Regional Water Quality Control Board
Los Angeles Region

Surface Water Ambient Monitoring Program

Annual Workplan for FY 2003/04

January 30, 2004

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1. Long-term (5 year) Plan

The Porter-Cologne Water Quality Control Act and the federal Clean Water Act (CWA) direct water quality programs to implement efforts intended to protect and restore the integrity of waters of the State. California Assembly Bill (AB) 982 (Water Code Section 13192) requires the State Water Resources Control Board (SWRCB) to assess and report on the State monitoring programs and to prepare a proposal for a comprehensive surface water quality monitoring program. Ambient monitoring is independent of other water quality programs, such as the National Pollutant Discharge Elimination Program which requires monitoring in direct relation to regulation of point source discharges. Ambient monitoring can serve as a measure of (1) the overall quality of water resources and (2) the overall effectiveness of Regional Water Quality Control Boards' (RWQCBs') prevention, regulatory, and remedial actions. Current monitoring and assessment capability at the SWRCB is limited and tends to be focused on specific program needs. This has led to a fragmentation of monitoring efforts resulting in gaps in needed information and a lack of integrated analysis. AB 982 mandates the SWRCB create and implement a comprehensive surface water quality monitoring program. The SWRCB and the RWQCBs have responded to this mandate with the development and implementation of the Surface Water Ambient Monitoring Program (SWAMP). The program goals of SWAMP are:

- Identify specific problems preventing the SWRCB, RWQCBs, and the public from realizing beneficial uses in targeted watersheds.

- Create an ambient monitoring program that addresses all hydrologic units of the State using consistent and objective monitoring, sampling and analysis methods; consistent data quality assurance protocols; and centralized data management.

- Document ambient water quality conditions in potentially "clean" and polluted areas.

- Provide the data to evaluate the effectiveness of water quality regulatory programs in protecting beneficial uses of waters of the State.[1]

The overall goal of the Site-Specific Monitoring portion of SWAMP is to develop site-specific information on sites or water bodies that are (1) known or suspected to have water quality problems and (2) known or suspected to be clean. This portion of SWAMP is focused on collecting information from sites in water bodies of the State that could be potentially listed or delisted under Clean Water Act Section 303(d). This workplan has been developed to implement the Site-Specific Monitoring Requirements of SWAMP. In Region 4, both the Site-Specific Monitoring goals and the Regional Monitoring goals have been integrated into one ambient monitoring program.

Per AB 982, monitoring is required in each hydrologic unit of the State at least once every five years. Region 4 proposes in general to visit each hydrologic unit one year ahead of the WMI schedule for targeted watersheds which rotate on a five-year cycle which would allow for monitoring all hydrologic units every five years. In this strategy, data will be gathered, analyzed, and interpreted in time to use the following year during NPDES permit renewals and other ongoing activities within the targeted watershed. The following table below provides a summary of the schedule for upcoming years:

[1] State of California State Water Resources Control Board; Proposal for A Comprehensive Ambient Surface Water Quality Monitoring Program; Report to Legislature; November 30, 2000.

Hydrologic Unit	WMI Timeline	SWAMP Timeline
Los Angeles River San Gabriel River Los Cerritos Channel	2004-2005 2005-2006 2005-2006	2003-2004
Channel Islands Ventura River Misc. Ventura Coastal	2005-2006 2006-2007 2006-2007	2004-2005
Santa Clara River Calleguas Creek	2006-2007 2006-2007	2005-2006
Dominguez Channel- LA/LB Harbor	2007-2008	2006-2007
Santa Monica Bay	2008-2009	2007-2008

2. FY 03/04 Annual Workplan

A. Overview of Watersheds to be Monitored (Problematic or Clean)

This section will summarize site-specific problems(s), potential problem(s), or clean water locations to be monitored.

i. San Gabriel River

Background

The San Gabriel River receives drainage from a large area of eastern Los Angeles County; its headwaters originate in the San Gabriel Mountains. The 689 sq. mi. watershed consists of extensive areas of undisturbed riparian and woodland habitats in its upper reaches. Much of the watershed of the West Fork and East Fork of the river is set aside as a wilderness area; other areas in the upper watershed are subject to heavy recreational use. The upper watershed also contains a series of flood control dams. Further downstream, towards the middle of the watershed, are large spreading grounds utilized for groundwater recharge. The watershed is hydraulically connected to the Los Angeles River through the Whittier Narrows Reservoir (normally only during high storm flows). The lower part of the river flows through a concrete-lined channel in a heavily urbanized portion of the county before becoming an soft bottom channel once again near the ocean in the city of Long Beach. Large electrical power poles line the river along the channelized portion and nurseries, small stable areas, and a large poultry farm are located in these areas.

Several reservoirs, which exist primarily for flood control purposes, occur in the upper part of the watershed. Frequent removal of accumulated sediments is necessary to maintain the flood control capacity of these reservoirs. Some of the removal methods previously used have had water quality impacts. Continued need for such maintenance could cause longer-term impacts. A study is currently underway to better assess impacts associated with the sluicing projects.

Other significant water quality issues include: sluicing of reservoirs, protection of groundwater recharge areas, trash in the upper watershed's recreational areas, mining/stream modifications, ambient toxicity in much of the urbanized reaches, urban and storm water runoff quality, and nonpoint source loadings from nurseries and horse stables.

Tertiary-treated effluent from several Publicly-owned Treatment Plants (POTWs) enters the river in its middle reaches (which is partially channelized) while two power generating stations discharge cooling water into the river's estuary. The volume of effluent from the two POTWs discharging directly to the middle reaches is about 50 MGD. The effluent volume from two other POTWs discharging into tributaries is about 115 MGD however much of this flow infiltrates into recharge basins. The power plants together are permitted to discharge up to about 2,000 MGD. The watershed is also covered under two municipal storm water NPDES permits. Several landfills are also located in the watershed. Thirty-nine of the 109 NPDES permittees in the watershed discharge directly to the San Gabriel River. Twenty-one discharge to Coyote Creek and twelve discharge to San Jose Creek.

Of the 534 dischargers enrolled under the general industrial storm water permit in the watershed, the largest numbers occur in the cities of Industry, Irwindale, Pomona, and Santa Fe Springs. Auto wrecking, lumber, metal plating, trucking, and die casting are a large component of these businesses. About two-thirds of the facilities are greater than one acre in size and about 80 of them are larger than 10 acres

There are 175 construction sites enrolled under the construction storm water permit. The sites are fairly evenly divided between residential and commercial and a similar number of sites are found in both the upper and lower watershed. About one-half of them occur on sites that are larger than ten acres. [2]

Beneficial Uses

Above the estuary: contact and non-contact water recreation, wildlife habitat, spawning, municipal water supply, industrial service supply, industrial process supply, agricultural supply, groundwater recharge, warm water habitat, cold water habitat, and protection of rare and endangered species.

In estuary: contact and non-contact water recreation, industrial service supply, wildlife habitat, protection of rare and endangered species, spawning, commercial and sportfishing, estuarine habitat, marine habitat, navigation, and migratory.

Known Impairments

Various reaches of this watershed are 303(d) listed for historic pesticides, coliform, nutrients, trash, toxicity, pH and metals.

[2] State of California Regional Water Quality Control Board, Los Angeles Region; Watershed Management Initiative Chapter; December 2001.

ii. Los Angeles River

Background

The Los Angeles (LA) River watershed is one of the largest in the Region at 824 square miles. It is also one of the most diverse in terms of land use patterns. Approximately 324 square miles of the watershed are covered by forest or open space land including the area near the headwaters which originate in the Santa Monica, Santa Susana, and San Gabriel Mountains. The rest of the watershed is highly developed. The river flows flows 55 miles to the ocean through the San Fernando Valley past heavily developed residential and commercial areas. From the Arroyo Seco, north of downtown Los Angeles, to the confluence with the Rio Hondo, the river flows through industrial and commercial areas and is bordered by railyards, freeways, and major commercial and government buildings. From the Rio Hondo to the Pacific Ocean, the river flows through industrial, residential, and commercial areas, including major refineries and petroleum products storage facilities, major freeways, rail lines, and rail yards serving the Ports of Los Angeles and Long Beach.

