99
1889-1890	100	.....	6.69*	110	.....	.....	.....	100	.....	100	.....	1.98	63
1890-1891	151	.....	9.07*	164	.....	.....	.....	151	.....	151	.....	3.92	124
1891-1892	91	.....	5.80*	106	.....	.....	.....	91	.....	91	.....	1.95	62
1892-1893	136	.....	6.32*	115	.....	.....	.....	136	.....	136	.....	3.74	118
1893-1894	57	.....	3.78*	61	.....	.....	.....	57	.....	57	.....	1.61	51
1894-1895	90	.....	3.78*	68	.....	.....	.....	90	.....	90	.....	2.91	92
1895-1896	15.93	.....	2.34*	42	.....	.....	.....	15.93	.....	15.93	.....	.60	19
1896-1897	16.61	.....	4.70*	85	.....	.....	.....	16.61	.....	16.61	.....	2.92	92
1897-1898	9.97	.....	1.69*	30	.....	.....	.....	9.97	.....	9.97	.....	.53	17
1898-1899	10.15	.....	3.10*	59	.....	.....	.....	10.15	.....	10.15	.....	1.66	52
1899-1900	11.35	.....	6.33*	61	.....	.....	.....	11.35	.....	11.35	.....	3.39	107
1900-1901	21.45	.....	10.97*	198	.....	.....	.....	21.45	.....	21.45	.....	2.39	75



TABLE 30.

1901-1902.....	11.97	69	5.29*	95	81	4.35	101	.....	81	2.90	92	87
1902-1903.....	9.12	53	2.80	50	49	2.36	55	.....	49	1.70	22	46
1903-1904.....	12.99	75	4.35	79	70	2.59	60	.....	70	1.20	38	65
1904-1905.....	17.25	100	7.70	139	128	4.05	94	.....	128	5.60	272	148
1905-1906.....	23.62	137	8.52	154	129	6.44	150	.....	129	2.80	88	122
1906-1907.....	.....	.....	6.51	117	.....	4.56	106	.....	5.09	117	148	122
1907-1908.....	.....	121	6.74	122	.....	5.30	123	.....	6.82	157	4.18	132
1908-1909.....	.....	125	6.51	117	.....	8.08	188	.....	5.03	116	4.85	154
1909-1910.....	.....	149	7.61	137	.....	5.08	118	.....	4.34	100	.....	129
1910-1911.....	.....	149	.....	149	.....	6.39	149	.....	5.34	123	.....	149
1911-1912.....	.....	85	.....	85	.....	3.65	85	.....	4.47	103	.....	85
1912-1913.....	.....	102	.....	102	.....	4.41	102	.....	4.76	109	.....	103
1913-1914.....	.....	278	.....	278	.....	11.97	278	.....	7.14	165	.....	278
1914-1915.....	.....	110	7.03	127	.....	3.83	89	.....	6.64	153	.....	110
1915-1916.....	.....	219	11.44	206	.....	10.14	236	.....	7.05	163	.....	219
1916-1917.....	.....	118	6.88	124	.....	4.77	111	.....	8.04	185	.....	118
1917-1918.....	.....	89	6.57	118	.....	2.23	52	.....	4.86	112	.....	89
1918-1919.....	.....	93	.....	93	.....	4.01	93	.....	3.74	86	.....	93
1919-1920.....	.....	71	.....	71	.....	11.15	73	.....	7.74	178	.....	71
1920-1921.....	.....	57	.....	57	.....	11.90	78	.....	2.46	57	.....	57
Years of record.....	11	.....	31	7	.....	30	.....	.....	16	24	.....	.....
Mean of record.....	14.58	.....	5.43	14.09	.....	4.87	.....	.....	5.70	3.01	.....	.....
50-year mean.....	17.30	.....	5.50	15.30	.....	4.30	.....	.....	4.30	3.20	.....	.....
County.....	Mono.	.....	Inyo.	Inyo.	.....	Inyo.	.....	.....	Inyo.	Inyo.	.....	.....
Elevation.....	8,248	.....	4,450	8,500	.....	3,957	.....	.....	3,728	3,620	.....	.....
Station reference number.....	261	.....	262	263	.....	264	.....	.....	265	266	.....	.....

Precipitation data are from U. S. Weather Bureau records unless otherwise noted.  
 \*From Water Supply Paper No. 81, page 426, table headed Bishop Creek, Elevation 4450.  
 †Streams within boundaries of Precipitation Division Z: Adobe Meadows Group.

TABLE 31.

TABLE 31. MISCELLANEOUS PRECIPITATION RECORDS, U. S. WEATHER BUREAU.

Data given in this table were not used in developing indices of seasonal wetness presented in Tables 5 to 30, inclusive. All other U. S. Weather Bureau records covering periods of ten years or over were used.

Season	Stations and precipitation in inches.																
	Tchama	Sacramento	San Francisco	Oakland	Berkeley	Point Reyes	Glenn Ranch	Barstow	Bagdad	Needles	Palm Springs	Indio	Mecca	Salton	Blythe	Sterling	Calxico
1871-72		23.65	30.78														
1872-73	11.05	14.19	15.66														
1873-74	11.60	22.02	24.73														
1874-75	5.36	17.70	20.56	21.57													
1875-76	21.19	26.30	31.19	28.50													
1876-77	10.57	9.19	11.04	12.33													
1877-78	29.94	24.86	35.18	32.33													
1878-79	9.35	17.85	24.44	23.47								1.90				1.89	
1879-80	15.05	26.47	26.66	30.84								4.65				1.34	
1880-81	10.40	26.57	29.86	31.76								28.79				1.74	
1881-82	12.82	16.51	16.14	18.13								19.45				2.71	
1882-83	18.23	18.11	20.12	17.22								3.04				1.65	
1883-84	18.20	24.78	32.38	31.10								5.60				3.11	
1884-85	11.22	16.58	18.10	17.95								.80				.89	
1885-86	23.14	32.27	33.05	32.21								.90				2.70	
1886-87	10.51	13.97	19.04	18.55								1.35				1.77	
1887-88	16.18	11.56	16.74	17.10	17.49							.95				.82	
1888-89	24.76	19.95	23.86	21.37	18.29							3.83				4.55	
1889-90	38.16	33.80	45.85	45.71	46.00							5.86				4.00	
1890-91	19.07	15.81	17.58	23.91	23.96	18.30						2.42				3.81	
1891-92	23.34	15.18	18.53	20.87	23.38	27.31						4.24				2.85	
1892-93	51.98	23.95	21.75	28.07	29.91	27.58						1.68				1.82	
1893-94	15.02	16.35	18.47	26.65	27.01	26.55	.95					1.63				.92	
1894-95	27.83	24.11	25.70	36.89	39.01	31.33						6.01				1.59	
1895-96	26.62	23.23	21.25	26.65	27.72	25.29						4.34				2.44	
												.57				.37	

TABLE 31.

1896-97.....	21.39	17.22	23.43	30.16	28.94	26.91	5.95	.....	4.07	0	1.29	3.87	.....	.01		
1897-98.....	10.63	10.51	9.38	13.68	14.40	17.18	.....	.....	1.57	1.69	2.50	.....	.....	T		
1898-99.....	18.42	15.04	16.87	23.02	27.66	20.18	.....	.....	2.19	2.03	1.70	.....	.....	.06		
1899-00.....	20.91	20.21	18.47	24.81	25.34	29.05	.....	.....	2.33	4.78	2.33	.....	.....	2.18		
1900-01.....	21.25	20.21	21.17	25.02	25.11	29.27	.....	.....	1.59	4.79	3.04	.....	.....	3.06		
1901-02.....	22.69	17.27	18.98	23.92	25.86	21.19	.....	.....	.....	1.50	.60	.....	.....	2.86		
1902-03.....	20.87	16.02	18.28	21.16	23.41	17.40	.....	.....	4.86	2.10	2.35	.....	.....	1.08		
1903-04.....	24.51	16.87	20.59	28.99	33.59	24.37	.....	.....	.88	.33	2.05	.....	.....	.25		
1904-05.....	30.57	21.98	23.45	27.61	29.35	26.55	.....	.....	8.64	9.33	5.18	.....	.....	3.77		
1905-06.....	28.79	23.93	20.42	23.38	27.75	19.91	.....	.....	7.01	5.70	4.70	.....	.....	2.80		
1906-07.....	21.99	24.04	26.17	25.97	31.87	22.79	.....	.....	.....	4.57	5.83	.....	.....	1.20		
1907-08.....	17.74	12.20	17.35	15.78	19.16	13.94	.....	.....	7.92	3.03	3.18	.....	.....	3.26		
1908-09.....	26.63	21.78	25.57	25.78	31.55	23.83	.....	.....	4.46	4.35	3.13	.....	.....	2.26		
1909-10.....	16.13	12.18	19.52	19.75	22.28	17.28	.....	.....	12.48	5.16	3.60	.....	.....	3.60		
1910-11.....	25.50	21.98	25.49	27.76	30.41	15.91	.....	.....	3.95	6.47	2.44	.....	.....	7.11		
1911-12.....	13.76	9.55	14.06	11.58	14.73	12.28	.....	.....	.....	4.05	2.62	.....	.....	3.47		
1912-13.....	18.31	8.03	11.97	11.89	15.63	11.82	.....	.....	3.35	4.05	2.62	.....	.....	7.85		
1913-14.....	30.82	20.44	29.60	27.89	33.37	21.30	.....	.....	4.60	5.38	3.01	.....	.....	.69		
1914-15.....	32.20	17.20	27.41	27.98	30.95	26.49	.....	.....	6.93	5.72	2.45	.....	.....	2.81		
1915-16.....	17.18	18.29	27.12	27.28	31.79	19.04	.....	.....	7.06	9.90	5.43	.....	.....	1.11		
1916-17.....	.....	12.95	15.78	20.05	20.08	12.75	.....	.....	3.24	.....	4.34	.....	.....	4.78		
1917-18.....	.....	10.61	11.48	14.21	13.94	10.81	.....	.....	.....	.....	3.56	.....	.....	1.10		
1918-19.....	.....	17.20	25.64	28.90	25.35	17.41	.....	.....	3.77	.....	1.77	.....	.....	3.31		
1919-20.....	.....	8.90	10.46	13.54	12.81	9.79	.....	.....	3.84	.....	1.51	.....	.....	1.87		
1920-21.....	.....	16.80	23.16	23.28	24.85	19.24	.....	.....	6.66	.....	1.09	.....	.....	1.63		
Years of record.....	44	72	72	47	34	38	24	18	29	26	43	16	18	9	43	16
Mean of record.....	30.53	18.72	22.49	23.84	25.72	20.98	4.26	2.17	4.28	4.50	2.91	3.22	2.66	4.34	2.32	2.94
Elevation.....	220	71	207	36	320	400	2105	784	477	584	-20	-185	293	268	255	0
Station No.....	14	94	125	126	127	143	268	269	270	271	272	273	274	275	276	277

TABLE 31.

TABLE 31—(Continued). MISCELLANEOUS PRECIPITATION RECORDS, U. S. WEATHER BUREAU.  
*Precipitation records prior to 1871-1872.*

Station.	Years and precipitation in inches.												
	1849-50	1850-51	1851-52	1852-53	1853-54	1854-55	1855-56	1856-57	1857-58	1858-59	1859-60		
Independence.....													
San Bernardino.....													
San Diego.....		8.41	9.48	11.03	9.77	13.56	9.89	4.76	7.54	6.61	6.58		
Walla Walla Creek.....						19.30		27.15					
Bowman's Dam.....													
Cisno.....													
Collax.....													
Emigrant Gap.....													
Fort Bidwell.....													
Nevada City.....													
Sacramento.....	36.00	4.71	17.98	36.35	20.06	18.62	13.76	10.46	14.99	16.04	22.06		
Rocklin.....													
Truckee.....													
La Grange.....													
Monterey.....	10.65		13.62										
San Francisco.....	33.10	7.42	18.46	35.26	23.87	23.76	21.66	19.91	21.81	22.22	22.27		
San Luis Obispo.....													
Santa Barbara.....													
Shingle Springs.....		17.18	32.50	47.55	30.45	19.50	18.60	24.76	18.36	32.31	27.29		
Stockton.....													
Independence.....	1860-61	1861-62	1862-63	1863-64	1864-65	1865-66	1866-67	1867-68	1868-69	1869-70	1870-71		
San Bernardino.....												4.13	
San Diego.....	7.90	15.64	3.87	5.14	8.45	12.82	13.73	11.23	11.68	5.48	13.94	5.17	
Walla Walla Creek.....	22.27	40.86	15.57	15.85	25.82	35.50	28.88	23.61	18.16	20.00	13.56	8.75	
Bowman's Dam.....													
Cisno.....													
Collax.....													
Emigrant Gap.....													
Fort Bidwell.....													
Nevada City.....													
Sacramento.....	16.18	36.10	11.59	7.79	54.46	59.26	81.56	31.40	8.43	32.78	22.81	30.83	
Rocklin.....													
Truckee.....													
La Grange.....													
Monterey.....													
San Francisco.....	19.72	49.27	23.74	10.08	13.10	15.93	34.02	38.84	21.35	19.31	14.11	11.83	
San Luis Obispo.....													
Santa Barbara.....													
Shingle Springs.....													
Stockton.....	27.05	79.24	21.83	24.27	34.43	36.98	50.29	25.22	15.77	10.27	8.91	7.64	6.73

TABLE 31—(Continued). MISCELLANEOUS PRECIPITATION RECORDS  
U. S. WEATHER BUREAU.

Records for season ending June 30, 1922.

No.	Station	Rainfall in inches	Index of seasonal wetness	No.	Station	Rainfall in inches	Index of seasonal wetness
247	Aguanga	24.17	175	264	Independence	4.37	101
186	Angiola	8.84	142	272	Indio	7.03	.....
128	Antioch	15.13	122	57	Inskip	82.21	93
227	Arrowhead Springs	39.49	174	196	Jolon	18.10	102
90	Auburn	37.87	112	253	Julian	51.28	160
269	Bagdad	4.63	.....	100	Kennedy Mine	27.63	89
188	Bakersfield	8.88	171	10	Kennett	48.31	73
242	Beaumont	32.89	178	141	Kentfield	31.86	68
241	Beaumont (near)	36.43	160	179	Kernville	10.49	105
127	Berkeley	25.46	99	194	King City	12.12	110
263	Bishop Creek	19.89	130	36	Kono Tayee (Lakeport)	21.76	92
83	Blue Canyon	71.10	110	36	Lakeport (Kono Tayee)	21.76	92
275	Blythe	6.54	.....	75	Lake Spaulding	75.91	109
29	Branscomb	59.33	72	63	La Porte	53.77	69
277	Calexico	6.84	.....	165	Le Grand	19.66	164
149	Campbell	15.43	96	175	Lemon Cove	16.45	117
260	Campo	33.41	164	152	Lick Observatory	28.65	95
66	Camptonville	65.35	88	120	Livermore	14.05	92
2	Cedarville	10.31	70	222	Los Angeles	19.66	129
45	Chico	22.52	95	148	Los Gatos	32.28	98
21	China Flat	37.65	81	226	Lytle Creek	53.51	149
223	Claremont	26.62	138	6	McCloud	35.29	71
32	Cloverdale	28.08	71	4	Madeline	inc.	.....
87	Colfax	51.57	107	51	Marysville	21.02	107
69	Colgate	44.48	99	273	Mecca	6.58	.....
49	Colusa	13.54	82	164	Merced	15.73	142
236	Corona	25.22	194	112	Merced Falls	22.11	136
23	Crescent City	78.07	106	251	Mesa Grande	45.57	150
254	Cuyamaca	59.58	154	98	Mill Creek No. 1	45.39	94
131	Davis	16.63	97	231	Mill Creek No. 2	34.01	148
72	Deer Creek	80.72	109	176	Milo	inc.	.....
114	Denair	15.45	158	106	Milton	24.63	119
55	De Sabla	50.93	74	102	Mokelumne Hill	30.59	99
68	Dobbins	42.89	96	17	Montague	9.76	84
65	Downieville	71.55	105	142	Mt. Tamalpais	inc.	.....
40	East Park	13.83	80	217	Mt. Wilson	60.51	190
189	Edison	10.28	109	138	Napa	19.75	84
257	El Cajon	25.86	189	270	Needles	9.62	.....
101	Electra	31.18	95	249	Nellie	inc.	.....
240	Elsinore	26.22	194	71	Nevada City	52.42	100
82	Emigrant Gap	44.13	81	161	Newman	7.98	78
252	Escondido	28.89	174	73	North Bloomfield	53.23	97
24	Eureka	34.76	82	166	North Fork	37.76	105
95	Folsom	23.24	95	115	Oakdale	15.10	108
76	Fordyce Dam	70.19	103	126	Oakland	23.31	98
1	Fort Bidwell	14.77	86	209	Ojai Valley	26.91	131
27	Fort Bragg	30.30	74	43	Orland	13.79	79
34	Fort Ross	29.94	56	19	Orleans	39.82	85
169	Fresno	10.83	113	53	Oroville	25.46	92
89	Georgetown	56.22	98	204	Ozena	15.09	95
181	Glennville	19.35	91	197	Parkfield	16.81	100
70	Grass Valley	56.90	108	218	Pasadena	29.61	150
73	Hanford	9.94	117	199	Paso Robles	21.81	134
67	Head Dam	inc.	.....	137	Peachland	28.79	69
33	Healdsburg	29.21	71	140	Petaluma	18.94	78
35	Helen Mine	55.68	67	97	Placerville	43.56	103
159	Hollister	18.53	141	258	Point Loma	22.26	208
15	Hot Springs	25.01	107	143	Point Reyes	15.09	.....
39	Hullville	41.68	80	184	Porterville	13.32	112

TABLE 31—(Concluded). MISCELLANEOUS PRECIPITATION RECORDS,  
U. S. WEATHER BUREAU.

Records for season ending June 30, 1922.

No.	Station	Rainfall in inches	Index of seasonal wetness	No.	Station	Rainfall in inches	Index of seasonal wetness
195	Priest Valley.....	25.46	125	230	Seven Oaks.....	52.80	191
61	Quincy.....	41.38	98	64	Sierraville.....	20.89	80
13	Red Bluff.....	16.70	68	7	Sisson.....	28.00	80
12	Redding.....	inc.		107	Sonora.....	33.85	104
233	Redlands.....	25.50	173	191	Spreckels.....	16.64	126
171	Redley.....	16.93	147	177	Springville.....	33.09	97
129	Rio Vista.....	16.60	96	276	Sterling.....	4.74	
234	Riverside.....	19.75	185	118	Stockton.....	14.66	103
93	Rocklin.....	23.54	105	167	Storey.....	14.52	154
94	Sacramento.....	14.16	76	80	Summit.....	53.92	116
135	St. Helena.....	24.96	67	79	Tamarack.....	44.23	89
158	Salinas.....	18.79	134	239	Tustin.....	17.51	135
228	San Bernardino.....	27.75	172	31	Ukiah.....	28.74	79
259	San Diego.....	18.65	187	26	Upper Mattole.....	61.45	73
125	San Francisco.....	19.91	90	174	Visalia.....	11.26	117
244	San Jacinto.....	25.23	188	248	Warner Springs.....	38.23	216
150	San Jose.....	14.77	98	187	Wasco.....	9.59	177
201	San Luis Obispo.....	23.36	108	154	Watsonville.....	23.94	113
238	Santa Ana.....	18.15	144	22	Weaverville.....	25.48	65
206	Santa Barbara.....	19.22	102	56	West Branch.....	68.52	86
151	Santa Clara.....	15.86	100	99	West Point.....	39.23	98
156	Santa Cruz.....	28.73	106	41	Willows.....	13.44	81
202	Santa Maria.....	16.88	119	110	Yosemite.....	32.65	93
211	Santa Monica.....	16.71	116	16	Yreka.....	14.61	81
136	Santa Rosa.....	23.99	82				

inc.: record incomplete.

NOTE.—These precipitation records were received too late to be incorporated in the calculations for 50-year means and seasonal indices of wetness.

TABLE 32. DRAINAGE AREAS IN CALIFORNIA.

The area in square miles of all water-producing drainage basins in California, is given in this table. Determinations were made from topographic maps of United States Geological Survey by planimeter and checked in their totals to computed areas between meridians and parallels of latitude. For areas not mapped by the United States Geological Survey, the maps of the United States Forest Service and various state and county maps were used.

All streams are grouped in geographic order within the six divisions of the State:

**Sacramento Basin.**  
**San Joaquin Basin.**  
**San Francisco Bay Basin.**  
**North Pacific Basins.**  
**South Pacific Basins.**  
**Great Basin.**

The one hundred and forty major streams or groups of smaller streams used in developing run-off curves (Plates XVIII to LIII, inclusive), in this report, are listed to the extreme left in the table and above each name are listed, indented to the right, the tributaries and the drainage area of each. Branches of the tributaries are listed, with their drainage areas, indented still further to the right, and above the name of the tributary. All branches and tributaries are listed in order of their confluence beginning at the headwaters and the areas are measured to the points of confluence. Tables Nos. 34 to 173, inclusive, describe specifically the lower limit of the areas on the main streams which are measured to the head of the main agricultural area.

The word "Direct" is used in this table referring to the area draining directly into the streams between points of confluence of branches or tributaries or between a point of confluence and the lower limit to which the drainage area was measured.

STREAM.	DRAINAGE AREA IN SQUARE MILES.	
<b>SACRAMENTO BASIN.</b>		
Wagon Valley Creek.....	48.7	
Direct.....	125.5	
Soda Creek.....	20.8	
Direct.....	4.6	
Castle Creek.....	57.8	
Direct.....	110.6	
Slate Creek.....	26.8	
Direct.....	140.3	
Direct, below Baird and Ydalpom Gages.....	33.0	
Sacramento River (Upper) to junction with Pit River.....		568.1
South Fork of Pit River.....	632.6	
North Fork of Pit River.....	223.3	
Rattlesnake Creek.....	182.7	
Direct.....	1,400.5	
Ash Creek.....	492.7	
Direct.....	439.5	
Beaver Creek.....	144.0	
Fall River.....	600.5	
Pit River at junction with Fall River.....		4,115.8
Direct.....	92.5	
Hat Creek.....	388.0	
Direct.....	26.4	
Burney Creek.....	165.8	
Direct.....	99.7	
Nelson Creek.....	35.0	
Kosk Creek.....	64.6	

TABLE 32—(Continued). DRAINAGE AREAS IN CALIFORNIA.

STREAM.	DRAINAGE AREA IN SQUARE MILES.	
Direct .....	76.7	
Hatchet Creek.....	52.9	
Direct.....	.8	
Montgomery Creek.....	49.0	
Direct.....	61.7	
Squaw Creek.....	117.2	
Pit River at Ydalpom.....		5,346.1
Direct.....	465.3	
Squaw Creek.....	111.7	
Direct.....	92.2	
McCloud River at Baird.....		669.2
Churn Creek.....	45.8	
Stillwater Creek.....	54.5	
Churn Creek Group.....		100.3
South Fork of Cow Creek.....	95.3	
North Fork of Cow Creek.....	83.0	
Direct.....	9.3	
Clover Creek.....	48.5	
Direct.....	1.1	
Oak Run.....	40.6	
Direct.....	1.7	
Little Cow Creek.....	103.2	
Dry Creek.....	23.8	
Direct.....	37.1	
Cow Creek.....		443.6
Ash Creek.....	14.1	
Bear Creek.....	123.1	
Bear Creek Group.....		137.2
South Fork of Battle Creek.....	130.5	
Direct.....	236.0	
Battle Creek.....		366.5
Ink's Creek.....		34.2
Payne's Creek.....		80.4
Backbone Creek Group.....		178.0
Clear Creek.....		251.0
Direct.....	78.0	
Beegum Creek.....	117.0	
Direct.....	66.4	
Middle Fork of Cottonwood Creek.....	261.4	
North Fork of Cottonwood Creek.....	146.3	
Dry Creek.....	391.4	
Direct and Hooker Creek.....	138.2	
Cottonwood Creek.....		937.3
Direct.....		146.3
Sacramento River at Red Bluff.....		9,258.2
Sycamore Hollow.....		15.8
Sheep Hollow.....		1.9
Grizzly Hollow.....		2.3
Mud Creek.....		21.3
Rock Creek.....		36.4
Pine Creek.....		25.6
Zimmershed Creek.....		13.0
Camel Creek.....		14.2
Rattlesnake Creek.....		5.2
Singer Creek.....		17.0
Brush Creek.....		18.2
Rio de Los Berrendos.....		46.2
Mill Creek.....		216.4
Deer Creek.....		205.7
Antelope Creek.....		233.6
Big Chico Creek.....		72.3
Little Chico Creek.....		25.8
Mill Creek Group.....		970.9
Direct.....	75.2	
East and West forks.....	20.1	
Direct.....	57.5	
Butte Creek.....		152.8
Clear Creek, Gold Run, Chambers Ravine, etc.....		98.1
Butte Creek Group.....		250.9
Last Chance Creek.....	100.9	
Smithneek Creek.....	53.7	
Hamlin Creek.....	111.9	
Valley area.....	276.4	
Sierra Valley.....		542.9
Grizzly Creek.....		52.8
Direct.....		43.0
Willow Creek.....		16.7
Direct.....		6
Mohawk Creek.....		32.7



TABLE 32—(Continued). DRAINAGE AREAS IN CALIFORNIA.

STREAM.	DRAINAGE AREA IN SQUARE MILES.	
Direct .....	113.2	
Long Valley Creek .....	25.2	
Direct .....	23.6	
Nelson Creek .....	45.3	
Direct .....	61.0	
Bear Creek .....	21.0	
Direct .....	51.1	
Little North Fork .....	46.3	
Direct .....	.5	
South Branch .....	33.5	
Direct .....	13.6	
Fall River .....	34.8	
Direct .....	39.7	
Middle Fork of Feather River .....		1,197.5
Direct .....	52.3	
Lost Creek .....	33.3	
Direct .....	23.9	
Sucker Run .....	20.2	
Direct .....	23.5	
South Fork of Feather River .....		153.2
Direct .....	7.1	
Canyon Creek .....	17.3	
Direct .....	1.3	
Feather River, South Fork to North Fork .....		25.7
Feather River above junction with North Fork .....		1,376.4
Mountain Meadows .....	170.5	
Warner Creek .....	121.3	
Rock Creek .....	31.9	
Big Meadows .....	173.4	
Direct .....	20.7	
Butt Valley .....	80.4	
Direct .....	27.2	
Direct .....	106.6	
Squaw Creek .....	204.5	
Red Clover Creek .....	122.9	
Direct .....	48.1	
Little Grizzly Creek .....	35.4	
Direct .....	22.6	
Lights Creek .....	103.6	
Direct .....	102.7	
Spanish Creek: Direct, 29.4; Rock Creek, 35.3; Direct, 31.2; Spring Garden Creek, 73.3; Direct, 33.8. Total..	203.0	
Direct .....	71.9	
Indian Creek .....		1,021.3
Direct .....	2.8	
Yellow Creek .....	85.4	
Direct .....	53.2	
Bucks Creek .....	45.2	
Direct .....	4.0	
Pine Creek .....	32.5	
Direct .....	5.5	
Grizzly Creek .....	31.0	
Direct .....	71.2	
Berry Creek .....	19.9	
Direct .....	6.4	
French Creek .....		40.4
Direct .....	53.4	
Kimshaw Creek .....	26.7	
Direct .....	13.9	
Little West Branch .....	13.2	
Direct .....	12.5	
Concow Creek .....	24.2	
Direct .....	24.1	
West Branch Feather River .....		168.0
Direct .....	19.0	
North Fork of Feather River .....		2,231.2
Direct .....		19.3
Feather River at Oroville .....		3,626.9
North Honcut Creek .....		63.6
South Honcut Creek .....		87.1
Wyman Creek .....		29.7
Wyandotte Creek .....		27.4
Dry Creek .....		105.9
Honcut Creek Group .....		313.7

TABLE 32—(Continued). DRAINAGE AREAS IN CALIFORNIA.

STREAM.	DRAINAGE AREA IN SQUARE MILES.	
North Fork of North Fork.....	51.8	
South Fork of North Fork.....	33.5	
Direct.....	52.3	
Direct.....	17.8	
Middle Fork of North Fork..	26.6	
Direct.....	.9	
East Fork of North Fork....	25.5	
Direct.....	.7	
West Fork of North Fork.....	71.5	
Direct.....	17.4	
Goodyear's Creek.....	12.5	
Direct.....	14.8	
Fiddle Creek.....	11.1	
Direct.....	13.9	
Canyon Creek.....	61.6	
Slate Creek.....	63.6	
Direct.....	22.8	
Woodville Creek.....	10.4	
Direct.....	14.0	
Willow Creek.....	19.1	
Direct.....	15.5	
North Fork of Yuba River.....		485.8
Direct.....	119.3	
Kanaka Creek.....	20.5	
Direct.....	13.7	
Grizzly Creek.....	9.0	
Direct.....	6.0	
Oregon Creek.....	36.0	
Direct.....	13.4	
Middle Fork of Yuba River.....		217.9
Yuba River at junction of Middle and North Forks.....		703.7
Direct.....		30.8
Direct.....	60.6	
Fordyce Creek.....	53.0	
Direct.....	12.5	
Fall Creek.....	11.1	
Direct.....	9.2	
Canyon Creek.....	51.6	
Direct.....	12.6	
Poorman Creek.....	20.5	
Direct.....	58.1	
Roek Creek.....	13.6	
Direct.....	14.6	
Shady Creek.....	16.6	
Direct.....	19.8	
South Fork of Yuba River.....		353.8
Direct.....		21.5
Direct.....	55.9	
Squirrel Creek.....	24.8	
Direct.....	8.7	
Deer Creek.....		80.4
Direct.....		1.3
Yuba River at Smartsville gage.....		1,200.5
Dry Creek.....		79.2
Direct.....		29.2
Steep Hollow.....		7.2
Direct.....		21.1
Greenhorn Creek.....		43.4
Direct.....		49.0
Direct.....	15.8	
Little South Fork.....		3.2
Direct.....	57.5	
Wolf Creek.....		76.5
Direct.....	35.5	
Bear River near Von Trent.....		261.9
Coon Creek.....		78.9
Auburn Ravine.....		59.1
Antelope Creek.....		71.8
Coon Creek Group.....		209.8
Direct.....	75.8	
Granite Creek.....	18.0	
Direct.....	3.1	
Big Valley.....	8.6	
Direct.....	37.2	
North Fork of North Fork.....	51.7	

TABLE 32—(Continued). DRAINAGE AREAS IN CALIFORNIA.

STREAM.	DRAINAGE AREA IN SQUARE MILES.	
Direct	46.5	
Indian Creek	9.6	
Direct	2.3	
Shittail Canyon	51.8	
Direct	41.3	
North Fork of American River		348.9
Direct	56.7	
Duncan Creek	19.5	
Direct	31.6	
Direct	67.0	
Five Lakes Creek	29.1	
Direct	42.2	
Little South Fork of Rubicon	56.4	
Direct	26.0	
Grizzly Creek	10.5	
Direct	4.7	
Pilot Creek	31.5	
Direct	1.6	
Long Canyon	44.1	
Direct	4.7	
Rubicon River		317.8
North Fork of Middle Fork		91.0
Direct	33.1	
Otter Creek		17.7
Direct	52.0	
Middle Fork of American River		619.4
American River at junction of North and Middle Forks		968.3
Direct		42.6
Direct	81.9	
Silver Fork	112.8	
Direct	10.8	
Alder Creek	23.6	
Direct	48.0	
South Fork	45.5	
Middle Fork	40.1	
North Fork	40.8	
Little Silver Creek	15.0	
Direct	33.7	
Silver Creek		175.1
Direct	3.6	
Brush Creek		11.9
Direct	6.0	
Slab Creek		21.5
Direct	24.1	
Rock Creek		75.0
Direct	18.8	
Irish Creek		21.8
Direct	18.3	
Greenwood Creek		24.6
Direct	.8	
Hastings Creek		18.7
Direct	12.3	
Direct	37.4	
Hangtown Creek	9.5	
Direct	21.0	
Dry Creek (White Oak)	27.1	
Direct	8.2	
Webber Creek		103.2
Direct	50.0	
South Fork of American River		862.8
Direct to Folsom Bridge		3.6
Direct to gage at Fair Oaks		41.2
American River at Fair Oaks		1,918.5
Reeds Creek		20.8
Red Bank Creek		87.9
Red Bank Creek Group		108.7
Elder Creek		128.1
Thomes Creek		242.6
Rice Creek		45.1
Elder Creek Group		413.8
Direct		407.8
Grindstone Creek		167.6
Direct		37.2
Freshwater Creek		97.3
Stony Creek		709.9
Hambricht Creek		6.1
Willow Creek		32.1

TABLE 32—(Continued). DRAINAGE AREAS IN CALIFORNIA.

STREAM.	DRAINAGE AREA IN SQUARE MILES.
Logan Creek.....	85.1
Hunters Creek.....	11.6
Funks Creek.....	46.9
Stone Corral.....	32.2
Lurline Canal.....	8.6
Glenn Valley Slough.....	16.6
Freshwater Creek.....	40.6
Salt Creek.....	11.0
Spring Creek.....	23.5
Cortina Creek.....	34.6
Sand Creek.....	24.9
Direct.....	20.4
Willow Creek Group.....	394.2
Cache Creek at Yolo.....	1,195.0
Direct.....	519.0
Capell Creek.....	39.4
Direct.....	86.5
Direct to Winters gage.....	9.7
Putah Creek near Winters.....	654.6
<b>SAN JOAQUIN BASIN.</b>	
Little Panoche Creek.....	143.0
Small foothill streams.....	100.8
Los Banos Creek.....	187.0
San Luis Creek.....	101.2
Small foothill streams.....	136.1
Orestimba Creek.....	116.9
Small foothill streams.....	241.7
Buenos Aires Creek.....	82.3
Small foothill streams.....	125.6
Marsh Creek.....	54.3
Small streams to Kirker Creek.....	50.9
Orestimba Creek Group.....	1,339.8
Cantua Creek Group.....	208.0
Direct.....	189.7
Silver Creek.....	5.1
Direct.....	100.3
Panoche Creek.....	295.1
Los Gatos Creek.....	119.0
Tejon Creek.....	114.8
Foothills to Buena Vista Lake.....	400.2
Foothills near Buena Vista Lake.....	152.5
Foothills, Buena Vista Lake to Waltham Creek.....	560.0
Waltham Creek.....	113.8
Tejon Creek Group.....	1,341.3
Direct.....	81.1
Indian Creek.....	57.1
Direct.....	62.9
Direct.....	91.4
Tweedder Creek.....	17.9
Direct.....	26.9
Tehachapi Creek.....	136.2
Direct.....	31.3
Direct to mouth of Walker Basin.....	65.4
Direct to Caliente Creek.....	37.3
Walker Basin Creek.....	102.7
Caliente Creek.....	471.3
Direct.....	40.1
Kern-Kaweah River.....	25.8
Direct.....	64.8
Roek Creek.....	37.1
Direct.....	22.6
Big Arroyo.....	49.0
Direct.....	39.4
Golden Trout.....	59.9
Direct.....	50.4
Ninemile Creeks.....	49.3
Direct.....	31.9
Rattlesnake Creek.....	55.3
Direct.....	6.6
Little Kern River.....	130.8
Direct.....	5.0
Freeman Creek.....	20.2
Direct.....	13.1
Durwood Creek.....	14.3

TABLE 32—(Continued). DRAINAGE AREAS IN CALIFORNIA.

STREAM.	DRAINAGE AREA IN SQUARE MILES.	
Direct.....		.2
Peppermint Creek.....		16.0
Direct.....		72.7
Brush Creek.....		30.6
Direct.....		36.6
Salmon Creek.....		25.8
Direct.....		49.0
Cannell Creek.....		17.8
Direct.....		44.4
Cowell Creek.....		15.0
Direct.....		45.2
Direct.....	159.2	
Direct.....	30.3	
Lost Creek.....	12.2	
Direct.....	51.3	
Big Pine Meadow.....	15.7	
Direct.....	3.5	
Fish Creek.....	53.2	
Direct.....	.6	
Trout Creek.....	54.5	
Direct.....	47.0	
Manter Creek.....	25.6	
Direct.....	.4	
Taylor Creek.....	19.3	
Direct.....	1.4	
Long Valley.....	19.2	
Direct.....	41.6	
Chimney Creek.....	137.8	
Direct.....	57.6	
Direct.....	101.9	
Staff Creek.....	18.4	
Direct.....	4.5	
Cane Canyon.....	10.2	
Direct.....	24.4	
Kelso Creek.....	159.4	
Direct.....	94.4	
South Fork of Kern River.....		984.2
Kern River at junction with South Fork.....		2,053.1
Direct.....		26.9
Erskine Creek.....		42.6
Direct to Boreli gage.....		24.8
Direct.....		121.5
Lucas Creek.....		8.1
Direct.....		32.5
Cottonwood Creek.....		51.7
Direct.....		48.7
Kern River near Bakersfield.....		2,409.9
Poso Creek.....		289.2
Rag Gulch.....		148.8
White River.....		138.0
Poso Creek Group.....		576.0
Direct.....	67.4	
Bear Creek.....	25.7	
Direct.....	5.4	
North Fork Tule River.....		98.5
North Fork of Middle Fork.....	42.2	
South Fork of Middle Fork.....	43.8	
Direct.....	24.8	
Middle Fork of Tule River.....		110.8
Direct.....	60.9	
South Fork of Tule River.....		119.4
Tule River near Porterville.....		389.6
Direct.....	10.9	
North Fork.....	17.6	
Direct.....	81.7	
Deer Creek.....		110.2
Lewis Creek.....		22.2
Yokohl Creek.....		50.4
Horse Creek.....		25.3
Yokohl Creek Group.....		97.9
Direct.....	103.4	
Marble Fork.....	51.6	
Direct.....	12.9	
Middle Fork of Kaweah River.....		167.9
East Fork.....		96.3
Direct.....		17.5

TABLE 32—(Continued). DRAINAGE AREAS IN CALIFORNIA.

STREAM.	DRAINAGE AREA IN SQUARE MILES.	
North Fork.....	136.3	
Direct.....	5.4	
South Fork.....	89.6	
Direct.....	1.5	
Kaweah River near Three Rivers.....		514.5
Limekiln Creek.....	76.3	
Rattlesnake Creek.....	53.7	
Sand and Stokes Creeks.....	44.0	
Greasy Creek.....	10.1	
Wa-to-ke Creek.....	16.6	
Limekiln Creek Group.....		200.7
Direct.....	29.5	
Palisade Creek.....	26.0	
Direct.....	43.1	
Goddard Creek.....	42.2	
Direct.....	91.0	
Crown Creek.....	49.5	
Direct.....	37.8	
Middle Fork of Kings River.....		319.1
Direct.....	54.5	
Woods Creek.....	55.0	
Direct.....	27.4	
Bubbs Creek.....	69.5	
Direct.....	27.0	
Roaring River.....	115.2	
Direct.....	18.6	
Lewis Creek.....	17.5	
Direct.....	12.6	
Grizzly Creek.....	10.4	
Direct.....	10.3	
Boulder Creek.....	46.9	
Direct.....	10.1	
South Fork of Kings River.....		475.0
Kings River at junction of South and Middle Forks.....		794.1
Tennile Creek.....	38.9	
Direct.....	53.7	
Converse Creek.....	10.1	
Mill Flat Creek.....	49.4	
Direct.....	6.6	
Direct.....	99.8	
Helms Creek.....	44.3	
Direct.....	59.1	
Rancheria Creek.....	26.6	
Direct.....	24.5	
Dinkey Creek.....	127.3	
Direct.....	4.4	
North Fork of Kings River.....		386.0
Kings River at junction with North Fork.....		1,338.8
Direct.....		31.1
Direct to Soaproot.....	18.6	
Direct.....	11.9	
Rush Creek.....	16.7	
Direct.....	24.5	
Big Creek.....		71.7
Direct.....	1.5	
Sycamore Creek.....		64.1
Direct.....	7.7	
Lefever Creek.....		9.1
Direct.....		21.9
Direct to damsite.....	80.8	
Direct.....	48.8	
Mill Creek.....		129.6
Direct.....		18.1
Kings River near Sanger.....		1,693.6
Dry Creek.....		47.7
Direct.....	77.9	
Fish and Silver Creeks.....	89.3	
Direct.....	13.9	
North Fork of Middle Fork.....	65.3	
Direct.....	17.9	
Granite Creek.....	64.7	
Middle Fork of San Joaquin River.....		329.0
Direct.....	65.0	
Piute.....	55.4	
Direct.....	45.4	
Direct.....	32.2	

TABLE 32—(Continued). DRAINAGE AREAS IN CALIFORNIA.

STREAM.	DRAINAGE AREA IN SQUARE MILES.	
Bear Creek.....	55.2	
Direct.....	23.6	
Direct.....	42.6	
North Fork.....	9.8	
Direct.....	48.3	
Mono Creek.....	100.7	
Direct.....	87.2	
South Fork of San Joaquin River.....		464.7
San Joaquin River at junction of Middle and South Forks.....		793.7
Direct.....		56.2
Kaiser Creek.....		47.0
Direct.....		3.7
Chiquito Creek.....		94.4
Direct.....		23.8
Rock Creek.....		16.6
Direct.....		27.5
Direct to Huntington Lake.....	79.0	
Direct.....	5.0	
Pitman Creek.....	23.5	
Direct.....	24.4	
Big Creek.....		131.9
Direct.....		52.4
Jose Creek.....		28.9
Direct.....		19.7
Direct to Crane Valley.....	52.3	
Direct.....	9.2	
South Fork of North Fork.....	38.3	
Direct.....	5.8	
Whiskey Creek.....	23.0	
Direct.....	2.2	
North Fork of San Joaquin River.....		130.8
Direct.....		101.7
Little Fine Gold Creek.....		90.4
Direct.....		11.9
San Joaquin River near Friant.....		1,630.6
Cottonwood Creek.....		28.5
Lewis Fork.....		16.7
Nelder Fork.....		14.1
Direct.....		30.7
North Fork.....		32.5
Direct to Crook Creek.....		8.9
Direct.....		51.1
Coarse Gold.....		64.6
Direct.....		17.1
Cottonwood Creek.....		21.3
Direct.....		12.5
Fresno River.....		269.5
Daulton Creek Group.....		66.4
West Fork.....		55.9
Middle Fork.....		13.1
Direct.....		1.8
Direct.....	26.1	
De Long Creek.....	17.3	
Direct.....	17.8	
East Fork of Chowchilla River.....		61.2
Direct.....		9.1
Striped Rock Creek.....		23.7
Direct.....		37.1
Chapman Creek.....		22.9
Direct.....		13.2
Chowchilla River.....		238.0
Dutchman Creek Group.....		72.0
Mariposa Creek.....		102.7
Owens Creek.....		66.2
Bear Creek.....		71.3
Burns Creek Group.....		170.9
Direct.....		51.4
McClure Fork.....		19.6
Direct.....		3.7
Echo Creek.....		20.2
Direct.....		23.3
Direct.....	10.9	
Clark Fork.....	10.5	
Direct.....	40.6	
Illilouette Creek.....		62.0
Direct.....		1.5

TABLE 32—(Continued). DRAINAGE AREAS IN CALIFORNIA.

STREAM.	DRAINAGE AREA IN SQUARE MILES.	
Tenaya Creek.....	46.9	
Direct.....	8.4	
Yosemite Creek.....	43.6	
Direct.....	13.2	
Bridal Veil Creek.....	24.6	
Direct.....	9.5	
Cascade Creek.....	13.3	
Direct.....	30.2	
Crane Creek.....	18.5	
Direct.....	9.1	
Moss Creek.....	10.6	
Direct.....	9.7	
Direct.....	72.3	
Chilnaulna Creek.....	18.0	
Direct.....	55.3	
Alder Creek.....	15.2	
Direct.....	36.7	
Devil Gulch.....	29.4	
Direct.....	13.2	
South Fork of Merced River.....	240.1	
Merced River at junction with South Fork.....		659.4
Direct.....	1.2	
Ned Gulch.....	12.7	
Direct.....	26.7	
Bear Creek.....	22.5	
Direct.....	29.5	
Direct.....	35.7	
Smith Creek.....	21.8	
Direct.....	6.2	
Bull Meadow.....	32.5	
Direct.....	27.1	
North Fork of Merced River.....	123.3	
Direct.....	62.2	
Maxwell Creek.....	40.6	
Direct.....	10.8	
Piney Creek.....	11.3	
Direct.....	20.2	
Cotton Creek.....	14.2	
Direct.....	19.8	
Merced River near Merced Falls.....		1,054.4
Lyell Fork.....	43.2	
Dana Fork.....	31.0	
Direct.....	27.0	
Connors Creek.....	22.6	
Direct.....	5.4	
Return Creek.....	58.4	
Direct.....	5.8	
Cathedral Creek.....	20.7	
Direct.....	103.3	
Rancheria Creek.....	87.2	
Direct.....	54.6	
Direct.....	30.9	
Direct.....	126.3	
Eleanor Creek.....	90.5	
Direct.....	16.8	
Cherry Creek.....	233.6	
Direct.....	1.2	
Jawbone Creek.....	22.7	
Direct.....	19.8	
Direct.....	87.4	
Middle Fork.....	71.6	
Direct.....	4.1	
South Fork of Tuolumne River.....	163.1	
Tuolumne River at junction with South Fork.....		930.5
Direct.....	8.4	
Clavey River.....	153.8	
Direct.....	25.3	
Big Creek.....	30.2	
Direct.....	3.0	
Direct.....	81.1	
Hunter Creek.....	15.5	
Direct.....	3.2	
North Fork of Tuolumne River.....	99.8	
Direct.....	1.5	
Turnback Creek.....	17.9	
Direct.....	35.7	
Moccasin Creek.....	36.6	
Direct.....	5.8	



TABLE 32—(Continued). DRAINAGE AREAS IN CALIFORNIA.

STREAM.	DRAINAGE AREA IN SQUARE MILES.	
Direct .....	46.9	
Sullivan Creek .....	37.7	
Curtis Creek .....	21.8	
Direct .....	88.4	
Woods Creek .....		194.8
Tuolumne River near La Grange .....		1,543.3
Martells Creek Group .....		121.9
Wildcat Creek .....	16.9	
Dry Creek .....	41.8	
Wildcat Creek Group .....		58.7
Direct .....	48.7	
Highland Creek .....	62.3	
Direct .....	59.3	
Beaver Creek .....	32.7	
Direct .....	16.3	
McCormick Creek .....	50.5	
Direct .....	3.1	
North Fork of Stanislaus River .....		272.0
Direct .....	116.9	
Clark Fork .....	64.9	
Direct .....	167.6	
Middle Fork of Stanislaus River .....		349.4
Stanislaus River at junction of Forks .....		622.3
Direct .....	10.4	
Knight Creek .....	42.7	
Direct .....	5.7	
South Fork of Stanislaus River .....		108.4
Direct .....	44.0	
Angels Creek .....	37.0	
Direct .....	45.9	
Green Spring Run .....	18.2	
Direct .....	.5	
Black Creek .....	35.4	
Direct to Goodwin Dam .....	4.0	
Direct to Knight's Ferry .....	8.5	
Stanislaus River at Knight's Ferry .....		983.0
Littlejohns Creek .....		40.5
Direct .....	8.6	
Cherokee Creek .....	18.8	
Direct .....	2.2	
San Domingo Creek .....	32.8	
Direct .....	6.0	
San Antonio Creek .....	48.8	
Direct .....	1.9	
Calaveras Creek .....	54.5	
Direct .....	6.6	
South Fork of Calaveras River .....		180.2
Direct .....	12.2	
Esperanza Creek .....	17.0	
Direct .....	9.2	
Jesus Maria Creek .....	35.5	
Direct .....	23.0	
Murray Creek .....	28.0	
Direct .....	1.1	
North Fork of Calaveras .....		126.0
Direct .....	27.4	
Bear Creek .....	28.5	
Direct .....	1.8	
Cosgrove Creek .....	21.2	
Direct .....	9.0	
Calaveras River at Jenny Lind .....		394.1
Direct .....	84.8	
Summit Creek .....	20.7	
Direct .....	50.0	
Cold Creek .....	18.7	
Direct .....	37.1	
Bear River .....	52.0	
Direct .....	9.1	
Blue Creek .....	29.0	
Direct .....	4.2	
Panther Creek .....	18.4	
Direct .....	45.9	
North Fork of Mokelumne River .....		369.9
Direct .....	29.0	
North Fork of Middle Fork .....	25.4	
Direct .....	20.3	

TABLE 32—(Continued). DRAINAGE AREAS IN CALIFORNIA.

STREAM.	DRAINAGE AREA IN SQUARE MILES.	
Middle Fork of Mokelumne River .....	74.7	
Direct between Middle and North Forks .....	2.3	
South Fork of Mokelumne River .....	76.1	
Direct .....	109.1	
Mokelumne River near Clement .....		632.1
Willow Creek .....	25.4	
Direct .....	84.3	
Sutter Creek .....	85.6	
Direct .....	90.0	
Dry Creek .....		259.9
Sutter Creek Group .....		285.3
South Fork of Cosumnes River .....		67.8
Direct .....	51.2	
North Fork of Middle Fork .....	21.5	
Direct .....	.7	
Sopiago Creek .....	9.3	
Direct .....	51.0	
Middle Fork of Cosumnes River .....		133.7
Direct .....		1.4
Direct .....	42.9	
Steeley Fork .....	25.1	
Direct .....	13.7	
Direct .....	39.6	
Sly Park Creek .....	19.0	
Direct .....	4.0	
Camp Creek .....	62.6	
Direct .....	.9	
Clear Creek .....	11.2	
Direct .....	19.2	
Martinez Creek .....	19.8	
Direct .....	14.1	
North Fork of Cosumnes River .....		209.5
Big Indian Creek .....		21.9
Direct .....		24.8
Big Canyon Creek .....		43.6
Direct .....		30.9
Cosumnes River at Michigan Bar .....		533.6
SAN FRANCISCO BAY BASINS.		
Petaluma Creek Group .....		139.0
Sonoma Creek Tributaries .....		78.3
Carneros Creek .....	5.6	
Mill Creek .....	12.9	
Dry Creek .....	17.6	
Sulphur Creek .....	4.2	
Conn Creek .....	40.7	
Rector Creek .....	11.5	
Milliken Creek .....	13.5	
Sulphur Springs Creek .....	7.2	
Intervening foothill drainage .....	112.8	
Napa River Tributaries .....		226.0
Suisun Creek Group .....		124.6
Mount Diablo Creek above Clayton .....	15.7	
Walnut Creek above Walnut Creek .....	78.4	
Rodeo Creek .....	9.7	
Pinole Creek .....	14.0	
Franklin Creek .....	14.2	
Foothill areas—Kirken to Pinole Creek .....	67.5	
Mount Diablo Creek Group .....		199.5
San Pablo Creek .....		40.6
San Leandro Creek .....		43.6
Small streams—Pinole to San Pablo .....	8.5	
Small streams—San Pablo to San Lorenzo .....	43.6	
Small streams—San Leandro to Alameda .....	30.8	
Claremont Creek Group .....		82.9
San Lorenzo Creek .....		37.9
Direct above Sunol Valley .....	150.1	
San Antonio Creek .....	39.3	
Sinbad Canyon .....	6.6	
Livermore Valley foothills .....	356.9	
Livermore Valley .....	62.5	
Direct .....	10.9	
Arroyo de la Laguna .....	430.3	
Sunol Valley .....	12.8	

TABLE 32—(Continued). DRAINAGE AREAS IN CALIFORNIA.

STREAM.	DRAINAGE AREA IN SQUARE MILES.	
Stonybrook Canyon.....	11.1	
Direct.....	3.3	
Alameda Creek at Niles.....		653.5
Small streams—Alameda to Penitencia.....	38.5	
Small streams—Penitencia to Coyote.....	38.6	
Mission Creek Group.....		77.1
Penitencia Creek.....		22.4
Direct.....	135.1	
Las Animas Creek.....	61.4	
Coyote River near Madrone.....		196.5
Guadalupe River.....		52.2
Los Gatos Creek Group.....		121.2
San Francisquito Creek.....		37.6
San Mateo Creek.....	32.9	
Small streams—San Francisquito to San Francisco.....	51.6	
San Mateo Creek Group.....		84.5
<b>NORTH PACIFIC BASINS.</b>		
Middle Fork of Smith River.....	127.6	
North Fork in California.....	71.1	
Direct.....	30.6	
South Fork of Smith River.....	294.3	
Direct.....	103.4	
Smith River near Crescent City.....		627.0
Direct, Oregon-California line to Shasta River.....	384.4	
Direct, Shasta to Scott Rivers.....	370.5	
Direct to Seiad gage.....	49.3	
Direct.....	187.7	
Indian Creek.....	133.0	
Direct to Salmon River.....	517.5	
Direct to Trinity River.....	312.2	
Direct to Requa gage.....	365.9	
Klamath River near Requa, including 34.5 sq. mi. in Oregon, and excluding Shasta, Scott, Salmon and Trinity Rivers, and residual Oregon area.....		2,320.5
Shasta River.....		802.9
Scott River.....		812.7
Salmon River.....		734.1
Direct.....	1,114.4	
North Fork and East Fork.....	154.9	
Direct.....	441.7	
Direct.....	159.2	
Post Creek.....	48.4	
Direct.....	144.8	
Hay Fork Trinity River.....	384.5	
Direct.....	213.5	
South Fork of Trinity River.....	950.4	
Trinity at junction of South Fork.....		2,661.4
Direct to Hoopa gage.....	189.7	
Direct.....	114.0	
Trinity River at junction with Klamath.....		2,965.1
Klamath River at Requa, total California area plus 34.5 sq. mi. in Oregon.....		7,635.3
Direct to gage.....	78.5	
Direct to Orick.....	192.3	
Direct to mouth.....	4.4	
Redwood Creek.....		275.2
Mad River near Arcata.....		457.0
Direct.....	141.0	
Direct to Van Arsdale Dam.....	351.4	
Direct.....	185.1	
South Eel River.....	536.5	
Direct.....	29.0	
Direct to Covelo gage.....	412.3	
Direct.....	342.9	
Middle Fork of Eel River.....	755.2	
Direct.....	168.0	
North Fork of Eel River.....	284.4	
Eel River at junction with North Fork.....		1,914.1
Direct.....	352.5	
Direct to Garberville gage.....	452.4	
Direct.....	209.2	
South Fork of Eel River.....	661.6	
Direct.....	186.7	

TABLE 32—(Continued). DRAINAGE AREAS IN CALIFORNIA.

STREAM.	DRAINAGE AREA IN SQUARE MILES.	
Direct to Bridgeville gage.....	199.7	
Direct.....	76.1	
Yager Creek.....	142.6	
Direct.....	13.5	
Van Duzen Fork of Eel River.....		431.9
Eel River at Junction of Forks.....		3,546.8
Bear Creek.....		81.5
Mattole River near Petrolia.....		263.5
Coast streams, Mattole to Clear Point.....	67.7	
Usal, Wade, and intervening streams.....	130.0	
Ten Mile Creek.....	130.0	
Intervening streams.....	29.0	
Noyo River.....	137.0	
Intervening streams.....	32.0	
Big River.....	174.0	
Albion Creek.....	80.0	
Noyo River Group.....		779.7
Navarro River.....		273.0
Donahue, Elk, Alder, Brush, Garcia Creeks.....	270.0	
Gualala River.....	315.0	
Intervening streams to Russian River.....	38.0	
Gualala River Group.....		623.0
Direct.....	99.4	
East Fork of Russian River.....	100.2	
Santa Rosa Creek above Mellita.....	21.4	
Mantanzas Creek above Bennett Valley.....	11.2	
Direct.....	1,275.6	
Russian River at mouth.....		1,507.8
Direct.....	23.1	
Geronimo Creek.....	9.9	
Direct to Plain.....	50.9	
Lagunitas Creek.....		83.9
Walker Creek.....	74.0	
Small Coast streams to Lagunitas.....	156.0	
Salmon Creek Group.....		230.0
Olema Creek above Olema.....	13.1	
Small streams to Lime Point.....	144.9	
Bolinas Creek Group.....		158.0
<b>SOUTH PACIFIC BASINS.</b>		
San Diego River at Lakeside.....		206.98
Santa Ysabel Creek near Escondido.....		125.8
San Luis Rey River near Pala.....		324.8
Santa Margarita River.....		689.8
Direct to Hemet Weir.....	67.3	
Direct to mouth of South Fork.....	11.5	
Strawberry Creek.....	27.8	
Direct.....	7.3	
North Fork.....	27.0	
Bautista Creek.....	53.3	
Cactus Valley.....	33.8	
Indian, Poppet and Potrero Creeks.....	101.6	
San Jacinto River Tributaries.....		329.6
Santa Ana River at junction with Mill Creek.....	199.0	
Mill Creek.....	43.3	
Sand, City and Plunge Creeks.....	43.9	
Strawberry Creek.....	9.2	
Waterman Canyon.....	4.6	
Devil Canyon.....	5.6	
Lone Pine Canyon.....	60.4	
Lytle Creek.....	47.0	
San Antonio Canyon.....	26.4	
Cucamonga, Deer, Day Canyons.....	20.1	
Santa Ana River Tributaries.....		459.
Eaton Creek.....	6.1	
Little Santa Anita Creek.....	1.9	
Santa Anita Creek.....	10.5	
Sawpit Creek and Monrovia pipe line.....	5.3	
Fish Creek.....	6.5	
Big and Little Daulton Creeks.....	10.0	

TABLE 32—(Continued). DRAINAGE AREAS IN CALIFORNIA.

STREAM.	DRAINAGE AREA IN SQUARE MILES.	
San Dimas Creek .....	17.4	
San Gabriel Direct .....	222.0	
San Gabriel River Tributaries .....		279.7
Pacoima Canyon .....	27.9	
Little Tejunga Canyon .....	15.9	
Tejunga Canyon .....	107.4	
Arroyo Seco .....	15.6	
Los Angeles River Tributaries .....		166.8
Small watersheds, Venice to Malibu .....	77.5	
Direct .....	24.6	
Triunfo Canyon .....	70.1	
Direct .....	15.5	
Malibu River .....	110.2	
Small watersheds, Malibu to Point Mugu .....	191.4	
Malibu River Group .....		379.1
Sespe Creek .....	255.7	
Santa Paula Creek .....	35.7	
Piru Creek .....	421.3	
Small tributaries .....	198.1	
Santa Clara River Tributaries .....		910.8
Direct .....	91.4	
Ojai Valley .....	52.5	
Direct .....	2.5	
Coyote Creek .....	42.5	
Direct .....	37.4	
Ventura River .....		226.3
Jalama Creek Group .....		242.0
Direct .....	77.1	
Mono Creek .....	125.6	
Direct to Gibraltar .....	14.0	
Santa Ynez above Gibraltar gage .....		216.7
Direct to Lompoc .....	532.8	
Lompoc Valley foothill drainage .....	47.7	
Santa Ynez River .....		797.2
San Antonio Creek .....		138.3
Direct .....	921.4	
Alamo Creek .....	93.6	
Direct .....	120.5	
Cuyama River .....	1,135.5	
Sisquoc River .....	498.4	
Santa Maria River .....		1,633.9
Arroyo Grande .....	82.0	
Chorro, San Luis Obispo Creeks .....	157.9	
Old Creek .....	22.9	
Small streams .....	39.0	
Santa Rosa Creek .....	44.3	
San Simeon Creek .....	32.1	
Small streams .....	25.5	
Arroyo de la Cruz .....	42.4	
Small streams .....	6.2	
San Carpojo River .....	34.8	
Small streams .....	120.3	
Sur River .....	58.2	
Little Sur River .....	40.5	
Small streams .....	62.4	
Carmel River .....	252.1	
San Luis Obispo Creek Group .....		1,018.6
Direct .....	208.6	
Trout Creek .....	12.8	
Santa Margarita Creek .....	23.7	
Direct .....	367.2	
Cholame Creek .....	233.6	
San Juan River .....	453.7	
Direct .....	278.9	
Estrella River .....	966.2	
Direct .....	13.0	
Vineyard Canyon .....	52.2	
Direct .....	3.1	
Indian Valley .....	86.3	
Direct .....	6.9	
Direct .....	41.5	
San Miguel Creek .....	15.7	

TABLE 32—(Continued). DRAINAGE AREAS IN CALIFORNIA.

STREAM.	DRAINAGE AREA IN SQUARE MILES	
Direct.....	21.3	
Los Burros Creek.....	28.8	
Direct.....	118.0	
Las Tablas Creek.....	67.5	
Direct.....	82.4	
Nacimiento River.....		375.2
Salinas at junction with Nacimiento River.....		2,115.3
Direct.....		23.2
Direct to Forest Creek.....	65.5	
Direct.....	275.7	
San Antonio River.....		341.2
Direct.....		79.1
Sargent Canyon.....		52.0
Direct.....		297.7
San Lorenzo Creek.....		265.2
North foothills to Chalone.....		30.5
South foothills to Arroyo Seco.....		75.9
Chalone Creek.....		153.3
North foothills to mouth.....		205.4
Direct.....	122.7	
Paloma Creek.....	57.8	
Direct.....	61.9	
Arroyo Seco.....		242.4
South foothills to mouth.....		159.9
Salinas River Tributaries.....		4,011.9
Direct.....	214.6	
Willow Creek.....	29.2	
Direct.....	12.7	
Stone Canyon Creek.....	15.6	
Direct.....	17.0	
Pescadero Creek.....	39.7	
Direct.....	24.0	
Direct.....	116.7	
Los Muertos Creek.....	80.4	
Direct.....	15.6	
Tres Pinos Creek.....	212.7	
Direct.....	1.6	
San Benito River.....		567.1
Bird Creek.....		15.0
San Juan Creek.....		8.4
Bodfish Creek.....		11.4
Little Arthur Creek.....		8.8
Uvas Creek.....		31.9
Llagas Creek.....		22.5
Pueheco Creek.....		147.8
Arroyo Dos Picachos.....		15.5
Arroyo de Las Viboras.....		22.3
Santa Ana Creek.....		33.5
Santa Clara Valley.....		99.0
Direct to Aromas.....		32.7
Corralitos Creek.....		54.0
Pajaro River near Corralitos.....		1,069.9
Aptos Creek.....		23.8
Soquel Creek.....		41.1
San Lorenzo River.....		134.3
Intervening small streams.....		42.9
Scott Creek.....		30.9
Waddell Creek.....		24.8
Gazos and small streams.....		26.3
Soquel Creek Group.....		324.1
Pescadero Creek.....	79.2	
Pomponio Creek.....	8.8	
San Gregorio Creek.....	52.7	
Trinitas and Purisima Creeks.....	27.0	
Pilarcitos Creek.....	26.4	
Small streams to Mursel Rock.....	28.3	
Pescadero Creek Group.....		222.4
GREAT BASIN.		
Battle Creek at Bayes.....	156.9	
Antelope Creek.....	52.7	
Willow Creek near Fairchild.....	63.5	
Lost River in California.....	628.0	
Tule Lake Group.....		901.1
Goose Lake Group.....		274.9
Cowhead Lake Basin.....		21.4

TABLE 32—(Continued). DRAINAGE AREAS IN CALIFORNIA.

STREAM.	DRAINAGE AREA IN SQUARE MILES.	
Upper Alkali Lake drainage	152.5	
Middle Alkali Lake drainage	125.9	
Lower Alkali Lake drainage	100.3	
Surprise Valley Group		378.7
Madelme Plains Group		548.5
Smoke Creek Group		188.3
Eagle Lake Group		498.2
Susan River to Petes Valley	356.9	
Horse Lake Basin	113.9	
Petes Valley	500.6	
Honey Lake Basin	535.9	
Honey Lake Group		1,507.3
California lake area	137.9	
California mountain area	229.5	
Nevada lake area	54.2	
Nevada mountain area	77.7	
Lake Tahoe at outlet of lake		499.3
Truckee River below Lake Tahoe, California area	408.1	
Truckee River below Lake Tahoe, Nevada area	38.5	
Truckee River at state line, exclusive of Lake Tahoe Basin		446.6
Truckee River at state line, total		945.9
West Fork Carson River at Woodfords		67.2
East Fork Carson River at state line		322.8
Direct	187.1	
East Fork	57.5	
Direct	160.3	
West Walker River at state line		401.9
Green Creek	19.2	
Virginia Creek	64.1	
Summers Creek	14.9	
Robinson Creek	40.5	
Buckeye Creek	42.8	
Swager Creek	53.3	
Aurora Canyon	28.9	
Direct	147.7	
East Walker River at state line		411.4
Rush Creek	58.9	
Parker Creek	15.0	
Walker Canyon	15.0	
Gibbs Canyon	6.0	
Leevining Creek	37.0	
Mill Creek	18.0	
Small streams	16.0	
Mono Lake Group		165.9
Adobe Meadows drainage	334.2	
Upper Owens drainage, east side	118.4	
Adobe Meadows Group		452.6
Deadman Creek	60.5	
Hot Creek	80.1	
Conviet Creek	22.0	
McGee Creek	19.9	
Direct	178.9	
Hilton Creek	16.8	
Direct to Long Valley Dam	9.5	
Direct	51.3	
Rock Creek	81.7	
Owens River (Upper) near Round Valley		523.7
Direct	6.6	
Pine Creek	37.2	
Huckleberry Creek	3.9	
Horton Creek	15.7	
McGee and Birch Creeks	33.3	
Bishop Creek	101.7	
Rawson Creek	9.9	
Direct	10.2	
Freeman Creek	7.9	
Shannon Creek	8.8	
Direct	6.4	
Baker Creek	33.1	
Big Pine Creek	31.8	
Little Pine and adjacent area	9.3	
Birch Creek	9.8	
Fuller Creek	2.4	
Tinmaha Creek	6.7	

TABLE 32—(Concluded). DRAINAGE AREAS IN CALIFORNIA.

STREAM.	DRAINAGE AREA IN SQUARE MILES.	
Red Mountain Creek.....	7.2	
Taboose Creek.....	10.2	
Goodale Creek.....	8.8	
Direct.....	3.3	
Division Creek.....	9.9	
Sawmill Creek.....	7.9	
Tibaut Creek.....	11.2	
Oak Creek.....	26.4	
Little Pine or Independence Creek.....	8.4	
Pinyon Creek.....	4.2	
Symmes Creek.....	10.4	
Direct.....	2.9	
Bishop Creek Group.....		445.5
Shepard Creek.....	13.0	
Bairs Creek.....	7.5	
George Creek.....	10.5	
Hogback Creek.....	8.7	
Lone Pine Creek.....	12.3	
Direct.....	3.2	
Tuttle and Dietz Creeks.....	11.8	
Richer and Carrol Creeks.....	20.8	
Cottonwood Creek.....	42.9	
Direct.....	4.7	
Ash Creek.....	15.4	
Braley Creek.....	5.1	
Direct.....	2.1	
Walker and adjacent streams.....	57.6	
Owens Lake Group.....		215.6
Deep Creek.....	136.2	
West Fork of Mojave River.....	74.7	
Mojave River at junction of Forks.....		210.9
Rock Creek.....	26.4	
Little Rock Creek.....	64.4	
Amargosa Creek.....	28.4	
Antelope Valley Group.....		119.2
San Geronio River.....	208.6	
Whitewater River.....	60.4	
Whitewater River at Whitewater.....		269.0



TABLE 33. PUBLICATIONS OF THE UNITED STATES GEOLOGICAL SURVEY CONTAINING CALIFORNIA STREAM FLOW DATA.

Water Supply Papers.

Water Supply Paper No.	Date of publication.	Title of publication.	Author.	Contents.
17	1898	Irrigation near Bakersfield, California.	C. E. Grunsky . . . . .	Nos. 17, 18 and 19 exhibit the character of the development of irrigation in the southern part of the great valley of California; No. 17 gives a description of San Joaquin Valley and irrigation districts.
18	1898	Irrigation near Fresno, California.	C. E. Grunsky . . . . .	
19	1899	Irrigation near Modesto, California.	C. E. Grunsky . . . . .	
38	1900	Operations at River Stations, 1899, Part IV.	.....	Measurements of flow of (1) Sacramento River at Jellys Ferry, (2) San Mateo Creek, (3) Stanislaus River at Oakdale, (4) Tuolumne River at La Grange, (5) San Joaquin River at Herndon.
39	1900	Operations at River Stations, 1899, Part V.	.....	Stream flow measurements in the Great Basin and Pacific slope basins in California, 1899.
45	1901	Water Storage on Cache Creek, California.	A. E. Chandler . . . . .	Topography, precipitation, stream measurements, ground waters, irrigation works in Cache Creek basin, description of Clear Lake.
46	1901	Physical Characteristics of Kern River, California.	F. H. Olmsted . . . . .	Topography, estimates of discharge, possible utilization of storage sites, and development of power.
51	1901	Reconnaissance of Yuba River, California.	Marsden Manson . . . . .	
51	1901	Operations at River Stations, 1900, Part V.	.....	Stream flow measurement in the Great Basin and Pacific slope basins in California, 1900.
58	1902	Storage of Water on Kings River, California.	J. B. Lippincott . . . . .	Physical features, rainfall, stream flow, evaporation, seepage, and power development.
59	1902	Development and Application of Water near San Bernardino, Colton, and Riverside, Calif., Part I.	J. B. Lippincott . . . . .	Nos. 59 and 60 describe topography, soil, climate, crops, canals, wells and pumping plants; discuss briefly the manufacture of Portland cement in southern California.
60	1902	Development and Application of Water near San Bernardino, Colton, and Riverside, Calif., Part II.	J. B. Lippincott . . . . .	(See above.)
66	1902	Operations at River Stations, 1901, Part II.	.....	Stream flow measurements in the San Francisco Bay and southern California drainage areas, 1901.
68	1902	Water Storage in Truckee Basin, California-Nevada.	L. H. Taylor . . . . .	Precipitation, drainage areas, run-off, stream flow, evaporation, reservoir sites, present uses of water and existing water rights, irrigable lands, power development, necessity of national control.
75	1903	Report of Progress on Stream Measurements, 1901.	.....	Stream flow measurements in the Great Basin and Pacific slope basins in California, 1901.
80	1903	Relation of Rainfall to Run-off.	George W. Rafter . . . . .	Discusses rainfall, run-off, evaporation, ground water, relation of geologic structure to run-off, effect of forests.
81	1903	California Hydrography.....	J. B. Lippincott . . . . .	A collection of published records of stream flow and rainfall "hitherto much scattered, some of them out of print and difficult to secure."
85	1903	Report on Progress of Stream Measurements, 1902.	.....	Flow measurements on streams west of the Mississippi River, 1902.
86	1903	Storage Reservoirs on Stony Creek, California.	Burt Cole . . . . .	Water supply of Glenn County as related to population and industry; irrigation districts, proposed Stony Creek forest reserve, and storage sites on Grindstone, Salt, Briscoe and Stony creeks.
89	1904	Water Resources of the Salinas Valley, California.	Homer Hamlin . . . . .	Salinas Valley: Geography, topography, general and economic geology, climate, water supply and irrigation.
100	1904	Report of Progress of Stream Measurements, 1903.	.....	Flow measurements on streams west of the Mississippi River, 1903.
112	1905	Underflow Tests in the Drainage Basin of the Los Angeles River.	Homer Hamlin . . . . .	Los Angeles River Basin: Conditions of occurrence of ground water in arid regions and fluctuations in water level; machinery and methods used in sinking test wells.
116	1905	Water Problems of Santa Barbara, California.	J. B. Lippincott . . . . .	Reviews earlier work in Santa Barbara region and describes nearby and distant water supplies, including Ventura and Santa Ynez Rivers.

TABLE 33—(Continued). PUBLICATIONS OF THE UNITED STATES GEOLOGICAL SURVEY CONTAINING CALIFORNIA STREAM FLOW DATA.

*Water Supply Papers.*

Water Supply Paper No.	Date of publication.	Title of publication.	Author.	Contents.
134	1905	Report of Progress of Stream Measurements, 1904, Part XI.	W. B. Clapp. . . . .	Stream flow measurements in the Great Basin and Pacific slope basins, 1904.
137	1905	Development of Underground Waters in the Eastern Coastal-plain Region of Southern California.	W. C. Mendenhall.	Nos. 137, 138, 139: Topography, crops, irrigation systems, wells, and the effect of development and drought on changes in ground-water level, in the Anaheim, Santa Ana, Downey, Las Bolsas, Santa Monica, and Redondo quadrangles, in Orange and Los Angeles Counties.
138	1905	Development of Underground Waters in the Central Coastal-plain Region of Southern California.	W. C. Mendenhall.	
139	1905	Development of Underground Waters in the Western Coastal-plain Region of Southern California.	W. C. Mendenhall.	
140	1905	Field Measurements of the Rate of Movement of Underground Waters.	C. S. Slichter. . . . .	Contains chapters on measurements of underground flow of Rio Hondo and San Gabriel Rivers and at the Narrows of Mojave River.
142	1905	The Hydrology of the San Bernardino Valley, California.	W. C. Mendenhall.	Rainfall, soils, artesian areas, temperature, chemical character of the ground waters, gives tables of flow of Santa Ana River, Mill Creek and other streams, and lists of wells in Redlands and San Bernardino quadrangles.
147	1905	Destructive Floods in the United States in 1904.	E. C. Murphy and others.	Sacramento River flood, by S. G. Bennett. Describes streams of the basin, precipitation, discharge, damages, and prevention of future losses.
162	1906	Destructive Floods in the United States in 1905.	E. C. Murphy and others.	Gives estimates of flood flow and frequency for Tuolumne River at La Grange, Kern River at Rio Bravo ranch, and Kings River at Sanger.
177	1906	Report of Progress of Stream Measurements, 1905.	W. B. Clapp, J. C. Hoyt.	Stream flow measurements in the Great Basin and Pacific slope basins, 1905.
181	1906	Geology and Water Resources of Owens Valley, Calif.	Willis T. Lee. . . . .	Geography, geology, underground waters, climate.
213	1907	The Surface Water Supply of California, 1906.	W. B. Clapp. . . . .	Results of stream measurements in 1906; with section on ground water levels in Southern California by W. C. Mendenhall.
219	1908	Ground Waters and Irrigation Enterprises in the Foothill Belt, Southern California.	W. C. Mendenhall.	Geologic conditions, physical features, rainfall, storage facilities, subterranean reservoirs, conservation of waters, fluctuations in ground water levels, irrigation enterprises and statistics of wells.
222	1908	Preliminary Report on the Ground Waters of San Joaquin Valley, California.	W. C. Mendenhall.	Soils, surface waters, and the origin, circulation, quantity, accessibility and development of the ground waters; notes on water supply by counties.
225	1909	Ground Waters of the Indio Region, California.	W. C. Mendenhall.	Geologic sketch of the Colorado Desert; water resources of the Indio region; history of development; soils and crops.
237	1910	The Quality of the Surface Waters of California.	Walton Van Winkle, F. M. Eaton.	Mineral analyses of river waters, with notes on geography, climate, industrial development and drainage.
250	1910	Surface Water Supply of the United States, Part X, Great Basin, 1907 and 1908.	W. B. Clapp, W. F. Martin.	Stream flow measurements in the Great Basin, 1907 and 1908.
251	1910	Surface Water Supply of the United States, Part XI, California, 1907 and 1908.	W. B. Clapp, W. F. Martin.	Stream flow measurements in California, 1907 and 1908.
270	1911	Surface Water Supply of the United States, Part X, Great Basin, 1909.	E. C. La Rue, F. F. Henshaw.	Stream flow measurements in the Great Basin, 1909.
271	1911	Surface Water Supply of the United States, Part XI, California, 1909.	W. B. Clapp, F. F. Henshaw.	Stream flow measurements in California, 1909.
278	1911	Water Resources of Antelope Valley, California.	Harry R. Johnson.	Topography, drainage, climate, natural resources, geologic features, water resources.
290	1912	Surface Water Supply of the United States, Part X, Great Basin in California, 1910.	F. F. Henshaw, E. A. Porter.	Stream flow measurements in the Great Basin, 1910.

TABLE 33—(Continued). PUBLICATIONS OF THE UNITED STATES GEOLOGICAL SURVEY CONTAINING CALIFORNIA STREAM FLOW DATA.

*Water Supply Papers.*

Water Supply Paper No.	Date of publication.	Title of publication.	Author.	Contents.
291	1912	Surface Water Supply of the United States, Part XI, Pacific Coast in California, 1910.	H. D. McGlashan, F. F. Henshaw.	Stream flow measurements in the Pacific slope basins, 1910.
294	1912	Water Resources of Part of Owens Valley, California.	C. H. Lee . . . . .	Physical features, precipitation, stream flow evaporation, percolation, ground water.
295	1912	Gazetteer of Surface Waters of California, Part I, Sacramento River basin.	B. D. Wood . . . . .	Nos. 295, 296 and 297: Description of all streams named on the best available maps.
296	1912	Gazetteer of Surface Waters of California, Part II, San Joaquin River basin.	B. D. Wood . . . . .	(See above.)
297	1912	Gazetteer of Surface Waters of California, Part III, Great Basin and Pacific coast streams.	B. D. Wood . . . . .	(See above.)
298	1912	Water Resources of California, Part I, Stream Measurements in Sacramento River basin.	H. D. McGlashan, F. F. Henshaw.	Nos. 298, 299 and 300: Compilation of all data concerning stream flow in California available up to September 30, 1912, including records previously published. The reports describe the drainage basins, precipitation, temperature, and forests; and give results of work at gaging stations.
299	1912	Water resources of California, Part II, Stream Measurements in San Joaquin River basin.	H. D. McGlashan, H. J. Dean.	(See above.)
300	1913	Water Resources of California, Part III, Stream Measurements in the Great Basin and Pacific Coast River basins.	H. D. McGlashan, H. J. Dean.	(See above.)
310	1913	Surface Water Supply of the United States, Part X, Great Basin, 1911.	F. F. Henshaw, H. D. McGlashan, E. A. Porter.	Stream flow measurements, Great Basin, 1911.
311	1912	Surface Water Supply of the United States, Part XI, Pacific Coast in California, 1911.	H. D. McGlashan, R. H. Bolster.	Stream flow measurements, Pacific slope basins, 1911.
330	1914	Surface Water Supply of the United States, Part X, Great Basin, 1911-12.	F. F. Henshaw, E. A. Porter, G. C. Stevens.	Stream flow measurements in the Great Basin during the year ending September 30, 1912.
331	1914	Surface Water Supply of the United States, Part XI, Pacific Slope Basins in California, 1911-12.	H. D. McGlashan, G. C. Stevens.	Stream flow measurements in the Pacific slope basins in California during the year ending September 30, 1912.
338	1915	Springs of California . . . . .	Gerald A. Waring . . . . .	Describes the physical features of California, including the coast ranges, Great Central Valley, the lava-covered region, the Sierra Nevada, the southeastern desert, and faults.
340-J	1915	Stream Gaging Stations and Publications Relating to Water Resources, 1885-1913, Part X, Great Basin.	B. D. Wood . . . . .	Lists stream gaging stations and publications of the U. S. Geological Survey containing results of stream flow measurements.
340-K	1915	Stream Gaging Stations and Publications Relating to Water Resources, 1885-1913, Part XI, Pacific Coast Basins in California.	B. D. Wood . . . . .	(See above.)
345	1915	Contributions to the Hydrology of the United States, 1914, Part H.	W. O. Clark . . . . .	Ground water resources of the Niles cone and adjacent areas, located just east of the south end of San Francisco Bay.
360	1916	Surface Water Supply of the United States, Part X, Great Basin, 1912-13.	E. A. Porter, H. D. McGlashan, F. F. Henshaw, G. C. Baldwin.	Stream flow measurements in the Great Basin during the year ending September 30, 1913.
361	1916	Surface Water Supply of the United States, Part XI, Pacific Slope Basins in California, 1912-13.	H. D. McGlashan, F. F. Henshaw.	Stream flow measurements in the Pacific slope basins in California during the year ending September 30, 1913.
375	1916	Contributions to the Hydrology of the United States, 1915, Part A.	Kirk Bryan . . . . .	Ground water for irrigation in the Sacramento Valley, geography and geology of the valley, the origin and movement of ground water, problems relating to wells and to pumping, progress of irrigation with well water.

TABLE 33—(Concluded). PUBLICATIONS OF THE UNITED STATES GEOLOGICAL SURVEY CONTAINING CALIFORNIA STREAM FLOW DATA.

*Water Supply Papers.*

Water Supply Paper No.	Date of publication.	Title of publication.	Author.	Contents.
390	1917	Surface Water Supply of the United States, Part X, Great Basin, 1913-14.	E. A. Porter, H. D. McGlashan, F. F. Henshaw, G. C. Baldwin.	Stream flow measurements in the Great Basin during the year ending September 30, 1914.
391	1917	Surface Water Supply of the United States, Part XI, Pacific Slope Basins in California, 1913-14.	H. D. McGlashan F. F. Henshaw.	Stream flow measurements in the Pacific slope basins in California during the year ending September 30, 1914.
395	1916	Colorado River and its Utilization	E. C. La Rue . . . . .	Physiography of the basin; history of exploration; stream flow measurements; description of present and prospective irrigation systems by basins; water power; description of developed water powers and undeveloped power sites; market for power; flood conditions; storage possibilities by basin; silt.
398	1916	Ground Water in the San Joaquin Valley, California.	W. C. Mendenhall, R. B. Dole, Her- man Stabler.	Geography of the valley; geologic outline of the rocks of the border; the origin of the present surface; composition of surface and ground waters; chemical composition of surface and ground waters.
400	1917	Contributions to the Hydrology of the United States, 1916, Part E.	W. C. Clark . . . . .	Ground water for irrigation in the Morgan Hill area.
410	1918	Surface Water Supply of the United States, Part X, Great Basin, 1914-15.	E. A. Porter, H. D. McGlashan, F. F. Henshaw, G. C. Baldwin.	Stream flow measurements in the Great Basin during the year ending September 30, 1915.
411	1918	Surface Water Supply of the United States, Part XI, Pacific Slope Basins in California, 1914-15.	H. D. McGlashan, F. F. Henshaw.	Stream flow measurements in the Pacific slope basins in California during the year ending September 30, 1915.
426	1918	Southern California Floods of January, 1916.	H. D. McGlashan, F. C. Ebert.	Compares the flood of January, 1916, with previous floods, summarizes the damages, and gives flood-flow records.
429	1919	Ground Water in the San Jacinto and Temecula Basins, California.	G. A. Waring . . . . .	General features, irrigation systems, ground water, description by areas.
440	1919	Surface Water Supply of the United States, Part X, Great Basin, 1915-16.	E. A. Porter, C. C. Jacob, H. D. McGlashan, F. F. Henshaw, Robert Follansbee.	Stream flow measurements in the Great Basin during the year ending September 30, 1916.
441	1918	Surface Water Supply of the United States, Part XI, Pacific Slope Basins in California, 1915-16.	H. D. McGlashan, F. F. Henshaw.	Stream flow measurements on the Pacific slope basins in California during the year ending September 30, 1916.
446	1919	Geology and Ground Waters of the Western Part of San Diego County, California.	Arthur J. Ellis, C. H. Lee.	Physiography, geology, precipitation, evaporation, wells, quality of water, pumping tests.
447	1921	Surface Water Supply of the Pacific Slope in Southern California to September 30, 1918.	H. D. McGlashan.	Stream flow measurements on the Pacific slope of southern California, up to September 30, 1918, including those published in Water-Supply Paper 300.
450	1921	Contributions to the Hydrology of the United States, 1919— Part B . . . . . Part C . . . . .	D. S. Thompson . . . . . G. A. Waring . . . . .	Ground water in Lanfair Valley. Ground water in Pahump, Mesquite and Ivanpah valleys.
460	1921	Surface Water Supply of the United States, Part X, Great Basin, 1916-17.	C. C. Jacob, H. D. McGlashan, F. F. Henshaw, G. C. Baldwin, Robert Follansbee.	Stream flow measurements in the Great Basin during the year ending September 30, 1917.
461	1920	Surface Water Supply of the United States, Part XI, Pacific Slope Basins in California, 1916-17.	H. D. McGlashan, F. F. Henshaw.	Stream flow measurements in the Pacific slope basins in California during the year ending September 30, 1917.
468	1921	Records of Water Levels in Wells in Southern California.	F. C. Ebert . . . . .	Causes of fluctuation of water table, and general conditions in (1) San Bernardino Valley, (2) foothill belt, coastal-plain and (3) San Jacinto Valley.
480	.....	Surface Water Supply of the United States, Part X, Great Basin, 1917-18.	.....	Stream flow measurements in the Great Basin during the year ending September 30, 1918.
481	1921	Surface Water Supply of the United States, Part XI, Pacific Slope Basins in California, 1917-18.	H. D. McGlashan, F. F. Henshaw	Stream flow measurements in the Pacific slope basins in California during the year ending September 30, 1918.

**TABLE 34. SACRAMENTO RIVER (UPPER).**  
SEASONAL RUN-OFF DATA. Drainage area 568 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division B.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.) <sup>f</sup>	Distribution of seasonal run-off by months as shown by U.S.G.S. records. <sup>d</sup>
1871-1872	111	51.5	105	1,561,300	January, 17.4%
1872-1873	53	20.3	41	614,000	February, 19.3%
1873-1874	85	33.6	69	1,017,500	March, 20.3%
1874-1875	51	19.5	40	592,400	April, 11.1%
1875-1876	154	77.1	157	2,335,600	May, 8.2%
1876-1877	69	46.9	96	1,421,600	June, 4.5%
1877-1878	182	96.7	197	2,929,600	July, 2.1%
1878-1879	92	41.3	84	1,253,600	August, 1.5%
1879-1880	107	59.7	122	1,810,100	September, 1.4%
1880-1881	127	78.9	161	2,391,900	October, 2.0%
1881-1882	75	39.0	79	1,181,300	November, 4.9%
1882-1883	75	32.3	66	978,000	December, 7.3%
1883-1884	98	52.8	108	1,602,000	
1884-1885	58	31.8	65	964,800	
1885-1886	124	69.0	141	2,090,600	
1886-1887	60	33.9	69	1,028,700	
1887-1888	55	24.7	50	748,600	
1888-1889	104	51.7	105	1,566,800	
1889-1890	198	115.5	235	3,500,900	
1890-1891	66	29.2	60	886,100	
1891-1892	77	34.7	71	1,051,500	
1892-1893	117	61.4	125	1,859,600	
1893-1894	92	41.0	84	1,242,500	
1894-1895	125	63.2	129	1,911,900	
1895-1896	120	50.9	104	1,543,400	
1896-1897	97	54.1	110	1,639,300	
1897-1898	60	22.6	46	685,800	
1898-1899	68	28.6	58	863,600	
1899-1900	112	31.0	63	939,000	
1900-1901	102	37.5	76	1,138,600	
1901-1902	131	52.0	106	1,575,200	
1902-1903	108	51.0	104	1,546,300	
1903-1904	144	88.6	181	2,683,300	
1904-1905	121	51.8	106	1,570,800	
1905-1906	117	55.3	113	1,674,700	
1906-1907	123	72.0	147	2,183,100	
1907-1908	85	41.2	84	1,246,800	
1908-1909	147	74.2	151	2,246,600	
1909-1910	82	57.8	118	1,751,600	
1910-1911	100	42.9	87	1,301,200	
1911-1912	76	32.0	65	970,700	
1912-1913	81	34.2	70	1,037,400	
1913-1914	140	73.3	149	2,210,800	
1914-1915	130	71.2	145	2,157,400	
1915-1916	106	52.0	106	1,576,900	
1916-1917	76	30.4	62	921,000	
1917-1918	66	23.1	47	698,000	
1918-1919	86	40.6	83	1,230,200	
1919-1920	48	18.9	39	573,800	
1920-1921	119	59.6	121	1,807,800	

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.<sup>e</sup>

5559,000  
386,200  
396,300  
785,300  
791,200  
689,600  
304,200  
c111,600  
d209,900  
373,300  
1,402,100

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	1,486,300	49.1	2,616	
Maximum seasonal	3,500,900	115.5	6,162	1889-1890
Minimum seasonal	573,800	18.9	1,010	1919-1920
Mean during July	31,200	1.0	55	
Maximum during July	73,500	2.4	129	1889-1890
Minimum during July	12,000	0.4	21	1919-1920
Mean during August	22,300	0.7	39	
Maximum during August	52,500	1.7	92	1889-1890
Minimum during August	8,600	0.3	15	1919-1920

Probable run-off curve, Plate XVIII.

Mass curve of run-off, Plate XCV.

Storage development curve, Plate CL.

Probable frequency of flood discharge, Plate LVIII.

(a) Description of drainage basin: Area tributary to the Sacramento River above its junction with Pit River; also 33 square miles tributary to Pit and McCloud Rivers below their gaging points at Ydalm and Baird, respectively.

(b) Partial record, October 15 to September 30.

(c) Partial record, February 12 to April 20.

(d) Partial record, May 1 to September 30.

(e) Point of measurement: October 15, 1910, to April 20, 1918, gage at highway bridge at Castella, one-half mile below the mouth of Castle Creek, drainage area 257 square miles; May 1, 1919, to date, at highway bridge at Antler, 200 feet above mouth of Gregory Creek, drainage area 463 square miles.

(f) The tributary streams of the Upper Sacramento River were adjusted for probable run-off among themselves to agree with the stream flow at Red Bluff, after deducting the run-off of the Pit and McCloud Rivers. Consideration was given to partial records where they existed.

**TABLE 35. PIT RIVER.**  
SEASONAL RUN-OFF DATA. Drainage area 5,346 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness <sup>g</sup>	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet.	Distribution of seasonal run-off by months as shown by U.S.G.S. records. <sup>f</sup>
1871-1872	96	13.7	93	3,910,000	January, 11.0%
1872-1873	64	10.0	68	2,850,000	February, 12.8%
1873-1874	78	11.7	80	3,340,000	March, 14.1%
1874-1875	56	9.0	61	2,570,000	April, 12.8%
1875-1876	114	16.5	112	4,710,000	May, 9.4%
1876-1877	133	19.7	134	5,620,000	June, 7.0%
1877-1878	133	19.7	134	5,620,000	July, 6.0%
1878-1879	86	12.5	85	3,570,000	August, 5.2%
1879-1880	129	19.0	129	5,420,000	September, 4.0%
1880-1881	154	23.4	159	6,680,000	October, 4.0%
1881-1882	98	14.1	96	4,020,000	November, 5.7%
1882-1883	74	11.1	76	3,170,000	December, 7.1%
1883-1884	128	18.9	128	5,390,000	
1884-1885	89	13.0	88	3,710,000	
1885-1886	144	21.6	147	6,160,000	
1886-1887	89	13.0	88	3,710,000	
1887-1888	73	11.2	76	3,200,000	
1888-1889	110	15.8	107	4,510,000	
1889-1890	180	28.8	196	8,220,000	
1890-1891	82	12.2	83	3,480,000	
1891-1892	83	12.3	84	3,510,000	
1892-1893	122	17.7	120	5,050,000	
1893-1894	93	13.5	91	3,850,000	
1894-1895	112	16.0	109	4,570,000	
1895-1896	118	17.3	117	4,940,000	
1896-1897	105	15.1	103	4,310,000	
1897-1898	64	10.0	68	2,850,000	
1898-1899	69	10.5	71	3,000,000	
1899-1900	103	14.8	100	4,220,000	
1900-1901	102	14.7	100	4,200,000	
1901-1902	108	15.7	107	4,480,000	
1902-1903	92	13.2	90	3,770,000	
1903-1904	131	19.2	130	5,480,000	c1,212,000
1904-1905	101	14.5	99	4,140,000	303,100
1905-1906	108	15.7	106	4,480,000	754,600
1906-1907	127	18.6	126	5,300,000	d1,109,300
1907-1908	79	11.8	80	3,370,000	186,400
1908-1909	124	18.1	123	5,160,000	
1909-1910	80	11.9	80	3,400,000	
1910-1911	106	15.2	103	4,397,900	e3,874,000
1911-1912	71	10.5	71	3,003,000	2,824,200
1912-1913	80	11.2	76	3,195,900	3,010,700
1913-1914	132	17.1	116	4,865,500	4,674,000
1914-1915	96	14.0	95	3,982,600	3,784,600
1915-1916	96	15.0	102	4,265,500	4,061,700
1916-1917	82	13.0	88	3,720,700	3,511,300
1917-1918	62	10.0	68	2,863,800	2,647,700
1918-1919	77	11.9	80	3,400,500	3,177,700
1919-1920	54	8.3	56	2,355,200	2,126,300
1920-1921	113	14.9	101	4,239,000	4,002,800

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	4,204,600	14.7	786	
Maximum seasonal	8,220,000	28.8	1,538	1889-1890
Minimum seasonal	2,355,200	8.3	441	1919-1920
Mean during July	252,300	0.9	47	
Maximum during July	493,200	1.7	92	1889-1890
Minimum during July	154,200	0.5	29	1874-1875
Mean during August	218,600	0.8	41	
Maximum during August	427,400	1.5	80	1889-1890
Minimum during August	133,600	0.5	25	1874-1875

Probable run-off curve, Plate XVIII. Mass curve of run-off, Plate XCV.

Storage development curve, Plate CL.

Probable frequency of flood discharge, Plate LVIII.

(a) Description of drainage basin: Tributary area above gage near Ydalpon, one-half mile below mouth of Squaw Creek. (Does not include Goose Lake Basin.) The area given is that of the drainage basin as indicated by the topography. The true drainage area is probably of greater extent, including an indeterminate area to the north, which appears to supply in part the great springs of Fall River.

(b) Point of measurement: January 1, 1904, to September 30, 1908, near Bieber in gorge at lower end of Big Valley, drainage area 3,086 square miles. November 16, 1910, to date, at gage near Ydalpon, drainage area 5,316 square miles.

(c) Partial, January 1 to September 30.

(d) Partial, October and January 1 to September 30.

(e) Partial, November 16 to September 30.

(f) Measured run-off adjusted for storage and irrigation above point of measurement as follows: Irrigated acreage 1910, 92,400 acres, thereafter increasing 3,500 acres per year to 127,400 acres in 1920. Storage capacity of reservoirs: 1910-1911, 10,778 acre-feet; 1911-1912, 24,487 acre-feet; 1912-1913, 24,664 acre-feet; 1913-1914, 19,529 acre-feet; 1914-1915, 22,257 acre-feet; 1915-1916, 21,542 acre-feet; 1916-1917, 22,652 acre-feet; 1917-1918, 29,369 acre-feet; 1918-1919-1920, 30,372 acre-feet; 1920-1921, 108,853 acre-feet.

(g) Index of seasonal wetness obtained by weighting indices of Divisions A and B equally.

TABLE 36. McCLOUD RIVER.

SEASONAL RUN-OFF DATA. Drainage area 669 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division B.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records.
1871-1872	111	49.0	110	1,750,000	January, 11.4%
1872-1873	53	24.3	54	870,000	February, 13.3%
1873-1874	85	37.5	84	1,340,000	March, 12.4%
1874-1875	51	23.2	52	830,000	April, 12.2%
1875-1876	154	69.5	156	2,480,000	May, 10.5%
1876-1877	69	30.8	69	1,100,000	June, 6.6%
1877-1878	182	83.5	187	2,980,000	July, 5.5%
1878-1879	92	40.5	91	1,440,000	August, 5.0%
1879-1880	107	47.0	106	1,680,000	September, 4.7%
1880-1881	127	56.0	127	2,000,000	October, 5.0%
1881-1882	75	33.2	74	1,190,000	November, 6.2%
1882-1883	75	33.2	74	1,190,000	December, 7.2%
1883-1884	98	43.8	99	1,570,000	
1884-1885	58	26.0	58	930,000	
1885-1886	124	55.0	124	1,960,000	
1886-1887	60	26.5	59	950,000	
1887-1888	55	24.7	56	880,000	
1888-1889	104	46.0	103	1,640,000	
1889-1890	198	91.5	206	3,270,000	
1890-1891	66	29.2	65	1,040,000	
1891-1892	77	34.0	76	1,210,000	
1892-1893	117	51.7	116	1,850,000	
1893-1894	92	40.5	91	1,450,000	
1894-1895	125	55.3	124	1,980,000	
1895-1896	120	53.0	119	1,830,000	
1896-1897	97	43.0	96	1,540,000	
1897-1898	60	26.5	59	950,000	
1898-1899	68	30.5	68	1,090,000	
1899-1900	112	49.0	110	1,750,000	
1900-1901	102	45.0	101	1,610,000	
1901-1902	131	58.0	130	2,070,000	
1902-1903	108	48.0	108	1,710,000	
1903-1904	144	64.6	145	2,310,000	
1904-1905	121	53.3	120	1,900,000	
1905-1906	117	51.7	116	1,850,000	
1906-1907	123	54.5	122	1,950,000	
1907-1908	85	37.5	84	1,340,000	
1908-1909	147	66.2	149	2,360,000	
1909-1910	82	36.3	81	1,300,000	
1910-1911	100	48.0	108	1,718,000	
1911-1912	76	35.4	80	1,256,900	1,256,900
1912-1913	81	35.6	80	1,268,100	1,268,100
1913-1914	140	57.6	129	2,055,300	2,055,300
1914-1915	130	57.6	129	2,047,000	2,047,000
1915-1916	106	54.5	123	1,935,800	1,935,800
1916-1917	76	35.1	79	1,247,300	1,247,300
1917-1918	66	28.9	65	1,032,300	1,032,300
1918-1919	86	33.4	75	1,190,600	1,190,600
1919-1920	48	22.4	50	800,500	800,500
1920-1921	119	50.5	113	1,808,900	1,808,900

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.<sup>b</sup>

c1,428,100

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	1,591,200	44.6	2,378	
Maximum seasonal	3,240,000	91.5	4,888	1889-1890
Minimum seasonal	800,500	22.4	1,197	1919-1920
Mean during July	87,500	2.5	131	
Maximum during July	179,800	5.0	269	1889-1890
Minimum during July	45,700	1.3	68	1874-1875
Mean during August	79,600	2.2	119	
Maximum during August	163,500	4.6	244	1889-1890
Minimum during August	41,500	1.2	62	1874-1875

Probable run-off curve, Plate XVIII.  
Storage development curve, Plate CL.

Mass curve of run-off, Plate XCV.

Probable frequency of flood discharge, Plate LVIII.

(a) Description of drainage basin: Tributary area above gage at Baird, 2 miles above junction with Pit River  
(b) Point of measurement: Gage at Baird, drainage area 669 square miles.  
(c) Partial record, December 22 to September 30.

TABLE 37. CHURN CREEK GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 100 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division B.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.) <sup>b</sup>	Distribution of seasonal run-off by months. <sup>c</sup>
1871-1872	111	17.6	113	94,000	January, 17.4%
1872-1873	53	1.0	6	5,300	February, 19.3%
1873-1874	85	8.8	57	47,200	March, 20.3%
1874-1875	51	0.8	5	4,200	April, 11.1%
1875-1876	154	32.4	208	173,300	May, 8.2%
1876-1877	69	7.2	46	38,700	June, 4.5%
1877-1878	182	42.7	275	228,600	July, 2.1%
1878-1879	92	11.9	77	63,700	August, 1.5%
1879-1880	107	19.8	127	106,100	September, 1.4%
1880-1881	127	27.2	175	145,600	October, 2.0%
1881-1882	75	7.7	50	41,300	November, 4.9%
1882-1883	75	6.4	41	34,200	December, 7.3%
1883-1884	98	16.3	105	87,000	
1884-1885	58	2.4	15	12,700	
1885-1886	124	25.6	165	136,900	
1886-1887	60	3.0	19	15,900	
1887-1888	55	1.5	10	7,800	
1888-1889	104	16.8	108	89,900	
1889-1890	198	55.1	355	294,800	
1890-1891	66	4.0	26	21,400	
1891-1892	77	7.4	48	39,500	
1892-1893	117	21.8	146	116,600	
1893-1894	92	11.8	76	63,100	
1894-1895	125	23.4	151	125,400	
1895-1896	120	18.0	116	96,100	
1896-1897	97	16.7	108	89,200	
1897-1898	60	2.0	13	10,600	
1898-1899	68	4.1	26	22,100	
1899-1900	112	10.7	69	57,300	
1900-1901	102	11.9	77	63,900	
1901-1902	131	20.1	129	107,700	
1902-1903	108	17.1	110	91,400	
1903-1904	144	35.9	231	192,000	
1904-1905	121	19.1	123	102,300	
1905-1906	117	19.7	127	105,400	
1906-1907	123	27.1	174	145,000	
1907-1908	85	10.8	70	57,800	
1908-1909	147	30.8	198	165,000	
1909-1910	82	14.3	92	76,300	
1910-1911	100	15.5	100	83,000	
1911-1912	76	6.6	42	35,500	
1912-1913	81	8.2	53	44,000	
1913-1914	140	29.2	188	156,100	
1914-1915	130	2.2	173	145,500	
1915-1916	106	17.1	110	91,700	
1916-1917	76	6.3	40	33,700	
1917-1918	66	3.0	19	16,100	
1918-1919	86	10.8	70	57,700	
1919-1920	48	0.6	4	3,200	
1920-1921	119	21.5	138	115,000	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	83,100	15.50	828	
Maximum seasonal	294,800	55.10	2,938	1889-1890
Minimum seasonal	3,200	0.60	32	1919-1920
Mean during July	1,700	0.32	17	
Maximum during July	6,200	1.15	62	1889-1890
Minimum during July	70	0.01	1	1919-1920
Mean during August	1,200	0.22	12	
Maximum during August	4,400	0.82	44	1889-1890
Minimum during August	50	0.01	Trace	1919-1920

Probable run-off curve, Plate XVIII.

Storage development curve, Plate CL.

Mass curve of run-off, Plate XCV.

Probable frequency of flood discharge, Plate LVIII.

(a) Description of drainage basin: Tributary area above junction with Sacramento River, 100 square miles.  
(b) The tributary streams of the Upper Sacramento River were adjusted for probable run-off among themselves to agree with the stream flow at Red Bluff, deducting the run-off of the Pit and McCloud Rivers. Consideration was given to partial records where they existed.

(c) Estimated from U. S. G. S. records for other streams in vicinity.



TABLE 38. COW CREEK.  
SEASONAL RUN-OFF DATA. Drainage area 444 square miles.a

Season. (Begins October 1.)	Index of seasonal wetness. Division B.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.) <sup>d</sup>	Distribution of seasonal run-off by months. <sup>e</sup>
1871-1872	111	24.5	114	579,300	January, 17.4%
1872-1873	53	2.8	13	66,000	February, 19.3%
1873-1874	85	12.7	59	301,000	March, 20.3%
1874-1875	51	2.4	11	56,000	April, 11.1%
1875-1876	154	41.7	193	985,400	May, 8.2%
1876-1877	69	13.2	61	311,200	June, 4.5%
1877-1878	182	51.8	240	1,225,800	July, 2.1%
1878-1879	92	17.0	79	402,400	August, 1.5%
1879-1880	107	27.8	129	657,300	September, 1.4%
1880-1881	127	36.8	171	869,900	October, 2.0%
1881-1882	75	12.5	58	296,000	November, 4.9%
1882-1883	75	10.4	48	245,100	December, 7.3%
1883-1884	98	23.0	107	545,200	
1884-1885	58	6.1	28	143,200	
1885-1886	124	34.7	161	821,400	
1886-1887	60	7.0	32	166,600	
1887-1888	55	4.1	19	96,400	
1888-1889	104	23.5	109	557,100	
1889-1890	198	64.7	300	1,531,300	
1890-1891	66	7.9	37	186,700	
1891-1892	77	11.6	54	274,000	
1892-1893	117	30.0	139	711,200	
1893-1894	92	16.9	78	398,800	
1894-1895	125	31.8	147	753,200	
1895-1896	120	24.5	114	581,100	
1896-1897	97	23.5	109	555,600	
1897-1898	60	4.7	22	111,100	
1898-1899	68	7.8	36	183,700	
1899-1900	112	14.8	69	350,700	
1900-1901	102	16.9	78	399,600	
1901-1902	131	27.1	126	641,200	
1902-1903	108	23.9	111	565,500	
1903-1904	144	47.1	218	1,112,700	
1904-1905	121	26.3	122	619,300	
1905-1906	117	27.1	126	642,600	
1906-1907	123	36.9	171	872,400	
1907-1908	85	15.6	72	368,800	
1908-1909	147	40.2	186	951,600	
1909-1910	82	21.0	97	496,100	
1910-1911	100	21.9	102	518,300	
1911-1912	76	10.5	49	248,200	
1912-1913	81	12.2	57	288,000	
1913-1914	140	38.5	178	910,100	
1914-1915	130	36.5	169	864,400	
1915-1916	106	24.1	112	569,300	
1916-1917	76	9.9	46	235,500	
1917-1918	66	6.0	28	140,700	
1918-1919	86	15.6	72	368,300	
1919-1920	48	1.6	7	38,900	
1920-1921	119	29.5	137	697,500	

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.c

b191,300  
b258,300

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	510,200	21.60	1,150	
Maximum seasonal	1,531,300	64.70	3,452	1889-1890
Minimum seasonal	38,900	1.60	88	1919-1920
Mean during July	10,700	0.45	24	
Maximum during July	32,200	1.36	73	1889-1890
Minimum during July	820	0.03	2	1919-1920
Mean during August	7,700	0.33	17	
Maximum during August	23,000	0.97	52	1889-1890
Minimum during August	580	0.02	1	1919-1920

Probable run-off curve, Plate XIX.

Storage development curve, Plate CLI.

Mass curve of run-off, Plate XCVI.

Probable frequency of flood discharge, Plate LIX.

(a) Description of drainage basin: Tributary area above junction with the Sacramento River.

(b) Gaged discharge of Cow Creek and Little Cow Creek combined.

(c) Point of measurement: Cow Creek, at highway bridge in Millville, drainage area 155 square miles; Little Cow Creek, one-fourth mile above junction with Cow Creek, drainage area 148 square miles.

(d) The tributary streams of the Upper Sacramento River were adjusted for probable run-off among themselves to agree with the stream flow at Red Bluff, deducting the run-off of the Pit and McCloud Rivers. Consideration was given to partial records where they existed.

(e) Estimated from U. S. G. S. records for other streams in vicinity.

TABLE 39. BEAR CREEK GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 137 square miles.a

Season. (Begins October 1.)	Index of seasonal wetness. Division B.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)c	Distribution of seasonal run-off by month.d
1871-1872	111	16.3	115	119,400	January, 17.4%
1872-1873	53	0.5	4	3,500	February, 19.3%
1873-1874	85	8.5	60	62,400	March, 20.3%
1874-1875	51	0.3	2	2,300	April, 11.1%
1875-1876	154	27.6	195	202,500	May, 8.2%
1876-1877	69	8.6	61	63,000	June, 4.5%
1877-1878	182	34.2	242	251,100	July, 2.1%
1878-1879	92	11.4	81	83,600	August, 1.5%
1879-1880	107	18.5	131	135,700	September, 1.4%
1880-1881	157	24.5	173	179,400	October, 2.0%
1881-1882	75	8.3	59	60,800	November, 4.9%
1882-1883	75	6.9	49	50,400	December, 7.3%
1883-1884	98	15.4	109	112,800	
1884-1885	58	1.6	11	11,800	
1885-1886	124	23.2	164	170,200	
1886-1887	60	3.1	22	23,100	
1887-1888	55	0.8	6	5,500	
1888-1889	104	15.7	111	115,300	
1889-1890	198	42.7	302	312,800	
1890-1891	66	5.1	36	37,000	
1891-1892	77	7.7	54	56,400	
1892-1893	117	20.0	141	146,900	
1893-1894	92	11.3	80	82,800	
1894-1895	125	21.2	150	155,800	
1895-1896	120	16.4	116	120,200	
1896-1897	97	15.8	112	115,600	
1897-1898	60	2.1	15	15,400	
1898-1899	68	5.0	35	36,900	
1899-1900	112	9.9	70	72,300	
1900-1901	102	11.3	80	82,500	
1901-1902	131	18.1	128	132,400	
1902-1903	108	15.9	112	116,900	
1903-1904	144	31.3	221	229,400	
1904-1905	121	17.5	124	128,500	
1905-1906	117	18.1	128	132,700	
1906-1907	123	25.0	177	180,400	
1907-1908	85	10.4	73	76,400	
1908-1909	147	26.7	189	195,400	
1909-1910	82	14.0	99	102,700	
1910-1911	100	14.6	103	107,300	
1911-1912	75	7.0	49	51,500	
1912-1913	81	8.1	57	59,500	
1913-1914	140	25.7	182	188,100	
1914-1915	130	21.4	172	178,900	
1915-1916	106	16.0	113	117,500	
1916-1917	76	6.7	47	48,800	
1917-1918	66	3.8	27	27,900	
1918-1919	86	10.4	73	76,500	
1919-1920	48	0.2	1	1,400	
1920-1921	119	19.7	139	144,000	

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.b

49,700  
53,600

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	103,700	14.2	755	
Maximum seasonal	312,800	42.7	2,280	1889-1890
Minimum seasonal	1,400	0.2	10	1919-1920
Mean during July	2,200	0.3	16	
Maximum during July	6,600	0.9	48	1889-1890
Minimum during July	30	Trace	Trace	1919-1920
Mean during August	1,600	0.2	12	
Maximum during August	4,700	0.6	34	1889-1890
Minimum during August	20	Trace	Trace	1919-1920

Probable run-off curve, Plate XIX.

Storage development curve, Plate CLI.

Mass curve of run-off, Plate XCVI.

Probable frequency of flood discharge, Plate LIX.

(a) Description of drainage basin: Tributary area of Bear Creek (123 square miles) and Ash Creek (14 square miles), above their junctions with Sacramento River.

(b) Point of measurement: Highway bridge on Bear Creek, 5 miles above the junction with the Sacramento River, drainage area 106.5 square miles.

(c) The tributary streams of the Upper Sacramento River were adjusted for probable run-off among themselves to agree with the stream flow at Red Bluff, deducting the run-off of the Pit and McCloud Rivers. Consideration was given to partial records where they exist.

(d) Estimated from U. S. G. S. records for other streams in vicinity.

TABLE 40. BATTLE CREEK.  
SEASONAL RUN-OFF DATA. Drainage area 366 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division B.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.) <sup>b</sup>	Distribution of seasonal run-off by months. <sup>c</sup>
1871-1872	111	23.2	108	453,100	January, 17.4%
1872-1873	53	7.7	36	150,400	February, 19.3%
1873-1874	85	14.7	68	286,900	March, 20.3%
1874-1875	51	7.4	34	144,000	April, 11.1%
1875-1876	154	34.8	161	680,600	May, 8.2%
1876-1877	69	19.2	89	375,800	June, 4.5%
1877-1878	182	42.1	196	823,500	July, 2.1%
1878-1879	92	18.3	85	358,200	August, 1.5%
1879-1880	107	26.8	124	524,700	September, 1.4%
1880-1881	12.	32.5	151	634,900	October, 2.0%
1881-1882	75	16.5	77	321,700	November, 4.9%
1882-1883	75	13.6	63	266,300	December, 7.3%
1883-1884	98	23.6	109	461,300	
1884-1885	58	12.3	57	240,800	
1885-1886	124	31.1	144	607,300	
1886-1887	60	13.2	61	258,900	
1887-1888	55	9.4	44	184,300	
1888-1889	104	23.2	108	453,000	
1889-1890	198	52.5	243	1,025,700	
1890-1891	66	12.4	58	241,600	
1891-1892	77	14.5	67	284,400	
1892-1893	117	27.6	128	539,600	
1893-1894	92	18.2	84	355,000	
1894-1895	125	28.3	131	554,300	
1895-1896	120	22.3	103	435,800	
1896-1897	97	24.2	112	473,700	
1897-1898	60	8.8	41	172,600	
1898-1899	68	11.6	54	227,400	
1899-1900	11	13.9	64	271,500	
1900-1901	102	16.8	78	328,700	
1901-1902	131	23.7	110	462,700	
1902-1903	108	23.0	107	448,700	
1903-1904	144	39.9	185	779,500	
1904-1905	121	23.7	110	463,600	
1905-1906	117	24.9	115	487,600	
1906-1907	123	33.1	153	647,300	
1907-1908	85	18.0	83	351,500	
1908-1909	147	33.9	157	662,000	
1909-1910	82	25.1	116	490,800	
1910-1911	100	22.1	102	432,400	
1911-1912	76	13.6	63	265,300	
1912-1913	81	14.8	69	289,800	
1913-1914	140	32.8	152	642,200	
1914-1915	130	32.0	148	626,500	
1915-1916	106	23.4	109	457,200	
1916-1917	76	12.9	60	252,200	
1917-1918	66	9.3	43	182,100	
1918-1919	86	17.8	83	347,600	
1919-1920	48	7.1	33	138,300	
1920-1921	119	26.8	124	524,500	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	421,800	21.60	1,151	
Maximum seasonal	1,025,700	52.50	2,799	1889-1890
Minimum seasonal	138,300	7.10	377	1919-1920
Mean during July	8,900	0.46	24	
Maximum during July	21,500	1.10	59	1889-1890
Minimum during July	2,900	0.15	8	1919-1920
Mean during August	6,300	0.32	17	
Maximum during August	15,400	0.79	42	1889-1890
Minimum during August	2,100	0.11	6	1919-1920

Probable run-off curve, Plate XIX.

Storage development curve, Plate CL.

Mass curve of run-off, Plate XCVI.

Probable frequency of flood discharge, Plate LIX.

(a) Description of drainage basin: Tributary area above junction with the Sacramento River.

(b) The tributary streams of the Sacramento River above Red Bluff were adjusted for probable run-off among themselves to agree with the stream flow at Red Bluff, deducting the run-off of the Pit and McCloud Rivers. Consideration was given to partial records where they existed.

(c) Estimated from U. S. G. S. records for other streams in vicinity.

TABLE 41. INK'S CREEK.  
SEASONAL RUN-OFF DATA. Drainage area 34 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness Division 4	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.) <sup>b</sup>	Distribution of seasonal run-off by months. <sup>c</sup>
1871-1872	111	17.7	114	32,200	January, 17.4%
1872-1873	53	0.4	3	700	February, 19.3%
1873-1874	85	8.6	56	15,700	March, 20.3%
1874-1875	51	0.2	1	400	April, 11.1%
1875-1876	154	32.1	207	58,500	May, 8.2%
1876-1877	69	8.1	52	14,800	June, 4.5%
1877-1878	182	41.5	268	75,600	July, 2.1%
1878-1879	92	11.7	76	21,200	August, 1.5%
1879-1880	107	20.0	129	36,400	September, 1.4%
1880-1881	127	27.2	176	49,600	October, 2.0%
1881-1882	75	8.1	52	14,800	November, 4.9%
1882-1883	75	6.7	43	12,200	December, 7.3%
1883-1884	98	16.5	107	30,200	
1884-1885	58	1.4	9	2,500	
1885-1886	124	25.9	167	47,100	
1886-1887	60	3.1	20	5,600	
1887-1888	55	0.6	4	1,100	
1888-1889	104	16.8	109	30,700	
1889-1890	198	52.8	341	96,400	
1890-1891	66	4.6	30	8,300	
1891-1892	77	7.5	48	13,700	
1892-1893	117	22.0	142	40,100	
1893-1894	92	11.6	75	21,000	
1894-1895	125	23.7	153	43,100	
1895-1896	120	18.1	117	33,100	
1896-1897	97	16.5	107	30,000	
1897-1898	60	2.1	14	3,700	
1898-1899	68	4.7	30	8,500	
1899-1900	112	10.7	69	19,400	
1900-1901	102	12.0	78	21,800	
1901-1902	131	20.2	131	36,900	
1902-1903	108	17.1	110	31,200	
1903-1904	144	36.0	233	65,600	
1904-1905	121	19.3	125	35,200	
1905-1906	117	19.9	129	36,300	
1906-1907	123	27.1	175	49,400	
1907-1908	85	10.6	68	19,300	
1908-1909	147	30.6	198	55,900	
1909-1910	82	14.0	90	25,600	
1910-1911	100	15.4	100	28,100	
1911-1912	76	6.9	45	12,500	
1912-1913	81	8.1	52	14,700	
1913-1914	140	29.2	189	53,200	
1914-1915	130	27.3	176	49,800	
1915-1916	106	17.1	110	31,200	
1916-1917	76	6.5	42	11,900	
1917-1918	66	3.4	22	6,300	
1918-1919	86	10.5	68	19,100	
1919-1920	48	0.1	1	200	
1920-1921	119	21.5	139	39,200	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	28,200	15.50	825	
Maximum seasonal	96,400	52.80	2,821	1889-1890
Minimum seasonal	200	0.10	6	1919-1920
Mean during July	590	0.32	17	
Maximum during July	2,020	1.11	59	1889-1890
Minimum during July	Trace	Trace	Trace	1919-1920
Mean during August	420	0.23	12	
Maximum during August	1,450	0.80	42	1889-1890
Minimum during August	Trace	Trace	Trace	1919-1920

Probable run-off curve, Plate XX.

Storage development curve, Plate CLII.

Mass curve of run-off, Plate XCVII.

Probable frequency of flood discharge, Plate LX.

(a) Description of drainage basin: Tributary area above junction with the Sacramento River.

(b) The tributary streams of the Sacramento River above Red Bluff were adjusted for probable run-off among themselves to agree with the stream flow at Red Bluff, deducting the run-off of the Pit and McCloud Rivers. Consideration was given to partial records where they existed.

(c) Estimated from U. S. G. S. records for other streams in vicinity.

TABLE 42. PAYNE'S CREEK.

SEASONAL RUN-OFF DATA. Drainage area 80 square miles.a

Season. (Begins October 1.)	Index of seasonal wetness. Division B.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.) <sup>b</sup>	Distribution of seasonal run-off by months.c
1871-1872	111	22.2	113	95,300	January, 17.4%
1872-1873	53	2.5	13	10,900	February, 19.3%
1873-1874	85	11.6	59	49,500	March, 20.3%
1874-1875	51	2.1	11	9,100	April, 11.1%
1875-1876	154	38.2	194	163,700	May, 8.2%
1876-1877	69	11.7	60	50,100	June, 4.5%
1877-1878	182	47.8	242	205,200	July, 2.1%
1878-1879	92	15.5	79	66,400	August, 1.5%
1879-1880	107	25.3	129	108,200	September, 1.4%
1880-1881	127	33.5	171	143,600	October, 2.0%
1881-1882	75	11.2	57	48,000	November, 4.9%
1882-1883	75	9.3	47	39,700	December, 7.3%
1883-1884	98	20.9	106	89,700	
1884-1885	58	5.3	27	22,900	
1885-1886	124	31.6	161	135,600	
1886-1887	60	6.2	32	26,500	
1887-1888	55	3.5	18	15,000	
1888-1889	104	21.2	108	91,700	
1889-1890	198	60.5	306	257,800	
1890-1891	66	7.0	36	29,900	
1891-1892	77	10.4	53	44,500	
1892-1893	117	27.4	140	117,100	
1893-1894	92	15.4	78	65,800	
1894-1895	125	29.1	148	124,800	
1895-1896	120	22.4	114	96,100	
1896-1897	97	21.4	109	91,900	
1897-1898	60	4.1	21	17,700	
1898-1899	68	6.9	35	20,500	
1899-1900	112	13.5	69	57,800	
1900-1901	102	15.4	78	65,800	
1901-1902	131	24.7	128	105,700	
1902-1903	108	21.7	110	93,200	
1903-1904	144	43.0	218	184,500	
1904-1905	121	23.9	122	102,300	
1905-1906	117	24.7	126	105,900	
1906-1907	123	33.7	172	144,300	
1907-1908	85	14.2	72	60,700	
1908-1909	147	36.7	187	157,200	
1909-1910	82	19.1	97	81,600	
1910-1911	100	19.8	101	84,600	
1911-1912	76	9.4	48	40,300	
1912-1913	81	11.0	56	47,000	
1913-1914	140	35.2	179	150,700	
1914-1915	130	33.4	170	142,900	
1915-1916	106	21.9	111	94,000	
1916-1917	76	8.9	45	38,300	
1917-1918	66	5.2	26	22,500	
1918-1919	86	14.1	72	60,600	
1919-1920	48	1.8	9	7,700	
1920-1921	119	26.9	137	115,500	

SUMMARY OF ESTIMATED RUNOFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	84,200	19.60	1,048	
Maximum seasonal	257,800	60.50	3,208	1889-1890
Minimum seasonal	7,700	1.80	96	1919-1920
Mean during July	1,800	0.42	22	
Maximum during July	5,400	1.26	67	1889-1890
Minimum during July	160	0.04	2	1919-1920
Mean during August	1,300	0.30	16	
Maximum during August	3,900	0.91	49	1889-1890
Minimum during August	120	0.03	1	1919-1920

Probable run-off curve, Plate XX.

Storage development curve, Plate CLII.

(a) Description of drainage basin: Tributary area above junction with the Sacramento River.

(b) The tributary streams of the Sacramento River above Red Bluff were adjusted for probable run-off among themselves to agree with the stream flow at Red Bluff, deducting the run-off of the Pit and McCloud Rivers. Consideration was given to partial records where they existed.

(c) Estimated from U. S. G. S. records for other streams in vicinity.

Mass curve of run-off, Plate XCVII.

Probable frequency of flood discharge, Plate LX.

TABLE 43. BACKBONE CREEK GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 178 square miles. a

Season. (Begins October 1.)	Index of seasonal wetness. Division B.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.) <sup>b</sup>	Distribution of seasonal run-off by months. <sup>c</sup>
1871-1872	111	24.9	114	236,100	January, 17.4%
1872-1873	53	1.9	9	18,200	February, 19.3%
1873-1874	85	12.8	59	121,300	March, 20.3%
1874-1875	51	1.1	5	10,800	April, 11.1%
1875-1876	154	43.2	198	410,100	May, 8.2%
1876-1877	69	12.7	58	121,000	June, 4.5%
1877-1878	182	54.2	248	514,800	July, 2.1%
1878-1879	92	17.2	79	163,100	August, 1.5%
1879-1880	107	28.3	130	268,300	September, 1.4%
1880-1881	127	37.7	173	357,500	October, 2.0%
1881-1882	75	12.3	56	115,300	November, 4.9%
1882-1883	75	10.1	46	96,300	December, 7.3%
1883-1884	98	22.3	102	221,600	
1884-1885	58	5.3	24	50,200	
1885-1886	124	35.5	163	336,600	
1886-1887	60	6.4	29	60,500	
1887-1888	55	3.3	15	30,900	
1888-1889	104	24.0	110	227,800	
1889-1890	198	67.7	310	642,300	
1890-1891	66	7.6	35	72,300	
1891-1892	77	11.5	53	109,000	
1892-1893	117	30.7	141	290,900	
1893-1894	92	17.0	78	161,700	
1894-1895	125	32.5	149	308,200	
1895-1896	120	25.0	114	237,800	
1896-1897	97	23.8	109	226,100	
1897-1898	60	4.2	19	40,300	
1898-1899	68	7.5	34	71,200	
1899-1900	112	15.1	69	143,600	
1900-1901	102	17.2	79	163,700	
1901-1902	131	27.7	127	263,400	
1902-1903	108	24.3	110	230,600	
1903-1904	144	48.5	222	460,400	
1904-1905	121	26.7	122	253,700	
1905-1906	117	27.7	127	262,900	
1906-1907	123	37.6	172	357,400	
1907-1908	85	15.7	72	148,600	
1908-1909	147	41.6	190	395,100	
1909-1910	82	21.0	96	199,800	
1910-1911	100	22.2	102	210,800	
1911-1912	76	10.4	48	98,300	
1912-1913	81	12.2	56	115,500	
1913-1914	140	39.6	181	375,600	
1914-1915	130	37.5	172	355,800	
1915-1916	106	24.6	113	233,100	
1916-1917	76	9.8	45	93,200	
1917-1918	66	5.7	26	54,500	
1918-1919	86	15.7	72	149,200	
1919-1920	43	0.2	1	2,000	
1920-1921	119	30.1	138	285,300	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	207,500	21.80	1,166	
Maximum seasonal	642,300	67.70	3,609	1889-1890
Minimum seasonal	2,000	0.20	11	1919-1920
Mean during July	4,400	0.46	25	
Maximum during July	13,500	1.42	76	1889-1890
Minimum during July	40	Trace	Trace	1919-1920
Mean during August	3,100	0.33	17	
Maximum during August	9,600	1.01	54	1889-1890
Minimum during August	30	Trace	Trace	1919-1920

Probable run-off curve, Plate XX.

Mass curve of run-off, Plate XCVII.

Storage development curve, Plate CLII.

Probable frequency of flood discharge, Plate LX.

(a) Description of drainage basin: Tributary area above junction with the Sacramento River.

(b) The tributary streams of the Sacramento River above Red Bluff were adjusted for probable run-off among themselves to agree with the stream flow at Red Bluff, deducting the run-off of the Pit and McCloud Rivers. Consideration was given to partial records where they existed.

(c) Estimated from U. S. G. S. records for other streams in vicinity.

TABLE 44. CLEAR CREEK.

SEASONAL RUN-OFF DATA. Drainage area 251 square miles.a

Season. (Begins October 1.)	Index of seasonal wetness. Division B.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)c	Distribution of seasonal run-off by months.d
1871-1872.....	111	24.8	112	332,300	January, 17.4%
1872-1873.....	53	4.1	19	54,300	February, 19.3%
1873-1874.....	85	13.3	60	178,400	March, 20.3%
1874-1875.....	51	3.7	17	49,500	April, 11.1%
1875-1876.....	154	41.2	187	551,200	May, 8.2%
1876-1877.....	69	14.5	66	194,400	June, 4.5%
1877-1878.....	182	51.0	231	683,100	July, 2.1%
1878-1879.....	92	17.6	80	235,600	August, 1.5%
1879-1880.....	107	28.2	128	377,500	September, 1.4%
1880-1881.....	127	36.7	166	491,900	October, 2.0%
1881-1882.....	75	13.5	61	180,200	November, 4.9%
1882-1883.....	75	11.1	50	149,200	December, 7.3%
1883-1884.....	98	23.6	107	316,100	
1884-1885.....	58	7.5	34	100,300	
1885-1886.....	124	34.8	158	465,300	
1886-1887.....	60	8.5	39	113,400	
1887-1888.....	55	5.4	25	72,400	
1888-1889.....	104	24.0	109	321,700	
1889-1890.....	198	62.6	289	850,800	
1890-1891.....	66	8.9	40	119,000	
1891-1892.....	77	12.1	56	166,200	
1892-1893.....	117	30.3	137	405,300	
1893-1894.....	92	17.4	79	233,500	
1894-1895.....	125	31.8	144	426,100	
1895-1896.....	120	24.6	112	329,900	
1896-1897.....	97	24.2	110	323,500	
1897-1898.....	60	5.6	25	75,600	
1898-1899.....	68	8.6	39	115,300	
1899-1900.....	112	15.0	68	200,800	
1900-1901.....	102	17.3	79	231,100	
1901-1902.....	131	27.0	123	361,300	
1902-1903.....	108	24.2	110	324,200	
1903-1904.....	144	46.6	211	623,200	
1904-1905.....	121	26.3	119	351,800	
1905-1906.....	117	27.4	124	366,300	
1906-1907.....	123	36.9	168	494,300	
1907-1908.....	85	16.3	74	213,600	
1908-1909.....	147	39.7	180	531,700	
1909-1910.....	82	22.1	100	296,400	
1910-1911.....	100	22.4	102	300,000	
1911-1912.....	76	11.3	51	151,400	
1912-1913.....	81	12.9	59	172,900	
1913-1914.....	140	38.1	173	510,600	
1914-1915.....	130	36.5	166	488,200	
1915-1916.....	106	24.5	111	328,000	
1916-1917.....	76	10.7	49	143,600	
1917-1918.....	66	6.7	30	89,700	
1918-1919.....	85	16.3	74	218,400	
1919-1920.....	48	3.2	15	43,300	
1920-1921.....	119	29.6	134	396,100	

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.b

136,100  
134,000

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal.....	294,900	22.00	1,175	
Maximum seasonal.....	850,800	63.60	3,390	1889-1890
Minimum seasonal.....	43,300	3.20	173	1919-1920
Mean during July.....	6,200	0.46	25	
Maximum during July.....	17,900	1.33	71	1889-1890
Minimum during July.....	910	0.07	4	1919-1920
Mean during August.....	4,400	0.33	18	
Maximum during August.....	12,800	0.96	51	1889-1890
Minimum during August.....	650	0.05	3	1919-1920

Probable run-off curve, Plate XX.

Mass curve of run-off, Plate XCVII.

Storage development curve, Plate CLII.

Probable frequency of flood discharge, Plate LX.

(a) Description of drainage basin: Tributary area above junction with the Sacramento River.

(b) Point of measurement: Suspension bridge near Whiskey Town, 1000 feet above mouth of Brandy Creek; drainage area 182 square miles.

(c) The tributary streams of the Upper Sacramento River were adjusted for probable run-off among themselves to agree with the stream flow at Red Bluff, deducting the run-off of the Pit and McCulloch Rivers. Consideration was given to partial records where they existed.

(d) Estimated from U. S. G. S. records for other streams in vicinity.

TABLE 45. COTTONWOOD CREEK.  
SEASONAL RUN-OFF DATA. Drainage area 937 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division B.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.) <sup>d</sup>	Distribution of seasonal run-off by months as shown by U.S.G.S. records.
1871-1872	111	20.7	113	1,036,900	January, 17.4%
1872-1873	53	2.7	15	136,600	February, 19.3%
1873-1874	85	10.8	59	540,000	March, 20.3%
1874-1875	51	2.4	13	121,300	April, 11.1%
1875-1876	154	35.0	192	1,749,300	May, 8.2%
1876-1877	69	11.9	65	559,400	June, 4.5%
1877-1878	182	43.2	236	2,162,700	July, 2.1%
1878-1879	92	14.4	79	722,200	August, 1.5%
1879-1880	107	23.5	129	1,175,700	September, 1.4%
1880-1881	127	31.1	170	1,555,700	October, 2.0%
1881-1882	75	10.6	58	529,500	November, 4.9%
1882-1883	75	8.8	48	438,400	December, 7.3%
1883-1884	98	19.5	107	974,100	
1884-1885	58	5.4	30	270,600	
1885-1886	124	29.4	161	1,468,900	
1886-1887	60	6.2	34	310,700	
1887-1888	55	3.8	21	188,100	
1888-1889	104	19.9	109	995,900	
1889-1890	198	53.9	295	2,697,100	
1890-1891	66	6.8	37	337,800	
1891-1892	77	9.8	54	490,800	
1892-1893	117	25.4	139	1,272,700	
1893-1894	92	14.3	78	715,800	
1894-1895	125	26.9	147	1,347,200	
1895-1896	120	20.8	114	1,039,700	
1896-1897	97	19.9	109	995,500	
1897-1898	60	4.1	22	207,200	
1898-1899	68	6.6	36	331,900	
1899-1900	112	12.5	68	627,500	
1900-1901	102	14.3	78	714,200	
1901-1902	131	22.9	125	1,143,600	Measured seasonal discharge in acre-feet at U.S.G.S. gaging station. <sup>c</sup>
1902-1903	108	20.2	111	1,012,000	
1903-1904	144	39.6	217	1,979,400	
1904-1905	121	22.2	122	1,107,600	
1905-1906	117	23.0	126	1,150,100	
1906-1907	123	31.2	171	1,560,500	
1907-1908	85	13.2	72	661,600	672,900
1908-1909	117	33.8	135	1,688,600	177,800
1909-1910	82	17.8	97	889,100	82,500
1910-1911	100	18.5	101	926,800	97,100
1911-1912	76	8.9	49	443,600	71,300
1912-1913	81	10.3	56	516,200	47,800
1913-1914	140	32.4	177	1,619,700	
1914-1915	130	30.9	169	1,544,000	
1915-1916	106	20.4	112	1,019,300	
1916-1917	76	8.4	46	420,900	
1917-1918	66	5.1	28	254,600	
1918-1919	86	13.2	72	661,000	
1919-1920	48	2.1	11	104,400	
1920-1921	119	25.0	137	1,248,900	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	913,300	18.30	974	
Maximum seasonal	2,697,100	53.50	2,877	1889-1890
Minimum seasonal	104,400	2.10	111	1919-1920
Mean during July	19,200	0.38	20	
Maximum during July	56,600	1.13	60	1889-1890
Minimum during July	2,200	0.04	2	1919-1920
Mean during August	13,700	0.27	15	
Maximum during August	40,500	0.81	43	1889-1890
Minimum during August	1,600	0.03	2	1919-1920

Probable run-off curve, Plate XXI.

Storage development curve, Plate CLIII.

Mass curve of run-off, Plate XCVIII.

Probable frequency of flood discharge, Plate LXI.

(a) Description of drainage basin: Tributary area above junction with the Sacramento River.

(b) Partial record, November 1 to September 30.

(c) Point of measurement: On North Fork of Cottonwood Creek, one-fourth mile southwest of Ono, 250 feet below junction with Byron Creek, drainage area 52 square miles

(d) The tributary streams of the Upper Sacramento River were adjusted for probable run-off among themselves to agree with the stream flow at Red Bluff, deducting the run-off of the Pit and McCloud Rivers. Consideration was given to partial records where they existed.



TABLE 46. SACRAMENTO RIVER.

SEASONAL RUN-OFF DATA. Drainage area 9,258 square miles.a

Season. (Begins October 1.)	Index of seasonal wetness. <sup>b</sup>	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.) <sup>c</sup>	Distribution of seasonal run-off by months as shown by U.S.G.S. records. <sup>e</sup>
1871-1872.....	103	20.7	103	10,200,000	January, 14.2 <sup>00</sup> / <sub>100</sub>
1872-1873.....	58	9.7	48	4,780,000	February, 16.0 <sup>00</sup> / <sub>100</sub>
1873-1874.....	81	14.8	74	7,300,000	March, 16.9 <sup>00</sup> / <sub>100</sub>
1874-1875.....	54	8.9	44	4,390,000	April, 11.9 <sup>00</sup> / <sub>100</sub>
1875-1876.....	134	29.3	146	14,500,000	May, 9.0 <sup>00</sup> / <sub>100</sub>
1876-1877.....	101	20.0	100	9,870,000	June, 5.7 <sup>00</sup> / <sub>100</sub>
1877-1878.....	157	36.1	180	17,800,000	July, 4.0 <sup>00</sup> / <sub>100</sub>
1878-1879.....	89	17.0	85	8,380,000	August, 3.4 <sup>00</sup> / <sub>100</sub>
1879-1880.....	118	25.0	124	12,300,000	September, 2.8 <sup>00</sup> / <sub>100</sub>
1880-1881.....	141	31.2	156	15,400,000	October, 3.5 <sup>00</sup> / <sub>100</sub>
1881-1882.....	87	16.2	80	8,000,000	November, 5.4 <sup>00</sup> / <sub>100</sub>
1882-1883.....	75	13.5	67	6,670,000	December, 7.2 <sup>00</sup> / <sub>100</sub>
1883-1884.....	113	23.0	114	11,400,000	
1884-1885.....	73	13.1	65	6,460,000	
1885-1886.....	134	29.2	145	14,400,000	
1886-1887.....	75	13.5	67	6,670,000	
1887-1888.....	64	11.0	55	5,430,000	
1888-1889.....	107	21.5	107	10,600,000	
1889-1890.....	189	46.0	229	22,700,000	
1890-1891.....	73	13.1	65	6,460,000	
1891-1892.....	80	14.7	73	7,250,000	
1892-1893.....	120	25.2	125	12,400,000	
1893-1894.....	92	17.5	87	8,640,000	
1894-1895.....	119	25.0	124	12,300,000	
1895-1896.....	119	23.0	114	11,343,200	
1896-1897.....	101	21.0	104	10,391,400	
1897-1898.....	62	10.4	52	5,135,800	
1898-1899.....	69	12.1	60	5,977,400	
1899-1900.....	107	17.6	88	8,712,500	
1900-1901.....	102	18.3	91	9,020,900	
1901-1902.....	119	23.1	115	11,380,600	
1902-1903.....	100	20.1	100	9,941,800	
1903-1904.....	138	32.6	162	16,095,800	
1904-1905.....	111	21.9	109	10,775,200	
1905-1906.....	112	22.9	114	11,294,300	
1906-1907.....	125	28.1	140	13,883,700	
1907-1908.....	82	16.0	80	7,921,100	
1908-1909.....	136	29.6	147	14,568,700	
1909-1910.....	81	18.4	91	9,106,300	
1910-1911.....	103	20.4	101	10,108,300	
1911-1912.....	73	13.3	66	6,577,800	
1912-1913.....	81	14.3	71	7,049,100	
1913-1914.....	136	27.7	138	13,737,900	
1914-1915.....	113	25.5	127	12,582,900	
1915-1916.....	101	21.6	107	10,719,600	
1916-1917.....	79	14.5	72	7,167,100	
1917-1918.....	64	10.9	54	5,388,500	
1918-1919.....	82	15.7	78	7,779,700	
1919-1920.....	51	8.2	41	4,068,800	
1920-1921.....	116	23.1	115	11,421,700	

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.<sup>c</sup>

January, 14.2<sup>00</sup>/<sub>100</sub>  
 February, 16.0<sup>00</sup>/<sub>100</sub>  
 March, 16.9<sup>00</sup>/<sub>100</sub>  
 April, 11.9<sup>00</sup>/<sub>100</sub>  
 May, 9.0<sup>00</sup>/<sub>100</sub>  
 June, 5.7<sup>00</sup>/<sub>100</sub>  
 July, 4.0<sup>00</sup>/<sub>100</sub>  
 August, 3.4<sup>00</sup>/<sub>100</sub>  
 September, 2.8<sup>00</sup>/<sub>100</sub>  
 October, 3.5<sup>00</sup>/<sub>100</sub>  
 November, 5.4<sup>00</sup>/<sub>100</sub>  
 December, 7.2<sup>00</sup>/<sub>100</sub>

d3,347,000  
 11,170,400  
 10,216,800  
 4,959,300  
 5,799,200  
 8,532,500  
 8,335,700  
 11,197,100  
 9,756,300  
 15,908,900  
 10,586,300  
 11,103,400  
 13,691,300  
 7,726,800  
 14,372,800  
 8,908,100  
 9,908,800  
 6,369,200  
 6,831,600  
 13,511,100  
 12,347,400  
 10,474,800  
 6,913,600  
 5,125,500  
 7,507,600  
 3,888,100  
 11,131,800

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal.....	9,929,000	20.10	1,072	
Maximum seasonal.....	22,700,000	46.00	2,452	1889-1890
Minimum seasonal.....	4,068,800	8.20	439	1919-1920
Mean during July.....	397,200	0.80	43	
Maximum during July.....	908,000	1.80	98	1889-1890
Minimum during July.....	175,600	0.40	19	1874-1875
Mean during August.....	337,600	0.70	36	
Maximum during August.....	771,800	1.60	83	1889-1890
Minimum during August.....	149,300	0.30	16	1874-1875

Probable run-off curve, Plate XXI. Mass curve of run-off, Plate XCVIII.  
 Storage development curve, Plate CLIII. Probable frequency of flood discharge, Plate LXI

(a) Description of drainage basin: Tributary area above gage at Red Bluff.  
 (b) Index of seasonal wetness for Divisions A and B weighted in proportion of 1 and 3, respectively.  
 (c) Point of measurement: (1) Jellys Ferry, 12 miles above Red Bluff, May 1, 1895, to February 1, 1902, drainage area 9,093 square miles. (2) Red Bluff gage 4 miles above Red Bluff, February 1, 1902 to date, drainage area 9,258 square miles. Area of 9,258 square miles used in computations, assuming discharges at Jellys Ferry and Red Bluff to be equal. This area includes 145 square miles of agricultural land, assumed to produce no run-off in computing yield of individual streams above Red Bluff.  
 (d) Partial record, May 1 to September 30.  
 (e) Measured run-off adjusted for storage and irrigation above point of measurement as follows: Storage capacity 1895-1896, 3,040 acre-feet; 1896-1900, 8,180 acre-feet; 1901-1903, 9,920 acre-feet; 1904-1905, 12,920 acre-feet; 1906-1907, 13,170 acre-feet; 1908-1909, 15,360 acre-feet; 1910, 15,900 acre-feet; 1911, 16,520 acre-feet; 1912, 16,870 acre-feet; 1913, 32,080 acre-feet; 1914, 32,260 acre-feet; 1915, 27,120 acre-feet; 1916, 29,850 acre-feet; 1917, 29,090 acre-feet; 1918, 30,240 acre-feet; 1919, 36,960 acre-feet; 1920, 37,960 acre-feet; 1921, 121,900 acre-feet. Irrigation, 1895-1896, 96,000 acres, increasing 1,000 acres per year to 111,000 acres in 1910-1911 and thereafter increasing 5,000 acres per year to 161,000 acres in 1920-1921.

TABLE 47. MILL CREEK GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 971 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division G.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>d</sup>
1871-1872	126	30.0	134	1,553,000	January, 19.0%
1872-1873	74	14.5	65	751,000	February, 16.5%
1873-1874	106	23.4	105	1,212,000	March, 14.9%
1874-1875	66	12.4	55	642,000	April, 11.9%
1875-1876	122	28.7	128	1,486,000	May, 9.9%
1876-1877	61	11.2	50	580,000	June, 7.0%
1877-1878	96	20.5	92	1,062,000	July, 3.5%
1878-1879	104	23.0	103	1,191,000	August, 2.1%
1879-1880	123	29.5	132	1,528,000	September, 1.9%
1880-1881	107	23.7	106	1,227,000	October, 1.9%
1881-1882	95	20.4	91	1,056,000	November, 5.1%
1882-1883	80	16.1	72	834,000	December, 6.3%
1883-1884	113	26.0	116	1,346,000	
1884-1885	77	15.2	68	787,000	
1885-1886	116	26.7	120	1,383,000	
1886-1887	63	12.0	54	621,000	
1887-1888	64	12.1	54	627,000	
1888-1889	100	21.7	97	1,124,000	
1889-1890	180	50.4	226	2,610,000	
1890-1891	77	15.2	68	787,000	
1891-1892	103	22.6	101	1,170,000	
1892-1893	125	29.8	133	1,543,000	
1893-1894	89	18.6	83	963,000	
1894-1895	125	29.8	133	1,543,000	
1895-1896	131	31.8	142	1,647,000	
1896-1897	106	23.4	105	1,212,000	
1897-1898	66	12.4	55	642,000	
1898-1899	74	14.5	65	751,000	
1899-1900	117	26.8	120	1,388,000	
1900-1901	114	26.2	117	1,357,000	
1901-1902	107	23.7	106	1,227,000	
1902-1903	95	20.4	91	1,056,000	
1903-1904	140	35.0	157	1,812,000	
1904-1905	109	24.7	111	1,279,000	
1905-1906	130	31.6	141	1,636,000	
1906-1907	153	40.0	179	2,071,000	
1907-1908	73	14.4	65	746,000	
1908-1909	136	33.4	150	1,729,000	
1909-1910	87	17.7	79	917,000	
1910-1911	126	30.0	134	1,553,000	b118,910
1911-1912	59	11.0	49	570,000	c123,900
1912-1913	77	15.2	68	787,000	c156,700
1913-1914	130	31.6	141	1,636,000	c398,800
1914-1915	99	21.6	97	1,118,000	c322,100
1915-1916	99	21.6	97	1,118,000	
1916-1917	83	17.0	76	880,000	
1917-1918	58	10.9	49	564,000	
1918-1919	80	16.1	72	834,000	
1919-1920	54	9.9	44	513,000	
1920-1921	105	23.2	104	1,201,000	c340,600

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	1,157,400	22.40	1,192	
Maximum seasonal	2,610,000	50.40	2,688	1889-1890
Minimum seasonal	513,000	9.90	528	1919-1920
Mean during July	40,500	0.78	42	
Maximum during July	91,400	1.77	94	1889-1890
Minimum during July	18,000	0.35	19	1919-1920
Mean during August	24,300	0.47	25	
Maximum during August	54,800	1.06	56	1889-1890
Minimum during August	10,800	0.21	11	1919-1920

Probable run-off curve, Plate XXI.

Mass curve of run-off, Plate XCVIII.

Storage development curve, Plate CLIII.

Probable frequency of flood discharge, Plate LXI.

(a) Description of drainage basin: Areas tributary to the following streams above designated points: MILL CREEK,  $\frac{1}{4}$  mile above mouth, drainage area 217 square miles; DEER CREEK, elevation 550 feet, drainage area 205 square miles; ANTELOPE CREEK, junction with Sacramento River, drainage area 234 square miles; BIG CHICO CREEK, elevation 225 feet, drainage area 72 square miles; LITTLE CHICO CREEK, elevation 270 feet, drainage area 26 square miles; SYCAMORE HOLLOW, elevation 290 feet, drainage area 16 square miles; SHEEP HOLLOW, elevation 260 feet, drainage area 2 square miles; GRIZZLY HOLLOW, elevation 270 feet, drainage area 2 square miles; MUD CREEK, elevation 260 feet, drainage area 21 square miles; ROCK CREEK, elevation 290 feet, drainage area 36 square miles; PINE CREEK, elevation 290 feet, drainage area 26 square miles; ZIMMERSHED CREEK, elevation 290 feet, drainage area 13 square miles; CAMEL CREEK, elevation 270 feet, drainage area 14 square miles; RATTLESAKE CREEK, junction with Brush Creek, drainage area 5 square miles; SINGER CREEK, junction with Brush Creek, drainage area 17 square miles; BRUSH CREEK, junction with Camel Creek, drainage area 18 square miles; RIO DE LOS BERRENDOS, junction with Sacramento River, drainage area 46 square miles.

(b) Mill Creek, near Los Molinos, N. E.  $\frac{1}{4}$  of Sec. 1, T. 25 N., R. 2 W., at suspension foot bridge, drainage area 137 square miles. Partial record, May 1 to September 30.

(c) Deer Creek, near Vina, in N. W.  $\frac{1}{4}$  of Sec. 23, T. 25 N., R. 1 W., drainage area 206 square miles.

(d) Estimated from records for other streams in vicinity.

TABLE 48. BUTTE CREEK GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 251 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division G.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>c</sup>
1871-1872.....	126	36.7	137	491,000	January, 16.1%
1872-1873.....	74	16.8	63	225,000	February, 18.7%
1873-1874.....	106	28.3	106	379,000	March, 14.9%
1874-1875.....	66	14.0	52	187,000	April, 12.0%
1875-1876.....	122	34.9	130	467,000	May, 10.1%
1876-1877.....	61	12.6	47	169,000	June, 4.5%
1877-1878.....	96	24.5	91	328,000	July, 1.9%
1878-1879.....	104	27.7	103	371,000	August, 1.4%
1879-1880.....	123	35.6	133	476,000	September, 2.0%
1880-1881.....	107	28.5	106	381,000	October, 2.6%
1881-1882.....	95	24.2	90	324,000	November, 5.7%
1882-1883.....	80	18.8	70	252,000	December, 10.1%
1883-1884.....	113	31.2	116	418,000	
1884-1885.....	77	17.5	65	234,000	
1885-1886.....	116	32.3	121	432,000	
1886-1887.....	63	15.5	50	181,000	
1887-1888.....	64	13.6	51	182,000	
1888-1889.....	100	28.2	98	351,000	
1889-1890.....	180	62.7	234	839,000	
1890-1891.....	77	17.5	65	234,000	
1891-1892.....	103	27.6	103	369,000	
1892-1893.....	125	36.3	136	486,000	
1893-1894.....	89	22.1	83	296,000	
1894-1895.....	125	36.3	136	486,000	
1895-1896.....	131	38.8	145	519,000	
1896-1897.....	106	28.3	106	379,000	
1897-1898.....	66	14.0	52	187,000	
1898-1899.....	74	16.8	63	225,000	
1899-1900.....	117	32.6	122	436,000	
1900-1901.....	114	31.8	119	426,000	
1901-1902.....	107	28.5	106	381,000	
1902-1903.....	95	24.2	90	324,000	
1903-1904.....	140	43.0	161	575,000	
1904-1905.....	109	29.9	112	400,000	
1905-1906.....	130	38.5	144	515,000	
1906-1907.....	153	49.5	185	662,000	
1907-1908.....	73	16.6	62	222,000	
1908-1909.....	136	41.0	153	549,000	
1909-1910.....	87	21.0	78	281,000	
1910-1911.....	126	36.5	136	488,000	
1911-1912.....	59	12.0	45	161,000	
1912-1913.....	77	17.5	65	234,000	
1913-1914.....	130	38.5	144	515,000	
1914-1915.....	99	25.8	96	345,000	
1915-1916.....	99	25.8	96	345,000	
1916-1917.....	83	20.0	75	268,000	
1917-1918.....	58	11.8	44	158,000	
1918-1919.....	80	18.8	70	252,000	
1919-1920.....	54	10.6	40	142,000	
1920-1921.....	105	28.0	105	375,000	

Measured seasonal discharge in acre-feet.<sup>b</sup>

192,000
89,000
191,900
109,700
185,800
84,500
97,600
187,000
197,500
180,700
140,500
79,500
97,100
68,700
149,200

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal.....	358,400	26.80	1,428	.....
Maximum seasonal.....	839,000	62.70	3,343	1889-1890
Minimum seasonal.....	142,000	10.60	566	1919-1920
Mean during July.....	6,800	0.51	27	.....
Maximum during July.....	15,900	1.19	63	1889-1890
Minimum during July.....	2,700	0.20	11	1919-1920
Mean during August.....	5,000	0.37	20	.....
Maximum during August.....	11,700	0.87	47	1889-1890
Minimum during August.....	2,000	0.15	8	1919-1920

Probable run-off curve, Plate XXI.

Mass curve of run-off, Plate XCVIII.

Storage development curve, Plate CLIII.

Probable frequency of flood discharge, Plate LXI.

(a) Description of drainage basin: Tributary areas above points where designated contours cross streams: BUTTE CREEK, 260 feet elevation; LITTLE DRY CREEK, 180 feet elevation; CLEAR CREEK, 180 feet elevation; GOLD RUN, 190 feet elevation; CHAMBERS RAVINE, 220 feet elevation; COAL CANYON, 220 feet elevation.

(b) Point of measurement: Head Dam on Butte Creek, drainage area 60 square miles. Data from the Pacific Gas and Electric Company.

(c) Estimated from records for streams in vicinity.

TABLE 49. FEATHER RIVER.  
SEASONAL RUN-OFF DATA. Drainage area 3,627 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness, Division G.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.) <sup>c</sup>	Distribution of seasonal run-off by months as shown by U.S.G.S. records. <sup>e</sup>
1871-1872	126	37.5	137	7,254,000	January, 10.9%
1872-1873	74	17.3	63	3,347,000	February, 11.9%
1873-1874	106	28.8	105	5,571,000	March, 17.5%
1874-1875	66	14.2	52	2,747,000	April, 18.8%
1875-1876	122	35.5	130	6,867,000	May, 15.9%
1876-1877	61	12.6	46	2,437,000	June, 7.8%
1877-1878	96	25.0	91	4,836,000	July, 3.1%
1878-1879	104	28.5	104	5,513,000	August, 1.9%
1879-1880	123	36.5	134	7,061,000	September, 1.5%
1880-1881	107	29.0	106	5,610,000	October, 1.9%
1881-1882	95	24.8	91	4,797,000	November, 3.9%
1882-1883	80	19.2	70	3,714,000	December, 4.9%
1883-1884	113	32.0	117	6,190,000	
1884-1885	77	18.0	66	3,482,000	
1885-1886	116	33.0	121	6,384,000	
1886-1887	63	13.5	49	2,611,000	
1887-1888	64	13.8	50	2,669,000	
1888-1889	100	26.5	97	5,126,000	
1889-1890	180	62.5	229	12,090,000	
1890-1891	77	18.0	66	3,482,000	
1891-1892	103	28.0	102	5,416,000	
1892-1893	125	37.1	136	7,177,000	
1893-1894	89	22.8	83	4,410,000	
1894-1895	125	37.1	136	7,177,000	
1895-1896	131	40.0	146	7,738,000	
1896-1897	106	29.0	106	5,610,000	
1897-1898	66	14.5	53	2,805,000	
1898-1899	74	17.0	62	3,288,000	
1899-1900	117	33.6	123	6,500,000	
1900-1901	114	32.2	118	6,229,000	
1901-1902	107	23.1	84	4,468,000	d3,948,300
1902-1903	95	23.2	85	4,483,500	4,441,200
1903-1904	140	48.5	177	9,377,000	9,334,700
1904-1905	109	23.5	86	4,529,200	4,486,900
1905-1906	130	35.0	128	6,753,400	6,711,100
1906-1907	153	48.6	178	9,383,400	9,341,100
1907-1908	73	18.3	67	3,530,000	3,487,700
1908-1909	136	39.0	143	7,430,600	7,388,300
1909-1910	87	23.5	86	4,541,600	4,499,400
1910-1911	126	36.4	133	7,022,600	6,978,100
1911-1912	59	11.0	40	2,117,800	2,071,100
1912-1913	77	14.1	52	2,722,700	2,673,900
1913-1914	130	41.2	151	7,958,200	7,746,600
1914-1915	99	30.6	112	5,915,400	5,882,700
1915-1916	99	35.5	130	6,852,100	6,800,100
1916-1917	83	25.4	93	4,908,000	4,853,200
1917-1918	58	13.5	49	2,603,300	2,547,000
1918-1919	80	18.1	66	3,499,000	3,440,300
1919-1920	54	10.7	39	2,073,900	2,053,000
1920-1921	105	30.5	112	5,879,400	5,725,800

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.<sup>b</sup>

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	5,283,500	27.3	1,456	
Maximum seasonal	12,090,000	62.5	3,333	1889-1890
Minimum seasonal	2,073,900	10.7	572	1919-1920
Mean during July	163,800	0.8	45	
Maximum during July	377,400	2.0	104	1906-1907
Minimum during July	75,500	0.4	21	1876-1877
Mean during August	100,400	0.5	28	
Maximum during August	229,700	1.2	63	1889-1890
Minimum during August	46,300	0.2	13	1876-1877

Probable run-off curve, Plate XXII.

Storage development curve, Plate CLIV.

Mass curve of run-off, Plate XCIX.

Probable frequency of flood discharge, Plate LXII.

- (a) Description of drainage basin: Tributary area above gage at highway bridge at Oroville.
- (b) Point of measurement at highway bridge at Oroville, 3,627 square miles.
- (c) Records adjusted for irrigation and storage in Lake Almanor. Irrigation: 1902-1903, 23,500 acres, thereafter increasing 1220 acres per year to 36,920 acres in 1920-1921. Records of monthly inflow and outflow at Lake Almanor are published in U. S. G. S. Water Supply Papers 391, 411, 461, 481 and advance sheets.
- (d) Partial record, January 1 to September 30.

TABLE 50. HONCUT CREEK GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 314 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division G.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872.....	126	17 0	143	284,000	January, 21.5%
1872-1873.....	74	6 7	56	112,000	February, 21.6%
1873-1874.....	106	12 7	107	212,000	March, 14.6%
1874-1875.....	66	5 4	45	90,000	April, 9.5%
1875-1876.....	122	16 2	136	271,000	May, 5.6%
1876-1877.....	61	4 7	39	79,000	June, 3.9%
1877-1878.....	96	10 7	90	179,000	July, 0.8%
1878-1879.....	104	12 3	103	206,000	August, 0.1%
1879-1880.....	123	16 5	138	276,000	September, 0.9%
1880-1881.....	107	12 8	107	214,000	October, 2.7%
1881-1882.....	95	10 5	88	176,000	November, 6.6%
1882-1883.....	80	7 7	65	129,000	December, 12.2%
1883-1884.....	113	14 2	119	238,000	
1884-1885.....	77	7 2	60	120,000	
1885-1886.....	116	14 8	124	248,000	
1886-1887.....	63	5 0	42	84,000	
1887-1888.....	64	5 2	44	87,000	
1889-1890.....	100	11 4	96	191,000	
1889-1890.....	180	31 2	262	522,000	
1890-1891.....	77	7 2	60	120,000	
1891-1892.....	103	12 1	102	202,000	
1892-1893.....	125	16 8	141	281,000	
1893-1894.....	89	9 4	79	157,000	
1894-1895.....	125	16 8	141	281,000	
1895-1896.....	131	18 2	153	305,000	
1896-1897.....	106	12 7	107	212,000	
1897-1898.....	66	5 4	45	90,000	
1898-1899.....	74	6 7	56	112,000	
1899-1900.....	117	15 0	126	251,000	
1900-1901.....	114	14 5	122	243,000	
1901-1902.....	107	12 8	107	214,000	
1902-1903.....	95	10 5	88	176,000	
1903-1904.....	140	20 4	171	341,000	
1904-1905.....	109	13 4	112	224,000	
1905-1906.....	130	18 0	151	301,000	
1906-1907.....	153	23 6	198	395,000	
1907-1908.....	73	6 6	55	110,000	
1908-1909.....	136	19 4	163	325,000	
1909-1910.....	87	8 8	74	147,000	
1910-1911.....	126	17 0	143	284,000	
1911-1912.....	59	4 4	37	74,000	
1912-1913.....	77	7 2	60	120,000	
1913-1914.....	130	18 0	151	301,000	
1914-1915.....	99	11 3	95	189,000	
1915-1916.....	99	11 3	95	189,000	
1916-1917.....	83	8 3	70	139,000	
1917-1918.....	58	4 2	35	70,000	
1918-1919.....	80	7 7	65	129,000	
1919-1920.....	54	3 5	29	59,000	
1920-1921.....	105	12 5	105	209,000	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal.....	199,400	11.90	636	
Maximum seasonal.....	522,000	31.20	1,664	1889-1890
Minimum seasonal.....	59,000	3.50	188	1919-1920
Mean during July.....	1,600	0.10	5	
Maximum during July.....	4,200	0.25	13	1889-1890
Minimum during July.....	470	0.03	1	1919-1920
Mean during August.....	200	0.01	1	
Maximum during August.....	520	0.03	2	1889-1890
Minimum during August.....	60	Trace	Trace	1919-1920

Probable run-off curve, Plate XXII.

Mass curve of run-off, Plate XCIX.

Storage development curve, Plate CLIV.

Probable frequency of flood discharge, Plate LXII.

(a) Description of drainage basin: North Honcut Creek, one mile above junction with South Honcut Creek, 63.6 square miles; South Honcut Creek, including Prairie Creek, one mile above junction with North Honcut Creek, 87.2 square miles; Wyman Creek at junction with Wyandotte Creek, 29.7 square miles; Wyandotte Creek at junction with North Honcut Creek, 27.5 square miles; Dry Creek, 500 feet above junction with Yuba River, 105.9 miles.

(b) The distribution of seasonal run-off by months was estimated as follows: The means of record of rainfall by months and seasons for three nearby rainfall stations, Colgate, Dobbins and Palermo, were averaged, 50% of rainfall for each month was carried into next following month, and the resulting values were reduced to percentages of the mean seasonal rainfall, which are assumed to represent the monthly distribution of run-off

TABLE 51. YUBA RIVER.  
SEASONAL RUN-OFF DATA. Drainage area 1,200 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division H.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records. <sup>c</sup>
1871-1872.	141	68.0	164	4,352,000	January, 11.9%
1872-1873.	74	25.6	62	1,638,400	February, 12.7%
1873-1874.	118	52.2	126	3,340,800	March, 17.9%
1874-1875.	72	24.4	59	1,561,600	April, 17.0%
1875-1876.	124	56.0	135	3,594,000	May, 18.0%
1876-1877.	63	20.2	49	1,292,800	June, 10.4%
1877-1878.	98	39.5	95	2,528,000	July, 2.6%
1878-1879.	105	43.7	105	2,796,800	August, 0.8%
1879-1880.	125	56.9	137	3,641,600	September, 0.6%
1880-1881.	112	48.5	117	3,104,000	October, 0.9%
1881-1882.	88	33.6	81	2,150,400	November, 2.8%
1882-1883.	79	28.2	68	1,804,800	December, 4.4%
1883-1884.	112	48.5	117	3,104,000	
1884-1885.	92	36.0	87	2,304,000	
1885-1886.	114	49.6	120	3,174,400	
1886-1887.	72	24.4	59	1,561,600	
1887-1888.	54	15.6	38	998,400	
1888-1889.	73	25.2	61	1,612,800	
1889-1890.	182	96.5	233	6,176,000	
1890-1891.	77	27.3	66	1,747,200	
1891-1892.	83	30.4	73	1,945,600	
1892-1893.	121	54.5	131	3,488,000	
1893-1894.	95	38.0	92	2,432,000	
1894-1895.	136	65.0	157	4,160,000	
1895-1896.	125	56.9	137	3,641,600	
1896-1897.	111	47.5	115	3,040,000	
1897-1898.	60	18.5	45	1,184,000	
1898-1899.	84	31.0	75	1,984,000	
1899-1900.	109	46.2	111	2,956,800	
1900-1901.	106	44.6	108	2,854,400	
1901-1902.	95	38.0	92	2,432,000	
1902-1903.	94	37.0	89	2,368,000	
1903-1904.	139	64.2	155	4,101,800	
1904-1905.	103	37.5	91	2,403,500	
1905-1906.	133	56.7	137	3,634,500	
1906-1907.	138	69.8	168	4,472,000	
1907-1908.	71	25.3	61	1,620,100	
1908-1909.	130	60.8	147	3,900,500	
1909-1910.	99	41.9	101	2,683,900	
1910-1911.	127	55.2	133	3,532,800	
1911-1912.	60	17.8	43	1,139,100	
1912-1913.	72	22.2	54	1,419,300	
1913-1914.	120	45.3	109	2,901,400	
1914-1915.	101	41.0	99	2,624,800	
1915-1916.	104	50.7	122	3,242,100	
1916-1917.	87	38.5	93	2,464,500	
1917-1918.	61	20.0	48	1,283,900	
1918-1919.	85	29.7	72	1,906,400	
1919-1920.	64	19.1	46	1,220,900	
1920-1921.	112	48.4	117	3,105,900	

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.<sup>c</sup>

b288,400
4,100,700
2,402,400
3,633,200
4,460,000
1,593,500
3,881,100
2,668,200
3,507,600
1,129,000
1,396,500
2,865,500
2,499,100
3,091,000
2,306,600
1,141,400
1,740,800
1,084,100
2,873,000

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal.	2,652,600	41.4	2,210	
Maximum seasonal.	6,176,000	96.5	5,147	1889-1890
Minimum seasonal.	998,400	15.6	832	1887-1888
Mean during July.	69,000	1.1	57	
Maximum during July.	194,800	3.0	162	1905-1906
Minimum during July.	20,000	0.3	17	1917-1918
Mean during August.	21,200	0.3	18	
Maximum during August.	49,400	0.8	41	1889-1890
Minimum during August.	8,000	0.1	7	1887-1888

Probable run-off curve, Plate XXII.

Storage development curve, Plate CLIV.

Mass curve of run-off, Plate XCIX.

Probable frequency of flood discharge, Plate LXII.

(a) Description of drainage basin: Tributary area above gage near Smartsville, 1 mile below mouth of Deer Creek.

(b) Partial record, June 1 to September 30.

(c) Measured run-off adjusted for storage, diversion and irrigation above point of measurement as follows: Storage in Lake Spaulding; diversions by South Yuba and Browns Valley canal and by Drum Canal from Lake Spaulding; irrigation of lands other than those served by Browns Valley canal. No adjustments made for diversions by Colgate Flume and by mining ditches, as this water is assumed to be returned.

(d) Point of measurement: Gage near Smartsville, drainage area 1,200 square miles.

TABLE 52. DRY CREEK.  
SEASONAL RUN-OFF DATA. Drainage area 79 square miles.*a*

Season. (Begins October 1.)	Index of seasonal wetness. Division H.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <i>b</i>
1871-1872	141	20.5	174	86,600	January, 18.9%
1872-1873	74	6.5	55	27,500	February, 18.4%
1873-1874	118	15.2	129	64,200	March, 15.3%
1874-1875	72	6.2	53	26,200	April, 11.7%
1875-1876	124	16.5	140	69,700	May, 6.3%
1876-1877	63	4.8	41	20,300	June, 3.0%
1877-1878	98	10.9	93	46,100	July, 0.7%
1878-1879	105	12.3	104	52,000	August, 0.2%
1879-1880	125	16.7	142	70,600	September, 0.8%
1880-1881	112	13.8	117	58,300	October, 3.4%
1881-1882	88	9.0	76	38,000	November, 8.0%
1882-1883	79	7.4	63	31,300	December, 13.3%
1883-1884	112	13.8	117	58,300	
1884-1885	92	9.7	82	41,000	
1885-1886	114	14.2	121	60,000	
1886-1887	72	6.2	53	26,200	
1887-1888	54	3.5	30	14,800	
1888-1889	73	6.4	54	27,000	
1889-1890	182	32.5	276	137,300	
1890-1891	77	7.0	59	29,600	
1891-1892	83	8.1	69	34,200	
1892-1893	121	15.8	134	66,800	
1893-1894	95	10.3	88	43,500	
1894-1895	136	19.3	164	81,500	
1895-1896	125	16.7	142	70,600	
1896-1897	111	13.5	115	57,000	
1897-1898	60	4.3	37	18,200	
1898-1899	84	8.2	70	34,600	
1899-1900	109	13.1	111	55,200	
1900-1901	106	12.5	106	52,800	
1901-1902	95	10.3	88	43,500	
1902-1903	94	10.1	86	42,700	
1903-1904	139	20.2	172	85,200	
1904-1905	103	12.0	102	50,700	
1905-1906	133	18.7	159	79,000	
1906-1907	138	20.0	170	84,500	
1907-1908	71	6.0	51	25,400	
1908-1909	130	17.9	152	75,600	
1909-1910	99	11.1	94	46,900	
1910-1911	127	17.1	145	72,200	
1911-1912	60	4.3	37	18,200	
1912-1913	72	6.2	53	26,200	
1913-1914	120	15.6	133	65,900	
1914-1915	101	11.5	98	48,600	
1915-1916	104	12.1	103	51,100	
1916-1917	87	8.7	74	36,800	
1917-1918	61	4.5	38	19,000	
1918-1919	85	8.4	71	35,500	
1919-1920	64	4.9	42	20,700	
1920-1921	112	13.8	117	58,300	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	49,700	11.80	627	
Maximum seasonal	137,300	32.50	1,733	1889-1890
Minimum seasonal	14,800	3.50	187	1887-1888
Mean during July	350	0.08	4	
Maximum during July	960	0.23	12	1889-1890
Minimum during July	100	0.02	1	1887-1888
Mean during August	100	0.02	1	
Maximum during August	270	0.06	3	1889-1890
Minimum during August	30	0.01	Trace	1887-1888

Probable run-off curve, Plate XXII.

Mass curve of run-off, Plate XCIX.

Storage development curve, Plate CLIV.

Probable frequency of flood discharge, Plate LXII.

(a) Description of drainage basin: Tributary area above a point one-third of a mile below Cabbage Patch.

(b) Estimated from rainfall records.

**TABLE 53. BEAR RIVER.**  
**SEASONAL RUN-OFF DATA. Drainage area 262 square miles.<sup>a</sup>**

Season. (Begins October 1.)	Index of seasonal wetness. Division H.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records. <sup>d</sup>
1871-1872	141	51.8	176	723,800	January, 25.4%
1872-1873	74	16.0	54	223,600	February, 21.7%
1873-1874	118	37.9	128	529,600	March, 20.7%
1874-1875	72	15.1	51	211,000	April, 9.3%
1875-1876	124	41.0	139	572,900	May, 6.1%
1876-1877	63	12.0	41	167,700	June, 2.6%
1877-1878	98	27.3	92	381,500	July, 1.0%
1878-1879	105	30.8	104	430,400	August, 3.6%
1879-1880	125	41.5	141	579,900	September, 0.7%
1880-1881	112	34.5	117	482,100	October, 1.3%
1881-1882	88	22.6	77	315,800	November, 2.3%
1882-1883	79	18.0	61	251,500	December, 8.3%
1883-1884	112	34.5	117	482,100	
1884-1885	92	24.3	82	339,500	
1885-1886	114	35.5	120	496,000	
1886-1887	72	15.1	51	211,000	
1887-1888	54	8.5	29	118,800	
1888-1889	73	15.6	53	218,000	
1889-1890	182	80.0	271	1,117,900	
1890-1891	77	17.4	59	243,100	
1891-1892	83	20.0	68	279,500	
1892-1893	121	39.5	134	551,900	
1893-1894	95	25.9	88	361,900	
1894-1895	136	48.5	164	677,700	
1895-1896	125	41.6	141	581,300	
1896-1897	111	34.0	115	475,100	
1897-1898	60	10.8	37	150,900	
1898-1899	84	20.7	70	289,200	
1899-1900	109	32.5	110	454,100	
1900-1901	106	31.2	106	436,000	
1901-1902	95	25.9	88	361,500	
1902-1903	94	25.0	85	349,300	
1903-1904	139	50.0	169	698,700	
1904-1905	103	27.5	93	d384,000	c314,600
1905-1906	133	44.7	151	d624,900	561,400
1906-1907	138	56.5	191	d789,600	726,100
1907-1908	71	18.1	61	d253,000	188,500
1908-1909	130	41.9	142	d586,300	525,000
1909-1910	99	22.8	77	d318,800	255,700
1910-1911	127	41.1	139	d574,800	513,000
1911-1912	60	11.2	38	d157,100	87,600
1912-1913	72	13.2	45	d184,100	106,400
1913-1914	120	36.5	124	d510,400	542,900
1914-1915	101	31.1	105	d434,000	472,500
1915-1916	104	42.9	145	d600,100	655,700
1916-1917	87	26.0	88	d363,100	340,200
1917-1918	61	10.2	35	d142,600	128,000
1918-1919	85	22.9	78	d320,400	302,800
1919-1920	64	10.3	35	d143,500	97,100
1920-1921	112	33.0	115	d472,400	466,900

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	412,500	29.50	1,574 0	
Maximum seasonal	1,117,900	80.00	4,267 0	1889-1890
Minimum seasonal	118,800	8.50	453.0	1887-1888
Mean during July	4,125	0.30	16.0	
Maximum during July	11,600	0.80	44.0	1915-1916
Minimum during July	650	0.05	2.5	1917-1918
Mean during August	2,475	0.20	9.4	
Maximum during August	8,900	0.60	34.0	1915-1916
Minimum during August	560	0.04	2.1	1920-1921

Probable run-off curve, Plate XXIII.

Storage development curve, Plate CV.

Mass curve of run-off, Plate C.

Probable frequency of flood discharge, Plate LXIII.

(a) Description of drainage basin: Tributary area above gage near Van Trent, 500 feet below highway bridge at McCourtney Crossing.

(b) Point of measurement: Gage near Van Trent, drainage area 262 square miles.

(c) Partial record, October 8 to September 30.

(d) Measured run-off adjusted for diversions, above point of measurement, through Gold Hill, Boardman, Bear River, Drum and South Yuba Canals, and for storage in Bear Valley Reservoir. (Records by Pacific Gas and Electric Co.)



**TABLE 54. COON CREEK GROUP.**  
**SEASONAL RUN-OFF DATA. Drainage area 210 square miles.<sup>a</sup>**

Season. (Begins October 1.)	Index of seasonal wetness. Division J.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	120	4.3	141	48,100	January, 20.3%
1872-1873	75	1.2	39	13,400	February, 19.9%
1873-1874	100	2.6	85	29,100	March, 16.5%
1874-1875	64	0.8	26	9,000	April, 12.2%
1875-1876	124	4.8	158	53,700	May, 6.3%
1876-1877	62	0.7	23	7,800	June, 2.9%
1877-1878	93	2.2	72	24,600	July, 0.0%
1878-1879	104	2.9	95	32,500	August, 0.0%
1879-1880	125	4.9	161	54,800	September, 0.0%
1880-1881	108	3.2	105	35,800	October, 0.1%
1881-1882	103	2.8	92	31,300	November, 7.8%
1882-1883	82	1.6	53	17,900	December, 14.0%
1883-1884	118	4.2	138	41,000	
1884-1885	73	1.2	39	13,400	
1885-1886	115	3.8	125	42,500	
1886-1887	75	1.2	39	13,400	
1887-1888	68	1.0	33	11,200	
1888-1889	76	1.3	43	14,500	
1889-1890	169	11.1	361	124,200	
1890-1891	77	1.3	43	14,500	
1891-1892	90	2.0	66	22,400	
1892-1893	123	4.7	154	52,600	
1893-1894	104	2.9	95	32,500	
1894-1895	128	5.3	174	59,300	
1895-1896	114	3.7	121	41,400	
1896-1897	110	3.4	112	38,000	
1897-1898	59	0.6	20	6,700	
1898-1899	86	1.8	59	20,100	
1899-1900	111	3.5	115	39,200	
1900-1901	112	3.6	118	40,300	
1901-1902	100	2.6	85	29,100	
1902-1903	99	2.5	82	28,000	
1903-1904	137	6.3	207	70,500	
1904-1905	100	2.6	85	29,100	
1905-1906	138	6.5	213	72,700	
1906-1907	150	8.1	266	90,600	
1907-1908	71	1.1	36	12,300	
1908-1909	124	4.8	158	53,700	
1909-1910	95	2.3	76	25,700	
1910-1911	129	5.3	174	59,300	
1911-1912	60	0.7	23	7,800	
1912-1913	67	0.9	30	10,100	
1913-1914	120	4.3	141	48,100	
1914-1915	111	3.5	115	39,200	
1915-1916	104	2.9	95	32,500	
1916-1917	89	1.9	62	21,300	
1917-1918	67	0.9	30	10,100	
1918-1919	91	2.1	69	23,500	
1919-1920	70	1.0	33	11,200	
1920-1921	110	3.4	112	38,000	

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	34,100	3.0	162	
Maximum seasonal	124,200	11.1	591	1889-1890
Minimum seasonal	6,700	0.6	32	1897-1898
Mean during July	0	0.0	0	
Maximum during July	0	0.0	0	
Minimum during July	0	0.0	0	1897-1898
Mean during August	0	0.0	0	
Maximum during August	0	0.0	0	
Minimum during August	0	0.0	0	1897-1898

Probable run-off curve, Plate XXIII.

Storage development curve, Plate CLV.

(a) Description of drainage basin: Tributary area of COON CREEK at junction with Doty Ravine; ANTELOPE CREEK at junction with Walker Ravine; AUBURN RAVINE at junction with Orchard Creek.

(b) Estimated from rainfall distribution.

Mass curve of run-off, Plate C.

Probable frequency of flood discharge, Plate LXIII.

