APPENDIX K: Private Citizen Comments (M)

From: "Malcolm Terence" <terence@starband.net>
To: <dfgsuctiondredge@dfg.ca.gov>
CC: "'Creek Hanauer'" <tcreek@sisqtel.net>
Date: 12/2/2009 8:29 PM
Subject: suction dredge input

I am an owner of a mining claim on the main stem of the Salmon River just upriver from Butler Creek. It is listed as CAMC#283436. Despite this ownership, I hope the state continues its ban of dredge mining. I mined in the Salmon River in the mid-1970s with a suction dredge and, despite my best efforts, it was inevitable that gasoline and oil got dumped in the river during refueling and lubrication. On top of that, the pit that I'd dredge out every season would be filled with sand and gravels by the following spring. I didn't realize at the time how damaging that was to the salmon redds I saw around me in the fall.

I mined a lot but it was essentially recreational and the lion's share of the dredges near here are also recreational, that is they cost the operators more to run than they yield in nuggets. It is not enough of a benefit to justify the damage dredging by me and others was doing to the dwindling runs of anadramous fish.

The worst pollution came when an unexpected overnight rainstorm would flip my dredge at its moorings. I never lost it entirely but every year I see dredges that have gone adrift. In those cases I would lose large amounts of gas and oil. And, sadly, not too much gold.

Again, I urge the Department of Fish and Game to prioritize fish survival over the more transitory needs of us recreational miners. We recreationalists will survive just fine.

Malcolm Terence
6304 Butler Mt. Rd.
Somes Bar, CA 95568
707-736-6173

From: Manuel Figueiredo <kenainson@yahoo.com>
To: <dfgsuctiondredge@dfg.ca.gov>
Date: 12/3/2009 11:38 PM
Subject: Suction Dredging Information

To: California Department of Fish and Game.
Since we the Dredgers cannot make Personal comments regarding Suction Dredging, I offer to you some of your own DFG Documents and E.P.A. studies as well as Biologists studies from California to Alaska on Suction Dredging and Mercury studies. Below are links in regards and reports to suction mining. I had no choice in sending you links due to the fact I couldn't send a PDF file of 896MB threw my PC.

1] www.akminning.com/mine/excerpts.htm Pages 1-11

2] www.plp2org/forum/showthread.php?t=149 Pages1-4

3] www.plp2.org/forum/showthread.php?t=516 Pages 1-7

4] waterboards.ca.gov This site is Calif, State Water Resources Control Board, Subject: Suction Dredge Mining Dated, June 6 2007. with Studies ranging from California to Alaska with all of the data and Biologists E.P.A as well of other officials in their Field of expertise in regards to Suction Mining.

I would like to thank you for letting me contribute information on this matter
Manuel Figueiredo, Reno Nevada.

From: Marianna Mejia <lamarianna@aol.com>
To: <dfgsuctiondredge@dfg.ca.gov>
Date: 12/2/2009 10:34 AM
Subject: Suction dredging? Maybe not....

Mark Stopher
California Department of Fish and Game
601 Locust Street
Redding, CA 96001

Dear Mr. Stopher

This comment is in regard to the Suction Dredge Permitting Program. It is my position - and that of most likely the majority of Californians - that our salmon fishery and its associated ecosystem is one of the most valuable natural resources of our state. It is, in fact, a State Treasure and should be regarded as such, and honored, and protected.

This resource merits the best and strongest protections that we can possibly provide, both now and ongoing, in order to maintain the fishery and ecosystem in optimum health in its own right, and so that it will be available for future generations of Californians.

No doubt your entire department is familiar with the writing of Peter B. Moyle, PhD, Associate Director of the Center for Integrated Watershed Science and Management at UC Davis since 2002. In a statement as an expert witness for the Karuk tribe he says that

"All anadromous fish in the Klamath River basin should be considered to be in decline and ultimately threatened with extirpation as wild populations... dredging is harming declining species... suction dredging represents a chronic unnatural disturbance of natural habitats."

Other studies that reaffirm this statement number in the hundreds, with sufficient research and evidence-based reasoning upon which to base your determination.

What about the miners? Considering that suction dredging buries spawning areas for salmon, it takes considerable and unconscionable hubris to place a human desire for sport, fun and profit above the needs of our land and its fish and animal species. The miners' position is immoral.

Kindly take these statements into consideration and be led to a Right decision- one that does not permit suction dredging on any river in the subject watershed in any area that will have a negative impact on the salmon fishery and its associated ecosystem.

Thank you for considering my opinion.

Marianna Mejia
1009 Hidden Valley Road

Soquel, CA 95073

From: Sandy Bar Ranch <sandybar58@gmail.com>
To: <dfgsuctiondredge@dfg.ca.gov>
Date: 12/1/2009 11:14 AM
Subject: Suction Dredge Mining
Attachments: SuctionMining Comments.doc

Dear Mr Stopher:

We submit these comments as owners of a recreational business on the Klamath River situated in the town on Orleans on the Mid-Klamath Section of the Klamath River: Sandy Bar Ranch, a lodging facility for vacationers, fisherman and outdoor recreationists.

As a lodge owners suction dredge mining has a severe impact on our business. There is a mining claim located on the opposite bank of the river from us, on a Forest Service River Access point. Our cabin guests use the banks of the Klamath River on both our side and the opposite side for swimming, fishing, rafting and general relaxation. When a suction dredge is in operation none of these activities are possible, and this dredge operated by a single person impacts many others. Elsewhere on the Klamath and nearby Salmon river I have seen suction dredges creating sediment and impairing water quality for fisheries and creating a general nuisance in the form of noise and pollution from spilled fuel containers and trash left behind.

The Klamath River is already suffering from a variety of impacts on water quality including reduced flows, toxic algae from upper basin dams, sedimentation from roads and upslope management, all of which have severe consequences for fisheries, recreation, and river communities. Suction dredge mining is just one more impact, which happens to benefit a few at the expense of many. We can and should prohibit it on all California streams.

We can be reached at any of the numbers below for questions or clarifications.

Sincerely,

Mark DuPont & Blythe Reis

Owners, Sandy Bar Ranch

Sandy Bar Ranch
PO Box 347, 797 Ishi Pishi Rd.
Orleans, CA, 95556
Tel: (530) 627-3379
Riverside Cabins: www.sandybar.com

SANDY BAR RANCH
PO Box 347
Orleans, CA, 95556
Phone (530) 627-3379
mail@ sandybar.com

December 1, 2009

Mark Stopher
California Department of Fish and Game
601 Locust Street
Redding, CA 96001
Subject: Instream Suction Dredge Mining

Dear Mr Stopher:

We submit these comments as owners of a recreational business on the Klamath River situated in the town on Orleans on the Mid-Klamath Section of the Klamath River: Sandy Bar Ranch, a lodging facility for vacationers, fisherman and outdoor recreationists.

As a lodge owners suction dredge mining has a severe impact on our business. There is a mining claim located on the opposite bank of the river from us, on a Forest Service River Access point. Our cabin guests use the banks of the Klamath River on both our side and the opposite side for swimming, fishing, rafting and general relaxation. When a suction dredge is in operation none of these activities are possible, and this dredge operated by a single person impacts many others. Elsewhere on the Klamath and nearby Salmon river I have seen suction dredges creating sediment and impairing water quality for fisheries and creating a general nuisance in the form of noise and pollution from spilled fuel containers and trash left behind.

The Klamath River is already suffering from a variety of impacts on water quality including reduced flows, toxic algae from upper basin dams, sedimentation from roads and upslope management, all of which have severe consequences for fisheries, recreation, and river communities. Suction dredge mining is just one more impact, which happens to benefit a few at the expense of many. We can and should prohibit it on all California streams.