Major tributaries to the river in the San Fernando Valley are the Pacoima Wash, Tujunga Wash (both drain portions of the Angeles National Forest in the San Gabriel Mountains), Burbank Western Channel and Verdugo Wash (both drain the Verdugo Mountains). Due to major flood events at the beginning of the century, by the 1950's most of the river was lined with concrete. In the San Fernando Valley, there is a section of the river with a soft bottom at the Sepulveda Flood Control Basin. The Basin is a 2,150-acre open space upstream of the Sepulveda Dam designed to collect flood waters during major storms. Because the area is periodically inundated, it remains in a semi-natural condition and supports a variety of low-intensity uses as well as supplying habitat. At the eastern end of the San Fernando Valley, the river bends around the Hollywood Hills and flows through Griffith and Elysian Parks, in an area known as the Glendale Narrows. Since the water table was too high to allow laying of concrete, the river in this area has a rocky, unlined bottom with concrete-lined or rip-rap sides. This stretch of the river is fed by natural springs and supports stands of willows, sycamores, and cottonwoods. The many trails and paths along the river in this area are heavily used by the public for hiking, horseback riding, and bird watching.

South of the Glendale Narrows, the river is contained in a concrete-lined channel down to Willow Street in Long Beach. The main tributaries to the river in this stretch are the Arroyo Seco (which drains areas of Pasadena and portions of the Angeles National Forest in the San Gabriel Mountains), the Rio Hondo, and Compton Creek. Compton Creek supports a wetland habitat just before its confluence with the Los Angeles River. The river is hydraulically connected to the San Gabriel River Watershed by the Rio Hondo through the Whittier Narrows Reservoir. Flows from the San Gabriel River and Rio Hondo merge at this reservoir during larger flood events, thus flows from the San Gabriel River Watershed may impact the LA River. Most of the water in the Rio Hondo is used for groundwater recharge during dry weather seasons.

The LA River tidal prism/estuary begins in Long Beach at Willow Street and runs approximately three miles before joining with Queensway Bay located between the Port of

Long Beach and the city of Long Beach. The channel has a soft bottom in this reach with concrete-lined sides. Queensway Bay is heavily water recreation-oriented; however, major pollutant inputs are likely more related to flows from the LA River which carries the largest storm flow of any river in southern California.

Also part of the watershed are a number of lakes including Peck Road Park, Belvedere Park, Hollenbeck Park, Lincoln Park, and Echo Park Lakes as well as Lake Calabasas. These lakes are heavily used for recreational purposes. Additionally, there are two artificial lakes maintained with 4-6 MGD of reclaimed water.

Four basins in the San Fernando Valley area contain substantial deep groundwater reserves and are recharged mainly through runoff and infiltration although the increase in impermeable surfaces has decreased infiltration. Groundwater basins in the San Gabriel Valley are not separated into distinct aquifers other than near the Whittier Narrows. Active recharge occurs in some of these areas through facilities operated by Los Angeles County. Spreading grounds recharge two basins in the coastal plain of Los Angeles west of the downtown area.

Pollutants from dense clusters of residential, industrial, and other urban activities have impaired water quality in the middle and lower watershed. Added to this complex mixture of pollutant sources (in particular, pollutants associated with urban and stormwater runoff), is the high number of point source permits.

A majority of the 147 NPDES discharges go directly to the Los Angeles River. Burbank Western Channel receives four discharges, Compton Creek receives five, and Eaton Wash receives three. The volume of discharge from the two POTWs on the mainstem is about 100 MGD while the POTW on Burbank Wash discharges just under 10 MGD.

Of the 1,307 dischargers enrolled under the general industrial storm water permit in the watershed, the largest numbers occur in the cities of Los Angeles (many within the community of Sun Valley), Vernon, South Gate, Long Beach, Compton, and Commerce. Metal plating, warehousing, auto wrecking, and recycling are a large component of these businesses. About two-thirds of the facilities are greater than one acre in size and about 40 of them are larger than 10 acres.

There are a total of 204 construction sites enrolled under the construction storm water permit. About twice as many of these are in the upper watershed (which includes the San Fernando Valley) and the construction in this watershed is fairly evenly divided between commercial and residential. About one-half of them occur on sites that are larger than ten acres.

Beneficial Uses

Above the estuary: wildlife habitat, contact and non-contact water recreation, protection of rare and endangered species, groundwater recharge, wetlands habitat, and warm water habitat.

In estuary: wildlife habitat, contact and non-contact water recreation, estuarine habitat, marine habitat, protection of rare and endangered species, commercial and sportfishing, navigation, industrial service supply, migratory, and spawning habitat.

Known Impairments

The majority of the LA River Watershed is considered impaired due to a variety of point and nonpoint sources. The 1998 303(d) list implicates pH, ammonia, a number of metals, coliform, trash, scum, algae, oil, chlorpyrifos as well as other pesticides, and volatile organics in that impairment. Some of these constituents are of concern throughout the length of the river while others are of concern only in certain reaches. Impairment may be due to water column exceedances, excessive sediment levels of pollutants, or bioaccumulation of pollutants. The beneficial uses threatened or impaired by degraded water quality are aquatic life, recreation, groundwater recharge, and municipal water supply. [3]

iii. Los Cerritos Channel/Wetlands and Alamitos Bay

Background

The Los Cerritos Watershed is essentially a manmade creation due to forced drainage of street runoff into Los Cerritos Channel (or adjacent wetlands), into Alamitos Bay, or directly into the ocean. Historically, it is an area likely to have been part of the large Los Angeles and San Gabriel Rivers flood plain and Los Cerritos Wetlands as well as the original form of Alamitos Bay would have been contiguous with the estuaries of the two large rivers. Much of the early draining of the wetlands was due to the discovery of oil and its subsequent extraction which continues today. Extensive coastal development followed along with creation of recreational facilities (Marine Stadium, Long Beach Marina).

Los Cerritos Channel, Tidal Prism, and Wetlands: The Los Cerritos Channel is concrete-lined above the tidal prism and drains a relatively small area of east Long Beach, albeit a densely urbanized one. The channel's tidal prism starts at Anaheim Road and connects with Alamitos Bay through the Marine Stadium; the wetlands connects to the Channel a short distance from the lower end of the Channel. The wetlands, and portion of the channel near the wetlands, is an overwintering site for a great diversity of birds (up to 50 species) despite its small size. An endangered bird species, the Belding's Savannah Sparrow, may nest there and an area adjacent to the wetlands is a historic least tern colony site. One small marina is located in the channel which is also used by rowing teams and is a popular fishing area.

Alamitos Bay: Alamitos Bay is composed of the Marine Stadium, a recreation facility built in 1932 and used for boating, water skiing, and jet skiing; Long Beach Marina, which contains five smaller basins for recreational craft and a boatyard; a variety of public and private berths; and the Bay proper which includes several small canals, a bathing beach,

[3] State of California Regional Water Quality Control Board, Los Angeles Region; Watershed Management Initiative Chapter; December 2001.

and several popular clamming areas. A small bathing lagoon, Colorado Lagoon in Long Beach, has a tidal connection with the Bay and a small wildlife pond, Sims Pond, also has a tidal connection. The latter is heavily used by overwintering migratory birds.

A considerable amount of leaching of boat paint likely occurs in the Bay, particularly in the marina. Nonpoint source runoff from storm drains is also a likely source of problems.

Most of the 12 NPDES permittees in the watershed discharge to Los Cerritos Channel; the rest discharge to Alamitos Bay.

Of the 17 dischargers enrolled under the general industrial storm water permit in the watershed, the majority occur in the cities of Long Beach. Many of these businesses are involved with aircraft or watercraft production or maintenance. Most of the facilities are between one and ten acres in size.

There are 15 construction sites enrolled under the construction storm water permit. About one-half of them occur on sites that are larger than ten acres.

Beneficial uses

Above the estuary: wildlife habitat (intermittent uses: non-contact recreation, warmwater habitat)

In estuary: contact and non-contact recreation, protection of rare and endangered species, industrial service supply, navigation, commercial and sport fishing, marine habitat, estuarine habitat, wildlife habitat, migratory, shellfish harvesting, wetlands habitat, and spawning habitat.

Known Impairments

Beneficial uses in the wetlands area are considered fully supported while those in the channel are not. Beneficial uses in the Bay are, for the most part, considered fully supported although Long Beach Marina is considered a site of concern due to elevated sediment concentrations of metals.