TABLE 55. AMERICAN RIVER.  
SEASONAL RUN-OFF DATA. Drainage area 1,919 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division J.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records. <sup>c</sup>
1871-1872	120	41.2	132	4,215,600	January, 12.3%
1872-1873	75	18.2	59	1,862,200	February, 11.0%
1873-1874	100	30.1	97	3,079,800	March, 15.8%
1874-1875	64	13.6	44	1,391,600	April, 17.0%
1875-1876	124	43.5	140	4,450,900	May, 19.1%
1876-1877	62	12.6	41	1,289,200	June, 12.8%
1877-1878	93	26.6	85	2,721,700	July, 3.7%
1878-1879	104	32.3	104	3,304,900	August, 0.9%
1879-1880	125	44.0	141	4,502,100	September, 0.6%
1880-1881	108	34.6	111	3,540,300	October, 0.8%
1881-1882	103	31.9	102	3,264,000	November, 1.8%
1882-1883	82	21.2	68	2,169,200	December, 3.6%
1883-1884	118	40.1	129	4,103,000	
1884-1885	73	17.4	56	1,780,400	
1885-1886	115	38.3	123	3,918,900	
1886-1887	75	18.2	59	1,862,200	
1887-1888	68	15.4	50	1,575,700	
1888-1889	76	18.6	60	1,903,200	
1889-1890	169	75.5	243	7,725,200	
1890-1891	77	19.0	61	1,944,100	
1891-1892	90	25.1	81	2,568,200	
1892-1893	123	43.0	138	4,399,800	
1893-1894	104	32.3	104	3,304,900	
1894-1895	128	46.3	149	4,737,400	
1895-1896	114	37.7	121	3,857,500	
1896-1897	110	35.5	114	3,632,400	
1897-1898	59	11.6	37	1,186,900	
1898-1899	86	23.1	74	2,363,600	
1899-1900	111	36.0	116	3,683,500	
1900-1901	112	36.3	117	3,714,200	
1901-1902	100	30.1	97	3,079,800	
1902-1903	99	29.7	95	3,038,900	
1903-1904	137	51.3	165	5,249,000	
1904-1905	100	20.0	64	2,050,000	
1905-1906	138	47.3	152	4,835,900	
1906-1907	150	56.5	182	5,782,800	
1907-1908	71	14.9	48	1,526,600	
1908-1909	124	45.2	145	4,622,500	
1909-1910	95	35.3	113	3,614,500	
1910-1911	129	54.3	175	5,555,300	
1911-1912	60	13.1	42	1,336,100	
1912-1913	67	15.1	49	1,541,800	
1913-1914	120	39.8	128	4,072,100	
1914-1915	111	31.1	100	3,179,800	
1915-1916	104	38.7	124	3,964,600	
1916-1917	89	28.8	93	2,948,300	
1917-1918	67	15.1	49	1,541,100	
1918-1919	91	22.1	71	2,265,800	
1919-1920	70	14.7	47	1,501,600	
1920-1921	110	32.6	105	3,336,800	

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.<sup>d</sup>

b1,955,000  
4,763,100  
5,710,100  
1,453,600  
4,549,200  
3,541,500  
5,480,500  
1,264,000  
1,433,800  
3,951,000  
3,060,900  
3,847,900  
2,831,800  
1,420,400  
2,154,900  
1,391,300  
3,223,300

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	3,181,900	31.1	1,658	
Maximum seasonal	7,725,200	75.5	4,026	1889-1890
Minimum seasonal	1,186,900	11.6	618	1897-1898
Mean during July	117,700	1.2	61	
Maximum during July	392,500	3.8	205	1905-1906
Minimum during July	22,800	0.2	12	1918-1919
Mean during August	28,600	0.3	15	
Maximum during August	92,800	0.9	48	1906-1907
Minimum during August	9,500	0.1	5	1917-1918

Probable run-off curve, Plate XXIII.

Storage development curve, Plate CLV.

Mass curve of run-off, Plate C.

Probable frequency of flood discharge, Plate LXIII.

(a) Description of drainage basin: Tributary area above gage at Fair Oaks highway bridge.

(b) Partial record, November 4 to September 30.

(c) Measured run-off adjusted for diversions as follows: Towle Canal (Pacific Gas and Electric Co. records); North Fork Ditch, Nigger Hill Ditch, El Dorado Ditch, Pilot Creek Ditch, Alder Creek pumping plant (Pacific Gas and Electric Co. and Natomas Mutual Water Co. records).

(d) Point of measurement: Gage near Fair Oaks, drainage area 1,919 square miles.

**TABLE 56. RED BANK CREEK GROUP.**  
SEASONAL RUN-OFF DATA. Drainage area 109 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division F.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	116	15.5	123	89,900	January, 18.5%
1872-1873	63	4.8	38	27,800	February, 23.6%
1873-1874	120	16.7	133	96,800	March, 27.0%
1874-1875	82	7.7	61	44,600	April, 11.9%
1875-1876	112	14.5	115	84,100	May, 5.8%
1876-1877	60	4.2	33	24,300	June, 2.4%
1877-1878	142	23.3	185	135,100	July, 0.7%
1878-1879	78	7.1	56	41,200	August, 0.5%
1879-1880	91	9.5	75	55,100	September, 0.2%
1880-1881	83	8.0	64	46,400	October, 0.7%
1881-1882	65	5.0	40	29,000	November, 3.4%
1882-1883	70	5.7	45	33,000	December, 5.3%
1883-1884	99	11.4	91	66,100	
1884-1885	54	3.5	28	20,300	
1885-1886	125	18.1	144	104,900	
1886-1887	64	4.9	39	28,400	
1887-1888	66	5.1	41	29,600	
1888-1889	91	9.5	75	55,100	
1889-1890	177	34.9	277	202,300	
1890-1891	93	10.0	79	58,000	
1891-1892	92	9.8	78	56,800	
1892-1893	138	22.1	175	128,100	
1893-1894	80	7.4	59	42,900	
1894-1895	149	25.7	204	149,000	
1895-1896	117	15.9	126	92,200	
1896-1897	110	13.9	110	80,600	
1897-1898	54	3.5	28	20,300	
1898-1899	80	7.4	59	42,900	
1899-1900	110	13.9	110	80,600	
1900-1901	108	13.5	107	78,300	
1901-1902	129	19.4	154	112,500	
1902-1903	95	10.3	82	59,700	
1903-1904	126	18.4	146	106,700	
1904-1905	141	22.9	182	132,700	
1905-1906	132	20.0	158	115,900	
1906-1907	119	16.5	131	95,700	
1907-1908	75	6.5	52	37,700	
1908-1909	126	18.4	146	106,700	
1909-1910	83	8.0	64	46,400	
1910-1911	110	13.9	110	80,600	
1911-1912	61	4.4	35	25,500	
1912-1913	79	7.2	57	41,700	
1913-1914	156	28.0	222	162,300	
1914-1915	143	23.7	188	137,400	
1915-1916	105	12.7	101	73,600	
1916-1917	81	7.5	60	43,500	
1917-1918	66	5.1	41	29,600	
1918-1919	94	10.2	81	59,100	
1919-1920	57	3.7	29	21,400	
1920-1921	133	20.5	163	118,800	

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	73,000	12.60	672	
Maximum seasonal	202,300	34.50	1,861	1889-1890
Minimum seasonal	20,300	3.50	187	1884-1885 1897-1898
Mean during July	510	0.09	5	
Maximum during July	1,420	0.24	13	1889-1890
Minimum during July	140	0.02	1	1884-1885 1897-1898
Mean during August	370	0.06	3	
Maximum during August	1,010	0.17	9	1889-1890
Minimum during August	100	0.02	1	1884-1885 1897-1898

Probable run-off curve, Plate XXIII.

Storage development curve, Plate CLV.

Mass curve of run-off, Plate CI.

Probable frequency of flood discharge, Plate LXIII.

(a) Description of drainage basin: Tributary area of REEDS CREEK, above base of foothills, longitude 122° 26.7', drainage area 21 square miles; North Fork RED BANK CREEK above base of foothills, longitude 122° 27', and South Fork RED BANK CREEK above base of foothills, longitude 122° 27.6', drainage area 88 square miles.

(b) Estimated from records for Stony Creek.

TABLE 57. ELDER CREEK GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 414 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division F.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	116	11.8	122	260,000	January, 18.5%
1872-1873	63	3.5	36	77,000	February, 23.6%
1873-1874	120	12.8	133	283,000	March, 27.0%
1874-1875	82	5.8	60	128,000	April, 11.9%
1875-1876	112	10.8	112	238,000	May, 5.8%
1876-1877	60	3.2	33	71,000	June, 2.4%
1877-1878	142	18.0	186	397,000	July, 0.7%
1878-1879	78	5.4	56	119,000	August, 0.5%
1879-1880	91	7.2	75	159,000	September, 0.2%
1880-1881	83	6.0	62	132,000	October, 0.7%
1881-1882	65	3.7	38	82,000	November, 3.4%
1882-1883	70	4.3	45	95,000	December, 5.3%
1883-1884	99	8.6	89	190,000	
1884-1885	54	2.6	27	57,000	
1885-1886	125	13.9	144	307,000	
1886-1887	64	3.6	37	79,000	
1887-1888	66	3.8	39	84,000	
1888-1889	91	7.2	75	159,000	
1889-1890	177	27.7	287	611,000	
1890-1891	93	7.6	79	168,000	
1891-1892	92	7.3	76	161,000	
1892-1893	138	17.2	178	350,000	
1893-1894	80	5.6	58	124,000	
1894-1895	149	20.0	207	441,000	
1895-1896	117	12.0	124	265,000	
1896-1897	110	10.6	110	234,000	
1897-1898	54	2.6	27	57,000	
1898-1899	80	5.6	58	124,000	
1899-1900	110	10.6	110	234,000	
1900-1901	108	10.3	107	227,000	
1901-1902	129	15.0	155	331,000	
1902-1903	95	7.9	82	174,000	
1903-1904	126	14.1	146	311,000	
1904-1905	141	17.8	184	393,000	
1905-1906	132	15.5	161	342,000	
1906-1907	119	12.6	131	278,000	
1907-1908	75	4.9	51	108,000	
1908-1909	126	14.1	146	311,000	
1909-1910	83	6.0	62	132,000	
1910-1911	110	10.6	110	234,000	
1911-1912	61	3.3	34	73,000	
1912-1913	79	5.5	57	121,000	
1913-1914	156	22.0	228	486,000	
1914-1915	143	18.4	191	406,000	
1915-1916	105	9.6	99	212,000	
1916-1917	81	5.7	59	126,000	
1917-1918	66	3.8	39	84,000	
1918-1919	94	7.8	81	172,000	
1919-1920	57	2.8	29	62,000	
1920-1921	133	15.9	165	351,000	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	213,000	9.70	515	
Maximum seasonal	611,000	27.70	1,476	1889-1890
Minimum seasonal	57,000	2.60	138	1884-1885 1897-1898
Mean during July	1,490	0.07	4	
Maximum during July	4,280	0.19	10	1889-1890
Minimum during July	400	0.02	1	1884-1885 1897-1898
Mean during August	1,070	0.05	3	
Maximum during August	3,060	0.14	7	1889-1890
Minimum during August	290	0.01	1	1884-1885 1897-1898

Probable run-off curve, Plate XXIV.

Mass curve of run-off, Plate CI.

Storage development curve, Plate CLVI.

Probable frequency of flood discharge, Plate LXIV.

(a) Description of drainage basin: Areas tributary to the following streams: ELDER CREEK, above intersection of longitude 122° 24.7' with stream, drainage area 126 square miles; THOMES CREEK, above Paskenta, drainage area 243 square miles; RICE CREEK tributaries, above intersections with longitude 122° 21', drainage area 45 square miles.

(b) Estimated from records for Stony Creek.

TABLE 58. STONY CREEK.

SEASONAL RUN-OFF DATA. Drainage area 710 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division F.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records. <sup>d</sup>
1871-1872	116	18.5	127	700,400	January, 18.5%
1872-1873	63	5.0	34	189,300	February, 23.6%
1873-1874	120	20.0	137	757,200	March, 27.0%
1874-1875	82	8.7	60	329,400	April, 11.9%
1875-1876	112	17.2	118	651,200	May, 5.8%
1876-1877	60	4.5	31	170,400	June, 2.4%
1877-1878	142	27.5	188	1,041,100	July, 0.7%
1878-1879	78	8.0	55	302,900	August, 0.5%
1879-1880	91	11.0	75	416,500	September, 0.2%
1880-1881	83	9.1	62	344,500	October, 0.7%
1881-1882	65	5.3	36	200,700	November, 3.4%
1882-1883	70	6.2	42	234,700	December, 5.3%
1883-1884	99	13.5	92	511,100	
1884-1885	54	3.4	23	128,700	
1885-1886	125	21.7	148	821,600	
1886-1887	64	5.2	36	196,900	
1887-1888	66	5.5	38	208,200	
1888-1889	91	11.0	75	416,500	
1889-1890	177	39.5	270	1,495,500	
1890-1891	93	11.7	80	443,000	
1891-1892	92	11.2	77	424,000	
1892-1893	138	26.2	179	991,900	
1893-1894	89	8.4	57	318,000	
1894-1895	149	30.0	205	1,135,800	
1895-1896	117	19.0	130	719,300	
1896-1897	110	16.6	114	628,500	
1897-1898	54	3.4	23	128,700	
1898-1899	80	8.4	57	318,000	
1899-1900	110	16.6	114	628,500	
1900-1901	108	16.0	109	665,800	c226,400
1901-1902	129	20.7	141	783,700	653,600
1902-1903	95	17.1	117	667,400	575,500
1903-1904	126	23.5	161	889,700	753,000
1904-1905	141	15.6	107	659,600	508,400
1905-1906	132	16.8	115	663,900	535,300
1906-1907	119	23.6	161	893,500	765,500
1907-1908	75	10.0	68	378,600	337,900
1908-1909	126	27.7	189	1,048,700	894,400
1909-1910	83	10.4	71	393,700	350,600
1910-1911	110	16.6	113	628,500	534,600
1911-1912	61	3.3	23	124,900	127,200
1912-1913	79	8.2	56	310,500	
1913-1914	156	32.2	220	1,219,100	
1914-1915	143	28.0	191	1,060,100	
1915-1916	105	15.2	104	575,500	
1916-1917	81	8.5	58	321,800	
1917-1918	66	5.5	38	208,200	
1918-1919	94	12.0	82	454,300	
1919-1920	57	3.8	26	143,900	
1920-1921	133	24.5	167	927,600	

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.<sup>b</sup>

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	555,000	14.60	782.00	
Maximum seasonal	1,495,500	39.50	2,106.00	1889-1890
Minimum seasonal	124,900	3.30	176.00	1911-1912
Mean during July	3,890	0.10	5.40	
Maximum during July	10,500	0.30	15.00	1889-1890
Minimum during July	900	0.02	1.30	1901-1902
Mean during August	2,780	0.07	3.90	
Maximum during August	11,400	0.30	16.00	1910-1911
Minimum during August	640	0.02	0.90	1884-1885 1897-1898

Probable run-off curve, Plate XXIV.

Storage development curve, Plate CLVI.

Mass curve of run-off, Plate CII.

Probable frequency of flood discharge, Plate LXIV.

(a) Description of drainage basin: Tributary area, including North Fork, above junction of North Fork.

(b) Point of measurement: At gage near Fruto, in S. W.  $\frac{1}{4}$  of N. E.  $\frac{1}{4}$  of Sec. 14, T. 21 N., R. 6 W., drainage area 577 square miles.

(c) Partial record, February 1 to September 30.

(d) Measured run-off adjusted for storage and irrigation as follows: Irrigation 2,250 acres; storage, 13,400 acre-feet carried over from 1910-1911 to 1911-1912 in East Park Reservoir; and for additional area.

TABLE 59. WILLOW CREEK GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 394 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division F.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	116	5.4	123	114,000	January, 18.5%
1872-1873	63	1.7	39	36,000	February, 23.6%
1873-1874	120	5.8	132	122,000	March, 27.0%
1874-1875	82	2.7	62	57,000	April, 11.9%
1875-1876	112	5.0	114	105,000	May, 5.8%
1876-1877	60	1.5	34	32,000	June, 2.4%
1877-1878	142	8.0	182	168,000	July, 0.7%
1878-1879	78	2.4	55	50,000	August, 0.5%
1879-1880	91	3.3	75	69,000	September, 0.2%
1880-1881	83	2.8	64	59,000	October, 0.7%
1881-1882	65	1.8	41	38,000	November, 3.4%
1882-1883	70	2.0	46	42,000	December, 5.3%
1883-1884	99	3.9	89	82,000	
1884-1885	54	1.3	30	27,000	
1885-1886	125	6.2	141	130,000	
1886-1887	64	1.7	39	36,000	
1887-1888	66	1.8	41	38,000	
1888-1889	91	3.3	75	69,000	
1889-1890	177	12.6	287	265,000	
1890-1891	93	3.5	80	74,000	
1891-1892	92	3.4	78	71,000	
1892-1893	138	7.7	176	162,000	
1893-1894	80	2.6	59	55,000	
1894-1895	149	8.9	203	187,000	
1895-1896	117	5.5	125	116,000	
1896-1897	110	4.8	109	101,000	
1897-1898	54	1.3	30	27,000	
1898-1899	80	2.6	59	55,000	
1899-1900	110	4.8	109	101,000	
1900-1901	108	4.8	109	101,000	
1901-1902	129	6.7	153	141,000	
1902-1903	95	3.6	82	76,000	
1903-1904	126	6.3	144	132,000	
1904-1905	141	7.9	180	166,000	
1905-1906	132	6.9	157	145,000	
1906-1907	119	5.7	130	120,000	
1907-1908	75	2.3	52	48,000	
1908-1909	126	6.3	144	132,000	
1909-1910	83	2.8	64	59,000	
1910-1911	110	4.8	109	101,000	
1911-1912	61	1.6	37	34,000	
1912-1913	79	2.5	57	53,000	
1913-1914	156	9.8	224	206,000	
1914-1915	143	8.2	187	172,000	
1915-1916	105	4.4	100	93,000	
1916-1917	81	2.6	59	55,000	
1917-1918	66	1.8	41	38,000	
1918-1919	94	3.5	80	74,000	
1919-1920	57	1.4	32	29,000	
1920-1921	133	7.1	162	149,000	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	92,200	4.40	234	
Maximum seasonal	265,000	12.60	672	1889-1890
Minimum seasonal	27,000	1.30	68	1884-1885 1897-1898
Mean during July	650	0.03	2	
Maximum during July	1,860	0.09	5	1889-1890
Minimum during July	190	0.01	Trace	1884-1885 1897-1898
Mean during August	460	0.02	1	
Maximum during August	1,330	0.06	3	1889-1890
Minimum during August	140	0.01	Trace	1884-1885 1897-1898

Probable run-off curve, Plate XXIV.

Storage development curve, Plate CLVI.

Mass curve of run-off, Plate CII.

Probable frequency of flood discharge, Plate LXIV.

(a) Description of drainage basin: Tributary areas above intersections with streams of longitude lines as follows: HUMBRIGHT CREEK, longitude 122° 21.8'; WILLOW CREEK, longitude 122° 22.3'; LOGAN CREEK, longitude 122° 21.5'; HUNTERS CREEK, longitude 122° 20'; FUNKS CREEK, longitude 122° 18.9'; STONE CORRAL CREEK, longitude 122° 19.4'; SAND CREEK, longitude 122° 10.2'; FRESHWATER CREEK, longitude 122° 19.2'; SALT CREEK, longitude 122° 18.4'; SPRING CREEK, longitude 122° 16.5'; CORTINA CREEK, longitude 122° 12.2'

(b) Estimated from record for Stony Creek.

TABLE 60. CACHE CREEK.

SEASONAL RUN-OFF DATA. Drainage area 1,195 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division F.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by records. <sup>f</sup>
1871-1872	116	10.8	117	688,000	January, 7.8%
1872-1873	63	3.8	41	242,000	February, 13.6%
1873-1874	120	11.6	126	739,000	March, 16.2%
1874-1875	82	5.7	62	363,000	April, 13.6%
1875-1876	112	10.0	109	637,000	May, 11.6%
1876-1877	60	3.5	38	223,000	June, 9.6%
1877-1878	142	16.3	177	1,039,000	July, 9.0%
1878-1879	78	5.3	58	338,000	August, 7.3%
1879-1880	91	6.8	74	433,000	September, 5.1%
1880-1881	83	5.9	64	376,000	October, 2.2%
1881-1882	65	4.0	43	255,000	November, 1.5%
1882-1883	70	4.5	49	287,000	December, 2.5%
1883-1884	99	8.1	88	516,000	
1884-1885	54	3.0	33	191,000	
1885-1886	125	12.6	137	803,000	
1886-1887	64	3.9	42	249,000	
1887-1888	66	4.0	44	255,000	
1888-1889	91	6.8	74	433,000	
1889-1890	177	25.7	280	1,638,000	
1890-1891	93	7.2	78	459,000	
1891-1892	92	7.1	77	453,000	
1892-1893	138	15.6	170	994,000	
1893-1894	80	5.5	60	351,000	
1894-1895	149	18.2	198	1,160,000	
1895-1896	117	10.9	119	695,000	
1896-1897	110	9.8	107	625,000	
1897-1898	54	3.0	33	191,000	
1898-1899	80	5.5	60	351,000	
1899-1900	110	9.8	107	625,000	
1900-1901	108	9.6	104	7612,000	
1901-1902	129	12.0	130	765,600	
1902-1903	95	9.8	107	762,100	
1903-1904	126	17.6	192	1,120,800	
1904-1905	141	11.2	122	7716,700	
1905-1906	132	12.5	136	7796,900	
1906-1907	119	16.3	177	1,039,600	
1907-1908	75	7.9	86	503,200	
1908-1909	126	21.1	230	1,343,600	
1909-1910	83	7.5	81	476,300	
1910-1911	110	9.2	100	584,400	
1911-1912	61	4.0	44	256,300	
1912-1913	79	5.0	54	318,500	
1913-1914	156	17.4	189	1,109,400	
1914-1915	143	16.4	178	1,045,700	
1915-1916	105	8.2	89	520,900	
1916-1917	81	6.0	65	384,400	
1917-1918	66	5.2	57	331,300	
1918-1919	94	6.2	67	393,400	
1919-1920	57	2.7	29	174,600	
1920-1921	133	9.0	98	576,000	

Measured seasonal discharge in acre-feet at gaging station.<sup>b</sup>

<sup>c</sup> 226,600  
<sup>e</sup> 368,000  
<sup>e</sup> 280,400  
<sup>e</sup> 569,300  
<sup>e</sup> 339,500  
<sup>e</sup> 380,900  
<sup>e</sup> 534,400  
<sup>e</sup> 204,900  
<sup>e</sup> 726,400  
<sup>e</sup> 183,200  
<sup>e</sup> 246,500  
<sup>e</sup> 49,700  
<sup>e</sup> 83,000  
<sup>e</sup> 577,600  
<sup>e</sup> 539,200  
<sup>e</sup> 212,800  
<sup>e</sup> 125,600  
<sup>e</sup> 102,300  
<sup>e</sup> 129,500  
<sup>e</sup> 41,200  
<sup>e</sup> 227,200

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	586,000	9.2	490	
Maximum seasonal	1,638,000	25.7	1,371	1889-1890
Minimum seasonal	174,600	2.7	146	1919-1920
Mean during July	52,740	0.8	44	
Maximum during July	117,400	2.3	123	1889-1890
Minimum during July	17,200	0.3	14	1884-1885 1897-1898
Mean during August	42,780	0.7	36	
Maximum during August	119,600	1.9	100	1889-1890
Minimum during August	13,900	0.2	12	1884-1885 1897-1898

Probable run-off curve, Plate XXIV.

Storage development curve, Plate CLVI.

(a) Description of drainage basin: Tributary area above point 1,000 feet upstream from railroad bridge at Yolo.

(b) Point of measurement, near Lower Lake, 300 feet above mouth of Seigler Creek, drainage area 487 square miles.

(c) By United States Geological Survey.

(d) By Yolo Water and Power Company.

(e) Partial record, January 1 to September 30.

(f) Measured discharge adjusted for storage in, and evaporation from, Clear Lake, and for additional area.

Mass curve of run-off, Plate CIII.

Probable frequency of flood discharge, Plate LXIV.

TABLE 61. PUTAH CREEK.  
SEASONAL RUN-OFF DATA. Drainage area 655 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division F.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records. <sup>e</sup>
1871-1872	116	16.1	133	562,000	January, 36.2%
1872-1873	63	2.4	20	84,000	February, 26.4%
1873-1874	120	17.3	143	604,000	March, 19.4%
1874-1875	82	6.7	56	234,000	April, 5.4%
1875-1876	112	15.0	124	524,000	May, 2.1%
1876-1877	60	1.7	15	59,000	June, 0.8%
1877-1878	142	23.7	197	827,000	July, 0.3%
1878-1879	78	5.9	49	206,000	August, 0.2%
1879-1880	91	9.2	76	321,000	September, 0.1%
1880-1881	83	7.1	59	248,000	October, 0.1%
1881-1882	65	2.7	24	94,000	November, 1.3%
1882-1883	70	3.9	32	136,000	December, 7.7%
1883-1884	99	11.4	95	398,000	
1884-1885	54	0.5	5	17,000	
1885-1886	125	18.8	156	656,000	
1886-1887	64	2.5	21	87,000	
1887-1888	66	3.0	25	165,000	
1888-1889	91	9.2	76	321,000	
1889-1890	177	35.5	294	1,239,000	
1890-1891	93	9.9	82	346,000	
1891-1892	92	9.5	79	332,000	
1892-1893	138	22.7	188	793,000	
1893-1894	80	6.2	51	216,000	
1894-1895	149	26.0	216	908,000	
1895-1896	117	16.5	137	576,000	
1896-1897	110	14.5	120	506,000	
1897-1898	54	0.5	5	17,000	
1898-1899	80	6.2	52	216,000	
1899-1900	110	14.5	120	506,000	
1900-1901	108	14.0	116	489,000	
1901-1902	129	20.0	166	698,000	
1902-1903	95	10.2	85	356,000	
1903-1904	126	19.0	158	663,000	
1904-1905	141	23.5	195	820,000	
1905-1906	132	16.9	141	583,000	582,600
1906-1907	119	20.0	166	690,700	690,300
1907-1908	75	5.7	47	199,800	199,400
1908-1909	126	25.3	210	882,200	881,800
1909-1910	83	6.5	54	228,000	227,700
1910-1911	110	13.9	116	487,000	486,200
1911-1912	61	1.6	13	57,300	56,600
1912-1913	79	3.9	32	134,400	133,500
1913-1914	156	25.7	213	896,400	895,300
1914-1915	143	20.5	170	710,600	709,700
1915-1916	105	20.4	169	710,100	708,800
1916-1917	81	8.2	68	285,900	284,400
1917-1918	66	2.6	23	90,800	88,800
1918-1919	94	9.1	75	317,500	315,500
1919-1920	57	1.3	11	45,000	42,600
1920-1921	133	14.7	122	512,900	510,200

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.<sup>d</sup>

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	421,800	12.10	644	
Maximum seasonal	1,239,000	35.50	1,892	1889-1890
Minimum seasonal	17,000	0.50	26	1884-1885 1897-1898
Mean during July	1,270	0.04	2	
Maximum during July	3,720	0.10	6	1889-1890
Minimum during July	50	Trace	Trace	1884-1885 1897-1898
Mean during August	840	0.02	1	
Maximum during August	2,480	0.10	4	1889-1890
Minimum during August	30	Trace	Trace	1884-1885 1897-1898

Probable run-off curve, Plate XXV.

Storage development curve, Plate CLVII.

Mass curve of run-off, Plate CIII.

Probable frequency of flood discharge, Plate LXV.

(a) Description of drainage basin: Tributary area above railroad bridge at Winters.

(b) Partial record, October 1 to May 16.

(c) Partial record, October 1 to May 12, June 10 to August 31, and September 8 to September 30.

(d) Point of measurement: At railroad bridge at Winters, drainage area 655 square miles.

(e) Measured run-off adjusted for irrigation above point of measurement as follows: 337 acres irrigated from 1905-1906 to 1910-1911, and thereafter increasing 167 acres per year to total of 2,000 acres in 1920-1921



TABLE 62. ORESTIMBA CREEK GROUP.

SEASONAL RUN-OFF DATA. Drainage area 1,340 square miles.a

Season. (Begins October 1.)	Index of seasonal wetness.b	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months.c
1871-1872	122	2.3	149	164,400	January, 12.9%
1872-1873	88	0.8	52	57,200	February, 14.9%
1873-1874	87	0.8	52	57,200	March, 15.4%
1874-1875	79	0.5	32	35,700	April, 21.4%
1875-1876	125	2.5	161	178,700	May, 17.4%
1876-1877	33	0.0	0	0	June, 8.9%
1877-1878	113	1.9	123	133,800	July, 4.3%
1878-1879	64	0.1	6	7,100	August, 0.0%
1879-1880	98	1.2	77	85,800	September, 0.0%
1880-1881	97	1.2	77	85,800	October, 0.9%
1881-1882	66	0.1	6	7,100	November, 1.5%
1882-1883	91	1.0	65	71,500	December, 2.4%
1883-1884	150	4.0	258	285,900	
1884-1885	70	0.2	13	14,300	
1885-1886	129	2.7	174	193,000	
1886-1887	55	0.0	0	0	
1887-1888	64	0.1	6	7,100	
1888-1889	80	0.5	32	35,700	
1889-1890	182	6.3	407	450,200	
1890-1891	82	0.6	39	42,900	
1891-1892	93	1.0	65	71,500	
1892-1893	132	2.9	187	207,200	
1893-1894	89	0.9	58	64,300	
1894-1895	140	3.3	213	235,800	
1895-1896	102	1.4	90	100,000	
1896-1897	111	1.8	116	128,600	
1897-1898	50	0.0	0	0	
1898-1899	77	0.5	32	35,700	
1899-1900	105	1.5	97	107,200	
1900-1901	131	2.8	181	200,100	
1901-1902	87	0.8	52	57,200	
1902-1903	100	1.3	84	92,900	
1903-1904	81	0.6	39	42,900	
1904-1905	132	2.9	187	207,200	
1905-1906	138	3.3	213	235,800	
1906-1907	156	4.4	284	314,500	
1907-1908	73	0.4	26	28,600	
1908-1909	116	2.0	129	142,900	
1909-1910	97	1.2	77	85,900	
1910-1911	124	2.4	155	171,500	
1911-1912	65	0.1	6	7,100	
1912-1913	49	0.0	0	0	
1913-1914	146	3.7	239	264,400	
1914-1915	140	3.3	213	235,800	
1915-1916	132	2.9	187	207,200	
1916-1917	82	0.7	45	50,000	
1917-1918	84	0.7	45	50,000	
1918-1919	101	1.4	90	100,000	
1919-1920	78	0.5	32	35,700	
1920-1921	114	2.0	129	142,900	

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	110,800	1.60	83	
Maximum seasonal	450,200	6.30	336	1889-1890
Minimum seasonal	0	0.00	0	(See above.)
Mean during July	4,800	0.07	4	
Maximum during July	19,400	0.27	14	1889-1890
Minimum during July	0	0.00	0	(See above.)
Mean during August	0	0.00	0	
Maximum during August	0	0.00	0	1889-1890
Minimum during August	0	0.00	0	(See above.)

Probable run-off curve, Plate XXV.

Mass curve of run-off, Plate CIV.

Storage development curve, Plate CLVII.

Probable frequency of flood discharge, Plate LXV.

(a) Description of drainage basin: Tributary areas above points of intersection of streams with latitude and longitude lines as follows: LITTLE PANOCHE CREEK, longitude 120° 45.9'; LAGUNA SECA, longitude 120° 48.1'; ORTIGALITA CREEK, longitude 120° 52.1'; LOS BANOS CREEK, latitude 37° 00'; SAN LUIS CREEK, longitude 121° 3.5'; ROMERO CREEK, longitude 121° 5'; QUINTO CREEK, longitude 121° 4.1'; MUSTANG CREEK, longitude 121° 5'; GARZOS CREEK, longitude 121° 7.7'; CROW CREEK, longitude 121° 7.6'; ORESTIMBA CREEK, longitude 121° 6.2'; LITTLE SALADA CREEK, longitude 121° 9.6'; PUERTO CREEK, longitude 121° 12.5'; INGRAM CREEK, longitude 121° 15.5'; HOSPITAL CREEK, longitude 121° 20.7'; BUENOS AIRES CREEK, longitude 121° 26.5'; MOUNTAIN HOUSE CREEK, longitude 121° 32.1'; BUSHY CREEK, longitude 121° 36.5'; KELLOGG CREEK, longitude 121° 39'; MARSH CREEK, longitude 121° 42.8'; LONE TREE CREEK, longitude 121° 21.6'; SAND CREEK, longitude 121° 44.1'; DRY CREEK, longitude 121° 43.2'; DEER CREEK, longitude 121° 43.2'; SALADA CREEK, longitude 121° 9.3'.

(b) Index of seasonal wetness obtained by weighting indices of Divisions L and P in proportion to one and three, respectively.

(c) Estimated from records for White River

TABLE 63. PANOCHE CREEK.  
SEASONAL RUN-OFF DATA. Drainage area 295 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division T.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months b
1871-1872	125	2.7	157	42,500	January, 12.9%
1872-1873	59	0.0	0	0	February, 14.9%
1873-1874	95	1.3	75	20,500	March, 15.4%
1874-1875	79	0.6	35	9,400	April, 21.4%
1875-1876	147	3.7	215	58,200	May, 17.4%
1876-1877	35	0.0	0	0	June, 8.9%
1877-1878	198	3.3	192	51,900	July, 4.3%
1878-1879	51	0.0	0	0	August, 0.0%
1879-1880	106	1.7	99	26,800	September, 0.0%
1880-1881	97	1.4	81	22,000	October, 0.9%
1881-1882	87	1.0	58	15,700	November, 1.5%
1882-1883	85	0.9	52	14,200	December, 2.4%
1883-1884	178	5.7	332	89,700	
1884-1885	72	0.4	23	6,300	
1885-1886	150	4.0	232	63,000	
1886-1887	72	0.4	23	6,300	
1887-1888	88	1.0	58	15,700	
1888-1889	113	2.1	122	33,100	
1889-1890	192	6.7	390	105,500	
1890-1891	89	1.0	58	15,700	
1891-1892	72	0.4	23	6,300	
1892-1893	128	2.8	163	44,100	
1893-1894	45	0.0	0	0	
1894-1895	110	2.0	116	31,500	
1895-1896	90	1.1	64	17,300	
1896-1897	99	1.5	87	23,600	
1897-1898	34	0.0	0	0	
1898-1899	71	0.4	23	6,300	
1899-1900	73	0.4	23	6,300	
1900-1901	142	3.6	210	56,700	
1901-1902	89	1.0	58	15,700	
1902-1903	78	0.6	35	9,400	
1903-1904	73	0.4	23	6,300	
1904-1905	130	2.9	169	45,600	
1905-1906	113	2.1	122	33,000	
1906-1907	147	3.7	215	58,200	
1907-1908	93	1.3	76	20,500	
1908-1909	144	3.6	210	56,700	
1909-1910	101	1.5	87	23,600	
1910-1911	152	4.1	238	64,500	
1911-1912	77	0.6	35	9,400	
1912-1913	46	0.0	0	0	
1913-1914	140	3.4	198	53,500	
1914-1915	147	3.7	215	58,200	
1915-1916	118	2.3	134	36,200	
1916-1917	108	1.9	111	29,900	
1917-1918	84	0.8	47	12,600	
1918-1919	82	0.7	41	11,000	
1919-1920	71	0.4	23	6,300	
1920-1921	85	0.9	52	14,200	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	27,100	1.70	92	
Maximum seasonal	105,500	6.70	358	1889-1890
Minimum seasonal	0	0.00	0	(See above.)
Mean during July	1,170	0.07	4	
Maximum during July	4,540	0.29	15	1889-1890
Minimum during July	0	0.00	0	(See above.)
Mean during August	0	0.00	0	
Maximum during August	0	0.00	0	
Minimum during August	0	0.00	0	(See above.)

Probable run-off curve, Plate XXV.

Storage development curve, Plate CLVII.

(a) Description of drainage basin: Tributary area above foothills, longitude 120° 39.7', near Mendota.

(b) Estimated from record for White River.

Mass curve of run-off, Plate CIV.

Probable frequency of flood discharge, Plate LXV.

**TABLE 64. CANTUA CREEK GROUP.**  
SEASONAL RUN-OFF DATA. Drainage area 208 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division T.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	125	1.7	150	18,900	January, 12.9%
1872-1873	59	0.0	0	0	February, 14.9%
1873-1874	95	0.8	71	8,900	March, 15.4%
1874-1875	79	0.4	35	4,400	April, 21.4%
1875-1876	147	2.6	230	28,800	May, 17.4%
1876-1877	35	0.0	0	0	June, 8.9%
1877-1878	138	2.3	203	25,500	July, 4.3%
1878-1879	51	0.0	0	0	August, 0.0%
1879-1880	106	1.1	97	12,200	September, 0.0%
1880-1881	97	0.8	71	8,900	October, 0.9%
1881-1882	87	0.5	44	5,500	November, 1.5%
1882-1883	85	0.5	44	5,500	December, 2.4%
1883-1884	178	4.2	372	46,600	
1884-1885	72	0.2	18	2,200	
1885-1886	150	2.7	239	30,000	
1886-1887	72	0.2	18	2,200	
1887-1888	88	0.6	53	6,700	
1888-1889	113	1.3	115	14,400	
1889-1890	192	5.0	442	55,500	
1890-1891	89	0.6	53	6,700	
1891-1892	72	0.2	18	2,200	
1892-1893	128	1.8	159	20,000	
1893-1894	45	0.0	0	0	
1894-1895	110	1.2	106	13,300	
1895-1896	99	0.6	53	6,700	
1896-1897	99	0.9	80	10,000	
1897-1898	34	0.0	0	0	
1898-1899	71	0.2	18	2,200	
1899-1900	73	0.2	18	2,200	
1900-1901	142	2.4	212	26,600	
1901-1902	89	0.6	53	6,700	
1902-1903	78	0.3	27	3,300	
1903-1904	73	0.2	18	2,200	
1904-1905	130	2.0	177	22,200	
1905-1906	113	1.3	115	14,400	
1906-1907	147	2.6	230	28,800	
1907-1908	93	0.7	62	7,800	
1908-1909	144	2.5	222	27,700	
1909-1910	101	1.0	89	11,100	
1910-1911	152	2.8	248	31,100	
1911-1912	77	0.3	27	3,300	
1912-1913	46	0.0	0	0	
1913-1914	140	2.3	203	25,500	
1914-1915	147	2.6	230	28,800	
1915-1916	118	1.5	133	16,600	
1916-1917	108	1.2	106	13,300	
1917-1918	84	0.5	44	5,500	
1918-1919	82	0.4	35	4,400	
1919-1920	71	0.2	18	2,200	
1920-1921	85	0.5	44	5,500	

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	12,500	1.10	60	
Maximum seasonal	55,500	5.00	267	1889-1890
Minimum seasonal	0	0.00	0	(See above.)
Mean during July	540	0.05	3	
Maximum during July	2,400	0.22	12	1889-1890
Minimum during July	0	0.00	0	(See above.)
Mean during August	0	0.00	0	
Maximum during August	0	0.00	0	
Minimum during August	0	0.00	0	(See above.)

Probable run-off curve, Plate XXV.

Storage development curve, Plate CLVII.

Mass curve of run-off, Plate CV.

Probable frequency of flood discharge, Plate LXV.

(a) Description of drainage basin: Tributary area above point where 500 foot contour crosses the following streams: DOMENGINE CREEK, MARTINEZ CREEK, SALT CREEK, CANTUA CREEK, ARROYO HONDO, ARROYO CIERVO.

(b) Estimated from records for White River

TABLE 65. LOS GATOS CREEK.  
SEASONAL RUN-OFF DATA. Drainage area 119 square miles.a

Season. (Begins October 1.)	Index of seasonal wetness. Division T.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months.b
1871-1872	125	2.4	156	15,200	January, 12.9%
1872-1873	59	0.0	0	0	February, 14.9%
1873-1874	95	1.1	72	7,000	March, 15.4%
1874-1875	79	0.6	39	3,800	April, 21.4%
1875-1876	147	3.4	221	21,600	May, 17.4%
1876-1877	35	0.0	0	0	June, 8.9%
1877-1878	138	3.0	195	19,000	July, 4.3%
1878-1879	51	0.0	0	0	August, 0.0%
1879-1880	106	1.5	98	9,500	September, 0.0%
1880-1881	97	1.2	78	7,600	October, 0.9%
1881-1882	87	0.8	52	5,100	November, 1.5%
1882-1883	85	0.7	46	4,400	December, 2.4%
1883-1884	178	5.4	351	34,300	
1884-1885	72	0.3	20	1,900	
1885-1886	150	3.5	228	22,200	
1886-1887	72	0.3	20	1,900	
1887-1888	88	0.9	59	5,700	
1888-1889	113	1.8	117	11,400	
1889-1890	192	6.5	422	41,300	
1890-1891	89	0.9	59	5,700	
1891-1892	72	0.3	20	1,900	
1892-1893	128	2.5	163	15,900	
1893-1894	45	0.0	0	0	
1894-1895	110	1.7	110	10,800	
1895-1896	90	1.0	65	6,300	
1896-1897	99	1.3	85	8,200	
1897-1898	34	0.0	0	0	
1898-1899	71	0.1	20	1,900	
1899-1900	73	0.4	26	2,500	
1900-1901	142	3.2	208	20,300	
1901-1902	89	0.9	59	5,700	
1902-1903	78	0.5	33	3,200	
1903-1904	73	0.4	26	2,500	
1904-1905	130	2.5	163	15,900	
1905-1906	113	1.8	117	11,400	
1906-1907	147	3.4	221	21,600	
1907-1908	93	1.0	65	6,400	
1908-1909	144	3.3	214	20,900	
1909-1910	101	1.4	91	8,900	
1910-1911	152	3.7	240	23,500	
1911-1912	77	0.5	33	3,200	
1912-1913	46	0.0	0	0	
1913-1914	140	3.0	195	19,000	
1914-1915	147	3.4	221	21,600	
1915-1916	118	2.0	130	12,700	
1916-1917	108	1.7	111	10,800	
1917-1918	81	0.7	46	4,400	
1918-1919	82	0.6	39	3,800	
1919-1920	71	0.3	20	1,900	
1920-1921	85	0.7	46	4,400	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	9,750	1.50	82	.....
Maximum seasonal	41,300	6.50	347	1889-1890
Minimum seasonal	0	0.00	0	(See above.)
Mean during July	420	0.07	4	.....
Maximum during July	1,780	0.28	15	1889-1890
Minimum during July	0	0.00	0	(See above.)
Mean during August	0	0.00	0	.....
Maximum during August	0	0.00	0	.....
Minimum during August	0	0.00	0	(See above.)

Probable run-off curve, Plate XXVI.

Storage development curve, Plate CLVIII.

Mass curve of run-off, Plate CV.

Probable frequency of flood discharge, Plate LXVI.

(a) Description of drainage basin: Tributary area above point at base of hills, 5½ miles northwest of Coalinga, in S. E. ¼ of Sec. 10, T. 20 S., R. 14 E.

(b) Estimated from record on White River

TABLE 66. TEJON CREEK GROUP.

SEASONAL RUN-OFF DATA. Drainage area 1,341 square miles.a

Season. (Begins October 1.)	Index of seasonal wetness. Division T.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months.b
1871-1872	125	2.0	153	143,100	January, 12.9%
1872-1873	59	0.0	0	0	February, 14.9%
1873-1874	95	0.9	69	64,400	March, 15.4%
1874-1875	79	0.4	31	28,600	April, 21.4%
1875-1876	147	3.0	229	214,600	May, 17.4%
1876-1877	35	0.0	0	0	June, 8.9%
1877-1878	138	2.6	199	186,000	July, 4.3%
1878-1879	51	0.0	0	0	August, 0.0%
1879-1880	106	1.3	100	93,000	September, 0.0%
1880-1881	97	1.0	76	71,500	October, 0.9%
1881-1882	87	0.6	46	42,900	November, 1.5%
1882-1883	85	0.6	46	42,900	December, 2.4%
1883-1884	178	4.8	367	343,400	
1884-1885	72	0.2	15	14,300	
1885-1886	150	3.2	244	228,900	
1886-1887	72	0.2	15	14,300	
1887-1888	88	0.7	54	50,100	
1888-1889	113	1.5	115	107,300	
1889-1890	192	5.8	443	414,900	
1890-1891	89	0.7	54	50,100	
1891-1892	72	0.2	15	14,300	
1892-1893	128	2.2	168	157,400	
1893-1894	45	0.0	0	0	
1894-1895	110	1.4	107	100,100	
1895-1896	90	0.7	54	50,100	
1896-1897	99	1.0	76	71,500	
1897-1898	34	0.0	0	0	
1898-1899	71	0.2	15	14,300	
1899-1900	73	0.2	15	14,300	
1900-1901	142	2.8	214	200,300	
1901-1902	89	0.7	54	50,100	
1902-1903	78	0.4	31	28,600	
1903-1904	73	0.3	23	21,500	
1904-1905	130	2.3	176	164,500	
1905-1906	113	1.5	115	107,300	
1906-1907	147	3.0	230	214,600	
1907-1908	93	0.8	61	57,200	
1908-1909	144	2.9	222	207,400	
1909-1910	101	1.1	84	78,700	
1910-1911	152	3.3	252	236,100	
1911-1912	77	0.3	23	21,500	
1912-1913	46	0.0	0	0	
1913-1914	140	2.7	206	193,100	
1914-1915	147	3.0	229	214,600	
1915-1916	118	1.7	130	121,600	
1916-1917	108	1.4	107	100,100	
1917-1918	84	0.5	38	35,800	
1918-1919	82	0.5	38	35,800	
1919-1920	71	0.2	15	14,300	
1920-1921	85	0.6	46	42,900	

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	95,600	1.30	71	
Maximum seasonal	414,900	5.80	309	1889-1890
Minimum seasonal	0	0.00	0	(See above.)
Mean during July	4,100	0.06	3	
Maximum during July	17,800	0.25	13	1889-1890
Minimum during July	0	0.00	0	(See above.)
Mean during August	0	0.00	0	
Maximum during August	0	0.00	0	
Minimum during August	0	0.00	0	(See above.)

Probable run-off curve, Plate XXVI.

Mass curve of run-off, Plate CVI.

Storage development curve, Plate CLVIII.

Probable frequency of flood discharge, Plate LXVI.

(a) Description of drainage basin: Tributary area, at base of foothills, above intersection of streams with the indicated longitude or latitude lines: WALTHAM CREEK, longitude 120° 22.4'; JACALITOS CREEK, longitude 120° 18.6'; ZAPATO CREEK, longitude 120° 13.9'; BITTERWATER CREEK, longitude 119° 59.4'; DEVILWATER CREEK, longitude 119° 54.9'; MEDIA AGUA, longitude 119° 53.8'; CHICO MARTINEZ, longitude 119° 47.2'; SALT CREEK, longitude 119° 45.5'; BITTER CREEK, longitude 119° 20.7'; SANTIAGO CREEK, latitude 34° 57.5'; LIVEOAK CREEK, latitude 34° 55.9'; SAN EMIGDIO CREEK, latitude 34° 59.3'; PLEITO CREEK, latitude 34° 56.6'; TECUJA CREEK, latitude 34° 56'; GRAPEVINE CREEK, latitude 34° 55.9'; PASTORIA CREEK, latitude 34° 56.2'; TUNIS CREEK, latitude 34° 58.7'; EL PASO CREEK, longitude 118° 44.4'; TEJON CREEK, longitude 118° 50.2'; SANTOS CREEK, longitude 119° 51.1'; CANOAS CREEK, latitude 35° 59.9'; GARZA CREEK, latitude 35° 59.1'; AVENAL CREEK, longitude 120° 10.3'; COTTONWOOD CANYON, longitude 120° 7.4'; FRANCISCAN CREEK, longitude 120° 6'; PACKWOOD CREEK, longitude 120° 1'; BUENA VISTA CREEK, longitude 119° 34.8'; BITTERWATER CREEK, longitude 119° 24.9'; SALT CREEK, latitude 34° 57'.

(b) Estimated from record for White River.

TABLE 67. CALIENTE CREEK.  
SEASONAL RUN-OFF DATA. Drainage area 471 square miles. *a*

Season. (Begins October 1.)	Index of seasonal wetness. Division V.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records. <sup>b</sup>
1871-1872	79	0.8	45	20,100	January, 12.9%
1872-1873	56	0.1	6	2,500	February, 14.9%
1873-1874	84	0.9	50	22,600	March, 15.4%
1874-1875	96	1.4	78	35,200	April, 21.4%
1875-1876	125	2.6	145	65,300	May, 17.4%
1876-1877	28	0.0	0	0	June, 8.9%
1877-1878	147	3.7	207	93,000	July, 4.3%
1878-1879	56	0.1	6	2,500	August, 0.0%
1879-1880	145	3.6	201	90,500	September, 0.0%
1880-1881	66	0.4	22	10,000	October, 0.9%
1881-1882	44	0.0	0	0	November, 1.5%
1882-1883	65	0.3	17	7,500	December, 2.4%
1883-1884	204	8.0	447	201,000	
1884-1885	65	0.3	17	7,500	
1885-1886	167	4.9	274	123,100	
1886-1887	120	2.3	128	57,800	
1887-1888	134	3.0	168	75,400	
1888-1889	146	3.6	201	90,500	
1889-1890	180	5.8	324	145,800	
1890-1891	94	1.3	73	32,700	
1891-1892	104	1.7	95	42,700	
1892-1893	107	1.8	101	45,200	
1893-1894	101	1.6	89	40,200	
1894-1895	126	2.6	145	65,300	
1895-1896	70	0.5	28	12,600	
1896-1897	96	1.4	78	35,200	
1897-1898	33	0.0	0	0	
1898-1899	30	0.0	0	0	
1899-1900	64	0.3	17	7,500	
1900-1901	103	1.6	89	40,200	
1901-1902	87	1.0	56	25,100	
1902-1903	84	0.9	50	22,600	
1903-1904	63	0.3	17	7,500	
1904-1905	140	3.3	184	82,900	
1905-1906	151	4.1	229	103,000	
1906-1907	140	3.3	184	82,900	
1907-1908	81	0.8	45	20,100	
1908-1909	117	2.2	123	55,300	
1909-1910	63	0.3	17	7,500	
1910-1911	119	2.3	128	57,800	
1911-1912	101	1.6	89	40,200	
1912-1913	85	1.0	56	25,100	
1913-1914	96	1.4	78	35,100	
1914-1915	128	2.7	151	67,800	
1915-1916	135	3.0	168	75,400	
1916-1917	111	2.0	112	50,300	
1917-1918	117	2.2	123	55,300	
1918-1919	75	0.6	33	15,100	
1919-1920	80	0.8	45	20,100	
1920-1921	89	1.1	61	27,600	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	45,000	1.80	96	
Maximum seasonal	201,000	8.00	427	1883-1884
Minimum seasonal	0	0.00	0	1876-1877, 1881-1882 1897-1898, 1898-1899
Mean during July	1,900	0.08	4	
Maximum during July	8,600	0.34	18	1883-1884
Minimum during July	0	0.00	0	1876-1877, 1881-1882 1897-1898, 1898-1899
Mean during August	0	0.00	0	
Maximum during August	0	0.00	0	
Minimum during August	0	0.00	0	1876-1877, 1881-1882 1897-1898, 1898-1899

Probable run-off curve, Plate XXVI.

Storage development curve, Plate CLVIII.

Mass curve of run-off, Plate CVI.

Probable frequency of flood discharge, Plate LXVII.

(a) Description of drainage basin: Tributary area of CALIENTE CREEK above a point one-half mile south of Bena, and WALKER CREEK at Bena.

(b) Estimated from records for White River.

TABLE 68. KERN RIVER.

SEASONAL RUN-OFF DATA. Drainage area 2,410 square miles.*a*

Season. (Begins October 1.)	Index of seasonal wetness. Division R.	Depth of run-off in inches.	Run-off index	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records. <i>e</i>
1871-1872	120	7.3	123	938,000	January, 5.1%
1872-1873	75	3.3	56	424,000	February, 5.4%
1873-1874	101	5.3	90	681,000	March, 9.1%
1874-1875	64	2.7	46	347,000	April, 14.0%
1875-1876	125	7.9	134	1,015,000	May, 20.6%
1876-1877	53	2.2	37	283,000	June, 20.4%
1877-1878	140	9.8	166	1,260,000	July, 10.9%
1878-1879	125	2.3	39	296,000	August, 4.5%
1879-1880	137	9.4	159	1,208,000	September, 2.3%
1880-1881	96	5.0	84	643,000	October, 2.5%
1881-1882	83	3.9	66	501,000	November, 2.4%
1882-1883	88	4.3	73	553,000	December, 2.8%
1883-1884	181	16.2	274	2,082,000	
1884-1885	71	3.1	52	398,000	
1885-1886	123	7.7	130	990,000	
1886-1887	86	4.1	69	527,000	Measured seasonal discharge in acre-feet at U.S.G.S. gaging station. <i>d</i>
1887-1888	60	2.5	42	321,000	
1888-1889	78	3.5	59	450,000	
1889-1890	119	7.2	122	925,000	
1890-1891	87	4.2	71	540,000	
1891-1892	107	5.9	100	758,000	
1892-1893	94	4.8	81	617,000	
1893-1894	88	4.5	76	€574,800	568,100
1894-1895	139	8.0	135	€1,030,200	1,017,500
1895-1896	91	5.0	84	€637,900	626,200
1896-1897	125	7.0	118	€896,000	884,200
1897-1898	54	2.3	39	€299,500	287,800
1898-1899	73	2.7	46	€342,500	330,800
1899-1900	82	2.6	44	€330,900	319,200
1900-1901	119	6.9	117	€883,800	871,700
1901-1902	97	4.5	76	€580,500	568,800
1902-1903	97	4.4	74	€569,500	556,800
1903-1904	71	3.7	62	€481,000	469,300
1904-1905	118	4.3	73	€559,700	548,000
1905-1906	169	14.4	243	€1,848,800	1,837,100
1906-1907	123	8.3	140	€1,065,200	€869,100
1907-1908	90	3.7	62	€479,500	€380,200
1908-1909	165	13.8	232	€1,771,500	1,759,800
1909-1910	102	5.8	98	€751,200	739,500
1910-1911	103	7.9	134	€1,013,700	1,002,000
1911-1912	76	3.4	58	€432,600	420,900
1912-1913	67	2.9	49	€369,500	358,000
1913-1914	135	8.6	144	€1,106,000	1,094,500
1914-1915	111	5.3	90	€675,300	664,000
1915-1916	153	19.2	328	€2,474,500	2,453,200
1916-1917	98	6.9	117	€883,500	872,300
1917-1918	62	4.1	69	€526,000	514,800
1918-1919	88	4.2	71	€544,100	532,500
1919-1920	99	4.7	79	€601,000	590,100
1920-1921	92	4.1	69	€528,900	518,100

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	760,400	5.90	316	
Maximum seasonal	2,474,500	19.20	1,027	1915-1916
Minimum seasonal	283,000	2.20	117	1876-1877
Mean during July	82,900	0.60	34	
Maximum during July	402,300	3.10	167	1905-1906
Minimum during July	17,300	0.13	7	1897-1898
Mean during August	34,200	0.27	14	
Maximum during August	143,300	1.10	59	1905-1906
Minimum during August	9,700	0.08	4	1897-1898

Probable run-off curve, Plate XXVI.

Storage development curve, Plate CLVIII.

(a) Description of drainage basin: Tributary area above gage near Bakersfield in N. E. 1/4 Sec. 2, T. 29 S., R. 28 E.

(b) Partial record, October 1 to June 30.

(c) Partial record, March 1 to September 30.

(d) Point of measurement: Gage near Bakersfield, drainage area 2,410 square miles

(e) Measured run-off adjusted for irrigation of 6,500 acres from 1893-1894 to 1910-1911, and thereafter decreasing 50 acres per year to 6,000 acres in 1920-1921.

(f) Index of 56 used in estimating run-off, being the lowest index of any mountain station for this year.

Mass curve of run-off, Plate CVII.

Probable frequency of flood discharge, Plate LXVI.

TABLE 69. POSO CREEK GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 576 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division R.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>d</sup>
1871-1872	120	2.2	143	67,600	January, 12.9%
1872-1873	75	0.4	29	13,800	February, 14.9%
1873-1874	101	1.3	85	39,900	March, 15.4%
1874-1875	64	0.2	13	6,100	April, 21.4%
1875-1876	125	2.4	159	75,300	May, 17.4%
1876-1877	53	0.0	0	0	June, 8.9%
1877-1878	140	3.3	215	101,400	July, 4.3%
1878-1879	25	0.0	0	0	August, 0.0%
1879-1880	137	3.1	202	95,200	September, 0.0%
1880-1881	96	1.1	72	33,800	October, 0.9%
1881-1882	83	0.7	46	21,500	November, 1.5%
1882-1883	88	0.8	55	26,100	December, 2.4%
1883-1884	181	6.0	390	184,300	
1884-1885	71	0.4	23	10,700	
1885-1886	123	2.4	153	72,200	
1886-1887	86	0.8	49	23,000	
1887-1888	60	0.2	10	4,600	
1888-1889	78	0.6	36	16,900	
1889-1890	119	2.2	140	66,000	
1890-1891	87	0.8	52	24,600	
1891-1892	107	1.5	98	46,100	
1892-1893	94	1.0	65	30,700	
1893-1894	88	0.8	55	26,100	
1894-1895	139	3.3	212	99,800	
1895-1896	91	1.0	62	29,200	
1896-1897	125	2.5	160	75,300	
1897-1898	54	0.0	0	0	
1898-1899	73	0.4	26	12,300	
1899-1900	82	0.6	42	20,000	
1900-1901	119	2.2	140	66,000	
1901-1902	97	1.2	75	35,300	
1902-1903	97	1.2	75	35,300	
1903-1904	71	0.4	23	10,700	
1904-1905	118	2.1	177	64,500	
1905-1906	169	5.1	335	158,200	
1906-1907	123	2.4	153	72,200	
1907-1908	90	0.9	58	27,600	
1908-1909	165	4.9	316	149,000	
1909-1910	102	1.4	88	41,500	
1910-1911	103	1.4	91	43,000	<i>b</i> c2,000
1911-1912	76	0.5	32	15,400	<i>b</i> 1,600
1912-1913	67	0.3	20	9,200	<i>b</i> 1,100
1913-1914	135	3.0	195	92,200	
1914-1915	111	1.8	114	53,800	
1915-1916	153	4.1	267	126,000	
1916-1917	98	1.2	78	36,000	
1917-1918	62	0.2	13	6,100	
1918-1919	88	0.8	55	26,100	
1919-1920	99	1.2	78	36,900	
1920-1921	92	1.0	65	30,700	

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	47,300	1.50	82	
Maximum seasonal	184,300	6.00	320	1883-1884
Minimum seasonal	0	0.00	0	1876-1877, 1878-1879, 1897-1898
Mean during July	2,000	0.07	3	
Maximum during July	7,900	0.26	14	1883-1884
Minimum during July	0	0.00	0	1876-1877, 1878-1879, 1897-1898
Mean during August	0	0.00	0	
Maximum during August	0	0.00	0	
Minimum during August	0	0.00	0	

Probable run-off curve, Plate XXVII.

Storage development curve, Plate CLIX.

Mass curve of run-off, Plate CVII.

Probable frequency of flood discharge, Plate LXVII.

(a) Description of drainage basin: WHITE RIVER to a point in N. W.  $\frac{1}{4}$  of Sec. 17, T. 24 S., R. 26 E., 138 square miles; POSO CREEK to a point in N. E.  $\frac{1}{4}$  of Sec. 35, T. 27 S., R. 27 E., 289 square miles; RAG GULCH to a point in N. E.  $\frac{1}{4}$  of Sec. 10, T. 25 S., R. 27 E., 149 square miles.

(b) Point of measurement: White River near Hot Springs, drainage area 33 square miles.

(c) Partial, January 18 to March 27 and April 14 to September 30.

(d) Estimated from records for other streams in vicinity.



TABLE 70. DEER CREEK.

SEASONAL RUN-OFF DATA. Drainage area 110 square miles.

Season. (Begins October 1.)	Index of seasonal wetness. Division R.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records.
1871-1872.	120	4.7	134	27,600	January, 10.0%
1872-1873.	75	1.6	45	9,400	February, 8.0%
1873-1874.	101	3.1	88	18,200	March, 14.2%
1874-1875.	64	1.1	31	6,500	April, 18.1%
1875-1876.	125	5.2	148	30,600	May, 19.0%
1876-1877.	53	0.7	20	4,100	June, 9.8%
1877-1878.	140	6.7	191	39,400	July, 4.0%
1878-1879.	225	0.8	23	4,700	August, 2.0%
1879-1880.	137	6.2	176	36,400	September, 2.1%
1880-1881.	96	2.8	80	16,500	October, 2.8%
1881-1882.	83	2.0	57	11,700	November, 4.2%
1882-1883.	88	2.3	65	13,500	December, 5.8%
1883-1884.	181	11.4	324	67,000	
1884-1885.	71	1.4	40	8,200	
1885-1886.	123	5.1	145	30,000	
1886-1887.	86	2.2	63	12,900	
1887-1888.	60	0.9	25	5,300	
1888-1889.	78	1.7	48	10,000	
1889-1890.	119	4.6	131	27,000	
1890-1891.	87	2.2	63	12,900	
1891-1892.	107	3.6	102	21,200	
1892-1893.	94	2.6	74	15,300	
1893-1894.	88	2.3	65	13,500	
1894-1895.	139	6.5	185	38,200	
1895-1896.	91	2.5	71	14,700	
1896-1897.	125	5.2	148	30,600	
1897-1898.	54	0.7	20	4,100	
1898-1899.	73	1.5	43	8,800	
1899-1900.	82	1.9	54	11,200	
1900-1901.	119	4.6	131	27,000	
1901-1902.	97	2.8	80	16,500	
1902-1903.	97	2.8	80	16,500	
1903-1904.	71	1.4	40	8,200	
1904-1905.	118	4.6	131	27,000	
1905-1906.	169	9.9	282	58,200	
1906-1907.	123	5.1	145	30,000	
1907-1908.	90	2.4	68	14,100	
1908-1909.	165	9.4	268	55,200	
1909-1910.	102	3.2	91	18,800	
1910-1911.	103	3.1	88	18,200	
1911-1912.	76	1.5	43	8,800	
1912-1913.	67	1.1	31	6,500	
1913-1914.	135	6.0	171	35,300	
1914-1915.	111	4.2	119	24,700	
1915-1916.	153	8.1	231	47,600	
1916-1917.	98	2.9	83	17,000	
1917-1918.	62	1.0	28	5,900	
1918-1919.	88	2.2	63	12,900	
1919-1920.	99	3.0	85	17,600	
1920-1921.	92	2.9	83	17,000	

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.*d*

5,500  
4,200  
3,400  
8,600  
8,900  
69,300  
7,600  
3,500  
5,200  
6,400  
7,700

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal.	20,650	3.50	187	
Maximum seasonal.	67,000	11.40	608	1883-1884
Minimum seasonal.	4,100	0.70	37	1876-1877 1897-1898
Mean during July.	830	0.14	7	
Maximum during July.	2,680	0.46	24	1883-1884
Minimum during July.	160	0.03	1	1876-1877 1897-1898
Mean during August.	410	0.07	4	
Maximum during August.	1,340	0.23	12	1883-1884
Minimum during August.	80	0.01	1	1876-1877 1897-1898

Probable run-off curve, Plate XXVII.

Storage development curve, Plate CLIX.

Mass curve of run-off, Plate CVIII.

Probable frequency of flood discharge, Plate LXVII.

(a) Description of drainage basin: Tributary area above point in Sec. 25, T. 22 S., R. 28 E.

(b) Partial record, October 31 to March 31.

(c) Partial record, November 15 to March 31 and May 1 to September 30.

(d) Point of measurement: Gage near Hot Springs, drainage area 11 square miles

NOTE.—Measurements by Terra Bella Irrigation District: Made at point in Section 10, T. 23 S., R. 29 E., drainage area 84 square miles. Discharge in 1919-1920, 11,086 acre-feet; in 1920-1921, 11,440 acre-feet.

TABLE 71. TULE RIVER.  
SEASONAL RUN-OFF DATA. Drainage area 390 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division R.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agri- cultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records. <sup>g</sup>
1871-1872	120	9.0	132	187,000	January.....13.0%
1872-1873	75	3.2	47	66,500	February.....10.3%
1873-1874	101	6.1	90	126,700	March.....17.8%
1874-1875	64	2.2	32	45,700	April.....18.2%
1875-1876	125	9.8	144	203,600	May.....17.8%
1876-1877	53	1.3	19	27,000	June.....10.3%
1877-1878	140	12.6	185	261,800	July.....3.1%
1878-1879	125	1.6	24	33,200	August.....1.1%
1879-1880	137	12.0	176	249,200	September.....0.8%
1880-1881	96	5.3	78	110,200	October.....1.3%
1881-1882	83	3.9	57	81,000	November.....1.8%
1882-1883	88	4.5	66	93,500	December.....4.5%
1883-1884	181	21.6	317	448,800	
1884-1885	71	2.7	40	56,100	
1885-1886	123	9.5	140	197,400	
1886-1887	86	4.2	62	87,300	
1887-1888	60	1.8	26	37,400	
1888-1889	78	3.4	50	70,600	
1889-1890	119	8.8	129	182,900	
1890-1891	87	4.3	63	89,300	
1891-1892	107	6.8	100	141,300	
1892-1893	94	5.2	76	108,000	
1893-1894	88	4.5	66	93,500	
1894-1895	139	12.5	184	259,700	
1895-1896	91	4.8	72	99,700	
1896-1897	125	9.8	144	203,600	
1897-1898	54	1.5	22	31,200	
1898-1899	73	3.0	44	62,300	
1899-1900	82	3.7	54	76,900	
1900-1901	119	8.8	129	182,900	d45,900
1901-1902	97	6.8	100	140,600	112,500
1902-1903	97	6.7	98	139,700	111,600
1903-1904	71	4.0	59	84,000	70,300
1904-1905	118	5.6	82	115,500	72,000
1905-1906	169	20.6	303	427,700	335,000
1906-1907	123	9.7	142	201,900	154,100
1907-1908	90	5.0	73	104,700	81,400
1908-1909	165	18.0	264	373,000	285,000
1909-1910	102	7.1	104	148,400	117,400
1910-1911	103	7.2	106	149,700	24,600
1911-1912	76	3.2	47	66,700	15,200
1912-1913	67	1.9	28	39,700	9,640
1913-1914	135	8.3	122	172,600	38,000
1914-1915	111	6.8	100	142,100	34,000
1915-1916	153	16.8	247	349,300	87,000
1916-1917	98	8.0	118	166,200	25,760
1917-1918	62	2.4	35	49,500	9,230
1918-1919	88	3.8	56	79,200	18,500
1919-1920	99	5.6	82	115,400	27,300
1920-1921	92	4.5	66	92,600	21,900

Measured seasonal discharge in  
acre-feet at U.S.G.S. gaging  
stations.

	South Fork. <sup>c</sup>	Main stream. <sup>b</sup>
1900-1901		d45,900
1901-1902		112,500
1902-1903		111,600
1903-1904		70,300
1904-1905		72,000
1905-1906		335,000
1906-1907		154,100
1907-1908		81,400
1908-1909		285,000
1909-1910		117,400
1910-1911		24,600
1911-1912		15,200
1912-1913		9,640
1913-1914		38,000
1914-1915		34,000
1915-1916		87,000
1916-1917		25,760
1917-1918		9,230
1918-1919		18,500
1919-1920		27,300
1920-1921		21,900

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal.....	141,500	6.81	363.0	
Maximum seasonal.....	448,800	21.60	1,152.0	1883-1884
Minimum seasonal.....	27,000	1.30	69.0	1876-1877
Mean during July.....	4,390	0.21	11.3	
Maximum during July.....	29,740	1.43	76.3	1905-1906
Minimum during July.....	840	0.04	2.2	1876-1877
Mean during August.....	1,560	0.08	4.0	
Maximum during August.....	7,000	0.34	18.0	1905-1906
Minimum during August.....	300	0.01	0.8	1876-1877

Probable run-off curve, Plate XXVII.

Storage development curve, Plate CLIX.

Mass curve of run-off, Plate CVIII.

Probable frequency of flood discharge, Plate LXVII.

(a) Description of drainage basin: Tributary area above junction of Tule River and South Fork of Tule River.

(b) Point of measurement: At gage 6 miles east of Porterville, drainage area 264 square miles.

(c) Point of measurement: At gage 8 miles above junction with Tule River, drainage area 74 square miles.

(d) Partial, May 1 to September 30. (e) Partial, October 1 to 28, November 26 to December

23, January 2 to 27, February 22 to April 20, May 20 to September 30.

(f) Partial, October 1 to April 30, July 1 to September 30.

(g) Measured run-off adjusted for irrigation diversion, from 1901 to 1921, of 910 acre-feet per season.

(h) Measured run-off adjusted for irrigation and for run-off from additional area below gaging stations.

(i) Index of 56 used for estimating run-off.

**TABLE 72. YOKOHL CREEK GROUP.**  
SEASONAL RUN-OFF DATA. Drainage area 98 square miles.a

Season. (Begins October 1.)	Index of seasonal wetness. Division R.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months.b
1871-1872	120	4.0	141	20,900	January, 12.9%
1872-1873	75	0.7	25	3,700	February, 14.9%
1873-1874	101	2.4	85	12,500	March, 15.4%
1874-1875	64	0.4	14	2,100	April, 21.4%
1875-1876	125	4.5	159	23,500	May, 17.4%
1876-1877	53	0.0	0	0	June, 8.9%
1877-1878	140	6.1	216	31,800	July, 4.3%
1878-1879	25	0.0	0	0	August, 0.0%
1879-1880	137	5.7	202	29,800	September, 0.0%
1880-1881	96	2.0	71	10,400	October, 0.9%
1881-1882	83	1.3	46	6,800	November, 1.5%
1882-1883	88	1.5	53	7,800	December, 2.4%
1883-1884	181	11.2	396	58,500	
1884-1885	71	0.7	25	3,700	
1885-1886	123	4.3	152	22,500	
1886-1887	86	1.4	49	7,300	
1887-1888	60	0.2	7	1,000	
1888-1889	78	1.0	35	5,200	
1889-1890	119	3.9	138	20,400	
1890-1891	87	1.5	53	7,800	
1891-1892	107	2.8	99	14,600	
1892-1893	94	1.9	67	9,900	
1893-1894	88	1.5	53	7,800	
1894-1895	139	6.0	212	31,300	
1895-1896	91	1.7	60	8,900	
1896-1897	125	4.5	159	23,500	
1897-1898	54	0.0	0	0	
1898-1899	73	0.7	25	3,700	
1899-1900	82	1.2	42	6,300	
1900-1901	119	3.9	138	20,400	
1901-1902	97	2.2	80	11,500	
1902-1903	97	2.2	80	11,500	
1903-1904	71	0.7	25	3,700	
1904-1905	118	3.9	138	20,400	
1905-1906	169	9.5	336	49,600	
1906-1907	123	4.3	152	22,500	
1907-1908	90	1.6	57	8,400	
1908-1909	165	9.0	318	47,000	
1909-1910	102	2.5	88	13,100	
1910-1911	103	2.6	92	13,600	
1911-1912	76	0.9	32	4,700	
1912-1913	67	0.5	18	2,600	
1913-1914	135	5.5	195	28,700	
1914-1915	111	3.2	113	16,700	
1915-1916	153	7.6	269	39,700	
1916-1917	98	2.2	80	11,500	
1917-1918	62	0.3	11	1,600	
1918-1919	88	1.5	53	7,800	
1919-1920	99	2.3	81	12,000	
1920-1921	92	1.7	60	8,900	

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	14,800	2.80	151	
Maximum seasonal	58,500	11.20	598	1883-1884
Minimum seasonal	0	0.00	0	(See above.)
Mean during July	640	0.12	7	
Maximum during July	2,520	0.48	26	1883-1884
Minimum during July	0	0.00	0	(See above.)
Mean during August	0	0.00	0	
Maximum during August	0	0.00	0	
Minimum during August	0	0.00	0	(See above.)

Probable run-off curve, Plate XXVII.

Storage development curve, Plate CLIX.

Mass curve of run-off, Plate CVIII.

Probable frequency of flood discharge, Plate LXVII.

(a) Description of drainage basin: Tributary areas above points designated: HORSE CREEK, at junction with Kaweah River; LEWIS CREEK, at intersection of longitude 119° 00' with stream; YOKOHL CREEK, at intersection of longitude 118° 59.4' with stream.

(b) Estimated from record for White River

TABLE 73. KAWEAH RIVER.

SEASONAL RUN-OFF DATA. Drainage area 514 square miles.a

Season. (Begins October 1.)	Index of seasonal wetness. Division R.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records.
1871-1872	120	19.0	128	520,800	January, 6.5%
1872-1873	75	8.7	58	238,500	February, 6.1%
1873-1874	101	14.1	95	386,500	March, 11.3%
1874-1875	64	6.8	46	186,400	April, 14.4%
1875-1876	125	20.3	137	556,500	May, 23.2%
1876-1877	53	5.0	34	137,100	June, 21.5%
1877-1878	140	24.6	165	674,400	July, 8.5%
1878-1879	25	1.8	12	49,300	August, 2.1%
1879-1880	137	23.8	160	653,400	September, 1.1%
1880-1881	96	13.0	88	356,400	October, 1.6%
1881-1882	83	10.3	69	282,400	November, 1.3%
1882-1883	88	11.4	77	312,500	December, 2.4%
1883-1884	181	38.5	259	1,055,100	
1884-1885	71	7.8	53	213,800	
1885-1886	123	19.8	133	542,800	
1886-1887	86	10.9	73	298,800	
1887-1888	60	6.1	41	167,200	
1888-1889	78	9.4	63	257,700	
1889-1890	119	18.7	126	512,600	
1890-1891	87	11.1	75	304,300	
1891-1892	107	15.6	105	427,600	
1892-1893	94	12.6	85	345,400	
1893-1894	88	11.4	77	312,500	
1894-1895	139	24.4	164	668,900	
1895-1896	91	11.8	79	323,500	
1896-1897	125	20.3	137	556,500	
1897-1898	54	5.4	36	148,000	
1898-1899	73	8.2	55	224,800	
1899-1900	82	10.0	67	274,100	
1900-1901	119	18.7	126	512,600	
1901-1902	97	13.3	89	364,600	
1902-1903	97	13.3	89	364,600	8261,500
1903-1904	71	13.6	91	373,000	373,000
1904-1905	118	12.3	83	337,700	337,700
1905-1906	169	39.7	267	1,088,400	1,088,400
1906-1907	123	21.7	146	593,500	593,500
1907-1908	90	9.2	62	252,600	252,600
1908-1909	165	29.2	196	799,900	799,900
1909-1910	102	12.8	86	349,700	349,700
1910-1911	103	19.9	134	546,000	546,000
1911-1912	76	7.5	50	207,400	207,400
1912-1913	67	8.1	54	220,700	220,700
1913-1914	135	17.7	119	486,000	486,000
1914-1915	111	15.5	91	369,500	369,500
1915-1916	153	27.8	187	762,200	762,200
1916-1917	98	17.2	115	471,500	471,500
1917-1918	62	8.4	56	229,700	229,700
1918-1919	88	10.2	69	285,300	285,300
1919-1920	99	15.3	103	420,400	420,400
1920-1921	92	13.4	90	371,400	371,400

Measured seasonal discharge in acre-feet at U.S.G.S. gaging stations.c

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	407,900	14.90	794	
Maximum seasonal	1,088,400	39.70	2,118	1905-1906
Minimum seasonal	49,300	1.80	96	1878-1879
Mean during July	34,700	1.30	68	
Maximum during July	211,000	7.70	411	1905-1906
Minimum during July	4,190	0.15	8	1878-1879
Mean during August	8,570	0.31	17	
Maximum during August	42,500	1.60	83	1905-1906
Minimum during August	1,040	0.04	2	1878-1879

Probable run-off curve, Plate XXVIII.  
Storage development curve, Plate CLX.

Mass curve of run-off, Plate CIX.

Probable frequency of flood discharge, Plate LXVIII.

(a) Description of drainage basin: Tributary area above gage near Three Rivers, three-quarters mile below mouth of South Fork.

(b) Partial record, June 1 to September 30.

(c) Point of measurement: Gaging station near Three Rivers, drainage area 514 square miles.

TABLE 74. LIMEKILN CREEK GROUP.

SEASONAL RUN-OFF DATA. Drainage area 201 square miles.a

Season. (Begins October 1.)	Index of seasonal wetness. Division R.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months.c
1871-1872	120	8.0	138	85,700	January, 12.9%
1872-1873	75	2.5	43	26,800	February, 14.9%
1873-1874	101	5.3	91	56,800	March, 15.4%
1874-1875	64	1.5	26	16,100	April, 21.4%
1875-1876	125	8.7	150	93,200	May, 17.4%
1876-1877	53	0.7	12	7,500	June, 8.9%
1877-1878	140	11.0	190	117,800	July, 4.3%
1878-1879	625	0.9	16	9,600	August, 0.0%
1879-1880	137	10.5	181	112,400	September, 0.0%
1880-1881	96	4.7	81	50,300	October, 0.9%
1881-1882	83	3.3	57	35,300	November, 1.5%
1882-1883	88	3.8	66	40,700	December, 2.4%
1883-1884	181	18.5	319	198,100	
1884-1885	71	2.1	36	22,500	
1885-1886	123	8.5	146	91,000	
1886-1887	86	3.5	60	37,500	
1887-1888	60	1.2	21	12,800	
1888-1889	78	2.8	48	30,000	
1889-1890	119	7.8	134	83,500	
1890-1891	87	3.6	62	38,500	
1891-1892	107	6.1	105	65,300	
1892-1893	94	4.5	78	48,200	
1893-1894	88	3.8	66	40,700	
1894-1895	139	10.9	188	116,700	
1895-1896	91	4.1	71	43,900	
1896-1897	125	8.7	150	93,200	
1897-1898	54	0.8	14	8,600	
1898-1899	73	2.3	40	24,600	
1899-1900	82	3.2	55	34,300	
1900-1901	119	7.8	134	83,500	
1901-1902	97	4.9	81	52,500	
1902-1903	97	4.9	84	52,500	
1903-1904	71	2.1	36	22,500	
1904-1905	118	7.8	134	83,500	
1905-1906	169	16.2	279	173,500	
1906-1907	123	8.5	146	91,000	
1907-1908	90	4.0	69	42,800	
1908-1909	165	15.5	267	166,000	
1909-1910	102	5.5	95	58,900	
1910-1911	103	5.7	98	61,000	
1911-1912	76	2.5	43	26,800	
1912-1913	67	1.7	29	18,200	
1913-1914	135	10.3	178	110,300	
1914-1915	111	6.7	115	71,700	
1915-1916	153	13.3	229	142,400	
1916-1917	98	5.0	86	53,500	
1917-1918	62	1.4	24	15,000	
1918-1919	88	3.8	66	40,700	
1919-1920	99	5.1	88	54,600	
1920-1921	92	4.2	72	45,000	

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	62,200	5.80	310	
Maximum seasonal	198,100	18.50	987	1883-1884
Minimum seasonal	7,500	0.70	37	1876-1877
Mean during July	2,700	0.25	13	
Maximum during July	8,500	0.79	42	1883-1884
Minimum during July	320	0.03	2	1876-1877
Mean during August	0	0.00	0	
Maximum during August	0	0.00	0	1883-1884
Minimum during August	0	0.00	0	1876-1877

Probable run-off curve, Plate XXVIII.

Mass curve of run-off, Plate CIX.

Storage development curve, Plate CLX.

Probable frequency of flood discharge, Plate LXVIII.

(a) Description of drainage basin: Tributary areas above points indicated on following streams: LIMEKILN CREEK, at junction with Kaweah River, drainage area 76 square miles; RATTLESNAKE CREEK, in N. W. 1/4 of Sec. 11, T. 16 S., R. 26 E., drainage area 54 square miles; STOKES CREEK, N. E. corner of Sec. 11, T. 16 S., R. 25 E.; SAND CREEK, S. E. corner of Sec. 17, T. 15 S., R. 25 E., drainage area 44 square miles; WA-TO-KE CREEK, N. E. corner of Sec. 17, T. 14 S., R. 24 E., drainage area 17 square miles; GREASY CREEK, at junction with Kaweah River, drainage area 10 square miles.

(b) Index 56 used.

(c) Estimated from record for White River

TABLE 75. KINGS RIVER.  
SEASONAL RUN-OFF DATA. Drainage area 1,694 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division Q.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records.
1871-1872.....	119	27.5	129	2,484,000	January, 4.5%
1872-1873.....	74	11.4	53	1,030,000	February, 3.9%
1873-1874.....	100	19.8	93	1,788,000	March, 7.2%
1874-1875.....	64	8.7	41	786,000	April, 12.4%
1875-1876.....	124	29.9	140	2,701,000	May, 24.7%
1876-1877.....	60	7.7	36	696,000	June, 26.2%
1877-1878.....	109	24.4	114	2,204,000	July, 11.5%
1878-1879.....	41	3.7	17	334,000	August, 3.5%
1879-1880.....	134	34.8	163	3,143,000	September, 1.4%
1880-1881.....	122	28.7	135	2,592,000	October, 1.6%
1881-1882.....	69	10.0	47	903,000	November, 1.4%
1882-1883.....	85	14.7	69	1,328,000	December, 1.7%
1883-1884.....	178	57.8	271	5,221,000	
1884-1885.....	78	12.7	60	1,147,000	
1885-1886.....	169	52.9	248	4,778,000	
1886-1887.....	88	15.8	74	1,427,000	
1887-1888.....	67	9.5	44	858,000	
1888-1889.....	92	16.8	79	1,517,000	
1889-1890.....	153	44.5	209	4,019,000	
1890-1891.....	79	12.8	60	1,156,000	
1891-1892.....	102	20.5	96	1,852,000	
1892-1893.....	101	20.2	95	1,825,000	
1893-1894.....	83	14.0	66	1,265,000	
1894-1895.....	119	27.5	129	2,484,000	
1895-1896.....	82	20.5	96	1,853,700	1,853,700
1896-1897.....	107	23.2	109	2,086,200	2,086,200
1897-1898.....	56	9.8	46	880,600	880,600
1898-1899.....	82	13.5	63	1,223,700	1,223,700
1899-1900.....	102	14.3	67	1,285,300	1,285,300
1900-1901.....	137	34.8	163	3,142,500	3,142,500
1901-1902.....	75	17.2	81	1,553,000	1,553,000
1902-1903.....	81	18.7	88	1,687,800	1,687,800
1903-1904.....	81	19.3	91	1,743,300	1,743,300
1904-1905.....	132	15.9	74	1,427,800	1,427,800
1905-1906.....	148	42.8	201	3,856,700	3,856,700
1906-1907.....	131	30.5	143	2,752,500	2,752,500
1907-1908.....	81	11.4	53	1,033,900	1,033,900
1908-1909.....	113	31.2	146	2,809,400	2,809,400
1909-1910.....	95	19.7	92	1,779,000	1,779,000
1910-1911.....	132	31.4	147	2,826,700	2,826,700
1911-1912.....	73	10.7	50	968,100	968,100
1912-1913.....	66	10.5	49	941,800	941,800
1913-1914.....	123	28.3	133	2,548,400	2,548,400
1914-1915.....	124	20.2	95	1,817,100	1,817,100
1915-1916.....	123	33.7	158	3,041,800	3,041,800
1916-1917.....	88	21.0	99	1,892,600	1,892,600
1917-1918.....	91	15.1	71	1,363,700	1,363,700
1918-1919.....	81	13.3	62	1,203,300	1,203,300
1919-1920.....	91	15.6	73	1,404,700	1,404,700
1920-1921.....	95	17.6	82	1,593,800	1,593,800

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.<sup>b</sup>

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal.....	1,925,100	21.30	1,136	.....
Maximum seasonal.....	5,221,000	57.80	3,082	1883-1884
Minimum seasonal.....	334,000	3.70	197	1878-1879
Mean during July.....	221,400	2.50	131	.....
Maximum during July.....	1,000,000	11.10	590	1905-1906
Minimum during July.....	38,400	0.43	23	1878-1879
Mean during August.....	67,400	0.75	40	.....
Maximum during August.....	264,000	2.90	156	1905-1906
Minimum during August.....	11,700	0.13	7	1878-1879

Probable run-off curve, Plate XXVIII.

Mass curve of run-off, Plate CIX.

Storage development curve, Plate CLX.

Probable frequency of flood discharge, Plate LXVIII.

(a) Description of drainage basin: Tributary area above gage near Sanger, in N. W.  $\frac{1}{4}$  of Sec. 8, T. 13 S., R. 24 E.

(b) Point of measurement: Gage near Sanger, drainage area 1,694 square miles.

**TABLE 76. DRY CREEK.**  
SEASONAL RUN-OFF DATA. Drainage area 48 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division Q.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	119	2.5	141	6,400	January, 7.1%
1872-1873	74	0.5	28	1,300	February, 18.4%
1873-1874	100	1.1	79	3,600	March, 24.4%
1874-1875	64	0.3	17	800	April, 17.4%
1875-1876	124	2.8	158	7,100	May, 14.2%
1876-1877	60	0.2	11	500	June, 7.9%
1877-1878	109	1.9	107	4,800	July, 2.3%
1878-1879	41	0.0	0	0	August, 0.5%
1879-1880	134	3.5	198	8,900	September, 0.3%
1880-1881	122	2.7	153	6,900	October, 1.6%
1881-1882	69	0.4	23	1,000	November, 2.1%
1882-1883	85	0.8	45	2,000	December, 3.8%
1883-1884	178	7.1	401	18,100	
1884-1885	78	0.6	34	1,500	
1885-1886	169	6.3	356	16,000	
1886-1887	88	0.9	51	2,300	
1887-1888	67	0.3	17	800	
1888-1889	62	1.1	62	2,800	
1889-1890	153	5.0	282	12,700	
1890-1891	79	0.6	34	1,500	
1891-1892	102	1.5	85	3,800	
1892-1893	101	1.5	85	3,800	
1893-1894	83	0.8	45	2,000	
1894-1895	119	2.5	141	6,400	
1895-1896	82	0.7	40	1,800	
1896-1897	107	1.8	102	4,600	
1897-1898	56	0.2	11	500	
1898-1899	82	0.7	40	1,800	
1899-1900	102	1.5	85	3,800	
1900-1901	137	3.7	209	9,400	
1901-1902	75	0.5	28	1,300	
1902-1903	81	0.7	40	1,800	
1903-1904	81	0.7	40	1,800	
1904-1905	132	3.3	186	8,400	
1905-1906	148	4.6	260	11,700	
1906-1907	131	3.3	186	8,400	
1907-1908	81	0.7	40	1,800	
1908-1909	113	2.2	124	5,600	
1909-1910	95	1.2	68	3,000	
1910-1911	132	3.3	186	8,400	
1911-1912	73	0.5	28	1,300	
1912-1913	66	0.3	17	800	
1913-1914	123	2.8	158	7,100	
1914-1915	124	2.8	158	7,100	
1915-1916	123	2.8	158	7,100	
1916-1917	88	0.9	51	2,300	
1917-1918	91	1.1	62	2,800	
1918-1919	81	0.7	40	1,800	
1919-1920	91	1.1	62	2,800	
1920-1921	95	1.2	68	3,000	

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	4,500	1.80	94	
Maximum seasonal	18,100	7.10	379	1883-1884
Minimum seasonal	0	0.00	0	1878-1879
Mean during July	100	0.04	2	
Maximum during July	420	0.17	9	1883-1884
Minimum during July	0	0.00	0	1878-1879
Mean during August	20	0.01	Trace	
Maximum during August	90	0.04	2	1883-1884
Minimum during August	0	0.00	0	1878-1879

Probable run-off curve, Plate XXVIII.

Storage development curve, Plate CLX.

Mass curve of run-off, Plate CIX.

Probable frequency of flood discharge, Plate LXVIII.

(a) Description of drainage basin: Tributary area above center of Sec. 11, T. 12 S., R. 22 E., 18 miles northeast of Fresno.

(b) Estimated from records for Fresno River.

TABLE 77. SAN JOAQUIN RIVER.  
SEASONAL RUN-OFF DATA. Drainage area 1,631 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Group Q.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.) <sup>f</sup>	Distribution of seasonal run-off by months as shown by U.S.G.S. records. <sup>g</sup>
1871-1872	119	30.2	128	2,627,000	January, 5.5%
1872-1873	74	12.9	55	1,122,000	February, 5.0%
1873-1874	100	21.4	91	1,862,000	March, 9.0%
1874-1875	64	10.2	43	887,000	April, 13.3%
1875-1876	124	32.9	139	2,862,000	May, 23.4%
1876-1877	60	9.3	39	809,000	June, 24.2%
1877-1878	109	25.5	108	2,218,000	July, 10.0%
1878-1879	41	5.4	23	470,000	August, 3.2%
1879-1880	134	38.5	163	3,349,000	September, 1.5%
1880-1881	122	31.5	133	2,740,000	October, 1.3%
1881-1882	69	11.5	49	1,000,000	November, 1.5%
1882-1883	85	16.0	68	1,392,000	December, 2.1%
1883-1884	178	65.9	279	5,732,000	
1884-1885	78	14.0	59	1,218,000	
1885-1886	169	59.9	253	5,211,000	
1886-1887	88	17.0	72	1,479,000	
1887-1888	67	11.0	47	957,000	
1888-1889	92	18.1	77	1,571,000	
1889-1890	153	50.0	211	4,349,000	
1890-1891	79	14.1	60	1,227,000	
1891-1892	102	22.2	94	1,931,000	
1892-1893	101	22.0	93	1,914,000	
1893-1894	83	15.3	65	1,331,000	
1894-1895	119	32.0	135	2,786,700	c2,643,600
1895-1896	82	22.8	96	1,985,700	1,979,100
1896-1897	107	25.5	108	2,219,700	2,213,100
1897-1898	56	10.6	45	925,300	915,700
1898-1899	82	14.6	62	1,269,500	1,262,900
1899-1900	102	15.4	65	1,343,600	1,337,000
1900-1901	137	34.5	146	3,004,500	2,997,900
1901-1902	75	13.0	55	1,131,000	d125,500
1902-1903	81	14.7	62	1,279,000	
1903-1904	81	14.7	62	1,279,000	
1904-1905	132	37.0	156	3,219,000	
1905-1906	148	47.0	199	4,088,000	
1906-1907	131	36.9	156	3,210,000	
1907-1908	81	13.2	56	1,145,000	e1,141,400
1908-1909	113	33.4	141	2,904,300	2,900,700
1909-1910	95	23.4	99	2,038,700	2,035,100
1910-1911	132	41.0	173	3,567,100	3,563,500
1911-1912	73	12.1	51	1,052,900	1,049,300
1912-1913	66	10.0	42	872,000	868,400
1913-1914	123	33.0	140	2,868,500	2,868,700
1914-1915	124	22.6	96	1,965,700	1,967,000
1915-1916	123	31.8	134	2,769,100	2,766,900
1916-1917	88	22.3	94	1,943,300	1,941,300
1917-1918	91	17.0	72	1,476,500	1,465,700
1918-1919	81	15.0	63	1,307,600	1,318,000
1919-1920	91	15.3	65	1,329,700	1,308,500
1920-1921	95	18.4	78	1,604,100	1,592,800

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile	Season.
Mean seasonal	2,056,900	23.60	1.261	
Maximum seasonal	5,732,000	65.90	3.514	1883-1884
Minimum seasonal	470,000	5.40	.288	1878-1879
Mean during July	205,690	2.40	.126	
Maximum during July	587,900	6.80	.360	1910-1911
Minimum during July	47,000	0.54	.29	1878-1879
Mean during August	65,800	0.76	.40	
Maximum during August	183,400	2.10	.112	1883-1884
Minimum during August	15,000	0.17	.9	1878-1879

Probable run-off curve, Plate XXIX.

Storage development curve, Plate CLXI.

(a) Description of drainage basin: Tributary area above gage at Friant in S. E.  $\frac{1}{4}$  of Sec. 34, T. 10 S., R. 21 E.

(b) Point of measurement: From January 1, 1855, to December 31, 1901, at railroad bridge near Herndon, 20 miles below Friant. From October 18, 1907, to date, at gage 4 miles above Friant in S. E.  $\frac{1}{4}$  of Sec. 31. Discharge at Herndon assumed to be the same as at Friant; drainage area 1,631 square miles.

(c) Partial record, January 1 to September 30.

(d) Partial record, October 1 to December 31.

(e) Partial record, October 18 to September 30.

(f) Measured run-off adjusted for irrigation, diversion and storage above point of measurement as follows: Irrigation, 1895 to 1901, 2000 acres; diversion of 10 second-feet by Fresno flume for 6 months of each year from 1907 to date; storage capacity of 38,100 acre-feet from 1910 to 1913, and 126,900 acre-feet from 1913 to date.

Mass curve of run-off, Plate CX.

Probable frequency of flood discharge, Plate LXIX.



TABLE 78. COTTONWOOD CREEK.

SEASONAL RUN-OFF DATA. Drainage area 28.5 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division Q.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	119	2.2	144	3,300	January, 7.1%
1872-1873	74	0.3	20	500	February, 18.4%
1873-1874	100	1.2	79	1,800	March, 24.4%
1874-1875	64	0.2	13	300	April, 17.4%
1875-1876	124	2.4	157	3,600	May, 14.2%
1876-1877	60	0.1	7	100	June, 7.9%
1877-1878	109	1.6	105	2,400	July, 2.3%
1878-1879	41	0.0	0	0	August, 0.5%
1879-1880	134	3.1	203	4,700	September, 0.3%
1880-1881	122	2.3	151	3,500	October, 1.6%
1881-1882	69	0.2	13	300	November, 2.1%
1882-1883	85	0.7	46	1,100	December, 3.8%
1883-1884	178	6.9	453	10,500	
1884-1885	78	0.4	26	600	
1885-1886	169	6.0	394	9,100	
1886-1887	88	0.7	46	1,100	
1887-1888	67	0.2	13	300	
1888-1889	92	0.9	59	1,400	
1889-1890	153	4.6	302	7,000	
1890-1891	79	0.5	33	800	
1891-1892	102	1.3	85	2,000	
1892-1893	101	1.2	79	1,800	
1893-1894	83	0.6	39	900	
1894-1895	119	2.2	144	3,300	
1895-1896	82	0.5	33	800	
1896-1897	107	1.5	98	2,300	
1897-1898	56	0.1	7	200	
1898-1899	82	0.5	33	800	
1899-1900	102	1.3	85	2,000	
1900-1901	137	3.3	217	5,000	
1901-1902	75	0.3	20	500	
1902-1903	81	0.5	33	800	
1903-1904	81	0.5	33	800	
1904-1905	132	3.0	197	4,600	
1905-1906	148	4.2	276	6,400	
1906-1907	131	2.9	190	4,400	
1907-1908	81	0.5	33	800	
1908-1909	113	1.8	118	2,700	
1909-1910	95	1.0	66	1,500	
1910-1911	132	3.0	197	4,600	
1911-1912	73	0.3	20	500	
1912-1913	66	0.2	13	300	
1913-1914	123	2.4	157	3,700	
1914-1915	124	2.4	157	3,700	
1915-1916	123	2.4	157	3,700	
1916-1917	88	0.7	46	1,100	
1917-1918	91	0.8	52	1,200	
1918-1919	81	0.5	33	800	
1919-1920	91	0.8	52	1,200	
1920-1921	95	1.0	66	1,500	

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	2,300	1.52	81	
Maximum seasonal	10,500	6.90	368	1883-1884
Minimum seasonal	0	0.00	0	1878-1879
Mean during July	50	0.03	2	
Maximum during July	240	0.16	8	1883-1884
Minimum during July	0	0.00	0	1878-1879
Mean during August	10	0.01	Trace	
Maximum during August	50	0.03	2	1883-1884
Minimum during August	0	0.00	0	1878-1879

<sup>a</sup> Probable run-off curve, Plate XXIX.

<sup>b</sup> Storage development curve, Plate CLXI.

Mass curve of run-off, Plate CX.

Probable frequency of flood discharge, Plate LXIX.

(a) Description of drainage basin: Tributary area above a point in the center of Sec. 34, T. 10 S., R. 19 E.

(b) Estimated from record for Fresno River at Knowles

**TABLE 79. FRESNO RIVER.**  
**SEASONAL RUN-OFF DATA. Drainage area 270 square miles.<sup>a</sup>**

Season. (Begins October 1.)	Index of seasonal wetness. Division Q.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agri- cultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records.
1871-1872	119	6.6	140	95,400	January..... 7.1%
1872-1873	74	1.8	37	25,400	February..... 18.4%
1873-1874	100	4.2	88	60,400	March..... 24.4%
1874-1875	64	1.2	26	17,500	April..... 17.4%
1875-1876	124	7.3	153	104,900	May..... 14.2%
1876-1877	60	0.9	19	12,700	June..... 7.9%
1877-1878	109	5.3	112	76,300	July..... 2.3%
1878-1879	41	0.3	7	4,800	August..... 0.5%
1879-1880	134	8.7	184	125,600	September..... 0.3%
1880-1881	122	7.0	146	100,100	October..... 1.6%
1881-1882	69	1.4	30	20,700	November..... 2.1%
1882-1883	85	2.7	56	38,100	December..... 3.8%
1883-1884	178	16.3	342	233,600	
1884-1885	78	2.1	44	30,200	
1885-1886	169	14.5	305	208,200	
1886-1887	88	3.0	63	42,900	
1887-1888	67	1.3	28	19,100	
1888-1889	92	3.3	70	47,700	
1889-1890	153	11.7	246	168,500	
1890-1891	79	2.2	47	31,800	
1891-1892	102	4.4	93	63,600	
1892-1893	101	4.3	91	62,000	
1893-1894	83	2.5	53	36,600	
1894-1895	119	6.6	140	95,400	
1895-1896	82	2.4	51	35,000	
1896-1897	107	5.0	105	71,500	
1897-1898	56	0.8	16	11,100	
1898-1899	82	2.4	51	35,000	Measured seasonal discharge in acre-feet at gaging stations. <sup>f</sup>
1899-1900	102	4.4	93	63,600	
1900-1901	137	9.2	193	131,900	
1901-1902	75	1.9	40	27,000	
1902-1903	81	2.3	49	33,400	
1903-1904	81	2.3	49	33,400	
1904-1905	132	8.4	177	120,800	
1905-1906	148	10.8	228	155,800	
1906-1907	131	8.2	172	117,600	
1907-1908	81	2.3	49	33,400	
1908-1909	113	5.9	123	84,200	
1909-1910	95	3.6	77	52,400	
1910-1911	132	8.4	177	120,800	
1911-1912	75	1.9	40	26,700	26,700
1912-1913	66	0.6	14	9,000	12,600
1913-1914	123	4.6	98	66,600	70,400
1914-1915	124	5.5	116	79,700	89,400
1915-1916	123	8.6	181	124,100	109,700
1916-1917	88	5.6	116	80,000	81,600
1917-1918	91	3.6	74	51,200	55,000
1918-1919	81	2.6	56	37,600	39,700
1919-1920	91	2.4	51	35,200	30,900
1920-1921	95	4.0	84	57,000	44,900
					58,600

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	68,300	4.75	253	
Maximum seasonal	233,600	16.22	867	1883-1884
Minimum seasonal	4,800	0.33	18	1878-1879
Mean during July	1,570	0.11	6	
Maximum during July	5,370	0.37	20	1883-1884
Minimum during July	110	Trace	Trace	1878-1879
Mean during August	310	0.02	1	
Maximum during August	1,170	0.08	4	1883-1884
Minimum during August	14	Trace	Trace	1918-1919

Probable run-off curve, Plate XXIX.

Mass curve of run-off, Plate CX.

Storage development curve, Plate CLXI.

Probable frequency of flood discharge, Plate LXIX.

(a) Description of drainage basin: Tributary area above diversion dam of Madera Irrigation District in the south-west quarter of Sec. 9, T. 10 S., R. 19 E.

(b) Measured at diversion dam at head of Madera Canal and Irrigation Company's main canal. Observers: 1904-1905, Teilman; 1911-1912, Kingdon; 1912-1913, Smith; 1913-1914 to 1916-1917, Barnes; 1917-1918 to 1919-1920, Lughan; 1920-1921 and 1921-1922, the State Water Commission. Drainage area 298 square miles.

(c) U. S. G. S. gaging station near Knowles, at highway bridge in N. ½ of Sec. 15, T. 8 S., R. 20 E., drainage area 134.4 square miles.

(d) Partial record, October 1 to August 14.

(e) Partial record, November 13 to September 30.

(f) Measured seasonal run-off includes a mean annual flow of 9,700 acre-feet diverted into the Fresno River watershed, by lumber flumes. This amount has been deducted from the measured discharge to obtain the estimated run-off from the Fresno River drainage basin.

(g) Monthly measurements at diversion dam and near Knowles are inconsistent and seem to indicate heavy stream bed losses. As all water passing Knowles is, or can be made, available for use, the monthly discharge at the diversion dam, whenever smaller than that at Knowles, has been increased by the difference, to obtain probable total run-off. From the seasonal discharge thus obtained, 5,700 acre-feet have been deducted to obtain estimated seasonal run-off.

NOTE.—Discharge for season 1921-1922 at diversion dam as measured by the State Water Commission and Madera Irrigation District, was 104,070 acre-feet. Discharge near Knowles, measured by U. S. G. S., was 93,000 acre-feet. Index of seasonal wetness, 125; estimated run-off, 104,150 acre-feet; run-off index, 153.

TABLE 80. DAULTON CREEK GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 66 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division Q.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	119	2.1	142	7,400	January, 7.1%
1872-1873	74	0.3	20	1,100	February, 18.4%
1873-1874	100	1.2	81	4,200	March, 24.4%
1874-1875	64	0.2	14	700	April, 17.4%
1875-1876	124	2.4	162	8,500	May, 14.2%
1876-1877	60	0.1	7	400	June, 7.9%
1877-1878	109	1.5	102	5,300	July, 2.3%
1878-1879	41	0	0	0	August, 0.5%
1879-1880	134	3.0	203	10,600	September, 0.3%
1880-1881	122	2.3	156	8,100	October, 1.6%
1881-1882	69	0.2	14	700	November, 2.1%
1882-1883	85	0.6	41	2,100	December, 3.8%
1883-1884	178	6.8	460	24,100	
1884-1885	78	0.4	27	1,400	
1885-1886	169	6.0	406	21,300	
1886-1887	88	0.7	47	2,500	
1887-1888	67	0.2	14	700	
1888-1889	92	0.8	54	2,800	
1889-1890	153	4.5	304	15,900	
1890-1891	79	0.4	27	1,400	
1891-1892	102	1.2	81	4,200	
1892-1893	101	1.2	81	4,200	
1893-1894	83	0.5	34	1,800	
1894-1895	119	2.1	142	7,400	
1895-1896	82	0.5	34	1,800	
1896-1897	107	1.4	95	5,100	
1897-1898	56	0.1	7	400	
1898-1899	82	0.5	34	1,800	
1899-1900	102	1.2	81	4,200	
1900-1901	137	3.3	223	11,700	
1901-1902	75	0.3	20	1,100	
1902-1903	81	0.4	27	1,400	
1903-1904	81	0.4	27	1,400	
1904-1905	132	2.9	196	10,300	
1905-1906	148	4.2	284	14,900	
1906-1907	131	2.9	196	10,300	
1907-1908	81	0.4	27	1,400	
1908-1909	113	1.8	122	6,400	
1909-1910	95	0.9	61	3,200	
1910-1911	132	2.9	196	10,300	
1911-1912	73	0.3	20	1,100	
1912-1913	66	0.2	14	700	
1913-1914	123	2.3	156	8,100	
1914-1915	124	2.4	162	8,500	
1915-1916	123	2.3	156	8,100	
1916-1917	88	0.7	47	2,500	
1917-1918	91	0.8	54	2,800	
1918-1919	81	0.4	27	1,400	
1919-1920	91	0.8	54	2,800	
1920-1921	95	0.9	61	3,200	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	5,200	1.50	78	
Maximum seasonal	24,100	6.80	363	1883-1884
Minimum seasonal	0	0.00	0	1878-1879
Mean during July	120	0.03	2	
Maximum during July	550	0.16	8	1883-1884
Minimum during July	0	0.00	0	1878-1879
Mean during August	30	0.01	Trace	
Maximum during August	120	0.03	2	1883-1884
Minimum during August	0	0.00	0	1878-1879

Probable run-off curve, Plate XXIX.

Storage development curve, Plate CLXI.

Mass curve of run-off, Plate CXI.

Probable frequency of flood discharge, Plate LXIX.

(a) Description of drainage basin: Tributary area above points indicated: DAULTON CREEK, in S.E.  $\frac{1}{4}$  of Sec. 13, T. 10 S., R. 17 E.; DRY CREEK at  $\frac{1}{4}$  corner between Secs. 10 and 15, T. 10 S., R. 17 E.

(b) Estimated from record for the Fresno River.

TABLE 81. CHOWCHILLA RIVER.  
SEASONAL RUN-OFF DATA. Drainage area 238 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness, Division K.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	122	7.4	140	94,400	January, 7.1%
1872-1873	86	3.5	66	44,700	February, 18.4%
1873-1874	87	3.6	68	46,000	March, 24.4%
1874-1875	61	1.6	29	19,900	April, 17.4%
1875-1876	154	12.0	226	152,800	May, 14.2%
1876-1877	34	0.1	2	1,200	June, 7.9%
1877-1878	112	6.3	118	79,500	July, 2.3%
1878-1879	78	2.8	53	36,000	August, 0.5%
1879-1880	105	5.5	103	69,600	September, 0.3%
1880-1881	87	3.6	68	46,000	October, 1.6%
1881-1882	85	3.4	64	43,500	November, 2.1%
1882-1883	88	3.7	70	47,200	December, 3.8%
1883-1884	135	9.2	173	116,800	
1884-1885	67	2.0	37	24,900	
1885-1886	129	8.3	156	105,600	
1886-1887	68	2.1	39	26,100	
1887-1888	64	1.8	33	22,400	
1888-1889	74	2.5	46	31,100	
1889-1890	174	15.4	288	195,100	
1890-1891	86	3.5	66	44,700	
1891-1892	90	3.9	73	49,700	
1892-1893	132	8.8	165	111,800	
1893-1894	122	7.4	140	94,400	
1894-1895	148	11.3	211	142,900	
1895-1896	104	5.4	101	68,300	
1896-1897	124	7.8	147	99,400	
1897-1898	62	1.6	29	19,900	
1898-1899	89	3.8	72	48,500	
1899-1900	103	5.3	99	67,100	
1900-1901	129	8.4	158	106,900	
1901-1902	97	4.6	86	58,400	
1902-1903	108	5.9	110	74,600	
1903-1904	108	5.9	110	74,600	
1904-1905	108	5.9	110	74,600	
1905-1906	139	9.8	184	124,300	
1906-1907	148	11.3	211	142,900	
1907-1908	64	1.8	33	22,400	
1908-1909	119	7.1	134	90,700	
1909-1910	98	4.7	88	59,600	
1910-1911	133	9.0	169	114,300	
1911-1912	62	1.6	29	19,900	
1912-1913	58	1.3	24	16,200	
1913-1914	117	6.9	129	87,000	
1914-1915	114	6.5	121	82,000	
1915-1916	94	4.2	79	53,400	
1916-1917	82	3.1	59	39,800	
1917-1918	77	2.6	50	33,600	
1918-1919	89	3.8	72	48,500	
1919-1920	76	2.5	48	32,300	
1920-1921	110	6.1	114	77,000	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	67,700	5.30	284	
Maximum seasonal	195,100	15.40	820	1889-1890
Minimum seasonal	1,200	0.10	5	1876-1877
Mean during July	1,560	0.10	7	
Maximum during July	4,490	0.40	19	1889-1890
Minimum during July	28	Trace	Trace	1876-1877
Mean during August	340	0.03	1	
Maximum during August	976	0.08	4	1889-1890
Minimum during August	6	Trace	Trace	1876-1877

Probable run-off curve, Plate XXX.

Mass curve of run-off, Plate CXI.

Storage development curve, Plate CLXII.

Probable frequency of flood discharge, Plate LXX.

(a) Description of drainage basin: Tributary area above the S. E. corner of Sec. 22, T. 8 S., R. 18 E.

(b) Estimated from records for Fresno River at Knowles.

NOTE.—Discharge for 1921-1922, measured by the Madera Irrigation District, at Buchanan damsite, drainage area 238 square miles, was 107,500 acre-feet. Depth of run-off, 8.5 inches; index of seasonal wetness, 109; run-off index, 157.

TABLE 82. DUTCHMAN CREEK GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 72 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division K.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	122	3.2	148	12,300	January, 7.1%
1872-1873	86	1.1	51	4,200	February, 18.4%
1873-1874	87	1.2	55	4,600	March, 24.4%
1874-1875	61	0.2	10	800	April, 17.4%
1875-1876	154	6.1	282	23,100	May, 14.2%
1876-1877	34	0.0	0	0	June, 7.9%
1877-1878	112	2.6	120	10,000	July, 2.3%
1878-1879	78	0.7	33	2,700	August, 0.5%
1879-1880	105	2.1	97	8,100	September, 0.3%
1880-1881	87	1.2	56	4,600	October, 1.6%
1881-1882	85	1.0	46	3,800	November, 2.1%
1882-1883	88	1.2	56	4,600	December, 3.8%
1883-1884	135	4.4	204	16,900	
1884-1885	67	0.3	14	1,200	
1885-1886	129	3.8	176	14,600	
1886-1887	68	0.3	14	1,200	
1887-1888	64	0.3	14	1,200	
1888-1889	74	0.6	28	2,300	
1889-1890	174	8.2	380	31,500	
1890-1891	86	1.1	51	4,200	
1891-1892	90	1.3	60	5,000	
1892-1893	132	4.1	189	15,700	
1893-1894	122	3.2	148	12,300	
1894-1895	148	5.6	259	21,500	
1895-1896	104	2.0	93	7,700	
1896-1897	124	3.5	162	13,400	
1897-1898	62	0.2	10	800	
1898-1899	89	1.2	56	4,600	
1899-1900	103	2.0	93	7,700	
1900-1901	129	3.8	176	14,600	
1901-1902	97	1.7	78	6,500	
1902-1903	108	2.3	106	8,800	
1903-1904	108	2.3	106	8,800	
1904-1905	108	2.3	106	8,800	
1905-1906	139	4.7	217	18,000	
1906-1907	148	5.6	259	21,500	
1907-1908	64	0.3	14	1,200	
1908-1909	119	3.0	139	11,500	
1909-1910	98	1.8	83	6,900	
1910-1911	133	4.2	194	16,100	
1911-1912	62	0.2	10	800	
1912-1913	58	0.2	9	800	
1913-1914	117	2.9	134	11,100	
1914-1915	114	2.7	125	10,400	
1915-1916	94	1.5	69	5,800	
1916-1917	82	0.8	37	3,100	
1917-1918	77	0.7	33	2,700	
1918-1919	89	1.2	56	4,600	
1919-1920	76	0.7	33	2,700	
1920-1921	110	2.4	111	9,200	

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	8,300	2.20	115	
Maximum seasonal	31,500	8.20	438	1889-1890
Minimum seasonal	0	0.00	0	1876-1877
Mean during July	190	0.05	3	
Maximum during July	720	0.19	10	1889-1890
Minimum during July	0	0.00	0	1876-1877
Mean during August	40	0.01	1	
Maximum during August	160	0.04	2	1889-1890
Minimum during August	0	0.00	0	1876-1877

Probable run-off curve, Plate XXX.

Storage development curve, Plate CLXII.

Mass curve of run-off, Plate CXII.

Probable frequency of flood discharge, Plate LXX.

(a) Description of drainage area: Areas tributary to DUTCHMAN CREEK and DEADMAN CREEK above the Santa Fe railroad grade.

(b) Estimated from record for the Fresno River.

TABLE 83. MARIPOSA CREEK.  
SEASONAL RUN-OFF DATA. Drainage area 103 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division K.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records. <sup>b</sup>
1871-1872.....	122	3.4	146	18,600	January, 7.1%
1872-1873.....	86	1.3	56	7,100	February, 18.4%
1873-1874.....	87	1.3	56	7,100	March, 24.4%
1874-1875.....	61	0.3	13	1,600	April, 17.4%
1875-1876.....	154	6.4	274	35,100	May, 14.2%
1876-1877.....	34	0.0	0	0	June, 7.9%
1877-1878.....	112	2.7	116	14,800	July, 2.3%
1878-1879.....	78	0.9	38	4,900	August, 0.5%
1879-1880.....	105	2.3	99	12,600	September, 0.3%
1880-1881.....	87	1.3	56	7,100	October, 1.6%
1881-1882.....	85	1.2	52	6,600	November, 2.1%
1882-1883.....	88	1.3	56	7,100	December, 3.8%
1883-1884.....	135	4.5	193	24,600	
1884-1885.....	67	0.5	21	2,700	
1885-1886.....	129	4.0	171	21,900	
1886-1887.....	68	0.6	26	3,300	
1887-1888.....	64	0.4	17	2,200	
1888-1889.....	74	0.8	34	4,400	
1889-1890.....	174	8.8	377	48,200	
1890-1891.....	56	1.3	56	7,100	
1891-1892.....	90	1.4	60	7,700	
1892-1893.....	132	4.2	180	23,000	
1893-1894.....	122	3.4	146	18,600	
1894-1895.....	148	5.8	249	31,800	
1895-1896.....	104	2.2	94	12,100	
1896-1897.....	124	3.6	154	19,700	
1897-1898.....	62	0.4	17	2,200	
1898-1899.....	89	1.4	60	7,700	
1899-1900.....	103	2.2	94	12,100	
1900-1901.....	129	4.0	171	21,900	
1901-1902.....	97	1.8	77	9,900	
1902-1903.....	108	2.5	107	13,700	
1903-1904.....	108	2.5	107	13,700	
1904-1905.....	108	2.5	107	13,700	
1905-1906.....	139	4.9	210	26,800	
1906-1907.....	148	5.8	249	31,800	
1907-1908.....	64	0.4	17	2,200	
1908-1909.....	119	3.3	141	18,100	
1909-1910.....	98	1.8	77	9,900	
1910-1911.....	133	4.3	184	23,600	
1911-1912.....	62	0.4	17	2,200	
1912-1913.....	58	0.3	13	1,600	
1913-1914.....	117	3.1	133	17,000	
1914-1915.....	114	2.8	120	15,300	
1915-1916.....	94	1.7	73	9,300	
1916-1917.....	82	1.1	47	6,000	
1917-1918.....	77	0.8	34	4,400	
1918-1919.....	89	1.4	60	7,700	
1919-1920.....	76	0.8	34	4,400	
1920-1921.....	110	2.6	111	14,200	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal.....	12,800	2.30	125	
Maximum seasonal.....	48,200	8.80	469	1889-1890
Minimum seasonal.....	0	0.00	0	1876-1877
Mean during July.....	290	0.05	3	
Maximum during July.....	1,110	0.20	11	1889-1890
Minimum during July.....	0	0.00	0	1876-1877
Mean during August.....	60	0.01	1	
Maximum during August.....	240	0.04	2	1889-1890
Minimum during August.....	0	0.00	0	1876-1877

Probable run-off curve, Plate XXX.

Storage development curve, Plate CLXII.

Mass curve of run-off, Plate CXII.

Probable frequency of flood discharge, Plate LXX.

(a) Description of drainage basin: Tributary area above point in N. W.  $\frac{1}{4}$  of Sec. 31, T. 7 S., R. 17 E.

(b) Estimated from record for Fresno River.

TABLE 84. OWENS CREEK.

SEASONAL RUN-OFF DATA. Drainage area 66 square miles.a

Season. (Begins October 1.)	Index of seasonal wetness. Division K.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records.b
1871-1872	122	2.7	147	9,500	January, 7.1%
1872-1873	86	0.8	44	2,800	February, 18.4%
1873-1874	87	0.9	49	3,200	March, 24.4%
1874-1875	61	0.2	11	700	April, 17.4%
1875-1876	154	5.6	305	19,800	May, 14.2%
1876-1877	34	0.0	0	0	June, 7.9%
1877-1878	112	2.2	120	7,800	July, 2.3%
1878-1879	78	0.6	33	2,100	August, 0.5%
1879-1880	105	1.7	93	6,000	September, 0.3%
1880-1881	87	0.9	49	3,200	October, 1.6%
1881-1882	85	0.8	44	2,800	November, 2.1%
1882-1883	88	0.9	49	3,200	December, 3.8%
1883-1884	135	3.8	207	13,400	
1884-1885	67	0.3	16	1,100	
1885-1886	129	3.3	180	11,700	
1886-1887	68	0.3	16	1,100	
1887-1888	64	0.3	16	1,100	
1888-1889	74	0.4	22	1,400	
1889-1890	174	7.9	430	27,900	
1890-1891	86	0.8	44	2,800	
1891-1892	90	1.0	55	3,500	
1892-1893	132	3.5	191	12,400	
1893-1894	122	2.7	147	9,500	
1894-1895	148	5.0	272	17,700	
1895-1896	104	1.7	93	6,000	
1896-1897	124	2.9	158	10,200	
1897-1898	62	0.2	11	700	
1898-1899	89	1.0	54	3,500	
1899-1900	103	1.6	87	5,600	
1900-1901	129	3.3	180	11,700	
1901-1902	97	1.3	71	4,600	
1902-1903	108	1.8	98	6,400	
1903-1904	108	1.8	98	6,400	
1904-1905	108	1.8	98	6,400	
1905-1906	139	4.1	223	14,500	
1906-1907	148	5.0	272	17,700	
1907-1908	64	0.3	16	1,100	
1908-1909	119	2.5	136	8,800	
1909-1910	98	1.3	71	4,600	
1910-1911	133	3.7	202	13,100	
1911-1912	62	0.2	11	700	
1912-1913	58	0.1	5	400	
1913-1914	117	2.4	131	8,500	
1914-1915	114	2.3	125	8,100	
1915-1916	94	1.2	65	4,200	
1916-1917	82	0.7	38	2,500	
1917-1918	77	0.5	27	1,800	
1918-1919	89	1.0	54	3,500	
1919-1920	76	0.5	27	1,800	
1920-1921	110	2.0	109	7,100	

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	6,500	1.80	98	
Maximum seasonal	27,900	7.90	421	1889-1890
Minimum seasonal	0	0.00	0	1876-1877
Mean during July	150	0.04	2	
Maximum during July	640	0.18	10	1885-1890
Minimum during July	0	0.00	0	1876-1877
Mean during August	30	0.01	Trace	
Maximum during August	140	0.04	2	1889-1890
Minimum during August	0	0.00	0	1876-1877

Probable run-off curve, Plate XXX.

Storage development curve, Plate CLXII.

Mass curve of run-off, Plate CXIII.

Probable frequency of flood discharge, Plate LXX.

(a) Description of drainage basin: Tributary area above points indicated: MILES CREEK in N. W. ¼ of N. E. ¼ of Sec. 25, T. 7 S., R. 15 E.; OWENS CREEK in N. W. ¼ of Sec. 36, T. 7 S., R. 15 E.

(b) Estimated from record for Fresno River.

**TABLE 85. BEAR CREEK.**  
SEASONAL RUN-OFF DATA. Drainage area 71 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division K.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records. <sup>b</sup>
1871-1872	122	2.9	148	11,000	January, 7.1%
1872-1873	86	0.9	46	3,400	February, 18.4%
1873-1874	8	1.0	51	3,800	March, 24.4%
1874-1875	61	0.3	15	1,100	April, 17.4%
1875-1876	154	5.7	291	21,700	May, 14.2%
1876-1877	34	0.0	0	0	June, 7.9%
1877-1878	112	2.3	117	8,800	July, 2.3%
1878-1879	78	0.7	36	2,700	August, 0.5%
1879-1880	105	1.8	92	6,900	September, 0.3%
1880-1881	87	1.0	51	3,800	October, 1.6%
1881-1882	85	0.8	41	3,000	November, 2.1%
1882-1883	88	1.0	51	3,800	December, 3.8%
1883-1884	135	3.9	199	11,900	
1884-1885	67	0.3	15	1,100	
1885-1886	129	3.5	178	13,300	
1886-1887	68	0.3	15	1,100	
1887-1888	64	0.3	15	1,100	
1888-1889	74	0.5	25	1,900	
1889-1890	174	7.8	398	29,700	
1890-1891	86	0.9	46	3,400	
1891-1892	90	1.2	61	4,600	
1892-1893	132	3.7	189	14,100	
1893-1894	123	2.9	148	11,000	
1894-1895	148	5.2	265	19,800	
1895-1896	104	1.8	92	6,900	
1896-1897	124	3.1	158	11,800	
1897-1898	62	0.3	15	1,100	
1898-1899	89	1.1	56	4,200	
1899-1900	103	1.7	87	6,500	
1900-1901	129	3.5	178	13,300	
1901-1902	97	1.4	71	5,300	
1902-1903	108	2.1	107	8,000	
1903-1904	108	2.1	107	8,000	
1904-1905	108	2.1	107	8,000	
1905-1906	139	4.3	219	16,400	
1906-1907	148	5.2	265	19,800	
1907-1908	64	0.3	15	1,100	
1908-1909	119	2.8	113	10,700	
1909-1910	98	1.5	76	5,700	
1910-1911	133	3.8	194	14,500	
1911-1912	62	0.3	15	1,100	
1912-1913	58	0.2	10	800	
1913-1914	117	2.6	133	9,900	
1914-1915	114	2.4	122	9,100	
1915-1916	94	1.3	66	5,000	
1916-1917	82	0.8	41	3,000	
1917-1918	77	0.6	31	2,300	
1918-1919	89	1.1	56	4,200	
1919-1920	76	0.6	31	2,300	
1920-1921	110	2.2	112	8,400	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	7,500	2 00	105	
Maximum seasonal	29,700	7 80	416	1889-1890
Minimum seasonal	0	0 00	0	1876-1877
Mean during July	170	0 01	2	
Maximum during July	680	0 18	10	1889-1890
Minimum during July	0	0 00	0	1876-1877
Mean during August	40	0 01	1	
Maximum during August	150	0 04	2	1889-1890
Minimum during August	0	0 00	0	1876-1877

Probable run-off curve, Plate XXXI.

Storage development curve, Plate CLXIII.

Mass curve of run-off, Plate CXIII.

Probable frequency of flood discharge, Plate LXXI.

<sup>(a)</sup> Description of drainage basin: Tributary area above point in N. W.  $\frac{1}{4}$  of Sec. 11, T. 7 S., R. 15 E.<sup>(b)</sup> Estimated from record for Fresno River.



**TABLE 86. BURNS CREEK GROUP.**  
SEASONAL RUN-OFF DATA. Drainage area 171 square miles.*a*

Season. (Begins October 1.)	Index of seasonal wetness. Division K.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <i>b</i>
1871-1872	122	4.0	150	36,500	January, 34.2%
1872-1873	86	1.5	56	13,700	February, 25.2%
1873-1874	87	1.6	60	14,600	March, 23.7%
1874-1875	61	0.3	11	2,700	April, 5.5%
1875-1876	154	6.8	255	62,000	May, 2.6%
1876-1877	34	0.0	0	0	June, 1.0%
1877-1878	112	3.3	124	30,100	July, 0.3%
1878-1879	78	1.1	41	10,000	August, 0.0%
1879-1880	105	2.8	105	25,500	September, 0.1%
1880-1881	87	1.6	60	14,600	October, 0.6%
1881-1882	85	1.4	52	12,800	November, 1.6%
1882-1883	88	1.6	60	14,600	December, 5.2%
1883-1884	135	5.2	195	47,400	
1884-1885	67	0.5	19	4,600	
1885-1886	129	4.6	172	41,900	
1886-1887	68	0.5	19	4,600	
1887-1888	64	0.4	15	3,600	
1888-1889	74	0.8	30	7,300	
1889-1890	174	8.8	329	80,200	
1890-1891	86	1.5	56	13,700	
1891-1892	90	1.8	67	16,400	
1892-1893	132	4.8	180	43,800	
1893-1894	122	4.0	150	36,500	
1894-1895	148	6.3	236	57,400	
1895-1896	104	2.7	101	24,600	
1896-1897	124	4.2	157	38,300	
1897-1898	62	0.3	11	2,700	
1898-1899	89	1.7	64	15,500	
1899-1900	103	2.6	97	23,700	
1900-1901	129	4.6	172	41,900	
1901-1902	97	2.2	82	20,100	
1902-1903	108	3.0	112	27,300	
1903-1904	108	3.0	112	27,300	
1904-1905	108	3.0	112	27,300	
1905-1906	139	5.5	206	50,100	
1906-1907	148	6.3	236	57,400	
1907-1908	64	0.4	15	3,600	
1908-1909	119	3.8	142	34,600	
1909-1910	98	2.3	86	21,000	
1910-1911	133	5.0	187	45,600	
1911-1912	62	0.3	11	2,700	
1912-1913	58	0.3	11	2,700	
1913-1914	117	3.7	139	33,700	
1914-1915	114	3.4	127	31,000	
1915-1916	94	2.0	75	18,200	
1916-1917	82	1.3	49	11,900	
1917-1918	77	1.0	37	9,100	
1918-1919	89	1.7	64	15,500	
1919-1920	76	1.0	37	9,100	
1920-1921	110	3.1	116	28,300	

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	24,400	2.70	143	
Maximum seasonal	80,200	8.80	469	1889-1890
Minimum seasonal	0	0.00	0	1876-1877
Mean during July	70	0.01	Trace	
Maximum during July	240	0.03	1	1889-1890
Minimum during July	0	0.00	0	1876-1877
Mean during August	0	0.00	0	
Maximum during August	0	0.00	0	1889-1890
Minimum during August	0	0.00	0	1876-1877

Probable run-off curve, Plate XXXI.

Storage development curve, Plate CLXXII.

Mass curve of run-off, Plate CXIV.

Probable frequency of flood discharge, Plate LXXI.

(a) Description of drainage basin: Tributary areas to points indicated: BURNS CREEK, in N. E. ¼ of Sec. 24, T. 7 S., R. 14 E.; BLACK RASCAL CREEK in N. W. ¼ of Sec. 15, T. 7 S., R. 14 E.; FAHRENS CREEK in S. W. ¼ of Sec. 31, T. 6 S., R. 14 E.

(b) Estimated from record for Calaveras River.

TABLE 87. MERCED RIVER.  
SEASONAL RUN-OFF DATA. Drainage area 1,054 square miles.a

Season. (Begins October 1.)	Index of seasonal wetness, Division K.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records.
1871-1872	122	26.9	133	1,511,000	January, 6.5%
1872-1873	86	13.7	68	769,000	February, 6.4%
1873-1874	87	14.1	70	791,000	March, 12.6%
1874-1875	61	7.8	39	439,000	April, 14.6%
1875-1876	154	42.4	210	2,384,000	May, 23.8%
1876-1877	34	3.9	19	250,000	June, 20.6%
1877-1878	112	22.7	113	1,274,000	July, 7.5%
1878-1879	78	11.7	58	659,000	August, 1.8%
1879-1880	105	20.1	100	1,132,000	September, 0.9%
1880-1881	87	14.1	70	791,000	October, 1.5%
1881-1882	85	13.6	67	764,000	November, 1.3%
1882-1883	88	14.5	72	813,000	December, 2.2%
1883-1884	135	32.8	162	1,840,000	
1884-1885	67	9.0	45	505,000	
1885-1886	129	30.1	149	1,692,000	
1886-1887	68	9.6	48	538,000	
1887-1888	64	8.5	42	478,000	
1888-1889	74	10.7	53	599,000	
1889-1890	174	52.6	261	2,955,000	
1890-1891	86	13.7	68	769,000	
1891-1892	90	15.1	75	846,000	
1892-1893	132	31.3	155	1,758,000	
1893-1894	122	26.9	133	1,511,000	
1894-1895	148	39.8	197	2,236,000	
1895-1896	104	19.8	98	1,110,000	
1896-1897	124	27.9	138	1,566,000	
1897-1898	62	8.0	40	450,000	
1898-1899	89	14.7	73	824,000	
1899-1900	103	19.6	97	1,099,000	
1900-1901	129	30.1	149	1,692,000	c970,200
1901-1902	97	14.8	73	828,600	828,600
1902-1903	108	17.5	87	982,900	982,900
1903-1904	108	19.5	97	1,096,600	1,096,600
1904-1905	108	16.0	80	900,900	900,900
1905-1906	139	36.3	180	2,040,900	2,040,900
1906-1907	148	37.9	188	2,132,400	2,132,400
1907-1908	64	9.2	46	518,400	518,400
1908-1909	119	26.3	130	1,479,400	1,479,400
1909-1910	98	19.0	97	1,068,300	1,068,300
1910-1911	133	37.7	184	2,119,900	2,119,900
1911-1912	62	9.2	46	515,000	515,000
1912-1913	58	7.8	39	440,900	440,900
1913-1914	117	24.5	122	1,379,000	d9,170
1914-1915	114	23.5	116	1,318,000	
1915-1916	94	26.5	131	f1,491,900	e1,446,700
1916-1917	82	20.0	99	f1,127,500	1,125,100
1917-1918	77	14.8	73	f832,200	830,400
1918-1919	89	12.1	60	f684,100	681,100
1919-1920	76	12.2	61	f687,600	685,800
1920-1921	110	18.0	89	f1,016,900	1,011,300

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.b

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	1,133,500	20.20	1.075	
Maximum seasonal	2,955,000	52.60	2,803	1889-1890
Minimum seasonal	220,000	3.90	209	1876-1877
Mean during July	99,800	1.77	95	
Maximum during July	385,000	6.85	365	1905-1906
Minimum during July	13,000	0.23	12	1918-1919
Mean during August	23,900	0.43	23	
Maximum during August	58,300	1.04	55	1905-1906
Minimum during August	3,800	0.07	4	1918-1919

Probable run-off curve, Plate XXXI.

Storage development curve, Plate CLXIII.

Mass curve of run-off, Plate CXIV.

Probable frequency of flood discharge, Plate LXXI.

(a) Description of drainage basin: Tributary area above former gaging point, 2 miles above dam at Merced Falls.  
(b) Point of measurement: April 1, 1902, to November 30, 1914, at gage 2 miles above dam at Merced Falls, drainage area 1,054 square miles. December 1, 1915 to date, at Exchequer, just above mouth of Cotton Creek, drainage area 1,020 square miles.

(c) Partial record, April 1 to September 30.

(d) Partial record, October 1 to November 30.

(e) Partial record, December 1 to September 30.

(f) Records at Exchequer increased by run-off for 34 square miles determined from run-off curve for Burns Creek.

TABLE 88. TUOLUMNE RIVER.

SEASONAL RUN-OFF DATA. Drainage area 1,543 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division K.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records. <sup>b</sup>
1871-1872	122	31.8	128	2,624,000	January, 6.2%
1872-1873	86	18.7	75	1,543,000	February, 6.8%
1873-1874	87	19.1	77	1,576,000	March, 11.2%
1874-1875	61	11.9	48	982,000	April, 15.0%
1875-1876	154	49.2	197	4,059,000	May, 23.0%
1876-1877	34	6.8	27	561,000	June, 21.9%
1877-1878	112	27.7	111	2,286,000	July, 8.1%
1878-1879	78	16.4	66	1,353,000	August, 1.6%
1879-1880	105	25.1	101	2,071,000	September, 0.6%
1880-1881	87	19.1	77	1,576,000	October, 1.2%
1881-1882	85	18.5	74	1,526,000	November, 1.9%
1882-1883	88	19.5	78	1,609,000	December, 2.5%
1883-1884	135	38.2	153	3,152,000	
1884-1885	67	13.3	53	1,097,000	
1885-1886	129	35.5	142	2,929,000	
1886-1887	68	13.8	55	1,139,000	
1887-1888	64	12.7	51	1,048,000	
1888-1889	74	15.3	61	1,262,000	
1889-1890	174	62.0	248	5,099,000	
1890-1891	86	18.7	75	1,543,000	
1891-1892	90	20.0	80	1,650,000	
1892-1893	132	36.8	148	3,036,000	
1893-1894	122	31.8	128	2,624,000	
1894-1895	148	46.0	184	3,795,000	
1895-1896	104	19.3	77	1,588,100	1,588,100
1896-1897	124	29.6	119	2,437,100	2,437,100
1897-1898	62	11.6	47	960,500	960,500
1898-1899	89	16.2	65	1,334,700	1,334,700
1899-1900	103	19.8	79	1,628,100	1,628,100
1900-1901	129	33.0	132	2,717,800	2,717,800
1901-1902	97	19.5	78	1,606,000	1,606,000
1902-1903	108	23.9	96	1,973,100	1,973,100
1903-1904	108	32.2	129	2,661,200	2,661,200
1904-1905	108	20.8	83	1,720,000	1,720,000
1905-1906	139	42.8	172	3,525,400	3,525,400
1906-1907	148	45.5	183	3,755,700	3,755,700
1907-1908	64	13.0	52	1,073,600	1,073,600
1908-1909	119	32.2	129	2,646,900	2,646,900
1909-1910	98	25.2	101	2,078,100	2,078,100
1910-1911	133	41.4	166	3,413,400	3,413,400
1911-1912	62	12.7	51	1,051,000	1,051,000
1912-1913	58	13.1	53	1,075,600	1,075,600
1913-1914	117	31.8	128	2,623,700	2,623,700
1914-1915	114	24.9	100	2,044,900	2,044,900
1915-1916	94	28.6	115	2,345,500	2,345,500
1916-1917	82	27.0	108	2,223,000	2,223,000
1917-1918	77	17.7	71	1,456,700	1,456,700
1918-1919	89	16.4	66	1,351,500	1,337,800
1919-1920	76	16.3	65	1,336,200	1,336,200
1920-1921	110	24.5	98	2,022,200	2,022,200

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.<sup>c</sup>

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	2,055,800	24.90	1,332.0	
Maximum seasonal	5,099,000	62.00	3,296.0	1889-1890
Minimum seasonal	561,000	6.80	363.0	1876-1877
Mean during July	166,520	2.02	108.0	
Maximum during July	712,900	8.66	461.0	1905-1906
Minimum during July	16,900	0.20	11.0	1897-1898
Mean during August	32,890	0.40	21.3	
Maximum during August	135,900	1.65	88.0	1905-1906
Minimum during August	2,500	0.03	1.6	1899-1900

Probable run-off curve, Plate XXXI.

Mass curve of run-off, Plate CXI.

Storage development curve, Plate CLXIII.

Probable frequency of flood discharge, Plate LXXI.

(a) Description of drainage basin: Tributary area above La Grange Dam.

(b) Measured run-off adjusted for storage of 28,382 acre-feet capacity.

(c) Point of measurement: October 1, 1895, to September 30, 1916, at La Grange Dam; October 1, 1916, to date, 3/2 miles above La Grange Dam, but run-off assumed to be the same as at La Grange Dam.

TABLE 89. WILDCAT CREEK GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 59 square miles.a

Season. (Begins October 1.)	Index of seasonal wetness. Division K.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months.b
1871-1872	122	4.2	149	13,100	January, 34.2%
1872-1873	86	1.5	53	4,700	February, 25.2%
1873-1874	87	1.5	53	4,700	March, 23.7%
1874-1875	61	0.3	11	900	April, 5.5%
1875-1876	154	7.9	280	24,700	May, 2.6%
1876-1877	34	0.0	0	0	June, 1.0%
1877-1878	112	3.4	120	10,600	July, 0.3%
1878-1879	78	1.1	39	3,400	August, 0.0%
1879-1880	105	2.7	96	8,500	September, 0.1%
1880-1881	87	1.5	53	4,700	October, 0.6%
1881-1882	85	1.4	50	4,400	November, 1.6%
1882-1883	88	1.6	57	5,000	December, 5.2%
1883-1884	135	5.6	198	17,500	
1884-1885	67	0.5	18	1,600	
1885-1886	129	5.0	177	15,700	
1886-1887	68	0.6	21	1,900	
1887-1888	64	0.4	14	1,300	
1888-1889	74	0.8	28	2,500	
1889-1890	174	10.5	372	32,900	
1890-1891	86	1.5	53	4,700	
1891-1892	90	1.7	60	5,300	
1892-1893	132	5.2	184	16,300	
1893-1894	122	4.2	149	13,100	
1894-1895	148	7.1	251	22,200	
1895-1896	104	2.7	96	8,500	
1896-1897	124	4.5	159	14,100	
1897-1898	62	0.3	11	900	
1898-1899	89	1.7	60	5,300	
1899-1900	103	2.6	92	8,100	
1900-1901	129	5.0	177	15,700	
1901-1902	97	2.2	78	6,900	
1902-1903	108	3.0	106	9,400	
1903-1904	108	3.0	106	9,400	
1904-1905	108	3.0	106	9,400	
1905-1906	139	6.1	216	19,100	
1906-1907	148	7.1	251	22,200	
1907-1908	64	0.4	14	1,300	
1908-1909	119	4.0	141	12,500	
1909-1910	98	2.3	81	7,200	
1910-1911	133	5.4	191	16,900	
1911-1912	62	0.3	11	900	
1912-1913	58	0.2	7	600	
1913-1914	117	3.7	131	11,600	
1914-1915	114	3.5	124	11,000	
1915-1916	94	2.0	71	6,300	
1916-1917	82	1.2	42	3,800	
1917-1918	77	1.0	35	3,100	
1918-1919	89	1.7	60	5,300	
1919-1920	76	1.0	35	3,100	
1920-1921	110	3.2	113	10,000	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	8,850	2.82	151	
Maximum seasonal	32,900	10.50	560	1889-1890
Minimum seasonal	0	0.00	0	1876-1877
Mean during July	30	0.01	1	
Maximum during July	100	0.03	2	1889-1890
Minimum during July	0	0.00	0	1876-1877
Mean during August	0	0.00	0	
Maximum during August	0	0.00	0	
Minimum during August	0	0.00	0	1876-1877

Proable run-off curve, Plate XXXII.

Mass curve of run-off, Plate CXV.

Storage development curve, Plate CLXIV.

Probable frequency of flood discharge, Plate LXXII.

(a) Description of drainage basin: Tributary area on WILDCAT CREEK above a point in the S. E.  $\frac{1}{4}$  of Sec. 33, T. 1 S., R. 12 E., and on DRY CREEK above a point in the N. W.  $\frac{1}{4}$  of Sec. 16, T. 2 S., R. 13 E.

(b) Estimated from record for Calaveras River.

TABLE 90. STANISLAUS RIVER.

SEASONAL RUN-OFF DATA. Drainage area 983 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness, Division K.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.) <sup>b</sup>	Distribution of seasonal run-off by months as shown by U.S.G.S. records. <sup>b</sup>
1871-1872	122	35.4	135	1,860,000	January, 7.1%
1872-1873	86	18.3	70	959,000	February, 7.9%
1873-1874	87	18.5	70	970,000	March, 16.6%
1874-1875	61	9.2	35	482,000	April, 17.4%
1875-1876	154	55.8	213	2,930,000	May, 22.7%
1876-1877	234	7.8	30	408,900	June, 17.7%
1877-1878	112	30.0	114	1,570,000	July, 5.6%
1878-1879	78	15.7	60	823,000	August, 1.2%
1879-1880	105	26.5	101	1,390,000	September, 0.5%
1880-1881	87	18.5	70	970,000	October, 0.6%
1881-1882	85	18.0	69	944,000	November, 0.9%
1882-1883	88	19.5	74	1,020,000	December, 1.8%
1883-1884	135	43.0	164	2,250,000	
1884-1885	67	11.1	42	582,000	
1885-1886	129	39.5	150	2,070,000	
1886-1887	68	11.8	45	619,000	
1887-1888	64	10.3	39	540,000	
1888-1889	74	13.7	52	718,000	
1889-1890	174	68.2	260	3,580,000	
1890-1891	86	18.3	70	959,000	
1891-1892	90	20.0	76	1,050,000	
1892-1893	132	41.0	156	2,150,000	
1893-1894	122	35.5	135	1,860,000	
1894-1895	148	51.5	196	2,700,000	
1895-1896	104	26.4	101	1,380,000	
1896-1897	124	36.7	140	1,920,000	
1897-1898	62	9.5	36	498,000	
1898-1899	89	19.6	75	1,030,000	
1899-1900	103	25.8	98	1,350,000	
1900-1901	129	39.5	150	2,070,000	
1901-1902	97	23.0	88	1,210,000	
1902-1903	108	23.9	91	1,254,800	
1903-1904	108	38.5	147	2,019,900	
1904-1905	108	16.3	62	848,400	
1905-1906	139	45.4	173	2,383,200	
1906-1907	148	53.3	203	2,803,500	
1907-1908	64	11.4	43	597,800	
1908-1909	119	36.1	138	1,897,100	
1909-1910	98	26.0	99	1,364,800	
1910-1911	133	44.2	168	2,322,900	
1911-1912	62	11.3	43	590,700	
1912-1913	58	9.6	37	506,700	
1913-1914	117	30.4	116	1,601,900	
1914-1915	114	21.3	93	1,277,500	
1915-1916	94	30.6	117	1,611,500	
1916-1917	82	26.2	100	1,362,800	
1917-1918	77	15.5	59	805,700	
1918-1919	89	14.4	55	749,800	
1919-1920	76	13.8	53	718,000	
1920-1921	110	23.4	89	1,219,500	

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.<sup>c</sup>

d479,200
2,014,800
844,000
2,378,800
2,799,100
593,500
1,892,700
1,360,400
2,318,900
587,000
494,000
1,584,400
1,274,900
1,609,200
1,360,900
804,100
748,600
712,700
1,218,600

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	1,376,000	26.24	1,400.0	
Maximum seasonal	3,580,000	68.20	3,642.0	1889-1890
Minimum seasonal	62,900	1.20	64.0	1876-1877
Mean during July	76,700	1.46	78.0	
Maximum during July	318,200	6.10	321.0	1905-1906
Minimum during July	3,520	0.07	3.6	1876-1877
Mean during August	16,400	0.30	17.0	
Maximum during August	64,000	1.20	65.0	1906-1907
Minimum during August	0	0.00	0	1913-1914

Probable run-off curve, Plate XXXII.

Mass curve of run-off, Plate CXIV.

Storage development curve, Plate CLXIV.

Probable frequency of flood discharge, Plate LXXII.

(a) Description of drainage basin: Tributary area above gage at Knights Ferry, in N. E.  $\frac{1}{4}$  of Sec. 29, T. 1 S., R. 12 E.

(b) Measured run-off adjusted for irrigation and storage above point of measurement as follows: Area irrigated, 2,910 acres from 1904 to 1910, then decreasing 230 acres per year to 600 acres in 1920-1921. Storage capacity, 1901-1909, 17,600 acre-feet; 1909-1910, 20,000 acre-feet; 1910-1916, 35,400 acre-feet; 1916-1921, 48,700 acre-feet.

(c) Point of measurement: May, 1903, to April, 1916, at Knights Ferry, drainage area 983 square miles; April, 1916, to date, near Knights Ferry, in S. W.  $\frac{1}{4}$  of Sec. 1, T. 1 S., R. 12 E., 2 miles above Goodwin Dam, drainage area 973 square miles. No adjustment made for difference in drainage area, the discharge being assumed the same at the two points.

(d) Partial record, May to September, inclusive.

(e) Index of 56 used.

TABLE 91. LITTLEJOHNS CREEK.

SEASONAL RUN-OFF DATA. Drainage area 40.5 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division K.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	122	5.3	141	11,400	January, 34.2%
1872-1873	86	2.2	58	4,800	February, 25.2%
1873-1874	87	2.2	58	4,800	March, 23.7%
1874-1875	61	0.9	24	1,900	April, 5.5%
1875-1876	154	9.7	257	20,900	May, 2.6%
1876-1877	34	0.2	5	400	June, 1.0%
1877-1878	112	4.4	117	9,500	July, 0.3%
1878-1879	78	1.7	45	3,700	August, 0.0%
1879-1880	105	3.7	98	8,000	September, 0.1%
1880-1881	87	2.2	58	4,800	October, 0.6%
1881-1882	85	2.1	56	4,500	November, 1.6%
1882-1883	88	2.3	61	5,000	December, 5.2%
1883-1884	135	6.9	183	14,900	
1884-1885	67	1.2	32	2,600	
1885-1886	129	6.1	162	13,200	
1886-1887	68	1.2	32	2,600	
1887-1888	64	1.0	27	2,200	
1888-1889	74	1.5	40	3,200	
1889-1890	174	13.3	353	28,700	
1890-1891	86	2.2	58	4,800	
1891-1892	90	2.5	64	5,400	
1892-1893	132	6.5	172	14,000	
1893-1894	122	5.3	141	11,400	
1894-1895	148	8.8	233	19,000	
1895-1896	104	3.6	95	7,800	
1896-1897	124	5.6	148	12,100	
1897-1898	62	1.0	27	2,200	
1898-1899	89	2.4	64	5,200	
1899-1900	103	3.5	93	7,600	
1900-1901	129	6.1	162	13,200	
1901-1902	97	3.0	80	6,500	
1902-1903	108	4.0	106	8,600	
1903-1904	108	4.0	106	8,600	
1904-1905	108	4.0	106	8,600	
1905-1906	139	7.5	199	16,200	
1906-1907	148	8.8	233	19,000	
1907-1908	64	1.0	27	2,200	
1908-1909	119	5.1	135	11,000	
1909-1910	98	3.1	82	6,700	
1910-1911	133	6.7	178	14,500	
1911-1912	62	1.0	27	2,200	
1912-1913	58	0.8	21	1,700	
1913-1914	117	4.8	127	10,400	
1914-1915	114	4.6	122	9,900	
1915-1916	94	2.7	72	5,800	
1916-1917	82	2.0	53	4,300	
1917-1918	77	1.7	45	3,700	
1918-1919	89	2.4	64	5,200	
1919-1920	76	1.6	42	3,500	
1920-1921	110	4.2	111	9,100	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	8,150	3.80	201	
Maximum seasonal	28,700	13.30	709	1889-1890
Minimum seasonal	400	0.20	10	1876-1877
Mean during July	20	0.01	1	
Maximum during July	90	0.04	2	1889-1890
Minimum during July	Trace	Trace	Trace	1876-1877
Mean during August	0	0.00	0	
Maximum during August				
Minimum during August	0	0.00	0	1876-1877

Probable run-off curve, Plate XXXII.

Storage development curve, Plate CLXIV.

Mass curve of run-off, Plate CXVI.

Probable frequency of flood discharge, Plate LXXII.

<sup>(a)</sup> Description of drainage basin: Tributary area above point where longitude 120° 42.3' intersects stream, near Knights Ferry.<sup>(b)</sup> Estimated from records for Calaveras River.

TABLE 92. MARTELLS CREEK GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 122 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division K.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	122	3.3	150	21,500	January, 34.2%
1872-1873	86	1.3	59	8,500	February, 25.2%
1873-1874	87	1.3	59	8,500	March, 23.7%
1874-1875	61	0.3	14	2,000	April, 5.5%
1875-1876	154	5.4	246	35,100	May, 2.6%
1876-1877	34	0.0	0	0	June, 1.0%
1877-1878	112	2.7	123	17,600	July, 0.3%
1878-1879	78	1.0	46	6,500	August, 0.0%
1879-1880	105	2.3	105	15,000	September, 0.1%
1880-1881	87	1.3	59	8,500	October, 0.6%
1881-1882	85	1.2	55	7,800	November, 1.6%
1882-1883	88	1.4	64	9,100	December, 5.2%
1883-1884	135	4.1	187	26,700	
1884-1885	67	0.5	23	3,300	
1885-1886	129	3.7	169	24,100	
1886-1887	68	0.6	27	3,900	
1887-1888	64	0.4	18	2,600	
1888-1889	74	0.8	36	5,200	
1889-1890	174	6.9	314	44,900	
1890-1891	86	1.3	59	8,500	
1891-1892	90	1.5	68	9,800	
1892-1893	132	3.9	178	25,400	
1893-1894	122	3.3	150	21,500	
1894-1895	148	5.0	228	32,500	
1895-1896	104	2.2	100	14,300	
1896-1897	124	3.4	155	22,100	
1897-1898	62	0.4	18	2,600	
1898-1899	89	1.5	68	9,800	
1899-1900	103	2.2	100	14,300	
1900-1901	129	3.7	169	24,100	
1901-1902	97	1.8	82	11,700	
1902-1903	108	2.4	109	15,600	
1903-1904	108	2.4	109	15,600	
1904-1905	108	2.4	109	15,600	
1905-1906	139	4.4	200	28,600	
1906-1907	148	5.0	228	32,500	
1907-1908	64	0.4	18	2,600	
1908-1909	119	3.1	141	20,200	
1909-1910	98	1.9	87	12,400	
1910-1911	133	4.0	182	26,000	
1911-1912	62	0.4	18	2,600	
1912-1913	58	0.3	14	2,000	
1913-1914	117	3.0	137	19,500	
1914-1915	114	2.8	128	18,200	
1915-1916	94	1.7	78	11,100	
1916-1917	82	1.1	50	7,200	
1917-1918	77	0.9	41	5,900	
1918-1919	89	1.5	68	9,800	
1919-1920	76	0.8	36	5,200	
1920-1921	110	2.6	118	16,900	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	14,300	2.20	117	
Maximum seasonal	44,900	6.90	365	1889-1890
Minimum seasonal	0	0.00	0	1876-1877
Mean during July	40	0.01	Trace	
Maximum during July	130	0.02	1	1889-1890
Minimum during July	0	0.00	0	1876-1877
Mean during August	0	0.00	0	
Maximum during August	0	0.00	0	
Minimum during August	0	0.00	0	1876-1877

Probable run-off curve, Plate XXXII.

Mass curve of run-off, Plate CXV.

Storage development curve, Plate CLXIV.

Probable frequency of flood discharge, Plate LXXII.

(a) Description of drainage basin: Tributary areas, above 300-foot contour, of following streams: MARTELLS CREEK, BEAR CREEK, ROCK CREEK, BIG SPRING CREEK, PEACHYS CREEK.

(b) Estimated from record for Calaveras River.

TABLE 93. CALAVERAS RIVER.  
SEASONAL RUN-OFF DATA. Drainage area 394 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division K.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records.
1871-1872	122	23.0	153	483,300	January, 34.2%
1872-1873	86	8.6	57	180,700	February, 25.2%
1873-1874	87	9.0	60	189,100	March, 23.7%
1874-1875	61	2.2	15	46,200	April, 5.5%
1875-1876	154	38.0	252	798,500	May, 2.6%
1876-1877	34	1.4	9	29,400	June, 1.0%
1877-1878	112	18.5	123	388,700	July, 0.3%
1878-1879	78	6.5	43	136,500	August, 0.6%
1879-1880	105	15.6	103	327,800	September, 0.1%
1880-1881	87	9.0	60	189,100	October, 0.6%
1881-1882	85	8.3	55	174,400	November, 1.6%
1882-1883	88	9.5	63	199,600	December, 5.2%
1883-1884	135	29.0	192	609,300	
1884-1885	67	3.7	24	77,700	
1885-1886	129	26.4	175	554,700	
1886-1887	68	4.0	26	84,000	
1887-1888	64	2.9	19	60,900	
1888-1889	74	5.2	35	109,200	
1889-1890	174	47.7	317	1,003,000	
1890-1891	86	8.6	57	180,700	
1891-1892	90	10.0	66	210,100	
1892-1893	132	27.5	182	577,800	
1893-1894	122	23.0	153	483,300	
1894-1895	148	35.4	235	743,800	
1895-1896	104	15.0	100	315,100	
1896-1897	124	24.0	159	504,300	
1897-1898	62	2.4	16	50,400	
1898-1899	89	9.7	64	203,800	
1899-1900	103	14.9	99	313,000	
1900-1901	129	26.2	174	550,500	
1901-1902	97	12.5	83	262,600	
1902-1903	108	17.0	113	357,200	
1903-1904	108	17.0	113	357,200	
1904-1905	108	17.0	113	357,200	
1905-1906	139	31.0	206	651,400	
1906-1907	148	31.0	206	651,000	
1907-1908	64	3.3	22	68,500	b592,900
1908-1909	119	22.4	149	471,600	c67,200
1909-1910	98	9.3	62	194,800	471,600
1910-1911	133	32.2	214	674,700	194,800
1911-1912	62	3.0	20	63,000	674,700
1912-1913	58	1.5	10	31,400	63,000
1913-1914	117	13.0	86	272,700	31,400
1914-1915	114	12.7	84	266,400	272,700
1915-1916	94	16.4	109	344,200	266,400
1916-1917	82	16.6	110	348,400	344,200
1917-1918	77	10.1	67	212,200	348,400
1918-1919	89	4.6	31	97,300	212,200
1919-1920	76	4.0	26	83,200	97,300
1920-1921	110	13.5	90	284,100	83,200
					284,100

Measured seasonal discharge in acre-feet at U.S.G.S gaging station.<sup>d</sup>

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	316,500	15.10	803.0	
Maximum seasonal	1,003,000	47.70	2,546.0	1889-1890
Minimum seasonal	29,400	1.40	75.0	1876-1877
Mean during July	950	0.05	2.4	
Maximum during July	3,000	0.11	7.6	1889-1890
Minimum during July	0	0.00	0	(See above.)
Mean during August	120	0.01	0.3	
Maximum during August	740	0.04	1.9	1910-1911
Minimum during August	0	0.00	0	(See above.)

Probable run-off curve, Plate XXXIII.

Storage development curve, Plate CLXV.

Mass curve of run-off, Plate CXVI.

Probable frequency of flood discharge, Plate LXXIII.

(a) Description of drainage basin: Tributary area above gage at highway bridge  $\frac{1}{4}$  mile southeast of Jenny Lind.

(b) Partial record, January 1 to June 30.

(c) Partial record, December 1 to September 30.

(d) Point of measurement: Gage near Jenny Lind, drainage area 394 square miles.



TABLE 94. MOKELUMNE RIVER.

SEASONAL RUN-OFF DATA. Drainage area 632 square miles.a

Season. (Begins October 1.)	Index of seasonal wetness. Division K.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)d	Distribution of seasonal run-off by months as shown by U.S.G.S. records.d
1871-1872	122	35.0	131	1,180,000	January, 7.1%
1872-1873	86	20.0	75	674,000	February, 7.5%
1873-1874	87	20.4	76	688,000	March, 13.6%
1874-1875	61	12.3	46	415,000	April, 17.4%
1875-1876	154	52.6	197	1,773,000	May, 23.6%
1876-1877	34	5.3	20	179,000	June, 19.8%
1877-1878	112	30.5	114	1,028,000	July, 5.8%
1878-1879	78	17.5	67	590,000	August, 0.9%
1879-1880	105	27.5	103	927,000	September, 0.3%
1880-1881	87	20.4	76	688,000	October, 0.5%
1881-1882	85	19.7	74	664,000	November, 1.3%
1882-1883	88	20.9	78	704,000	December, 2.2%
1883-1884	135	41.7	156	1,406,000	
1884-1885	67	14.0	53	472,000	
1885-1886	129	38.5	144	1,298,000	
1886-1887	68	14.3	54	482,000	
1887-1888	64	13.1	49	442,000	
1888-1889	74	16.1	61	539,000	
1889-1890	174	64.7	242	2,181,000	
1890-1891	86	20.1	75	678,000	
1891-1892	90	21.5	82	725,000	
1892-1893	132	40.0	151	1,348,000	
1893-1894	122	35.0	131	1,180,000	
1894-1895	148	50.0	188	1,685,000	
1895-1896	104	27.0	102	910,000	
1896-1897	124	36.0	135	1,213,000	
1897-1898	62	12.5	47	421,000	
1898-1899	89	21.1	79	711,000	
1899-1900	103	26.7	101	900,000	
1900-1901	129	38.5	144	1,298,000	
1901-1902	97	24.2	92	816,000	
1902-1903	108	28.8	108	971,000	
1903-1904	108	28.8	108	971,000	
1904-1905	108	17.9	67	602,300	
1905-1906	139	40.2	151	1,356,900	
1906-1907	148	50.0	188	1,679,200	
1907-1908	64	14.4	54	487,600	
1908-1909	119	34.2	128	1,154,600	
1909-1910	98	27.0	102	913,500	
1910-1911	133	45.4	171	1,532,600	
1911-1912	62	11.8	44	399,900	
1912-1913	58	12.8	48	430,500	
1913-1914	117	32.0	120	1,083,900	
1914-1915	114	24.5	92	830,000	
1915-1916	94	30.8	116	1,039,700	
1916-1917	82	25.9	98	875,200	
1917-1918	77	15.6	59	527,800	
1918-1919	89	17.7	66	597,100	
1919-1920	76	13.9	53	472,300	
1920-1921	110	22.5	84	761,100	

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.b

c560,400
1,352,700
1,672,000
480,400
1,147,400
906,300
1,525,400
392,700
423,300
1,076,700
822,800
1,032,500
868,000
520,600
589,900
465,100
754,000

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal.....	898,100	26.70	1,421.0	
Maximum seasonal.....	2,181,000	64.70	3,451.0	1889-1890
Minimum seasonal.....	176,000	5.30	283.0	1876-1877
Mean during July.....	52,100	1.50	82.0	
Maximum during July.....	214,900	6.40	340.0	1905-1906
Minimum during July.....	2,420	0.07	3.8	1918-1919
Mean during August.....	8,080	0.24	13.0	
Maximum during August.....	40,100	1.20	63.0	1906-1907
Minimum during August.....	820	0.02	1.3	1909-1910

Probable run-off curve, Plate XXXIII.

Mass curve of run-off, Plate CXVII.

Storage development curve, Plate CLXV.

Probable frequency of flood discharge, Plate LXXVIII.

(a) Description of drainage basin: Tributary area above gage near Clements at bridge on Lockford to Ione highway.

(b) Point of measurement at gage near Clements, drainage area 632 square miles.

(c) Partial record, January 1 to September 30.

(d) Mean run-off adjusted for diversion and storage above point of measurement as follows: Storage capacity, 1905 to 1921, 24,929 acre-feet. Diversion for domestic use, 1905 to 1921, 10 second-feet.

TABLE 95. SUTTER CREEK GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 285 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division K.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	122	9.0	147	137,000	January, 34.2%
1872-1873	86	3.8	62	57,800	February, 25.2%
1873-1874	87	3.9	64	59,400	March, 23.7%
1874-1875	61	1.2	20	18,300	April, 5.5%
1875-1876	154	14.4	235	219,200	May, 2.6%
1876-1877	34	0.0	0	0	June, 1.0%
1877-1878	112	7.4	121	112,600	July, 0.3%
1878-1879	78	2.9	47	44,100	August, 0.0%
1879-1880	105	6.4	104	97,400	September, 0.1%
1880-1881	87	3.9	64	59,400	October, 0.6%
1881-1882	85	3.7	60	56,300	November, 1.6%
1882-1883	88	4.1	67	62,400	December, 5.2%
1883-1884	135	11.1	181	169,000	
1884-1885	67	1.7	28	28,900	
1885-1886	129	10.2	167	155,300	
1886-1887	68	1.9	31	28,900	
1887-1888	64	1.5	25	22,800	
1888-1889	74	2.5	41	38,100	
1889-1890	174	18.2	297	277,000	
1890-1891	86	3.8	62	57,800	
1891-1892	90	4.3	70	65,500	
1892-1893	132	10.6	173	161,300	
1893-1894	122	9.0	147	137,000	
1894-1895	148	13.4	219	204,000	
1895-1896	104	6.2	101	94,400	
1896-1897	124	9.3	152	141,600	
1897-1898	62	1.3	21	19,800	
1898-1899	89	4.2	69	63,900	
1899-1900	103	6.1	100	92,800	
1900-1901	129	10.2	167	155,300	
1901-1902	97	5.2	85	79,100	
1902-1903	108	6.8	111	103,500	
1903-1904	108	6.8	111	103,500	
1904-1905	108	6.8	111	103,500	
1905-1906	139	11.7	188	175,300	
1906-1907	148	13.4	219	204,000	
1907-1908	64	1.5	25	22,800	
1908-1909	119	8.5	139	129,400	
1909-1910	98	5.4	88	82,200	
1910-1911	133	10.8	176	164,400	
1911-1912	62	1.3	21	19,800	
1912-1913	58	0.9	15	13,700	
1913-1914	117	8.2	134	124,800	
1914-1915	114	7.7	126	117,200	
1915-1916	94	4.9	80	74,600	
1916-1917	82	3.3	54	50,200	
1917-1918	77	2.8	46	42,600	
1918-1919	89	4.2	69	63,900	
1919-1920	76	2.7	44	41,100	
1920-1921	110	7.1	116	108,100	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	93,200	6.10	327	
Maximum seasonal	277,000	18.20	971	1889-1890
Minimum seasonal	0	0.00	0	1876-1877
Mean during July	280	0.02	1	
Maximum during July	830	0.05	3	1889-1890
Minimum during July	0	0.00	0	1876-1877
Mean during August	0	0.00	0	
Maximum during August	0	0.00	0	
Minimum during August	0	0.00	0	1876-1877

Probable run-off curve, Plate XXXIII.

Storage development curve, Plate CLXV.

Mass curve of run-off, Plate CXVII.

Probable frequency of flood discharge, Plate LXXXIII.

(a) Description of drainage basin: Tributary area of DRY CREEK and WILLOW CREEK above intersection of longitude 121° 00' with streams. SUTTER CREEK is a tributary of Dry Creek.

(b) Estimated from record for Calaveras River.

TABLE 96. COSUMNES RIVER.

SEASONAL RUN-OFF DATA. Drainage area 534 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division K.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records.
1871-1872	122	24.6	145	700,000	January, 21.8%
1872-1873	86	10.2	60	260,000	February, 18.9%
1873-1874	87	10.5	62	299,000	March, 21.1%
1874-1875	61	3.8	22	108,000	April, 16.3%
1875-1876	154	40.1	237	1,141,000	May, 11.2%
1876-1877	64	3.8	22	108,000	June, 4.3%
1877-1878	112	20.0	118	569,000	July, 0.7%
1878-1879	78	8.0	47	228,000	August, 0.1%
1879-1880	105	17.4	103	495,000	September, 0.2%
1880-1881	87	10.5	62	299,000	October, 0.4%
1881-1882	85	10.0	59	284,000	November, 1.1%
1882-1883	88	11.0	65	313,000	December, 3.9%
1883-1884	135	31.0	183	882,000	
1884-1885	67	5.0	29	142,000	
1885-1886	129	28.0	166	797,000	
1886-1887	68	5.2	31	148,000	
1887-1888	64	4.6	27	131,000	
1888-1889	74	6.8	40	194,000	
1889-1890	174	49.6	292	1,412,000	
1890-1891	86	10.2	60	290,000	
1891-1892	90	11.8	70	336,000	
1892-1893	132	29.4	174	838,000	
1893-1894	122	24.6	145	700,000	
1894-1895	148	37.2	220	1,059,000	
1895-1896	104	17.0	100	484,000	
1896-1897	124	25.7	152	731,000	
1897-1898	62	4.0	24	114,000	
1898-1899	89	11.2	66	319,000	
1899-1900	103	16.8	99	478,000	
1900-1901	129	28.0	166	797,000	
1901-1902	97	14.1	83	401,000	
1902-1903	108	19.0	112	511,000	
1903-1904	108	19.0	112	541,000	
1904-1905	108	19.0	112	541,000	
1905-1906	139	32.9	195	936,000	
1906-1907	148	37.2	220	1,059,000	
1907-1908	64	5.2	31	149,100	b148,300
1908-1909	119	22.5	133	639,100	639,100
1909-1910	98	16.3	96	462,300	462,900
1910-1911	133	30.8	182	876,400	876,400
1911-1912	62	4.9	29	138,600	138,600
1912-1913	58	4.5	26	127,300	127,300
1913-1914	117	19.2	114	547,600	547,600
1914-1915	114	14.3	85	407,700	407,700
1915-1916	94	20.1	119	571,800	571,800
1916-1917	82	14.6	86	416,100	416,100
1917-1918	77	7.9	46	224,000	224,000
1918-1919	89	9.1	54	259,200	259,200
1919-1920	76	6.0	35	170,500	170,500
1920-1921	110	14.3	84	406,600	406,600

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.<sup>d</sup>

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	482,000	16.90	903.0	
Maximum seasonal	1,412,000	49.60	2,644.0	1889-1890
Minimum seasonal	108,000	3.80	202.0	1876-1877
Mean during July	3,370	0.12	6.3	
Maximum during July	10,900	0.38	20.0	1910-1911
Minimum during July	500	0.02	0.9	1917-1918
Mean during August	480	0.02	0.9	
Maximum during August	2,180	0.08	4.1	1910-1911
Minimum during August	0	0.00	0	1907-1908

Probable run-off curve, Plate XXXIII.

Storage development curve, Plate CLXV.

Mass curve of run-off, Plate CXVII.

Probable frequency of flood discharge, Plate LXXIII.

(a) Description of drainage basin: Tributary area above gage at highway bridge at Michigan Bar in N. W. ¼ of S. E. ¼, Sec. 36, T. 8 N., R. 8 E.

(b) Partial record, October 20 to September 30.

(c) Index of 60 used.

(d) Point of measurement: At Michigan Bar, 534 square miles.

TABLE 97. PETALUMA CREEK GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 139 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division M.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S records. <sup>b</sup>
1871-1872	124	15.0	148	111,200	January, 36.2%
1872-1873	79	5.4	53	40,000	February, 26.4%
1873-1874	101	9.7	96	71,900	March, 19.4%
1874-1875	72	4.1	40	30,400	April, 5.4%
1875-1876	112	12.2	120	90,500	May, 2.1%
1876-1877	52	1.2	12	8,900	June, 0.8%
1877-1878	143	20.0	197	148,300	July, 0.3%
1878-1879	100	9.6	95	71,200	August, 0.2%
1879-1880	109	11.6	114	86,000	September, 0.1%
1880-1881	111	12.0	118	89,000	October, 0.1%
1881-1882	70	3.8	37	28,200	November, 1.3%
1882-1883	83	6.3	62	46,700	December, 7.7%
1883-1884	107	11.1	109	82,300	
1884-1885	62	2.5	25	18,500	
1885-1886	128	16.2	160	120,100	
1886-1887	71	4.0	39	29,700	
1887-1888	73	4.4	43	32,600	
1888-1889	96	8.7	86	64,500	
1889-1890	195	35.5	350	263,300	
1890-1891	85	6.5	64	48,200	
1891-1892	90	7.5	74	55,600	
1892-1893	117	13.4	132	99,400	
1893-1894	96	8.7	86	64,500	
1894-1895	138	18.6	183	137,900	
1895-1896	115	13.0	128	96,400	
1896-1897	110	11.8	116	87,500	
1897-1898	62	2.5	25	18,500	
1898-1899	82	5.9	58	43,800	
1899-1900	94	8.4	83	62,300	
1900-1901	105	10.7	105	79,400	
1901-1902	113	12.5	123	92,700	
1902-1903	95	8.6	85	63,800	
1903-1904	128	16.2	160	120,100	
1904-1905	122	14.6	144	108,300	
1905-1906	122	14.6	144	108,300	
1906-1907	131	16.7	165	123,800	
1907-1908	73	4.3	42	31,900	
1908-1909	135	17.8	175	132,000	
1909-1910	85	6.5	64	48,200	
1910-1911	110	11.8	116	87,500	
1911-1912	59	2.1	21	15,600	
1912-1913	68	3.6	35	26,700	
1913-1914	152	22.2	219	164,600	
1914-1915	128	16.2	160	120,100	
1915-1916	109	11.6	114	86,000	
1916-1917	75	4.7	46	34,900	
1917-1918	54	1.4	14	10,400	
1918-1919	99	9.4	93	69,700	
1919-1920	53	1.3	13	9,600	
1920-1921	107	11.1	109	82,300	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	75,300	10.20	542	
Maximum seasonal	263,300	35.50	1,894	1889-1890
Minimum seasonal	8,900	1.20	64	1876-1877
Mean during July	230	0.03	2	
Maximum during July	790	0.11	6	1889-1890
Minimum during July	30	Trace	Trace	1876-1877
Mean during August	150	0.02	1	
Maximum during August	530	0.07	4	1889-1890
Minimum during August	20	Trace	Trace	1876-1877

Probable run-off curve, Plate XXXIV.

Mass curve of run-off, Plate CXVIII.

Storage development curve, Plate CLXVI.

Probable frequency of flood discharge, Plate LXXIV.

(a) Description of drainage basin: Area tributary to the following streams above the intersections with designated latitude and longitude lines: NOVATO CREEK, longitude 122° 37.4'; GALLINAS CREEK, longitude 122° 35.3'; SAN ANTONIO CREEK, longitude 122° 36.8'; TOLAY CREEK, longitude 122° 27.6'; PETALUMA CREEK TRIBUTARIES: ADOBE CREEK, latitude 38° 15.8'; LYNCH CREEK, latitude 38° 17.2'; HAGGIN CREEK latitude 38° 18.4'.

(b) Estimated from record for Putah Creek.

TABLE 98. SONOMA CREEK TRIBUTARIES.  
SEASONAL RUN-OFF DATA. Drainage area 78 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division M.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	124	12.3	144	51,400	January, 36.2%
1872-1873	79	4.9	58	20,500	February, 26.4%
1873-1874	101	8.0	94	33,400	March, 19.4%
1874-1875	72	3.9	46	16,300	April, 5.4%
1875-1876	112	10.0	117	41,700	May, 2.1%
1876-1877	52	1.9	22	7,900	June, 0.8%
1877-1878	143	16.3	191	68,100	July, 0.3%
1878-1879	100	7.9	93	33,000	August, 0.2%
1879-1880	109	9.4	110	39,200	September, 0.1%
1880-1881	111	9.8	115	40,900	October, 0.1%
1881-1882	70	3.7	43	15,400	November, 1.3%
1882-1883	83	5.4	63	22,500	December, 7.7%
1883-1884	107	9.0	104	37,600	
1884-1885	62	2.7	32	11,300	
1885-1886	128	13.2	155	55,100	
1886-1887	71	3.8	45	15,900	
1887-1888	73	4.1	48	17,100	
1888-1889	96	7.2	85	30,100	
1889-1890	195	29.8	350	124,400	
1890-1891	85	5.6	66	23,400	
1891-1892	90	6.3	74	26,300	
1892-1893	117	10.8	127	45,100	
1893-1894	96	7.2	85	30,100	
1894-1895	138	15.3	180	63,900	
1895-1896	115	10.5	123	43,800	
1896-1897	110	9.6	113	40,100	
1897-1898	62	2.7	32	11,300	
1898-1899	82	5.2	61	21,700	
1899-1900	94	6.9	81	28,800	
1900-1901	105	8.7	102	36,300	
1901-1902	113	10.3	121	43,000	
1902-1903	95	7.1	83	29,600	
1903-1904	128	13.2	155	55,100	
1904-1905	122	11.8	139	49,300	
1905-1906	122	11.8	139	49,300	
1906-1907	131	13.7	161	57,200	
1907-1908	73	4.1	48	17,100	
1908-1909	135	14.5	170	60,500	
1909-1910	85	5.6	66	23,400	
1910-1911	110	9.6	113	40,100	
1911-1912	59	2.5	29	10,400	
1912-1913	68	3.5	41	14,600	
1913-1914	152	18.3	215	76,400	
1914-1915	128	13.2	155	55,100	
1915-1916	109	9.4	110	39,200	
1916-1917	75	4.3	50	18,000	
1917-1918	54	2.1	25	8,800	
1918-1919	99	7.7	90	32,100	
1919-1920	53	2.0	23	8,300	
1920-1921	107	9.0	106	37,600	

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	35,600	8.50	455	
Maximum seasonal	124,400	29.80	1,589	1889-1890
Minimum seasonal	7,900	1.90	101	1876-1877
Mean during July	110	0.03	1	
Maximum during July	370	0.09	5	1889-1890
Minimum during July	20	Trace	Trace	1876-1877
Mean during August	70	0.02	1	
Maximum during August	250	0.06	3	1889-1890
Minimum during August	20	Trace	Trace	1876-1877

Probable run-off curve, Plate XXXIV.

Storage development curve, Plate CLXVI.

Mass curve of run-off, Plate CLXVIII.

Probable frequency of flood discharge, Plate LXXIV.

(a) Description of drainage basin: Tributary area above crossing of each stream by indicated contour: LOVEALL VALLEY, 200 feet elevation; AGUA CALIENTE, 200 feet elevation; HOOKER CREEK, 300 feet elevation; STEWART CREEK, 350 feet elevation; NUN'S CANYON CREEK, 400 feet elevation; SONOMA CANYON, 500 feet elevation; SONOMA CREEK, above Glen Ellen.

(b) Estimated from records for streams in vicinity.

TABLE 99. NAPA RIVER TRIBUTARIES.  
SEASONAL RUN-OFF DATA. Drainage area 226 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division M.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	124	14.3	150	172,300	January, 36.2%
1872-1873	79	5.0	52	60,300	February, 26.4%
1873-1874	101	9.1	95	109,700	March, 19.4%
1874-1875	72	3.7	39	44,600	April, 5.4%
1875-1876	112	11.5	120	132,600	May, 2.1%
1876-1877	52	0.8	8	9,600	June, 0.8%
1877-1878	143	19.2	201	231,400	July, 0.3%
1878-1879	100	9.0	94	108,500	August, 0.2%
1879-1880	109	10.9	114	131,400	September, 0.1%
1880-1881	111	11.2	117	135,000	October, 0.1%
1881-1882	70	3.5	37	42,200	November, 1.3%
1882-1883	83	5.7	60	68,700	December, 7.7%
1883-1884	107	10.4	109	125,300	
1884-1885	62	2.2	23	26,500	
1885-1886	128	15.4	161	185,600	
1886-1887	71	3.6	38	43,400	
1887-1888	73	4.0	42	48,200	
1888-1889	96	8.1	85	97,600	
1889-1890	195	34.8	364	419,400	
1890-1891	85	6.0	63	72,300	
1891-1892	90	7.0	73	84,400	
1892-1893	117	12.6	132	151,800	
1893-1894	96	8.1	85	97,600	
1894-1895	138	17.8	186	214,500	
1895-1896	115	12.2	128	147,000	
1896-1897	110	11.1	116	133,800	
1897-1898	62	2.2	23	26,500	
1898-1899	82	5.4	56	65,100	
1899-1900	94	7.8	81	94,000	
1900-1901	105	10.0	105	120,500	
1901-1902	113	11.9	121	143,400	
1902-1903	95	8.0	84	96,400	
1903-1904	128	15.4	161	185,600	
1904-1905	122	13.8	144	166,300	
1905-1906	122	13.8	144	166,300	
1906-1907	131	16.0	167	192,800	
1907-1908	73	4.0	42	48,200	
1908-1909	135	17.0	178	204,900	
1909-1910	85	6.0	63	72,300	
1910-1911	110	11.1	116	133,800	
1911-1912	59	1.8	19	21,700	
1912-1913	68	3.2	33	38,600	
1913-1914	152	21.5	225	259,100	
1914-1915	128	15.4	161	185,600	
1915-1916	109	10.9	114	131,400	
1916-1917	75	4.3	45	51,800	
1917-1918	54	1.1	12	13,300	
1918-1919	99	8.8	92	106,000	
1919-1920	53	1.0	10	12,100	
1920-1921	107	10.4	109	125,300	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	115,200	9.60	510	
Maximum seasonal	419,400	34.80	1,856	1889-1890
Minimum seasonal	9,600	0.80	42	1876-1877
Mean during July	350	0.03	2	
Maximum during July	1,260	0.10	6	1889-1890
Minimum during July	30	Trace	Trace	1876-1877
Mean during August	230	0.02	1	
Maximum during August	940	0.08	4	1889-1890
Minimum during August	20	Trace	Trace	1876-1877

Probable run-off curve, Plate XXXIV

Storage development curve, Plate CLXVI.

