***The Pacific Coast Federation of Fishermen's Associations (PCFFA), Institute for Fisheries Resources, Coast Action Group, Northcoast Environmental Center (NEC), Environmental Protection and Information Center (EPIC), Mendocino Group of the Redwood Chapter of the Sierra Club, and the Sierra Club of California***

Chair Tam Doduc and Members of the Board
C/o Selica Potter, Acting Clerk of the Board
State Water Resources Control Board – Executive Office
1001 "I" Street, 24th Floor
Sacramento, CA 95814

12 June 2006
Via Email and Mail

Re: Joint Comments on the Proposed Action Plan for the Scott River Watershed Sediment and Temperature TMDL

Dear Board Members:

The Board's decision to adopt an Action Plan (Plan) for the Scott River Watershed Sediment and Temperature TMDL offers a tremendous opportunity. When it enacted the Porter-Cologne Water Quality Control Act, the Legislature assigned the State Board jurisdiction over both water quality and water *quantity* for the agency to take each into account when determining what pollutants may go in and what water may come out of a watershed. To date, the State Board's divisional structure and the sharp separation between the water quality and water rights divisions' proceedings and staffing has resulted in the regulatory distancing of water quality and water quantity issues for most of the State's rivers. Although the State's involvement in water quality certifications provided by the federal Clean Water Act, for example in dam licensing proceedings, have bridged the gap on occasion, those few occasions are very project specific, subject to the scheduling licensing proceedings, and include water quality issues only as a secondary issues. The TMDL proceedings currently underway around the state provide a much more integrated and timely opportunity for the State Board to realize Porter-Cologne's goals of integrating its water quality *and* water quantity management and assuring water quality standards and beneficial uses are attained as soon as possible for hundreds of degraded rivers and streams throughout the State.

Although many of the technical TMDLs produced for the North Coast region have identified sufficiently the sediment and temperature problems confronting rivers and creeks throughout that region, with the exception of the Garcia River, the Regional Board has failed to adopt any implementation plans specific to any of the other listed waterbodies. The Regional Board's failure appears to be a combination of lack of political will to confront the facts presented in these watersheds and, in regard to temperature issues, a lack of authority to directly address flows.

The Scott River Action Plan could be a model of how to integrate its water quality *and* water quantity responsibilities in a manner that reflects the natural connection between a river's flow volumes and the quality of that water rather than allow the Board's divisional structure to serve as a roadblock to effective implementation of needed regulatory requirements.

Unfortunately, the proposed Plan does not contain sufficient enforceable actions to protect public trust and beneficial water uses, including fisheries protections, in the Scott River. In light of the ongoing collapse of Klamath River salmon resources, and ample evidence that particularly for state and federally ESA-listed coho salmon these issues are particularly important in the Scott River, the Plan needs measurable and definite actions that the State can apply to reduce controllable temperature and sediment pollutants. Temperature pollution in particular needs to be reduced to achieve applicable water quality standards, and thus restore protected beneficial uses.

The most egregious and indefensible omission in the current proposed Implementation Plan (the "Plan") is the failure to recognize the nexus between increasing water use (surface and groundwater) and declining instream flows that have led to temperature impairment throughout the Scott River watershed.

Reduced surface flows and elevated water temperatures are significant factors in the decline of the Scott River's anadromous salmonid fisheries, particularly state and federally protected coho salmon (see ATTACHMENT A). The Plan should confront the problem of temperature impairment and address the need for adequate instream flows for the Scott River and its tributaries to enable the recovery of at-risk anadromous salmonids.

Diminished flows in the Scott River are clearly linked not only to temperature impairment but also to the concentration of chemical pollutants, low dissolved oxygen (DO) levels, and high nutrient levels. The almost completely unenforceable voluntary actions proposed in the Plan are not consistent with the State and Basin Plan's Anti-degradation Policy which applies to all waters of the state, including ground water; specifically it is the State's responsibility to regulate land use activities that may reasonably be controlled, such as surface diversions, ground water pumping, grading, clearing riparian habitat, and grazing, which singly or cumulatively influence the quality of waters of the State.

General TMDL Comments:

The Regional Water Board needs to develop/adopt a Temperature TMDL Implementation Policy similar to its Sediment TMDL Implementation Policy that identifies what actions the Board will take to control activities that elevate water temperature, resulting in non-attainment of water quality standards.

The State Water Resources Control Board (SWRCB), in addition to its Regional Boards, are also charged by the federal Clean Water Act and California Porter-Cologne Act to control waste discharges and ensure attainment of water quality standards.

Porter-Cologne does not allow mere voluntarism (which by its very nature is uncertain and unreliable as well as unenforceable) as the means for the Boards to address discharges of pollution to the State's waters. Porter-Cologne provides three primary tools to the SWRCB and RWQCBs to control any waste discharges to waters of the State, including the Scott River, and assure attainment of water quality standards. These three tools are: 1) waste discharge requirements, 2) conditional waivers of waste discharge requirements, or 3) discharge prohibitions.

In addition to these three fundamental regulatory tools, Porter-Cologne allows for additional layers of activity to supplement the regulatory scheme, including funding provisions, voluntary actions, guidance authority, etc. However, in no case do any of these additional authorities supplant the three options the Board must turn to when pollution is being discharged. Every discharger of the state, large or small, good or bad, simple or complex, must report its waste discharge to the applicable Regional Board. The Regional Board then must take one of the three required actions. The choice of action and the appropriate regulatory conditions to be included can then take into account the severity (or lack thereof) of any reported discharge. But, as a matter of law, one of these three basic tools must be used wherever a discharge is occurring.

The three fundamental regulatory tools described above are recognized by the State Board's existing Nonpoint Source Policy. The tools available to the Boards are no different when developing a TMDL implementation plan. Every TMDL implementation plan must employ the three categories for every pollutant source identified by the TMDL. Every TMDL implementation plan must be consistent with the State Board's Nonpoint Source Policy.

Similarly, the Legislature delegated to the State Board the authority to regulate water diversions, including the regulation of bypass flows and enforcement of diversion limitations via water rights licenses. Given the State Board's authority over all activities affecting water quality and quantity in any given waterbody, it would be antithetical to the goals of Porter-Cologne not to integrate these two components of ecosystem health into proceedings purporting to address impairments to that health right now.

However, where an implementation plan attempts to justify holding any of these three mandated water quality tools (WDRs, Conditional Waivers or Prohibitions) or the State Board's water quantity tools at bay, based on mere speculations of the efficacy of future voluntary efforts or future potential challenges of any water right proceedings, this turns "implementation" into hesitation. Instead of eliminating pollution problems, such a plan simply institutionalizes them.

Comments on the Action Plan for the Scott River Watershed Sediment and Temperature TMDL

The Plan identifies several implementation actions that the Regional Board believes will achieve sediment and temperature TMDL, and thus meet minimum water quality standards. However, it will take higher standards than just meeting the minimum to actually recover the Scott River's beneficial uses such as those that support its anadromous salmonid resources. The Scott River has been classified as impaired now for nine to fourteen years; the Plan expects another forty years to attain water quality standards, yet no quantifiable goals nor targets have been identified in the Plan for instream flows, temperature, or sediment. Some beneficial uses that support recovery of state and federally listed anadromous salmonid populations (RARE) simply cannot wait until 2046. Entire generations of citizens will be denied their right to enjoy the Scott River's un-impaired beneficial uses: (REC-1, REC-2, COMM, COLD, RARE, MIGR, and SPWN).

Additionally, at least 13 three-year lifecycles of coho salmon will pass between now and 2046, with ESA-listed coho continuing at risk of extinction throughout that period. Threatened salmon runs may well go extinct long before those 40-year goals are ever attained. More aggressive achievement goals are more than warranted, they are required by law. Adoption of a Plan that fails

to attain water quality standards until 2046 violates federal and state Endangered Species Act prohibitions on "take" of protected species such as listed salmonids and the degradation of designated critical habitat.

The Plan fails to adequately address the issue of excessive consumption of water, thus its adoption will merely legitimize all the existing uses that currently degrade instream habitat and minimum flow needs of salmonids, and are detrimental to the recovery of these species. Likewise the Plan fails to require pro-active and enforceable measures to protect and restore federally designated critical riparian and aquatic habitats, including by excluding grazing in these critical habitats.

The proposed Plan will be an amendment to the Basin Plan; therefore, it must meet requirements of water quality control plan statutes, particularly Section 13242 of the CA Water Code. In order for the Plan to achieve both narrative and numeric water quality objectives, it must at a minimum include: (1) a description of what actions will implemented; (2) when those actions will be implemented, and; (3) how compliance with the objectives will determined. The proposed Plan relies excessively on actions that are by their very nature entirely unenforceable because they are entirely voluntary implementation actions delegated to entities other than to the Board, which is inconsistent with State water law. Encouraging voluntary actions is commendable, but they do not supplant the Boards' obligations to issue either WDRs, conditional waivers (where appropriate) or prohibitions, and cannot be effective unless there are definitive standards and goals to be met.

Comments on the Plan's Proposed Actions to Achieve Temperature TMDL

The Plan's temperature source analysis identifies three controllable anthropogenic activities that adversely affect water temperature: stream shade, stream flow, and stream channel geometry or morphology. Yet, the Plan provides no facts to support its unsupported finding that reductions in stream flow have only a small temperature impact and that reduction of shade is the primary cause of increased water temperatures in the Scott River. There is in fact considerable scientific evidence and monitoring data that shows that reductions in flows throughout the Scott River have had a far greater impact on water temperatures than the Plan acknowledges (see ATTACHMENT A).