We can be reached at any of the numbers above for questions or clarifications.

Sincerely,

Mark DuPont & Blythe Reis
Owners, Sandy Bar Ranch

11-28-09

Dear Mark,

I have a 2" Suction Dredge that I Bought in 07, And Have used 11 times. I use a 5 gal. bucket with holes in it to place the suction (water inlet) in.

Were I have dredged I have not seen Any fish near the inlet pipe or water feed pipe while dredging. I have seen A lot of SMALL fish Around the hole that I have taken material out of After I have shut down the dredge. I let the fish Feed for About 10 mins in the hole before I refill it. If I do cloud up the water in the stream it may track down stream for 25' at the most

Thank you for listening to me

Mark Meszaros
4980 Brittany Dr.
Fairfield, CA.
94534

H.# 707-646-2833
C.# 707-480-8540

Comments and Questions submitted for the public record for the Initial Study for Suction Dredge Permitting, Nov 2009

The Initial Study for Suction Dredge Permitting (The Study), Nov 2009 as prepared by Horizon Water and Environment of Oakland, CA completely omits the property rights of miners and mischaracterizes the nature of gold dredging operations when conducted on inactive, existing, or potential mining claims (mining claims) as outlined in the following section of "The Study"

5.1 "Activity Description". (On page 8)

It states that "Suction dredgers regulated under the program are often small-scale recreational gold dredging operators conducting suction dredging for a limited time each year.

In the above cited section "The Study" makes no designation between recreational suction dredgers vs the property rights of mining claim owners or those in the process of exploring and sampling potential claims, who happen to find that geology of their claim dictates that the use of water for mining or "suction dredging" is the most efficient and economical means of uncommon mineral recovery. "The Study" also has no mention of any remedy by the State of California for payment of compensation to mining claim holders for the loss of their property rights and the economic impact that the loss of those rights incur.

Most of the suction dredge activity in the state is conducted on recorded mining claims and the claim owners and those who work in association with them have property rights. These rights were initially granted by an Act of United States Government in H.R. 365 which was approved July 26, 1866. The act includes the right to the exploration and occupation of public domain lands that bare uncommon minerals including gold. Included in H.R. 365 is the granted right to:

a) Declare Property Vesting via Claim [H.R. 365 Section 1 & H.R. 365 Section 2]

b) "That the right of way for the construction of highways over public lands, not reserved for public uses, is hereby granted." [H.R. 365 Section 8]

c) ..."That whenever, by priority of possession, rights to

the use of water for mining agricultural, manufacturing, or other purposes, have vested and accrued"... [H.R. 365 Section 9]

See Footnote (3) for the rest of HR 365

These granted rights and the case law cited in the footnotes of this document establish claim ownership and gives claim (or potential claim) holder access to their claim via the "right of ingress and egress by private entry" [H.R. 365 Section 8] which is a granted right that cannot be denied by administrative authority. (See Footnote 1) There is case law supporting this where an agent of a mining claim owner was cited by the U.S. Forest service for using a motorized vehicle with the intention of accessing a mining claim in an area that the U.S. National **Forest** closed to motor vehicles by closure order. The U.S. The Ninth Circuit Court of Appeals determined that landowner property rights permitted access by motorized vehicle and that the citation was in error due to the rights granted in [H.R. 365 Section 8] There is also case law that conclude Mineral rights are ownership in land (Footnote 2)

The legal precedent set forth in the above case would permit the claim (or potential claim) holder to exercise their granted rights "to the use of water for mining" as outlined [H.R. 365 Section 9]

Yet, the regulation of "Suction Dredging" via California SR670 and the Administrative Authority of the California Department of Fish and Game Code 5653 seeks to regulate how and when we use our granted right to the use of water for mining via suction dredging and other recovery methods that may come under the review of "The Study". In doing so it ignores similar long-standing U.S. Granted rights such as Copyright, Patents and Homestead rights. The granted rights in H.R. 365 entitle the claim (or potential claim) holder to individual to property protection in the grant. The granted rights may then not be taken or regulated away without due process of law and the granted right cannot be taken without the payment of compensation.

I ask that the California Department of Fish and Game Instruct Horizon Water and Environment of Oakland, CA to amend the The

Initial Study for Suction Dredge Permitting Dated November 2009 to include the following:

1) Define and include Mining Claim Owners and their respective granted property rights as defined in HR 365 in Section 5.1 of "The Study"

1) Conduct a current economic review of the impact on the mining claim holders and the industries they support (Such as grocery stores campgrounds, mining equipment manufactures and resellers)

2)A legal review of the implications of the violation of the granted property rights as set forth in HR 365 for claim (or potential claim) holders without due process of law and without payment of compensation.

3) Demonstrate how the "The Study" and the California Fish and Game has the legal Administrative Authority to regulate the granted rights listed in HR 365 including the regulation of the use of water for mining purposes which would result in effectively creating and "economic" mineral land withdrawal from mining claims by making them unprofitable to recover uncommon minerals by other means

4) Demonstrate how "The Study" and the California Fish and Game intends to show how it is not acting contrary to the laws of the United States when purporting to study via this EIR Property Congress lawfully disposed of as lawful use under HR 365

5) Where does the "The Study" show the researchers are competent in mining law, the Law of Possession, and mining "rule and regulations", Which is a corner stone of HR 365. To be able to competently define or study anything impacting mining or the law relating. Evidence of the incompetence of the study can be found in the lack of understanding that the term "small-scale recreational gold dredging operators" as applied to the congressionally disposed property is a fabricated term, an impossibility in law or the mining environment. Being that additional power resides in each miner, whether or not he has a mineral claim, how has "The Study" completely, accurately, and faithfully reported upon the subject matter of the mining environment as impacted by the study subject matter? Or, is it that the "The Study" was not to include the impact upon mining or other economic, social, or cultural, or heritage environments? And if this is the case, Where in the study has it been shown that the

study, or the agency in reliance, takes precedence over the law recognizing the prevailing nature of the valuable mineral environment, greater even than that of fish, that it's assertions, whether or not favorable, could be used to impact the granted Property
environment?

6) By "The Sudy"'s omission of the violation of the granted rights of mining claim owners under HR 365 there is no reference to any to the conflict that arises by the assumed Administrative Authority of the California Department of Fish and Game Code 5653 with respect to existing mining rights under the following section of "The Study"

IX(b) "Land use and Planning" (On page 76)

Would the project Conflict with any applicable land use plan, policy or regulation of an agency with juristiction over the project....

7) 6) By "The Sudy"'s omission of the violation the granted rights of mining claim owners under HR 365 there is no reference to the economic loss to the claim holder if they were unable to recover uncommon minerals from their claim in and economic manner via the use of water for suction dredging, and the devaluation of their claim via the loss of property rights as outlined in HR 365 in the following section of "The Study"

X "Mineral Resources (a) and (b) (On page 78)

Would the project ... Result in the loss of the availability of a known mineral mineral resource that would be of value to the region and residents of the state?

Respectfully Submitted for the Public Record

Mark Weiss
160 Clinton St Apt A
Redwood City, CA 94062

650-369-1151
mrlocksmith@sbcglobal.net

Footnote (1)
United States Court of Appeals,Ninth Circuit.
UNITED STATES of America, Plaintiff-Appellee,
v.
Steve A. **HICKS**, Defendant-Appellant.
No. 01-30146.
D.C. No. CR-00-00001-DWM.

Argued and Submitted Nov. 5, 2002.
Decided Nov. 14, 2002.

Corporate employee was convicted in the United States District Court for the District of Montana, Donald W. Molloy, Chief Judge, of operating motorcycle in area of National **Forest** closed to motor vehicles by **Forest Service** closure order, and he appealed. The Court of Appeals held that employee of corporation that owned subsurface mineral rights in national **forest** was not subject to **Forest Service** closure order that exempted landowners.