Mass curve of run-off, Plate CXVIII.

Probable frequency of flood discharge, Plate LXXIV.

(a) Description of drainage basin: Tributary areas above intersection of streams with designated contour: CONN CREEK, 180 feet elevation; RECTOR CANYON, 200 feet elevation; SODA CREEK, 100 feet elevation; MILLIKEN CREEK, 100 feet elevation; SARCO CREEK, 100 feet elevation; TULUCA CREEK, 300 feet elevation; SUSCOL CREEK, 200 feet elevation; LAKE CHABOT SYSTEM, 100 feet elevation; NORTH BRANCH NAPA CREEK, 180 feet elevation; SOUTH BRANCH NAPA CREEK, 180 feet elevation; SULPHUR SPRINGS, 300 feet elevation; DRY CREEK, 180 feet elevation.

(b) Estimated from record for Putah Creek.

**TABLE 100. SUISUN CREEK GROUP.**  
SEASONAL RUN-OFF DATA. Drainage area 125 square miles.a

Season. (Begins October 1.)	Index of seasonal wetness. Division M.	Depth of run-off in inches.	Run-off in index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months.b
1871-1872	124	11.5	146	76,400	January, 36.2%
1872-1873	79	4.3	54	28,600	February, 26.4%
1873-1874	101	7.3	92	48,500	March, 19.4%
1874-1875	72	3.4	43	22,600	April, 5.4%
1875-1876	112	9.2	117	61,100	May, 2.1%
1876-1877	52	1.6	20	10,600	June, 0.8%
1877-1878	143	15.5	196	103,000	July, 0.3%
1878-1879	100	7.2	91	47,800	August, 0.2%
1879-1880	109	8.8	111	58,500	September, 0.1%
1880-1881	111	9.1	115	60,500	October, 0.1%
1881-1882	70	3.3	42	21,900	November, 1.3%
1882-1883	83	4.8	61	31,900	December, 7.7%
1883-1884	107	8.3	105	55,200	
1884-1885	62	2.4	30	15,900	
1885-1886	128	12.4	157	82,400	
1886-1887	71	3.3	42	21,900	
1887-1888	73	3.6	46	23,900	
1888-1889	96	6.6	84	43,900	
1889-1890	195	28.7	364	190,700	
1890-1891	85	5.0	63	33,200	
1891-1892	90	5.7	72	37,900	
1892-1893	117	10.2	129	67,800	
1893-1894	96	6.6	84	43,900	
1894-1895	138	14.5	184	96,400	
1895-1896	115	9.9	125	65,800	
1896-1897	110	9.0	114	59,800	
1897-1898	62	2.4	30	15,900	
1898-1899	82	4.7	60	31,200	
1899-1900	94	6.2	79	41,200	
1900-1901	105	8.1	103	53,800	
1901-1902	113	9.5	120	63,100	
1902-1903	95	6.4	81	42,500	
1903-1904	128	12.4	157	82,400	
1904-1905	122	11.1	141	73,800	
1905-1906	122	11.1	141	73,800	
1906-1907	131	12.9	163	85,700	
1907-1908	73	3.6	46	23,900	
1908-1909	135	13.8	175	91,700	
1909-1910	85	5.0	63	33,200	
1910-1911	110	9.0	114	59,800	
1911-1912	59	2.2	28	14,600	
1912-1913	68	3.1	39	20,600	
1913-1914	152	17.3	219	115,000	
1914-1915	128	12.4	157	82,400	
1915-1916	109	8.8	111	58,500	
1916-1917	75	3.8	48	25,300	
1917-1918	54	1.7	22	11,300	
1918-1919	99	7.0	89	46,500	
1919-1920	53	1.7	22	11,300	
1920-1921	107	8.3	105	55,200	

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	52,500	7.90	421	
Maximum seasonal	190,700	28.70	1,530	1889-1890
Minimum seasonal	10,600	1.60	85	1876-1877
Mean during July	160	0.02	1	
Maximum during July	570	0.09	5	1889-1890
Minimum during July	30	Trace	Trace	1876-1877
Mean during August	110	0.02	1	
Maximum during August	380	0.06	3	1889-1890
Minimum during August	20	Trace	Trace	1876-1877

Probable run-off curve, Plate XXXIV.

Storage development curve, Plate CLXVI.

Mass curve of run-off, Plate CXVIII.

Probable frequency of flood discharge, Plate LXXIV.

(a) Description of drainage basin: Tributary area above intersection with stream of latitude or longitude lines indicated; SUISUN CREEK, latitude 38° 18.2'; ULATIS CREEK, longitude 122° 1.5'; LEDGEWOOD CREEK, latitude 38° 18.3'; GREEN VALLEY CREEK, latitude 38° 15.3'; SULPHUR SPRINGS CREEK, latitude 38° 5.3'

(b) Estimated from records for other streams in vicinity.

TABLE 101. MT. DIABLO CREEK GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 200 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness, Division L.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	130	11.1	169	118,100	January, 28.9%
1872-1873	79	3.0	46	31,900	February, 17.7%
1873-1874	86	4.0	61	42,600	March, 35.9%
1874-1875	69	2.0	30	21,300	April, 8.5%
1875-1876	131	11.4	174	121,300	May, 2.2%
1876-1877	43	0.1	2	1,100	June, 1.0%
1877-1878	129	11.0	168	117,100	July, 0.5%
1878-1879	79	3.0	46	31,900	August, 0.3%
1879-1880	99	5.8	88	61,700	September, 0.3%
1880-1881	107	7.0	107	74,500	October, 0.2%
1881-1882	69	2.0	30	21,300	November, 0.3%
1882-1883	87	4.1	63	43,600	December, 4.2%
1883-1884	125	10.2	156	108,600	
1884-1885	66	1.8	27	19,200	
1885-1886	115	8.5	130	90,500	
1886-1887	70	2.1	32	22,300	
1887-1888	78	3.0	46	31,900	
1888-1889	98	5.6	85	59,600	
1889-1890	192	24.7	377	262,900	
1890-1891	86	4.0	61	42,600	
1891-1892	91	4.6	70	49,000	
1892-1893	139	12.9	197	137,300	
1893-1894	111	7.7	117	81,900	
1894-1895	147	14.5	221	154,300	
1895-1896	106	6.9	105	73,400	
1896-1897	112	7.9	120	84,100	
1897-1898	57	1.1	17	11,700	
1898-1899	91	4.6	70	49,000	
1899-1900	104	6.5	99	69,200	
1900-1901	121	9.5	145	101,100	
1901-1902	91	4.6	70	49,000	
1902-1903	99	5.8	88	61,700	
1903-1904	105	6.6	101	70,200	
1904-1905	124	10.0	152	106,400	
1905-1906	120	9.2	140	97,900	
1906-1907	144	13.9	212	147,900	
1907-1908	72	2.3	35	24,500	
1908-1909	124	10.0	152	106,400	
1909-1910	93	4.9	75	52,100	
1910-1911	121	9.5	145	101,100	
1911-1912	64	1.5	23	16,000	
1912-1913	52	0.7	11	7,400	
1913-1914	128	10.8	165	114,900	
1914-1915	126	10.5	160	111,700	
1915-1916	120	9.2	140	97,900	
1916-1917	78	3.0	46	31,900	
1917-1918	53	0.8	12	8,500	
1918-1919	105	6.7	102	71,300	
1919-1920	66	1.8	27	19,200	
1920-1921	98	5.6	85	59,600	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	69,800	6.60	350	
Maximum seasonal	262,900	24.70	1,317	1889-1890
Minimum seasonal	1,100	0.10	6	1876-1877
Mean during July	350	0.03	2	
Maximum during July	1,310	0.12	7	1889-1890
Minimum during July	10	Trace	Trace	1876-1877
Mean during August	210	0.02	1	
Maximum during August	790	0.07	4	1889-1890
Minimum during August	Trace	Trace	Trace	1876-1877

Probable run-off curve, Plate XXXV.

Mass curve of run-off, Plate CXIX.

Storage development curve, Plate CLXVII.

Probable frequency of flood discharge, Plate LXXX.

(a) Description of drainage basin: Areas tributary above designated points: KIRKER CREEK, at Southern Pacific Railroad grade; MT. DIABLO CREEK, at mouth; WALNUT CREEK, at mouth; RODEO CREEK, at a point one mile above mouth; PINOLE CREEK, at interseting of latitude 37° 59.7' with stream.

(b) Estimated from record for Coyote River.



TABLE 102. SAN PABLO CREEK.  
SEASONAL RUN-OFF DATA. Drainage area 41 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division L.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records. <sup>b</sup>
1871-1872	130	13 1	165	28,400	January, 28.9%
1872-1873	79	4 0	50	8,700	February, 17.7%
1873-1874	86	5 0	63	10,800	March, 35.9%
1874-1875	69	2 5	32	5,400	April, 8.5%
1875-1876	131	13 4	169	29,000	May, 2.2%
1876-1877	43	0 0	0	0	June, 1.0%
1877-1878	129	13 0	164	28,100	July, 0.5%
1878-1879	79	4 0	50	8,700	August, 0.3%
1879-1880	99	7 4	93	16,000	September, 0.3%
1880-1881	107	8 7	110	18,800	October, 0.2%
1881-1882	69	2 5	32	5,400	November, 0.3%
1882-1883	87	5 3	67	11,500	December, 4.2%
1883-1884	125	12 1	153	26,200	
1884-1885	66	2 1	26	4,500	
1885-1886	115	10 3	130	22,300	
1886-1887	70	2 6	33	5,600	
1887-1888	78	3 9	49	8,400	
1888-1889	98	7 3	92	15,800	
1889-1890	192	27 5	346	59,500	
1890-1891	86	5 1	64	11,000	
1891-1892	91	6 0	76	13,000	
1892-1893	139	15 1	190	32,700	
1893-1894	111	9 5	120	20,600	
1894-1895	147	16 6	209	35,900	
1895-1896	106	8 5	107	18,400	
1896-1897	112	9 7	122	21,000	
1897-1898	57	1 1	14	2,400	
1898-1899	91	6 0	76	13,000	
1899-1900	104	8 3	105	18,000	
1900-1901	121	11 4	144	24,700	
1901-1902	91	6 0	76	13,000	
1902-1903	99	7 4	93	16,000	
1903-1904	105	8 4	106	18,200	
1904-1905	124	12 0	151	26,000	
1905-1906	120	11 2	141	24,300	
1906-1907	144	16 1	203	34,900	
1907-1908	72	2 8	35	6,100	
1908-1909	124	12 0	151	26,000	
1909-1910	93	6 3	79	13,600	
1910-1911	121	11 4	144	24,700	
1911-1912	64	1 9	24	4,100	
1912-1913	52	0 6	8	1,300	
1913-1914	128	12 7	160	27,500	
1914-1915	126	12 4	156	26,800	
1915-1916	120	11 2	141	24,300	
1916-1917	78	3 9	49	8,400	
1917-1918	53	0 7	9	1,500	
1918-1919	105	8 4	106	18,200	
1919-1920	66	2 1	26	4,500	
1920-1921	98	7 2	91	15,600	

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	17,200	7.93	424	
Maximum seasonal	59,500	27.48	1,466	1889-1890
Minimum seasonal	0	0.00	0	1876-1877
Mean during July	90	0.04	2	
Maximum during July	300	0.14	7	1889-1890
Minimum during July	0	0.00	0	1876-1877
Mean during August	50	0.02	1	
Maximum during August	180	0.08	4	1889-1890
Minimum during August	0	0.00	0	1876-1877

Probable run-off curve, Plate XXXV.

Storage development curve, Plate CLXVII.

Mass curve of run-off, Plate CXX.

Probable frequency of flood discharge, Plate LXXV.

(a) Description of drainage basin: Tributary area above point of intersection of longitude 122° 20.1' with stream near San Pablo.

(b) From record on the Coyote River.

TABLE 103. SAN LEANDRO CREEK.  
SEASONAL RUN-OFF DATA: Drainage area 44 square miles.<sup>d</sup>

Season. (Begins October 1.)	Index of seasonal wetness, Division L.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>c</sup>
1871-1872	130	13.8	170	32,100	January, 28.9%
1872-1873	79	3.4	42	7,900	February, 17.7%
1873-1874	86	4.4	54	10,200	March, 35.0%
1874-1875	69	2.0	25	4,600	April, 8.5%
1875-1876	131	14.0	172	32,500	May, 2.2%
1876-1877	43	0.0	0	0	June, 1.0%
1877-1878	129	13.5	166	31,400	July, 0.5%
1878-1879	79	3.4	42	7,900	August, 0.3%
1879-1880	99	6.9	85	16,000	September, 0.2%
1880-1881	107	8.4	103	19,500	October, 0.2%
1881-1882	69	2.0	25	4,600	November, 0.3%
1882-1883	87	4.5	55	10,500	December, 4.2%
1883-1884	125	12.5	154	20,100	
1884-1885	66	1.5	18	3,500	
1885-1886	115	10.2	126	23,700	
1886-1887	70	2.0	25	4,600	
1887-1888	78	3.2	39	7,400	
1888-1889	98	6.8	84	15,800	
1889-1890	192	30.5	376	70,900	
1890-1891	86	4.4	54	10,200	
1891-1892	91	5.3	65	12,300	
1892-1893	139	16.1	168	37,400	
1893-1894	111	9.3	115	21,600	
1894-1895	147	18.0	222	41,800	
1895-1896	106	8.2	101	19,100	
1896-1897	112	9.5	117	22,100	
1897-1898	57	0.7	9	1,600	
1898-1899	91	5.3	65	12,300	
1899-1900	104	7.9	97	18,400	
1900-1901	121	6.7	83	15,500	15,000
1901-1902	91	6.9	85	16,000	15,500
1902-1903	99	9.8	121	22,800	22,000
1903-1904	105	15.1	186	35,100	33,900
1904-1905	124	4.9	60	11,400	11,000
1905-1906	120	12.0	148	27,900	26,900
1906-1907	144	16.4	202	38,100	36,800
1907-1908	72	4.4	54	10,200	9,900
1908-1909	124	15.8	195	36,700	35,400
1909-1910	93	5.1	63	11,900	11,400
1910-1911	121	16.4	202	38,100	36,800
1911-1912	64	0.9	11	2,100	2,000
1912-1913	52	1.1	14	2,600	2,500
1913-1914	128	12.7	156	29,500	28,500
1914-1915	126	15.1	186	35,100	33,900
1915-1916	120	13.6	168	31,600	30,500
1916-1917	78	5.7	70	13,200	12,700
1917-1918	53	0.9	11	2,100	2,000
1918-1919	105	8.6	106	20,000	19,300
1919-1920	66	0.6	7	1,400	1,200
1920-1921	98	5.5	68	12,800	12,300

Measured seasonal discharge in acre-feet.<sup>b</sup>

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	18,900	8.13	433	
Maximum seasonal	70,900	30.49	1,626	1889-1890
Minimum seasonal	0	0.00	0	1876-1877
Mean during July	90	0.04	2	
Maximum during July	350	0.15	8	1889-1890
Minimum during July	0	0.00	0	1876-1877
Mean during August	60	0.03	1	
Maximum during August	210	0.09	5	1889-1890
Minimum during August	0	0.00	0	1876-1877

Probable run-off curve, Plate XXXV.

Storage development curve, Plate CLXVII.

(a) Description of drainage basin: Tributary area above point one mile below dam at Lake Chabot.

(b) At Lake Chabot Dam, drainage area 42 square miles. From records of East Bay Water Co.

(c) Estimated from records for streams in vicinity.

Mass curve of run-off, Plate CXX.

Probable frequency of flood discharge, Plate LXXV.

TABLE 104. CLAREMONT CREEK GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 83 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division L.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	130	10.5	189	46,400	January, 28.9%
1872-1873	79	1.9	34	8,400	February, 17.7%
1873-1874	86	2.6	47	11,500	March, 35.9%
1874-1875	69	1.0	18	4,400	April, 8.5%
1875-1876	131	10.6	191	46,900	May, 2.2%
1876-1877	43	0.0	0	0	June, 1.0%
1877-1878	129	10.4	187	46,000	July, 0.5%
1878-1879	79	1.9	34	8,400	August, 0.3%
1879-1880	99	4.3	77	19,000	September, 0.3%
1880-1881	107	5.5	99	24,300	October, 0.2%
1881-1882	69	1.0	18	4,400	November, 0.3%
1882-1883	87	2.7	49	11,900	December, 4.2%
1883-1884	125	9.3	168	41,100	
1884-1885	66	0.9	16	4,000	
1885-1886	115	7.1	128	31,400	
1886-1887	70	1.1	20	4,900	
1887-1888	78	1.8	32	8,000	
1888-1889	98	4.1	74	18,100	
1889-1890	192	26.2	472	115,800	
1890-1891	86	2.6	47	11,500	
1891-1892	91	3.2	58	14,100	
1892-1893	139	12.5	225	55,300	
1893-1894	111	6.3	113	2,900	
1894-1895	147	14.5	261	64,100	
1895-1896	106	5.4	97	23,900	
1896-1897	112	6.5	117	28,700	
1897-1898	57	0.4	7	1,800	
1898-1899	91	3.1	56	13,700	
1899-1900	104	5.0	90	22,100	
1900-1901	121	8.5	153	37,600	
1901-1902	91	3.1	56	13,700	
1902-1903	99	4.3	77	19,000	
1903-1904	105	5.2	94	23,000	
1904-1905	124	9.0	162	39,800	
1905-1906	120	8.2	148	36,300	
1906-1907	144	13.8	249	61,000	
1907-1908	72	1.2	22	5,300	
1908-1909	124	9.0	162	39,800	
1909-1910	93	3.5	63	15,500	
1910-1911	121	8.5	153	37,600	
1911-1912	64	0.8	14	3,500	
1912-1913	52	0.2	4	900	
1913-1914	128	10.0	180	44,200	
1914-1915	126	9.5	171	42,000	
1915-1916	120	8.2	148	36,300	
1916-1917	78	1.8	32	8,000	
1917-1918	53	0.2	4	900	
1918-1919	105	5.2	94	23,000	
1919-1920	66	0.9	16	4,000	
1920-1921	98	4.1	74	18,100	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	24,600	5.55	297	
Maximum seasonal	115,800	26.16	1,397	1889-1890
Minimum seasonal	0	0.00	0	1876-1877
Mean during July	120	0.03	1	
Maximum during July	580	0.13	7	1889-1890
Minimum during July	0	0.00	0	1876-1877
Mean during August	70	0.02	1	
Maximum during August	350	0.08	4	1889-1890
Minimum during August	0	0.00	0	1876-1877

Probable run-off curve, Plate XXXV.

Mass curve of run-off, Plate CXIX.

Storage development curve, Plate CLXVII.

Probable frequency of flood discharge, Plate LXXV.

(a) Description of drainage basin: Tributary area above intersection of streams by indicated longitude lines: WILDCAT CREEK, longitude 122° 19.7'; CERRITO CREEK, longitude 122° 17.8'; STRAWBERRY CREEK, longitude 122° 15.0'; CLAREMONT CREEK, longitude 122° 15.0'; TEMESCAL CREEK, longitude 122° 15.0'; HAYES CREEK, longitude 122° 15.0'; INDIAN CREEK, longitude 122° 15.0'; DIAMOND CREEK, longitude 122° 13.5'; EAST CREEK, 1.5 miles from mouth; ARROYO VIEJO, longitude 122° 10.0'.

(b) Estimated from records for streams in the vicinity.

TABLE 105. SAN LORENZO CREEK.  
SEASONAL RUN-OFF DATA. Drainage area 38 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness, Division L.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	130	14.3	173	28,900	January, 28.9%
1872-1873	79	3.7	45	7,500	February, 17.7%
1873-1874	86	4.7	57	9,500	March, 35.9%
1874-1875	69	2.4	29	4,900	April, 8.5%
1875-1876	131	14.5	175	29,300	May, 2.2%
1876-1877	43	0.1	1	200	June, 1.0%
1877-1878	129	14.0	169	28,300	July, 0.5%
1878-1879	79	3.7	45	7,500	August, 0.3%
1879-1880	99	7.3	88	14,800	September, 0.3%
1880-1881	107	9.0	109	18,200	October, 0.2%
1881-1882	69	2.4	29	4,900	November, 0.3%
1882-1883	87	4.9	59	9,900	December, 4.2%
1883-1884	125	13.1	158	26,500	
1884-1885	66	2.0	24	4,000	
1885-1886	115	10.7	129	21,600	
1886-1887	70	2.5	30	5,000	
1887-1888	78	3.5	42	7,100	
1888-1889	98	7.0	85	14,100	
1889-1890	192	31.5	381	63,700	
1890-1891	86	4.7	57	9,500	
1891-1892	91	5.5	66	11,100	
1892-1893	139	16.5	159	33,400	
1893-1894	111	9.8	118	19,800	
1894-1895	147	18.5	223	37,400	
1895-1896	106	8.6	104	17,400	
1896-1897	112	10.0	121	20,200	
1897-1898	57	1.2	15	2,400	
1898-1899	91	5.5	66	11,100	
1899-1900	104	8.4	102	17,000	
1900-1901	121	12.0	145	24,300	
1901-1902	91	5.5	66	11,100	
1902-1903	99	7.3	88	14,800	
1903-1904	105	8.5	103	17,200	
1904-1905	124	13.0	157	26,300	
1905-1906	120	12.0	145	24,300	
1906-1907	144	18.0	217	36,400	
1907-1908	72	2.7	33	5,500	
1908-1909	124	13.0	157	26,300	
1909-1910	93	6.0	73	12,100	
1910-1911	121	12.1	146	24,500	
1911-1912	64	1.9	23	3,800	
1912-1913	52	0.8	10	1,600	
1913-1914	128	14.0	169	28,300	
1914-1915	126	13.2	159	26,700	
1915-1916	120	12.0	145	24,300	
1916-1917	78	3.5	42	7,100	
1917-1918	53	0.9	11	1,800	
1918-1919	105	8.5	103	17,200	
1919-1920	66	2.0	24	4,000	
1920-1921	98	7.0	85	14,100	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	16,700	8.26	441	
Maximum seasonal	63,700	31.51	1,681	1889-1890
Minimum seasonal	200	0.10	5	1876-1877
Mean during July	80	0.04	2	
Maximum during July	320	0.16	8	1889-1890
Minimum during July	Trace	Trace	Trace	1876-1877
Mean during August	50	0.02	1	
Maximum during August	190	0.09	5	1889-1890
Minimum during August	Trace	Trace	Trace	1876-1877

Probable run-off curve, Plate XXXVI.

Storage development curve, Plate CLXVIII.

Mass curve of run-off, Plate CXXI.

Probable frequency of flood discharge, Plate LXXVI.

<sup>(a)</sup> Description of drainage basin: Tributary area above highway bridge, 1 mile northwest of Haywards.<sup>(b)</sup> Estimated from record for the Coyote River.

TABLE 106. ALAMEDA CREEK.  
SEASONAL RUN-OFF DATA. Drainage area 654 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division L.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by records.
1871-1872	130	7.2	178	250,900	January, 25.6%
1872-1873	79	1.8	45	62,700	February, 24.5%
1873-1874	86	2.3	57	80,200	March, 24.0%
1874-1875	69	1.2	30	41,800	April, 6.7%
1875-1876	131	7.3	180	254,400	May, 3.3%
1876-1877	43	0.0	0	0	June, 1.6%
1877-1878	129	7.1	176	247,500	July, 1.3%
1878-1879	79	1.8	44	62,700	August, 1.1%
1879-1880	99	3.5	87	122,000	September, 1.0%
1880-1881	107	4.2	104	146,400	October, 1.1%
1881-1882	69	1.2	30	41,800	November, 2.6%
1882-1883	87	2.4	59	83,600	December, 7.2%
1883-1884	125	6.5	161	226,500	
1884-1885	66	1.0	25	34,900	
1885-1886	115	5.2	129	181,200	Measured seasonal discharge in acre-feet.
1886-1887	70	1.2	30	41,800	
1887-1888	78	1.8	45	62,700	
1888-1889	98	3.4	84	118,500	
1889-1890	192	15.7	388	547,200	<i>b</i> , 516,200
1890-1891	86	3.4	84	118,500	<i>b</i> 115,700
1891-1892	91	1.9	47	66,200	<i>b</i> 64,100
1892-1893	139	10.6	262	369,400	<i>b</i> 362,700
1893-1894	111	5.3	131	184,700	<i>b</i> 179,700
1894-1895	147	7.8	193	271,900	<i>b</i> 265,900
1895-1896	106	3.6	89	125,500	<i>b</i> 122,900
1896-1897	112	6.1	151	212,600	<i>b</i> 207,800
1897-1898	57	0.4	10	13,900	<i>b</i> 12,700
1898-1899	91	2.1	52	73,200	<i>b</i> 71,600
1899-1900	104	1.7	42	59,300	<i>b</i> 58,600
1900-1901	121	3.7	91	129,000	<i>b</i> 124,600
1901-1902	91	2.8	69	97,600	<i>b</i> 94,100
1902-1903	99	3.6	89	125,500	<i>c</i> 124,400
1903-1904	105	3.4	84	118,500	<i>c</i> 115,200
1904-1905	124	1.8	44	62,700	<i>c</i> 61,800
1905-1906	120	6.4	158	223,100	<i>c</i> 216,900
1906-1907	144	10.0	247	348,500	<i>c</i> 341,700
1907-1908	72	1.9	47	66,200	<i>c</i> 64,100
1908-1909	124	7.4	183	257,900	<i>c</i> 253,600
1909-1910	93	3.0	74	104,600	<i>c</i> 102,500
1910-1911	121	8.4	208	292,800	<i>c</i> 287,900
1911-1912	64	1.0	25	34,900	<i>c</i> 34,000
1912-1913	52	0.6	15	20,900	<i>c</i> 21,600
1913-1914	128	5.9	146	205,600	<i>c</i> 199,700
1914-1915	126	6.0	148	209,100	<i>c</i> 205,300
1915-1916	120	7.5	185	261,400	<i>c</i> 255,500
1916-1917	78	3.1	77	108,000	<i>c</i> 106,300
1917-1918	53	1.1	27	38,300	<i>c</i> 36,300
1918-1919	105	3.6	89	125,500	<i>c</i> 121,600
1919-1920	66	0.9	22	31,400	<i>c</i> 30,100
1920-1921	98	2.4	59	83,600	<i>c</i> 80,700

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	140,900	4.04	.215	
Maximum seasonal	547,200	15.70	.837	1889-1890
Minimum seasonal	0	0.00	0	1876-1877
Mean during July	1,800	0.05	.3	
Maximum during July	3,740	0.11	.6	1918-1919
Minimum during July	0	0.00	0	1876-1877
Mean during August	1,500	0.04	.2	1876-1877
Maximum during August	4,060	0.12	.6	1916-1917
Minimum during August	0	0.00	0	

Probable run-off curve, Plate XXXVI.

Mass curve of run-off, Plate CXXI.

Storage development curve, Plate CLXVIII.

Probable frequency of flood discharge, Plate LXXVI.

(a) Description of drainage basin: Tributary area above Niles.

(b) From records of Spring Valley Water Company, near Sausalito at Sunol Dam, 1 mile below junction of Arroyo de la Laguna, drainage area 639 square miles.

(c) From records of United States Geological Survey at Sunol Dam, including flow in aqueduct.

(d) Partial record, December 1 to September 30.

TABLE 107. MISSION CREEK GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 77 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division L.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	130	11.3	186	46,500	January, 28.9%
1872-1873	79	2.1	35	8,600	February, 17.7%
1873-1874	86	3.0	49	12,300	March, 35.9%
1874-1875	69	1.2	20	4,900	April, 8.5%
1875-1876	131	11.5	189	47,300	May, 2.2%
1876-1877	43	0.0	0	0	June, 1.0%
1877-1878	129	11.0	181	45,200	July, 0.5%
1878-1879	79	2.1	35	8,600	August, 0.3%
1879-1880	99	4.8	79	19,700	September, 0.3%
1880-1881	107	6.1	100	25,100	October, 0.2%
1881-1882	69	1.2	20	4,900	November, 0.3%
1882-1883	87	3.0	49	12,300	December, 4.2%
1883-1884	125	10.0	165	41,100	
1884-1885	66	1.0	17	4,100	
1885-1886	115	7.9	30	32,500	
1886-1887	70	1.3	21	5,300	
1887-1888	78	2.0	33	8,200	
1888-1889	98	4.7	77	19,300	
1889-1890	192	28.0	461	115,100	
1890-1891	86	3.0	49	12,300	
1891-1892	91	3.5	58	14,400	
1892-1893	139	13.5	222	55,500	
1893-1894	111	7.0	115	28,800	
1894-1895	147	15.4	253	63,300	
1895-1896	106	6.0	99	24,700	
1896-1897	112	7.2	119	29,600	
1897-1898	57	0.5	8	2,100	
1898-1899	91	3.5	58	14,400	
1899-1900	104	5.5	91	22,600	
1900-1901	121	9.2	151	37,800	
1901-1902	91	3.5	58	14,400	
1902-1903	99	4.8	79	19,700	
1903-1904	105	5.8	96	23,800	
1904-1905	124	9.9	163	40,700	
1905-1906	120	9.0	148	37,000	
1906-1907	144	14.6	240	60,000	
1907-1908	72	1.5	25	6,200	
1908-1909	124	9.9	163	40,700	
1909-1910	93	3.8	63	15,600	
1910-1911	121	9.2	151	37,800	
1911-1912	64	0.9	15	3,700	
1912-1913	52	0.2	3	800	
1913-1914	128	10.9	179	44,800	
1914-1915	126	10.4	171	42,800	
1915-1916	120	9.0	148	37,000	
1916-1917	78	2.0	33	8,200	
1917-1918	53	0.3	5	1,200	
1918-1919	105	5.8	96	23,800	
1919-1920	66	1.0	17	4,100	
1920-1921	98	4.7	77	19,300	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	25,000	6.08	324	
Maximum seasonal	115,100	27.99	1,493	1889-1890
Minimum seasonal	0	0.00	0	1876-1877
Mean during July	130	0.03	2	
Maximum during July	580	0.14	8	1889-1890
Minimum during July	0	0.00	0	1876-1877
Mean during August	80	0.02	1	
Maximum during August	350	0.09	5	1889-1890
Minimum during August	0	0.00	0	1876-1877

Probable run-off curve, Plate XXXVI.

Storage development curve, Plate CLXVIII.

Mass curve of run-off, Plate CXXII.

Probable frequency of flood discharge, Plate LXXXI.

(a) Description of drainage basin: Area tributary to the following streams above points indicated: MISSION CREEK, at Mission San Jose; AGUA CALIENTE CREEK, at Irvington—Milpitas Highway; AGUA FRIA CREEK, at Irvington—Milpitas Highway; TOROGES CREEK, at Irvington—Milpitas Highway; SCOTT CREEK,  $\frac{1}{2}$  mile above Irvington—Milpitas Highway; CALERA CREEK, at intersection of longitude 121° 53.8' with stream; ARROYO DE LOS COCHES, at intersection of longitude 121° 52.6' with stream; BERRYESSA CREEK, at intersection of longitude 121° 1.5' with stream; DRY CREEK, at intersection of longitude 121° 47.9' with stream; SILVER CREEK, at intersection of longitude 121° 48.4' with stream.

(b) Estimated from record for Coyote River.

**TABLE 108. PENITENCIA CREEK.**  
**SEASONAL RUN-OFF DATA. Drainage area 22.4 square miles.<sup>a</sup>**

Season. (Begins October 1.)	Index of seasonal wetness. Division L.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	130	7.3	167	8,700	January, 28.9%
1872-1873	79	2.1	48	2,500	February, 17.7%
1873-1874	86	2.6	60	3,100	March, 35.9%
1874-1875	69	1.4	32	1,700	April, 8.5%
1875-1876	131	7.5	172	9,000	May, 2.2%
1876-1877	43	0.2	5	200	June, 1.0%
1877-1878	129	7.2	165	8,600	July, 0.5%
1878-1879	79	2.1	48	2,500	August, 0.3%
1879-1880	99	3.7	85	4,400	September, 0.3%
1880-1881	107	4.5	103	5,400	October, 0.2%
1881-1882	69	1.4	32	1,700	November, 0.3%
1882-1883	87	2.7	62	3,200	December, 4.2%
1883-1884	125	6.6	151	7,900	
1884-1885	66	1.3	30	1,600	
1885-1886	115	5.4	124	6,500	
1886-1887	70	1.5	34	1,800	
1887-1888	78	2.0	46	2,400	
1888-1889	98	3.6	82	4,300	
1889-1890	192	19.0	435	22,700	
1890-1891	86	2.6	60	3,100	
1891-1892	91	3.0	69	3,600	
1892-1893	139	8.6	197	10,300	
1893-1894	111	4.9	112	5,900	
1894-1895	147	10.0	229	11,900	
1895-1896	106	4.4	101	5,300	
1896-1897	112	5.0	115	6,000	
1897-1898	57	0.8	18	1,000	
1898-1899	91	3.0	69	3,600	
1899-1900	104	4.2	96	5,000	
1900-1901	121	6.1	140	7,300	
1901-1902	91	3.0	69	3,600	
1902-1903	99	3.7	85	4,400	
1903-1904	105	4.3	98	5,100	
1904-1905	124	6.5	149	7,800	
1905-1906	120	6.0	137	7,200	
1906-1907	144	9.5	217	11,300	
1907-1908	72	1.6	37	1,900	
1908-1909	124	6.5	149	7,800	
1909-1910	93	3.2	73	3,800	
1910-1911	121	6.1	140	7,300	
1911-1912	64	1.1	25	1,300	
1912-1913	52	0.5	11	600	
1913-1914	128	7.0	160	8,400	
1914-1915	126	6.8	156	8,100	
1915-1916	120	6.0	137	7,200	
1916-1917	78	2.0	46	2,400	
1917-1918	53	0.6	14	700	
1918-1919	105	4.3	98	5,100	
1919-1920	66	1.3	30	1,600	
1920-1921	98	3.6	82	4,300	

**SUMMARY OF ESTIMATED RUN-OFF.**

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	5,200	4.37	232	
Maximum seasonal	22,700	19.00	1,013	1889-1890
Minimum seasonal	200	0.17	9	1876-1877
Mean during July	30	0.03	1	
Maximum during July	110	0.09	5	1889-1890
Minimum during July	Trace	Trace	Trace	1876-1877
Mean during August	20	0.02	1	
Maximum during August	70	0.06	3	1889-1890
Minimum during August	Trace	Trace	Trace	1876-1877

Probable run-off curve, Plate XXXVI.

Storage development curve, Plate CLXVIII.

Mass curve of run-off, Plate CXXII.

Probable frequency of flood discharge, Plate LXXVI.

(a) Description of drainage basin: Tributary area above intersection of longitude 121° 15.4' with stream.

(b) Estimated from record for Coyote River.

TABLE 109. COYOTE RIVER.  
SEASONAL RUN-OFF DATA. Drainage area 197 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division N.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records.
1871-1872	129	13.5	177	142,000	January, 28.9%
1872-1873	76	2.5	33	26,000	February, 17.7%
1873-1874	89	4.6	60	48,000	March, 35.9%
1874-1875	52	0.2	3	2,000	April, 8.5%
1875-1876	129	13.5	177	142,000	May, 2.2%
1876-1877	32	0.0	0	0	June, 1.0%
1877-1878	128	13.4	175	140,000	July, 0.5%
1878-1879	109	8.5	111	89,000	August, 0.3%
1879-1880	91	5.0	65	52,000	September, 0.3%
1880-1881	82	3.3	43	34,000	October, 0.2%
1881-1882	86	4.0	52	42,000	November, 0.3%
1882-1883	94	5.5	72	58,000	December, 4.2%
1883-1884	159	21.5	282	225,000	
1884-1885	105	7.8	102	82,000	
1885-1886	124	12.3	161	129,000	
1886-1887	77	2.7	35	28,000	
1887-1888	85	3.9	51	41,000	
1888-1889	92	5.0	65	52,000	
1889-1890	204	33.5	439	351,000	
1890-1891	95	5.6	73	59,000	
1891-1892	88	4.6	60	48,000	
1892-1893	146	18.0	236	189,000	
1893-1894	84	3.6	47	38,000	
1894-1895	136	15.2	199	159,000	
1895-1896	97	5.8	76	61,000	
1896-1897	105	7.6	100	80,000	
1897-1898	50	0.1	1	1,000	
1898-1899	89	4.5	59	47,000	
1899-1900	86	4.0	52	42,000	
1900-1901	117	10.5	138	110,000	
1901-1902	96	5.7	75	60,000	
1902-1903	94	7.9	103	83,200	
1903-1904	98	3.4	45	35,800	
1904-1905	115	3.0	39	31,800	
1905-1906	121	11.2	147	117,000	
1906-1907	137	19.5	255	203,800	
1907-1908	73	4.5	59	47,200	
1908-1909	133	16.8	220	176,600	
1909-1910	84	4.3	56	45,300	
1910-1911	133	12.0	157	126,000	
1911-1912	64	0.6	8	6,400	
1912-1913	45	0.0	0	0	
1913-1914	125	12.5	164	131,000	
1914-1915	128	13.5	177	142,000	
1915-1916	105	7.6	100	80,000	
1916-1917	82	6.7	88	70,600	667,900
1917-1918	51	1.2	16	12,500	c12,200
1918-1919	111	4.5	59	47,500	d45,200
1919-1920	65	1.3	17	14,000	14,000
1920-1921	104	5.4	71	56,800	56,800

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.<sup>e</sup>

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	80,100	7.64	407	
Maximum seasonal	351,000	33.49	1,782	1889-1890
Minimum seasonal	0	0.00	0	1876-1877 1912-1913
Mean during July	400	0.04	2	
Maximum during July	1,800	0.17	9	1889-1890
Minimum during July	0	0.00	0	1876-1877 1912-1913
Mean during August	240	0.02	1	
Maximum during August	1,100	0.10	6	1889-1890
Minimum during August	0	0.00	0	1876-1877 1912-1913

Probable run-off curve, Plate XXXVII.

Storage development curve, Plate CLXIX.

Mass curve of run-off, Plate CXXIII.

Probable frequency of flood discharge, Plate LXXVII.

(a) Description of drainage basin: Tributary area above a point  $\frac{1}{4}$  mile below junction with Las Animas Creek.

(b) Partial record, December 8 to September 30.

(c) Partial record, October 1 to August 31.

(d) Partial record, January 1 to September 30.

(e) Point of measurement: Gage near Madrone,  $\frac{1}{4}$  mile below mouth of Las Animas Creek, drainage area 197 square miles.



TABLE 110. GUADALUPE RIVER.  
SEASONAL RUN-OFF DATA. Drainage area 52 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division N.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	129	13.8	175	38,400	January, 28.9%
1872-1873	76	2.7	34	7,500	February, 17.7%
1873-1874	89	4.7	60	13,100	March, 35.9%
1874-1875	52	0.5	6	1,400	April, 8.5%
1875-1876	129	13.8	175	38,400	May, 2.2%
1876-1877	32	0.0	0	0	June, 1.0%
1877-1878	128	13.6	172	37,900	July, 0.5%
1878-1879	109	8.8	112	24,500	August, 0.3%
1879-1880	91	5.0	63	13,900	September, 0.3%
1880-1881	82	3.5	44	9,700	October, 0.2%
1881-1882	86	4.1	52	11,400	November, 0.3%
1882-1883	94	5.5	70	15,300	December, 4.2%
1883-1884	159	21.6	274	60,100	
1884-1885	105	7.9	100	22,000	
1885-1886	124	12.5	159	34,800	
1886-1887	77	2.8	36	7,800	
1887-1888	85	4.0	51	11,100	
1888-1889	92	5.2	66	14,500	
1889-1890	204	34.0	431	94,700	
1890-1891	95	5.7	72	15,900	
1891-1892	88	4.6	58	12,800	
1892-1893	146	18.0	228	50,100	
1893-1894	84	3.9	50	10,900	
1894-1895	136	15.5	197	43,200	
1895-1896	97	6.1	77	17,000	
1896-1897	105	7.9	100	22,000	
1897-1898	50	0.3	4	800	
1898-1899	89	4.7	60	13,100	
1899-1900	86	4.1	52	11,400	
1900-1901	117	10.8	137	30,100	
1901-1902	96	5.9	75	16,400	
1902-1903	94	5.5	70	15,300	
1903-1904	98	6.4	81	17,800	
1904-1905	115	10.3	131	28,700	
1905-1906	121	11.6	147	32,300	
1906-1907	137	15.6	198	43,400	
1907-1908	73	2.4	30	6,700	
1908-1909	133	14.7	186	40,900	
1909-1910	84	3.9	49	10,900	
1910-1911	133	14.7	186	40,900	
1911-1912	64	1.4	18	3,900	
1912-1913	45	0.0	0	0	
1913-1914	125	12.7	161	35,400	
1914-1915	128	13.6	172	37,900	
1915-1916	105	7.9	100	22,000	
1916-1917	82	3.5	44	9,700	
1917-1918	51	0.4	5	1,400	
1918-1919	111	9.2	117	25,600	
1919-1920	65	1.5	19	4,200	
1920-1921	104	7.6	96	21,200	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	22,000	7.89	421	
Maximum seasonal	94,700	34.02	1,814	1889-1890
Minimum seasonal	0	0.00	0	1876-1877 1912-1913
Mean during July	110	0.04	2	
Maximum during July	470	0.17	9	1889-1890
Minimum during July	0	0.00	0	1876-1877 1912-1913
Mean during August	70	0.03	1	
Maximum during August	280	0.10	5	1889-1890
Minimum during August	0	0.00	0	1876-1877 1912-1913

Probable run-off curve, Plate XXXVII.

Mass curve of run-off, Plate CXXIII.

Storage development curve, Plate CLXIX.

Probable frequency of flood discharge, Plate LXXVII.

(a) Description of drainage basin: Tributary area above intersection of latitude 37° 14.6' with stream.

(b) Estimated from record for Coyote River.

TABLE 111. LOS GATOS CREEK GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 121 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division N.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	129	16.3	153	105,200	January, 28.9%
1872-1873	76	5.6	53	36,100	February, 17.7%
1873-1874	89	8.1	76	52,300	March, 35.9%
1874-1875	52	1.7	16	11,000	April, 8.5%
1875-1876	129	16.3	153	105,200	May, 2.2%
1876-1877	32	0.0	0	0	June, 1.0%
1877-1878	128	16.2	153	104,500	July, 0.5%
1878-1879	109	12.0	113	77,400	August, 0.3%
1879-1880	91	8.5	80	54,900	September, 0.3%
1880-1881	82	6.8	64	43,900	October, 0.2%
1881-1882	86	7.5	71	48,400	November, 0.3%
1882-1883	94	9.1	86	58,700	December, 4.2%
1883-1884	159	23.0	217	148,400	
1884-1885	105	11.2	105	72,300	
1885-1886	124	15.2	143	98,100	
1886-1887	77	5.8	55	37,400	
1887-1888	85	7.4	70	47,800	
1888-1889	92	8.6	81	55,500	
1889-1890	204	34.0	320	219,400	
1890-1891	95	9.3	88	60,000	
1891-1892	88	7.9	74	51,000	
1892-1893	146	20.1	189	129,700	
1893-1894	84	7.1	67	45,800	
1894-1895	136	17.8	168	114,900	
1895-1896	97	9.6	90	62,000	
1896-1897	105	11.2	105	72,300	
1897-1898	50	1.4	13	9,000	
1898-1899	89	8.1	76	52,300	
1899-1900	86	7.5	71	48,400	
1900-1901	117	13.6	128	87,800	
1901-1902	96	9.5	89	61,300	
1902-1903	94	9.1	86	58,700	
1903-1904	98	9.8	92	63,200	
1904-1905	115	13.2	124	85,200	
1905-1906	121	14.6	138	94,200	
1906-1907	137	18.0	170	116,200	
1907-1908	73	5.3	50	34,200	
1908-1909	133	17.3	163	111,600	
1909-1910	84	7.1	67	45,800	
1910-1911	133	17.3	163	111,600	
1911-1912	64	3.7	35	23,900	
1912-1913	45	0.6	6	3,900	
1913-1914	125	15.4	145	90,400	
1914-1915	128	16.2	153	104,500	
1915-1916	105	11.2	105	72,300	
1916-1917	82	6.8	64	43,900	
1917-1918	51	1.5	14	9,700	
1918-1919	111	12.4	117	80,000	
1919-1920	65	3.9	37	25,200	
1920-1921	104	11.0	104	71,000	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	68,500	10.61	566	
Maximum seasonal	219,400	34.00	1,813	1889-1890
Minimum seasonal	0	0.00	0	1876-1877
Mean during July	340	0.05	3	
Maximum during July	1,100	0.17	9	1889-1890
Minimum during July	0	0.00	0	1876-1877
Mean during August	210	0.03	2	
Maximum during August	660	0.10	5	1889-1890
Minimum during August	0	0.00	0	1876-1877

Probable run-off curve, Plate XXXVII.

Storage development curve, Plate CLXIX.

Mass curve of run-off, Plate CXXIV.

Probable frequency of flood discharge, Plate LXXVII.

(a) Description of drainage basin: Tributary areas above indicated points: LOS GATOS CREEK,  $\frac{1}{2}$  mile south of Los Gatos; SAN TOMAS CREEK, intersection of latitude  $37^{\circ} 16.2'$  with stream; CAMPBELL CREEK,  $\frac{1}{2}$  mile northeast of Saratoga; CALABAZOS CREEK, intersection of latitude  $37^{\circ} 17'$  with stream; STEVENS CREEK, intersection of latitude  $37^{\circ} 20'$  with stream; PERMANENTE CREEK, intersection of latitude  $37^{\circ} 21'$  with stream.

(b) Estimated from record for Coyote River.

TABLE 112. SAN FRANCISQUITO CREEK.  
SEASONAL RUN-OFF DATA. Drainage area 38 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division L.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records. <sup>c</sup>
1871-1872	130	16 0	155	32,100	January, 28.9%
1872-1873	79	5 5	53	11,000	February, 17.7%
1873-1874	86	6 7	65	13,400	March, 35.9%
1874-1875	69	3 8	37	7,600	April, 8.5%
1875-1876	131	16 2	157	32,500	May, 2.2%
1876-1877	43	0 4	4	800	June, 1.0%
1877-1878	129	15 8	153	31,700	July, 0.5%
1878-1879	79	5 5	53	11,000	August, 0.3%
1879-1880	99	9 4	91	18,800	September, 0.3%
1880-1881	107	11 0	107	22,100	October, 0.2%
1881-1882	69	3 8	37	7,600	November, 0.3%
1882-1883	87	7 0	68	14,000	December, 4.2%
1883-1884	125	15 0	146	30,100	
1884-1885	66	3 1	30	6,200	
1885-1886	115	12 5	121	25,100	
1886-1887	70	4 0	39	8,000	
1887-1888	78	5 4	52	10,800	
1888-1889	98	9 2	89	18,400	
1889-1890	192	32 0	311	64,200	
1890-1891	86	6 6	64	13,200	
1891-1892	91	7 6	74	15,200	
1892-1893	139	18 2	177	36,500	
1893-1894	111	11 7	114	23,500	
1894-1895	147	20 0	194	40,100	
1895-1896	106	10 7	104	21,500	
1896-1897	112	12 0	116	24,100	
1897-1898	57	1 9	18	3,800	
1898-1899	91	7 6	74	15,200	
1899-1900	104	10 4	101	20,900	
1900-1901	121	14 0	136	28,100	
1901-1902	91	7 6	74	15,200	
1902-1903	99	7 8	76	15,600	12,300
1903-1904	105	9 6	93	19,300	15,100
1904-1905	124	6 5	63	13,000	10,200
1905-1906	120	15 6	151	31,300	24,600
1906-1907	144	20 8	202	41,700	32,700
1907-1908	72	6 3	61	12,800	9,900
1908-1909	124	20 0	194	40,100	31,500
1909-1910	93	6 7	65	13,400	10,500
1910-1911	121	20 0	194	40,100	31,400
1911-1912	64	5 2	50	10,400	8,200
1912-1913	52	6 4	62	12,800	1,000
1913-1914	128	17 0	165	34,100	26,700
1914-1915	126	13 1	127	26,300	20,600
1915-1916	120	18 9	183	37,900	29,800
1916-1917	78	6 9	67	13,800	10,900
1917-1918	53	1 6	16	3,200	2,500
1918-1919	105	10 9	106	21,900	17,200
1919-1920	66	2 3	22	4,600	3,700
1920-1921	98	9 2	89	18,400	

Measured seasonal discharge in acre-feet.<sup>b</sup>

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	20,700	10 32	550	.....
Maximum seasonal	64,200	32 01	1,707	1889-1890
Minimum seasonal	800	0 40	21	1876-1877
Mean during July	100	0 05	3	.....
Maximum during July	300	0 15	8	1889-1890
Minimum during July	Trace	Trace	Trace	1876-1877
Mean during August	60	0 03	2	.....
Maximum during August	200	0 10	5	1889-1890
Minimum during August	Trace	Trace	Trace	1876-1877

Probable run-off curve, Plate XXXVII.

Storage development curve, Plate CLXIX.

Mass curve of run-off, Plate CXXIV.

Probable frequency of flood discharge, Plate LXXXVII.

(a) Description of drainage basin: Tributary area above a point 1 mile below forks near Palo Alto.  
(b) From F. C. Hermann's rating for Searsville Lake, covering the drainage basin above junction with Los Trancos Creek, area 25.5 square miles, as reported by F. H. Tibbetts to Santa Clara Valley Water Conservation Committee.  
(c) Estimated from record for Coyote River.

TABLE 113. SAN MATEO CREEK GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 84 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division L.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872.....	130	13.3	161	59,900	January, 28.9%
1872-1873.....	79	4.5	55	20,300	February, 17.7%
1873-1874.....	86	5.4	66	24,300	March, 35.9%
1874-1875.....	69	3.3	40	14,900	April, 8.5%
1875-1876.....	131	13.5	164	60,800	May, 2.2%
1876-1877.....	43	0.8	10	3,600	June, 1.0%
1877-1878.....	129	13.1	159	59,000	July, 0.5%
1878-1879.....	79	4.5	55	20,300	August, 0.3%
1879-1880.....	99	7.4	90	33,300	September, 0.3%
1880-1881.....	107	8.7	106	39,200	October, 0.2%
1881-1882.....	69	3.3	40	14,900	November, 0.3%
1882-1883.....	87	5.5	67	24,800	December, 4.2%
1883-1884.....	125	12.2	148	55,000	
1884-1885.....	66	2.9	35	13,100	
1885-1886.....	115	10.2	124	46,000	
1886-1887.....	70	3.4	41	15,300	Measured seasonal discharge in acre-feet. <sup>c</sup>
1887-1888.....	78	4.4	53	19,800	
1888-1889.....	98	7.3	89	32,900	
1889-1890.....	192	28.7	348	129,300	d48,500
1890-1891.....	86	5.4	66	24,300	d9,800
1891-1892.....	91	6.1	74	27,500	d2,400
1892-1893.....	139	15.4	187	69,400	d20,300
1893-1894.....	111	9.4	114	42,300	d12,400
1894-1895.....	147	17.0	206	76,600	d23,700
1895-1896.....	106	8.6	104	38,700	d6,600
1896-1897.....	112	9.6	116	43,200	d8,600
1897-1898.....	57	2.0	24	9,000	d, 14,600
1898-1899.....	91	6.1	74	27,500	d4,400
1899-1900.....	104	8.2	99	36,900	e5,600
1900-1901.....	121	11.4	138	51,400	e3,000
1901-1902.....	91	6.1	74	27,500	e2,500
1902-1903.....	99	7.4	90	33,300	e7,600
1903-1904.....	105	8.4	102	37,800	e15,700
1904-1905.....	124	12.1	147	54,500	e6,900
1905-1906.....	120	11.2	136	50,500	e10,300
1906-1907.....	144	16.4	199	78,900	e19,100
1907-1908.....	72	3.6	44	16,200	e5,800
1908-1909.....	124	12.1	147	54,500	e22,100
1909-1910.....	93	6.4	78	28,800	e4,100
1910-1911.....	121	11.4	138	51,400	
1911-1912.....	64	2.7	33	12,200	
1912-1913.....	52	1.6	19	7,200	
1913-1914.....	128	12.9	156	58,100	
1914-1915.....	126	12.4	150	55,900	
1915-1916.....	120	11.2	136	50,500	
1916-1917.....	78	4.4	53	19,800	
1917-1918.....	53	1.6	19	7,200	
1918-1919.....	105	8.4	102	37,800	
1919-1920.....	66	2.9	35	13,100	
1920-1921.....	98	7.3	89	32,900	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal.....	37,100	8.23	439	
Maximum seasonal.....	129,300	28.70	1,531	1889-1890
Minimum seasonal.....	3,600	0.80	43	1876-1877
Mean during July.....	190	0.04	2	
Maximum during July.....	650	0.14	8	1889-1890
Minimum during July.....	20	Trace	Trace	1876-1877
Mean during August.....	110	0.02	1	
Maximum during August.....	390	0.09	5	1889-1890
Minimum during August.....	10	Trace	Trace	1876-1877

Probable run-off curve, Plate XXXVIII.

Storage development curve, Plate CLXX.

Mass curve of run-off, Plate CCXY.

Probable frequency of flood discharge, Plate LXXVIII.

(a) Description of drainage basin: Tributary area above designated points: ISLAIS CREEK, at intersection of longitude 122° 25.1' with stream; SAN BRUNO CREEK, at highway bridge, ¼ mile west of San Bruno; SAN MATEO CREEK, at highway bridge at San Mateo; LAUREL CREEK, at highway bridge near Cottrell; BELMONT CREEK, at highway bridge near Belmont; PULGAS CREEK, at railroad bridge; CORDILLERAS CREEK, at intersection of longitude 122° 15' with stream.

(b) Estimated from records for Coyote River.

(c) Records from the report of the Spring Valley Water Company, entitled "The Future Water Supply of San Francisco," page 98. Season is from June 1 to May 31. Records are from area tributary to Crystal Springs Reservoir. Evaporation from reservoir has been deducted from gross yield.

(d) Drainage area, 1889-1890 to 1898-1899, 23.5 square miles.

(e) Drainage area, 1899-1900 to 1909-1910, 22.5 square miles.

(f) Evaporation greater than run-off.

TABLE 114. SMITH RIVER.

SEASONAL RUN-OFF DATA. Drainage area 627 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division D.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records.
1871-1872	104	105.8	104	3,538,000	January, 27.0%
1872-1873	62	63.0	62	2,106,700	February, 16.2%
1873-1874	100	101.5	100	3,394,200	March, 9.1%
1874-1875	69	70.0	69	2,340,800	April, 9.4%
1875-1876	166	170.8	168	5,711,600	May, 9.4%
1876-1877	92	92.8	91	3,103,200	June, 3.5%
1877-1878	132	135.0	133	4,514,400	July, 1.9%
1878-1879	105	106.8	105	3,571,400	August, 1.0%
1879-1880	131	134.5	132	4,497,700	September, 1.4%
1880-1881	113	115.8	114	3,872,400	October, 1.6%
1881-1882	101	102.2	100	3,417,600	November, 10.9%
1882-1883	90	91.0	89	3,013,000	December, 8.6%
1883-1884	92	92.8	91	3,103,200	
1884-1885	69	70.0	69	2,340,800	
1885-1886	142	146.0	143	4,882,200	
1886-1887	99	100.5	98	3,360,700	
1887-1888	85	86.0	84	2,875,800	
1888-1889	74	75.2	74	2,514,700	
1889-1890	157	162.0	159	5,417,300	
1890-1891	82	82.8	81	2,768,800	
1891-1892	81	81.8	80	2,735,400	
1892-1893	104	105.8	104	3,538,000	
1893-1894	110	112.0	110	3,745,300	
1894-1895	100	101.5	100	3,394,200	
1895-1896	99	100.5	99	3,360,700	
1896-1897	101	102.2	100	3,417,600	
1897-1898	72	73.0	72	2,441,100	
1898-1899	75	76.0	75	2,541,400	
1899-1900	118	121.0	119	4,046,200	
1900-1901	97	98.0	96	3,277,100	
1901-1902	120	122.8	121	4,106,400	
1902-1903	114	116.5	114	3,895,800	
1903-1904	147	151.0	148	5,049,400	
1904-1905	92	92.8	91	3,103,200	
1905-1906	91	92.0	90	3,076,500	
1906-1907	110	112.0	110	3,745,300	
1907-1908	79	80.0	79	2,675,200	
1908-1909	117	119.0	117	3,979,400	
1909-1910	94	95.3	94	3,186,800	
1910-1911	79	80.0	78	2,675,200	
1911-1912	89	93.0	91	3,110,700	
1912-1913	84	83.4	82	2,790,100	
1913-1914	109	111.5	109	3,728,600	
1914-1915	122	125.0	123	4,180,000	
1915-1916	103	105.0	103	3,511,200	
1916-1917	75	76.0	75	2,541,400	
1917-1918	68	69.2	68	2,314,000	
1918-1919	101	102.2	100	3,417,600	
1919-1920	55	57.5	56	1,922,800	
1920-1921	129	132.5	130	4,430,800	

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.<sup>b</sup>

c2,771,000  
d1,810,900

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	3,406,200	101.9	5.433	
Maximum seasonal	5,711,600	170.8	9.109	1875-1876
Minimum seasonal	1,922,800	57.5	3.067	1919-1920
Mean during July	64,700	1.9	103	
Maximum during July	108,500	3.2	173	1875-1876
Minimum during July	36,500	1.1	58	1919-1920
Mean during August	34,100	1.0	54	
Maximum during August	57,100	1.7	91	1875-1876
Minimum during August	19,200	0.6	31	1919-1920

Probable run-off curve, Plate XXXVIII.

Mass curve of run-off, Plate CXXV.

Storage development curve, Plate CLXX.

Probable frequency of flood discharge, Plate LXXXVIII.

(a) Description of drainage basin: Tributary area above a point in N. W.  $\frac{1}{4}$  of Sec. 34, T. 18 N., R. 1 W., near mouth, excepting area of 77 square miles in Oregon. Total drainage area is 704 square miles.

(b) Points of measurement: South Fork,  $\frac{1}{8}$  mile above junction with Smith River, 294 square miles; North Fork,  $\frac{1}{2}$  mile above junction of North and Middle Forks, 148 square miles; Middle Fork, at highway bridge 800 feet above junction of North and Middle Forks, 128 square miles.

(c) Complete record on South Fork; partial record on Middle Fork, October 1 to 31 and January 1 to September 30.

(d) Complete record on South Fork; partial record on Middle Fork, October 1 to 31 and March 1 to September 30.

**TABLE 115. KLAMATH RIVER.\***  
SEASONAL RUN-OFF DATA. Drainage area 2,320 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division C.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agri- cultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records. <sup>h</sup>
1871-1872	110	31.0	112	3,836,700	January..... 11 1%
1872-1873	54	11.2	40	1,376,700	February..... 18 1%
1873-1874	83	21.2	77	2,630,900	March..... 21 2%
1874-1875	51	9.9	36	1,218,000	April..... 19.5%
1875-1876	118	34.0	121	4,214,300	May..... 8 3%
1876-1877	73	17.6	64	2,180,200	June..... 5 2%
1877-1878	115	33.0	120	4,080,300	July..... 3 6%
1878-1879	87	22.5	81	2,777,000	August..... 1 3%
1879-1880	100	27.4	99	3,386,000	September..... 1 8%
1880-1881	115	33.0	120	4,080,300	October..... 2 2%
1881-1882	80	20.0	73	2,472,500	November..... 1.9%
1882-1883	76	18.1	66	2,241,100	December..... 5.8%
1883-1884	92	24.3	88	3,008,500	
1884-1885	83	20.9	76	2,594,300	
1885-1886	107	29.7	108	3,678,400	
1886-1887	90	23.7	86	2,935,400	
1887-1888	88	22.9	83	2,825,800	
1888-1889	69	16.2	59	1,997,500	
1889-1890	178	57.4	208	7,100,900	
1890-1891	81	20.4	74	2,521,300	
1891-1892	88	22.9	83	2,825,800	
1892-1893	101	27.6	100	3,410,400	
1893-1894	158	49.8	181	6,163,100	
1894-1895	83	20.9	76	2,594,300	
1895-1896	120	34.7	126	4,299,500	
1896-1897	112	33.8	122	4,177,700	
1897-1898	60	13.0	47	1,607,800	
1898-1899	68	15.4	56	1,912,300	
1899-1900	99	26.9	97	3,325,100	
1900-1901	121	35.3	128	4,372,600	
1901-1902	95	25.6	93	3,166,800	
1902-1903	105	29.2	106	3,617,500	
1903-1904	173	56.1	204	6,942,600	
1904-1905	115	33.0	120	4,080,300	
1905-1906	118	34.0	123	4,214,300	
1906-1907	135	40.7	148	5,012,500	
1907-1908	82	20.7	75	2,557,800	
1908-1909	123	36.3	132	4,494,400	
1909-1910	93	24.6	89	3,045,000	
1910-1911	97	26.2	95	3,239,000	
1911-1912	118	34.0	123	4,214,300	
1912-1913	90	23.8	86	2,935,400	
1913-1914	135	40.7	148	5,042,500	
1914-1915	115	33.0	120	4,080,300	
1915-1916	102	27.9	101	3,446,900	
1916-1917	80	20.0	73	2,472,900	
1917-1918	65	14.8	54	1,827,000	
1918-1919	110	31.0	112	3,836,700	
1919-1920	56	11.6	42	1,437,200	
1920-1921	133	40.3	146	4,993,800	

Measured seasonal discharge in acre-feet at U.S.G.S. gaging stations.			
	Requa. <sup>b</sup>	Seiad Valley. <sup>c</sup>	Keno. <sup>d</sup>
.....			993,200
.....			1,586,600
.....			1,660,400
.....			1,951,400
.....			1,350,500
.....			1,445,500
.....			1,612,600
.....			1,515,500
.....			1,351,500
.....			1,513,300
.....		72,850,000	1,946,700
.....		3,966,400	1,357,200
.....		13,934,000	1,468,000
.....		13,523,000	1,468,900
.....		10,065,000	1,468,900
.....		7,066,000	1,144,500
.....		1,990,400	-----
.....		2,439,200	-----
.....		1,415,300	-----
.....		5,309,400	-----
.....		16,753,800	3,532,200

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal.....	3,410,700	27.56	1 470	
Maximum seasonal.....	7,100,900	57.38	3,061	1889-1890
Minimum seasonal.....	1,218,000	9.84	525	1874-1875
Mean during July.....	122,800	1.00	53	
Maximum during July.....	255,600	2.10	110	1889-1890
Minimum during July.....	43,800	0.35	19	1874-1875
Mean during August.....	44,300	0.36	19	
Maximum during August.....	92,300	0.75	40	1889-1890
Minimum during August.....	15,800	0.13	7	1874-1875

Probable run-off curve, Plate XXXVIII.

Mass curve of run-off, Plate CXXV.

Storage development curve, Plate CLXX.

Probable frequency of flood discharge, Plate LXXVIII.

(a) Description of drainage basin: Tributary area between the mouth of river and the California-Oregon state line; also 35 square miles in Oregon, except the area tributary to the Shasta, Scott, Salmon and Trinity Rivers.

(b) At Scofield, in Sec. 29, T. 13 N., R. 2 E., 9 miles above Requa.

(c) Near Seiad Valley, 300 feet above mouth of Walker Creek.

(d) From June 1, 1904, to September 30, 1913, at county highway bridge at Keno. From October 1, 1913, to September 30, 1918, at highway bridge, 1 mile below Spence Creek.

(e) Partial record, December 25 to September 30.

(f) Partial record, November 23 to September 30.

(g) Partial record, June 1 to September 30.

(h) Estimated from records modified for adjusted areas.

\*NOTE.—This table covers residual drainage area only. Shasta, Scott, Salmon and Trinity Rivers are each considered separately in this report. The total area tributary to the Klamath River in California is 7,600 square miles.

TABLE 116. SHASTA RIVER.

SEASONAL RUN-OFF DATA. Drainage area 803 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division C.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records <sup>d</sup>
1871-1872	110	6.3	111	269,800	January, 9.8%
1872-1873	54	2.5	44	107,100	February, 10.5%
1873-1874	83	4.2	75	179,900	March, 12.0%
1874-1875	51	2.4	43	102,800	April, 10.0%
1875-1876	118	7.0	124	299,800	May, 11.4%
1876-1877	73	3.7	66	158,400	June, 9.6%
1877-1878	115	6.7	118	286,900	July, 7.0%
1878-1879	87	4.5	79	192,700	August, 6.9%
1879-1880	100	5.5	97	235,500	September, 1.5%
1880-1881	115	6.7	118	286,900	October, 5.1%
1881-1882	80	4.0	71	171,300	November, 8.2%
1882-1883	76	3.7	66	158,400	December, 8.0%
1883-1884	92	4.8	85	205,500	
1884-1885	83	4.2	74	179,900	
1885-1886	107	6.0	106	256,900	
1886-1887	90	4.7	83	201,300	
1887-1888	88	4.5	80	192,700	
1888-1889	69	3.2	57	137,000	
1889-1890	178	13.8	244	590,900	
1890-1891	81	4.0	71	171,300	
1891-1892	88	4.0	81	197,000	
1892-1893	101	5.6	99	239,800	
1893-1894	158	11.0	194	471,000	
1894-1895	83	4.2	74	179,900	
1895-1896	120	7.2	127	308,300	
1896-1897	112	6.4	113	274,100	
1897-1898	60	2.8	50	119,900	
1898-1899	68	3.2	57	137,000	
1899-1900	99	5.4	95	231,200	
1900-1901	121	7.3	129	312,600	
1901-1902	95	5.1	90	218,400	
1902-1903	105	5.8	102	248,400	
1903-1904	173	12.7	224	543,800	
1904-1905	115	6.7	118	286,900	
1905-1906	116	7.0	123	299,800	
1906-1907	135	8.6	152	368,300	
1907-1908	82	4.1	72	175,600	
1908-1909	123	7.4	131	316,900	
1909-1910	93	5.0	88	214,100	
1910-1911	97	5.2	92	222,700	
1911-1912	118	4.4	78	190,100	
1912-1913	90	5.7	100	242,600	
1913-1914	135	8.7	153	372,600	
1914-1915	115	6.7	118	286,900	
1915-1916	102	5.7	100	244,100	
1916-1917	80	3.7	65	156,800	c82,200
1917-1918	65	3.9	69	166,500	86,100
1918-1919	110	5.1	89	218,700	127,100
1919-1920	56	3.9	69	166,800	81,900
1920-1921	133	7.8	136	332,300	216,100

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.<sup>b</sup>

125,700  
163,100  
.....  
.....  
.....  
c82,200  
86,100  
127,100  
81,900  
216,100

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	242,600	5.65	302	.....
Maximum seasonal	590,900	13.80	736	1889-1890
Minimum seasonal	102,800	2.40	128	1874-1875
Mean during July	17,000	0.40	21	.....
Maximum during July	41,400	1.00	52	1889-1890
Minimum during July	4,300	0.10	5	1916-1917
Mean during August	16,700	0.39	21	.....
Maximum during August	40,800	0.95	51	1889-1890
Minimum during August	4,350	0.10	5	1916-1917

Probable run-off curve, Plate XXXVIII. Mass curve of run-off, Plate CXXXVI.  
 Storage development curve, Plate CLXX. Probable frequency of flood discharge, Plate LXXVIII.  
 (a) Description of drainage basin: Tributary area above junction with Klamath River.  
 (b) Point of measurement: 1 mile below junction with Little Shasta River, 1¼ miles S. W. of Montague, drainage area 673 square miles.  
 (c) Partial record, October 1 to January 20 and April 1 to September 30.  
 (d) Measured discharge adjusted for increased area, also for storage and irrigation above point of measurement as follows: Storage 1920-1921, 1,000 acre-feet; irrigation, 20,640 acres in 1911-1912, and increasing 1,470 acres per year to 32,400 acres in 1919-1920 and 1920-1921.

TABLE 117. SCOTT RIVER.  
SEASONAL RUN-OFF DATA. Drainage area 813 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division C.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records. <sup>c</sup>
1871-1872	110	13.6	113	589,300	January, 7.0%
1872-1873	54	4.5	37	194,900	February, 9.2%
1873-1874	83	8.6	71	371,700	March, 8.2%
1874-1875	51	4.0	33	172,200	April, 10.4%
1875-1876	118	15.3	127	661,500	May, 21.9%
1876-1877	73	7.1	59	308,200	June, 18.6%
1877-1878	115	14.6	122	634,600	July, 7.3%
1878-1879	87	9.4	78	407,900	August, 4.2%
1879-1880	100	11.6	97	503,100	September, 2.6%
1880-1881	115	14.6	122	634,600	October, 2.8%
1881-1882	80	8.0	67	349,100	November, 4.2%
1882-1883	76	7.5	63	326,300	December, 3.6%
1883-1884	92	10.0	83	435,100	
1884-1885	83	8.6	71	371,700	
1885-1886	107	13.1	109	566,600	
1886-1887	90	9.8	82	426,100	
1887-1888	88	9.6	80	417,000	
1888-1889	69	6.4	53	276,500	
1889-1890	178	28.4	236	1,233,100	
1890-1891	81	8.3	69	358,100	
1891-1892	88	9.6	80	417,000	
1892-1893	101	11.6	96	503,100	
1893-1894	158	23.8	198	1,033,500	
1894-1895	83	8.6	71	371,700	
1895-1896	120	15.4	128	666,300	
1896-1897	112	13.9	116	602,900	
1897-1898	60	5.1	43	222,100	
1898-1899	68	6.3	52	271,900	
1899-1900	99	11.5	96	498,600	
1900-1901	121	15.7	130	679,900	
1901-1902	95	10.7	89	462,300	
1902-1903	105	12.5	101	543,900	
1903-1904	173	27.5	230	1,192,200	
1904-1905	115	14.6	122	634,600	
1905-1906	118	15.2	126	657,300	
1906-1907	135	18.6	155	806,000	
1907-1908	82	8.4	70	362,600	
1908-1909	123	16.0	133	693,500	
1909-1910	93	10.2	85	444,300	
1910-1911	97	11.0	91	476,000	
1911-1912	118	12.5	104	540,300	513,800
1912-1913	90	13.7	114	593,300	567,500
1913-1914	135	18.6	155	806,900	
1914-1915	115	14.6	122	634,600	
1915-1916	102	11.9	99	516,700	
1916-1917	80	8.0	67	349,100	
1917-1918	65	5.8	49	253,800	
1918-1919	110	13.5	112	584,700	
1919-1920	56	4.6	38	199,400	
1920-1921	133	18.4	153	797,800	

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.<sup>b</sup>

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	521,100	12.01	641	
Maximum seasonal	1,233,100	28.45	1,517	1889-1890
Minimum seasonal	172,200	3.97	212	1874-1875
Mean during July	38,000	0.88	47	
Maximum during July	90,000	2.10	111	1889-1890
Minimum during July	12,600	0.29	15	1874-1875
Mean during August	21,900	0.51	27	
Maximum during August	51,800	1.20	64	1889-1890
Minimum during August	7,200	0.17	9	1874-1875

Probable run-off curve, Plate XXXIX.

Storage development curve, Plate CLXXI.

Mass curve of run-off, Plate CXXVI.

Probable frequency of flood discharge, Plate LXXIX.

(a) Description of drainage basin: Tributary area above junction with Klamath River.

(b) Point of measurement: Near Scott's Bar,  $\frac{1}{2}$  mile above junction with Klamath River, drainage area 812 square miles.

(c) Measured discharge adjusted for irrigation above point of measurement as follows: 1911-1912, 15,100 acres; 1912-1913, 14,800 acres.



TABLE 118. SALMON RIVER.

SEASONAL RUN-OFF DATA. Drainage area 734 square miles.a

Season. (Begins October 1.)	Index of seasonal wetness. Division C.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records.
1871-1872	110	35.8	111	1,401,400	January, 14.0%
1872-1873	54	14.4	45	563,700	February, 14.1%
1873-1874	83	25.7	80	1,006,100	March, 7.8%
1874-1875	51	13.0	41	508,900	April, 11.0%
1875-1876	118	39.3	122	1,538,500	May, 22.0%
1876-1877	73	21.5	67	841,600	June, 12.8%
1877-1878	115	38.0	118	1,487,600	July, 3.8%
1878-1879	87	27.0	84	1,057,000	August, 1.6%
1879-1880	100	32.0	99	1,252,700	September, 1.6%
1880-1881	115	38.0	118	1,487,600	October, 1.2%
1881-1882	80	24.0	75	939,500	November, 5.7%
1882-1883	76	22.3	70	873,000	December, 4.4%
1883-1884	92	28.7	90	1,123,500	
1884-1885	83	25.4	79	994,300	
1885-1886	107	34.6	108	1,354,500	
1886-1887	90	28.1	87	1,100,000	
1887-1888	88	27.3	85	1,068,700	
1888-1889	69	20.0	62	782,900	
1889-1890	178	63.0	196	2,466,200	
1890-1891	81	24.3	76	951,300	
1891-1892	88	27.1	85	1,060,900	
1892-1893	101	32.3	101	1,264,400	
1893-1894	158	55.2	172	2,160,900	
1894-1895	83	25.6	80	1,002,100	
1895-1896	120	40.0	125	1,565,900	
1896-1897	112	36.8	115	1,440,600	
1897-1898	60	16.5	52	645,900	
1898-1899	68	19.5	61	763,400	
1899-1900	99	31.7	98	1,240,900	
1900-1901	121	40.4	126	1,581,500	
1901-1902	95	30.1	94	1,178,300	
1902-1903	105	34.0	106	1,331,000	
1903-1904	173	61.4	191	2,403,600	
1904-1905	115	38.0	118	1,487,600	
1905-1906	118	39.0	121	1,526,700	
1906-1907	135	46.0	143	1,800,700	
1907-1908	82	25.0	78	978,700	
1908-1909	123	41.3	129	1,616,700	
1909-1910	93	29.5	92	1,154,800	
1910-1911	97	30.6	95	1,197,900	
1911-1912	118	34.4	107	1,343,500	
1912-1913	90	33.0	103	1,290,700	
1913-1914	135	45.7	142	1,789,000	
1914-1915	115	38.0	118	1,487,600	
1915-1916	102	32.7	102	1,280,100	
1916-1917	80	24.1	75	943,400	
1917-1918	65	18.3	57	716,400	
1918-1919	110	36.0	112	1,409,300	
1919-1920	56	15.0	47	587,200	
1920-1921	133	45.3	141	1,773,200	

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.<sup>b</sup>

1 330,400  
1,277,400

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	1,256,400	32.09	1,712	
Maximum seasonal	2,466,200	63.00	3,360	1889-1890
Minimum seasonal	508,900	13.00	693	1874-1875
Mean during July	47,700	1.20	65	
Maximum during July	93,700	2.40	128	1889-1890
Minimum during July	19,300	0.49	26	1874-1875
Mean during August	20,100	0.51	27	
Maximum during August	39,500	1.00	54	1889-1890
Minimum during August	8,100	0.21	11	1874-1875

Probable run-off curve, Plate XXXIX.

Storage development curve, Plate CLXXI.

(a) Description of drainage basin: Tributary area above junction with Klamath River.

Mass curve of run-off, Plate CXXXVI.

Probable frequency of flood discharge, Plate LXXIX.

(b) Point of measurement: At Somesbar, 13 1/4 miles above junction with Klamath River, drainage area 727 square miles.

TABLE 119. TRINITY RIVER.  
SEASONAL RUN-OFF DATA. Drainage area 2,965 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division C.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records.
1871-1872	110	32.2	115	5,091,900	January, 11 8%
1872-1873	54	10.0	36	1,581,300	February, 15 8%
1873-1874	83	21.4	76	3,384,000	March, 13 9%
1874-1875	51	9.0	32	1,423,200	April, 15 1%
1875-1876	118	35.8	127	5,661,200	May, 17 2%
1876-1877	73	17.6	63	2,783,100	June, 8 2%
1877-1878	115	34.2	122	5,408,100	July, 2 8%
1878-1879	87	22.8	81	3,665,400	August, 1 5%
1879-1880	100	28.2	100	4,439,300	September, 1 4%
1880-1881	115	34.2	122	5,408,100	October, 1 3%
1881-1882	80	20.0	71	3,162,700	November, 4 9%
1882-1883	76	18.8	67	2,973,000	December, 6 1%
1883-1884	92	25.0	89	3,953,300	
1884-1885	83	21.4	76	3,384,000	
1885-1886	107	31.1	110	4,917,900	
1886-1887	90	24.0	85	3,795,200	
1887-1888	88	23.4	83	3,700,300	
1888-1889	69	15.8	56	2,498,500	
1889-1890	178	61.0	217	9,646,100	
1890-1891	81	20.5	73	3,241,700	
1891-1892	88	23.4	83	3,700,300	
1892-1893	101	28.8	102	4,554,200	
1893-1894	158	52.5	187	8,302,000	
1894-1895	83	21.4	76	3,384,000	
1895-1896	120	36.7	130	5,803,500	
1896-1897	112	33.1	118	5,234,200	
1897-1898	60	12.5	44	1,976,600	
1898-1899	68	15.7	56	2,482,700	
1899-1900	99	27.8	99	4,396,100	
1900-1901	121	37.0	131	5,850,900	
1901-1902	95	26.2	93	4,143,100	
1902-1903	105	30.2	107	4,775,600	
1903-1904	173	58.8	209	9,298,200	
1904-1905	115	34.2	122	5,408,100	
1905-1906	118	35.8	127	5,661,200	
1906-1907	135	42.8	152	6,768,100	
1907-1908	82	21.0	75	3,320,800	
1908-1909	123	38.0	135	6,009,000	
1909-1910	93	25.2	90	3,984,900	
1910-1911	97	27.2	97	4,301,200	
1911-1912	118	22.1	79	3,493,900	3,335,700
1912-1913	90	24.6	88	3,897,500	3,751,100
1913-1914	135	42.8	152	6,768,100	b2,478,100
1914-1915	115	34.2	122	5,408,100	2,156,900
1915-1916	102	29.1	103	4,601,700	1,502,400
1916-1917	80	20.0	71	3,162,600	c1,455,000
1917-1918	65	13.6	48	2,149,100	d2,059,300
1918-1919	110	32.2	115	5,091,900	1,150,800
1919-1920	56	11.0	39	1,739,500	407,900
1920-1921	133	42.0	149	6,641,600	1,795,000

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.

	Hoopa. <sup>e</sup>	Lewiston. <sup>f</sup>
		1,030,600
		1,071,200
		2,026,600
		2,156,900
		1,502,400
		652,100
		602,200
		1,150,800
		407,900
		1,795,000

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	4,447,700	28.14	1,500	
Maximum seasonal	9,646,100	61.00	3,253	1889-1890
Minimum seasonal	1,423,200	9.00	480	1874-1875
Mean during July	124,600	0.80	42	
Maximum during July	270,100	1.70	91	1889-1890
Minimum during July	29,800	0.20	10	1917-1918
Mean during August	66,800	0.40	23	
Maximum during August	144,700	0.90	49	1889-1890
Minimum during August	21,300	0.10	7	1874-1875

Probable run-off curve, Plate XXXIX.

Storage development curve, Plate CLXXI.

(a) Description of drainage basin: Tributary area above junction with Klamath River.

(b) Partial record, October 1 to January 31.

(c) Partial record, October 7 to March 31 and July 2 to September 30.

(d) Partial record, October 1 to September 7.

(e) At Hoopa, 11 miles above junction with Klamath River, drainage area 2,851 square miles.

(f) At highway bridge at Lewiston.

Mass curve of run-off, Plate CXXVI.

Probable frequency of flood discharge, Plate LXXIX.

**TABLE 120. REDWOOD CREEK.**  
SEASONAL RUN-OFF DATA. Drainage area 275 square miles.

Season. (Begins October 1.)	Index of seasonal wetness. Division D.	Depth of run-off in inches.	Run-off index	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records.
1871-1872	104	59.0	103	866,100	January, 25.6%
1872-1873	62	35.6	62	522,600	February, 15.2%
1873-1874	100	56.8	100	833,800	March, 8.1%
1874-1875	69	40.0	70	587,200	April, 9.5%
1875-1876	166	93.4	164	1,371,100	May, 8.7%
1876-1877	92	52.3	92	767,700	June, 1.8%
1877-1878	132	74.5	130	1,093,600	July, 0.9%
1878-1879	105	59.5	104	873,400	August, 0.9%
1879-1880	131	74.0	130	1,036,300	September, 0.8%
1880-1881	113	64.4	113	945,400	October, 0.8%
1881-1882	101	57.4	100	842,600	November, 13.1%
1882-1883	90	51.3	90	753,100	December, 14.6%
1883-1884	92	52.3	92	767,700	
1884-1885	69	40.0	70	587,200	
1885-1886	142	80.2	140	1,177,300	
1886-1887	99	56.3	99	826,500	
1887-1888	85	48.6	85	713,400	
1888-1889	74	42.6	75	625,300	
1889-1890	157	88.5	155	1,299,100	
1890-1891	82	46.5	81	682,600	
1891-1892	81	46.2	81	678,200	
1892-1893	104	59.0	103	866,100	
1893-1894	110	62.3	109	914,500	
1894-1895	100	56.8	100	833,800	
1895-1896	99	56.3	99	826,500	
1896-1897	101	57.4	100	842,600	
1897-1898	72	41.0	72	601,900	
1898-1899	75	42.9	75	629,700	
1899-1900	118	67.0	117	983,500	
1900-1901	97	55.2	97	810,300	
1901-1902	120	68.1	119	999,700	
1902-1903	114	64.5	113	946,800	
1903-1904	147	83.0	145	1,218,400	
1904-1905	92	52.3	92	767,700	
1905-1906	91	51.9	91	761,900	
1906-1907	110	62.3	109	914,500	
1907-1908	79	45.4	80	666,400	
1908-1909	117	66.2	116	971,800	
1909-1910	94	53.7	94	788,300	
1910-1911	79	45.2	79	663,500	
1911-1912	89	47.5	83	697,200	
1912-1913	84	62.6	110	919,400	
1913-1914	109	62.0	109	910,100	
1914-1915	122	69.0	121	1,012,900	
1915-1916	103	58.5	102	858,700	
1916-1917	75	42.9	75	629,800	
1917-1918	68	39.4	69	578,400	
1918-1919	101	57.4	100	842,600	
1919-1920	55	32.4	57	475,600	
1920-1921	129	73.0	128	1,071,600	

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station. c  
697,200  
6908,500

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	837,400	57.1	3,042	
Maximum seasonal	1,371,100	93.4	4,981	1875-1876
Minimum seasonal	475,600	32.4	1,728	1919-1920
Mean during July	7,500	0.5	27	
Maximum during July	12,300	0.8	45	1875-1876
Minimum during July	4,300	0.3	16	1919-1920
Mean during August	7,500	0.5	27	
Maximum during August	12,300	0.8	45	1875-1876
Minimum during August	4,300	0.3	16	1919-1920

Probable run-off curve, Plate XXXIX.

Storage development curve, Plate CLXXI.

(a) Description of drainage area: Tributary area above highway bridge at Oriels.

(b) Partial record, October 1 to August 9.

(c) Point of measurement: Gage at highway bridge at Oriels, drainage area 275 square miles.

Mass curve of run-off, Plate CXXVII.

Probable frequency of flood discharge, Plate LXXIX.

TABLE 121. MAD RIVER.  
SEASONAL RUN-OFF DATA. Drainage area 457 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. <sup>d</sup>	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet.	Distribution of seasonal run-off by months as shown by U.S.G.S. records.
1871-1872	123	60.5	125	1,474,600	January, 26.0%
1872-1873	77	35.7	74	870,100	February, 15.1%
1873-1874	103	50.0	103	1,218,600	March, 12.2%
1874-1875	73	33.6	69	818,900	April, 12.3%
1875-1876	105	51.0	105	1,243,000	May, 10.2%
1876-1877	63	28.6	59	697,100	June, 2.1%
1877-1878	160	82.0	169	1,998,600	July, 0.8%
1878-1879	115	56.8	117	1,384,400	August, 0.4%
1879-1880	120	59.5	123	1,450,200	September, 0.5%
1880-1881	105	51.0	105	1,243,000	October, 0.3%
1881-1882	81	38.0	78	926,200	November, 8.7%
1882-1883	80	37.4	77	911,500	December, 11.4%
1883-1884	77	36.0	74	877,400	
1884-1885	57	25.5	53	621,500	
1885-1886	122	60.5	125	1,474,600	
1886-1887	68	31.0	64	755,600	
1887-1888	71	32.6	67	794,500	
1888-1889	75	35.0	72	853,000	
1889-1890	151	77.0	159	1,876,700	
1890-1891	68	31.0	64	755,600	
1891-1892	94	45.0	93	1,096,800	
1892-1893	118	58.2	120	1,418,500	
1893-1894	115	56.5	117	1,377,100	
1894-1895	140	70.5	145	1,718,300	
1895-1896	112	55.0	113	1,340,500	
1896-1897	105	51.0	105	1,243,000	
1897-1898	68	31.0	64	755,600	
1898-1899	86	40.8	84	994,400	
1899-1900	103	50.0	103	1,218,600	
1900-1901	100	48.2	99	1,174,800	
1901-1902	122	60.5	125	1,474,600	
1902-1903	103	50.0	103	1,218,600	
1903-1904	151	76.8	158	1,871,800	
1904-1905	113	55.5	115	1,352,700	
1905-1906	116	57.2	118	1,394,100	
1906-1907	124	61.6	127	1,501,400	
1907-1908	78	36.5	75	889,600	
1908-1909	142	71.8	148	1,750,000	
1909-1910	89	42.3	87	1,031,000	
1910-1911	87	38.8	80	946,700	6746,300
1911-1912	74	34.9	72	850,200	850,200
1912-1913	87	43.2	89	1,055,000	1,055,000
1913-1914	137	69.0	142	1,681,700	
1914-1915	131	65.6	135	1,598,900	
1915-1916	102	49.5	102	1,206,500	
1916-1917	78	36.5	75	889,600	
1917-1918	60	27.0	56	658,100	
1918-1919	91	43.6	90	1,062,700	
1919-1920	52	22.5	46	548,400	
1920-1921	128	64.0	132	1,559,900	

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.<sup>c</sup>

6746,300  
850,200  
1,055,000

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	1,182,500	48.51	2,588	
Maximum seasonal	1,998,600	82.00	4,373	1877-1878
Minimum seasonal	548,400	22.50	1,200	1919-1920
Mean during July	9,500	0.39	21	
Maximum during July	16,000	0.66	35	1877-1878
Minimum during July	4,400	0.18	10	1919-1920
Mean during August	4,700	0.19	10	
Maximum during August	8,000	0.33	18	1877-1878
Minimum during August	2,200	0.09	5	1919-1920

Probable run-off curve, Plate XL.

Storage development curve, Plate CLXXII.

(a) Description of drainage area: Tributary area above gage at Oregon and Eureka Railroad bridge at Essex, 5 miles northeast of Arcata.

(b) Partial record, January 1 to September 30.

(c) Point of measurement at railroad bridge at Essex, drainage area 457 square miles.

(d) Index of seasonal wetness obtained by weighting indices for Precipitation Divisions D and E in proportions of one and seven, respectively.

Mass curve of run-off, Plate CXXVII.

Probable frequency of flood discharge, Plate LXXX.

TABLE 122. EEL RIVER.

SEASONAL RUN-OFF DATA. Drainage area 3,547 square miles.a

Season. (Begins October 1.)	Index of seasonal wetness. Division E.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records.g
1871-1872	125	41.2	129	7,793,000	January, 29.2%
1872-1873	79	23.4	74	4,426,000	February, 19.8%
1873-1874	103	32.1	101	6,071,000	March, 14.8%
1874-1875	73	21.1	66	3,991,000	April, 12.0%
1875-1876	110	35.1	110	6,639,000	May, 6.0%
1876-1877	59	16.4	52	3,102,000	June, 1.3%
1877-1878	164	58.4	184	11,046,000	July, 0.4%
1878-1879	116	37.5	118	7,093,000	August, 0.2%
1879-1880	118	38.2	120	7,225,000	September, 0.3%
1880-1881	104	32.6	102	6,166,000	October, 0.3%
1881-1882	78	23.1	73	4,369,000	November, 7.3%
1882-1883	78	23.1	73	4,369,000	December, 8.4%
1883-1884	75	21.9	69	4,142,000	
1884-1885	55	15.3	48	2,894,000	
1885-1886	119	38.7	122	7,376,000	
1886-1887	63	18.0	57	3,404,000	
1887-1888	69	19.9	62	3,764,000	
1888-1889	75	21.9	69	4,142,000	
1889-1890	150	52.1	164	9,854,000	
1890-1891	66	19.1	60	3,613,000	
1891-1892	95	29.1	91	5,504,000	
1892-1893	120	39.2	123	7,414,000	
1893-1894	115	37.1	116	7,017,000	
1894-1895	145	50.1	157	9,476,000	
1895-1896	114	36.5	115	6,904,000	
1896-1897	105	33.0	104	6,242,000	
1897-1898	67	19.1	60	3,613,000	
1898-1899	87	26.4	83	4,993,000	
1899-1900	100	31.1	98	5,882,000	
1900-1901	100	31.1	98	5,882,000	
1901-1902	122	40.0	126	7,566,000	
1902-1903	101	31.6	99	5,977,000	
1903-1904	151	52.8	166	9,987,000	
1904-1905	116	37.5	118	7,112,000	
1905-1906	119	38.7	122	7,320,000	
1906-1907	126	41.6	131	7,868,000	
1907-1908	78	23.1	73	4,388,000	
1908-1909	145	50.1	159	9,495,000	
1909-1910	88	26.8	84	5,069,000	
1910-1911	88	26.8	93	5,611,000	b, c, 3,964,500
1911-1912	72	24.2	76	4,572,000	d, 1,223,500
1912-1913	87	33.0	104	6,245,000	e, 3,995,600
1913-1914	141	53.3	167	10,080,000	f, 8,589,500
1914-1915	132	35.9	113	6,797,000	b, f, 4,142,300
1915-1916	102	31.6	99	5,977,000	
1916-1917	78	26.8	84	5,053,000	h, 2,204,800
1917-1918	59	15.1	47	2,861,000	i, 2,197,100
1918-1919	89	32.4	102	6,125,000	j, 5,200,100
1919-1920	51	12.5	39	2,379,000	k, 1,357,700
1920-1921	128	31.9	100	7,169,000	l, 5,864,400

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	6,040,000	31.53	1,703	
Maximum seasonal	11,016,000	58.39	3,115	1877-1878
Minimum seasonal	2,379,000	12.58	671	1919-1920
Mean during July	24,160	0.13	7	
Maximum during July	44,180	0.23	12	1877-1878
Minimum during July	9,520	0.05	3	1919-1920
Mean during August	12,080	0.06	3	
Maximum during August	22,990	0.12	6	1877-1878
Minimum during August	4,760	0.03	1	1919-1920

Probable run-off curve, Plate XL.

Storage development curve, Plate CLXXII.

Mass curve of run-off, Plate CXXVII.

Probable frequency of flood discharge, Plate LXXX.

(a) Description of drainage basin: Tributary area above point just below mouth of Van Duzen Fork.

(b) Eel River at Scotia, drainage area 3,071 square miles.

(c) Partial record, December 18 to September 30.

(d) Eel River at Scotia, plus Van Duzen Fork at Bridgeville, plus Yager Creek at Carlotta, drainage area 3,414 square miles.

(e) Same as note (d), except partial record for Van Duzen Fork at Bridgeville, October 1 to July 31, drainage area 3,414 square miles.

(f) Partial record, October 1 to February 6.

(g) Measured discharge adjusted for diversion from Eel River into Russian River, and for increased drainage area.

**TABLE 123. BEAR CREEK.**  
SEASONAL RUN-OFF DATA. Drainage area 82 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division D.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet.	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	104	54.4	104	236,500	January, 35.8%
1872-1873	62	31.0	59	134,700	February, 10.9%
1873-1874	100	52.0	100	226,000	March, 9.1%
1874-1875	69	34.8	67	151,300	April, 7.5%
1875-1876	166	90.3	173	392,500	May, 6.8%
1876-1877	92	47.5	91	206,500	June, 2.1%
1877-1878	132	70.3	135	305,600	July, 0.9%
1878-1879	105	54.9	105	238,600	August, 0.4%
1879-1880	131	69.9	134	303,800	September, 0.6%
1880-1881	113	59.6	114	259,100	October, 0.8%
1881-1882	101	52.5	100	228,200	November, 14.1%
1882-1883	90	46.5	89	202,100	December, 11.0%
1883-1884	92	47.4	91	206,000	
1884-1885	69	35.0	67	152,100	
1885-1886	142	76.0	146	330,300	
1886-1887	99	51.5	99	223,900	
1887-1888	85	43.9	84	190,800	
1888-1889	74	37.8	72	164,300	
1889-1890	157	85.0	163	369,500	
1890-1891	82	42.0	80	182,600	
1891-1892	81	41.6	80	180,800	
1892-1893	104	54.1	104	235,200	
1893-1894	110	57.7	110	250,800	
1894-1895	100	52.0	100	226,000	
1895-1896	99	51.5	99	223,900	
1896-1897	101	52.5	100	228,200	
1897-1898	72	36.5	70	158,700	
1898-1899	75	38.1	73	165,600	
1899-1900	118	62.5	120	271,700	
1900-1901	97	50.2	96	218,200	
1901-1902	120	63.4	121	275,600	
1902-1903	114	60.0	115	260,800	
1903-1904	147	79.0	151	343,400	
1904-1905	92	47.4	91	206,000	
1905-1906	91	47.0	90	204,300	
1906-1907	110	57.7	110	250,800	
1907-1908	79	40.5	78	176,000	
1908-1909	117	61.7	118	268,200	
1909-1910	94	48.8	93	212,100	
1910-1911	79	40.5	78	176,000	
1911-1912	89	46.0	88	199,900	
1912-1913	84	43.0	82	186,900	
1913-1914	109	57.0	109	247,800	
1914-1915	122	64.8	124	281,700	
1915-1916	103	54.0	103	234,700	
1916-1917	75	38.1	73	165,600	
1917-1918	68	34.6	66	150,400	
1918-1919	101	52.5	100	228,200	
1919-1920	55	27.5	53	119,500	
1920-1921	129	68.8	132	299,100	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	227,000	52.22	2,785	
Maximum seasonal	392,500	90.30	4,816	1875-1876
Minimum seasonal	119,500	27.49	1,466	1919-1920
Mean during July	2,040	0.50	25	
Maximum during July	3,530	0.80	43	1875-1876
Minimum during July	1,080	0.20	13	1919-1920
Mean during August	910	0.20	11	
Maximum during August	1,570	0.40	19	1875-1876
Minimum during August	480	0.10	6	1919-1920

Probable run-off curve, Plate XL.

Storage development curve, Plate CLXXII.

(a) Description of drainage basin: Tributary area above mouth.

(b) Estimated from record for Mattole River.

Mass curve of run-off, Plate CXXVII.

Probable frequency of flood discharge, Plate LXXX.

TABLE 124. MATTOLE RIVER.

SEASONAL RUN-OFF DATA. Drainage area 264 square miles.a

Season. (Begins October 1.)	Index of seasonal wetness. Division D.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet.	Distribution of seasonal run-off by months as shown by U.S.G.S. records.
1871-1872	104	77.7	103	1,093,400	January, 35.8%
1872-1873	62	46.1	61	649,400	February, 10.9%
1873-1874	100	74.8	99	1,053,600	March, 9.1%
1874-1875	69	50.8	67	715,700	April, 7.5%
1875-1876	166	129.9	171	1,828,900	May, 6.8%
1876-1877	92	68.2	91	960,800	June, 2.1%
1877-1878	132	100.7	134	1,418,100	July, 0.9%
1878-1879	105	78.9	105	1,110,600	August, 0.4%
1879-1880	131	100.3	133	1,412,800	September, 0.6%
1880-1881	113	85.8	114	1,208,700	October, 0.8%
1881-1882	101	75.9	101	1,068,800	November, 14.1%
1882-1883	90	66.8	89	941,000	December, 11.0%
1883-1884	92	68.2	91	960,800	
1884-1885	69	50.8	67	715,700	
1885-1886	142	109.2	145	1,537,300	
1886-1887	99	73.6	98	1,036,400	
1887-1888	85	63.1	84	887,900	
1888-1889	74	54.6	72	768,700	
1889-1890	157	122.4	162	1,722,900	
1890-1891	82	60.8	81	856,100	
1891-1892	81	60.2	80	848,200	
1892-1893	104	77.7	103	1,093,400	
1893-1894	110	82.8	110	1,166,300	
1894-1895	100	74.8	99	1,053,600	
1895-1896	99	73.6	98	1,036,400	
1896-1897	101	75.8	100	1,066,900	
1897-1898	72	53.2	71	748,900	
1898-1899	75	55.5	74	781,800	
1899-1900	118	89.4	119	1,259,000	
1900-1901	97	72.5	96	1,020,500	
1901-1902	120	90.9	121	1,280,100	
1902-1903	114	85.8	114	1,208,700	
1903-1904	147	113.9	151	1,603,600	
1904-1905	92	68.2	91	960,800	
1905-1906	91	67.8	90	954,200	
1906-1907	110	82.8	110	1,166,300	
1907-1908	79	58.4	77	821,700	
1908-1909	117	88.5	117	1,245,800	
1909-1910	94	69.7	93	980,700	
1910-1911	79	59.3	79	835,000	
1911-1912	89	61.7	82	868,800	
1912-1913	84	72.6	96	1,021,700	
1913-1914	109	81.6	108	1,149,000	
1914-1915	122	92.5	123	1,302,800	
1915-1916	103	77.2	103	1,086,700	
1916-1917	75	55.5	74	781,900	
1917-1918	68	50.8	67	715,700	
1918-1919	101	75.9	101	1,068,200	
1919-1920	55	40.9	55	576,400	
1920-1921	129	98.1	130	1,381,000	

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.c  
b852,600  
1,021,700

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	1,060,600	75.33	4,017	.....
Maximum seasonal	1,828,900	129.90	6,925	1875-1876
Minimum seasonal	576,400	40.94	2,183	1919-1920
Mean during July	9,500	0.70	36	.....
Maximum during July	16,500	1.20	63	1875-1876
Minimum during July	5,200	0.40	20	1919-1920
Mean during August	4,200	0.30	16	.....
Maximum during August	7,300	0.50	28	1875-1876
Minimum during August	2,300	0.20	9	1919-1920

Probable run-off curve, Plate XL.

Mass curve of run-off, Plate CXXVIII.

Storage development curve, Plate CLXXII.

Probable frequency of flood discharge, Plate LXXX.

(a) Description of drainage basin: Tributary area above gage near Petrolia, in S. W. ¼ of Sec. 11, T. 2 S., R. 2 W., 2 miles southeast of Petrolia.

(b) Partial record, November 21 to September 30.

(c) Point of measurement: Gage near Petrolia, 264 square miles.

TABLE 125. NOYO RIVER GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 780 square miles.a

Season. (Begins October 1.)	Index of seasonal wetness. Division D.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet.	Distribution of seasonal run-off by months.b
1871-1872	104	32.8	105	1,364,000	January, 29.2%
1872-1873	62	13.0	41	540,600	February, 19.8%
1873-1874	100	30.7	98	1,276,700	March, 14.8%
1874-1875	69	16.4	52	682,000	April, 12.0%
1875-1876	166	68.8	219	2,861,100	May, 6.0%
1876-1877	92	26.7	85	1,110,300	June, 1.3%
1877-1878	132	48.0	153	1,996,100	July, 0.4%
1878-1879	105	33.2	106	1,380,600	August, 0.2%
1879-1880	131	47.5	151	1,975,300	September, 0.3%
1880-1881	113	37.6	120	1,563,600	October, 0.3%
1881-1882	101	31.2	99	1,297,500	November, 7.3%
1882-1883	90	25.8	82	1,072,900	December, 8.4%
1883-1884	92	26.7	85	1,110,300	
1884-1885	69	16.4	52	682,000	
1885-1886	142	54.0	172	2,245,600	
1886-1887	99	30.3	97	1,260,000	
1887-1888	85	23.5	75	977,300	
1888-1889	74	18.4	59	765,200	
1889-1890	157	63.0	201	2,619,900	
1890-1891	82	22.0	70	914,900	
1891-1892	81	21.6	69	898,200	
1892-1893	104	32.8	105	1,364,000	
1893-1894	110	35.8	114	1,488,800	
1894-1895	100	30.7	98	1,276,700	
1895-1896	99	30.3	97	1,260,000	
1896-1897	101	31.2	99	1,297,500	
1897-1898	72	17.5	56	727,700	
1898-1899	75	18.8	60	781,800	
1899-1900	118	40.2	128	1,671,700	
1900-1901	97	29.3	93	1,218,500	
1901-1902	120	41.3	132	1,717,500	
1902-1903	114	38.1	121	1,584,400	
1903-1904	147	57.0	182	2,370,400	
1904-1905	92	26.7	85	1,110,300	
1905-1906	91	26.2	84	1,089,500	
1906-1907	110	35.8	114	1,488,800	
1907-1908	79	20.8	66	865,000	
1908-1909	117	39.6	126	1,646,800	
1909-1910	94	27.7	88	1,151,900	
1910-1911	79	20.8	66	865,000	
1911-1912	89	25.4	81	1,056,300	
1912-1913	84	23.0	73	956,500	
1913-1914	109	35.3	112	1,468,000	
1914-1915	122	42.4	135	1,763,200	
1915-1916	103	32.3	103	1,343,200	
1916-1917	75	18.8	60	781,800	
1917-1918	68	16.0	51	665,400	
1918-1919	101	31.2	99	1,297,500	
1919-1920	55	10.3	33	428,300	
1920-1921	129	46.5	148	1,933,700	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	1,305,300	31.39	1,674	
Maximum seasonal	2,861,100	68.80	3,669	1875-1876
Minimum seasonal	428,300	10.30	549	1919-1920
Mean during July	5,220	0.13	7	
Maximum during July	11,440	0.28	15	1875-1876
Minimum during July	1,730	0.01	2	1919-1920
Mean during August	2,610	0.06	3	
Maximum during August	5,720	0.14	7	1875-1876
Minimum during August	860	0.02	1	1919-1920

Probable run-off curve, Plate XLI.

Storage development curve, Plate CLXXXII.

Mass curve of run-off, Plate CXXVIII.

Probable frequency of flood discharge, Plate LXXXI

(a) Description of drainage basin: Areas tributary to following streams above tidewater: USAL CREEK, WADE CREEK, TEN MILE CREEK, NOYO RIVER, BIG RIVER, ALBION CREEK

(b) Estimated from record for Eel River.



TABLE 126. NAVARRO RIVER.

SEASONAL RUN-OFF DATA. Drainage area 273 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division D.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet.	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	104	28.2	105	410,600	January, 29.2%
1872-1873	62	10.8	40	157,200	February, 19.8%
1873-1874	100	26.2	97	381,500	March, 14.8%
1874-1875	69	13.5	50	196,600	April, 12.0%
1875-1876	166	59.5	221	866,300	May, 6.0%
1876-1877	92	22.8	55	332,000	June, 1.3%
1877-1878	132	41.8	153	608,600	July, 0.4%
1878-1879	105	28.6	106	416,400	August, 0.2%
1879-1880	151	41.3	154	601,300	September, 0.3%
1880-1881	113	32.4	121	471,700	October, 0.3%
1881-1882	101	26.7	99	388,800	November, 7.3%
1882-1883	90	22.0	82	320,300	December, 8.4%
1883-1884	92	22.8	85	332,000	
1884-1885	69	13.5	50	196,600	
1885-1886	142	46.8	174	681,400	
1886-1887	99	25.9	96	377,100	
1887-1888	85	19.9	74	289,700	
1888-1889	74	15.4	57	224,200	
1889-1890	157	54.7	203	796,400	
1890-1891	82	18.5	69	269,400	
1891-1892	81	18.1	67	263,500	
1892-1893	104	28.2	105	410,600	
1893-1894	110	30.9	115	449,900	
1894-1895	100	26.2	97	381,500	
1895-1896	99	25.9	96	377,100	
1896-1897	101	26.7	99	388,800	
1897-1898	72	14.5	54	211,100	
1898-1899	75	15.8	59	230,000	
1899-1900	118	34.8	129	506,700	
1900-1901	97	25.0	93	364,000	
1901-1902	120	35.8	133	521,200	
1902-1903	114	32.8	122	477,600	
1903-1904	147	49.4	184	719,300	
1904-1905	92	22.8	85	332,000	
1905-1906	91	22.4	83	326,100	
1906-1907	110	30.9	115	449,900	
1907-1908	79	17.5	65	254,800	
1908-1909	117	34.3	128	499,400	
1909-1910	94	23.9	89	348,000	
1910-1911	79	17.5	65	254,800	
1911-1912	89	21.6	80	314,500	
1912-1913	84	19.5	73	283,900	
1913-1914	109	30.5	113	441,100	
1914-1915	122	36.8	137	535,800	
1915-1916	103	27.7	103	403,300	
1916-1917	75	15.8	59	230,000	
1917-1918	68	13.1	49	190,700	
1918-1919	101	26.7	99	388,800	
1919-1920	55	8.2	31	119,400	
1920-1921	129	40.3	150	586,800	

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	391,600	26.90	1,435	
Maximum seasonal	866,300	59.50	3,173	1875-1876
Minimum seasonal	119,400	8.20	437	1919-1920
Mean during July	1,570	0.11	6	
Maximum during July	3,470	0.24	13	1875-1876
Minimum during July	480	0.03	2	1919-1920
Mean during August	780	0.05	3	
Maximum during August	1,730	0.12	6	1875-1876
Minimum during August	240	0.02	1	1919-1920

Probable run-off curve, Plate XLI.

Storage development curve, Plate CLXXIII.

(a) Description of drainage basin: Tributary area above mouth.

(b) Estimated from record for Eel River.

Mass curve of run-off, Plate CXXVIII.

Probable frequency of flood discharge, Plate LXXXI.

TABLE 127. GUALALA RIVER GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 623 square miles.a

Season. (Begins October 1.)	Index of seasonal wetness. Division D.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months.b
1871-1872	104	26.7	104	887,200	January, 27.5%
1872-1873	62	10.6	42	352,200	February, 22.0%
1873-1874	100	25.1	98	834,000	March, 18.5%
1874-1875	69	13.1	51	435,300	April, 10.1%
1875-1876	166	55.4	217	1,840,800	May, 9.8%
1876-1877	92	21.9	86	727,700	June, 3.0%
1877-1878	132	39.2	153	1,302,500	July, 0.4%
1878-1879	105	27.2	106	903,800	August, 0.1%
1879-1880	131	38.7	151	1,285,900	September, 0.6%
1880-1881	113	30.7	120	1,020,100	October, 0.1%
1881-1882	101	25.5	100	847,300	November, 4.0%
1882-1883	90	21.1	83	701,100	December, 3.9%
1883-1884	92	21.9	86	727,700	
1884-1885	69	13.1	51	435,300	
1885-1886	142	43.8	171	1,455,300	
1886-1887	99	24.8	97	824,000	
1887-1888	85	19.1	75	634,600	
1888-1889	74	14.9	58	495,100	
1889-1890	157	50.9	199	1,691,200	
1890-1891	82	18.0	70	598,100	
1891-1892	81	17.7	69	588,100	
1892-1893	104	26.7	104	887,200	
1893-1894	110	29.4	115	976,900	
1894-1895	100	25.1	98	834,000	
1895-1896	99	24.8	97	824,000	
1896-1897	101	25.5	100	847,300	
1897-1898	72	14.2	56	471,800	
1898-1899	75	15.3	60	508,400	
1899-1900	118	32.8	128	1,089,800	
1900-1901	97	23.9	94	794,100	
1901-1902	120	33.6	131	1,116,400	
1902-1903	114	31.1	122	1,033,300	
1903-1904	147	46.1	180	1,531,700	
1904-1905	92	21.9	86	727,700	
1905-1906	91	21.5	84	714,400	
1906-1907	110	29.4	115	976,900	
1907-1908	79	16.9	66	561,500	
1908-1909	117	32.3	126	1,073,200	
1909-1910	94	22.8	89	757,600	
1910-1911	79	16.9	66	561,500	
1911-1912	89	20.8	81	691,100	
1912-1913	84	18.8	74	624,700	
1913-1914	109	29.0	113	963,600	
1914-1915	122	34.6	135	1,149,600	
1915-1916	103	26.3	103	873,900	
1916-1917	75	15.3	60	508,400	
1917-1918	68	12.8	50	425,300	
1918-1919	101	25.5	100	847,300	
1919-1920	55	8.2	32	272,500	
1920-1921	129	37.8	148	1,256,000	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	849,700	25.57	1,364	
Maximum seasonal	1,840,800	55.40	2,955	1875-1876
Minimum seasonal	272,500	8.20	437	1919-1920
Mean during July	3,400	0.10	5	
Maximum during July	7,360	0.22	12	1875-1876
Minimum during July	1,060	0.03	2	1919-1920
Mean during August	850	0.03	1	
Maximum during August	1,840	0.06	3	1875-1876
Minimum during August	270	0.01	Trace	1919-1920

Probable run-off curve, Plate XLI.

Mass curve of run-off, Plate CXXVIII.

Storage development curve, Plate CLXXXIII.

Probable frequency of flood discharge, Plate LXXXI.

(a) Description of drainage basin: Area tributary to following streams above tidewater: DONAHOE CREEK, ELK CREEK, ALDER CREEK, BRUSH CREEK, GARCIA RIVER, GUALALA RIVER.

(b) Estimated from record for Russian River.

TABLE 128. RUSSIAN RIVER.

SEASONAL RUN-OFF DATA. Drainage area 1,508 square miles.*a*

Season. (Begins October 1.)	Index of seasonal wetness. Division E.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet.	Distribution of seasonal run-off by months as shown by U.S.G.S. records. <i>d</i>
1871-1872	125	26.6	151	2,137,900	January, 27.5%
1872-1873	79	9.8	56	787,600	February, 22.0%
1873-1874	103	18.3	104	1,470,800	March, 18.5%
1874-1875	73	7.8	44	626,900	April, 10.1%
1875-1876	110	21.0	119	1,687,800	May, 9.8%
1876-1877	59	3.0	17	241,100	June, 3.0%
1877-1878	164	41.9	238	3,367,600	July, 0.4%
1878-1879	116	23.3	132	1,872,700	August, 0.1%
1879-1880	118	24.1	137	1,937,000	September, 0.6%
1880-1881	104	18.8	107	1,511,000	October, 0.1%
1881-1882	78	9.6	54	771,600	November, 4.0%
1882-1883	78	9.6	54	771,600	December, 3.9%
1883-1884	75	8.3	47	667,100	
1884-1885	55	2.0	11	160,700	
1885-1886	119	24.4	138	1,961,100	
1886-1887	63	4.6	26	369,700	
1887-1888	69	6.2	35	498,300	
1888-1889	75	8.3	47	667,100	
1889-1890	150	36.4	207	2,925,600	
1890-1891	66	5.4	31	434,000	
1891-1892	95	15.5	88	1,245,800	
1892-1893	120	24.9	141	2,001,300	
1893-1894	115	23.0	131	1,848,600	
1894-1895	145	34.5	196	2,772,900	
1895-1896	114	22.5	128	1,808,400	
1896-1897	105	19.1	108	1,535,100	
1897-1898	67	5.5	31	442,000	
1898-1899	87	12.8	73	1,028,800	
1899-1900	100	17.1	97	1,374,400	
1900-1901	100	17.1	97	1,374,400	
1901-1902	122	25.5	145	2,049,500	
1902-1903	101	17.8	101	1,430,600	
1903-1904	151	37.0	210	2,973,800	
1904-1905	116	23.3	132	1,872,700	
1905-1906	119	24.4	138	1,961,100	
1906-1907	126	27.1	154	2,178,100	
1907-1908	78	9.6	54	771,600	
1908-1909	145	34.5	196	2,772,900	
1909-1910	88	13.0	74	1,044,800	
1910-1911	88	13.0	74	1,044,800	
1911-1912	72	8.5	48	658,300	5501,200
1912-1913	87	11.2	64	893,800	365,900
1913-1914	141	33.0	187	2,652,300	533,300
1914-1915	132	29.4	167	2,363,000	
1915-1916	102	18.0	102	1,446,700	
1916-1917	78	9.6	54	771,600	
1917-1918	59	3.0	17	241,100	
1918-1919	89	13.1	74	1,052,900	
1919-1920	51	0.8	5	64,300	
1920-1921	128	28.0	159	2,250,400	

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.*c*

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	1,416,600	17.60	940	
Maximum seasonal	3,367,600	41.90	2,235	1877-1878
Minimum seasonal	64,300	0.80	43	1919-1920
Mean during July	5,670	0.07	4	
Maximum during July	13,500	0.17	9	1877-1878
Minimum during July	260	Trace	Trace	1919-1920
Mean during August	1,420	0.02	1	
Maximum during August	3,400	0.04	2	1877-1878
Minimum during August	60	Trace	Trace	1919-1920

Probable run-off curve, Plate XLI.

Storage development curve, Plate CLXXXIII.

(a) Description of drainage basin: Area tributary to stream above the mouth.

(b) Partial record, February 1 to September 30.

(c) Point of measurement: Gage at highway bridge, 1/2 mile northeast of Geyserville, drainage area 662 square miles

(d) Measured run-off adjusted for diversions from South Fork of the Eel River.

Mass curve of run-off, Plate CXXIX.

Probable frequency of flood discharge, Plate LXXXI.

TABLE 129. LAGUNITAS CREEK.  
SEASONAL RUN-OFF DATA. Drainage area 84 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division D.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	104	20.9	105	93,600	January, 27.5%
1872-1873	62	7.4	37	33,200	February, 22.0%
1873-1874	100	19.5	98	87,400	March, 18.5%
1874-1875	69	9.3	47	41,700	April, 10.1%
1875-1876	166	45.7	230	204,700	May, 9.8%
1876-1877	92	16.4	82	73,500	June, 3.0%
1877-1878	132	31.7	159	142,000	July, 0.4%
1878-1879	105	21.2	107	95,000	August, 0.1%
1879-1880	131	31.4	158	140,700	September, 0.6%
1880-1881	113	24.5	123	109,800	October, 0.1%
1881-1882	101	19.9	100	89,200	November, 4.0%
1882-1883	90	15.9	80	71,200	December, 3.9%
1883-1884	92	16.4	82	73,500	
1884-1885	69	9.3	47	41,700	
1885-1886	142	35.9	180	160,800	
1886-1887	99	19.1	96	85,600	
1887-1888	85	14.1	71	63,200	
1888-1889	74	10.8	54	48,400	
1889-1890	157	42.0	211	188,200	
1890-1891	82	13.0	65	58,200	
1891-1892	81	12.8	64	57,300	
1892-1893	104	20.9	105	93,600	
1893-1894	110	23.2	116	103,900	
1894-1895	100	19.5	98	87,400	
1895-1896	99	19.1	96	85,600	
1896-1897	101	19.9	100	89,200	
1897-1898	72	10.1	51	45,200	
1898-1899	75	11.0	55	49,300	
1899-1900	118	26.4	133	118,300	
1900-1901	97	18.3	92	82,000	
1901-1902	120	27.0	136	121,000	
1902-1903	114	24.7	124	110,700	
1903-1904	147	37.9	190	169,800	
1904-1905	92	16.4	82	73,500	
1905-1906	91	16.2	81	72,600	
1906-1907	110	23.2	116	103,900	
1907-1908	79	12.4	62	55,600	
1908-1909	117	25.8	130	115,600	
1909-1910	94	17.2	86	77,100	
1910-1911	79	12.4	62	55,600	
1911-1912	89	15.6	78	69,900	
1912-1913	84	13.9	70	62,300	
1913-1914	109	22.9	115	102,600	
1914-1915	122	27.8	140	124,500	
1915-1916	103	20.6	103	92,300	
1916-1917	75	11.0	55	49,300	
1917-1918	68	9.1	46	40,800	
1918-1919	101	19.9	100	89,200	
1919-1920	55	5.6	28	25,100	
1920-1921	129	30.7	154	137,500	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	89,200	19.92	1,062	
Maximum seasonal	204,700	45.69	2,437	1875-1876
Minimum seasonal	25,100	5.60	299	1919-1920
Mean during July	360	0.08	4	
Maximum during July	820	0.18	10	1875-1876
Minimum during July	100	0.02	1	1919-1920
Mean during August	90	0.02	1	
Maximum during August	200	0.04	2	1875-1876
Minimum during August	30	0.01	Trace	1919-1920

Probable run-off curve, Plate XLII.

Storage development curve, Plate CLXXIV.

Mass curve of run-off, Plate CXXIX.

Probable frequency of flood discharge, Plate LXXXII.

<sup>(a)</sup> Description of drainage basin: Tributary area above a point  $\frac{1}{4}$  mile east of Point Reyes.<sup>(b)</sup> Estimated from records of streams in the vicinity.

TABLE 130. SALMON CREEK GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 230 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness, Division D.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet.	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	104	9.8	106	120,200	January, 27.5%
1872-1873	62	2.9	31	35,600	February, 22.0%
1873-1874	100	9.0	97	110,400	March, 18.5%
1874-1875	69	3.8	41	46,600	April, 10.1%
1875-1876	166	23.2	250	284,600	May, 9.8%
1876-1877	92	7.5	81	92,000	June, 3.0%
1877-1878	132	15.3	165	187,700	July, 0.4%
1878-1879	105	10.0	108	122,700	August, 0.1%
1879-1880	131	15.2	164	186,400	September, 0.6%
1880-1881	113	11.5	124	141,100	October, 0.1%
1881-1882	101	9.2	99	112,900	November, 4.0%
1882-1883	90	7.2	78	88,300	December, 3.9%
1883-1884	92	7.5	81	92,000	
1884-1885	69	3.8	41	46,600	
1885-1886	142	17.5	189	214,700	
1886-1887	99	8.8	95	107,900	
1887-1888	85	6.4	69	78,500	
1888-1889	74	4.5	48	55,200	
1889-1890	157	21.0	226	257,600	
1890-1891	82	5.8	62	71,100	
1891-1892	81	5.6	60	68,700	
1892-1893	104	9.7	105	119,000	
1893-1894	110	10.9	117	133,700	
1894-1895	100	9.0	97	110,400	
1895-1896	99	8.8	95	107,900	
1896-1897	101	9.2	99	112,900	
1897-1898	72	4.2	45	51,500	
1898-1899	75	4.7	51	57,600	
1899-1900	118	12.5	135	153,300	
1900-1901	97	8.5	92	104,300	
1901-1902	120	12.9	139	158,200	
1902-1903	114	11.6	125	142,300	
1903-1904	147	18.7	201	229,400	
1904-1905	92	7.5	81	92,000	
1905-1906	91	7.4	80	90,800	
1906-1907	110	10.9	117	133,700	
1907-1908	79	5.5	59	67,500	
1908-1909	117	12.2	131	149,600	
1909-1910	94	7.9	85	96,900	
1910-1911	79	5.4	58	66,200	
1911-1912	89	7.0	75	85,900	
1912-1913	84	6.1	66	74,800	
1913-1914	109	10.6	114	130,000	
1914-1915	122	13.3	143	163,100	
1915-1916	103	9.6	103	117,700	
1916-1917	75	4.7	51	57,600	
1917-1918	68	3.8	41	46,600	
1918-1919	101	9.2	99	112,800	
1919-1920	55	2.0	22	24,500	
1920-1921	129	14.8	159	181,500	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	113,900	9.28	495	
Maximum seasonal	284,600	23.20	1,237	1875-1876
Minimum seasonal	24,500	2.00	107	1919-1920
Mean during July	460	0.04	2	
Maximum during July	1,140	0.09	5	1875-1876
Minimum during July	100	0.01	Trace	1919-1920
Mean during August	110	Trace	Trace	
Maximum during August	280	0.01	1	1875-1876
Minimum during August	20	0.02	Trace	1919-1920

Probable run-off curve, Plate XLII.

Storage development curve, Plate CLXXIV.

Mass curve of run-off, Plate CXXIX.

Probable frequency of flood discharge, Plate LXXXII.

(a) Description of drainage basin: Tributary area above points indicated: SALMON CREEK and SAN ANTONIO CREEK, at tidewater, 156 square miles; WALKER CREEK, one mile above mouth, 74 square miles.

(b) Estimated from records of streams in vicinity

TABLE 131. BOLINAS CREEK GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 158 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division D.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872.	104	4.5	103	37,900	January, 27.5%
1872-1873.	62	1.2	28	10,100	February, 22.0%
1873-1874.	100	4.0	92	33,700	March, 18.5%
1874-1875.	69	1.6	37	13,500	April, 10.1%
1875-1876.	166	12.7	292	107,000	May, 9.8%
1876-1877.	92	3.3	76	27,800	June, 3.0%
1877-1878.	132	7.7	177	64,900	July, 0.4%
1878-1879.	105	4.6	106	38,800	August, 0.1%
1879-1880.	131	7.6	175	64,000	September, 0.6%
1880-1881.	113	5.4	124	45,500	October, 0.1%
1881-1882.	101	4.1	94	34,500	November, 4.0%
1882-1883.	90	3.1	71	26,100	December, 3.9%
1883-1884.	92	3.3	76	27,800	
1884-1885.	69	1.6	37	13,500	
1885-1886.	142	9.1	209	76,700	
1886-1887.	99	3.9	90	32,900	
1887-1888.	85	2.7	62	22,800	
1888-1889.	74	1.9	44	16,000	
1889-1890.	157	11.4	262	96,100	
1890-1891.	82	2.5	57	21,100	
1891-1892.	81	2.4	55	20,200	
1892-1893.	104	4.5	103	37,900	
1893-1894.	110	5.0	115	42,100	
1894-1895.	100	4.0	92	33,700	
1895-1896.	99	3.9	90	32,900	
1896-1897.	101	4.1	94	34,500	
1897-1898.	72	1.7	39	14,300	
1898-1899.	75	2.0	46	16,800	
1899-1900.	118	6.0	138	50,600	
1900-1901.	97	3.7	85	31,200	
1901-1902.	120	6.2	143	52,200	
1902-1903.	114	5.5	127	46,300	
1903-1904.	147	9.9	228	83,400	
1904-1905.	92	3.3	76	27,800	
1905-1906.	91	3.2	74	27,000	
1906-1907.	110	5.0	115	42,100	
1907-1908.	79	2.2	51	18,500	
1908-1909.	117	5.8	133	48,900	
1909-1910.	54	3.5	80	29,500	
1910-1911.	79	2.2	51	18,500	
1911-1912.	89	3.0	69	25,300	
1912-1913.	84	2.6	60	21,900	
1913-1914.	109	4.9	113	41,300	
1914-1915.	122	6.4	147	53,900	
1915-1916.	103	4.4	101	37,100	
1916-1917.	75	2.0	46	16,800	
1917-1918.	68	1.5	34	12,600	
1918-1919.	101	4.1	94	34,500	
1919-1920.	55	0.9	21	7,600	
1920-1921.	129	7.3	168	61,500	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	36,600	4.35	232	
Maximum seasonal	107,000	12.70	677	1875-1876
Minimum seasonal	7,600	0.90	48	1919-1920
Mean during July	150	0.02	1	
Maximum during July	430	0.05	3	1875-1876
Minimum during July	30	Trace	Trace	1919-1920
Mean during August	40	Trace	Trace	
Maximum during August	110	0.01	1	1875-1876
Minimum during August	10	Trace	Trace	1919-1920

Probable run-off curve, Plate XLII.

Storage development curve, Plate CLXXIV.

Mass curve of run-off, Plate CXXIX.

Probable frequency of flood discharge, Plate LXXXII.

(a) Description of drainage basin: Tributary areas above tidewater of BOLINAS CREEK, INVERNESS CREEK and OLEMA CREEK.

(b) Estimated from record for other streams in vicinity.

TABLE 132. SAN DIEGO RIVER.

SEASONAL RUN-OFF DATA. Drainage area 207 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division Y.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>c</sup>
1871-1872	72	0.7	22	7,700	January, 38.6%
1872-1873	65	0.5	16	5,500	February, 18.1%
1873-1874	170	11.1	346	123,000	March, 16.7%
1874-1875	58	0.3	9	3,500	April, 10.2%
1875-1876	103	2.2	69	24,300	May, 7.5%
1876-1877	46	0.1	3	1,100	June, 2.4%
1877-1878	129	4.9	153	54,200	July, 0.9%
1878-1879	56	0.3	9	3,300	August, 0.5%
1879-1880	112	3.0	94	33,200	September, 0.4%
1880-1881	81	1.0	31	11,000	October, 0.7%
1881-1882	82	1.1	34	12,200	November, 1.1%
1882-1883	83	1.2	37	13,500	December, 2.9%
1883-1884	225	21.0	655	232,000	
1884-1885	78	0.9	28	9,500	
1885-1886	150	7.8	243	86,200	
1886-1887	70	0.7	22	7,700	
1887-1888	110	2.8	87	30,900	
1888-1889	129	4.9	153	54,200	
1889-1890	153	8.3	258	91,700	
1890-1891	130	5.0	156	55,200	
1891-1892	111	2.9	90	32,000	
1892-1893	98	2.0	62	22,100	
1893-1894	67	0.6	19	6,600	
1894-1895	130	5.0	156	55,200	
1895-1896	60	0.4	12	4,400	
1896-1897	117	3.5	109	38,700	
1897-1898	64	0.5	16	5,500	
1898-1899	54	0.2	6	2,200	
1899-1900	72	0.7	22	7,700	
1900-1901	96	1.9	59	21,000	
1901-1902	79	1.0	31	11,000	
1902-1903	110	2.8	87	30,900	
1903-1904	51	0.2	6	2,200	
1904-1905	143	6.8	211	75,100	
1905-1906	147	7.3	228	80,600	
1906-1907	115	4.5	140	49,200	
1907-1908	84	1.3	41	13,800	648,200
1908-1909	111	4.0	125	44,100	44,100
1909-1910	98	2.1	66	23,000	23,000
1910-1911	98	1.4	44	15,500	15,500
1911-1912	92	1.4	44	15,800	15,800
1912-1913	66	0.5	16	5,000	5,000
1913-1914	103	1.3	41	14,600	14,600
1914-1915	148	5.0	156	55,400	55,400
1915-1916	151	18.1	563	200,600	200,600
1916-1917	97	1.9	59	21,000	
1917-1918	86	1.3	41	14,400	
1918-1919	77	0.9	28	9,900	
1919-1920	105	2.5	78	27,600	
1920-1921	69	0.6	19	6,600	

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.<sup>d</sup>

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	35,400	3.21	171	
Maximum seasonal	232,000	21.02	1,121	1883-1884
Minimum seasonal	1,100	0.10	5	1876-1877
Mean during July	320	0.03	2	
Maximum during July	2,100	0.20	10	1883-1884
Minimum during July	10	Trace	Trace	1876-1877
Mean during August	180	0.02	1	
Maximum during August	14.50	0.13	7	1908-1909
Minimum during August	6	Trace	Trace	1876-1877

Probable run-off curve, Plate XLII.

Storage development curve, Plate CLXXIV.

Mass curve of run-off, Plate CXXX.

Probable frequency of flood discharge, Plate LXXXII.

(a) Description of drainage basin: Tributary area above gage at Lakeside, one mile above mouth of San Vicente Creek.

(b) Partial record, January 1 to September 30.

(c) Monthly percentage of mean seasonal discharge is taken from records for Santa Ysabel Creek, as it is not practicable to correct for storage in Cuyamaca reservoir because of stream bed losses between reservoir and diverting dam.

(d) Point of measurement: Gage at Lakeside, one mile above mouth of San Vicente Creek, plus the Cuyamaca flume at Los Coches measuring flume, drainage area 207 square miles.

No adjustment has been made for storage for reason stated above, nor for irrigation from wells above Lakeside.

TABLE 133. SANTA YSABEL CREEK.  
SEASONAL RUN-OFF DATA. Drainage area 126 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division Y.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records.
1871-1872	72	1.2	24	7,900	January, 38.6%
1872-1873	65	0.8	16	5,300	February, 18.1%
1873-1874	170	16.0	325	107,200	March, 16.7%
1874-1875	58	0.6	12	4,000	April, 10.2%
1875-1876	102	3.5	71	23,400	May, 7.5%
1876-1877	46	0.2	4	1,300	June, 2.4%
1877-1878	129	7.6	154	50,800	July, 0.9%
1878-1879	56	0.5	10	3,300	August, 0.5%
1879-1880	112	5.0	102	33,600	September, 0.4%
1880-1881	81	1.6	33	10,900	October, 0.7%
1881-1882	82	1.7	35	11,600	November, 1.1%
1882-1883	83	1.8	37	12,200	December, 2.9%
1883-1884	225	29.9	607	200,300	
1884-1885	78	1.5	31	10,200	
1885-1886	150	11.5	234	77,200	
1886-1887	70	1.0	20	6,600	
1887-1888	110	4.7	95	31,300	
1888-1889	129	7.6	154	50,800	
1889-1890	153	12.3	250	82,500	
1890-1891	130	7.8	159	52,500	
1891-1892	111	4.8	98	32,300	
1892-1893	98	3.2	65	21,400	
1893-1894	67	0.9	18	5,900	
1894-1895	130	7.8	159	52,500	
1895-1896	60	0.6	12	4,000	
1896-1897	117	5.7	116	38,300	
1897-1898	64	0.7	14	4,600	
1898-1899	54	0.4	8	2,600	
1899-1900	72	1.2	24	7,900	
1900-1901	96	3.0	61	20,100	
1901-1902	79	1.5	31	10,200	
1902-1903	110	4.7	95	31,300	
1903-1904	51	0.3	6	3,000	
1904-1905	143	10.2	207	68,300	
1905-1906	147	9.4	191	63,300	b, d61,700
1906-1907	115	5.3	108	35,700	d35,700
1907-1908	84	1.7	35	11,200	d11,200
1908-1909	111	7.0	142	47,100	d47,100
1909-1910	98	5.1	104	33,900	d33,900
1910-1911	58	3.2	65	21,400	c, d2,900
1911-1912	92	2.4	49	16,300	d16,300
1912-1913	66	1.0	20	6,600	e5,800
1913-1914	103	3.4	69	22,800	e19,800
1914-1915	148	8.9	181	59,500	e49,800
1915-1916	151	25.6	520	172,000	e149,400
1916-1917	97	4.2	85	28,000	e24,300
1917-1918	86	2.1	43	14,300	e12,400
1918-1919	77	1.0	20	6,800	e5,900
1919-1920	105	3.3	67	22,300	e19,300
1920-1921	69	0.7	14	4,600	e4,000

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	33,000	4.92	262	
Maximum seasonal	200,300	29.86	1,590	1883-1884
Minimum seasonal	1,300	0.19	10	1876-1877
Mean during July	300	0.04	2	
Maximum during July	1,800	0.30	14	1883-1884
Minimum during July	10	Trace	Trace	1918-1919
Mean during August	170	0.03	1	
Maximum during August	1,000	0.15	8	1883-1884
Minimum during August	0	0.00	0	1920-1921

Probable run-off curve, Plate XLIII.

Mass curve of run-off, Plate CXXX.

Storage development curve, Plate CLXXV.

Probable frequency of flood discharge, Plate LXXXIII.

(a) Description of drainage basin: Tributary area above gage at Escondido in S. W.  $\frac{1}{4}$ , Sec. 31, T. 12 S., R. 1 E.

(b) Partial record, January 1 to September 30.

(c) Partial record, October 1 to December 31 and April 11 to September 30.

(d) Point of measurement: At Escondido, drainage area 126 square miles.

(e) Point of measurement: At Ramona, drainage area 109 square miles.



TABLE 134. SAN LUIS REY RIVER.

SEASONAL RUN-OFF DATA. Drainage area 325 square miles.*a*

Season. (Begins October 1.)	Index of seasonal wetness. Division Y.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records. <i>g</i>
1871-1872	72	1 0	29	17,300	January, 33.9%
1872-1873	65	0 8	23	13,900	February, 16.6%
1873-1874	170	11 2	327	194,100	March, 24.3%
1874-1875	58	0 6	18	10,400	April, 9.7%
1875-1876	102	2 5	73	43,300	May, 6.9%
1876-1877	46	0 2	6	3,500	June, 2.4%
1877-1878	129	5 3	155	91,900	July, 1.0%
1878-1879	56	0 5	15	8,700	August, 0.8%
1879-1880	112	3 4	99	58,900	September, 0.2%
1880-1881	81	1 4	41	24,300	October, 0.7%
1881-1882	82	1 4	41	24,300	November, 0.9%
1882-1883	83	1 5	44	26,000	December, 2.6%
1883-1884	225	22 0	642	381,300	
1884-1885	78	1 3	38	22,500	
1885-1886	150	8 2	239	142,100	
1886-1887	70	1 0	29	15,600	
1887-1888	110	3 2	93	55,500	
1888-1889	129	5 3	155	91,900	
1889-1890	153	8 5	218	147,300	
1890-1891	130	5 4	158	93,600	
1891-1892	111	3 2	93	55,500	
1892-1893	98	2 3	67	39,900	
1893-1894	67	0 8	23	13,900	
1894-1895	130	5 4	158	93,600	
1895-1896	60	0 6	18	10,400	
1896-1897	117	4 0	117	69,300	
1897-1898	64	0 7	20	12,000	
1898-1899	54	0 5	15	9,000	
1899-1900	72	1 0	29	17,300	
1900-1901	96	2 1	61	36,400	
1901-1902	79	1 3	38	22,500	
1902-1903	110	3 2	93	55,500	
1903-1904	51	0 4	12	8,600	
1904-1905	143	2 7	79	46,400	
1905-1906	147	6 4	187	110,600	
1906-1907	115	5 0	146	86,200	
1907-1908	84	1 7	50	29,300	
1908-1909	111	3 1	91	53,700	
1909-1910	98	2 9	85	50,200	
1910-1911	98	2 3	67	39,900	
1911-1912	92	1 2	35	20,700	
1912-1913	66	0 6	18	10,800	
1913-1914	103	2 2	64	38,000	
1914-1915	148	6 0	175	104,200	
1915-1916	151	14 8	520	308,800	
1916-1917	97	2 9	85	51,000	
1917-1918	86	2 4	70	42,800	
1918-1919	77	0 8	23	14,000	
1919-1920	105	2 4	70	41,300	
1920-1921	69	0 6	18	10,600	

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.

*b, di, 700*  
*b12,000*  
*b107,700*  
*b83,000*  
*b21,900*  
*b48,600*  
*b, e46,100*  
*b, f31,000*  
*c12,000*  
*55,900*  
*b29,900*  
*b94,400*  
*c182,100*  
*c29,500*  
*c24,400*  
*c7,300*  
*c23,400*  
*c5,100*

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	59,400	3 42	183	
Maximum seasonal	381,300	22 00	1,173	1883-1884
Minimum seasonal	3,500	0 20	11	1876-1877
Mean during July	600	0 03	2	
Maximum during July	3,800	0 22	12	1883-1884
Minimum during July	35	Trace	Trace	1876-1877
Mean during August	500	0 03	2	
Maximum during August	3,100	0 18	10	1883-1884
Minimum during August	32	Trace	Trace	1876-1877

Probable run-off curve, Plate XLIII.  
 Storage development curve, Plate CLXXV.  
 (a) Description of drainage basin: Tributary area above gage, in N. W. 1/4 of Sec. 31, T. 9 S., R. 1 W., 4 miles southeast of Pala.  
 (b) Point of measurement: Gage near Pala, drainage area 325 square miles.  
 (c) Point of measurement: Gage near Mesa Grande, one mile below mouth of Carrizo Creek, drainage area 211 square miles.  
 (d) Partial record, October 8 to September 30.  
 (e) Partial record, October 1 to June 30.  
 (f) Partial record, January 1 to June 30.  
 (g) Measured run-off adjusted for diversions above point of measurement by Escondido Mutual Water Co. as follows: 1903-1904, 3,435 acre feet; 1905-1906, 1,922 acre-feet; 1906-1907, 2,217 acre-feet; 1907-1908, 3,408 acre-feet; 1908-1909, 4,173 acre-feet; 1909-1910, 2,999 acre-feet; 1910-1911, 3,968 acre-feet; 1912-1913, 2,960 acre-feet; 1913-1914, 5,932 acre-feet; 1914-1915, 7,277 acre-feet; also for irrigation on the following areas: 1903-1904 through 1909-1910, 1,100 acres; 1910-1911, 1,390 acres; 1912-1913, 1,917 acres; 1913-1914, 2,260 acres; 1914-1915, 2,550 acres.

TABLE 135. SANTA MARGARITA RIVER.  
SEASONAL RUN-OFF DATA. Drainage area 690 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division Y.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	72	0.2	23	7,400	January, 33.9%
1872-1873	65	0.2	23	7,400	February, 16.6%
1873-1874	170	2.9	334	106,700	March, 24.3%
1874-1875	58	0.1	12	3,700	April, 9.7%
1875-1876	102	0.7	81	25,700	May, 6.9%
1876-1877	46	T	2	700	June, 2.4%
1877-1878	129	1.4	161	51,500	July, 1.0%
1878-1879	56	T	2	700	August, 0.8%
1879-1880	112	1.0	115	36,800	September, 0.2%
1880-1881	81	0.4	46	14,700	October, 0.7%
1881-1882	82	0.4	46	14,700	November, 0.9%
1882-1883	83	0.4	46	14,700	December, 2.6%
1883-1884	225	4.6	531	169,200	
1884-1885	78	0.3	34	11,000	
1885-1886	150	2.1	242	77,200	
1886-1887	70	0.2	23	7,400	
1887-1888	110	0.9	104	33,100	
1888-1889	129	1.4	161	51,500	
1889-1890	153	2.2	254	80,900	
1890-1891	130	1.4	162	51,500	
1891-1892	111	1.0	115	36,800	
1892-1893	98	0.7	81	25,700	
1893-1894	67	0.2	23	7,400	
1894-1895	130	1.4	162	51,500	
1895-1896	60	0.1	12	3,700	
1896-1897	117	1.1	127	40,500	
1897-1898	64	0.2	23	7,400	
1898-1899	54	T	2	700	
1899-1900	72	0.2	23	7,400	
1900-1901	96	0.7	80	25,700	
1901-1902	79	0.3	34	11,000	
1902-1903	110	0.9	104	33,100	
1903-1904	51	T	2	700	
1904-1905	143	1.8	208	66,200	
1905-1906	147	1.9	219	69,900	
1906-1907	115	1.0	115	36,800	
1907-1908	84	0.4	46	14,700	
1908-1909	111	1.0	115	36,800	
1909-1910	98	0.7	81	25,700	
1910-1911	98	0.7	81	25,700	
1911-1912	92	0.6	69	22,100	
1912-1913	66	0.2	23	7,400	
1913-1914	103	0.8	92	29,400	
1914-1915	148	2.0	231	73,600	
1915-1916	151	2.1	242	77,200	
1916-1917	97	0.7	81	25,700	
1917-1918	86	0.5	58	18,400	
1918-1919	77	0.3	34	11,000	
1919-1920	105	0.8	92	29,400	
1920-1921	69	0.2	23	7,400	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	31,900	0.87	46	
Maximum seasonal	169,200	4.60	245	1883-1884
Minimum seasonal	700	0.02	1	1876-1877
Mean during July	320	0.01	Trace	
Maximum during July	1,690	0.05	2	1883-1884
Minimum during July	10	0.00	0	1876-1877
Mean during August	260	0.01	Trace	
Maximum during August	1,350	0.04	2	1883-1884
Minimum during August	10	0.00	0	1876-1877

Probable run-off curve, Plate XLIII.

Storage development curve, Plate CLXXV.

(a) Description of drainage basin: Tributary area above a point one mile below mouth of Deluz Creek.

(b) From record for San Luis Rey River.

Mass curve of run-off, Plate CXXXI.

Probable development of flood discharge, Plate LXXXIII.

TABLE 136. SAN JACINTO RIVER TRIBUTARIES.  
SEASONAL RUN-OFF DATA. Drainage area 330 square miles.

Season. (Begins October 1.)	Index of seasonal wetness, Division X.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by Lake Hemet Water Company record <i>d</i>
1871-1872	56	0.8	29	14,100	January, 9.6%
1872-1873	94	2.2	80	38,700	February, 17.5%
1873-1874	148	4.9	178	86,200	March, 22.0%
1874-1875	84	1.8	65	31,700	April, 16.2%
1875-1876	123	3.6	130	63,400	May, 14.5%
1876-1877	59	1.0	36	17,600	June, 6.0%
1877-1878	137	4.2	152	73,900	July, 2.5%
1878-1879	52	0.7	25	12,300	August, 2.1%
1879-1880	117	3.2	116	56,300	September, 1.6%
1880-1881	73	1.3	47	22,900	October, 1.9%
1881-1882	63	1.1	40	19,400	November, 2.2%
1882-1883	54	0.8	29	14,100	December, 3.9%
1883-1884	229	8.2	297	144,300	
1884-1885	68	1.2	43	21,100	
1885-1886	120	3.4	123	59,800	
1886-1887	74	1.4	51	24,600	
1887-1888	127	3.7	134	65,100	
1888-1889	128	3.8	138	66,900	
1889-1890	164	5.8	210	102,100	
1890-1891	117	3.2	116	56,300	
1891-1892	78	1.6	58	28,200	
1892-1893	117	3.2	116	56,300	
1893-1894	58	0.9	33	15,800	
1894-1895	138	4.3	156	73,700	
1895-1896	58	0.9	33	15,800	a2,400
1896-1897	116	3.2	116	56,300	a5,100
1897-1898	56	0.8	29	14,100	a2,400
1898-1899	47	0.6	22	10,600	a1,800
1899-1900	58	0.9	33	15,800	a2,100
1900-1901	102	2.5	90	44,000	a4,700
1901-1902	69	1.2	43	21,100	a2,900
1902-1903	116	3.2	116	56,300	a5,000
1903-1904	61	1.0	36	17,600	a2,200
1904-1905	140	4.5	163	79,200	a6,400
1905-1906	135	4.2	152	73,900	a18,000
1906-1907	138	4.3	156	75,700	a10,900
1907-1908	88	1.9	69	33,400	a4,100
1908-1909	117	2.9	105	51,000	b25,300
1909-1910	97	2.1	76	37,000	b20,300
1910-1911	105	2.5	90	44,000	b23,100
1911-1912	81	1.9	69	33,400	b20,900
1912-1913	61	1.3	47	22,900	b14,800
1913-1914	141	1.1	149	72,200	b36,600
1914-1915	136	5.2	188	91,500	b54,600
1915-1916	146	12.4	449	218,200	b161,600
1916-1917	91	2.2	80	38,700	c13,000
1917-1918	86	1.3	47	22,900	c6,200
1918-1919	73	1.4	51	24,600	c7,700
1919-1920	111	3.0	109	52,800	c15,700
1920-1921	93	2.2	80	38,700	

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet	Depth in inches	Acre-feet per square mile.	Season.
Mean seasonal	48,600	2.76	147.0	
Maximum seasonal	218,200	12.41	661.0	1915-1916
Minimum seasonal	10,600	0.60	32.0	1898-1899
Mean during July	1,200	.07	4.0	
Maximum during July	5,500	.31	17.0	1915-1916
Minimum during July	300	.02	0.9	1898-1899
Mean during August	1,000	.06	3.0	
Maximum during August	4,600	.26	14.0	1915-1916
Minimum during August	200	.01	0.6	1898-1899

Probable run-off curve, Plate XLIII.

Storage development curve, Plate CLXXXV.

Partial run-off curves, Plate XLIII-A.

Mass curve of run-off, Plate CXXXI.

Probable frequency of flood discharge, Plate LXXXIII.

Description of drainage basin: Tributary areas above designated points and points of intersection of streams with latitude lines as follows: SAN JACINTO RIVER, 141 square miles,  $\frac{3}{4}$  mile below mouth of North Fork. INDIAN CREEK, 23.6 square miles, latitude 33° 45.4'. POPPET CREEK, 15.6 square miles, latitude 33° 46.9'. POTRERO CREEK, 30.9 square miles, latitude 33° 50.8'. BAUTISTE CREEK, 58.1 square miles, latitude 33° 42.2'. CACTUS VALLEY CREEK, 29.7 square miles, latitude 33° 40.2'. UNNAMED area south and west of Beaumont, 31.1 square miles.

(a) Record for inflow into Lake Hemet, 67.3 square miles.

(b) Record for Lake Hemet, Strawberry Creek, North Fork, 122.1 square miles.

(c) Record for Lake Hemet and Strawberry Creek, 95.1 square miles.

(d) Year 1915-1916 not used in computing mean monthly percentage of seasonal run-off.

(e) An index of 200 was used to compute run-off.

Gages of Lake Hemet Water Company: Lake Hemet weir near Lake Hemet Dam; Strawberry Creek, near mouth; North Fork, S. W.  $\frac{1}{4}$  Sec. 17, T. 5 S., R. 2 E., S. B. M.

TABLE 137. SANTA ANA RIVER TRIBUTARIES.  
SEASONAL RUN-OFF DATA. Drainage area 460 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division X.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.) <sup>b</sup>	Distribution of seasonal run-off by months as shown by U.S.G.S. records. <sup>c</sup>
1871-1872	56	3.8	37	93,100	January, 17.2%
1872-1873	94	8.9	86	218,100	February, 18.5%
1873-1874	148	18.4	178	450,900	March, 29.8%
1874-1875	84	7.5	72	183,800	April, 13.4%
1875-1876	123	13.8	133	338,200	May, 7.3%
1876-1877	59	4.2	41	102,900	June, 3.4%
1877-1878	137	16.2	157	397,000	July, 1.7%
1878-1879	52	3.3	32	80,900	August, 1.1%
1879-1880	117	12.6	122	308,800	September, 0.8%
1880-1881	73	5.8	56	142,100	October, 1.1%
1881-1882	63	4.6	44	112,700	November, 1.3%
1882-1883	54	3.6	35	88,200	December, 4.4%
1883-1884	229	29.4	284	720,500	
1884-1885	68	5.3	51	129,900	
1885-1886	120	13.1	127	321,000	
1886-1887	74	6.0	58	147,000	
1887-1888	127	14.5	140	355,300	
1888-1889	128	14.6	141	357,800	
1889-1890	164	21.6	209	529,300	
1890-1891	117	12.6	122	308,800	
1891-1892	78	6.6	64	161,700	
1892-1893	117	12.6	122	308,800	
1893-1894	58	4.0	39	98,000	
1894-1895	133	16.6	161	406,800	
1895-1896	58	4.0	39	98,000	
1896-1897	116	10.8	104	264,700	
1897-1898	56	4.3	42	105,400	
1898-1899	47	2.7	26	66,200	
1899-1900	58	3.6	35	88,200	
1900-1901	102	9.1	88	223,000	
1901-1902	69	4.1	43	107,800	
1902-1903	116	11.5	111	281,800	
1903-1904	61	4.5	44	110,300	
1904-1905	140	8.1	78	198,500	
1905-1906	135	14.7	142	360,200	
1906-1907	138	20.0	193	490,100	
1907-1908	88	9.8	95	240,200	
1908-1909	117	11.2	108	274,500	
1909-1910	97	10.1	98	247,500	
1910-1911	105	13.6	132	333,300	
1911-1912	81	7.8	75	191,200	
1912-1913	61	4.9	47	120,100	
1913-1914	141	15.6	151	382,300	
1914-1915	136	15.5	150	379,900	
1915-1916	146	23.9	231	585,700	
1916-1917	91	9.7	94	237,700	
1917-1918	86	11.2	108	274,500	
1918-1919	73	5.8	56	142,100	
1919-1920	111	11.7	113	286,700	
1920-1921	63	8.9	86	218,100	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.*
Mean seasonal	253,400	10.34	551	
Maximum seasonal	720,500	29.40	1,568	1883-1884
Minimum seasonal	66,200	2.70	144	1898-1899
Mean during July	4,300	0.18	9	
Maximum during July	12,200	0.50	27	1883-1884
Minimum during July	1,100	0.04	2	1898-1899
Mean during August	2,800	0.11	6	
Maximum during August	7,900	0.32	17	1883-1884
Minimum during August	700	0.03	2	1898-1899

Probable run-off curve, Plate XLIV.

Storage development curve, Plate CLXXVI.

Partial run-off curves, Plate XLIV-A.

Mass curve of run-off, Plate CXXVII.

Probable frequency of flood discharge, Plate LXXXIV.

(a) Description of drainage basin: Area tributary to SANTA ANA RIVER at point 31 $\frac{1}{2}$  miles above Montone, 199 square miles, and area tributary to following streams, at base of foothills, above elevation 2,000 feet: MILL CREEK, 43 square miles; SAND, CITY and PLUNGE CREEKS, 44 square miles; WATERMAN CANYON, 5 square miles; DEVIL CANYON CREEK, 6 square miles; CAJON CANYON, including LONE PINE CANYON, 60 square miles; LYTLE CREEK, 47 square miles; SAN ANTONIO CREEK, 27 square miles; CUCAMONGA CANYON, 20 square miles; STRAWBERRY CREEK, 9 square miles.

(b) Points of measurement: Santa Ana River and canals near Montone, prior to October 1, 1914, 189 square miles; since October 1, 1914, 199 square miles; Mill Creek at Forest Home, 14 miles east of Redlands, 20.7 square miles; Waterman Canyon near San Bernardino, 5.6 square miles; Devil Creek near San Bernardino, 16.8 square miles; Lytle Creek near San Bernardino, 16.8 square miles; San Antonio Creek near Upland, 26.5 square miles, and near Claremont, 1915 to 1921, 25.5 square miles.

(c) Estimated from records for San Gabriel and Mojave Rivers. (d) Santa Ana Rivers and canals. (e) Partial record on Santa Ana River and canals. (f) Santa Ana River. (g) Santa Ana River and canals and San Antonio Creek. (h) San Antonio Creek and partial record on Santa Ana River and canals. (i) Partial record on San Antonio Creek. (j) Partial record on Mill and Lytle Creeks. (k) Partial record on Mill Creek. (l) Mill Creek and partial record on Lytle Creek. (m) Partial record on Waterman and Devil Canyons. (n) Waterman Canyon. (o) Mill and Lytle Creeks. (p) Lytle Creek and Waterman Canyon. (q) Waterman and Devil Canyons. (r) Lytle Creek and partial record on Santa Ana River and canals, San Antonio Creek and Mill Creek. (s) Measured run-off for Santa Ana River adjusted for storage regulation in Bear Valley reservoir, 40,000 acre-feet capacity.

**TABLE 138. SAN GABRIEL RIVER TRIBUTARIES.**  
SEASONAL RUN-OFF DATA. Drainage area 280 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division W.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records.
1871-1872	69	3.5	35	52,400	January, 15.6%
1872-1873	72	3.7	37	53,400	February, 17.1%
1873-1874	134	16.3	162	242,900	March, 27.6%
1874-1875	79	4.7	47	70,500	April, 13.6%
1875-1876	117	12.0	119	179,600	May, 8.4%
1876-1877	44	1.1	11	16,000	June, 4.7%
1877-1878	140	18.0	178	267,900	July, 2.8%
1878-1879	75	4.2	42	62,500	August, 1.8%
1879-1880	134	16.3	162	242,900	September, 1.4%
1880-1881	86	5.8	58	87,200	October, 1.8%
1881-1882	68	3.4	34	50,900	November, 2.0%
1882-1883	80	4.8	48	72,000	December, 3.2%
1883-1884	f251	37.1	368	553,400	
1884-1885	61	2.5	25	36,600	
1885-1886	147	19.8	197	295,500	
1886-1887	92	6.8	68	102,100	
1887-1888	91	6.7	67	99,400	
1888-1889	127	14.4	143	214,100	
1889-1890	f229	37.1	368	553,400	
1890-1891	88	6.3	63	93,700	
1891-1892	77	4.4	44	66,400	
1892-1893	154	21.9	217	327,300	
1893-1894	52	1.7	17	25,000	
1894-1895	116	11.9	118	177,000	b, 95,800
1895-1896	53	2.0	20	30,000	b, 45,200
1896-1897	102	7.0	70	105,100	b27,100
1897-1898	49	1.7	17	24,900	b90,900
1898-1899	40	0.6	6	9,700	b23,000
1899-1900	58	0.9	9	13,700	b9,600
1900-1901	111	7.4	74	110,700	b12,100
1901-1902	63	1.8	18	27,500	b96,200
1902-1903	110	8.2	82	122,100	b23,800
1903-1904	56	2.2	22	32,100	b106,100
1904-1905	123	12.3	122	183,400	b28,700
1905-1906	125	17.8	177	265,100	b160,400
1906-1907	139	26.7	264	398,800	b231,900
1907-1908	78	6.1	61	90,800	b350,200
1908-1909	128	13.8	137	206,100	b77,500
1909-1910	87	10.9	108	161,800	b189,400
1910-1911	113	21.0	207	313,800	b139,100
1911-1912	75	6.1	61	90,300	b272,900
1912-1913	74	3.9	39	58,600	b77,100
1913-1914	156	22.4	221	334,600	b50,300
1914-1915	110	10.2	101	151,900	b295,600
1915-1916	129	21.3	211	318,800	b131,900
1916-1917	94	7.6	76	113,200	b278,800
1917-1918	83	10.0	100	149,300	c96,800
1918-1919	61	2.9	29	43,600	d144,100
1919-1920	99	8.5	85	126,200	e42,800
1920-1921	101	5.5	55	82,600	e124,300
					e80,500

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	150,200	10.07	536	
Maximum seasonal	553,400	37.11	1,976	1883-1884
Minimum seasonal	9,700	0.65	35	1898-1899
Mean during July	4,200	0.28	15	
Maximum during July	13,500	1.00	55	1883-1884
Minimum during July	230	0.02	1	1898-1899
Mean during August	2,700	0.18	10	
Maximum during August	10,000	0.67	36	1883-1884
Minimum during August	250	0.01	1	1899-1900

Probable run-off curve, Plate XLIV.

Mass curve of run-off, Plate CXXXIII.

Storage development curve, Plate CLXXVI.

Probable frequency of flood discharge, Plate LXXXIV.

(a) Description of drainage basin: Tributary area above base of foothills on the following streams: SAN GABRIEL RIVER, 222 square miles; EATON CREEK, 6.1 square miles; LITTLE SANTA ANITA CREEK, 2 square miles; SANTA ANITA CREEK, 10.4 square miles; SAWPIT CREEK, 5.3 square miles; FISH CREEK, 6.4 square miles; SAN DIMAS CREEK, 17.4 square miles; BIG DALTON and LITTLE DALTON CREEKS, 10 square miles.

(b) Record for San Gabriel River and canals near Azusa, 222 square miles.

(c) Record for San Gabriel River and canals near Azusa, Santa Anita Creek and Little Santa Anita Creek near Sierra Madre, 234 square miles.

(d) Record for San Gabriel River and canals near Azusa, Santa Anita Creek and Little Santa Anita Creek near Sierra Madre, Sawpit Creek and Monrovia pipe line near Monrovia, Fish Creek near Duarte, San Dimas Creek near San Dimas, 264 square miles.

(e) Same as (c), plus record for Eaton Creek near Pasadena, 270 square miles.

(f) Index of 200 used in computing run-off.

(g) Partial record, May 1 to September 30.

(h) Partial record, October 1 to November 15 and August 8 to September 30.

TABLE 139. LOS ANGELES RIVER TRIBUTARIES.  
SEASONAL RUN-OFF DATA. Drainage area 167 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division W.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records. <sup>c</sup>
1871-1872	69	2.3	29	20,490	January, 12.3%
1872-1873	72	2.5	31	22,200	February, 27.4%
1873-1874	134	14.8	185	131,000	March, 31.3%
1874-1875	79	3.5	44	31,100	April, 8.9%
1875-1876	117	10.4	130	92,500	May, 7.4%
1876-1877	44	0.3	4	2,700	June, 2.9%
1877-1878	140	16.4	205	145,000	July, 0.8%
1878-1879	75	3.0	38	26,600	August, 0.4%
1879-1880	134	14.8	185	131,000	September, 0.5%
1880-1881	86	4.5	56	39,900	October, 1.2%
1881-1882	68	2.2	28	19,500	November, 1.7%
1882-1883	80	3.6	45	32,000	December, 5.2%
1883-1884	125 1/2	34.5	432	307,000	
1884-1885	61	1.4	18	12,400	
1885-1886	147	18.3	229	162,000	
1886-1887	92	5.5	69	48,900	
1887-1888	91	5.3	66	47,100	
1888-1889	127	12.8	160	114,000	
1889-1890	122 1/2	34.5	432	307,000	
1890-1891	88	5.0	63	44,500	
1891-1892	77	3.2	40	28,500	
1892-1893	154	20.5	256	182,000	
1893-1894	52	0.7	9	6,200	
1894-1895	116	10.2	128	90,800	
1895-1896	53	0.8	10	7,100	
1896-1897	102	7.3	91	64,900	
1897-1898	49	0.5	6	4,400	
1898-1899	40	0.0	0	0	
1899-1900	58	1.2	15	10,700	
1900-1901	111	9.0	113	80,100	
1901-1902	63	1.5	19	13,300	
1902-1903	110	9.0	113	80,100	
1903-1904	56	1.0	13	8,900	
1904-1905	123	12.0	150	107,000	
1905-1906	125	12.4	155	110,000	
1906-1907	139	16.2	202	144,000	
1907-1908	78	3.4	43	30,300	
1908-1909	128	13.3	166	118,000	
1909-1910	87	4.7	59	41,800	
1910-1911	113	9.6	120	85,400	
1911-1912	75	3.0	38	26,700	
1912-1913	74	2.8	35	24,900	
1913-1914	156	22.8	285	202,000	
1914-1915	110	9.1	114	80,900	
1915-1916	129	13.5	169	120,000	
1916-1917	94	3.9	49	34,700	
1917-1918	83	4.1	51	36,300	
1918-1919	61	1.1	14	9,600	
1919-1920	99	4.0	50	35,800	
1920-1921	101	3.0	38	26,900	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	71,000	7.87	426	
Maximum seasonal	307,000	34.50	1,841	1883-1884, 1889-1890
Minimum seasonal	0	0.00	0	1898-1899
Mean during July	600	0.07	4	
Maximum during July	2,500	0.28	15	1883-1884, 1889-1890
Minimum during July	0	0.00	0	1898-1899
Mean during August	300	0.03	2	
Maximum during August	1,200	0.13	7	1883-1884, 1889-1890
Minimum during August	0	0.00	0	1898-1899

Probable run-off curve, Plate XLIV.

Storage development curve, Plate CLXXVI.

Mass curve of run-off, Plate CXXXIII.

Probable frequency of flood discharge, Plate LXXXIV.

(a) Description of drainage basin: Tributary area above designated points on the following streams: PACOIMA CREEK, 600 feet above mouth of canyon (near San Fernando), drainage area 28 square miles; TUJUNGA CREEK, 2 miles above mouth of canyon (near Sunland), drainage area 107 square miles; ARROYO SECO, 1.5 miles above mouth of Millard Canyon (near Pasadena), drainage area 16 square miles; LITTLE TUJUNGA CANYON, at base of foothills, drainage area 16 square miles.

(b) Index of 200 used to estimate run-off.

(c) Estimated from seven years' record on Arroyo Seco and five years' record on Tujunga Creek.

(d) Partial record on Arroyo Seco, December 1 to 13 and April 1 to September 30.

(e) Partial record on Arroyo Seco, October 1 to December 31, and May 25 to September 24.

(f) Partial record on Arroyo Seco, October 1 to January 18 and April 1 to September 30.

(g) Complete record on Arroyo Seco.

(h) Partial record on Arroyo Seco, October 1 to November 30, and April 1 to September 30.

(i) Complete record on Arroyo Seco; partial record on Pacoima Creek, December 2 to July 31; and partial record on Tujunga Creek, October 28 to September 30.

(j) Complete record on Arroyo Seco, Pacoima and Tujunga Creeks.

TABLE 140. MALIBU RIVER GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 379 square miles.*a*

Season. (Begins October 1.)	Index of seasonal wetness. Division U.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <i>g</i>
1871-1872.....	79	1.0	37	20,200	January, 15.6%
1872-1873.....	56	0.2	7	4,000	February, 17.1%
1873-1874.....	84	1.3	48	26,300	March, 27.6%
1874-1875.....	96	2.0	74	40,400	April, 13.6%
1875-1876.....	125	4.0	148	80,900	May, 8.4%
1876-1877.....	27	0.0	0	0	June, 4.7%
1877-1878.....	116	3.3	122	66,700	July, 2.8%
1878-1879.....	63	0.4	15	8,100	August, 1.8%
1879-1880.....	128	4.3	159	86,900	September, 1.4%
1880-1881.....	73	0.8	30	16,200	October, 1.8%
1881-1882.....	76	0.9	33	18,200	November, 2.0%
1882-1883.....	69	0.6	22	12,100	December, 3.2%
1883-1884.....	214	11.4	422	230,500	
1884-1885.....	58	0.2	7	4,000	
1885-1886.....	141	5.4	200	109,200	
1886-1887.....	83	1.2	44	24,300	
1887-1888.....	118	3.5	130	70,800	
1888-1889.....	118	3.5	130	70,800	
1889-1890.....	166	7.8	289	157,700	
1890-1891.....	99	2.2	81	44,500	
1891-1892.....	70	0.6	22	12,100	
1892-1893.....	139	5.3	196	107,200	
1893-1894.....	41	0.0	0	0	
1894-1895.....	99	2.2	81	44,500	
1895-1896.....	65	0.4	15	8,100	
1896-1897.....	107	2.6	96	52,600	
1897-1898.....	38	0.0	0	0	
1898-1899.....	51	0.1	4	2,000	
1899-1900.....	58	0.2	7	4,000	
1900-1901.....	86	1.4	52	28,300	
1901-1902.....	83	1.2	44	24,300	
1902-1903.....	114	2.5	96	53,000	
1903-1904.....	61	0.4	15	8,800	
1904-1905.....	148	6.9	256	138,600	
1905-1906.....	124	3.5	129	70,500	
1906-1907.....	160	7.2	266	145,600	
1907-1908.....	97	2.0	74	40,400	
1908-1909.....	158	7.1	263	143,600	
1909-1910.....	102	2.3	85	46,500	
1910-1911.....	154	6.6	244	133,500	
1911-1912.....	79	1.0	37	20,200	
1912-1913.....	78	1.0	37	20,200	
1913-1914.....	163	7.6	280	153,700	
1914-1915.....	128	4.3	159	86,900	
1915-1916.....	136	5.0	185	101,100	
1916-1917.....	111	2.9	107	58,600	
1917-1918.....	117	3.3	122	66,700	
1918-1919.....	75	0.8	30	16,200	
1919-1920.....	80	1.1	41	22,200	
1920-1921.....	89	1.6	59	32,400	

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.*f*

b12,500  
c1,800  
d34,600  
e1,500  
f1,800

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal.....	54,700	2.79	144	
Maximum seasonal.....	230,500	11.40	608	1883-1884
Minimum seasonal.....	0	0.00	0	1876-1877, 1893-1894, 1897-1898
Mean during July.....	1,500	0.07	4	
Maximum during July.....	6,500	0.30	17	1883-1884
Minimum during July.....	0	0.00	0	1876-1877, 1893-1894, 1897-1898
Mean during August.....	1,000	0.05	3	
Maximum during August.....	4,100	0.20	11	1883-1884
Minimum during August.....	0	0.00	0	1876-1877, 1893-1894, 1897-1898

Probable run-off curve, Plate XLIV.

Mass curve of run-off, Plate CXXXIV.

Storage development curve, Plate CLXXVI.

Probable frequency of flood discharge, Plate LXXXIV.

(a) Description of drainage basin: Tributary area of following streams, above points indicated: DUME CREEK, 2 miles from mouth; RAMERA CREEK, 1 1/2 miles from mouth; SOLSTICE CREEK, 1 mile from mouth; CALLEGUAS CREEK, above 1,000 foot contour; SYCAMORE CREEK, 1 mile from mouth; ARROYO SEQUIT, 1 mile from mouth; TRANCOS CANYON, 1 mile from mouth; MALIBU RIVER, at tidewater; TOPANGA CREEK, at tidewater; RUSTIC CREEK, at tidewater.

(b) Partial record, January 1 to July 31.

(c) Partial record, November 1 to June 30.

(d) Partial record, October 15 to September 30.

(e) Partial record, October 1 to December 1.

(f) Point of measurement: Malibu Creek near Calabasas, drainage area 94 square miles.

(g) Estimated from record for San Gabriel River and canals near Azusa.

(h) Index of 200 was used in computing run-off.

TABLE 141. SANTA CLARA RIVER TRIBUTARIES.  
SEASONAL RUN-OFF DATA. Drainage area 911 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division U.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records. <sup>d</sup>
1871-1872	79	2.4	52	116,600	January, 15 6%
1872-1873	56	0.7	15	34,000	February, 17 1%
1873-1874	84	2.8	61	136,000	March, 27 6%
1874-1875	96	3.8	83	184,600	April, 13 6%
1875-1876	125	6.7	146	325,500	May, 8 4%
1876-1877	27	0.0	0	0	June, 4 7%
1877-1878	116	5.7	125	276,900	July, 2 8%
1878-1879	63	1.2	26	58,300	August, 1 8%
1879-1880	128	7.0	153	340,000	September, 1 4%
1880-1881	73	1.9	42	92,300	October, 1 8%
1881-1882	76	2.1	46	102,000	November, 2 0%
1882-1883	69	1.5	33	72,900	December, 3 2%
1883-1884	e214	15.5	339	752,900	
1884-1885	58	0.8	17	38,900	
1885-1886	141	8.4	184	408,000	
1886-1887	83	2.7	59	131,200	
1887-1888	118	6.0	131	291,500	
1888-1889	118	6.0	131	291,500	
1889-1890	166	11.2	245	544,100	
1890-1891	99	4.0	88	194,300	
1891-1892	70	1.7	37	82,600	
1892-1893	139	8.2	179	398,300	
1893-1894	41	0.0	0	0	
1894-1895	99	4.0	88	194,300	
1895-1896	65	1.3	28	63,100	
1896-1897	107	4.8	105	233,200	
1897-1898	38	0.0	0	0	
1898-1899	51	0.3	7	14,600	
1899-1900	58	0.8	17	38,900	
1900-1901	86	3.0	66	145,700	
1901-1902	83	2.7	59	131,200	
1902-1903	114	5.5	120	267,200	
1903-1904	61	1.0	22	48,600	
1904-1905	148	9.3	203	451,800	Measured seasonal discharge
1905-1906	124	6.5	142	315,700	in acre-feet at U.S.G.S. gaging station. <sup>b</sup>
1906-1907	160	10.5	230	510,000	
1907-1908	97	3.8	83	184,600	
1908-1909	158	10.3	225	500,300	
1909-1910	102	4.3	94	208,900	
1910-1911	154	9.8	214	476,000	
1911-1912	79	2.4	52	116,600	e79,400
1912-1913	78	3.7	81	177,400	f144,800
1913-1914	163	10.9	238	529,500	
1914-1915	128	7.0	153	340,000	
1915-1916	136	7.8	171	378,900	g125,700
1916-1917	111	5.3	116	257,500	q51,000
1917-1918	117	5.8	127	281,700	h128,400
1918-1919	75	2.0	44	97,200	
1919-1920	80	2.4	53	116,600	i30,200
1920-1921	89	3.2	70	155,400	q24,200

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	222,100	4.57	244	
Maximum seasonal	752,900	15.50	826	1883-1884
Minimum seasonal	0	0.00	0	1897-1898
Mean during July	6,200	0.13	7	
Maximum during July	21,100	0.43	23	1883-1884
Minimum during July	0	0.00	0	1897-1898
Mean during August	4,000	0.08	4	
Maximum during August	13,600	0.28	15	1883-1884
Minimum during August	0	0.00	0	1897-1898

Probable run-off curve, Plate XLV.

Storage development curve, Plate CLXXVII.

Mass curve of run-off, Plate CXXIV.

Probable frequency of flood discharge, Plate LXXXV.

(a) Description of drainage area: Tributary area above designated points: SANTA PAULA CREEK, 1.5 miles above junction with Santa Clara River, drainage area 36 square miles; SESPE CREEK at Sespe, drainage area 256 square miles; PIRU CREEK, 2 miles above junction with Santa Clara River, drainage area 421 square miles; CASTAIC CREEK, at elevation 1,600 feet; SAN FRANCISQUITO CREEK, at elevation 1,500 feet; BOUQUET CREEK, at elevation 1,750 feet, total drainage area 198 square miles.

(b) Points of measurement: Piru Creek near Pine, drainage area 421 square miles; Sespe Creek near Sespe, drainage area 205 square miles; Sespe Creek at Sespe, drainage area 256 square miles; Santa Paula Creek near Santa Paula, drainage area 36 square miles.

(d) Estimated from record for San Gabriel River.

(e) Complete record on Sespe Creek at Sespe; partial record on Piru Creek, January 1 to September 30; partial record on Santa Paula Creek, March 24 to September 30.

(f) Complete record on Sespe Creek at Sespe, Pine Creek and Santa Paula Creek.

(g) Complete record on Sespe Creek near Sespe.

(h) Partial record on Sespe Creek near Sespe, October 1 to 14, January 25 to August 3, and September 1 to 30.

(i) Partial record on Sespe Creek near Sespe, November 1 to September 30.



TABLE 142. VENTURA RIVER.

SEASONAL RUN-OFF DATA. Drainage area 226 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division U.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>e</sup>
1871-1872	79	2.5	46	30,200	January, 15.6%
1872-1873	56	1.1	20	13,300	February, 17.1%
1873-1874	84	2.9	53	35,000	March, 27.6%
1874-1875	96	4.1	75	49,500	April, 13.6%
1875-1876	125	7.7	140	92,900	May, 8.4%
1876-1877	27	0.0	0	0	June, 4.7%
1877-1878	116	6.4	117	77,200	July, 2.8%
1878-1879	63	1.4	26	16,900	August, 1.8%
1879-1880	128	8.2	149	98,900	September, 1.4%
1880-1881	73	2.1	38	25,300	October, 1.8%
1881-1882	76	2.3	42	27,700	November, 2.0%
1882-1883	69	1.8	33	21,700	December, 3.2%
1883-1884	c214	22.3	406	269,000	
1884-1885	58	1.2	22	14,500	
1885-1886	141	10.2	186	123,100	
1886-1887	83	2.8	51	33,800	
1887-1888	118	6.7	122	80,800	
1888-1889	118	6.7	122	80,800	
1889-1890	166	14.8	270	178,500	
1890-1891	99	4.4	80	53,100	
1891-1892	70	1.8	33	21,700	
1892-1893	139	9.9	180	119,400	
1893-1894	41	0.6	11	7,200	
1894-1895	99	4.4	80	53,100	
1895-1896	65	1.6	29	19,300	
1896-1897	107	5.2	95	62,700	
1897-1898	38	0.5	9	6,000	
1898-1899	51	0.8	15	9,700	
1899-1900	58	1.2	22	14,500	
1900-1901	86	3.1	57	37,400	
1901-1902	83	2.8	51	33,800	
1902-1903	114	6.2	113	74,800	
1903-1904	61	1.3	24	15,700	
1904-1905	148	11.4	208	137,500	
1905-1906	124	7.5	137	90,500	
1906-1907	160	13.7	250	165,300	
1907-1908	97	4.2	77	50,700	
1908-1909	158	13.3	242	160,500	
1909-1910	102	4.7	86	56,700	
1910-1911	154	12.4	226	149,600	
1911-1912	79	2.4	44	29,000	
1912-1913	78	3.2	58	38,600	
1913-1914	163	14.3	261	172,500	
1914-1915	128	8.2	149	98,900	
1915-1916	136	9.3	170	112,200	
1916-1917	111	5.8	106	70,000	
1917-1918	117	6.6	120	79,600	
1918-1919	75	2.2	40	26,500	
1919-1920	80	2.6	47	31,400	
1920-1921	89	3.4	62	41,000	

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.<sup>d</sup>

20,600  
28,000  
62,700

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	66,200	5.48	293	
Maximum seasonal	269,000	22.30	1,189	1883-1884
Minimum seasonal	0	0.00	0	1876-1877
Mean during July	1,900	0.16	8	
Maximum during July	7,500	0.62	33	1883-1884
Minimum during July	0	0.00	0	1876-1877
Mean during August	1,200	0.10	5	
Maximum during August	4,800	0.40	21	1883-1884
Minimum during August	0	0.00	0	1876-1877

Probable run-off curve, Plate XLV.

Mass curve of run-off, Plate CXXXV.

Storage development curve, Plate CLXXXVII.

Probable frequency of flood discharge, Plate LXXXV.

(a) Description of drainage basin: Tributary area above mouth, at Ventura.

(b) Partial record, October 1 to January 17.

(c) Index of 200 used in computing run-off.

(d) Point of measurement: Gage at highway bridge  $\frac{1}{4}$  mile below mouth of Coyote Creek, drainage area 189 square miles.

(e) Estimated from record for San Gabriel River.

