

**BIOLOGICAL JUSTIFICATION TO SUPPORT THE 1707 PETITION  
OF A DECREED WATER RIGHT IN LOWER FRENCH CREEK  
TO BENEFIT ANADROMOUS SALMONIDS  
February, 2009**

**Introduction**

The goal of the French Creek 1707 Petition (Petition) is to improve rearing habitat for coho salmon (*Oncorhynchus kisutch*), Chinook salmon (*Oncorhynchus tshawytscha*) and steelhead trout (*Oncorhynchus mykiss*) through voluntary dedication of a decreed water right of 0.76 cubic feet per second (cfs) in the lower reach of French Creek to its confluence with the Scott River. The water right identified in this Petition is currently held by Mr. John Spencer and is described as the Browne Ditch (Diversion No. 48) in the French Creek Decree No. 14478 of the Superior Court of Siskiyou County<sup>1</sup>. The water right associated with Diversion No. 48 is a seventh priority right and allows for continuous use during the year but is limited to the amount required for domestic, stock water, or other beneficial uses during the period from October 1 to March 31. Surface water diversions in French Creek have been fully adjudicated and there is currently a total of 36.51 cubic feet per second (cfs) in water rights allocated within the French Creek watershed under the French Creek Decree.

Coho salmon are listed as a threatened species pursuant to both the California Endangered Species Act (CESA) and the Federal Endangered Species Act (ESA) in the Southern Oregon Northern California Coast (SONCC) Evolutionarily Significant Unit (ESU) which includes the Scott River watershed. Agricultural diversions during the summer and early fall have reduced the quantity and quality of rearing habitats available to anadromous salmonids in French Creek. In recent years considerable efforts have been made to improve habitat conditions and conserve water to benefit anadromous salmonids.

The Petition described here is yet another step forward in improving habitat conditions for anadromous salmonids in French Creek. Mr. Spencer has previously proved a willingness to voluntarily forbear use of his water right during the critical summer irrigation period when additional flows would benefit rearing salmonids. He has filed a Petition to add instream beneficial use as a potential purpose and place of use for his water right, so as to make possible future forbearance of his water right on a continuing basis. The purpose of this report is to provide habitat and biological information in support of the Petition.

**Existing Conditions**

French Creek is an important anadromous fish producing tributary of the Scott River located in Siskiyou County. The Scott River is a tributary to the Klamath

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<sup>1</sup> French Creek Decree No. 14478, Siskiyou County Superior Court, July 1, 1958.

River. French Creek is located on the west side of Scott Valley, south of the town of Etna. The creek originates in the Marble Mountains to the west. Elevations in the watershed range from approximately 2,950 feet at the mouth of the creek to approximately 7,400 feet in the headwaters area. French Creek is a third order stream and has approximately 37.3 miles of perennial stream and drains a watershed area of 20,584 acres. The vegetative community is primarily mixed coniferous forest of red fir, douglas fir, jeffery pine, ponderosa pine, sugar pine, incense cedar and mountain hemlock. Native hardwoods are also present at lower elevations and primarily include black oak, Oregon White oak, with an understory of mixed shrubs.

Lands within the watershed are owned and managed by a combination of federal agencies, private timber companies, and rural agricultural and residential parcels. U.S. Forest Service lands comprise 54% of the watershed including wilderness areas in the upper elevations. Private timber companies own 33% of the watershed in mid-elevations while ranches manage 10% and residential users control 3% primarily in the lower elevations of the watershed (French Creek Watershed Project Newsletter 1992).

Granitic mountain slopes comprise approximately 49% of the French Creek watershed while nongranitic slopes account for 23%. Inner gorges, glacial/terrace deposits, and valley alluvium account for 4%, 17% and 6%, respectively.<sup>2</sup> Granitic slopes are easily eroded and are sensitive to land management activities such as road construction and timber harvest. In 1990, the *Scott River Basin Granitic Sediment Study*<sup>3</sup> found that French Creek contributed about 23% of the total average annual erosion to the Scott River, or 79,295 tons. Of this amount, French Creek's roads (road surface, road fill, and road cuts) were responsible for 62%. Stream channel erosion (including inner gorge debris slides) and skid trails were also found to be a large contributor of sediment to the creek. Cooperative road improvement projects through the French Creek Watershed Advisory Group were conducted following the study and these efforts appear to have greatly reduced erosion of granitic soils within the French Creek watershed<sup>2</sup>.

The lower section of French Creek, in which the proposed Petition is located, can be characterized as a low gradient (< 1%) meandering channel with alluvial deposits of cobble, gravel, and sand. The riparian community is willow dominated and the adjacent floodplain has been developed for agricultural use. Large rock revetment (rip-rap) has been placed along the north bank of the channel at various locations to help stabilize the channel and reduce lateral erosion of the banks. There is about 0.6 miles of stream channel between Diversion No. 48 and the confluence of the creek with the Scott River (Figure 1).

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<sup>2</sup> U.S.D.A. Pacific Southwest Region, Klamath National Forest. (1997). Callahan Ecosystem Analysis. 149 pp.

<sup>3</sup> Sommarstrom, S., E. Kellogg and J. Kellogg. (1990) Scott River Basin Granitic Sediment Study. Prepared for the Siskiyou Resource Conservation District. 175 pp.



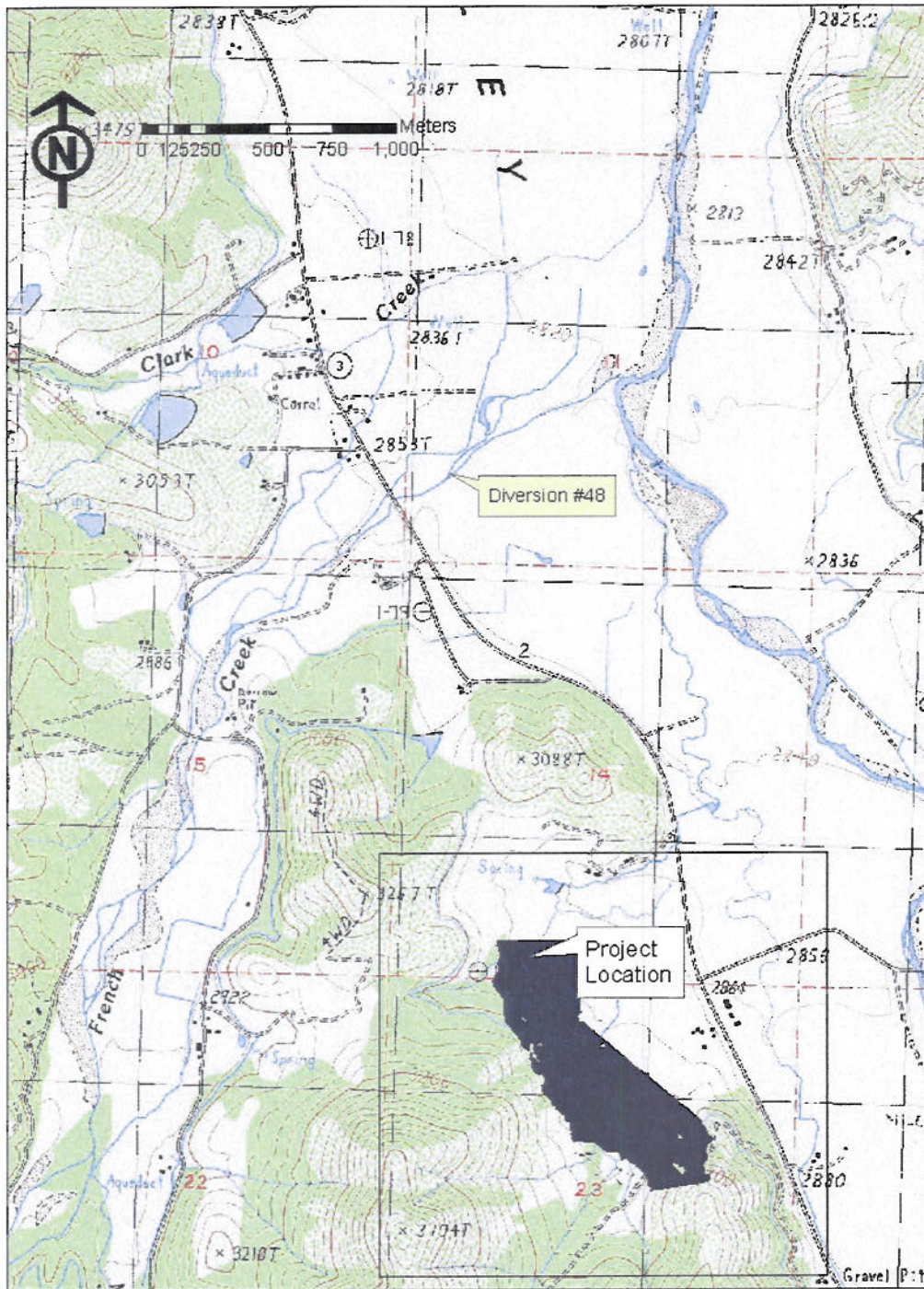


Figure 1. Lower French Creek showing the current location of French Creek Water Right Diversion No. 48, Siskiyou County, CA.