Reversed and remanded.

Woods and Forests 411 8

411 Woods and **Forests** 411k8 k. **Forest** Reservations, Preserves, or Parks. Most Cited Cases
Corporation that owned subsurface mineral rights in national **forest** was "landowner," and thus corporate employee was not subject to **Forest Service** closure order that exempted landowners from prohibition against operating motor vehicles in national **forest**. 36 C.F.R. § 261.55(b).

867 Appeal from the United States District Court for the District of Montana, Donald W. Molloy, Chief District Judge, Presiding.

Before TROTT, T.G. NELSON and THOMAS, Circuit Judges.

1 **Steve A. **Hicks** (" **Hicks**") appeals pro se the district court's affirmation of his conviction in magistrate court for operating a motorcycle in an area of Lolo National **Forest** closed to motor vehicles by a **Forest Service** closure order, in violation of 36 C.F.R. § 261.55(b). **Hicks** drove a motorcycle on a **Forest Service** trail while acting as an agent of Kenton Lewis ("Lewis"), an owner of subsurface mineral rights in Lolo National **Forest**. We have jurisdiction pursuant to 28 U.S.C. § 1291, and we reverse because **Hicks's** conviction is based upon a plain legal error.

1. Standard of Review

This court reviews for plain error when an appellant raises an issue on appeal that the appellant did not raise before the lower court. Jones v. United States, 527 U.S. 373, 388, 119 S.Ct. 2090, 144 L.Ed.2d 370 (1999). The **Forest Service** closure order exempts landowners from its provisions, but **Hicks** did not rely upon the landowner exemption before the magistrate court. Hence, we review for plain error. This court has discretion to grant relief under the plain error standard if there has been (1) an error; (2) that is plain; and (3) ***868** affects substantial rights. Id. at 389, 119 S.Ct. 2090.

2. Both Lower Courts Committed A Plain Error By Determining The Landowner Exemption Did Not Apply To Hicks

Footnote (2)
Mineral rights are ownership in land, and therefore Lewis is a landowner. See, e.g., United States v. Shoshone Tribe of Indians of Wind River Reservation in Wyo., 304 U.S. 111, 116, 58 S.Ct. 794, 82 L.Ed. 1213 (1938) (with respect to question of ownership, "[m]inerals ... are constituent elements of the land itself"); British-American Oil Producing Co. v. Bd. of Equalization of State of Mont., 299 U.S. 159, 164-65, 57 S.Ct. 132, 81 L.Ed. 95 (1936) (finding a mineral estate an estate in land); Texas Pac. Coal & Oil Co. v. State, 125 Mont. 258, 234 P.2d 452, 453 (1951) ("[l]ands as a word in the law includes minerals"). We need not decide whether the term "landowner" as it is used in **Forest Service** regulations and orders always includes owners of mineral estates. Here, the government conceded at oral argument that Lewis is a landowner under the terms of the closure order before us and thus exempt from this closure order. The landowner exemption in this closure order must necessarily apply to agents

of landowners. For example, corporate landowners can only access their land through agents. Hicks, as Lewis's agent, is therefore also exempt.

Because the trial courts did not recognize mineral rights as ownership in land, and because this error adversely affected Hicks's entitlement to the landowner exemption, we exercise our discretion to correct this plain error.

REVERSED AND REMANDED WITH AN INSTRUCTION TO ENTER A JUDGMENT OF NOT GUILTY.

C.A.9 (Mont.),2002.
U.S. v. Hicks
50 Fed.Appx. 867, 2002 WL 31553938 (C.A.9 (Mont.))

Footnote (3)

39TH CONGRESS,
1st Session

H.R. 365.

IN THE SENATE OF THE UNITED STATES.
JULY 19, 1866.
Ordered to be printed.

AMENDMENT

Reported by Mr. STEWART. from the Committee on Public Lands, to the act (H. B. 365) granting the right of way to ditch and canal owners over the public lands in the States of California, Oregon, and Nevada, viz: Strike out all after the enacting clause, and insert as follows:

SEC. 1 That the mineral lands of the public domain, both surveyed and unsurveyed, are hereby declared to be free and open to exploration and occupation by all citizens of the United States, and those who have declared their intention to become citizens, subject to such regulations as may be prescribed by law, and subject also to the local custom or rules of miners in the several mining districts, so far as the same may not be in conflict with the laws of the United States.

SEC. 2. *And be it further enacted,* That whenever any person or association of persons claim a vein or lode of quartz, or other rock in place, bearing gold, silver, cinnabar, or copper, having previously occupied and improved the same according to the local custom or rules of miners in the district where the same is situated, and having expended in actual labor and improvements thereon an amount of not less than one thousand dollars, and in regard to whose possession there is no controversy or opposing claim, it shall and may be law- ful for said claimant or association of claimants to file in the local land office a diagram of the same, so extended laterally or otherwise as to conform to the local laws, customs, and rules of miners, and to enter such tract and receive a patent therefor, granting such mine, together with the right to follow such vein or lode with its dips, angles, and variations, to any depth, although it may enter the land adjoining, which land adjoining shall be sold subject to this condition.

SEC. 3. *And be it further enacted,* That upon the filing of the diagram as provided in the second section of this act, and posting the same in a conspicuous place on the claim, together with a notice of intention to apply for a patent, the register of the land office shall publish a notice of the same in a newspaper published nearest to the location of said claim, and shall also post such notice in his office for the period of ninety days; and after the expiration of said period, if no adverse claim shall have been filed, it shall be the duty of the surveyor general, upon application of the party, to survey the premises and make a plat thereof, indorsed with his approval, designating the number and description of the location, the value of the labor and improvements, and the character of the vein exposed; and upon the payment to the proper officer of five dollars per acre, together with the cost of such survey, plat, and notice, and giving satisfactory evidence that said diagram and notice have been posted on the claim during said period of ninety days, the register of the land office shall transmit to the General Land Office said plat, survey, and description; and a patent shall issue for the same thereupon. But said plat, survey, or description shall in no case cover more than one vein or lode, and no patent shall issue for more than one vein or lode, which shall be expressed in the patent issued.

SEC. 4. *And be it further enacted,* That when such location and entry of a mine shall be upon unsurveyed lands,it shall and may be lawful, after the extension thereto of thepublic surveys, to adjust the surveys to the limits of the premises according to

the location and possession and plat aforesaid, and the surveyor general may, in extending the surveys, vary the same from a rectangular form to suit the circumstances of the country and the local rules, laws, and customs of miners: *Provided,* That no location hereafter made shall exceed two hundred feet in length along the vein for each locator, with an additional claim for discovery to the discoverer of the lode, with the right to follow such vein to any depth, with all its dips, variations, and angles, together with a reasonable quantity of surface for the convenient working of the same as fixed by local rules : *And provided further,* That no person may make more than one locationon the same lode, and not more than three thousand feet shall be taken in any one claim by any association of persons.

SEC. 5. *And be it further enacted,* That as a further condition of sale, in. the absence of necessary legislation by Congress, the local legislature of any State or Territory may provide rules for working mines involving casements, drainage, and other necessary means to their complete development; and those conditions shall be fully expressed in the patent.

SEC. 6. *And be it further enacted,* That whenever any adverse claimants to any mine located and claimed as afore said, shall appear before the approval of the survey, as provided in the third section of this act, all proceedings shall be stayed until a final settlement and adjudication in the courts of competent jurisdiction of the rights of possession to such claim, when a patent may issue as in other cases.

SEC. 7. *And be it further enacted,* That the President of the United States be, and is hereby, authorized to establish additional land districts and to appoint the necessary officers under existing laws, wherever he may deem the same necessary for the public convenience in executing the provisions of this act.