The Plan also does not address the severity of direct or indirect impacts of anthropogenic changes to stream morphology on water temperature. These impacts too can be severe.

The Plan's implementation actions, to protect or restore effective shade to achieve temperature TMDLs, reference the State's Nonpoint Source Policy (NPS) to develop and take appropriate permitting and enforcement actions to address human-caused removal and suppression of vegetation that provides shade to a water body. The NPS Policy relies on the three regulatory tools provided by Porter-Cologne – WDRs, conditional waivers of WDRs, or prohibitions - to regulate all current and proposed nonpoint sources of stormwater pollution. The Plan should declare that all current and future nonpoint sources of pollution, regardless of the affected acreage, will be required to secure WDR permits, conditional waivers, and/or be subject to a Basin Plan prohibition, or be subject to its enforcement actions via cease and desist or cleanup and abatement orders. These are the only legal options available under California water law. In contrast to the proposed Plan, the word "voluntary" is not in the lexicon of the NPS, and the Plan and SWRCB should be in conformance with this NPS Policy.

The Plan's focus on the relationship of shade to water temperature completely ignores the excessive diversion of surface flows and pumping of groundwater. Both activities are controllable. The connection between flow and temperature is well established and is in no way controversial. The State has long failed to adequately regulate surface water diversions and bypass flows in the Scott River pursuant to its own Water and Fish & Game Codes, allowing conditions in the river to deteriorate; these laws must now be aggressively enforced if this deterioration is to be reversed. Adequate flow standards for each life-cycle of salmonids are needed throughout the Scott River Basin (for example to ensure spawning flows in areas where spawning occurs). The Board should have the Division of Water Rights study the impacts of surface water diversions on water temperature, fisheries, aquatic life and riparian vegetation in the Scott River Watershed, and establish adequate flow needs, particularly during critical low flow periods. This is a state responsibility: it cannot be delegated to the County, which is ill equipped to make such an analysis.

An analysis of the best available scientific information will lead to the finding that flows and temperature in the Scott River have been severely compromised by surface diversions and an increasing number of groundwater pumping projects for irrigation. It is highly likely that the sustainable draw levels of the local aquifers have been exceeded. The Board should request that the County declare a moratorium on new well drilling and well deepening in the Scott Valley bottoms pending further studies to ascertain if this is the case. Again, these studies are the responsibility of the State – the County has neither the expertise, funding, nor the inclination to conduct such studies.

The Board should also request that the County, through its General Plan and Zoning Ordinance, better regulate agricultural uses and the density of wells by land use/zoning districts to protect instream flows and thus water temperature. The rate of decline in flows in the Scott River at the USGS gauge below Scott Valley has accelerated during the period of record 1950-2000. The decline in flows corresponds closely to an increase in the number of irrigation wells and increased consumptive irrigation water use throughout this same period.

In other words, the Scott River is being incrementally dewatered through excessive and unregulated groundwater pumping. The Board should have the Division of Water Rights study the impacts of ground water use on water temperature, fisheries, aquatic life and riparian vegetation in the Scott River watershed, and establish adequate minimum instream flows throughout the watershed.

The Board should also re-examine all existing water rights for stream diversions for adherence to the terms regarding bypass conditions and compliance with Statements of Use, and correct any non-compliance, particularly diversions in excess of license conditions. Both monitoring and enforcement have been lax in the Scott River watershed for some time, and water permit violations are very common. The Scott River Adjudication must be enforced, particularly quantity and period of diversion (for example it states that irrigation is to end about October 15$^{th}$ yet in practice it does not).

The Board should review the record for compliance with the terms of the Adjudication for diversion and bypass requirements, and take appropriate enforcement actions in cases of non-compliance or usage in excess of license conditions. Surveys of other similar watersheds have disclosed more un-permitted diversions than permitted diversions. The continued decline of summer flows since the

adjudication indicates that same pattern exists on the Scott. The watershed should be surveyed for un-permitted diversions or impoundments and enforcement actions taken to correct illegal diversions. Landowners who are in compliance should not be penalized by allowing those who are not to continue illegal uses. The Board should also reopen adjudication and reallocate water rights, as necessary, to achieve water quality standards and restore beneficial uses, including instream minimum flow protections for ESA-protected salmonids, in the Scott River Watershed.

Ultimately, the Plan has no goal, for it does not provide a measurable water temperature TMDL standard that it will use to determine the effectiveness of its implementation measures even in 40 years. The Plan must not only have a goal but it must require that the Scott River watershed have an adequate number of stream gages to continually monitor discharge, temperature, turbidity, and verify whether instream flow and temperature goals are being achieved.

Enforcement of violations of the Plan cannot be limited as proposed to enforceable restrictions contained in new water quality certifications or WDR permits, but must require certifications and WDRs or appropriate conditional waivers for existing uses that are contributing to the impairment of two water quality attributes: temperature and sediment. Enforcement of the Plan must parallel the Endangered Species Acts prohibition on "take" of listed species, since many pre-existing land uses clearly impair the Scott River. Achieving TMDL Action Plan objectives or attaining water quality standards for temperature and sediment is not possible if existing activities that degrade water quality simply are allowed to continue.

Comments on Other Proposed Actions

The Plan identifies twenty implementation actions. Unfortunately, few contain regulatory or physical recommendations that the Board can implement to achieve sediment or temperature TMDLs, and more importantly, reach minimum thresholds for water quality standards, which mean achieving beneficial uses or Basin Plan objectives. The majority of the implementation actions simply encourage others to take actions or to engage in planning exercises or management agreements such as MOUs. Thus these many voluntary actions sought in the Plan are unenforceable, and therefore inconsistent with Cal. Water Code Section 13242, as these examples demonstrate:

- Roads: The Plan's implementation action for roads at the County level is restricted to merely encouraging the County to address their roads issues but does not address problems with the far more numerous private roads. The Board should inform the County that their General Plan and Zoning Ordinance are not in compliance with the proposed Plan or the Basin Plan, and require that the County develop and adopt by a date certain a comprehensive grading ordinance for roads, including land disturbances activities inclusive of clearing vegetation, and grading. The Board should set a date to issue county-wide WDRs or federal NPDES permits to the county and private roads. Many of the discharges associated with these roads are through point source discharges. For example, Caltrans roads currently are regulated through a NPDES permit. The road WDRs/permits should set forth necessary road construction and maintenance conditions, including other land disturbances activities inclusive of clearing vegetation, and grading and taking into account cumulative impacts of road sin the watershed.

- Dredging: The implementation action for dredging is one of the few that the Board itself will implement if necessary; DFG already regulates such activities.

- Water Use: If no study as proposed is undertaken then there is no implementation action addressing the most significant and controllable adverse impact to water quality: water use.

- Flood Control & Bank Stabilization: The over-reliance on WQC via a federal nexus with the Army Corps of Engineers to control water quality impacts from flood control or bank stabilization activities will fail to prevent the removal or suppression of stream-side vegetation, which is an activity that is rarely subjected to federal regulatory oversight. In fact, clearing vegetation is often mandated in federally funded/constructed flood control projects, in which case riparian vegetation is not protected. These activities should be addressed in appropriate WDRs or conditional waivers. The Plan should set forth a timeline for developing such WDRs or waivers.

- Grazing: The Plan's action for grazing again relies on simply encouraging others to act, yet the Plan should require that cattle be excluded from riparian areas, and that degraded riparian corridors be restored along the tributaries and mainstem of the Scott River. The Plan needs a more definitive description of desired near-stream conditions with a description of specific actions that can achieve these conditions within finite time periods. The Plan should require that the County adopt a stream management ordinance to regulate all land uses within a specified stream management zone, and that all such uses regardless of the acreage affected be required to secure WDRs or conditional waiver).

- Federal Agencies: The Plan proposes no actions to develop an MOU to coordinate regulation of activities with NOAA Fisheries to protect designated critical habitat pursuant to the federal Endangered Species Act nor essential fish habitat pursuant to the Magnuson-Stevens Fishery Management Act.

- CDFG: Lastly, the Plan should develop an MOU with DFG to inventory the Scott River and its tributaries to locate existing water diversions, determine bypass flow needs, assess whether present rates of diversion create low flow barriers to migration of anadromous salmonids, and to implement/apply the Coho Recovery Strategy Guidelines in the Scott River watershed. The Coho Recovery Strategy Guidelines and measures were developed with considerably Scott River watershed stakeholder input and approval, and should be incorporated into and/or coordinated with actions in the Plan.

Conclusion

The Clean Water Act charges the State with ensuring that necessary actions are taken to meet water quality standards and restore beneficial uses in the Scott River Watershed. Both the federal and state ESA listings of Scott River coho salmon also require similar actions, as does the CESA Coho Recovery Strategy long since adopted by the Fish and Game Commission.

In the 1983 Mono Lake case, the federal court stated that the Public Trust Doctrine requires the state to exercise continual supervision whenever feasible to protect the public's right to use and enjoy the State's waters and their associated resources. The Plan as proposed will cause significant adverse impacts to the distribution and abundance of state and federally protected anadromous salmonids in the Scott River watershed. This is a resource that many in-river Tribal communities, and many coast fishing ports, depend upon for their sustenance and livelihoods.