TABLE 143. JALAMA CREEK GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 242 square miles.<sup>a</sup>

Season (Begins October 1.)	Index of seasonal wetness. Division U.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>c</sup>
1871-1872	79	1.4	38	18,100	January, 15.0%
1872-1873	56	0.0	0	0	February, 32.4%
1873-1874	84	1.7	46	21,900	March, 36.4%
1874-1875	96	2.7	73	34,800	April, 7.7%
1875-1876	125	5.6	150	72,300	May, 3.4%
1876-1877	27	0.0	0	0	June, 1.3%
1877-1878	116	4.6	124	59,400	July, 0.3%
1878-1879	63	0.5	13	6,500	August, 0.2%
1879-1880	128	6.0	161	77,400	September, 0.1%
1880-1881	73	1.1	30	14,200	October, 0.3%
1881-1882	76	1.2	32	15,500	November, 0.6%
1882-1883	69	0.8	22	10,300	December, 2.3%
1883-1884	214	15.7	422	202,600	
1884-1885	58	0.3	8	3,900	
1885-1886	141	7.5	202	96,800	
1886-1887	83	1.7	46	21,900	
1887-1888	118	4.8	129	61,900	
1888-1889	118	4.8	129	61,900	
1889-1890	166	10.7	288	138,100	
1890-1891	99	2.9	78	37,400	
1891-1892	70	0.9	24	11,600	
1892-1893	139	7.3	196	94,200	
1893-1894	41	0.0	0	0	
1894-1895	99	2.9	78	37,400	
1895-1896	65	0.6	16	7,700	
1896-1897	107	3.7	99	47,700	
1897-1898	38	0.0	0	0	
1898-1899	51	0.0	0	0	
1899-1900	58	0.3	8	3,900	
1900-1901	86	1.8	48	23,200	
1901-1902	83	1.7	46	21,900	
1902-1903	114	4.4	118	56,800	
1903-1904	61	0.4	11	5,200	
1904-1905	148	8.4	226	108,400	
1905-1906	124	5.5	148	71,000	
1906-1907	160	9.9	266	127,800	
1907-1908	97	-2.7	73	34,800	
1908-1909	158	9.8	263	126,500	
1909-1910	102	3.2	86	41,300	
1910-1911	154	9.1	245	117,400	
1911-1912	79	1.4	38	18,100	
1912-1913	78	1.3	35	16,800	
1913-1914	163	10.3	277	133,000	
1914-1915	128	6.0	161	77,400	
1915-1916	136	6.9	185	89,000	
1916-1917	111	4.1	110	52,900	
1917-1918	117	1.7	126	60,700	
1918-1919	75	1.2	32	15,500	
1919-1920	80	1.4	38	18,100	
1920-1921	89	2.1	56	27,100	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	48,000	3.72	198	
Maximum seasonal	202,600	15.70	837	1883-1884
Minimum seasonal	0	0.00	0	1872-1873, 1876-1877 1893-1894, 1897-1898 1898-1899
Mean during July	140	0.01	1	
Maximum during July	610	0.05	3	1883-1884
Minimum during July	0	0.00	0	1872-1873, 1876-1877 1893-1894, 1897-1898 1898-1899
Mean during August	100	0.01	T	
Maximum during August	410	0.03	2	1883-1884
Minimum during August	0	0.00	0	1872-1873, 1876-1877 1893-1894, 1897-1898 1898-1899

Probable run-off curve, Plate XLV.

Storage development curve, Plate CLXXVII.

Mass curve of run-off, Plate CXXXV.

Probable frequency of flood discharge, Plate LXXXV.

(a) Description of drainage basin: Areas tributary to following streams above base of foothills: RINCON CREEK, JALAMA CREEK, HONDA CREEK and SAN ANTONIO CREEK

(b) Index of 200 used.

(c) Estimated from records for Santa Ynez River.

TABLE 144. SANTA YNEZ RIVER.  
SEASONAL RUN-OFF DATA. Drainage area 797 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness, Division U.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet <sup>f</sup>	Distribution of seasonal run-off by months as shown by U.S.G.S. records.
1871-1872	79	1.3	27	55,300	January, 20.7%
1872-1873	56	0.4	8	17,000	February, 34.0%
1873-1874	84	1.9	39	80,800	March, 27.1%
1874-1875	96	3.1	64	131,800	April, 6.6%
1875-1876	125	7.2	149	306,100	May, 4.0%
1876-1877	27	Trace	0	Trace	June, 1.8%
1877-1878	116	5.7	118	242,300	July, 1.1%
1878-1879	63	0.6	12	25,500	August, 0.7%
1879-1880	128	7.7	159	327,400	September, 0.6%
1880-1881	73	1.1	23	46,800	October, 0.8%
1881-1882	76	1.3	27	55,300	November, 0.9%
1882-1883	69	0.9	19	38,300	December, 1.7%
1883-1884	214	23.7	491	1,007,700	
1884-1885	58	0.4	8	17,000	
1885-1886	141	9.8	203	416,700	
1886-1887	83	1.8	37	76,500	
1887-1888	118	6.1	126	259,400	
1888-1889	118	6.1	126	259,400	
1889-1890	166	14.3	296	608,000	
1890-1891	99	3.5	72	148,800	
1891-1892	70	1.0	21	42,500	
1892-1893	139	9.5	197	403,900	
1893-1894	41	0.1	2	4,300	
1894-1895	99	3.5	72	148,800	
1895-1896	65	0.7	14	29,800	
1896-1897	107	4.6	95	195,600	
1897-1898	38	Trace	0	Trace	
1898-1899	51	0.2	4	8,500	
1899-1900	58	0.4	8	17,000	
1900-1901	86	2.1	43	89,300	
1901-1902	83	1.8	37	76,500	
1902-1903	114	5.4	112	229,600	
1903-1904	61	0.5	10	21,300	
1904-1905	148	11.0	228	467,700	
1905-1906	124	7.0	145	297,600	
1906-1907	160	13.2	273	561,200	517,400
1907-1908	97	6.0	124	255,100	239,100
1908-1909	158	12.9	267	548,500	41,600
1909-1910	102	2.6	54	110,500	101,600
1910-1911	154	13.4	277	569,700	533,500
1911-1912	79	1.3	27	55,300	50,400
1912-1913	78	1.2	25	51,000	47,400
1913-1914	163	13.6	281	578,200	545,800
1914-1915	128	9.9	205	420,900	395,300
1915-1916	136	6.4	133	272,100	257,700
1916-1917	111	3.4	70	144,600	137,300
1917-1918	117	8.0	166	340,100	320,400
1918-1919	75	1.2	25	51,000	
1919-1920	80	1.5	31	63,800	
1920-1921	89	2.4	50	102,000	

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	205,500	4.83	258	
Maximum seasonal	1,007,700	23.70	1,264	1883-1884
Minimum seasonal	0	0.00	0	1876-1877, 1877-1898
Mean during July	2,300	0.05	3	
Maximum during July	11,100	0.26	14	1883-1884
Minimum during July	0	0.00	0	1876-1877, 1897-1898
Mean during August	1,400	0.03	2	
Maximum during August	7,100	0.17	9	1883-1884
Minimum during August	0	0.00	0	1876-1877, 1897-1898

Probable run-off curve, Plate XLV.

Storage development curve, Plate CLXXVII.

Mass curve of run-off, Plate CXXXVI.

Probable frequency of flood discharge, Plate LXXXV.

(a) Description of drainage basin: Tributary area above tidewater, excluding 114 square miles of agricultural land; total area, 911 square miles; net area, 797 square miles.

(b) Partial record, November 10 to January 7.

(c) Partial record, October 1 to December 31.

(d) Partial record, January 1 to September 30.

(e) Point of measurement at highway bridge, 1.5 miles east of Lompoc, drainage area 750 square miles.

(f) Measured run-off adjusted for additional area.

TABLE 145. SAN ANTONIO CREEK.  
SEASONAL RUN-OFF DATA. Drainage area 138 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness, Division U.	Depth of run-off in inches	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	79	0.7	23	5,200	January, 24.6%
1872-1873	56	0.1	3	700	February, 35.4%
1873-1874	84	1.0	33	7,400	March, 21.7%
1874-1875	96	1.7	56	12,500	April, 6.2%
1875-1876	125	4.5	147	33,200	May, 3.3%
1876-1877	27	Trace	0	Trace	June, 1.8%
1877-1878	116	3.5	114	25,800	July, 1.2%
1878-1879	63	0.2	7	1,500	August, 0.9%
1879-1880	128	4.8	156	35,400	September, 0.8%
1880-1881	73	0.4	13	2,900	October, 1.0%
1881-1882	76	0.5	15	3,700	November, 1.0%
1882-1883	69	0.3	10	2,200	December, 2.1%
1883-1884	214	18.5	602	136,400	
1884-1885	58	0.1	3	700	
1885-1886	141	6.5	212	47,900	
1886-1887	83	0.8	26	5,900	
1887-1888	118	3.8	124	28,000	
1888-1889	118	3.8	124	28,000	
1889-1890	166	10.2	332	75,200	
1890-1891	99	2.0	65	14,700	
1891-1892	70	0.3	10	2,200	
1892-1893	139	6.3	205	46,500	
1893-1894	41	Trace	0	Trace	
1894-1895	99	1.9	62	14,000	
1895-1896	65	0.2	7	1,500	
1896-1897	107	2.7	88	19,900	
1897-1898	38	Trace	0	Trace	
1898-1899	51	0.0	0	0	
1899-1900	58	0.1	3	700	
1900-1901	86	1.1	36	8,100	
1901-1902	83	0.8	26	5,900	
1902-1903	114	3.3	107	24,300	
1903-1904	61	0.1	3	700	
1904-1905	148	7.5	244	55,300	
1905-1906	124	4.4	113	32,400	
1906-1907	160	9.3	303	68,600	
1907-1908	97	1.7	55	12,500	
1908-1909	158	9.0	293	66,400	
1909-1910	102	2.2	72	16,200	
1910-1911	154	8.3	270	61,200	
1911-1912	79	0.7	23	5,200	
1912-1913	78	0.6	19	4,400	
1913-1914	163	9.7	316	71,500	
1914-1915	128	4.8	156	35,400	
1915-1916	136	5.8	189	42,800	
1916-1917	111	3.1	101	22,900	
1917-1918	117	3.7	121	27,300	
1918-1919	75	0.5	16	3,700	
1919-1920	80	0.7	23	5,200	
1920-1921	89	1.3	43	9,600	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	22,600	3.06	163	
Maximum seasonal	136,400	18.50	987	1883-1884
Minimum seasonal	0	0.00	0	1876-1877, 1893-1894 1897-1898, 1898-1899
Mean during July	270	0.04	2	
Maximum during July	1,600	0.22	12	1883-1884
Minimum during July	0	0.00	0	1876-1877, 1893-1894 1897-1898, 1898-1899
Mean during August	200	0.03	1	
Maximum during August	1,200	0.17	9	1887-1884
Minimum during August	0	0.00	0	1876-1877, 1893-1894 1897-1898, 1898-1899

Probable run-off curve, Plate XLVI.

Mass curve of run-off, Plate CXXXVII.

Storage development curve, Plate CLXXXVIII.

Probable frequency of flood discharge, Plate LXXXVI.

(a) Description of drainage basin: Tributary area above mouth.

(b) Estimated from record for Santa Ynez River near Lompoc.

**TABLE 146. SANTA MARIA RIVER.**  
SEASONAL RUN-OFF DATA. Drainage area 1,634 square miles.*a*

Season. (Begins October 1.)	Index of seasonal wetness. Division T.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <i>d</i>
1871-1872	125	3.6	151	313,700	January, 21.4%
1872-1873	59	0.2	8	17,400	February, 30.3%
1873-1874	95	1.3	55	113,300	March, 28.3%
1874-1875	70	0.5	21	43,600	April, 7.9%
1875-1876	147	5.9	248	514,100	May, 3.8%
1876-1877	35	Trace	0	Trace	June, 1.7%
1877-1878	138	4.9	206	427,000	July, 0.8%
1878-1879	51	0.1	4	8,700	August, 0.5%
1879-1880	106	2.1	88	183,000	September, 0.4%
1880-1881	97	1.4	59	122,000	October, 0.6%
1881-1882	87	1.0	42	87,100	November, 0.9%
1882-1883	85	0.8	34	69,700	December, 3.4%
1883-1884	178	9.5	400	827,900	
1884-1885	72	0.4	17	34,900	
1885-1886	150	6.2	261	540,300	
1886-1887	72	0.4	17	34,900	
1887-1888	88	1.0	42	87,100	
1888-1889	113	2.6	109	226,600	
1889-1890	192	11.4	479	993,400	
1890-1891	89	1.0	42	87,100	
1891-1892	72	0.4	17	34,900	
1892-1893	128	4.0	168	348,600	
1893-1894	45	0.1	4	8,700	
1894-1895	110	2.4	101	209,100	
1895-1896	90	1.0	42	87,100	
1896-1897	99	1.6	67	139,400	
1897-1898	34	Trace	0	Trace	
1898-1899	71	0.4	17	34,900	Measured seasonal discharge in acre-feet at U.S.G.S. gaging station. <i>e</i>
1899-1900	73	0.4	17	34,900	
1900-1901	142	5.3	223	461,900	
1901-1902	89	1.0	42	87,100	
1902-1903	78	0.5	21	43,600	
1903-1904	73	0.4	17	34,900	
1904-1905	130	4.7	172	357,000	53,400
1905-1906	113	2.6	109	226,600	67,900
1906-1907	147	5.9	248	514,100	1,600
1907-1908	93	1.3	55	113,300	
1908-1909	144	5.6	236	488,000	
1909-1910	101	1.7	71	148,100	
1910-1911	152	6.4	269	557,700	
1911-1912	77	0.5	21	43,600	
1912-1913	46	0.1	4	8,700	
1913-1914	140	5.1	215	444,400	
1914-1915	147	5.9	248	514,100	
1915-1916	118	3.0	126	261,400	
1916-1917	108	2.2	93	191,700	
1917-1918	84	0.8	34	69,700	
1918-1919	82	0.7	29	61,000	
1919-1920	71	0.4	17	34,900	
1921-1921	85	0.8	34	69,700	

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	207,200	2.38	127	
Maximum seasonal	993,400	11.40	608	1889-1890
Minimum seasonal	0	0.00	0	1876-1877, 1897-1898
Mean during July	1,700	0.02	1	
Maximum during July	7,900	0.09	5	1889-1890
Minimum during July	0	0.00	0	1897-1898
Mean during August	1,000	0.01	1	
Maximum during August	5,000	0.06	3	1889-1890
Minimum during August	0	0.00	0	1897-1898

*a* Probable run-off curve, Plate XLVI.

*b* Storage development curve, Plate CLXXVIII.

*c* Description of drainage basin: Tributary area above junction of Cuyama and Sisquoc Rivers.

*d* Partial record, October 22 to June 30.

*e* Partial record, October 1 to December 31.

*f* Estimated from records for Santa Ynez River and Arroyo Seco.

*g* Point of measurement: At Dutard's Ranch, 21 miles northeast of Santa Maria, in S. W. ¼ of S. E. ¼ of Sec. 13, T. 11 N., R. 32 W., drainage area 890 square miles.

TABLE 147. SAN LUIS OBISPO CREEK GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 1,019 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division T.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	125	6.0	146	326,000	January, 24.5%
1872-1873	59	0.6	15	32,600	February, 23.1%
1873-1874	95	3.0	73	163,000	March, 26.8%
1874-1875	79	1.8	44	97,800	April, 9.9%
1875-1876	147	8.7	212	472,600	May, 4.7%
1876-1877	35	Trace	0	Trace	June, 2.1%
1877-1878	138	7.7	188	418,300	July, 0.8%
1878-1879	51	0.3	7	16,300	August, 0.3%
1879-1880	106	4.0	98	217,300	September, 0.3%
1880-1881	97	3.2	78	173,900	October, 0.6%
1881-1882	87	2.3	56	125,000	November, 1.2%
1882-1883	85	2.2	54	119,500	December, 5.7%
1883-1884	178	13.7	334	744,300	
1884-1885	72	1.3	32	70,600	
1885-1886	150	9.3	227	505,200	
1886-1887	72	1.3	32	70,600	
1887-1888	88	2.4	59	130,400	
1888-1889	113	4.8	117	260,800	
1889-1890	192	15.7	383	852,900	
1890-1891	89	2.5	61	135,800	
1891-1892	72	1.3	32	70,600	
1892-1893	128	6.3	154	342,300	
1893-1894	45	Trace	0	Trace	
1894-1895	110	4.4	107	239,000	
1895-1896	90	2.6	63	141,200	
1896-1897	99	3.3	80	179,300	
1897-1898	34	Trace	0	Trace	
1898-1899	71	1.3	32	70,600	
1899-1900	73	1.4	34	76,100	
1900-1901	142	8.1	198	440,000	
1901-1902	89	2.5	61	135,800	
1902-1903	78	1.8	44	97,800	
1903-1904	73	1.4	34	76,000	
1904-1905	130	6.6	161	358,600	
1905-1906	113	4.8	117	260,800	
1906-1907	147	8.7	212	472,600	
1907-1908	93	2.8	68	152,100	
1908-1909	144	8.4	205	456,300	
1909-1910	101	3.5	85	190,100	
1910-1911	152	9.5	232	516,100	
1911-1912	77	1.7	41	92,400	
1912-1913	46	0.1	2	5,400	
1913-1914	140	7.9	193	429,200	
1914-1915	147	8.7	212	472,600	
1915-1916	118	5.3	129	288,000	
1916-1917	108	4.2	102	228,200	
1917-1918	84	2.1	51	114,100	
1918-1919	82	2.0	49	108,700	
1919-1920	71	1.3	32	70,600	
1920-1921	85	2.2	54	119,500	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	222,700	4.10	219	
Maximum seasonal	852,900	15.70	837	1889-1890
Minimum seasonal	0	0.00	0	1876-1877 1893-1894 1897-1898
Mean during July	1,800	0.03	2	
Maximum during July	6,800	0.13	7	1889-1890
Minimum during July	0	0.00	0	1876-1877 1893-1894 1897-1898
Mean during August	700	0.01	1	
Maximum during August	2,600	0.05	3	1889-1890
Minimum during August	0	0.00	0	1876-1877 1893-1894 1897-1898

Probable run-off curve, Plate XLVI.

Mass curve of run-off, Plate CXXXVII.

Storage development curve, Plate CLXXXVIII.

Probable frequency of flood discharge, Plate LXXXVI.

(a) Description of drainage basin: Tributary area, above agricultural area where such exists, otherwise above tide-water, of the following streams and intervening watersheds: GRANDE CREEK, SAN LUIS OBISPO CREEK, DIABLO CREEK, COON CREEK, ISLAY CREEK, SAN BERNARDO CREEK, MORRO CREEK, TORO CREEK, VILLA CREEK, SANTA ROSA CREEK, SAN SIMEON CREEK, ARROYO DELA CRUZ, SAN CARPAJO RIVER, BIG SUR CREEK, LITTLE SUR CREEK, CARMEL RIVER, CORRAL DE PIEDRA CREEK, BRIZZOLARI CREEK, STEINER CREEK, PENNINGTON CREEK, SAN LUISITO CREEK, DAVIS CANYON, WILD CHERRY CANYON, DIABLO CANYON, HARFORD CANYON, CROWBAR CANYON, PECHO CREEK, WILLOW CREEK, OLD CREEK, CUYACOS CREEK, PICO CREEK, LITTLE PICO CREEK, SIERRA CREEK, ARROYO HONDO, ARROYO DE LOS CHINOS, JOSHUA CREEK, SALMON CREEK, VILLA CREEK, ALDER CREEK, WILLOW CREEK, PREWILLITT CREEK, WILD CATTLE CREEK, MILL CREEK, PALO COLORADO CANYON, DOUD CREEK, WILDCAT CREEK, GRANITE CANYON, MAL PASO CREEK, SOBERANES CREEK.

(b) Estimated from record for Arroyo Seco at Soledad.

**TABLE 148. SALINAS RIVER TRIBUTARIES.**  
SEASONAL RUN-OFF DATA. Drainage area 4,042 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division T.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records <sup>d</sup>
1871-1872	125	6.7	149	1,440,000	January, 24.5%
1872-1873	59	0.6	13	129,000	February, 23.1%
1873-1874	95	3.0	67	646,000	March, 26.8%
1874-1875	79	1.7	37	366,000	April, 9.9%
1875-1876	147	10.0	222	2,150,000	May, 4.7%
1876-1877	35	0.1	2	21,500	June, 2.1%
1877-1878	138	8.7	193	1,870,000	July, 0.8%
1878-1879	51	0.3	6	64,600	August, 0.3%
1879-1880	106	4.3	96	926,000	September, 0.3%
1880-1881	97	3.3	74	711,000	October, 0.6%
1881-1882	87	2.4	52	517,000	November, 1.2%
1882-1883	85	2.2	47	474,000	December, 5.7%
1883-1884	178	15.2	338	3,275,000	
1884-1885	72	1.2	26	259,000	
1885-1886	150	10.5	233	2,260,000	
1886-1887	72	1.2	26	259,000	
1887-1888	88	2.4	54	517,000	
1888-1889	113	5.3	117	1,140,000	
1889-1890	192	17.5	389	3,770,000	
1890-1891	89	2.5	56	538,000	
1891-1892	72	1.2	26	259,000	
1892-1893	128	7.2	161	1,550,000	
1893-1894	45	0.2	4	43,100	
1894-1895	110	4.8	102	1,030,000	
1895-1896	90	2.6	58	560,000	
1896-1897	99	3.5	78	754,000	
1897-1898	34	0.1	2	21,500	
1898-1899	71	1.2	26	259,000	
1899-1900	73	1.3	28	280,000	
1900-1901	142	9.2	205	1,980,000	b145,100
1901-1902	89	2.5	56	539,000	100,500
1902-1903	78	1.8	41	388,000	104,900
1903-1904	73	1.3	28	280,000	59,000
1904-1905	130	7.0	157	1,568,000	117,400
1905-1906	113	5.3	120	1,140,000	205,200
1906-1907	147	10.2	226	2,198,000	306,100
1907-1908	93	2.7	60	581,700	68,600
1908-1909	144	9.4	208	2,025,000	237,700
1909-1910	101	3.5	80	754,000	84,500
1910-1911	152	10.8	239	2,327,000	291,400
1911-1912	77	1.4	33	301,600	36,900
1912-1913	46	0.2	4	43,100	14,400
1913-1914	140	9.0	200	1,939,000	261,200
1914-1915	147	9.7	250	2,089,000	209,000
1915-1916	118	6.2	139	1,336,000	257,200
1916-1917	108	4.7	107	1,010,000	181,500
1917-1918	84	2.1	46	452,000	75,800
1918-1919	82	1.9	41	409,000	68,500
1919-1920	71	1.2	26	259,000	53,000
1920-1921	85	2.1	46	452,000	83,900

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.<sup>c</sup>

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	961,900	4.46	238.0	
Maximum seasonal	3,770,000	17.49	933.0	1889-1890
Minimum seasonal	21,500	0.10	5.3	1876-1877
Mean during July	7,700	0.04	1.9	
Maximum during July	30,200	0.14	7.5	1889-1890
Minimum during July	200	Trace	Trace	1876-1877
Mean during August	2,900	0.01	0.7	
Maximum during August	11,300	0.05	2.8	1889-1890
Minimum during August	100	Trace	Trace	1876-1877

Probable run-off curve, Plate XLVI.

Mass curve of run-off, Plate CXXXVIII.

Storage development curve, Plate CLXXXVIII.

Probable frequency of flood discharge, Plate LXXXVI.

(a) Description of drainage basin: Tributary area of Salinas Valley streams, above agricultural area, as follows: Arroyo Seco, 242 square miles; San Antonio Creek, 341 square miles; Nacimiento River 375 square miles; San Lorenzo Creek, 265 square miles; Estrella Creek, 966 square miles; Salinas River, above mouth of Estrella Creek, 612 square miles; small streams from East side of valley, 521 square miles; small streams from West side of valley, 420 square miles. Streams included in the basin, above the agricultural area, are as follows: AGUA GRANDE CANYON, MONROE CANYON, THOMPSON CANYON, BRANSTETTER CANYON, PINE CANYON, CHERRY CANYON, KENT CANYON, SEVEN WELL CANYON, FELIZ CANYON, ESPINOSA CANYON, BROADHURST CANYON, BARRELL CANYON, SAN LORENZO CREEK, SWEETWATER CANYON, WILD HORSE CANYON, HAMILTON CANYON, LONG VALLEY CREEK, PINE VALLEY CREEK, REDWOOD CANYON, LYNCH CANYON, SARGENT CANYON, SALINAS RIVER (UPPER), TORO CREEK, PINE CANYON, LIMEKILN CREEK, ALISAL CREEK, QUAIL CREEK, PARSONS CREEK, JOHNSON CANYON, ARROYO SECO, RELIZ CREEK, SHIRTAIL CREEK, CHALONE CREEK, SAN CARLOS CANYON.

\*NOTE: Includes all tributary area above point in N. W. 1/4 of Sec. 14, T. 23 S., R. 10 E. Among streams included are: San Antonio Creek, Nacimiento River, San Marcos Creek, Huachuera Creek, Estrella Creek, Vineyard Canyon, and Stone Canyon. (b) Partial record, January 1 to September 30.

(c) Point of measurement: Arroyo Seco near Soledad, 1,000 feet below Vaquero Creek, drainage area 238 square miles

d) Estimated from record for Arroyo Seco near Soledad.

TABLE 149. PAJARO RIVER TRIBUTARIES.  
SEASONAL RUN-OFF DATA. Drainage area 1,070 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. <sup>d</sup>	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>c</sup>
1871-1872	126	7.7	157	439,000	January, 26.7%
1872-1873	64	0.9	18	51,300	February, 20.4%
1873-1874	91	3.2	65	182,400	March, 31.3%
1874-1875	76	1.7	35	96,900	April, 9.2%
1875-1876	147	11.0	225	627,100	May, 3.4%
1876-1877	34	Trace	0	Trace	June, 1.6%
1877-1878	144	10.5	215	598,600	July, 0.6%
1878-1879	64	0.9	18	51,300	August, 0.3%
1879-1880	100	4.1	84	233,800	September, 0.3%
1880-1881	100	4.1	84	233,800	October, 0.4%
1881-1882	84	2.5	51	142,500	November, 0.8%
1882-1883	81	2.2	45	125,400	December, 5.0%
1883-1884	151	11.7	239	667,100	
1884-1885	68	1.2	25	68,400	
1885-1886	136	9.2	188	524,500	
1886-1887	66	1.1	22	62,700	
1887-1888	86	2.7	55	153,900	
1888-1889	97	3.7	76	210,900	
1889-1890	192	19.5	399	1,111,800	
1890-1891	86	2.7	55	153,900	
1891-1892	80	2.1	43	119,700	
1892-1893	128	8.1	166	461,800	
1893-1894	66	1.1	22	62,700	
1894-1895	124	2.5	153	427,600	
1895-1896	92	3.2	65	182,400	
1896-1897	100	4.1	84	233,800	
1897-1898	42	0.2	4	11,400	
1898-1899	78	1.9	39	108,300	
1899-1900	80	2.1	43	119,700	
1900-1901	126	7.7	157	439,000	
1901-1902	91	3.2	65	182,400	
1902-1903	84	2.5	51	142,500	
1903-1904	81	2.2	45	125,400	
1904-1905	128	8.1	166	461,800	
1905-1906	119	6.7	137	382,000	
1906-1907	155	12.5	256	712,700	
1907-1908	88	2.8	57	159,600	
1908-1909	144	10.5	215	598,600	
1909-1910	102	4.4	90	250,900	
1910-1911	137	9.3	190	530,200	
1911-1912	76	1.7	35	96,900	
1912-1913	48	0.3	6	17,100	
1913-1914	141	10.0	205	570,100	
1914-1915	144	10.5	215	598,600	
1915-1916	120	6.9	141	393,400	
1916-1917	98	4.0	82	228,100	
1917-1918	69	1.2	25	68,400	
1918-1919	98	4.0	82	228,100	
1919-1920	74	1.6	33	91,200	
1920-1921	94	3.5	72	199,500	

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.<sup>b</sup>

22,400  
9,800

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	278,800	4.89	261	
Maximum seasonal	1,111,800	19.48	1,040	1889-1890
Minimum seasonal	0	0.00	0	1876-1877
Mean during July	1,700	0.03	2	
Maximum during July	6,700	0.12	6	1889-1890
Minimum during July	0	0.00	0	1876-1877
Mean during August	800	0.01	1	
Maximum during August	3,300	0.06	3	1889-1890
Minimum during August	0	0.00	0	1876-1877

Probable run-off curve, Plate XLVII.

Storage development curve, Plate CLXXIX.

Mass curve of run-off, Plate CXXXVIII.

Probable frequency of flood discharge, Plate LXXXVII.

(a) Description of drainage basin: Areas tributary to the following streams above base of foothills: PESCADERO CREEK, LA BREA CREEK, BODFISH CREEK, LITTLE ARTHUR CREEK, UVAS CREEK, LLAGAS CREEK, PACHICO CREEK, ARROYO DE LOS VIBORAS, ARROYO DOS PICHACOS, SANTA ANA CREEK, TRES PINOS CREEK, SAN BENITO CREEK\*, BIRD CREEK, SAN JUAN CREEK.

\*At point 5 miles north of Hollister.

(b) Point of measurement: Gate at Watsonville, drainage area 1,274 square miles. Records not used owing to diversions for irrigation and stream bed losses.

(c) Estimated from records for Salinas and Coyote Rivers

(d) Mean of indices for Divisions O and T.



TABLE 150. SOQUEL CREEK GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 324 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. <sup>c</sup>	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet.	Distribution of seasonal run-off by months as shown. <sup>b</sup>
1871-1872	128	25 0	154	432,100	January, 38.1%
1872-1873	73	7 6	47	131,300	February, 30.5%
1873-1874	88	11 5	71	198,800	March, 13.2%
1874-1875	63	5 4	33	93,300	April, 4.4%
1875-1876	138	29 0	179	501,200	May, 2.3%
1876-1877	32	0 6	4	10,400	June, 1.5%
1877-1878	138	29 0	179	501,200	July, 0.9%
1878-1879	93	13 0	80	224,700	August, 0.7%
1879-1880	93	13 0	80	224,700	September, 0.6%
1880-1881	93	13 0	80	224,700	October, 1.2%
1881-1882	84	10 4	64	179,700	November, 1.3%
1882-1883	86	10 8	67	186,700	December, 5.3%
1883-1884	141	30 0	185	518,500	
1884-1885	85	10 6	66	183,200	
1885-1886	123	23 0	142	397,500	
1886-1887	69	6 6	41	114,100	
1887-1888	85	10 6	66	183,200	
1888-1889	87	11 0	68	190,100	
1889-1890	197	53 0	327	916,000	
1890-1891	90	12 0	74	207,400	
1891-1892	88	11 5	71	198,800	
1892-1893	137	28 4	175	490,800	
1893-1894	86	10 8	67	186,700	
1894-1895	137	28 4	175	490,800	
1895-1896	95	13 5	83	233,300	
1896-1897	103	16 0	99	276,500	
1897-1898	50	3 0	19	51,800	
1898-1899	87	11 0	68	190,100	
1899-1900	86	10 8	67	186,700	
1900-1901	113	19 3	119	333,600	
1901-1902	94	43 3	82	229,900	
1902-1903	93	13 0	80	224,700	
1903-1904	93	13 0	80	224,700	
1904-1905	120	21 6	133	373,300	
1905-1906	123	23 0	142	397,500	
1906-1907	150	33 8	209	584,200	
1907-1908	78	8 9	55	153,800	
1908-1909	139	29 4	182	508,100	
1909-1910	93	13 0	80	224,700	
1910-1911	127	24 2	149	418,200	
1911-1912	70	6 8	42	117,500	
1912-1913	47	2 5	15	43,200	
1913-1914	133	26 9	166	464,900	
1914-1915	134	27 2	168	470,000	
1915-1916	113	19 3	119	333,600	
1916-1917	85	10 6	66	183,200	
1917-1918	53	3 5	22	60,500	
1918-1919	112	18 8	116	324,500	
1919-1920	71	7 0	43	121,000	
1920-1921	104	16 3	101	281,700	

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	279,900	16 20	864	
Maximum seasonal	916,000	53 00	2,827	1889-1890
Minimum seasonal	10,400	0 60	32	1876-1877
Mean during July	2,500	0 14	8	
Maximum during July	8,200	0 47	25	1889-1890
Minimum during July	90	Trace	Trace	1876-1877
Mean during August	2,000	0 12	6	
Maximum during August	6,400	0 37	20	1889-1890
Minimum during August	70	Trace	Trace	1876-1877

Probable run-off curve, Plate XLVII.

Storage development curve, Plate CLXXIX.

Mass curve of run-off, Plate CXXXIX.

Probable frequency of flood discharge, Plate LXXXVII.

(a) Description of drainage basin: Area tributary to following streams, above tidewater: SAN VICENTE CREEK, LIDDELL CREEK, RESPINI CREEK, LAGUNA CREEK, COJA CREEK, BALDWIN CREEK, MEDER CREEK, ARROYO DE LOS FRIJOLES, WHITE HOUSE CREEK, CASCADE CREEK, GREEN OAKS CREEK, ANO NUEVO CREEK, FINNY CREEK, GAZOS CREEK, WADDELL CREEK, SCOTT CREEK, SAN LORENZO CREEK, SOQUEL CREEK, APTOS CREEK.

(b) Estimated from record for other streams in vicinity.

(c) Mean of indices of Divisions N and O.

TABLE 151. PESCADERO CREEK GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 222 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Divison L.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by records. <sup>b</sup>
1871-1872	130	25.5	160	302,500	January, 38.1%
1872-1873	79	8.9	56	105,600	February, 30.5%
1873-1874	86	10.6	66	125,700	March, 13.2%
1874-1875	69	6.6	41	78,300	April, 4.4%
1875-1876	131	25.7	161	304,800	May, 2.3%
1876-1877	43	1.9	12	22,500	June, 1.5%
1877-1878	129	25.1	157	297,700	July, 0.9%
1878-1879	79	9.0	56	106,700	August, 0.7%
1879-1880	99	14.6	91	173,200	September, 0.6%
1880-1881	107	17.1	107	202,800	October, 1.2%
1881-1882	69	6.6	41	78,300	November, 1.3%
1882-1883	87	11.0	69	130,500	December, 5.3%
1883-1884	125	23.5	147	278,700	
1884-1885	66	6.0	38	71,200	
1885-1886	115	19.9	125	236,000	
1886-1887	70	6.8	43	80,700	
1887-1888	78	8.8	55	104,400	
1888-1889	98	14.5	91	172,000	
1889-1890	192	50.5	316	599,000	
1890-1891	86	10.6	66	125,700	
1891-1892	91	12.1	76	143,500	
1892-1893	139	29.0	182	344,000	
1893-1894	111	18.5	116	219,400	
1894-1895	147	32.3	202	383,100	
1895-1896	106	16.7	105	198,100	
1896-1897	112	18.7	117	221,800	
1897-1898	57	4.0	25	47,400	
1898-1899	91	12.1	76	143,500	
1899-1900	104	16.4	103	194,500	
1900-1901	121	22.0	138	260,900	
1901-1902	91	12.1	76	143,500	
1902-1903	99	14.6	91	173,200	
1903-1904	105	16.5	103	195,700	
1904-1905	124	23.3	146	276,400	
1905-1906	120	21.7	136	257,400	
1906-1907	144	31.0	194	367,700	
1907-1908	72	7.2	45	85,400	
1908-1909	124	23.3	146	276,400	
1909-1910	93	13.0	82	154,200	
1910-1911	121	22.0	138	260,900	
1911-1912	64	5.5	35	65,200	
1912-1913	52	3.2	20	38,000	
1913-1914	128	24.9	156	295,200	
1914-1915	126	23.9	150	283,500	
1915-1916	120	21.7	136	257,400	
1916-1917	78	8.7	55	103,200	
1917-1918	53	3.5	22	41,500	
1918-1919	105	16.5	103	195,700	
1919-1920	66	6.0	38	71,200	
1920-1921	98	14.4	90	170,800	

Measured seasonal discharge in acre-feet.<sup>b</sup>

79,300  
39,700

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	189,300	15.96	853	
Maximum seasonal	599,000	50.50	2,698	1889-1890
Minimum seasonal	22,500	1.90	101	1876-1877
Mean during July	1,700	0.14	8	
Maximum during July	5,400	0.46	24	1889-1890
Minimum during July	200	0.02	1	1876-1877
Mean during August	1,300	0.11	6	
Maximum during August	4,200	0.35	19	1889-1890
Minimum during August	200	0.02	1	1876-1877

Probable run-off curve, Plate XLVII.

Storage development, curve, Plate CLXXXIX.

Mass curve of run-off, Plate CXXXIX.

Probable frequency of flood discharge, Plate LXXXVII.

(a) Description of drainage basin: Tributary area, above tidewater, of the following streams: PILARCITOS CREEK, PURISSIMA CREEK, TRINITAS CREEK, SAN GREGORIO CREEK, POMPONIO CREEK, PESCADERO CREEK, LOBITOS CREEK, FRENCHMANS CREEK, DENNISTON CREEK, SAN VICENTE CREEK, SAN PEDRO CREEK.

(b) Record of the Spring Valley Water Co. for San Gregorio Creek at La Honda and Pescadero Creek at Harrison; combined drainage area 65 square miles.

(c) Partial record, October 1 to 31, December 1 to 31, January 3 to April 25, May 1 to September 30.

TABLE 152. TULE LAKE GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 901 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness, Division A.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records. <sup>e</sup>
1871-1872	81	2.8	49	134,500	January, 7.8 <sup>c</sup>
1872-1873	75	2.2	38	105,700	February, 17.4 <sup>c</sup>
1873-1874	71	1.9	33	91,300	March, 32.3 <sup>c</sup>
1874-1875	62	1.2	21	57,700	April, 29.2 <sup>c</sup>
1875-1876	73	2.1	37	100,900	May, 5.2 <sup>c</sup>
1876-1877	197	23.7	414	1,138,900	June, 2.3 <sup>c</sup>
1877-1878	84	3.1	54	149,000	July, 0.4 <sup>c</sup>
1878-1879	81	2.8	49	134,500	August, 0.4 <sup>c</sup>
1879-1880	150	13.3	232	639,100	September, 0.4 <sup>c</sup>
1880-1881	181	19.9	347	956,300	October, 0.7 <sup>c</sup>
1881-1882	121	8.0	140	384,400	November, 0.8 <sup>c</sup>
1882-1883	74	2.1	37	100,900	December, 3.1 <sup>c</sup>
1883-1884	158	15.0	262	720,800	
1884-1885	119	7.6	135	365,200	
1885-1886	165	16.4	286	788,100	
1886-1887	118	7.5	131	360,400	
1887-1888	91	3.9	68	187,400	
1888-1889	116	7.1	124	341,200	
1889-1890	162	15.6	272	749,600	
1890-1891	95	4.4	77	211,400	
1891-1892	89	3.7	65	177,800	
1892-1893	128	9.1	159	437,300	
1893-1894	93	4.2	73	201,800	
1894-1895	100	5.0	87	240,300	
1895-1896	116	7.1	124	341,200	
1896-1897	113	6.8	119	326,800	
1897-1898	67	1.6	28	76,900	
1898-1899	71	1.9	33	91,300	
1899-1900	93	4.2	73	201,800	
1900-1901	102	5.2	91	249,900	
1901-1902	85	3.2	56	153,800	
1902-1903	77	2.4	42	115,300	
1903-1904	118	7.5	131	360,400	
1904-1905	80	2.7	47	129,700	
1905-1906	99	4.9	85	235,500	
1906-1907	131	9.6	168	461,300	
1907-1908	73	2.1	37	100,900	
1908-1909	102	5.2	91	249,900	
1909-1910	77	2.4	42	115,300	
1910-1911	113	6.8	119	326,800	
1911-1912	65	1.4	24	67,300	
1912-1913	80	2.7	47	129,700	
1913-1914	123	8.3	145	398,800	
1914-1915	62	1.2	21	57,700	
1915-1916	86	3.3	58	158,600	
1916-1917	88	3.6	63	173,000	
1917-1918	58	0.9	16	43,200	
1918-1919	69	1.7	30	81,700	
1919-1920	60	1.0	17	48,000	
1920-1921	108	6.0	105	288,300	

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.<sup>d</sup>

6700  
47,300  
145,600  
253,600  
40,400  
98,300

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	275,200	5.73	305	
Maximum seasonal	1,138,900	23.70	1,264	1876-1877
Minimum seasonal	43,200	0.90	48	1917-1918
Mean during July	1,100	0.02	1	
Maximum during July	4,600	0.10	5	1876-1877
Minimum during July	200	Trace	Trace	1917-1918
Mean during August	1,100	0.02	1	
Maximum during August	4,600	0.10	5	1876-1877
Minimum during August	200	Trace	Trace	1917-1918

Probable run-off curve, Plate XLVIII.  
Storage development curve, Plate CLXXX.

Mass curve of run-off, Plate CXL.  
Probable frequency of flood discharge, Plate LXXXVIII

(a) Description of drainage basin: Tributary area above points indicated: BUTTE CREEK at Bayes, 157 square miles; WILLOW (or COTTONWOOD) CREEK near Fairchild, 64 square miles; ANTELOPE CREEK at base of hills, 53 square miles; LOST RIVER in California, 628 square miles.

(b) September only.

(c) Period of record, October 1 to June 12.

(d) Point of measurement: Lost River near Clear Lake, drainage area 574 square miles.

(e) Estimated from record for Lost River.

TABLE 153. GOOSE LAKE GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 275 square miles. a

Season. (Begins October 1.)	Index of seasonal wetness, Division A.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. b
1871-1872	81	1.0	46	14,700	January, 7.8%
1872-1873	75	0.8	36	11,700	February, 17.4%
1873-1874	71	0.6	27	8,800	March, 32.3%
1874-1875	62	0.4	18	5,900	April, 29.2%
1875-1876	73	0.7	32	10,300	May, 5.2%
1876-1877	197	10.0	456	146,700	June, 2.3%
1877-1878	84	1.1	50	16,100	July, 0.4%
1878-1879	81	1.0	46	14,700	August, 0.4%
1879-1880	150	5.2	237	76,300	September, 0.4%
1880-1881	181	8.2	374	120,300	October, 0.7%
1881-1882	121	3.0	137	44,000	November, 0.8%
1882-1883	74	0.8	36	11,700	December, 3.1%
1883-1884	158	6.0	273	88,000	
1884-1885	119	2.9	132	42,500	
1885-1886	165	6.6	301	96,800	
1886-1887	118	2.9	132	42,500	
1887-1888	91	1.1	64	20,500	
1888-1889	116	2.7	123	39,600	
1889-1890	162	6.3	287	92,400	
1890-1891	95	1.6	73	23,500	
1891-1892	89	1.3	59	19,100	
1892-1893	128	3.5	160	51,300	
1893-1894	93	1.5	68	22,000	
1894-1895	100	1.8	82	26,400	
1895-1896	116	2.7	123	39,600	
1896-1897	113	2.6	118	38,100	
1897-1898	67	0.5	23	7,300	
1898-1899	71	0.6	27	8,800	
1899-1900	93	1.5	68	22,000	
1900-1901	102	1.9	87	27,900	
1901-1902	85	1.2	55	17,600	
1902-1903	77	0.9	41	13,200	
1903-1904	118	2.9	132	42,500	
1904-1905	80	1.0	46	14,700	
1905-1906	99	1.8	82	26,400	
1906-1907	131	3.7	169	54,300	
1907-1908	73	0.7	32	10,300	
1908-1909	102	1.9	87	27,900	
1909-1910	77	0.9	41	13,200	
1910-1911	113	2.6	118	38,100	
1911-1912	65	0.5	23	7,300	
1912-1913	80	1.0	46	14,700	
1913-1914	123	3.2	146	46,900	
1914-1915	62	0.4	18	5,900	
1915-1916	86	1.2	55	17,600	
1916-1917	88	1.3	59	19,100	
1917-1918	58	0.3	14	4,400	
1918-1919	69	0.6	27	8,800	
1919-1920	60	0.3	14	4,400	
1920-1921	108	2.2	100	32,300	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	32,200	2.18	117.0	
Maximum seasonal	146,700	10.00	533.0	1876-1877
Minimum seasonal	4,400	0.30	16.0	1917-1918
Mean during July	100	0.01	0.4	
Maximum during July	600	0.04	2.2	1876-1877
Minimum during July	20	Trace	Trace	1917-1918
Mean during August	100	0.01	0.4	
Maximum during August	600	0.04	2.2	1876-1877
Minimum during August	20	Trace	Trace	1917-1918

Probable run-off curve, Plate XLVIII.

Storage development curve, Plate CLXXX.

Mass curve of run-off, Plate CXLI.

Probable frequency of flood discharge, Plate LXXXVIII.

(a) Description of drainage basin: Area tributary to Goose Lake in California, excluding lake surface. Principal streams are: COTTONWOOD CREEK, MYRTLE CREEK, FANDANGO CREEK, LASSEN CREEK, and DAVID CREEK.

(b) Estimated from records for Lost River near Clear Lake.

TABLE 154. COWHEAD LAKE BASIN.  
SEASONAL RUN-OFF DATA. Drainage area 24 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division A.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet.	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	81	2.6	62	3,400	January, 2.5%
1872-1873	75	2.3	55	3,000	February, 10.9%
1873-1874	71	2.0	48	2,600	March, 20.5%
1874-1875	62	1.6	38	2,100	April, 25.8%
1875-1876	73	2.1	50	2,700	May, 20.8%
1876-1877	197	13.5	323	17,500	June, 7.1%
1877-1878	84	2.8	67	3,600	July, 2.4%
1878-1879	81	2.6	62	3,400	August, 1.4%
1879-1880	150	8.2	196	10,600	September, 1.1%
1880-1881	181	11.6	278	15,100	October, 1.2%
1881-1882	121	5.5	132	7,100	November, 3.3%
1882-1883	74	2.2	53	2,900	December, 2.5%
1883-1884	158	9.1	218	11,800	
1884-1885	119	5.3	127	6,900	
1885-1886	165	9.8	235	12,700	
1886-1887	118	5.3	127	6,900	
1887-1888	91	3.2	77	4,200	
1888-1889	116	5.1	122	6,600	
1889-1890	162	9.5	228	12,300	
1890-1891	95	3.5	84	4,500	
1891-1892	89	3.1	74	4,000	
1892-1893	128	6.2	149	8,100	
1893-1894	93	3.3	79	4,300	
1894-1895	100	3.8	91	4,900	
1895-1896	116	5.1	122	6,600	
1896-1897	113	4.8	115	6,200	
1897-1898	67	1.9	46	2,500	
1898-1899	71	2.0	48	2,600	
1899-1900	93	3.3	79	4,300	
1900-1901	102	3.9	93	5,100	
1901-1902	85	2.8	67	3,600	
1902-1903	77	2.4	58	3,100	
1903-1904	118	5.3	127	6,900	
1904-1905	80	2.5	60	3,300	
1905-1906	99	3.8	91	4,900	
1906-1907	131	6.4	153	8,300	
1907-1908	73	2.2	53	2,900	
1908-1909	102	3.9	93	5,100	
1909-1910	77	2.4	58	3,100	
1910-1911	113	4.8	115	6,200	
1911-1912	65	1.8	43	2,300	
1912-1913	80	2.5	60	3,300	
1913-1914	123	5.7	137	7,400	
1914-1915	62	1.6	38	2,100	
1915-1916	86	2.9	70	3,800	
1916-1917	88	3.0	72	3,900	
1917-1918	58	1.5	36	1,900	
1918-1919	69	2.0	43	2,600	
1919-1920	60	1.6	38	2,100	
1920-1921	108	4.4	105	5,700	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	5,400	4.17	222	
Maximum seasonal	17,500	13.47	718	1876-1877
Minimum seasonal	1,900	1.46	78	1917-1918
Mean during July	160	0.12	7	
Maximum during July	510	0.39	21	1876-1877
Minimum during July	60	0.05	2	1917-1918
Mean during August	80	0.06	3	
Maximum during August	250	0.19	10	1876-1877
Minimum during August	30	0.02	1	1917-1918

Probable run-off curve, Plate XLVIII.

Storage development curve, Plate CLXXX.

Mass curve of run-off, Plate CXI.

Probable frequency of flood discharge, Plate LXXXVIII.

(a) Description of drainage basin: Area in California, excluding lake surface, tributary to Cowhead Lake, including EIGHT MILE CREEK.

(b) Estimated from record for Susan River.

TABLE 155. SURPRISE VALLEY GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 379 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness, Division A.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	81	2.6	43	53,500	January, 2.5%
1872-1873	75	2.3	55	46,500	February, 10.9%
1873-1874	71	2.1	50	42,400	March, 20.5%
1874-1875	62	1.7	40	34,300	April, 25.8%
1875-1876	73	2.2	52	44,400	May, 20.8%
1876-1877	197	13.3	317	268,600	June, 7.1%
1877-1878	81	2.8	67	56,600	July, 2.9%
1878-1879	81	2.6	63	53,500	August, 1.4%
1879-1880	150	8.2	195	165,600	September, 1.1%
1880-1881	181	11.5	273	232,300	October, 1.2%
1881-1882	121	5.5	132	112,100	November, 3.3%
1882-1883	74	2.2	54	45,400	December, 2.5%
1883-1884	158	9.0	214	181,800	
1884-1885	119	5.3	127	108,100	
1885-1886	165	9.7	231	195,900	
1886-1887	118	5.3	126	107,000	
1887-1888	91	3.2	77	65,600	
1888-1889	116	5.1	121	103,000	
1889-1890	162	9.4	224	189,900	
1890-1891	95	3.5	83	70,700	
1891-1892	89	3.1	74	62,600	
1892-1893	128	6.2	147	125,200	
1893-1894	93	3.4	81	68,700	
1894-1895	100	3.8	92	77,800	
1895-1896	116	5.1	121	103,000	
1896-1897	113	4.9	117	99,000	
1897-1898	67	1.9	45	38,400	
1898-1899	71	2.1	50	42,400	
1899-1900	93	3.4	81	68,700	
1900-1901	102	4.0	95	80,800	
1901-1902	85	2.9	69	58,600	
1902-1903	77	2.4	58	49,500	
1903-1904	118	5.3	129	107,000	
1904-1905	80	2.6	62	52,500	
1905-1906	99	3.8	90	76,700	
1906-1907	131	6.4	152	129,300	
1907-1908	73	2.2	52	44,400	
1908-1909	102	4.0	95	80,800	
1909-1910	77	2.4	58	49,500	
1910-1911	113	4.8	115	98,000	
1911-1912	65	1.9	45	38,400	
1912-1913	60	2.6	62	52,500	
1913-1914	123	5.7	136	115,100	
1914-1915	62	1.7	40	34,300	
1915-1916	86	2.9	69	58,600	
1916-1917	88	3.0	72	61,600	
1917-1918	58	1.5	36	30,300	
1918-1919	69	2.0	49	41,400	
1919-1920	60	1.6	38	32,300	
1920-1921	108	4.4	106	89,900	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	84,900	4 20	224	
Maximum seasonal	268,600	13 30	709	1876-1877
Minimum seasonal	30,300	1 50	80	1917-1918
Mean during July	2,500	0 12	7	
Maximum during July	7,800	0 39	21	1876-1877
Minimum during July	900	0 04	2	1917-1918
Mean during August	1,200	0 06	3	
Maximum during August	3,800	0 19	10	1876-1877
Minimum during August	400	0 02	1	1917-1918

Probable run-off curve, Plate XLVIII.

Storage development curve, Plate CLXXX.

Mass curve of run-off, Plate CNLI.

Probable frequency of flood discharge, Plate LXXXVIII.

(a) Description of drainage basin: Area in California tributary to the following streams above the 4,800 foot contour: DRY CREEK, COTTONWOOD CREEK, OWL CREEK, RAIDER CREEK, EAGLE CREEK, BARES CREEK.

(b) Estimated from records for Susan River.

**TABLE 156. MADELINE PLAINS GROUP.**  
**SEASONAL RUN-OFF DATA. Drainage area 548 square miles.<sup>a</sup>**

Season. (Begins October 1.)	Index of seasonal wetness. Division A.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	81	2.3	61	67,300	January, 2.5%
1872-1873	75	1.9	50	55,600	February, 10.9%
1873-1874	71	1.7	45	49,700	March, 20.5%
1874-1875	62	1.2	32	35,100	April, 25.8%
1875-1876	73	1.8	48	52,700	May, 20.8%
1876-1877	197	12.4	328	362,700	June, 7.1%
1877-1878	84	2.4	64	70,200	July, 2.9%
1878-1879	81	2.3	61	67,300	August, 1.4%
1879-1880	150	7.7	204	225,300	September, 1.1%
1880-1881	181	10.8	286	315,900	October, 1.2%
1881-1882	121	5.2	138	152,100	November, 3.3%
1882-1883	74	1.9	50	55,600	December, 2.5%
1883-1884	158	8.5	225	248,700	
1884-1885	119	5.0	132	146,300	
1885-1886	165	9.2	243	269,100	
1886-1887	118	4.9	130	143,300	
1887-1888	91	2.9	77	84,800	
1888-1889	116	4.7	124	137,500	
1889-1890	162	8.8	233	257,400	
1890-1891	95	3.1	82	90,700	
1891-1892	89	2.8	74	81,900	
1892-1893	128	5.8	153	169,700	
1893-1894	93	3.0	79	87,800	
1894-1895	100	3.5	93	102,400	
1895-1896	116	4.7	124	137,500	
1896-1897	113	4.5	119	131,600	
1897-1898	67	1.5	40	43,900	
1898-1899	71	1.7	45	49,700	
1899-1900	93	3.0	79	87,800	
1900-1901	102	3.6	95	105,300	
1901-1902	85	2.5	66	73,100	
1902-1903	77	2.0	53	58,500	
1903-1904	118	4.9	130	143,300	
1904-1905	80	2.2	58	64,400	
1905-1906	99	3.4	90	99,500	
1906-1907	131	6.0	159	175,500	
1907-1908	73	1.8	48	52,700	
1908-1909	102	3.6	95	105,300	
1909-1910	77	2.0	53	58,500	
1910-1911	113	4.5	119	131,600	
1911-1912	65	1.4	37	41,000	
1912-1913	80	2.2	58	64,400	
1913-1914	123	5.3	140	155,000	
1914-1915	62	1.2	32	35,100	
1915-1916	86	2.6	69	76,100	
1916-1917	88	2.7	71	79,000	
1917-1918	58	1.1	29	32,200	
1918-1919	69	1.6	42	46,800	
1919-1920	60	1.1	29	32,200	
1920-1921	108	4.1	108	119,900	

**SUMMARY OF ESTIMATED RUN-OFF.**

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	110,600	3.78	202	
Maximum seasonal	362,700	12.40	661	1876-1877
Minimum seasonal	32,200	1.10	59	1917-1918
Mean during July	3,210	0.11	6	
Maximum during July	10,500	0.36	19	1876-1877
Minimum during July	930	0.03	2	1917-1918
Mean during August	1,550	0.05	3	
Maximum during August	5,100	0.17	9	1876-1877
Minimum during August	450	0.02	1	1917-1918

Probable run-off curve, Plate XLIX.

Storage development curve, Plate CLXXXI.

Mass curve of run-off, Plate CXLII.

Probable frequency of flood discharge, Plate LXXXIX.

(a) Description of drainage basin: Total area of Madeline Plains drainage basin, excluding non-water-producing plains area. The principal streams are: RED ROCK CREEK, COLD SPRINGS CREEK and VAN LONE CREEK.

(b) Estimated from record for Susan River.

TABLE 157. SMOKE CREEK GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 188 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division A.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	81	2.2	59	22,100	January, 2.5%
1872-1873	75	1.9	51	19,100	February, 10.9%
1873-1874	71	1.6	43	16,000	March, 20.5%
1874-1875	62	1.2	32	12,000	April, 25.8%
1875-1876	73	1.7	45	17,000	May, 20.8%
1876-1877	197	12.4	330	124,300	June, 7.1%
1877-1878	84	2.4	64	24,100	July, 2.9%
1878-1879	81	2.2	59	22,100	August, 1.4%
1879-1880	150	7.7	205	77,200	September, 1.1%
1880-1881	181	10.8	288	108,300	October, 1.2%
1881-1882	121	5.2	139	52,100	November, 3.3%
1882-1883	74	1.8	48	18,000	December, 2.5%
1883-1884	158	8.5	226	85,200	
1884-1885	119	5.0	133	50,100	
1885-1886	165	9.2	245	92,200	
1886-1887	118	4.9	130	49,100	
1887-1888	91	2.8	75	28,100	
1888-1889	116	4.7	125	47,100	
1889-1890	162	8.9	237	89,200	
1890-1891	95	3.1	83	31,100	
1891-1892	89	2.7	72	27,100	
1892-1893	128	5.8	155	58,200	
1893-1894	93	3.0	80	30,100	
1894-1895	100	3.5	93	35,100	
1895-1896	116	4.7	125	47,100	
1896-1897	113	4.5	120	45,100	
1897-1898	67	1.4	37	14,000	
1898-1899	71	1.6	43	16,000	
1899-1900	93	3.0	80	30,100	
1900-1901	102	3.7	99	37,100	
1901-1902	85	2.5	67	25,100	
1902-1903	77	2.0	53	20,100	
1903-1904	118	4.9	130	49,100	
1904-1905	80	2.1	56	21,100	
1905-1906	99	3.4	91	34,100	
1906-1907	131	6.0	160	60,200	
1907-1908	73	1.7	45	17,000	
1908-1909	102	3.7	99	37,100	
1909-1910	77	2.0	53	20,100	
1910-1911	113	4.5	120	45,100	
1911-1912	65	1.3	35	13,000	
1912-1913	80	2.1	56	21,100	
1913-1914	123	5.3	141	53,100	
1914-1915	62	1.2	32	12,000	
1915-1916	86	2.5	67	25,100	
1916-1917	88	2.6	69	26,100	
1917-1918	58	1.0	27	10,000	
1918-1919	69	1.5	40	15,000	
1919-1920	60	1.1	29	11,000	
1920-1921	108	4.1	109	41,100	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	37,600	3.75	200	
Maximum seasonal	124,300	12.40	661	1876-1877
Minimum seasonal	10,000	1.00	53	1917-1918
Mean during July	1,090	0.11	6	
Maximum during July	3,600	0.36	19	1876-1877
Minimum during July	290	0.03	2	1917-1918
Mean during August	530	0.05	3	
Maximum during August	1,740	0.17	9	1876-1877
Minimum during August	140	0.01	1	1917-1918

Probable run-off curve, Plate XLIX.

Storage development curve, Plate CLXXXI.

Mass curve of run-off, Plate CXLII.

Probable frequency of flood discharge, Plate LXXXIX.

(a) Description of drainage basin: Area tributary to SMOKE CREEK and RUSH CREEK, above California-Nevada state line.

(b) Estimated from record for Susan River.



**TABLE 158. EAGLE LAKE GROUP.**  
SEASONAL RUN-OFF DATA. Drainage area 498 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division A.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872.	81	1.8	53	47,800	January, 2.5%
1872-1873.	75	1.4	41	37,200	February, 10.9%
1873-1874.	71	1.2	35	31,900	March, 20.5%
1874-1875.	62	0.7	20	18,600	April, 25.8%
1875-1876.	73	1.3	38	34,500	May, 20.8%
1876-1877.	197	12.7	371	337,300	June, 7.1%
1877-1878.	84	2.0	58	53,100	July, 2.9%
1878-1879.	81	1.8	53	47,800	August, 1.4%
1879-1880.	150	7.6	222	201,900	September, 1.1%
1880-1881.	181	10.9	318	289,500	October, 1.2%
1881-1882.	121	4.9	143	130,100	November, 3.3%
1882-1883.	74	1.3	38	34,500	December, 2.5%
1883-1884.	158	8.4	245	223,100	
1884-1885.	119	4.7	137	124,800	
1885-1886.	165	9.1	266	241,700	
1886-1887.	118	4.7	137	124,800	
1887-1888.	91	2.5	73	66,400	
1888-1889.	116	4.4	123	116,900	
1889-1890.	162	8.8	257	233,700	
1890-1891.	95	2.8	82	74,400	
1891-1892.	89	2.3	67	61,100	
1892-1893.	128	5.5	161	146,100	
1893-1894.	93	2.6	76	69,100	
1894-1895.	100	3.1	90	82,300	
1895-1896.	116	4.4	128	116,900	
1896-1897.	113	4.2	123	111,600	
1897-1898.	67	1.0	29	26,000	
1898-1899.	71	1.2	35	31,900	
1899-1900.	93	2.6	76	69,100	
1900-1901.	102	3.3	96	87,600	
1901-1902.	85	2.1	61	55,800	
1902-1903.	77	1.5	44	39,800	
1903-1904.	118	4.7	137	124,800	
1904-1905.	80	1.7	50	45,200	
1905-1906.	99	3.1	90	82,300	
1906-1907.	131	5.8	169	154,000	
1907-1908.	73	1.3	38	34,500	
1908-1909.	102	3.3	96	87,600	
1909-1910.	77	1.5	41	39,800	
1910-1911.	113	4.2	123	111,600	
1911-1912.	65	0.9	26	23,900	
1912-1913.	80	1.7	50	45,200	
1913-1914.	123	5.1	149	135,500	
1914-1915.	62	0.7	20	18,600	
1915-1916.	86	2.1	61	55,800	
1916-1917.	88	2.3	67	61,100	
1917-1918.	58	0.6	18	15,900	
1918-1919.	69	1.1	32	29,200	
1919-1920.	60	0.6	18	15,900	
1920-1921.	108	3.8	111	100,900	

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	91,000	3.43	183	
Maximum seasonal	337,300	12.70	677	1876-1877
Minimum seasonal	15,900	0.60	32	1917-1918
Mean during July	2,600	0.10	5	
Maximum during July	9,800	0.37	20	1876-1877
Minimum during July	460	0.02	1	1917-1918
Mean during August	1,300	0.05	3	
Maximum during August	4,700	0.18	9	1876-1877
Minimum during August	220	0.01	Trace	1917-1918

Probable run-off curve, Plate XLIX.

Storage development curve, Plate CLXXXI.

Mass curve of run-off, Plate CXLIII.

Probable frequency of flood discharge, Plate LXXXIX.

(a) Description of drainage basin: Area tributary to Eagle Lake, excluding lake surface, but including PINE CREEK.

(b) Estimated from record for Susan River.

TABLE 159. HONEY LAKE GROUP.

SEASONAL RUN-OFF DATA. Drainage area 1,507 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division A.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	81	2.4	58	193,000	January, 2 5/10
1872-1873	75	2.0	49	161,000	February, 10 9/10
1873-1874	71	1.7	41	137,000	March, 20 5/10
1874-1875	62	1.2	29	96,000	April, 25 8/10
1875-1876	73	1.9	46	153,000	May, 20 8/10
1876-1877	197	13.9	338	1,117,000	June, 7 1/10
1877-1878	84	2.6	63	209,000	July, 2 9/10
1878-1879	81	2.4	58	193,000	August, 1 4/10
1879-1880	150	8.5	207	683,000	September, 1 1/10
1880-1881	181	12.0	292	964,000	October, 1 2/10
1881-1882	121	5.7	130	458,000	November, 3 3/10
1882-1883	74	1.9	46	153,000	December, 2 5/10
1883-1884	158	9.3	226	747,000	
1884-1885	119	5.5	134	442,000	
1885-1886	165	10.1	245	812,000	
1886-1887	118	5.4	131	434,000	
1887-1888	91	3.1	75	249,000	
1888-1889	116	5.2	126	418,000	
1889-1890	162	9.7	236	780,000	
1890-1891	95	3.5	85	281,000	
1891-1892	89	3.0	73	241,000	
1892-1893	128	6.3	153	506,000	
1893-1894	93	3.3	80	265,000	
1894-1895	100	3.8	92	305,000	
1895-1896	116	5.2	126	418,000	
1896-1897	113	5.0	122	402,000	
1897-1898	67	1.5	37	121,000	
1898-1899	71	1.7	41	137,000	
1899-1900	93	3.3	80	265,000	63,800
1900-1901	102	4.0	97	321,000	102,900
1901-1902	85	2.7	66	217,000	3,500
1902-1903	77	2.1	51	169,000	62,100
1903-1904	118	5.4	131	434,000	166,000
1904-1905	80	2.3	56	185,000	62,100
1905-1906	99	3.8	92	305,000	3,200
1906-1907	131	6.6	160	530,000	
1907-1908	73	1.9	46	153,000	
1908-1909	102	4.0	97	321,000	
1909-1910	77	2.1	51	169,000	
1910-1911	113	5.0	122	402,000	
1911-1912	65	1.4	34	113,000	
1912-1913	80	2.3	56	185,000	
1913-1914	123	5.9	143	474,000	
1914-1915	62	1.2	29	96,000	
1915-1916	86	2.8	68	225,000	
1916-1917	88	2.9	71	233,000	58,700
1917-1918	58	1.0	21	80,000	25,800
1918-1919	69	1.6	39	129,000	44,100
1919-1920	60	1.1	27	88,000	19,400
1920-1921	108	4.6	112	370,000	73,400

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.<sup>g</sup>

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	330,800	4.12	220	
Maximum seasonal	1,117,000	13.90	741	1876-1877
Minimum seasonal	80,000	1.00	53	1917-1918
Mean during July	9,600	0.12	6	
Maximum during July	32,400	0.40	21	1876-1877
Minimum during July	2,300	0.03	2	1917-1918
Mean during August	4,600	0.06	3	
Maximum during August	15,600	0.19	10	1876-1877
Minimum during August	1,100	0.01	1	1917-1918

Probable run-off curve, Plate XLIX.

Mass curve of run-off, Plate CXLIII.

Storage development curve, Plate CLXXXI.

Probable frequency of flood discharge, Plate LXXXIX.

(a) Description of drainage basin: Total area tributary to Honey Lake including SUSAN RIVER, BAXTER CREEK and LONG VALLEY CREEK, less 175 square miles consisting of lake surface and non-contributing adjacent area.

(c) Partial record, October 1 to December 31.

(b) Partial record, June 1 to September 30.

(e) Partial record, February 8 to September 30.

(d) Partial record, January 1 to 31 and March 1 to September 30.

(f) Partial record, October 1 to June 30.

(g) Point of measurement: Susan River near Susanville, drainage area 212.5 square miles.

(h) Estimated from record for Susan River, corrected for diversion of 400 acre-feet per month from May to August, inclusive, and 300 acre-feet in September.

TABLE 160. LAKE TAHOE BASIN.  
SEASONAL RUN-OFF DATA. Drainage area 499 square miles.*a*

Season. (Begins October 1.)	Index of seasonal wetness. Division I.	Depth of run-off in inches.	Run-off index.	Estimated net seasonal run-off in acre-feet. (Above main agricultural area.) <sup>f</sup>	Distribution of seasonal run-off by months. <sup>h</sup>
1871-1872	123	15.1	154	402,100	January, 3.9%
1872-1873	65	1.4	14	37,300	February, 4.5%
1873-1874	118	13.8	141	367,500	March, 9.8%
1874-1875	74	3.2	33	85,200	April, 22.0%
1875-1876	124	15.3	156	407,400	May, 26.2%
1876-1877	53	0.0	0	0	June, 18.1%
1877-1878	81	4.7	48	125,200	July, 6.2%
1878-1879	85	5.6	57	149,100	August, 1.7%
1879-1880	125	15.6	159	415,400	September, 1.3%
1880-1881	80	4.5	46	119,800	October, 1.7%
1881-1882	120	14.2	145	378,100	November, 2.3%
1882-1883	48	0.0	0	0	December, 2.3%
1883-1884	123	15.1	154	402,100	
1884-1885	68	2.1	21	55,900	
1885-1886	93	7.5	76	199,700	
1886-1887	96	8.0	81	213,000	
1887-1888	43	0.0	0	0	
1888-1889	46	0.0	0	0	Measured seasonal discharge in acre-feet at U.S.G.S. gaging station. <sup>g</sup>
1889-1890	227	45.0	458	1,198,300	
1890-1891	101	9.4	96	223,700	
1891-1892	97	8.3	85	221,000	
1892-1893	162	25.8	263	687,000	
1893-1894	115	12.9	131	343,500	
1894-1895	123	15.1	154	402,100	\$104,600
1895-1896	120	14.2	145	378,100	\$99,700
1896-1897	109	11.5	117	306,200	
1897-1898	69	2.2	22	58,600	
1898-1899	108	11.3	115	300,900	
1899-1900	106	10.5	107	279,600	\$42,200
1900-1901	111	10.9	111	289,600	96,700
1901-1902	83	6.1	62	163,400	126,600
1902-1903	86	5.6	57	148,200	155,600
1903-1904	106	19.3	197	514,300	390,200
1904-1905	79	3.8	39	102,300	280,500
1905-1906	121	20.0	204	532,500	360,500
1906-1907	171	27.9	284	742,900	656,900
1907-1908	66	2.8	28	75,400	383,800
1908-1909	113	15.1	154	402,600	327,600
1909-1910	106	10.5	107	280,100	347,500
1910-1911	150	17.4	177	462,600	312,700
1911-1912	57	2.0	20	53,000	186,900
1912-1913	71	2.1	21	56,200	169,000
1913-1914	135	17.6	179	468,600	147,900
1914-1915	104	4.8	49	127,300	191,200
1915-1916	121	12.0	122	320,300	195,000
1916-1917	84	8.6	88	229,200	279,500
1917-1918	67	3.3	34	88,800	227,600
1918-1919	92	1.7	17	45,400	191,700
1919-1920	64	0.3	3	7,300	178,100
1920-1921	111	6.8	69	182,000	104,600

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	261,000	9.8	523	.....
Maximum seasonal	1,198,300	45.0	2,400	..... 1889-1890
Minimum seasonal	0	0.0	0	1876-1877, 1882-1883 1887-1888, 1888-1889
Mean during July	16,200	0.6	32	.....
Maximum during July	74,300	2.8	149	..... 1889-1890
Minimum during July	0	0.0	0	1876-1877, 1882-1883 1887-1888, 1888-1889
Mean during August	4,400	0.2	9	.....
Maximum during August	20,400	0.8	41	..... 1889-1890
Minimum during August	0	0.0	0	1876-1877, 1882-1883 1887-1888, 1888-1889

Probable run-off curve, Plate L.

Mass curve of run-off, Plate CXLIV

Storage development curve, Plate CLXXXII.

Probable frequency of flood discharge, Plate XC.

(a) Description of drainage basin: Tributary area above gaging station at outlet of Lake Tahoe, including lake surface and tributary area in Nevada. Tributary streams: WARD CREEK, BLACKWOOD CREEK, MADDEN CREEK, MCKINNEY CREEK, GENERAL CREEK, MEIGS CREEK, LONELY GULCH, UPPER TRUCKEE RIVER, FALLEN LEAF LAKE BASIN and others. See table 61 for data on Truckee River below Lake Tahoe.

(b) Partial record, July 1 to September 30.

(d) Partial record, March 1 to September 30.

(c) Measured discharge corrected for storage in lake.

(e) Estimated seasonal run-off is net yield of watersheds deduced directly from measured outflow which automatically deducts all evaporation losses from gross yield of watershed.

(g) Point of measurement: Gage 200 feet below outlet of lake, drainage area 499 square miles.

(h) Estimated from records of Truckee River near state line, after deducting therefrom the recorded discharge at Lake Tahoe.

TABLE 161. TRUCKEE RIVER.  
SEASONAL RUN-OFF DATA. Drainage area 447 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division I.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.) <sup>f</sup>	Distribution of seasonal run-off by months as shown by U.S.G.S. records. <sup>d</sup>
1871-1872	123	27.8	131	662,000	January, 3.9%
1872-1873	65	11.2	53	266,700	February, 4.5%
1873-1874	118	26.4	124	628,700	March, 9.8%
1874-1875	74	13.5	63	321,500	April, 22.0%
1875-1876	124	28.0	132	666,800	May, 26.2%
1876-1877	53	8.5	40	202,400	June, 18.1%
1877-1878	81	15.2	71	362,000	July, 6.2%
1878-1879	85	16.4	77	390,500	August, 1.7%
1879-1880	125	28.4	134	676,300	September, 1.3%
1880-1881	80	15.0	71	357,200	October, 1.7%
1881-1882	120	26.9	127	640,600	November, 2.3%
1882-1883	48	7.5	35	178,600	December, 2.3%
1883-1884	123	27.8	131	662,000	
1884-1885	68	12.0	56	285,800	
1885-1886	93	18.5	87	440,500	
1886-1887	96	19.5	92	464,400	
1887-1888	43	6.6	31	157,200	
1888-1889	46	7.0	33	166,700	
1889-1890	227	60.6	285	1,443,100	
1890-1891	101	20.9	98	497,700	
1891-1892	97	19.6	92	466,700	
1892-1893	162	40.0	188	952,500	
1893-1894	115	25.4	120	604,900	
1894-1895	123	27.8	131	662,000	
1895-1896	120	26.9	127	640,600	
1896-1897	109	23.4	110	557,200	
1897-1898	69	12.3	58	292,900	
1898-1899	108	23.3	110	554,900	
1899-1900	106	14.8	70	€352,400	b285,400
1900-1901	111	25.7	121	€612,000	579,800
1901-1902	83	18.6	88	€442,900	418,600
1902-1903	86	16.2	76	€385,500	364,900
1903-1904	106	33.0	155	€785,800	744,200
1904-1905	79	15.9	75	€378,600	357,500
1905-1906	121	27.9	131	€664,400	628,500
1906-1907	171	34.7	163	€826,300	782,900
1907-1908	66	13.2	62	€314,300	297,000
1908-1909	113	30.4	143	€723,900	686,100
1909-1910	106	18.9	89	€450,100	442,800
1910-1911	150	34.2	161	€814,400	798,800
1911-1912	57	10.7	50	€254,800	251,000
1912-1913	71	12.1	57	€288,100	260,400
1913-1914	135	32.5	153	€773,900	698,400
1914-1915	104	18.7	88	€445,300	402,000
1915-1916	121	28.5	134	€678,600	611,900
1916-1917	84	20.0	94	€476,200	425,400
1917-1918	67	12.3	58	€292,900	263,700
1918-1919	92	18.3	86	€435,800	391,700
1919-1920	64	10.8	51	€257,200	232,100
1920-1921	111	18.6	88	€442,900	398,300

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	506,000	21.25	1.133	
Maximum seasonal	1,443,100	60.60	3.232	1889-1890
Minimum seasonal	157,200	6.60	.352	1887-1888
Mean during July	31,400	1.30	.70	
Maximum during July	92,000	3.90	2.06	1906-1907
Minimum during July	2,600	0.11	.6	1917-1918
Mean during August	8,600	0.36	.19	
Maximum during August	27,600	1.20	.62	1906-1907
Minimum during August	600	0.03	.1	1905-1906

Probable run-off curve, Plate L.

Storage development curve, Plate CLXXXII.

(a) Description of drainage basin: Tributary area above intersection of California-Nevada State Line with the Truckee River, including 37 square miles of area in Nevada, but excluding all area above outlet of Lake Tahoe, which is considered separately as Lake Tahoe Basin. See Table 160.

(b) Partial record, March 1 to September 30.

(c) Points of measurement: September 7, 1889 to June 14, 1909, at Farad, drainage area 422.7 square miles; June 14, 1909, to August, 1912, at Calvada, drainage area 438.1 square miles; August 1, 1912, to September 30, 1921, at Iceland, drainage area 402.4 square miles. The areas given above do not include the area of Lake Tahoe Basin, 499 square miles; that is, the total areas at the above points of measurement are obtained by adding 499 square miles to the areas given. The measured discharge of the Truckee River at Lake Tahoe was deducted from measured discharge at above stations to obtain the measured discharge used in this table.

(d) Percentages estimated from measured discharge of Truckee River near state line, after deducting therefrom the measured discharge of the Truckee River at Lake Tahoe.

(e) Measured seasonal run-off adjusted for run-off from additional area.

**TABLE 162. WEST FORK CARSON RIVER.**  
SEASONAL RUN-OFF DATA. Drainage area 67 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness, Division I.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records. <sup>j</sup>
1871-1872.	123	39.0	121	140,000	January, 3.4%
1872-1873.	65	21.7	68	78,000	February, 3.9%
1873-1874.	118	37.5	117	134,000	March, 5.6%
1874-1875.	74	24.0	75	86,000	April, 13.4%
1875-1876.	124	39.4	123	141,000	May, 26.9%
1876-1877.	53	18.5	58	66,000	June, 21.9%
1877-1878.	81	25.9	81	93,000	July, 9.9%
1878-1879.	85	27.0	84	97,000	August, 4.9%
1879-1880.	125	39.7	124	142,000	September, 2.1%
1880-1881.	80	25.6	80	92,000	October, 2.3%
1881-1882.	120	37.9	118	136,000	November, 2.8%
1882-1883.	48	17.6	55	63,000	December, 2.9%
1883-1884.	123	39.0	121	140,000	
1884-1885.	68	22.5	70	81,000	Measured seasonal
1885-1886.	93	29.4	91	105,000	discharge in acre-
1886-1887.	96	30.1	94	108,000	feet at U.S.G.S.
1887-1888.	43	16.7	52	60,000	gaging station. <sup>b</sup>
1888-1889.	46	17.1	53	61,000	
1889-1890.	227	77.0	240	276,000	c130,000
1890-1891.	101	33.1	103	118,800	d81,100
1891-1892.	97	24.8	77	88,900	e17,800
1892-1893.	162	53.5	167	192,000	
1893-1894.	115	36.3	113	130,000	
1894-1895.	123	39.0	121	140,000	
1895-1896.	120	37.9	118	136,000	
1896-1897.	109	34.4	107	123,000	
1897-1898.	69	22.8	71	82,000	
1898-1899.	108	34.1	106	122,000	
1899-1900.	106	33.4	104	120,000	
1900-1901.	111	30.9	96	110,700	f103,100
1901-1902.	83	29.6	92	106,100	98,500
1902-1903.	86	25.8	80	92,600	85,000
1903-1904.	106	38.0	118	136,300	g127,800
1904-1905.	79	24.1	75	86,600	h78,000
1905-1906.	121	48.0	150	171,600	164,000
1906-1907.	171	60.9	190	218,100	210,500
1907-1908.	66	22.3	69	80,000	72,400
1908-1909.	113	41.6	129	149,100	141,500
1909-1910.	106	30.8	96	110,400	102,800
1910-1911.	150	44.0	137	157,500	149,600
1911-1912.	57	22.6	70	81,100	73,000
1912-1913.	71	23.1	72	82,800	74,400
1913-1914.	135	32.4	101	116,300	107,600
1914-1915.	104	26.8	83	96,200	87,200
1915-1916.	121	33.5	104	119,900	116,500
1916-1917.	84	29.2	91	104,500	95,000
1917-1918.	67	22.2	69	80,000	
1918-1919.	92	29.0	90	104,000	
1919-1920.	64	21.5	67	77,000	
1920-1921.	111	35.0	109	125,000	

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal.	115,200	32.1	1,714	
Maximum seasonal.	276,000	77.0	4,107	1889-1890
Minimum seasonal.	60,000	16.7	893	1887-1888
Mean during July.	11,400	3.2	170	
Maximum during July.	33,800	9.4	503	1906-1907
Minimum during July.	5,100	1.4	76	1907-1908
Mean during August.	5,640	1.6	84	
Maximum during August.	15,200	4.2	226	1906-1907
Minimum during August.	2,660	0.7	40	1914-1915

Probable run-off curve, Plate L. Mass curve of run-off, Plate CXLV.  
 Storage development curve, Plate CLXXXII. Probable frequency of flood discharge, Plate XC.  
<sup>(a)</sup> Description of drainage basin: Tributary area above gage near Woodfords, at highway bridge on Woodfords-Markleville road.  
<sup>(b)</sup> Point of measurement: Near Woodfords, California, drainage area 67 square miles.  
<sup>(c)</sup> Partial record, April 1 to September 30.  
<sup>(d)</sup> Partial record, October 1 to December 31, and May 1 to September 30.  
<sup>(e)</sup> Partial record, October 1 to March 31.  
<sup>(f)</sup> Partial record, October 18 to September 30.  
<sup>(g)</sup> Partial record, October 1 to January 31 and February 8 to September 30.  
<sup>(h)</sup> Partial record, October 1 to December 31 and January 9 to September 30.  
<sup>(i)</sup> Partial record, April 12 to September 30.  
<sup>(j)</sup> Measured run-off adjusted for irrigation as follows: 230 acres for the years 1889-1890 to 1891-1892, also 1900-1901 through 1910-1911, and thereafter increasing 100 acres per year to a total of 3,800 acres in 1920-1921.

TABLE 163. EAST FORK CARSON RIVER.  
SEASONAL RUN-OFF DATA. Drainage area 323 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division 1.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records.
1871-1872	123	23.3	130	401,000	January, 3.5%
1872-1873	65	9.7	54	167,000	February, 3.5%
1873-1874	118	22.4	125	385,500	March, 5.6%
1874-1875	74	11.7	65	201,400	April, 12.9%
1875-1876	124	22.4	125	385,500	May, 26.5%
1876-1877	53	7.3	41	125,600	June, 26.1%
1877-1878	81	13.2	74	227,300	July, 10.1%
1878-1879	85	14.2	79	244,300	August, 3.5%
1879-1880	125	23.7	132	408,000	September, 1.9%
1880-1881	80	13.0	72	223,800	October, 1.8%
1881-1882	120	22.5	125	387,400	November, 2.2%
1882-1883	48	6.3	35	108,500	December, 2.4%
1883-1884	123	23.4	130	402,900	
1884-1885	68	10.6	50	182,500	Measured seasonal discharge in acre-foot at U.S.G.S. gaging station i
1885-1886	93	16.4	91	282,300	
1886-1887	96	16.7	93	287,500	
1887-1888	43	5.3	30	91,300	
1888-1889	46	5.5	31	94,700	
1889-1890	227	50.4	281	868,500	b, c540,700
1890-1891	101	17.8	99	306,400	b445,200
1891-1892	97	17.0	95	292,700	b399,800
1892-1893	162	33.0	184	568,100	b, d117,800
1893-1894	115	21.2	118	365,000	
1894-1895	123	23.3	130	401,100	
1895-1896	120	22.5	125	387,400	
1896-1897	109	20.0	111	344,300	
1897-1898	69	10.7	60	184,200	
1898-1899	108	19.8	110	340,900	
1899-1900	106	19.0	106	327,100	
1900-1901	111	19.7	110	334,200	e378,500
1901-1902	83	12.6	70	217,600	241,700
1902-1903	86	16.9	94	291,200	329,800
1903-1904	106	20.5	114	353,100	f368,900
1904-1905	79	12.1	67	209,000	g199,000
1905-1906	121	22.6	126	389,100	
1906-1907	171	35.5	198	611,200	
1907-1908	66	10.0	56	172,700	h166,200
1908-1909	113	21.4	119	367,800	386,200
1909-1910	106	17.2	96	296,500	311,200
1910-1911	150	28.9	161	498,100	461,200
1911-1912	57	10.1	56	173,300	158,900
1912-1913	71	9.4	52	161,900	148,300
1913-1914	135	27.2	152	468,400	431,200
1914-1915	104	18.8	105	323,700	
1915-1916	121	22.6	126	389,100	
1916-1917	84	14.0	78	241,000	
1917-1918	67	10.0	56	172,200	
1918-1919	92	15.6	87	268,600	
1919-1920	64	9.6	54	165,300	
1920-1921	111	20.2	113	347,800	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile	Season.
Mean seasonal	309,000	17.9	957	
Maximum seasonal	868,500	50.4	2,689	1889-1890
Minimum seasonal	91,300	5.3	283	1887-1888
Mean during July	31,200	1.8	97	
Maximum during July	87,700	5.1	272	1889-1890
Minimum during July	9,220	0.5	29	1887-1888
Mean during August	10,800	0.6	33	
Maximum during August	30,400	1.8	94	1889-1890
Minimum during August	3,200	0.2	10	1887-1888

Probable run-off curve, Plate L.

Storage development curve, Plate CLXXXII.

(a) Description of drainage basin: Area tributary to East Fork Carson River and its branches in California.

(b) Record disregarded in constructing curve of probable run-off and in estimating discharge, as authority and point of measurement are uncertain. See page 184, W. S. paper No. 300.

(c) Partial record, October 1 to September 30.

(d) Partial record, October 1 to July 31.

(e) Partial record, October 1 to September 30.

(f) Partial record, January 1 to July 31.

(g) Partial record, January 1 to July 15.

(h) Partial record, January 1 to September 30.

(i) Points of measurement: October 17, 1900, to July 15, 1905, at Rodenbali's Ranch, near highway bridge, at upper end of Carson Valley, drainage area 360 square miles; January 1, 1908, to December 31, 1910, at Horseshoe Bend, three miles above first station, drainage area 340 square miles; January 1, 1911, to September 30, 1914,  $\frac{1}{4}$  mile above California-Nevada State line, drainage area 298 square miles.

(j) Measured discharge adjusted for irrigation of 550 acres from 1900 to 1910, and increasing thereafter by 45 acres per year to a total of 730 acres in 1913-1914; also adjusted for difference in area.

**TABLE 164. WEST WALKER RIVER.**  
SEASONAL RUN-OFF DATA. Drainage area 405 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness, Division I.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records.
1871-1872	123	18.8	130	406,000	January, 1.5%
1872-1873	65	7.4	51	160,000	February, 1.7%
1873-1874	118	17.6	121	380,000	March, 3.7%
1874-1875	74	8.7	60	188,000	April, 8.4%
1875-1876	124	19.1	131	412,000	May, 19.3%
1876-1877	53	6.0	41	130,000	June, 29.3%
1877-1878	81	9.7	67	209,000	July, 21.9%
1878-1879	85	10.4	71	225,000	August, 6.4%
1879-1880	125	19.3	133	417,000	September, 2.7%
1880-1881	80	9.6	66	207,000	October, 2.0%
1881-1882	120	18.0	124	389,000	November, 1.6%
1882-1883	48	5.5	38	119,000	December, 1.5%
1883-1884	123	18.9	130	408,000	
1884-1885	68	8.0	55	173,000	
1885-1886	93	12.0	82	259,000	
1886-1887	96	12.5	86	270,000	
1887-1888	43	5.1	35	110,000	
1888-1889	46	5.4	37	116,000	
1889-1890	227	50.0	344	1,079,000	
1890-1891	101	13.5	93	291,000	
1891-1892	97	12.7	87	274,000	
1892-1893	162	30.6	210	660,000	
1893-1894	115	16.8	115	363,000	
1894-1895	123	18.9	130	408,000	
1895-1896	120	18.0	124	389,000	
1896-1897	109	15.4	106	332,000	
1897-1898	69	8.0	55	173,000	
1898-1899	108	15.2	104	328,000	
1899-1900	106	14.5	100	313,000	
1900-1901	111	15.7	108	339,000	
1901-1902	83	10.1	69	218,000	
1902-1903	86	12.8	88	h275,300	b225,400
1903-1904	106	15.0	103	h322,500	264,700
1904-1905	79	9.9	68	h215,400	176,800
1905-1906	121	23.5	162	h507,600	416,700
1906-1907	171	27.3	188	h588,500	483,100
1907-1908	66	10.7	74	h230,600	c172,100
1908-1909	113	15.1	104	h325,600	d245,100
1909-1910	106	13.5	93	h290,800	e234,500
1910-1911	150	26.9	185	581,000	
1911-1912	57	6.5	45	140,000	
1912-1913	71	8.3	57	177,000	
1913-1914	135	22.1	152	477,000	
1914-1915	104	14.4	99	h308,000	f87,500
1915-1916	121	14.1	97	h304,300	249,800
1916-1917	84	12.8	88	h275,300	226,000
1917-1918	67	7.8	53	168,000	
1918-1919	92	11.9	82	257,000	
1919-1920	64	7.4	51	160,000	
1920-1921	111	15.7	108	339,000	

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	313,800	14.5	775	
Maximum seasonal	1,079,000	50.0	2,664	1889-1890
Minimum seasonal	110,000	5.1	272	1887-1888
Mean during July	68,700	3.2	170	
Maximum during July	236,300	10.9	583	1889-1890
Minimum during July	24,100	1.1	60	1887-1888
Mean during August	20,100	0.9	50	
Maximum during August	69,100	3.2	171	1889-1890
Minimum during August	7,060	0.3	17	1887-1888

Probable run-off curve, Plate LI.

Storage development curve, Plate CLXXXIII.

(a) Description of drainage basin: Area tributary to West Walker River in California.

(b) Partial record, October 5 to September 30.

(c) Partial record, October 1 to July 31.

(d) Partial record, March 1 to September 30.

(e) Partial record, October 1 to August 31.

(f) Partial record, June 18 to September 30.

(g) Point of measurement: At gage near Coleville, 400 feet east of the high way at mouth of Ross Canyon, drainage area 245 square miles.

(h) Measured run-off adjusted for additional area.

Mass curve of run-off, Plate CXLV.

Probable frequency of flood discharge, Plate XCI.

TABLE 165. EAST WALKER RIVER.  
SEASONAL RUN-OFF DATA. Drainage area 411 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division I.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records. <sup>h</sup>
1871-1872	123	17.1	120	375,200	January, 1.5%
1872-1873	65	8.9	63	195,300	February, 1.7%
1873-1874	118	16.2	114	355,400	March, 3.7%
1874-1875	74	9.2	65	201,900	April, 8.4%
1875-1876	124	17.4	122	381,800	May, 19.3%
1876-1877	53	7.9	55	173,300	June, 29.3%
1877-1878	81	10.5	74	230,400	July, 21.9%
1878-1879	85	11.0	77	241,400	August, 6.4%
1879-1880	125	17.5	123	384,000	September, 2.7%
1880-1881	80	10.1	73	228,200	October, 2.0%
1881-1882	120	16.5	116	362,000	November, 1.6%
1882-1883	48	7.5	53	164,600	December, 1.5%
1883-1884	123	17.1	120	375,200	
1884-1885	68	9.2	65	201,900	
1885-1886	93	12.0	84	263,300	
1886-1887	96	12.5	88	274,300	
1887-1888	43	7.0	49	153,600	
1888-1889	46	7.3	51	160,200	
1889-1890	227	47.0	330	1,031,300	
1890-1891	101	13.2	93	289,600	
1891-1892	97	12.6	88	276,500	
1892-1893	162	26.7	188	555,800	
1893-1894	115	15.5	109	340,100	
1894-1895	123	17.1	120	375,200	
1895-1896	120	16.5	116	362,000	
1896-1897	109	14.5	102	318,100	
1897-1898	69	9.3	65	204,000	
1898-1899	108	14.4	101	316,000	
1899-1900	106	14.0	98	307,200	
1900-1901	111	14.9	105	326,900	
1901-1902	83	10.7	75	234,800	
1902-1903	86	12.4	87	271,000	
1903-1904	106	14.5	102	317,600	
1904-1905	79	9.7	68	212,200	
1905-1906	121	22.8	160	500,000	
1906-1907	171	26.4	186	579,700	
1907-1908	66	10.5	74	230,500	
1908-1909	113	15.3	107	335,700	
1909-1910	106	13.1	92	286,400	
1910-1911	150	23.5	165	515,600	
1911-1912	57	8.2	58	g179,900	e, b47,200
1912-1913	71	9.5	67	g208,400	e, c9,200
1913-1914	135	19.7	138	g432,200	e242,300
1914-1915	104	13.7	96	g300,600	e76,600
1915-1916	121	13.7	96	g299,700	c117,700
1916-1917	84	12.4	87	g271,100	f, d161,900
1917-1918	67	9.1	64	199,700	
1918-1919	92	11.9	84	261,100	
1919-1920	64	8.9	62	195,300	
1920-1921	111	14.9	105	326,900	

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	312,300	14.24	759	
Maximum seasonal	1,031,300	47.00	2,507	1889-1890
Minimum seasonal	153,600	7.00	373	* 1887-1888
Mean during July	68,400	3.10	166	
Maximum during July	225,900	10.30	549	1889-1890
Minimum during July	33,600	1.50	82	1887-1888
Mean during August	20,000	0.91	49	
Maximum during August	66,000	3.00	160	1889-1890
Minimum during August	9,800	0.45	24	1887-1888

Probable run-off curve, Plate LI.

Storage development curve, Plate CLXXXIII.

Mass curve of run-off, Plate CXLV.

Probable frequency of flood discharge, Plate XCI.

(a) Description of drainage basin: Area tributary to East Walker River in California, less agricultural area in Bridgeport Valley, 102 square miles.

(c) Partial record, July 5 to September 30.

(b) Partial record, October 1 to September 15.

(e) Near Mason, Nevada, 2.5 miles above junction with West Walker River, drainage area 1,252 square miles.

(d) Partial record, October 1 to July 1 and September 16 to 30.

(f) Above Mason Valley,  $\frac{1}{2}$  mile above the highway bridge 14 miles southeast of Mason, 1,152 square miles.

(g) Record not used in estimating run-off.

(h) Estimated from record for West Walker River at Ross Canyon.



TABLE 166. MONO LAKE GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 166 square miles.a

Season. (Begins October 1.)	Index of seasonal wetness. Division K.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records.g
1871-1872	122	30.5	125	269,500	January, 2.2%
1872-1873	86	20.4	84	180,300	February, 2.2%
1873-1874	87	20.7	85	182,900	March, 2.4%
1874-1875	61	13.4	55	118,400	April, 3.4%
1875-1876	154	39.6	162	350,000	May, 12.0%
1876-1877	34	5.8	24	51,300	June, 28.1%
1877-1878	112	27.7	114	244,800	July, 26.5%
1878-1879	78	18.2	75	160,800	August, 11.2%
1879-1880	105	25.7	105	227,100	September, 4.8%
1880-1881	87	20.7	85	182,900	October, 2.4%
1881-1882	85	20.2	83	178,500	November, 2.5%
1882-1883	88	21.0	86	185,600	December, 2.3%
1883-1884	135	34.2	140	302,200	
1884-1885	67	15.1	62	133,400	
1885-1886	129	32.6	134	288,100	
1886-1887	68	15.5	64	137,000	
1887-1888	64	14.3	59	126,400	
1888-1889	74	17.1	70	151,100	
1889-1890	174	45.5	186	402,100	
1890-1891	86	20.4	84	180,300	
1891-1892	90	21.5	88	190,000	
1892-1893	132	33.3	136	294,300	
1893-1894	122	30.5	125	269,500	
1894-1895	148	38.1	156	336,700	
1895-1896	104	25.5	105	225,400	
1896-1897	124	31.1	127	274,800	
1897-1898	62	13.7	56	121,100	
1898-1899	89	21.3	87	188,200	
1899-1900	103	25.3	104	223,600	
1900-1901	129	32.6	134	288,100	
1901-1902	97	23.5	96	207,700	
1902-1903	108	26.7	109	236,000	
1903-1904	108	26.7	109	236,000	
1904-1905	108	26.7	109	236,000	
1905-1906	139	35.4	145	312,800	
1906-1907	148	38.1	156	336,700	
1907-1908	64	14.3	59	126,400	
1908-1909	119	29.8	122	263,400	
1909-1910	98	23.9	98	211,200	
1910-1911	133	33.7	138	297,800	
1911-1912	62	13.7	56	121,100	c75,883
1912-1913	58	12.7	52	112,200	d17,465
1913-1914	117	29.2	120	258,100	e34,592
1914-1915	114	28.3	116	250,100	f59,830
1915-1916	94	22.7	93	200,600	
1916-1917	82	19.2	79	169,700	
1917-1918	77	17.9	73	158,200	
1918-1919	89	21.3	87	188,200	
1919-1920	76	17.6	72	155,500	
1920-1921	110	27.2	111	240,400	

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.b

c75,883  
d17,465  
e34,592  
f59,830

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	215,650	24.4	1,301	
Maximum seasonal	402,100	45.5	2,427	1889-1890
Minimum seasonal	51,300	5.8	310	1876-1877
Mean during July	57,150	6.5	345	
Maximum during July	106,560	12.1	643	1889-1890
Minimum during July	13,590	1.5	82	1876-1877
Mean during August	24,150	2.7	146	
Maximum during August	45,040	5.1	272	1889-1890
Minimum during August	5,750	0.7	35	1876-1877

Probable run-off curve, Plate LI.

Storage development curve, Plate CLXXXIII.

(a) Description of drainage basin: Tributary area above T. 1 S., R. 26 E., 59 square miles; PARKER CREEK, in S. E. ¼ of Sec. 4, T. 1 S., R. 26 E., 15 square miles; WALKER CANYON, in N. W. ¼ of Sec. 4, T. 1 S., R. 26 E., 15 square miles; GIBBS CANYON, in N. E. ¼ of Sec. 21, T. 1 N., R. 26 E., 6 square miles; LEEVING CREEK, in S. W. ½ of Sec. 18, T. 1 N., R. 26 E., 37 square miles; MILL CREEK, near middle of Sec. 15, T. 2 N., R. 25 E., 18 square miles; unnamed small streams between Mill and Leeving Creeks, above points 1 mile from Mono Lake, 16 square miles.

(b) Point of measurement: On Leeving Creek in S. E. ¼ of Sec. 17, T. 1 N., R. 26 E., drainage area 37 square miles.

(c) Partial record, November 17 to September 30.

(d) Partial record, October 1 to March 12 and June 3 to 30.

(e) Partial record, October 1 to December 31 and April 16 to September 30.

(f) Partial record, October 1 to December 31 and May 8 to September 30.

(g) From U. S. G. S. records, supplemented by interpolated values from records of Southern Sierras Power Company.

Mass curve of run-off, Plate CXLVI.

Probable frequency of flood discharge, Plate XCI.

TABLE 167. ADOBE MEADOWS GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 453 square miles.a

Season. (Begins October 1)	Index of seasonal wetness. Division Z.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months.b
1871-1872.....	155	4.7	216	114,700	January, 5.2%
1872-1873.....	46	0.1	5	2,400	February, 4.9%
1873-1874.....	162	5.2	236	125,500	March, 7.3%
1874-1875.....	90	1.5	66	35,000	April, 8.9%
1875-1876.....	124	3.0	136	72,400	May, 11.2%
1876-1877.....	43	0.1	5	2,400	June, 16.6%
1877-1878.....	126	3.1	141	74,800	July, 14.8%
1878-1879.....	58	0.4	18	9,700	August, 10.9%
1879-1880.....	123	3.0	136	72,400	September, 4.5%
1880-1881.....	73	0.8	39	20,500	October, 5.8%
1881-1882.....	69	0.7	32	16,900	November, 5.3%
1882-1883.....	62	0.5	23	12,100	December, 4.6%
1883-1884.....	51	0.2	9	4,800	
1884-1885.....	33	0.0	0	0	
1885-1886.....	64	0.6	25	13,300	
1886-1887.....	72	0.8	36	19,300	
1887-1888.....	114	2.5	114	60,400	
1888-1889.....	99	1.8	82	43,500	
1889-1890.....	97	1.7	77	41,000	
1890-1891.....	150	4.4	202	107,400	
1891-1892.....	89	1.4	64	33,800	
1892-1893.....	137	3.7	168	89,300	
1893-1894.....	57	0.4	18	9,700	
1894-1895.....	92	1.5	68	36,200	
1895-1896.....	53	0.3	14	7,200	
1896-1897.....	92	1.5	68	36,200	
1897-1898.....	36	0.0	0	0	
1898-1899.....	52	0.3	14	7,200	
1899-1900.....	77	1.0	43	22,900	
1900-1901.....	135	3.6	164	86,900	
1901-1902.....	87	1.3	59	31,400	
1902-1903.....	46	0.1	5	2,400	
1903-1904.....	65	0.6	27	14,500	
1904-1905.....	148	4.3	198	105,000	
1905-1906.....	122	2.9	132	70,000	
1906-1907.....	122	2.9	132	70,000	
1907-1908.....	131	3.4	154	82,100	
1908-1909.....	145	4.2	191	101,400	
1909-1910.....	123	3.0	136	72,400	
1910-1911.....	144	4.1	186	99,000	
1911-1912.....	87	1.3	59	31,400	
1912-1913.....	103	2.0	91	48,300	
1913-1914.....	257	11.8	536	284,900	
1914-1915.....	117	2.7	123	65,200	
1915-1916.....	209	8.3	377	200,400	
1916-1917.....	131	3.4	155	82,100	
1917-1918.....	92	1.5	68	36,200	
1918-1919.....	91	1.5	68	36,200	
1919-1920.....	89	1.4	64	33,800	
1920-1921.....	60	0.5	20	10,900	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal.....	53,100	2.20	117	
Maximum seasonal.....	284,900	11.80	629	1913-1914
Minimum seasonal.....	0	0.00	0	1884-1885 1897-1898
Mean during July.....	7,900	0.33	17	
Maximum during July.....	42,200	1.70	93	1913-1914
Minimum during July.....	0	0.00	0	1884-1885 1897-1898
Mean during August.....	5,800	0.24	13	
Maximum during August.....	31,100	1.20	69	1913-1914
Minimum during August.....	0	0.00	0	1884-1885 1897-1898

Probable run-off curve, Plate LI.

Mass curve of run-off, Plate CXLVI.

Storage development curve, Plate CLXXXIII.

Probable frequency of flood discharge, Plate XCI.

(a) Description of drainage basin: Tributary area above designated elevations on the following streams: ADOBE CREEK, 6,700 feet; CHIDAGO CANYON, 6,300 feet; MONTGOMERY CREEK, 6,400 feet; MARBLE CREEK, 6,400 feet; COLDWATER CANYON, 6,000 feet; LONE TREE CREEK, 6,200 feet; MILNER CREEK, 6,200 feet; PIUTE CREEK, 7,000 feet; BIRCH CREEK, 6,300 feet; WILLOW CREEK, 6,000 feet; SACRAMENTO CANYON, 6,500 feet; McGEE CANYON, 7,000 feet; BLACK CANYON, 6,700 feet. Total area 765 square miles; non-water-producing area 312 square miles.

(b) Estimated from records for Owens River and Rock Creek

TABLE 168. OWENS RIVER (UPPER).  
SEASONAL RUN-OFF DATA. Drainage area 524 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division Q.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records. <sup>d</sup>
1871-1872	119	11.5	116	321,100	January, 5.1%
1872-1873	74	8.0	80	223,400	February, 4.9%
1873-1874	100	9.8	99	273,700	March, 7.3%
1874-1875	64	7.5	75	209,400	April, 8.9%
1875-1876	124	12.0	121	335,100	May, 11.2%
1876-1877	60	7.3	73	203,900	June, 16.6%
1877-1878	109	10.6	106	296,000	July, 14.8%
1878-1879	41	6.5	65	181,500	August, 10.9%
1879-1880	134	13.1	132	365,800	September, 4.5%
1880-1881	122	11.7	118	326,700	October, 5.8%
1881-1882	69	7.7	77	215,000	November, 5.3%
1882-1883	85	8.7	87	243,000	December, 4.7%
1883-1884	178	18.5	186	516,600	
1884-1885	78	8.2	82	229,000	
1885-1886	169	17.4	175	485,900	
1886-1887	88	9.0	90	251,300	
1887-1888	67	7.6	76	212,200	
1888-1889	92	9.1	91	254,100	
1889-1890	153	15.3	154	427,300	
1890-1891	79	8.4	84	234,600	
1891-1892	102	10.0	101	279,300	
1892-1893	101	10.0	101	279,300	
1893-1894	83	8.5	85	237,400	
1894-1895	119	11.5	116	321,100	
1895-1896	82	8.5	85	237,400	
1896-1897	107	10.4	104	290,400	
1897-1898	56	7.1	71	198,300	
1898-1899	82	8.5	85	237,400	
1899-1900	102	10.0	101	279,300	
1900-1901	137	13.5	136	377,000	
1901-1902	75	8.0	80	223,400	
1902-1903	81	8.5	85	237,400	
1903-1904	81	9.7	97	270,500	
1904-1905	132	8.6	86	239,400	
1905-1906	148	12.2	122	340,600	
1906-1907	131	13.2	133	369,800	
1907-1908	81	9.5	95	264,800	
1908-1909	113	10.5	106	294,600	
1909-1910	95	9.7	97	269,600	
1910-1911	132	12.5	125	347,800	
1911-1912	73	8.3	83	230,800	
1912-1913	66	7.7	78	216,300	
1913-1914	123	12.0	121	336,100	
1914-1915	124	9.2	93	257,600	
1915-1916	123	9.8	99	274,500	
1916-1917	88	10.6	107	297,100	
1917-1918	91	8.3	84	232,800	
1918-1919	81	8.7	88	243,600	
1919-1920	91	7.3	73	203,700	
1920-1921	95	7.5	76	210,700	

	Measured seasonal discharge in acre-feet at U.S.G.S. gaging station. <sup>c</sup>
	b21,500
	220,000
	183,800
	289,700
	319,300
	214,300
	244,100
	219,100
	297,200
	190,300
	165,800
	285,600
	207,800
	203,200
	247,400
	183,100
	188,800
	154,700
	161,800

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	278,100	10.0	531	
Maximum seasonal	516,600	18.5	987	1883-1884
Minimum seasonal	151,500	6.5	347	1878-1879
Mean during July	41,200	1.5	79	
Maximum during July	76,500	2.7	146	1883-1884
Minimum during July	23,200	0.8	44	1919-1920
Mean during August	30,300	1.1	58	
Maximum during August	56,300	2.0	108	1883-1884
Minimum during August	19,800	0.7	38	1878-1879

Probable run-off curve, Plate LII.

Storage development curve, Plate CLXXXIV.

Mass curve of run-off, Plate CXLVII.

Probable frequency of flood discharge, Plate XCII.

(a) Description of drainage basin: Area tributary to Owens River and Roek Creek, excluding Horton Creek and Pine Creek, above mouth of Roek Creek.

(b) Partial record, August 4 to September 30.

(c) Points of measurement: Owens River, near Round Valley, 700 feet above mouth of Roek Creek, drainage area 439 square miles; Roek Creek, near Round Valley, below highway bridge a short distance above mouth of Pine Creek, drainage area 85 square miles.

(d) Measured discharge adjusted for irrigation as follows: Owens River, 18,100 acres, 1902-1903 to 1914-1915; 17,800 acres, 1914-1915 to 1918-1919; 17,500 acres, 1918-1919 to 1920-1921; Roek Creek, 600 acres for entire period.

TABLE 169. BISHOP CREEK GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 446 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness, Division Q.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>c</sup>
1871-1872	119	17.5	122	415,800	January, 3.7%
1872-1873	74	10.1	70	240,000	February, 3.6%
1873-1874	100	14.0	97	332,700	March, 3.8%
1874-1875	64	9.0	63	213,900	April, 5.2%
1875-1876	124	18.3	127	434,900	May, 11.0%
1876-1877	60	8.4	58	199,600	June, 20.9%
1877-1878	109	15.5	108	368,300	July, 21.0%
1878-1879	41	6.5	45	154,500	August, 12.3%
1879-1880	134	20.1	140	477,600	September, 6.1%
1880-1881	122	17.7	123	420,600	October, 4.7%
1881-1882	69	9.5	66	225,700	November, 3.8%
1882-1883	85	11.6	81	275,600	December, 3.9%
1883-1884	178	30.0	209	712,900	
1884-1885	78	10.6	74	251,900	
1885-1886	169	27.6	192	655,800	
1886-1887	88	12.2	85	289,900	
1887-1888	67	9.2	64	218,600	
1888-1889	92	12.5	88	299,400	
1889-1890	153	24.0	167	570,300	
1890-1891	79	10.8	75	256,600	
1891-1892	102	14.2	99	337,400	
1892-1893	101	14.1	98	335,000	
1893-1894	83	11.4	79	270,900	
1894-1895	119	17.4	121	413,500	
1895-1896	82	11.2	78	266,100	
1896-1897	107	15.1	105	358,800	
1897-1898	56	8.0	56	190,100	
1898-1899	82	11.2	78	266,100	
1899-1900	102	14.2	99	337,400	
1900-1901	137	20.7	144	491,900	
1901-1902	75	10.2	71	242,400	
1902-1903	81	11.0	77	261,400	
1903-1904	81	14.6	102	347,600	
1904-1905	132	11.8	82	281,600	118,300
1905-1906	148	31.3	148	505,600	154,500
1906-1907	131	17.9	125	425,700	208,600
1907-1908	81	11.7	81	279,200	228,900
1908-1909	113	20.0	139	475,100	163,300
1909-1910	95	14.7	102	348,900	258,000
1910-1911	132	21.8	152	519,200	198,500
1911-1912	73	13.6	95	323,000	124,600
1912-1913	66	9.3	65	222,000	76,400
1913-1914	123	15.7	109	373,700	76,300
1914-1915	124	15.7	109	372,200	123,900
1915-1916	123	18.0	125	428,300	103,900
1916-1917	88	15.1	105	358,600	122,500
1917-1918	91	12.2	85	291,000	101,000
1918-1919	81	12.9	90	407,100	82,900
1919-1920	91	10.0	70	237,000	86,100
1920-1921	95	8.1	57	193,100	30,200
					53,700

(a) See next page.

(b) See next page.

(c) Estimated from above records and interpolated values.

TABLE 169—(Concluded). BISHOP CREEK GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 446 square miles.<sup>a</sup>  
SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal.....	341,500	14.4	766	
Maximum seasonal.....	712,900	30.0	1,600	1883-1884
Minimum seasonal.....	154,500	6.5	347	1878-1879
Mean during July.....	71,700	3.0	161	
Maximum during July.....	161,800	6.8	363	1905-1906
Minimum during July.....	32,400	1.4	73	1878-1879
Mean during August.....	42,000	1.8	94	
Maximum during August.....	89,600	3.8	201	1905-1906
Minimum during August.....	19,000	0.8	43	1878-1879

Probable run-off curve, Plate LII.

Mass curve of run-off, Plate CXLVII.

Storage development curve, Plate CLXXXIV.

Probable frequency of flood discharge, Plate XCII.

(a) Description of drainage basin: Tributary area on following streams above designated elevations:

Streams in group.	Drainage area, square miles.	(b) Period of measurement and authority	Elevation, feet.
Pine.....	37.2	Record not used.....	6,000
Huckleberry.....	3.9		6,000
Horton.....	15.6		6,000
McGee and Birch.....	33.3		6,000
Bishop.....	101.7	U. S. G. S. 1903-1911; S. S. P. C.* 1911-1919.....	4,500
Rawson.....	9.9		5,000
Freeman.....	7.9		5,200
Shannon.....	8.9		5,100
Baker.....	33.1	U. S. G. S. 1907-1908; L. A.† 1908-1910.....	5,000
Big Pine.....	31.8	U. S. G. S. 1903-1910; L. A.† 1919-1921.....	4,500
Little Pine.....	9.4		4,500
Birch.....	9.8	U. S. G. S. 1906-1909; L. A.† 1909-1910.....	6,000
Fuller.....	2.4		6,400
Tinemaha.....	6.7	U. S. G. S. 1906-1910.....	6,500
Red Mountain.....	7.2		6,500
Taboose.....	10.2	U. S. G. S. 1904-1910; L. A.† 1920-1921.....	6,300
Goodale.....	8.8	U. S. G. S. 1904-1910; L. A.† 1920-1921.....	4,200
Division.....	9.9	U. S. G. S. 1904-1910.....	4,600
Sawmill.....	7.8	U. S. G. S. 1907-1908; L. A.† 1912-1914; 1920-21.....	4,700
Thibaut.....	11.2		4,900
Oak.....	26.4	U. S. G. S. 1904-1910; L. A.† 1920-1921.....	4,200
Independence.....	8.4	U. S. G. S. 1904-1910; L. A.† 1912-1921.....	5,300
Pinyon.....	4.2	U. S. G. S. 1908-1910; L. A.† 1920-1921.....	5,300
Symmes.....	10.4	U. S. G. S. 1906-1910; L. A.† 1920-1921.....	5,500
Unnamed area.....	29.4		Above top of Talus slope

\*Southern Sierras Power Company.

†City of Los Angeles.

TABLE 170. OWENS LAKE GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 216 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division R.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	120	8.8	121	101,200	January, 2.6%
1872-1873	75	4.0	55	46,000	February, 2.6%
1873-1874	101	6.5	89	73,800	March, 4.0%
1874-1875	64	3.2	44	36,800	April, 8.4%
1875-1876	125	9.6	132	110,400	May, 19.6%
1876-1877	53	2.5	34	28,800	June, 23.9%
1877-1878	140	12.0	165	138,000	July, 16.4%
1878-1879	25	2.6	36	29,900	August, 9.3%
1879-1880	137	11.5	158	132,300	September, 4.3%
1880-1881	86	6.0	83	69,000	October, 3.6%
1881-1882	93	4.7	65	54,000	November, 2.7%
1882-1883	88	5.2	72	59,800	December, 2.6%
1883-1884	181	19.5	268	224,300	
1884-1885	71	3.6	50	41,400	
1885-1886	123	9.4	129	108,100	
1886-1887	86	4.9	67	56,400	
1887-1888	60	2.9	40	33,400	
1888-1889	78	4.2	58	48,300	
1889-1890	119	8.8	121	101,200	
1890-1891	87	5.1	70	58,700	
1891-1892	107	7.2	99	82,800	
1892-1893	94	5.8	80	66,700	
1893-1894	88	5.2	72	59,800	
1894-1895	139	12.0	165	138,000	
1895-1896	91	6.0	83	68,000	
1896-1897	125	9.6	132	110,400	
1897-1898	54	2.5	34	28,800	
1898-1899	73	3.8	52	43,700	
1899-1900	82	4.6	63	52,900	
1900-1901	119	8.8	121	101,200	
1901-1902	97	6.1	84	70,200	
1902-1903	97	6.1	84	70,200	
1903-1904	71	3.6	50	41,400	
1904-1905	118	5.1	70	59,000	
1905-1906	169	17.1	235	196,500	
1906-1907	123	11.8	162	135,500	
1907-1908	90	8.3	114	95,100	
1908-1909	165	15.2	209	174,500	
1909-1910	102	7.2	99	82,800	
1910-1911	103	9.0	124	103,100	
1911-1912	76	4.1	56	47,100	
1912-1913	67	6.6	91	76,500	
1913-1914	135	12.8	176	148,200	
1914-1915	111	7.0	96	81,000	
1915-1916	153	13.8	190	158,900	
1916-1917	98	8.4	116	97,100	
1917-1918	62	6.9	95	79,100	
1918-1919	88	5.3	73	60,900	
1919-1920	99	5.1	70	59,100	
1920-1921	92	3.5	48	40,800	

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.<sup>i</sup>

c6,800  
d114,200  
d76,000  
d53,300  
d95,200  
e45,100  
f4,600  
e8,300  
g51,900  
h34,200  
h61,400  
h38,600  
h35,900  
h27,400  
h25,500  
h10,800

- (a) See next page.  
(b) Estimated from records and interpolated values.  
(c) Lone Pine Creek.  
(d) Ash, Shepard, George, Cottonwood and Lone Pine Creeks.  
(e) Shepard, George, Cottonwood and Lone Pine Creeks.  
(f) Cottonwood Creek.  
(g) Cottonwood and Lone Pine Creeks.  
(h) Ash, Cottonwood and Lone Pine Creeks.  
(i) Records incomplete.

TABLE 170—(Concluded). OWENS LAKE GROUP.  
SEASONAL RUN-OFF DATA. Drainage area 216 square miles.<sup>a</sup>  
SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal.....	83,600	7.3	388	
Maximum seasonal.....	224,300	19.5	1,040	1883-1884
Minimum seasonal.....	28,800	2.5	134	1876-1877
Mean during July.....	13,700	1.2	64	
Maximum during July.....	53,900	4.7	250	1905-1906
Minimum during July.....	4,700	0.4	22	1876-1877
Mean during August.....	7,800	0.7	36	
Maximum during August.....	24,950	2.2	116	1905-1906
Minimum during August.....	2,700	0.2	13	1876-1877

Probable run-off curve, Plate LII.

Storage development curve, Plate CLXXXIV.

(a) Description of drainage basin: Tributary area on following streams above designated elevations:

Mass curve of run-off, Plate CXLVII.

Probable frequency of flood discharge, Plate XCII.

Streams in group.	Drainage area, sq. miles	Period of measurement and authority.	Elevation, feet.
Ash.....	15.4	U. S. G. S. 1905-1906 to 1908-1909; L. A.* 1914-1915 to 1920-1921...	4,000
Shepard.....	13.0	U. S. G. S. 1905-1906 to 1909-1910.....	5,900
Bairs.....	7.5	Record not used.....	6,100
George.....	10.6	U. S. G. S. 1905-1906 to 1909-1910.....	6,500
Hogback.....	8.7	No record.....	6,400
Cottonwood.....	42.9	U. S. G. S. 1905-1906 to 1910-1911; L. A. 1913-1914 to 1920-1921.....	5,200
Lone Pine.....	12.3	U. S. G. S. 1904-1905 to 1909-1910; L. A.* 1912-1913 to 1920-1921.....	6,300
Tuttle and Dietz.....	11.8	No record.....	6200-6500
Rieher and Carrol.....	20.8	No record.....	5900-6400
Braley.....	1.5	Record not used.....	4,300
Olancha.....			4,500
Walker.....			4,900
Summit.....	57.6		4,500
Hogback.....			5,200
Carthage.....			4,000
Haiwee.....			4,900
Unnamed area.....	10.0		

\*City of Los Angeles.

TABLE 171. MOJAVE RIVER.  
SEASONAL RUN-OFF DATA. Drainage area 211 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division X.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months. <sup>c</sup>
1871-1872	56	1.8	21	20,200	January, 18.8%
1872-1873	94	6.7	77	75,300	February, 19.8%
1873-1874	148	18.1	207	203,500	March, 32.1%
1874-1875	81	5.0	57	56,200	April, 13.2%
1875-1876	123	13.5	143	140,400	May, 6.3%
1876-1877	59	2.1	24	23,600	June, 2.1%
1877-1878	137	15.5	178	174,100	July, 0.6%
1878-1879	52	1.5	17	16,800	August, 0.3%
1879-1880	117	11.0	126	123,600	September, 0.2%
1880-1881	73	3.6	41	40,400	October, 0.3%
1881-1882	63	2.5	29	28,100	November, 0.6%
1882-1883	54	1.7	19	19,100	December, 5.7%
1883-1884	229	36.3	416	407,700	
1884-1885	68	3.2	37	35,900	
1885-1886	120	11.6	133	130,300	
1886-1887	74	3.8	44	42,700	
1887-1888	127	13.4	154	150,500	
1888-1889	128	13.5	155	151,600	
1889-1890	164	21.5	246	241,500	
1890-1891	117	11.0	126	123,600	
1891-1892	78	4.3	49	48,300	
1892-1893	117	11.0	126	123,600	
1893-1894	58	2.1	24	23,600	
1894-1895	138	15.8	181	177,500	
1895-1896	58	2.1	24	23,600	
1896-1897	116	10.8	124	121,300	
1897-1898	56	1.8	21	20,200	
1898-1899	47	1.3	15	14,600	
1899-1900	58	2.1	24	23,600	
1900-1901	102	8.0	92	89,900	Measured seasonal discharge in acre-feet. <sup>b, c</sup>
1901-1902	69	3.2	37	35,900	
1902-1903	116	10.8	124	121,300	
1903-1904	61	2.4	27	27,000	
1904-1905	140	9.3	107	104,900	d103,900
1905-1906	135	12.2	140	136,700	136,700
1906-1907	138	22.7	260	255,100	255,100
1907-1908	88	5.2	60	58,900	58,900
1908-1909	117	8.0	92	89,600	f89,600
1909-1910	97	12.1	139	136,300	f136,300
1910-1911	105	13.2	151	148,400	148,400
1911-1912	81	4.2	48	47,600	f47,600
1912-1913	61	2.3	26	26,000	26,000
1913-1914	141	15.1	173	170,400	170,400
1914-1915	136	10.9	125	122,400	c121,200
1915-1916	146	17.5	200	196,600	
1916-1917	91	6.1	70	68,500	
1917-1918	86	5.4	62	60,700	
1918-1919	73	3.8	43	42,700	
1919-1920	111	9.8	112	110,100	
1920-1921	93	6.5	74	73,000	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	98,200	8.74	466	
Maximum seasonal	407,700	36.30	1,936	1883-1884
Minimum seasonal	14,600	1.30	69	1898-1899
Mean during July	590	0.50	3	
Maximum during July	2,450	.32	12	1883-1884
Minimum during July	90	.01	Trace	1898-1899
Mean during August	290	.03	1	
Maximum during August	1,220	.11	6	1883-1884
Minimum during August	40	Trace	Trace	1898-1899

Probable run-off curve, Plate LII.

Storage development curve, Plate CLXXXIV.

(a) Description of drainage basin: Tributary area above junction of East and West Forks.

(b) Point of measurement: On East and West Forks, near junction, drainage area 311 square miles.

(c) Discharge measurements from records of Arrowhead Reservoir and Power Company, except as noted.

(d) Partial record, December 1 to September 30.

(e) Partial record, October 1 to June 30.

(f) From records of Arrowhead Reservoir and Power Company and Mojave Water and Power Company as published in the Sixth Biennial Report, State Department of Engineering, pages 68 to 72.



**TABLE 172. ANTELOPE VALLEY GROUP.**  
SEASONAL RUN-OFF DATA. Drainage area 119 square miles.a

Season. (Begins October 1.)	Index of seasonal wetness. Division V.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area.)	Distribution of seasonal run-off by months as shown by U.S.G.S. records.
1871-1872	79	2.4	52	15,300	January, 9 7/10%
1872-1873	56	1.1	24	7,000	February, 16 4/10%
1873-1874	84	2.7	58	17,200	March, 29 8/10%
1874-1875	96	3.6	77	22,900	April, 25 2/10%
1875-1876	125	6.5	139	41,400	May, 9 7/10%
1876-1877	28	0.2	4	1,300	June, 2 1/10%
1877-1878	147	9.1	195	57,900	July, 0 2/10%
1878-1879	56	1.1	24	7,000	August, 0 1/10%
1879-1880	145	8.8	189	56,000	September, 0 2/10%
1880-1881	66	1.6	34	10,200	October, 1 9/10%
1881-1882	44	0.6	13	3,800	November, 2 2/10%
1882-1883	65	1.5	32	9,500	December, 2 5/10%
1883-1884	204	17.0	365	108,200	
1884-1885	65	1.5	32	9,500	
1885-1886	167	11.7	251	74,400	
1886-1887	120	6.0	129	38,200	
1887-1888	134	7.4	159	47,100	
1888-1889	146	9.0	193	57,300	
1889-1890	180	13.5	290	85,900	
1890-1891	94	3.5	75	22,300	
1891-1892	104	4.3	92	27,400	
1892-1893	107	4.6	99	29,300	
1893-1894	101	4.0	86	25,400	
1894-1895	126	6.6	142	42,000	
1895-1896	70	1.6	34	10,200	
1896-1897	96	4.1	88	26,100	
1897-1898	33	0.7	15	4,500	
1898-1899	30	0.4	9	2,500	
1899-1900	64	1.5	32	9,500	
1900-1901	103	4.2	90	26,700	
1901-1902	87	3.0	64	19,100	
1902-1903	84	2.7	58	17,200	
1903-1904	63	1.5	32	9,500	
1904-1905	140	8.2	176	52,200	
1905-1906	154	10.0	215	63,600	
1906-1907	140	8.2	176	52,200	
1907-1908	81	2.5	54	15,900	
1908-1909	117	5.6	120	35,600	
1909-1910	63	1.5	32	9,500	
1910-1911	119	5.8	124	36,900	
1911-1912	101	4.0	86	25,400	
1912-1913	85	2.8	60	17,800	
1913-1914	96	3.6	77	22,900	
1914-1915	128	6.8	146	43,300	
1915-1916	135	7.6	163	48,400	
1916-1917	111	5.0	107	31,800	
1917-1918	117	5.6	120	35,600	
1918-1919	75	2.2	47	14,000	
1919-1920	80	2.5	54	15,900	
1920-1921	89	3.1	67	19,700	

Measured seasonal discharge in acre-feet at U.S.G.S. gaging station.c

66,200  
17,300  
2,900  
1,600

SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	29,700	4.66	249	
Maximum seasonal	108,200	17.01	907	1883-1884
Minimum seasonal	1,300	0.20	11	1876-1877
Mean during July	60	0.01	1	
Maximum during July	220	0.03	2	1883-1884
Minimum during July	0	0.00	0	1897-1898
Mean during August	30	Trace	Trace	
Maximum during August	110	0.02	1	1883-1884
Minimum during August	0	0.00	0	1897-1898

Probable run-off curve, Plate LIII.

Storage development curve, Plate CLXXXV.

Mass curve of run-off, Plate CXLVIII.

Probable frequency of flood discharge, Plate XCIII.

(a) Description of drainage basin: Areas tributary to following streams above designated points: AMARGOSA CREEK, above N. W. cor. of Sec. 29, T. 6 N., R. 12 W., drainage area 28.4 square miles; LITTLE ROCK CREEK, at intersection with Lat. 34° 29.4', drainage area 64.4 square miles; BIG ROCK CREEK, at intersection with Lat 34° 26.1', drainage area 36.5 square miles.

(b) Partial record, January 1 to September 30.

(c) Point of measurement: Little Rock Creek near Palmdale, drainage area 64 square miles.

TABLE 173. WHITEWATER RIVER.  
SEASONAL RUN-OFF DATA. Drainage area 269 square miles.<sup>a</sup>

Season. (Begins October 1.)	Index of seasonal wetness. Division X.	Depth of run-off in inches.	Run-off index.	Estimated seasonal run-off in acre-feet. (Above main agricultural area)	Distribution of seasonal run-off by months. <sup>b</sup>
1871-1872	56	0.1	11	1,400	January, 18.5%
1872-1873	94	0.5	53	7,200	February, 19.8%
1873-1874	148	2.2	233	31,600	March, 32.1%
1874-1875	84	0.4	42	5,700	April, 13.2%
1875-1876	123	1.3	138	18,600	May, 6.3%
1876-1877	59	0.1	11	1,400	June, 2.1%
1877-1878	137	1.8	191	25,800	July, 0.6%
1878-1879	52	0.1	11	1,400	August, 0.3%
1879-1880	117	1.1	116	15,800	September, 0.2%
1880-1881	73	0.3	32	4,300	October, 0.3%
1881-1882	63	0.2	21	2,900	November, 0.6%
1882-1883	54	0.1	11	1,400	December, 5.7%
1883-1884	229	5.6	593	80,300	
1884-1885	68	0.2	21	2,900	
1885-1886	120	1.2	127	17,200	
1886-1887	74	0.3	32	4,300	
1887-1888	127	1.5	159	21,500	
1888-1889	128	1.5	159	21,500	
1889-1890	164	2.8	297	40,200	
1890-1891	117	1.1	116	15,800	
1891-1892	78	0.3	32	4,300	
1892-1893	117	1.1	116	15,800	
1893-1894	58	0.1	11	1,400	
1894-1895	138	1.8	191	25,800	
1895-1896	58	0.1	11	1,400	
1896-1897	116	1.1	116	15,800	
1897-1898	56	0.1	11	1,400	
1898-1899	47	0.1	11	1,400	
1899-1900	58	0.1	11	1,400	
1900-1901	102	0.8	85	11,500	
1901-1902	69	0.2	21	2,900	
1902-1903	116	1.1	116	15,800	
1903-1904	61	0.2	21	2,900	
1904-1905	140	1.9	201	27,200	
1905-1906	135	1.7	180	24,400	
1906-1907	138	1.8	191	25,800	
1907-1908	88	0.5	53	7,200	
1908-1909	117	1.1	116	15,800	
1909-1910	97	0.7	74	10,000	
1910-1911	105	0.8	85	11,500	
1911-1912	81	0.4	42	5,700	
1912-1913	61	0.2	21	2,900	
1913-1914	141	1.9	201	27,200	
1914-1915	136	1.7	180	24,400	
1915-1916	146	2.1	222	30,100	
1916-1917	91	0.5	53	7,200	
1917-1918	86	0.5	53	7,200	
1918-1919	73	0.3	32	4,300	
1919-1920	111	1.0	106	14,300	
1920-1921	93	0.6	63	8,600	

## SUMMARY OF ESTIMATED RUN-OFF.

	Acre-feet.	Depth in inches.	Acre-feet per square mile.	Season.
Mean seasonal	13,500	0.94	50	
Maximum seasonal	80,300	5.60	299	1883-1884
Minimum seasonal	1,400	0.10	5	1898-1899
Mean during July	80	0.01	Trace	
Maximum during July	480	0.03	2	1883-1884
Minimum during July	10	Trace	Trace	1898-1899
Mean during August	40	Trace	Trace	
Maximum during August	240	0.02	1	1883-1884
Minimum during August	Trace	Trace	Trace	1898-1899

Probable run-off curve, Plate LIII.

Storage development curve, Plate CLXXXV.

(a) Description of drainage basin: Tributary area above forks near Whitewater.

(b) Estimated from records for the Mojave River.

Mass curve of run-off, Plate CXLVIII

Probable frequency of flood discharge, Plate XCIII



TABLE 174. SUMMARY OF RUN-OFF DATA AND INDEX TO PLATES AND TABLES.

COLUMN 2. This number shows the location of the basin on map, Plate XV, and is also the number of the table which contains its run-off data.  
 COLUMN 3. This is the letter naming the irrigation draft line, among the types on Plate CXLIX, which was used in studies of storage requirements in the basin for quenching periodic run-off for irrigation use.  
 COLUMN 4. This letter designates the precipitation division in which the basin lies, and its location is shown on map, Plate XII.  
 COLUMN 5. This table presents records of precipitation and computed indices of seasonal wetness for this precipitation division.  
 COLUMN 6. This plate presents mass diagrams of indices of wetness showing comparison of sequence of station precipitation to mean sequence of division.  
 COLUMN 7. This shows, diagrammatically, the relation between the run-off from the drainage basin and the index of seasonal wetness for the precipitation division in which the basin lies.  
 COLUMN 8. This shows, diagrammatically, the number of times in one hundred years that floods may be expected to occur in the basin which equal or exceed each rate of run-off.  
 COLUMN 9. This is a graph of the successive sums of monthly run-off from the basin, each sum beginning with October, 1871, and continuing up to each succeeding month of the fifty-year period. The monthly run-off, before being included in the sum, was expressed in per cent of the mean seasonal run-off, and from each successive sum is deducted a percentage proportional to 100 per cent per season from beginning of period.  
 COLUMN 10. This shows, diagrammatically, the amount of storage capacity required in the basin to equalize the periodic flow of the stream, in order to yield for irrigation diversion any volume of water which is possible to develop, with the use represented by the draft line designated in Column 3.  
 COLUMN 11. The point above which this area is measured is given in the table of Seasonal Run-off Data, numbered in Column 2.  
 COLUMN 12. The point above which run-off is computed is given in the table of Seasonal Run-off Data, numbered in Column 2.

Name of drainage basin.	Map reference number and run-off table number.	Irrigation draft line.	Precipitation.				Plate numbers.					Mean seasonal run-off, upstream from main body of agricultural lands		
			Division.	Table number.	Plate number.	Curve of probable run-off.	Flood frequency curve.	Mass diagram of run-off.	Storage development curve.	Drainage area in square miles.	Acre-feet.	Acre-feet per square mile of drainage area.	Average depth in inches over drainage area.	
Sacramento River (Upper).....	34	A	B	6	II	XVIII	(8)	(9)	(10)	(11)	(12)	(13)	(14)	
Pit River.....	35	A-B	A-B	5-6	II	XVIII	LVIII	XCV	CL	568	1,486,300	2,616	49.1	
McCloud.....	36	A	B	6	II	XVIII	LVIII	XCV	CL	5,316	4,201,600	780	14.7	
Churn Creek Group.....	37	A	B	6	II	XVIII	LVIII	XCV	CL	669	1,501,200	2,378	41.6	
Cow Creek.....	38	A	B	6	II	XVIII	LVIII	XCV	CL	100	83,100	828	15.5	
						XIX	LVIII	XCVI	CLI	441	510,200	1,150	21.6	
Bear Creek.....	39	A	B	6	II	XIX	LIX	XCVI	CLI	137	103,700	756	14.2	
Battle Creek.....	40	A	B	6	II	XIX	LIX	XCVI	CLI	366	421,800	1,151	21.6	
Ink's Creek.....	41	A	B	6	II	XX	LX	XCVII	CLII	34	28,200	825	15.5	
Payne's Creek.....	42	A	B	6	II	XX	LX	XCVII	CLII	80	81,200	1,018	19.6	
Backbone Creek Group.....	43	A	B	6	II	XX	LX	XCVII	CLII	178	207,500	1,166	21.8	
Clear Creek.....	44	A	B	6	II	XX	LX	XCVII	CLII	251	291,900	1,175	22.0	
Cottonwood Creek.....	45	A	B	6	II	XXI	LXI	XCVIII	CLIII	937	913,300	971	18.3	
Sacramento River*.....	46	A	A-B	5-6	II	XXI	LXI	XCVIII	CLIII	9,258	9,929,000	1,072	20.1	
Mill Creek Group.....	47	A	G	11	IV	XXI	LXI	XCVIII	CLIII	971	1,157,400	1,192	22.4	
Butte Creek Group.....	48	A	G	11	IV	XXI	LXI	XCVIII	CLIII	251	338,400	1,427	26.8	

\*At Red Bluff, includes all streams listed above, and 147 square miles of agricultural area. See Table 2.

49	Feather River	A	11	IV	XXII	LXII	XCLX	CLIV	3,627	5,283,500	1,156	27.3
50	Honcut Creek Group	A	11	IV	XXII	LXII	XCLX	CLIV	314	199,400	666	11.9
51	Kuba River	A	12	IV	XXII	LXII	XCLX	CLIV	1,200	2,052,000	2,210	41.4
52	Dry Creek	A	12	IV	XXII	LXII	XCLX	CLIV	79	49,700	627	11.8
53	Bear River	A	12	IV	XXIII	LXIII	C	CLV	262	412,500	1,574	29.5
54	Coon Creek Group	J	14	V	XXIII	LXIII	C	CLV	210	34,100	162	3.0
55	American River	A	14	V	XXIII	LXIII	C	CLV	1,919	3,481,900	1,658	31.1
56	Red Bank Creek Group	F	10	III	XXIII	LXIII	CI	CLV	109	73,000	672	12.6
57	Elder Creek Group	F	10	III	XXIII	LXIII	CI	CLV	414	213,000	515	9.7
58	Stony Creek	F	10	III	XXIV	LXIV	CH	CLVI	710	555,000	782	14.6
59	Willow Creek Group	F	10	III	XXIV	LXIV	CH	CLVI	394	92,200	234	4.4
60	CACHE Creek	F	10	III	XXIV	LXIV	CH	CLVI	1,195	586,000	490	9.2
61	Putah Creek	F	10	III	XXV	LXV	CH	CLVII	655	421,800	644	12.1
62	Orestimba Creek Group	F-L	20-16	VI-V	XXV	LXV	CIV	CLVII	1,340	110,800	83	1.6
63	Panoche Creek	T	24	VIII	XXV	LXV	CIV	CLVII	285	27,100	92	1.7
64	Canjua Creek Group	T	24	VIII	XXV	LXV	CV	CLVIII	208	12,500	60	1.1
65	Los Gatos Creek	T	24	VIII	XXV	LXV	CV	CLVIII	119	9,750	82	1.5
66	Tejon Creek Group	T	24	VIII	XXVI	LXVI	CVI	CLVIII	1,341	95,600	71	1.3
67	Caliente Creek	B	26	VIII	XXVI	LXVI	CVI	CLVIII	471	45,000	96	1.8
68	Kern River	R	22	VII	XXVI	LXVI	CVII	CLVIII	2,410	760,100	316	5.9
69	Peso Creek Group	R	22	VII	XXVII	LXVII	CVIII	CLIX	576	47,200	82	1.5
70	Deer Creek	R	22	VII	XXVII	LXVII	CVIII	CLIX	110	20,650	187	3.5
71	Tule River	R	22	VII	XXVII	LXVII	CVIII	CLIX	390	141,500	363	6.8
72	Yokoh Creek Group	B	22	VII	XXVII	LXVII	CVIII	CLIX	68	14,800	151	2.8
73	Kaweah River	B	22	VII	XXVIII	LXVIII	CLX	CLX	514	407,900	791	14.9
74	Limekin Creek Group	B	22	VII	XXVIII	LXVIII	CLX	CLX	201	62,200	310	5.8
75	King River	Q	21	VII	XXVIII	LXVIII	CLX	CLX	1,694	1,925,100	1,136	21.3
76	Dry Creek	Q	21	VII	XXVIII	LXVIII	CLX	CLX	48	4,500	94	1.8
77	San Joaquin River (Upper)	Q	21	VII	XXIX	LXIX	CX	CLXI	1,631	2,056,900	1,261	23.6
78	Cottonwood Creek	Q	21	VII	XXIX	LXIX	CX	CLXI	28	2,300	81	1.5
79	Fresno River	Q	21	VII	XXIX	LXIX	CX	CLXI	270	68,300	253	4.7
80	Quinton Creek Group	B	21	VII	XXX	LXX	CXI	CLXI	168	5,200	78	1.5
81	Chowchilla River	B	15	V	XXX	LXX	CXI	CLXI	298	67,700	281	5.3
82	Durham Creek Group	B	15	V	XXX	LXX	CXI	CLXI	72	8,300	115	2.2
83	Mariposa Creek	B	15	V	XXX	LXX	CXI	CLXI	103	12,800	125	2.3
84	Owens Creek	B	15	V	XXX	LXX	CXIII	CLXII	66	6,500	98	1.8
85	Bear Creek	B	15	V	XXXI	LXXI	CXIII	CLXII	71	7,500	105	2.1
86	Burns Creek Group	B	15	V	XXXI	LXXI	CXIV	CLXII	171	24,400	143	2.7
87	Merced River	B	15	V	XXXI	LXXI	CXIV	CLXII	1,054	1,132,500	1,073	20.4
88	Tuolumne River	B	15	V	XXXI	LXXI	CXV	CLXIII	1,543	2,055,800	1,332	24.9
89	Wildcat Creek Group	B	15	V	XXXII	LXXII	CXV	CLXIV	59	8,850	151	2.8
90	Stanislaus River	B	15	V	XXXII	LXXII	CXVI	CLXIV	983	1,376,000	1,400	26.2
91	Littlejohns Creek	B	15	V	XXXII	LXXII	CXVI	CLXIV	41	8,150	201	3.8
92	Martells Creek Group	B	15	V	XXXII	LXXII	CXVI	CLXIV	122	14,300	117	2.2
93	Calaveras River	B	15	V	XXXIII	LXXIII	CXVI	CLXV	394	316,500	863	15.1

TABLE 174—(Concluded). SUMMARY OF RUN-OFF DATA AND INDEX TO PLATES AND TABLES.

Name of drainage basin.	Map reference number and run-off table number.	Irrigation draft line.	Precipitation.			Plate numbers.					Drainage area in square miles.	Mean seasonal run-off from main body of agricultural lands.		
			Division.	Table number.	Plate number.	Curve of probable run-off.	Flood frequency curve.	Mass diagram of run-off.	Storage development curve.	Acres-feet per square mile of drainage area.		Acres-feet per square mile of drainage area.	Average depth in inches over drainage area.	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	
Mokelumne River.....	94	B	K	15	V	XXXIII	LXXXIII	CXVII	CLXV	682	898,100	1,421	26.7	
Sutter Creek Group.....	95	B	K	15	V	XXXIII	LXXXIII	CXVII	CLXV	682	93,200	327	6.1	
Costaumas River.....	96	B	K	15	V	XXXIII	LXXXIII	CXVII	CLXV	682	482,000	903	16.9	
Petaluma Creek Group.....	97	C	M	17	VI	XXXIV	LXXXIV	CXVIII	CLXVI	139	75,300	542	10.2	
Sonoma Creek Tributaries.....	98	C	M	17	VI	XXXIV	LXXXIV	CXVIII	CLXVI	78	35,600	455	8.5	
Napa River Tributaries.....	99	C	M	17	VI	XXXIV	LXXXIV	CXVIII	CLXVI	226	115,200	510	9.6	
Susun Creek Group.....	100	C	M	17	VI	XXXIV	LXXXIV	CXVIII	CLXVI	125	52,500	421	7.9	
Mt. Diablo Creek Group.....	101	C	L	16	V	XXXV	LXXXV	CXIX	CLXVII	200	69,800	350	6.6	
San Pablo Creek.....	102	C	L	16	V	XXXV	LXXXV	CXIX	CLXVII	41	17,200	424	7.9	
San Leandro Creek.....	103	C	L	16	V	XXXV	LXXXV	CXIX	CLXVII	44	18,900	433	8.1	
Claremont Creek Group.....	104	C	L	16	V	XXXV	LXXXV	CXIX	CLXVII	83	24,600	297	5.6	
San Lorenzo Creek.....	105	C	L	16	V	XXXV	LXXXV	CXIX	CLXVII	38	16,700	411	8.3	
Alameda Creek.....	106	C	L	16	V	XXXV	LXXXV	CXIX	CLXVII	654	140,900	245	4.0	
Mission Creek Group.....	107	C	L	16	V	XXXV	LXXXV	CXIX	CLXVII	77	25,000	324	6.1	
Penitencia Creek.....	108	C	L	16	V	XXXV	LXXXV	CXIX	CLXVII	22	5,200	232	4.3	
Coyote River.....	109	C	N	18	VI	XXXVII	LXXXVII	CXXIII	CLXX	197	80,100	407	7.6	
Guadalupe River.....	110	C	N	18	VI	XXXVII	LXXXVII	CXXIII	CLXX	52	22,000	421	7.9	
Los Gatos Creek Group.....	111	C	N	18	VI	XXXVII	LXXXVII	CXXIII	CLXX	121	68,500	566	10.6	
San Francisco Creek.....	112	C	L	16	V	XXXVIII	LXXXVIII	CXXIV	CLXX	38	20,700	550	10.3	
San Mateo Creek Group.....	113	C	L	16	V	XXXVIII	LXXXVIII	CXXIV	CLXX	84	37,100	439	8.2	
Smith River.....	114	C	D	8	III	XXXVIII	LXXXVIII	CXXV	CLXX	627	3,406,200	5,433	101.9	
Klamath River.....	115	C	C	7	II	XXXVIII	LXXXVIII	CXXV	CLXX	2,320	3,410,700	1,470	27.6	
Shasta River.....	116	C	C	7	II	XXXVIII	LXXXVIII	CXXV	CLXX	803	242,600	302	5.7	
Scott River.....	117	C	C	7	II	XXXIX	LXXXIX	CXXVI	CLXXI	813	521,100	813	12.0	
Salmon River.....	118	C	C	7	II	XXXIX	LXXXIX	CXXVI	CLXXI	734	1,256,400	1,712	32.1	
Trinity River.....	119	C	C	7	II	XXXIX	LXXXIX	CXXVI	CLXXI	2,965	4,447,700	1,500	28.1	
Redwood Creek.....	120	C	D-E	8	III	XXXIX	LXXXIX	CXXVI	CLXXI	275	837,400	57.1	31.4	
Mad River.....	121	C	D-E	8-9	III	XL	LXXX	CXXVII	CLXXII	457	1,182,500	2,588	48.5	
Eel River.....	122	C	E	9	III	XL	LXXX	CXXVII	CLXXII	3,517	6,040,000	1,708	31.8	
Bear Creek.....	123	C	D	8	III	XL	LXXX	CXXVII	CLXXII	82	227,000	2,785	52.2	
Mattole River.....	124	C	D	8	III	XL	LXXX	CXXVIII	CLXXIII	264	1,060,600	4,017	75.3	
Noyo River Group.....	125	C	D	8	III	XL	LXXX	CXXVIII	CLXXIII	780	1,305,500	1,674	31.4	
Navarro River.....	126	C	D	8	III	XL	LXXX	CXXVIII	CLXXIII	273	391,600	1,435	26.9	
Guadalupe River Group.....	127	C	D	8	III	XL	LXXX	CXXVIII	CLXXIII	623	849,700	1,364	25.6	
Russian River.....	128	C	E	9	III	XL	LXXX	CXXIX	CLXXIII	1,508	1,416,600	940	17.6	

129	Lagunitas Creek.....	C	D	8	III	XLIII	LXXXII	CXXX	CLXXXIV	84	80,200	1,962	19.9
130	Salmon Creek Group.....	C	D	8	III	XLII	LXXXII	CXXX	CLXXXIV	230	113,900	495	9.3
131	Bollinas Creek Group.....	C	D	8	III	XLII	LXXXII	CXXX	CLXXXIV	158	36,600	232	4.3
132	San Diego River.....	E	Y	29	IX	XLII	LXXXII	CXXX	CLXXXIV	297	35,400	171	3.2
133	Santa Ysabel Creek.....	E	Y	29	IX	XLIII	LXXXIII	CXXX	CLXXXV	126	33,000	262	4.9
134	San Luis Rey River.....	E	Y	29	IX	XLIII	LXXXIII	CXXXVI	CLXXXV	325	59,400	183	3.1
135	Santa Margarita River.....	E	Y	29	IX	XLIII	LXXXIII	CXXXVII	CLXXXV	690	31,900	46	0.9
136	San Jacinto River Tributaries.....	E	X	28	IX	XLIII	LXXXIII	CXXXVI	CLXXXV	330	48,600	148	2.8
137	Santa Ana River Tributaries.....	E	X	28	IX	XLIV	LXXXIV	CXXXVII	CLXXXVI	460	253,400	551	10.3
138	San Gabriel River Tributaries.....	E	X	27	IX	XLV	LXXXV	CXXXVIII	CLXXXVI	280	150,200	536	10.1
139	Los Angeles River Tributaries.....	E	W	27	IX	XLV	LXXXV	CXXXVIII	CLXXXVI	467	71,000	426	8.0
140	Malibu River Group.....	E	U	25	VIII	XLV	LXXXV	CXXXIX	CLXXXVI	379	34,700	144	2.7
141	Santa Clara River Tributaries.....	E	U	25	VIII	XLV	LXXXV	CXXXIX	CLXXXVI	911	222,000	244	4.6
142	Ventura River.....	E	U	25	VIII	XLV	LXXXV	CXXXIX	CLXXXVI	226	66,200	293	5.5
143	Jalisco Creek Group.....	D	U	25	VIII	XLV	LXXXV	CXXXIX	CLXXXVI	242	48,000	198	3.7
144	Santa Ynez River.....	D	U	25	VIII	XLV	LXXXV	CXXXVI	CLXXXVII	797	205,500	258	4.8
145	San Antonio Creek.....	D	U	25	VIII	XLVI	LXXXVI	CXXXVII	CLXXXVII	138	22,600	163	3.1
146	Santa Maria River.....	D	T	24	VIII	XLVI	LXXXVI	CXXXVI	CLXXXVII	1,634	207,200	127	2.4
147	San Luis Obispo Creek Group.....	D	T	24	VIII	XLVI	LXXXVI	CXXXVII	CLXXXVII	1,019	222,700	219	4.1
148	Salinas River Tributaries.....	C	T	24	VIII	XLVI	LXXXVI	CXXXVIII	CLXXXVIII	4,042	961,900	238	4.5
149	Pajaro River Tributaries.....	C	O-T	19-24	VI-VIII	XLVII	LXXXVII	CXXXVIII	CLXXXIX	1,070	278,800	261	4.9
150	Soquel Creek Group.....	C	O-N	19-18	VI	XLVII	LXXXVII	CXXXIX	CLXXXIX	324	279,900	861	16.2
151	Pescadero Creek Group.....	C	L	16	V	XLVII	LXXXVII	CXXXIX	CLXXXIX	222	189,300	853	16.0
152	Tule Lake Group.....	C	A	5	II	XLVIII	LXXXVIII	CXL	CLXXX	901	275,200	305	5.7
153	Goose Lake Group.....	C	A	5	II	XLVIII	LXXXVIII	CXLI	CLXXX	275	32,200	117	2.2
154	Cowhead Lake Basin.....	C	A	5	II	XLVIII	LXXXVIII	CXL	CLXXX	24	5,400	222	4.2
155	Surprise Valley Group.....	C	A	5	II	XLVIII	LXXXVIII	CXLI	CLXXX	379	84,900	224	4.2
156	Madeline Plains Group.....	C	A	5	II	XLIX	LXXXIX	CXLI	CLXXX	548	110,600	202	3.8
157	Smoke Creek Group.....	C	A	5	II	XLIX	LXXXIX	CXLII	CLXXX	188	37,900	200	3.8
158	Eagle Lake Group.....	C	A	5	II	XLIX	LXXXIX	CXLII	CLXXX	498	91,000	183	3.4
159	Honey Lake Group.....	C	A	5	II	XLIX	LXXXIX	CXLII	CLXXXI	1,507	330,800	220	4.1
160	Lake Tahoe Basin.....	A	I	13	IV	XL	LXXXX	CXLIII	CLXXXII	499	261,000	523	9.8
161	Truckee River.....	A	I	13	IV	XL	LXXXX	CXLIII	CLXXXII	447	508,000	1,133	21.3
162	West Fork Carson River.....	D	I	13	IV	XL	LXXXX	CXLIII	CLXXXII	67	115,200	1,714	32.1
163	East Fork Carson River.....	D	I	13	IV	XL	LXXXX	CXLIII	CLXXXII	323	309,000	957	17.9
164	West Walker River.....	D	I	13	IV	XL	LXXXX	CXLIII	CLXXXII	405	313,800	775	14.5
165	East Walker River.....	D	I	13	IV	XL	LXXXX	CXLIII	CLXXXII	411	212,300	759	11.2
166	Mono Lake Group.....	D	K	15	V	XL	LXXXX	CXLIII	CLXXXII	156	215,650	1,301	24.4
167	Atobac Meadows Group.....	D	Z	30	X	XL	LXXXX	CXLIII	CLXXXII	453	53,100	117	2.2
168	Owens River (Upper).....	D	Q	21	VII	XL	LXXXX	CXLIII	CLXXXIV	521	278,100	531	10.0
169	Bishop Creek Group.....	D	R	21	VII	XL	LXXXX	CXLIII	CLXXXIV	446	311,500	766	11.1
170	Owens Lake Group.....	D	D	22	VII	XL	LXXXX	CXLIII	CLXXXIV	216	83,600	388	7.3
171	Mojave River.....	D	X	28	IX	XL	LXXXX	CXLIII	CLXXXIV	211	98,200	466	8.7
172	Antelope Valley Group.....	D	V	26	VIII	XL	LXXXX	CXLIII	CLXXXIV	119	29,700	249	4.7
173	Whitewater River.....	E	X	28	IX	XLII	LXXXIV	CXLIV	CLXXXV	269	13,500	50	0.9





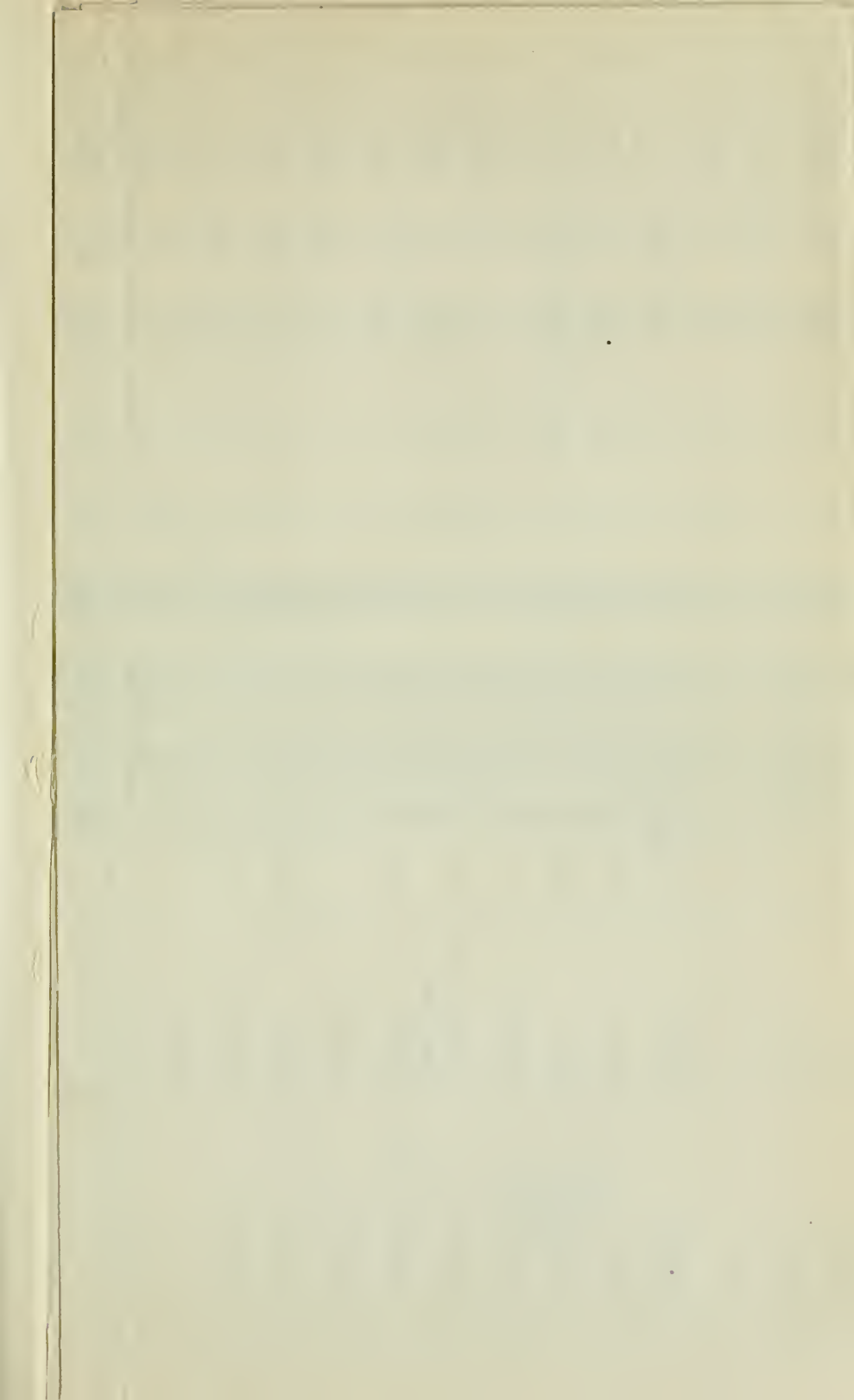


TABLE 175. FLOOD FLOW IN CALIFORNIA STREAMS.

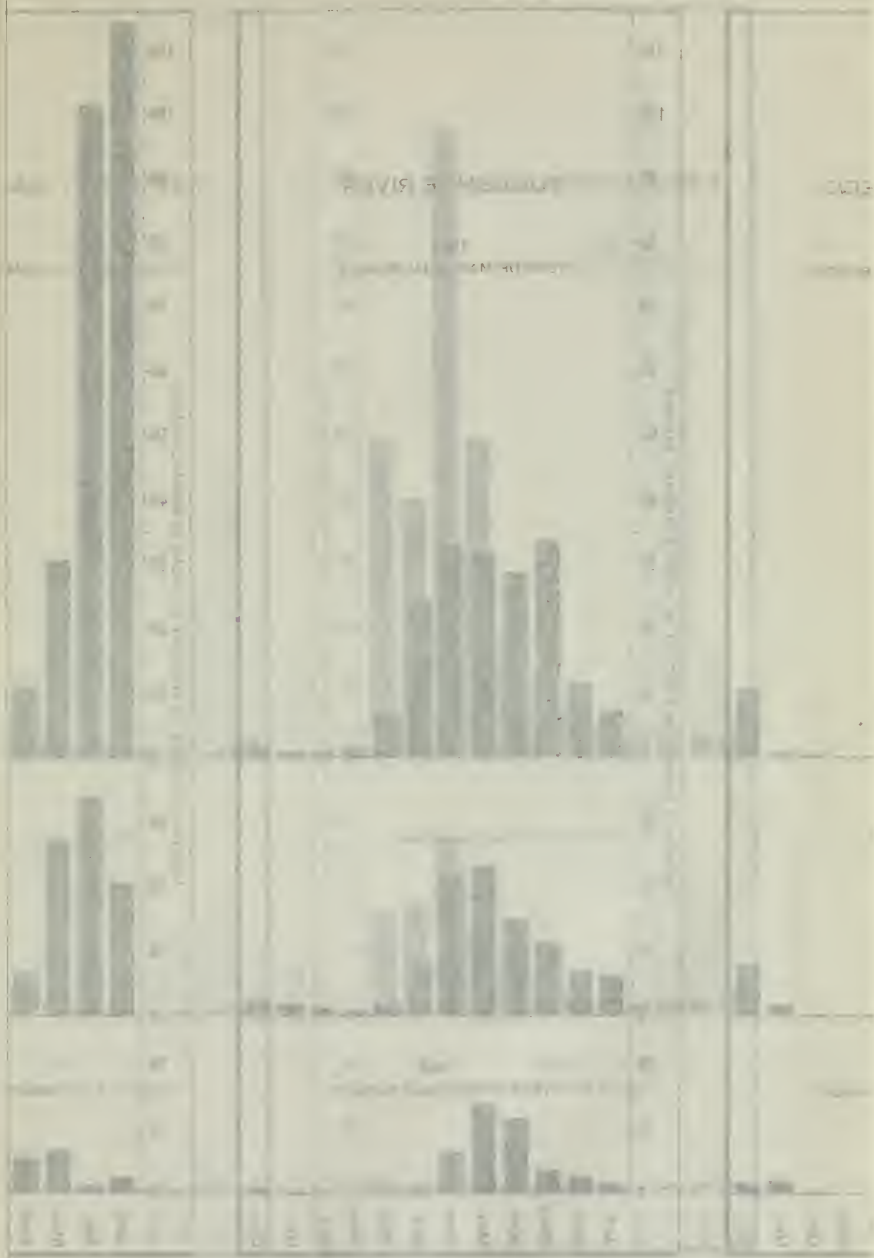
Basin number	Stream	Place of government.	Date of flood	Maximum flow in cfs.	Mean rate of flow (cfs) over the duration of flood	Estimated stage in feet		Discharge in cfs.	Area of flood in sq. ft.	Average depth in feet.	Depth in feet of flood water above normal stage.	Volume of flood water in cu. ft.	Peak flow date	Name of author.
						Actual stage	Normal stage							
35	Pit River	Yukon	Feb. 25, 1917	10,700	33,500	8.7	0.32	498,000	72,200	1.43	1.85	14,000,000,000	Feb. 25, 1917	W. S. 411, p. 282.
36	McClure River	Mead	Mar. 4, 1904	No record	42,000	47.9	2.31	253,000	42,400	0.65	1.61	8,200,000,000	Mar. 4, 1904	W. S. 235, p. 213, W. S. 411, p. 282.
46	Sarawatsa River	Red Bluff	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	1.89	10,900,000,000	Mar. 19, 1907	W. S. 296, p. 141, and 143.
49	Feather River	Oreville	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	1.89	10,900,000,000	Mar. 19, 1907	W. S. 296, p. 143, and 144.
51	Yuba River	Summersville	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	1.89	10,900,000,000	Mar. 19, 1907	W. S. 296, p. 144, p. 291.
53	Rain River	Van Tren	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	1.89	10,900,000,000	Mar. 19, 1907	W. S. 296, p. 144, p. 291.
55	American River	Forelands	Mar. 19, 1907	110,000	105,000	54.6	5.02	1,620,000	72,200	1.43	4.92	5,800,000,000	Mar. 19, 1907	W. S. 295, p. 300, 300.
58	Sung Creek	Folsom	Feb. 22, 1904	No record	22,400	35.5	1.41	1,800,000	427,500	8.53	3.53	1,800,000,000	Feb. 22, 1904	"Flood Discharge of American River," by C. L. Grady and A. Owen.
60	Catch Creek	Yuba	Mar. 9, 1907	30,900	29,500	49.1	0.62	400,000	300,500	2.22	3.44	1,200,000,000	Mar. 9, 1907	W. S. 296, p. 141.
61	Patux Creek	Winters	Mar. 9, 1907	30,900	29,500	49.1	0.62	400,000	300,500	2.22	3.44	1,200,000,000	Mar. 9, 1907	W. S. 296, p. 141.
68	Napa River	Hibersfield	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	4.38	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
71	Yuba River	Near Petersville	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	3.31	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
72	Bayview River	Town Bar	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	2.16	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
75	Rain River	Sageo	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	0.57	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
77	Sacramento River	Front	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	5.59	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
79	Feather River	Near Keswinn	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	2.20	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
87	Merced River	Merced Falls, 1913-23	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	1.05	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
88	Tulare River	La Grange	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	1.24	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
89	Shasta River	King's Ferry	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	4.92	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
91	Colusa River	Jenny Lind	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	1.39	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
94	Madrone River	Near Chimneys	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	3.56	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
96	Comana River	Melburn Bar	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	3.85	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
106	Alameda Creek	Sausal Glen	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	0.99	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
109	Coyote River	Near Madison	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	2.22	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
114	Smith River (See Also, Fort.)	Near Crescent City	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	1.10	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
116	Shasta River	Near Montague	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	1.39	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
117	Scott River	Bowl Bar	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	3.01	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
118	Shasta River	Sum Bar	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	0.47	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
119	Trotter River	Lewiston	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	0.62	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
120	Redwood Creek	Orvis	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	1.46	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
121	Mad River	Arden	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	1.72	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
122	Edo River	Benita	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	1.41	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
124	Middle River	Near Petrola	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	3.23	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
128	Bumby River	Near Greenville	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	0.67	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
132	San Diego River	Leland	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	0.84	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
132	Santa Ynez Creek	Near Hannon	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	1.22	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
134	San Luis River	Near Pala	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	0.95	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
136	San Jacinto River Tributaries	Near Elmer	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	0.27	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
137	San Jacinto River, South Fork	Near Riverside	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	0.95	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
138	South Fork San Jacinto	Near Westmore	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	1.73	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
139	San Gabriel River Tributaries	Near Santa Ana	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	0.95	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
144	Shasta York River	Near Lamore	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	0.95	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
146	Shasta Main River	Shasta Main	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	0.95	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
148	William River Tributaries (Orvis Sub)	Near Colusa	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	0.95	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
161	Truckee River	Silver Lake	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	0.95	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
162	West Fork Feather River	Woodlands	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	0.95	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
182	East Fork Feather River	State Lake	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	0.95	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
184	West Walker River	Colusa	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	0.95	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
188	Oroon River	Round Valley	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	0.95	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.
191	Moore River	Yreaville	Mar. 19, 1907	27,800	29,900	49.2	3.43	377,000	52,740	0.89	0.95	1,000,000,000	Mar. 19, 1907	W. S. 411, p. 282, 281.

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Notes: W. S. refers to the *Waterways and Harbors* reports published by the United States Government Survey.

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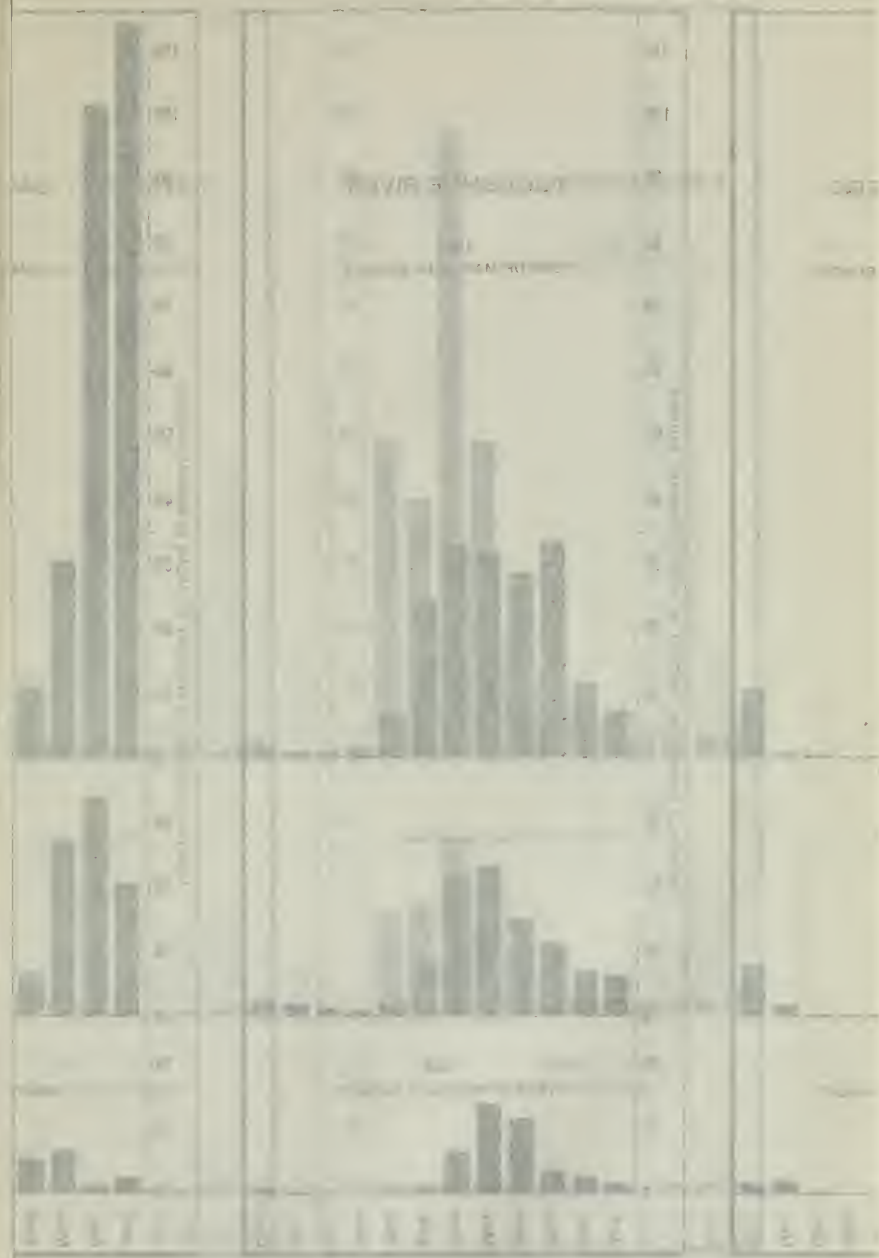
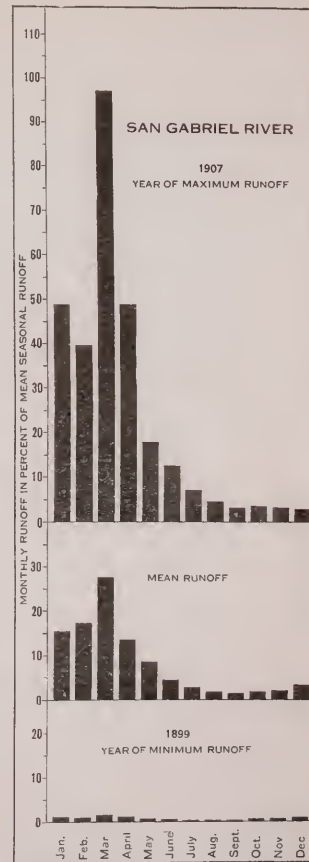
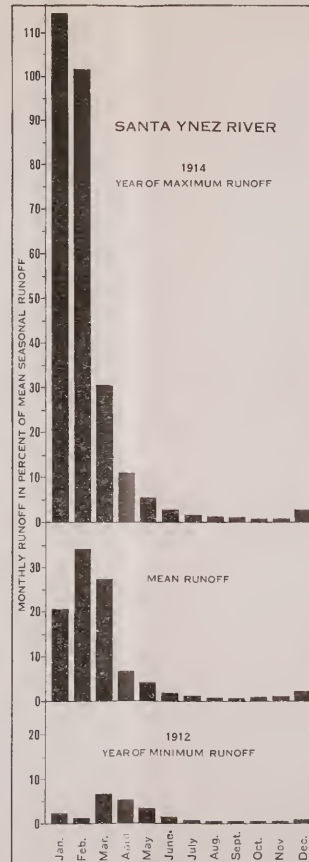
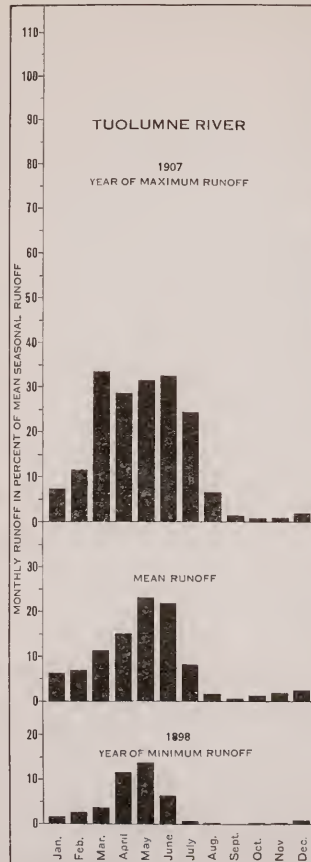
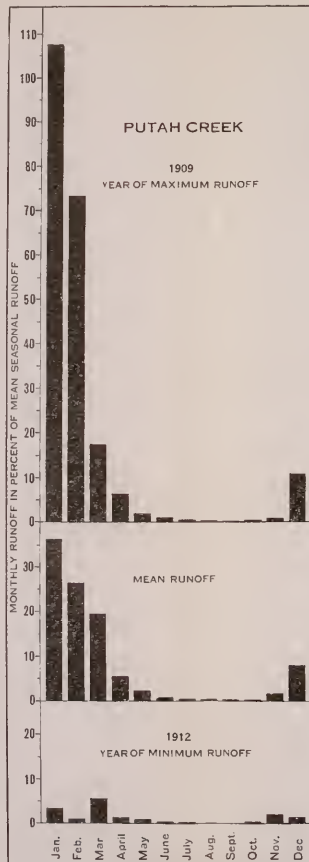
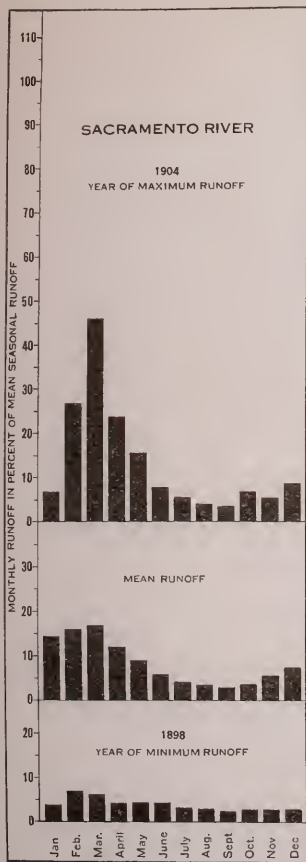


Fig. 1. Monthly precipitation and temperature for 1901, 1902, and 1903. The vertical axis represents precipitation in inches, and the horizontal axis represents months (J through D). The data is presented in a grid format with 12 charts, 3 rows (years) and 4 columns (locations).



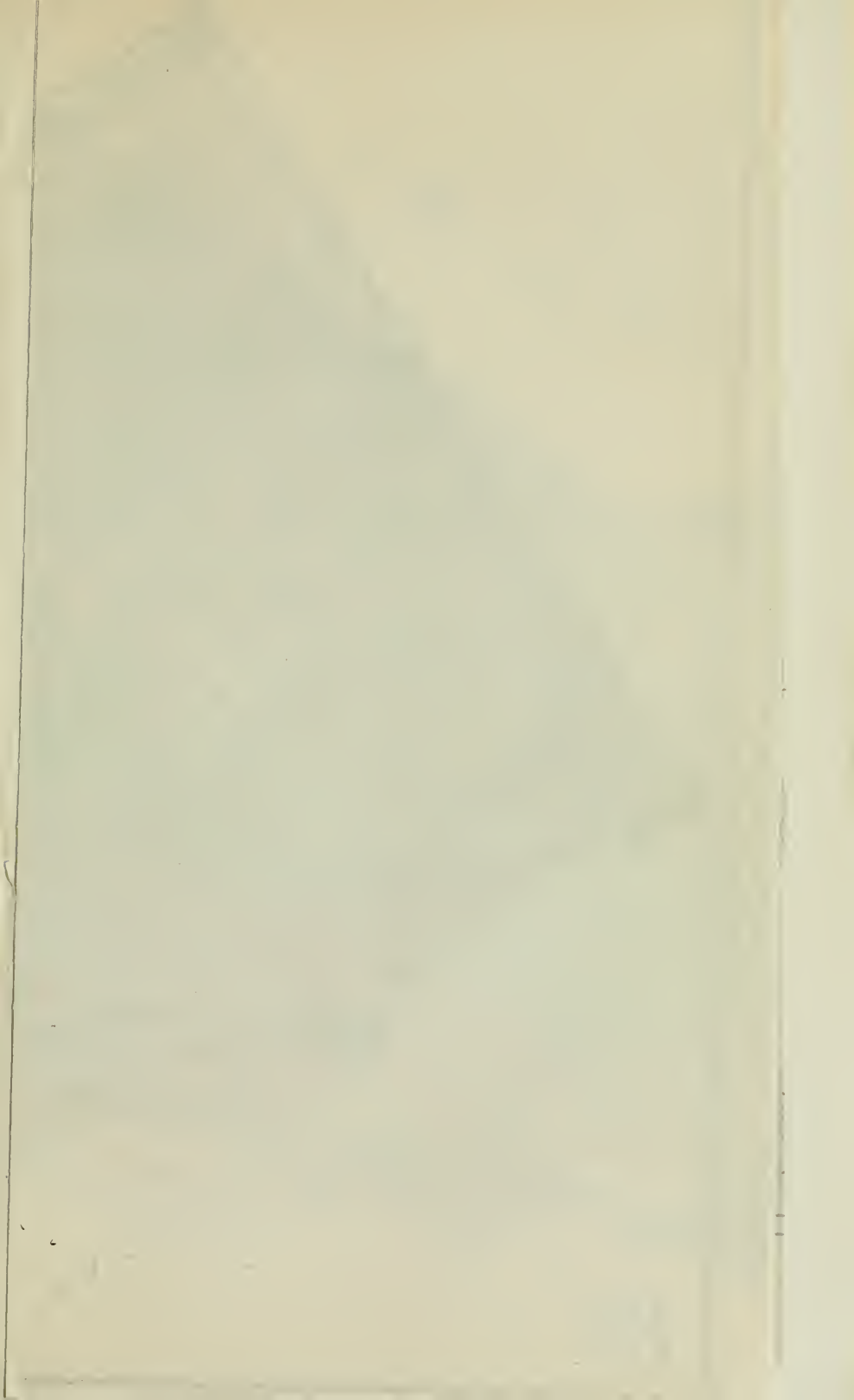
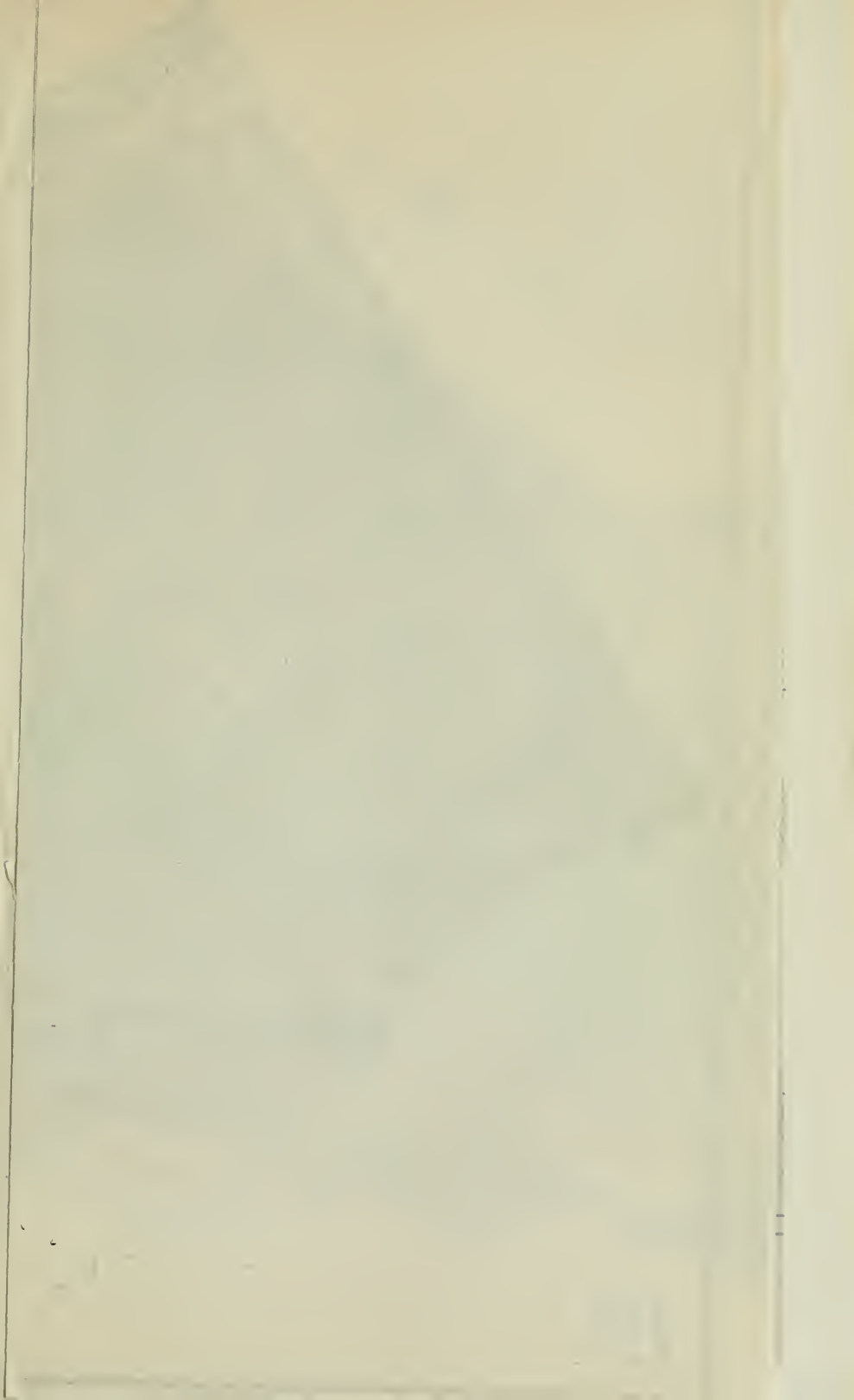




FIGURE 1. MONTHLY VARIATION IN THE NUMBER OF ...