SEC. 8. *And be it further enacted,* That the right of way for the construction of highways over public lands, not reserved for public uses, is hereby granted.

SEC. 9. *And be it further enacted,* That whenever, by priority of possession, rights to the use of water for mining, agricultural, manufacturing, or other purposes, have vested and accrued, and the same are recognized and acknowledged by the local customs, laws, and the decisions of courts, the possessors and

owners of such vested rights, shall be maintained and protected in the same; and the right of way for the construction of ditches and canals for the purposes aforesaid is hereby acknowledged and confirmed: *Provided, however,* That whenever, after the passage of this act, any perso or persons shall, in the construction of any ditch or canal, injure or damage the possession of any settler on the public domain, the party committing such injury or damage shall be liable to the party injured for such injury or damage.

SEC. 10. *And be it further enacted,* That wherever, prior to the passage of this act, upon the lands heretofore designated as mineral lands, which have been excluded from survey and sale, there have been homesteads made by citizens of the United States, or persons who have declared their intention to become citizens, which homesteads have been made, improved, and used for agricultural purposes, and upon which there have been no valuable mines of gold, silver, cinnabar or copper discovered, and which are properly agricultural lands, the said settlers or owners of such homesteads shall have a right of pre-emption thereto, and shall he entitled to purchase the same at the price of one dollar and twenty-five cents per acre, and in quantity not to exceed one hundred and sixty-acres ; or said parties may avail themselves of the provisions of the act of Congress approved May twenty, eig teen hundred and sixty-two, entitled "An act to secure homesteads to actual settlers on the public domain," and acts amendatory thereof.

SEC. II. *And be it further enacted,* That upon the survey of the lands aforesaid, the Secretary of the Interior may designate and set apart such portions of the said lands as are clearly agricultural lands, which lands shall thereafter be subject to pre-emption and sale as other public lands of the United States, and subject to all the laws and regulations applicable to the same.

From: Marcia Armstrong <armstrng@sisqtel.net>
To: "Mark Stopher" <MStopher@dfg.ca.gov>
CC: <rcostales@co.siskiyou.ca.us>, <tmbst@sisqtel.net>, <mkobseff@co.siskiyo...
Date: 11/3/2009 5:58 PM
Subject: Re: Suction dredge Notice of Preparation and Initial Study
Attachments: Coordination with State and Federal Agencies 2008 RES.pdf

Mark,

Please arrange with our Natural Resource specialist Ric Costales to formaly meet on a government to government basis for coordination purposes. (See attached Resolution)

Water Code §§ 8125-8129 places planning for non-navigable streams within the authority of county supervisors. State planning activities must be coordinated with local County processes. Public Resources Code § 5099.3 mandates coordination by the state with Siskiyou County since it is a county “having interest in the planning, development, and maintenance of outdoor recreation resources and facilities.The California Legislature has mandated in Government Code Section 65300 that each county shall prepare a comprehensive plan, and stated legislative intent in Section 65300.9 that the county planning shall be coordinated with federal and state program activities, and has mandated in Section 65103 that county local plans and programs must be coordinated with plans and programs of other agencies.

In addition, our Comprehensive Land and Resource Management Plan passed in 1999 cites, among many authorities, that:
http://library.ceres.ca.gov/docs/data/1600/1646/HYPEROCR/hyperocr.html

"The California Administrative Procedures Act mandates any state agency that proposes to impose a new rule, order or regulation, or proposes to change any existing order or regulation, upon Siskiyou County or its citizens, to first consider all reasonable alternatives and create a formal '...statement that no alternative considered by the agency would be more effective in carrying out the purpose for which the regulation is proposed or would be as effective or less burdensome to affected private persons than the proposed regulation.' This Act clearly shows the California Legislature's intent that its agencies carefully consider the customs, culture and economics of California citizens during the process of consideration and adoption of new or changed rules, orders and/or regulations in Siskiyou County.

Marcia Armstrong, District 5 Supervisor

At 03:05 PM 11/3/2009, you wrote:

>Michael and Marcia
>
>We sent these documents listed above to the
>County Clerk office in Siskiyou County. However,
>they are also accessible at
><http://www.dfg.ca.gov/suctiondredge/docs/SuctionDredge-IS-NOP-20091025.pdf>http://www.dfg.ca.gov/suctiondredge/docs/SuctionDredge-IS-NOP-20091025.pdf
>for your review.
>
>Mark Stopher
>Environmental Program Manager
>California Department of Fish and Game
>601 Locust Street
>Redding, CA 96001
>
>voice 530.225.2275
>fax 530.225.2391
>cell 530.945.1344
>
>
>

RESOLUTION OF THE BOARD OF SUPERVISORS
OF THE COUNTY OF SISKIYOU ASSERTING LEGAL
STANDING AND FORMALLY REQUESTING
COORDINATION WITH ALL FEDERAL AND STATE AGENCIES
MAINTAINING JURISDICTION OVER LANDS AND/OR
RESOURCES LOCATED IN SISKIYOU COUNTY

WHEREAS, Siskiyou County is a public unit of local government and a five member elected Board of Supervisors serves as its chief governing authority; and,

WHEREAS, the Siskiyou County Board of Supervisors is charged with supervising and protecting the tax base of the County and establishing comprehensive land use plans (including, but not limited to, the General Plan) outlining present and future authorized uses for all lands and resources situated within the County; and,

WHEREAS, Siskiyou County is engaged in the land use planning process for future land uses to serve the welfare of all the citizens of Siskiyou County; and,

WHEREAS, approximately sixty-eight percent (68%) of lands in Siskiyou County are publicly owned, managed, and/or regulated by various federal and state agencies; and,

WHEREAS, the citizens of Siskiyou County historically earn their livelihood from activities reliant upon natural resources and land which produces natural resources is critical to the economy of Siskiyou County; and,

WHEREAS, the economic base and stability of Siskiyou County is largely dependent upon commercial and business activities operated on federally and state owned, managed, and/or regulated lands that include, but are not limited to, recreation, tourism, timber harvesting, mining, livestock grazing, and other commercial pursuits; and,

WHEREAS, Siskiyou County desires to assure that federal and state agencies shall inform the Board of Supervisors of all ending or proposed actions affecting local communities and citizens within Siskiyou County and coordinate with the Board of Supervisors in the planning and implementation of those actions; and,

WHEREAS, coordination of planning and management actions is mandated by federal laws governing land management, including the Federal Land Policy and Management Act, 43 USC § 1701, and 43 USC § 1712, regarding the coordinate status of a county engaging in the land use planning process, and requires that the “Secretary of the

Interior [Secretary] shall . . . coordinate the land use inventory, planning and management activities . . . with the land use planning and management programs of other federal departments and agencies and of the state and local governments within which the lands are located"; and,

WHEREAS, the coordination requirements of Section 1712 provide for special involvement by government officials who are engaged in the land use planning process; and,

WHEREAS, Section 1712 sets forth the nature of the coordination required with planning efforts by government officials and subsection (f) of Section 1712 sets forth an additional requirement that the Secretary "shall allow an opportunity for public involvement" (including local government without limiting the coordination requirement of Section 1712 allowing land or resource management or regulatory agencies to simply lump local government in with special interest groups of citizens or members of the public in general); and,

WHEREAS, Section 1712 also provides that the "Secretary shall . . . assist in resolving, to the extent practical, inconsistencies between federal and non-federal government plans" and gives preference to those counties which are engaging in the planning process over the general public, special interest groups of citizens, and even counties not engaging in a land use planning program; and,