Further, the Plan as currently proposed will significantly reduce the probability of recovery of these already seriously depressed salmonid species because it fails to provide or protect adequate instream flows, improve elevated water temperatures, or restore/protect riparian corridors.

Lastly, the public's ability to enjoy the waters of the Scott River for recreation are significantly threatened by health risks associated with toxic algae blooms now proliferating throughout the Klamath River in waters with elevated temperatures. Deteriorating water quality in the Scott River, much of it triggered by decreasing instream flows, can only encourage the growth of these toxic algae species, posing a serious health risk to members of the general public.

In short, the Board must request an Action Plan where the State establishes adequate flows and regulates controllable consumptive water uses, and land disturbance activities that impair water quality if it wants to restore beneficial uses which are Public Trust uses in the Scott River.

Please make these comments part of the public record in this proceeding, and we hope they will be helpful to Staff as they prepare their recommendations.

Sincerely,

Glen H. Spain, J.D., for the Pacific Coast Federation
of Fishermen's Associations and the Institute
for Fisheries Resources, and the organizations below:

Coast Action Group
By Alan Levine, Executive Director

Northcoast Environmental Center (NEC)
By Tim McKay, Executive Director

Environmental Protection and Information Center (EPIC)
By Larry Evans, Executive Director

Mendocino Group of the Redwood Chapter of the Sierra Club
By David Myers, Water Committee Chair

The Sierra Club of California
By Paul Mason, Legislative Representative

Enclosed: Attachment A: Scott TMDL Related Data, Photos and Maps Regarding Flow and Temperature Problems

ScottTMDLJointLtr06-12-06.doc

# Attachment A

## Scott TMDL Related Data, Photos and Maps Regarding Flow and Temperature Problems

Below are summary charts, photos and map images that provide support for arguments regarding the impact of diminished flows in the Scott River basin as follows:

1. Flows have been progressively decreased by ground water extraction;
2. Flows have declined to far below those required by the Scott River Adjudication and now often cause stream reaches and tributaries to go dry;
3. Low flow exacerbates water temperature problems, and;
4. Flow and temperature problems combine with sediment to severely limit productivity of salmon and steelhead populations.

Scott River salmon and steelhead stocks are at high risk of extinction and evidence is presented herein to demonstrate the need for immediate action to prevent loss of locally adapted salmonid populations. This is only a sampling of such supporting data, which is voluminous, but of which only this small portion could be included herein.

Data are from the California Department of Fish and Game, California Department of Water Resources, U.S. Geologic Survey, Siskiyou Resource Conservation District, U.S. Forest Service, North Coast Regional Water Quality Control Board and private contractors. These data along with photos and maps were often extracted from the Klamath Resource Information System Version 3.0, which is also available on-line at www.krisweb.com.

**Ground Water Pumping and Lack of Sufficient Scott River Flows**

The *Long Range Plan for the Klamath River Basin Conservation Area Fishery Restoration Program* (Kier Assoc., 1991) noted that ground water pumping in the Scott River valley depleted surface flows because of interconnections between surface and ground water. This fact was also clearly noted in the *Scott River Adjudication* (CSWRCB, 1980) and by earlier work by the U.S. Geologic Survey (Mack, 1958).

California Department of Water Resources (CDWR) unpublished well log data (Eaves, personal communication) indicate that installation of irrigation wells continues in the Scott River Valley (Figure 1). Data show that the highest number of wells installed occurred from 1971-1980. After a decrease in installations between 1981 and 1990, well construction resurged during the 1990's and continues to the present. Not all well installations are reported and CDWR estimates their records may be 30-50% low as a result. Data from 2005 and 2006 have not been recorded and data from 2001-2004 is provisional.

Long term flow records show a substantial decrease in surface flows at the USGS flow gauge at Fort Jones after the number of ground water pumps began to increase in the 1970's. Figure 2 shows the number of days by water year that flows in the Scott River fell below 20 cubic feet per second. The pattern in the data shows that before ground water pumps were installed river flows rarely fell to this level, but that now there are sometimes more than 100 days/year with average flows less than 20 cfs. Probably the most telling pattern is the high number of days with extremely low flows even in years

with moderate rainfall. Rainfall data by which water years are grouped are based on the California Data Exchange Center gauge in Fort Jones.

Kier Associates (1991) pointed out that the *Scott River Adjudication* allotted instream water rights to the U.S. Forest Service as a riparian owner for its lands downstream of the valley

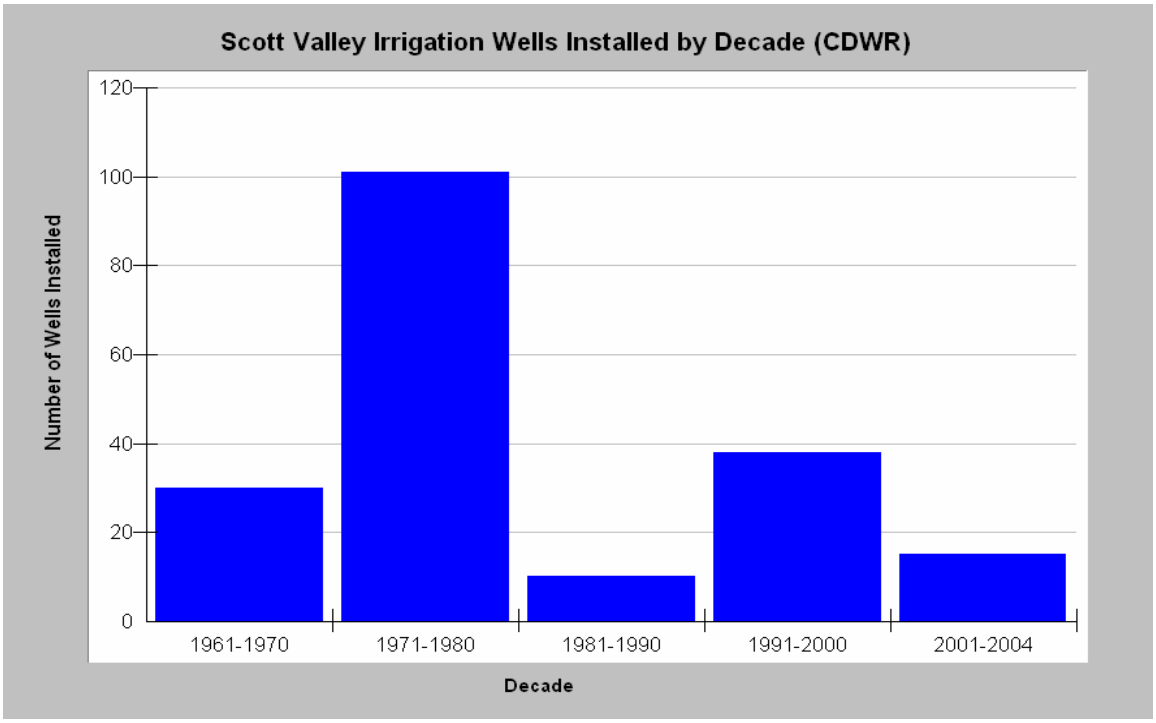


Figure 1. This chart shows the number of irrigation wells recorded by the California Department of Water Resources (Eaves, personal communication).

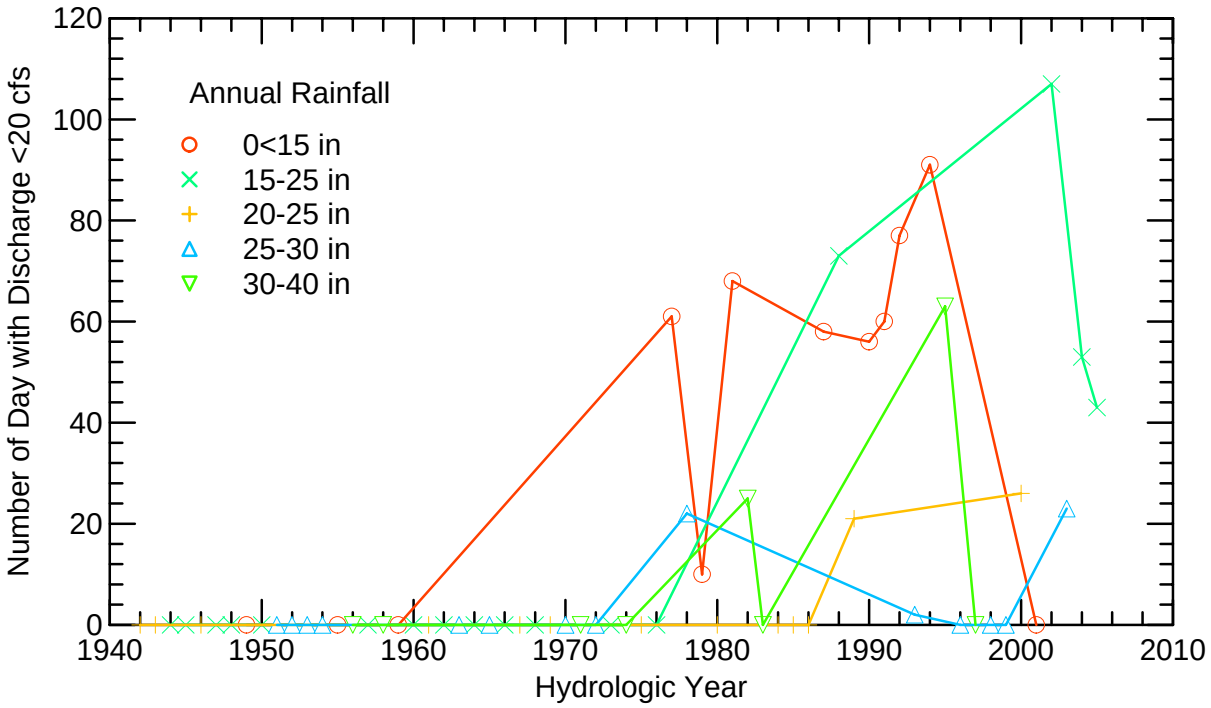


Figure 2. USGS flow gauge data are the basis for this chart showing the number of days/yr. with flows less than 20 cfs at Jones Beach in the lower Scott River. Annual rainfall from Ft. Jones CDEC gauge allows identification of associated rainfall in various years.