Wolford Slough is located upstream of French Creek and joins the creek near the mouth during high flows. Beavers are active in Wolford Slough in the lower reach of French and their actions have created additional rearing habitat in the backwaters created by their dams. Riparian plants (rooted willow, cottonwood, alder cuttings) were planted on the Spencer property in 1995, 1996 and 1997 as a stream restoration project of the Siskiyou Resource Conservation District (Siskiyou RCD) and many have survived and grown. A fish screen structure was constructed off-stream in 2004 by the Siskiyou RCD. In the summer of 2007, two vortex weirs were constructed by the Siskiyou RCD at the location of Diversion No. 48 to help stabilize the channel and improve migration and rearing conditions for salmon and steelhead. Photo 1 shows the general condition of the stream channel at Diversion No. 48 and further downstream.



**Photo 1. Photographs of lower French Creek showing one of the vortex weirs at Diversion No. 48 (left) and the conditions of the stream channel upstream (right). Photos are courtesy of the Scott River Water Trust.**

Stream flow in French Creek originates as snowfall in the higher elevations (>5,000 ft) of the watershed and as rainfall in the lower elevations. Flow is generally highest during warm winter rains and rain-on-snow events, typically occurring between October and March. The California Department of Water Resources (DWR) installed a stream flow gage on French Creek upstream of the Highway 3 Bridge crossing in the summer of 2004. The rating curve for this gage is calibrated for lower stream flow conditions relevant to the irrigation diversion season which typically begins after April 1. Therefore, the gage does not provide

accurate stream flow data under conditions of high run-off periods related to winter storms or periods of the high snow melt. However, the gage's accuracy is significantly reduced when streamflow is below 1.0 cfs.<sup>4</sup> The average daily annual flows for the 2005, 2006, and 2007 water years are presented in Figure 2.

Diversion No. 48 is located downstream of the French Creek gage and the Highway 3 Bridge crossing. All other diversions within the French Creek watershed are located upstream of the gage and therefore, flow measurements recorded at the gage are fully impaired with the exception Diversion No. 48. Some connective groundwater accretion enters the stream channel between the gage and the location of Diversion No. 48 and the source of this water is believed to originate from irrigated pasture lands adjacent to the channel. As a result, flows measured by the gage upstream do not account for the full volume of water that is typically available at the point of the diversion during the irrigation season.

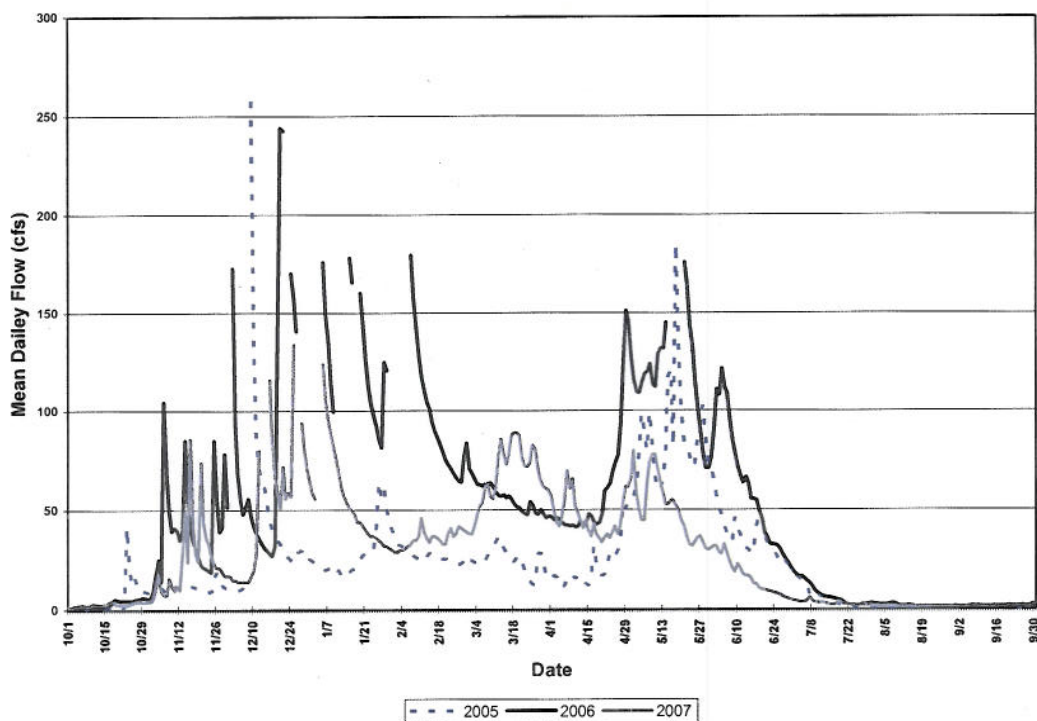


Figure 2. Average daily flows observed in French Creek for water years 2005, 2006, and 2007. High flow periods exceed the rating curve boundaries and are either extrapolated or are not available. Data downloaded from the DWR data library.

Coho salmon and steelhead trout reside in freshwater one or more years prior to emigrating downstream as smolts. Therefore, suitable flow and water temperatures are critical to sustaining these species during the warm summer months. Flows in French Creek are typically very low during this critical rearing

<sup>4</sup> Mr. Joe Scott, Department of Water Resources, Watermaster, personal communication.



period. For water years 2005 through 2007 the average monthly flows recorded at the French Creek Gage range from 7.2 to 3.1 cfs in July, 1.6 to 0.2 cfs in August, and 1.9 to 0.4 cfs in September. In the summer of 2005, average daily flows dropped to less than 0.1 cfs on 10 occasions between August 18 and September 2, and were less than 0.2 cfs for a total of 19 days between August 13 and September 3 (Figure 3).