WHEREAS, the requirement that the Secretary "coordinate" land use inventory, planning, and management activities with local governments, requires the assisting in resolving inconsistencies to mean that the resolution process takes place during the planning cycle instead of at the end of the planning cycle when the draft federal plan or proposed action is released for public review; and,

WHEREAS, Section 1712 further requires that the "Secretary shall . . . provide for meaningful public involvement of state and local government officials . . . in the development of land use programs, land use regulations, and land use decisions for public lands"; and, when read in light of the "coordinate" requirement of Section 1712, reasonably contemplates "meaningful involvement" as referring to ongoing consultations and involvement throughout the planning cycle, not merely at the end of the planning cycle; and,

WHEREAS, Section 1712 further provides that the Secretary must assure that the federal agency's land use plan be "consistent with state and local plans" to the maximum extent possible under federal law and the purposes of the Federal Land Policy and Management Act and distinguishes local government officials from members of the general public or special interest groups of citizens; and,

WHEREAS, the Environmental Protection Agency, charged with administration and implementation of the National Environmental Policy Act (NEPA), has issued regulations which require that federal agencies consider the economic impact of their actions and plans on local government such as Siskiyou County; and,

WHEREAS, NEPA requires federal agencies to consider the impact of their actions on the customs of the people as shown by their beliefs, social forms, and "material traits," it reasonably follows that NEPA requires federal agencies to consider the impact of their actions on the rural, land and resource-oriented citizens of Siskiyou County who depend on the "material traits" including recreation, tourism, timber harvesting, mining, livestock grazing, and other commercial pursuits for their economic livelihoods; and,

WHEREAS, NEPA requires federal agencies to consider the impact of their actions on the customs, beliefs, and social forms, as well as the "material traits" of the people; and,

WHEREAS, it is reasonable to interpret NEPA as requiring federal agencies to consider the impacts of their actions on those traditional and historical and economic practices, including commercial and business activities, which are performed or operated on federally and state managed lands (including, but not limited to, recreation, tourism, timber harvesting, mining, livestock grazing, and other commercial pursuits); and,

WHEREAS, 42 USC § 4331 places upon federal agencies the "continuing responsibility . . . to use all practical means, consistent with other considerations of national policy to . . . preserve important historic, culture, and natural aspects of our national heritage"; and,

WHEREAS, Webster's New Collegiate Dictionary (at 227, 1975) defines "culture" as "customary beliefs, social forms, and material traits of a group; the integrated pattern of human behavior passed to succeeding generations"; and,

WHEREAS, In 16 USC § 1604, the National Forest Management Act, requires the Forest Service to coordinate its planning processes with local government units such as Siskiyou County; and,

WHEREAS, federal agencies implementing the Endangered Species Act, the Clean Water Act, the Clean Air Act, and the Outdoor Recreation Coordination Act (16 USC § 4601-1(c) and (d)) are required by Congress to consider local plans and to coordinate and cooperate directly with plans of local government such as Siskiyou County; and,

WHEREAS, the coordinating provisions referred to in the resolution require the Secretary of the Interior to work directly with local government to resolve water resource

issues and with regard to recreation uses of the federal lands, and,

WHEREAS, the regulations issued by the federal agencies in this resolution are consistent with statutory requirements of coordination and direct cooperation and provide implementation processes for such coordination and direction consideration and communication; and,

WHEREAS, the California Constitution has recognized Siskiyou County's authority to exercise its local, police and sanitary powers, and the California Legislature has recognized and mandated exercise of certain of those powers in specific statutes; and,

WHEREAS, the California Legislature has mandated in Government Code Section 65300 that each county shall prepare a comprehensive plan, and stated legislative intent in Section 65300.9 that the county planning shall be coordinated with federal and state program activities, and has mandated in Section 65103 that county local plans and programs must be coordinated with plans and programs of other agencies; and,

WHEREAS, the California Legislature has stated its intent in Section 65070 that preparation of state and regional transportation plans be performed in a cooperative process involving local government; and,

WHEREAS, the California Legislature has mandated in Section 65040 that the State Office of Planning and Research shall "coordinate, in conjunction with . . . local agencies with regard to matters relating to the environmental quality of the state"; and,

WHEREAS, in Water Code §§ 8125-8129, the California Legislature has placed planning for non-navigable streams within the authority of county supervisors, and since such planning activities must be coordinated with natural resource planning processes of federal and state agencies; and,

WHEREAS, in Streets and Highways Code §§ 940-941.2, the California Legislature has placed the general supervision, management, and control of county roads and highways - including closing such roads (Section 901) and removing and preventing encroachment of such roads and highways, and since planning and actions with regard to such roads by any federal or state agency must be coordinated with the county; and,

WHEREAS, in Public Resources Code § 5099.3, the California Legislature has mandated coordination by the state with Siskiyou County since it is a county "having interest in the planning, development, and maintenance of outdoor recreation resources and facilities,"

NOW, THEREFORE, BE IT RESOLVED that the Siskiyou County Board of Supervisors does hereby assert legal standing and formally requests coordination status with all federal and state agencies maintaining jurisdiction over lands and/or resources located within Siskiyou County.

BE IT FURTHER RESOLVED that the Clerk of the Board shall cause a copy of this Resolution to be transmitted annually to local, regional, state, and/or national offices of all federal and state agencies maintaining jurisdiction of lands and/or resources located within Siskiyou County and to all federal and state elected representatives serving Siskiyou County.

BE IT FURTHER RESOLVED that the Clerk of the Board of Supervisors is authorized and hereby directed to publish a copy of this Resolution in the Siskiyou Daily News, a newspaper of general circulation printed and published in Siskiyou County, California.

PASSED AND ADOPTED this _____ day of _____, 2008, by the following vote:

AYES:
NOES:
ABSENT:
ABSTAIN:

_____
Chair, Board of Supervisors

ATTEST:
COLLEEN SETZER, CLERK
Board of Supervisors

By_____
Deputy

G:\Share\RESOLUTN\Coordination with State and Federal Agencies 2008 RES.wpd

From: Marcia Armstrong <armstrng@sisqtel.net>
To: "Mark Stopher" <MStopher@dfg.ca.gov>
CC: <rcostales@co.siskiyou.ca.us>, <tmbst@sisqtel.net>, <mkobseff@co.siskiyo...
Date: 11/3/2009 5:58 PM
Subject: Re: Suction dredge Notice of Preparation and Initial Study
Attachments: Coordination with State and Federal Agencies 2008 RES.pdf

Mark,

Please arrange with our Natural Resource specialist Ric Costales to formaly meet on a government to government basis for coordination purposes. (See attached Resolution)

Water Code §§ 8125-8129 places planning for non-navigable streams within the authority of county supervisors. State planning activities must be coordinated with local County processes. Public Resources Code § 5099.3 mandates coordination by the state with Siskiyou County since it is a county “having interest in the planning, development, and maintenance of outdoor recreation resources and facilities.The California Legislature has mandated in Government Code Section 65300 that each county shall prepare a comprehensive plan, and stated legislative intent in Section 65300.9 that the county planning shall be coordinated with federal and state program activities, and has mandated in Section 65103 that county local plans and programs must be coordinated with plans and programs of other agencies.

In addition, our Comprehensive Land and Resource Management Plan passed in 1999 cites, among many authorities, that:
http://library.ceres.ca.gov/docs/data/1600/1646/HYPEROCR/hyperocr.html

"The California Administrative Procedures Act mandates any state agency that proposes to impose a new rule, order or regulation, or proposes to change any existing order or regulation, upon Siskiyou County or its citizens, to first consider all reasonable alternatives and create a formal '...statement that no alternative considered by the agency would be more effective in carrying out the purpose for which the regulation is proposed or would be as effective or less burdensome to affected private persons than the proposed regulation.' This Act clearly shows the California Legislature's intent that its agencies carefully consider the customs, culture and economics of California citizens during the process of consideration and adoption of new or changed rules, orders and/or regulations in Siskiyou County.