(CSWRCB, 1980) as shown in Table 1. "These amounts are necessary to provide minimum subsistence-level fishery conditions including spawning, egg incubation, rearing, downstream migration, and summer survival of anadromous fish, and can be experienced only in critically dry years without resulting in depletion of the fishery resource."

Table 1. Scott River Adjudication instream flow allotment for U.S. Forest Service needs for instream flow in Scott River canyon (CSWRCD, 1980 as cited in Kier Assoc., 1991).

| **Period** | **Flow Requirement in Cubic Feet per Second** |
|---|---|
| November – March | 200 cfs |
| April - June 15 | 150 cfs |
| June 16 - June 30 | 100 cfs |
| July 1 - July 15 | 60 cfs |
| July 16 - July 31 | 40 cfs |
| August - September | 30 cfs |
| October | 40 cfs |

Flow records from summer periods in 2002 and 2004 are charted against low flow allotments for the U.S. Forest Service in the *Scott River Adjudication* in Figure 3 and Figure 4, respectively. These data show

that the requirements of the adjudication are not being met, thus greatly decreasing carrying capacity for salmonids in the Scott River canyon and jeopardizing their future existence. This important habitat area has until recently served as a refugia for juvenile salmonids during summer when many reaches of the Scott River in Scott Valley and tributaries lack surface flow (see De-Watering section). Low flow conditions exacerbate water temperature problems throughout the lower Scott River (see Temperature section).

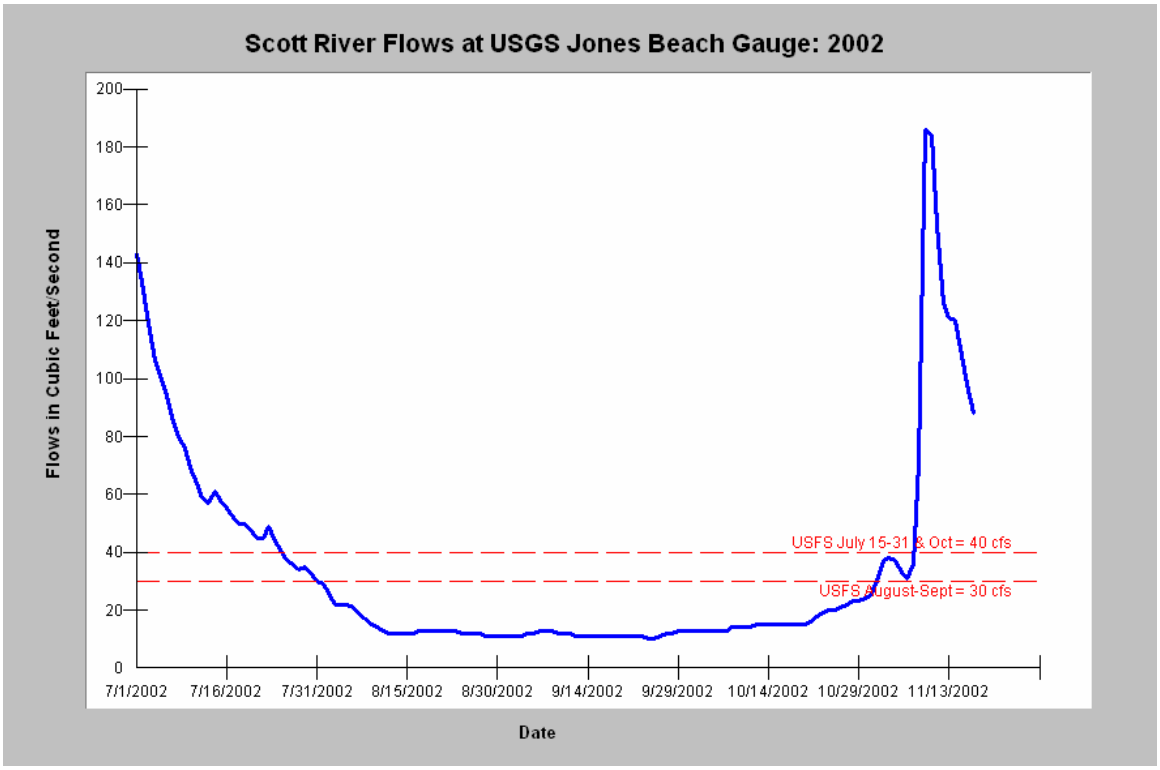


Figure 3. Jones Beach USGS flow gauge data from the irrigation season of 2002 show that flows failed to meet adjudicated levels for the USFS and flows needed for fish migration, spawning and rearing in August, September and October.

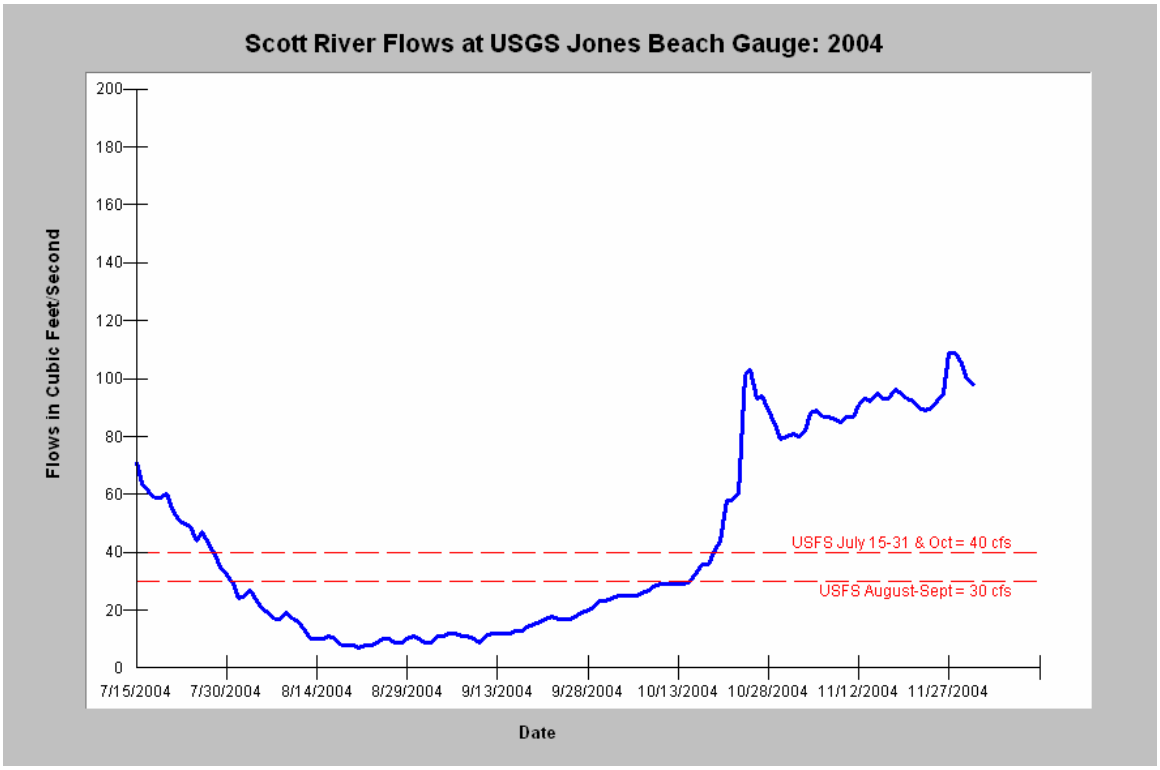


Figure 4. Jones Beach USGS flow gauge data from the summer and fall of 2004 show that flows failed to meet adjudicates levels for the USFS and flows needed for fish migration, spawning and rearing in August, September and the first half of October.

CDWR well data show a pattern of decline of minimum ground water levels over the last several decades as a greater number irrigation wells were installed. Figures 5 and 6 show the annual minimum and maximum measurements at a well, along with annual precipitation at the Fort Jones rain gage. The charts suggest that while annual maximum levels have remained relatively constant over time, annual minimum levels have declined since 1965, although they fluctuate with precipitation. Decreased ground water levels are likely linked to reduced cold water inflows into the Scott River.

**De-Watering of Mainstem Scott River Reaches and Major Tributaries**

While flows are often too low in the canyon of the Scott River, surface flows are sometimes completely lacking in mainstem reaches in Scott Valley and in tributaries that harbor salmon and steelhead. Photographic evidence from the KRIS project documents the loss of summer surface flow in numerous stream reaches, completely negating their ability to support cold water fisheries and other beneficial uses.