B. Review of Available Information

i. San Gabriel River

The overall status of surface water quality in the San Gabriel River Watershed was evaluated for a State of the Watershed Report in 2000. Monitoring in this watershed until very recently has concentrated around the major point sources, namely, the POTWs, and at easily accessible locations (i.e. bridge crossings) to the river. More recent TMDL and stormwater monitoring has changed this pattern but for the 2000 report, the majority of available data were for sites clumped at specific locations on the mainstem relative to POTWs and major bridge crossings and near certain confluences (San Jose and Coyote Creeks) located near POTWs. And although confluence data often showed these

subwatersheds to be major contributors of pollutants (although not necessarily from the point sources), little monitoring has occurred within the subwatersheds themselves. The intent of the data review was to generally describe patterns in various constituents which had been sampled in the watershed, to highlight where future data gathering may be useful, and to suggest where a more thorough data analysis could yield decisions for Water Quality Assessment purposes.

Since the various entities which conduct monitoring in the watershed do so with different objectives in mind, the parameters they monitor differ as do the monitoring sites and frequencies. Usually sampling was on a regular schedule that only rarely occurred during a storm event. Large datasets were often limited to only a few locations or parameters; sometimes different forms of parameters were reported by agencies (such as total nitrates versus nitrate as nitrogen) which were not directly comparable.

With regards to information found in the large datasets, not surprisingly, nutrient concentrations tended to be quite low in the upper watershed within the National Forest compared to elsewhere. Concentrations then gradually increased lower in the watershed before reaching POTW discharges below which concentrations rose noticeably higher until dropping off in the tidal prism. As is generally the case, pH was higher in the more natural areas of the watershed and lower below POTW discharges in the urbanized areas. Various reaches of the river or tributaries are listed as impaired due to nutrients, toxicity, or pH problems. Chemical oxygen demand (COD) was measured in the lower watershed as part of POTW receiving water monitoring and increased steadily at downstream stations but then rose sharply in the tidal prism. This pattern did not appear to be related to the POTW discharges. The limited data for coliform in the upper watershed showed consistently low levels of total and fecal coliform. The Coyote and San Jose Creeks tributaries exhibited high median levels of total and fecal coliform as well as entercoccus (higher than the mainstem). Also of note was an abrupt increase in median total coliform levels in the lower, concrete portion of the main river. A number of large storm drains enter the river in this stretch. These results are coincident with 303(d) coliform listings for various reaches of the main river, San Jose Creek, and Coyote Creek. Metals were generally not detected in the upper watershed but were found most often in the lowermost part of the watershed with arsenic and zinc being most frequently detected. Various reaches of the river and its tributaries are listed as impaired for a number of metals. Except for lindane, organics were rarely detected. Chloride data indicated that full strength seawater was not reached until well into the tidal prism.

More focused storm water monitoring was conducted at one site in the lower main river and one in Coyote Creek near the confluence with the main river in the 1997-98 storm season. Very high coliform and streptococcus levels were found in the main river during storm events (Coyote Creek was not sampled for bacteria). In general, a “first flush” effect was seen with nutrient concentrations following the season’s first season with gradually lower concentrations seen throughout the rest of the season. Nutrient concentrations were not outside the range found during dry weather although varied considerably from storm to storm. BOD5 and COD concentrations, however, were noticeably elevated over that found during dry weather and were higher in Coyote Creek than in the San

Gabriel River. It is clear from the chloride data that Coyote Creek in particular receives a considerable amount of storm runoff (relative to baseline flow) due to the greatly lowered chloride concentrations during some storms. Metals data were compared with estimated water quality objectives for metals (hardness-adjusted). Potential metals exceedances occurred on 88% of the monitored days (at both an acute and chronic level) at the Coyote Creek site. Potential chronic objective exceedances occurred at the San Gabriel River site on 66% of the monitored days while potential acute exceedances occurred on 33% of the monitored days. Copper and zinc were the most common problem metals in Coyote Creek. Cadmium and lead were also occasionally at high levels. Other metals were rarely detected. The creek is 303(d)-listed for silver only (in tissue) which did not occur at excessive levels in the water column sampling. Potential exceedances at the San Gabriel River site involved copper, lead, and zinc to a fairly equal extent. One reach of the river is 303(d)-listed for lead but not for copper or zinc.

1998-99 storm season included some sampling on non-storm days. Total coliform was always high at the San Gabriel River site; however fecal coliform and streptococcus levels decreased throughout the season and eventually were no higher after a storm than during dry weather (although still high relative to body contact standards). The patterns for nutrients and chlorides were similar to those of the previous year. However, there were far fewer monitoring days where metals concentration represented potential exceedances.

A focused toxicity study was conducted in the early 1990s. Persistent toxicity problems were noted in Walnut Creek as well as in Coyote Creek and the San Gabriel River near their confluence; persistent toxicity was also seen in the tidal prism. An organophosphate and/or a metal were implicated as causes at times.[4] Have they done any monitoring?

ii. Los Angeles River

A State of the Watershed Report for the Los Angeles River was produced in 1998 and focused on presenting ranges or maxima for various conventional pollutants, minerals, coliform, nutrients, and metals in the river's reaches and tributaries. Many of the same agencies as in the San Gabriel River collected these samples with similar limitations resulting for use of the datasets. Water column data were from the previous six years while sediment and bioaccumulation data were from the previous ten years (as far back as 1988).

Of the data presented in the report, by far the most extensive datasets existed for pH and chlorides. Information on dissolved oxygen and fecal coliform was also fairly extensive. However, it is unclear, since the report summarizes the data and does not include a copy of the entire dataset, how many data points are represented at each site for the various parameters and over what time period or

[4] State of California Regional Water Quality Control Board, Los Angeles Region, State of the Watershed – The San Gabriel River Watershed, June 2000

season sampling occurred. Having identified these shortcomings, one may still generalize on the implications of the data.

Summarized data were available for thirteen tributaries in the upper watershed, seven sites along the mainstem, one tributary in the lower watershed, and for both the Rio Hondo and two tributaries draining to the Rio Hondo. Land use at the sites ranged from commercial/residential to natural open space. In general, lower mean levels of chlorides were found at sites near open space and higher levels in urbanized areas or at sites further downstream. The ranges in the chloride concentrations were generally smaller near natural open space and much greater in urbanized areas, likely due to the limited ability of concrete channels to reduce loadings from runoff the way natural systems can. Mean pH values was generally higher in the upper watershed tributaries (~8.1 – 8.3) than in the mainstem or lower watershed (~7.4 – 8.0). POTWs discharge tertiary-treated effluent into a number of locations in the mainstem and this effluent will usually have a pH of 7 or less. However, at virtually all locations, pH ranges were large which is likely representative of natural daily fluctuations picked up by different sampling times. Several reaches of the river or its tributaries are listed as impaired for pH.

Dissolved oxygen values had been obtained at less sites, particularly, less sites in the upper watershed tributaries. However, at those tributary where DO was collected, means were approximately 9 – 10 mg/l with fairly tight ranges. Means elsewhere in the watershed were either much higher or much lower with large ranges which is likely representative of large amounts of algae (or aquatic vascular plants) and their daily uptake and release of oxygen. Virtually all of the mainstem and some of the tributaries are 303(d)-listed for nutrient-related problems. Fecal coliform was collected at less sites also and only ranges were reported. Ranges were generally small in or near natural open spaces and very large in the more urbanized areas. Most sites reported "non-detects" at the low end of the range. Most of the mainstem and a number of tributaries are listed as impaired for coliform.[5]

More recently, an effort, led by the City of Los Angeles, to characterize the existing water quality and habitat conditions under the current flow regime has led to a draft summary report on existing data for the mainstem of the river. Of note was a similar conclusion on the limitations of existing databases.

iii. Los Cerritos Channel/Wetlands and Alamitos Bay

This area has been sampled for sediment chemistry and toxicity during the Southern California Bight projects in 1994 and 1998 as well as in the Bay Protection Program. Although Alamitos Bay was found to be relatively clean (there are no 303(d)-listings for the Bay), the Bay Protection Program found sediment toxicity in the wetlands. Poor circulation in this remnant wetlands may

[5] State of California Regional Water Quality Control Board, Los Angeles Region, Los Angeles River Watershed Water Quality Characterization, First Edition, April 1998

be a contributing factor. The nearby Los Cerritos Channel, to which it connects, is 303(d)-listed for coliform, ammonia, and several metals. The Bay Protection Program also sampled sediments in Colorado Lagoon and Sims Pond. Sediments in Colorado Lagoon were toxic to amphipods and had high levels of many historic pesticides and metals. Colorado Lagoon is 303(d)-listed for lead, zinc, chlordane, DDT, PCBs, dieldrin, PAHs, and sediment toxicity. Sims Pond sediments were not analyzed for chemistry but were not toxic to amphipods during testing.[6] For many years, regular water column sampling was mainly limited to coliform sampling conducted at bathing beaches in Alamitos Bay. More recently, several stations have been monitored in Los Cerritos Channel and a special study is in the process of the being conducted in Alamitos Bay by the City of Long Beach under their Municipal Stormwater NPDES permit. Recent results indicate occasional water column toxicity which TIEs indicate may be due to an organophosphate or one of several metals.[7]