Marcia Armstrong, District 5 Supervisor

At 03:05 PM 11/3/2009, you wrote:

>Michael and Marcia
>
>We sent these documents listed above to the
>County Clerk office in Siskiyou County. However,
>they are also accessible at
><http://www.dfg.ca.gov/suctiondredge/docs/SuctionDredge-IS-NOP-20091025.pdf>http://www.dfg.ca.gov/suctiondredge/docs/SuctionDredge-IS-NOP-20091025.pdf
>for your review.
>
>Mark Stopher
>Environmental Program Manager

>California Department of Fish and Game
>601 Locust Street
>Redding, CA 96001
>
>voice 530.225.2275
>fax 530.225.2391
>cell 530.945.1344
>
>
>

RESOLUTION OF THE BOARD OF SUPERVISORS
OF THE COUNTY OF SISKIYOU ASSERTING LEGAL
STANDING AND FORMALLY REQUESTING
COORDINATION WITH ALL FEDERAL AND STATE AGENCIES
MAINTAINING JURISDICTION OVER LANDS AND/OR
RESOURCES LOCATED IN SISKIYOU COUNTY

WHEREAS, Siskiyou County is a public unit of local government and a five member elected Board of Supervisors serves as its chief governing authority; and,

WHEREAS, the Siskiyou County Board of Supervisors is charged with supervising and protecting the tax base of the County and establishing comprehensive land use plans (including, but not limited to, the General Plan) outlining present and future authorized uses for all lands and resources situated within the County; and,

WHEREAS, Siskiyou County is engaged in the land use planning process for future land uses to serve the welfare of all the citizens of Siskiyou County; and,

WHEREAS, approximately sixty-eight percent (68%) of lands in Siskiyou County are publicly owned, managed, and/or regulated by various federal and state agencies; and,

WHEREAS, the citizens of Siskiyou County historically earn their livelihood from activities reliant upon natural resources and land which produces natural resources is critical to the economy of Siskiyou County; and,

WHEREAS, the economic base and stability of Siskiyou County is largely dependent upon commercial and business activities operated on federally and state owned, managed, and/or regulated lands that include, but are not limited to, recreation, tourism, timber harvesting, mining, livestock grazing, and other commercial pursuits; and,

WHEREAS, Siskiyou County desires to assure that federal and state agencies shall inform the Board of Supervisors of all ending or proposed actions affecting local communities and citizens within Siskiyou County and coordinate with the Board of Supervisors in the planning and implementation of those actions; and,

WHEREAS, coordination of planning and management actions is mandated by federal laws governing land management, including the Federal Land Policy and Management Act, 43 USC § 1701, and 43 USC § 1712, regarding the coordinate status of a county engaging in the land use planning process, and requires that the “Secretary of the

Interior [Secretary] shall . . . coordinate the land use inventory, planning and management activities . . . with the land use planning and management programs of other federal departments and agencies and of the state and local governments within which the lands are located"; and,

WHEREAS, the coordination requirements of Section 1712 provide for special involvement by government officials who are engaged in the land use planning process; and,

WHEREAS, Section 1712 sets forth the nature of the coordination required with planning efforts by government officials and subsection (f) of Section 1712 sets forth an additional requirement that the Secretary "shall allow an opportunity for public involvement" (including local government without limiting the coordination requirement of Section 1712 allowing land or resource management or regulatory agencies to simply lump local government in with special interest groups of citizens or members of the public in general); and,

WHEREAS, Section 1712 also provides that the "Secretary shall . . . assist in resolving, to the extent practical, inconsistencies between federal and non-federal government plans" and gives preference to those counties which are engaging in the planning process over the general public, special interest groups of citizens, and even counties not engaging in a land use planning program; and,

WHEREAS, the requirement that the Secretary "coordinate" land use inventory, planning, and management activities with local governments, requires the assisting in resolving inconsistencies to mean that the resolution process takes place during the planning cycle instead of at the end of the planning cycle when the draft federal plan or proposed action is released for public review; and,

WHEREAS, Section 1712 further requires that the "Secretary shall . . . provide for meaningful public involvement of state and local government officials . . . in the development of land use programs, land use regulations, and land use decisions for public lands"; and, when read in light of the "coordinate" requirement of Section 1712, reasonably contemplates "meaningful involvement" as referring to ongoing consultations and involvement throughout the planning cycle, not merely at the end of the planning cycle; and,

WHEREAS, Section 1712 further provides that the Secretary must assure that the federal agency's land use plan be "consistent with state and local plans" to the maximum extent possible under federal law and the purposes of the Federal Land Policy and Management Act and distinguishes local government officials from members of the general public or special interest groups of citizens; and,

WHEREAS, the Environmental Protection Agency, charged with administration and implementation of the National Environmental Policy Act (NEPA), has issued regulations which require that federal agencies consider the economic impact of their actions and plans on local government such as Siskiyou County; and,

WHEREAS, NEPA requires federal agencies to consider the impact of their actions on the customs of the people as shown by their beliefs, social forms, and "material traits," it reasonably follows that NEPA requires federal agencies to consider the impact of their actions on the rural, land and resource-oriented citizens of Siskiyou County who depend on the "material traits" including recreation, tourism, timber harvesting, mining, livestock grazing, and other commercial pursuits for their economic livelihoods; and,

WHEREAS, NEPA requires federal agencies to consider the impact of their actions on the customs, beliefs, and social forms, as well as the "material traits" of the people; and,

WHEREAS, it is reasonable to interpret NEPA as requiring federal agencies to consider the impacts of their actions on those traditional and historical and economic practices, including commercial and business activities, which are performed or operated on federally and state managed lands (including, but not limited to, recreation, tourism, timber harvesting, mining, livestock grazing, and other commercial pursuits); and,

WHEREAS, 42 USC § 4331 places upon federal agencies the "continuing responsibility . . . to use all practical means, consistent with other considerations of national policy to . . . preserve important historic, culture, and natural aspects of our national heritage"; and,

WHEREAS, Webster's New Collegiate Dictionary (at 227, 1975) defines "culture" as "customary beliefs, social forms, and material traits of a group; the integrated pattern of human behavior passed to succeeding generations"; and,

WHEREAS, In 16 USC § 1604, the National Forest Management Act, requires the Forest Service to coordinate its planning processes with local government units such as Siskiyou County; and,

WHEREAS, federal agencies implementing the Endangered Species Act, the Clean Water Act, the Clean Air Act, and the Outdoor Recreation Coordination Act (16 USC § 4601-1(c) and (d)) are required by Congress to consider local plans and to coordinate and cooperate directly with plans of local government such as Siskiyou County; and,

WHEREAS, the coordinating provisions referred to in the resolution require the Secretary of the Interior to work directly with local government to resolve water resource

issues and with regard to recreation uses of the federal lands, and,

WHEREAS, the regulations issued by the federal agencies in this resolution are consistent with statutory requirements of coordination and direct cooperation and provide implementation processes for such coordination and direction consideration and communication; and,

WHEREAS, the California Constitution has recognized Siskiyou County's authority to exercise its local, police and sanitary powers, and the California Legislature has recognized and mandated exercise of certain of those powers in specific statutes; and,

WHEREAS, the California Legislature has mandated in Government Code Section 65300 that each county shall prepare a comprehensive plan, and stated legislative intent in Section 65300.9 that the county planning shall be coordinated with federal and state program activities, and has mandated in Section 65103 that county local plans and programs must be coordinated with plans and programs of other agencies; and,

WHEREAS, the California Legislature has stated its intent in Section 65070 that preparation of state and regional transportation plans be performed in a cooperative process involving local government; and,