Mainstem Scott River reaches often go dry in irrigation season, such as the reach near the airport shown in Figure 7 in a photo taken by Michael Hentz in summer 2002. A photo from the same year near Fort Jones shows very little water in the Scott River channel below Highway 3. The photo also shows a stream bed with extremely fine average particle size distribution, an indication of recent sediment contributions and aggradation. Massive aggradation of some stream beds in the Scott River contributes to decreased available surface flow or complete loss of flow in some cases.

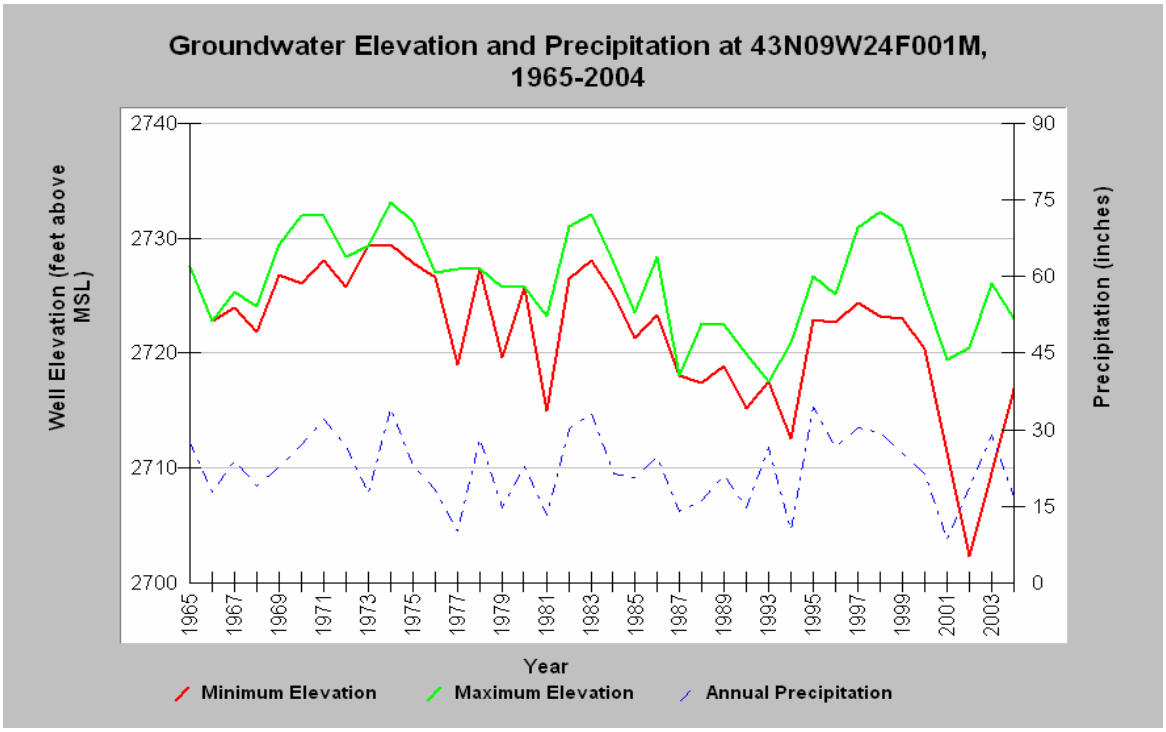


Figure 5. Department of Water Resources well 43N09W24F001M, approximately 5 kilometers south-southeast of Fort Jones, for the years 1965-2004.

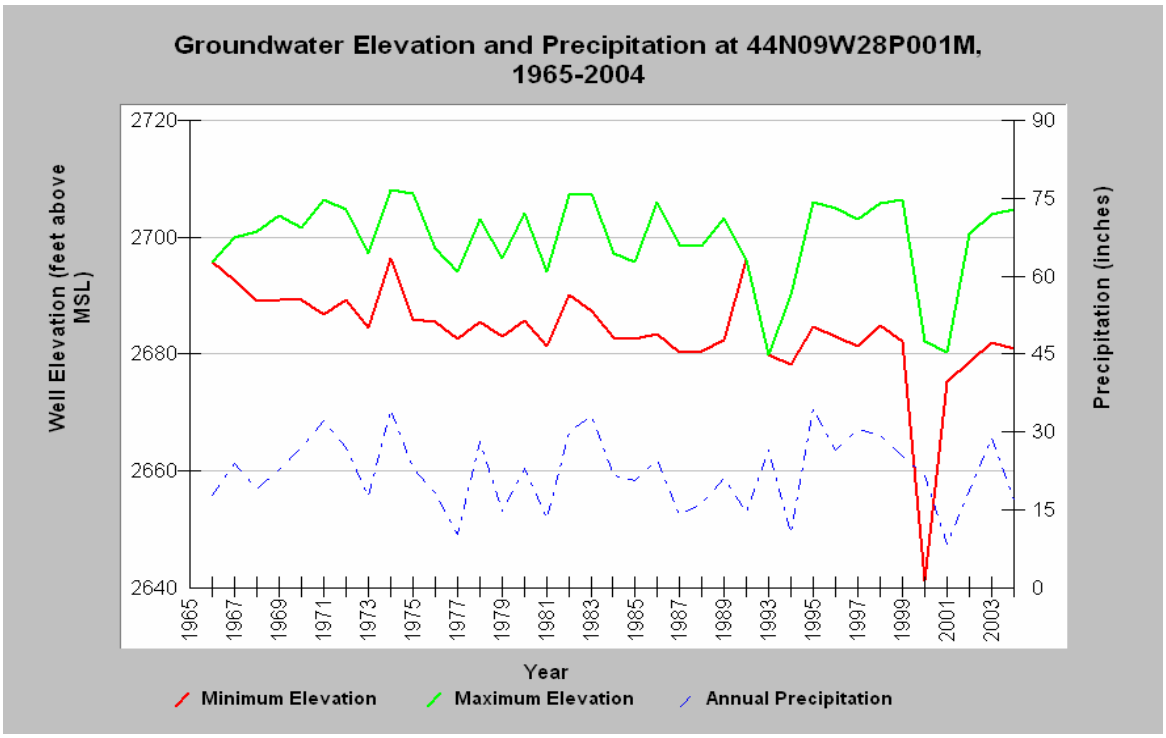


Figure 6. California Department of Water Resources well 44N09W28P001M, approximately 8 kilometers northwest of Fort Jones, for the years 1965-2004.


Figure 7. This photo shows the dry bed of the Scott River in a reach near the airport looking upstream. Photo from KRIS taken by Michael Hentz. 2002.


Figure 8. Scott River at Fort Jones Bridge looking downstream. Note streambed is comprised of mostly sand. Photo from KRIS taken by Michael Hentz. 2002.

Many tributaries of the Scott River that are known to harbor steelhead and coho salmon (see Fish section below) are routinely de-watered as a result of water extraction for irrigation. Figure 9 shows Moffett Creek where a combination of surface water extraction and ground water extraction combines to cause a loss of surface flow (Kier Associates, 1999).

Figure 9. Moffett Creek in August 1997 after the January 1997 Storm and subsequent excavation. Note lack of riparian trees due to drop in ground water levels (Kier Associates, 1999). Photo from KRIS Version 3.0.

Other major salmon and steelhead bearing tributaries that now typically lose surface flow due to diversion are Shackleford Creek (Figure 10 and 11), Kidder Creek (Figure 12) and Etna Creek (Figure 13). All stream reaches that are currently de-watered were formerly excellent salmonid rearing areas. The National Academy of Sciences (2003) makes it clear that "dewatering of tributaries eliminates potential rearing habitat for coho and causes loss of connectivity and reduction of base flow in the main stem."

**Low Flow Adds to Water Temperature and Water Quality Problems**

The National Academy of Sciences (2003) makes a clear case that flow depletion is at the root of temperature problems in the Scott River. As flows drop, transit time for water increases, allowing an opportunity for stream warming. Figure 14 shows maximum daily water temperatures at several mainstem Scott River locations during 1996. The South Fork has the coolest temperatures because it flows from U.S. Forest Service lands and has few diversions. The East Fork is much warmer by comparison and has a substantial number of diversions. The Scott River warms as it flows downstream, with temperatures well over stressful (McCullough, 1999) and sometimes over lethal (Sullivan et al, 2001) levels.

A thermal infrared radar (TIR) image of Shackleford Creek (Figure 15) was taken by Watershed Associates (2003) as part of the Scott River TMDL study process, and shows dramatic effects of flow depletion on water temperature. Shackleford Creek is cool enough for juvenile salmonid


Figure 10. Shackleford Creek looking downstream at a bridge over a middle reach showing complete loss of flow due to diversion. Photo from KRIS V 3.0 taken by Michael Hentz.

Figure 11. This photo shows the dry creek bed of Shackleford Creek at its convergence with the Scott River in August 1997. Photo from KRIS Version 3.0.


Figure 12. Photo shows Kidder Creek looking upstream off the Highway #3 Bridge in Greenview. Photo from KRIS V 3.0 by Michael Hentz. 2002.


Figure 13. Photo shows Etna Creek looking downstream off the Highway 3 Bridge. Photo from KRIS V 3.0 by Michael Hentz. 2002.