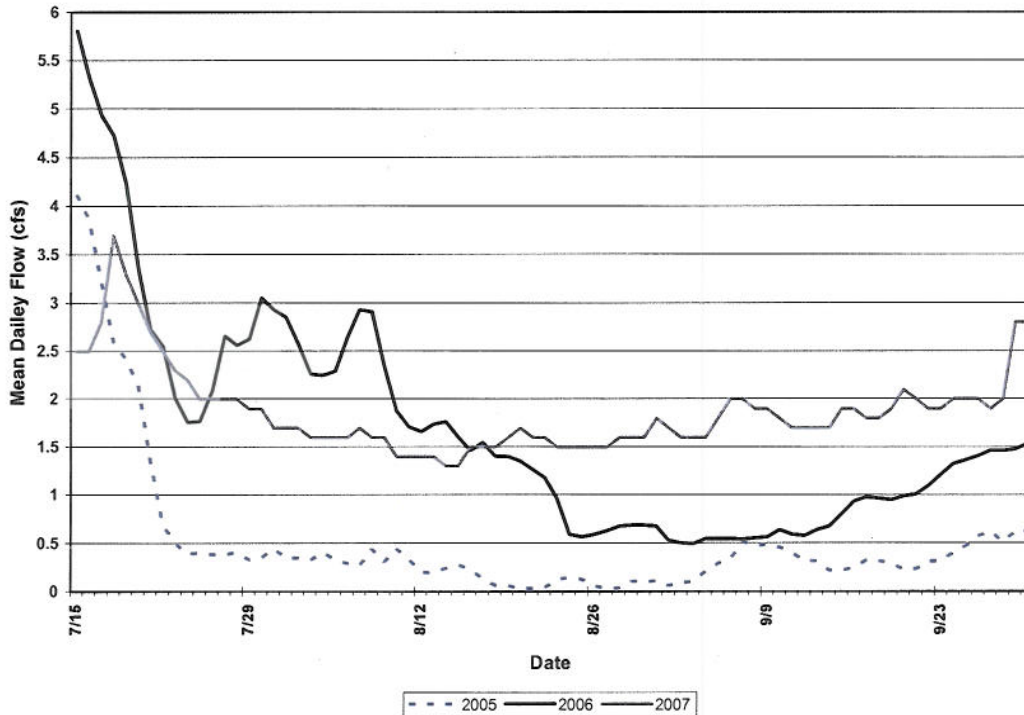


Figure 3. Average daily flows (cfs) recorded at the French Creek gage from July 15 to September 30 for water years 2005, 2006 and 2007. Data downloaded from the DWR data library.

### Scott River Water Trust

Development and implementation of the Scott River Water Trust is identified under the Incidental Take Permit Program as a measure to mitigate potential take of listed coho salmon associated with agricultural water use<sup>5</sup>. The goal of the water trust is to improve instream flows by leasing or purchasing water from willing water right holders for beneficial use. The Scott River Water Trust became active in the summer of 2007 and has been working with willing landowners throughout Scott Valley, including French Creek.

<sup>5</sup> CDFG. (2008). Draft Environmental Impact Report, Scott River Watershed-Wide Permitting Program. California Department of Fish and Game, Northern Region, 601 Locust Street, Redding, CA 96001.

In 2007, the Scott River Water Trust leased water through forbearance agreements from 4 diversions in French Creek, with 3 located above the DWR gage (Table 1). These leases may have influenced the gage readings from August 13 through September 30, 2007.

Location / Site	Lease Date	Lease Amount (cfs)	Stream Flow Above (cfs <sup>1</sup> )
French Creek – Miner's Ck			
Diversions #33	8/13/2007	0.4	0.65
Diversions #36	8/21/2007	0.25	1
French Creek			
Diversions #20	8/30/2007	2.4	3.5
Diversions #48	8/13/2007	0.18-0.4	0.4

<sup>1</sup> Estimated by the DWR Watermaster at time of lease.

In 2008, the Scott River Water Trust again entered into forbearance lease agreements with local water right holders in French Creek to improve instream beneficial uses. The Water Trust entered into agreements at 3 sites, 2 of which were above the DWR gage, as described in Table 2 below.

Location / Site	Duration of Lease		Lease Amount (cfs)	Stream Flow at Start of Lease (cfs)
	Start	End		
French Creek – Miner's Ck				
Diversions #33 - Initial	7/29/2008	9/30/2008	0.2	0.45
Diversions #33 - Additional	8/16/2008	9/30/2008	0.20 to 0.10	0.4
Diversions #36	9/4/2008	9/30/2008	0.25	0.35
French Creek				
Diversions #48	7/10/2008	9/30/2008	0.70 to 0.40	8.4

In terms of providing instream beneficial uses, forbearance agreements can only protect the instream flow until the next diverter. Therefore, unless the next downstream diverter also participates in an agreement, that person can legally divert the available water if the Watermaster declares it available.

## Juvenile Salmonid Populations

In 1992, the French Creek Watershed Advisory Group (FCWAG) was formed in response to concerns over the high levels of granitic sedimentation that had been identified within the *Scott River Basin Granitic Sediment Study*. In an effort to reduce erosion rates of fine sediment, the FCWAG prepared a Road Management Plan and a Fire and Fuel Management Plan for the French Creek watershed. The primary goal of these plans is to reduce the yield of fine sediment in the watershed and reduce the potential for negative cumulative watershed effects with emphasis on salmonid habitats. To assess the efficacy of these plans as well as implementation of other habitat restoration efforts in the watershed, the FCWAG developed the French Creek Watershed Monitoring Plan.

### Juvenile Steelhead Population Monitoring in French Creek

To assist in this monitoring effort the California Department of Fish and Game (Department) monitored juvenile salmonid populations in French Creek from 1992 through 2005.<sup>6</sup> The results of this effort are presented in a report to the FCWAG titled "*Juvenile Steelhead Population Monitoring in the French Creek Watershed 1992 – 2005*". The study monitored salmonid populations at six locations, four on French Creek (FC), one in the lower portion of Miners Creek (MC), and one on the lower portion of Duck Lake Creek (DLC). The specific location of these monitoring sites is presented in Figure 4. These sites are all upstream of the Petition site near the mouth of French Creek.

Although the study was focused on juvenile steelhead trout, observations of juvenile coho salmon were also documented. Sampling throughout the study was conducted in late August and September when stream flows are typically at their lowest levels. Although absent in some years, juvenile coho salmon were present in the lower three monitoring sites in French Creek (FC1A, FC2, & FC3) and in Miners Creek (MC). Juvenile steelhead trout were consistently found in all sites every year (Table 3). The standing crop estimates for juvenile coho salmon support the conclusion that coho salmon populations in the Scott River basin are comprised of one relatively strong year class and two much weaker year classes. This trend has been verified further by adult coho salmon spawning surveys conducted by the Siskiyou RCD and trapping of yearling coho salmon out migrants in the lower Scott River conducted by the Department since the spring of 2000<sup>7</sup>.

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<sup>6</sup> CDFG. (2006). *Juvenile Steelhead Population Monitoring in the French Creek Watershed 1992-2005*. Prepared for the French Creek Watershed Advisory Group.

<sup>7</sup> William Chesney, Associate Fishery Biologist, California Department of Fish and Game, Yreka, CA.