WHEREAS, the California Legislature has mandated in Section 65040 that the State Office of Planning and Research shall "coordinate, in conjunction with . . . local agencies with regard to matters relating to the environmental quality of the state"; and,

WHEREAS, in Water Code §§ 8125-8129, the California Legislature has placed planning for non-navigable streams within the authority of county supervisors, and since such planning activities must be coordinated with natural resource planning processes of federal and state agencies; and,

WHEREAS, in Streets and Highways Code §§ 940-941.2, the California Legislature has placed the general supervision, management, and control of county roads and highways - including closing such roads (Section 901) and removing and preventing encroachment of such roads and highways, and since planning and actions with regard to such roads by any federal or state agency must be coordinated with the county; and,

WHEREAS, in Public Resources Code § 5099.3, the California Legislature has mandated coordination by the state with Siskiyou County since it is a county "having interest in the planning, development, and maintenance of outdoor recreation resources and facilities,"

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PASSED AND ADOPTED this _____ day of _____, 2008, by the following vote:

AYES:
NOES:
ABSENT:
ABSTAIN:

_____
Chair, Board of Supervisors

ATTEST:
COLLEEN SETZER, CLERK
Board of Supervisors

By_____
Deputy

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From: Marshall Apple <mcapple@sbcglobal.net>
To: <dfgsuctiondredge@dfg.ca.gov>
Date: 11/30/2009 8:44 AM
Subject: Public Scoping Meetings

Hello, I am sending this email to relay my thoughts on the continuation of dredging in 2010. I was unable to attend your meetings and appreciate this opportunity to voice my opposition to the dredging ban in 2009. I have a mining claim on Canyon Creek in Sierra County. My family has been dredging on this claim since 1959. We appreciate the beauty of the land and have been careful not to harm it. I feel dredging helps the fish population by loosening the gravel and allows the fish to spaun. It also sturs up insects for them to feed on. When I find mercury on the bottom of a hole, I do suck it up and recover it and remove it from the water. If I can not use the dredge, I use a turkey baster and am able to remove the mercury. I also want to point out, we still had to pay taxes (over $400) on the claim where we could not mine. We still needed to pay for our permit to dredge (no refund was offered) and file assessment work at the county and BLM and pay the filing fees. Mining claims have been around longer than California has been a state. Gold mining is responsible for the establishment of many California cities and still provides an income for miners and a hobby for recreational dredgers. If the decline of the salmon population is the culperate for the loss of dredging, I suggest you look at the gill nets the indians string from bank to bank on the Klamath. Look at the overfishing both legal and illegal in the oceans and look at the warming of the oceans for the decline of the salmon population. I also feel there is a major problem with the stripers (a non-native fish to California waters) that eat the millions of salmon fingerlings released into the rivers. The limit on stripers should be removed to control this problem. There are also large populations of sea lions feeding on the salmon when they enter the bays to feed and spaun. Their populations seem to be growing as their preditor (great white shark) is declining in population. Please keep me informed of any development on the future of dredging in California.
Sincerely,
Marshall C. Apple
Horsetird Mine

From: "MARTIN H. MILas" <mhmilas@yahoo.com>
To: <dfgsuctiondredge@dfg.ca.gov>, <mstopher@dfg.ca.gov>
CC: Steve Karno RR <skarno@socal.rr.com>, Art Morgan <amcollects@verizon.net...
Date: 12/3/2009 4:09 PM
Subject: Public Scoping Written Comments

Dear Mr. Stopher:
This e-mail is in response to your written invitation to me [as a 2009 suction dredge permit holder] to submit scoping comments regarding the DFG Suction Dredge Permit Program. Specifically, comments were requested as to the range of actions, alternatives, significant environmental effects and mitigation measures to be discussed in the draft Subsequent Environmental Impact Report [SEIR]. I believe the following questions and issues should be addressed in the SEIR:
1. How will objective comparisons of environmental impacts be made between rivers and waterways that [a] involve no active suction dredging and [b] rivers and waterways that do not involve active dredging? For example, there are several rivers and waterways in California that have no history of ever having been significantly dredged due to the well known absence of gold bearing gravels. COMMENT: It is scientifically more reliable and credible when assessing environmental impacts to utilize comparisons BOTH of ecosystems that do not experience the activity to be studied [in this case, suction dredging] with ecosystems that do experience the activity to be studied in order to form a valid opinion.
2. As of August 6th 2009 no suction dredging is lawful in the state of California. What will be the DFG methodology in preparing a SEIR during times that no active suction dredging is lawful in the entire state of California? COMMENT: The DFG SEIR should place greater reliance on data and opinions that in the past were developed prior to the time that suction dredging was made illegal on August 6, 2009. Such data and opinions were gathered in prior EIRs performed by DFG regarding suction dredging when EIR studies had the benefit of actual and measurable observation of the thing being studied [suction dredging].
3. I have personally removed substantial amounts of elemental mercury [Hg] that is amalgamated with some of the gold I have recovered while using a suction dredge in California. This Hg no longer is in the waterways of California and thus not capable of adding to the methyl-mercury levels of those waters. To what extent will the SEIR address the positive environmental impact that Hg removal by suction dredging has on the environment? COMMENT: The prevention of methyl-mercury development by the removal of elemental mercury through the use of suction dredges is environmentally significant and should be addressed in the current SEIR.
4. I personally have removed many pounds of lead, copper, zinc and other heavy metals from California waterways while employing my suction dredge. COMMENT: The SEIR should address the amount of environmental impact that results from the removal of heavy metals by suction dredges from California waterways.
5. I have personally observed spawning salmon fight each other over the privilege of nest building in recently dredged gravel tailings and I have observed them shun silty, mud packed river bottoms. Fish egg parasites and harmful molds thrive in silty, mud choked river beds, but they do not thrive in freshly dredged gravels tailings. COMMENT: The SEIR should address the environmental impact that results from the creation of suction dredge tailing piles and why spawning salmon are intuitively attracted to them.
6. I personally dredge down to bedrock while suction dredging for gold nuggets and flakes because this is where the gold pay streaks typically are most prevalent. In the course of removing the strong layers of cemented gravels that were formed from the hydraulic mining clays of the 19th century, I noticed that fish and other forms of aquatic life, especially during the hot summer months, congregated at the bottoms of these holes even AFTER I removed my suction dredge. It occurs to me that the water temperature at the bottom of these holes is lower than that of the ambient river water. This, in turn, likely is due to the removal of those tough, cemented gravels which no longer can choke off the seepage of cold artesian water from the bedrocks cracks and crevices thus exposed. COMMENT: The SEIR should address the environmental impact that dredge holes provide by providing thermal refugia for aquatic life during the hot summer months.
7. It is well established that a healthy river bottom is well oxygenated. Suction dredges dissolve much oxygenation into the waters where they are deployed by bringing oxygen depleted water in direct contact with the atmosphere. COMMENT: The SEIR should address the positive impact that suction dredges create by dissolving badly needed oxygen into the rivers of California, especially during the hot summer months when river water is less able to hold dissolved oxygen due to increased heat.
8. I have personally observed migrating salmon utilize deep dredge holes as rest areas. COMMENT: The SEIR should address the environmental impact to migrating salmon that suction dredges provide by the creation of deep dredge holes all along the length of of salmon habitat rivers.
9. It is common knowledge that both the periodic release of water from dams during the summer and the release of water by summer monsoon rain storms create vast amounts of turbidity up and down the entire length of a river for days at a time. This is so because in each of those cases water volume is increased throughout the river. Increased water volume, in turn, increases water pressure which, in turn, increases water velocity which, in turn, is the cause of massive turbidity in California river systems. Dredging, on the other hand, does not add any water to the river, cannot increase water pressure throughout the river and cannot increase water velocity throughout the river and is entirely localized for short periods of time. COMMENT: The SEIR should address the localized significance of river turbidity generated by suction dredging in comparison to the total and enduring turbidity caused by the large scale release of dam water and natural
rainfall.
10. I am a law abiding small scale prospector who is deeply committed to a healthy California water environment. To what extent does DFG publicize that it has tribal partners, but not suction dredge partners, in helping to improve the California natural river environments? Why is this so? Is there a place in this quest for small scale suction dredgers such as myself and my wife [ages 67 and 61 respectively]? COMMENT: The SEIR should address a range of actions that INCLUDE rather than EXCLUDE small scale suction dredge operators, particularly in light of a suction dredge operator's potential to contribute positively to the water quality of California.
Thank you for considering these comments
Martin H. Milas

November 22 09

Dept of Fish & Game

As we are unable to attend the Public Scoping Meetings Regarding: Suction Dredge Permit Program.