- 38 Sacramento River Group
- 39 Red Bluff
- 40 Clear Creek Group
- 41 Clear Creek
- 42 Bear River
- 43 Mokelumne River
- 44 Mokelumne River Group
- 45 Mokelumne River
- 46 Mokelumne River Group
- 47 Mokelumne River
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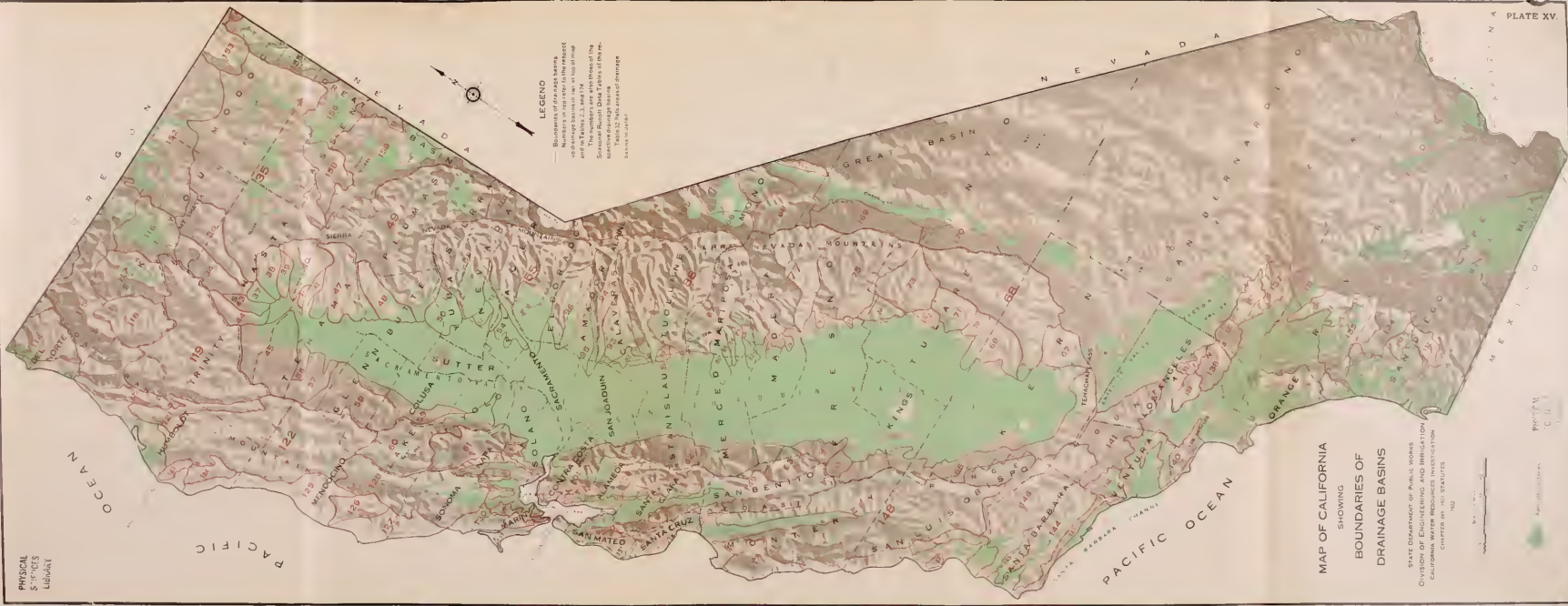
- 61 Mokelumne River
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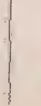
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**LEGEND**  
 Boundaries of drainage basins.  
 Numbers in red refer to the respective drainage basins (not at foot of map and in Tables 2, 3, and 174).  
 The numbers are also those of the Seasonal Runoff Data Tables of the respective drainage basins.  
 Table 12 lists areas of drainage basins in acres.

SHOWING  
**BOUNDARIES OF  
 DRAINAGE BASINS**

STATE DEPARTMENT OF PUBLIC WORKS  
 DIVISION OF ENGINEERING AND IRRIGATION  
 CALIFORNIA WATER RESOURCES INVESTIGATION  
 CHAPTER BY 1951 STATUTES  
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STREAM	RECORDING STATION	YEARS
SACRAMENTO BASIN		
SACRAMENTO RIVER	Castilla	1910-
SACRAMENTO RIVER	Antler	1910-
SACRAMENTO RIVER	Red Bluff	1895-
SACRAMENTO RIVER	Collinsville	1878-1885
PIT RIVER	Canby	1904-1905
PIT RIVER	Bieber	1921-
PIT RIVER	Fall R Mills	1910-
PIT RIVER	Henderson	1910-
PIT RIVER	Ydsloom	1910-
South Fork Pit River	Lively	1904-1905
West Valley Creek	Alturas	1918-
Asn Creek	Adin	1904-1905
Fall River	Fall R Mills	1912-
Bear Creek	Dane	1921-
Hat Creek	Hawkins Ranch	1911-
Hat Creek	4st Creek	1910-1914
Hat Creek	Carson	1921-
Rising River	Cassel	1921-
Burney Creek	Burney above	1911-
Burney Creek	Burney below	1911-
Burney Creek	Burney below Falls	1911-
Koon Creek	Henderson	1910-1916
Montgomery Creek	Montgomery Cr.	1911-1913
Sauwau Creek	Ydsloom	1902-1908
MCCLOUD RIVER	Bard	1910-
MCCLOUD RIVER	Shasta	1911-1913
McCLURE CREEK	Milville	1911-1914
CHUB CREEK	Milville	1911-1914
Lower Chub Creek	Milville	1911-1914
CHUB CREEK	Palo Cedro	1911-1913
CHUB CREEK	Milville	1911-1913
CHUB CREEK	Forester above	1920-
CHUB CREEK	Ono	1907-1913
CHUB CREEK	Los Molinos	1911-1912
CHUB CREEK	Pasternita	1920-
CHUB CREEK	Vina	1911-
CHUB CREEK	1913-1921	
CHUB CREEK	Stonyford near	1919-
CHUB CREEK	Elk Creek	1901-1912
CHUB CREEK	Frodo	1910-1914
CHUB CREEK	Orland	1920-
CHUB CREEK	Lodona	1938-
CHUB CREEK	Prattville above	1905-1907
CHUB CREEK	Prattville below	1905-
CHUB CREEK	Big Bend	1911-
CHUB CREEK	Big Bend	1905-1910
CHUB CREEK	Oroville	1902-
CHUB CREEK	Prattville	1905-1907
CHUB CREEK	Butte Valley	1905-1921
CHUB CREEK	Crescent Mill	1906-1918
CHUB CREEK	Keddie	1911-
CHUB CREEK	Sheat	1910-
CHUB CREEK	Oroville	1911-
CHUB CREEK	Bockwith	1906
CHUB CREEK	Enterprise	1911-
CHUB CREEK	Smartsville	1900-
CHUB CREEK	North S. Juan	1900-
CHUB CREEK	North S. Juan	1910-
CHUB CREEK	Goodyear Bar	1900
CHUB CREEK	North S. Juan	1910-
CHUB CREEK	Downville	1910-
CHUB CREEK	Goodyear Bar	1910-
CHUB CREEK	Goodyear Bar	1910-
CHUB CREEK	Colfax	1911-1917
CHUB CREEK	Van Trent	1904-
CHUB CREEK	Colfax	1912-
CHUB CREEK	Colfax	1911-
CHUB CREEK	Fairbald	1904-
CHUB CREEK	Sacramento	1921
CHUB CREEK	East Auburn	1911-
CHUB CREEK	Rubicon Spr	1910-1914
CHUB CREEK	Quintette	1909-1914
CHUB CREEK	Rubicon Spr	1910-1911
CHUB CREEK	Quintette	1910-1914
CHUB CREEK	Below Cerie Cr.	1910-1914
CHUB CREEK	At mouth	1909-1911
CHUB CREEK	Rubicon Spr.	1910-1914
CHUB CREEK	Quintette	1910-1913
CHUB CREEK	Quintette	1910-1914
CHUB CREEK	Quintette	1906-1907
CHUB CREEK	Kyburz	1911-1920
CHUB CREEK	Placerville	1874-
CHUB CREEK	Placerville	1874-
CHUB CREEK	Lower Lake	1901-1915
CHUB CREEK	Yolo	1903-
CHUB CREEK	Guenoic	1904-1906
CHUB CREEK	Winters	1905-
CHUB CREEK	Kernville (above)	1912-
CHUB CREEK	Kernville	1905-1912
CHUB CREEK	Isabella	1910-1911
CHUB CREEK	Rio Bravo Ranch	1878-1884
CHUB CREEK	Bakerfield	1893-
CHUB CREEK	Kernville	1910-1914
CHUB CREEK	Onyx	1911-1912
CHUB CREEK	Isabella	1895-1896
CHUB CREEK	Tejon Ranch	1894-1895
CHUB CREEK	S. E. Ranch	1894-1895
CHUB CREEK	Kern County	1878-1884
CHUB CREEK	Havilah	1911-1912
CHUB CREEK	Kings County	1906-
CHUB CREEK	Kern County	1878-1884
CHUB CREEK	Kern County	1878-1884
CHUB CREEK	Tulare County	1911-1913
CHUB CREEK	Hot Springs	1911-1913
CHUB CREEK	Tulare County	1878-1884
CHUB CREEK	Hot Springs	1910-
CHUB CREEK	Hot Springs	1911-1913
CHUB CREEK	Hot Springs	1878-1884
CHUB CREEK	Porterville	1901-
CHUB CREEK	Porterville	1909-1912
CHUB CREEK	Springville	1909-1912
CHUB CREEK	Springville	1911-1916
CHUB CREEK	Springville	1910-
CHUB CREEK	Hammond	1013
CHUB CREEK	Wachuma H.s	1878-1884
CHUB CREEK	Three Rivers	1903-
CHUB CREEK	Ranger	1913
CHUB CREEK	Hammond	1913
CHUB CREEK	Kaweah	1910-
CHUB CREEK	Three Rivers	1911-
CHUB CREEK	Hume	1921-
CHUB CREEK	Sanger	1895-
CHUB CREEK	Slate Point	1878-1884
CHUB CREEK	Kingsburg	1896-1897
CHUB CREEK	Meadow Brook	1921-
CHUB CREEK	Cliff Camp	1921-
CHUB CREEK	Dinkey Creek	1919-
CHUB CREEK	Mouth	1911-1913
CHUB CREEK	Tolhouse	1911-1914
CHUB CREEK	Oxendon	1907-
CHUB CREEK	Fiandt	1911-
CHUB CREEK	Hamptonville	1878-1884
CHUB CREEK	Hemdon	1895-1901
CHUB CREEK	North Fork	1921
CHUB CREEK	Lake Firemie	1921
CHUB CREEK	Hoffman Mead	1921-
CHUB CREEK	Vermilion Valley	1921-
CHUB CREEK	Merriam Valley	1921-
CHUB CREEK	Merriam Valley	1921
CHUB CREEK	Jacksass Meadow	1921
CHUB CREEK	Cattle Mountain	1921
CHUB CREEK	Iron Creek below	1921-
CHUB CREEK	Arnold Meadow	1921-
CHUB CREEK	Big Creek	1910-
CHUB CREEK	Shaver	1916-1922
CHUB CREEK	Shaver	1916-1917
CHUB CREEK	Shaver	1916-1917
CHUB CREEK	North Fork	1910-1911
CHUB CREEK	North Fork	1910-1915
CHUB CREEK	North Fork	1910-1915
CHUB CREEK	North Fork	1910-1913
CHUB CREEK	North Fork	1910-1913
CHUB CREEK	North Fork	1910-1912
CHUB CREEK	Knowles	1911-
CHUB CREEK	Madera County	1878-1884
CHUB CREEK	Buchanan	1878-1884
CHUB CREEK	Mariposa County	1878-1884
CHUB CREEK	Merced County	1878-1884
CHUB CREEK	Illioquette Creek	1915
CHUB CREEK	Yosemite	1915-
CHUB CREEK	Yosemite	1904-1916
CHUB CREEK	Yosemite	1916-
CHUB CREEK	Eschequer	1915-
CHUB CREEK	Merced Falls	1878-1884
CHUB CREEK	Merced Falls	1901-1913
CHUB CREEK	Nayman	1912-
CHUB CREEK	Yosemite	1915-1916
CHUB CREEK	Yosemite	1904-
CHUB CREEK	Yosemite	1914-
CHUB CREEK	Yosemite	1914-













STREAM	RECORDING STATION	YEARS
SAN JOAQUIN BASIN (cont.)		
TUOLUMNE RIVER (High Hearty Cabin)	Sequoia	1910-1916
TUOLUMNE RIVER (High Hearty dam site)	Sequoia	1901-1915
TUOLUMNE RIVER (below H. H. dam site)	Sequoia	1914-
TUOLUMNE RIVER (above La Grange dam)	Buck Meadows	1907-
TUOLUMNE RIVER	La Grange	1915-
TUOLUMNE RIVER	Modesto	1876-1884
TUOLUMNE RIVER	Modesto	1895-1896
Falls Creek	Sequoia	1901-
Cherry Creek	Sequoia	1901-
Evaporation Lake Eleanor	Sequoia	1915-1918
Jawbone Creek	Sequoia	1910-1914
Corral Creek	Clowland	1910-1913
South Fork, Tuolumne River	Sequoia	1914-1918
South Fork, Tuolumne River	Buck Meadows	1918-
Yosemite Fork, Tuolumne River	Sequoia	1914-1915
Cady's Rock Ditch	Sequoia	1910-1913
Cherry Creek S. E. Power Co. Canal	Turmine	1908-
Yosemite Canal	La Grange	1902-
Yosemite Canal	La Grange	1899-
STANISLAUS RIVER (Middle Fork)	Knights Ferry	1915-
STANISLAUS RIVER	Knights Ferry	1903-1916
STANISLAUS RIVER	Dakota	1876-1884
Relief Reservoir	Dakota	1895-1900
North Fork, Stanislaus River	Baker Station	1910-1918
Unica Gold Mining Co. Canal	Baker Station	1910-1918
South Fork, Stanislaus River	Avry	1914-
South Fork, Stanislaus River	Avry	1915-
Stanislaus-Joaquim Canal	Knights Ferry	1911-1913
Stanislaus	Knights Ferry	1914-
Stanislaus and S. J. Water Co. Canal	Knights Ferry	1899-1912
CALAVERAS RIVER	Jenny Lind	1907-
CALAVERAS RIVER	Bellota	1878-1884
MOKELUMNE RIVER, North Fork	West Point	1917-1918
MOKELUMNE RIVER	Electra	1901-1904
MOKELUMNE RIVER	Long Star Mill	1878-1884
MOKELUMNE RIVER	Clements	1905-
Middle Fork of Mokelumne River	West Point	1911-
South Fork of Mokelumne River	Railroad Flat	1911-
Dry Creek	Iron	1911-1912
Dry Creek, base foothills	San Joaquin Co.	1878-1884
Cosumnes River, North Fork	Pleasant Valley	1906-1907
Cosumnes River, North Fork	El Dorado	1911-
COSUMNES RIVER	Michigan Bar	1907-
COSUMNES RIVER (below)	Michigan Bar	1878-1884
Middle Fork Cosumnes River	Fair Play Park	1913
Sly Park Creek	Park	1906
SAN FRANCISCO BAY BASINS		
COYOTE RIVER	Madroño	1903-
COYOTE RIVER	Coyote	1916-
COYOTE RIVER	Edendale	1916-
COYOTE RIVER	San Jose	1916-1917
ALAMEDA CREEK	Sunol Glen	1906-
ALAMEDA CREEK	Niles	1916-
ALAMEDA CREEK	Decoy	1916-1919
Serrano Valley Water Co. Acqueduct	Sunol Glen	1903-
Canal at Slough	Centerville	1916-1919
Laguna Creek	Decoto	1918-1919
Dry Creek	San Pablo	1917-
SAN PABLO CREEK		
ELI, JUANA RIVER		
Coltonwood Creek	Nestor	1915
Price Valley Creek	Dulzura	1906-1915
SWEETWATER RIVER	Dulzura	1909-1915
SWEETWATER RIVER	Juniata	1906-1907
SAN DIEGO RIVER (diverting dam)	Delceno	1913-1916
SAN DIEGO RIVER	Delceno	1912-1916
SAN DIEGO RIVER	Lakeside	1905-1916
SAN DIEGO RIVER	San Diego	1912-1916
Boulder Creek (Cuyamaca Reservoir)	Julian	1912-1916
Cuyamaca Water Co. Flume (at dam)	Lakeside	1912-1916
Cuyamaca Water Co. Flume	Lakeside	1912-
South Fork Elmore	Lakeside	1907-
South Fork Elmore	Alpine	1913-1915
SANTA YSABEL CREEK	Alpine	1913-1915
SANTA YSABEL CREEK	Foster	1915-
SANTA YSABEL CREEK	Santa Ysabel	1913-1915
SANTA YSABEL CREEK	Mesa Grande	1912-
SANTA YSABEL CREEK	Ramona	1912-
SANTA YSABEL CREEK	Escondido	1906-1912
SAN DIEGO RIVER	Bernardo	1912-
Black Canyon Creek	Mesa Grande	1913-
Temescal Creek	Almond	1913-1915
Gujito Creek	Escondido	1915-1917
East San Pascual Ditch	Escondido	1912-1914
West San Pascual Ditch	Escondido	1912-1915
Santa Ysabel Creek	Yuma	1912-1920
SAN LUIS REY RIVER	Warner Springs	1913-1916
SAN LUIS REY RIVER	Mesa Grande	1915-1916
SAN LUIS REY RIVER	Nellie	1885-1899
SAN LUIS REY RIVER	Pala	1890-1916
SAN LUIS REY RIVER	Bonsall	1912-1916
SAN LUIS REY RIVER	Oceanside	1912-1916
Asua Caliente Creek	Warner Spring	1913-1915
Canaja Verde Creek	Warner Spring	1913-1915
West Fork San Luis Rey River	Warner Spring	1913-1915
Carrazo Creek	Warner Spring	1913-1915
Susanna Creek	Warner Spring	1913-1915
Matagual Creek	Warner Spring	1913-1915
Escondido Mutual Water Co. canal	Nellie	1896-
Rimmon Indian Reservation ditch	Valley Center	1912
Pauma Creek	Nellie	1912-
Pauma Creek	Pauma Indian Res.	1920-
San Luis Rey Ditch	Pala	1912-1913
SANTA ANA RIVER	San Luis Rey	1913
SANTA ANA RIVER	Mentone	1896-
SANTA ANA RIVER	Prado	1919-
Southern California Edison Co. canal	Mentone	1886-
Greenspot Pipe Line	Mentone	1901-1918
Highlands or North Fork Canal	San Bernardino Co.	1901-1904
Redlands or South Fork Canal	San Bernardino Co.	1901-1904
Mill Creek	Crifton Canal	1887-1902
Mill Creek	Forest Home	1903-1918
Mill Creek	Criftonville	1919-
City Creek	Highlands	1919-
Plunge Creek	East Highlands	1919-
Strawberry Creek	Arrowhead Springs	1919-
Watchman Canyon Creek	San Bernardino	1911-
Devil Canyon Creek	San Bernardino	1911-
Cajon Creek	Keenbrook	1919-
Lone Pine Creek	Keenbrook	1919-
Lytic Creek (mouth of canyon)	San Bernardino	1894-1918
Elsinore Lake	Elsinore	1915-
Temescal Creek	Elsinore	1916-
Coldwater Creek above dam	Riverside County	1899
Warm Creek	Colton	1920
Meeks & Daley Canal	Colton	1920-
Santrago Creek	Villa Park	1920-
Serrano & Carpenter canal	Villa Park	1920
San Antonio Creek	Claremont	1917-
San Antonio Creek	Upland	1901-1917
Southern California Edison Co. Canal	Claremont	1917-
San Jacinto River	San Jacinto	1920-
San Jacinto River	Elsinore	1916-
South Fork San Jacinto River	San Jacinto	1916-
SAN GABRIEL RIVER	Above Fish Fork	1900-1912
SAN GABRIEL RIVER	Head works	1912-1914
SAN GABRIEL RIVER	Azusa	1894-
Southern California Edison Co. canal	Azusa	1860-
W Branch of N. Fork San Gabriel R.	Azusa	1900-
N Branch N. Fork San Gabriel R.	At weir	1900
W Fork San Gabriel R. above N. Fork	At weir	1900
Coldwater Creek above mouth	North Fork	1900
Fish Fork of S. Gabriel (flow water)	At weir	1900-1912
Iron Fork of S. Gabriel (flow water)	Azusa	1900-1912
Tunnel Diversion	Azusa	1917-
Rogers Creek	Azusa	1917-
Fish Creek	Duarte	1916-
Sawpit Creek	Duarte	1916-
Monrovia Pipe Line	Monrovia	1916-
Darton Creek	Monrovia	1916-
LOS ANGELES RIVER	Grindora	1915-
Pasadena Creek	Los Angeles	1896-1916
Tujunga Creek	San Fernando	1916-
Haines Creek	Sunland	1916-
Arroyo Seco	Tujunga	1917-
Santa Anita Creek	Pasadena	1910-
Little Santa Anita Creek	Sierra Madre	1916-
San Dimas Creek	San Dimas	1916-
Estero Creek	Pasadena	1916-

Results of measurements  
published in Water  
Supply Papers of the United  
States Geological Survey

1	12	1000000	1000000
2	12	1000000	1000000
3	12	1000000	1000000
4	12	1000000	1000000
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96	12	1000000	1000000
97	12	1000000	1000000
98	12	1000000	1000000
99	12	1000000	1000000
100	12	1000000	1000000



Year	Month	Day	Time	Location	Remarks
1900	Jan	1	10:00	St. Paul	Left for St. Paul
1900	Jan	2	10:00	St. Paul	Left for St. Paul
1900	Jan	3	10:00	St. Paul	Left for St. Paul
1900	Jan	4	10:00	St. Paul	Left for St. Paul
1900	Jan	5	10:00	St. Paul	Left for St. Paul
1900	Jan	6	10:00	St. Paul	Left for St. Paul
1900	Jan	7	10:00	St. Paul	Left for St. Paul
1900	Jan	8	10:00	St. Paul	Left for St. Paul
1900	Jan	9	10:00	St. Paul	Left for St. Paul
1900	Jan	10	10:00	St. Paul	Left for St. Paul
1900	Jan	11	10:00	St. Paul	Left for St. Paul
1900	Jan	12	10:00	St. Paul	Left for St. Paul
1900	Jan	13	10:00	St. Paul	Left for St. Paul
1900	Jan	14	10:00	St. Paul	Left for St. Paul
1900	Jan	15	10:00	St. Paul	Left for St. Paul
1900	Jan	16	10:00	St. Paul	Left for St. Paul
1900	Jan	17	10:00	St. Paul	Left for St. Paul
1900	Jan	18	10:00	St. Paul	Left for St. Paul
1900	Jan	19	10:00	St. Paul	Left for St. Paul
1900	Jan	20	10:00	St. Paul	Left for St. Paul
1900	Jan	21	10:00	St. Paul	Left for St. Paul
1900	Jan	22	10:00	St. Paul	Left for St. Paul
1900	Jan	23	10:00	St. Paul	Left for St. Paul
1900	Jan	24	10:00	St. Paul	Left for St. Paul
1900	Jan	25	10:00	St. Paul	Left for St. Paul
1900	Jan	26	10:00	St. Paul	Left for St. Paul
1900	Jan	27	10:00	St. Paul	Left for St. Paul
1900	Jan	28	10:00	St. Paul	Left for St. Paul
1900	Jan	29	10:00	St. Paul	Left for St. Paul
1900	Jan	30	10:00	St. Paul	Left for St. Paul
1900	Jan	31	10:00	St. Paul	Left for St. Paul





№	Имя (рус.)	Имя (лат.)	№	1800 - 1810
32	Мельничков (Мельничков)	Мельничков	31	1800 -
33	Мельничков	Мельничков	31	1800 -
34	Мельничков	Мельничков	42	1800 -
35	Мельничков	Мельничков	44	1800 -
36	Мельничков	Мельничков	1	1800 -
37	Мельничков	Мельничков	4	1800 -
38	Мельничков	Мельничков	50	1800 -
39	Мельничков	Мельничков	51	1800 -
40	Мельничков	Мельничков	11	1800 -
41	Мельничков	Мельничков	31	1800 -
42	Мельничков	Мельничков	23	1800 -
43	Мельничков	Мельничков	42	1800 -
44	Мельничков	Мельничков	34	1800 -
45	Мельничков	Мельничков	30	1800 -
46	Мельничков	Мельничков	31	1800 -
47	Мельничков	Мельничков	15	1800 -
48	Мельничков	Мельничков	52	1800 -
49	Мельничков	Мельничков	18	1800 -
50	Мельничков	Мельничков	34	1800 -
51	Мельничков	Мельничков	30	1800 -
52	Мельничков	Мельничков	40	1800 -
53	Мельничков	Мельничков	58	1800 -
54	Мельничков	Мельничков	31	1800 -
55	Мельничков	Мельничков	32	1800 -
56	Мельничков	Мельничков	33	1800 -
57	Мельничков	Мельничков	34	1800 -
58	Мельничков	Мельничков	35	1800 -





PRECIPITATION RECORDS OF THE UNITED STATES WEATHER BUREAU

NO	STATION	COUNTY	YEARS RECORDED	PERIOD OF RECORD
1	Fort Bowie	Medoc	36	1857 - *
2	Cedarville	Medoc	27	1894 -
3	Alturas	Medoc	15	1904 - 1919
4	Madeline	Lassen	13	1908 -
5	Susannah	Lassen	28	1889 - 1918*
6	McCloud	Siskiyou	10	1911 -
7	Sisson	Siskiyou	32	1889 -
8	Dunsmuir	Siskiyou	32	1889 -
9	Delta	Shasta	39	1882 -
10	Kennett	Shasta	14	1907 -
11	Shasta	Shasta	17	1899 - 1912
12	Ridding	Shasta	46	1875 -
13	Red Butte	Tehama	44	1877 -
14	Tahama	Tehama	44	1877 -
15	Humboldt	Siskiyou	28	1866 - 1916
16	Yreka	Siskiyou	40	1872 - *
17	Montague	Siskiyou	30	1884 - *
18	*Walla Walla Creek	Siskiyou	34	1854 - 1892*
19	Orleans	Humboldt	18	1903 -
20	Fort Gaston	Humboldt	25	1866 - 1891
21	China Flat	Humboldt	12	1909 -
22	Wacareville	Trinity	31	1871 - *
23	Cracrant City	Del Norte	30	1885 - *
24	Eureka	Humboldt	34	1887 -
25	Rhonerville	Humboldt	49	1901 - 1920
26	Upper Matolie	Humboldt	33	1897 - *
27	Fort Bragg	Mendocino	21	1898 - *
28	Blossburg	Humboldt	11	1905 - 1916
29	Branscomb	Mendocino	21	1900 -
30	Willits	Mendocino	29	1878 - 1907
31	Ukiah	Mendocino	41	1877 -
32	Gloverdale	Sonoma	21	1893 - *
33	Healdsburg	Sonoma	44	1877 -
34	Fort Ross	Sonoma	45	1875 - *
35	Heaven Mine	Lac	21	1900 -
36	Laveport (Kono Taylor)	Lac	21	1874 - *
37	North Lakopart	Lac	16	1901 - 1919
38	Upper Lake	Lac	28	1886 - 1914
39	Hulville	Lac	14	1907 -
40	East Park	Colusa	10	1911 -
41	Willows	Glenn	42	1879 -
42	Frito	Glenn	22	1889 - 1911
43	Orland	Glenn	36	1883 -
44	Conning	Tehama	34	1885 - 1916*
45	Chico	Butte	50	1871 -
46	Dunham	Butte	24	1898 - 1919
47	Bugs	Butte	17	1899 - 1916
48	Gridley	Butte	10	1907 - 1917
49	Colusa	Colusa	49	1871 - *
50	Dunnigan	Yolo	39	1877 - 1916
51	Marysville	Yuba	50	1871 -
52	Palom	Butte	23	1893 - 1914
53	Oroville	Butte	36	1885 -
54	Magalia	Butte	13	1906 - 1917
55	De Sable	Butte	17	1908 -
56	West Branch	Butte	14	1907 -
57	Inslip	Butte	14	1907 -
58	Stirling City	Butte	14	1903 - 1917
59	Edmonton	Plumas	13	1893 - 1905
60	Greenville	Plumas	20	1894 - 1914
61	Quincy	Plumas	26	1898 -
62	Stanwood	Butte	15	1903 - 1920*
63	La Porte	Plumas	25	1894 -
64	Stearnsville	Sierra	12	1909 -
65	Downsville	Sierra	13	1908 -
66	Campdownville	Sierra	14	1907 -
67	Head Dam	Yuba	14	1907 -
68	Dobbins	Yuba	17	1904 -
69	Colgate	Yuba	12	1907 -
70	Grass Valley	Nevada	46	1873 -
71	Nevada City	Nevada	57	1864 -
72	Ogier Creek	Nevada	14	1907 -
73	North Bloomfield	Nevada	43	1870 -
74	Bowman Dam	Nevada	39	1871 - 1915*
75	Lake Spaulding	Nevada	27	1894 -
76	Fordyce Dam	Nevada	27	1894 -
77	Boca	Nevada	44	1879 - 1916*
78	Frickee	Nevada	50	1870 - 1920
79	Tamarack	Alpine	18	1900 -
80	Summit	Placer	50	1871 -
81	Chico	Placer	46	1870 - 1916
82	Emigrant Gap	Placer	40	1872 - *
83	Blue Canyon	Placer	22	1899 -
84	Toledo	Placer	30	1888 - 1920*
85	Gold Run	Placer	20	1899 - 1919
86	Iowa Hill	Placer	31	1879 - 1910
87	Colfas	Placer	51	1870 -
88	Flat Creek*	El Dorado	20	1894 - 1914
89	Georgetown	El Dorado	46	1873 -
90	Auburn	Placer	50	1871 -
91	Wheatland	Yuba	29	1887 - 1916
92	Newcastle	Placer	14	1892 - 1910*
93	Rocklin	Placer	48	1870 - *
94	Sacramento	Sacramento	72	1849 -
95	Folsom	Sacramento	50	1871 -
96	Shingio Springs	El Dorado	36	1850 - 1912*
97	Placerville	El Dorado	43	1874 - *
98	Mill Creek No. 1	Amador	14	1907 -
99	West Point	Calaveras	24	1894 -
100	Kennedy Mine	Amador	29	1892 -
101	Electra	Calaveras	17	1904 -
102	Mohavumne Hill	Calaveras	36	1882 - 1918
103	Iron	Amador	43	1878 - *
104	Galt	Sacramento	42	1878 - *
105	Valley Springs	Calaveras	26	1888 - 1915*
106	Milton	Calaveras	31	1888 -
107	Sobera	Tuolumne	26	1888 -
108	Croftland	Tuolumne	8	1904 - 1913*
109	Crocker	Tuolumne	13	1896 - 1909
110	Yosemite	Mariposa	15	1904 -
111	Summerside	Mariposa	14	1896 - 1910
112	Merced Falls	Merced	11	1907 -
113	La Grange	Stanislaus	36	1868 - 1915
114	Danair	Stanislaus	18	1899 -
115	Ondale	Stanislaus	34	1881 - *
116	Farmington	San Joaquin	36	1877 - 1915
117	Lodi	San Joaquin	24	1888 - 1912
118	Stockton	San Joaquin	54	1867 -
119	Tracy	San Joaquin	40	1879 - **
120	Livermore	Alameda	50	1871 - *
121	Niles	Alameda	42	1871 - 1918*
122	San Mateo	San Mateo	47	1874 - *
123	San Leandro	Alameda	14	1895 - 1911
124	Mills College	Alameda	1	1893 - 1916*
125	San Francisco	San Francisco	72	1849 -
126	Oakland	Alameda	47	1874 -
127	Berkeley	Alameda	34	1887 -
128	Antioch	Contra Costa	42	1879 -
129	Rio Vista	Solano	24	1893 -
130	Suisun	Solano	46	1872 - *

PRECIPITATION RECORDS OF THE UNITED STATES WEATHER BUREAU  
 U. S. DEPARTMENT OF PUBLIC WORKS  
 DIVISION OF ENGINEERING AND IRRIGATION  
 U. S. GEOLOGICAL SURVEY  
 WASHINGTON, D. C.

\* Record not continuous.  
 \*\* Records of S. P. R. Co. 1916-1921.  
 \* From Water Supply Paper No. 81.

Year	Location	Notes	Count	Year
1871	St. Louis	St. Louis	10	1871
1872	St. Louis	St. Louis	10	1872
1873	St. Louis	St. Louis	10	1873
1874	St. Louis	St. Louis	10	1874
1875	St. Louis	St. Louis	10	1875
1876	St. Louis	St. Louis	10	1876
1877	St. Louis	St. Louis	10	1877
1878	St. Louis	St. Louis	10	1878
1879	St. Louis	St. Louis	10	1879
1880	St. Louis	St. Louis	10	1880
1881	St. Louis	St. Louis	10	1881
1882	St. Louis	St. Louis	10	1882
1883	St. Louis	St. Louis	10	1883
1884	St. Louis	St. Louis	10	1884
1885	St. Louis	St. Louis	10	1885
1886	St. Louis	St. Louis	10	1886
1887	St. Louis	St. Louis	10	1887
1888	St. Louis	St. Louis	10	1888
1889	St. Louis	St. Louis	10	1889
1890	St. Louis	St. Louis	10	1890
1891	St. Louis	St. Louis	10	1891
1892	St. Louis	St. Louis	10	1892
1893	St. Louis	St. Louis	10	1893
1894	St. Louis	St. Louis	10	1894
1895	St. Louis	St. Louis	10	1895
1896	St. Louis	St. Louis	10	1896
1897	St. Louis	St. Louis	10	1897
1898	St. Louis	St. Louis	10	1898
1899	St. Louis	St. Louis	10	1899
1900	St. Louis	St. Louis	10	1900
1901	St. Louis	St. Louis	10	1901
1902	St. Louis	St. Louis	10	1902
1903	St. Louis	St. Louis	10	1903
1904	St. Louis	St. Louis	10	1904
1905	St. Louis	St. Louis	10	1905
1906	St. Louis	St. Louis	10	1906
1907	St. Louis	St. Louis	10	1907
1908	St. Louis	St. Louis	10	1908
1909	St. Louis	St. Louis	10	1909
1910	St. Louis	St. Louis	10	1910
1911	St. Louis	St. Louis	10	1911
1912	St. Louis	St. Louis	10	1912
1913	St. Louis	St. Louis	10	1913
1914	St. Louis	St. Louis	10	1914
1915	St. Louis	St. Louis	10	1915
1916	St. Louis	St. Louis	10	1916
1917	St. Louis	St. Louis	10	1917
1918	St. Louis	St. Louis	10	1918
1919	St. Louis	St. Louis	10	1919
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1921	St. Louis	St. Louis	10	1921
1922	St. Louis	St. Louis	10	1922
1923	St. Louis	St. Louis	10	1923
1924	St. Louis	St. Louis	10	1924
1925	St. Louis	St. Louis	10	1925
1926	St. Louis	St. Louis	10	1926
1927	St. Louis	St. Louis	10	1927
1928	St. Louis	St. Louis	10	1928
1929	St. Louis	St. Louis	10	1929
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1931	St. Louis	St. Louis	10	1931
1932	St. Louis	St. Louis	10	1932
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1946	St. Louis	St. Louis	10	1946
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1948	St. Louis	St. Louis	10	1948
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1951	St. Louis	St. Louis	10	1951
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1954	St. Louis	St. Louis	10	1954
1955	St. Louis	St. Louis	10	1955
1956	St. Louis	St. Louis	10	1956
1957	St. Louis	St. Louis	10	1957
1958	St. Louis	St. Louis	10	1958
1959	St. Louis	St. Louis	10	1959
1960	St. Louis	St. Louis	10	1960
1961	St. Louis	St. Louis	10	1961
1962	St. Louis	St. Louis	10	1962
1963	St. Louis	St. Louis	10	1963
1964	St. Louis	St. Louis	10	1964
1965	St. Louis	St. Louis	10	1965
1966	St. Louis	St. Louis	10	1966
1967	St. Louis	St. Louis	10	1967
1968	St. Louis	St. Louis	10	1968
1969	St. Louis	St. Louis	10	1969
1970	St. Louis	St. Louis	10	1970
1971	St. Louis	St. Louis	10	1971
1972	St. Louis	St. Louis	10	1972
1973	St. Louis	St. Louis	10	1973
1974	St. Louis	St. Louis	10	1974
1975	St. Louis	St. Louis	10	1975
1976	St. Louis	St. Louis	10	1976
1977	St. Louis	St. Louis	10	1977
1978	St. Louis	St. Louis	10	1978
1979	St. Louis	St. Louis	10	1979
1980	St. Louis	St. Louis	10	1980
1981	St. Louis	St. Louis	10	1981
1982	St. Louis	St. Louis	10	1982
1983	St. Louis	St. Louis	10	1983
1984	St. Louis	St. Louis	10	1984
1985	St. Louis	St. Louis	10	1985
1986	St. Louis	St. Louis	10	1986
1987	St. Louis	St. Louis	10	1987
1988	St. Louis	St. Louis	10	1988
1989	St. Louis	St. Louis	10	1989
1990	St. Louis	St. Louis	10	1990
1991	St. Louis	St. Louis	10	1991
1992	St. Louis	St. Louis	10	1992
1993	St. Louis	St. Louis	10	1993
1994	St. Louis	St. Louis	10	1994
1995	St. Louis	St. Louis	10	1995
1996	St. Louis	St. Louis	10	1996
1997	St. Louis	St. Louis	10	1997
1998	St. Louis	St. Louis	10	1998
1999	St. Louis	St. Louis	10	1999
2000	St. Louis	St. Louis	10	2000

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№	Имя	Вид спорта	Возраст	Рост	Вес	Средняя скорость
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ВЕЩЕВЫЕ РЕКОРДЫ И РЕЗУЛЬТАТЫ ИГР НАЧАЛЬНИКОВ

ИЗДАНИЕ  
1970  
№ 1

Case No.	Case Name	Case Description	Case Status	Case Date
101	John Doe	John Doe	Open	10/1/2023
102	Jane Smith	Jane Smith	Closed	10/2/2023
103	Bob Johnson	Bob Johnson	Open	10/3/2023
104	Alice Brown	Alice Brown	Closed	10/4/2023
105	Charlie White	Charlie White	Open	10/5/2023
106	Diana Green	Diana Green	Closed	10/6/2023
107	Frank Black	Frank Black	Open	10/7/2023
108	Grace King	Grace King	Closed	10/8/2023
109	Henry Lee	Henry Lee	Open	10/9/2023
110	Ivy Hill	Ivy Hill	Closed	10/10/2023
111	Jack King	Jack King	Open	10/11/2023
112	Karen Lee	Karen Lee	Closed	10/12/2023
113	Liam Park	Liam Park	Open	10/13/2023
114	Mia Hill	Mia Hill	Closed	10/14/2023
115	Noah King	Noah King	Open	10/15/2023
116	Olivia Lee	Olivia Lee	Closed	10/16/2023
117	Peter Hill	Peter Hill	Open	10/17/2023
118	Quinn King	Quinn King	Closed	10/18/2023
119	Rachel Lee	Rachel Lee	Open	10/19/2023
120	Sam Hill	Sam Hill	Closed	10/20/2023
121	Tina King	Tina King	Open	10/21/2023
122	Uma Lee	Uma Lee	Closed	10/22/2023
123	Victor Hill	Victor Hill	Open	10/23/2023
124	Wendy King	Wendy King	Closed	10/24/2023
125	Xavier Lee	Xavier Lee	Open	10/25/2023
126	Yara Hill	Yara Hill	Closed	10/26/2023
127	Zoe King	Zoe King	Open	10/27/2023
128	Adam Lee	Adam Lee	Closed	10/28/2023
129	Bella Hill	Bella Hill	Open	10/29/2023
130	Carl King	Carl King	Closed	10/30/2023
131	Dora Lee	Dora Lee	Open	10/31/2023
132	Ethan Hill	Ethan Hill	Closed	11/1/2023
133	Fiona King	Fiona King	Open	11/2/2023
134	George Lee	George Lee	Closed	11/3/2023
135	Hannah Hill	Hannah Hill	Open	11/4/2023
136	Ian King	Ian King	Closed	11/5/2023
137	Jessica Lee	Jessica Lee	Open	11/6/2023
138	Kyle Hill	Kyle Hill	Closed	11/7/2023
139	Laura King	Laura King	Open	11/8/2023
140	Michael Lee	Michael Lee	Closed	11/9/2023
141	Nancy Hill	Nancy Hill	Open	11/10/2023
142	Oscar King	Oscar King	Closed	11/11/2023
143	Pamela Lee	Pamela Lee	Open	11/12/2023
144	Quinn Hill	Quinn Hill	Closed	11/13/2023
145	Rachel King	Rachel King	Open	11/14/2023
146	Samuel Lee	Samuel Lee	Closed	11/15/2023
147	Tina Hill	Tina Hill	Open	11/16/2023
148	Uma King	Uma King	Closed	11/17/2023
149	Victor Lee	Victor Lee	Open	11/18/2023
150	Wendy Hill	Wendy Hill	Closed	11/19/2023
151	Xavier King	Xavier King	Open	11/20/2023
152	Yara Lee	Yara Lee	Closed	11/21/2023
153	Zoe Hill	Zoe Hill	Open	11/22/2023
154	Adam King	Adam King	Closed	11/23/2023
155	Bella Lee	Bella Lee	Open	11/24/2023
156	Carl Hill	Carl Hill	Closed	11/25/2023
157	Dora King	Dora King	Open	11/26/2023
158	Ethan Lee	Ethan Lee	Closed	11/27/2023
159	Fiona Hill	Fiona Hill	Open	11/28/2023
160	George King	George King	Closed	11/29/2023
161	Hannah Lee	Hannah Lee	Open	11/30/2023
162	Ian Hill	Ian Hill	Closed	12/1/2023
163	Jessica King	Jessica King	Open	12/2/2023
164	Kyle Lee	Kyle Lee	Closed	12/3/2023
165	Laura Hill	Laura Hill	Open	12/4/2023
166	Michael King	Michael King	Closed	12/5/2023
167	Nancy Lee	Nancy Lee	Open	12/6/2023
168	Oscar Hill	Oscar Hill	Closed	12/7/2023
169	Pamela King	Pamela King	Open	12/8/2023
170	Quinn Lee	Quinn Lee	Closed	12/9/2023
171	Rachel Hill	Rachel Hill	Open	12/10/2023
172	Samuel King	Samuel King	Closed	12/11/2023
173	Tina Lee	Tina Lee	Open	12/12/2023
174	Uma Hill	Uma Hill	Closed	12/13/2023
175	Victor King	Victor King	Open	12/14/2023
176	Wendy Lee	Wendy Lee	Closed	12/15/2023
177	Xavier Hill	Xavier Hill	Open	12/16/2023
178	Yara King	Yara King	Closed	12/17/2023
179	Zoe Lee	Zoe Lee	Open	12/18/2023
180	Adam Hill	Adam Hill	Closed	12/19/2023
181	Bella King	Bella King	Open	12/20/2023
182	Carl Lee	Carl Lee	Closed	12/21/2023
183	Dora Hill	Dora Hill	Open	12/22/2023
184	Ethan King	Ethan King	Closed	12/23/2023
185	Fiona Lee	Fiona Lee	Open	12/24/2023
186	George Hill	George Hill	Closed	12/25/2023
187	Hannah King	Hannah King	Open	12/26/2023
188	Ian Lee	Ian Lee	Closed	12/27/2023
189	Jessica Hill	Jessica Hill	Open	12/28/2023
190	Kyle King	Kyle King	Closed	12/29/2023
191	Laura Lee	Laura Lee	Open	12/30/2023
192	Michael Hill	Michael Hill	Closed	12/31/2023
193	Nancy King	Nancy King	Open	1/1/2024
194	Oscar Lee	Oscar Lee	Closed	1/2/2024
195	Pamela Hill	Pamela Hill	Open	1/3/2024
196	Quinn King	Quinn King	Closed	1/4/2024
197	Rachel Lee	Rachel Lee	Open	1/5/2024
198	Samuel Hill	Samuel Hill	Closed	1/6/2024
199	Tina King	Tina King	Open	1/7/2024
200	Uma Lee	Uma Lee	Closed	1/8/2024

PRECIPITATION RECORDS OF THE UNITED STATES WEATHER BUREAU

NO	STATION	CO. & T.	YEARS	PERIOD OF RECORD
131	Ogus	Yo	46	1872 -
132	Woodland	Yo	48	1873
133	Guinda	Yo	20	1896-1916
134	Calistoga	Napa	48	1873 -
135	St. Helena	Napa	13	1908 -
136	Santa Rosa	Sonoma	34	1886 -
137	Peachland	Sonoma	25	1876
138	Napa	Napa	41	1877
139	Sonoma	Sonoma	17	1886-1907
140	Petaluma	Sonoma	29	1874 -
141	Ketchikan	Main	33	1888 -
142	St. Tennings	Main	44	1898-1920
143	Point Reyes	Main	38	1880 -
144	Boulder Creek	Santa Cruz	28	1888-1916
145	Ben Lumped	Santa Cruz	16	1899-1916
146	Felton	Santa Cruz	26	1889
147	Laurel	Santa Cruz	25	1891-1916
148	Los Gatos	Santa Cruz	36	1885 -
149	Carmel	Santa Clara	24	1897 -
150	San Jose	Santa Clara	47	1874 -
151	Santa Clara	Santa Clara	38	1881 -
152	Lick Observatory	Santa Clara	40	1881 -
153	Groby	Santa Clara	47	1874 -
154	Wasiperville	Santa Cruz	31	1891
155	Atcos	Santa Cruz	30	1895-1915
156	Santa Cruz	Santa Cruz	43	1878 -
157	Monterey	Monterey	41	1869-1915
158	Salinas	Monterey	47	1873 -
159	Hollister	San Benito	47	1874 -
160	Los Banos	Merced	39	1873-1913
161	Newman	Stanislaus	32	1889 -
162	Wistley	Stanislaus	26	1889-1915
163	Modesto	Stanislaus	44	1871-1915
164	Merced	Merced	49	1872 -
165	La Grand	Merced	21	1899 -
166	North Fork	Madera	12	1907 -
167	Storzy	Madera	21	1899 -
168	Mendota	Fresno	13	1894-1908
169	Fresno	Fresno	40	1881 -
170	Sanger	Fresno	25	1889-1915
171	Redley	Fresno	20	1901 -
172	Solima	Fresno	29	1886-1915
173	Hanford	Kern	19	1899 -
174	Vernalis	Tulare	41	1877 -
175	Laman Cove	Tulare	21	1899 -
176	Milo	Tulare	20	1898 -
177	Springville	Tulare	14	1907 -
178	Hot Springs	Tulare	10	1907-1917
179	Karlsruhe	Kern	27	1894 -
180	Isabella	Kern	13	1897-1910
181	Clanville	Kern	12	1909 -
182	Gallatin	Kern	39	1876-1915
183	Oakdale	Kern	32	1876-1908
184	Porterville	Tulare	32	1889 -
185	Tulare	Tulare	44	1875 -
186	Angels	Tulare	15	1899 -
187	Wasco	Kern	18	1899 -
188	Bakersfield	Kern	31	1889 -
189	Edison	Kern	16	1904 -
190	Bear Valley	Kern	13	1900-1915
191	Stockdale	Monterey	16	1905 -
192	Gonzales	Monterey	16	1899-1915
193	Sodad	Monterey	45	1874 -
194	King City	Monterey	32	1887 -
195	Prist Valley	Monterey	19	1899 -
196	John	Monterey	37	1882 -
197	Parkfield	Monterey	11	1908 -
198	San Miguel	San Luis Obispo	28	1887-1915
199	Paso Robles	San Luis Obispo	34	1887 -
200	Santa Margarita	San Luis Obispo	27	1898-1916
201	San Luis Obispo	San Luis Obispo	52	1869 -
202	Spring Valley	Santa Barbara	30	1885 -
203	Sisuvot Ranch	Santa Barbara	10	1904-1914
204	Ozema	Ventura	15	1904 -
205	Pine Crest	Santa Barbara	17	1898-1916
206	Santa Barbara	Santa Barbara	54	1867 -
207	San Miguel Island	Santa Barbara	23	1894 -
208	Ventura	Ventura	35	1873-1909
209	Ojai Valley	Ventura	16	1905 -
210	West Salcoy	Ventura	19	1893-1916
211	Santa Monica	Los Angeles	36	1885 -
212	Newhall	Los Angeles	38	1877-1915
213	Tehachapi	Kern	37	1877-1914
214	Mojave	Kern	37	1877-1914
215	Montero	Kern	13	1899-1912
216	Love Observatory	Los Angeles	21	1896-1919
217	Mc Wilson	Los Angeles	17	1904 -
218	Palmdale	Los Angeles	22	1892 -
219	Sierra Madre	Los Angeles	24	1897 -
220	Acasa	Los Angeles	22	1898-1920
221	Lordsburg	Los Angeles	14	1904-1918
222	Los Angeles	Los Angeles	44	1877 -
223	Ciamont	Los Angeles	30	1891 -
224	Glendora	Los Angeles	11	1892-1911
225	Upland	San Bernardino	20	1891-1911
226	Lytle Creek	San Bernardino	16	1905 -
227	Arrowhead Springs	San Bernardino	7	1909-1919
228	San Bernardino	San Bernardino	51	1876 -
229	Bear Valley Dam	San Bernardino	22	1892-1916
230	Seven Oaks	San Bernardino	10	1911 -
231	Mill Creek No 2	San Bernardino	18	1903 -
232	Craftonville	San Bernardino	17	1892-1909
233	Redlands	San Bernardino	32	1889 -
234	Riverside	Riverside	40	1881 -
235	Ching	San Bernardino	22	1893-1915
236	Concha	Riverside	12	1908 -
237	Anaheim	Orange	29	1878-1909
238	Santa Ana	Orange	11	1899 -
239	Tustin	Orange	44	1877 -
240	Esunore	Riverside	22	1887 -
241	Beaumont	Riverside	10	1911 -
242	Reumont	Riverside	16	1888 -
243	Cabazon	Riverside	11	1886-1909
244	San Jacinto	Riverside	28	1893 -
245	Ignarville	Riverside	10	1901-1911
246	Falbrook	San Diego	27	1876-1903
247	Aganga	Riverside	13	1906 -
248	Warner Springs	San Diego	15	1906 -
249	Nellis	San Diego	13	1901-1920
250	Oceanside	San Diego	10	1905-1919
251	Mesa Grande	San Diego	13	1908 -
252	Escandido	San Diego	24	1897 -
253	Julian	San Diego	22	1886 -
254	Imperial	Inyo	16	1904-1920
255	Desereno	Inyo	24	1895-1909
256	Poway	San Diego	12	1895-1915
257	El Cajon	San Diego	24	1879-1909
258	Point Loma	San Diego	17	1904 -
259	San Diego	San Diego	71	1850 -
260	Cameo	San Diego	31	1877 -
261	Boile	Mono	11	1895-1906
262	Bishop	Inyo	31	1883-1918
263	Bishop Creek	Inyo	7	1911 -
264	Independence	Inyo	30	1876 -
265	Little Pine	Inyo	16	1904-1920
266	Kearney	Inyo	24	1895-1909
267	Clim Ranch	San Bernardino	16	1900-1916
268	Berston	San Bernardino	24	1889 -
269	Basgal	San Bernardino	18	1903 -
270	Needles	San Bernardino	29	1882 -
271	Palm Springs	Riverside	26	1889-1915
272	Indio	Riverside	43	1878 -
273	Mecca	Riverside	16	1905 -
274	Santon	Riverside	18	1889-1907
275	Blythe	Riverside	9	1909 -
276	Stirling	Imperial	43	1874 -
277	Colton	Imperial	16	1905 -

Record not continuous  
From Water Supply Paper No. 81  
From Water Supply Paper No. 81

PRECIPITATION RECORDS OF THE  
UNITED STATES WEATHER BUREAU

See Direction of Public Works  
Division of Engineering and Irrigation  
Bureau, Water Project, Index - A-124  
CHAPTER 85 - 40-37085





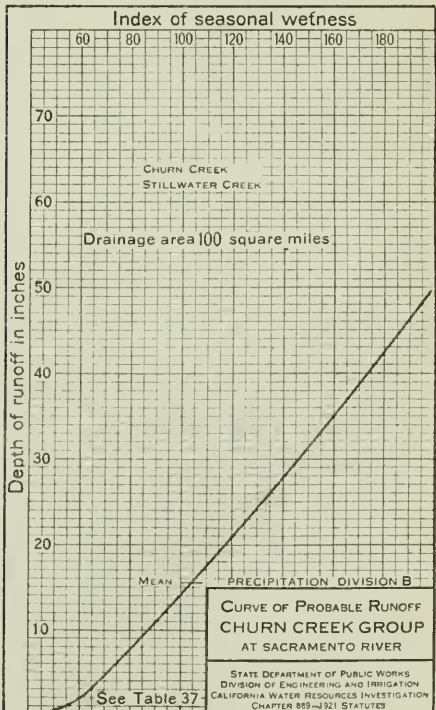
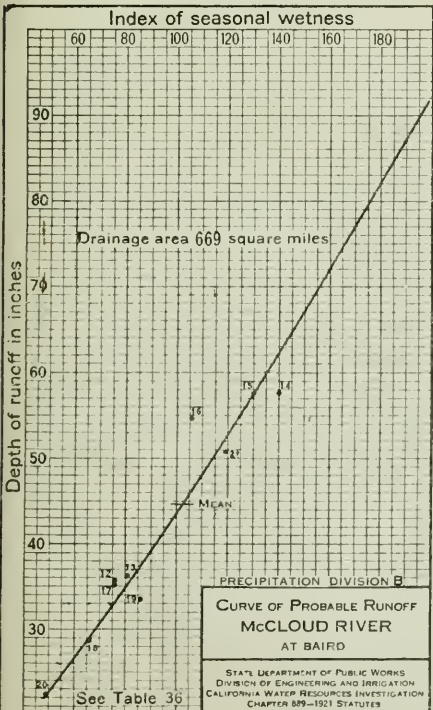
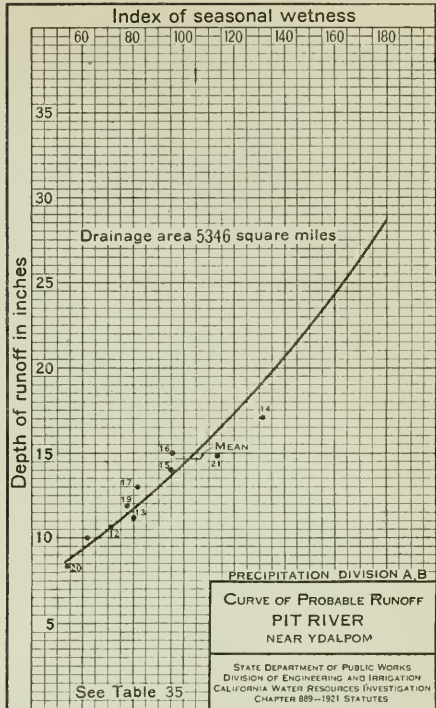
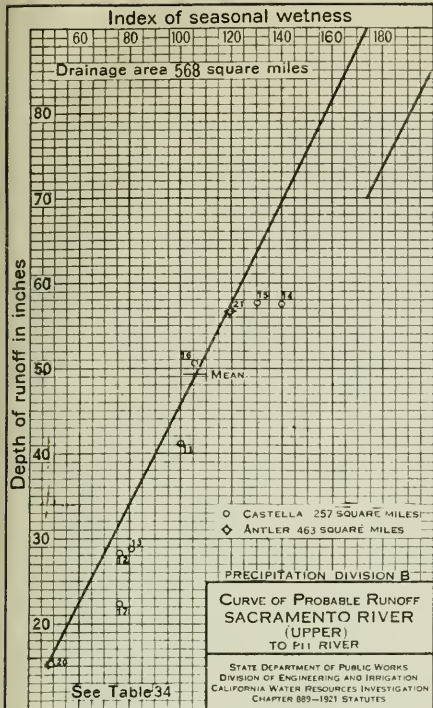
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MEMBERSHIP RECORD OF THE UNITED STATES MEMBERS SOCIETY

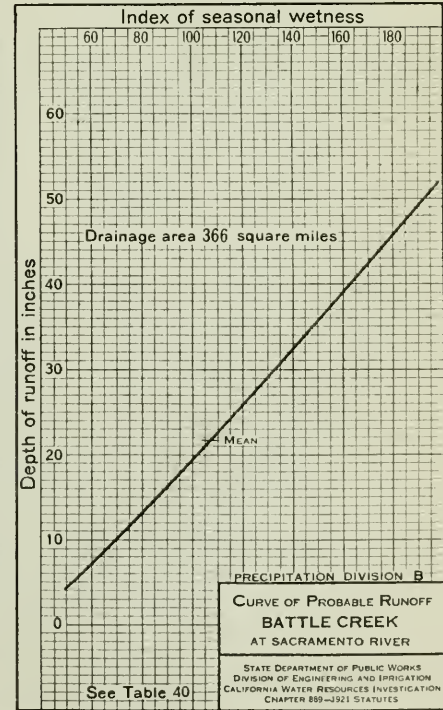
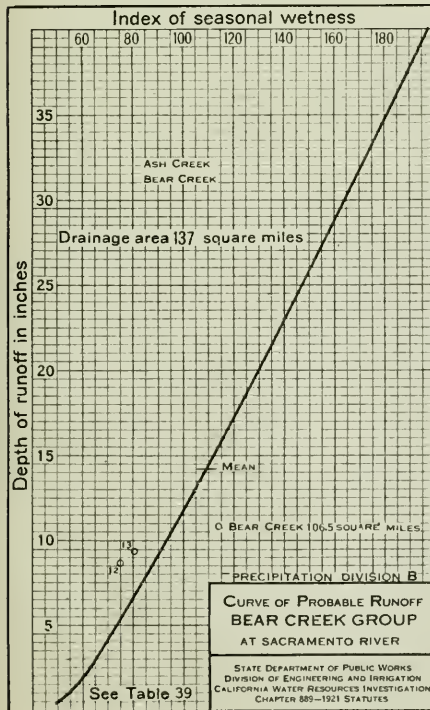
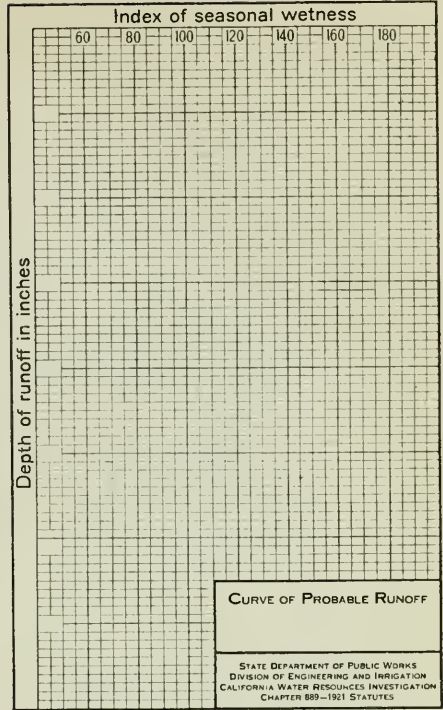
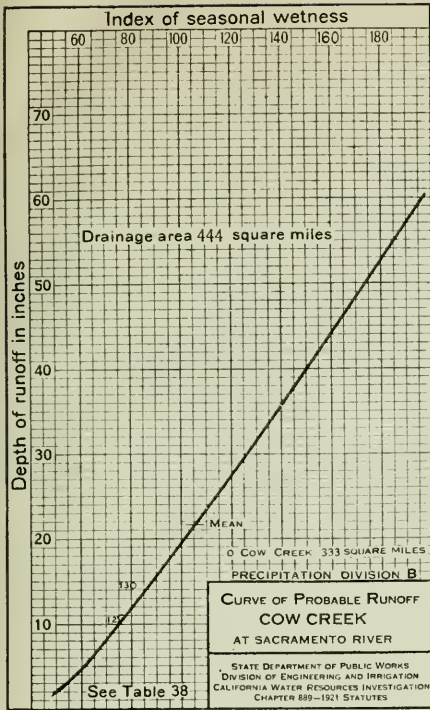
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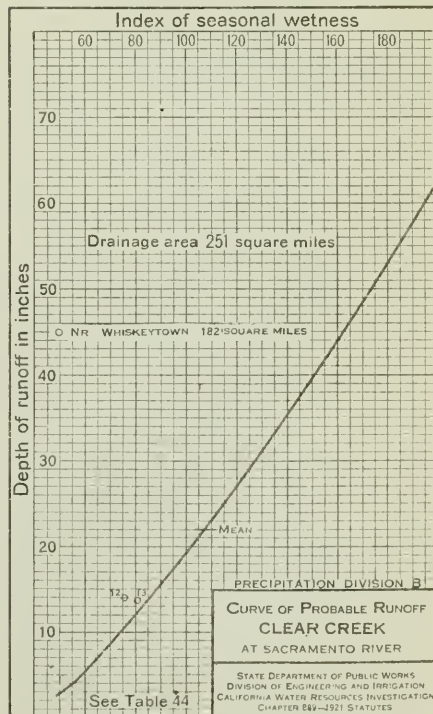
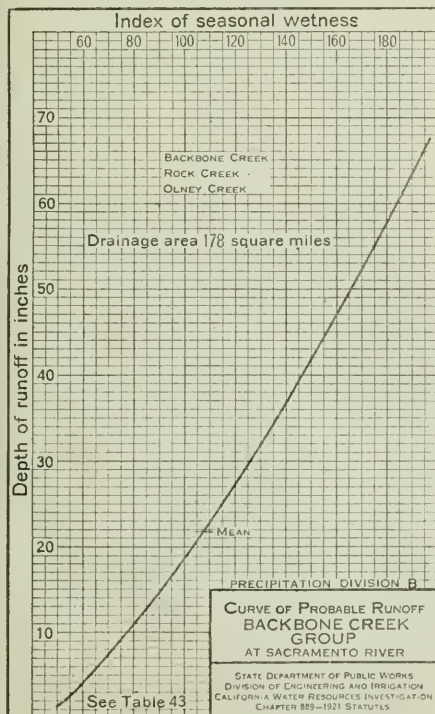
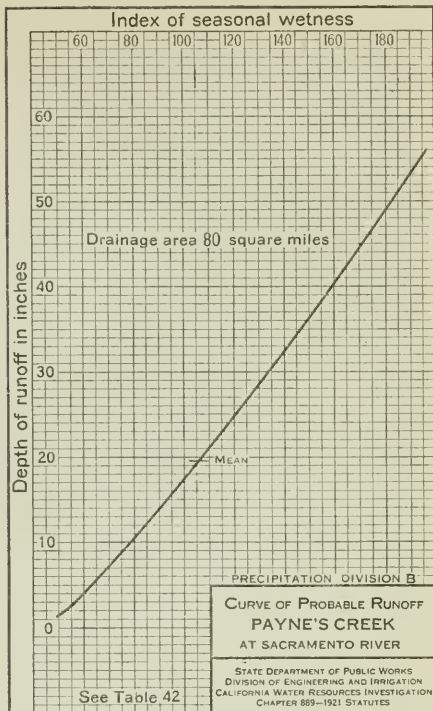
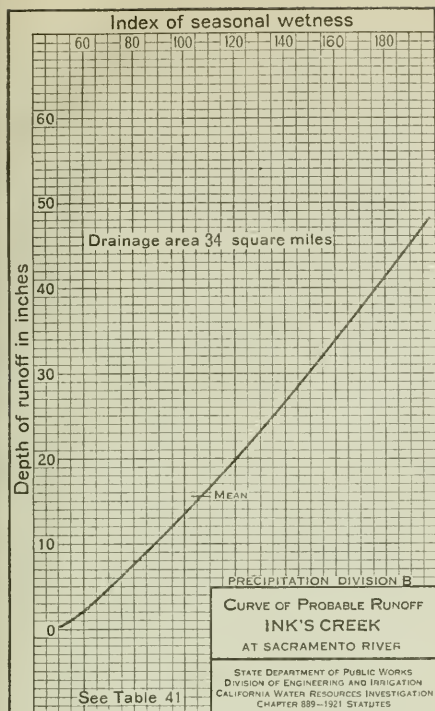




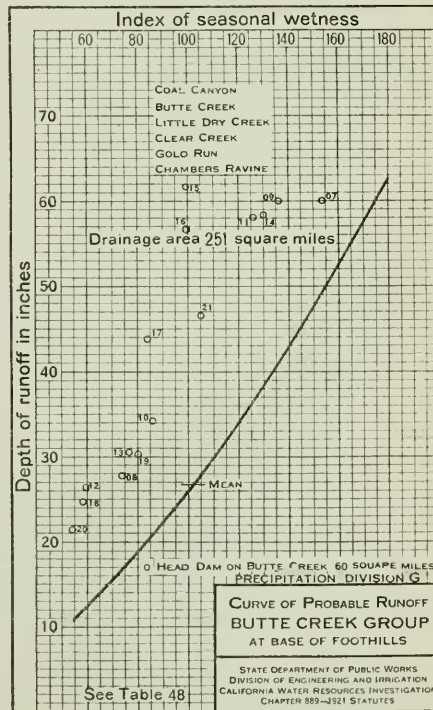
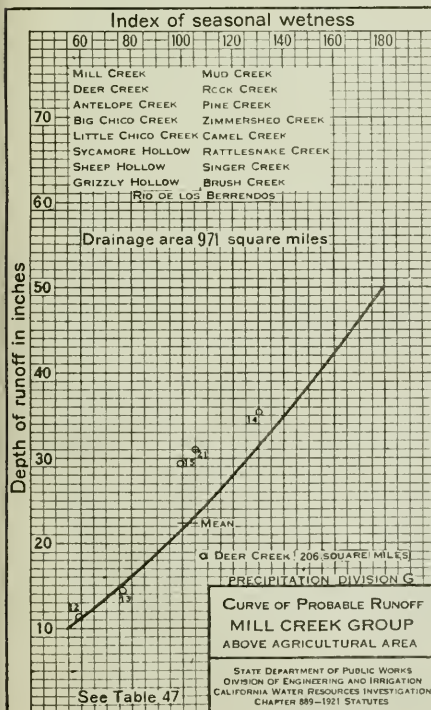
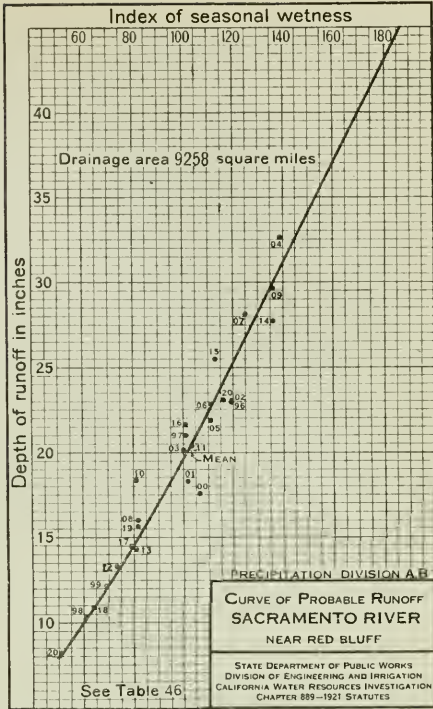
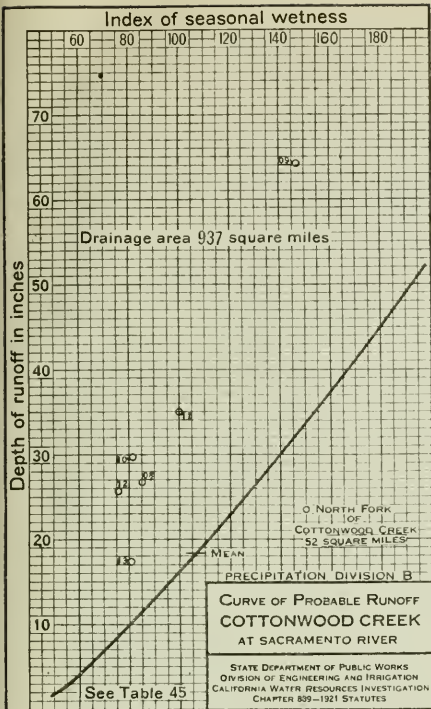




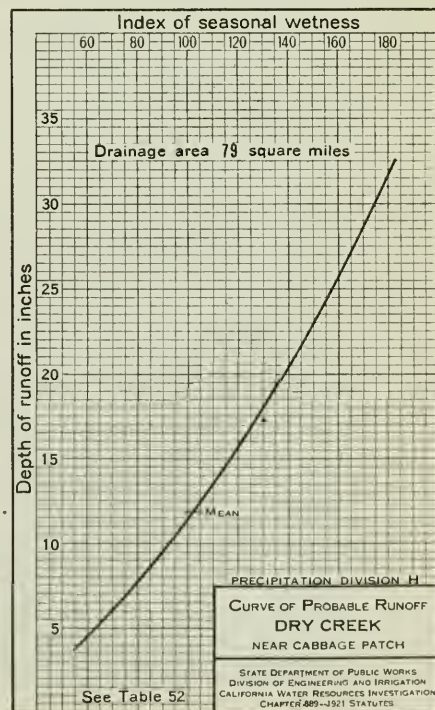
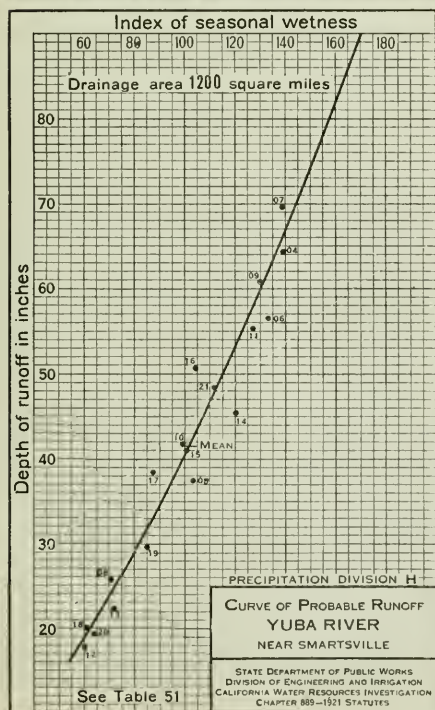
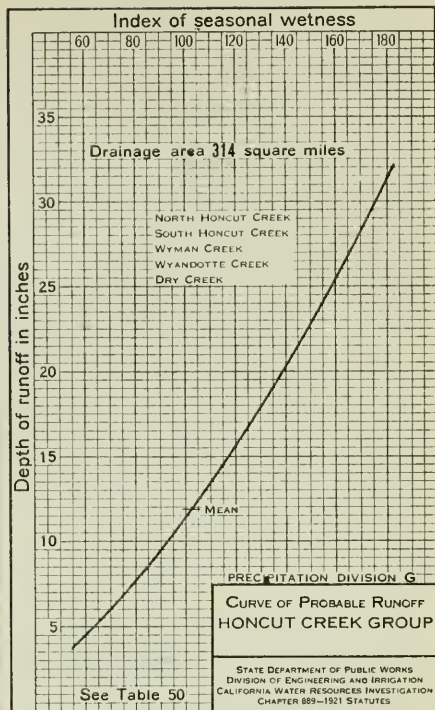
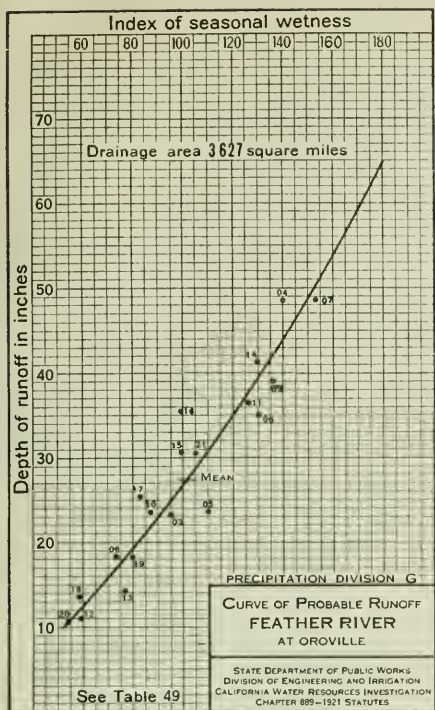




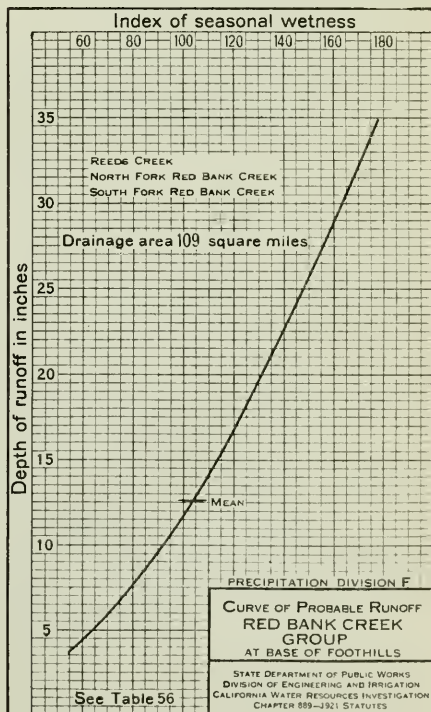
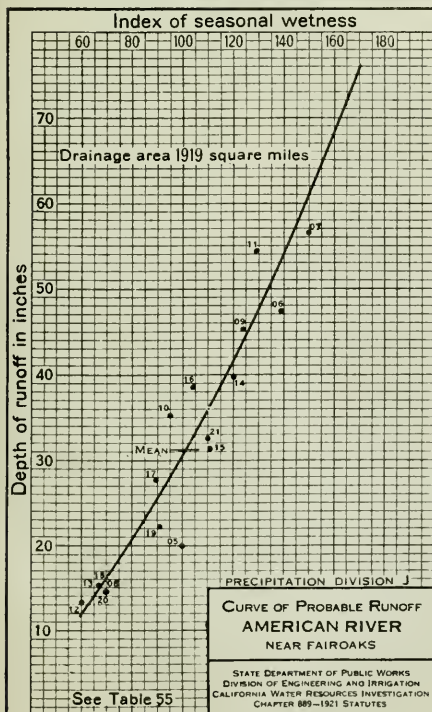
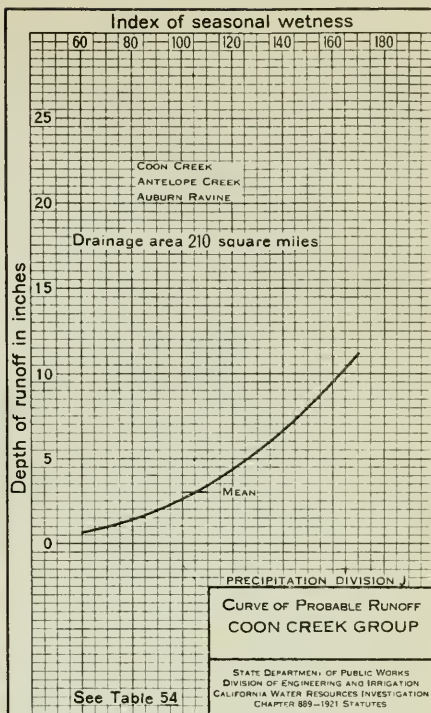
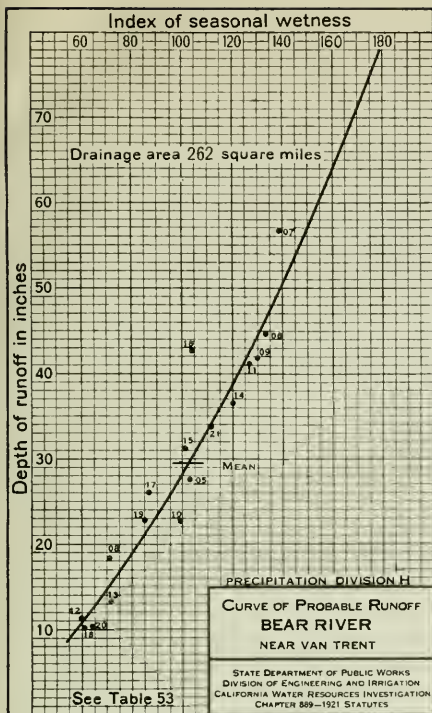






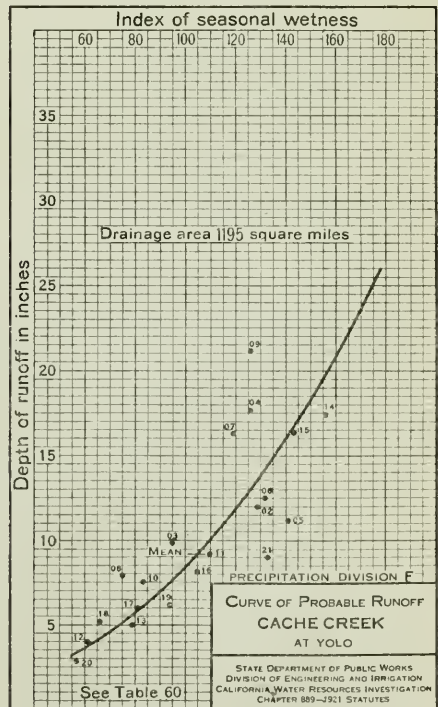
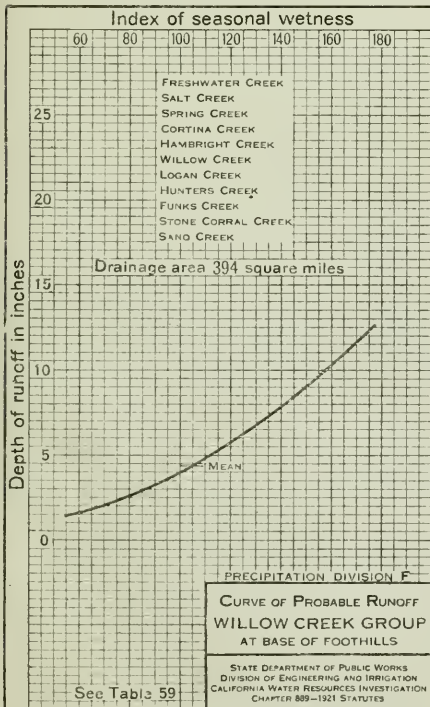
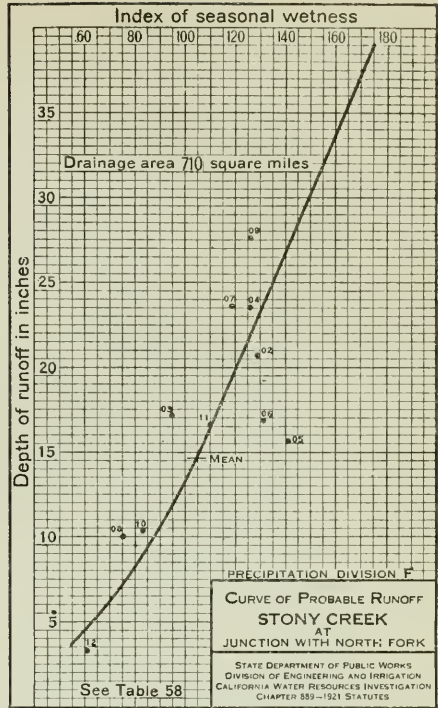
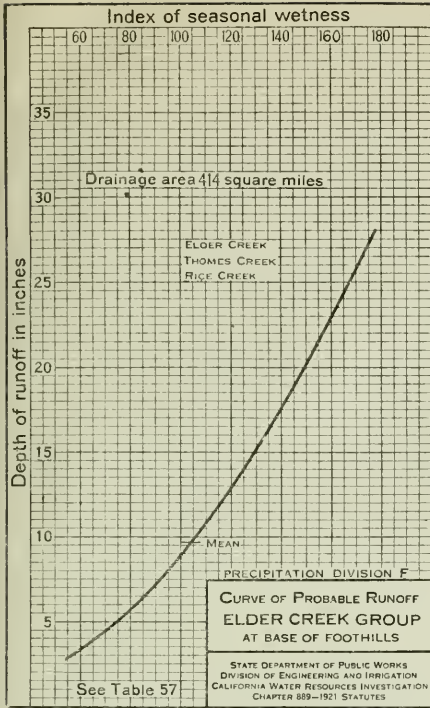




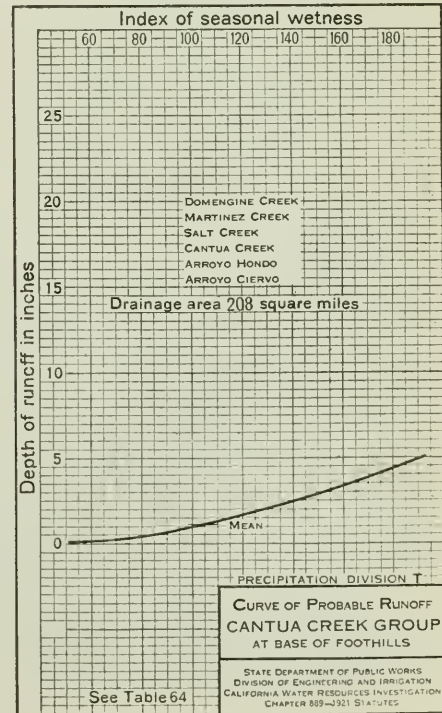
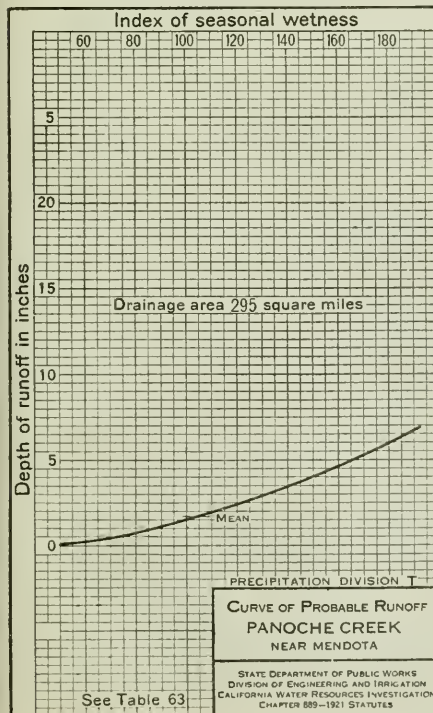
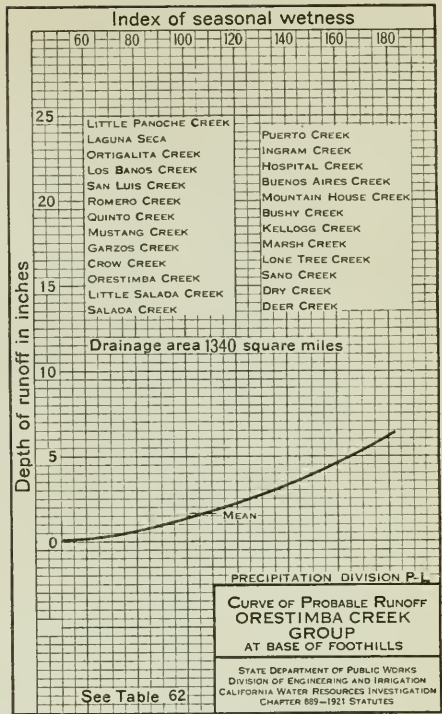
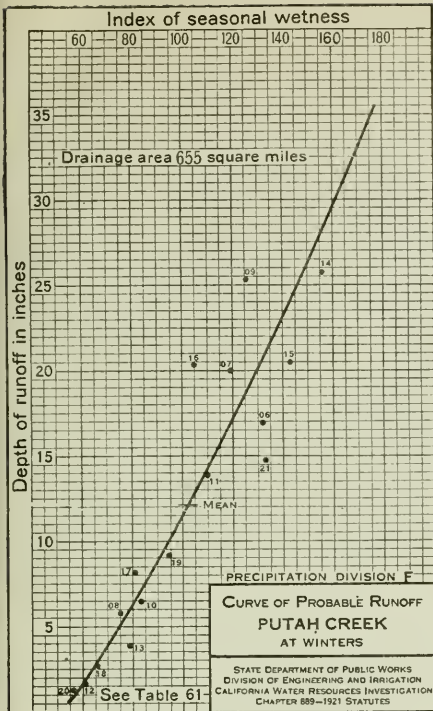




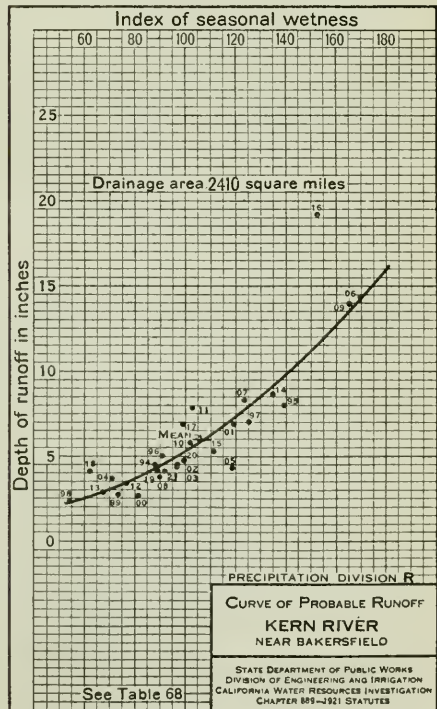
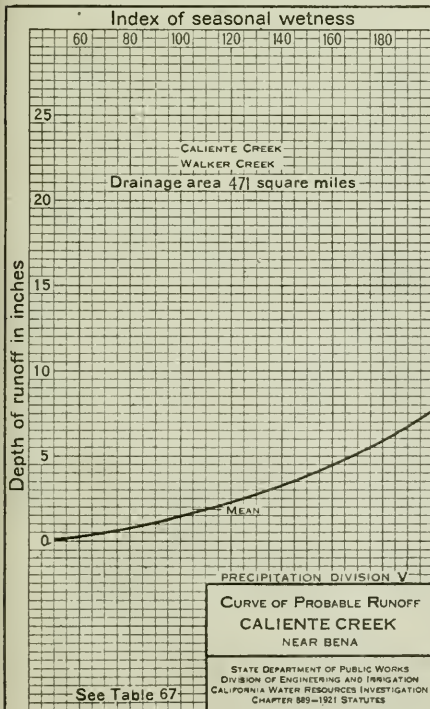
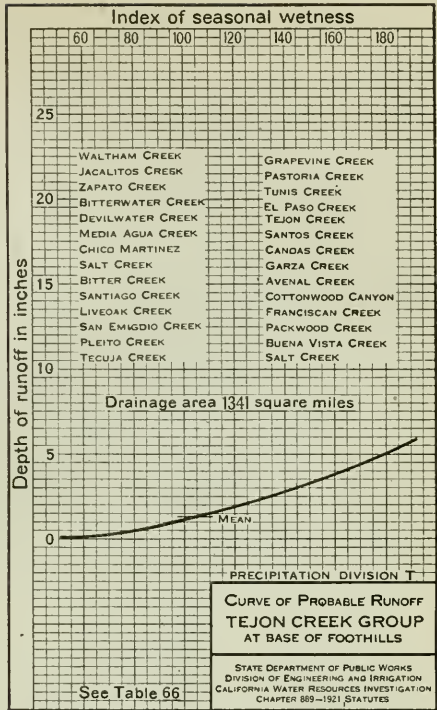
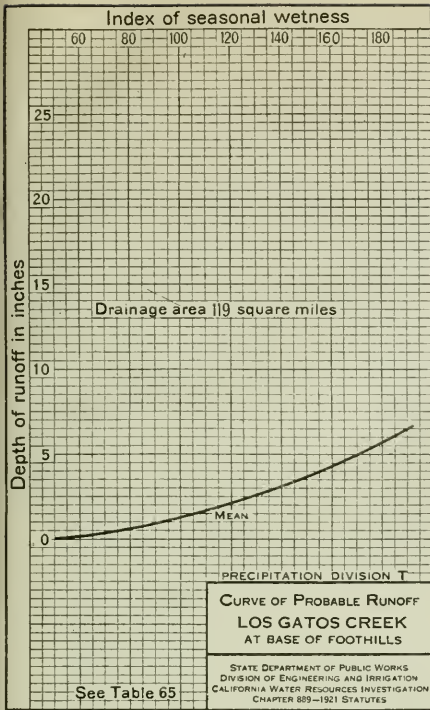




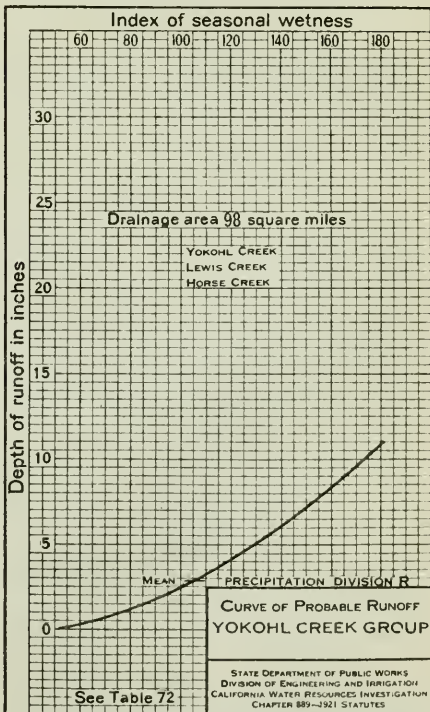
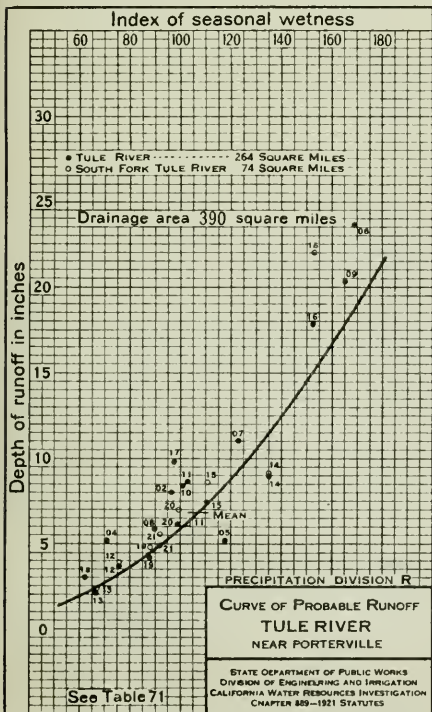
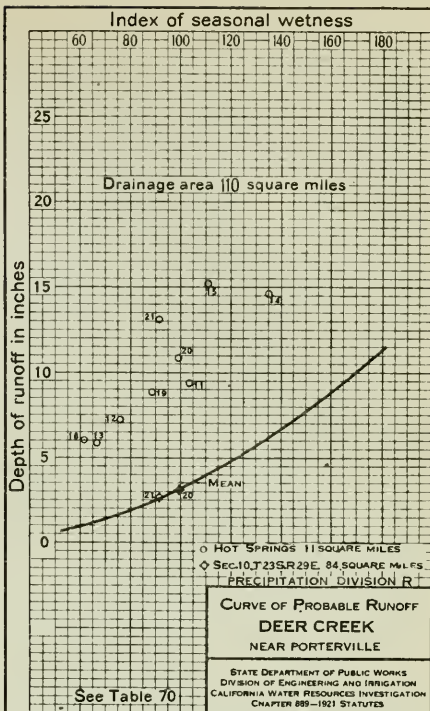
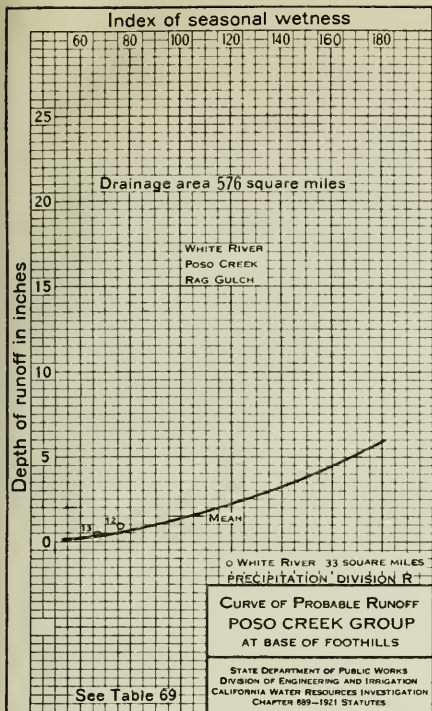






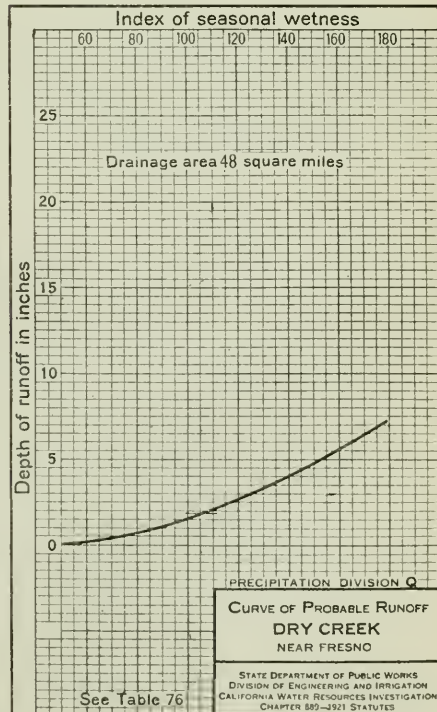
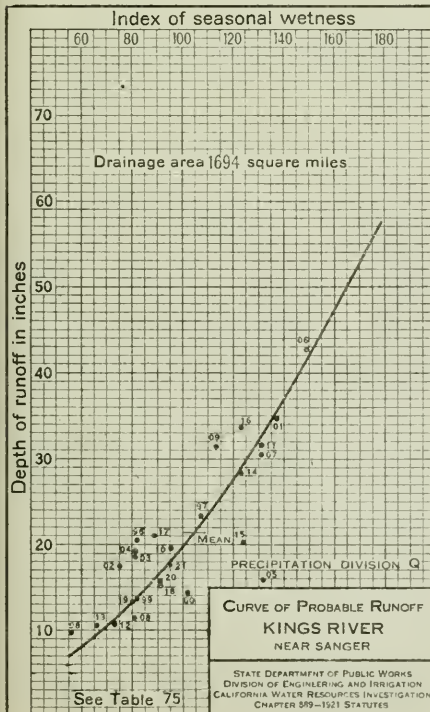
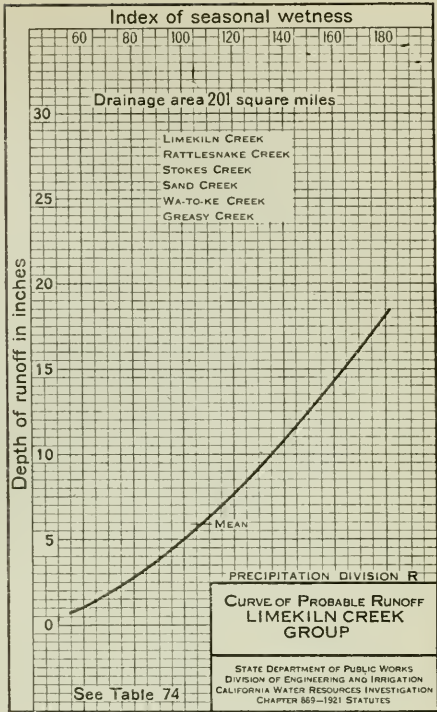
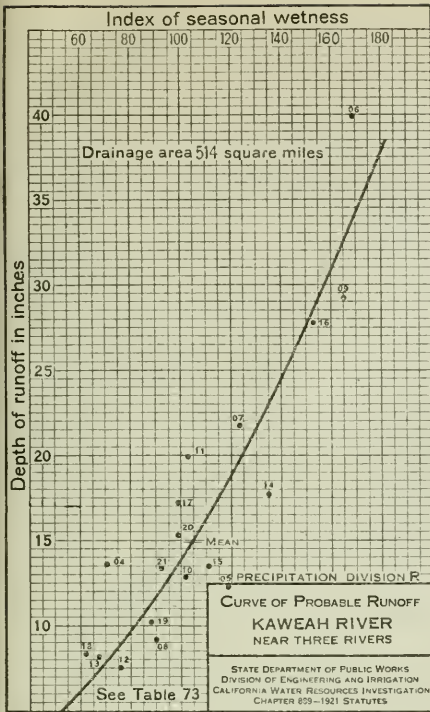




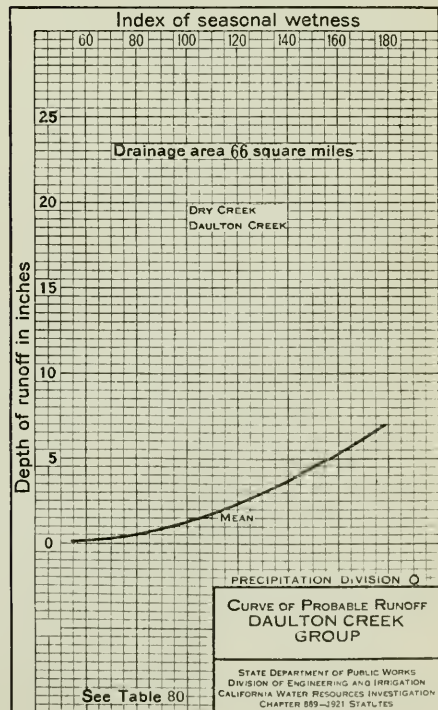
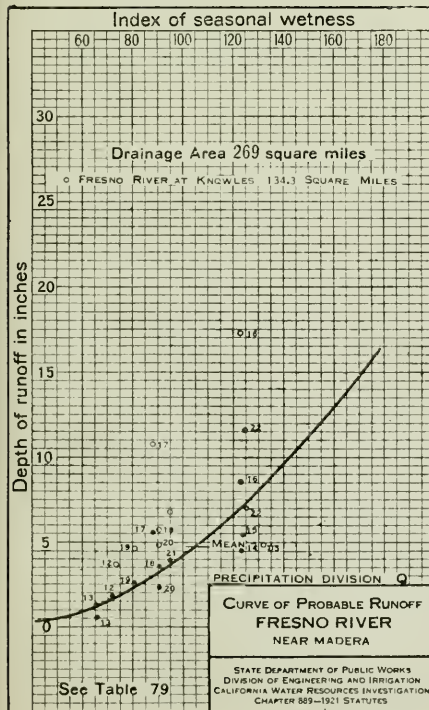
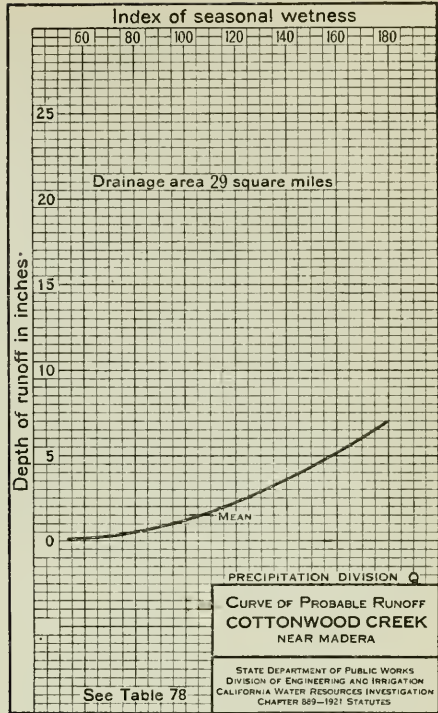
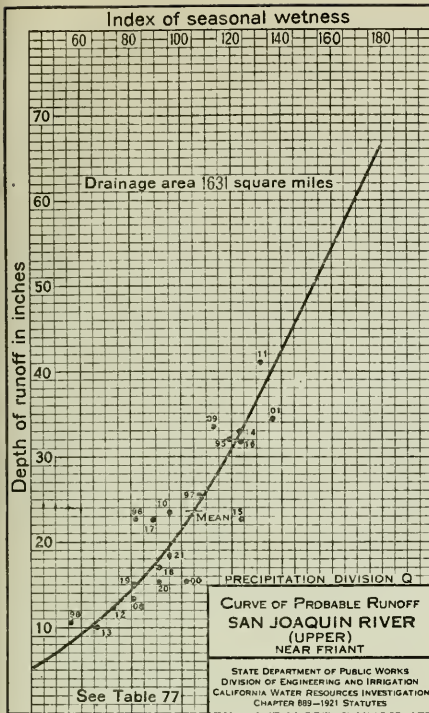




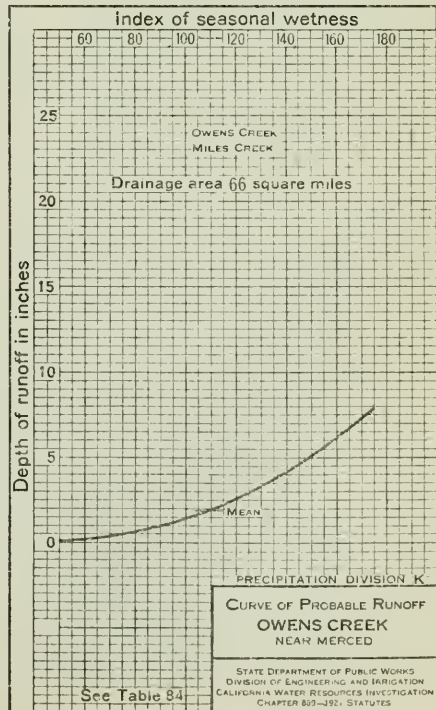
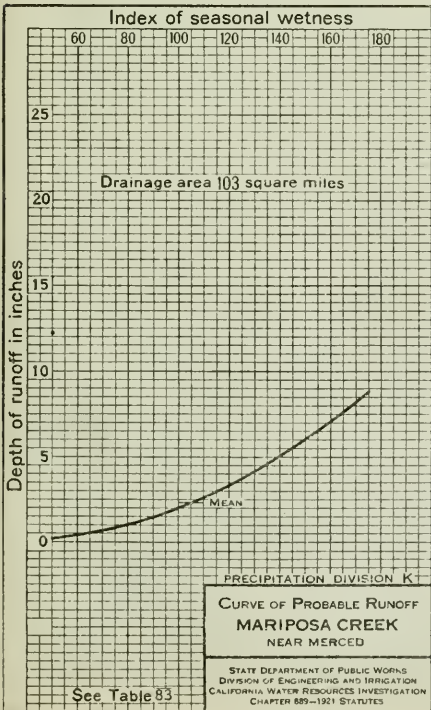
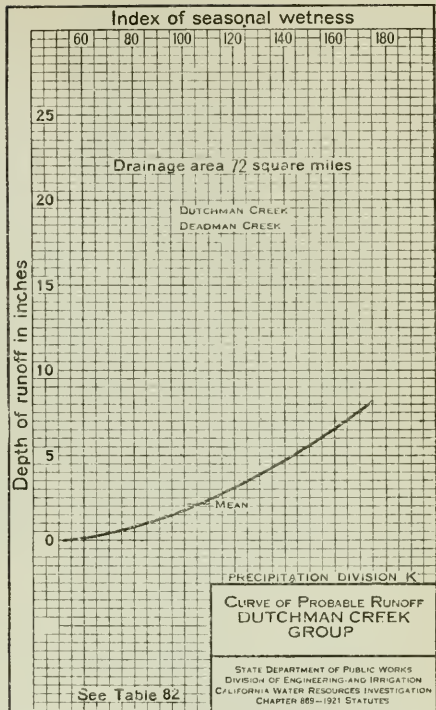
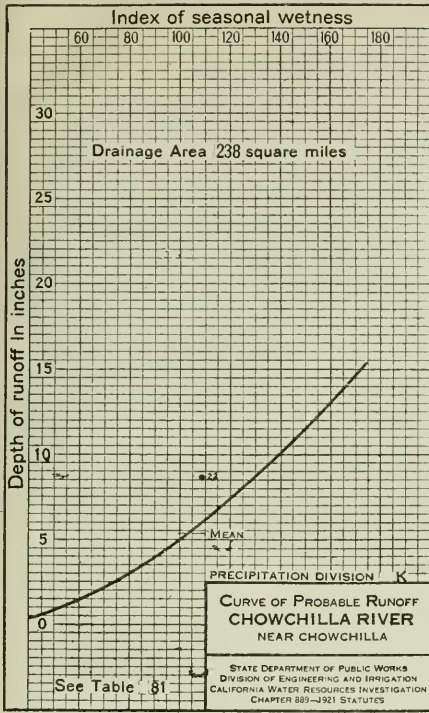




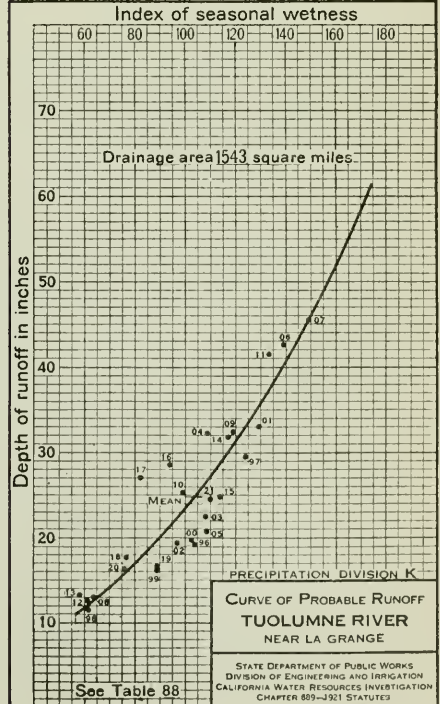
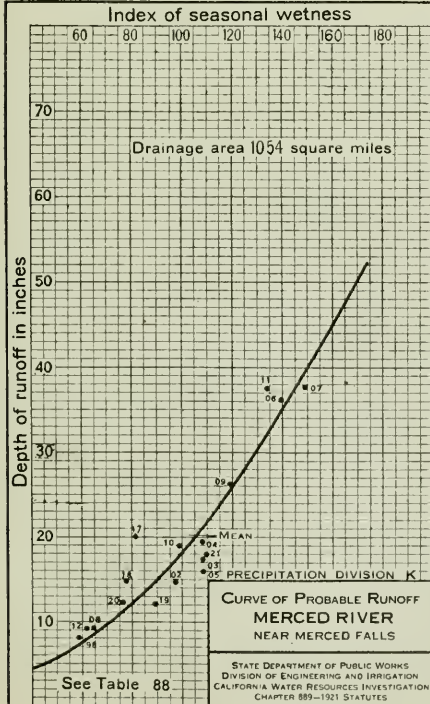
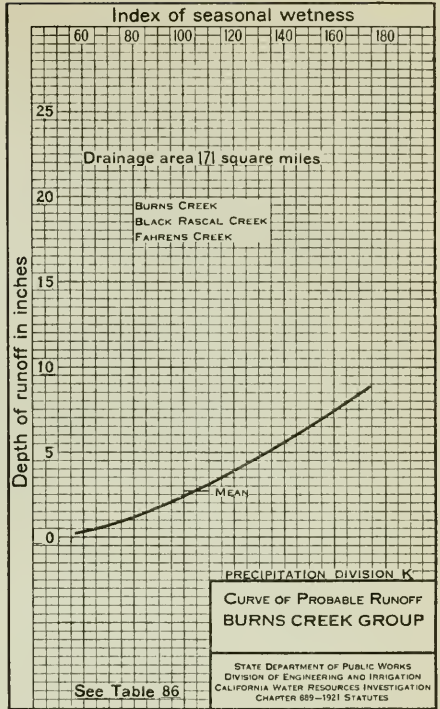
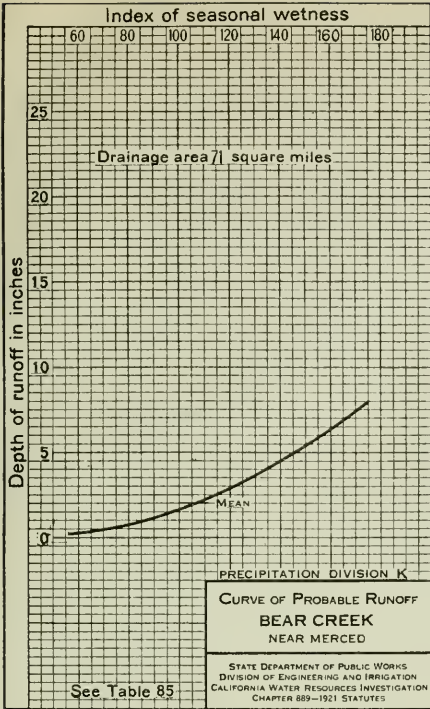






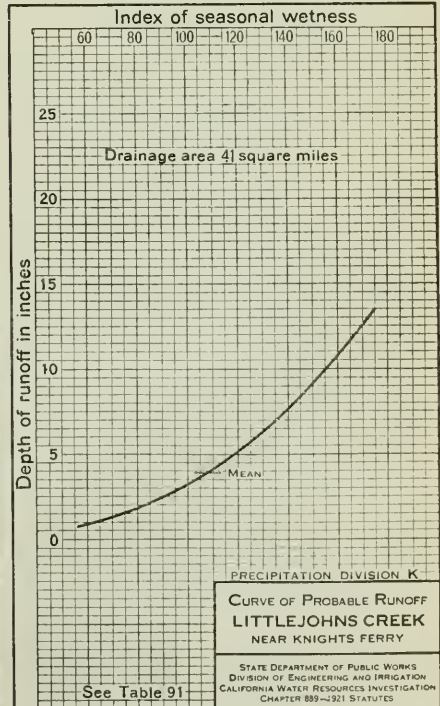
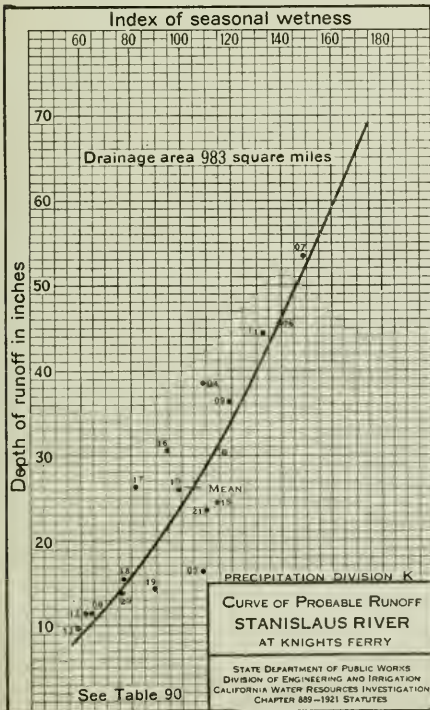
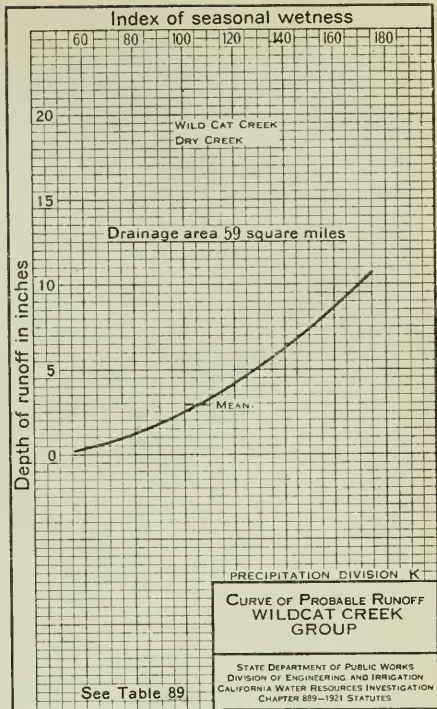
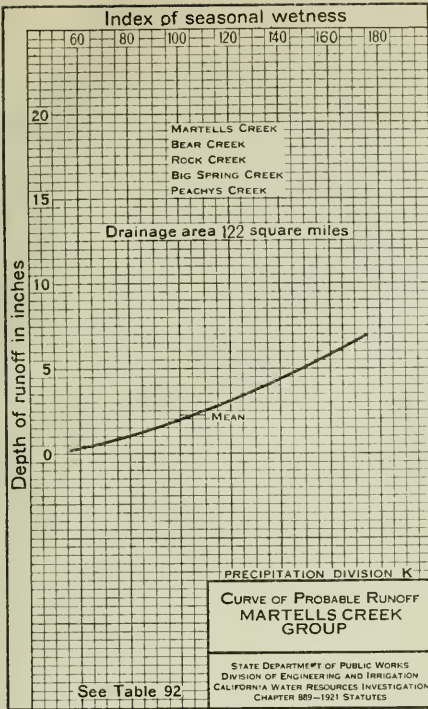




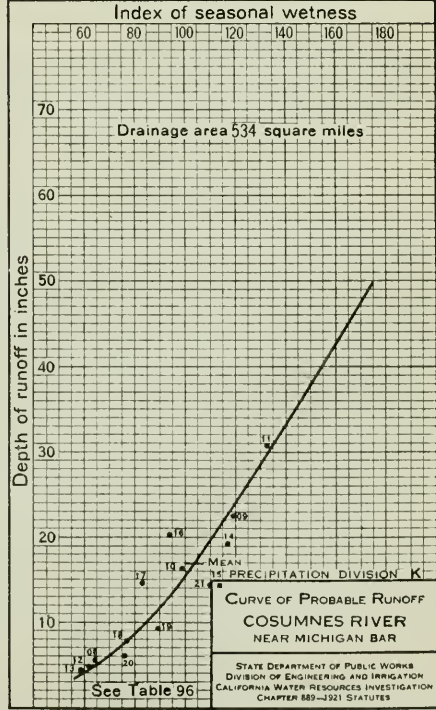
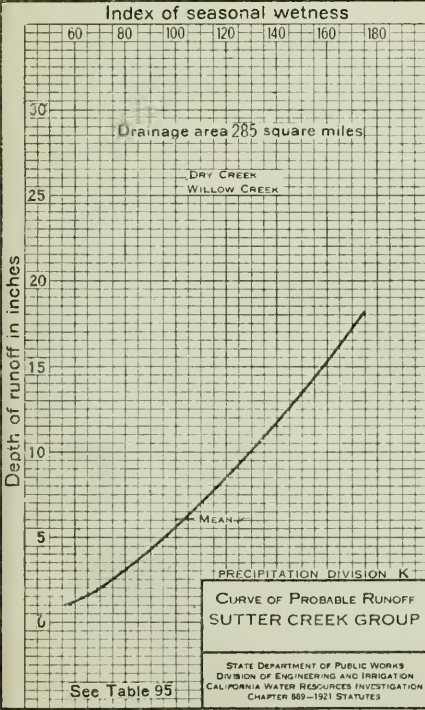
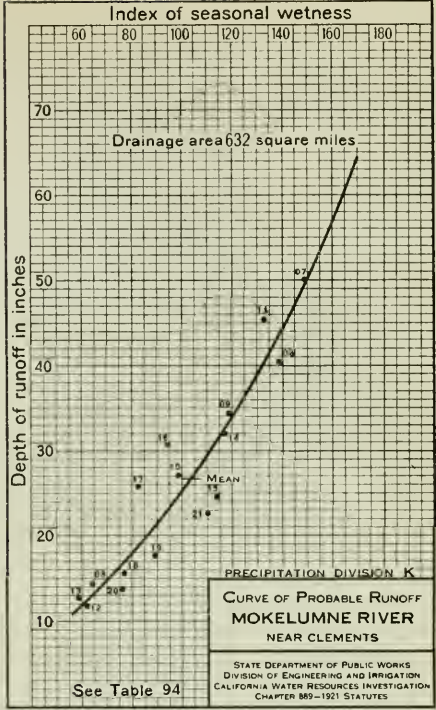
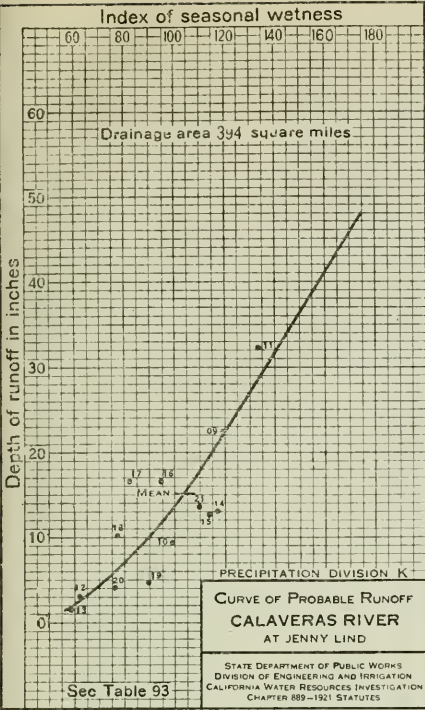




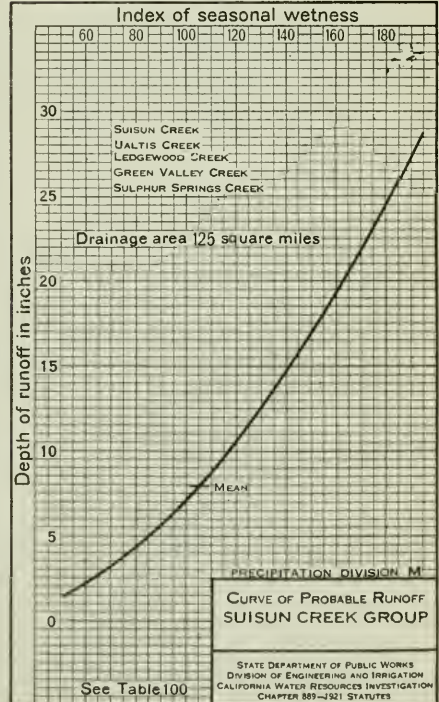
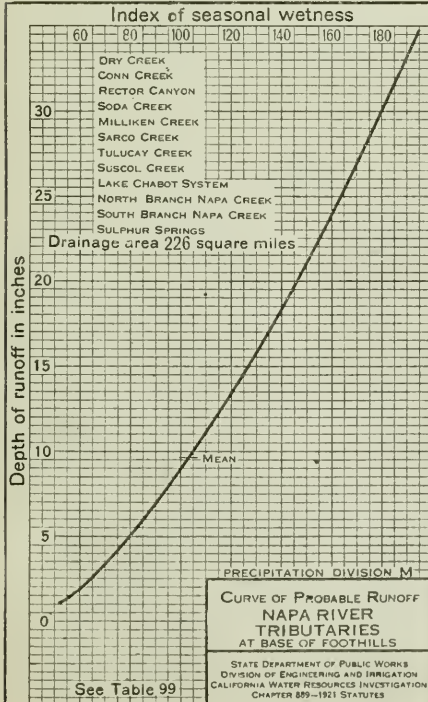
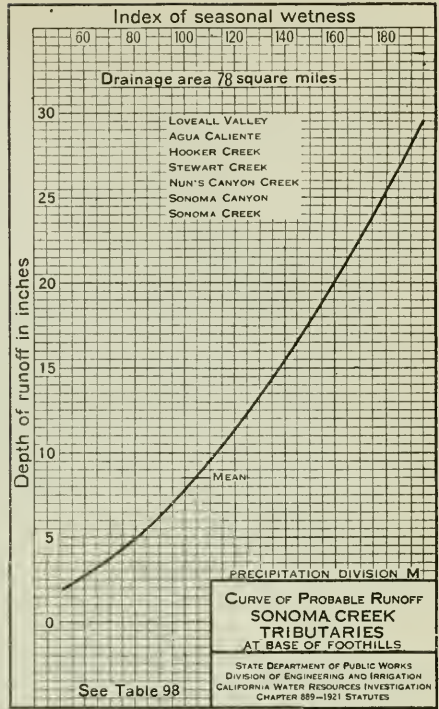
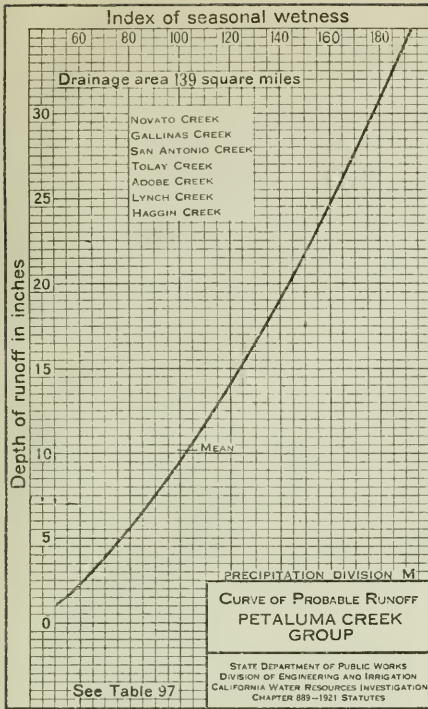




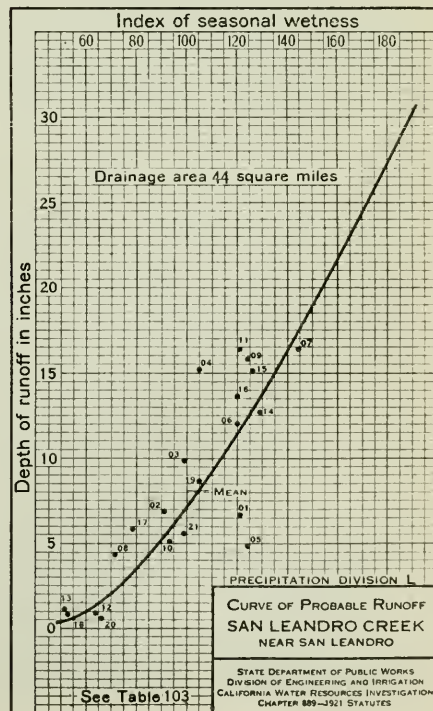
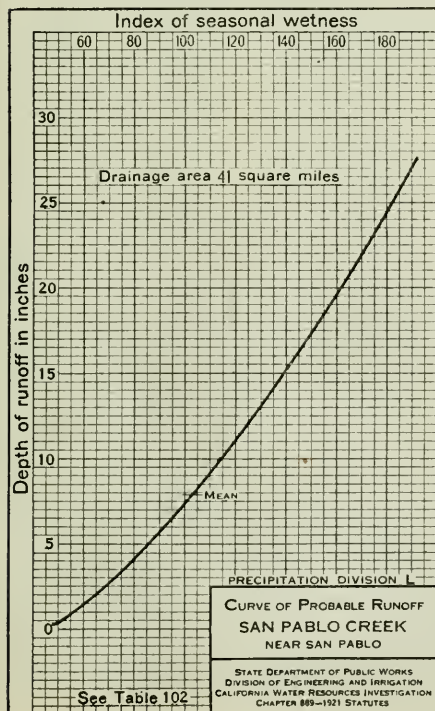
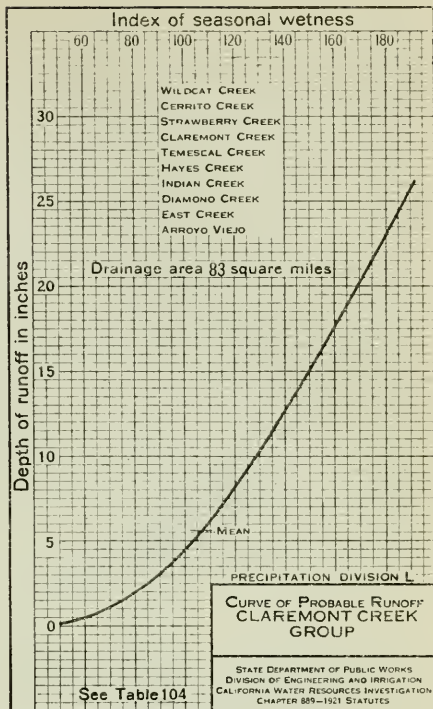
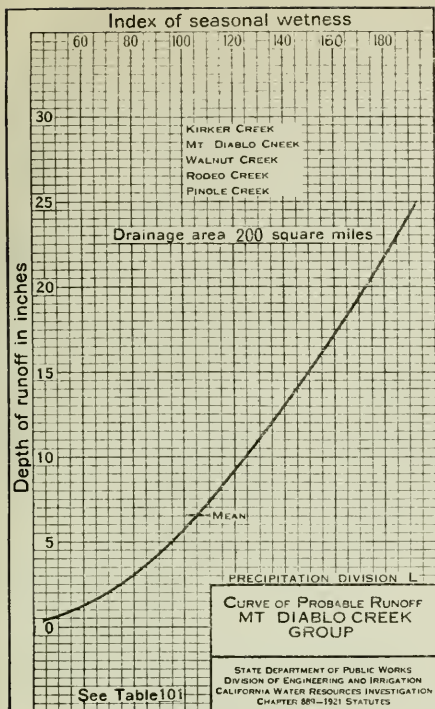






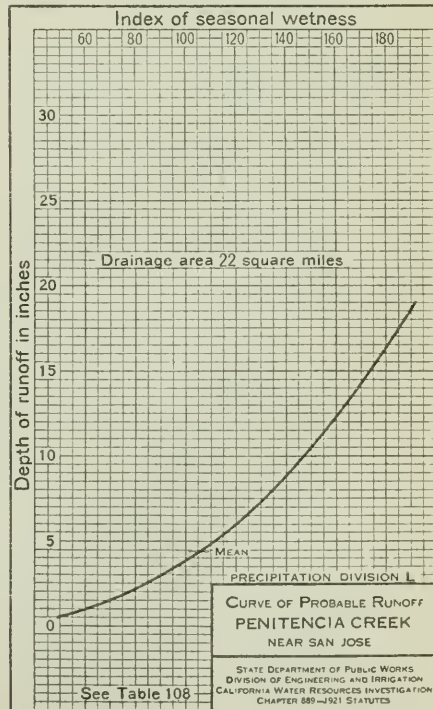
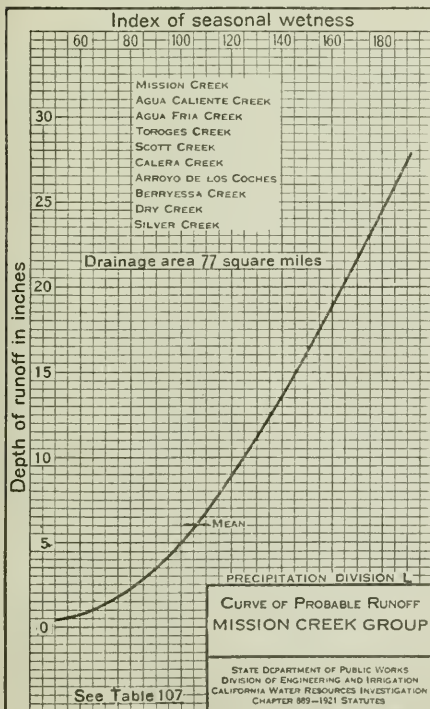
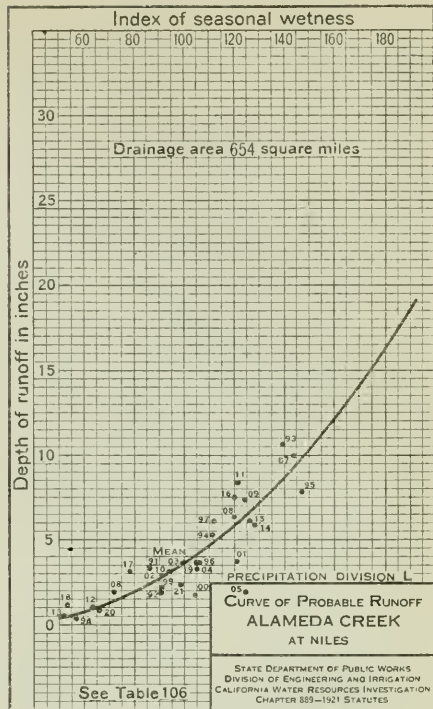
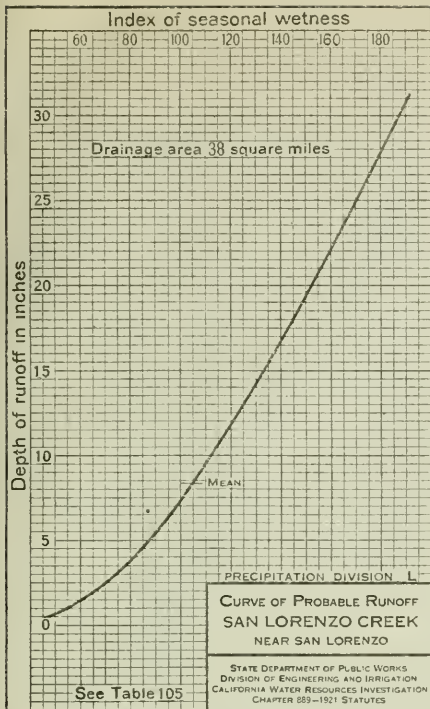




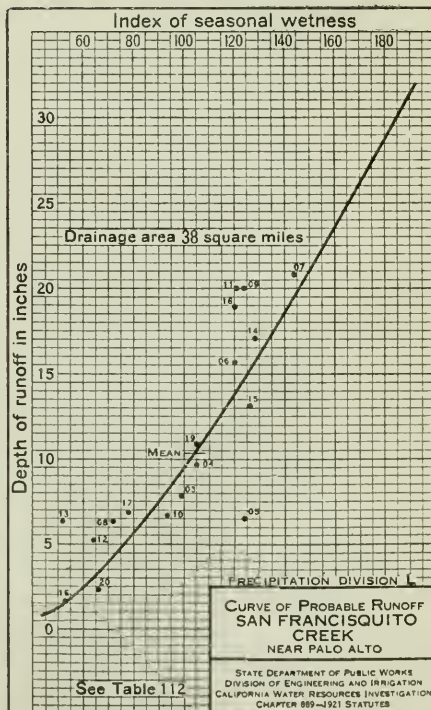
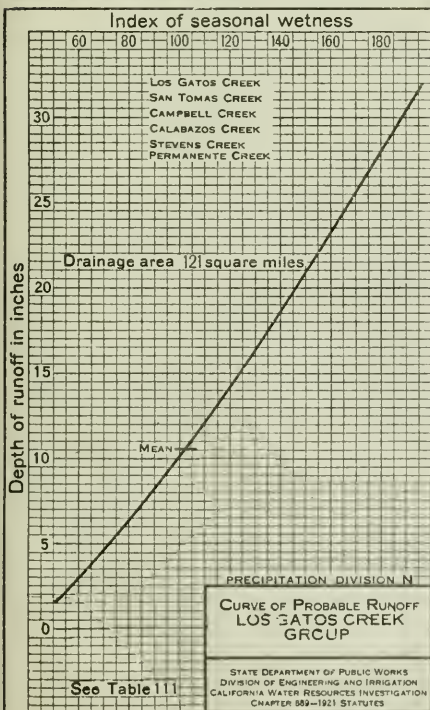
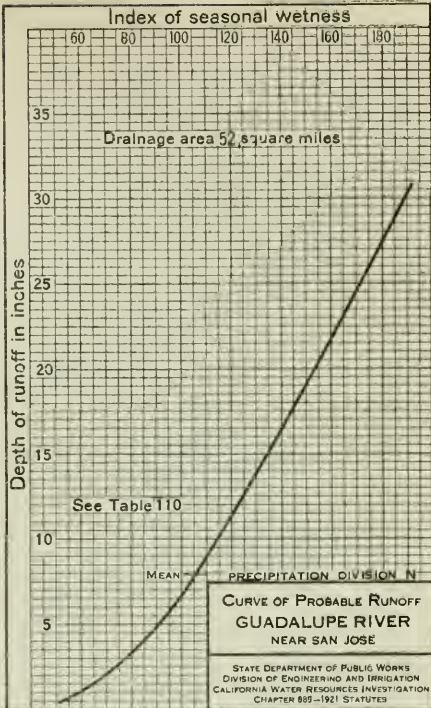
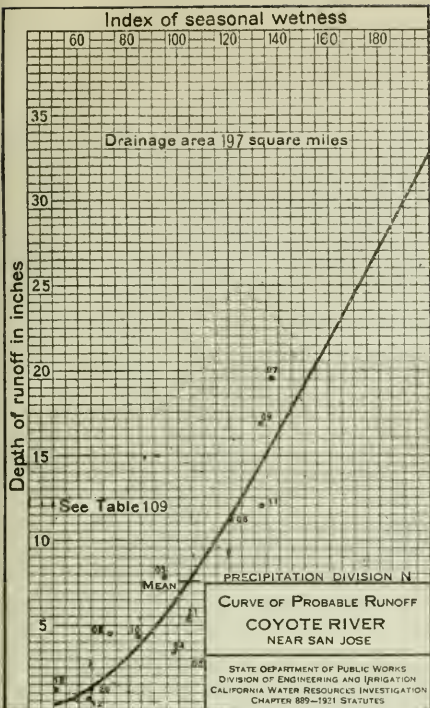




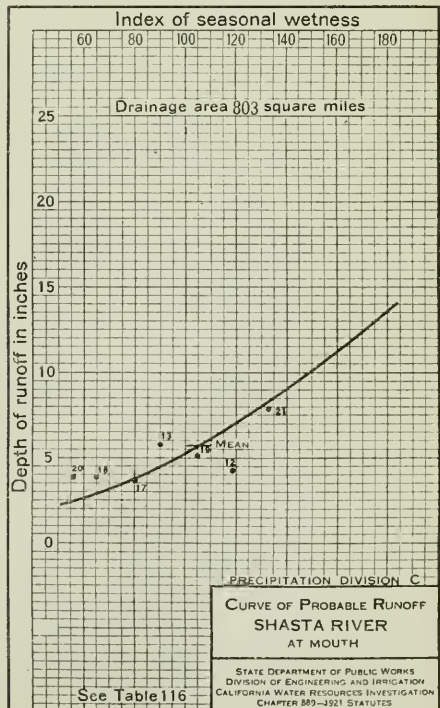
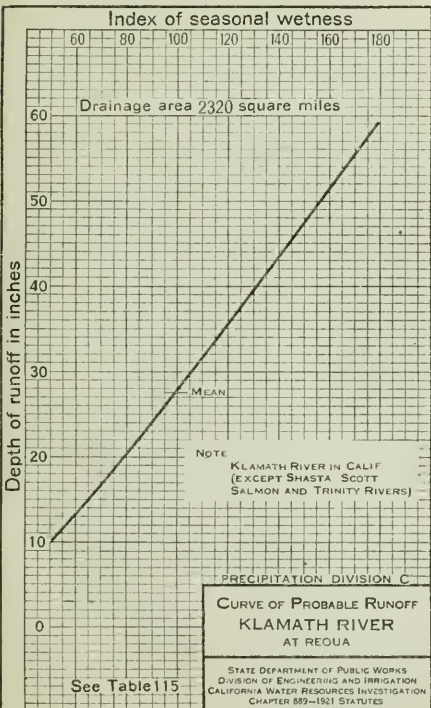
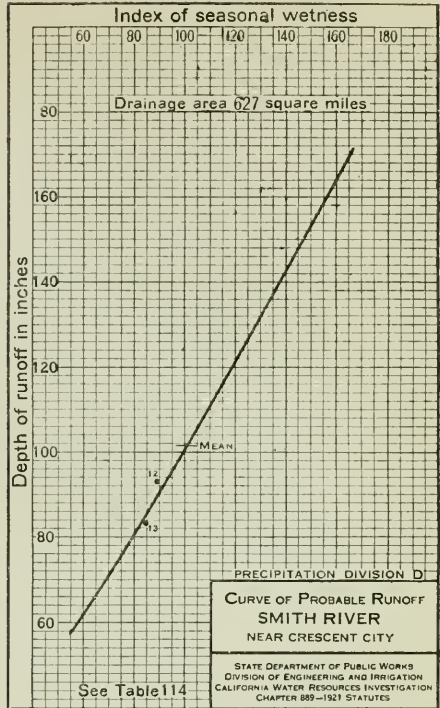
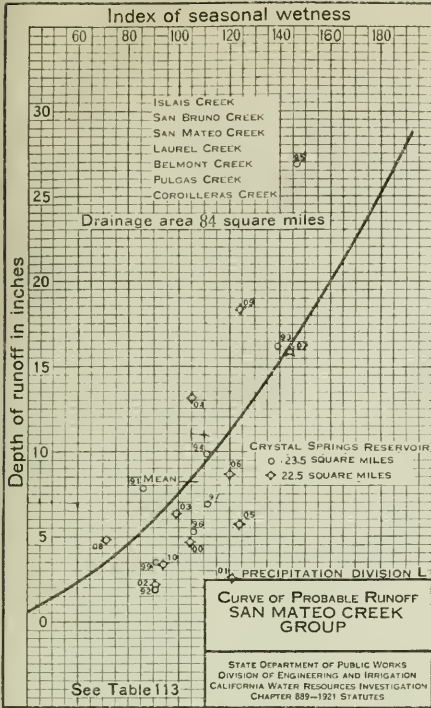




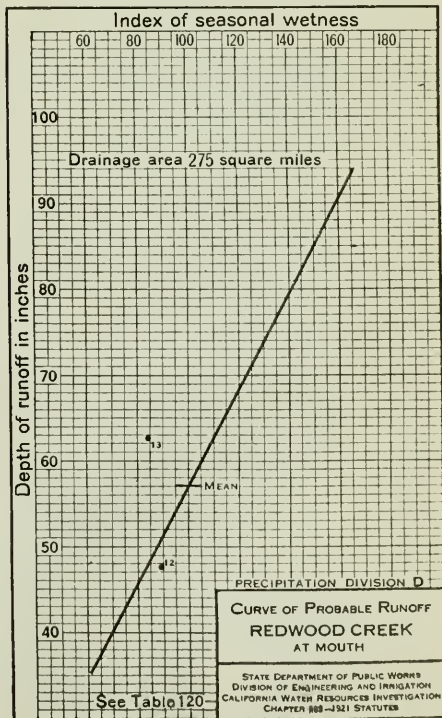
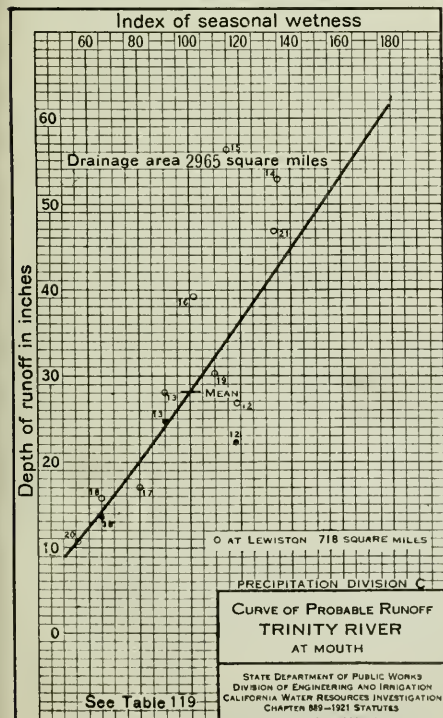
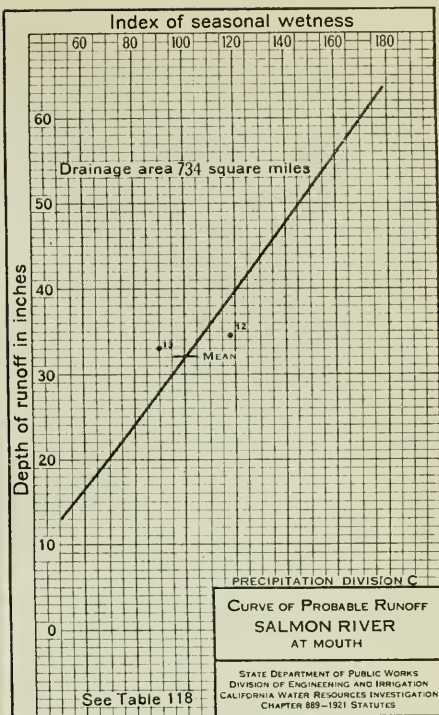
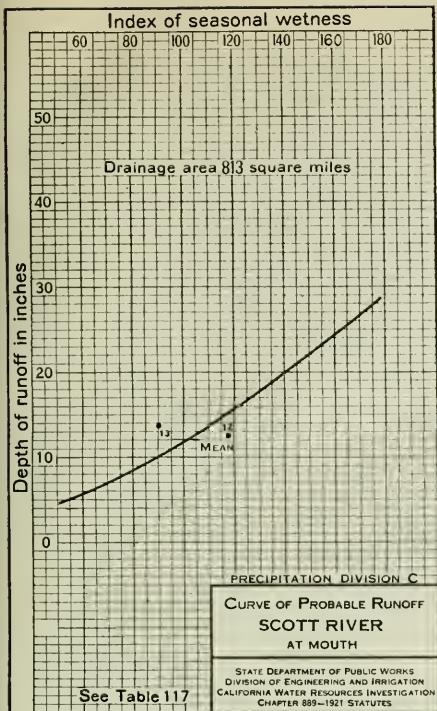






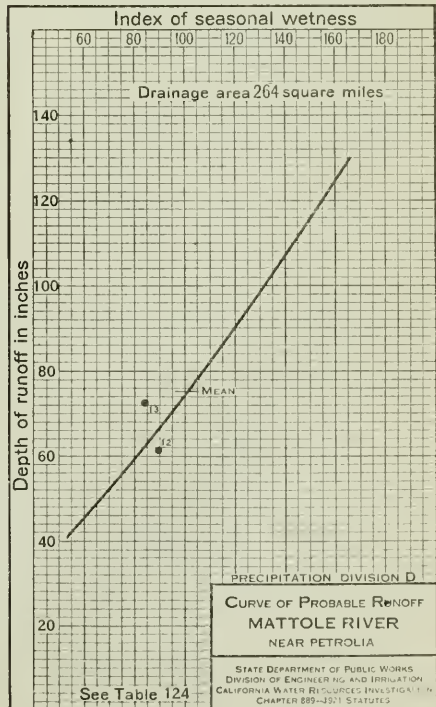
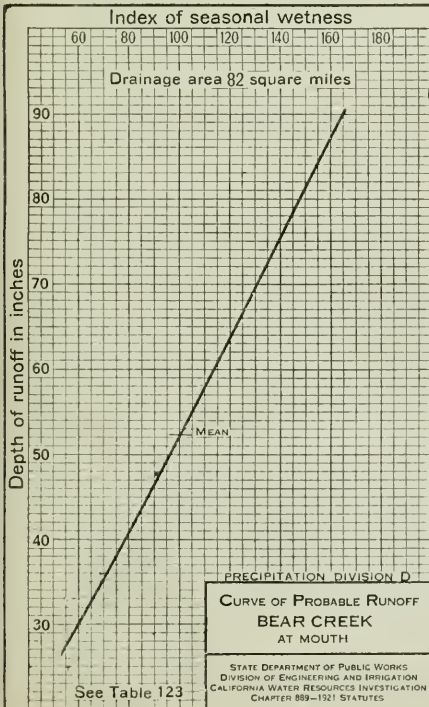
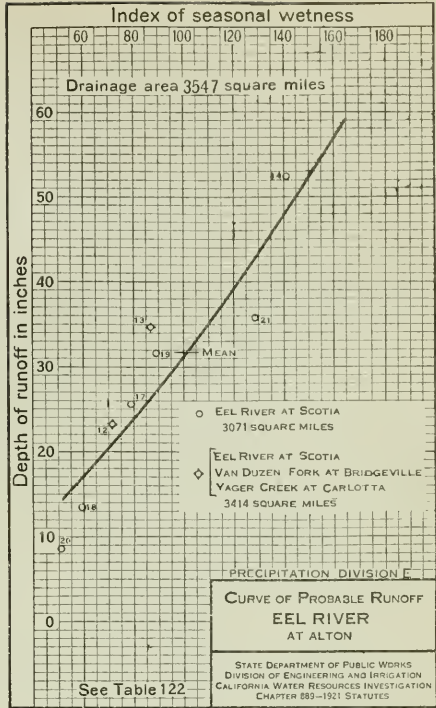
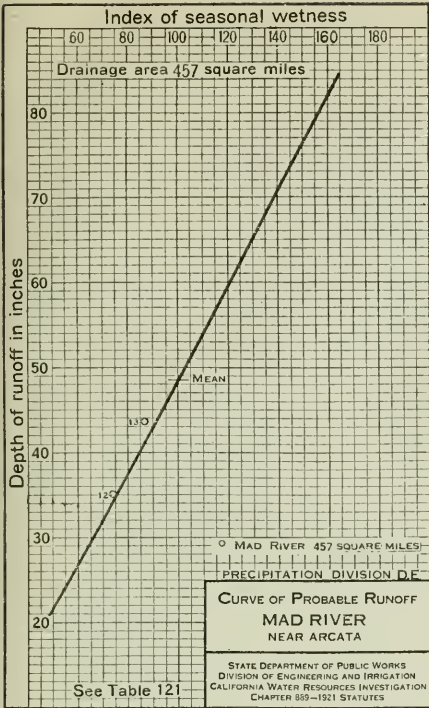




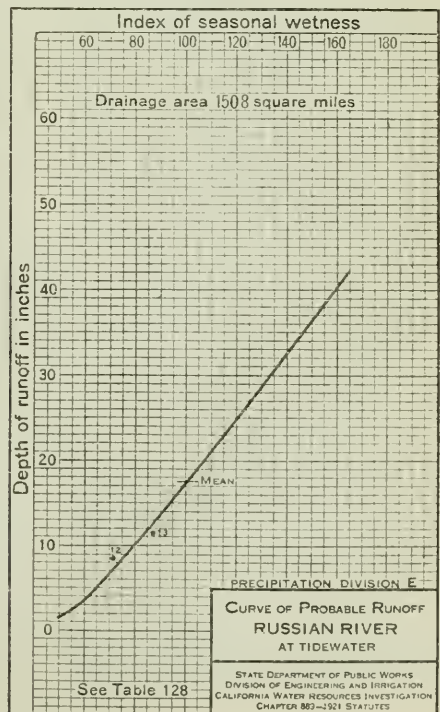
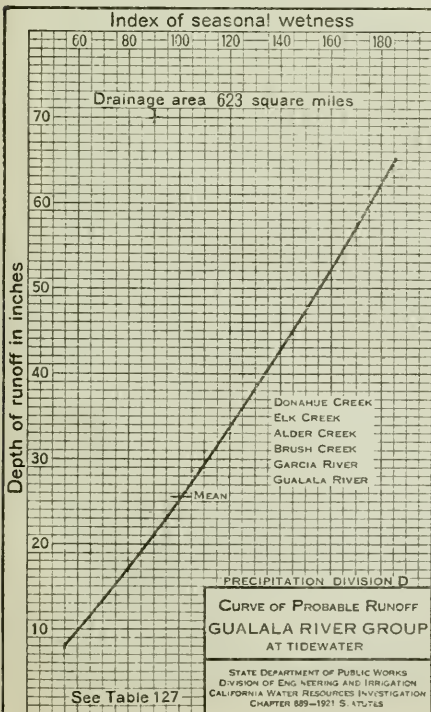
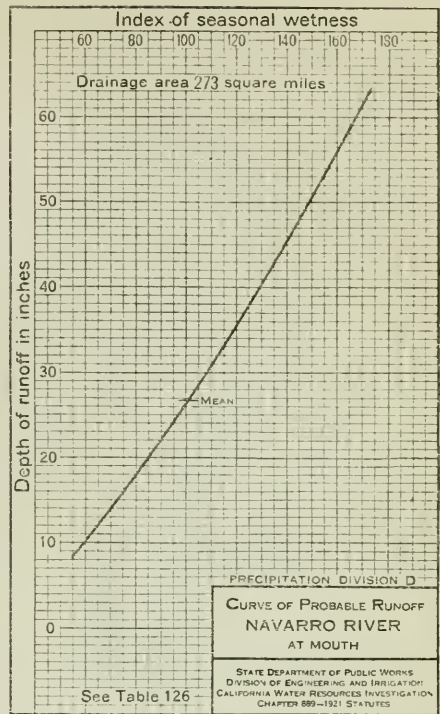
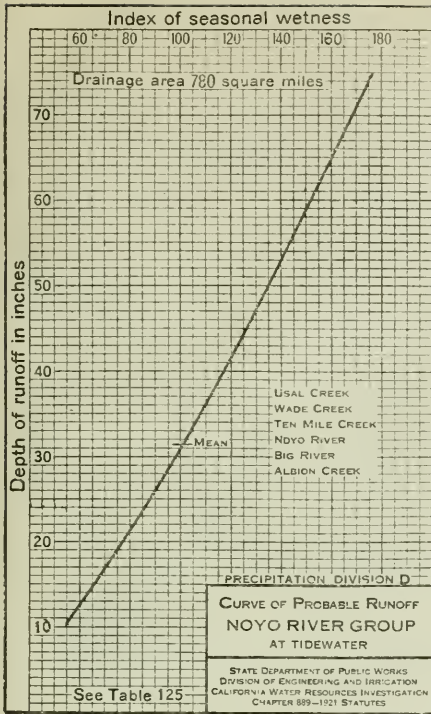




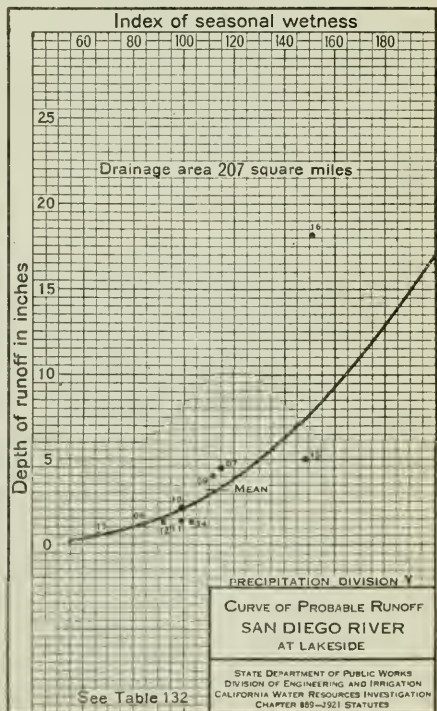
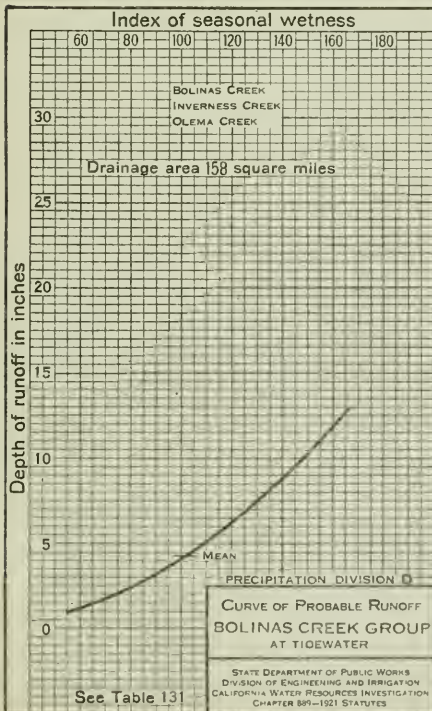
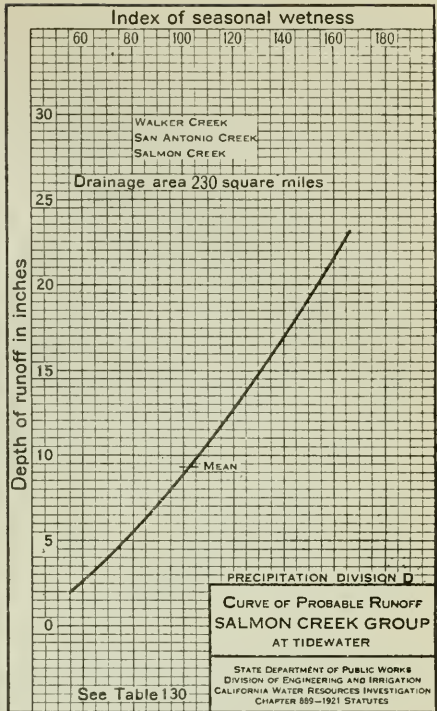
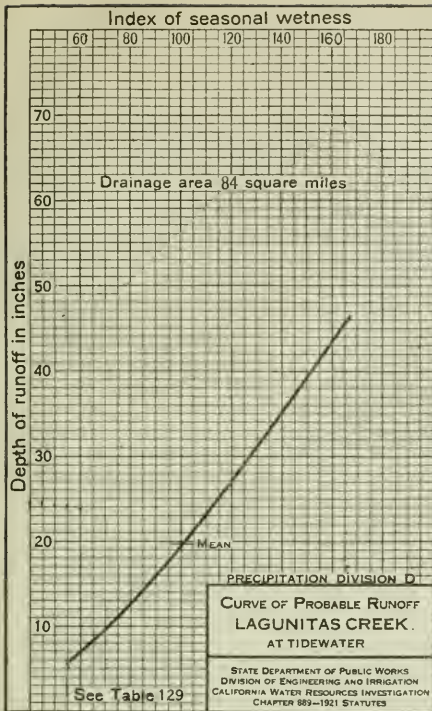




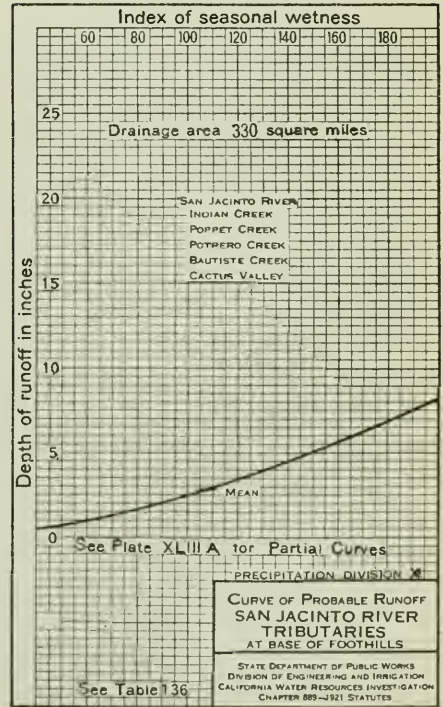
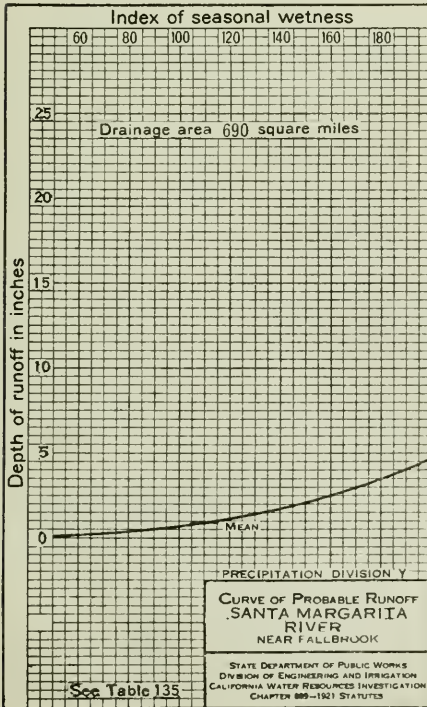
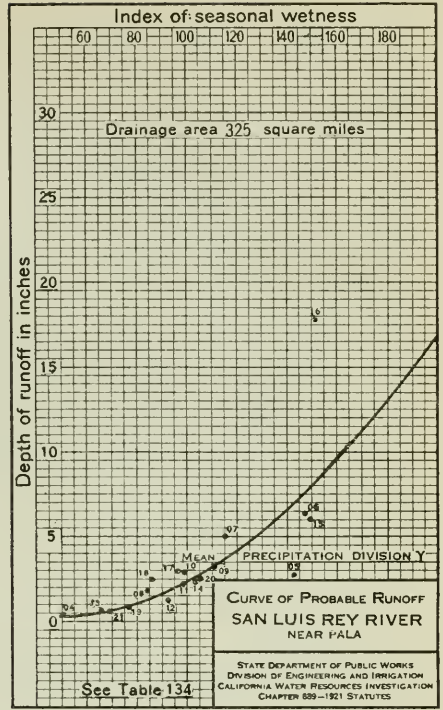
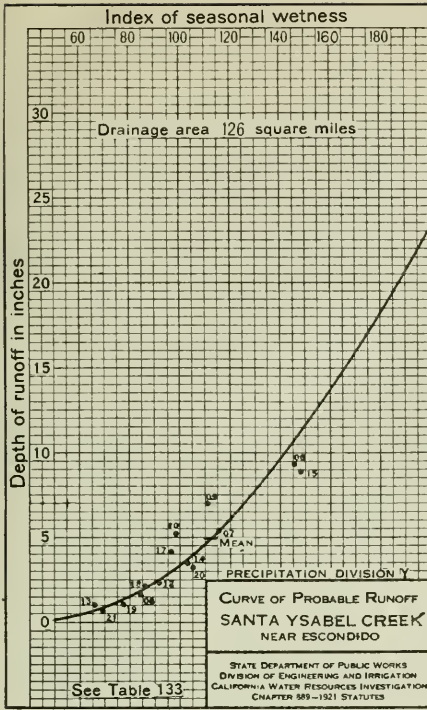






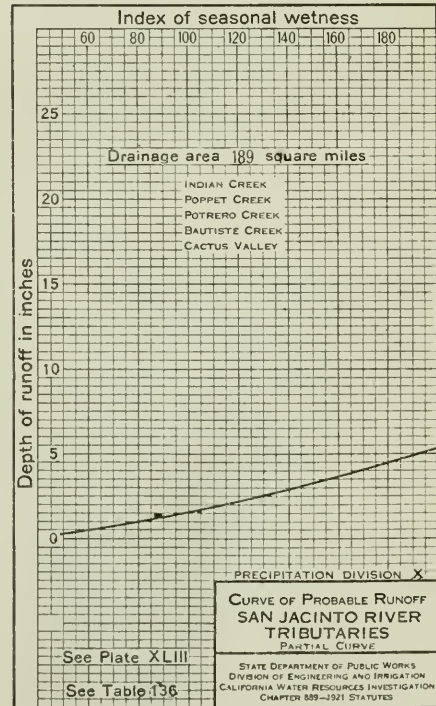
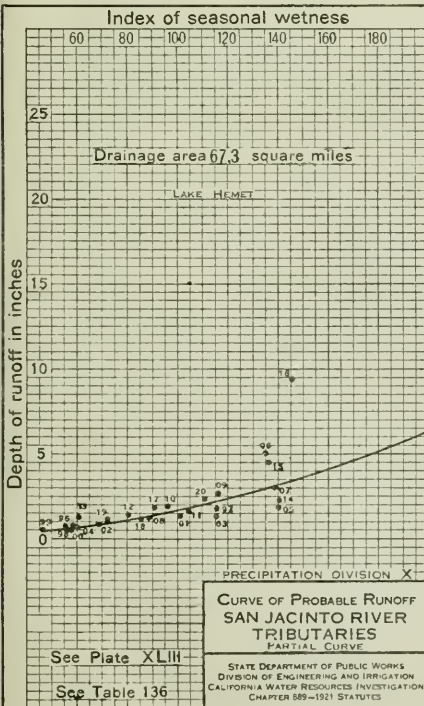
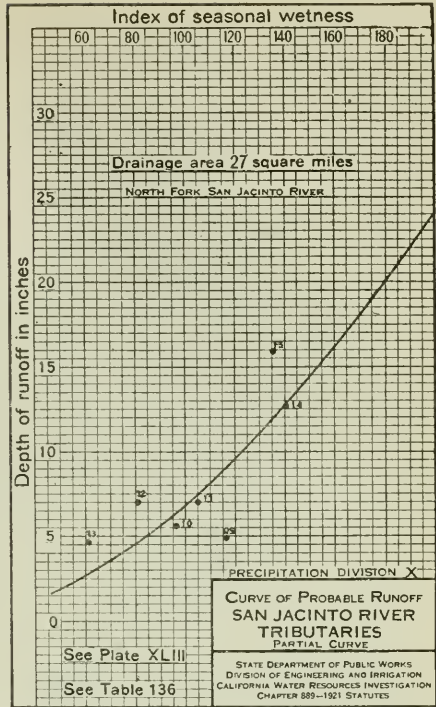
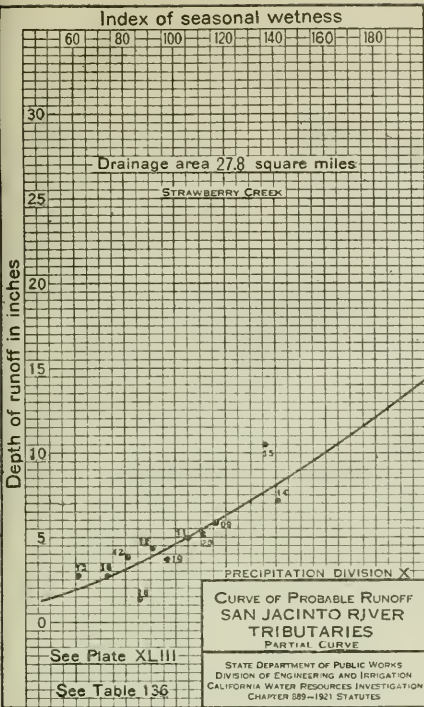




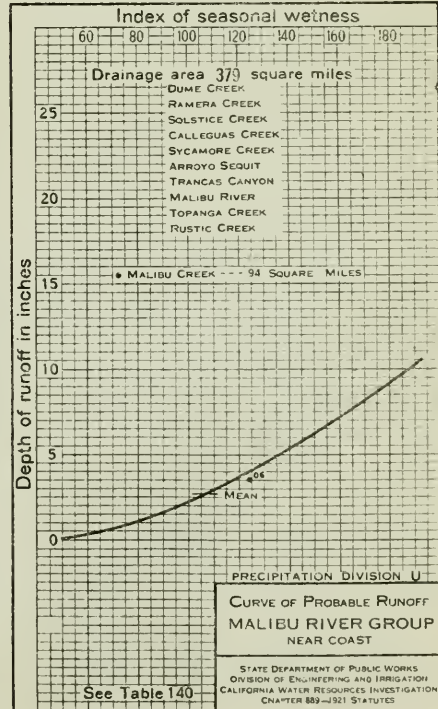
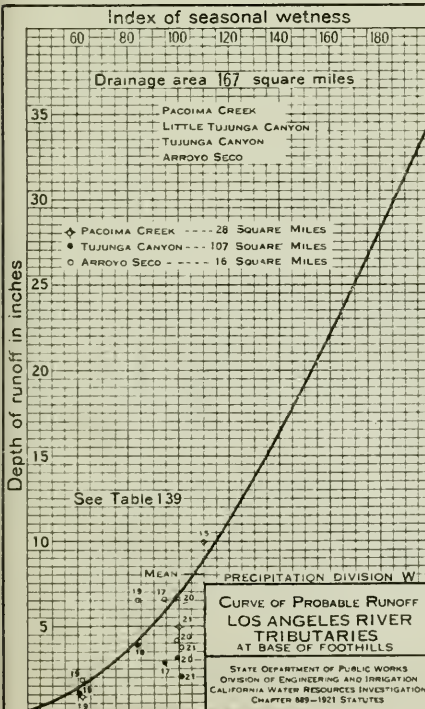
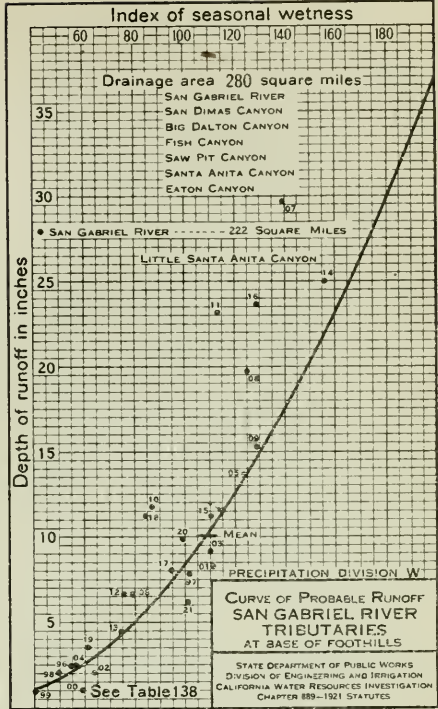
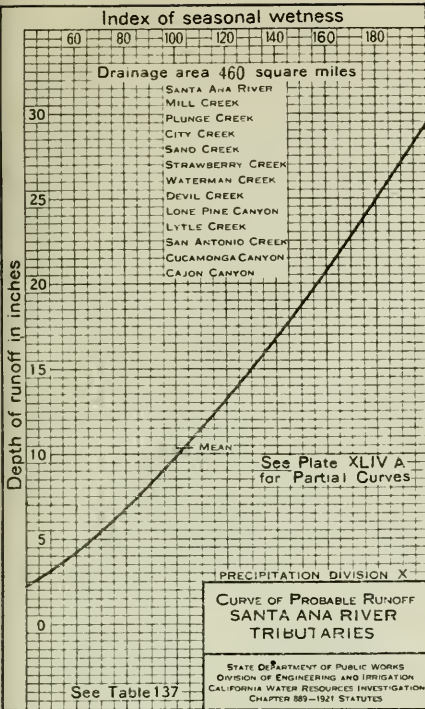




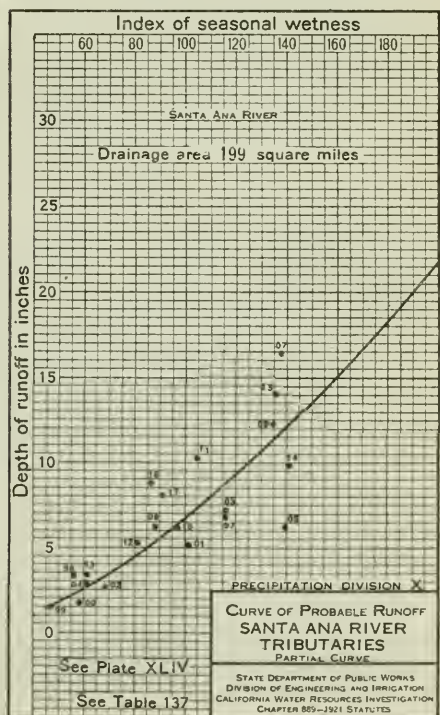
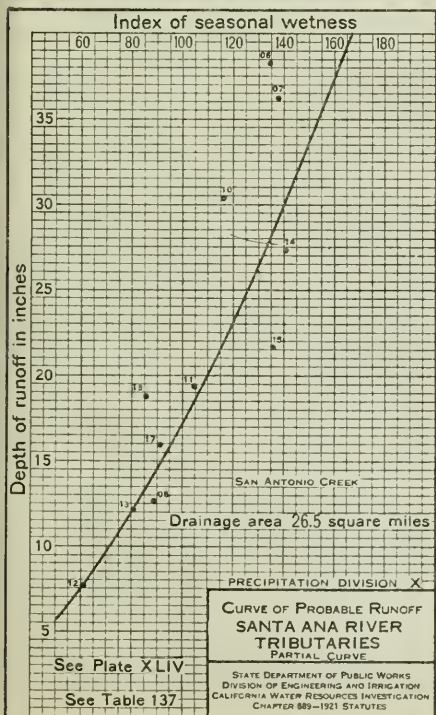
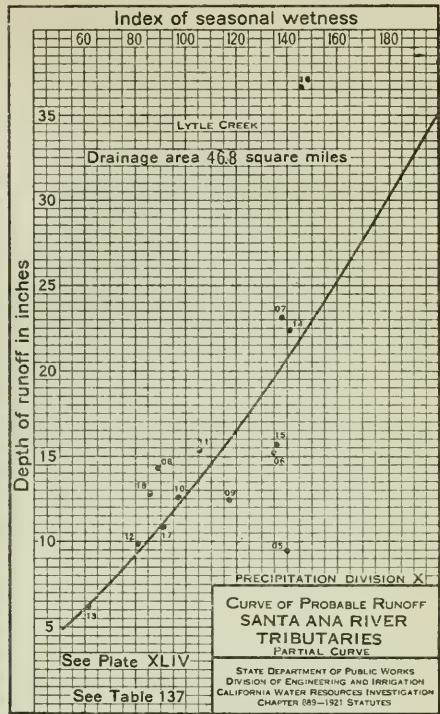
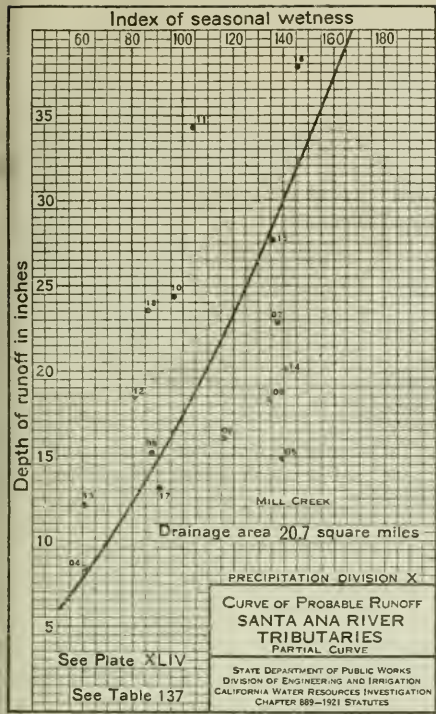




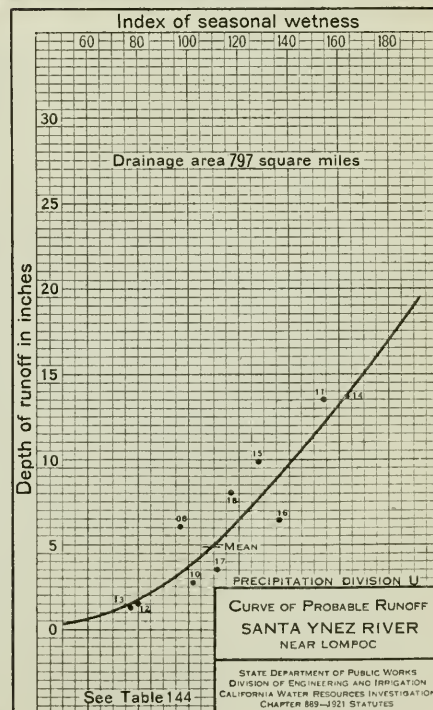
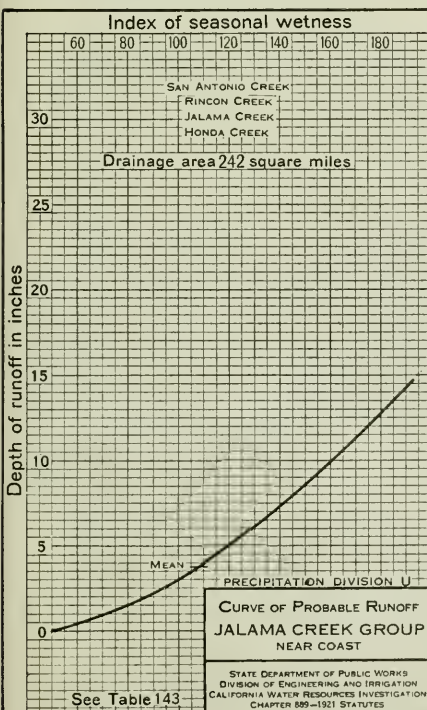
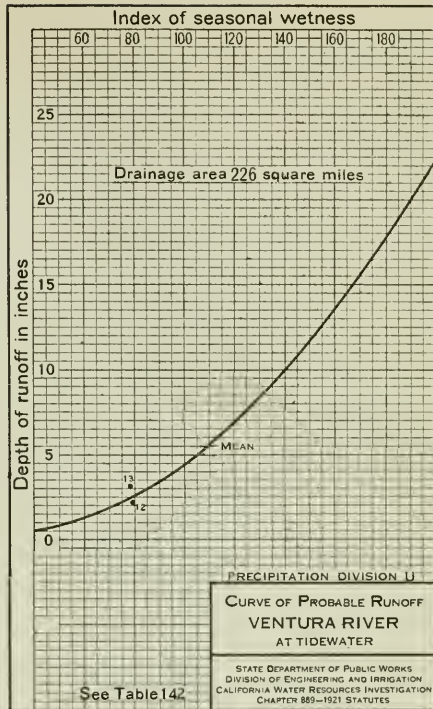
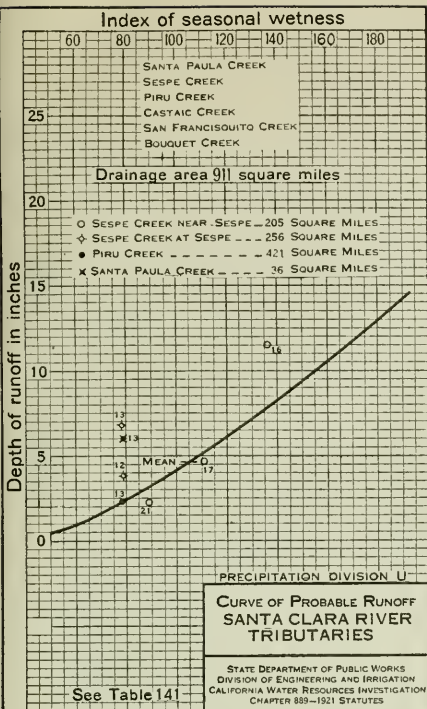