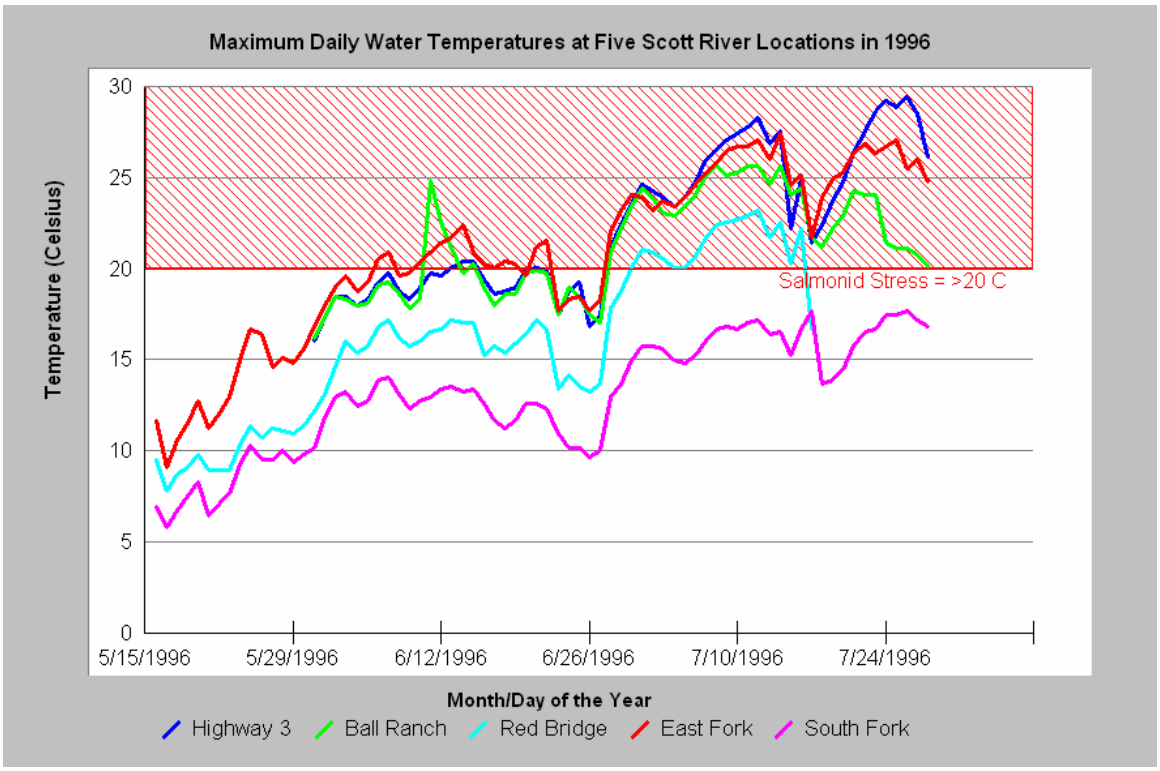


Figure 14. Water temperature at various Scott River mainstem locations in 1996. Chart from KRIS V 3.0 and data from the Siskiyou Resource Conservation District.

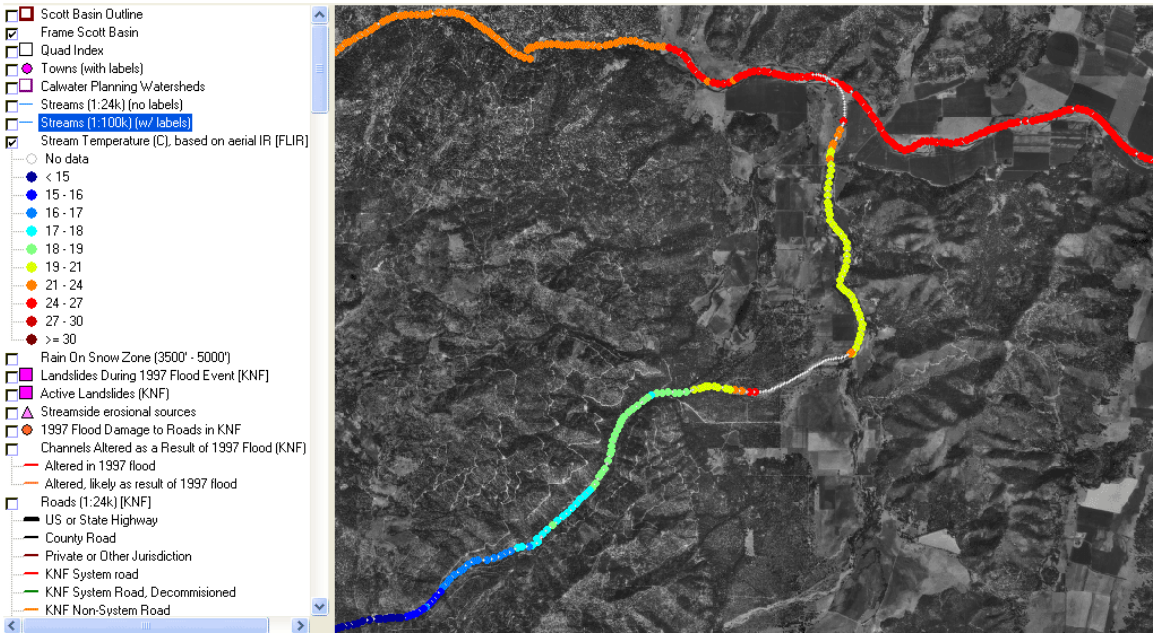


Figure 15. This map shows summary data of Scott River Thermal Infrared Radar (TIR) surveys for Shackleford Creek. Note that water temperature warms in a downstream direction as flow is depleted. Reaches with no temperature coded color (i.e., gray) are dry. Data from Watershed Sciences (2003).

rearing above points of diversion, then warms rapidly as its flow is depleted. Flow resumes below the major tributary Mill Creek, warms again as flow is further reduced by irrigation until surface flows are again entirely lost, just upstream of the convergence with the Scott River.

Although the Scott River is not yet listed as "water quality limited" for nutrients, dissolved oxygen (DO) or pH, these problems may arise if flows drop low enough to cause stagnation. Figure 16 shows a reach of the Scott River with much depleted flows due to irrigation. The algae blooms seen forming here can cause a diurnal increase in pH associated with high rates of photosynthesis and very low nocturnal dissolved oxygen (DO) levels as algae respires.


Figure 16. Photo shows the mainstem Scott River looking downstream with significant signs of algae blooms evident. Algae growth may alter water chemistry. Photo from KRIS V 3.0 by Michael Hentz.

**Sediment and Increased Peak Flows Cause Channel Scour and Lead to Stream Warming**

Kier Associates (2005) point out that changes in sediment yield and watershed hydrology related to logging and road building in the Scott River basin can also contribute to water temperature problems. The January 1997, flood damage report by the Klamath National Forest (de la Fuente and Elder, 1998) indicated that debris torrents caused 437 miles of stream channel scour, which in turn made these streams more subject to warming. Landslides were most frequently triggered by road failures, but were also well above background occurrence levels in recently logged or burned areas. Water temperature data from the Karuk Tribe and Klamath National Forest show that some

tributaries of the lower Scott River increased in water temperature as a result of debris torrents associated with the January 1997 storm (Figure 17). Canyon Creek and Boulder Creek