C. Objectives of FY 03/04 Monitoring Program

In the development of a comprehensive monitoring program, the following steps should be followed where applicable:

1. Identify overall objectives and sub-objectives (defined in SWAMP Proposal and Report to Legislature)
2. Identify assessment questions (defined by Regional Board staff)
3. Develop a conceptual model
4. Select indicators (Regional Board staff per SWAMP documents)
5. Design spatial and temporal aspects of an ideal monitoring program (Regional Board staff in conjunction with assistance from US EPA)
6. Assess quality of data needed for results (being done at Statewide level)
7. Examine reporting options (being done at Statewide level)

In the design of objectives, the following guidelines should be remembered:

1. Objectives can be both wide-scale and/or site-specific
2. Objectives can be incorporated into study through a multi-tiered design that addresses:
   a. baseline ecosystem level condition
   b. long term trend analysis
   c. hypothesized environmental problems
   d. flexibility for the future

The indicators chosen should be regionally responsive, unambiguously interpretable, allow for simple quantification (i.e., synoptic sampling), should have index period stability, low year to year variation (especially if used for trend analysis), and represent the environmental impact of concern. Indicators should also have an available EPA approved method, historical use with

[6] State of California Water Resources Control Board, Sediment Chemistry, Toxicity, and Benthic Community Conditions in Selected Water Bodies of the Los Angeles Region, August 1998
[7] City of Long Beach, Storm Water Monitoring Report 2002-2003, NPDES Permit No. CAS004003 (CI#8052)

database of results, be retrospective, anticipatory (provide early warning of widespread change in ecosystem) and cost effective[8].

i. Program-Wide Monitoring Objectives

Beneficial Use: Water Contact Recreation – *Is it safe to swim?*

SWAMP Objective
At sites influenced by point sources (e.g., storm drains, publicly owned treatment works, etc.) or nonpoint sources of pathogenic contaminants, estimate the concentration of bacteria above screening values, health standards, or adopted water quality objectives.

Potential Assessment Questions

- What is the percent of streams in the watershed/region that support their designated beneficial use of water contact recreation? Do they support their designated beneficial uses all year or a majority of the time?

- Is the percent of streams in the watershed/region which support the beneficial use of water contact recreation increasing or decreasing over time? (For region-wide answer, will need to complete 10 year data cycle to answer… for watershed specific answer, can answer for first round of watersheds in year 6)

Potential Indicators: Pollutant exposure: total coliform bacteria, fecal coliform bacteria, enterococcus bacteria, enteric viruses. Another potential indicator not mentioned in SWAMP is *E. coli*.

Beneficial Use: Municipal and Domestic Water Supply - *Is it safe to drink the water?*

SWAMP Objective
At specific locations in lakes, rivers, and streams that are sources of drinking water and suspected to be contaminated, estimate the concentration of or verify previous estimates of the concentration of microbial and chemical contaminants above screening values, drinking water standards, or adopted water quality objectives used to protect drinking water quality.

Potential Assessment Questions

- What is the percent of streams that support their designated beneficial use of municipal and domestic water supply?

- Is the percent of streams in the watershed/region which support the beneficial use of municipal and domestic water supply increasing or decreasing over time?

Potential Indicators: Pollutant exposure: inorganic water chemistry, nutrients, organic water chemistry, total coliform bacteria, C*ryptosporidium*, G*iardia*

Beneficial Uses: Commercial and Sport Fishing, Shellfish Harvesting – *Is it safe to*

[8] United States Environmental Protection Agency, EMAP West Coastal Technology Transfer Workshop; Moss Landing Marine Laboratory, June 13-14, 2001.

eat fish and other aquatic resources?

SWAMP Objective

- At specific sites influenced by sources of bacterial contaminants, estimate the concentration of bacterial contaminants above health standards or adopted water quality objectives to protect shellfish harvesting areas.

- At specific sites influenced by sources of chemical contaminants, estimate the concentration of chemical contaminants in edible aquatic life tissues above advisory levels and critical thresholds of potential human health risk.

- At frequently fished sites, estimate the concentration of or verify previous estimates of chemical contaminants in commonly consumed fish and shellfish target species above advisory levels and critical thresholds of potential human health risk (adapted from USEPA, 1995).

- Throughout water bodies (streams, rivers, lakes, nearshore waters, enclosed bays and estuaries), estimate the concentration of chemical contaminants in fish and aquatic resources from year to year using several critical threshold values of potential human impact (advisory or action levels).

Potential Assessment Questions

- What is the percent of streams that support their designated beneficial uses of commercial fishing, sport fishing, and shellfish harvesting?

- Is the percent of streams in the watershed/region which support the beneficial uses of commercial fishing, sport fishing, and shellfish harvesting increasing or decreasing over time?

Potential Indicators: Pollutant exposure: fish tissue chemistry, shellfish tissue chemistry, coliform bacteria in shellfish

Beneficial Uses: Cold Freshwater Habitat, Estuarine Habitat, Marine Habitat, Preservation of Biological Habitats (Preservation of Rare and Endangered Species), Rare, Threatened or Endangered Species, Warm Freshwater Habitat, Wildlife Habitat – *Are aquatic populations, communities, and habitats protected?*

SWAMP Objective

- At sites influenced by point sources or nonpoint sources of pollutants, identify specific locations of degraded water or sediments in rivers, lakes, nearshore waters, enclosed bays, or estuaries using several critical threshold values of toxicity, water column or epibenthic community analysis, habitat condition, and chemical concentrations.

- Identify the areal extent of degraded sediment locations in rivers, lakes, nearshore waters, enclosed bays, and estuaries using several critical threshold values of toxicity, benthic community analysis, habitat condition, and chemical concentration.

Potential Assessment Questions

- What is the percent of streams that support their designated beneficial uses of cold water habitat, estuarine habitat, marine habitat, preservation of rare and endangered species, warm freshwater habitat, and wildlife habitat?

- Is the percent of streams in the watershed/region which support the beneficial uses of cold water habitat, estuarine habitat, marine habitat, preservation of rare and endangered species, warm freshwater habitat, and wildlife habitat increasing or decreasing over time?

- What is the distribution of benthic conditions in streams of the watershed?

- What is the distribution of the total number of benthic species per site at each station sampled?

- What is the distribution of exotic species in the benthos in this watershed?

- What proportion of streams have an altered/degraded benthic community structure?

- What is the distribution of sediment contaminants in this watershed?

Potential Indicators:
Biological responses: benthic infauna, fish assemblage, fish pathology, interstitial water toxicity, macroinvertebrate assemblage, periphyton, sediment toxicity, water toxicity
Pollutant exposure: acid volatile sulfides, debris, interstitial water metal chemistry, report gene system (RGS450), organic and inorganic sediment chemistry, shellfish or fish tissue chemistry, nutrients, inorganic and organic water chemistry
Habitat: dissolved oxygen, sediment grain size, sediment organic carbon, water flow, water temperature, channel morphology, wetland vegetation, riparian vegetation

Beneficial Uses: Spawning, Reproduction and/or Early Development – *Are aquatic populations, communities, and habitats protected?*

SWAMP Objective
At sites influenced by point sources or nonpoint sources of pollutants, identify specific locations of or verify previous measurements identifying specific locations of degraded water or sediments in rivers, lakes, nearshore waters, enclosed bays, or estuaries using several critical threshold values of early life-stage toxicity, chemical concentrations, and physical characteristics.

Potential Assessment Questions
- What is the percent of streams that support their designated beneficial use of spawning, reproduction, and/or early development?

- Is the percent of streams in the watershed/region which support the beneficial use of spawning, reproduction, and/or early development increasing or decreasing over time?

- What is the distribution of benthic conditions in streams of the watershed?

- What is the distribution of the total number of benthic species per site at each station sampled?

- What is the distribution of exotic species in the benthos in this watershed?

- What proportion of streams have an altered/degraded benthic community structure?

- What is the distribution of sediment contaminants in this watershed?

- What is the distribution of toxicity in this watershed?