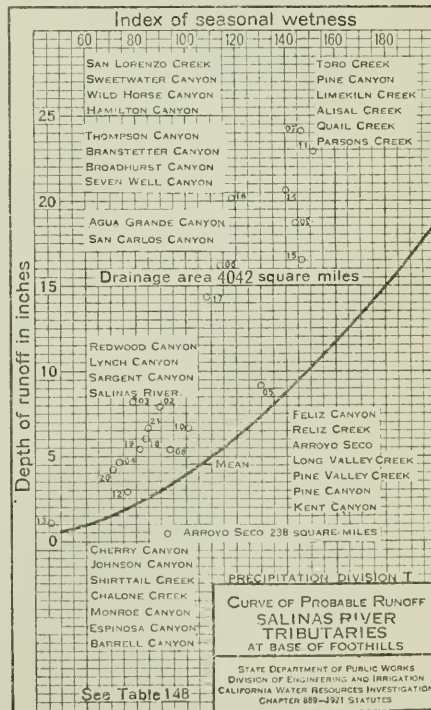
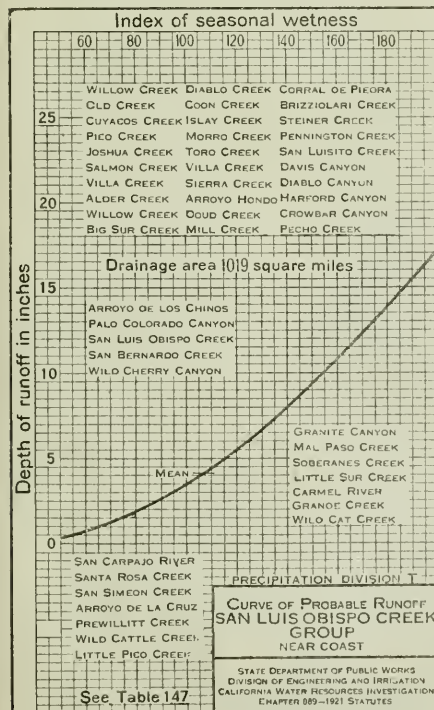
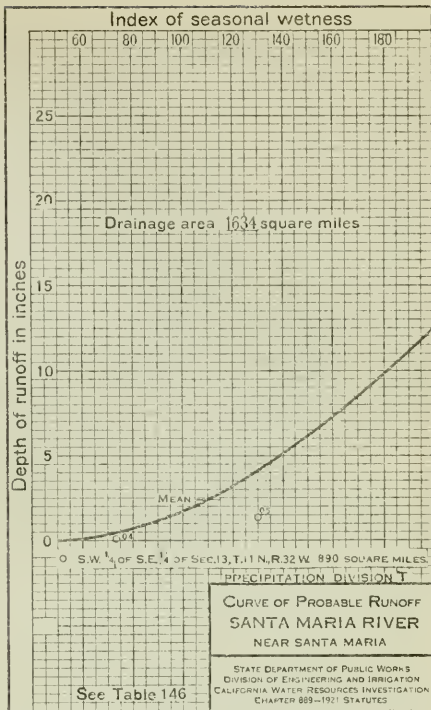
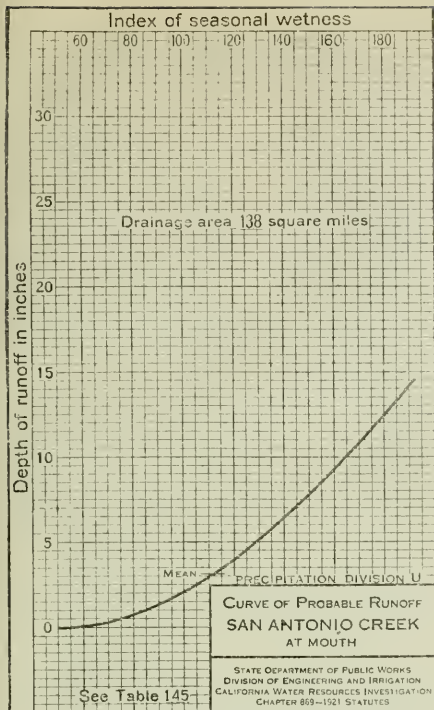




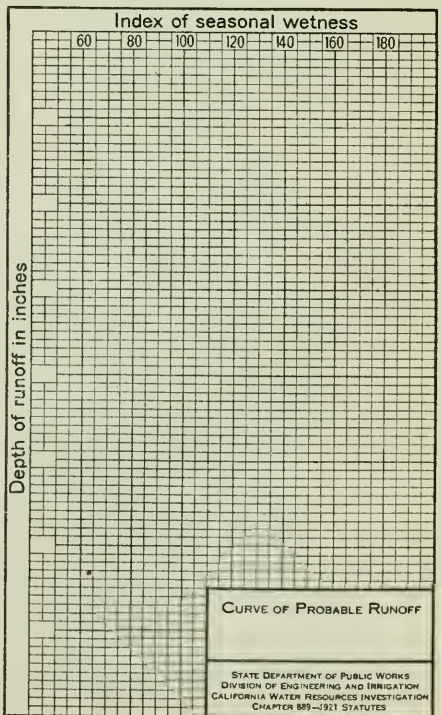
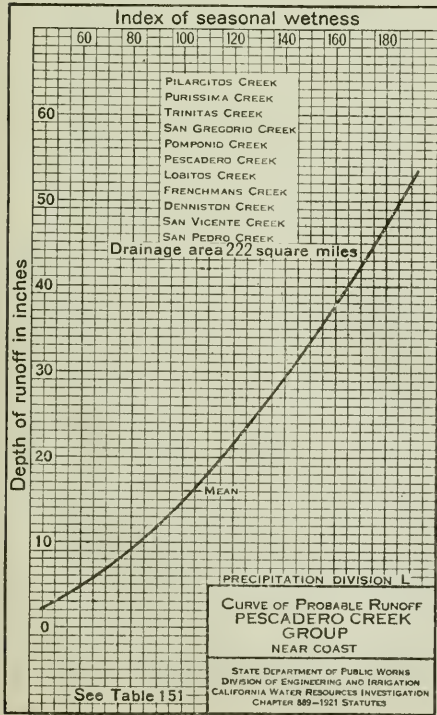
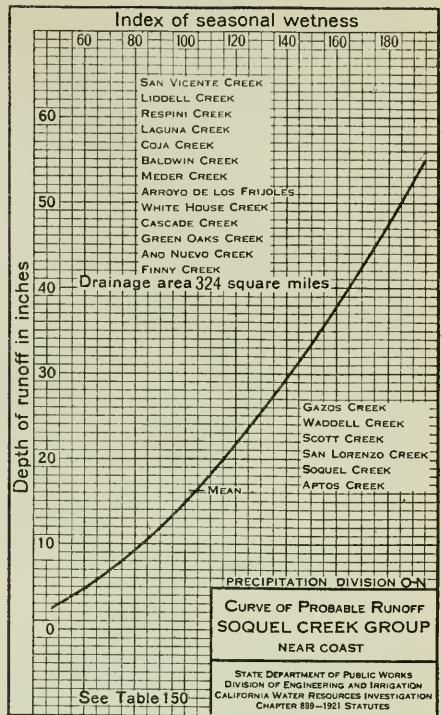
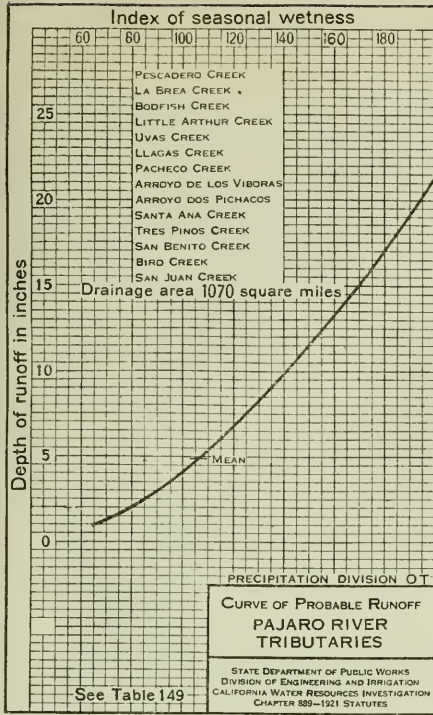




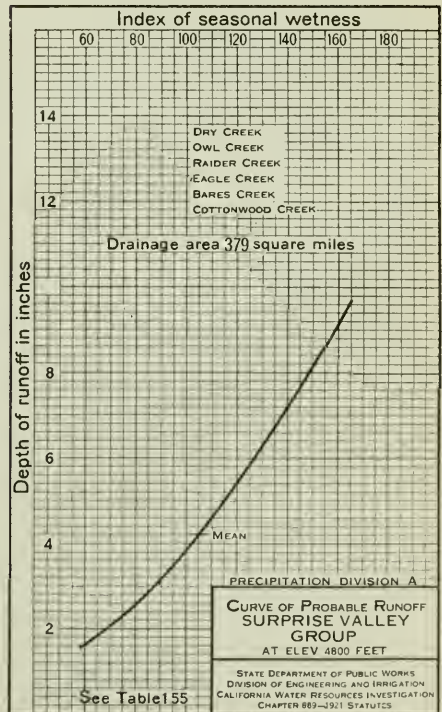
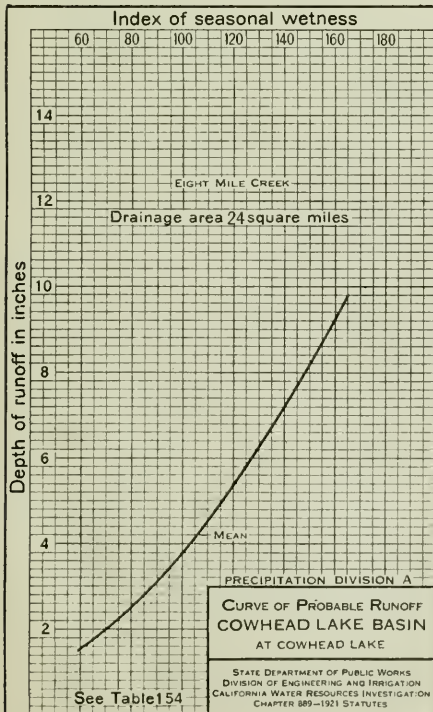
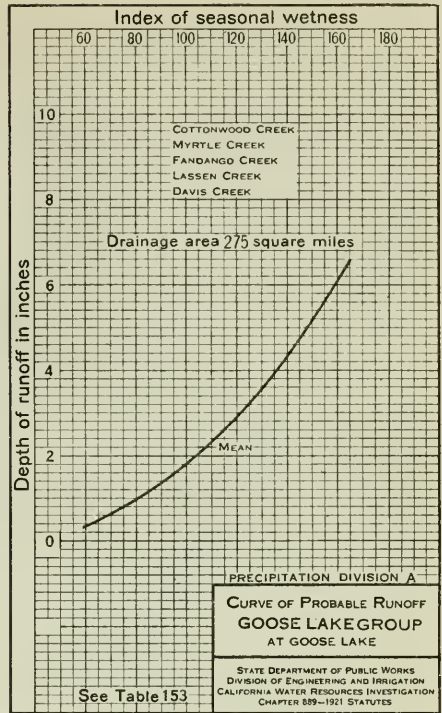
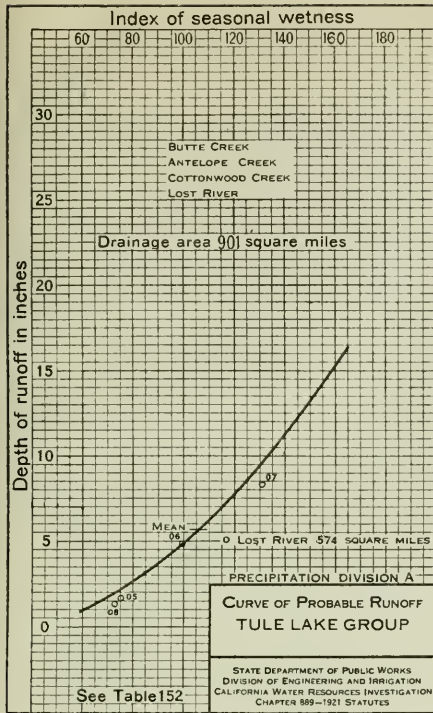




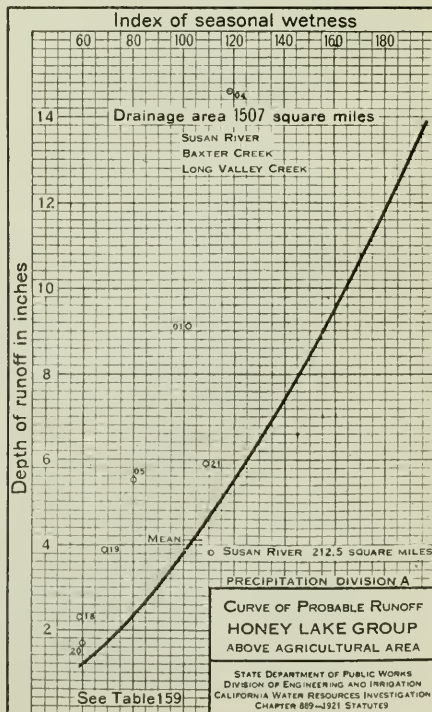
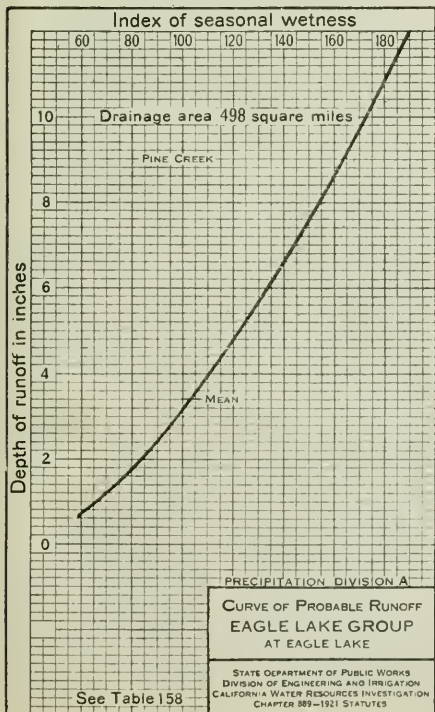
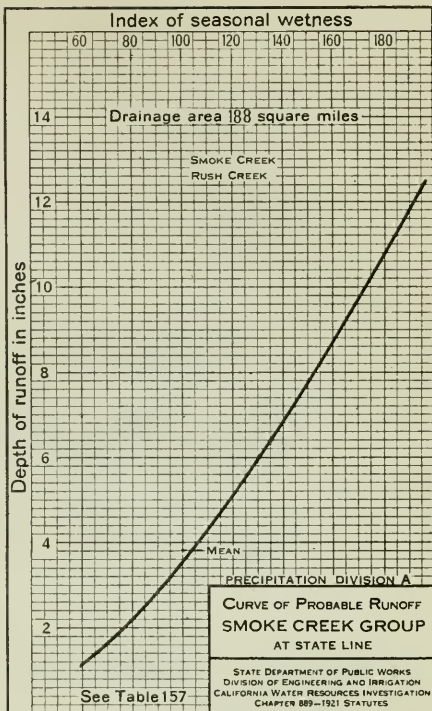
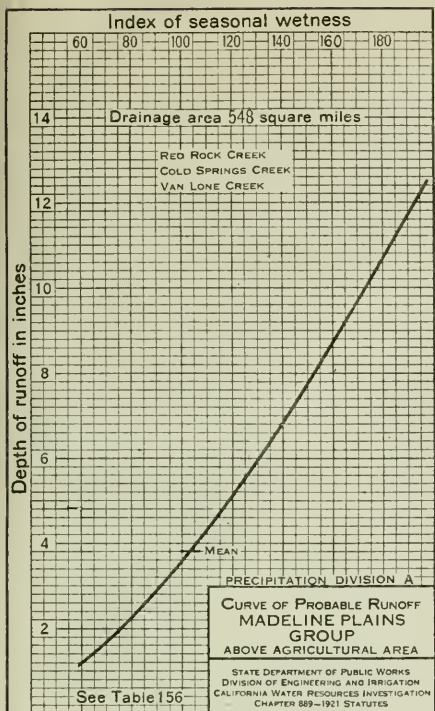






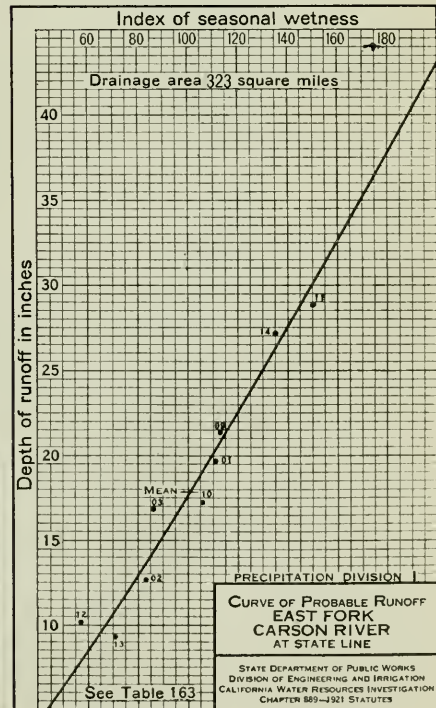
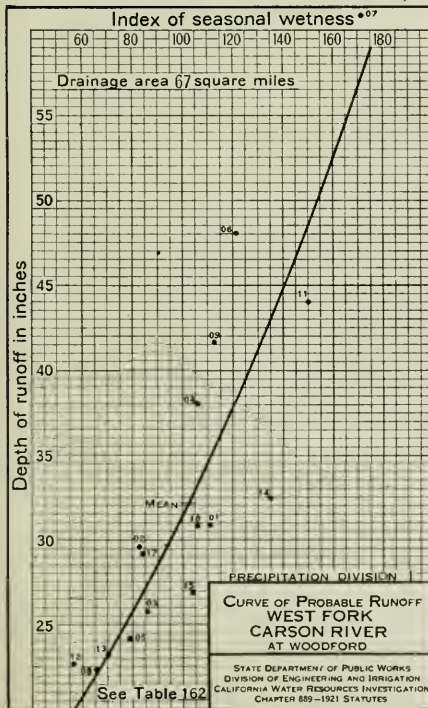
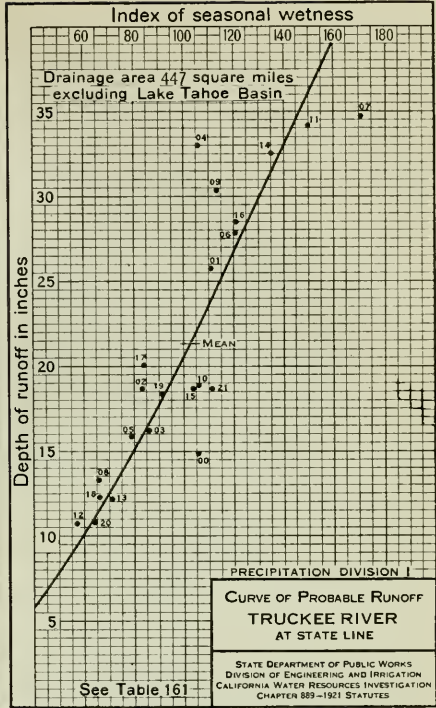
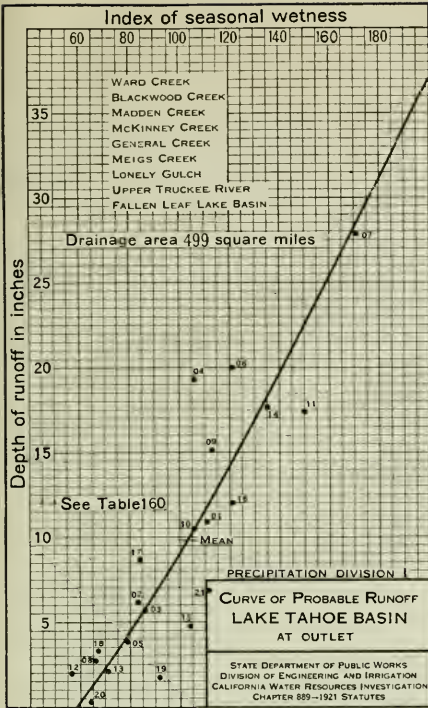




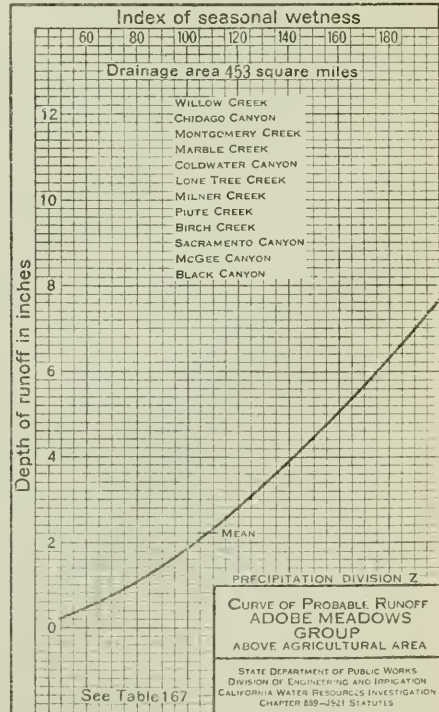
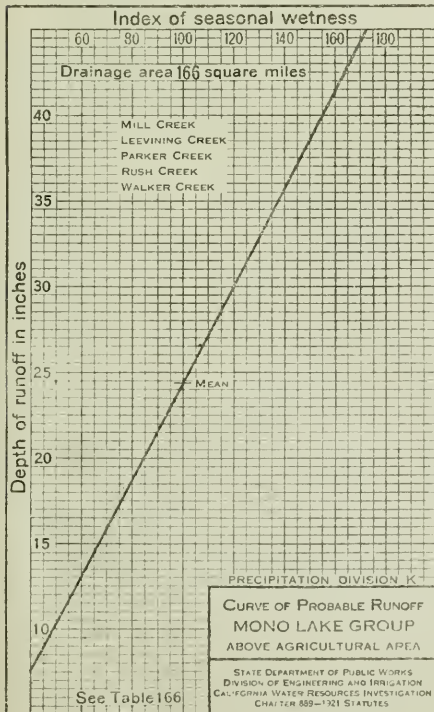
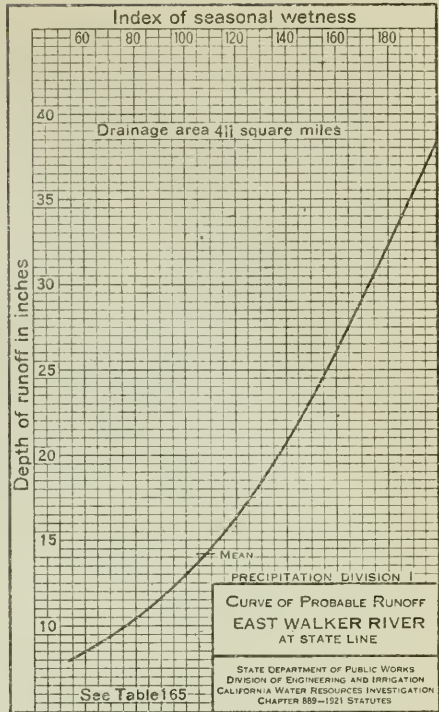
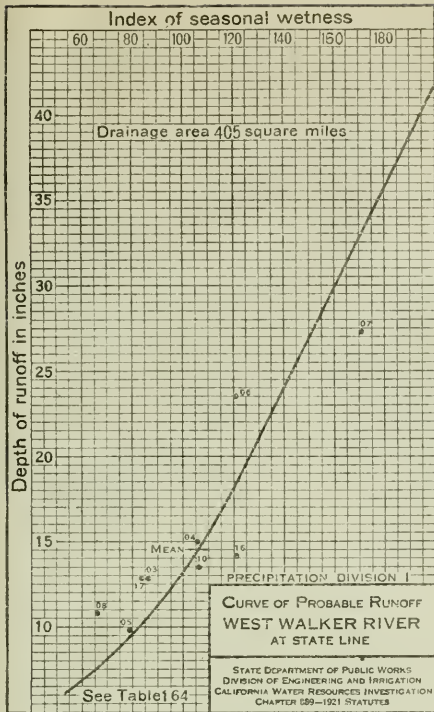




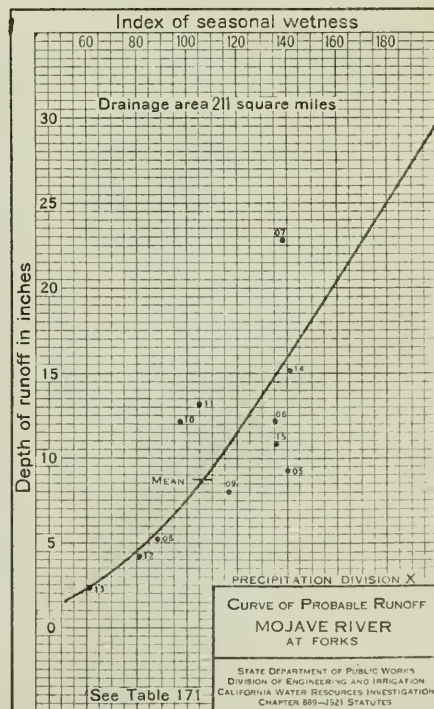
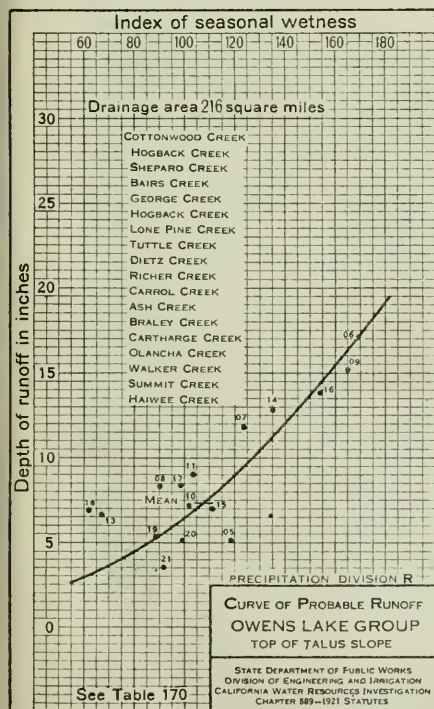
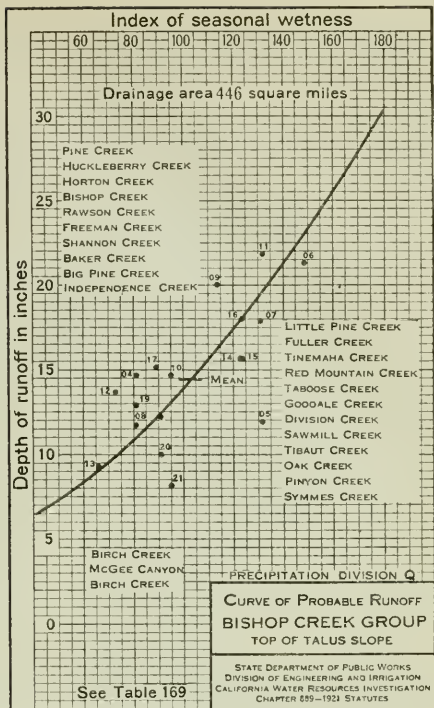
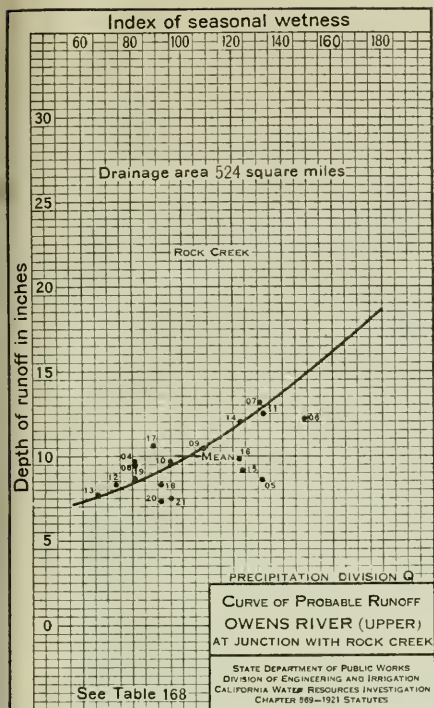




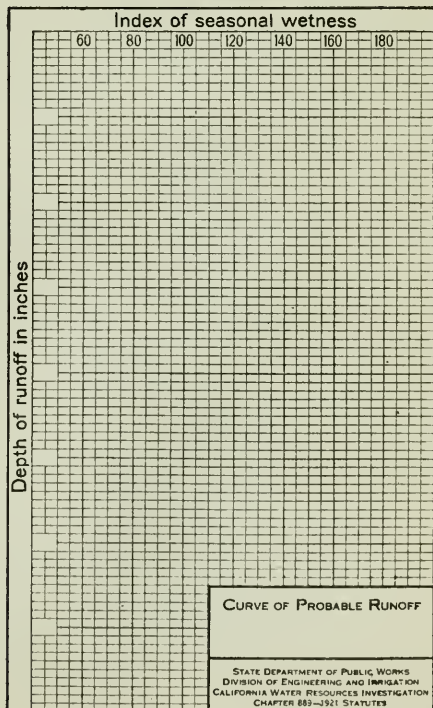
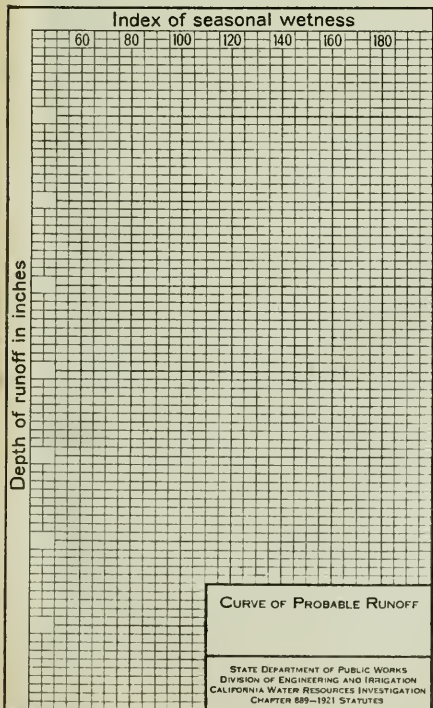
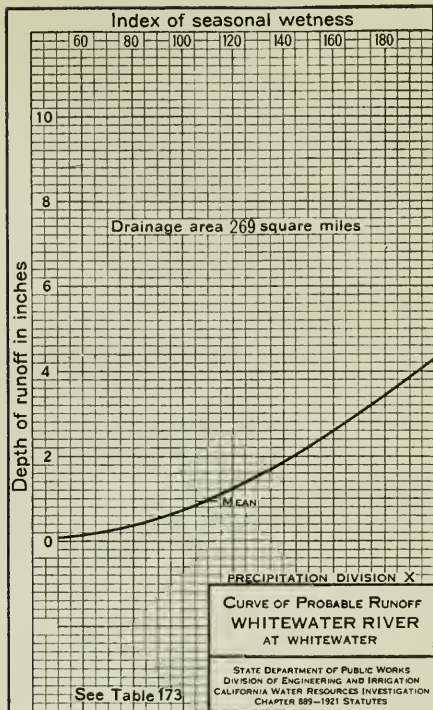
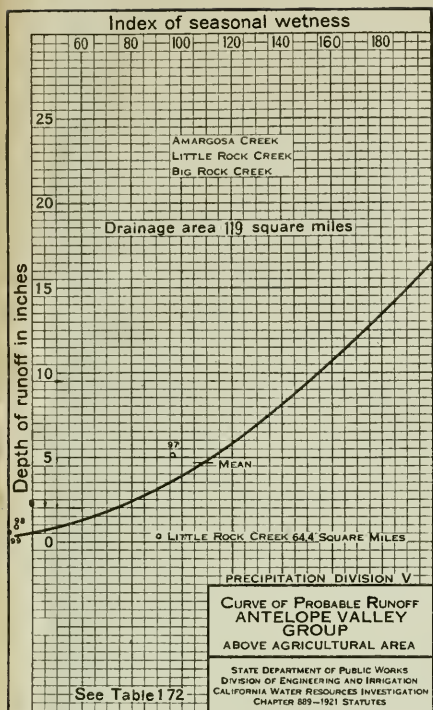








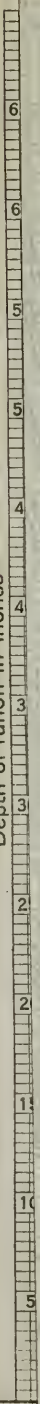






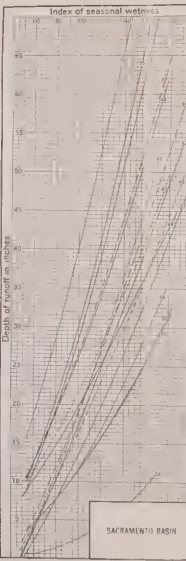
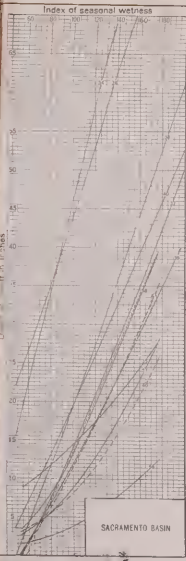


Depth of runoff in inches

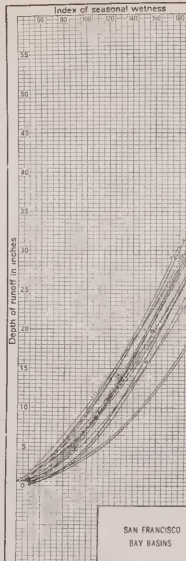
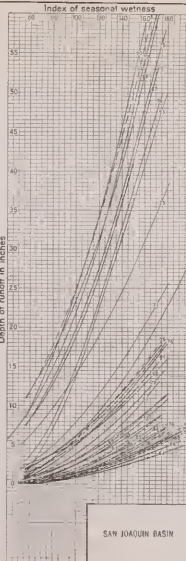


Runoff Curve No.	Time of Concentration (min)	Peak Runoff (inches)	Time to Peak (min)
1	10	0.5	5
2	15	0.6	7.5
3	20	0.7	10
4	25	0.8	12.5
5	30	0.9	15
6	35	1.0	17.5
7	40	1.1	20
8	45	1.2	22.5
9	50	1.3	25
10	55	1.4	27.5
11	60	1.5	30
12	65	1.6	32.5
13	70	1.7	35
14	75	1.8	37.5
15	80	1.9	40
16	85	2.0	42.5
17	90	2.1	45
18	95	2.2	47.5
19	100	2.3	50
20	105	2.4	52.5
21	110	2.5	55
22	115	2.6	57.5
23	120	2.7	60
24	125	2.8	62.5
25	130	2.9	65
26	135	3.0	67.5
27	140	3.1	70
28	145	3.2	72.5
29	150	3.3	75
30	155	3.4	77.5
31	160	3.5	80
32	165	3.6	82.5
33	170	3.7	85
34	175	3.8	87.5
35	180	3.9	90
36	185	4.0	92.5
37	190	4.1	95
38	195	4.2	97.5
39	200	4.3	100
40	205	4.4	102.5
41	210	4.5	105
42	215	4.6	107.5
43	220	4.7	110
44	225	4.8	112.5
45	230	4.9	115
46	235	5.0	117.5
47	240	5.1	120
48	245	5.2	122.5
49	250	5.3	125
50	255	5.4	127.5
51	260	5.5	130
52	265	5.6	132.5
53	270	5.7	135
54	275	5.8	137.5
55	280	5.9	140
56	285	6.0	142.5
57	290	6.1	145
58	295	6.2	147.5
59	300	6.3	150
60	305	6.4	152.5
61	310	6.5	155
62	315	6.6	157.5
63	320	6.7	160
64	325	6.8	162.5
65	330	6.9	165
66	335	7.0	167.5
67	340	7.1	170
68	345	7.2	172.5
69	350	7.3	175
70	355	7.4	177.5
71	360	7.5	180
72	365	7.6	182.5
73	370	7.7	185
74	375	7.8	187.5
75	380	7.9	190
76	385	8.0	192.5
77	390	8.1	195
78	395	8.2	197.5
79	400	8.3	200
80	405	8.4	202.5
81	410	8.5	205
82	415	8.6	207.5
83	420	8.7	210
84	425	8.8	212.5
85	430	8.9	215
86	435	9.0	217.5
87	440	9.1	220
88	445	9.2	222.5
89	450	9.3	225
90	455	9.4	227.5
91	460	9.5	230
92	465	9.6	232.5
93	470	9.7	235
94	475	9.8	237.5
95	480	9.9	240
96	485	10.0	242.5
97	490	10.1	245
98	495	10.2	247.5
99	500	10.3	250
100	505	10.4	252.5
101	510	10.5	255
102	515	10.6	257.5
103	520	10.7	260
104	525	10.8	262.5
105	530	10.9	265
106	535	11.0	267.5
107	540	11.1	270
108	545	11.2	272.5
109	550	11.3	275
110	555	11.4	277.5
111	560	11.5	280
112	565	11.6	282.5
113	570	11.7	285
114	575	11.8	287.5
115	580	11.9	290
116	585	12.0	292.5
117	590	12.1	295
118	595	12.2	297.5
119	600	12.3	300
120	605	12.4	302.5
121	610	12.5	305
122	615	12.6	307.5
123	620	12.7	310
124	625	12.8	312.5
125	630	12.9	315
126	635	13.0	317.5
127	640	13.1	320
128	645	13.2	322.5
129	650	13.3	325
130	655	13.4	327.5
131	660	13.5	330
132	665	13.6	332.5
133	670	13.7	335
134	675	13.8	337.5
135	680	13.9	340
136	685	14.0	342.5
137	690	14.1	345
138	695	14.2	347.5
139	700	14.3	350
140	705	14.4	352.5
141	710	14.5	355
142	715	14.6	357.5
143	720	14.7	360
144	725	14.8	362.5
145	730	14.9	365
146	735	15.0	367.5
147	740	15.1	370
148	745	15.2	372.5
149	750	15.3	375
150	755	15.4	377.5
151	760	15.5	380
152	765	15.6	382.5
153	770	15.7	385
154	775	15.8	387.5
155	780	15.9	390
156	785	16.0	392.5
157	790	16.1	395
158	795	16.2	397.5
159	800	16.3	400
160	805	16.4	402.5
161	810	16.5	405
162	815	16.6	407.5
163	820	16.7	410
164	825	16.8	412.5
165	830	16.9	415
166	835	17.0	417.5
167	840	17.1	420
168	845	17.2	422.5
169	850	17.3	425
170	855	17.4	427.5
171	860	17.5	430
172	865	17.6	432.5
173	870	17.7	435
174	875	17.8	437.5
175	880	17.9	440
176	885	18.0	442.5
177	890	18.1	445
178	895	18.2	447.5
179	900	18.3	450
180	905	18.4	452.5
181	910	18.5	455
182	915	18.6	457.5
183	920	18.7	460
184	925	18.8	462.5
185	930	18.9	465
186	935	19.0	467.5
187	940	19.1	470
188	945	19.2	472.5
189	950	19.3	475
190	955	19.4	477.5
191	960	19.5	480
192	965	19.6	482.5
193	970	19.7	485
194	975	19.8	487.5
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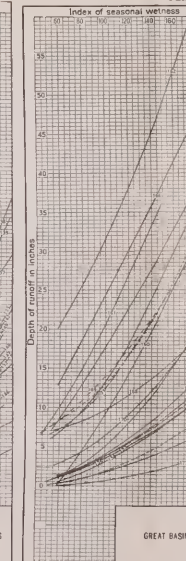
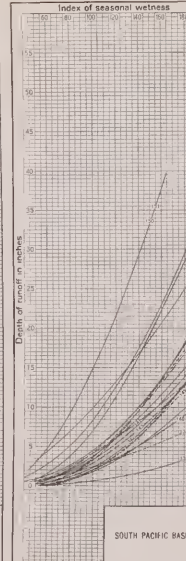
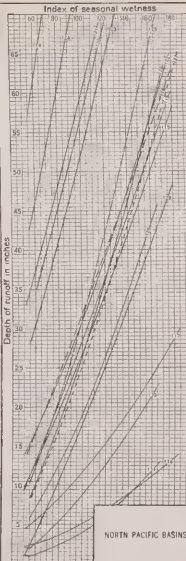




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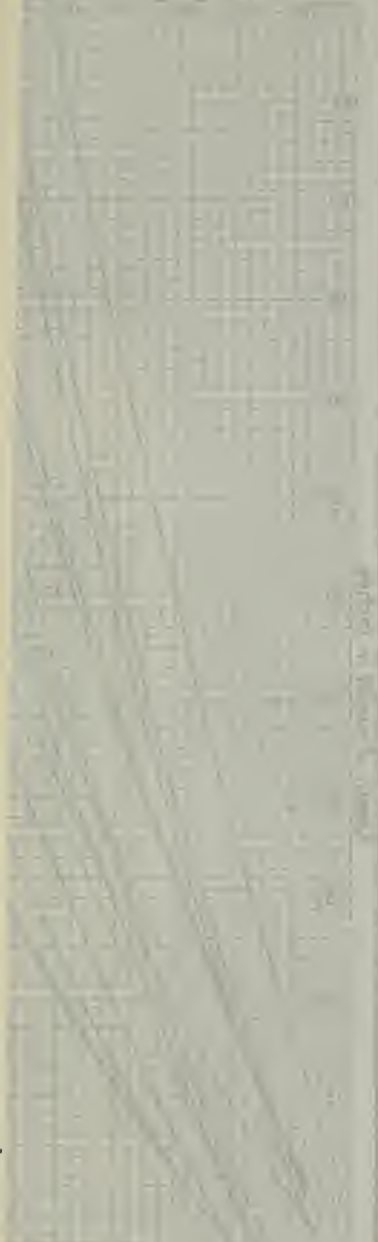
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- 49. ...
- 50. ...

Scale in feet to 1 inch

Scale in miles to 1 inch



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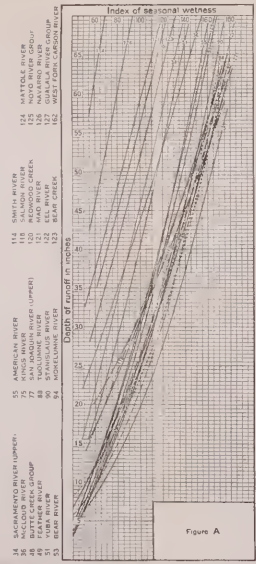


Figure A

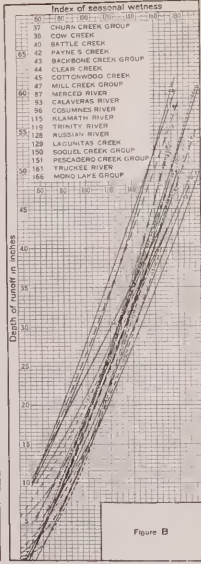


Figure B

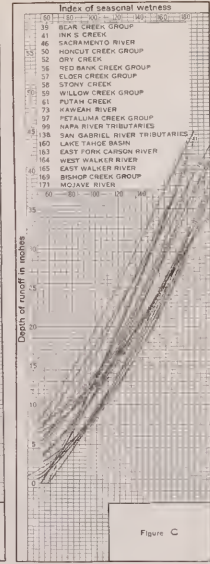


Figure C

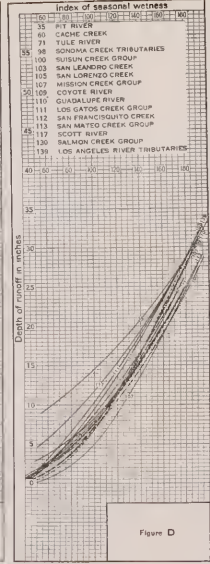


Figure D

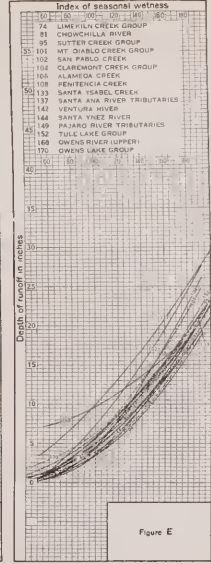


Figure E

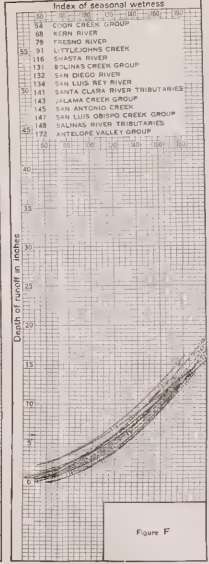


Figure F

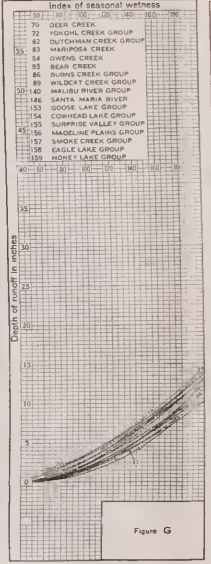


Figure G

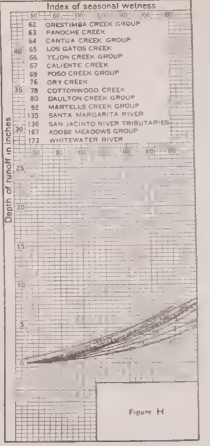


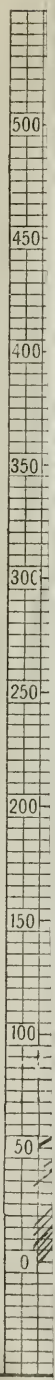
Figure H

COMPARISON OF RUNOFF CURVES GROUPED BY TYPES

STATE DEPARTMENT OF PUBLIC WORKS DIVISION OF ENGINEERING AND IRRIGATION CALIFORNIA WATER RESOURCES INVESTIGATION CHAPTER 89 1921 STATUTES

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Index of seasonal runoff



1950-1951

1951-1952

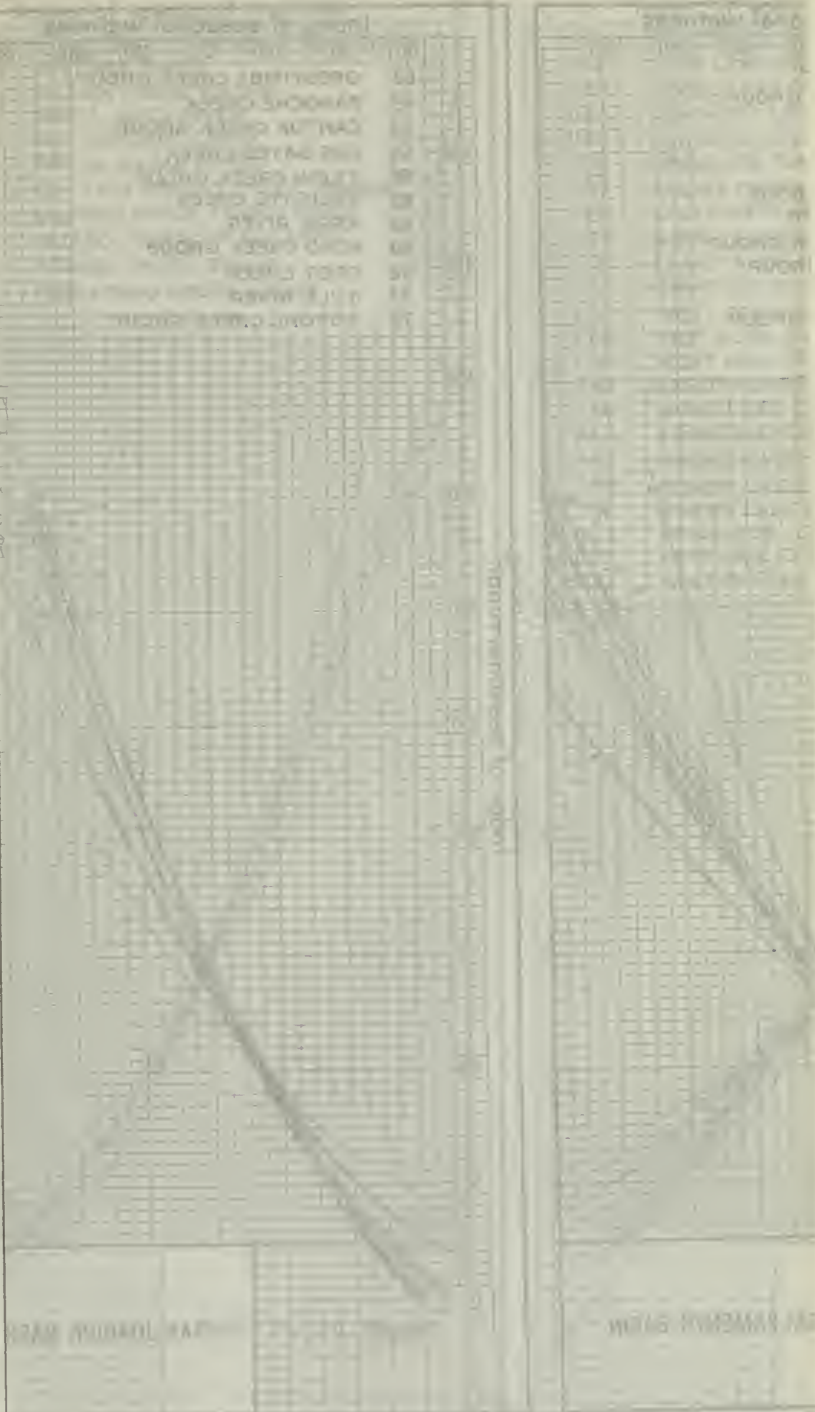
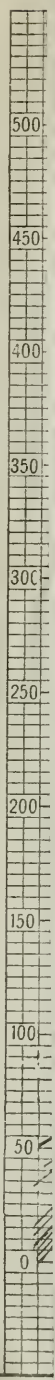


- |    |                |     |                |     |                |
|----|----------------|-----|----------------|-----|----------------|
| 11 | Upper Devonian | 121 | Upper Devonian | 131 | Upper Devonian |
| 12 | Lower Devonian | 122 | Lower Devonian | 132 | Lower Devonian |
| 13 | Carboniferous  | 123 | Carboniferous  | 133 | Carboniferous  |
| 14 | Permian        | 124 | Permian        | 134 | Permian        |
| 15 | Triassic       | 125 | Triassic       | 135 | Triassic       |
| 16 | Jurassic       | 126 | Jurassic       | 136 | Jurassic       |
| 17 | Cretaceous     | 127 | Cretaceous     | 137 | Cretaceous     |
| 18 | Tertiary       | 128 | Tertiary       | 138 | Tertiary       |
| 19 | Quaternary     | 129 | Quaternary     | 139 | Quaternary     |
| 20 | Basement       | 130 | Basement       | 140 | Basement       |

110000  
 200000  
 300000

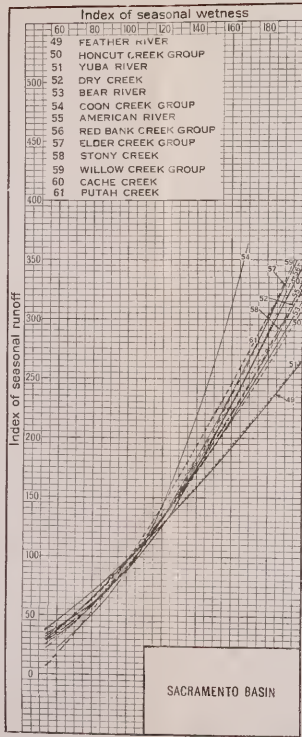


Index of seasonal runoff



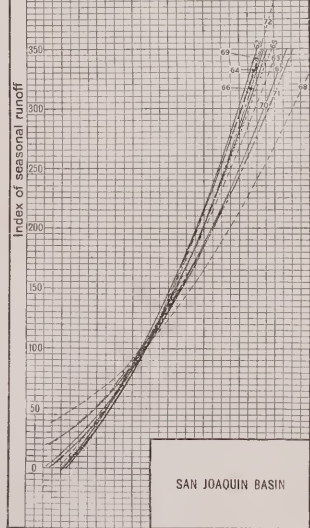
Index of seasonal wetness

60	80	100	120	140	160	180
34	SACRAMENTO RIVER (UPPER)					
35	PIT RIVER					
38	MCCLOUD RIVER					
37	CHURN CREEK GROUP					
38	COW CREEK					
39	BEAR CREEK GROUP					
40	BATTLE CREEK					
41	INK'S CREEK					
42	PAYNE'S CREEK					
43	BACKBONE CREEK GROUP					
44	CLEAR CREEK					
45	COTTONWOOD CREEK					
46	SACRAMENTO RIVER					
47	MILL CREEK GROUP					
48	BUTTE CREEK GROUP					



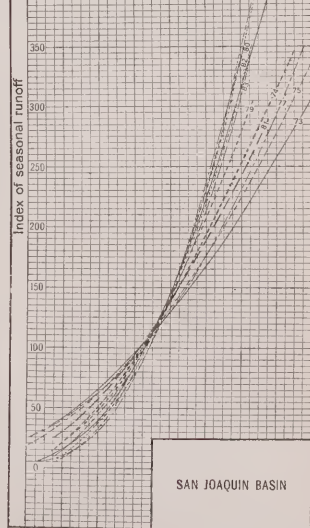
Index of seasonal wetness

60	80	100	120	140	160	180
62	ORESTIMBA CREEK GROUP					
63	PANOCHÉ CREEK					
64	CANTUA CREEK GROUP					
65	LOS GATOS CREEK					
66	TEJON CREEK GROUP					
67	CALIENTE CREEK					
68	KERN RIVER					
69	POSO CREEK GROUP					
70	DEER CREEK					
71	TULE RIVER					
72	YOKOHL CREEK GROUP					



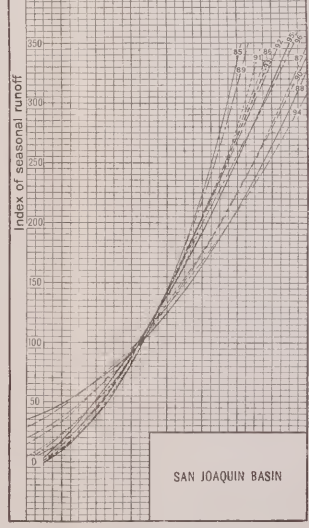
Index of seasonal wetness

60	80	100	120	140	160	180
73	KAWEAH RIVER					
74	LIMEKILN CREEK GROUP					
75	KINGS RIVER					
76	DRY CREEK					
77	SAN JOAQUIN RIVER (UPPER)					
78	COTTONWOOD CREEK					
79	FRESNO RIVER					
80	DAULTON CREEK GROUP					
81	CHOWCHILLA RIVER					
82	DUTCHMAN CREEK GROUP					
83	MARIPOSA CREEK					
84	OWENS CREEK					



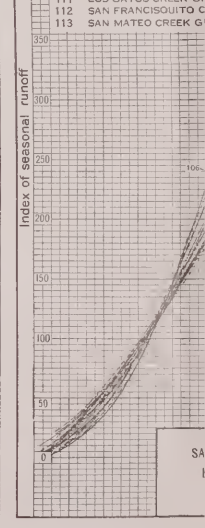
Index of seasonal wetness

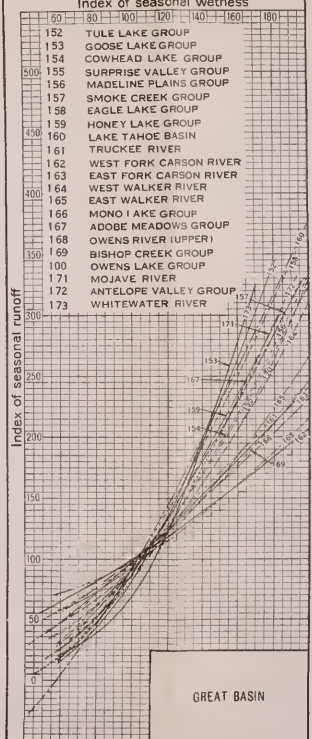
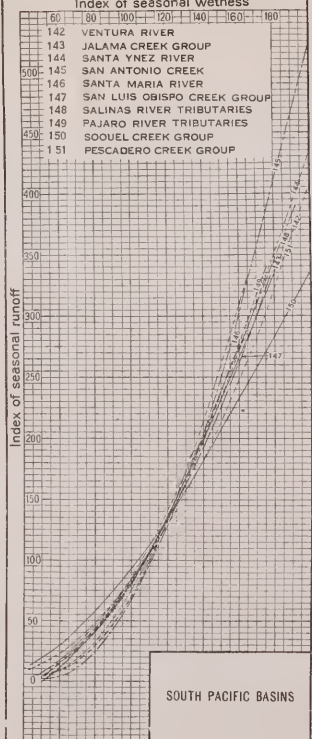
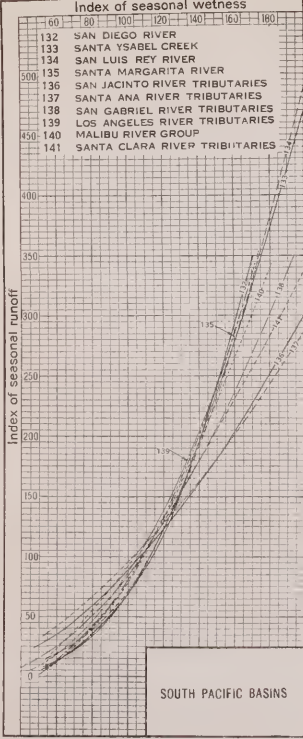
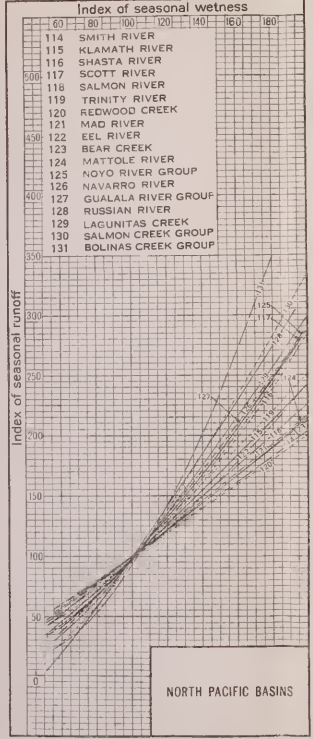
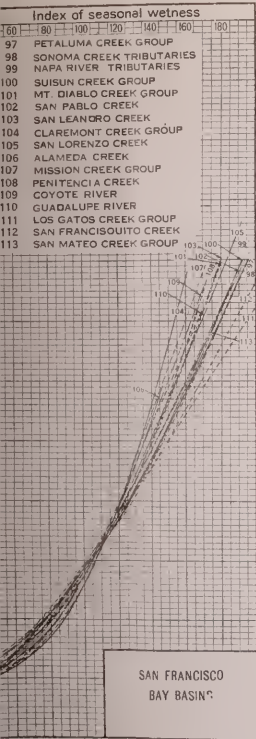
60	80	100	120	140	160	180
85	BEAR CREEK					
86	BURNS CREEK GROUP					
87	MERCED RIVER					
88	TUOLUMNE RIVER					
89	WILDCAT CREEK GROUP					
90	STANISLAUS RIVER					
91	LITTLEJOHNS CREEK					
92	MARTELLS CREEK GROUP					
93	CALAVERAS RIVER					
94	MOKELUMNE RIVER					
95	SUTTER CREEK GROUP					
96	COSUMNES RIVER					



Index of seasonal wetness

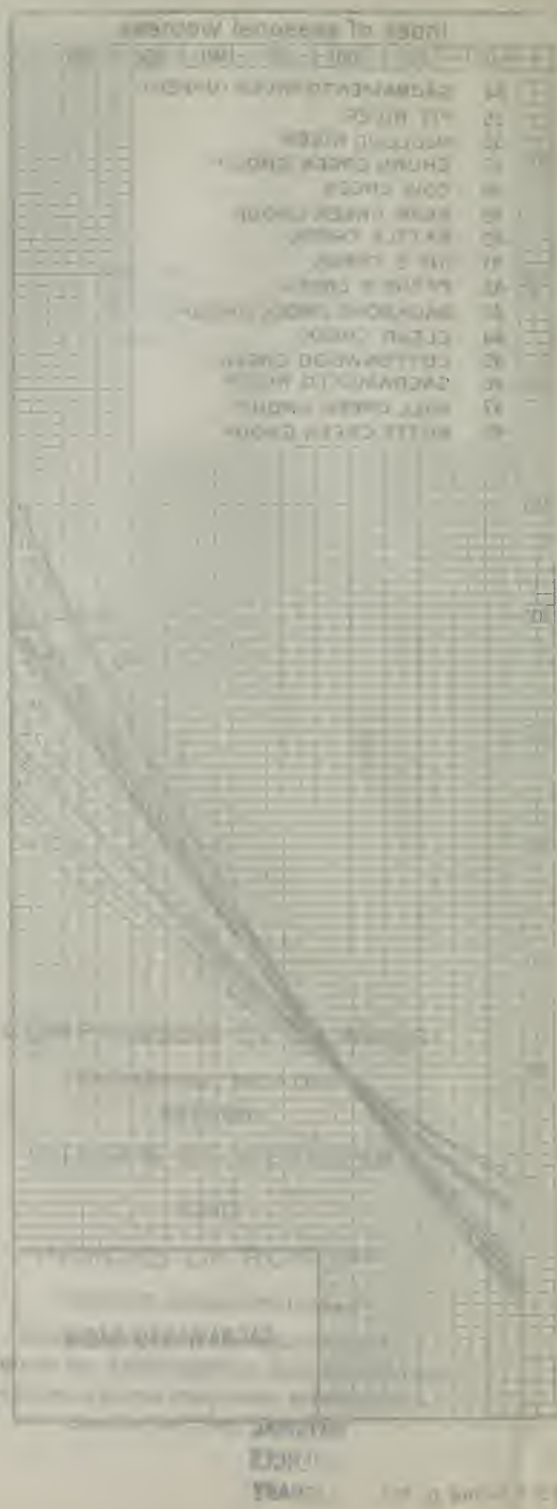
60	80	100	120	140	160	180
97	PETALUMA CREEK GROUP					
98	SONOMA CREEK TRIBUTARIES					
99	NAPA RIVER TRIBUTARIES					
100	SUISUN CREEK GROUP					
101	MT. DIABLO CREEK GROUP					
102	SAN PABLO CREEK GROUP					
103	SAN LEANORO CREEK GROUP					
104	CLAREMONT CREEK GROUP					
105	SAN LORENZO CREEK GROUP					
106	ALAMEDA CREEK GROUP					
107	MISSION CREEK GROUP					
108	PENITENCIA CREEK GROUP					
109	COYOTE RIVER					
110	GUADALUPE RIVER					
111	LOS GATOS CREEK GROUP					
112	SAN FRANCISCO CREEK GROUP					
113	SAN MATEO CREEK GROUP					





COMPARISON OF CURVES  
 EXPRESSING RELATION  
 BETWEEN  
 INDICES OF WETNESS  
 AND  
 INDICES OF RUNOFF  
 GROUPED GEOGRAPHICALLY

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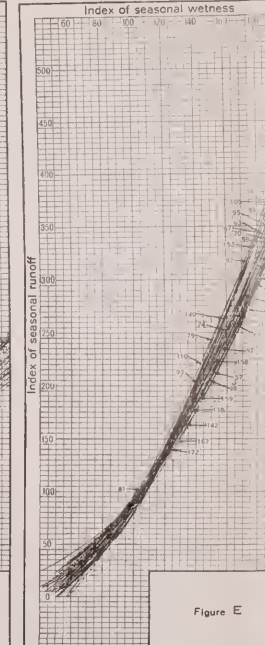
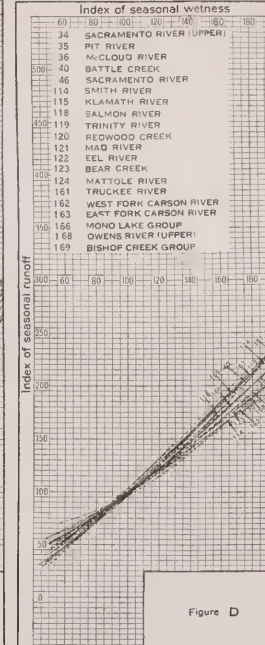
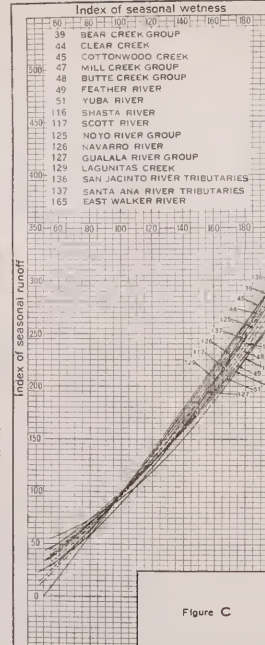
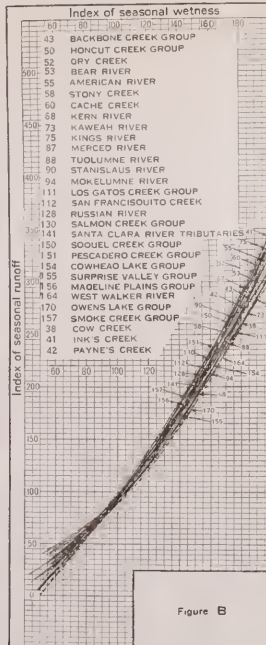
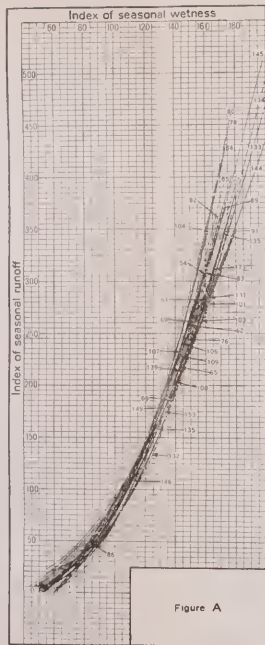
Hourly earnings to cents



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- 54 C
- 69 R
- 72 Y
- 76 D
- 78 C
- 80 D
- 82 N
- 83 D
- 84 C
- 85 E
- 86 E
- 89 V
- 91 L
- 66 T
- 65 L
- 62 C
- 64 C
- 101 M
- 104 C
- 103 S
- 106 A
- 107 M
- 109 C
- 108 P
- 132 S
- 133 S
- 134 S
- 135 S
- 139 L
- 144 S
- 145 S
- 146 S
- 149 F
- 173 V
- 131 E

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85	E				
86	E				
89	V				
91	L				
66	T				
65	L				
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64	C				
101	M				
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133	S				
134	S				
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139	L				
144	S				
145	S				
146	S				
149	F				
173	V				
131	E				

- 153 GOOSE LAKE GROUP
- 54 LOON CREEK GROUP
- 69 POSO CREEK GROUP
- 72 YOKOHL CREEK GROUP
- 76 DRY CREEK
- 78 COTTONWOOD CREEK
- 80 DAULTON CREEK GROUP
- 82 OUTCHMAN CREEK GROUP
- 83 MARIPOSA CREEK
- 84 OWENS CREEK
- 85 BEAR CREEK
- 86 BURNS CREEK GROUP
- 89 WILDCAT CREEK GROUP
- 91 LITTLEJOHNS CREEK
- 66 TEJON CREEK GROUP
- 65 LOS GATOS CREEK
- 62 ORESTIMBA CREEK GROUP
- 64 CANTUA CREEK GROUP
- 101 MT. DIABLO CREEK GROUP
- 104 CLAREMONT CREEK GROUP
- 103 SAN LEONORO CREEK
- 106 ALAMEGA CREEK
- 107 MISSION CREEK GROUP
- 109 COYOTE RIVER
- 108 PENITENCIA CREEK
- 132 SAN DIEGO RIVER
- 133 SANTA YSABEL CREEK
- 134 SAN LUIS REY RIVER
- 135 SANTA MARGARITA RIVER
- 139 LOS ANGELES RIVER TRIBUTARIES
- 144 SANTA YNEZ RIVER
- 145 SAN ANTONIO CREEK
- 146 SANTA MARIA RIVER
- 149 PAJARO RIVER TRIBUTARIES
- 173 WHITewater RIVER
- 131 BOLINAS CREEK GROUP



- 37 CHURN CREEK GROUP
- 56 RED BANK CREEK GROUP
- 57 ELDER CREEK GROUP
- 59 WILLOW CREEK GROUP
- 61 PUTAH CREEK
- 67 CALIENTE CREEK
- 70 OER CREEK
- 74 LIMEKILN CREEK GROUP
- 79 FRESNO RIVER
- 81 CHOWCHILLA RIVER
- 92 MARTELLS CREEK GROUP
- 93 CALAVERAS RIVER
- 95 SUTTER CREEK GROUP
- 96 COSUMNES RIVER
- 63 PANOCHE CREEK
- 71 TULE RIVER
- 77 SAN JOAQUIN RIVER (UPPER)
- 97 PETALUMA CREEK GROUP
- 98 SONOMA CREEK TRIBUTARIES
- 99 NAPA RIVER TRIBUTARIES
- 100 SUISUN CREEK GROUP
- 102 SAN PABLO CREEK
- 105 SAN LORENZO CREEK
- 110 GUADALUPE RIVER
- 113 SAN MATEO CREEK GROUP
- 136 SAN GABRIEL RIVER TRIBUTARIES
- 140 MALIBU RIVER GROUP
- 142 VENTURA RIVER
- 143 JALAMA CREEK GROUP
- 147 SAN LUIS OBISPO CREEK GROUP
- 148 SALINAS RIVER TRIBUTARIES
- 152 TULE LAKE GROUP
- 158 EAGLE LAKE GROUP
- 159 HONEY LAKE GROUP
- 160 LAKE TAHOE BASIN
- 171 MOJAVE RIVER
- 172 ANTELOPE VALLEY GROUP
- 167 ADOBE MEADOWS GROUP

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COMPARISON OF CURVES  
EXPRESSING RELATION  
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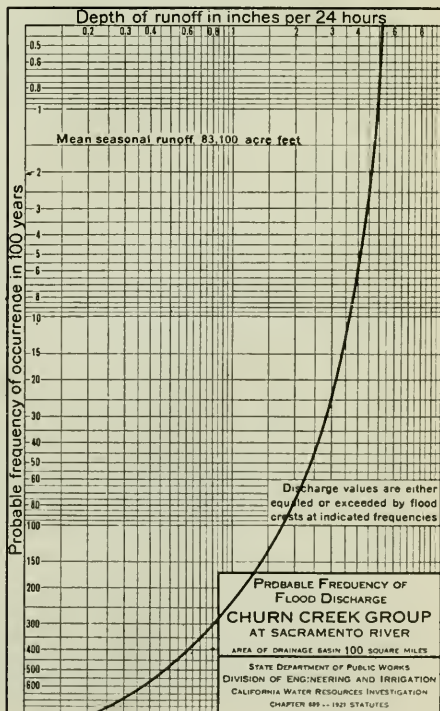
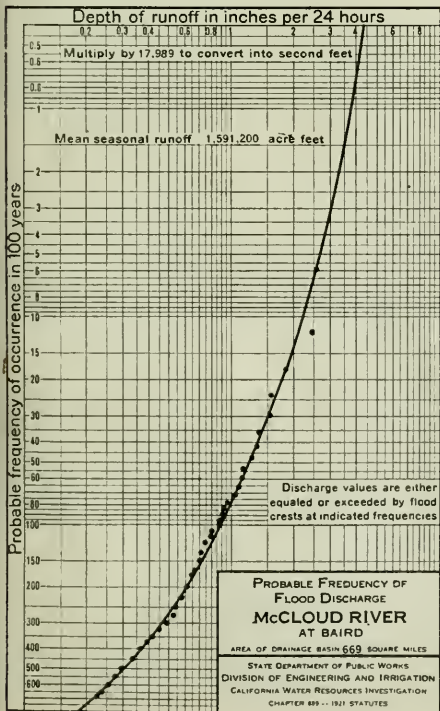
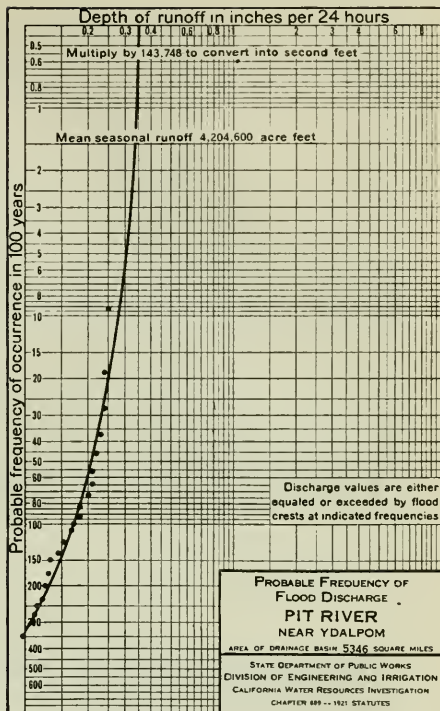
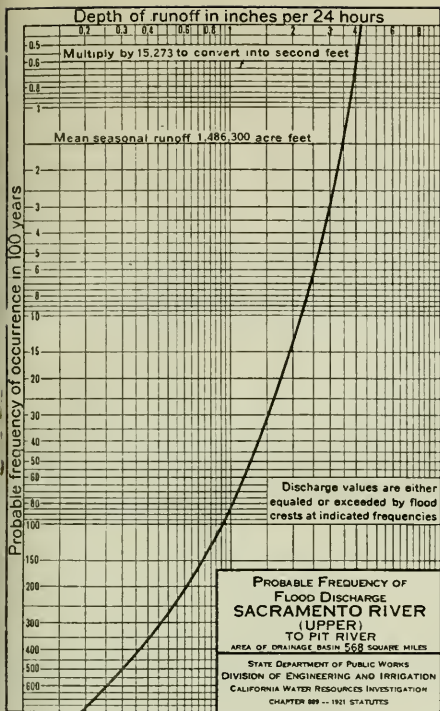




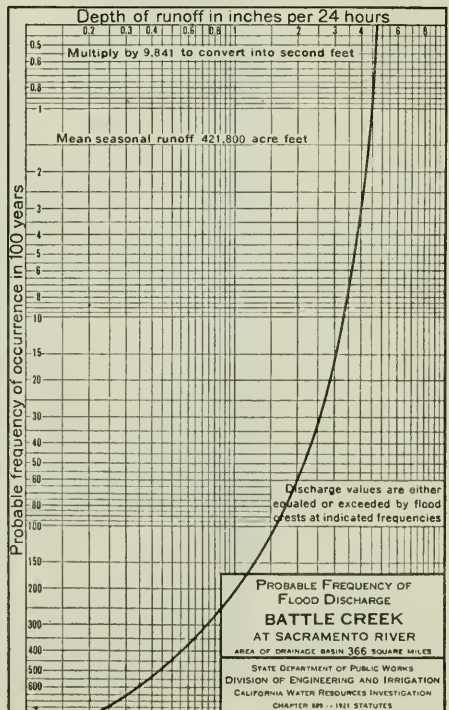
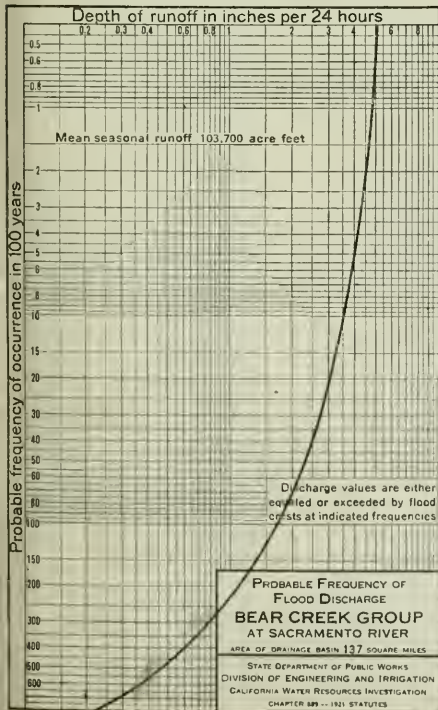
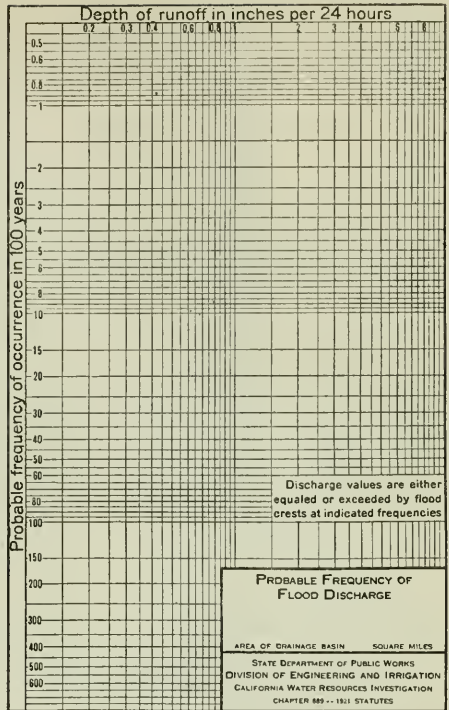
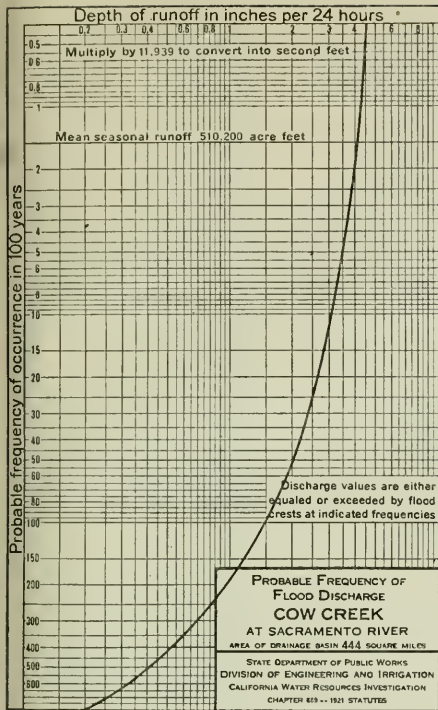




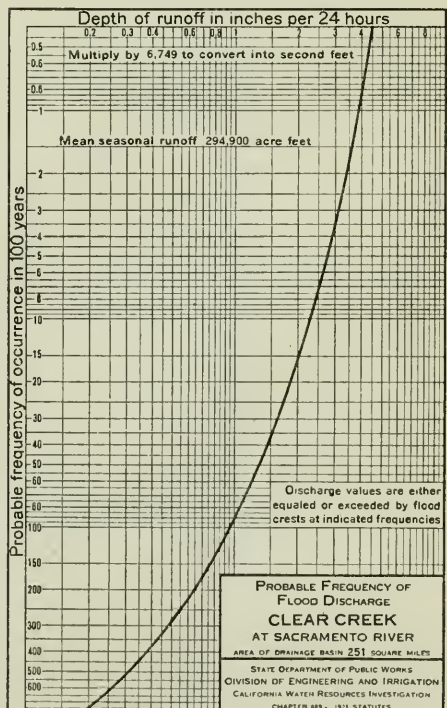
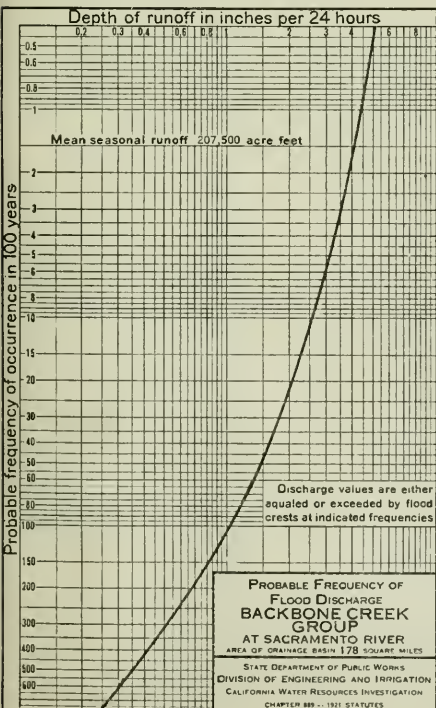
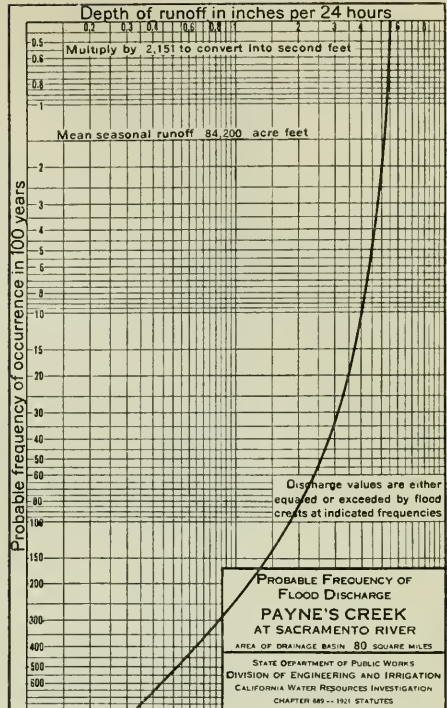
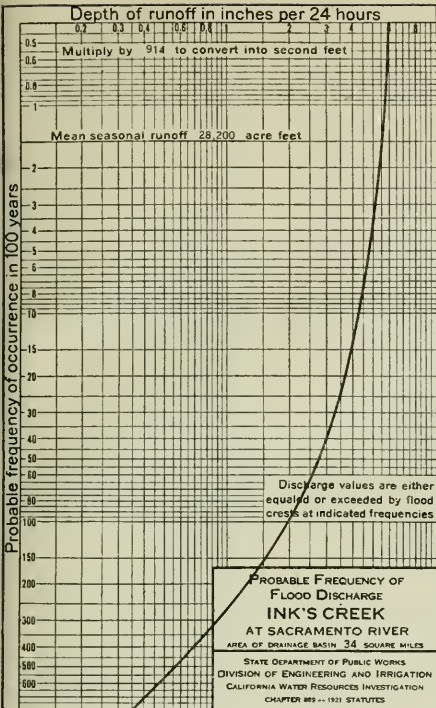






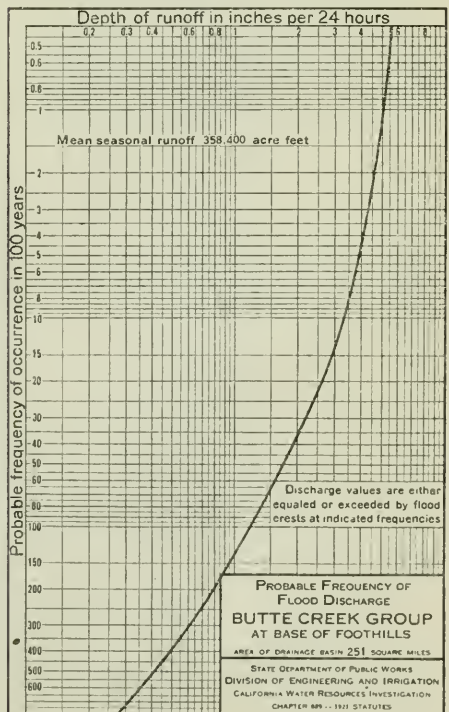
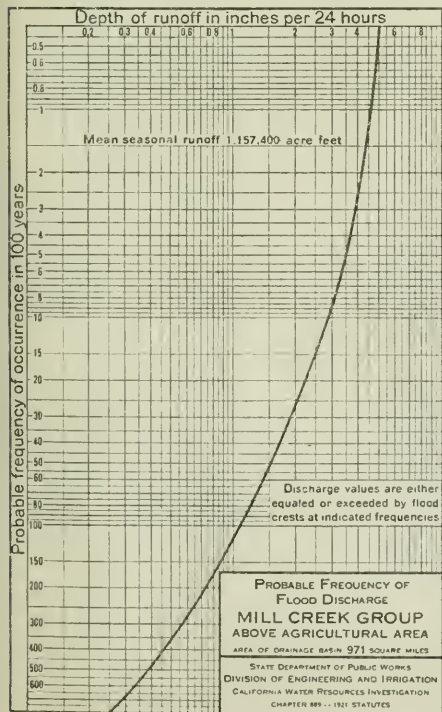
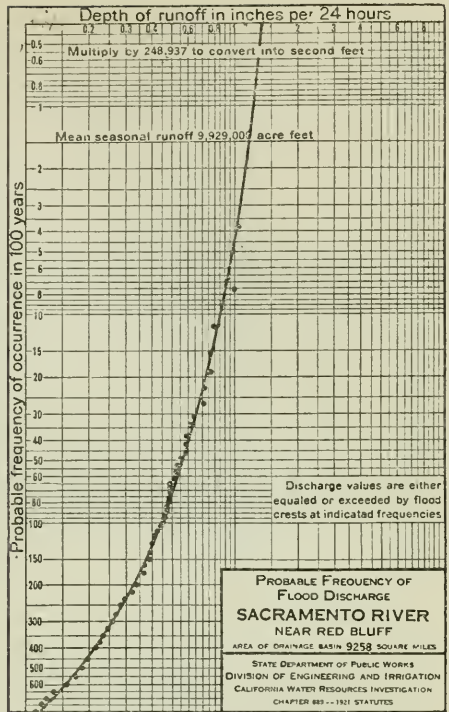
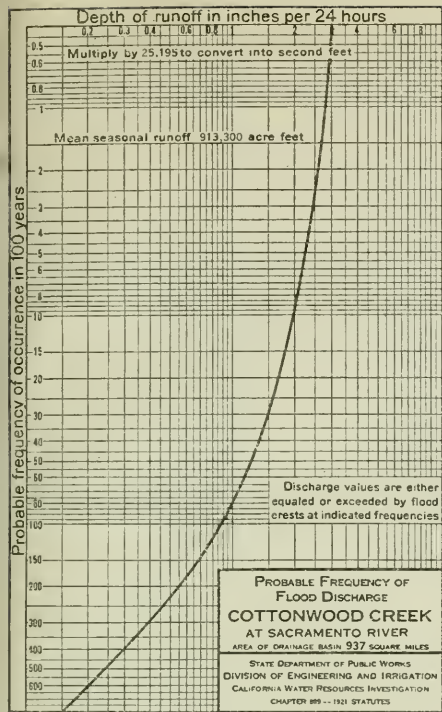




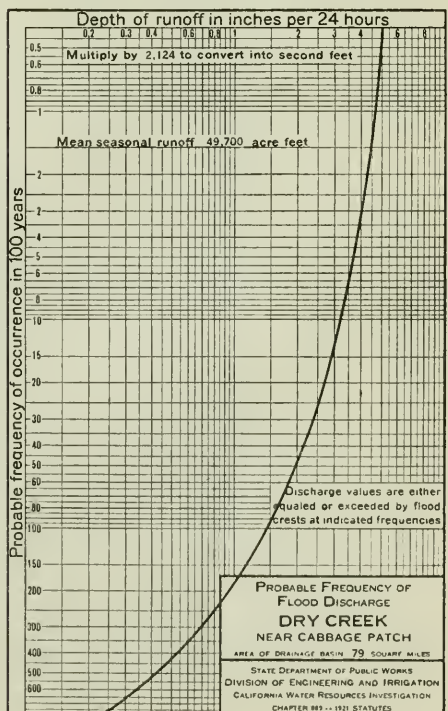
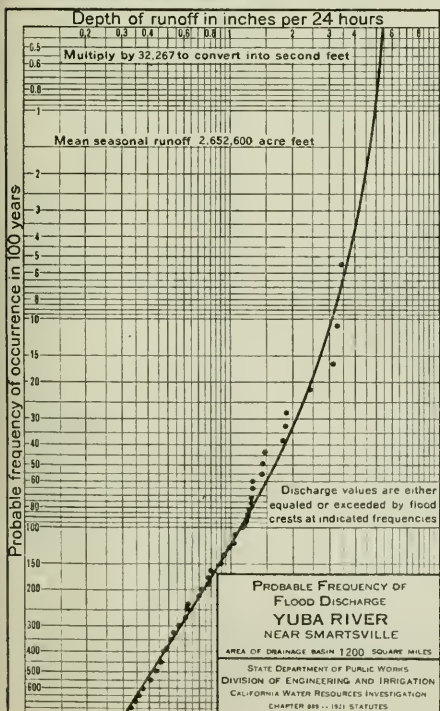
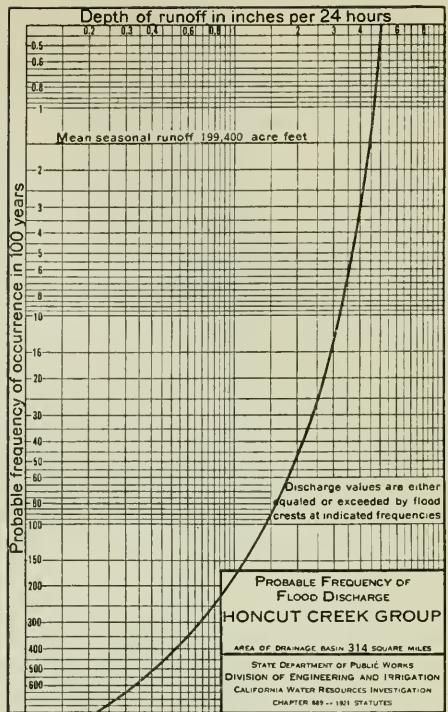
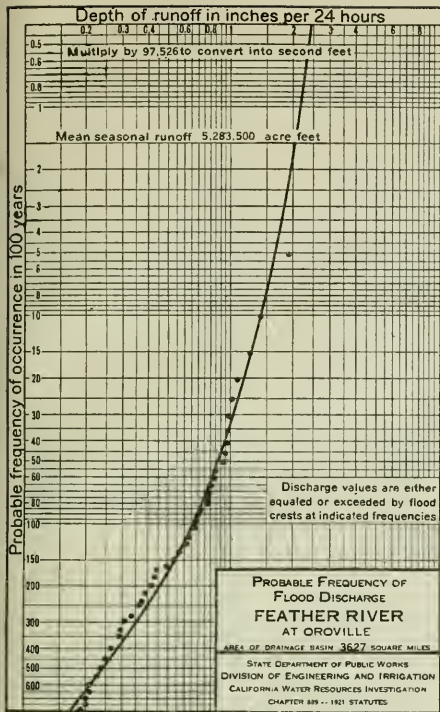




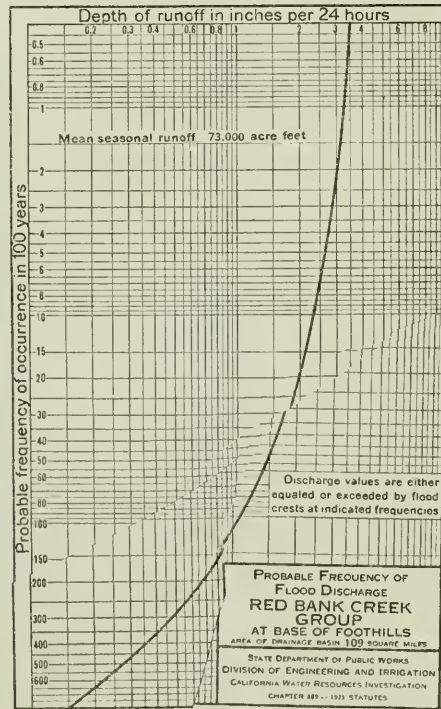
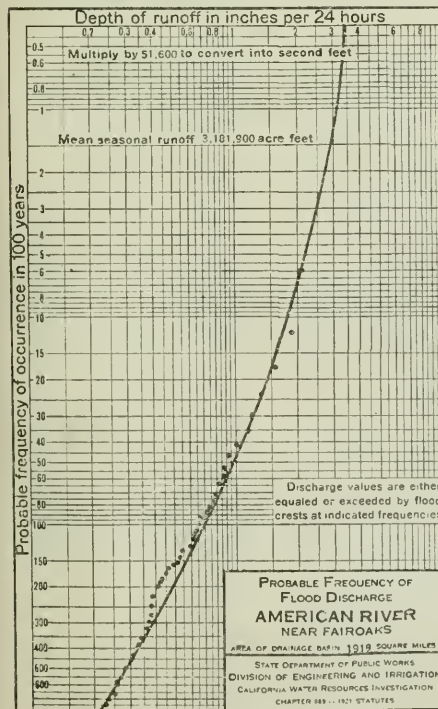
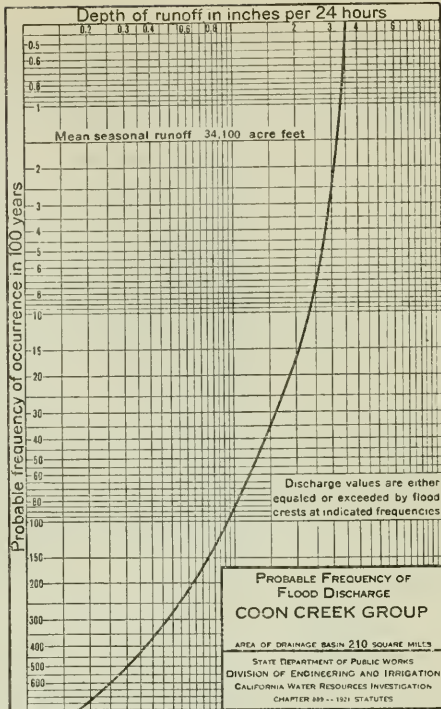
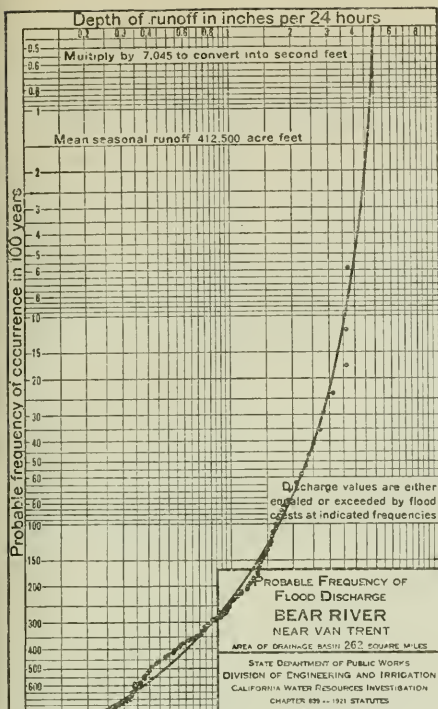




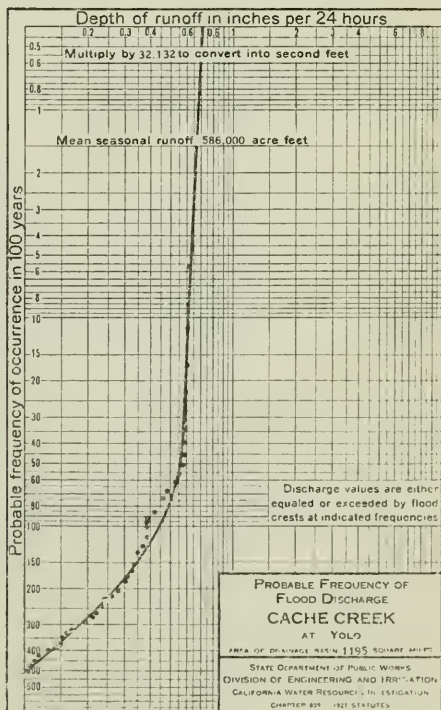
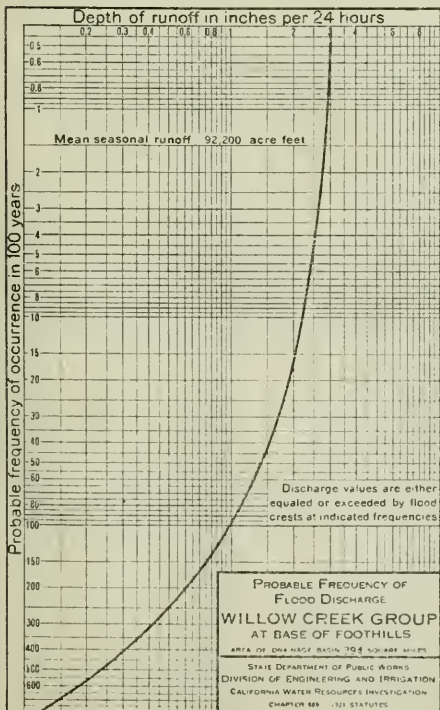
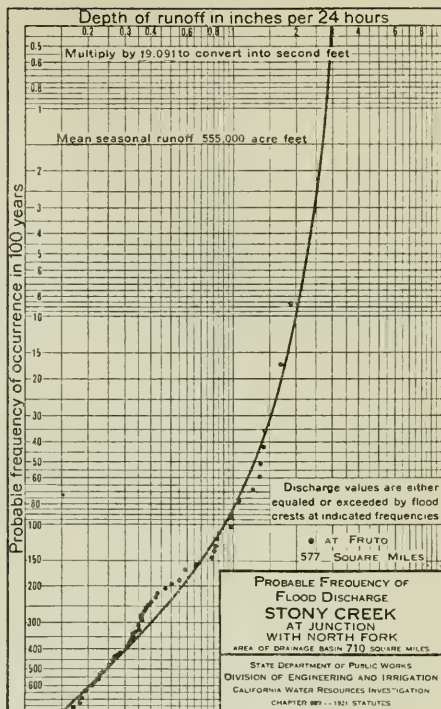
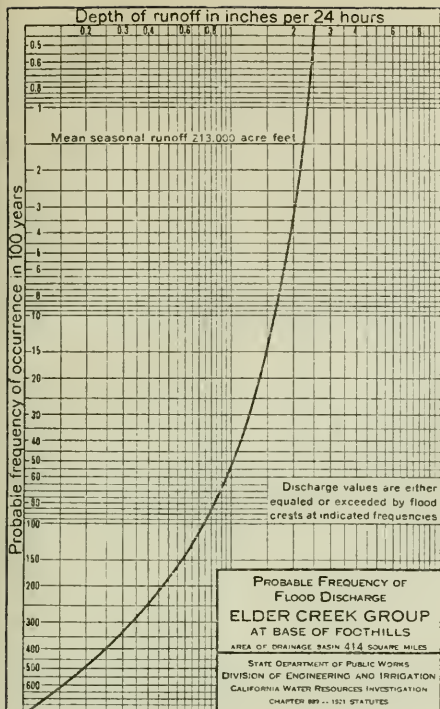






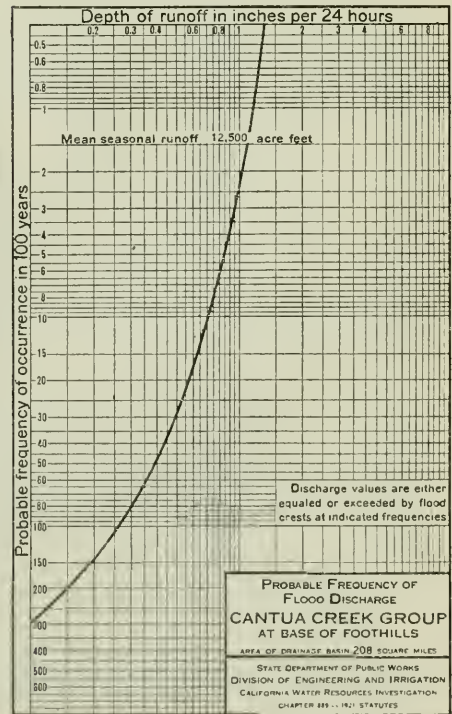
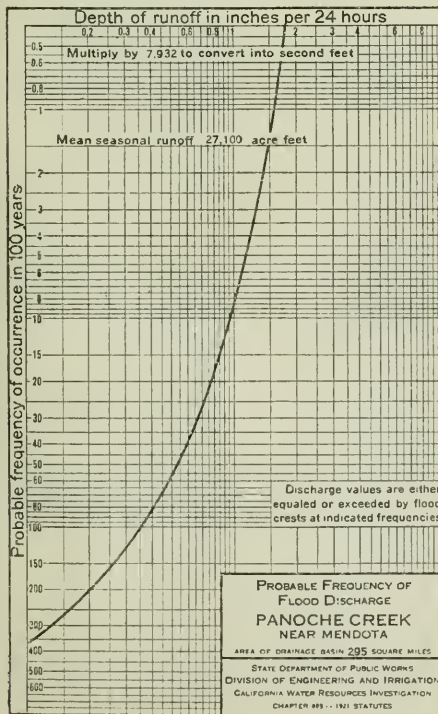
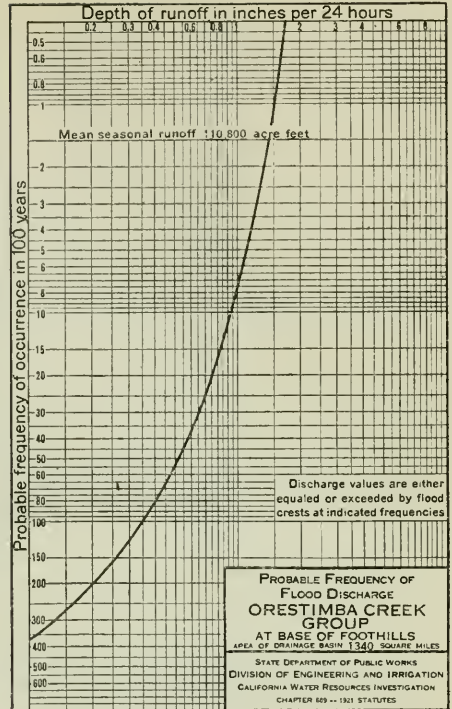
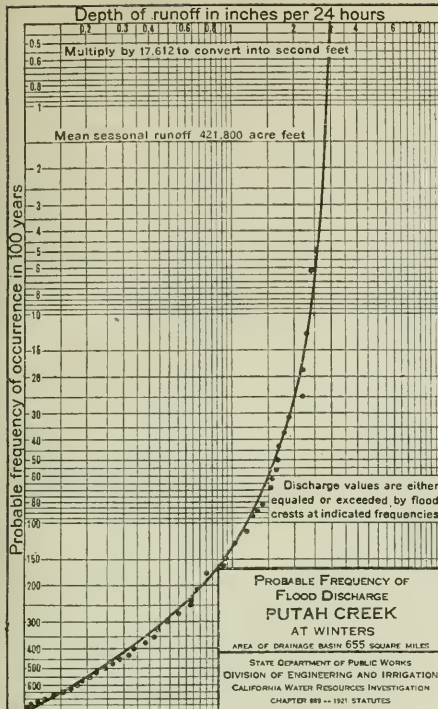




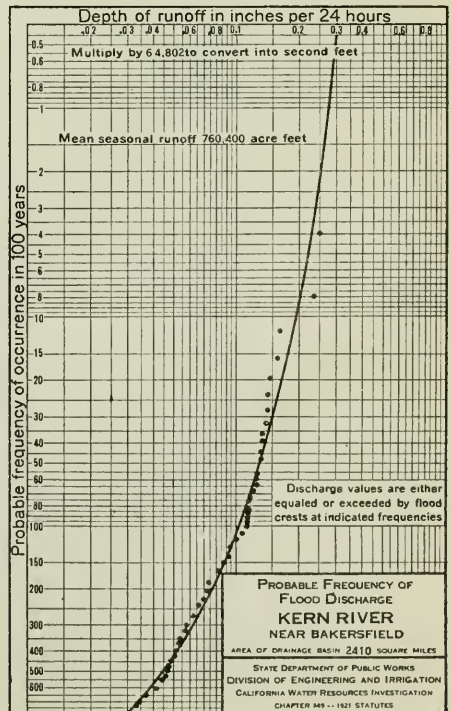
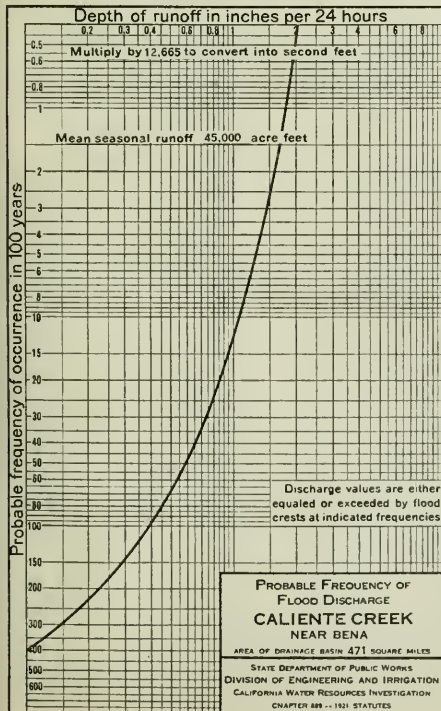
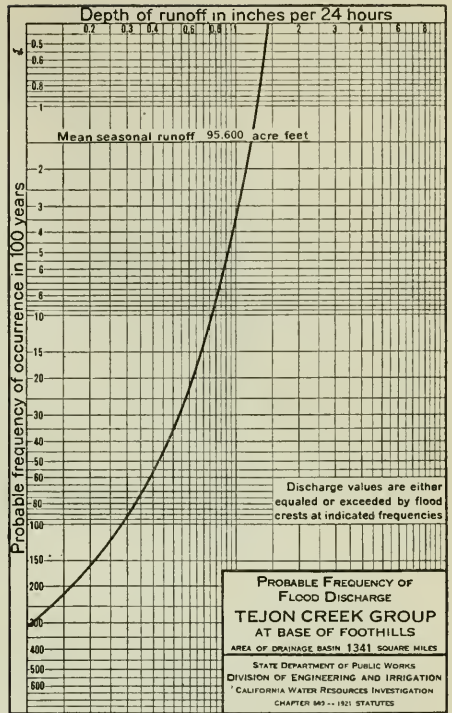
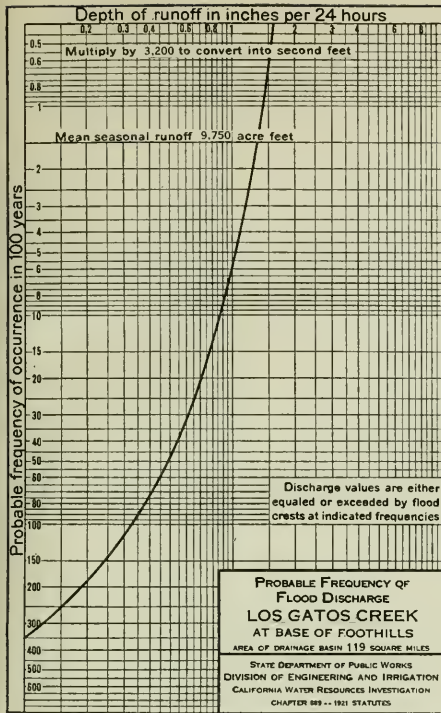




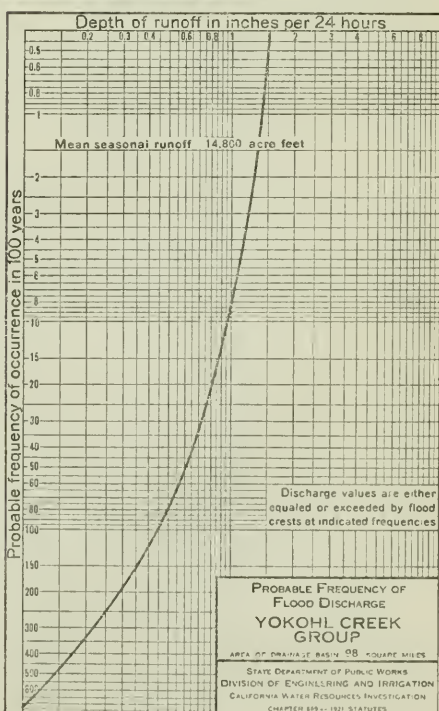
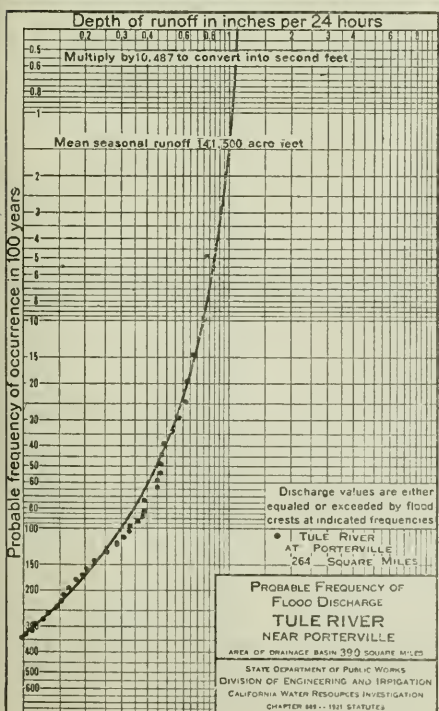
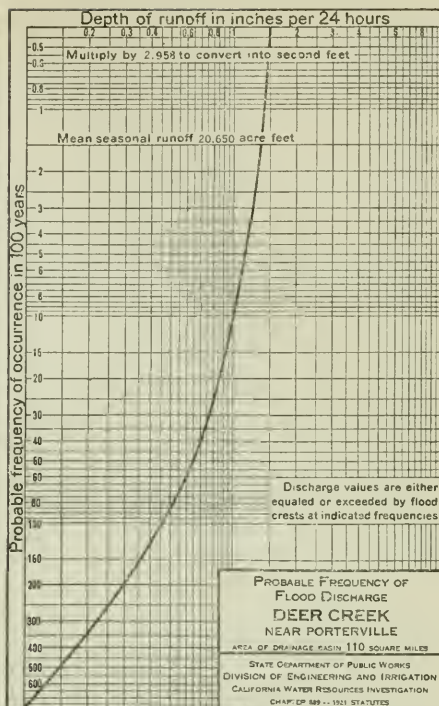
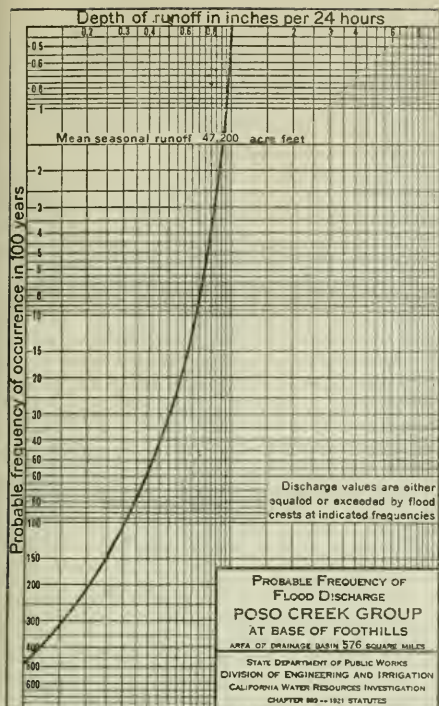




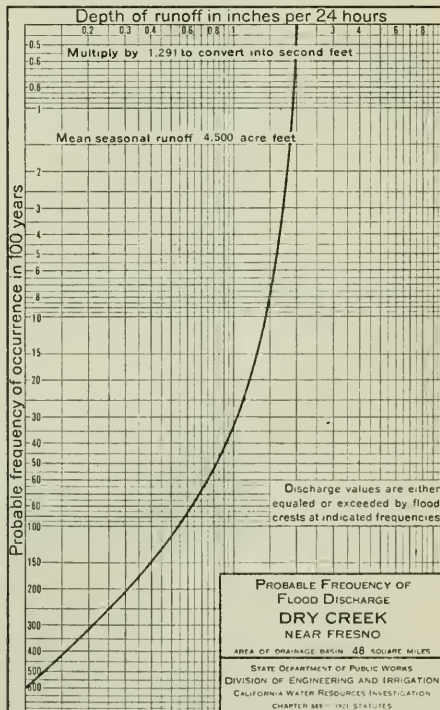
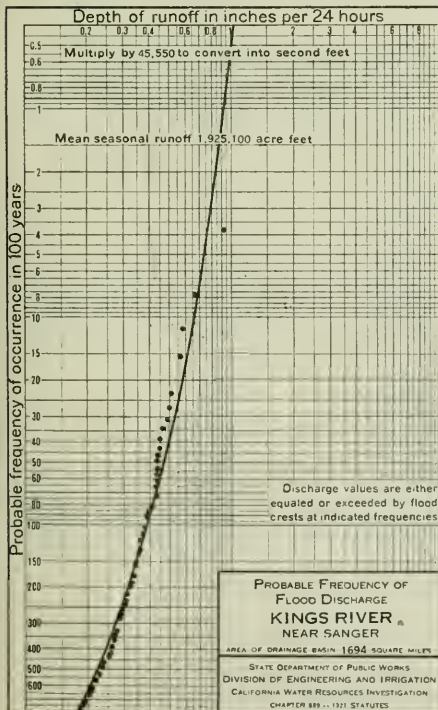
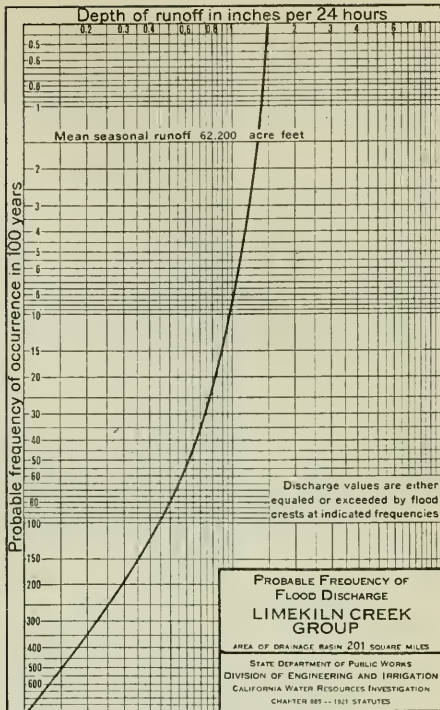
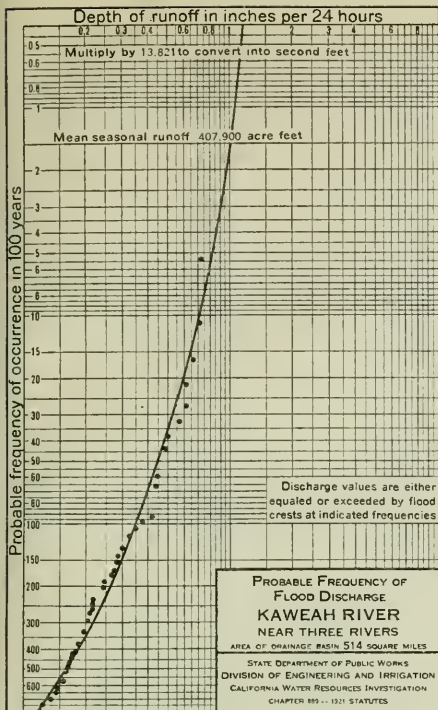






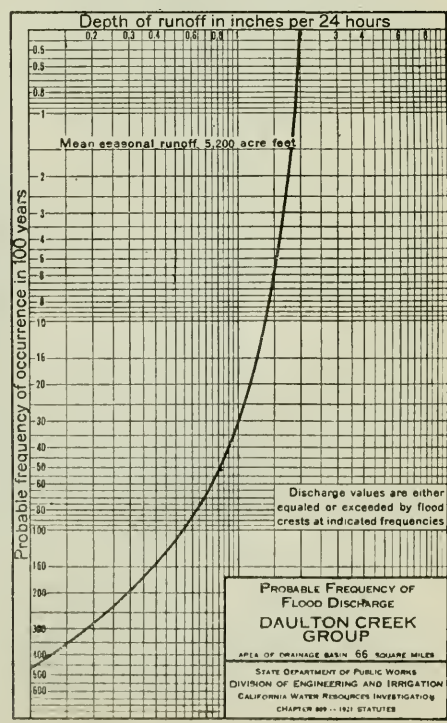
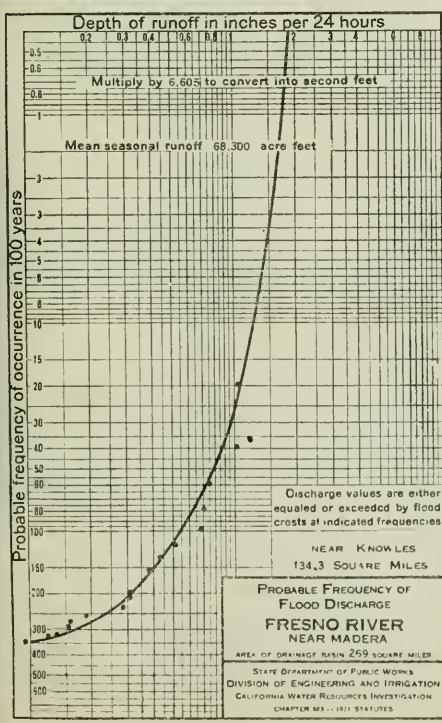
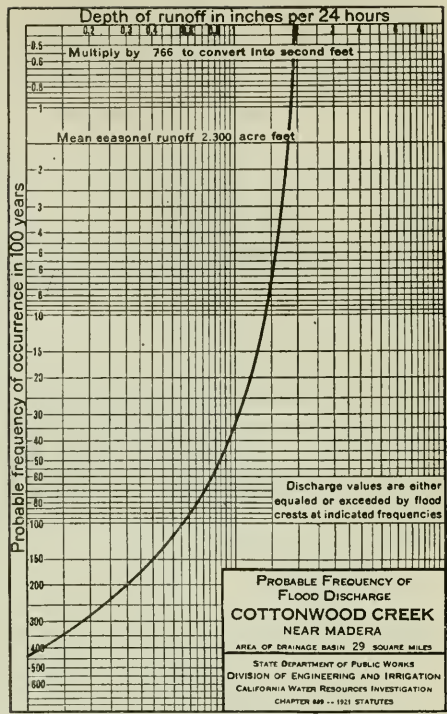
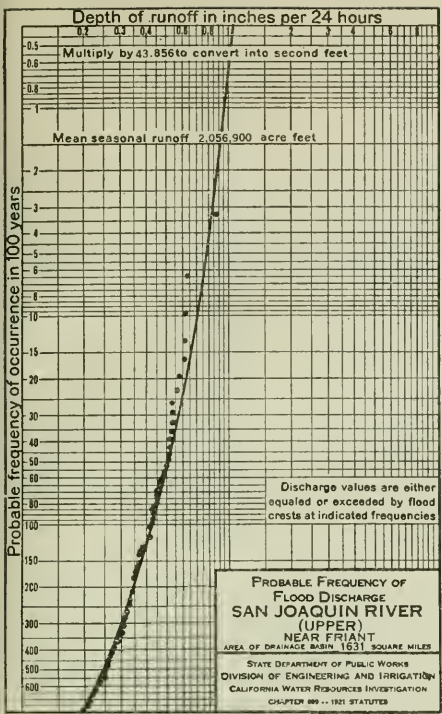




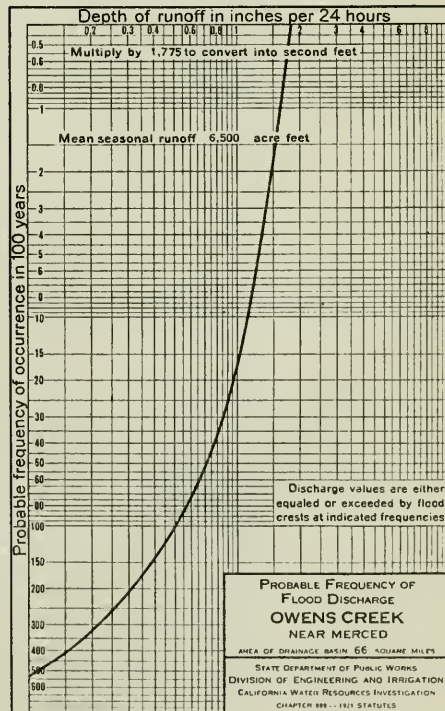
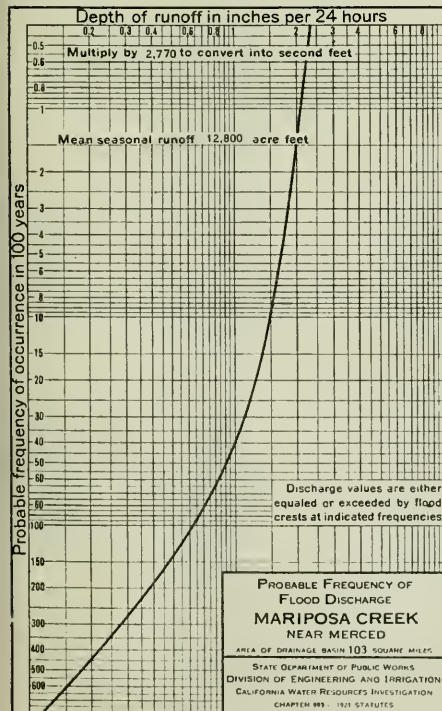
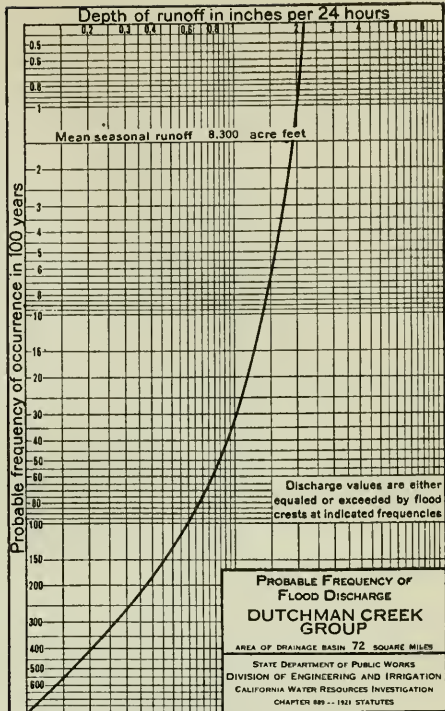
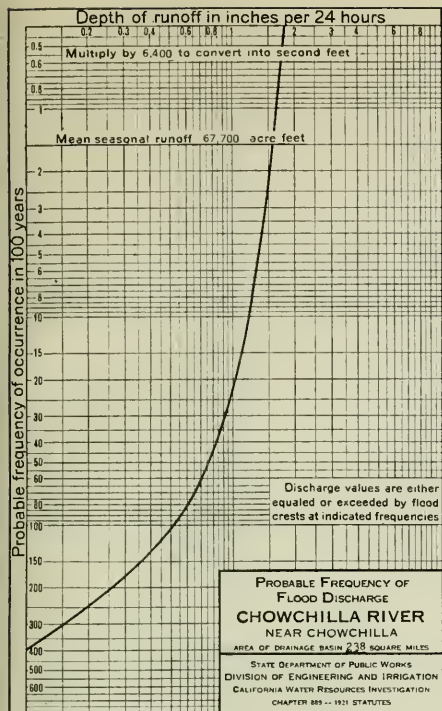




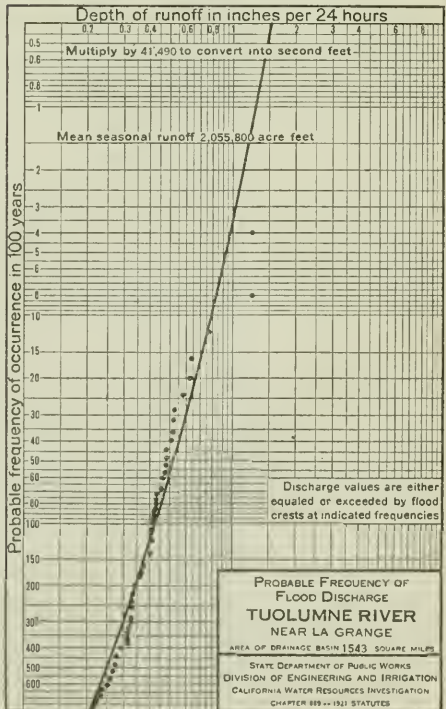
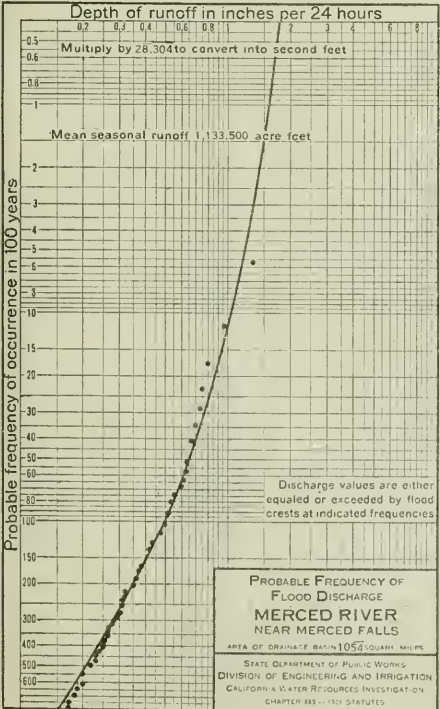
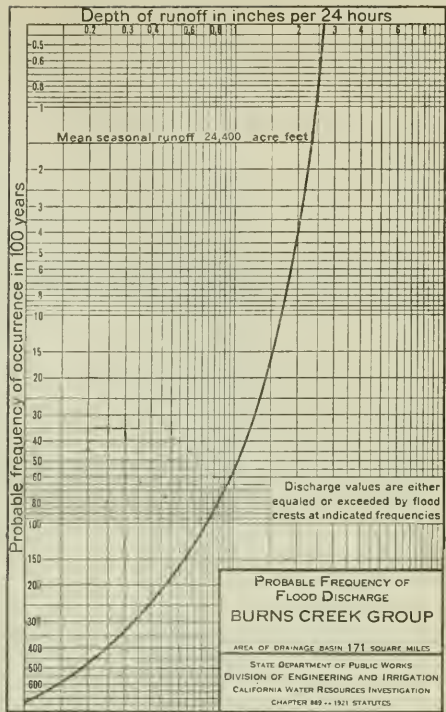
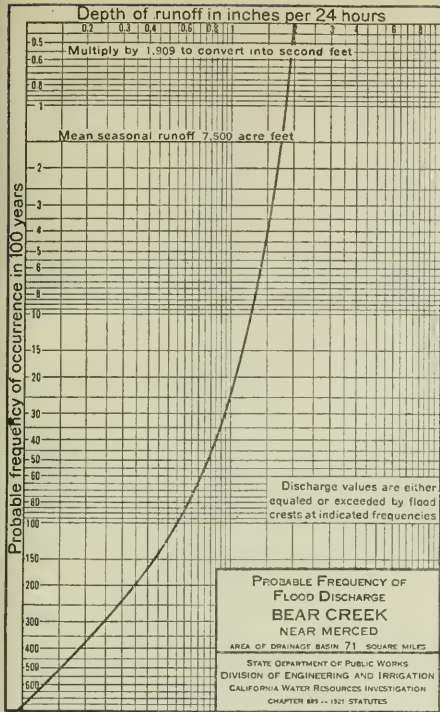




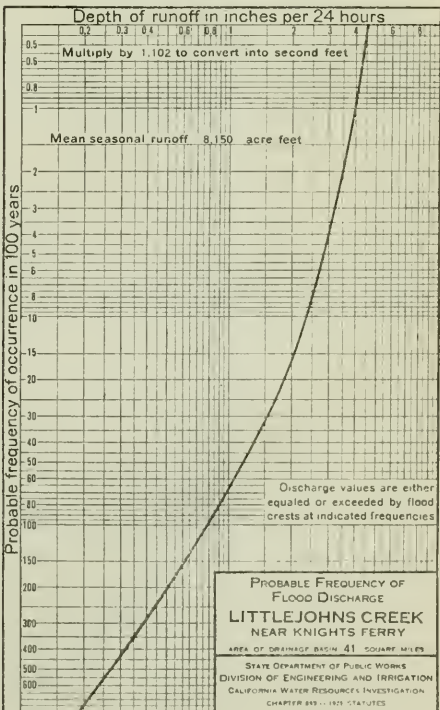
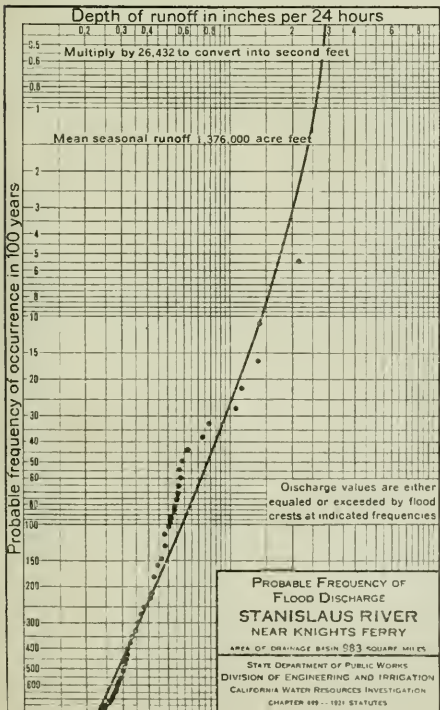
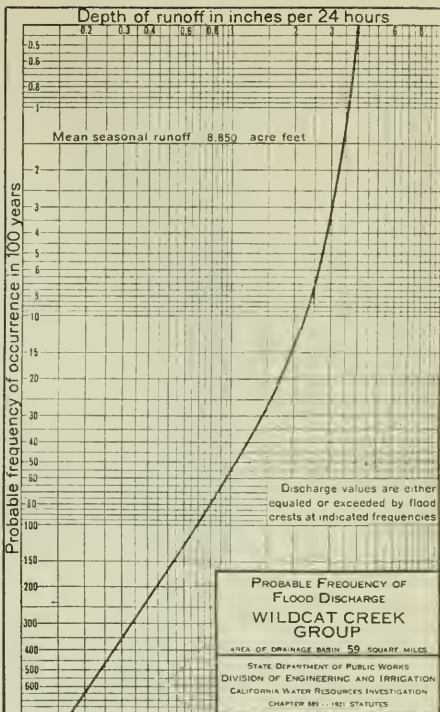
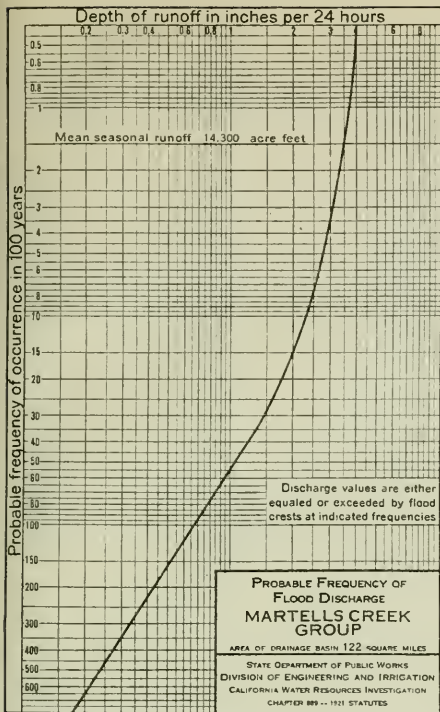






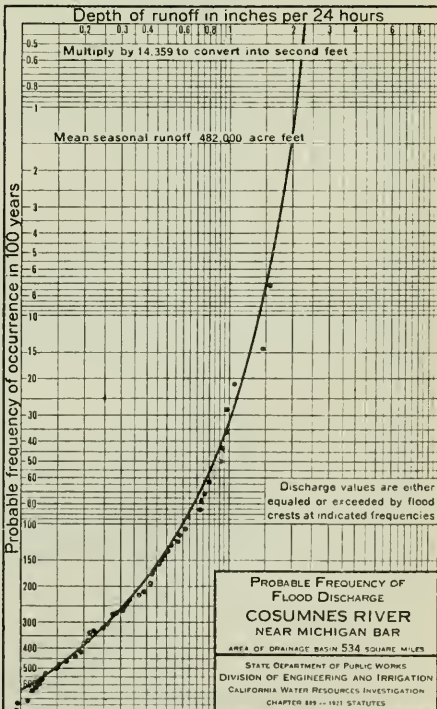
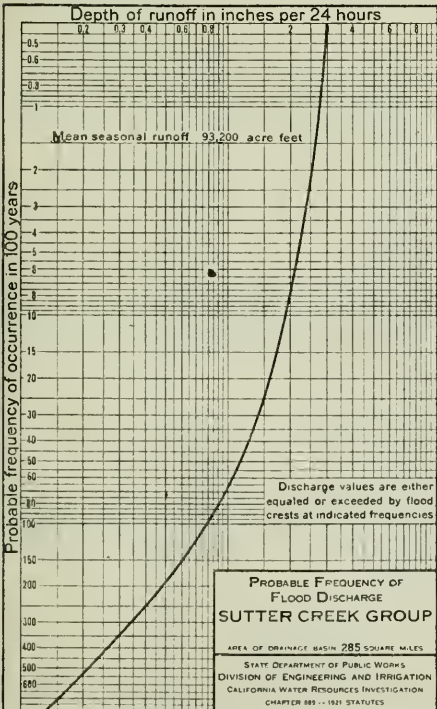
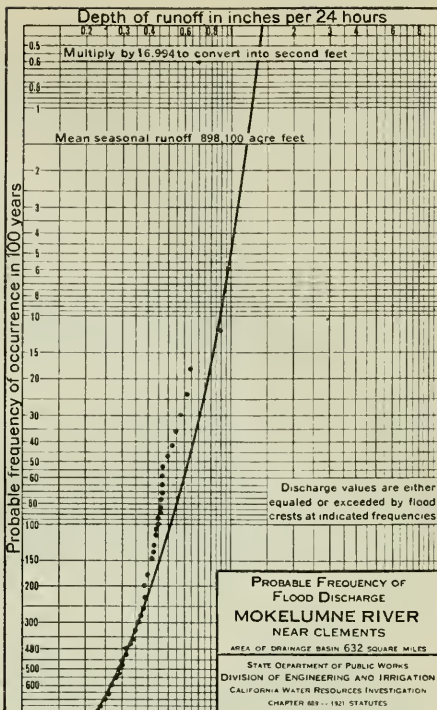
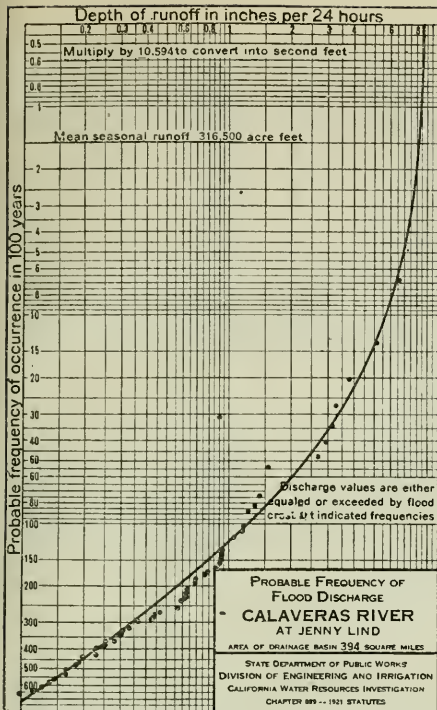




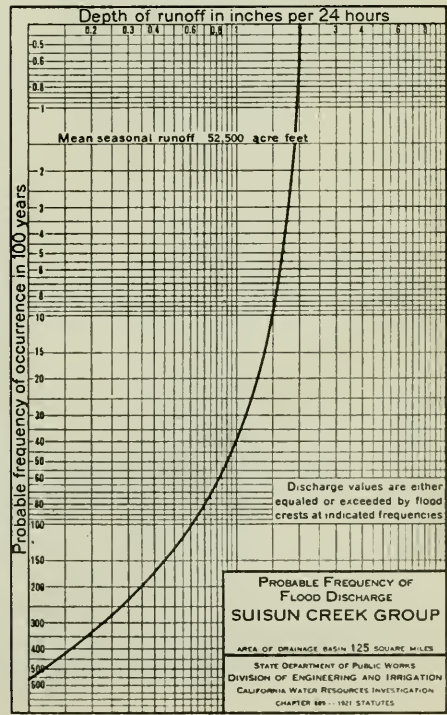
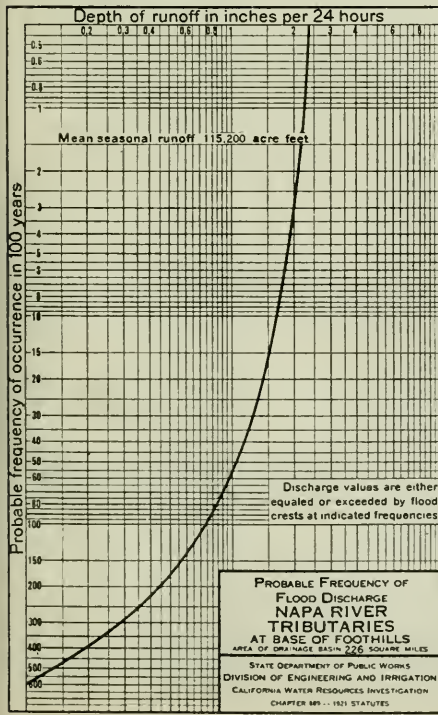
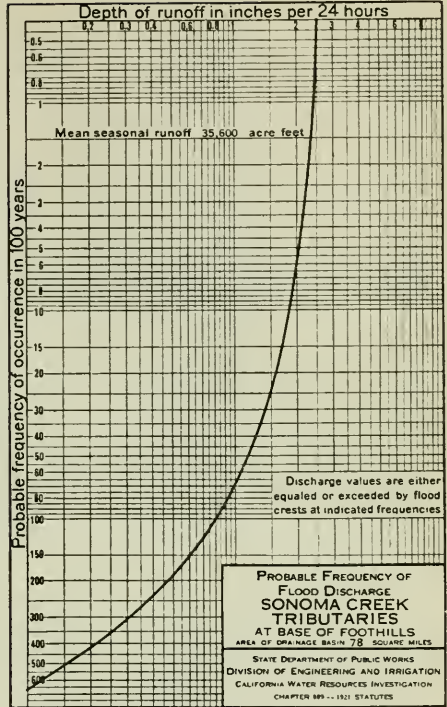
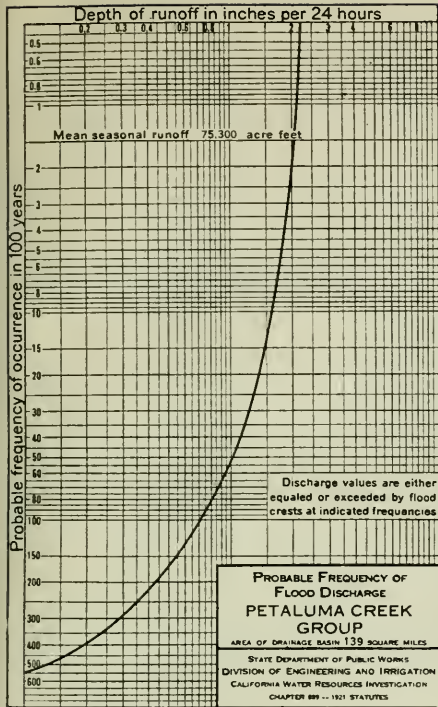




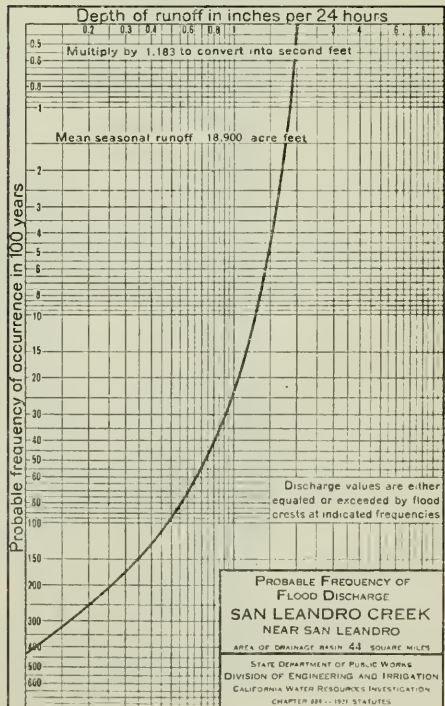
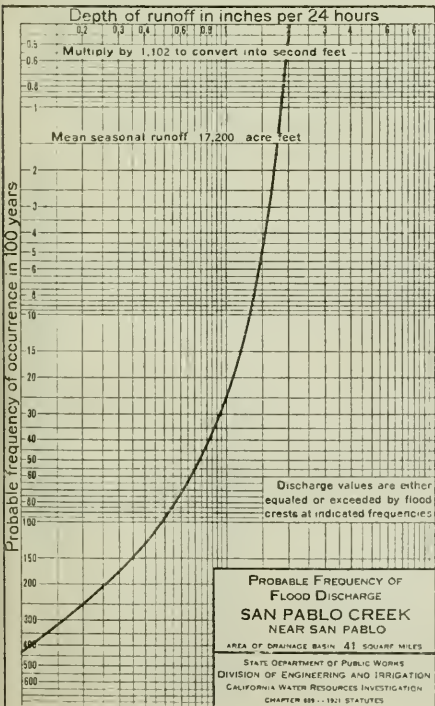
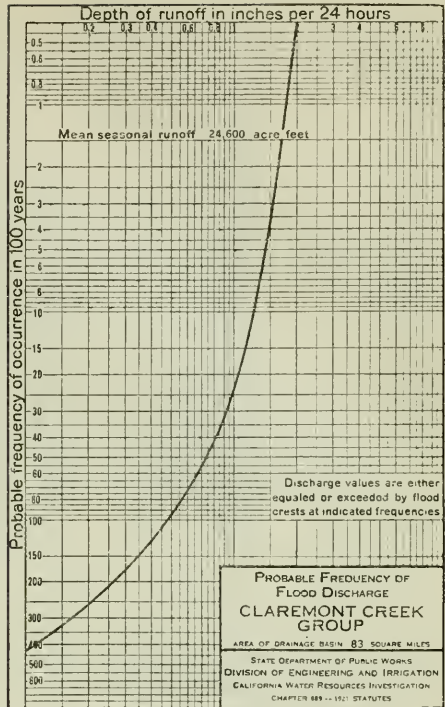
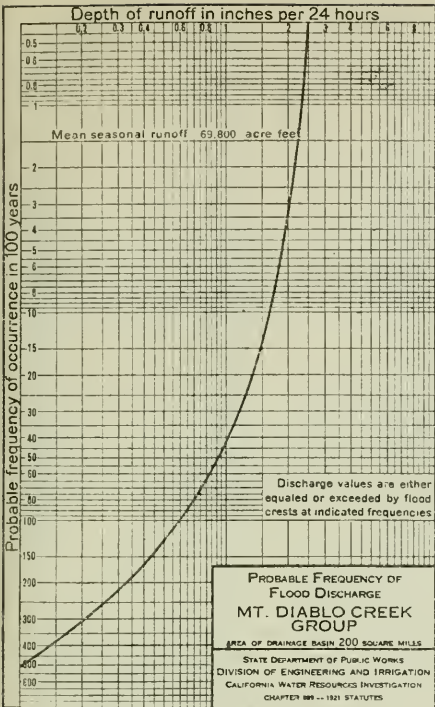




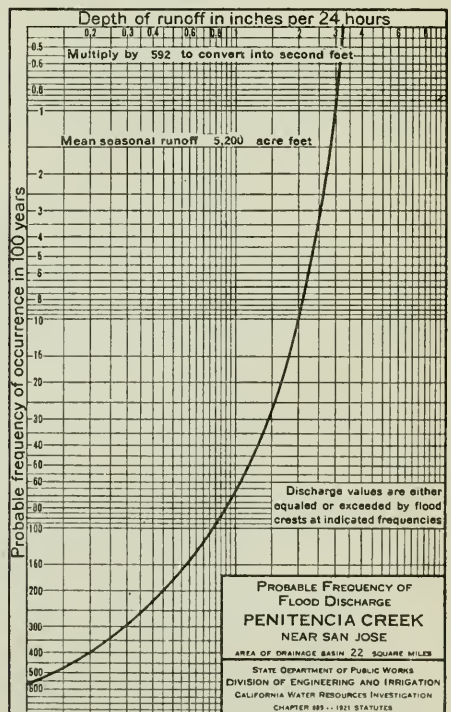
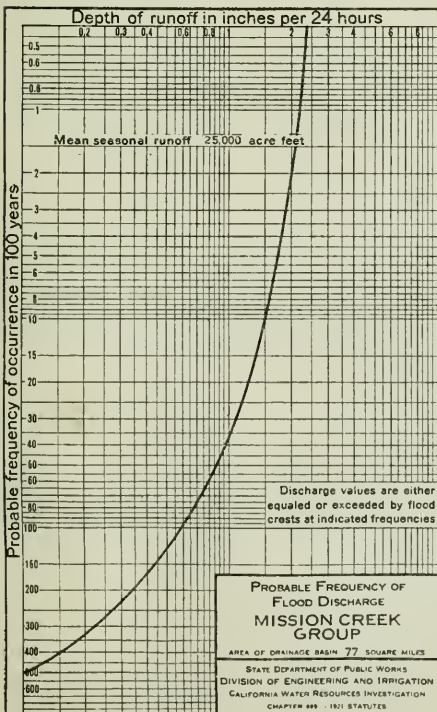
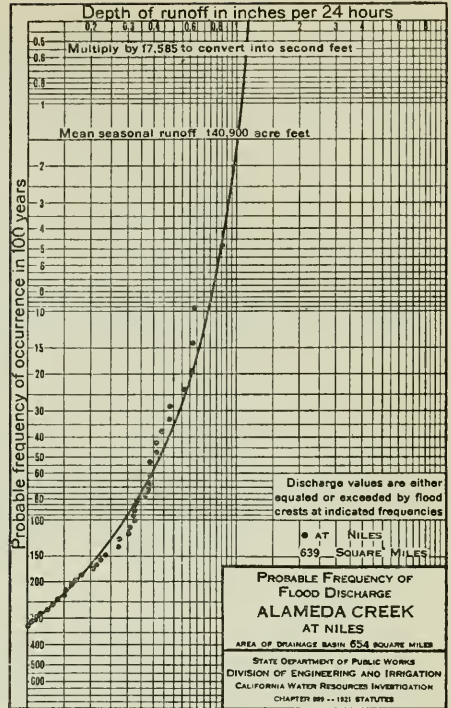
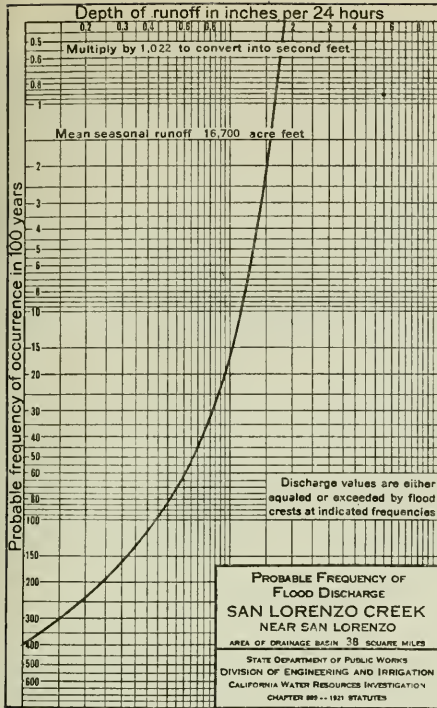






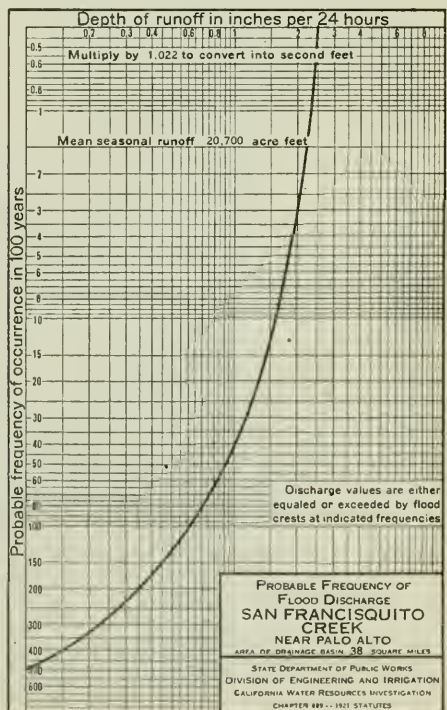
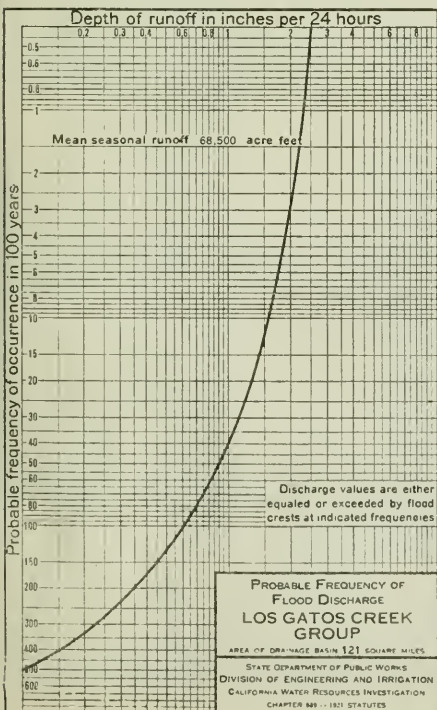
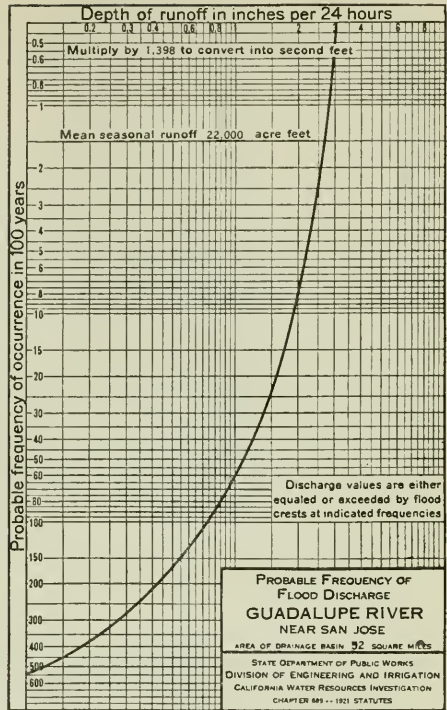
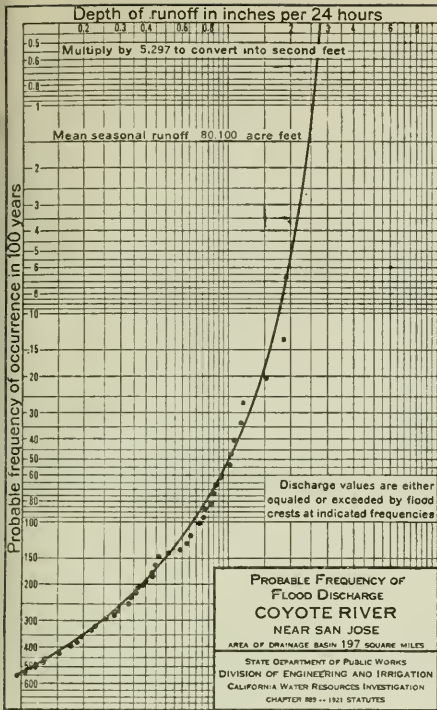




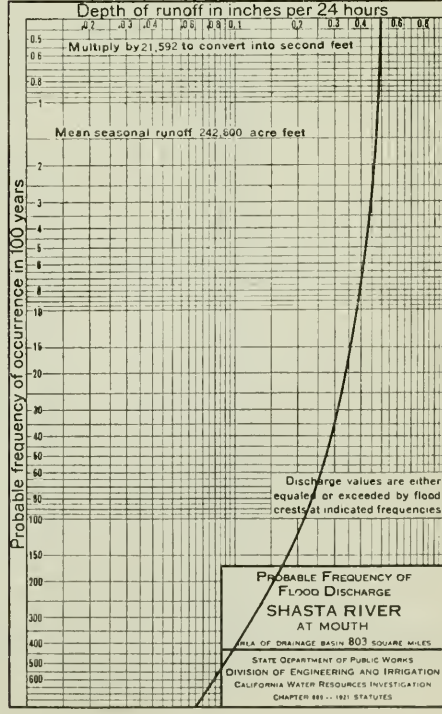
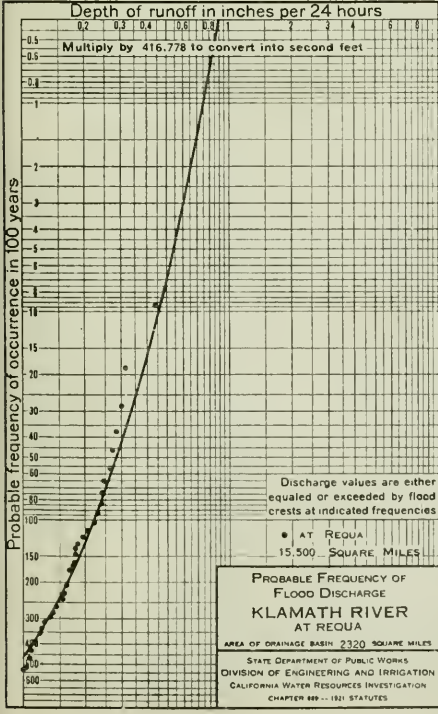
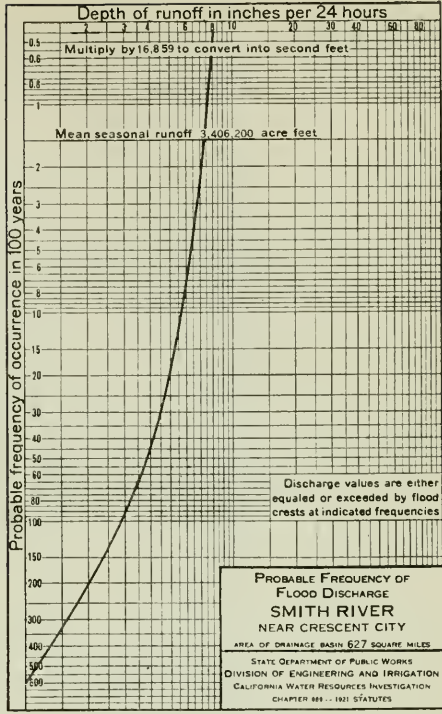
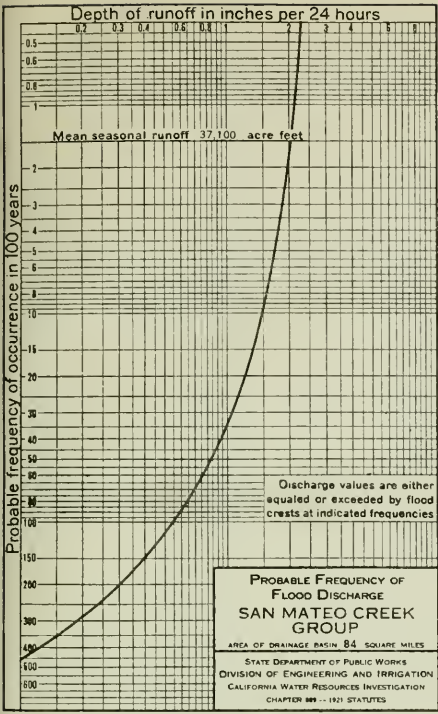




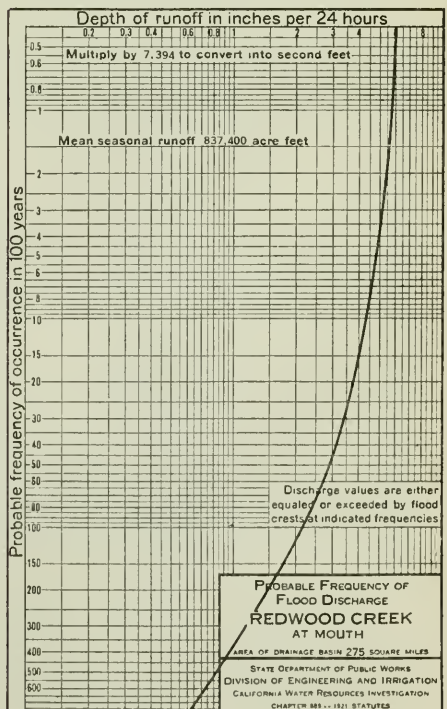
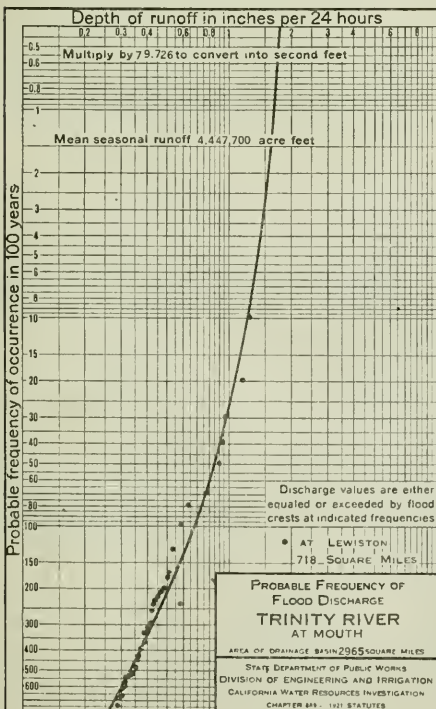
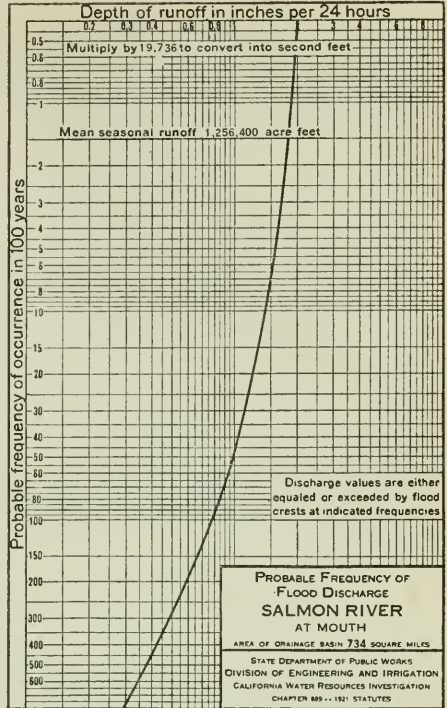
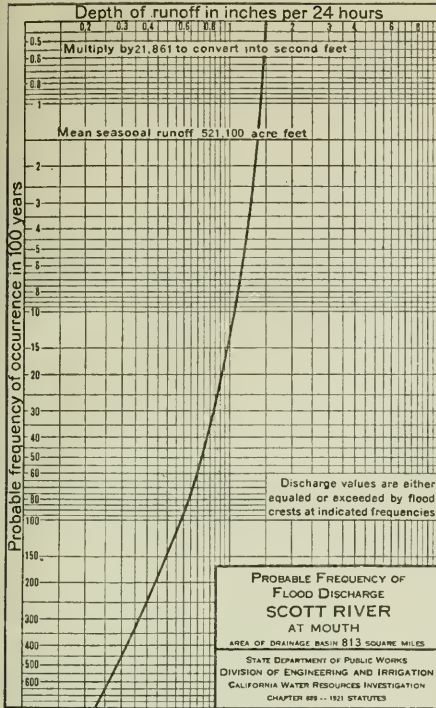




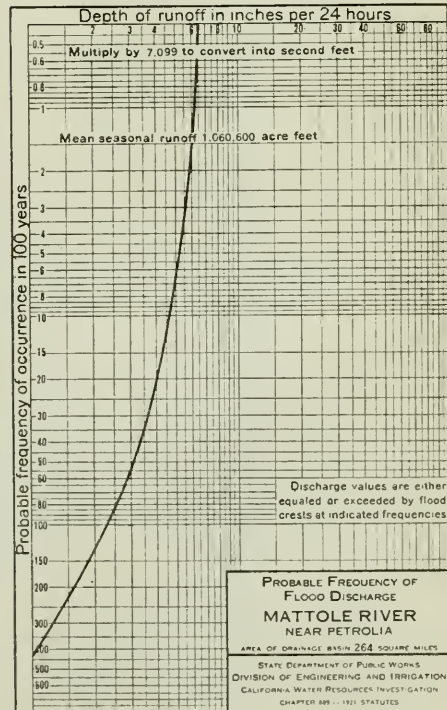
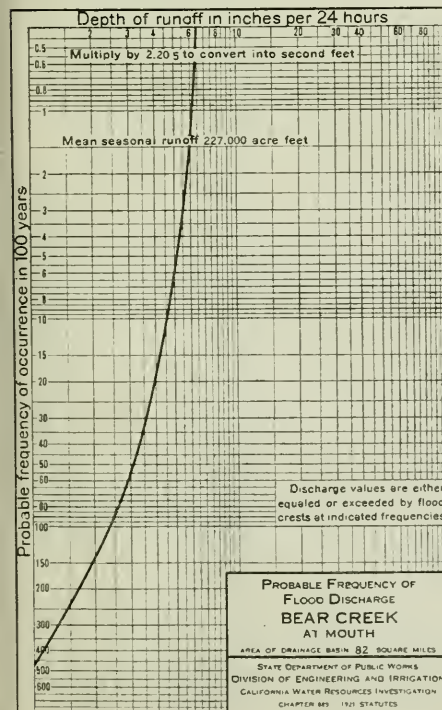
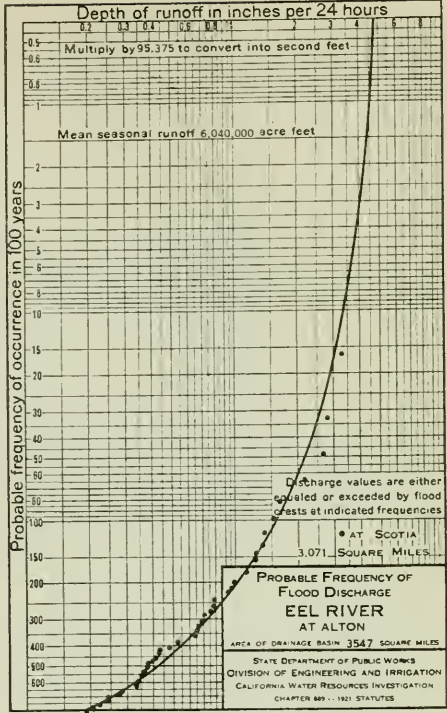
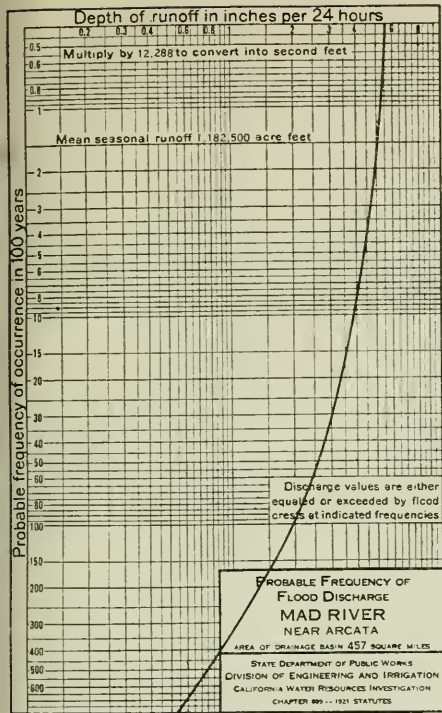






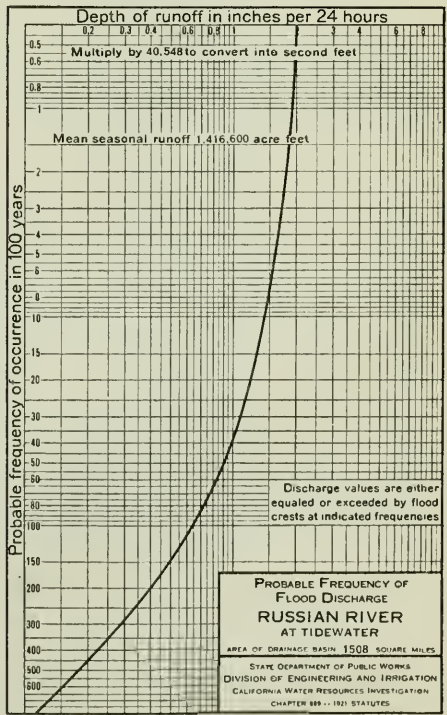
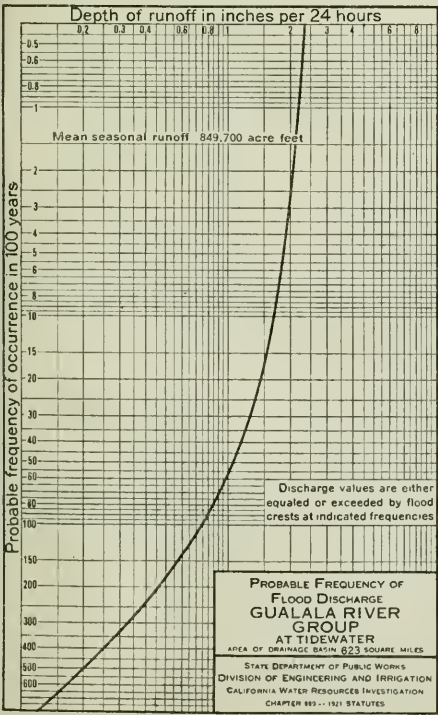
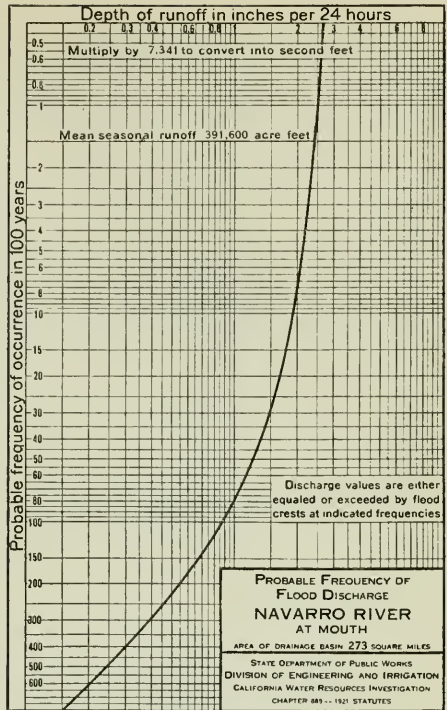
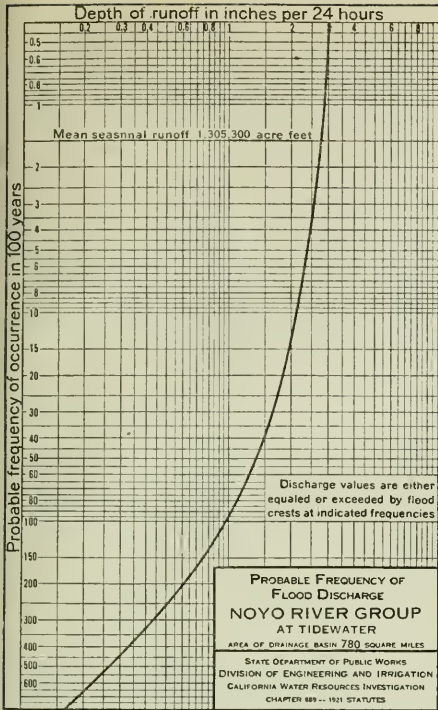




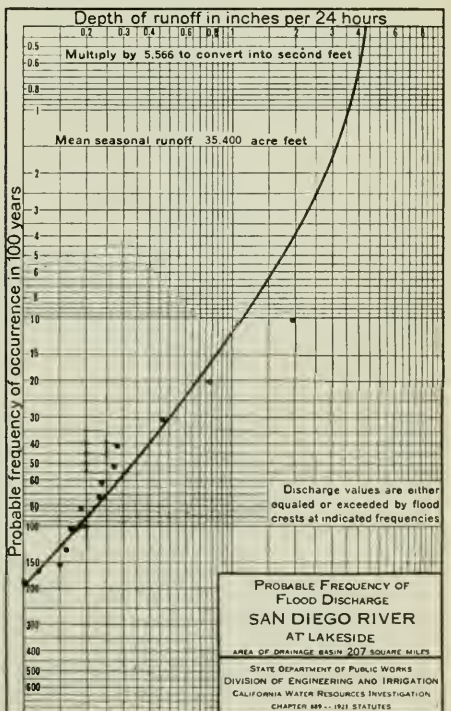
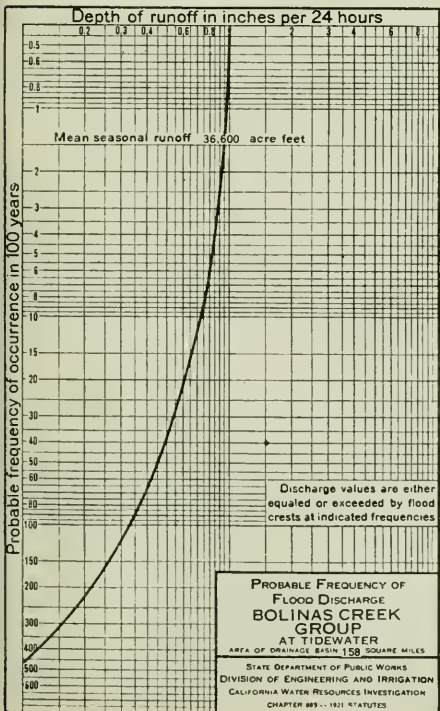
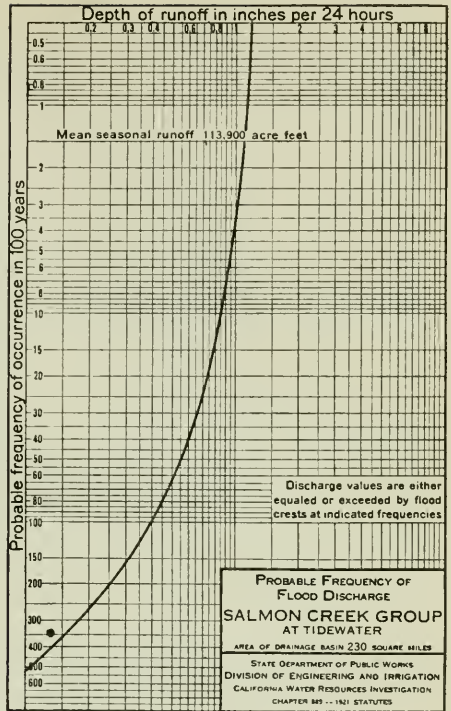
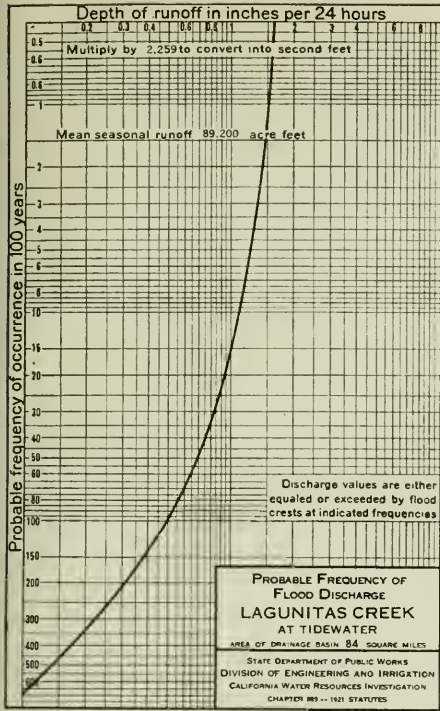




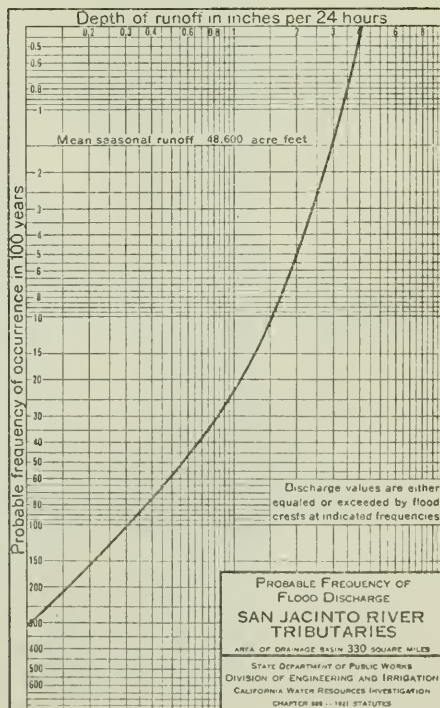
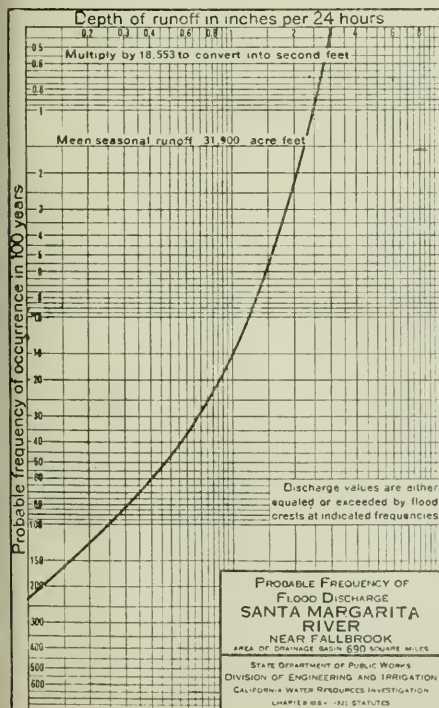
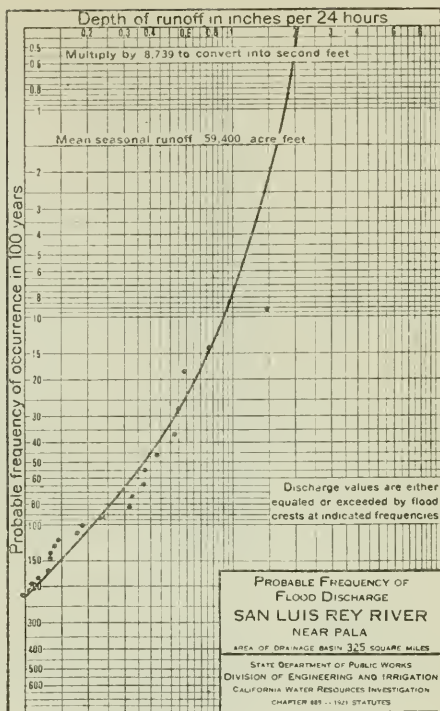
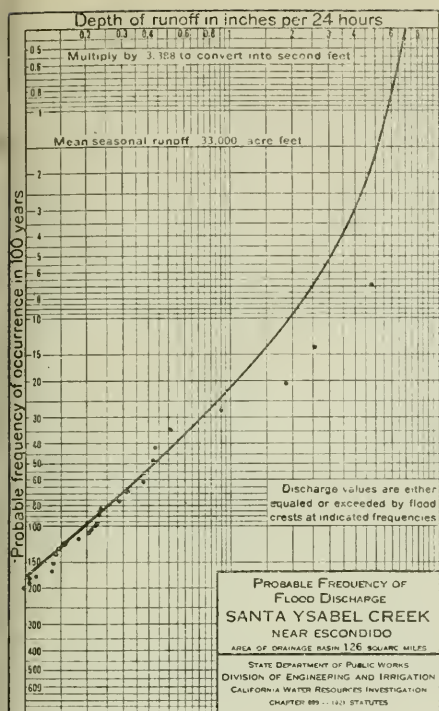