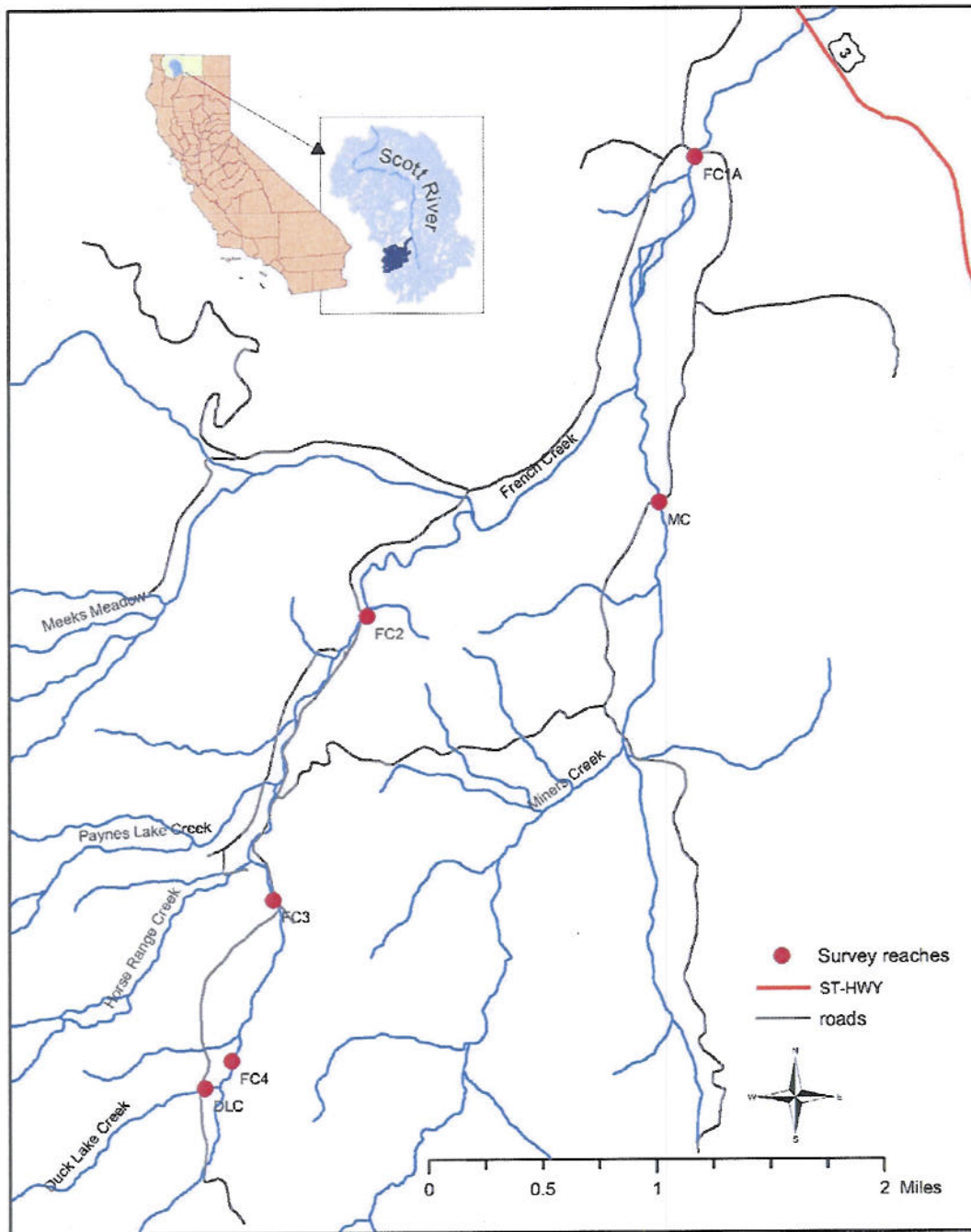


Figure 4. Location of salmonid monitoring sites sampled during the juvenile steelhead population monitoring effort in the French Creek watershed from 1992 to 2005.

**Table 3. Standing crop estimates for juvenile coho salmon and steelhead trout in the lower three monitoring sites of French Creek and Miners Creek as reported by the California Department of Fish and Game, 1992-2005.**

Year	Coho Salmon				Steelhead Trout			
	FC1A	FC2	FC3	MC	FC1A	FC2	FC3	MC
1992	0	0	0	0	39	142	49	4
1993	0	0	0	7	61	12	13	58
1994	0	0	0	0	83	172	32	43
1995	0	0	0	0	53	32	17	52
1996	0	29	15	No Survey	35	54	30	No Survey
1997	0	0	0	0	171	34	14	89
1999	28	46	2	139	141	102	54	182
2000	2	0	0	0	495	197	96	117
2001	3	0	0	12	147	206	14	59
2002	500	12	21	95	334	86	28	7
2003	9	0	0	30	347	60	35	25
2004	NA <sup>1</sup>	0	0	4	NA <sup>1</sup>	31	19	63
2005	No Survey	47	5	216	No Survey	139	19	24

<sup>1/</sup> Due to sampling difficulties only one electrofish pass was made in 2004

All of the monitoring sites described in Table 3 are located upstream of Diversion No. 48. Monitoring site FC1A is approximately 1.1 miles upstream. In many ways the instream habitat characteristics at site FC1A (Photo 2) are similar to those habitat conditions present in the lower section of French Creek downstream of Diversion No. 48 (Photo 1). Both sites contain alluvial bars with long glides interspersed by relatively short lateral scour pools. The stream gradient at monitoring site FC1A is about 1% while the gradient downstream of Diversion No. 48 is approximately 0.6% and contains more cobbles. Based on these gradients, one would anticipate that the channel width would be greater further downstream. However, placement of rip-rap along sections in the lower channel, downstream of Diversion No. 48, has resulted in additional scour (depth) in pools and has caused a reduction in channel width at some locations (Photo 1).

The riparian community at both locations is comprised of white alder and willow species understory with some cottonwood and ponderosa pine overstory and is not well developed when compared to reaches further upstream. Riparian vegetation provides an important source of cover and shading in pool and glide habitats that were used extensively by juvenile coho for rearing during the summer. Gradual development of a more complex and mature riparian community in concert with development of a functional floodplain in the lower reach will greatly improve coho salmon rearing conditions over time. Continued healing of sediment erosion sources further upstream will improve the ability of the channel to stabilize over time as well.





**Photo 2. Lower French Creek monitoring site FC1A looking upstream from Miners Creek Road bridge.**

### Scott River Juvenile Salmonid Habitat Assessment

In the winter of 2004-2005 the Siskiyou RCD documented 960 coho salmon redds and observed approximately 1,577 adult coho salmon while conducting spawning ground surveys in the Scott River and various tributary streams surrounding Scott Valley<sup>8</sup>. Relative to the other two brood year cycles, this one relatively strong brood year provided an opportunity to observe rearing behavior and habitat selection of juvenile coho salmon during the following summer when numerous juvenile coho salmon were anticipated to be present in the system. To take advantage of these favorable conditions, Erich Yokel of the Siskiyou RCD conducted a study to describe habitat use of juvenile coho salmon in the main stem Scott River and several tributary streams that surround Scott Valley, including French Creek in the summer of 2005.<sup>9</sup> The objectives of the study were to:

1. Determine actual physical habitats being used for summer rearing by coho salmon and other anadromous species in the Scott River;
2. Determine relative density of habitat utilization coefficients to determine summer carrying capacity of Scott River;

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<sup>8</sup> Siskiyou Resource Conservation District. 2005. Scott River Watershed Adult Coho Spawning Ground Surveys, November 2004 – January 2005. 42 pp.

<sup>9</sup> Yokel, E. (2005). Draft Final Report: Scott River Summer Habitat Utilization Study. Siskiyou Resource Conservation District, Etna, CA 69 pp.

3. Use existing habitat typing data and habitat utilization coefficients to determine summer carrying capacity of Scott River;
4. Identify essential summer habitats for protection, enhancement, and restoration, and;
5. Use information gathered from surveys to direct management and develop plans for restoration projects that address key summer habitat parameters.

Two study reaches were surveyed in French Creek, a middle reach and an upper reach. The lower boundary of the middle reach began at the Miners Creek Road Bridge and extended upstream for about 0.94 miles ending at the confluence of Miners Creek. The instream habitat present in this reach resembles habitat types that are present above and below Diversion No. 48, and also includes the long term monitoring site FC1A sampled by the Department between 1992 and 2005. The stream channel within this middle reach is classified as C3 and C4 which are low gradient meandering alluvial channels with dominate substrates of cobble and gravel<sup>10</sup>. The substrate contains decomposed granitic sand which has filled the interstitial spaces between the dominant substrate types. The reach is dominated by flatwater (run and glide) habitats (60%) and are interspersed by riffles (30%) with very few pools (<10%). Side channels are common throughout the reach, however very few are connected to the channel during low flow periods common during the summer months. The riparian community is comprised of mature stands of alder and willow and is considered to be in fair to good condition. Terrestrial vegetation, small and large woody debris, root wads, and undercut banks provide cover for rearing salmonids.

The upper reach included approximately 0.41 stream miles in French Creek centered above and below the confluence of Payne's Creek. The stream channel in this upper reach is classified as B2 and B3 which are characterized as moderately entrenched stable channels with a stream gradient typically between 2% to 4%. The habitats are comprised of a near equal mix of flatwater (49%) and riffles (48%) interspersed by pool habitat types (3%). The dominant substrates are comprised of a mix of boulder and cobbles with large volumes of granitic sand found in the interstitial areas between the dominate types. The riparian species is dominated by mature alders which nearly cover the entire the channel providing an excellent source of shade. Although several cover types are available within this reach, the most prevalent cover type available during the study included boulders and bubble curtains. Lesser cover types present included large and small woody debris, rootwads, undercut banks and terrestrial vegetation along the channel margins.