Potential Indicators:
Biological responses: benthic infauna, fish assemblage, fish pathology, interstitial water toxicity, macroinvertebrate assemblage, periphyton, sediment toxicity, water toxicity
Pollutant exposure: acid volatile sulfides, debris, interstitial water metal chemistry, report gene system (RGS450), organic and inorganic sediment chemistry, shellfish or fish tissue chemistry, nutrients, inorganic and organic water chemistry
Habitat: dissolved oxygen, sediment grain size, sediment organic carbon, water flow, water temperature, channel morphology, wetland vegetation, riparian vegetation

Beneficial Uses: Migration of Aquatic Organisms; Rare, Threatened or Endangered Species; Wildlife Habitat – *Is water flow sufficient to protect fisheries?*

SWAMP Objective
At specific sties influenced by pollution, estimate the presence of conditions or verify previous estimates of the presence of conditions necessary for the migration and survival of aquatic organisms, such as anadromous fish, using measures of habitat condition including water flow, watercourse geomorphology, sedimentation, temperature, and biological communities.

Potential Assessment Questions
- What is the percent of streams that support their designated beneficial uses of migration of aquatic organisms, rare, threatened or endangered species, and wildlife habitat?

- Is the percent of streams in the watershed/region which support the beneficial uses of migration of aquatic organisms, rare, threatened or endangered species, and wildlife habitat increasing or decreasing over time?

- What is the distribution of benthic conditions in streams of the watershed?

- What is the distribution of the total number of benthic species per site at each station sampled?

- What is the distribution of exotic species in the benthos in this watershed?

- What proportion of streams have an altered/degraded benthic community structure?

- What is the distribution of sediment contaminants in this watershed?

- What is the distribution of toxicity in this watershed?

Potential Indicators:
Habitat: water flow, suspended solids, channel morphology, water temperature
Another potential indicator not listed in SWAMP is dissolved oxygen levels.
Biological response: fish assemblage, macroinvertebrate assemblage, periphyton, wetland habitat, riparian habitat, water toxicity

Beneficial Use: Agricultural Supply – *Is water safe for agricultural use?*

SWAMP Objective
At specific locations in lakes, rivers, and streams that are used for agricultural purposes, estimate the concentration of or verify previous estimates of the concentrations of chemical pollutants above screening values or adopted water quality objectives used to protect agricultural uses.

Potential Assessment Questions
- What is the percent of streams that support their designated beneficial use of agricultural supply?

- Is the percent of streams in the watershed/region which support the beneficial use of agricultural supply increasing or decreasing over time?

Potential Indicators: None listed in the SWAMP documents. Alternatives include TDS, chloride, and heavy metals.

Beneficial Use: Industrial Source Supply, Industrial Process Supply – *Is water safe for industrial use?*

SWAMP Objective
At specific locations in coastal waters, enclosed bays, estuaries, lakes, rivers and streams that are used for industrial purposes, estimate the concentration of or verify previous estimates of the concentration of chemical pollutants above screening values or adopted water quality objectives used to protect industrial use.

Potential Assessment Questions
- What is the percent of streams that support their designated beneficial uses of industrial source and process supply?

- Is the percent of streams in the watershed/region which support the beneficial uses of industrial source and process supply increasing or decreasing over time?

Potential Indicators: None listed in the SWAMP documents. Alternatives include odor, scum, bacteria, trash, and algae.

Beneficial Use: Non-Contact Water Recreation – *Are aesthetic conditions of the water protected?*

SWAMP Objective
At specific locations in coastal waters, enclosed bays, estuaries, lakes, rivers and streams, estimate the aesthetic condition or verify previous estimates of the aesthetic condition above screening values or adopted water quality objectives to protect non-contact water recreation.

Potential Assessment Questions
- What is the percent of streams that support their designated beneficial use of non-contact water recreation?

- Is the percent of streams in the watershed/region which support the beneficial use of non-contact water recreation increasing or decreasing over time?

Potential Indicators: None listed in the SWAMP documents. Alternatives include odor, scum, trash, and algae.

ii. San Gabriel River Monitoring Objectives

Because the design of this section of the monitoring program is probability-based, the Regional Board will be able to infer the status of the watershed based on the sampling of the thirty randomly selected stations (to be located throughout the Los Angeles – San Gabriel HU). The types of questions that we will be able to answer are as follows:

- What is the percent of streams that support their designated beneficial uses of commercial fishing and sport fishing?

- Is the percent of streams in the watershed/region which support the beneficial uses of commercial fishing and sport fishing increasing or decreasing over time?

- What is the percent of streams that support their designated beneficial uses of cold water habitat, estuarine habitat, marine habitat, preservation of rare and endangered species, warm freshwater habitat, and wildlife habitat?

- Is the percent of streams in the watershed/region which support the beneficial uses of cold water habitat, estuarine habitat, marine habitat, preservation of rare and endangered species, warm freshwater habitat, and wildlife habitat increasing or decreasing over time?

- What is the distribution of benthic conditions in streams of the watershed?

- What is the distribution of the total number of benthic species per site at each station sampled?

- What is the distribution of exotic species in the benthos in this watershed?
- What proportion of streams have an altered/degraded benthic community structure?
- What is the percent of streams that support their designated beneficial use of spawning, reproduction, and/or early development?
- Is the percent of streams in the watershed/region which support the beneficial use of spawning, reproduction, and/or early development increasing or decreasing over time?
- What is the distribution of toxicity in this watershed?
- What is the percent of streams that support their designated beneficial uses of migration of aquatic organisms, rare, threatened or endangered species, and wildlife habitat?
- Is the percent of streams in the watershed/region which support the beneficial uses of migration of aquatic organisms, rare, threatened or endangered species, and wildlife habitat increasing or decreasing over time?

The directed stations at the bottom of each of four major subwatersheds in the San Gabriel River Watershed will provide the Regional Board with site specific information and, depending on funds available, allow for follow-up by further monitoring both at the site already sampled and by monitoring upstream of the location as source identification is pursued. Examples of site-specific questions can be seen below in the Los Cerritos Channel/Wetlands section.

iii. Los Angeles River Monitoring Objectives

Because the design of this section of the monitoring program is probability-based, the Regional Board will be able to infer the status of the watershed based on the sampling of the thirty randomly selected stations (located throughout the Los Angeles – San Gabriel HU). The types of questions that we will be able to answer are as follows:

- What is the percent of streams that support their designated beneficial uses of commercial fishing and sport fishing?
- Is the percent of streams in the watershed/region which support the beneficial uses of commercial fishing and sport fishing increasing or decreasing over time?
- What is the percent of streams that support their designated beneficial uses of cold water habitat, estuarine habitat, marine habitat, preservation of rare and endangered species, warm freshwater habitat, and wildlife habitat?

- Is the percent of streams in the watershed/region which support the beneficial uses of cold water habitat, estuarine habitat, marine habitat, preservation of rare and endangered species, warm freshwater habitat, and wildlife habitat increasing or decreasing over time?

- What is the distribution of benthic conditions in streams of the watershed?

- What is the distribution of the total number of benthic species per site at each station sampled?

- What is the distribution of exotic species in the benthos in this watershed?

- What proportion of streams have an altered/degraded benthic community structure?

- What is the percent of streams that support their designated beneficial use of spawning, reproduction, and/or early development?

- Is the percent of streams in the watershed/region which support the beneficial use of spawning, reproduction, and/or early development increasing or decreasing over time?

- What is the distribution of toxicity in this watershed?

- What is the percent of streams that support their designated beneficial uses of migration of aquatic organisms, rare, threatened or endangered species, and wildlife habitat?

- Is the percent of streams in the watershed/region which support the beneficial uses of migration of aquatic organisms, rare, threatened or endangered species, and wildlife habitat increasing or decreasing over time?

The directed stations at the bottom of each seven major subwatersheds in the Los Angeles River Watershed will provide the Regional Board with site specific information and, depending on funds available, allow for follow-up by further monitoring both at the site already sampled and by monitoring upstream of the location as source identification is pursued. Examples of site-specific questions can be seen below in the Los Cerritos Channel/Wetlands section.

iv. Los Cerritos Channel/Wetlands and Alamitos Bay Monitoring Objectives

A directed study design has been selected for Los Cerritos Channel/Wetlands and Alamitos Bay since although some sediment contamination and sediment toxicity data are available, water chemistry and toxicity as well as benthic invertebrate data are almost non-existent; additionally the area is quite small and not easily subjected to a randomized sampling design. Questions to be answered include:

- Does this site support its designated beneficial use of shellfish harvesting?