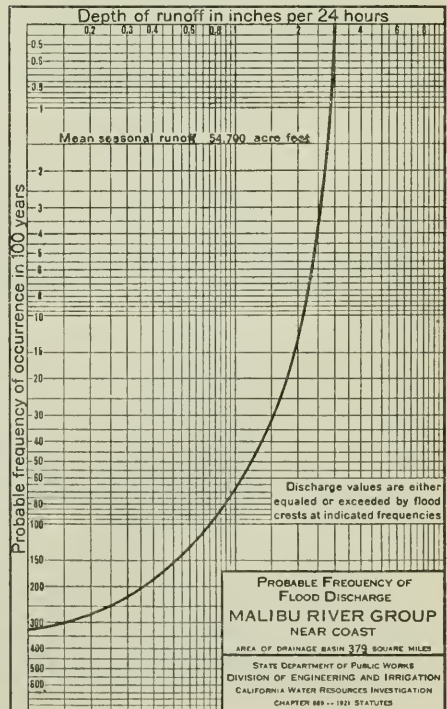
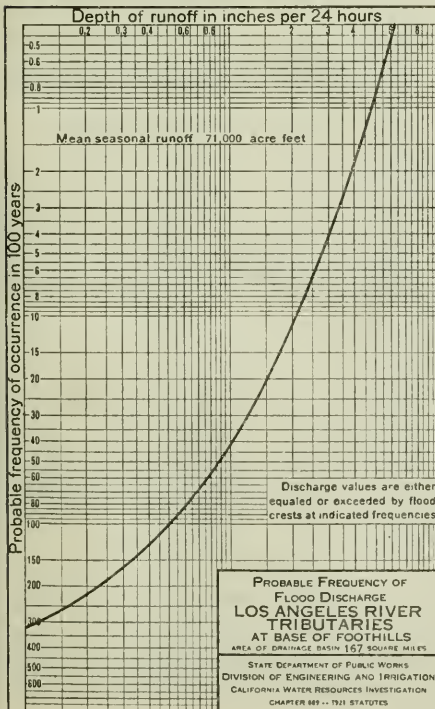
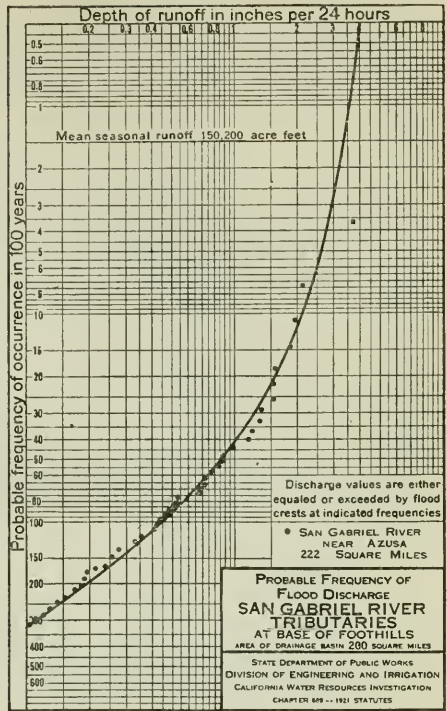
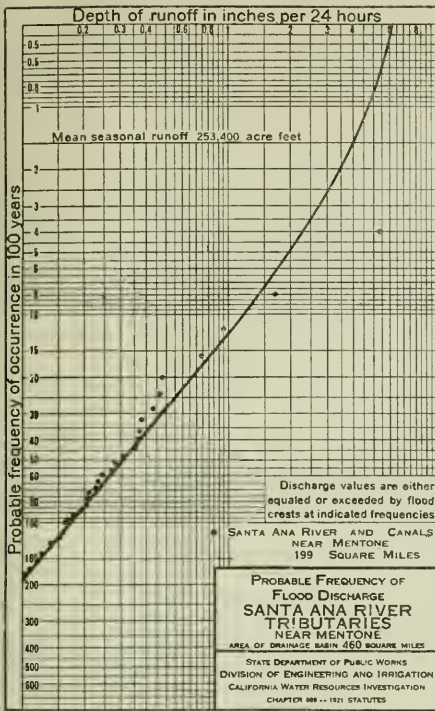






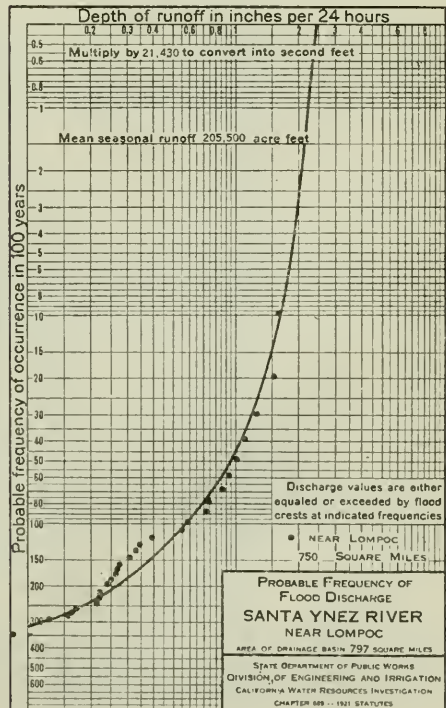
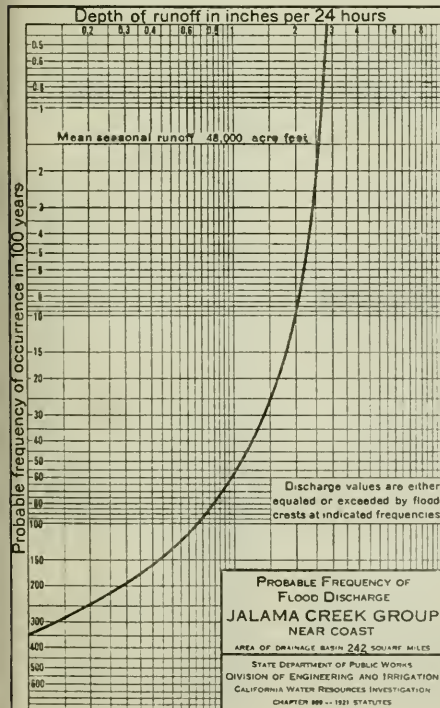
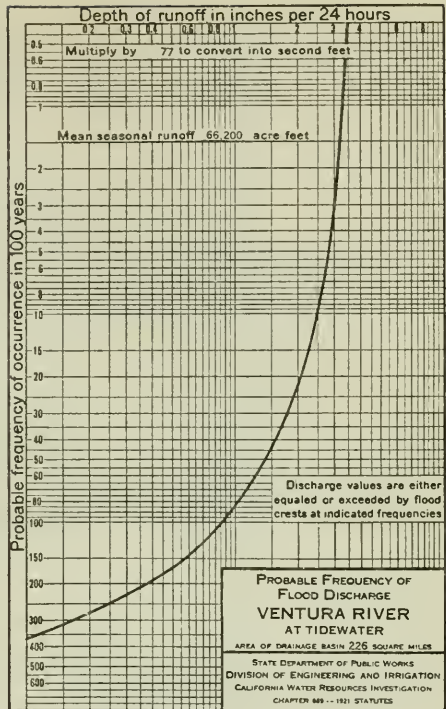
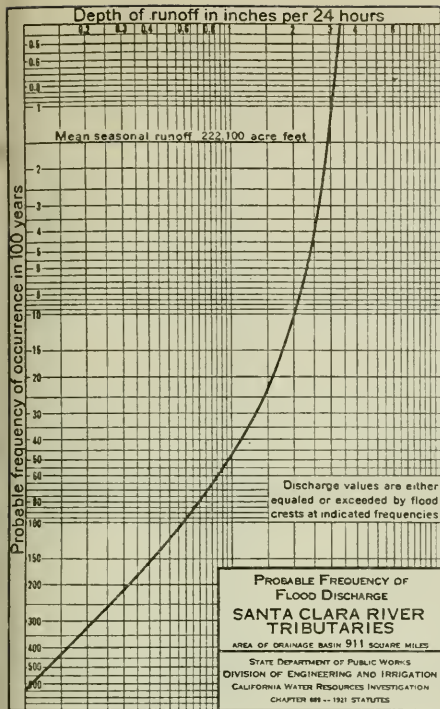




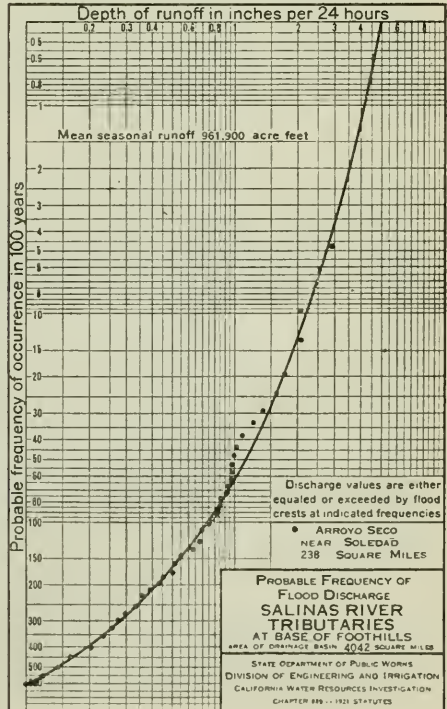
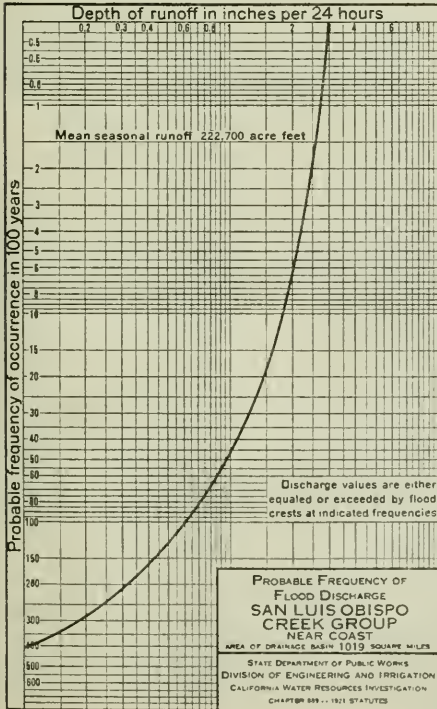
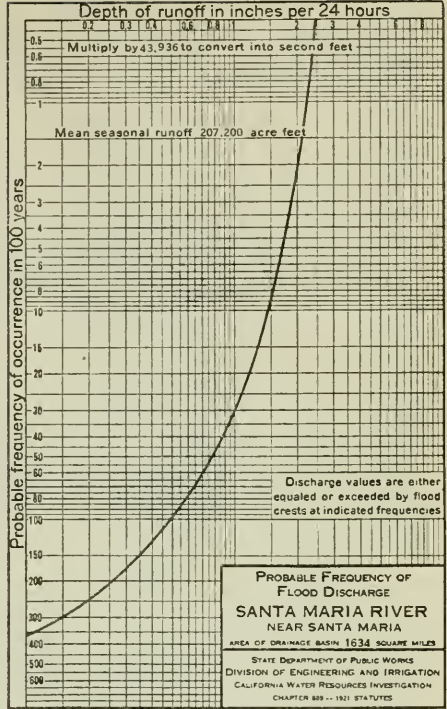
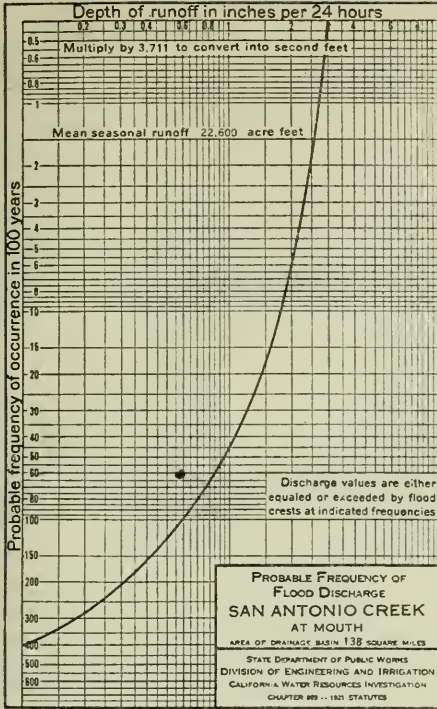




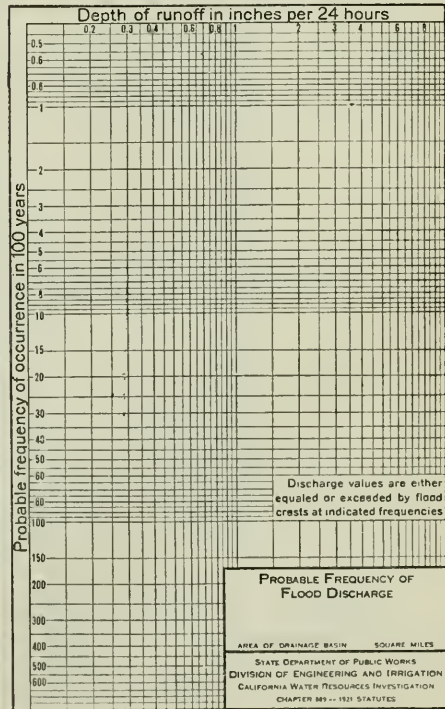
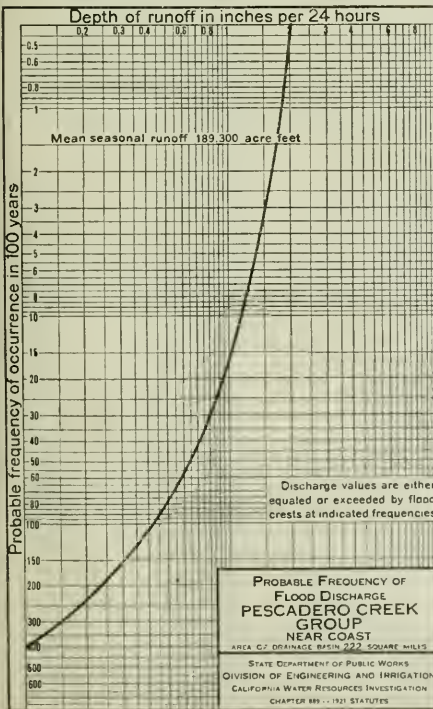
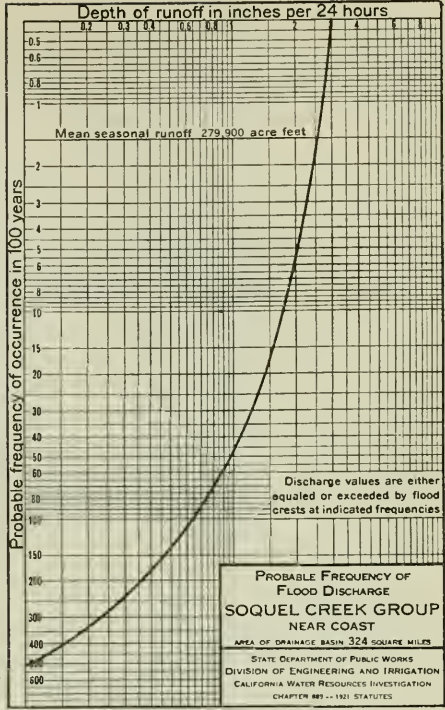
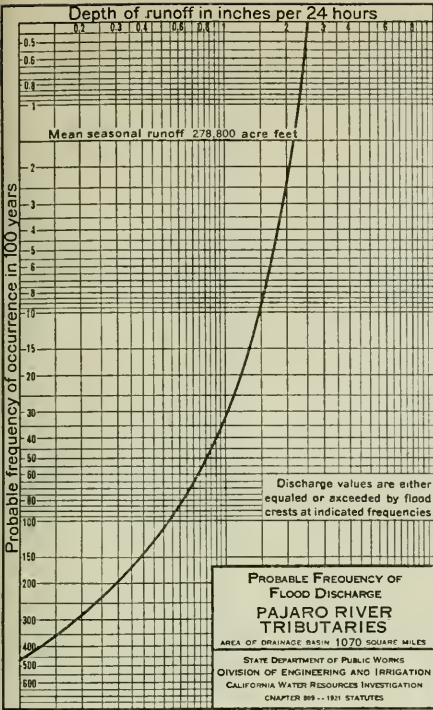




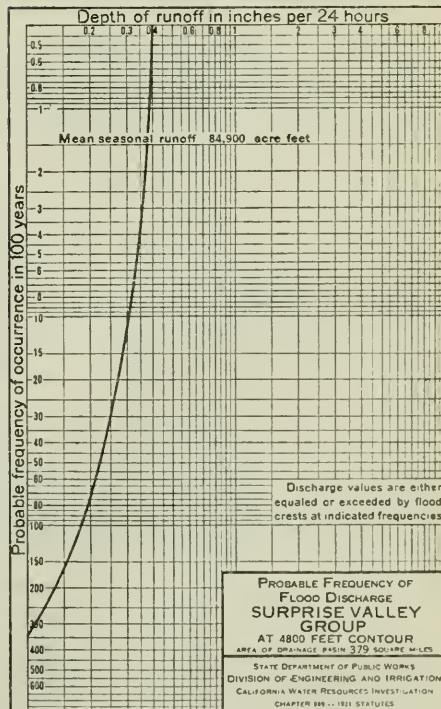
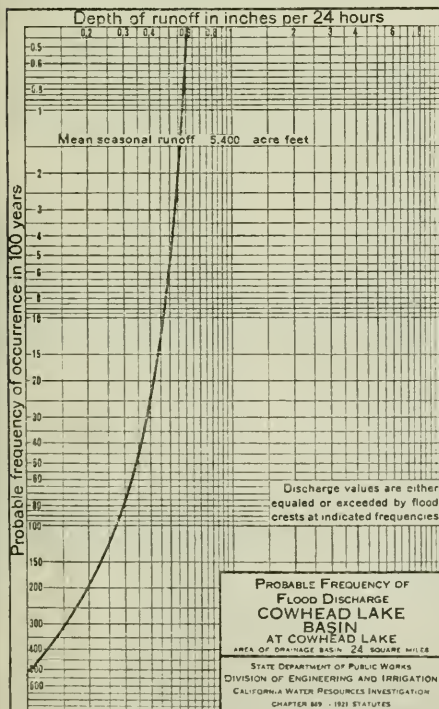
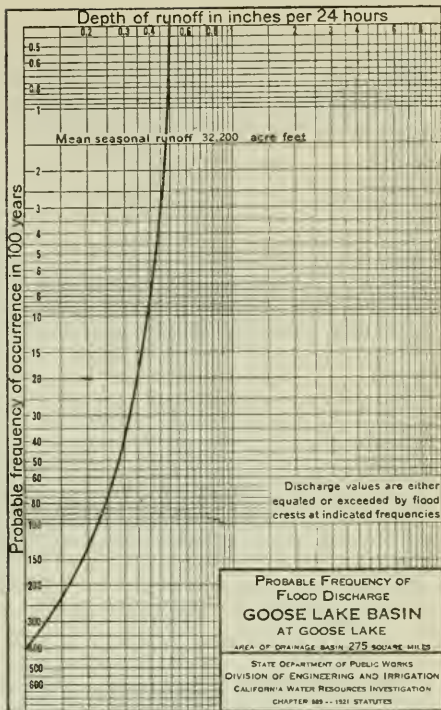
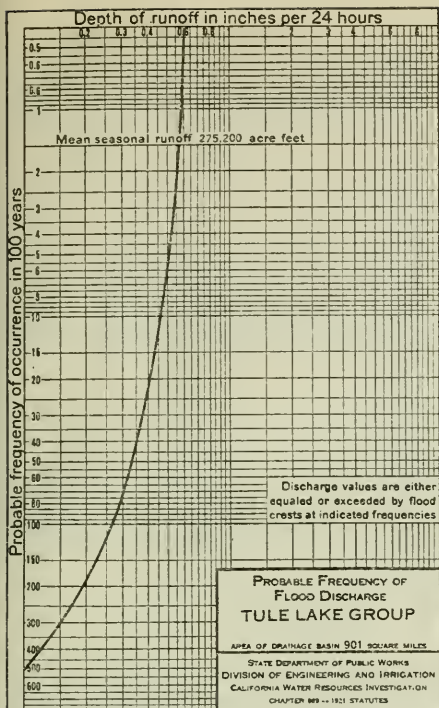






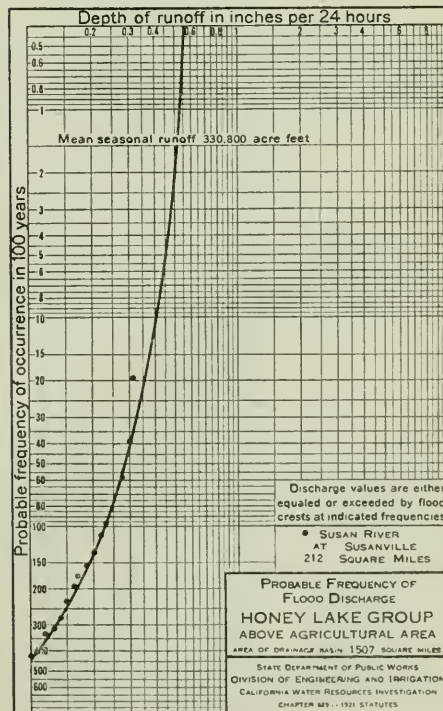
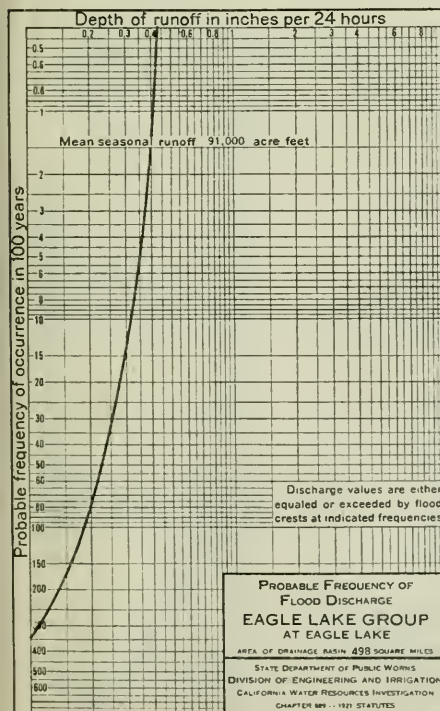
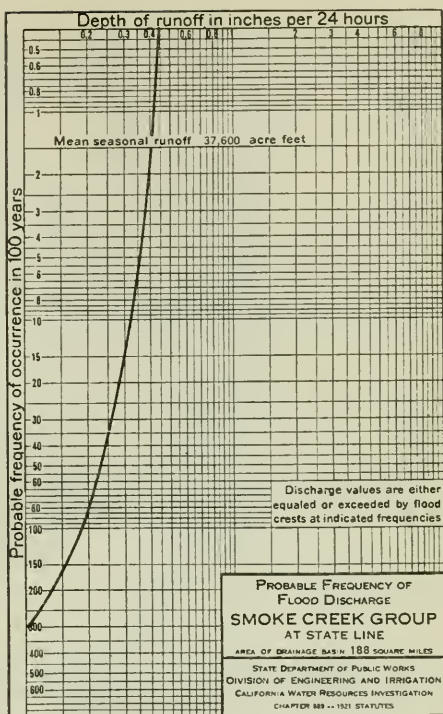
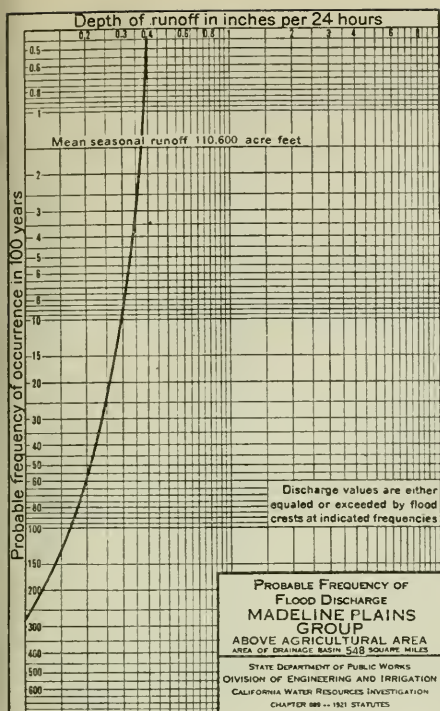




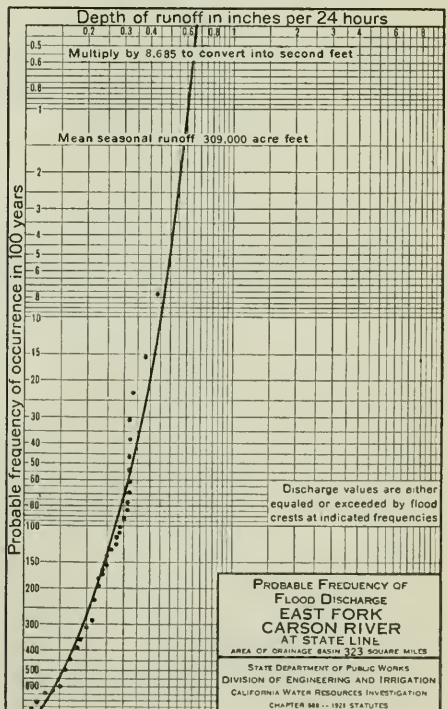
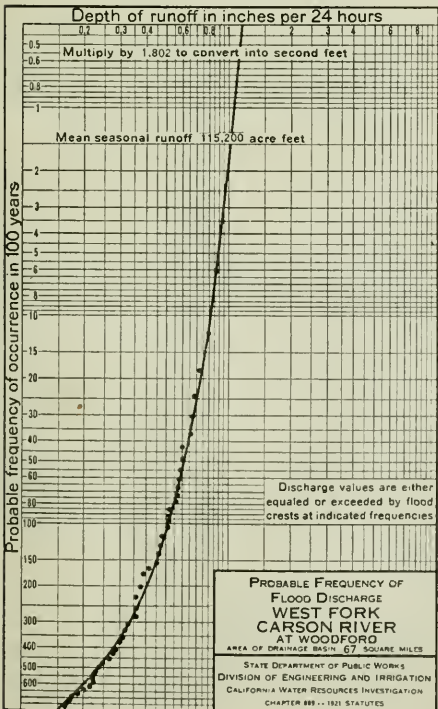
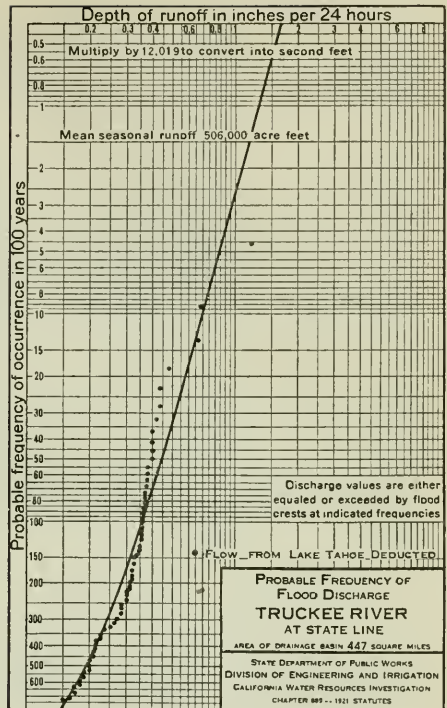
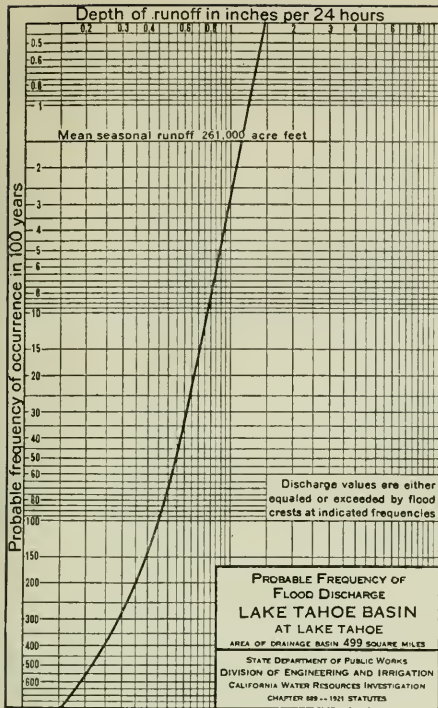




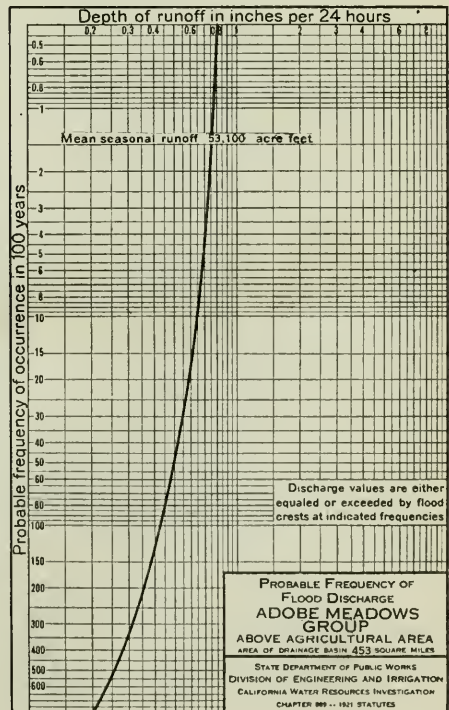
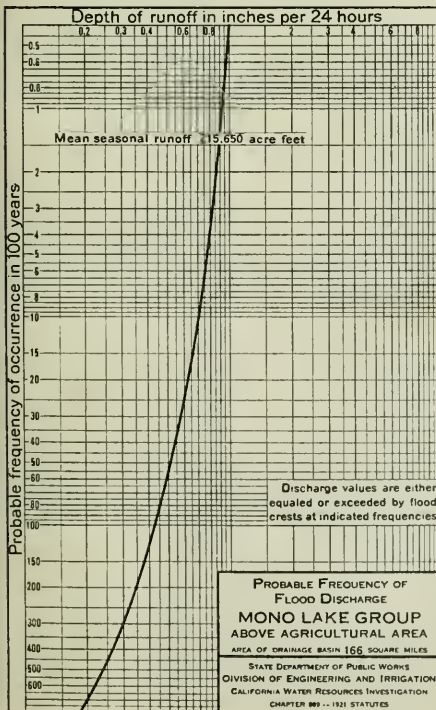
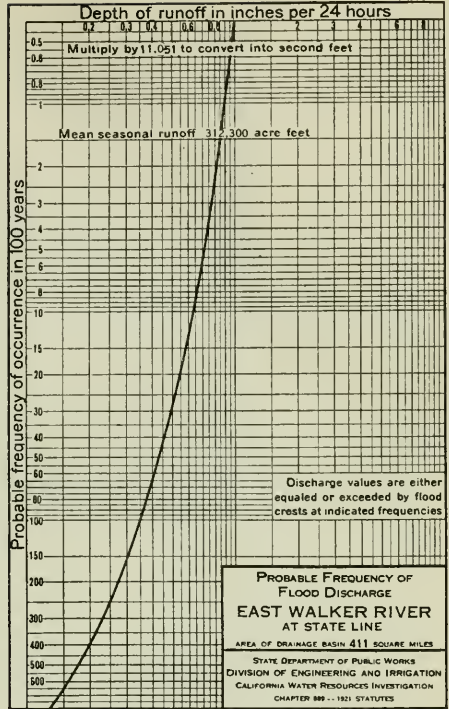
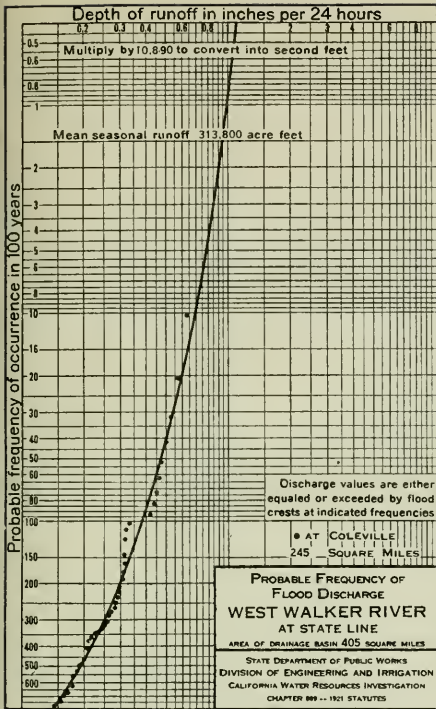




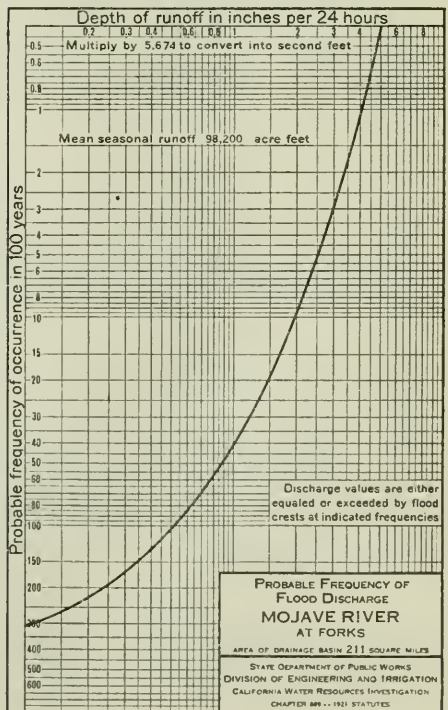
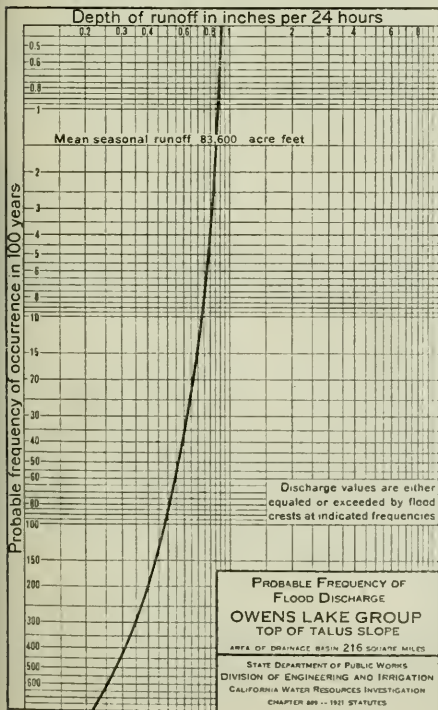
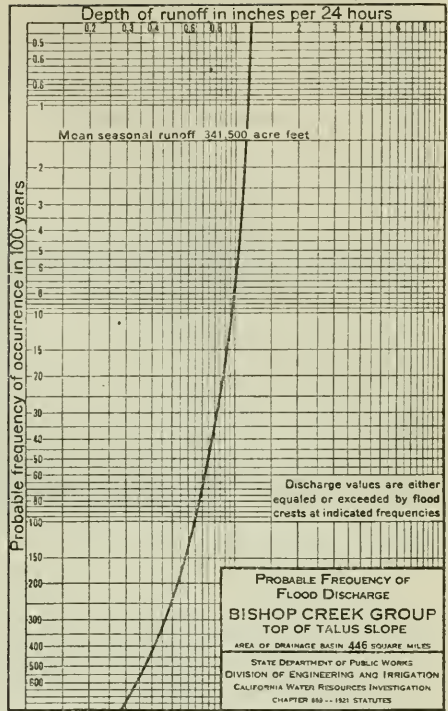
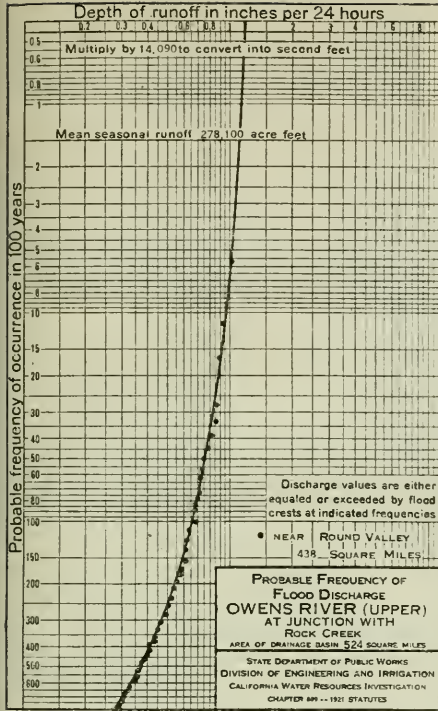






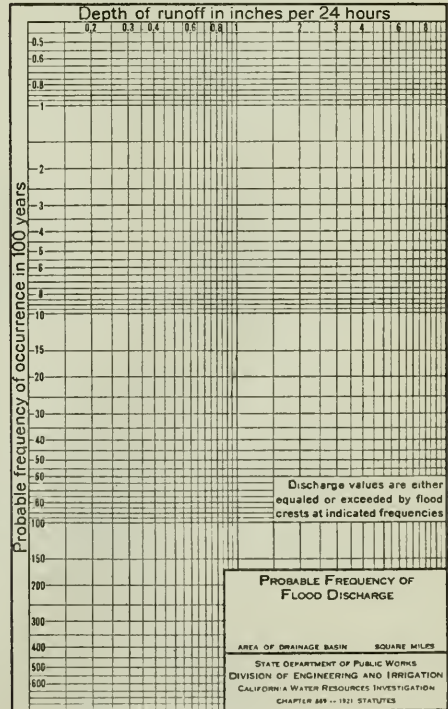
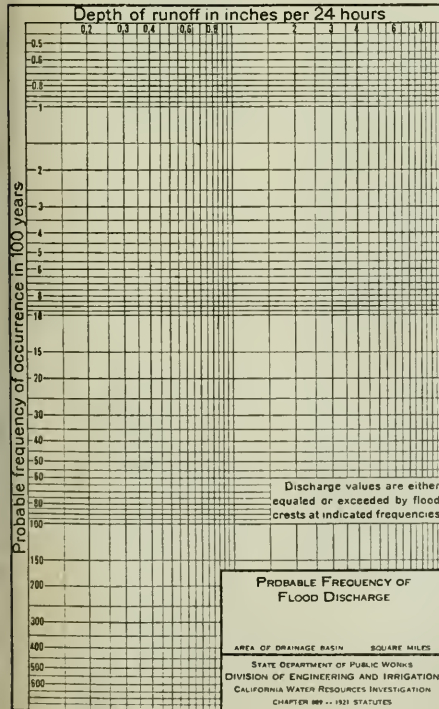
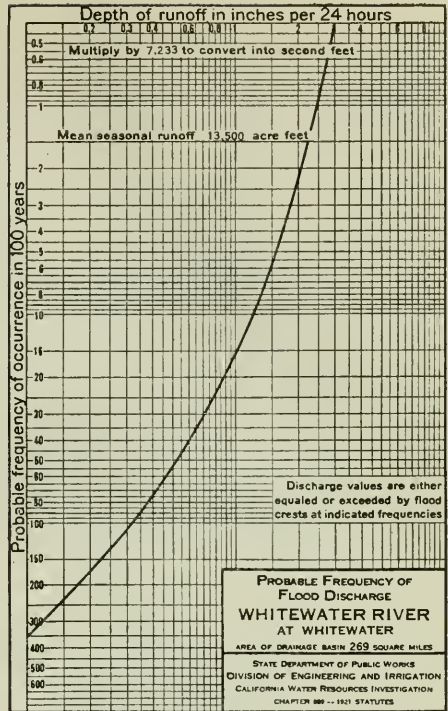
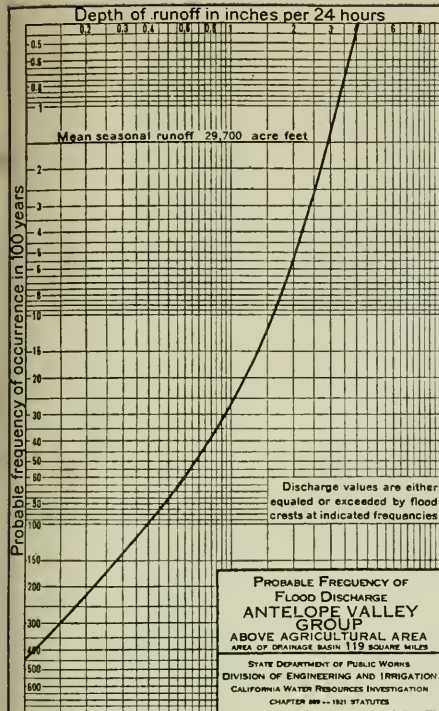








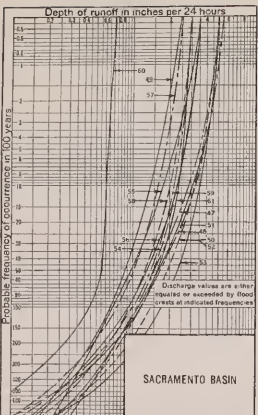
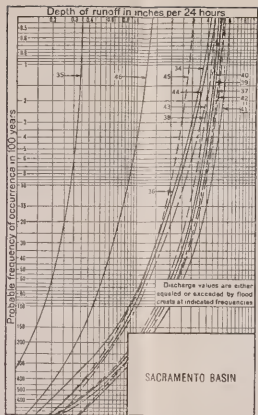




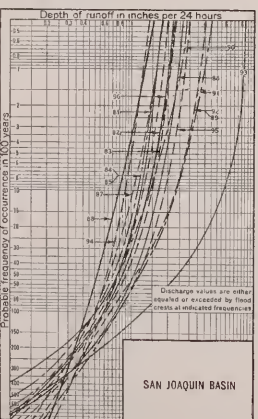
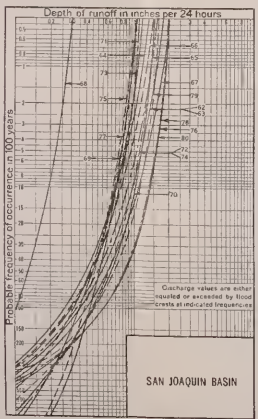




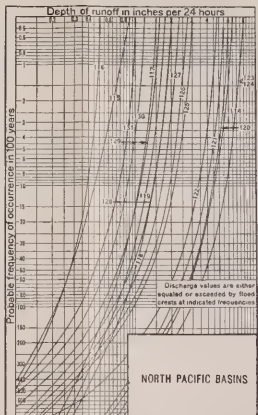
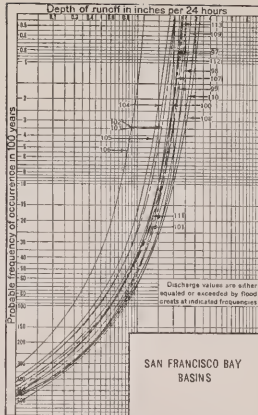
- 34 SACRAMENTO RIVER (UPPER)
- 35 PIT RIVER
- 36 MC CLOUD RIVER
- 37 CHURN CREEK GROUP
- 38 COW CREEK
- 39 BEAR CREEK GROUP
- 40 BATTLE CREEK
- 41 INK'S CREEK
- 42 PAYNE'S CREEK
- 43 BACKBONE CREEK GROUP
- 44 CLEAR CREEK
- 45 COTTONWOOD CREEK
- 46 SACRAMENTO RIVER



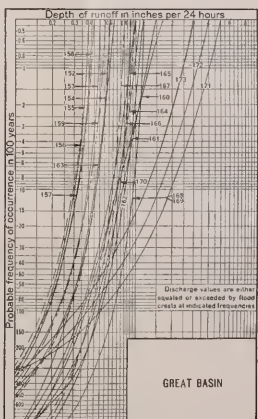
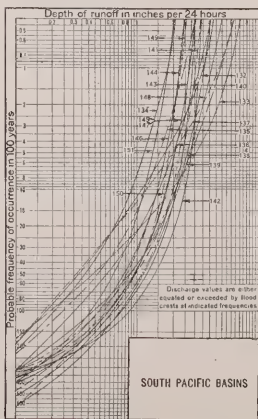
- 47 MILL CREEK GROUP
- 48 BUTTE CREEK GROUP
- 49 FEATHER RIVER
- 50 HONCUT CREEK GROUP
- 51 YUBA RIVER
- 52 DRY CREEK
- 53 BEAR RIVER
- 54 CODD CREEK GROUP
- 55 AMERICAN RIVER
- 56 RED BANK CREEK GROUP
- 57 ELDER CREEK GROUP
- 58 STONY CREEK
- 59 WILLOW CREEK GROUP
- 60 CACHE CREEK
- 61 PUTAH CREEK



- 81 CHOWCHILLA RIVER
- 82 DUTCHMAN CREEK GROUP
- 83 NARIPOSA CREEK
- 84 OWENS CREEK
- 85 BEAR CREEK
- 86 BURNS CREEK GROUP
- 87 MERCED RIVER
- 88 TUOLUMNE RIVER
- 89 WILDCAT CREEK GROUP
- 90 STANISLAUS RIVER
- 91 LITTLEJOHNS CREEK
- 92 MARTELLS CREEK GROUP
- 93 CALAVERAS RIVER
- 94 MOKELUMNE RIVER
- 95 SUTTER CREEK GROUP
- 96 COSUMNES RIVER



- 97 PETALUMA CREEK GROUP
- 98 SONOMA CREEK TRIBUTARIES
- 99 NAPA RIVER TRIBUTARIES
- 100 SUISUN CREEK GROUP
- 101 MT. DIABLO CREEK GROUP
- 102 SAN PABLO CREEK
- 103 SAN LEANDRO CREEK
- 104 CLAREMONT CREEK GROUP
- 105 SAN LORENZO CREEK
- 106 ALAMEDA CREEK
- 107 MISSION CREEK GROUP
- 108 PENITENCIA CREEK
- 109 COYOTS RIVER
- 110 GUADALUPE RIVER
- 111 LOS GATOS CREEK GROUP
- 112 SAN FRANCISQUITO CREEK
- 113 SAN MATEO CREEK GROUP



- 132 SAN DIEGO RIVER
- 133 SANTA YSABEL CREEK
- 134 SANTA LUIS REY RIVER
- 135 SANTA MARGARITA RIVER
- 136 SAN JACINTO RIVER TRIBUTARIES
- 137 SANTA ANA RIVER TRIBUTARIES
- 138 SAN GABRIEL RIVER TRIBUTARIES
- 139 LOS ANGELES RIVER TRIBUTARIES
- 140 MALIBU RIVER GROUP
- 141 SANTA CLARA RIVER TRIBUTARIES
- 142 VENTURA RIVER
- 143 JALAMA CREEK GROUP
- 144 SANTA YNEZ RIVER
- 145 SAN ANTONIO CREEK
- 146 SANTA MARIA RIVER
- 147 SAN LUIS OBISPO CREEK GROUP
- 148 SALINAS RIVER TRIBUTARIES
- 149 PALJARO RIVER TRIBUTARIES
- 150 SOQUEL CREEK GROUP
- 151 PESCADEIRO CREEK GROUP

- 152 TULE LAKE GROUP
- 153 GOOSE LAKE GROUP
- 154 COWHEAD LAKE BASIN
- 155 SURPRISE VALLEY GROUP
- 156 MADELINE PLAINS GROUP
- 157 SMOKE CREEK GROUP
- 158 EAGLE LAKE GROUP
- 159 HONEY LAKE GROUP
- 160 LAKE TAHOE BASIN
- 161 TRUCKEE RIVER
- 162 WEST FORK CARSON RIVER
- 163 EAST FORK CARSON RIVER
- 164 WEST WALKER RIVER
- 165 EAST WALKER RIVER
- 166 MONO LAKE GROUP
- 167 ADOBE MEADOWS GROUP
- 168 OWENS RIVER (UPPER)
- 169 BISHOP CREEK GROUP
- 170 OWENS LAKE GROUP
- 171 MOJAVE RIVER
- 172 ANTELOPE VALLEY GROUP
- 173 WHITEWATER RIVER

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- 82 ORESTIMBA CREEK GROUP
- 83 PANOCHE CREEK
- 84 CANTUA CREEK GROUP
- 85 LOS GATOS CREEK
- 86 TEJON CREEK GROUP
- 87 CALIENTE CREEK
- 88 KERN RIVER
- 89 FOGO CREEK GROUP
- 90 DEER CREEK
- 91 TULE RIVER
- 92 YOKOH CREEK GROUP
- 93 KAWeah RIVER
- 94 LIMICKLE CREEK GROUP
- 95 KINGS RIVER
- 96 DRY CREEK
- 97 SAN JOAQUIN RIVER (UPPER)
- 98 COTTONWOOD CREEK
- 99 FRESNO RIVER
- 80 DAULTON CREEK GROUP

- 114 SMITH RIVER
- 115 KLAMATH RIVER
- 116 SHASTA RIVER
- 117 SCOTT RIVER
- 118 SALMON RIVER
- 119 TRINITY RIVER
- 120 REDWOOD CREEK
- 121 MAD RIVER
- 122 EEL RIVER
- 123 BEAR CREEK
- 124 MATTOLE RIVER
- 125 NOYO RIVER GROUP
- 126 NAVARRO RIVER
- 127 GUALALA RIVER GROUP
- 128 RUSSIAN RIVER
- 129 LAGUNITAS CREEK
- 130 SALMON CREEK GROUP
- 131 BOLINAS CREEK GROUP

COMPARISON OF CURVES OF PROBABLE FREQUENCY OF FLOOD DISCHARGE GROUPED GEOGRAPHICALLY



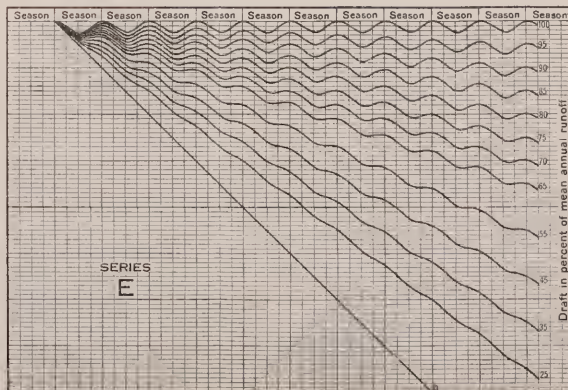
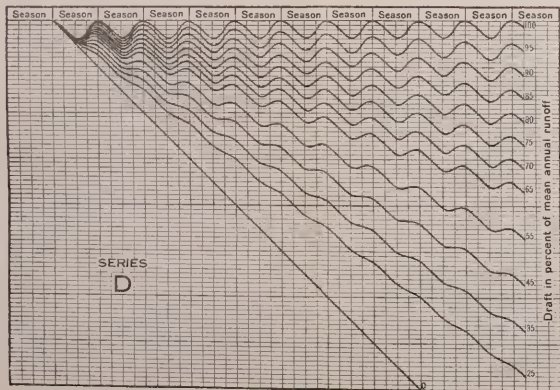
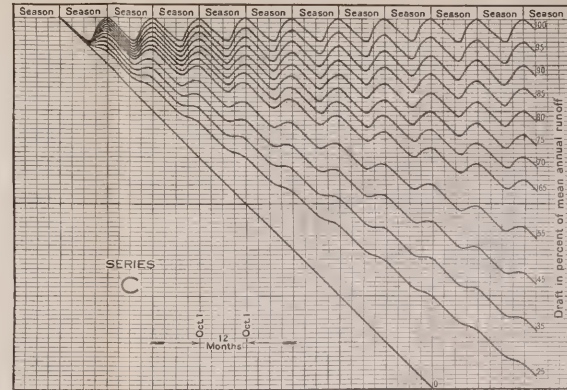
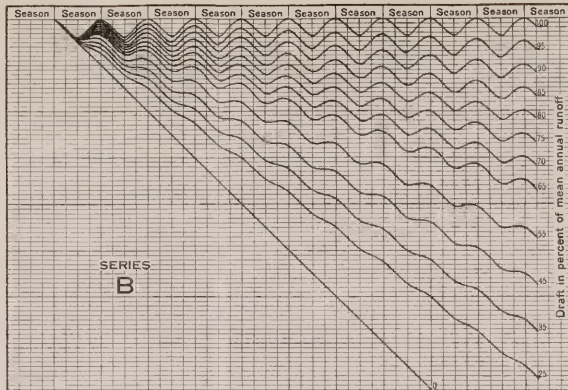
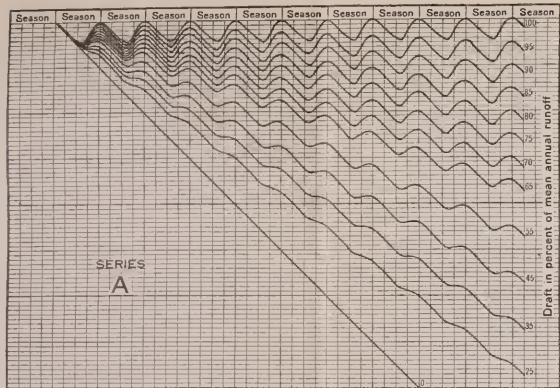
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PHYSICAL  
STATISTICS

**MONTHLY DISTRIBUTION OF IRRIGATION DRAFT**

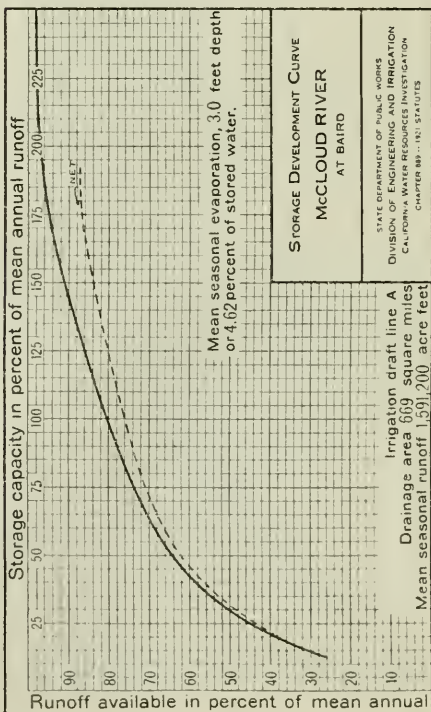
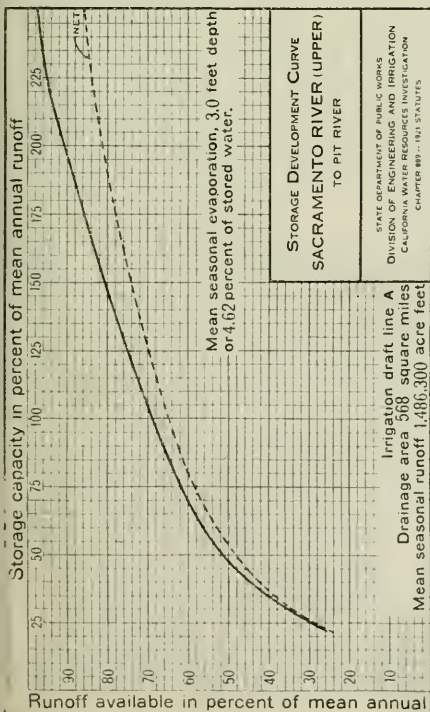
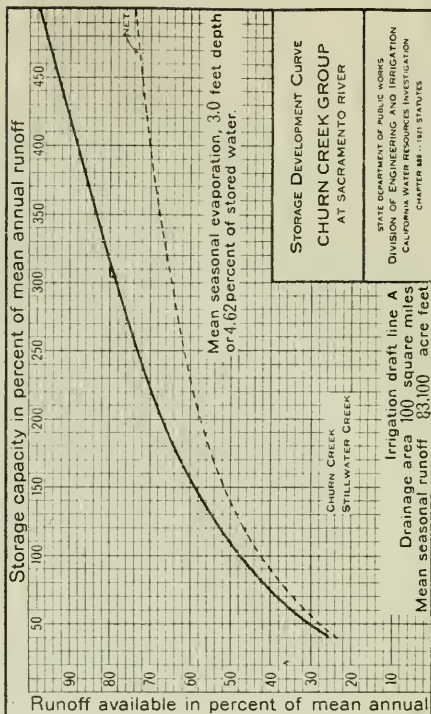
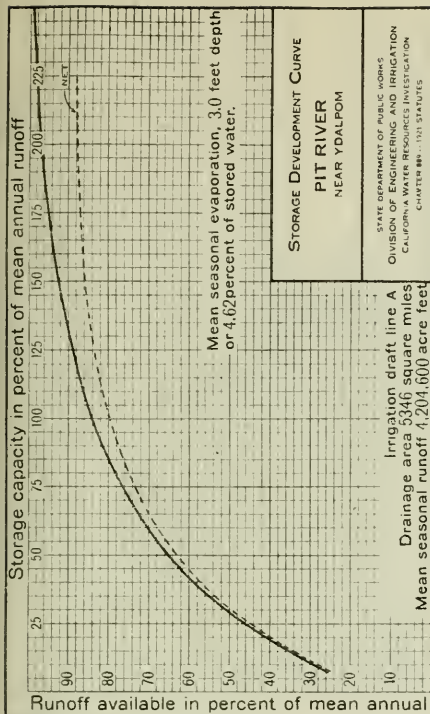
Used in construction of draft lines presented hereon, for storage development studies with mass curves of stream flow, the results of which are shown by "Storage Development Curves"

Distribution of irrigation draft by months, in percent of total seasonal use.												
	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Draft Line A	0	0	1	4	15	20	24	20	12	4	0	0
Draft Line B	0	2	4	11	16	17	18	16	11	4	1	0
Draft Line C	0	0	1	5	15	22	24	20	12	1	0	0
Draft Line D	1	1	2	9	15	18	20	17	10	5	1	1
Draft Line E	3	3	3	7	12	14	15	14	12	9	5	3

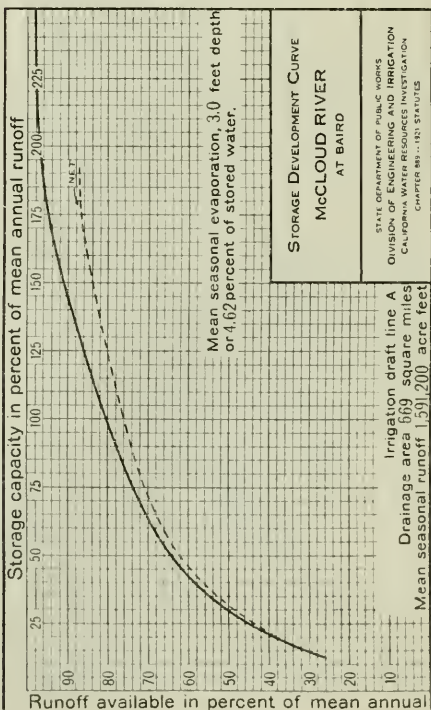
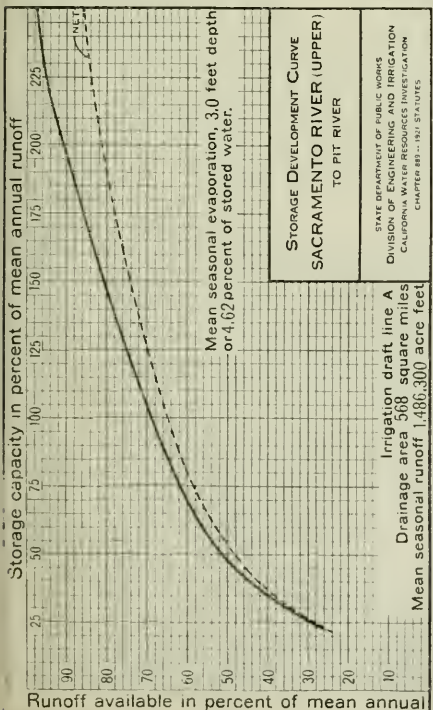
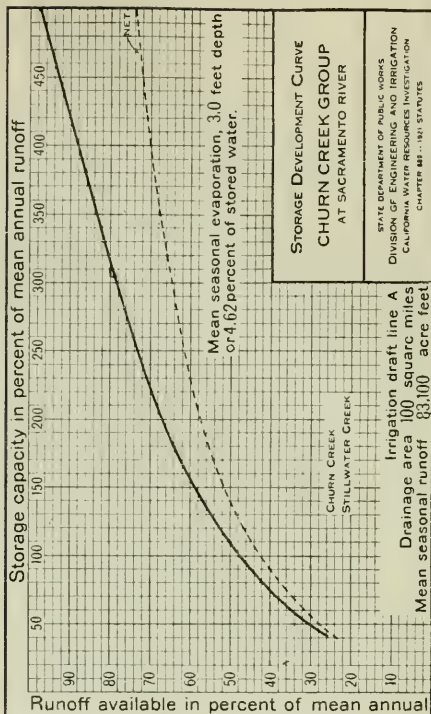
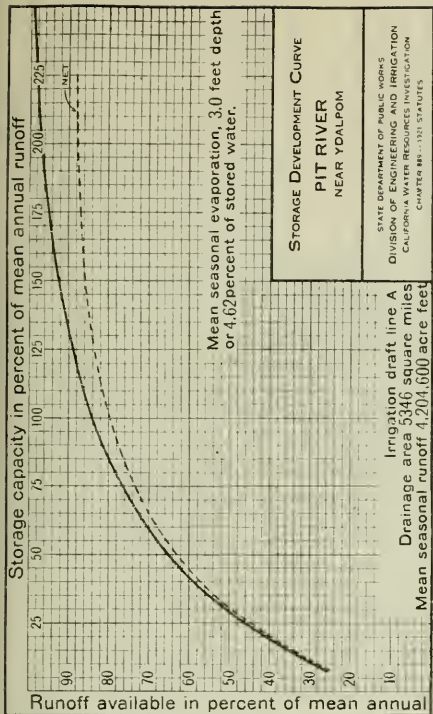
**IRRIGATION DRAFT LINES  
FOR  
STORAGE DEVELOPMENT STUDIES**

STATE DEPARTMENT OF PUBLIC WORKS  
DIVISION OF ENGINEERING AND IRRIGATION  
CALIFORNIA WATER RESOURCES INVESTIGATION  
CHAPTER 888 -- 1921 STATUTES

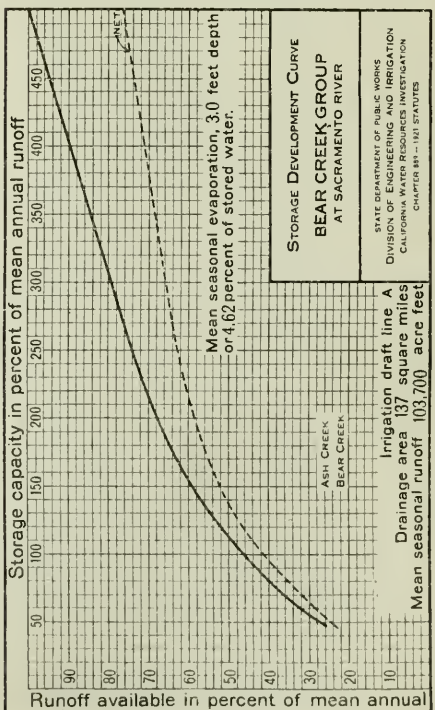
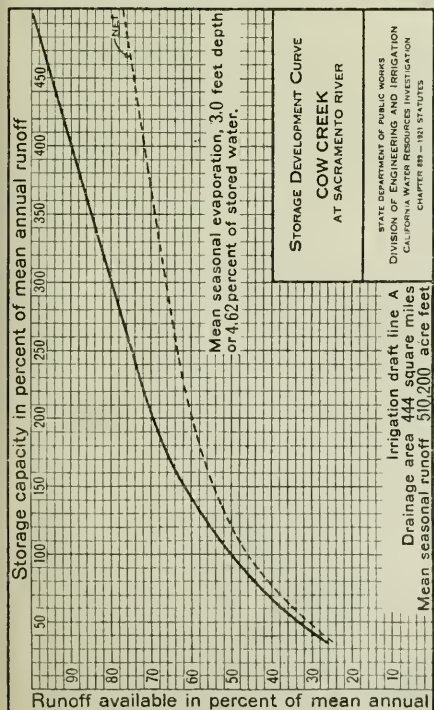
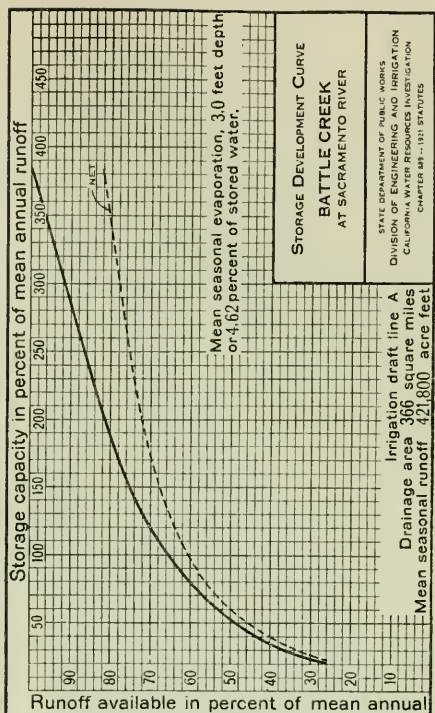
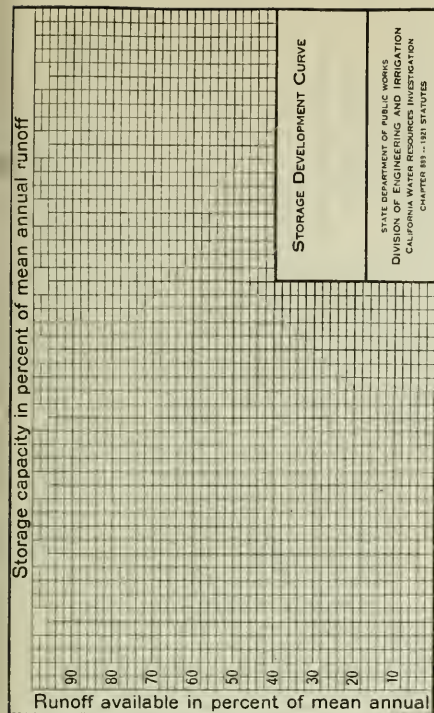




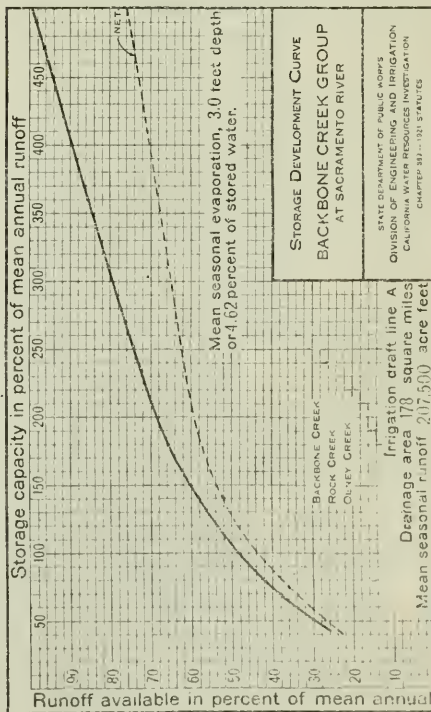
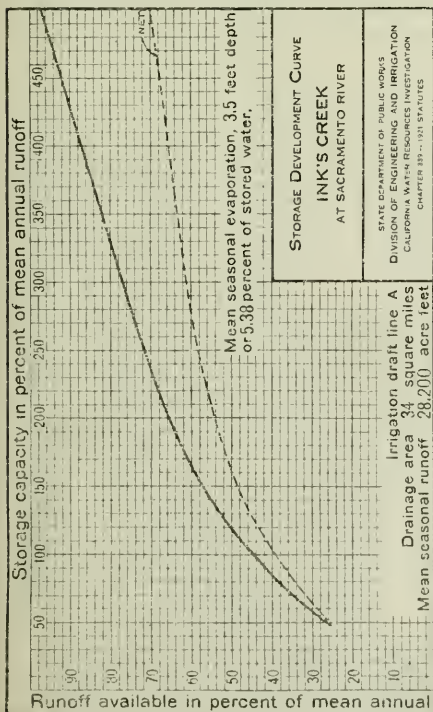
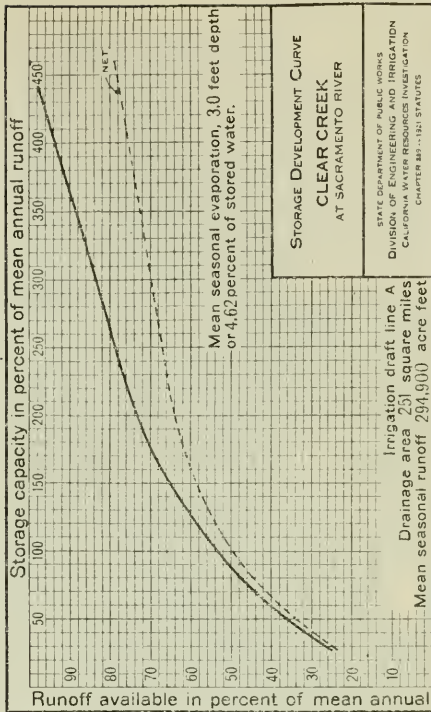
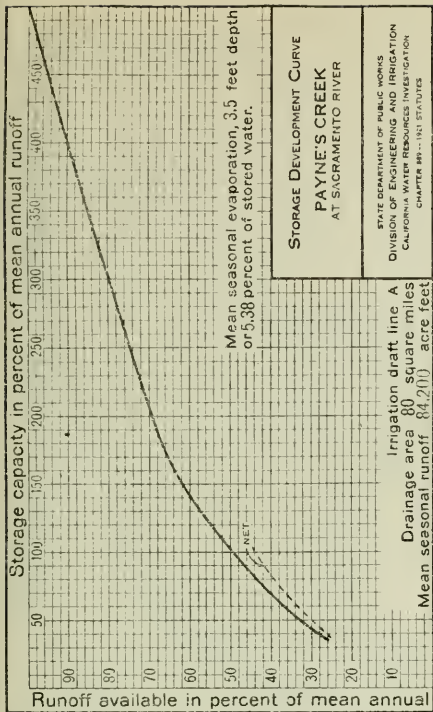






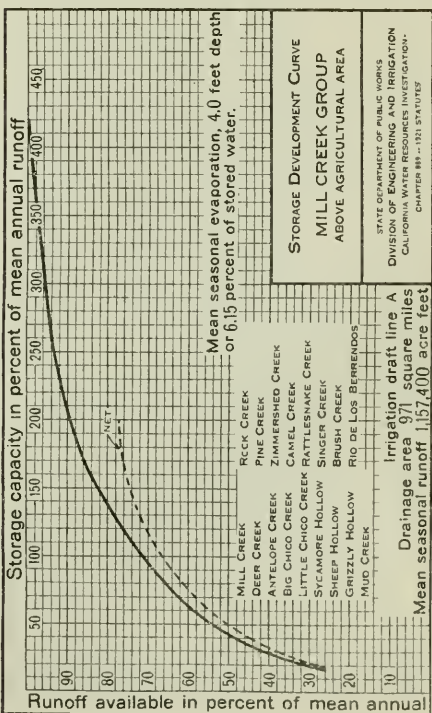
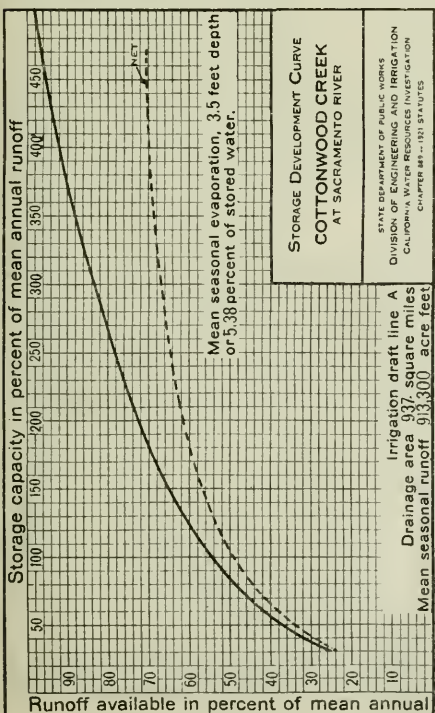
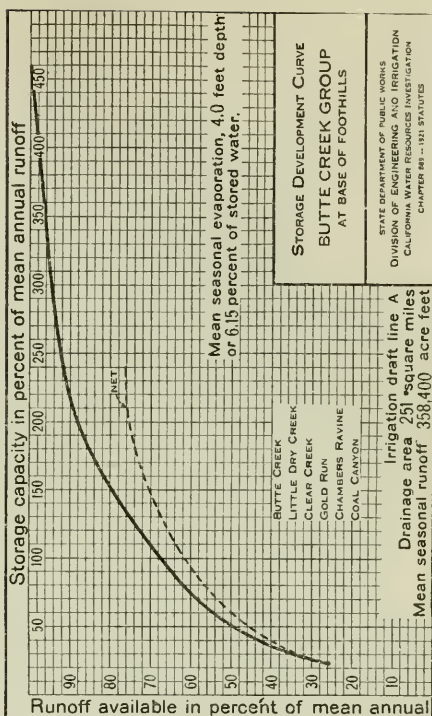
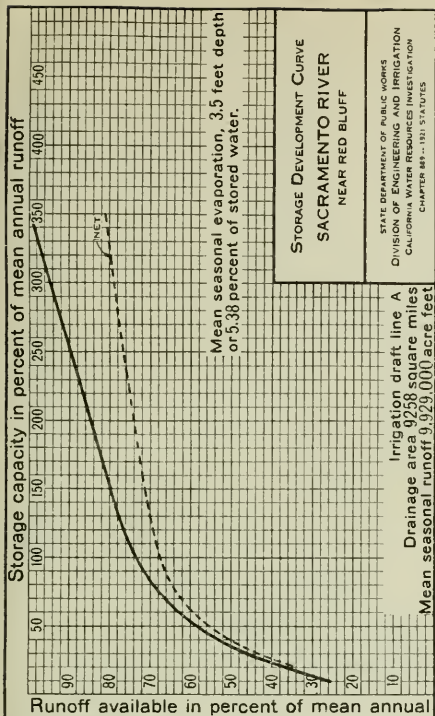




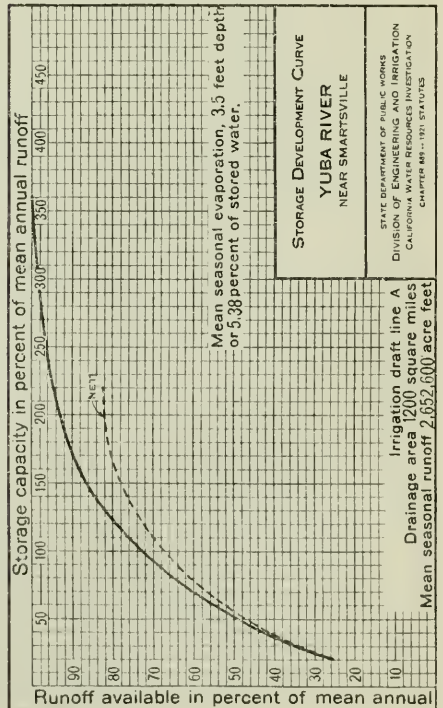
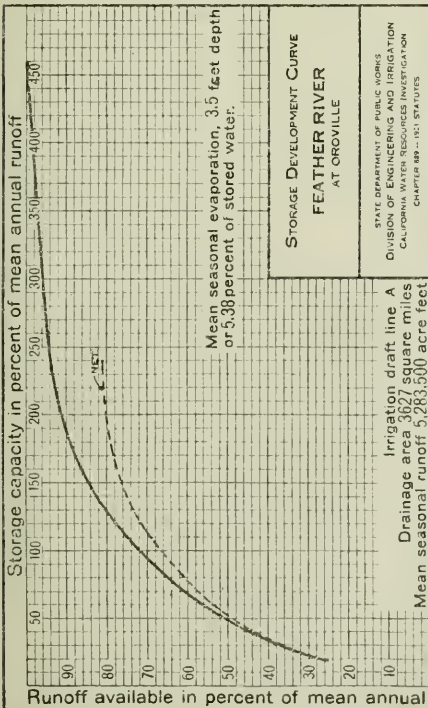
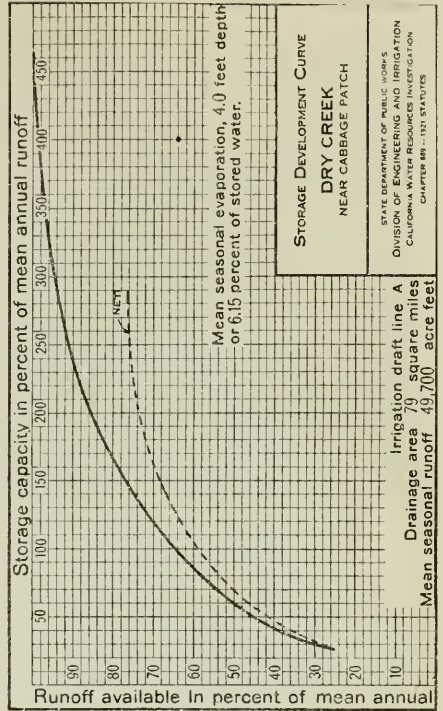
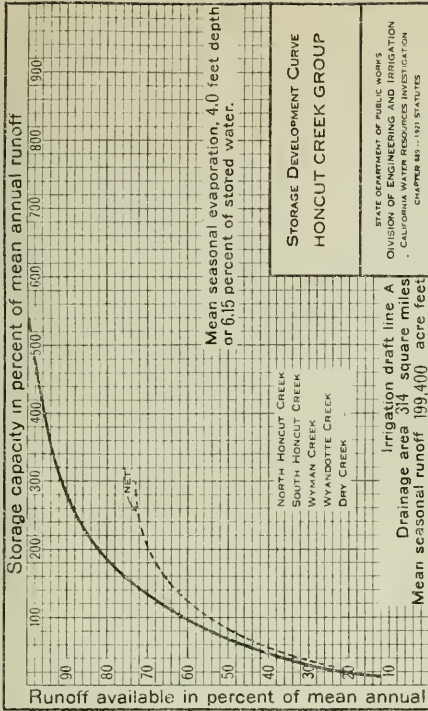




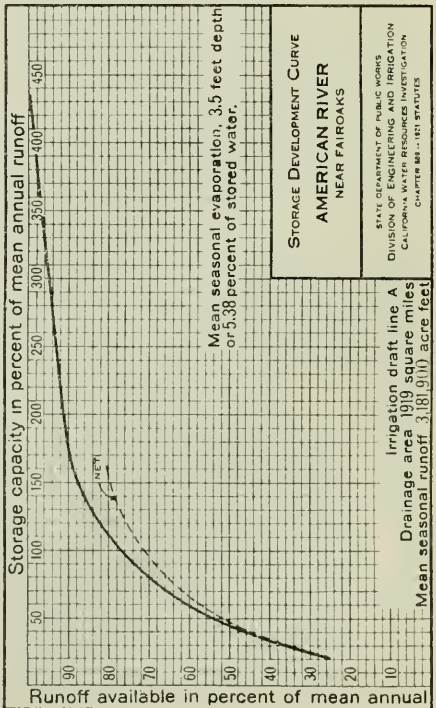
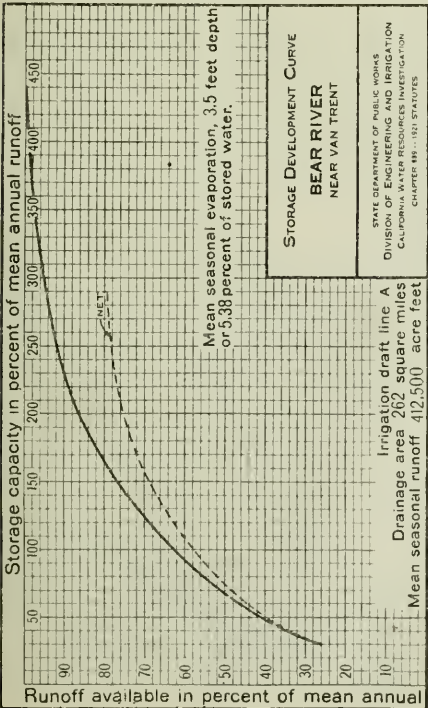
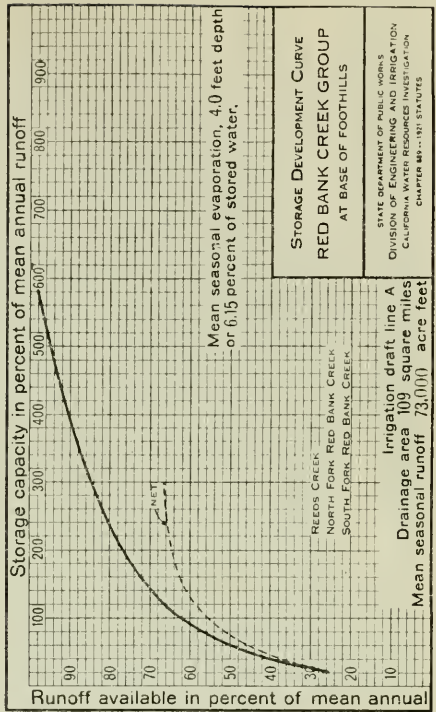
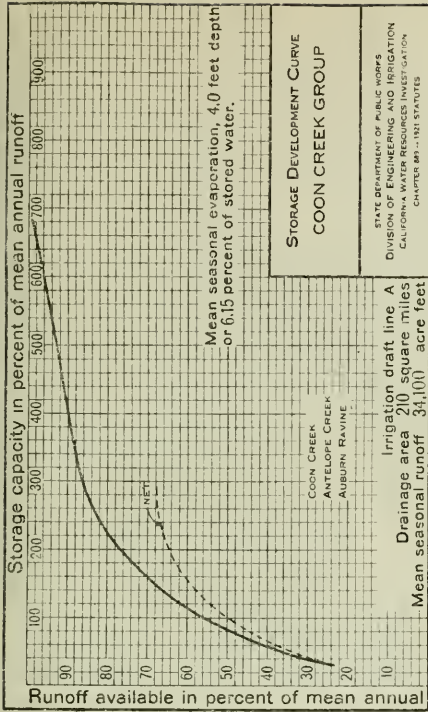




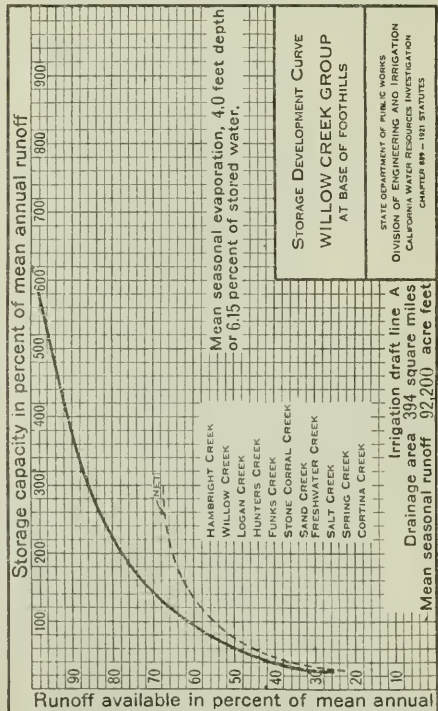
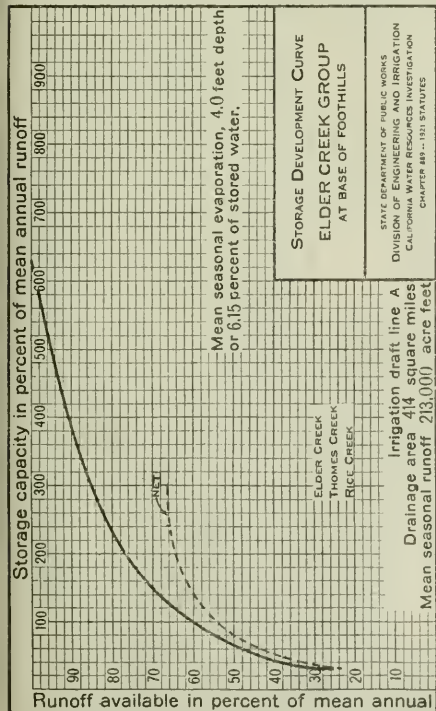
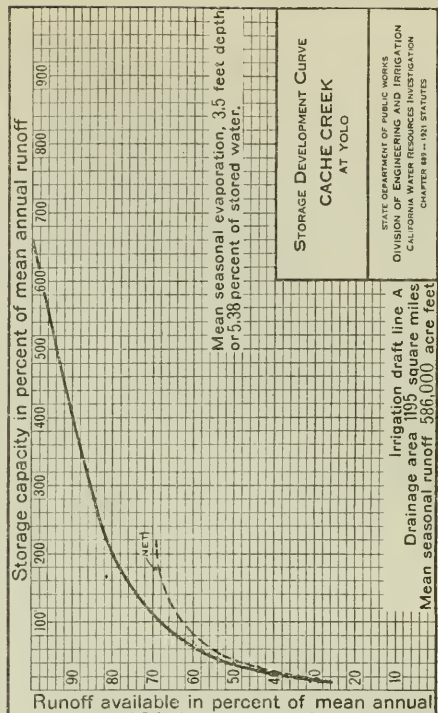
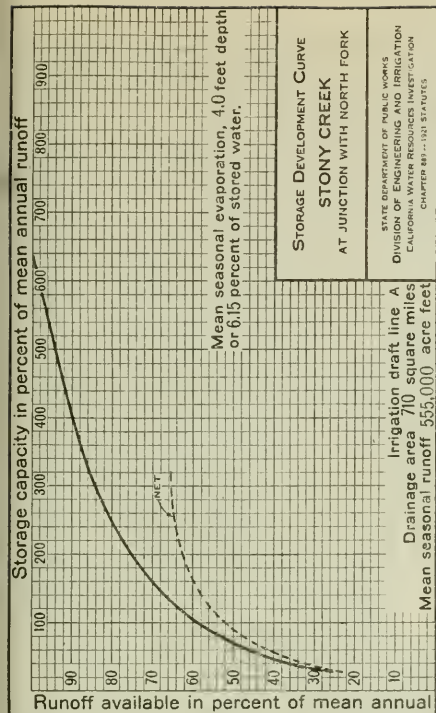






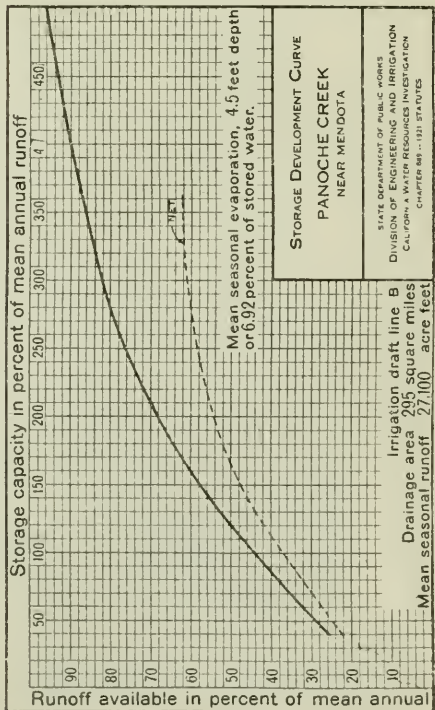
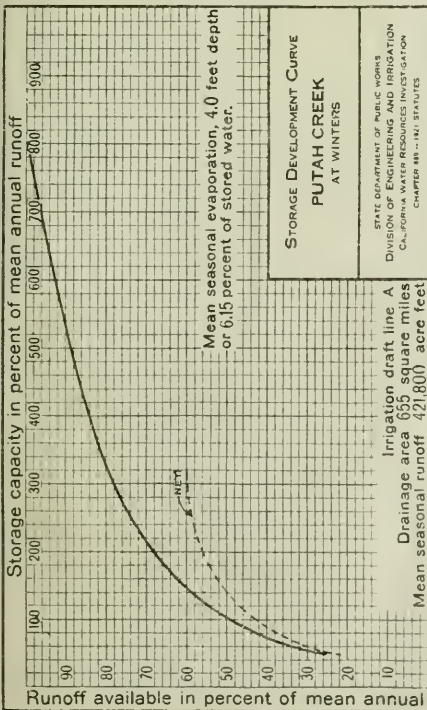
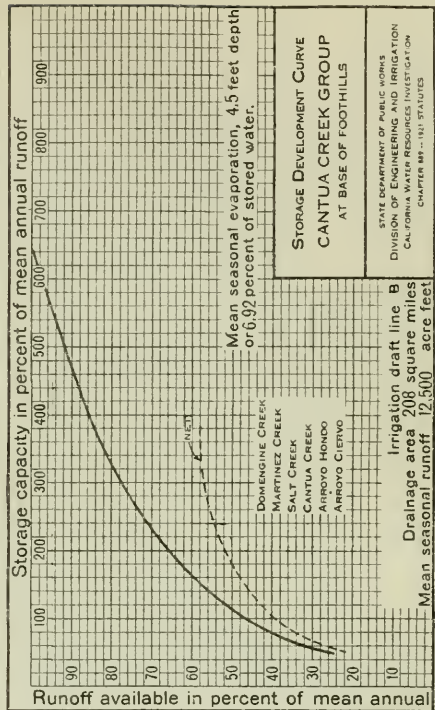
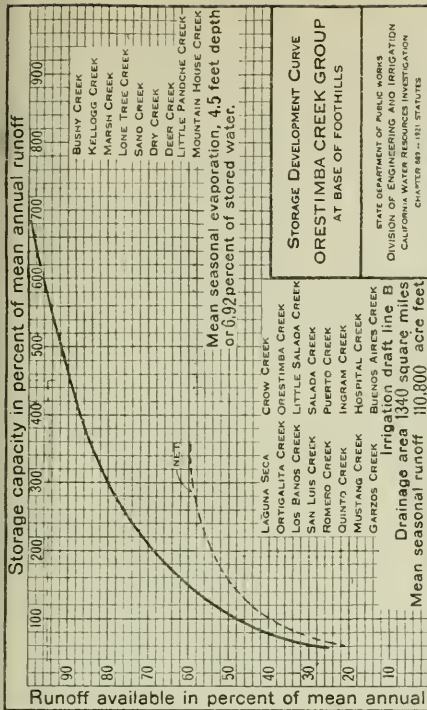




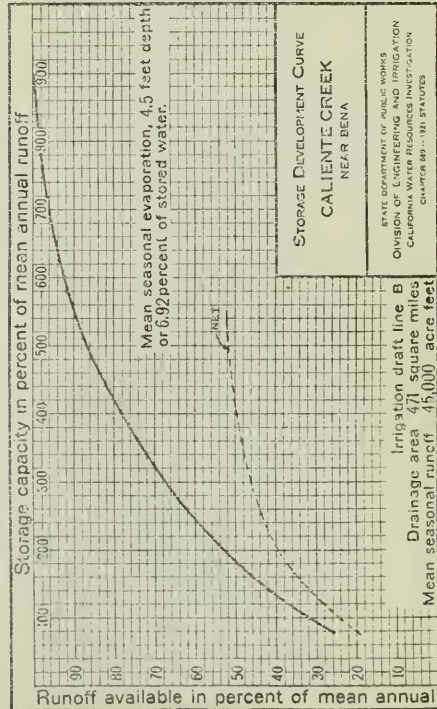
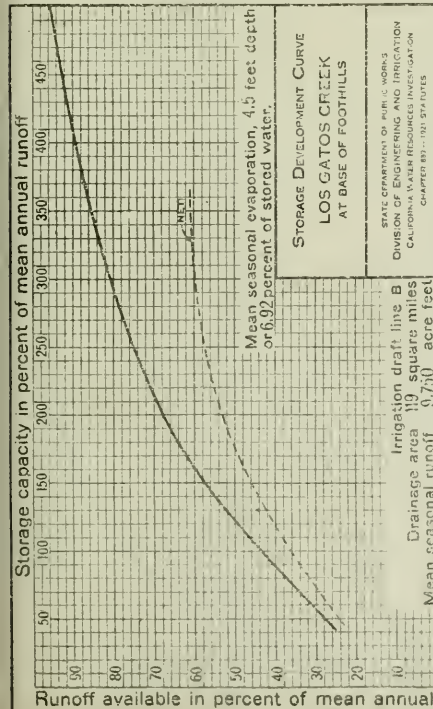
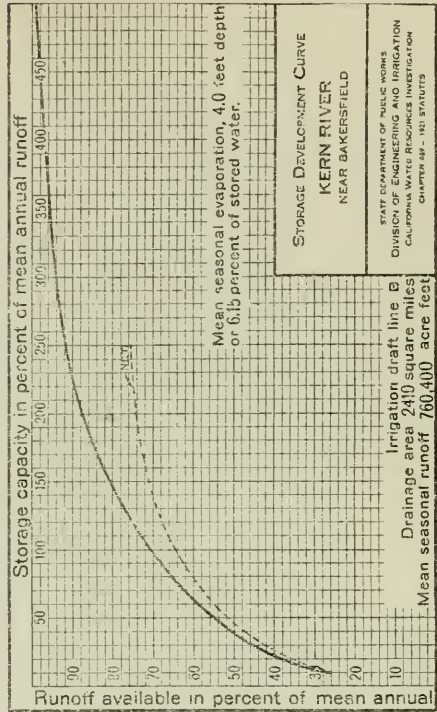
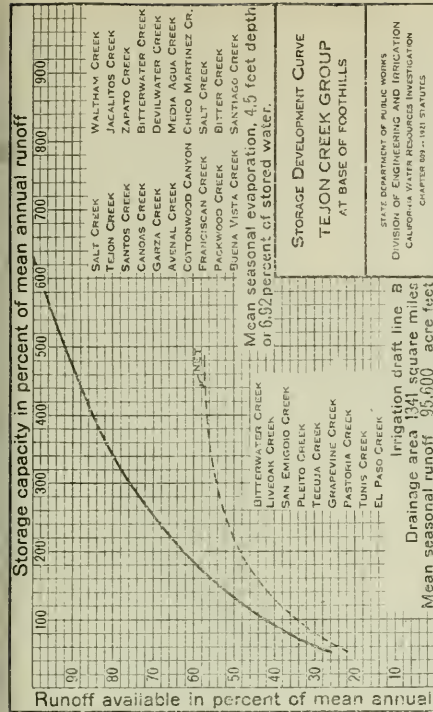




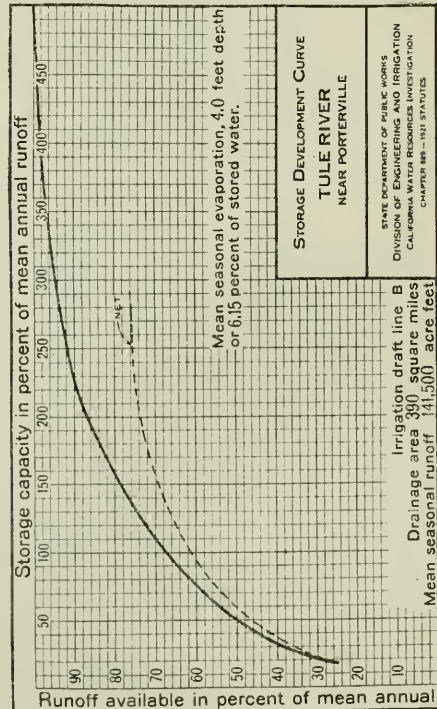
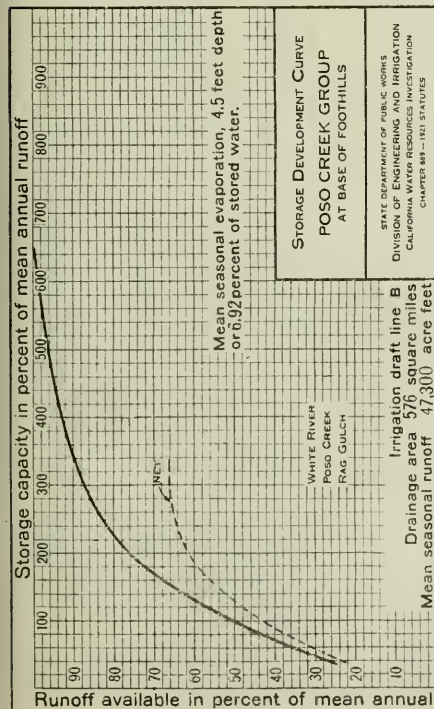
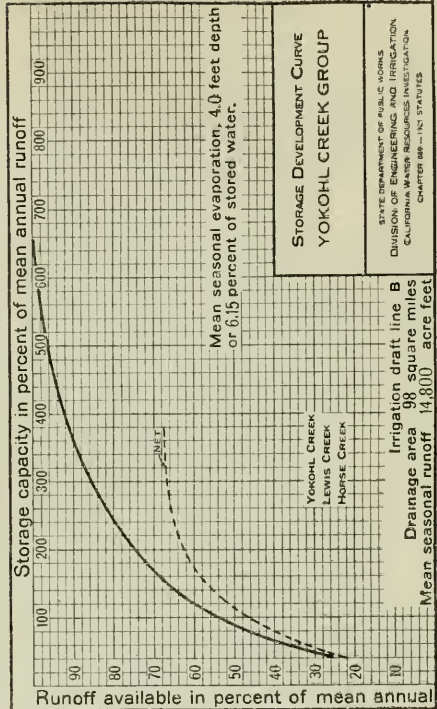
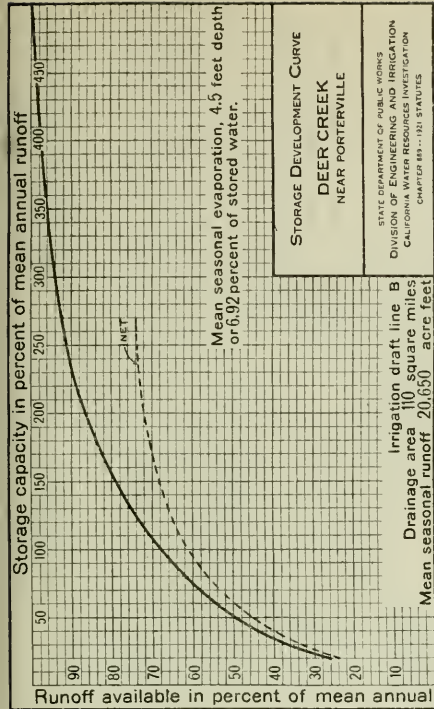




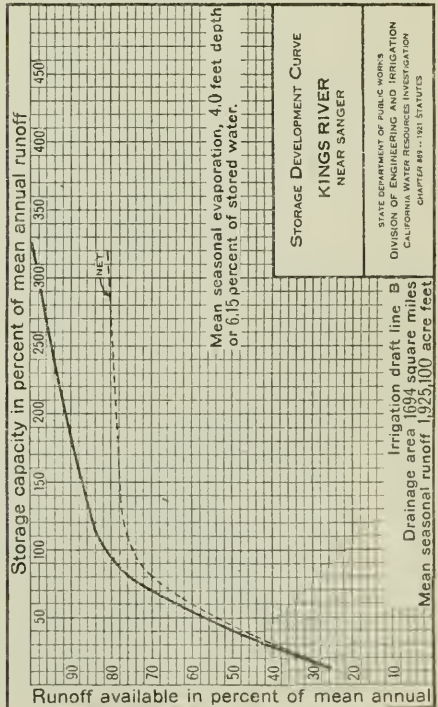
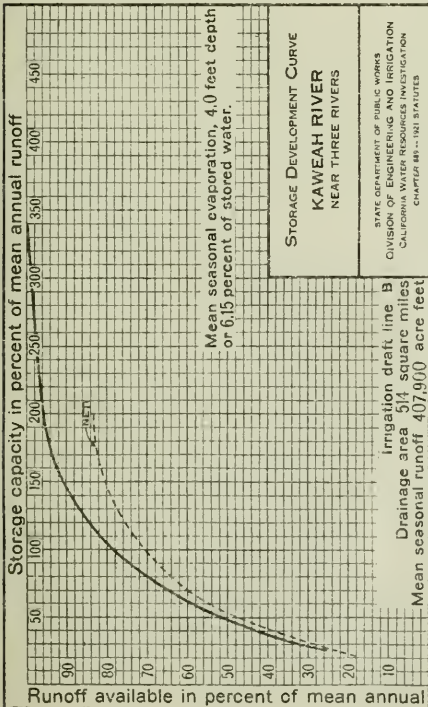
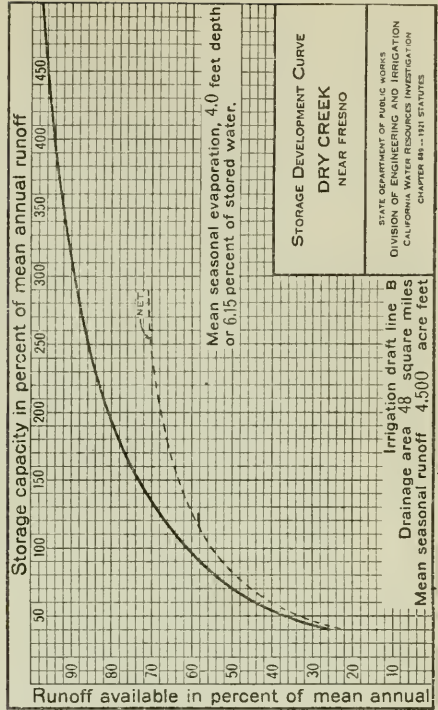
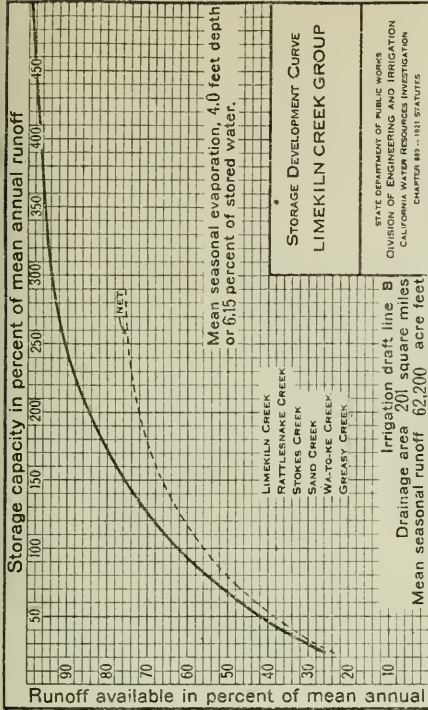






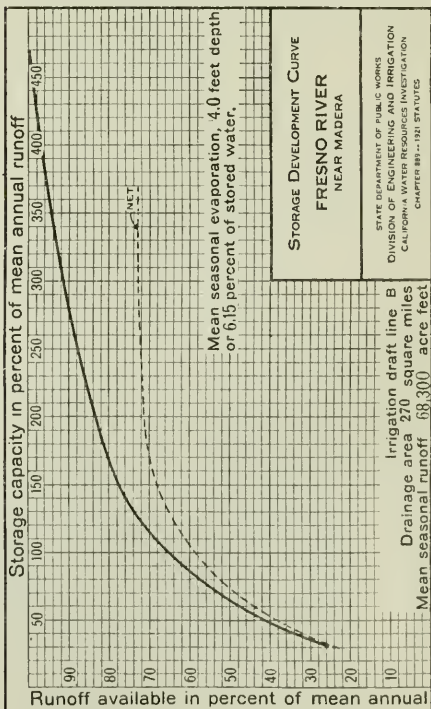
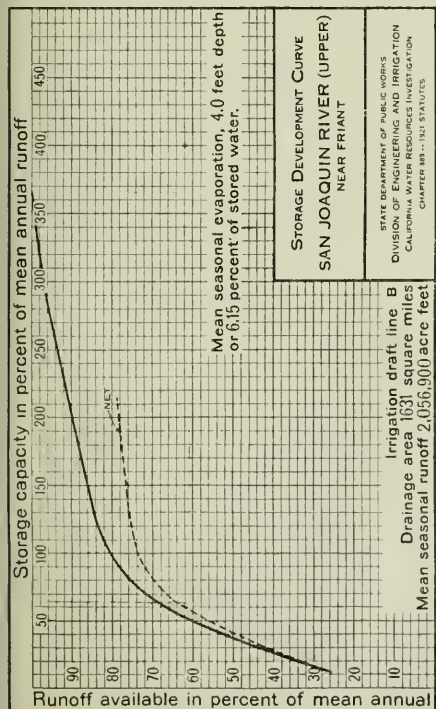
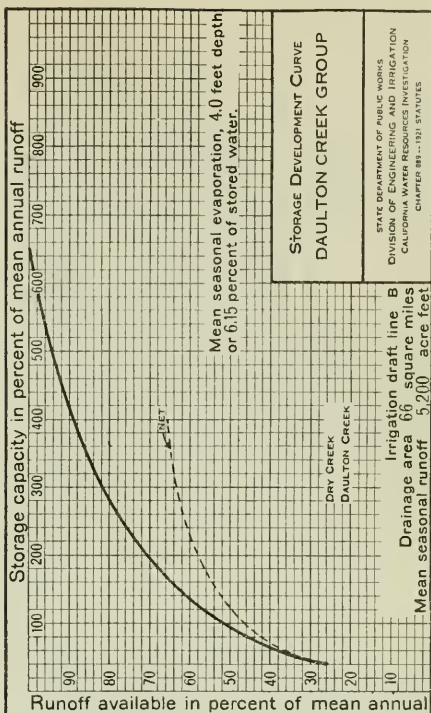
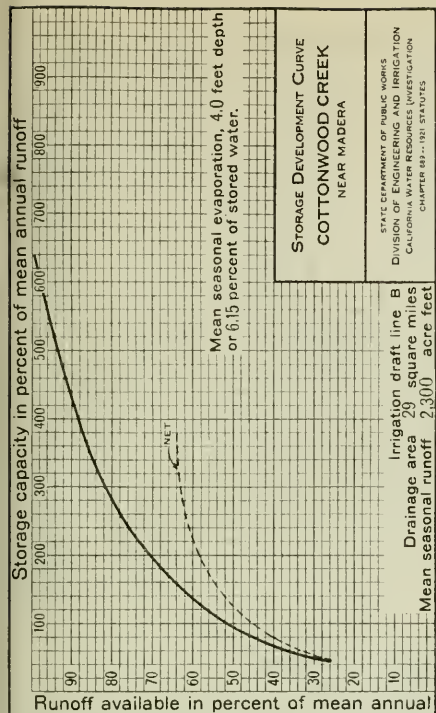




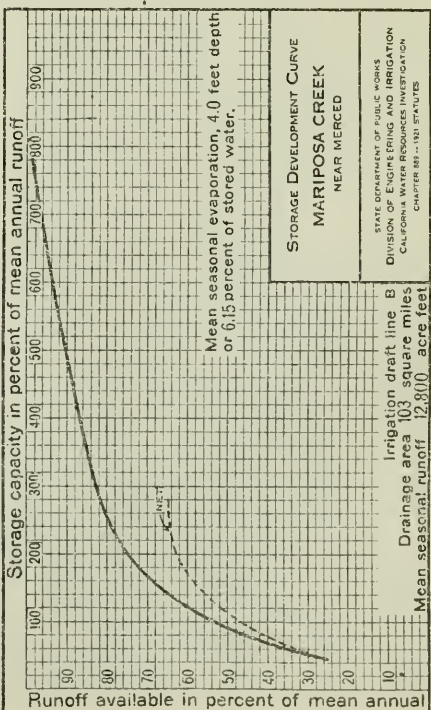
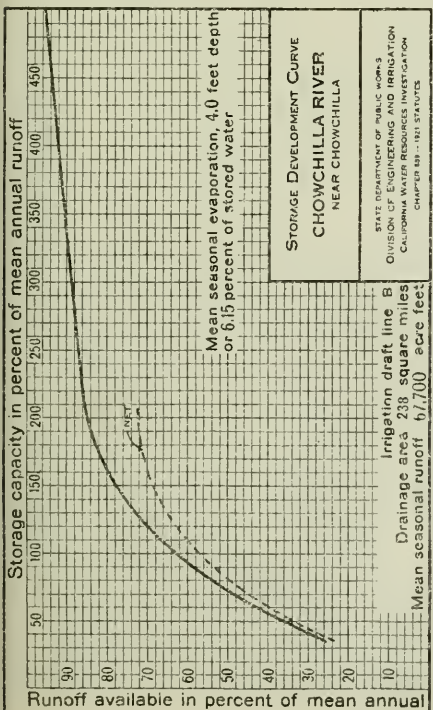
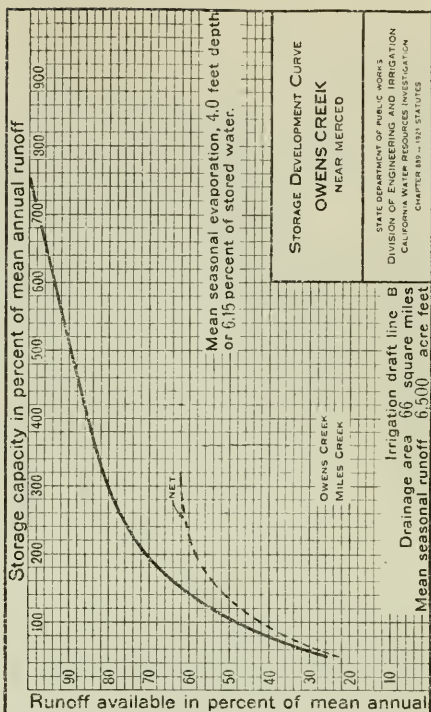
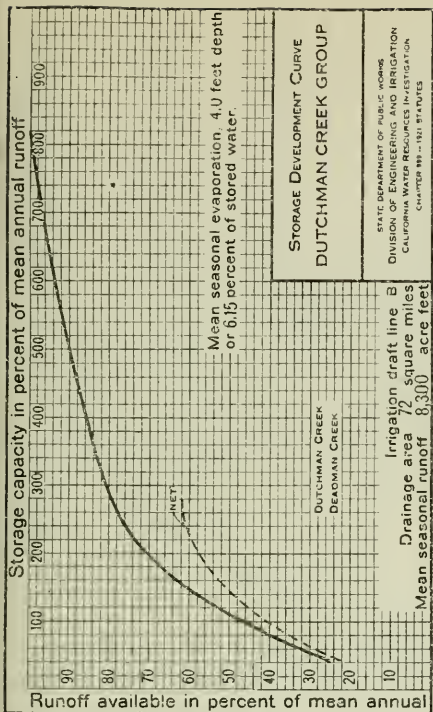




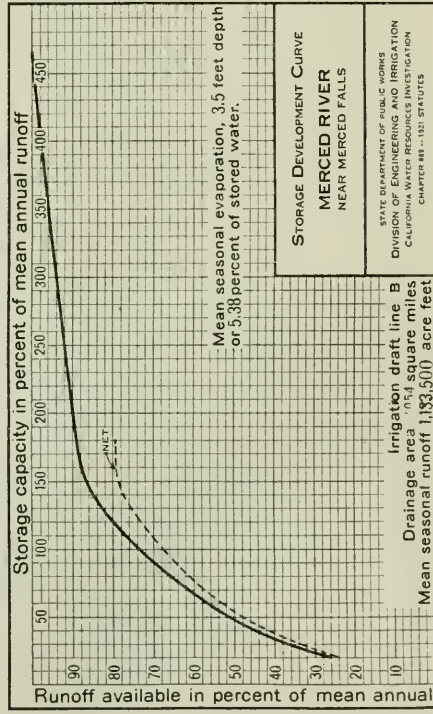
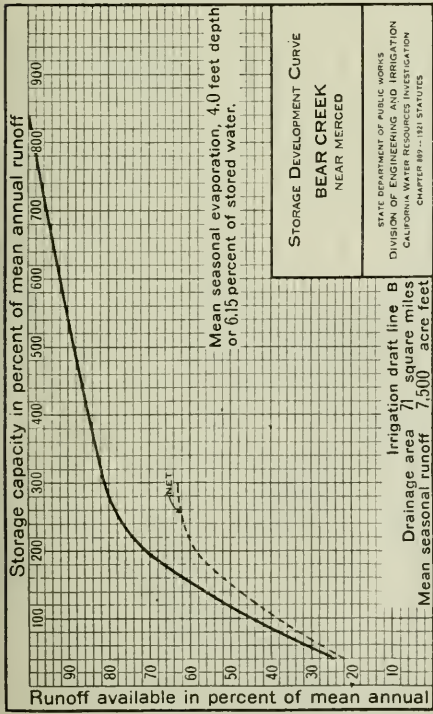
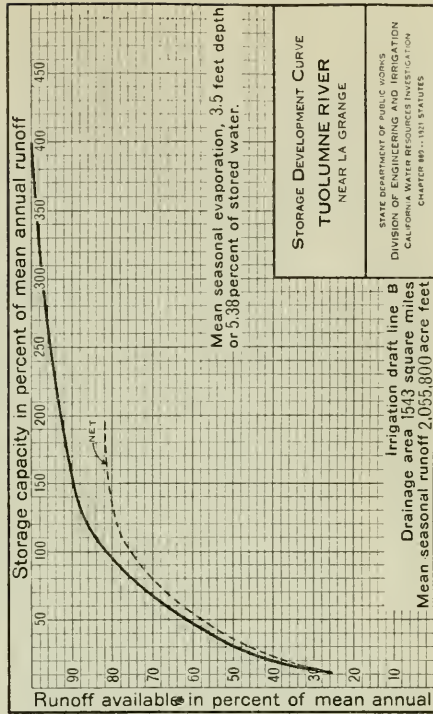
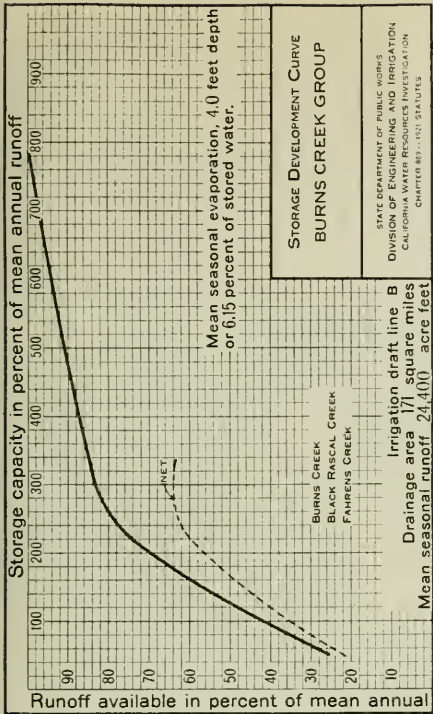




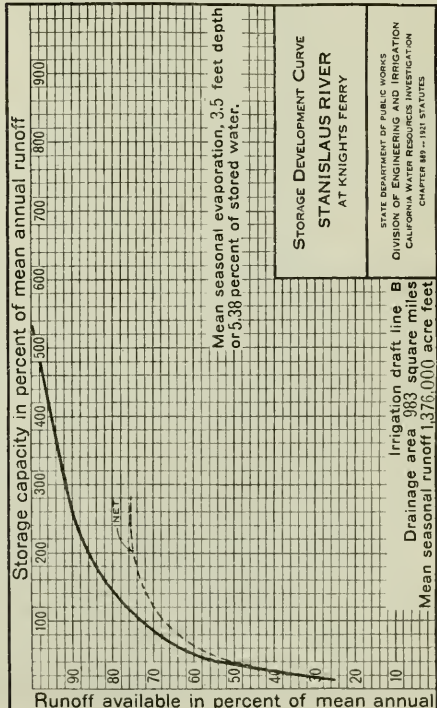
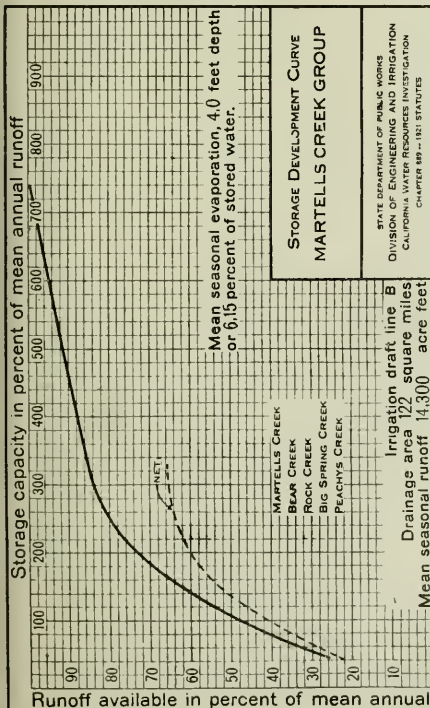
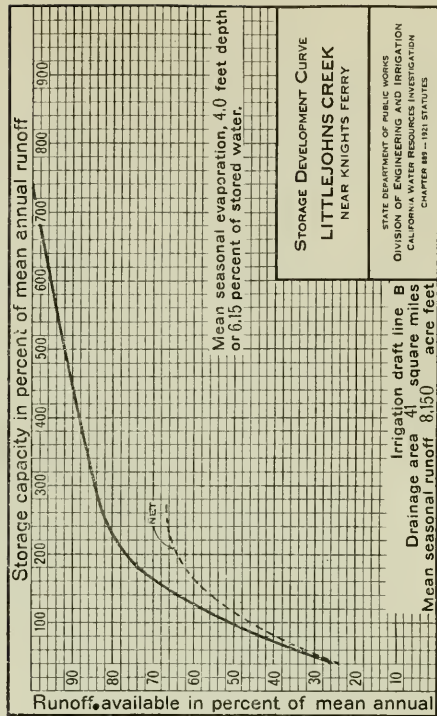
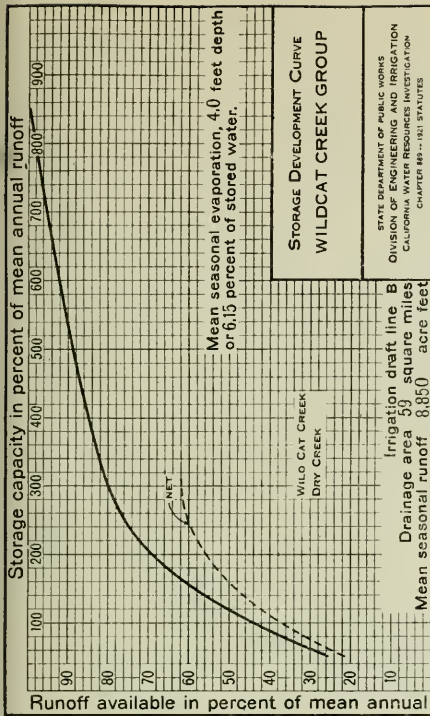






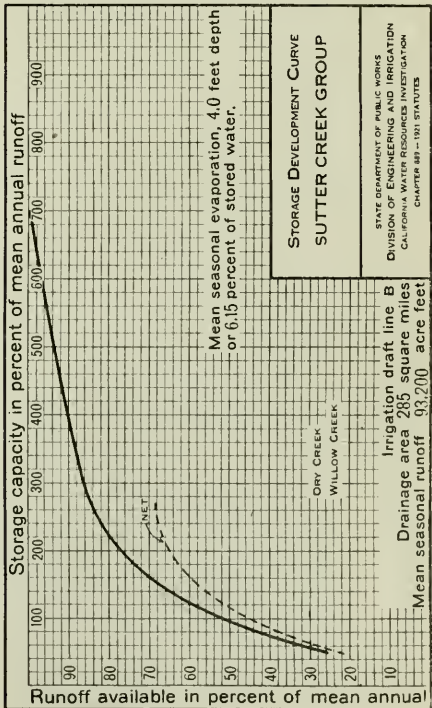
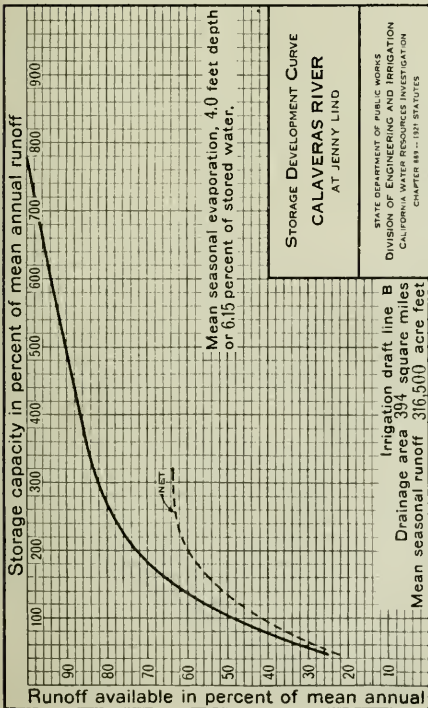
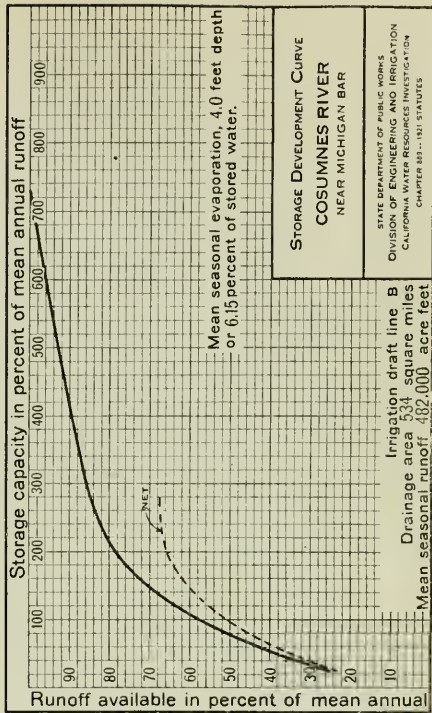
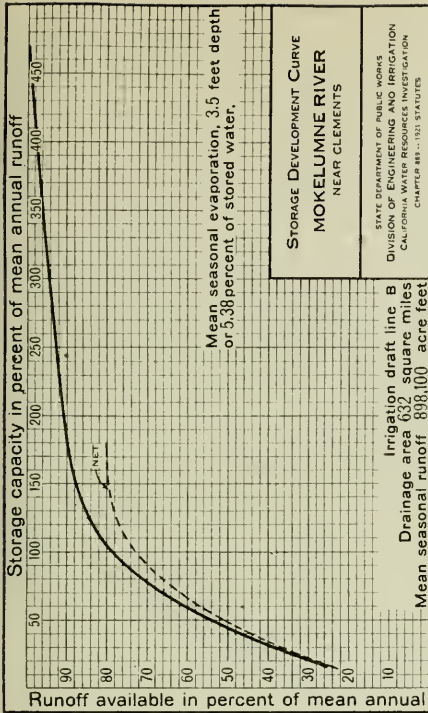




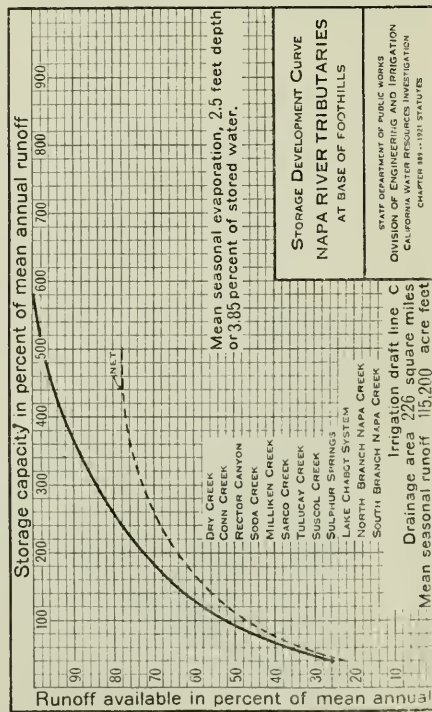
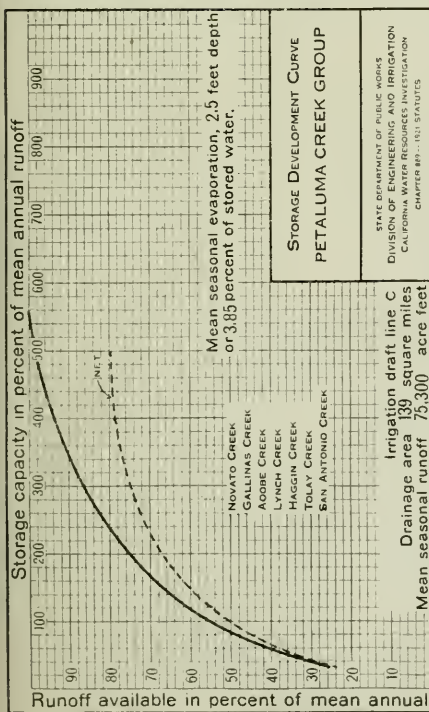
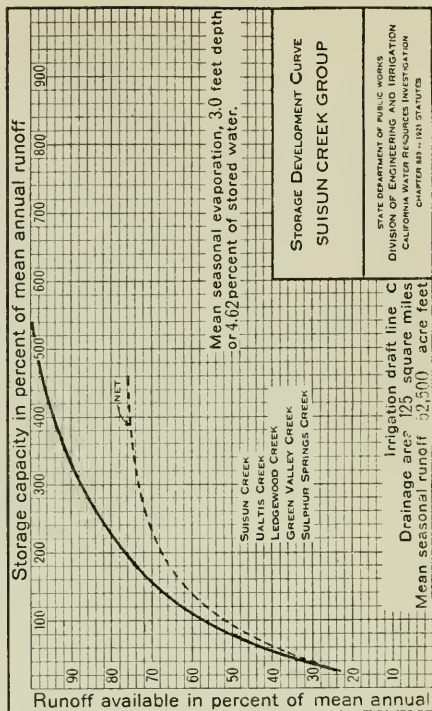
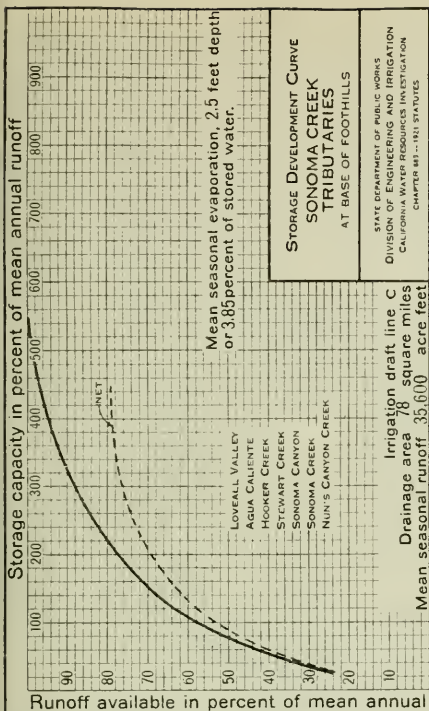




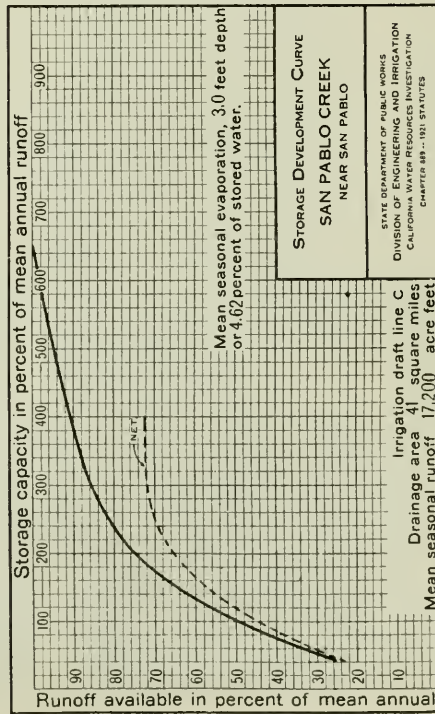
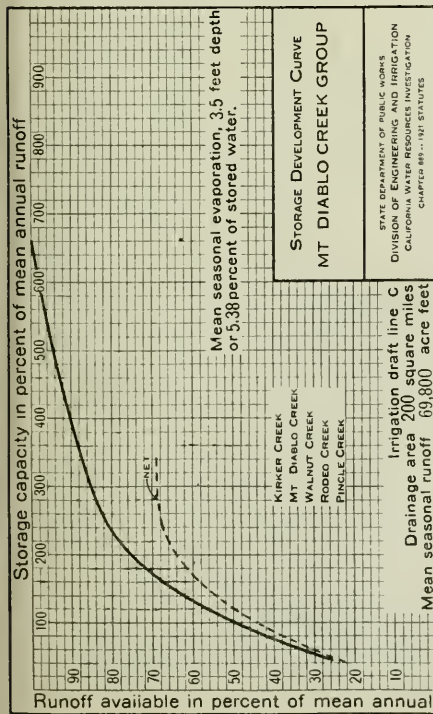
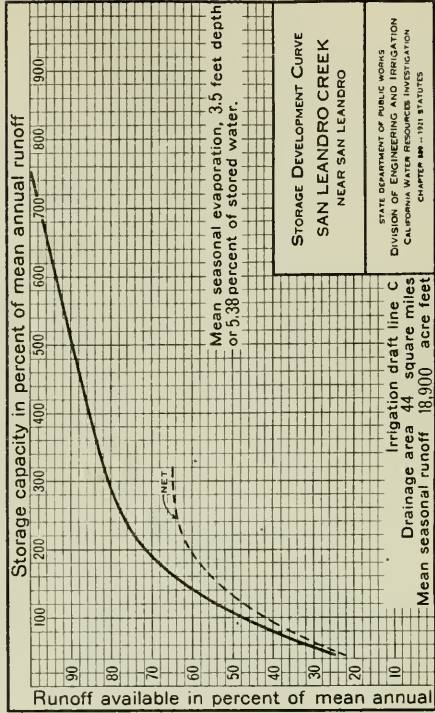
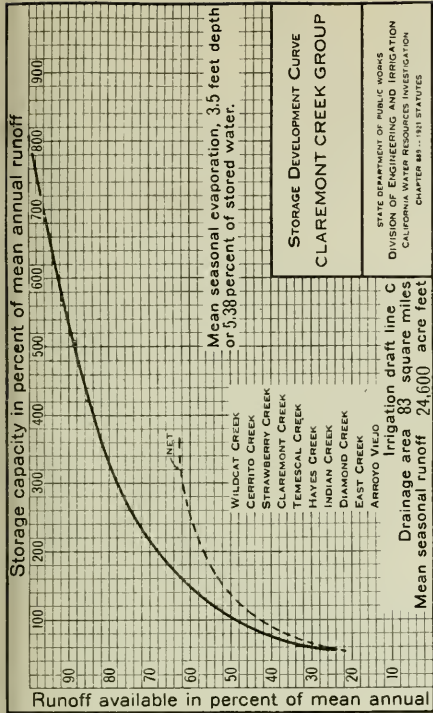




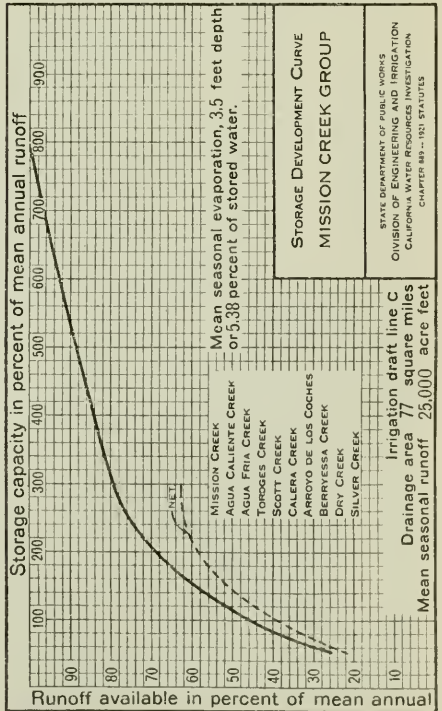
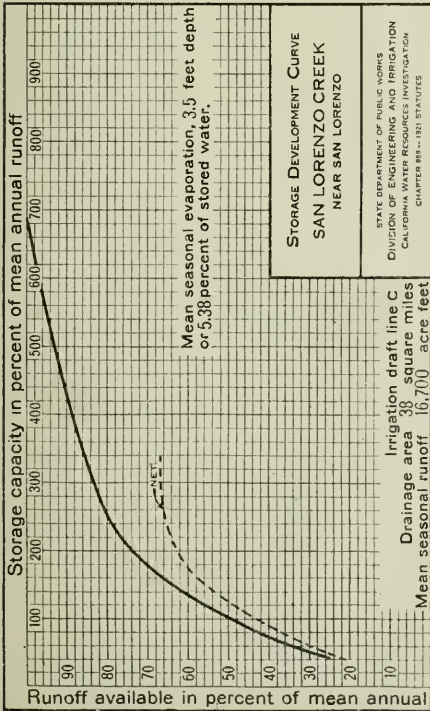
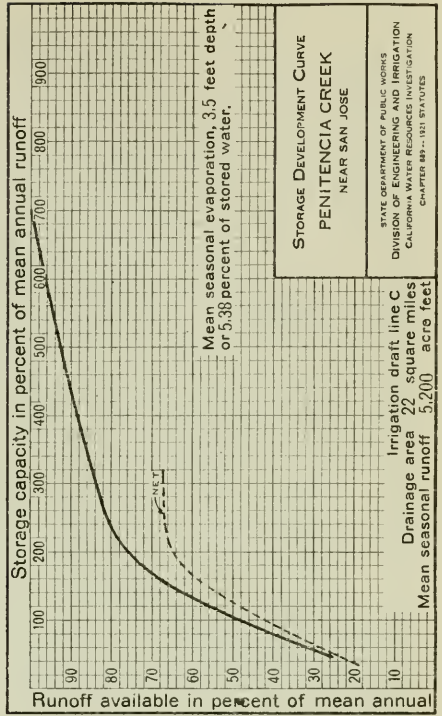
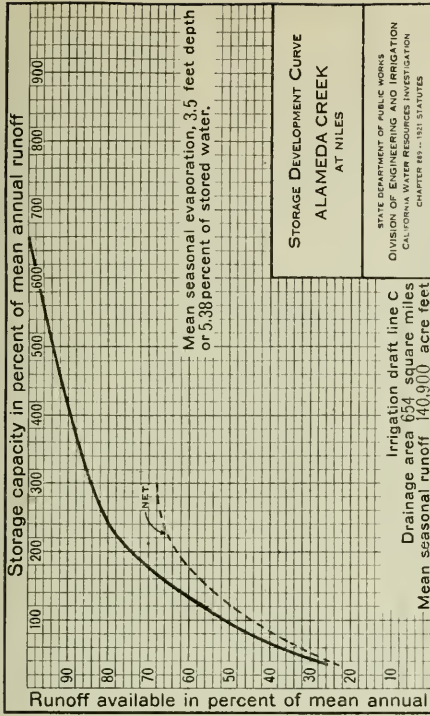






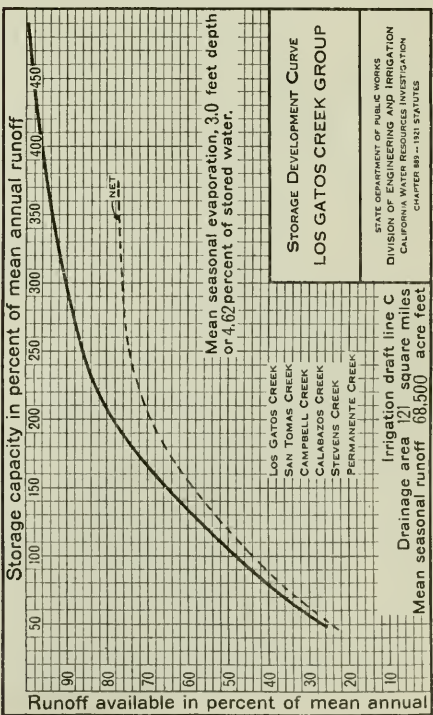
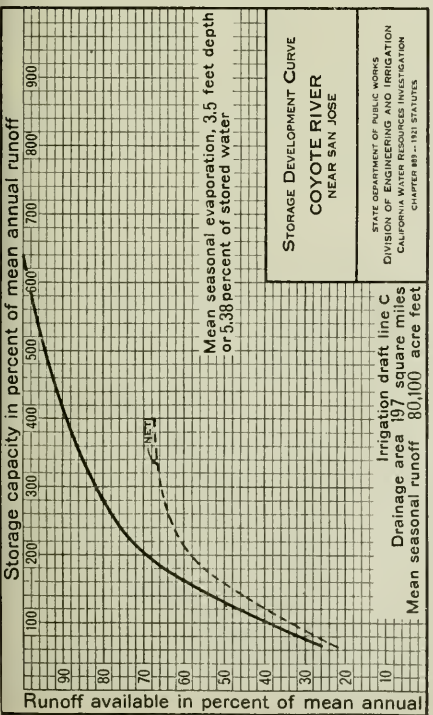
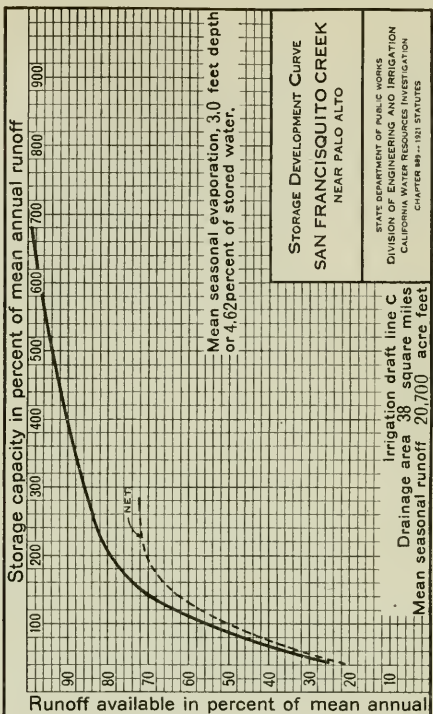
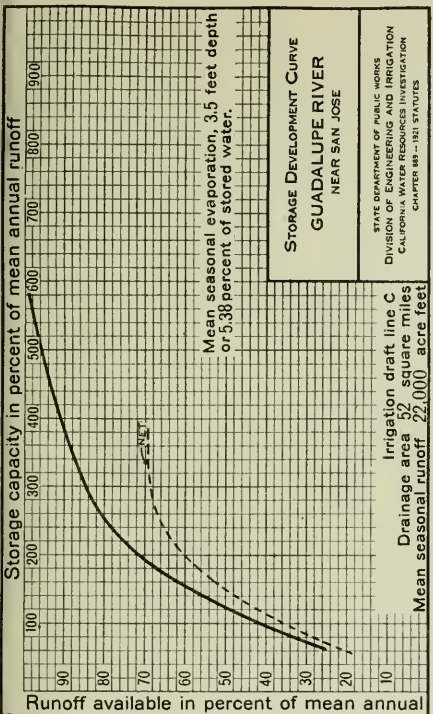




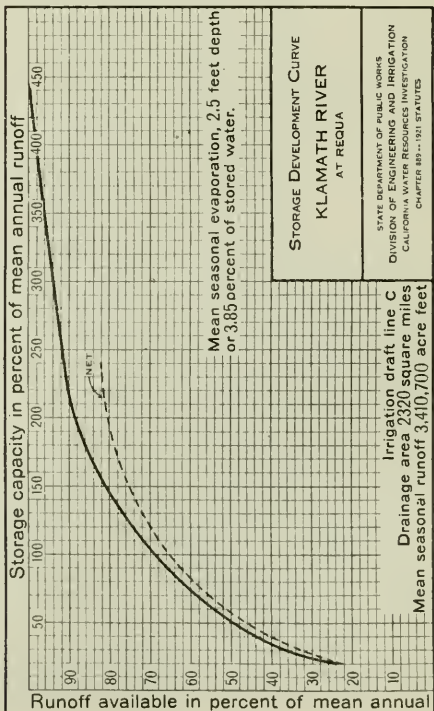
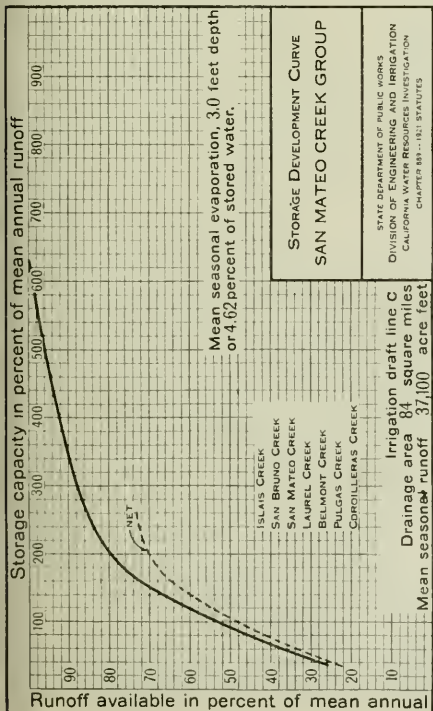
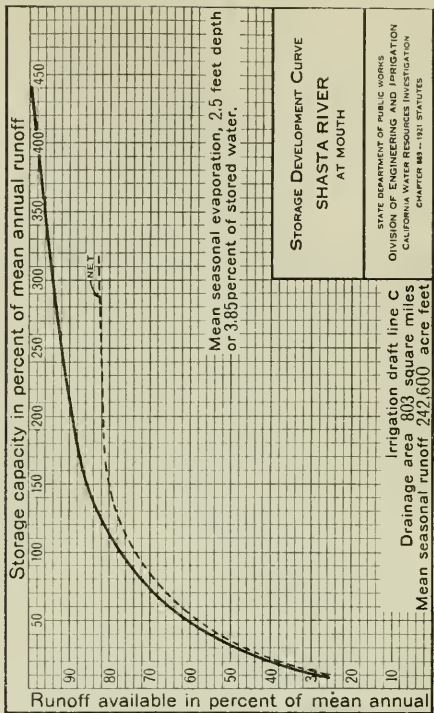
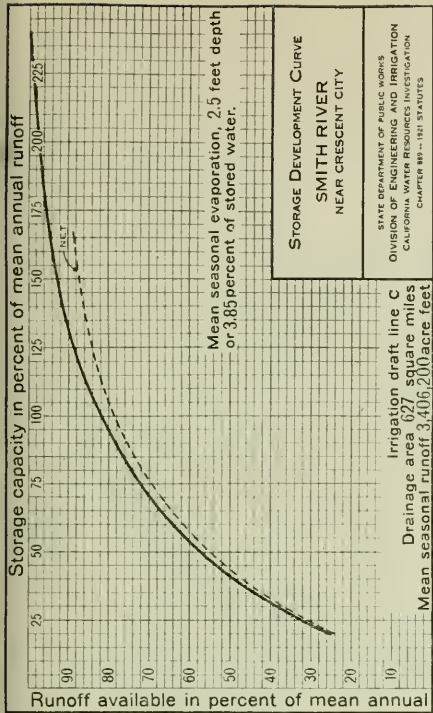




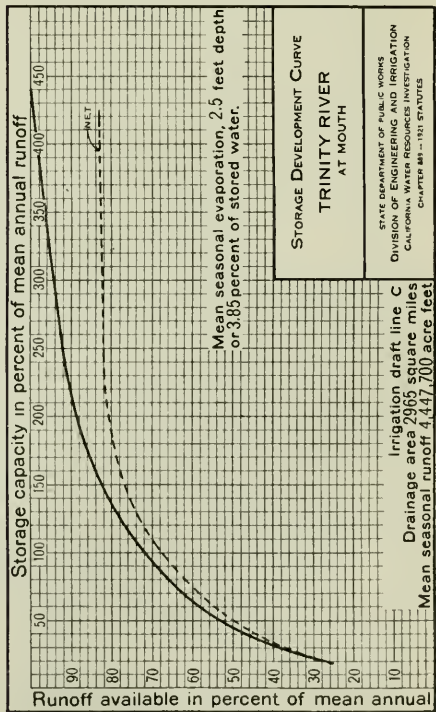
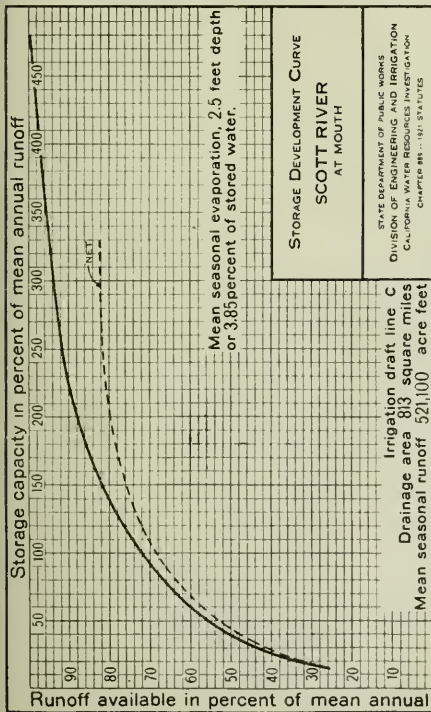
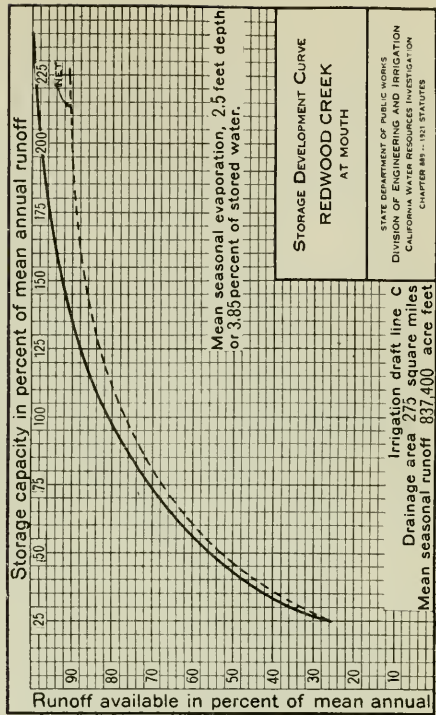
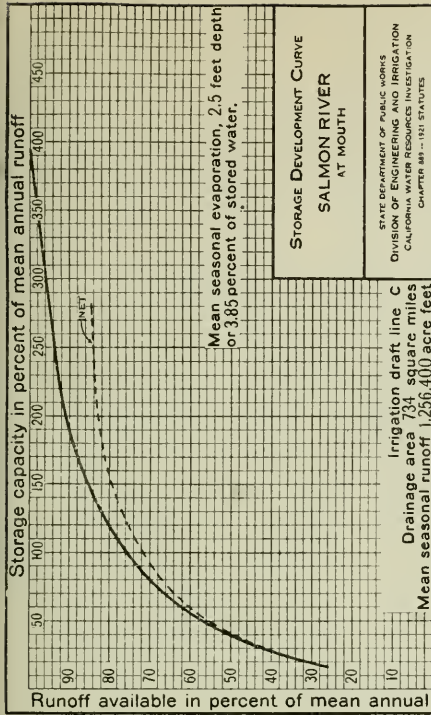




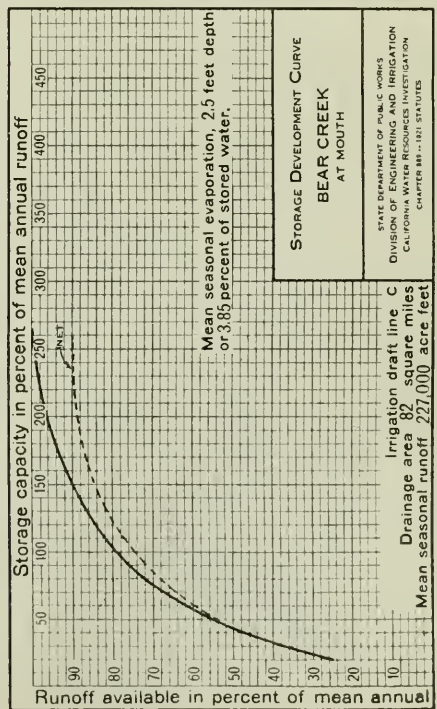
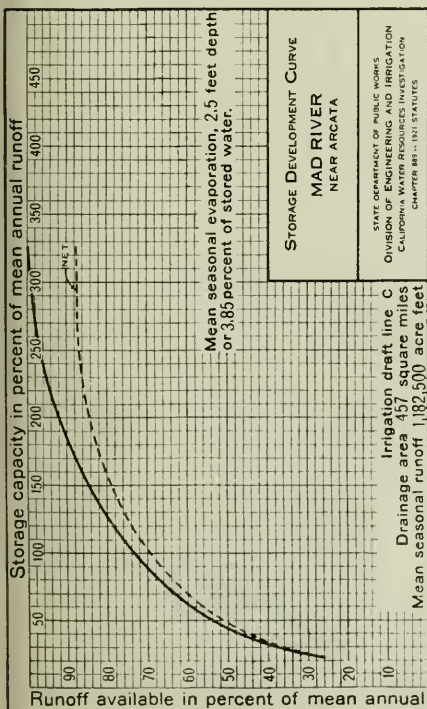
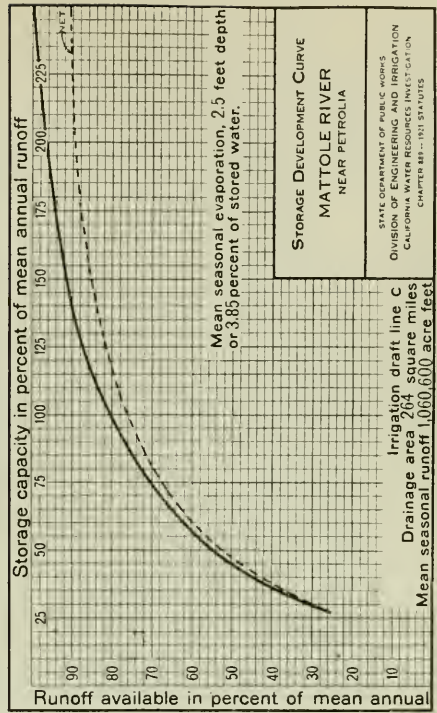
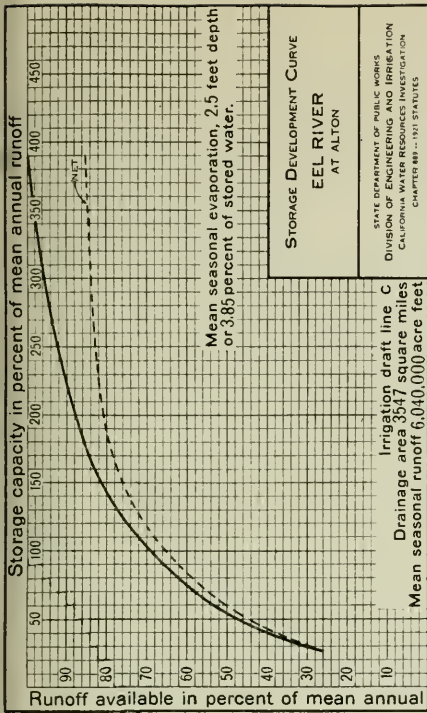






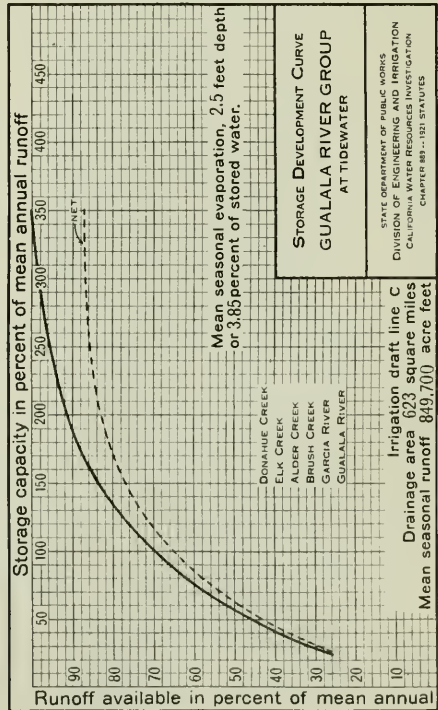
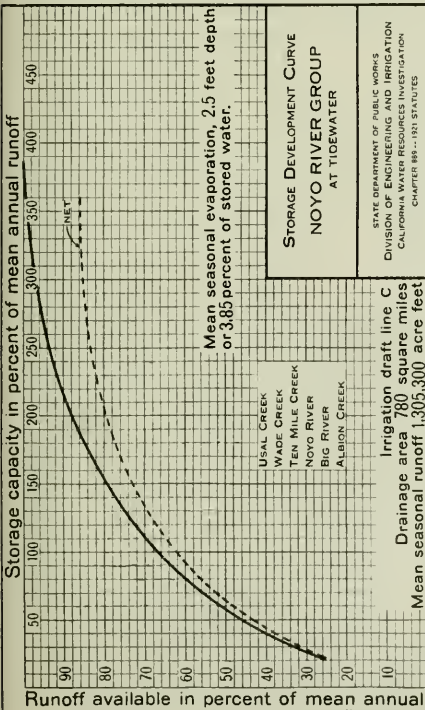
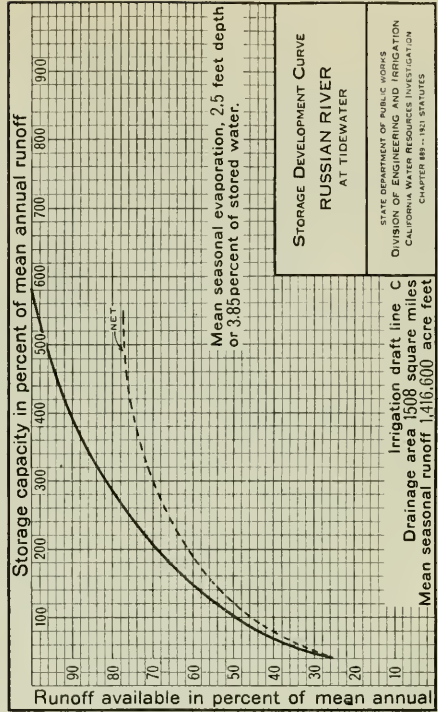
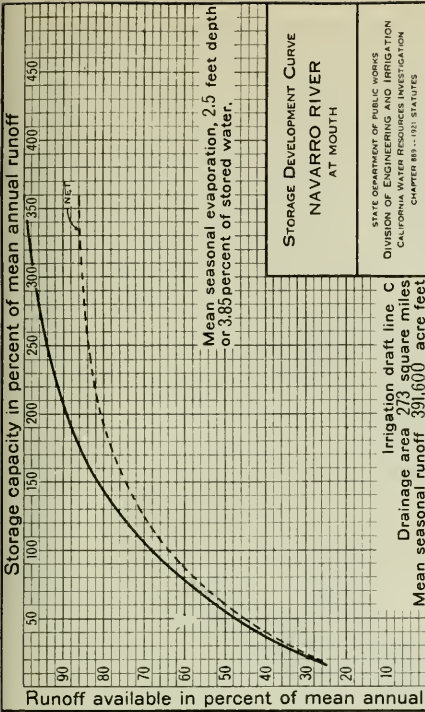




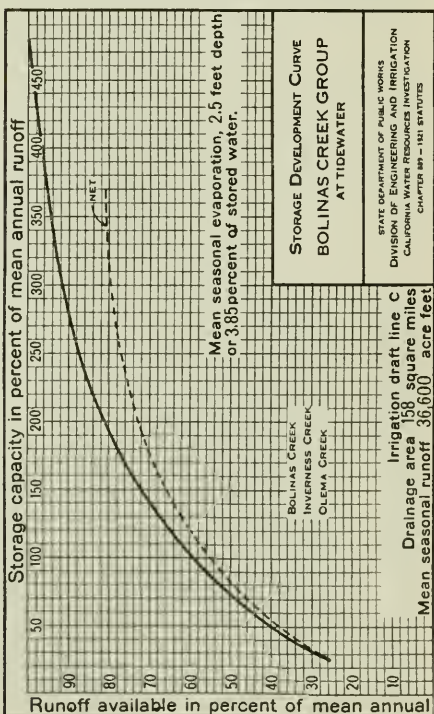
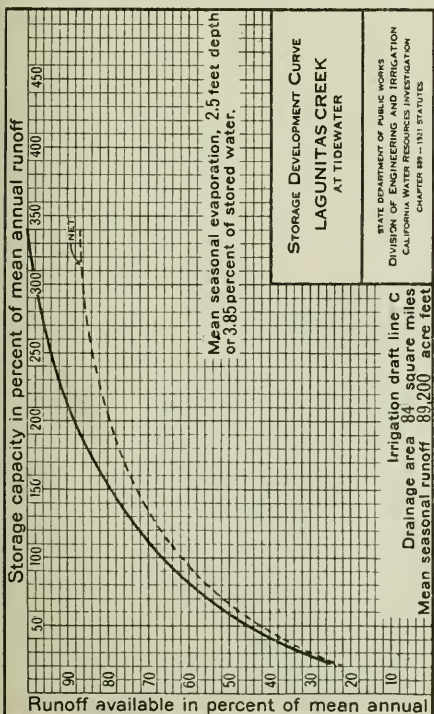
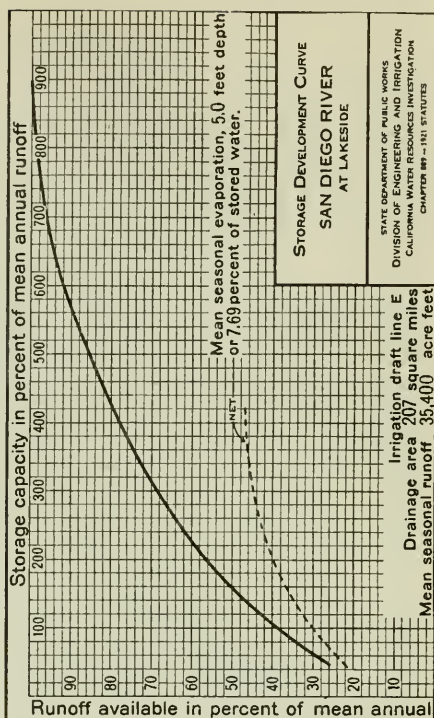
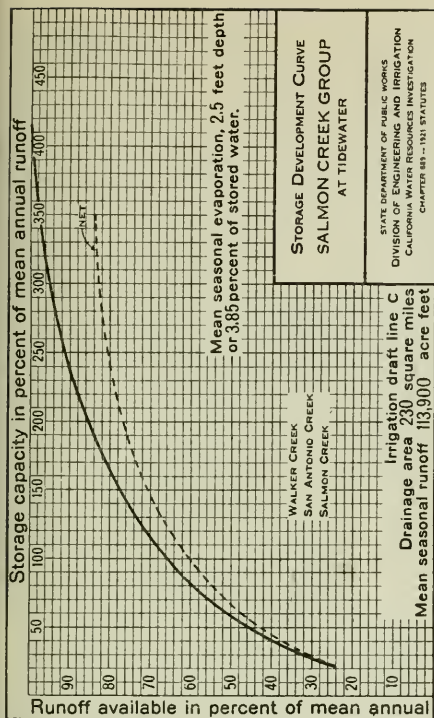




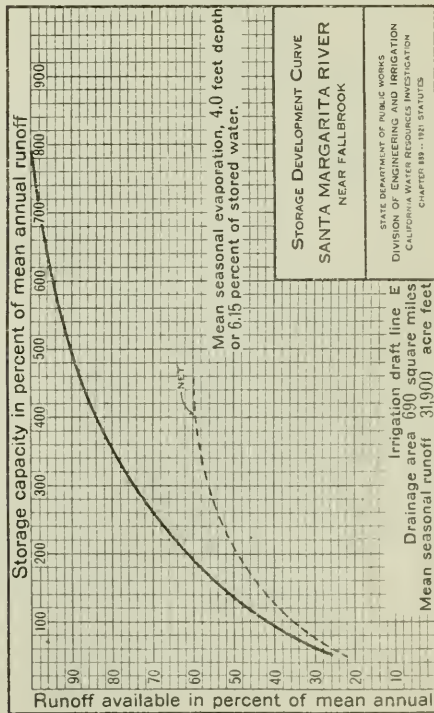
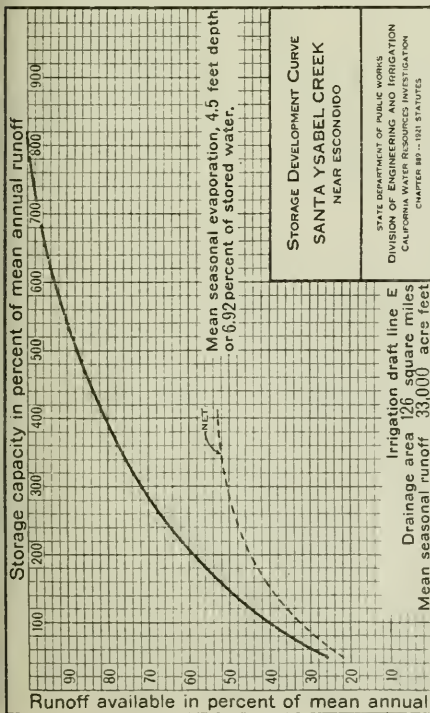
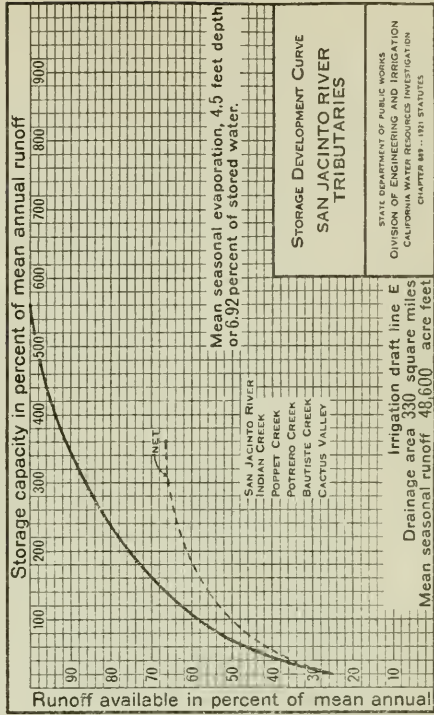
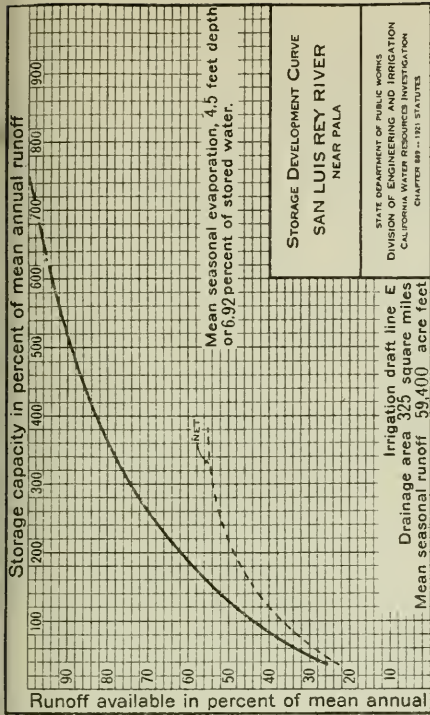




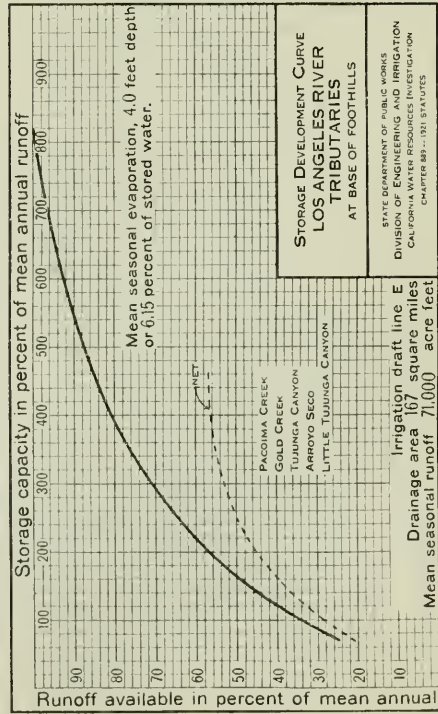
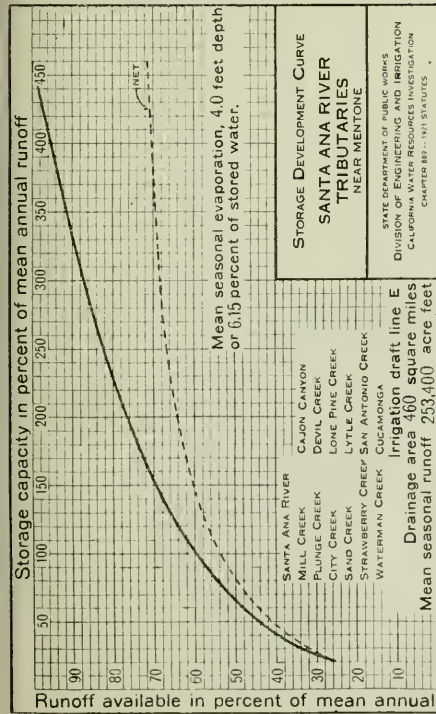
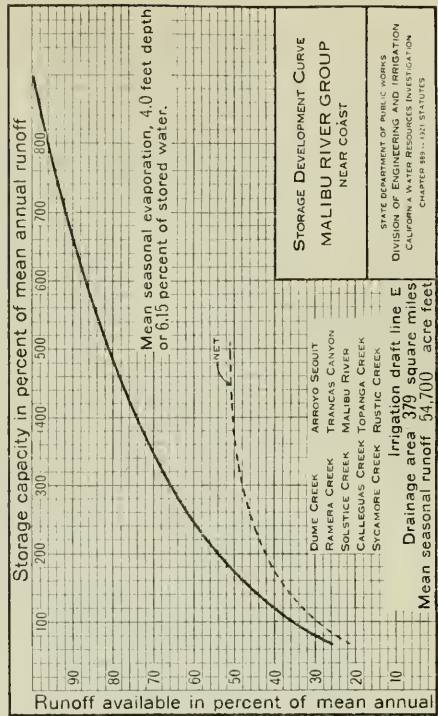
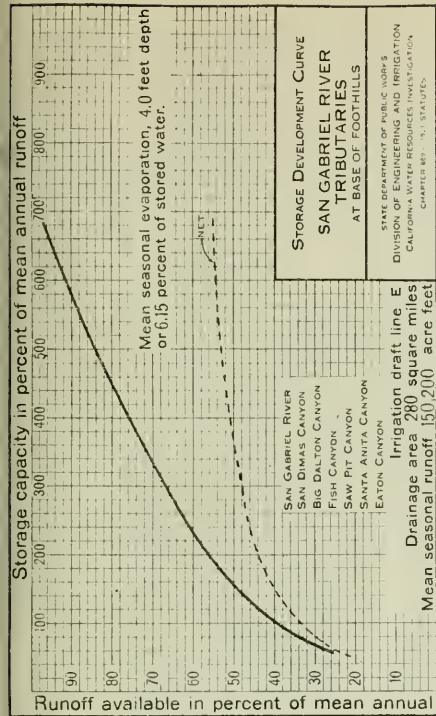






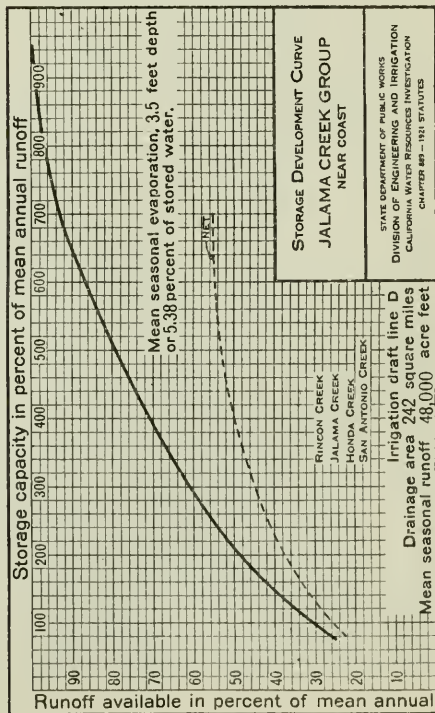
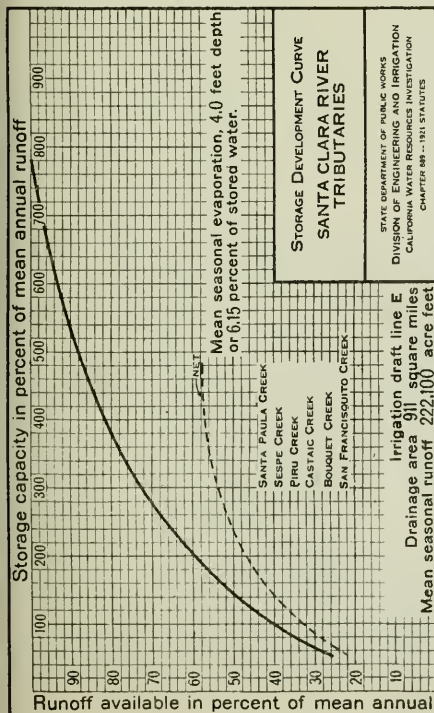
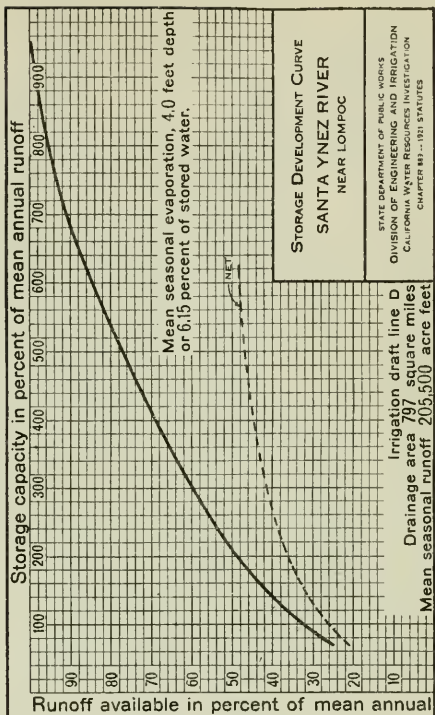
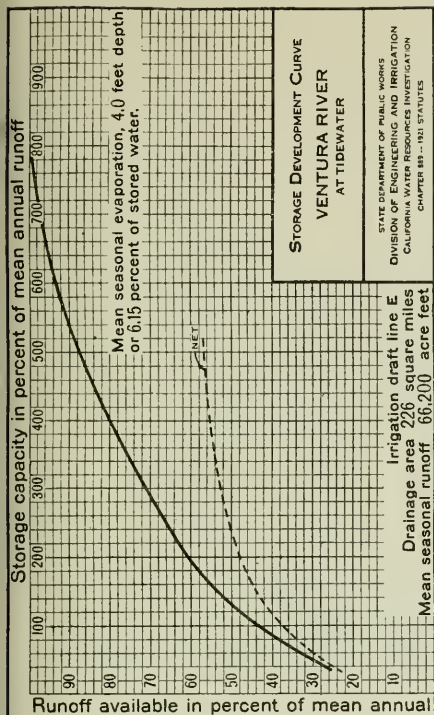




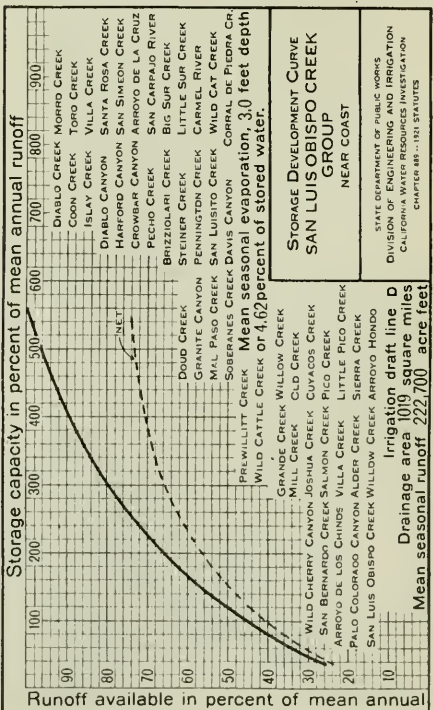
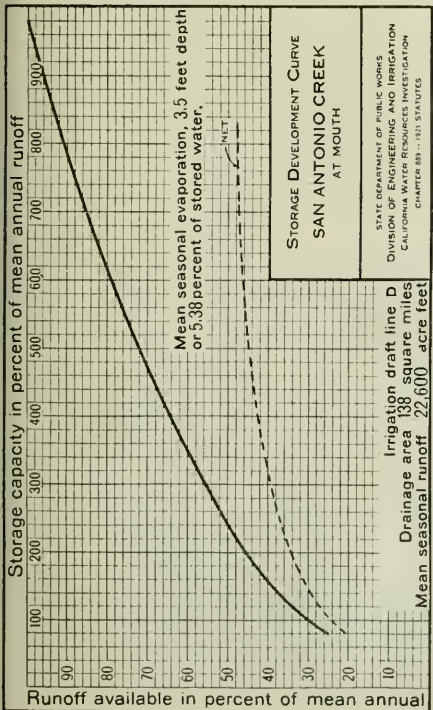
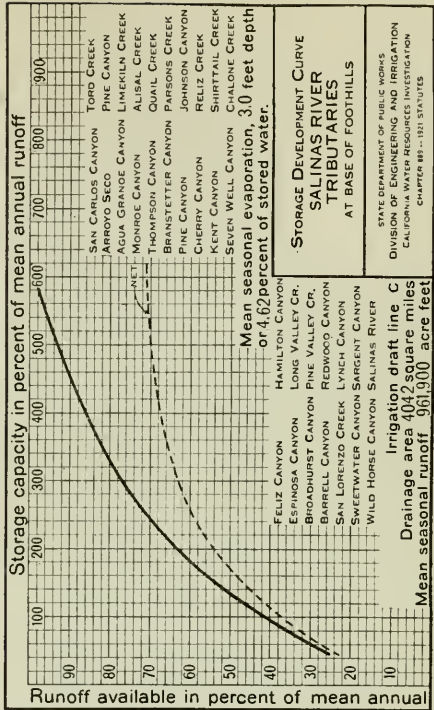
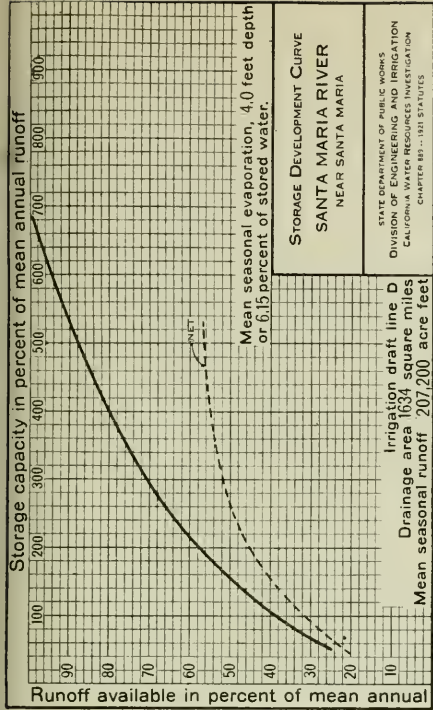