Siskiyou RCD staff used both direct observation using snorkel divers (Photo 3) and/or standard electrofishing methodologies to sample juvenile fish in both the

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<sup>10</sup> Flosi, G., S. Downie, J. Hopelain, M. Bird, R. Coey and B. Collins. 1998. California Salmonid Stream Habitat Restoration Manual, 3<sup>rd</sup> edition. California Department of Fish and Game, Sacramento, CA.





**Photo 3. Snorkel diver conducting juvenile salmonid survey in lower French Creek immediately downstream of a vortex weir below Diversion No. 48 in August 2008. Photo courtesy of the Siskiyou RCD.**

middle and upper reach of the stream during the summer of 2005. In the middle reach, a total of 23 individual habitat units were sampled and included 5 riffles, 9 runs, 1 side-channel run, 4 glides, 2 root-wad formed lateral scour pools (LSP), 1 wood formed LSP, and 1 plunge pool. Juvenile coho salmon were found in all of the habitat units sampled with the exception of three riffles. The greatest densities of juvenile coho salmon were found in deep runs, without cover, and in scour pools with complex cover comprised of undercut banks with both small wood and root wad structures. The average densities of juvenile coho salmon observed in this middle reach ranged from a low of 0.01 coho/M<sup>2</sup> (riffles), to a high of 3.79 coho/M<sup>2</sup> (LSPs).

In the upper reach, a total of 15 individual habitat units were sampled which included 2 riffles, 9 runs, 1 step run, 2 plunge pools, and 1 bedrock formed LSP. Juvenile coho salmon were found at all of the habitat units surveyed with average densities ranging from a low of 0.03 coho/M<sup>2</sup> (riffles), to a high of 0.74 coho/ M<sup>2</sup> (LSP). Boulders within this reach were found to create important zones of slow velocity in higher velocity habitat types and these areas provided important holding and feeding lanes for juvenile coho salmon.

The densities of juvenile coho salmon observed in both the middle and upper reaches of the creek compare favorably with findings reported elsewhere in the



Pacific Northwest, and confirm the value of instream habitats that are provided in French Creek and are critical to the recovery of listed coho salmon within the basin.

#### Scott River Water Trust Monitoring Efforts

To document the effectiveness of water leases obtained through the Scott Valley Water Trust, the Siskiyou RCD has been monitoring improvements to summer flow and juvenile salmonid habitat use during critical summer rearing periods.

In 2008, additional habitat units were sampled upstream and downstream of the diversion and in the Scott River above and below the confluence of French Creek (Figure 5). Dive surveys were conducted on August 13 and coho salmon were present above Diversion No. 48 (FRAB), a short distance downstream of the diversion (FRBG), near the mouth of French Creek (FRAM), and in the Scott River below the confluence of French Creek (SCBF). Juvenile Chinook salmon, although in lower numbers, were also present at those same locations. Fry (0+) rainbow trout were abundant above and below Diversion No. 48 and a few juvenile (1+) rainbow trout were also observed in these same locations. Juvenile salmon were generally found using deeper areas of the channel (small scour pools) with abundant overhead and instream woody cover (Photo 4 and 5).

Measured water temperatures where juvenile coho and Chinook salmon were found were generally less than 20°C and were as low as 16.7°C. Water temperatures in areas of the channel without juvenile salmon were generally greater than 20°C and were recorded as high as 24.7°C. Pockets of cooler water provided thermal refuges for rearing salmonids and were generally associated with inter-connective groundwater seeps. Many of these locations were also shaded by riparian vegetation and in addition to providing valuable cover, may have helped temper water temperatures under these low flow conditions benefiting survival. Mean weekly average temperatures (MWAT) in excess of 18°C are known induce physiological stress upon juvenile coho salmon and may cause an increase in mortality over time.<sup>11</sup> Juvenile coho and Chinook salmon and rainbow trout were found using a scour pool in the Scott River downstream of the confluence of French Creek (SCBF). However, no juvenile salmonids were found in a similar pool with log cover upstream of the confluence of the French Creek (SCAF). Water temperatures within the scour pool at SCBF were 14.4°C near the bottom, 17.0°C at mid-column, and were 22.1°C at the surface. Water temperatures measured at the location where fish were observed were 16.7°C. Water temperatures measured in the pool at SRAF were 24.7°C. Since additional water temperatures were not collected throughout the water column at SRAF it is unknown as to whether cooler temperatures may have been present in deeper sections of the pool. Regardless surface temperatures were 2.6°C higher than observed in the downstream pool (SCBF). Based on these findings, the

<sup>11</sup> State of California. CDFG, Recovery Strategy for California Coho Salmon, Report to the California Fish and Game Commission, February 2004.