- Is the ability of this site to support the beneficial use of shellfish harvesting increasing or decreasing over time?

- Does this site support its designated beneficial uses of cold water habitat, estuarine habitat, marine habitat, preservation of rare and endangered species, warm freshwater habitat, and wildlife habitat?

- Is the ability of this site to support the beneficial uses of cold water habitat, estuarine habitat, marine habitat, preservation of rare and endangered species, warm freshwater habitat, and wildlife habitat increasing or decreasing over time?

- What is the distribution of benthic conditions at this site?

- What is the distribution of the total number of benthic species at this site?

- What is the distribution of exotic species in the benthos at this site?

- Does this site have an altered/degraded benthic community structure?

- Does this site support its designated beneficial use of spawning, reproduction, and/or early development?

D. Monitoring Program Design

i. Overview of General Approach

Overall Approach

The sampling and analysis will be used to assess the ambient conditions of the watersheds in the Los Angeles – San Gabriel Hydrologic Unit. The sampling and analyses described in this Workplan will further delineate the nature, extent, and sources of toxic pollutants which have been detected or are suspected to be problematic for this region and its individual watersheds. Where applicable, a triad approach (benthic community analysis, water chemistry, and toxicity testing) has been used. Ultimately, the information from these analyses will be used in the water quality assessment. The bioaccumulation tests are being conducted in order to address possible human health concerns (contaminants in edible fish tissue) and ecologic concerns (benthic community impacts) which could result if the contaminants at a site were bioavailable for uptake by organisms. There is also a large focus on bioassessment which historically has been overlooked. The information gathered will be used in trend analysis as well as the potential identification of reference sites which could then be used in the development of an index of biological integrity.

The proposed sampling plan for chemistry, toxicity, bioaccumulation, and bioassessment is indicated on the attached table (Attachment A) “Services to Be Performed at Each Station/Cost.”

ii. Specific Sampling Design / Sample Collection

a) San Gabriel River Watershed

The primary objective of monitoring in the San Gabriel River Watershed is to provide a broad baseline of the overall health of the watershed. Existing monitoring programs and constituents are focused on point source discharges and evaluation of storm water quality at specific locations, often with conflicting monitoring goals and with differing suites of constituents which make use of combined data sets difficult. As a consequence, large areas of the watershed are mainly unmonitored or infrequently monitored for limited constituents. The monitoring done in SWAMP will fill in many of the data gaps and provide data where none exists at all. A broad suite of parameters will be tested at the various stations.

The San Gabriel River Watershed is part of the Los Angeles – San Gabriel Hydrologic Unit. Thirty stratified random sites (following the USEPA Environmental Monitoring and Assessment Program design protocol) will be selected for monitoring in the hydrologic unit with stratification by the Los Angeles and San Gabriel Rivers Watersheds. These thirty sites will be sampled for toxicity, bioassessment, and conventional water chemistry, including nutrients (ortho-phosphate, total phosphate, chlorophyll a, TKN, ammonia, nitrate, and nitrite), TDS, chloride, sulfate, hardness, dissolved oxygen, pH, depth, temperature, flow, conductivity, and turbidity. After the California Department of Fish and Game (CDFG) completes the necessary field reconnaissance, a list of sites with latitude and longitude coordinates and a map of the locations of the randomly chosen sites will be provided. Additionally, one station at the base of each four subwatersheds (Walnut Creek, West Fork, North Fork, and East Fork) where monitoring is not already being conducted by other programs will be selected and analyzed for the same parameters listed above, as well as, bioaccumulation, metals in the water column and sediment, and sediment grain size. A station in the estuary will also be included and will be tested for trace organic chemistry (pesticides, PCBs, and PAHs in the sediment) in addition to the parameters listed above.

As was done previously when sampling was conducted in the Santa Clara River Watershed, advice and input from USEPA will be sought for sample design which follows EMAP procedures in order to generate a list of randomly selected sites that through reconnaissance efforts can be reduced to 30 sites actually sampled.

EMAP uses a Random Tessellation Stratified (RTS) design to spatially balance the sample across the resource which provides improved precision. This design uses an oversample selection population to address non-target and inaccessible sites. This random design was chosen in order to allow the Regional Board, in a statistically sound manner, to sample the watershed and develop an assessment of the overall health of the watershed which is the geographic area of interest. Fulfilling an additional goal of SWAMP, this approach theoretically will provide data both in clean and polluted areas, with sites near areas that have been sampled previously and those that have not. By choosing a random sampling

design, bias is removed. The representative 30 sites is the recommended number of sites to provide a statistically defensible summary of the watershed.

The sampling effort is randomized to make an inference that is statistically defensible. One of the reasons Region 4 decided to implement a probability based design in the San Gabriel and Los Angeles Rivers Watersheds is because the area is so large and "A key point in favor of probability based designs is that they allow lower cost sampling programs because a smaller number of sites are able to support conclusions with known accuracy and precision about status and trends of a region."[9] The probability survey design fulfills one of the Regional Board's objectives which is to determine the status of the watershed and to determine trend analysis over time. [10]

At the same time, staff believes that a station at the bottom of each major subwatershed will provide valuable information about those said subwatersheds and the beginnings of a directed tributary-based monitoring program and will assist in TMDL development. There may be funding to follow up on "hot spot" stations in subsequent years and subwatersheds where problems have been found.

A list and map of all sites is unavailable at this time since random sites have not yet been selected but a map of directed sites is attached (Attachment B).

b) Los Angeles River Watershed

The primary objective of monitoring in the Los Angeles River Watershed is to provide a broad baseline of the overall health of the watershed. Existing monitoring programs and constituents are focused on point source discharges and evaluation of storm water quality at specific locations, often with conflicting monitoring goals and with differing suites of constituents which make use of combined data sets difficult (although it has been attempted recently). As a consequence, large areas of the watershed are mainly unmonitored or infrequently monitored for limited constituents. The monitoring done in SWAMP will fill in many of the data gaps and provide data where none exists at all. A broad suite of parameters will be tested at the various stations.

The Los Angeles River Watershed is part of the Los Angeles – San Gabriel Hydrologic Unit. Thirty stratified random sites (following the USEPA Environmental Monitoring and Assessment Program design protocol) will be selected for monitoring in the hydrologic unit with stratification by the Los Angeles and San Gabriel Rivers Watersheds. These thirty sites will be sampled for toxicity, bioassessment, and conventional water chemistry, including nutrients (ortho-phosphate, total phosphate, chlorophyll a, TKN, ammonia, nitrate, and nitrite), TDS, chloride, sulfate, hardness, dissolved oxygen, pH, depth, temperature, flow, conductivity, and turbidity. After the California Department of Fish and Game (CDFG) completes the necessary field reconnaissance, a list of sites with latitude and longitude coordinates and a map of the locations of the randomly chosen sites will be provided. Additionally, one station at the base of seven subwatersheds (Compton

[9] United States Environmental Protection Agency; Environmental Monitoring and Assessment Program: West – Research Strategy, February 2001.
[10] United States Environmental Protection Agency, EMAP West Coastal Technology Transfer Workshop; Moss Landing Marine Laboratory, June 13-14, 2001.

Creek, Arroyo Seco, Verdugo Wash, Tujunga Wash, Arroyo Calabasas and two others to be defined later) where monitoring is not already being conducted by other programs and water is generally known to be flowing will be selected and analyzed for the same parameters listed above, as well as, bioaccumulation, metals in the water column and sediment, and sediment grain size. A station in the estuary will also be included and will be tested for trace organic chemistry (pesticides, PCBs, and PAHs in the sediment) in addition to the parameters listed above.

As was done previously when sampling was conducted in the Santa Clara River Watershed, advice and input from USEPA will be sought for sample design which follows EMAP procedures in order to generate a list of randomly selected sites that through reconnaissance efforts can be reduced to 30 sites actually sampled.

EMAP uses a Random Tessellation Stratified (RTS) design to spatially balance the sample across the resource which provides improved precision. This design uses an oversample selection population to address non-target and inaccessible sites. This random design was chosen in order to allow the Regional Board, in a statistically sound manner, to sample the watershed and develop an assessment of the overall health of the watershed which is the geographic area of interest. Fulfilling an additional goal of SWAMP, this approach theoretically will provide data both in clean and polluted areas, with sites near areas that have been sampled previously and those that have not. By choosing a random sampling design, bias is removed. The representative 30 sites is the recommended number of sites to provide a statistically defensible summary of the watershed.