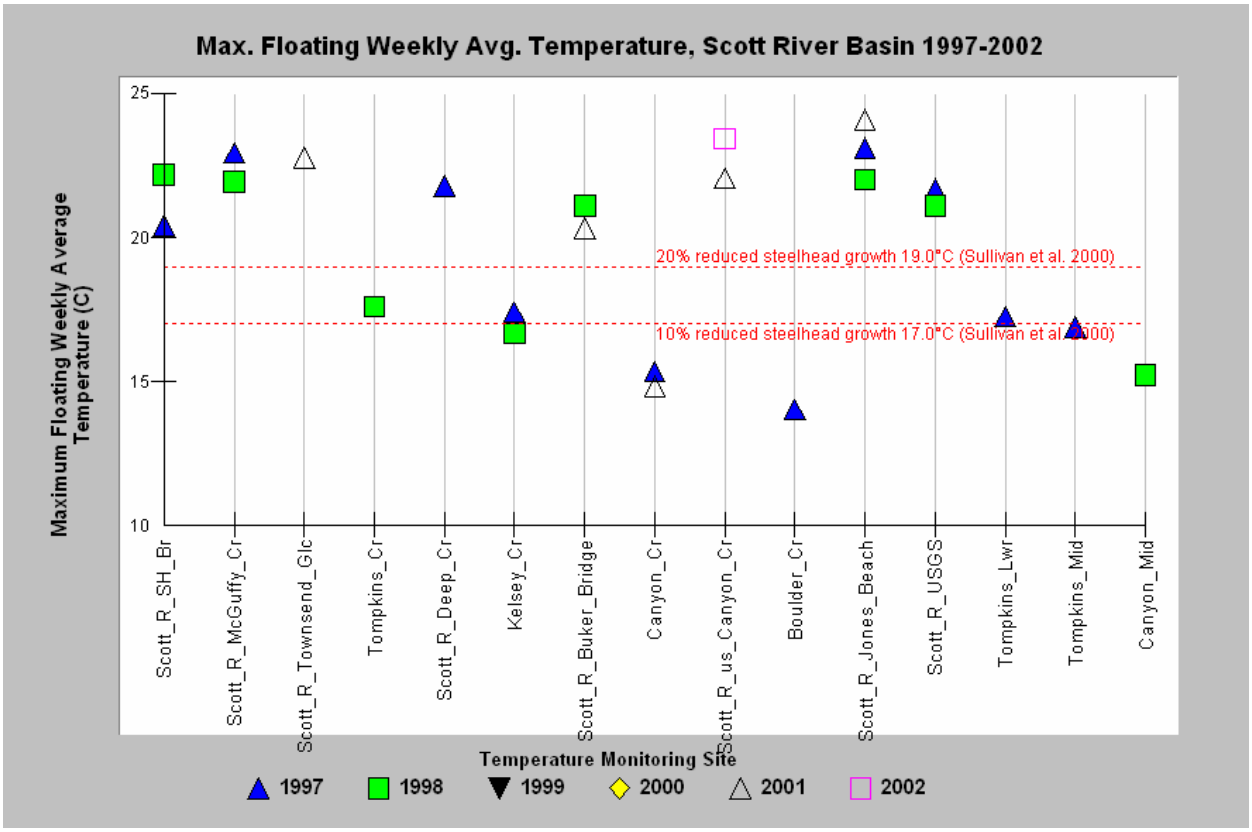


Figure 17. Maximum floating weekly average water temperature (MWAT) for several mainstem Scott River and tributary locations. Data from the Karuk Tribe and USFS.

did not experience debris torrenting and thus still maintain water temperature sufficiently cool to support coho salmon. Welsh et al. (2001) found that coho were present in streams that did not attain a maximum floating weekly average water temperature (MWAT) of greater than 16.8 C. Figure 17 shows reference lines from Sullivan et al. (2001) that indicate suppressed growth in steelhead juveniles at temperatures higher than 17 C.

Kelsey Creek and Tompkins Gulch both had major channel alterations as a result of the January 1997 storm which likewise triggered stream warming. Figure 17 indicates that neither of these streams was sufficiently cool to support coho juveniles after 1997. The Klamath National Forest flood study (de la Fuente and Elder, 1997) noted that the stream damage was high given the fairly low recurrence interval of the storm event, which was judged to be a 14-35 year event. Extensive logging, road building and fires all combine to elevate flood risk (Figure 18) and resulting increased flows and sediment yield caused major channel adjustments (Figure 19).

The lower reach of McGuffy Gulch, a tributary of the lower Scott River, serves as an example of what type of damage debris torrents can cause. Damage to this stream went well beyond loss of channel depth and increased channel width (Figure 20). The channel was buried so deeply that it

lost surface flow. Kier Associates (2005) point out that channel scour can also occur due to increased peak flows related to rain-on-snow events (Berris and Harr, 1987; Coffin and Harr, 1991). Jones and Grant (1996) describe how road cuts intercepting ground water pathways can shunt water into road ditches, thus increasing peak flows and cutting off ground water recharge downhill, in turn resulting in decreased summer base flows.

Figure 18. Patch clear cuts, areas burned by forest fires, plantations and road networks in upper Kelsey Creek set the stage for flood damage and 70% channel scour by the January 1, 1997 storm. Photo by Patrick Higgins from KRIS V 3.0.

Figure 19. Kelsey Creek, just upstream of its mouth in early 1997, with snapped alder trees, large rubble and bank erosion near the house indicative of recent debris torrent damage. KRIS V 3.0.


Figure 20. Photo shows McGuffy Creek, a lower the Scott River tributary, just upstream of the Scott River Road. From KRIS V 3.0 by Michael Hentz. 2002.

**Fish Population Status, Trends and Need for Immediate Action**

The low gradient of the mainstem Scott River and its major tributaries made it ideal habitat for summer and winter steelhead, spring and fall chinook and coho salmon. Long term declines in these populations have been well documented (Kier Associates, 1991; CH2Mhill, 1985). Scott River spring chinook and summer steelhead populations are at remnant levels and are only sighted infrequently in surveys.

The low flows coming out of the lower Scott River Valley today not only reduce carrying capacity for juvenile salmonids but would also prevent any successful attempts by summer steelhead or spring chinook adults to hold over during summer. The Scott TMDL needs to recognize also that spring chinook and summer steelhead recovery may be attainable, due to metapopulation function (Rieman et al., 1993), if cold water refugia are restored in the lower Scott River, sediment diminished and water flows improved.

The Scott River TMDL should also specifically target recovery of coho salmon, which are recognized as "threatened" under both the federal and California Endangered Species Acts. The distribution of coho spawning is known (Figure 21), yet the TMDL does not specifically focus protection or restoration on reaches or tributaries that presently harbor ESA-listed coho as "best science" restoration efforts must (Bradbury et al., 1996).

Scott River adult coho returns are now only robust in one out of three year-classes, which is an indicator that the population is trending towards extinction (Rieman et al., 1993; NMFS, 2001; CDFG, 2003). Table 2 shows downstream migrant trapping results from CDFG indicating that coho juveniles are only abundant in one of three years following high spawner years.

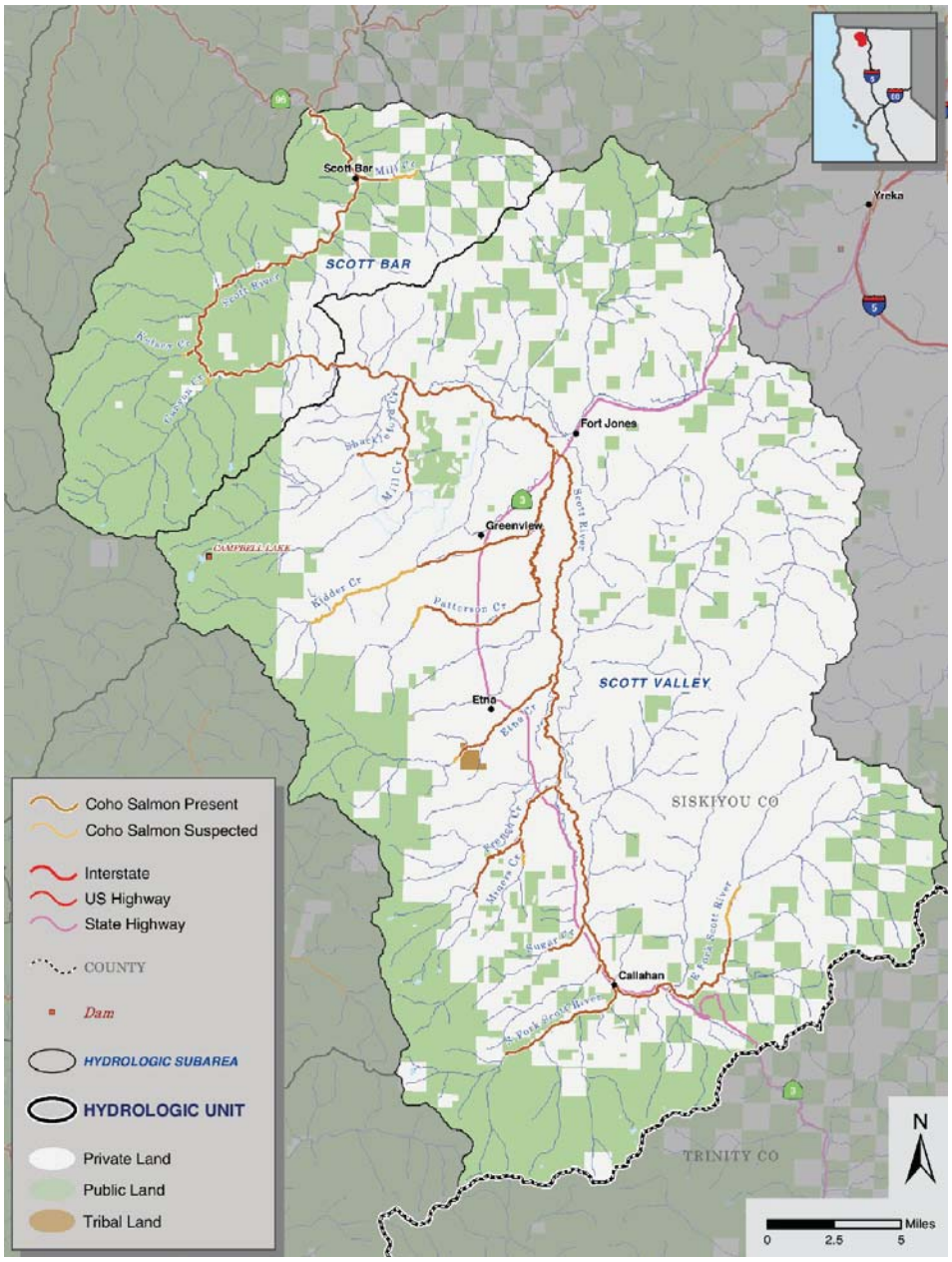


Figure 21. Coho salmon distribution map for known or potential Scott River spawning locations (from Maurer, 2001).

| Grand Total by Species: | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | TOTALS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Steelhead* | 10181 | 17693 | 5943 | 7127 | 7980 | 4158 | 5008 | 21982 | 79887 | 135319 | 69823 | **365101** |
| *Coho* | 15 | 433 | 0 | 253 | 3 | 8 | 538 | 30 | 69 | 30019 | 50 | **31418** |
| *Chinook* | 2 | 266 | 0 | 3 | 1 | 0 | 0 | 365 | 3191 | 0 | 0 | **3828** |
| ***Totals =>*** | **10198** | **18392** | **5943** | **7383** | **7984** | **4166** | **5546** | **22377** | **83147** | **165338** | **69873** | **400347** |

Table 2. Coho in California Department of Fish and Game trap records as taken from Siskiyou RCD (2004) Table 6c.