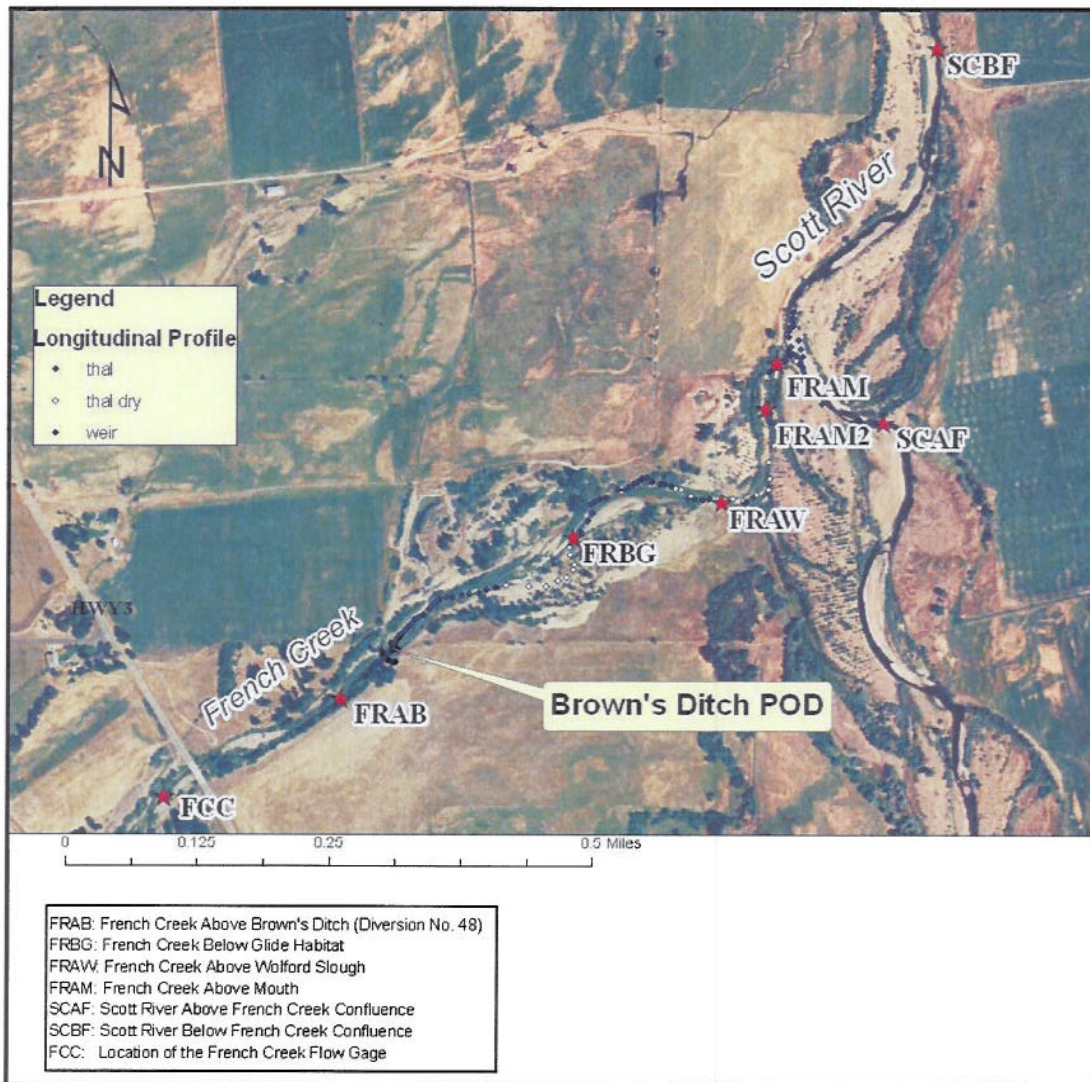
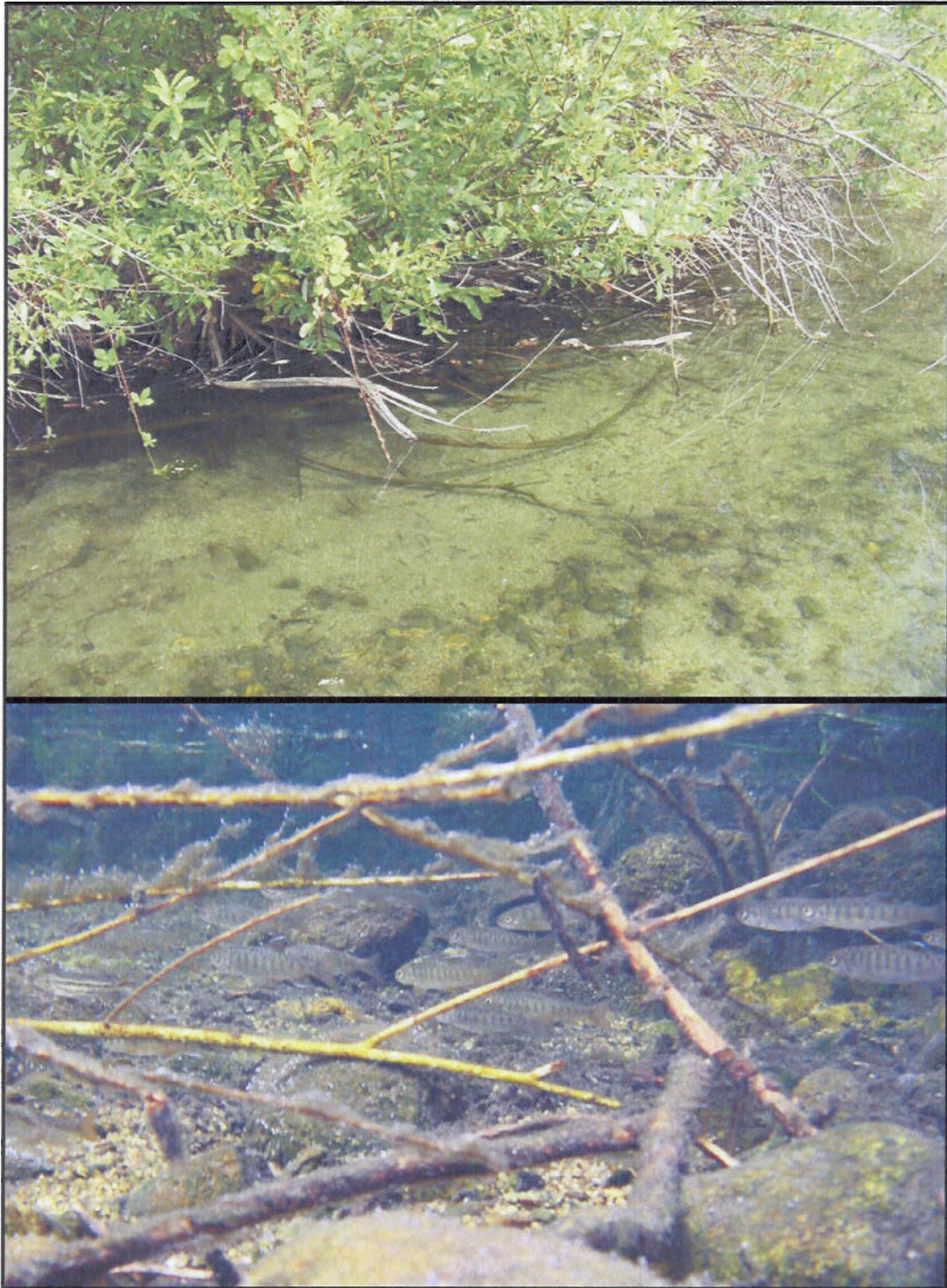


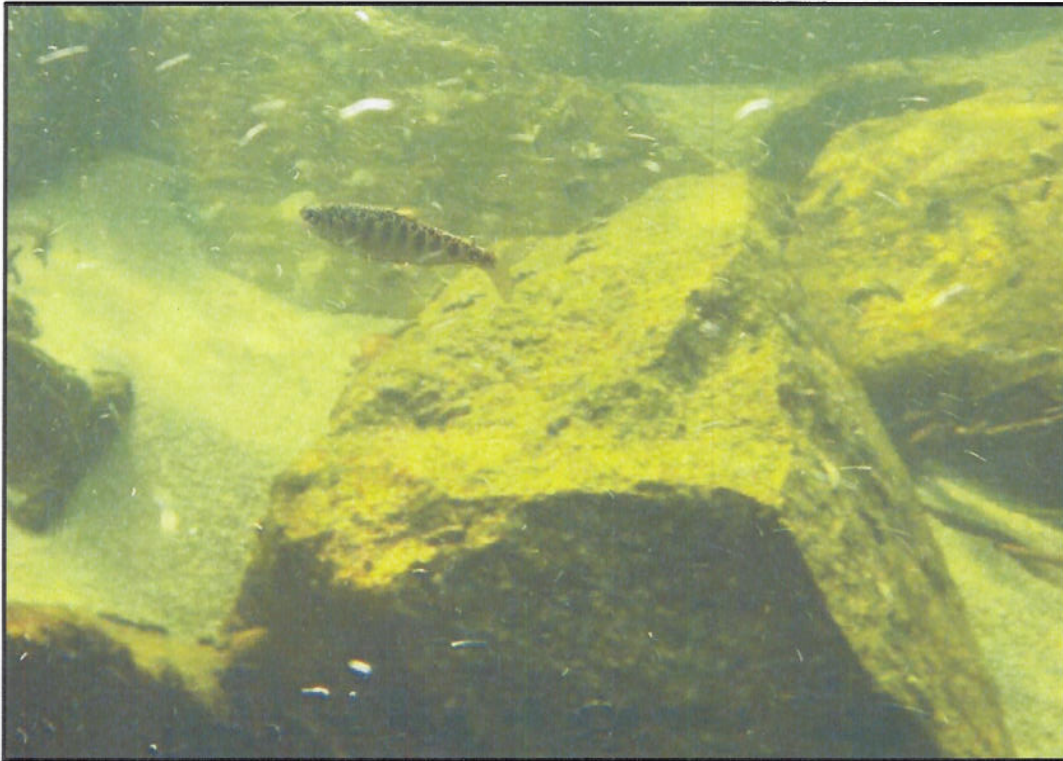
Figure 5. Location of fish observation and flow measurement sample sites conducted by biological staff of the Siskiyou RCD in lower French Creek during August of 2008. The location of Diversion No. 48 is denoted as the Brown's Ditch POD. The location of the current thalweg is denoted by the small dark blue (wetted at time of survey) and light blue dots (dry during the survey). Map is courtesy of the Siskiyou RCD.





**Photo 4. A school of juvenile salmonids (salmon and trout) using a small scour pool with overhead and instream woody cover provided by willows (top). Juvenile coho salmon using similar habitats (bottom). Both photos were taken in lower French Creek downstream of Diversion No. 48 in the summer of 2008. Photos are courtesy of the Siskiyou RCD.**





**Photo 5. Juvenile Chinook salmon over rock revetment in a small sour pool downstream of Diversion No. 48 in lower French Creek during the summer of 2008. Photo courtesy of the Siskiyou RCD.**

dive surveys conducted in the Scott River, above (SCAF) and below (SCBF) the confluence of French Creek, verify the importance of water temperature as a critical factor in determining habitat viability for juvenile salmonids. Therefore, maintenance of cool water habitat within and downstream of French Creek is crucial to the survival of coho salmon and other anadromous salmonids.