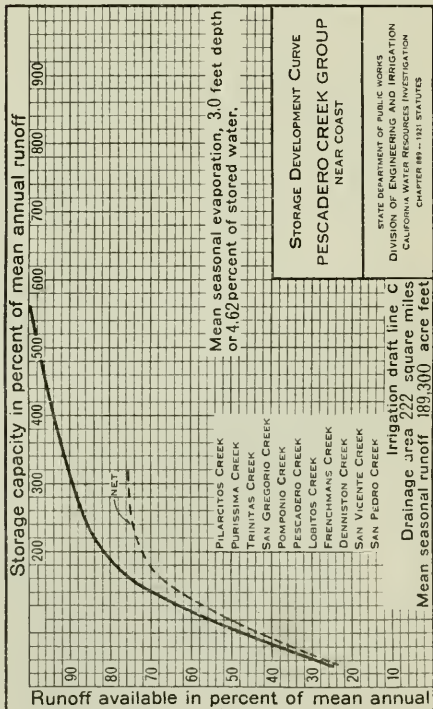
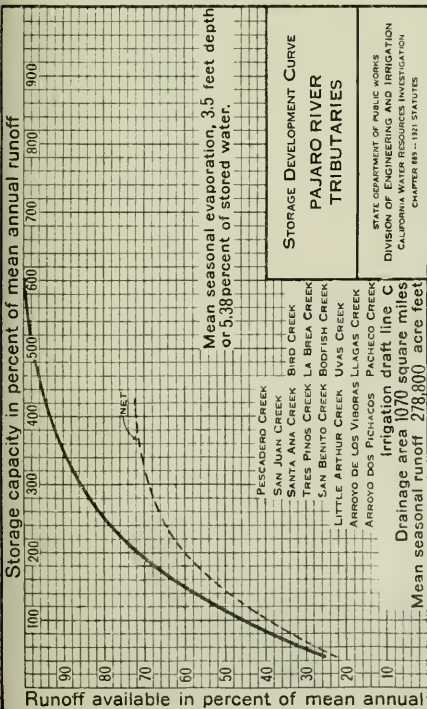
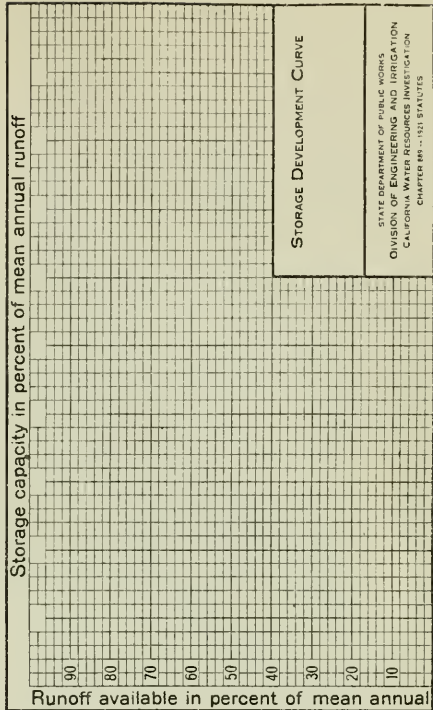
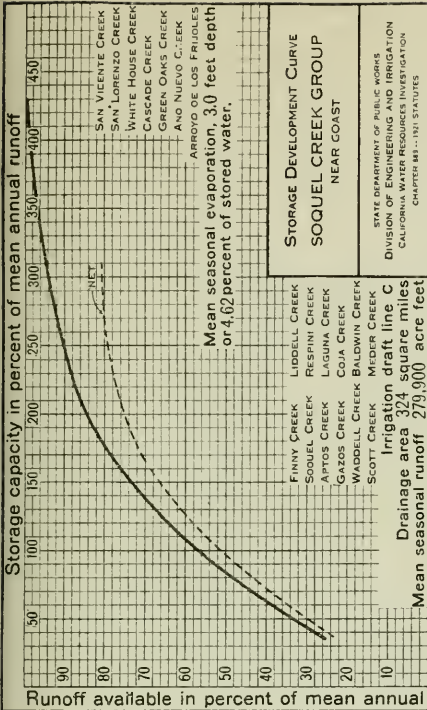




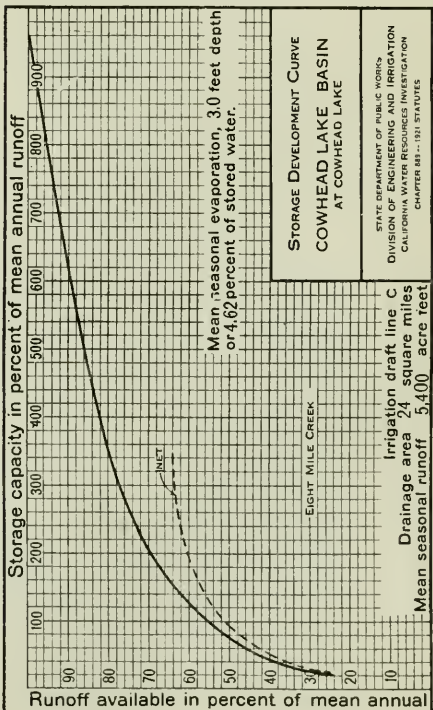
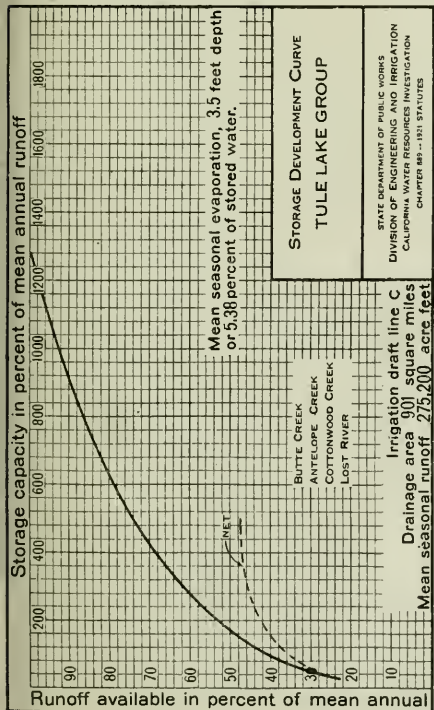
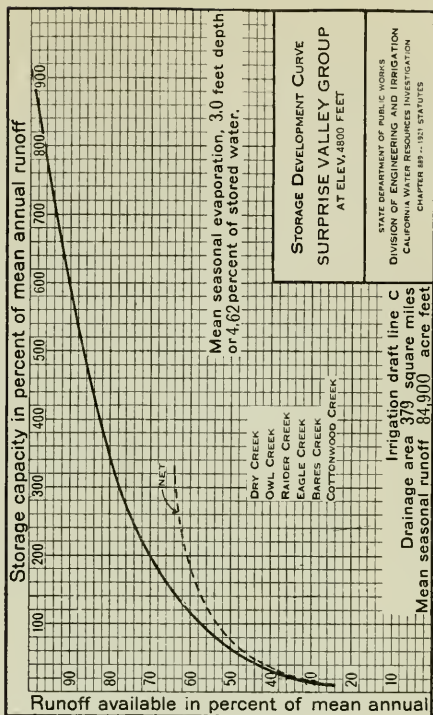
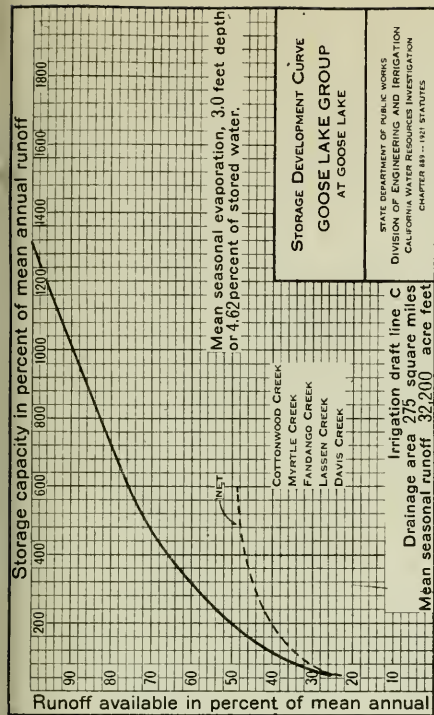






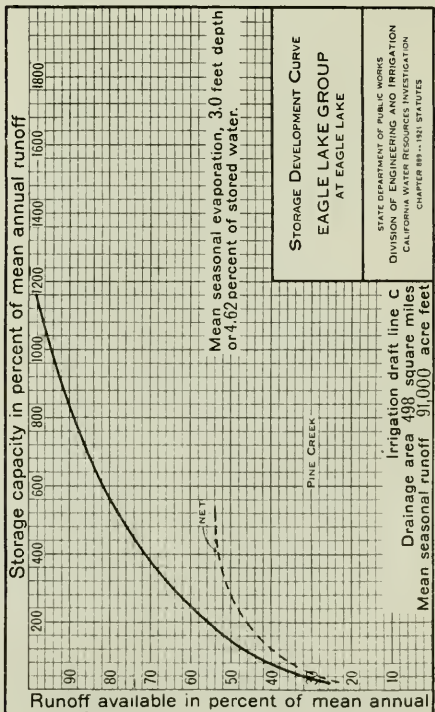
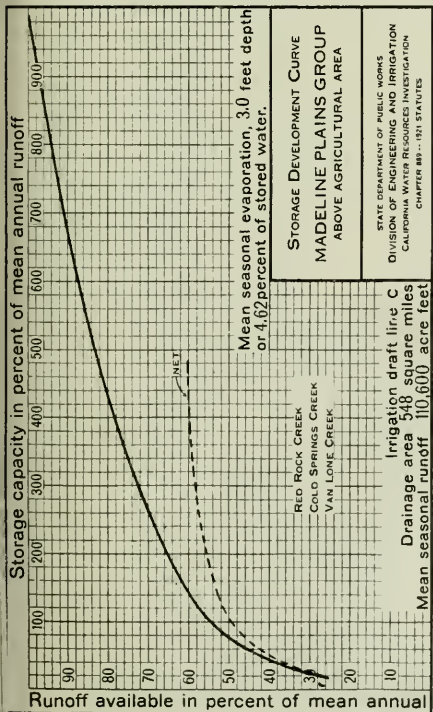
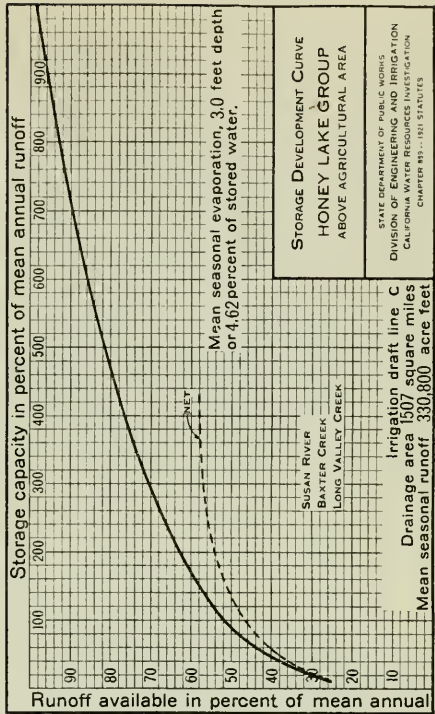
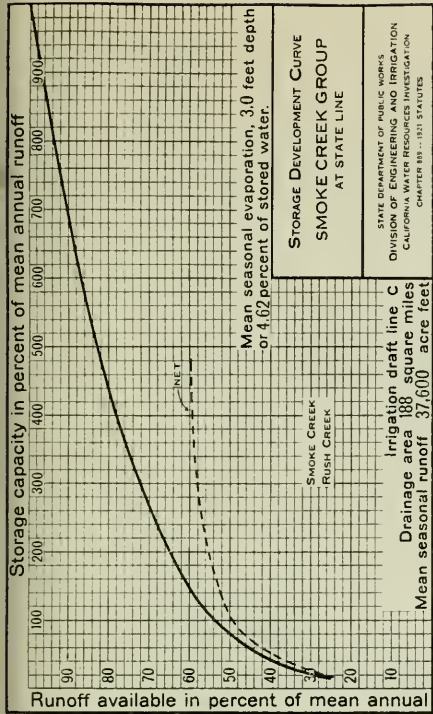




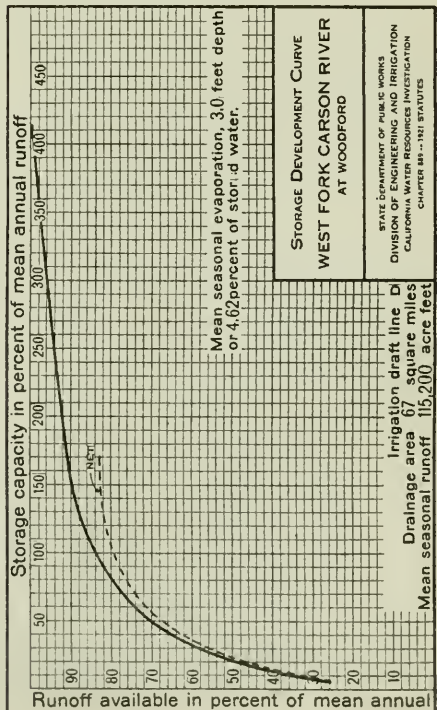
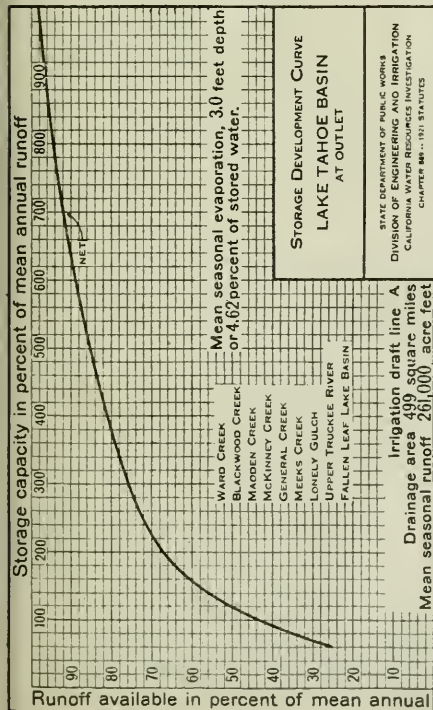
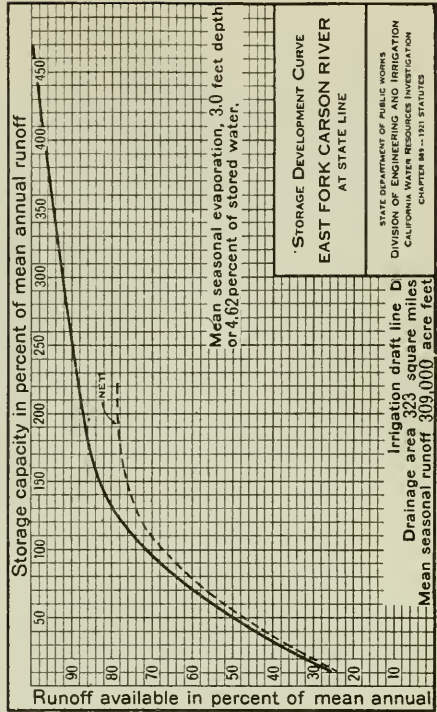
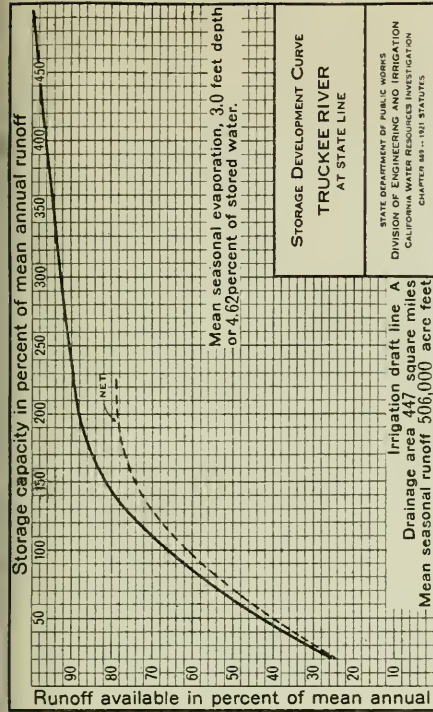




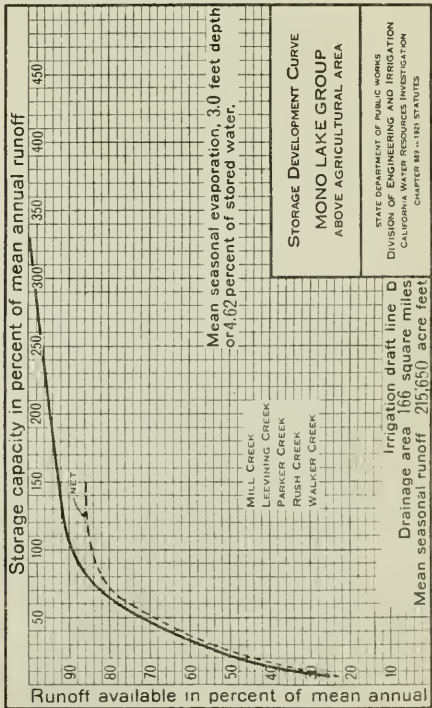
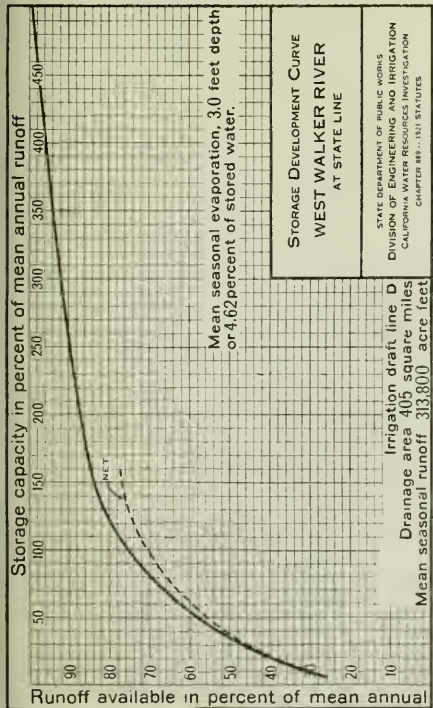
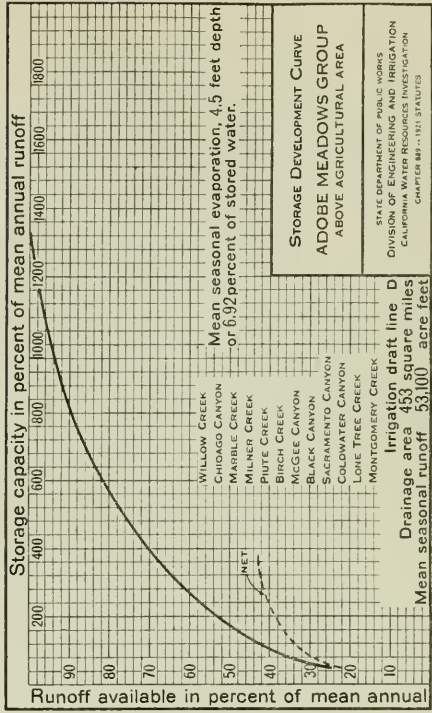
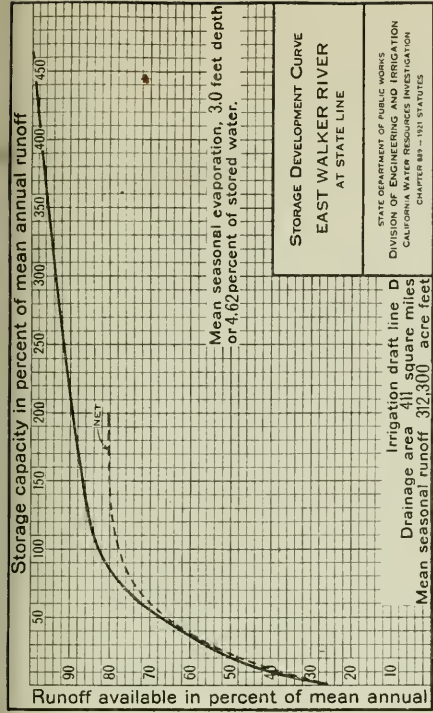




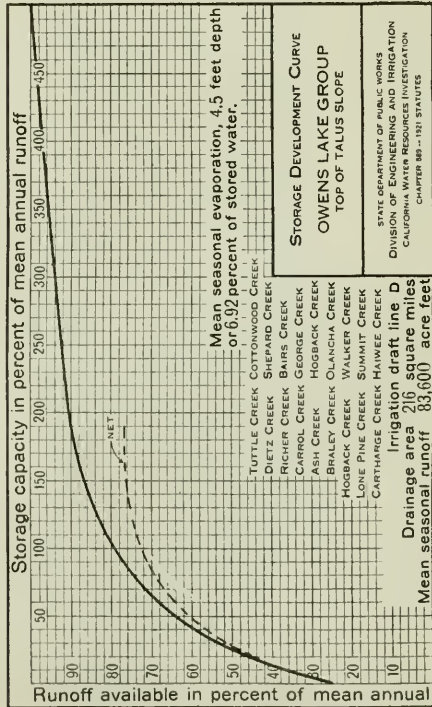
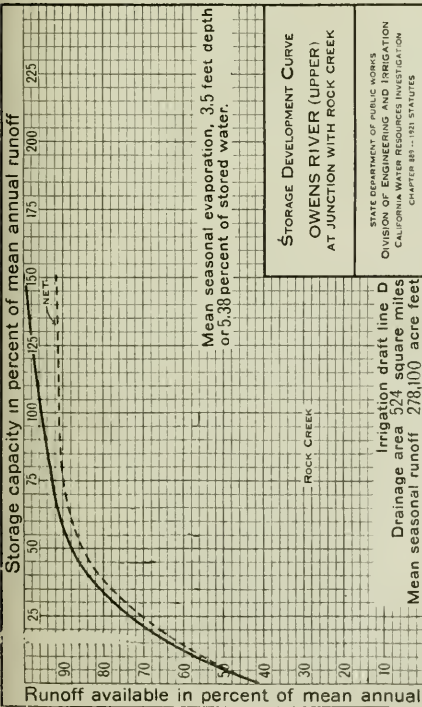
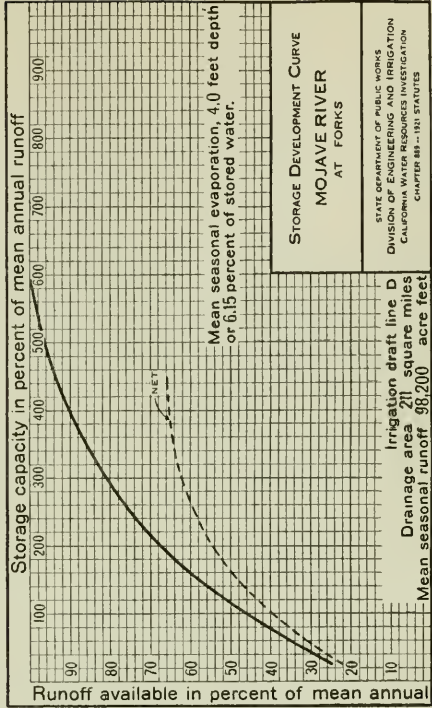
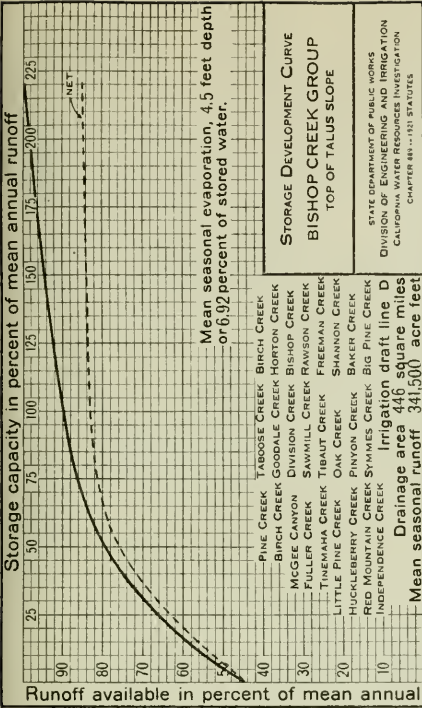






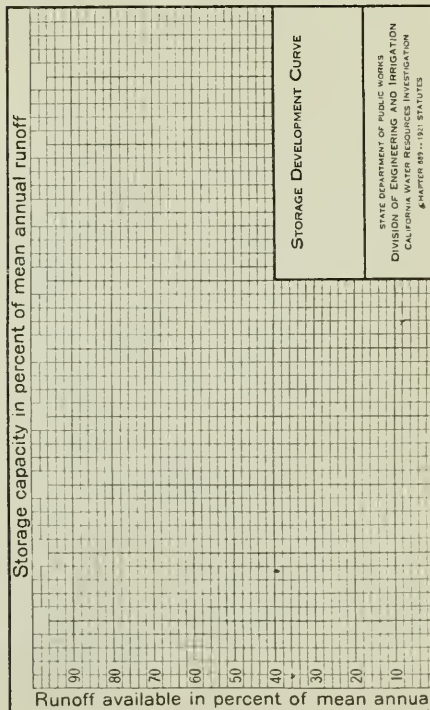
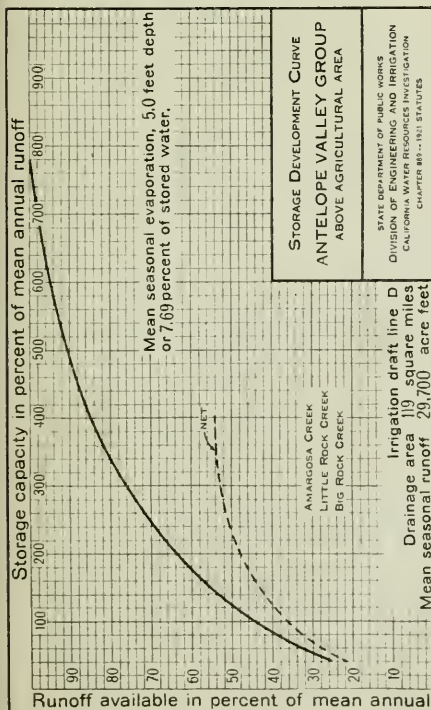
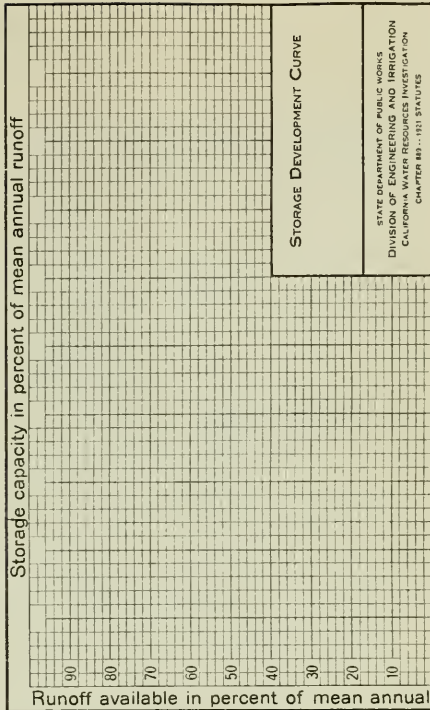
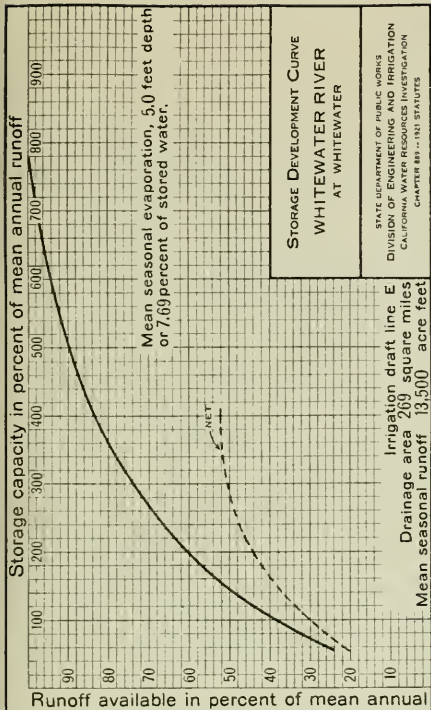














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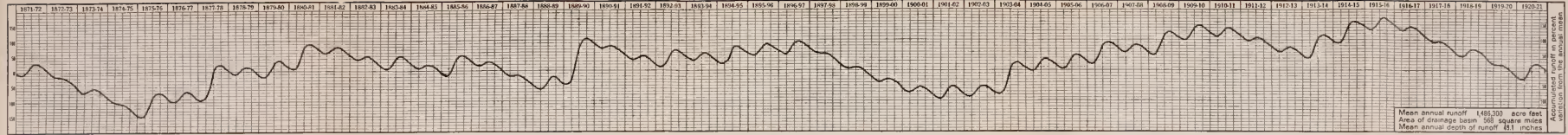
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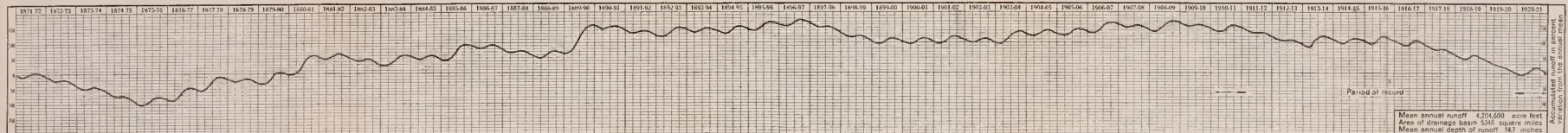
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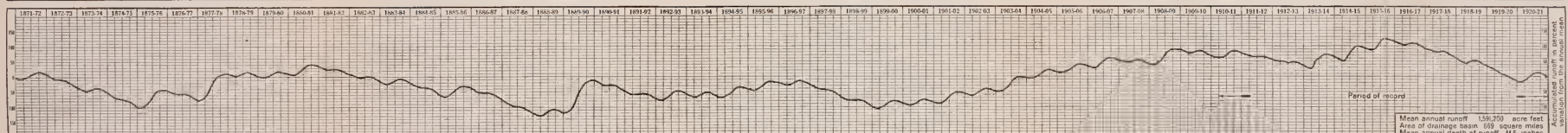
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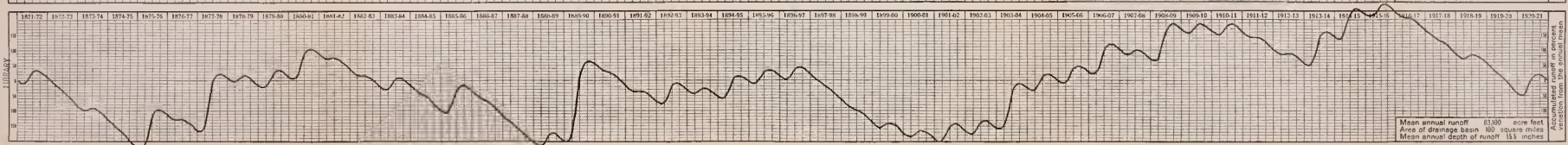
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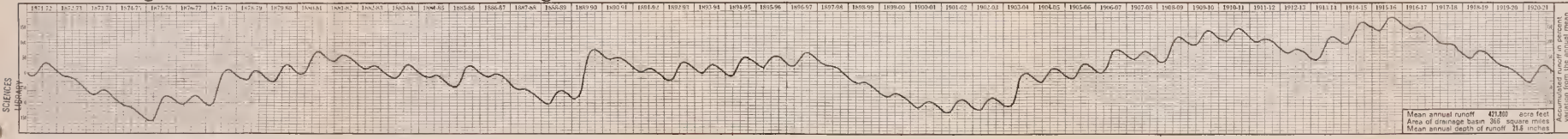
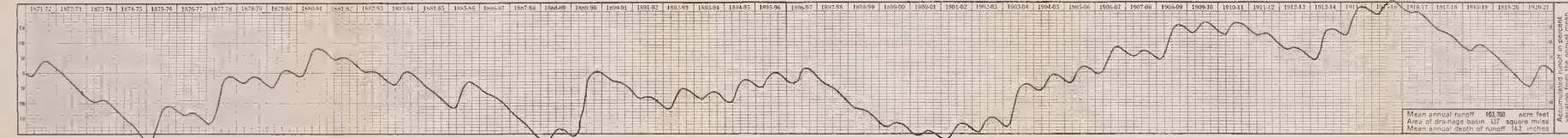
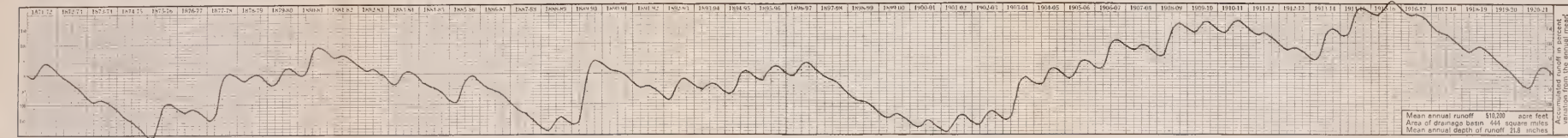
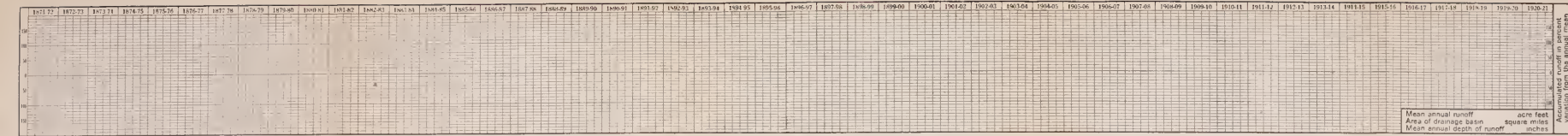


CHURN CREEK GROUP

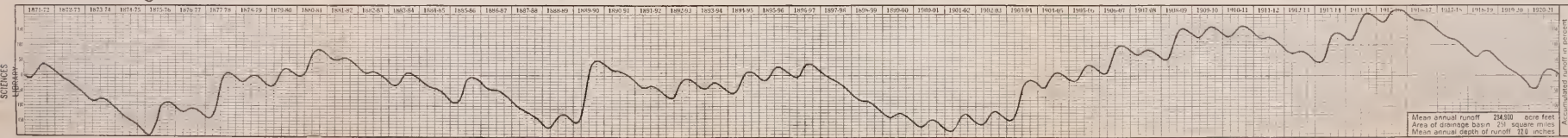
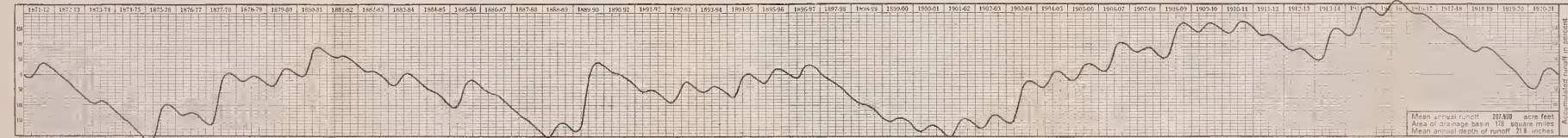
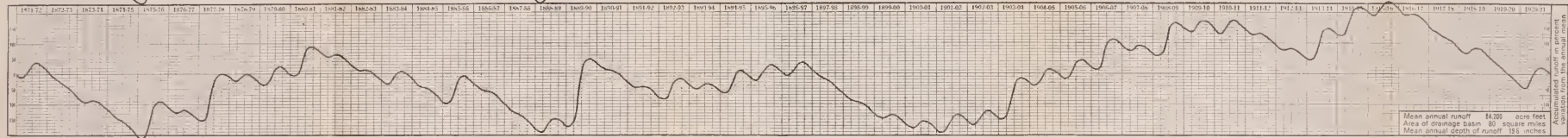
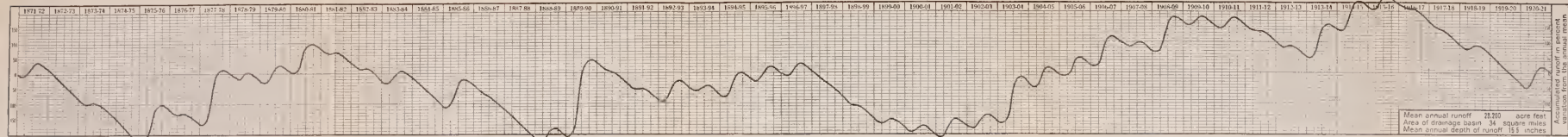
AT SACRAMENTO RIVER

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CALIFORNIA WATER RESOURCES INVESTIGATION  
CHAPTER 58 183 STRAUSS



BATTLE CREEK AT SACRAMENTO RIVER  
 BEAR CREEK AT SACRAMENTO RIVER  
 COW CREEK AT SACRAMENTO RIVER  
 BATTLE CREEK AT SACRAMENTO RIVER





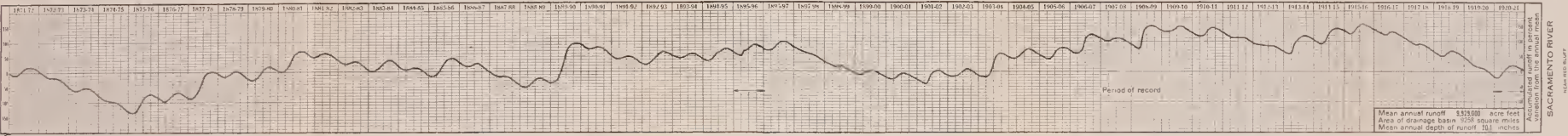
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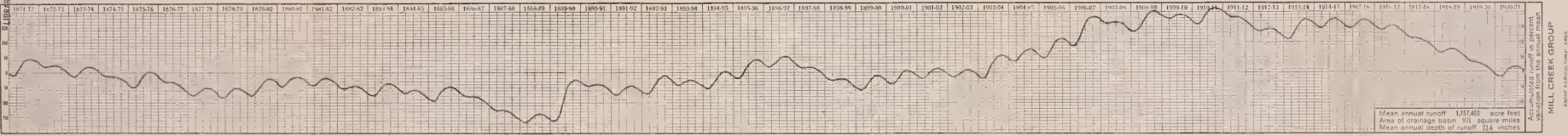
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DIVISION OF ENGINEERING AND IRRIGATION  
CALIFORNIA WATER RESOURCES INVESTIGATION  
CHAPTER 801 181 STATION 2



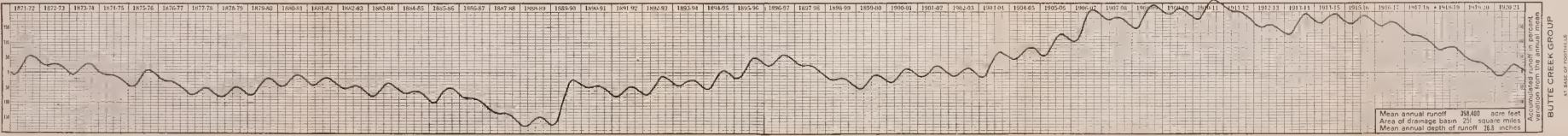
COTTONWOOD CREEK  
AT SACRAMENTO RIVER



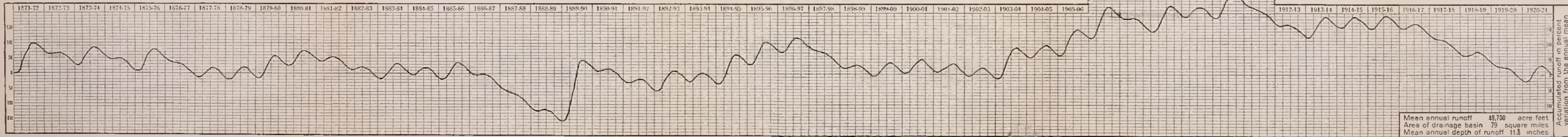
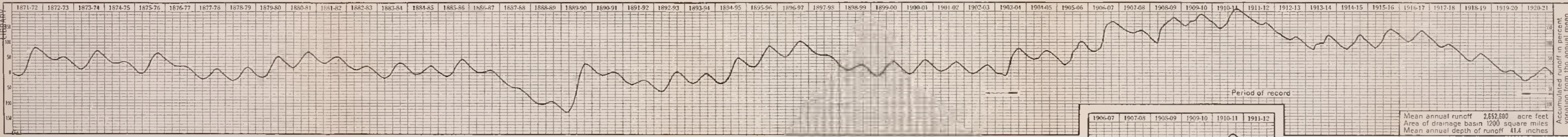
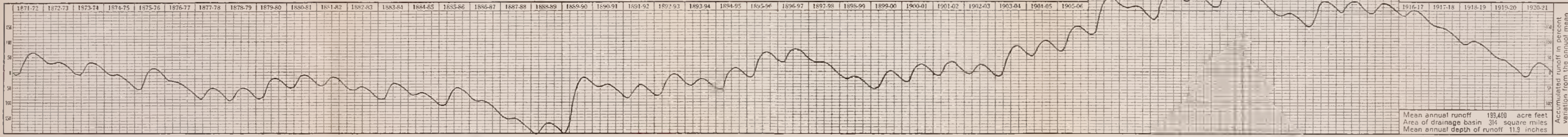
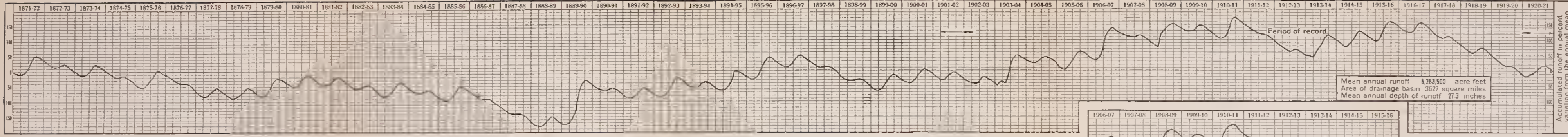
SACRAMENTO RIVER  
NEAR RED BLUFF



MILL CREEK GROUP  
ABOUT AGRICULTURAL AREA

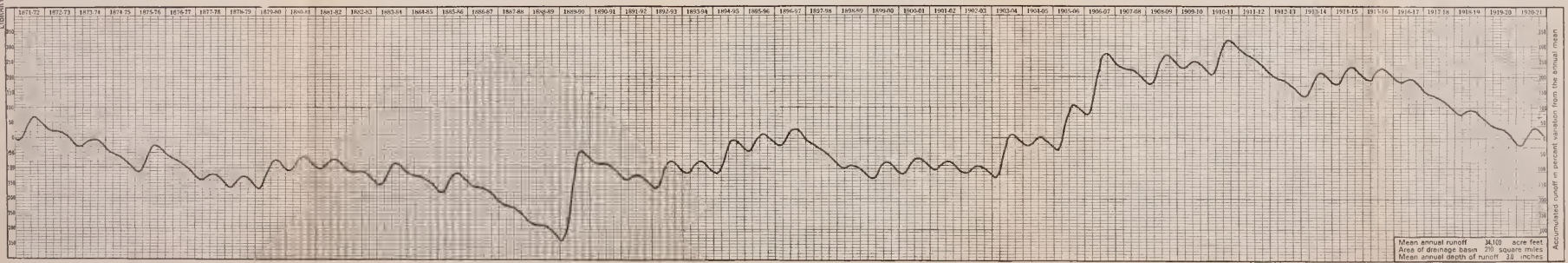
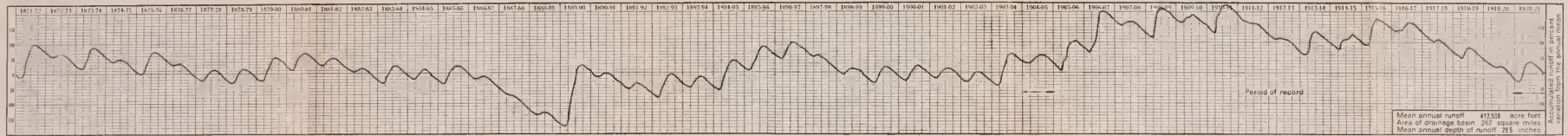
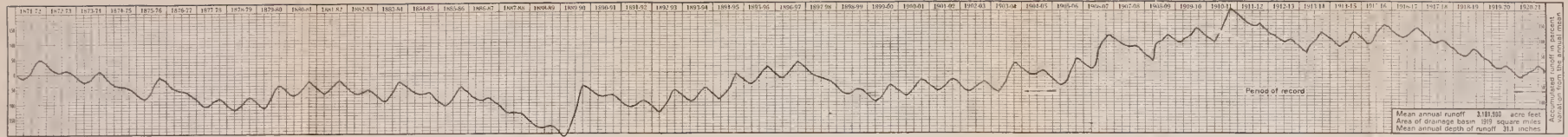


BUTTE CREEK GROUP  
AT BASE OF FOOTHILLS



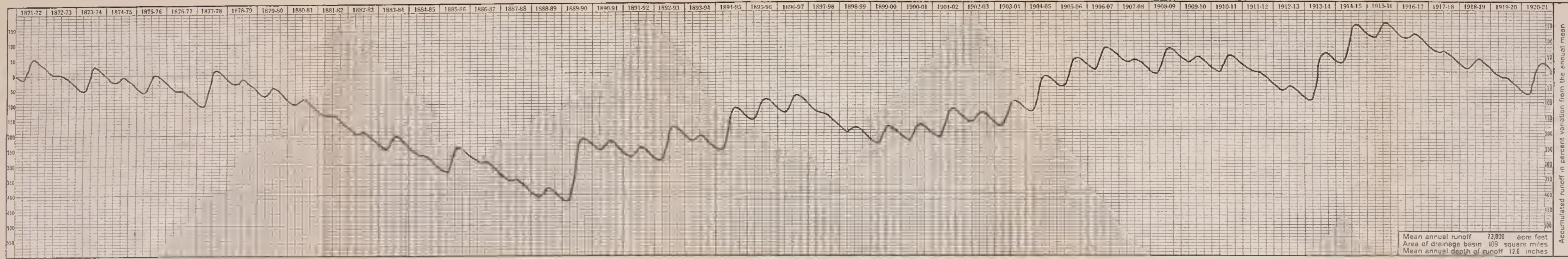
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CHAPTER NO. 191 STATOPE

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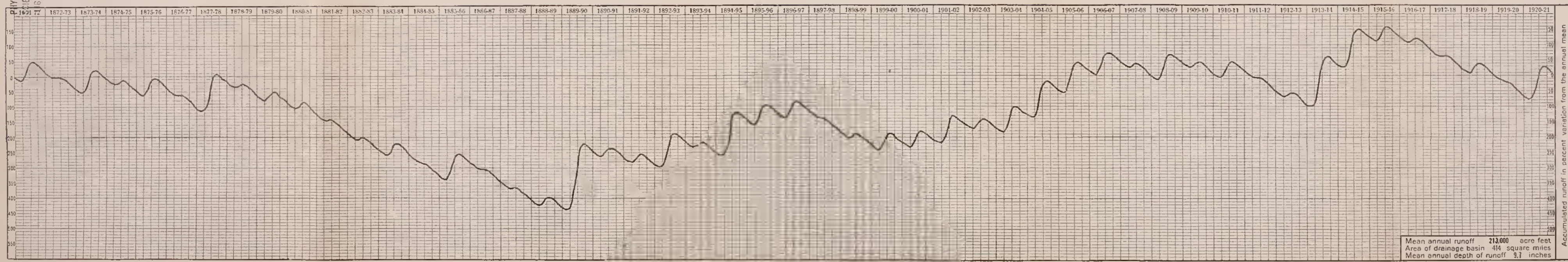
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RED BANK CREEK GROUP  
AT BASE OF FOOTHILLS

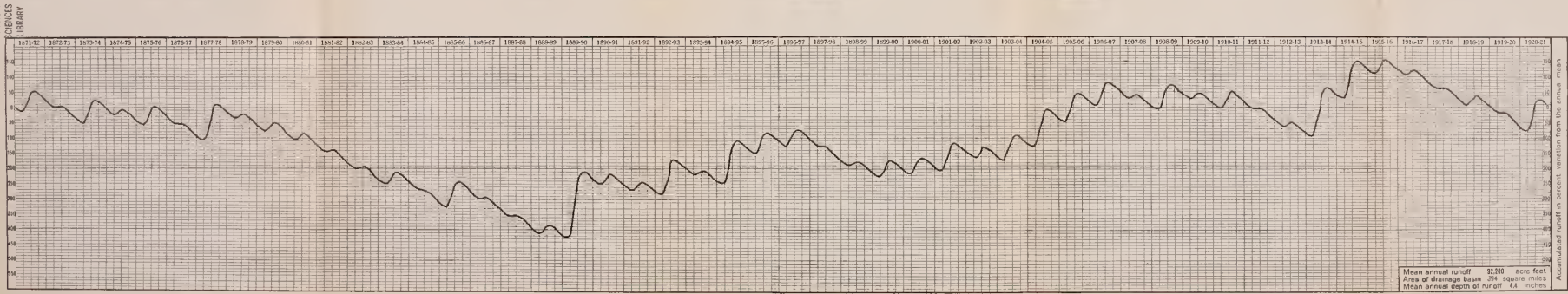
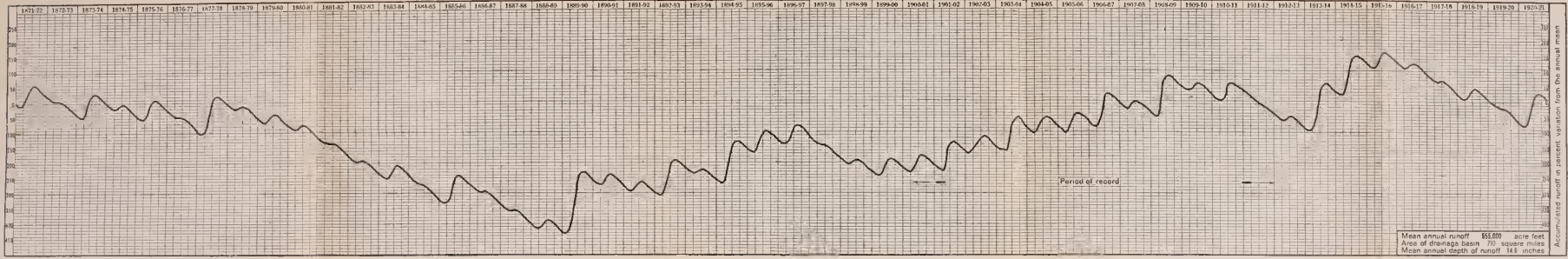
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ELDER CREEK GROUP  
AT BASE OF FOOTHILLS

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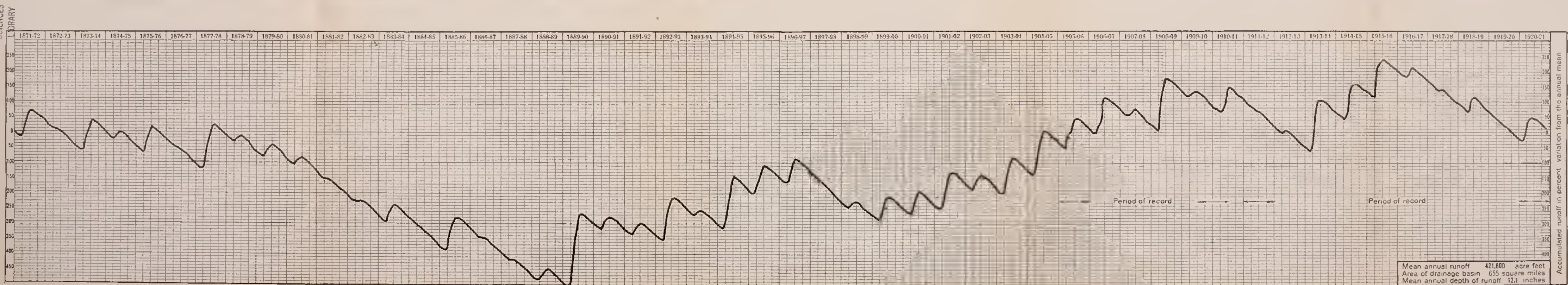
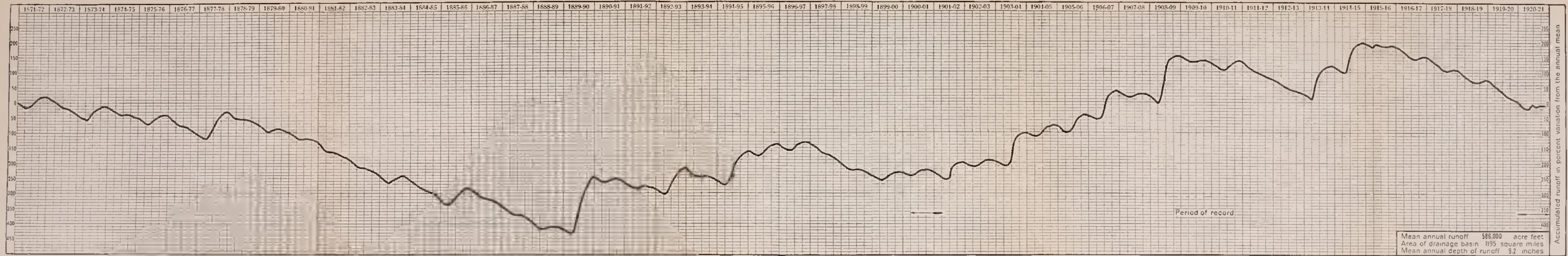
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STONY CREEK  
AT JUNCTION WITH NORTH FORK

WILLOW CREEK GROUP  
AT BASE OF FOOTHILLS

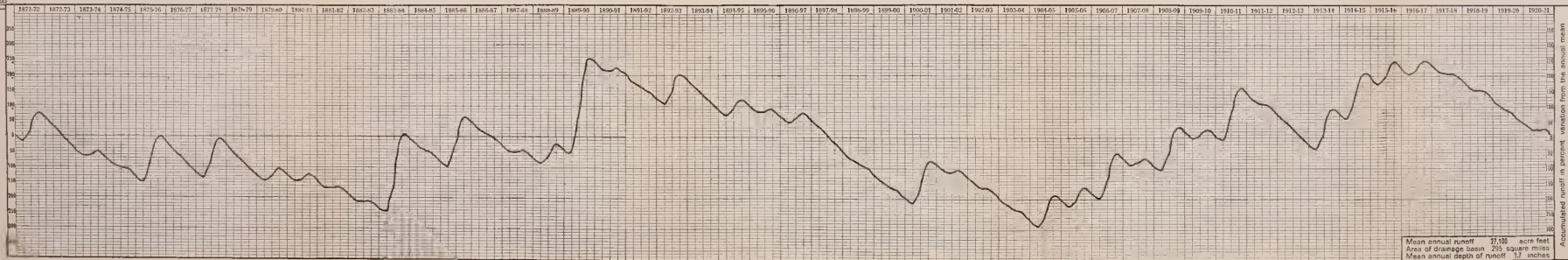
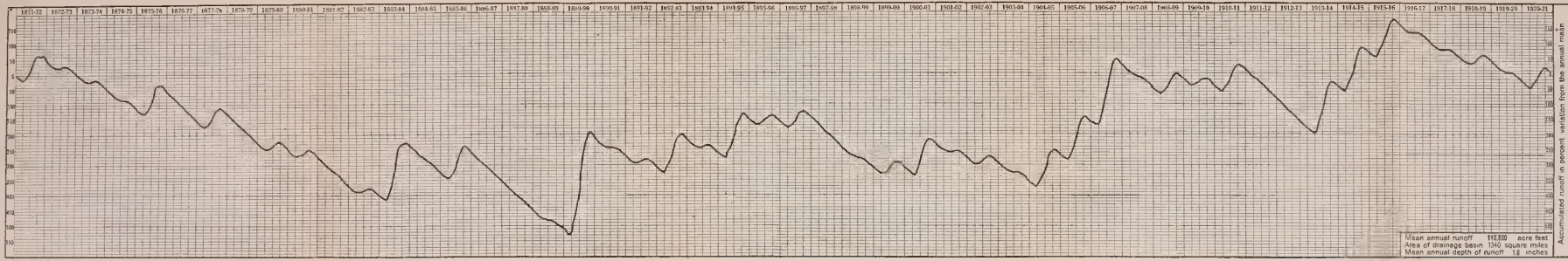
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DIVISION OF ENGINEERING AND IRRIGATION  
CALIFORNIA WATER RESOURCES INVESTIGATION  
CHAPTER III - 1917 YEARBOOK

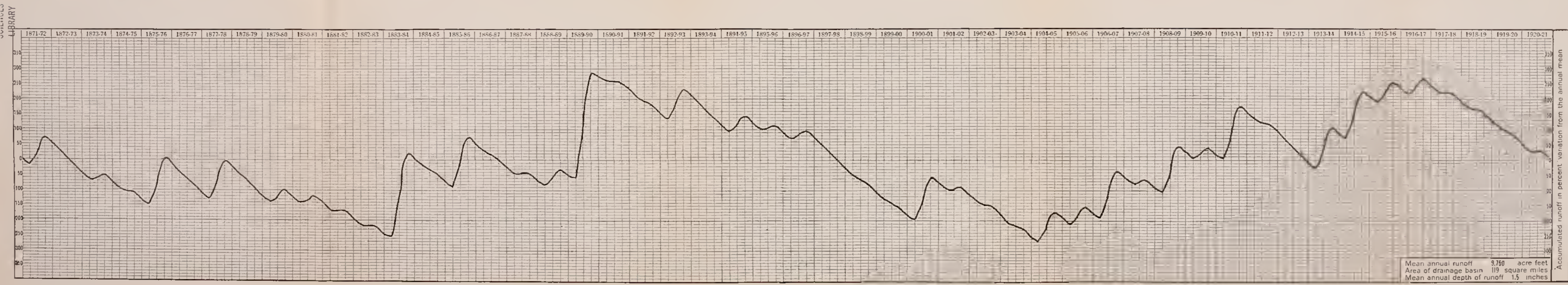
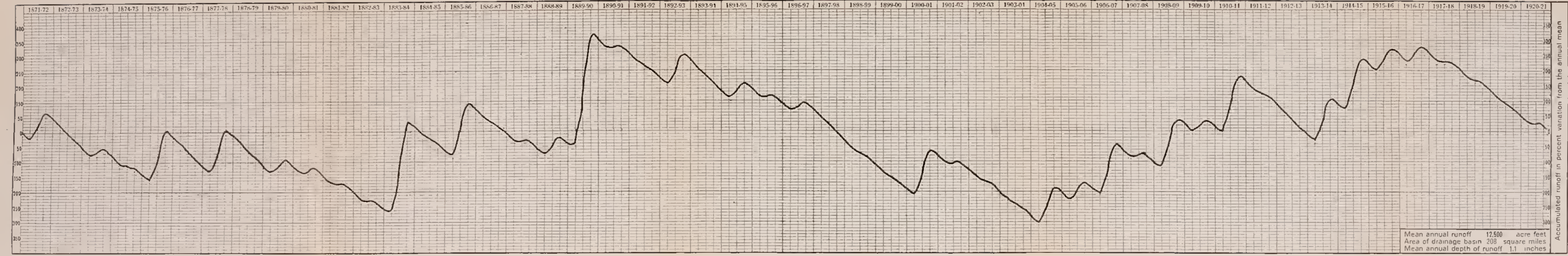
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DIVISION OF ENGINEERING AND IRRIGATION  
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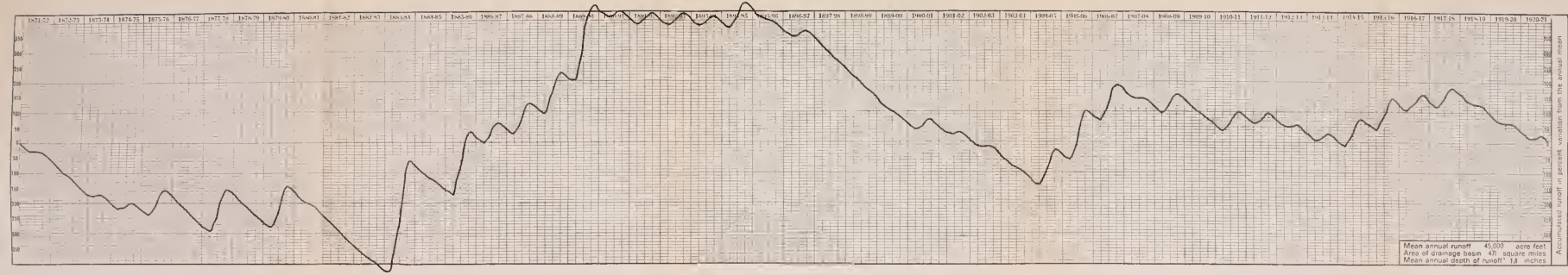




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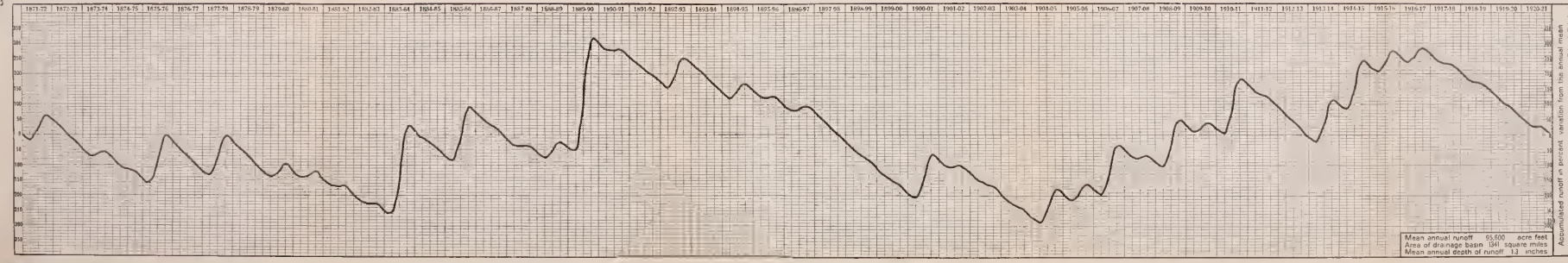
CALIENTE CREEK

NEAR BINA

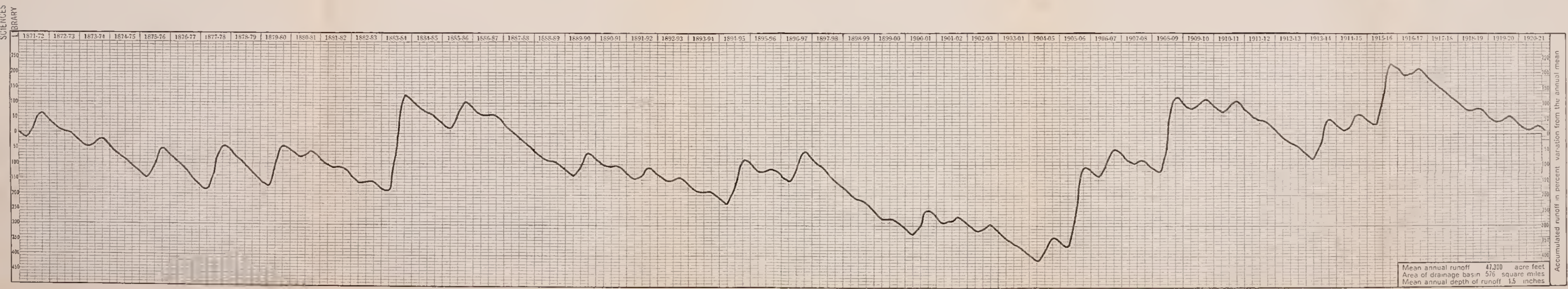
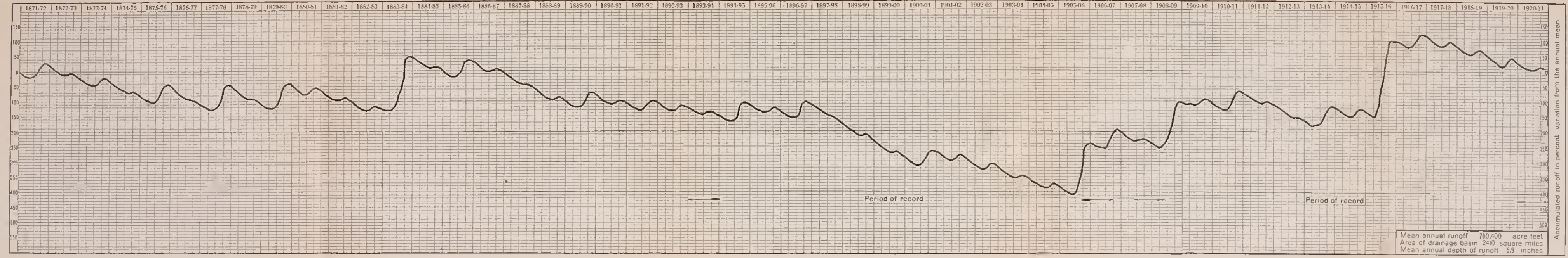


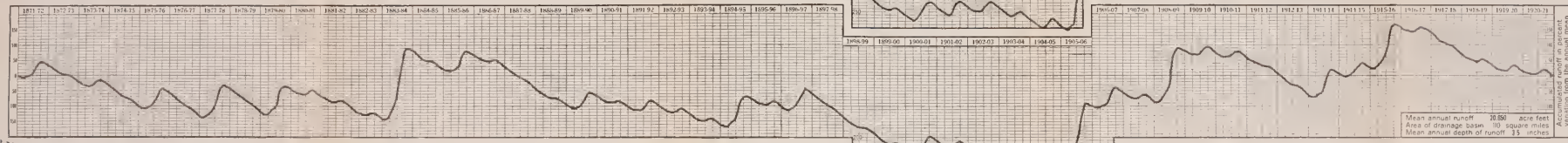
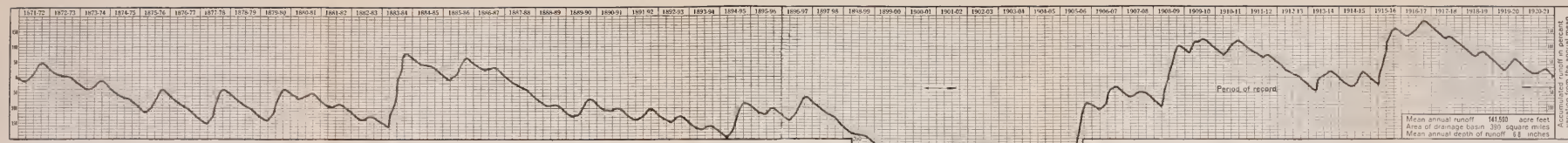
TEJON CREEK GROUP

AT BASE OF MOUNTAINS



MASS DIAGRAMS OF RUNOFF  
STATE DEPARTMENT OF PUBLIC WORKS  
DIVISION OF ENGINEERING AND IRRIGATION  
CALIFORNIA WATER RESOURCES INVESTIGATION  
CHAPTER 89 - 1931 STATUTES



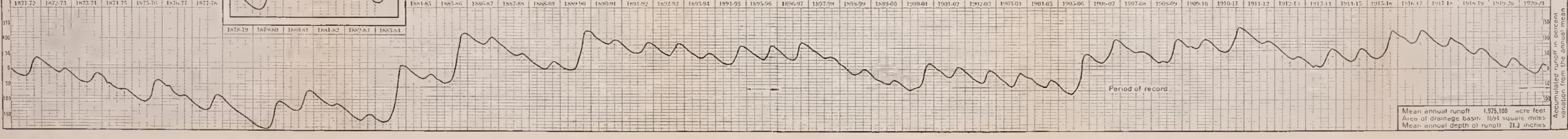
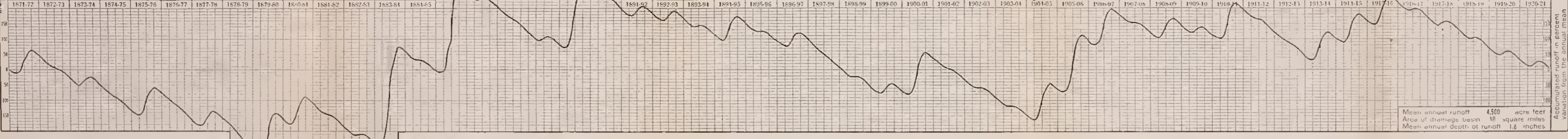
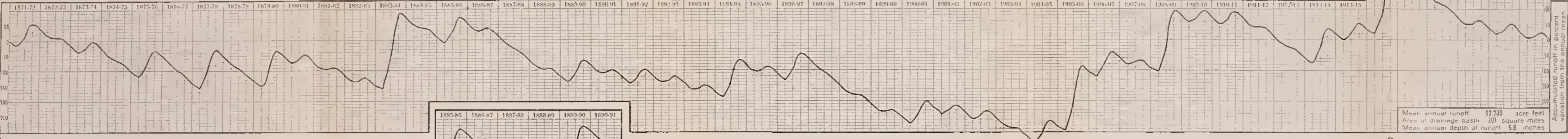
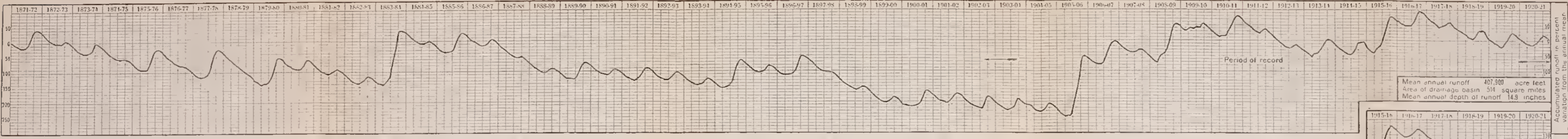


MASS DIAGRAMS OF RUNOFF

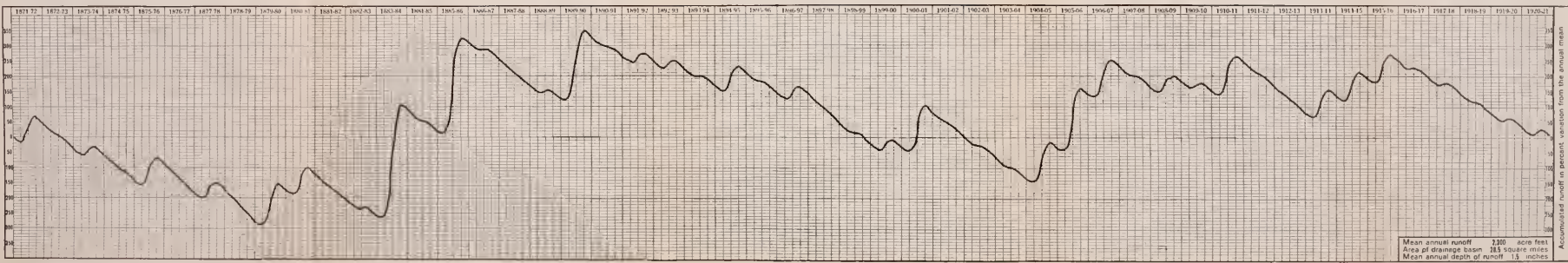
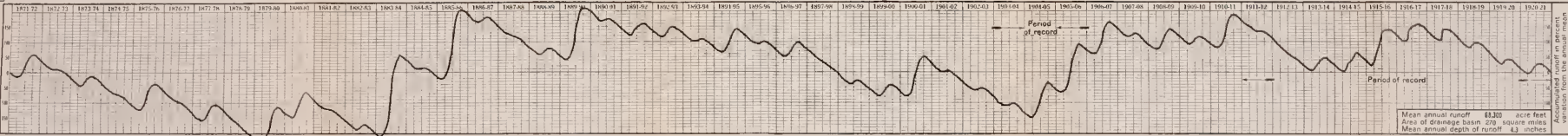
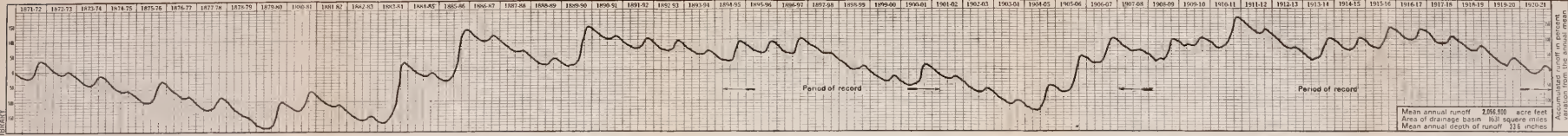
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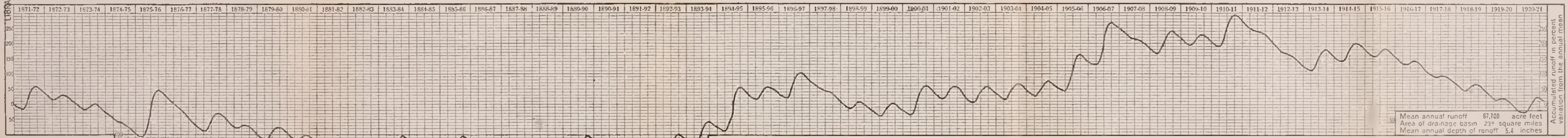
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DAULTON CREEK GROUP



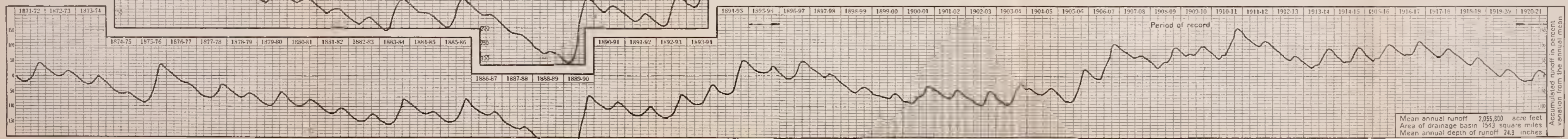
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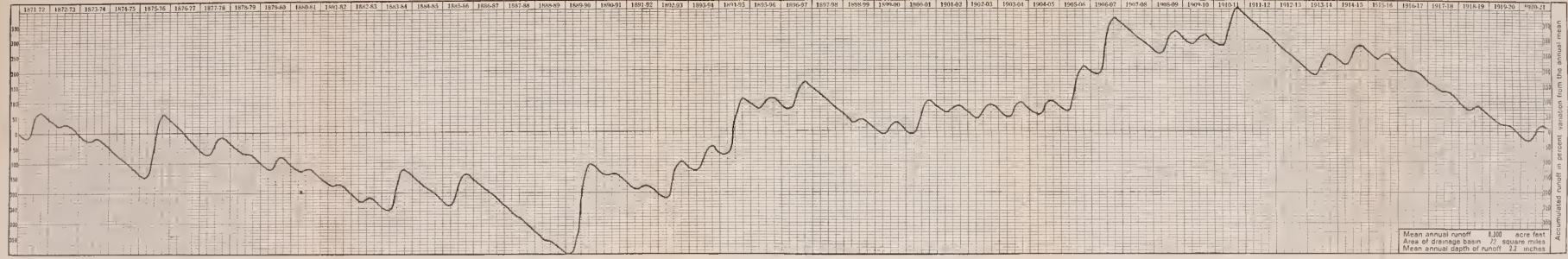
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TUOLUMNE RIVER

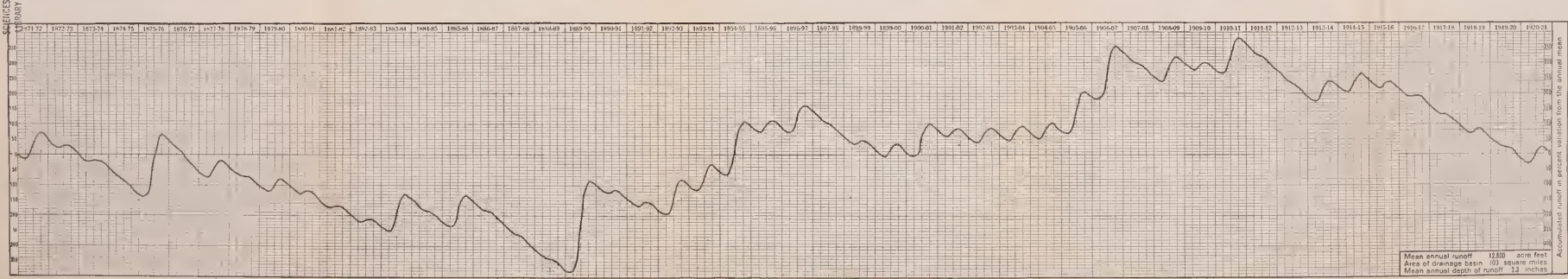
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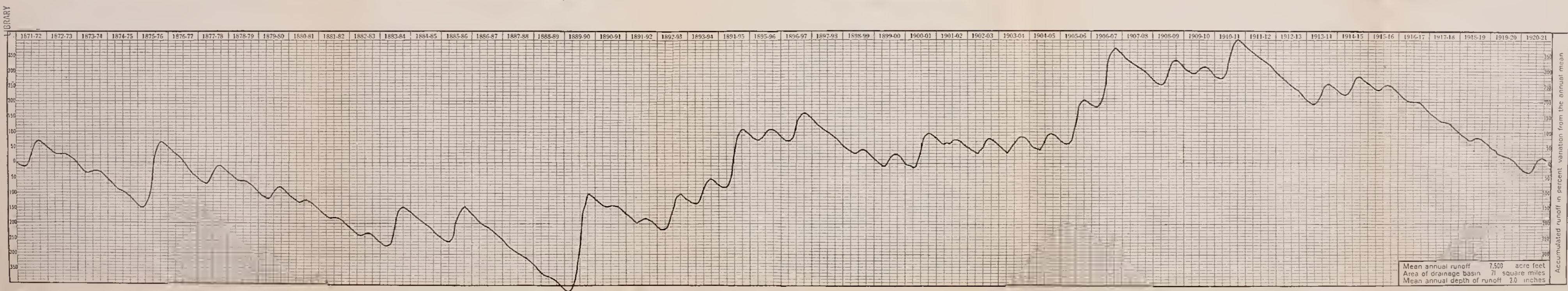
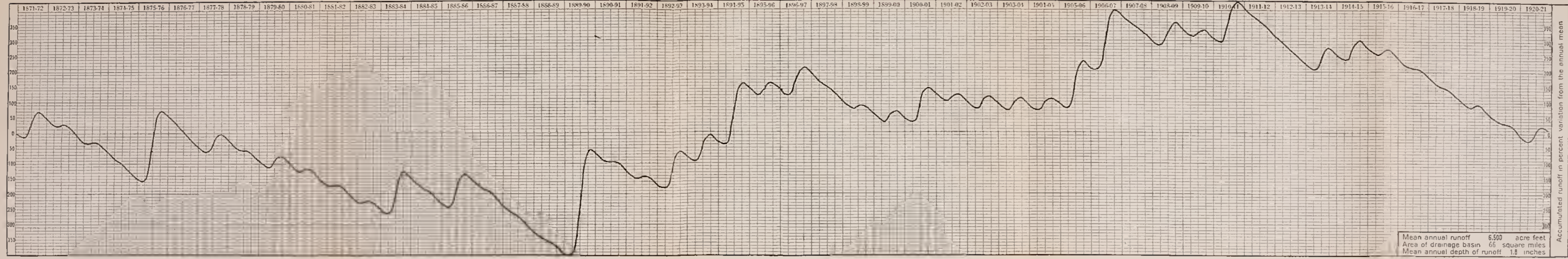
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MARIPOSA CREEK  
NEAR MERCED

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 CHAPTER 48--III--STAVES

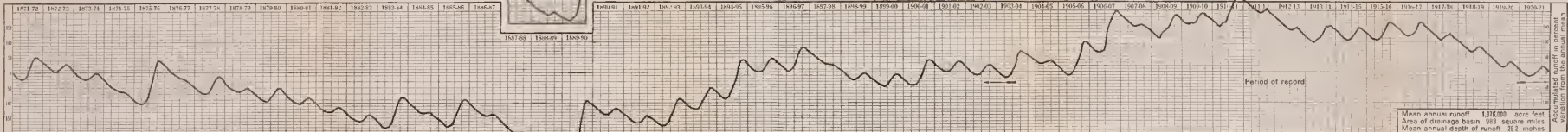
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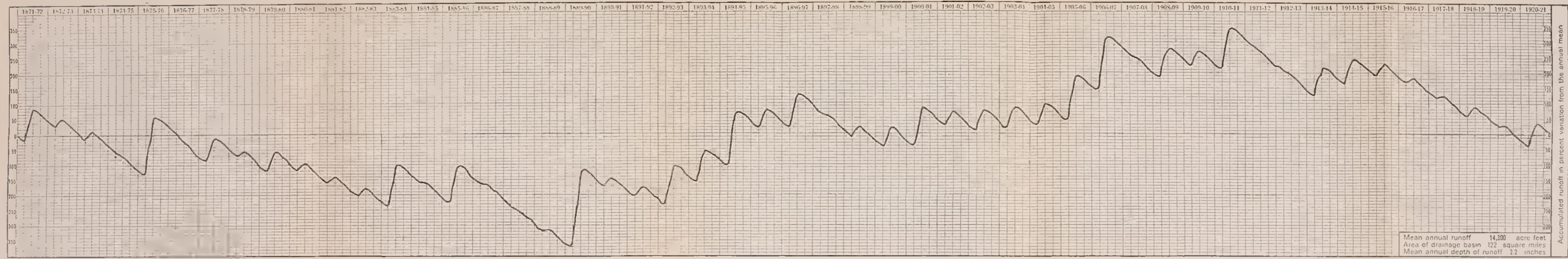
MERCED RIVER  
NEAR MERCED FALLS



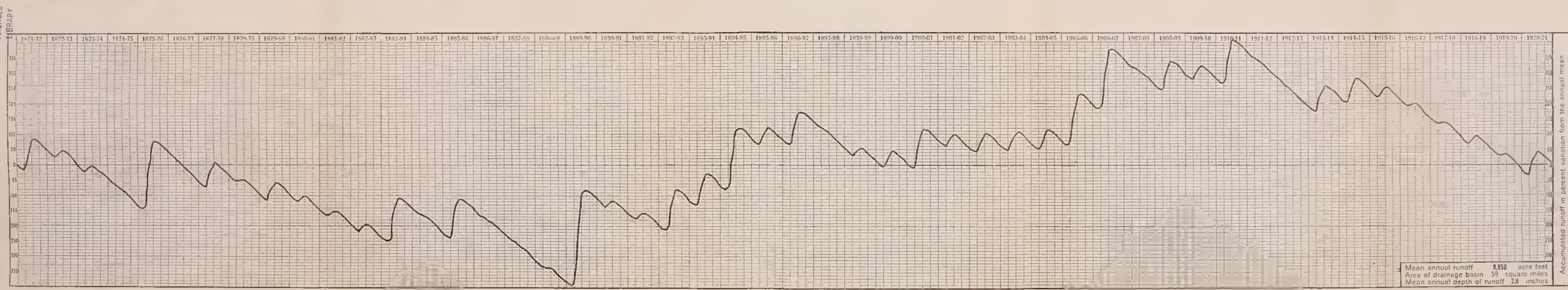
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AT KNIGHTS CROSS



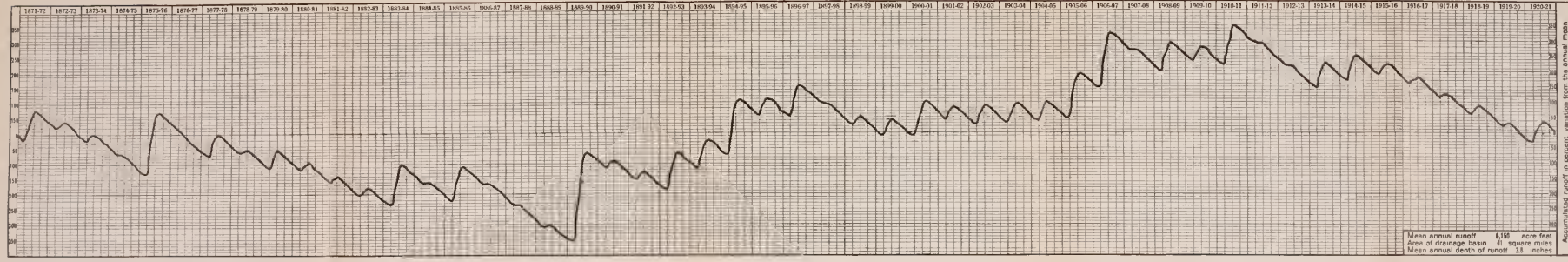
BURNS CREEK GROUP



MARTELLS CREEK GROUP

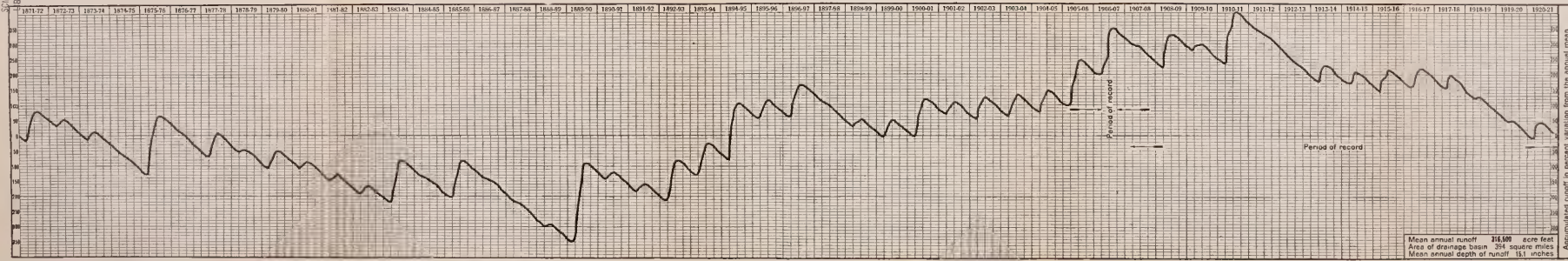


WILDCAT CREEK GROUP



LITTLEJOHNS CREEK  
NEAR HIGHTS FERRY

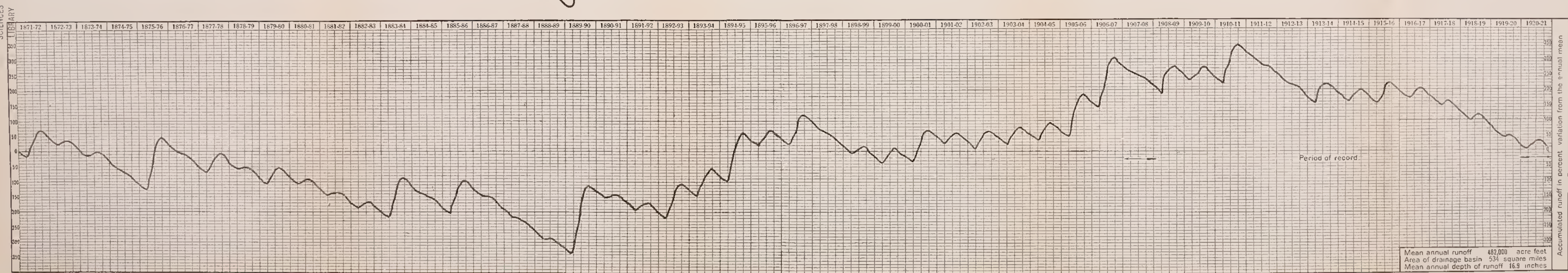
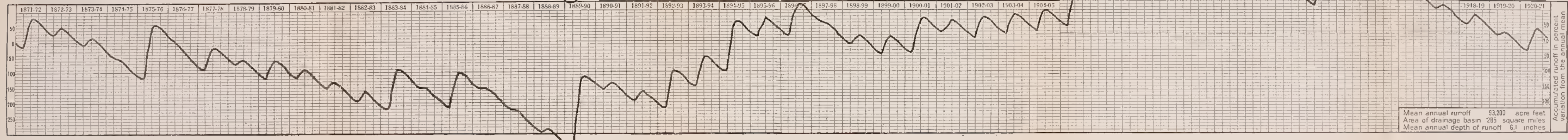
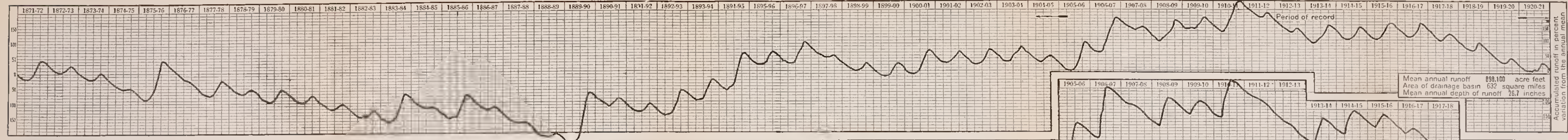
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CALAVERAS RIVER  
AT JERRY LIND

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SURVEYS

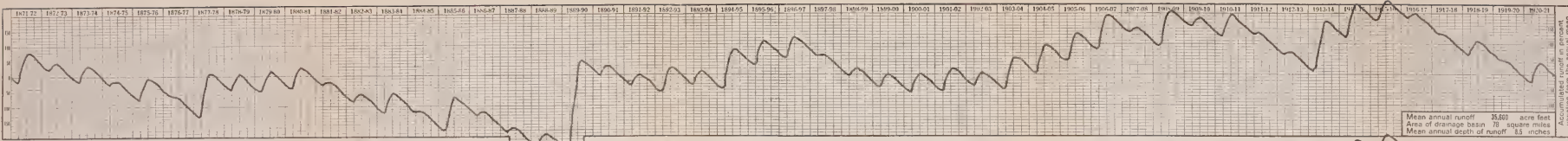
AT BASE OF FOOTHILLS

AT BASE OF FOOTHILLS

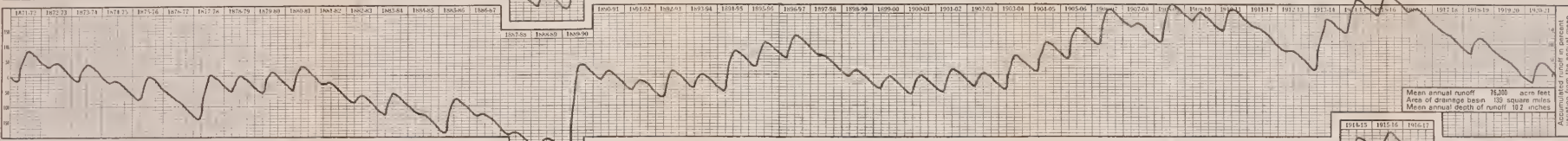
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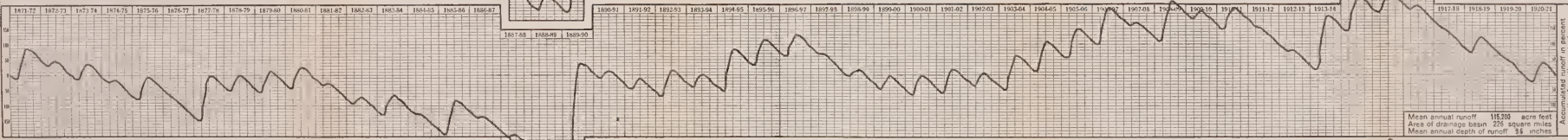
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CHAPTER 89 - 181 (PLATE)



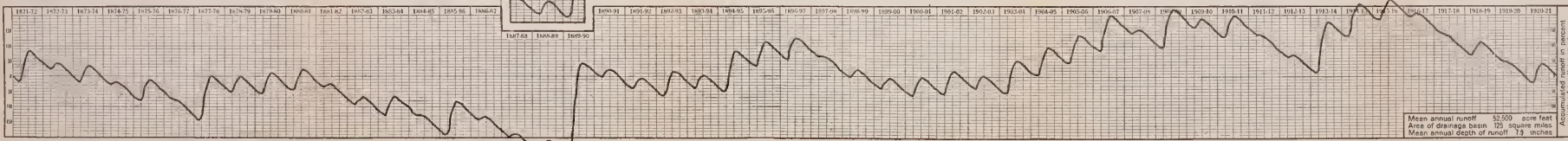
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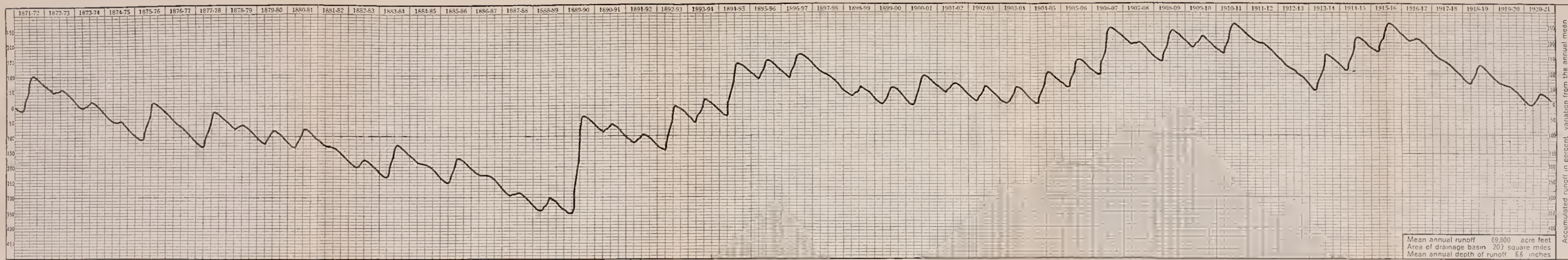
PETALUMA CREEK GROUP



NAPA RIVER TRIBUTARIES

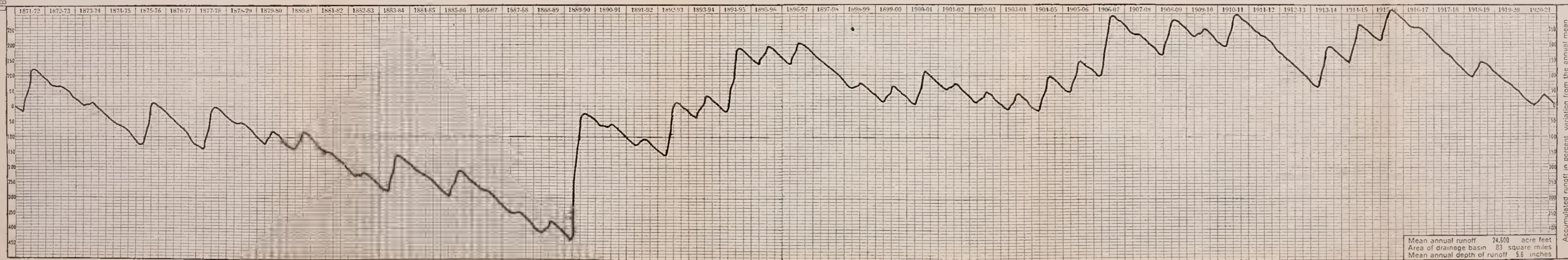


SUISUN CREEK GROUP



MOUNT DIABLO CREEK GROUP

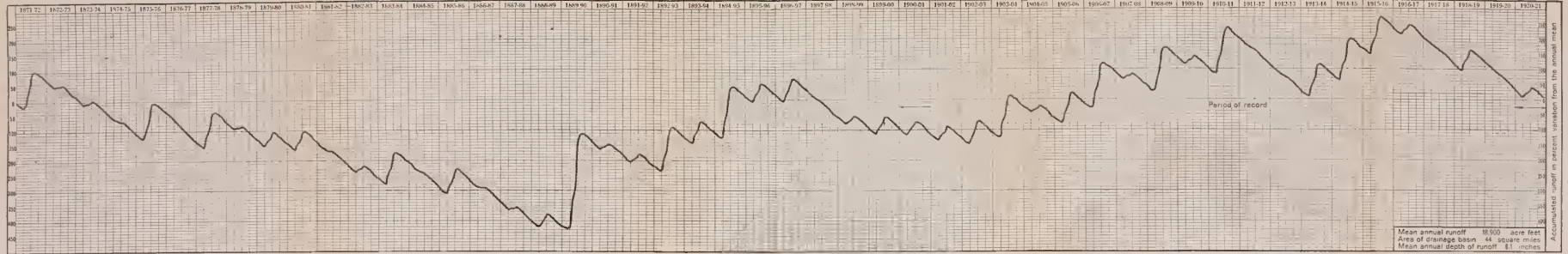
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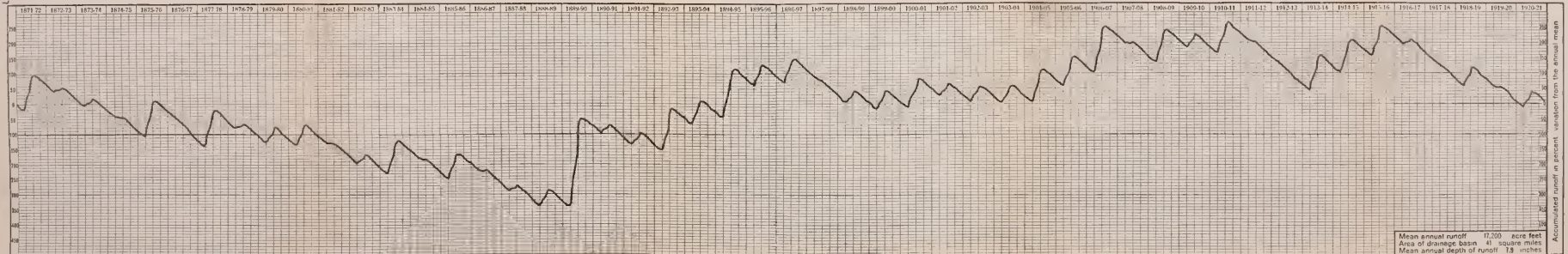
CLAREMONT CREEK GROUP

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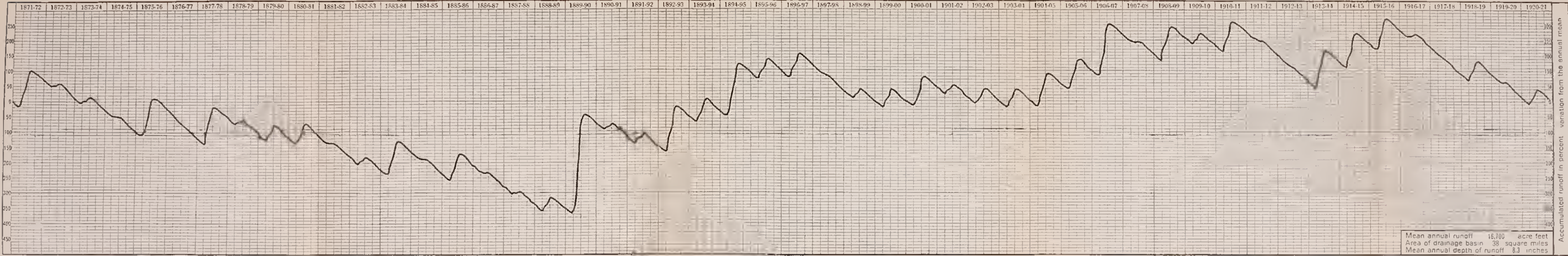
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SAN LEANDRO CREEK  
NEAR SAN LEANDRO



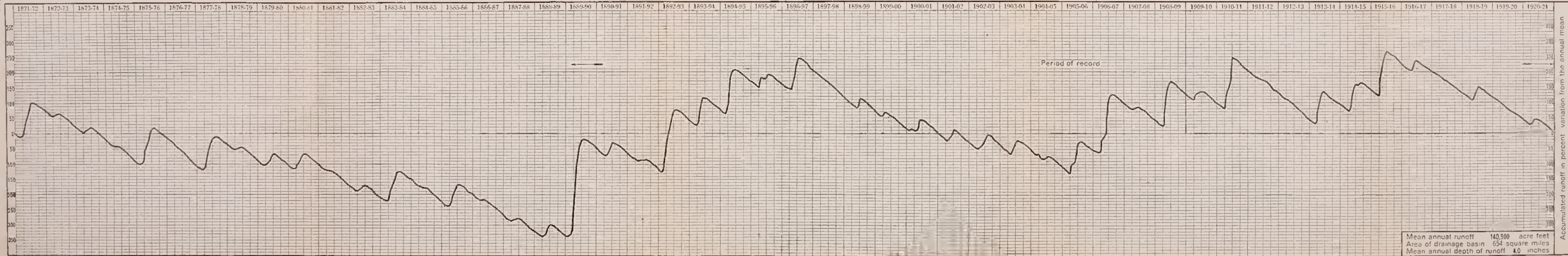
SAN PABLO CREEK  
NEAR SAN PABLO



SAN LORENZO CREEK

NEAR SAN LORENZO

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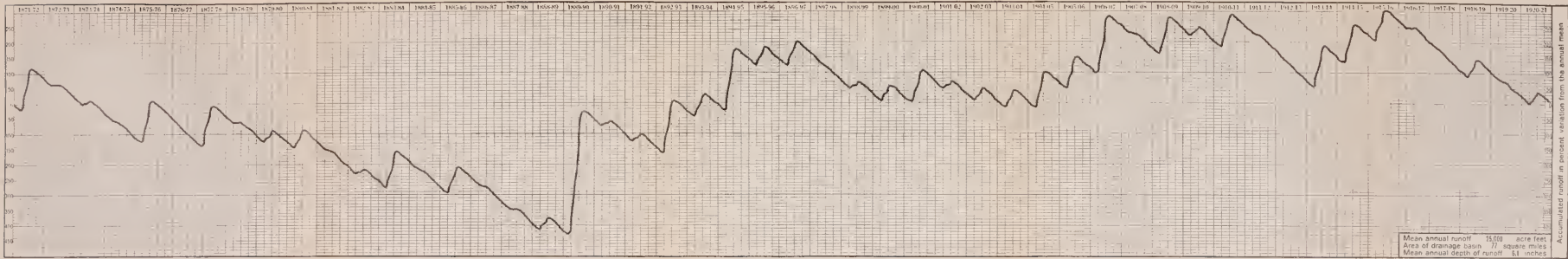
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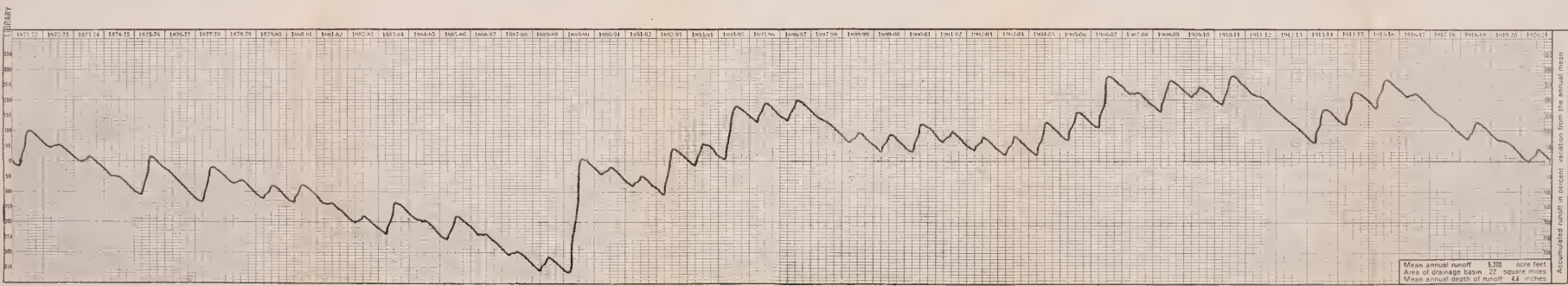
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MISSION CREEK GROUP

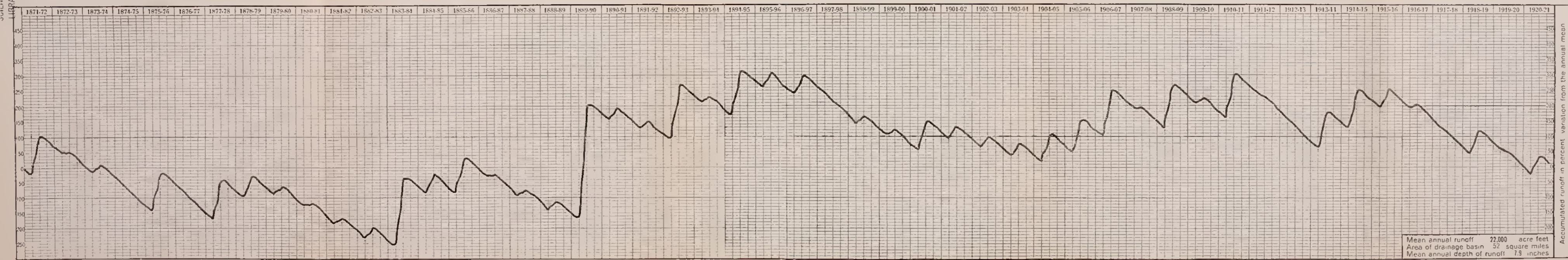
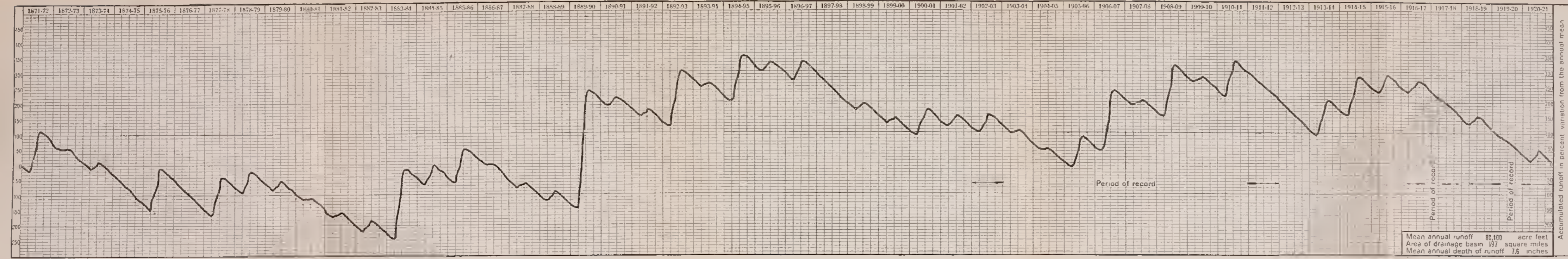
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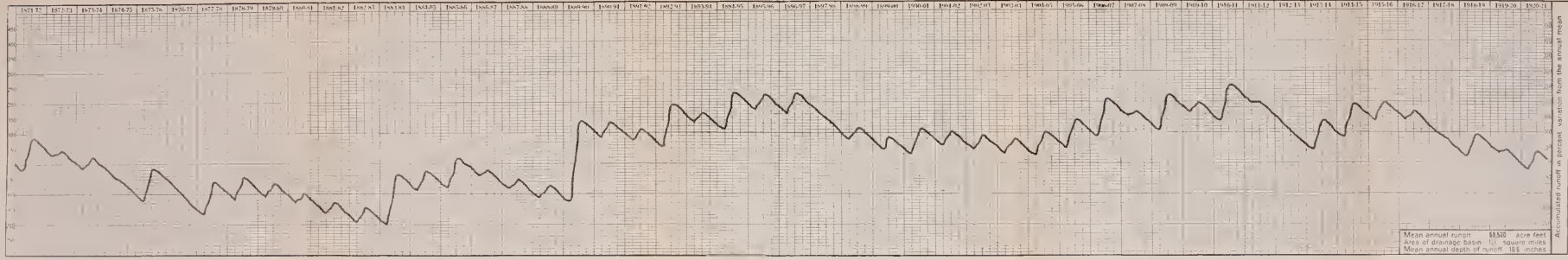


PENTENCIA CREEK

NEAR SAN JOSE

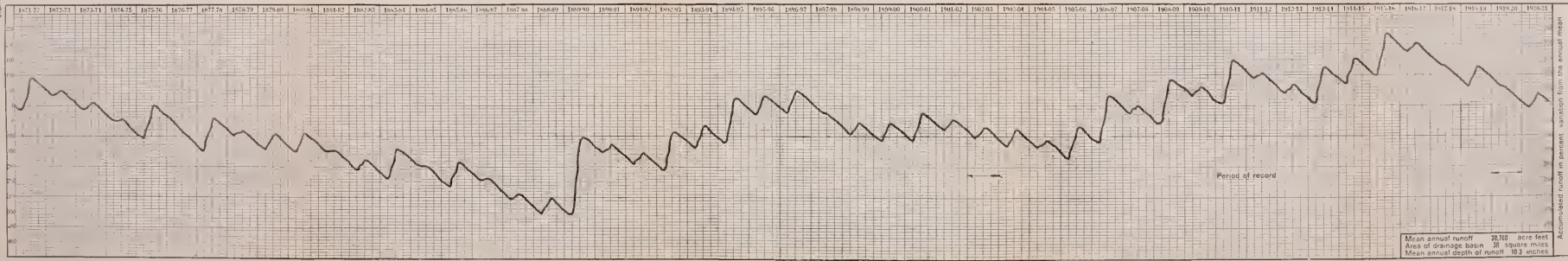
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COURTESY U.S. GEOLOGICAL SURVEY





LOS GATOS CREEK GROUP

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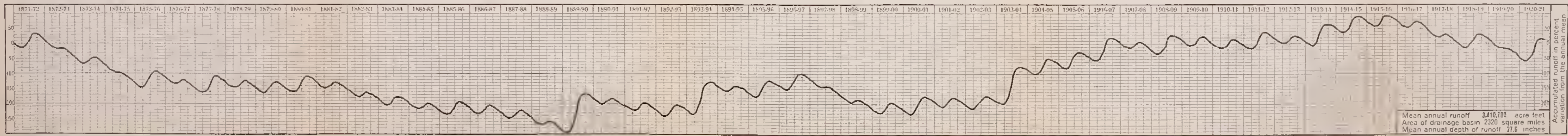
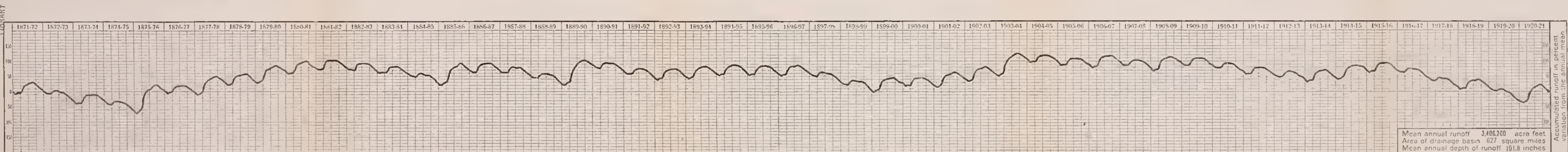
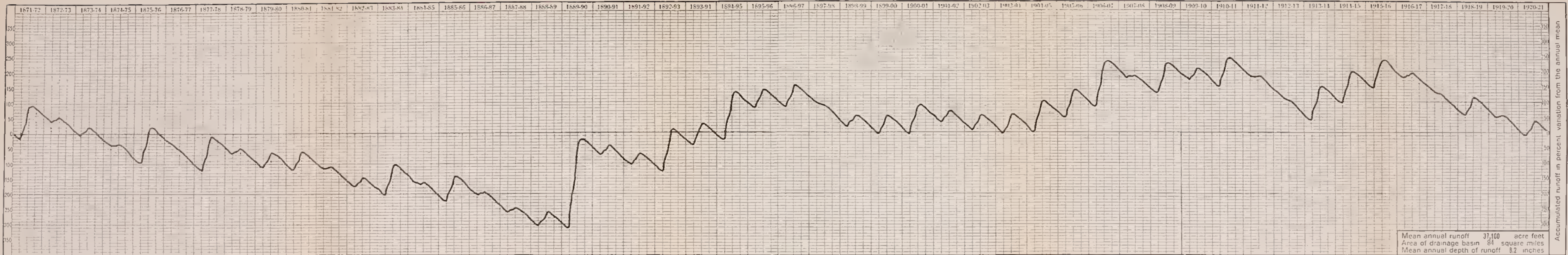


SAN FRANCISQUITO CREEK

HEAD PALO ALTO

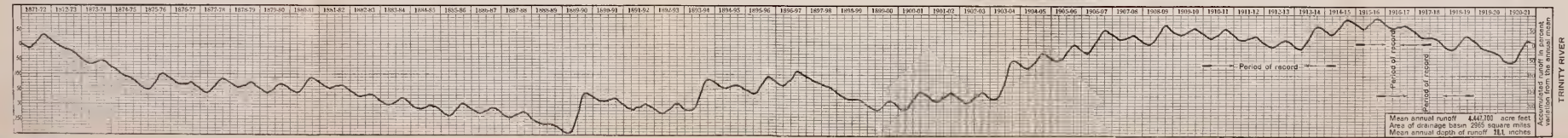
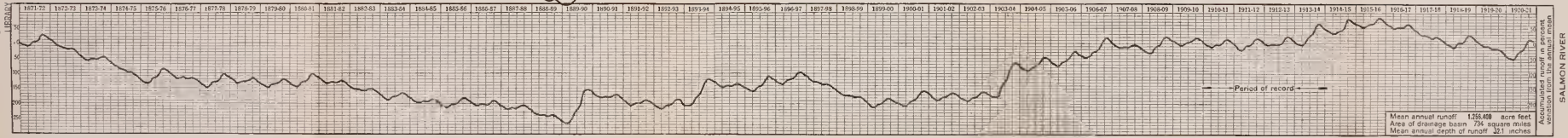
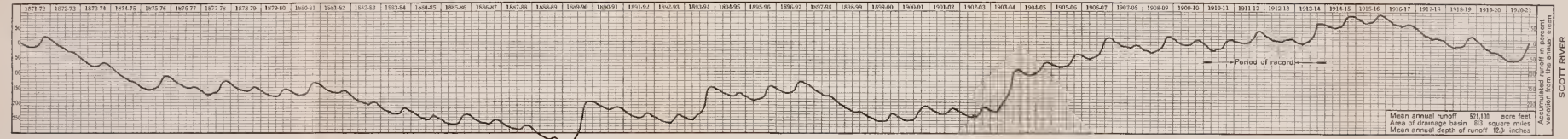
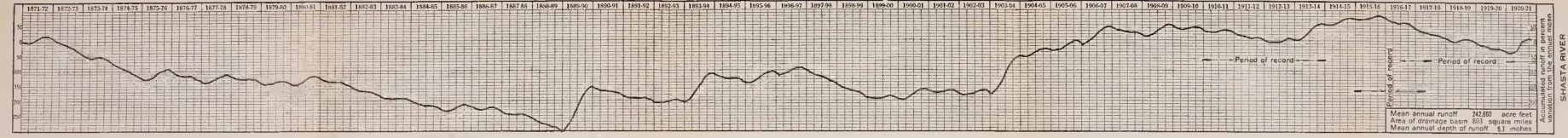
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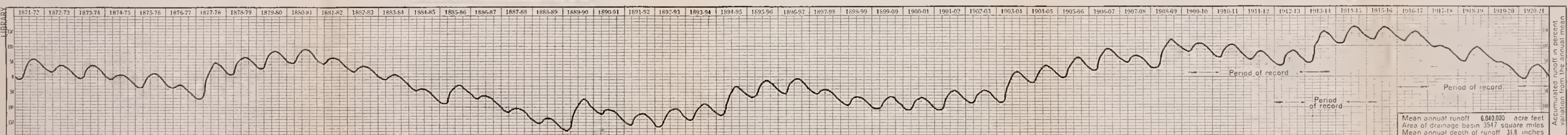
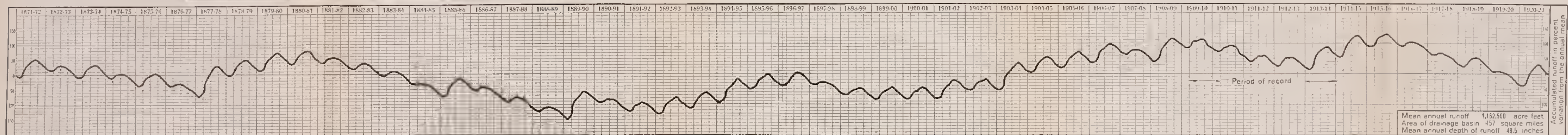
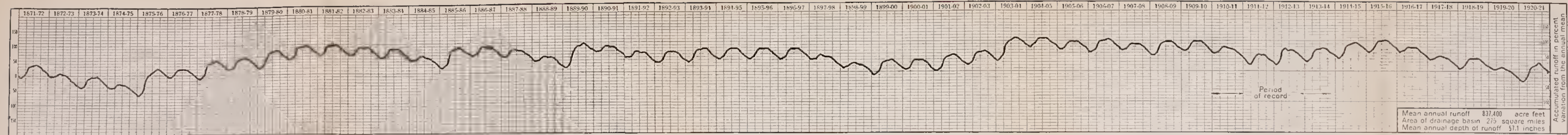
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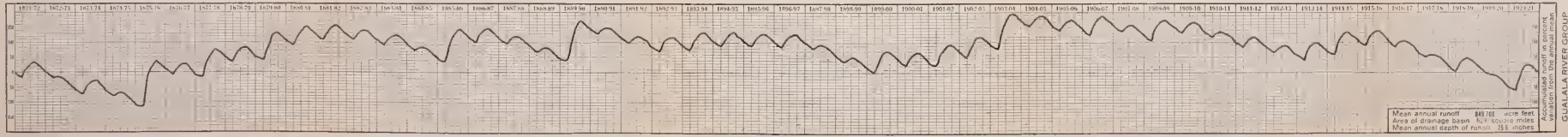
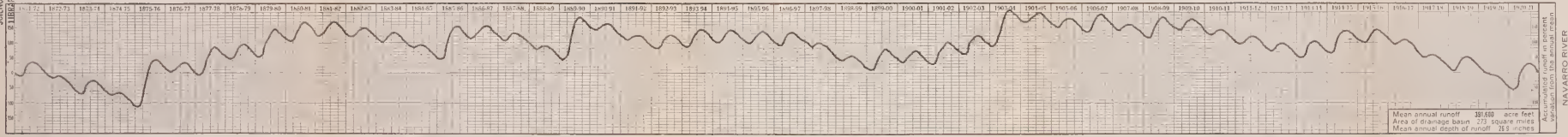
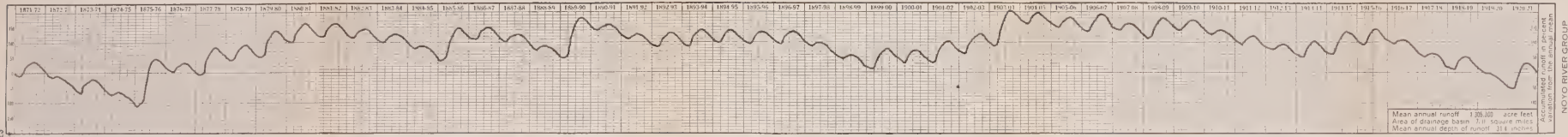
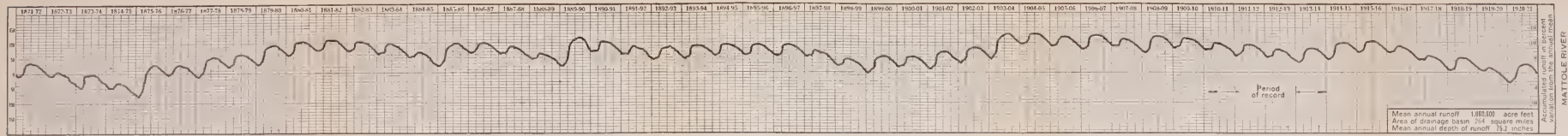


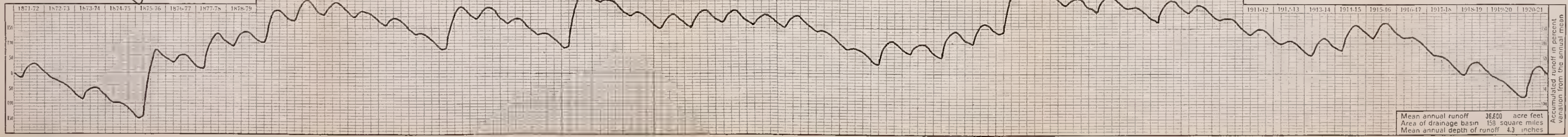
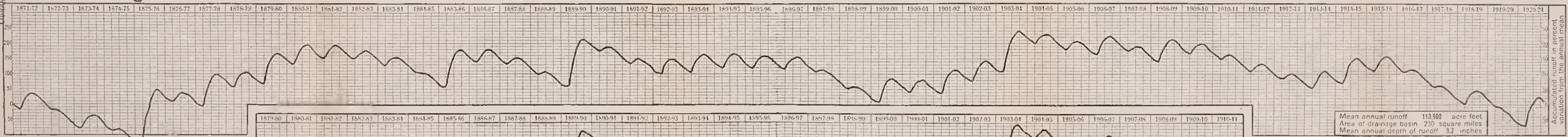
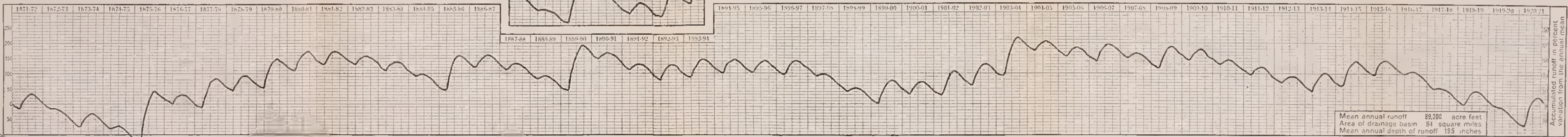
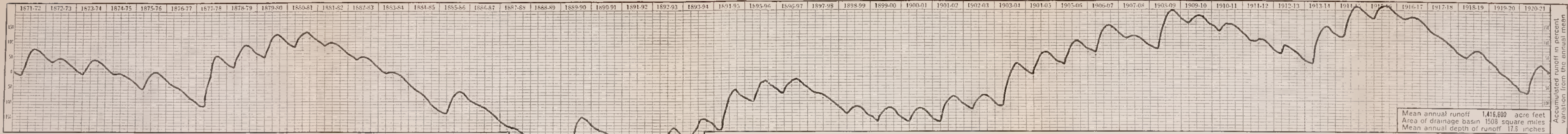
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RUSSIAN RIVER  
AT TIDEWATER

LAGUNITAS CREEK  
AT TIDEWATER

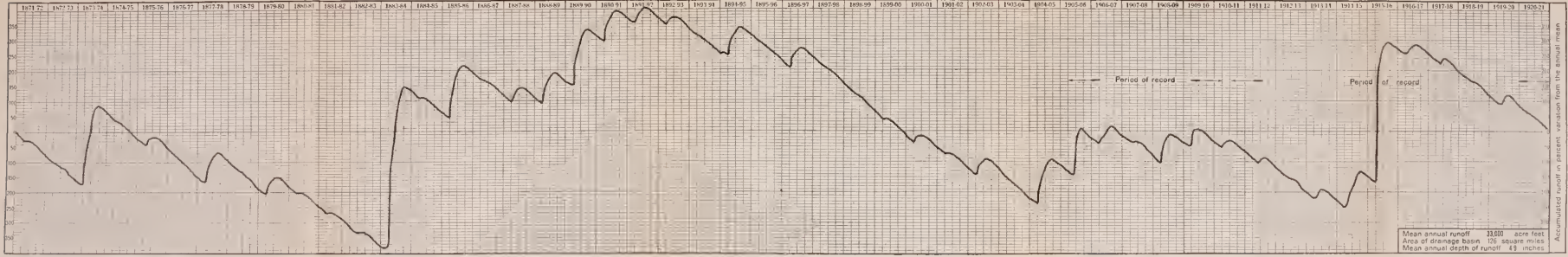
SALMON CREEK GROUP  
AT TIDEWATER

BOLINAS CREEK GROUP  
AT TIDEWATER

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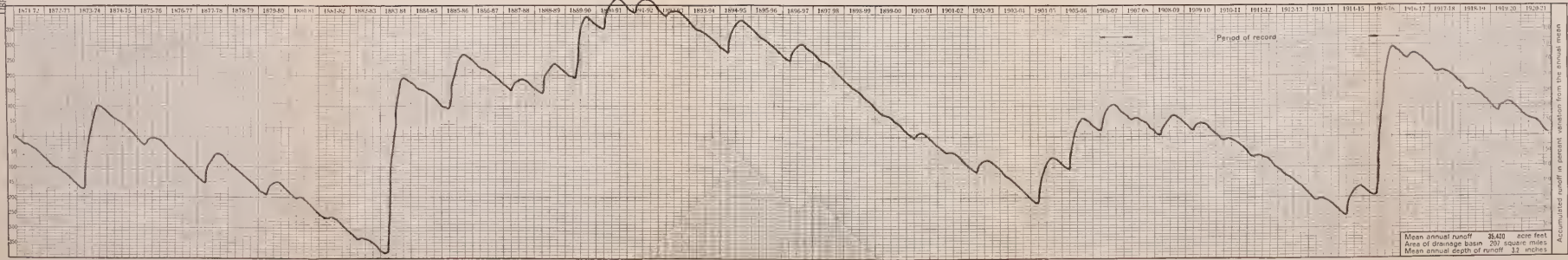
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SANTA YSABEL CREEK  
NEAR ESCOBEDO

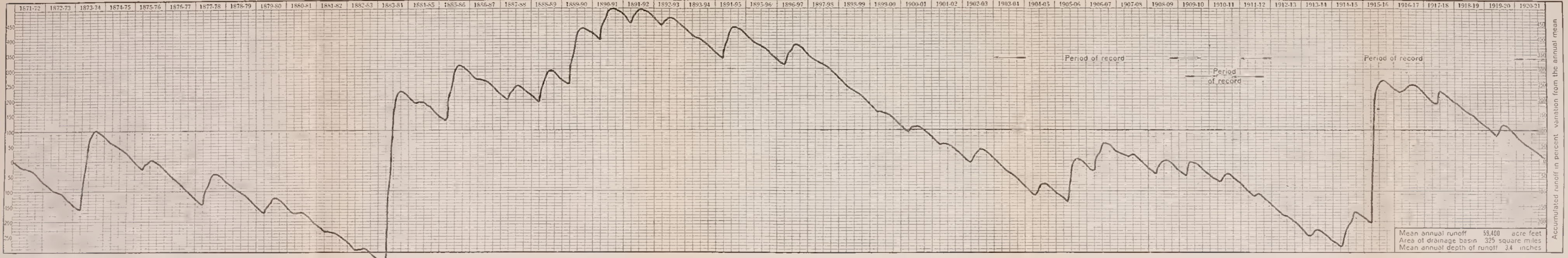
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SAN DIEGO RIVER  
NEAR FLACKS

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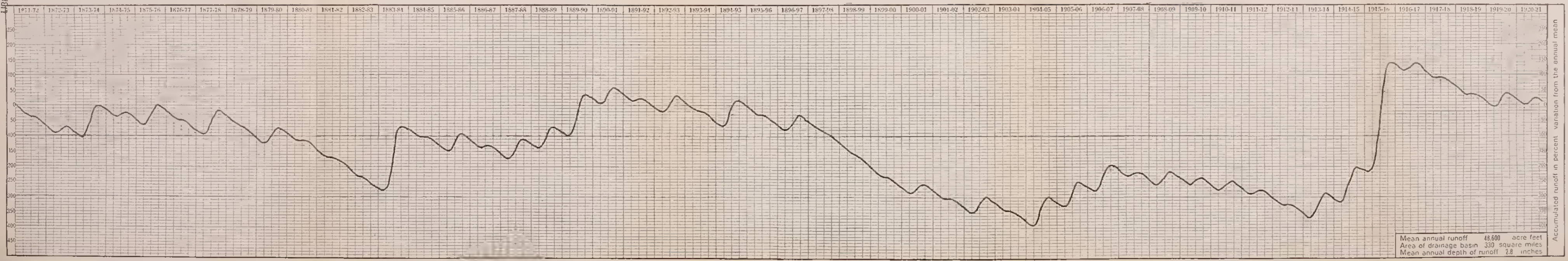
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SAN LUIS REY RIVER

HEAVY PALE

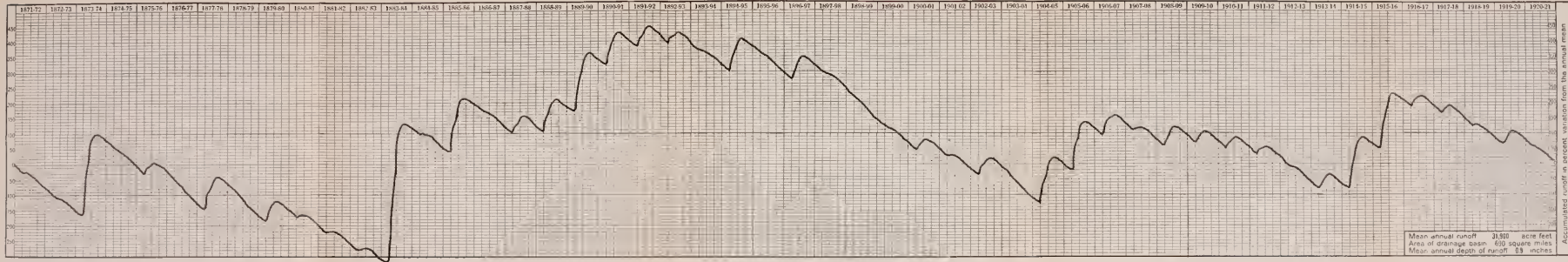
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SAN JACINTO RIVER TRIBUTARIES

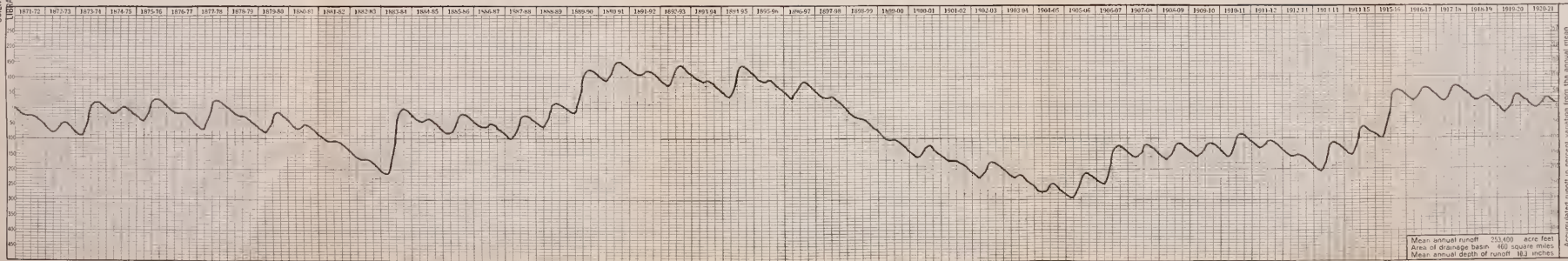
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SANTA MARGARITA RIVER  
 PLUM FALLS STATION

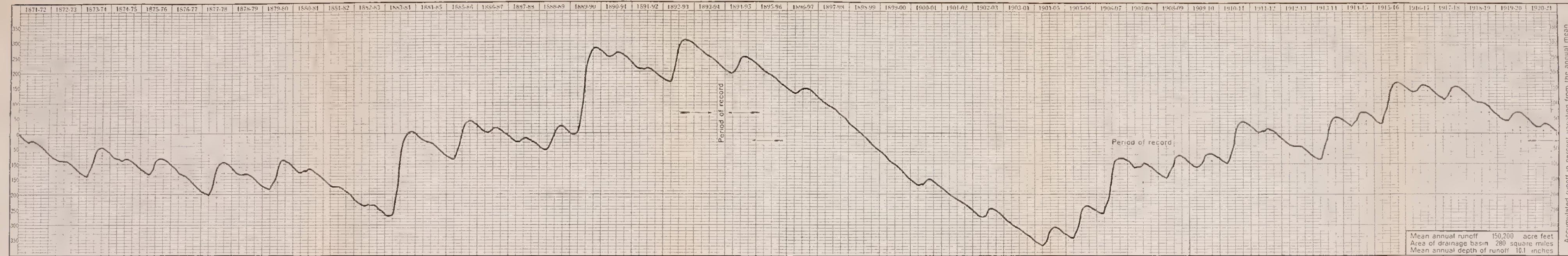
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SANTA ANA RIVER TRIBUTARIES  
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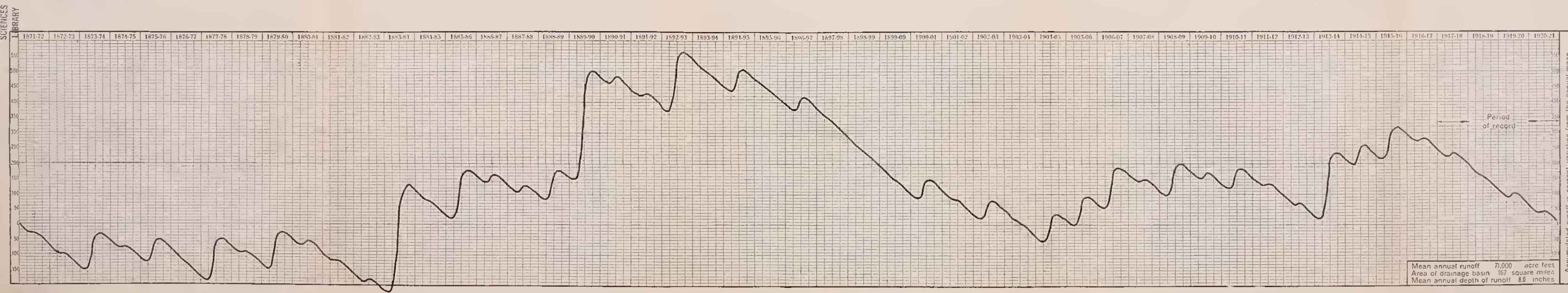
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SAN GABRIEL RIVER TRIBUTARIES  
AT BASE OF FOOTHILLS

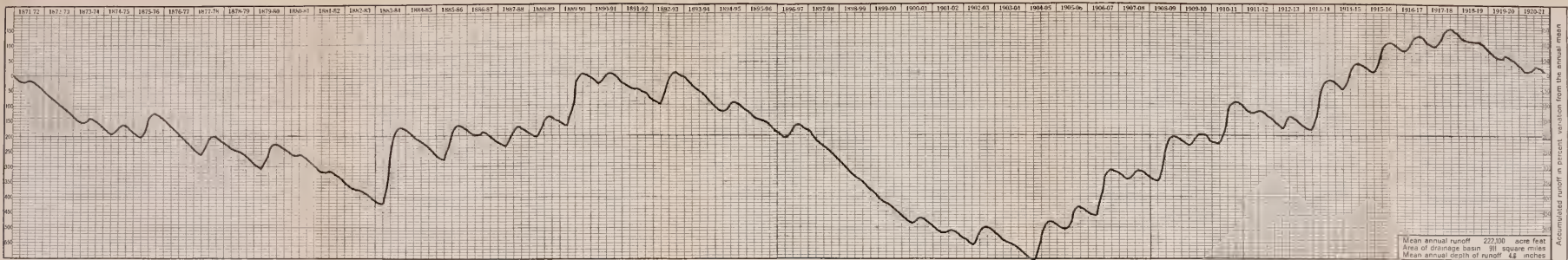
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LOS ANGELES RIVER TRIBUTARIES  
AT BASE OF FOOTHILLS

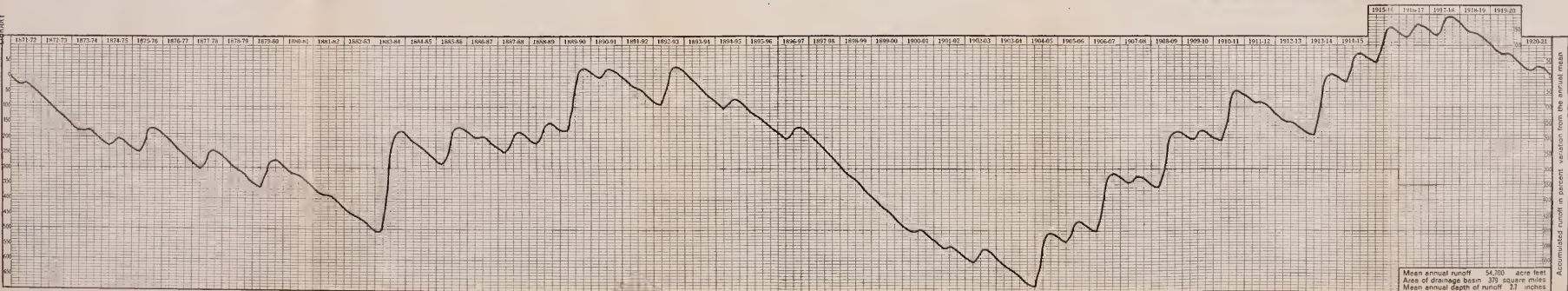
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SANTA CLARA RIVER TRIBUTARIES

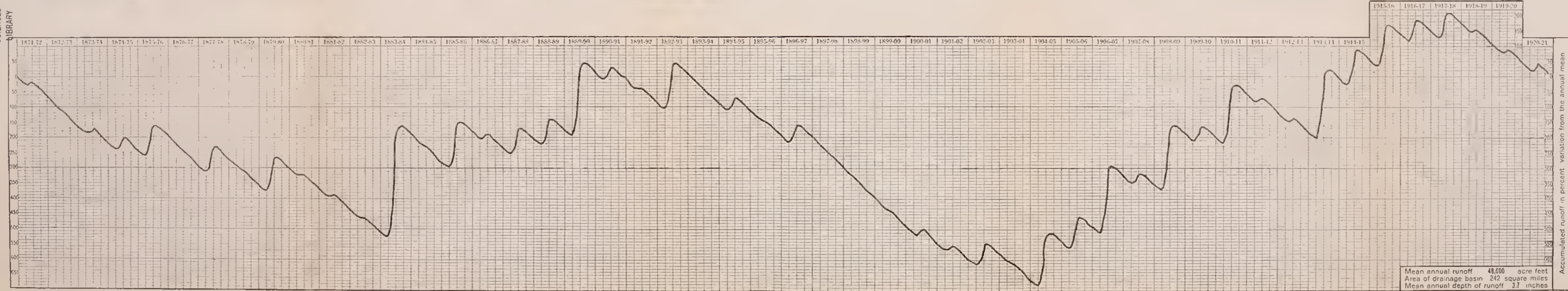
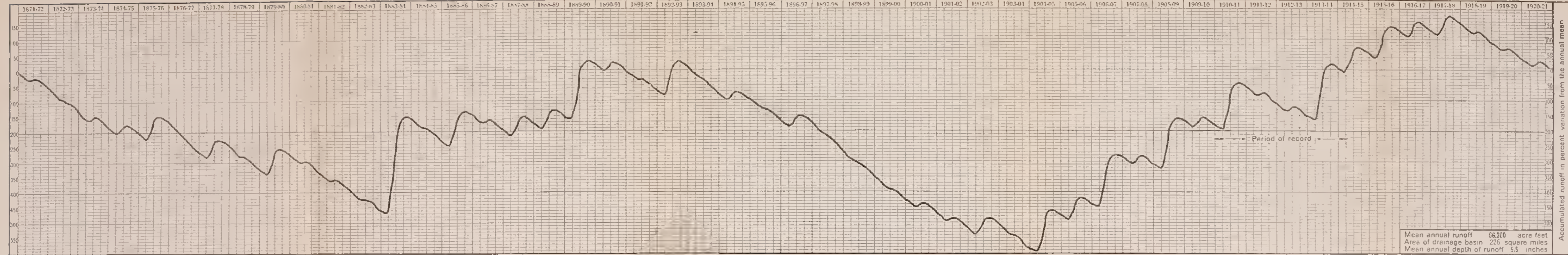


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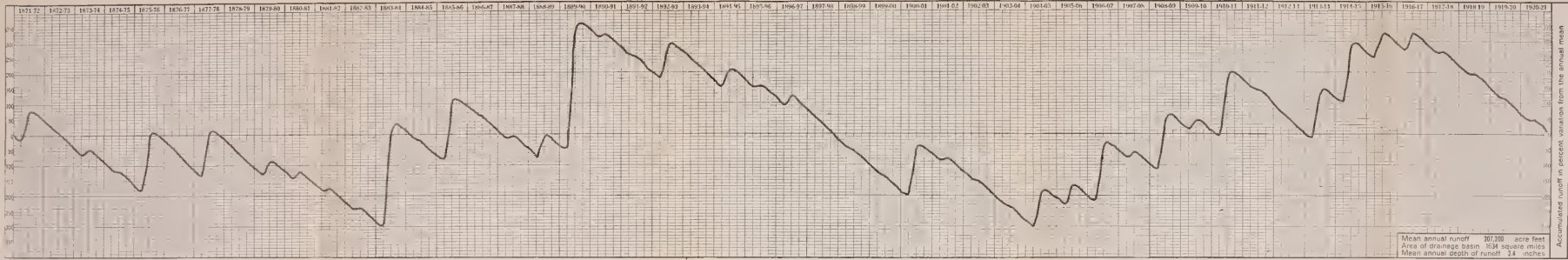
MALIBU RIVER GROUP  
 NEAR COAST



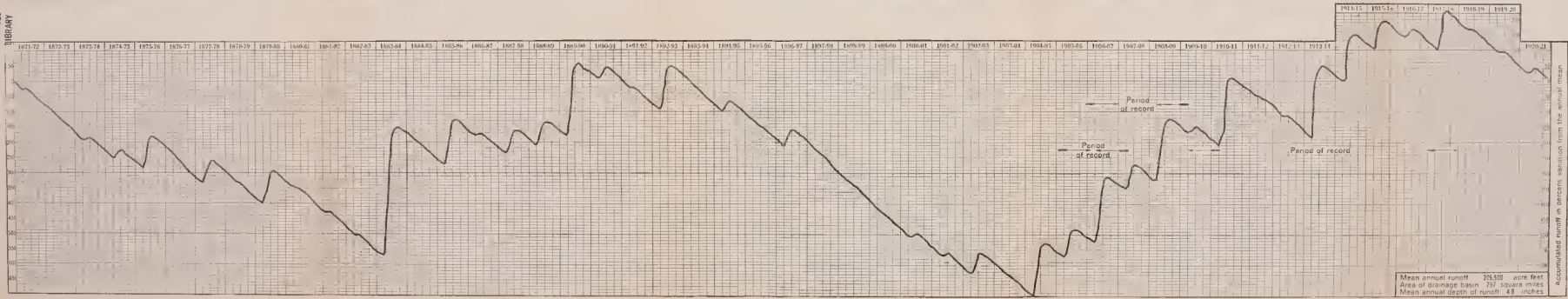
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SANTA MARIA RIVER  
NEAR SANTA MARIA

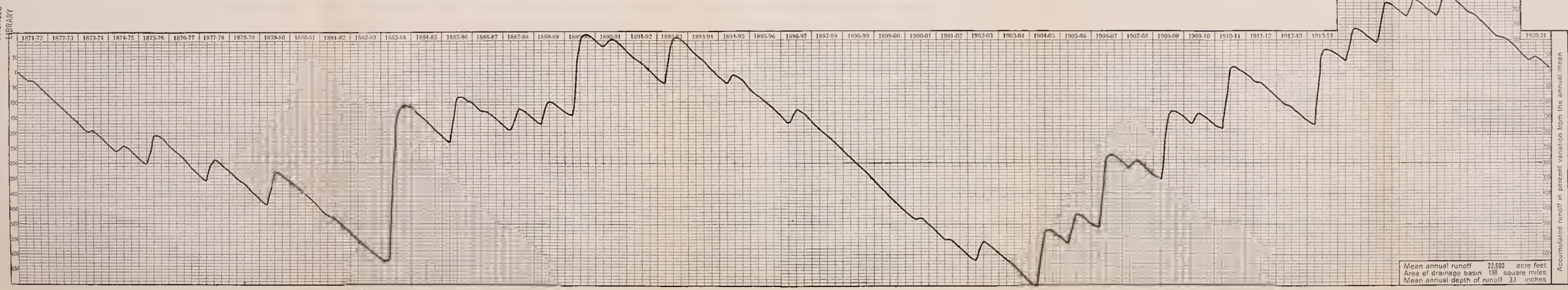
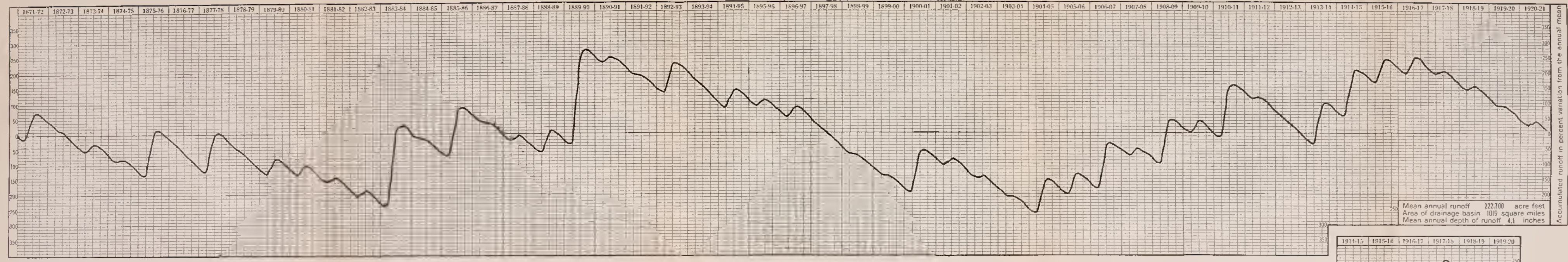


SANTA YNEZ RIVER  
NEAR LOMPOC

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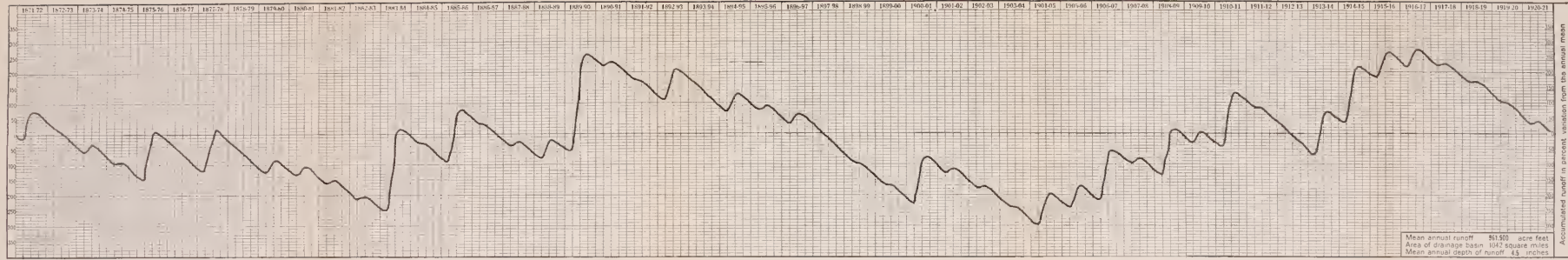
SAN LUIS OBISPO CREEK GROUP  
NEAR COAST

SAN ANTONIO CREEK  
AT MOUTH

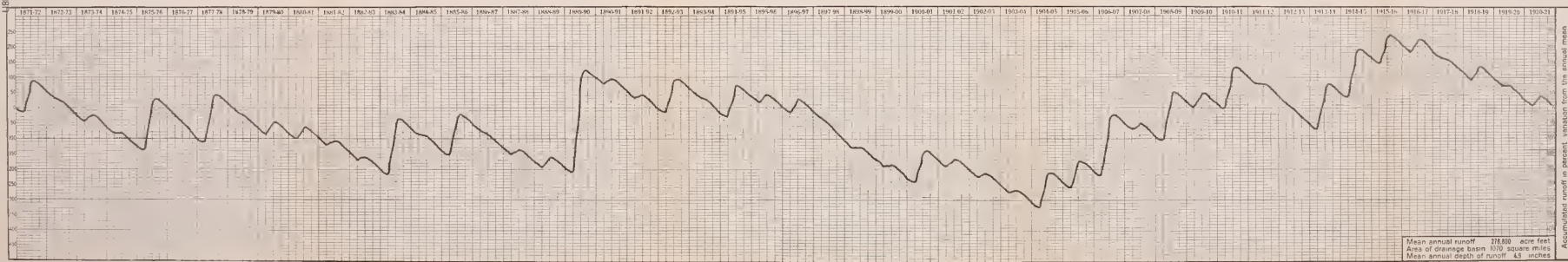
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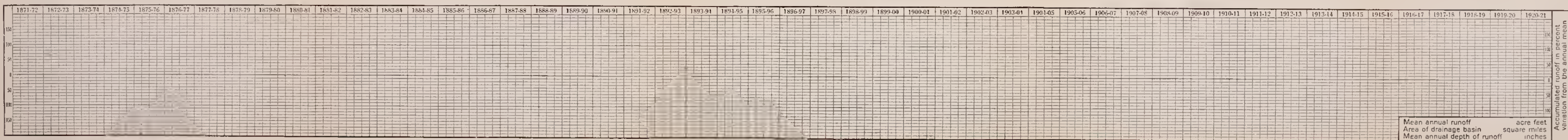
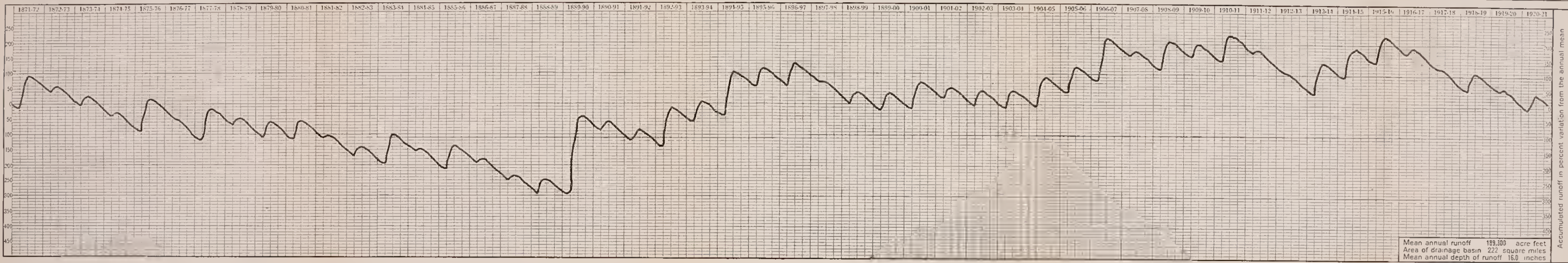
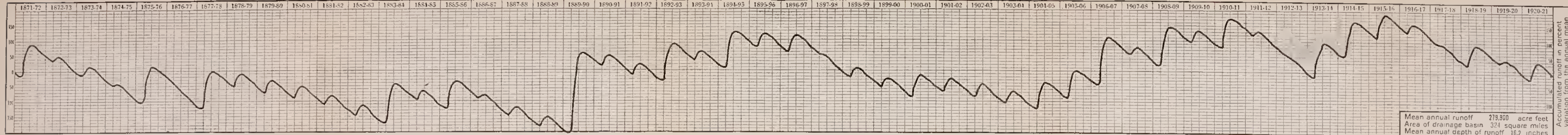
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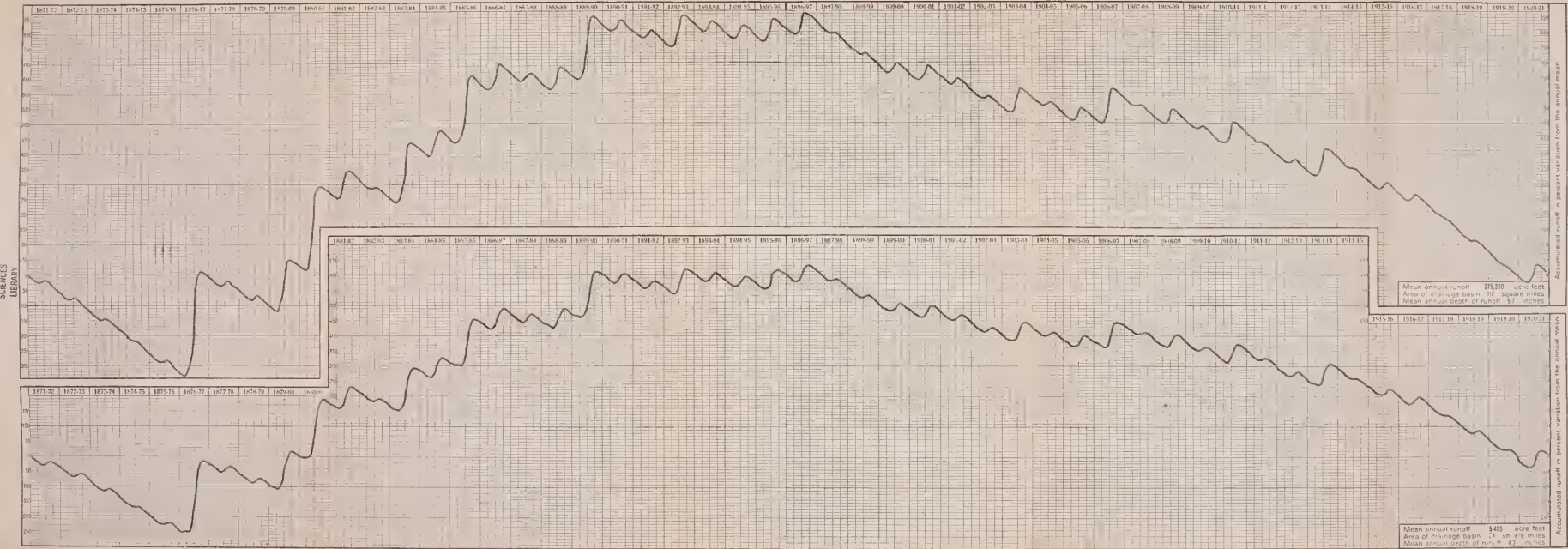
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Mean annual runoff 275,200 acre feet  
 Area of drainage basin 90 square miles  
 Mean annual depth of runoff 37 inches

Mean annual runoff 5,400 acre feet  
 Area of drainage basin 24 square miles  
 Mean annual depth of runoff 47 inches

TULE LAKE GROUP

COWHEAD LAKE GROUP

AT CORNICO LAKE

MASS DIAGRAMS OF RUNOFF

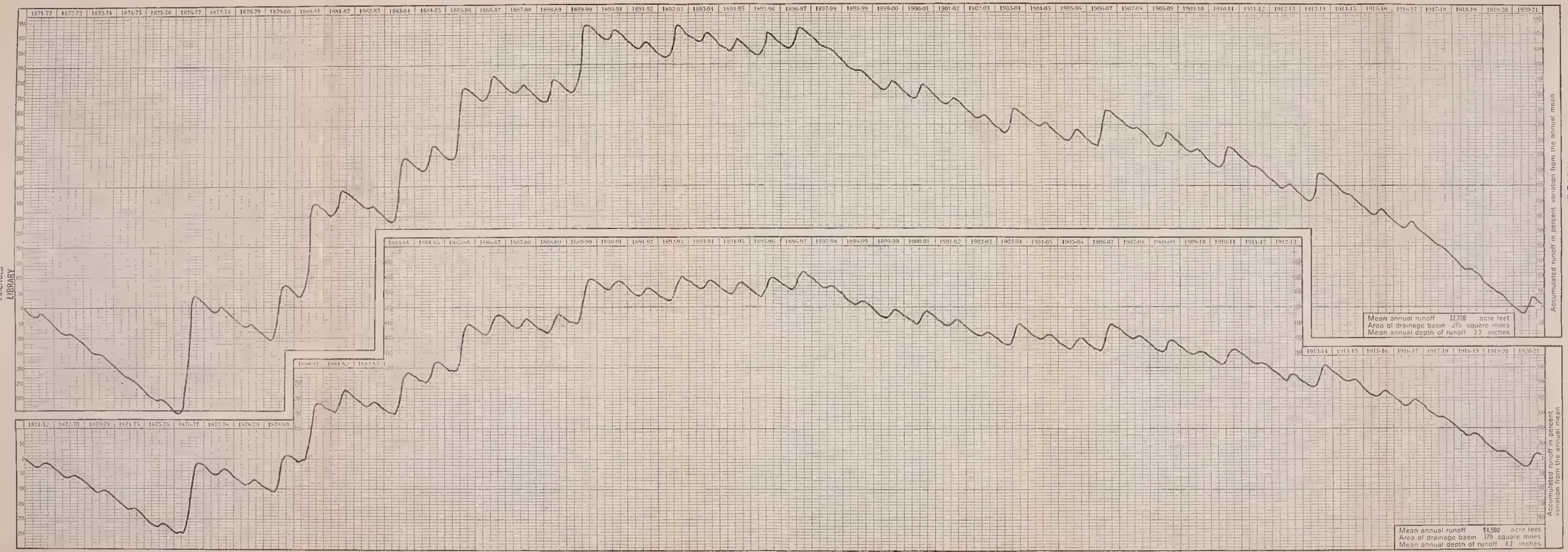
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GOOSE LAKE BASIN  
AT GOOSE LAKE

SURPRISE VALLEY GROUP  
AT 4800 FEET CONTOUR

MASS DIAGRAMS OF RUNOFF

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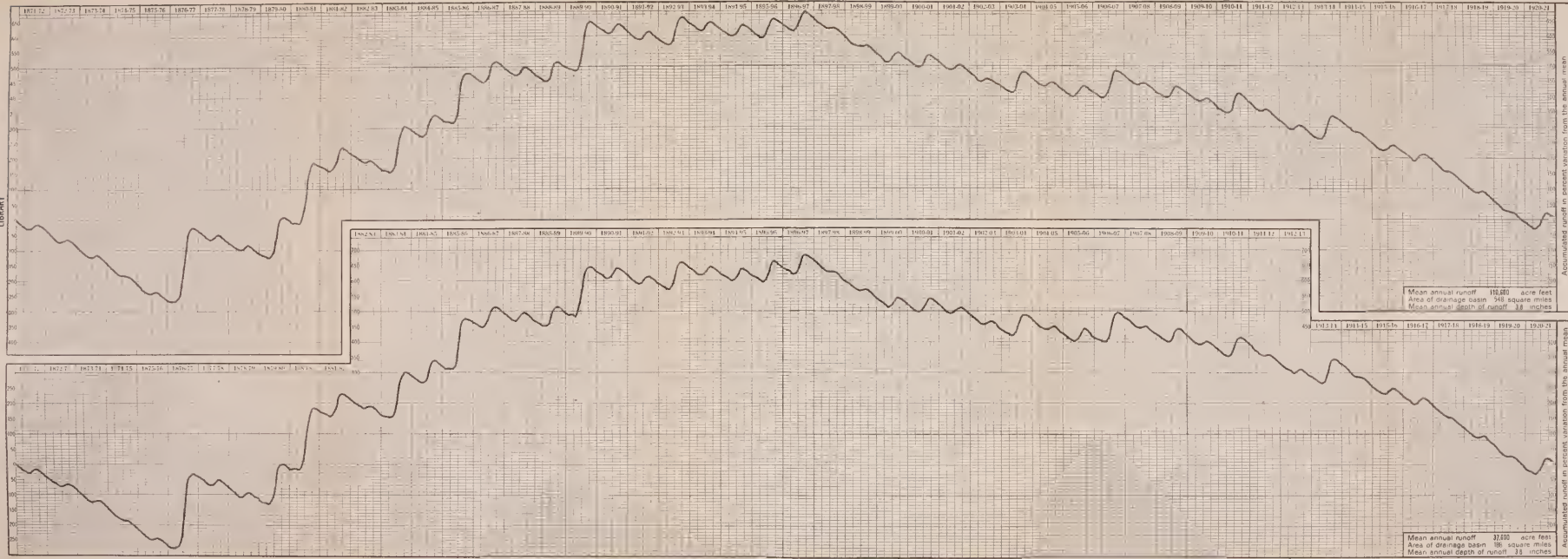
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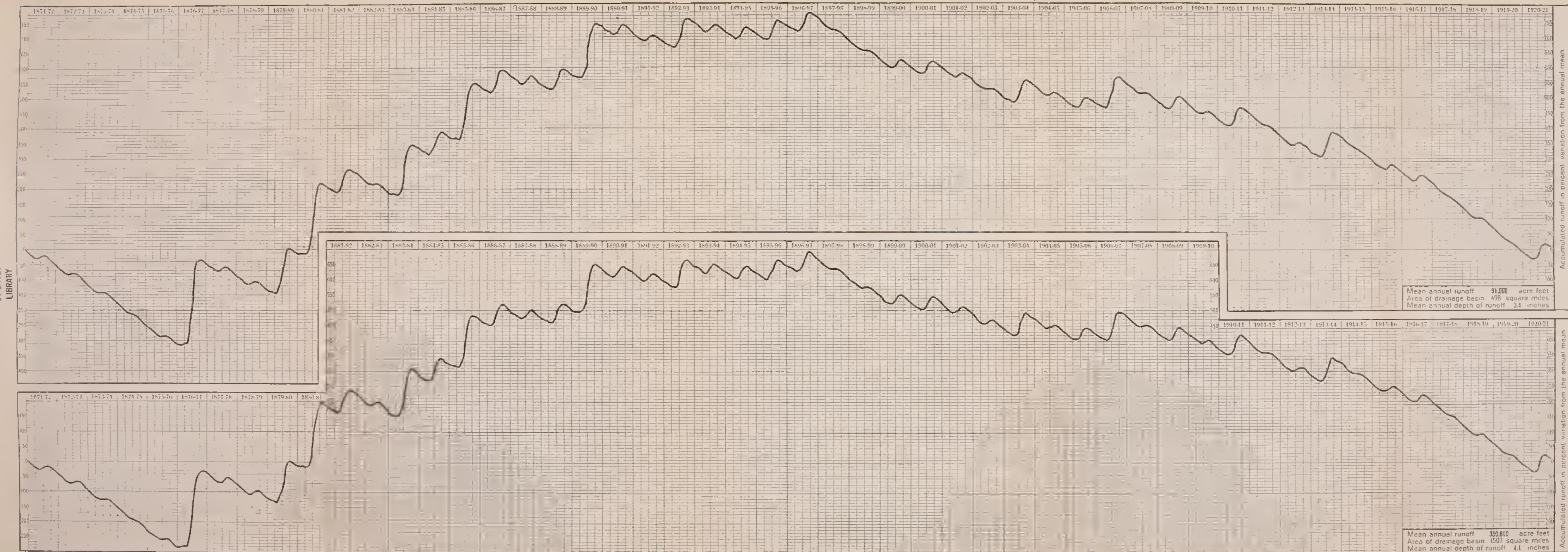
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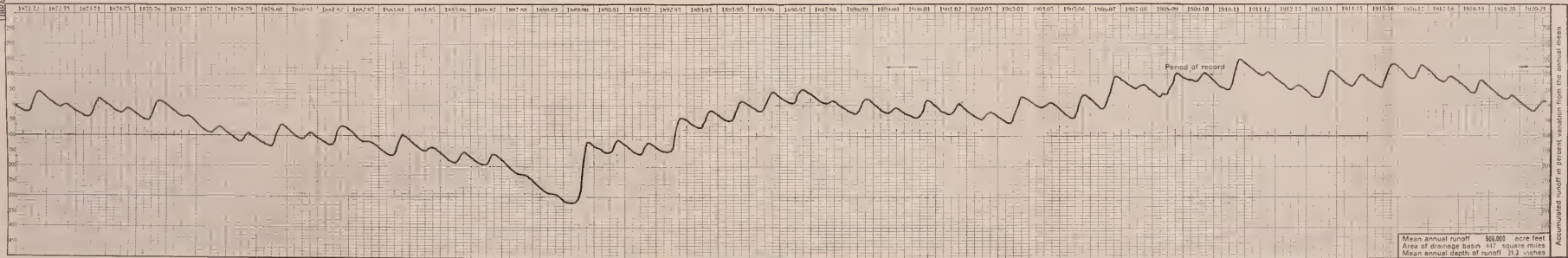
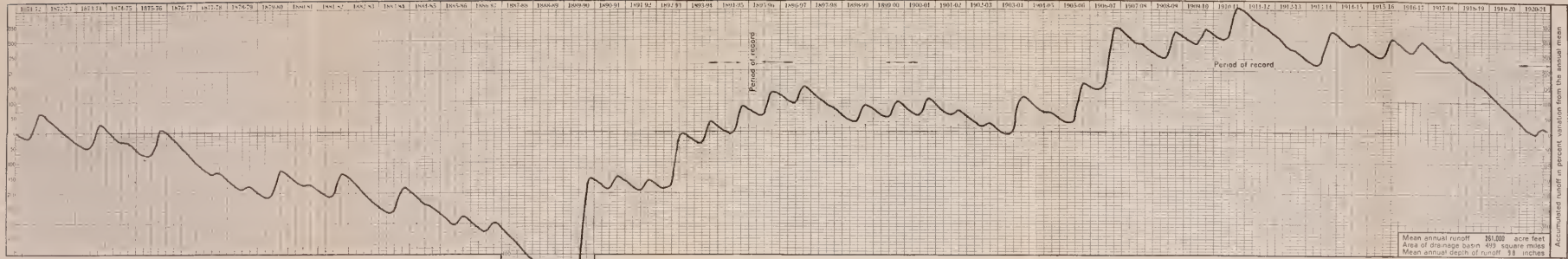
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EAGLE LAKE GROUP  
AT EAGLE LAKE

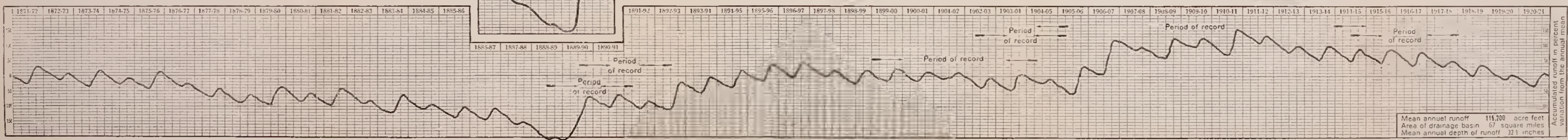
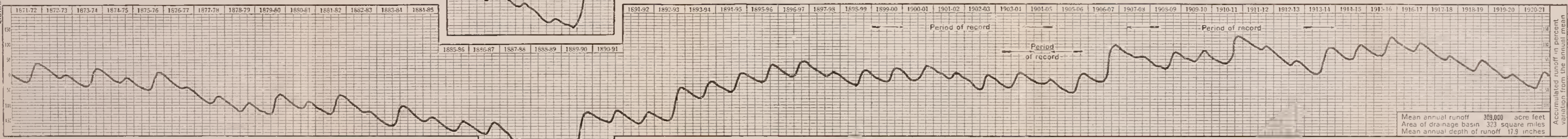
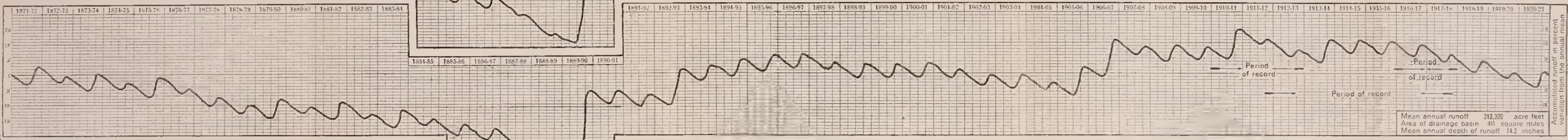
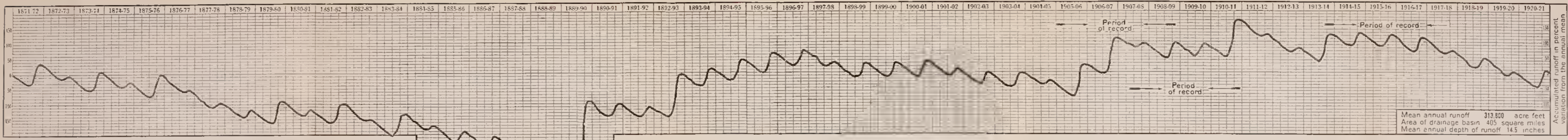
HONEY LAKE GROUP  
ABOVE AGRICULTURAL AREA



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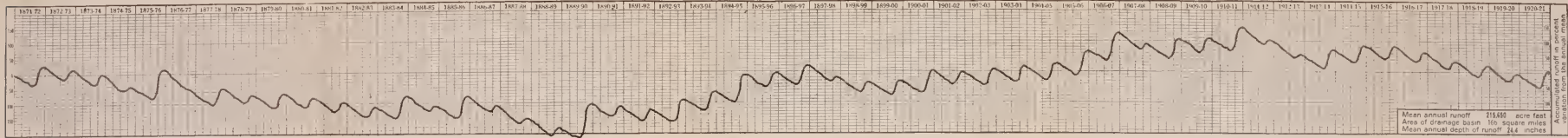
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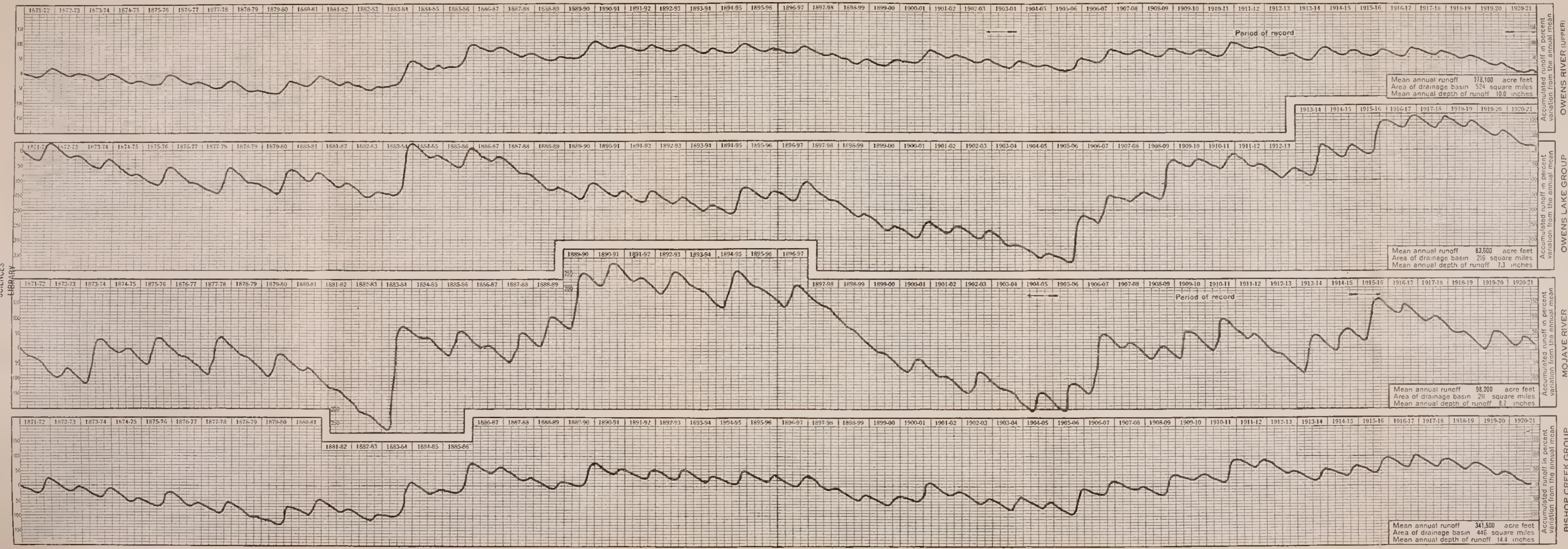


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OWENS RIVER (UPPER)

OWENS LAKE GROUP

MOJAVE RIVER

BISHOP CREEK GROUP

AT JUNCTION WITH ROCKY GREEN

AT TOP OF TALUS SLOPE

AT FORKS

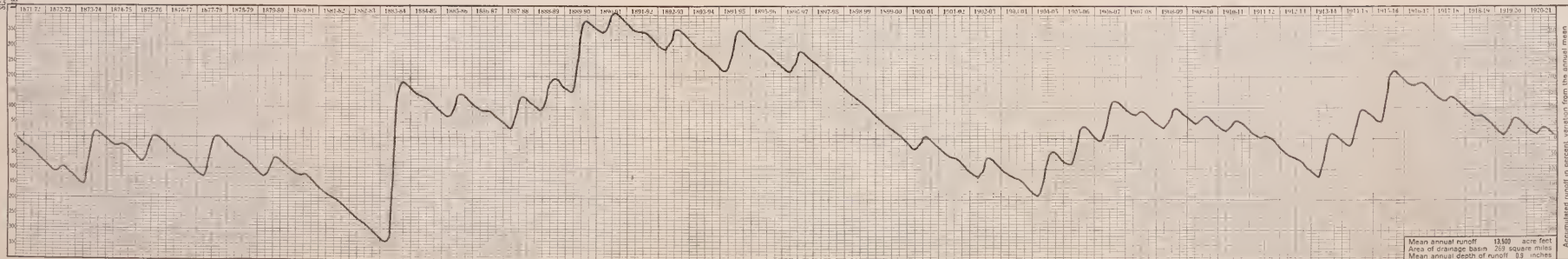
AT TOP OF TALUS SLOPE



ANTELOPE VALLEY GROUP

ABOVE AGRICULTURAL AREA

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WHITWATER RIVER

AT WHITWATER

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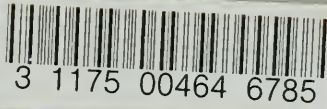
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