Scott River fall chinook returns likewise plummeted in 2004 and 2005 to the lowest level on record for two years in a row (Figure 22). Higgins et al. (1992) discussed the risk of extinction of northwestern California Pacific salmon stocks and discussed minimum viable population sizes, noting that:

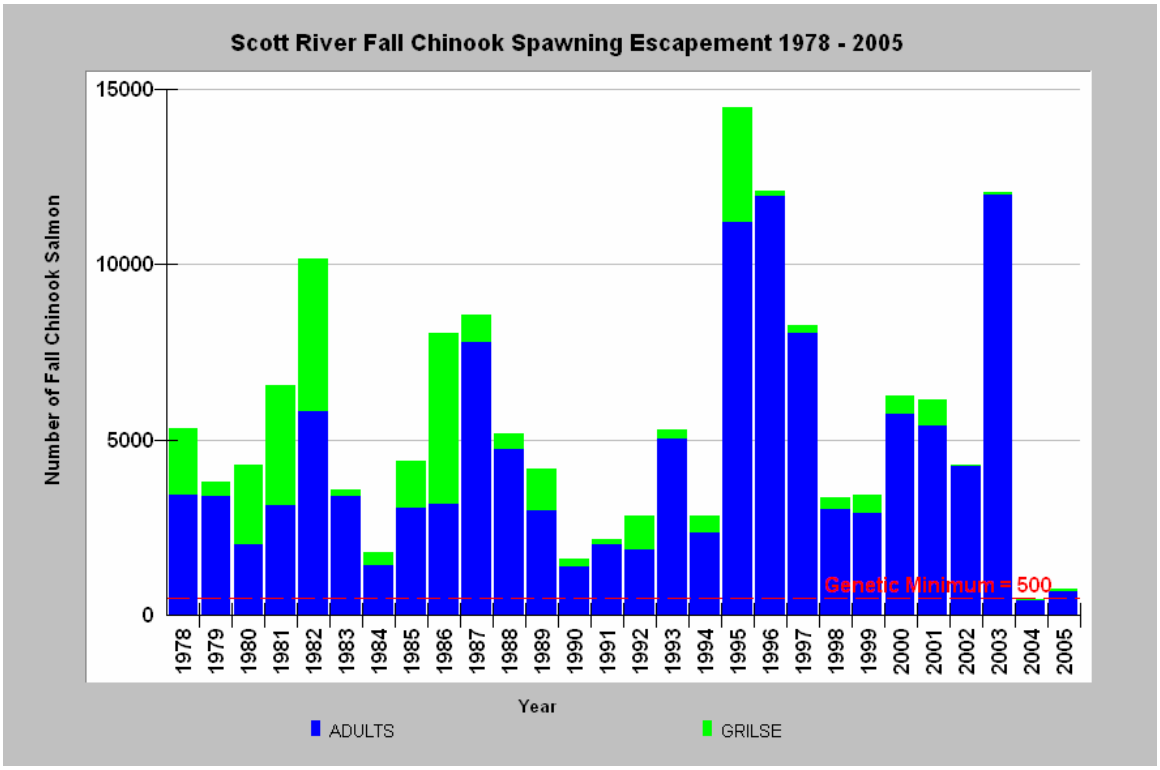


Figure 22. Scott River fall chinook escapement shows both 2004 and 2005 as the lowest years on record. Data from CDFG.

> "When a stock declines to fewer than 500 individuals, it may face a risk of loss of genetic diversity which could hinder its ability to cope with future environmental changes (Nelson and Soule, 1986). A random event such as a drought or variation in sex ratios may lead to extinction if a stock is at an extremely low level (Gilpin and Soule, 1990). The National Marine Fisheries Service (NMFS, 1987) acknowledged that, while 200 adults might be sufficient to maintain genetic diversity in a hatchery population, the actual number of Sacramento River winter run chinook needed to maintain genetic diversity in the wild would be 400 - 1,100."

In other words, despite favorable or average ocean conditions (Collison et al. 2003) and wet years with at least average flows, the population of fall chinook in the Scott River has fallen to critically low levels. These populations have some additional ability to rebound without loss of genetic diversity because chinook spawn at different ages (Simon et al. 1986), but the low adult returns should be viewed with considerable alarm. Low flow, water temperature problems and high sediment yield are all playing a role, although mainstem Klamath River water quality problems are also a factor in the decline of Scott River fall chinook (Kier Associates, 2006).

Discussions above show that flows in the lower Scott River in October do not even meet requirements of the *Scott River Adjudication* in October, when fall chinook salmon adults would be migrating upstream

and spawning. Very low flows in the Scott River canyon cause a concentration of spawning by fall chinook in the lowest reaches (Figure 23). This concentration poses higher risk for egg survival than if flows were sufficient for chinook spawners to disburse upstream (Kier Associates, 2005). Epidemic transmission of disease also becomes a higher risk under such densities. Risk of increased peak flows that might mobilize the stream bed is also higher in the lower mainstem than in upstream reaches or tributaries. Large quantities of decomposed granitic sand in transport through the Scott River canyon may also be mobilized by high flows and smother eggs or entomb alevin.

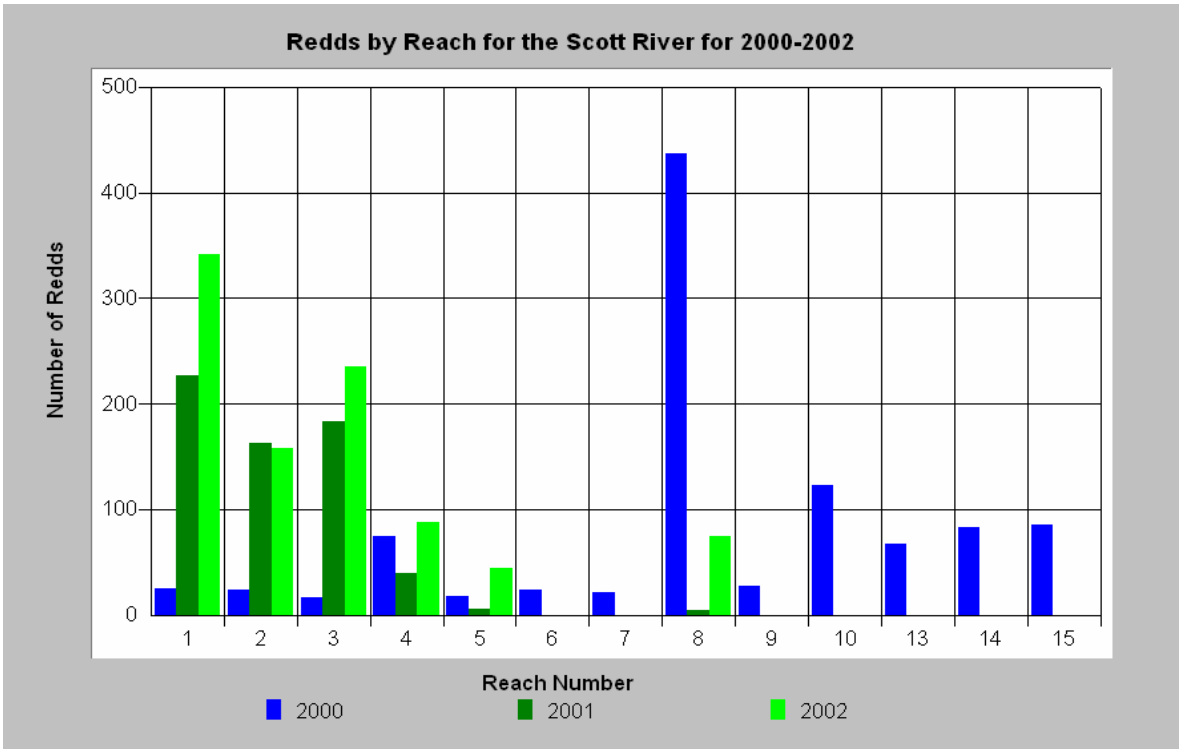


Figure 23. Data from CDFG spawner surveys show that fall chinook salmon spawned mostly in the lowest five reaches of the Scott River in 2001 and 2002, where eggs may be vulnerable due to potential for bed load movement or transport of decomposed granitic sands.

Collison et al. (2003) noted that we are presently experiencing relatively favorable conditions for salmonids in the ocean and in a wet on-land cycle that will likely reverse sometime between 2015 and 2025 in what is known as the Pacific Decadal Oscillation (PDO) cycle (Hare et al. 1999). That coho salmon and fall chinook salmon populations are at such low levels or showing declines during the positive cycle of the PDO is not a good sign. In order to restore Scott River chinook and coho salmon stocks, flow and water quality problems must be remedied by 2015 or whenever the PDO switches to less favorable conditions for salmon stocks or further extinctions are likely to occur.

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