Biological staff from the Siskiyou RCD measured stream flows in lower French Creek periodically through the summer of 2008 from July 9 to October 14. See Figure 5 for the location of flow measurement sites. The Scott River Water Trust began leasing the full water right of 0.76 cfs from Mr. Spencer on July 10. Flow measurements conducted on July 11 showed an immediate response to surface flows downstream of the diversion (Table 4). However, as the summer progressed, surface flows began to decrease above and below the diversion causing some sections of the channel to lose connectivity downstream of the diversion.

Inter-gravel flow through alluvial bars within the channel, and contributions from groundwater seeps originating from irrigated agricultural lands adjacent to the channel, continued to supply cool water to low lying areas of the channel further

**Table 4. Flow measurements (CFS) conducted in French Creek and the Scott River during the summer of 2008 by the SRCD to monitor benefits derived through the lease of water from Diversion No. 48 for instream use. See Figure 5 for locations of flow measurement sites.**

Date	French Creek							Scott River		
	DWR Gage	Above Diversion No. 48	Diversion No. 48		Below Diversion No. 48	Above Wolford Slough	Upstream of Mouth	Above French Creek	Below French Creek	% Increase in Flow
	FCC	FRAB	Diverted	Leased	FRBG	FRAW	FRAM	SCAF	SCBF	
	Stream Mile									
	0.85	0.66	0.60	0.60	0.37	0.17	0.01			
7/9/2008	7.8	8.2	0.76	0	2	8.4	12.7	36.3	50.7	40%
7/11/2008	8.1	8.4	0	0.76	2.9	8.3	13.1	32.1	47.5	48%
7/28/2008	3.0	3.1	0	0.76	2.1	2.3	3.4	12.8	17	33%
8/13/2008	NA	1.7	0	0.76	1	1.2	1.4	6.6	10.3	56%
9/12/2008	NA	1.4	0	0.76	0.6	0.4	0.3	2.2	4.3	95%
10/14/2008	NA	5	0	0.76	3	3.5	3.5	11.5	17.2	50%

downstream. These increases to surface flow are apparent from flow measurements conducted above Wolford Slough (FRAW) and above the mouth of French Creek (FRAM). The presence of beaver dams in the lower sections of the creek, and in Wolford Slough, also helped to improve conditions for rearing salmonids in the lower channel by capturing accretions of cool water. Beaver dams also created areas of deeper water with abundant cover which are important features used by juvenile coho salmon.

Since inter-gravel flows within the channel likely have a much faster travel time relative to percolation rates of groundwater through adjacent agricultural lands, the forbearance of 0.76 cfs below Diversion No. 48 may have been critical to maintaining the survival of juvenile coho salmon through the summer of 2008. Diversion of this water would likely have resulted in less flow downstream due to additional evaporative loss and delayed contribution of inter-connective groundwater back to the channel. Future restoration that focuses on stabilizing the stream channel in conjunction with creation of a mature riparian zone and interconnected floodplain will likely improve the thermal regime and instream habitat to a more favorable condition capable of supporting greater numbers of anadromous salmonids throughout the summer when flows are most critical. A restored channel and floodplain should also provide for better conveyance of flood flows that are common during the winter season.

The importance of inter-gravel flows and inter-connective groundwater seeps originating from the French Creek drainage area are also apparent when one considers additional flow contributions to the Scott River. Flow measurements conducted in the Scott River above and below the mouth French Creek show that French Creek increases flow in the Scott River by as much as 95% during



September when flow conditions are most critical. Based on the flow measurements presented in Table 2, it appears likely that a large portion of the flow increases observed in the Scott River during August and September can be attributed to inter-gravel flows within French Creek and inter-connective groundwater seeps from adjacent agricultural lands.

The Petition will provide instream benefits to the Scott River through both improvements in flow (surface and subsurface) and water temperatures. Observations conducted by the Siskiyou RCD in the summer of 2008 verify the presence of cooler water temperatures and use of these habitats by juvenile coho and Chinook salmon and rainbow trout.

### **Adult Coho Salmon Spawning Ground Surveys**

Cooperative spawning ground surveys for coho salmon have been conducted in tributary streams around Scott Valley since the winter of 2001-2002. The surveys counted live adults, carcasses, and redds (spawning nests). In French Creek, spawning ground survey locations have varied some from year to year. In 2001, surveys were generally limited to approximately 0.8 miles in the middle reach of French Creek downstream of the confluence of Miners Creek and to spot checks at bridge crossings and other small stretches of stream channel in Miners Creek and Horse Range Creek where land owner permission was granted. By the winter of 2003-2004 additional cooperation from land owners provided access to the entire lower reach of French Creek downstream of Highway 3 to the confluence with the Scott River. Surveys were also expanded to include additional areas in Miners Creek, upper French Creek, Payne's Creek, and North Fork French Creek. Coho salmon spawning has been documented in Miners Creek and in French Creek from the general area near the confluence of Horse Range and Payne's Creek to the mouth. The most commonly used spawning areas are in the middle and lower reaches of French Creek and in the lower reaches of Miners Creek (Figure 6). The map below indicates coho spawning use in the lower reach that will be benefiting from Diversion 48's dedication for instream flow. Table 3 summarizes the findings of coho salmon spawning ground surveys in the French Creek watershed as reported by the USFS<sup>12</sup> and the Siskiyou RCD<sup>13</sup>. Adult coho salmon numbers were much

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<sup>12</sup> Maurer, S. (2002). Scott River Watershed Adult Coho Salmon Spawning Survey, December 2001 – January 2002. In fulfillment of contract with the USDA, USFS, Klamath National Forest, Scott River Ranger District, CA

<sup>13</sup> Maurer, S. (2003). Scott River Watershed Adult Coho Salmon Spawning Survey, December 2002 – January 2003. In fulfillment of contract with the Siskiyou Resource Conservation District, Etna, CA and the Department of Fish and Game, Yreka, CA

Siskiyou Resource Conservation District. (2004). Final Report Scott River Coho Spawning Assessment: 2003 – 2004. Prepared for U.S. Fish and Wildlife Service, Yreka, CA under Agreement #113333J027.

greater in 2001, 2004 and 2007 when compared to the other two brood year cycles.

**Table 3. Summary of the number of coho salmon spawning redds, live adults and carcasses observed in the French Creek watershed during spawning ground surveys conducted since the 2001-2002 season.**

Spawning Period	Number of Redds Observed	Number of Live Adults	Number of Carcasses
2001-2002	41	24	32
2002-2003	2	1	0
2003-2004	1	3	4
2004-2005	72	296 <sup>1</sup>	98
2005-2006	7	7 <sup>2</sup>	2
2006-2007	1	0	4
2007-2008	44	90	27

<sup>1</sup> Population estimate based on Schaefer mark-recapture estimate

<sup>2</sup> Two of these fish could not be verified as coho salmon

The life cycle of coho salmon typically follow a three year pattern which entails about one year of rearing in fresh water after emergence followed by two years of growth in the ocean. Although some coho salmon return to the river as grilse (two years old), the vast majority of the spawning population is comprised of three year old fish. Therefore, each brood cycle is vulnerable to catastrophic events, natural (floods or drought) or anthropogenic, that may negatively impact survival. Spawning ground surveys conducted in the Scott River watershed have shown that coho salmon populations are at risk. The current population is comprised of one relatively strong brood year cycle (2001 cycle) and two very weak brood year cycles. Given the extremely low numbers observed for the

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Siskiyou Resource Conservation District. (2005). Scott River Watershed Adult Coho Spawning Ground Surveys, November 2004 – January 2005. Prepared for U.S. Fish and Wildlife Service under Agreement #113333J027 and California Department of Fish and Game under Agreement #PO310331.