The sampling effort is randomized to make an inference that is statistically defensible. One of the reasons Region 4 decided to implement a probability based design in the San Gabriel and Los Angeles Rivers Watersheds is because the area is so large and "A key point in favor of probability based designs is that they allow lower cost sampling programs because a smaller number of sites are able to support conclusions with known accuracy and precision about status and trends of a region."[11] The probability survey design fulfills one of the Regional Board's objectives which is to determine the status of the watershed and to determine trend analysis over time. [12]

At the same time, staff believes that a station at the bottom of each major subwatershed will provide valuable information about those said subwatersheds and the beginnings of a directed tributary-based monitoring program and will assist in TMDL development. There may be funding to follow up on "hot spot" stations in subsequent years where problems are found.

A list and map of all sites is unavailable at this time since random sites have not yet been selected but a map of directed sites is attached (Attachment B).

[11] United States Environmental Protection Agency; Environmental Monitoring and Assessment Program: West – Research Strategy, February 2001.
[12] United States Environmental Protection Agency, EMAP West Coastal Technology Transfer Workshop; Moss Landing Marine Laboratory, June 13-14, 2001.

c) Los Cerritos Channel/Wetlands and Alamitos Bay

The Los Cerritos area is part of the Los Angeles – San Gabriel Hydrologic Unit and while historically the area was part of the Los Angeles - San Gabriel River estuary, through extensive concreting of storm drains it is a separate small watershed draining into the now highly modified Alamitos Bay and thence to the ocean through an opening adjacent to but separate from the mouth of the San Gabriel River. Due to its small size compared to the other two watersheds in the hydrologic unit, it was deemed appropriate to conduct directed sampling in this area. In this way the rather distinctly different areas within the watershed (concrete channel above tidal influence, rip-rapped channel within tidal influence, within remnant wetlands, and within marina which is part of Alamitos Bay) could be most effectively evaluated. Sediments in one small remnant freshwater wetlands, Sims Pond, now nearly completely disconnected from the main flow of water, will also be sampled. Another remnant wetland, the mostly saline Colorado Lagoon, would have sediment chemistry, sediment toxicity, and bioassessment conducted (although under a different task order and likely at a different time than sampling in the main rivers).

The proposal is that each of the six areas will be sampled to fill in the incomplete and dated information relevant to each area. For example, only sporadic sampling has been conducted over the years in Los Cerritos Channel and this mainly focused on metals and coliform. The wetlands has only been sampled through the Bay Protection and Toxic Cleanup Program which found some evidence of sediment toxicity. The marina has also been sporadically sampled for metals while parts of the Bay proper are intensively sampled for coliform by a local jurisdiction due to nearby bathing beach. Much historic data are available for Colorado Lagoon that reveals considerable metals, historic pesticides, and coliform problems but only recently has some information been updated due to plans for restoration underway although regular coliform monitoring occurs due to the bathing beach. Sims Pond, a very small remnant freshwater wetlands (although likely estuarine at one time) has only been sampled about ten years ago by the Bay Protection and Toxic Cleanup Program which did not find sediment toxicity.

Only sediment will be collected at Sims Pond and Colorado Lagoon and a full metals and organics (including PCBs and PAHs) scan will be conducted. Additionally, at Colorado Lagoon, sediments will be evaluated for toxicity and benthic invertebrates. More complete sampling and analyses (similar to the subwatershed work in Los Angeles and San Gabriel Rivers) will be conducted at the other four sites with some variations due to lack of available sediment above the tidal area of Los Cerritos Channel and the need to use different species for toxicity testing in the more saline waters of the other three sites. Sites will be sampled for water column toxicity, bioassessment, and conventional water chemistry, including nutrients (ortho-phosphate, total phosphate, chlorophyll a, TKN, ammonia, nitrate, and nitrite), TDS, chloride, sulfate, hardness, dissolved oxygen, pH, depth, temperature, flow, conductivity, and turbidity. Additionally, water samples will be analyzed for metals and a limited suite of organics, sediments will be analyzed for organics and metals, and tissue samples will be analyzed for bioaccumulation of metals and organics. And, due to the proximity to boating activities, water and tissue sampled will be analyzed for tributyltin.

A map of the sampling locations is attached (Attachment C).

E. Additional Activities and Deliverables for Fiscal Year 03/04

i. Laboratory Analysis

Actual analytical services that will be performed on each sample are shown on Attachment A, "Services to Be Performed at Each Station/Cost."

ii. Data Quality Evaluation and Data Reporting

Results from sampling shall be analyzed and reported in tabular and graphical format. Analyses shall be compared to criteria supplied to CDFG by the Los Angeles Regional Board. These criteria will consist of water quality criteria and water quality objectives. Comparative analyses shall be performed in such a way to present the current state of health of the Los Angeles and San Gabriel Rivers and Los Cerritos Channel/Wetlands and Alamitos Bay.

Toxicity data will include test mean, standard deviation, and a determination of whether or not a sample is toxic at a statistically significant level of difference from the laboratory control samples.

Data from sampling in the Los Angels and San Gabriel watersheds shall be analyzed and interpreted in a method consistent with the EMAP approach and protocol.

The California Stream Bioassessment Protocol developed by CDFG will be followed until a SWAMP-specific bioassessment protocol is established.

The statewide standardized SWAMP QAPP will be followed.

iii. Deliverable Products

Field Report: A field report will be prepared. This field report will be provided to the Regional Board, with an additional copy provided to the State Board (one copy to each). The field report will include a map with sufficient detail of stations sampled, including latitude and longitude coordinates and GPS coordinates. Digital photographs of each sampling site shall also be included in the report and provided electronically to the Regional Board.

Final Data Report: All data shall be reported in electronic file (Excel spreadsheet or Access database) on three CDs, as well as on hard copy (three one-sided originals for copying, and three bound copies). One of each type-- electronic file, one-sided hardcopy original, and bound hardcopy-- shall go to the

State Board and the Regional Board and DFG. QA/QC evaluation reports and verification that data met QA criteria set forth in QA Project Plan must be provided with hardcopy data report.

The data report will include the following items, where applicable, but shall not necessarily be limited to the following items:

All station data including CDFG station name, station number, IDORG number, leg number, sample collection date, sample station longitude and latitude, sample GPS coordinates, sample station water depth, sample location characteristics, toxicity test endpoint mean and standard deviation, and all detection limits. In addition to the above data, the following will also be reported for all stations indicated on the attached "Services to be performed at each station/cost" spreadsheet for bioassessment: raw data and computed biological indices. Additionally, data from the bioaccumulation tests will be reported as tissue chemistry data for the specific chemical constituents shown on the attached "Services to be performed at each station/cost" spreadsheet. A map (and GIS shape file) should be included showing the locations of each sampling station and an indication of the overall integrity of that site as excellent, good, marginal, or poor. Another map (and GIS shape file) should further indicate the integrity of each site for biological, chemical, and toxicity data results expressed as a triad for each site.

QA/QC evaluation ranking by each analytical laboratory will be provided in the database. In addition, appendices will include replicate data for toxicity tests, a database description and file structure description. A QA/QC report will also be included in the final data report, containing an evaluation of how the data complied with actual QA/QC parameters.

iv. Desired Milestone Schedule

The index period is when sampling occurs; in ecoregions where streams are perennial, sampling can occur in the spring or fall, each choice having pros and cons. At this time, sample collection for FY 2003-2004 is scheduled to be conducted during the spring of 2004.

v. Desired "Sample Throughput Schedule"

Need to obtain from Fish and Game

vi. Budget

The maximum cost of all SWAMP services specified for FY 2003-2004, as shown in the attached table "Service to be performed at each station/cost" (Attachment A), shall not exceed **$360,000**. This amount of $360,000 is from the Region 4 allocation for FY 2003-2004.

3. Monitoring Coordination

A. Coordination of Intra-agency Monitoring

Toxic Substances Monitoring and State Mussel Watch Programs

The Toxic Substances Monitoring and State Mussel Watch Programs (TSMP and SMWP) are statewide programs that are in the process of being incorporated into SWAMP. Each year CDFG in conjunction with Regional Board staff select sites and collect fish (generally from fresh or estuarine waters) and/or place transplanted mussels (generally in saline waters) from these sites to analyze toxic substances that are being bioaccumulated by these species. Recent sites include:

Los Angeles River

- TSMP – Within the tidal prism, in Long Beach (#405.12.03); just northwest of downtown LA, at Los Feliz (#405.21.06); and near Sepulveda Basin, at Burbank Blvd in Van Nuys (#405.21.16)
- SMWP – In Queensway Bay, at the river mouth in Long Beach (#609.4)

San Gabriel River

- TSMP – Within the lower tidal prism, in Long Beach (#405.15.04); within the upper tidal prism below the confluence with Coyote Creek, in Los Alamitos (#405.15.91); in San Jose Creek near confluence with San Gabriel River, in El Monte (#405.41.04); and in the West Fork of the San Gabriel River, in Angeles National Forest (#405.43.11)
- SMWP - none

Los Cerritos

- TSMP – Sims Pond (#405.12.91) and Colorado Lagoon (#405.12.04)
- SMWP – none recent

Ambient Toxicity Testing Program

The Ambient Toxicity Testing Program existed as an independent program until recently and now is incorporated into SWAMP. The San Gabriel River was sampled intensively for ambient toxicity in the mid-1990s and, more recently, the Los Angeles River was sampled in 2000/2001.

TMDLs

Both LA and San Gabriel Rivers continue to be extensively monitored and modeled under both dry and weather conditions for impairment-related pollutants by SCCWRP under contract with the Regional Board; this work is in collaboration with 18 entities including the City of Los Angeles, the Los Angeles County Department of Public Works,

the Los Angeles and San Gabriel Rivers Watershed Council, and the Friends of the San Gabriel River.

The current SWAMP sampling plan acknowledges extensive sampling being done for TMDL work and any directed sampling has been adjusted accordingly.What about Bay Protection and Cleanup Program?

B. Coordination of Inter-agency Monitoring

Los Angeles River

"Regular" monitoring

- City of LA, Bureau of Sanitation – POTW receiving water monitoring (for NPDES permits); extensive list of parameters concentrated around outfalls
- LA County Public Works stormwater monitoring (for municipal stormwater NPDES permit); extensive list of parameters but with focused timing
- General industrial stormwater NPDES permit monitoring (group monitoring in receiving water); limited list of parameters
- Citizen monitoring (Friends of the Los Angeles River, The River Project); generally good station coverage but with limited list of parameters
- City of Long Beach stormwater monitoring (for municipal stormwater NPDES permit); extensive list of parameters with focused timing and one location
- City of Long Beach Health Department (bathing beach monitoring); limited list of parameters sampled intensively at limited locations
- Groundwater management agencies – limited list of parameters focused on source water concerns

"Periodic" monitoring or special studies

- City of LA Integrated Resources Plan: LA River Recycle Water Optimization Study Phase II
- US Geological Survey
- US Army Corps
- US Bureau of Reclamation
- California Department of Water Resources
- Southern California Bight sampling events
- Baseline monitoring for development of watershed management plans – Compton Creek (LA/SG Rivers Watershed Council), Rio Hondo (San Gabriel Valley Council of Governments and Rivers & Mountains Conservancy), Sun Valley (LA County Public Works), Arroyo Seco (Council of Arroyo Seco Agencies, City of Pasadena, Northeast Trees, US Army Corps)

San Gabriel River

"Regular" monitoring

- County Sanitation Districts of Los Angeles County – POTW receiving water monitoring (for NPDES permits); extensive list of parameters concentrated around outfalls

- LA County Public Works stormwater monitoring (for municipal stormwater NPDES permit); extensive list of parameters but with focused timing
- Power plants receiving water monitoring (for NPDES permits); fairly extensive list of parameters concentrated around outfalls
- General industrial stormwater NPDES permit monitoring (group monitoring in receiving water); limited list of parameters
- Citizen monitoring (Friends of the San Gabriel River); generally good station coverage but with limited list of parameters
- City of Long Beach Health Department (bathing beach monitoring); limited list of parameters sampled intensively at limited locations
- Groundwater management agencies - limited list of parameters focused on source water concerns

"Periodic" monitoring or special studies

- US Geological Survey
- US Army Corps
- US Bureau of Reclamation
- California Department of Water Resources
- Southern California Bight sampling events
- Baseline monitoring for development of watershed management plans – San Jose Creek, Walnut Creek, and Upper San Gabriel River (San Gabriel Mountains Regional Conservancy), Coyote Creek (LA County Public Works, Orange County Public Works, US Army Corps)

<u>Los Cerritos Channel/Wetlands and Alamitos Bay</u>

"Regular" monitoring

- City of Long Beach stormwater monitoring (for municipal stormwater NPDES permit); extensive parameters at three stations with focused timing
- City of Long Beach Health Department (bathing beach monitoring)
- Power plant intake monitoring (for NPDES permit); extensive list of parameters monitored annually
- Citizen monitoring (Friends of Colorado Lagoon)

"Periodic" monitoring or special studies

- Southern California Bight sampling events

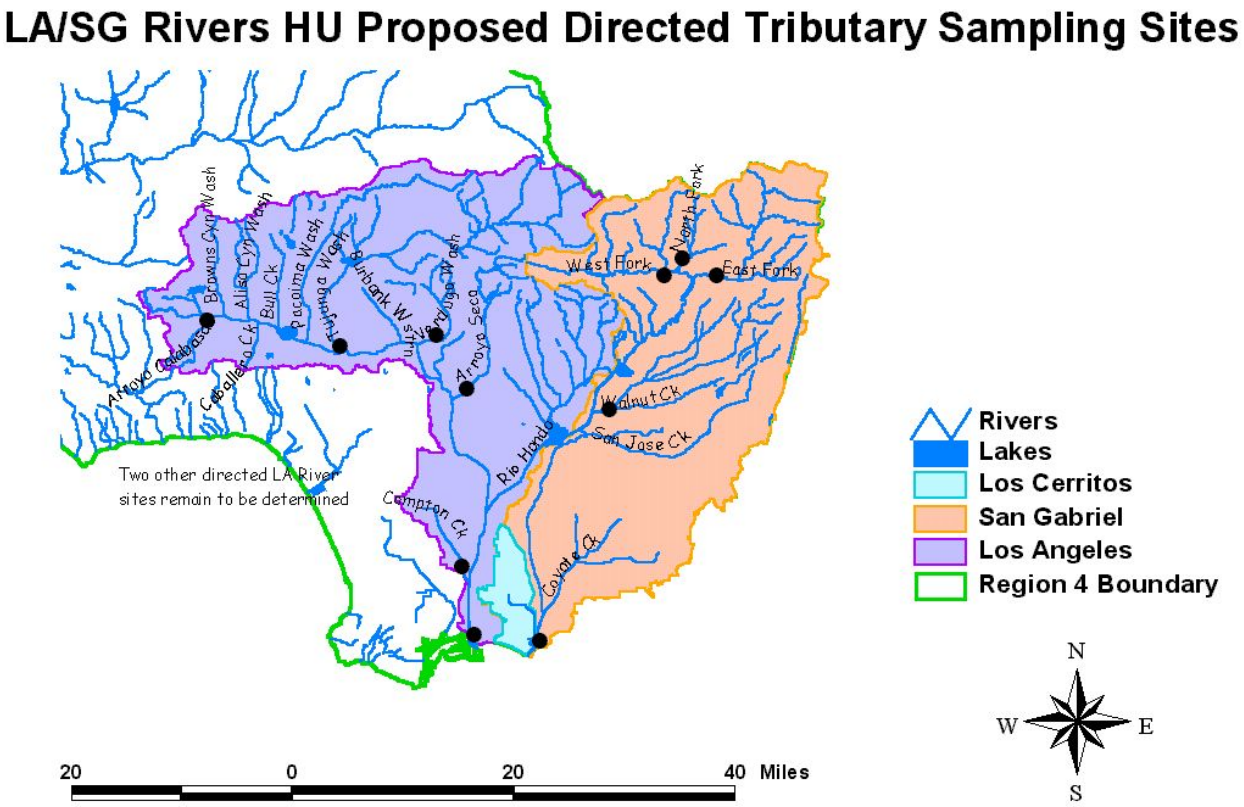
The current SWAMP sampling plan acknowledges expensive sampling being done by other agencies and any directed sampling has been adjusted accordingly.What about Bay Protection and Cleanup Program?

4. Attachments

Attachment A: Services to Be Performed at Each Station/Cost

See linked file Region 4 SWAMP Task Order for 03_04 Monies.xls

Attachment B:



Attachment C:

Los Angeles-San Gabriel HUA (proposed Los Cerritos/Alamitos Bay) Sampling Sites