Quigley, D. (2006). Final Report Scott River Adult Coho Spawning Ground Surveys, November 2005 – January 2006. Siskiyou Resource Conservation District, Etna, CA. Funding provided by U.S. Fish and Wildlife Service under Agreement #113333J027 and California Department of Fish and Game under Agreement #PO310331.

Quigley, D. (2007). Final Report Scott River Adult Coho Spawning Ground Surveys, 2006 – 2007. Siskiyou Resource Conservation District, Etna, CA. Funding provided by U.S. Fish and Wildlife Service under Agreement #2004-FP-02 and California Department of Fish and Game under Agreement #PO310331.

Walsh, B. (2008). Scott River Adult Coho Spawning Ground Surveys 2007 – 2008 Season. Siskiyou Resource Conservation District, Etna, CA. Funding provided by U.S. Fish and Wildlife Service under Agreement #813337J039.



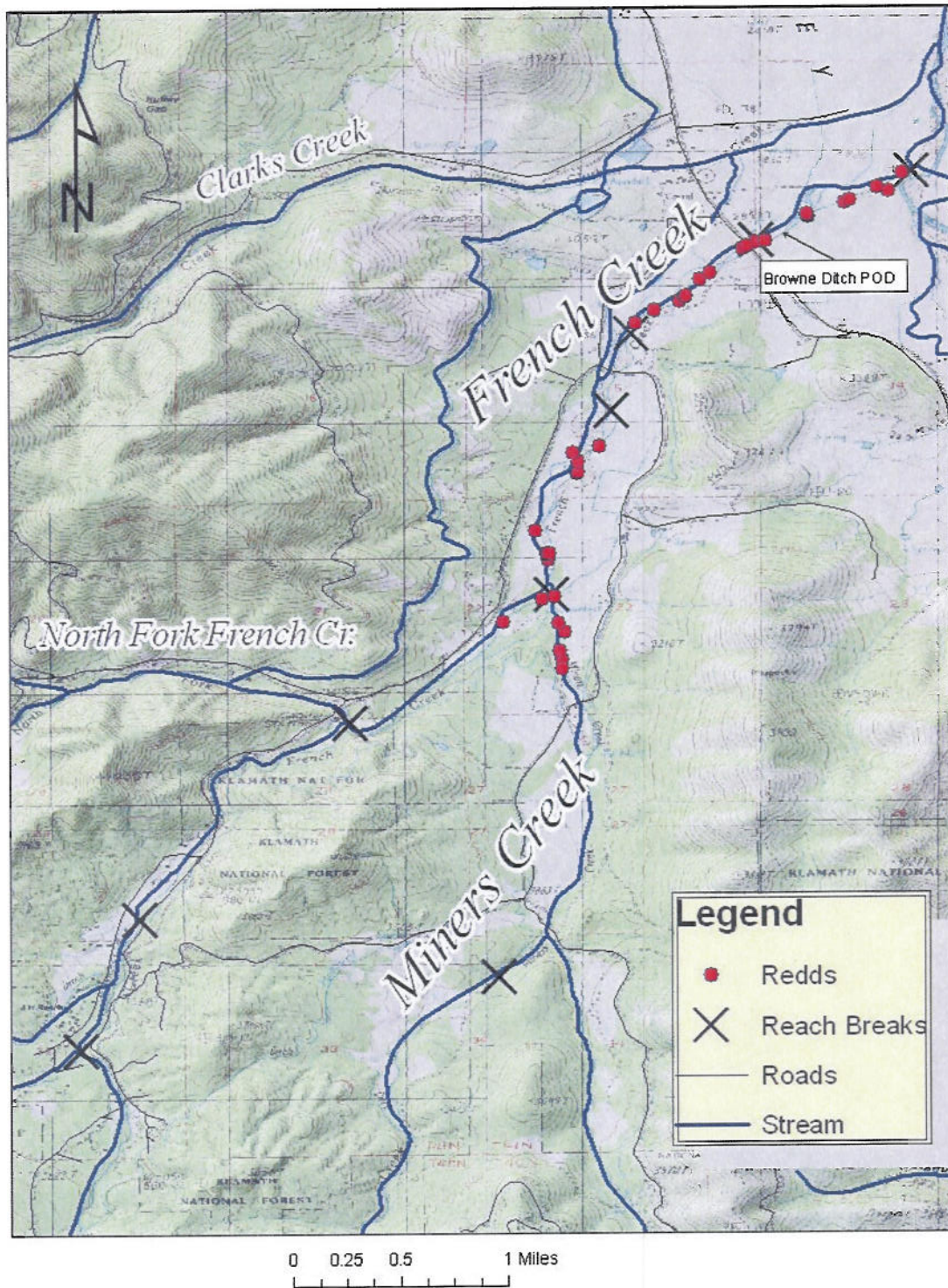


Figure 6. Distribution of coho salmon spawning redds observed within the French Creek watershed during the 2007-2008 season. Figure is courtesy of the Siskiyou RCD.



2002 and 2003 brood cycle, the viability of these two brood cycles is already at risk. Therefore, it is critically important that instream habitat and flow levels be improved immediately if species recovery is to be successful.

### **French Creek Water Right 1707 Petition**

The French Creek 1707 Petition seeks to improve rearing habitat for anadromous salmonids by providing additional flow to the lower 0.6 miles of French Creek during the summer irrigation season. Diversion No. 48 is the lowest surface water diversion point in French Creek. The water right associated with Diversion No. 48 is a seventh priority right and allows for continuous use during the year but is limited to the amount required for domestic, stock water, or other beneficial uses during the period from October 1 to March 31. Mr. John Spencer currently holds the water right for 0.76 cfs at Diversion No. 48.

Forbearance agreements were used by the Scott River Water Trust in 2007 and 2008 to lease his full water right for part of the season. Under these and future agreements, Mr. Spencer would receive monetary compensation from the Water Trust for voluntary forbearance of water during the summer irrigation period when such flows would benefit rearing salmonids, including threatened coho salmon. The fall period, during low rainfall months, may also be a time for water leasing to assist upstream migration of spawning Chinook and coho salmon.

Surface water diversions in French Creek have been fully adjudicated and there is currently a total of 36.51 cubic feet per second (cfs) in water rights allocated within the French Creek watershed under the French Creek Decree. While spring and early summer flows are generally adequate to meet agricultural diversion demands, summer and early fall flows are not. This gap results in reduced and degraded rearing habitat conditions for cold water fish such as coho and Chinook salmon. The French Creek Decree does not provide flow for instream beneficial use.

### **Summary**

French Creek provides critically important habitat for anadromous salmonids, particularly coho salmon which are currently listed as threatened under both the federal Endangered Species Act and the California Endangered Species Act. Adult coho salmon have been observed spawning in French Creek every year since 2001, when the first spawning ground survey targeting coho salmon was conducted. French Creek also provides some of the most important rearing habitat within the Scott River drainage. The presence of cool water refugia habitats for over-summering salmonids is critically important to the survival of coho salmon. As a result, French Creek has been identified as one of the



highest priority streams within the Scott River for implementation of habitat restoration and water conservation projects in the future. The Petition will also provide instream benefits to the Scott River through both improvements in flow (surface and subsurface) and water temperatures. Observations conducted by the Siskiyou RCD in the summer of 2008 verify the presence of cooler water temperatures and use of these habitats by juvenile coho and Chinook salmon and rainbow trout.

The presence of several interested local landowners and stakeholder groups, such as the FCWAG, Siskiyou RCD, and the Scott River Water Trust, provide additional optimism and impetus to ensure that funding and implementation of future restoration efforts are successful. Based on the importance of French Creek to the continued existence and recovery of coho salmon and the presence of these motivated local stakeholders, the Department fully supports the Scott River Water Trust in their effort to move forward with the French Creek Petition for Diversion 48 through the State Water Board's 1707 water right process. In addition, the Department will continue to work with the Scott River Water Trust and other local irrigators as opportunities arise to facilitate additional water conservation and habitat restoration projects that will further improve minimum base flows and habitat for rearing salmonids in late summer to aid in the recovery of both listed coho salmon and other anadromous species that rely on French Creek for part of their life cycle.