Will you mail us any information you may have: ?

Initial Study
Project description
Notice of Preparation

We want to stay involved

With the Repeal of HR670.

Dredgers unite!

Thank You

Mary Harrison

Mary J Harrison
PO Box 2185
Blythe, CA 92226-2185

To whom it may concern,

We Mary Lee Knox and Joe Lopes oppose this ban on dredging. Due to the fact of Lack of public knowledge from DFG concerning the reason behind this ban.

It is our understanding that the ban is focused on the Salmon fishing industry.

We reside in Plumas County and to the best of our knowledge there is not and has not been any Salmon population in our rivers and streams since the building of Oroville Dam.

So why does this ban blanket the whole state, instead of only the counties this issue is at hand?

So there for we strongly oppose the loss of our rights to supplemental income and recreational activity, due to the action of others.

Joe Lopes Mary Lee Knox

From: Matthew Plourd <mattominer@yahoo.com>
To: <dfgsuctiondredge@dfg.ca.gov>
Date: 11/21/2009 11:00 PM
Subject: suction dredge impact commentary from miner

Dear sirs or madams,
My name is Matt Plourd and I live in the foothills of the Sierras, known as Paradise California.... I speak as a experienced miner, Up until about 3 months ago I owned the "Red Hill Hydraulic Mine" A historic piece of Magalia Calif, This is a patented 80 acre claim with part of this property overlaying the West Branch Of The Feather River. This Property has had a history of mining since 1848. I owned and mined this property for 3 Years.

Part of the past history of the property has been Suction Dredging on a recreational basis.While I have lived here in this area for the past 9 years I have witnessed very little activity in Suction Dredging , there has been an estimated 13 dredge operations actively mining in this area and most lasted no longer than a week, most were small dredges 3" size and smaller, one 8" operation that lasted an estimated 10 days and was operated by a few older miners and as such more talk on the banks of the river took place than actual mining.

The same activity has been observed on butte creek, although more mining has taken place by suction dredging operations on butte creek, the number of Dredgers on Butte over the last few years has been minimal at best.
BLM would have statistics on how many people have Dredged on Butte Creek as the BLM pay sites are really the only sites accessible to Dredging on Butte Creek.

Both the West Feather River and Butte Creek have not only had low numbers of dredgers. Both rivers have a point at which the so called "Tribitity" factors would not apply as there are "Settling" areas of calm waters where sediments can have a chance to settle.

On Butte Creek there is the PG&E Power House, were the sediment settles behind the dam and never reaches the "Salmon Habitat" as Dredging below the dam is illegal and for the most part inaccessible.

On the West Feather River, the water enters Lake Oroville on the North side and exits the dam some 10 miles away.
As such, NO sediment from the West Feather Dredging Operations EVER reach the "Salmon Habitat" that is located below the dam.

There are ways to catch sediments and slurries from dredge operations if necessary to insure against possible mercury contamination or other harmful products becoming water bourne using various methods. Question is, is this really necessary considering the impact of winter storms on a annual basis?

It does not take a million dollar + Environmental Impact Study to figure out that the winter storms on any given El Nino year, tears up the Stream Bed and re-distributes Gravels and Boulders beyond what any impact from small scale mining could cause in a life time of Suction Dredging.

Thank you,
Matt Plourd of Paradise, California
E-mail mattominer@yahoo.com

From: Michael Adams <audredger2002@yahoo.com>
To: <dfgsuctiondredge@dfg.ca.gov>
Date: 12/3/2009 2:15 PM
Subject: Responce to Draft EIR
Attachments: responce.doc

Gentlemen,
My response to your "Initial Study Suction Dredge Permitting Program Subsequent Environmental Impact Report"

Aesthetics Pages 30.31 &32
a.) (Effects on Scenic Vistas) Almost every point of visual impacts can apply to fishermen, drift boats, rafters and rotary fish traps. Is it the intent of Fish & Game to limit there access to the river so my scenic vistas are not impaired?

b.) (Effects on Scenic Resources) & c.) (Degradation of Visual Character) Illegal activities are illegal. You cannot condemn a group of people just because there may be some outlaws. The California Fish & Game and the National Marine Fisheries are more than guilty of destruction of riparian habitats where ever the launch and monitor one of there rotary fish traps.

Air Quality Section Pages 34 thru 36
ATV's, dirt bikes, go carts, dune buggies, dragsters, lawnmowers, leaf blowers, chainsaws, ECT. all would have the same impacts. It is the legislators job to deal with these not DFGs'. The last two dredge engines that I purchased were CARB complaint!!!

Biological Resources

Page 41 "Heavy metal contamination" "suction dredging activities can result in the discharge of mercury (Hg) or other toxic contaminants."
Page 54 "Mercury contamination" "suction dredging activities can result in the discharge of mercury (Hg) or other toxic contaminants,"

Suction dredging is not a source of mercury nor any other heavy metal contaminates. Suction dredges only discharge what is already in the streambed sediments. Suction dredges capture and remove many heavy metal contaminates including but limited to mercury, lead and, tungsten.

"Mercury biomethylation is the transformation of divalent inorganic mercury (Hg(II)) to CH_3Hg^+, and is primarily carried out by sulfate-reducing bacteria that live in anoxic (low dissolved oxygen) environments, such as estuarine and lake-bottom sediments." USGS Website http://toxics.usgs.gov/definitions/methylmercury.html

Suction dredges remove mercury from the anoxic environments where bimethylation may occur and trap and remove at least 98% of the free mercury encountered. Ref. Staff Report Mercury Losses and Recovery, California Water Boards 2005.

Page 55 "Behavioral Effects" Human visitation along stream banks resulted in 80 to 100 percent decrease in frog use with a five□fold and 12□fold increase in direct disturbance (Rodríguez□Prieto and Fernández□Juricic 2005).

Page 55 "Recreation Use" Activities associated with suction dredging, such as camping, may have effects on special status wildlife. In general, recreational activities can change the habitat of an animal, which can affect the behavior, survival, reproduction, and distribution of individuals (Cole and Landres 1995).

Fishing, Rafting and hunting have the same effects; is it the intent of Fish & Game to outlaw or limit these activities?

"Dumping of trash and toxic materials (soap, motor oil, mercury), associated with dredging operations, can degrade water quality, and may also have adverse effects on eggs and developing larvae (USFS 2001, USFWS 2002)."

The dumping of trash and toxic material is illegal, and should not be considered as a consequence of suction dredging but as a law enforcement problem.

Hazards and Hazardous Materials

a, b. Dredgers use of gasoline and oil is no worse than the average homeowner and should not constitute a significant impact. Dredgers use of nitric acid is overstated! In 2002 I was gifted 4 liters of nitric acid. Since May 2002 thru Dec 2009 I and my partner have used approximately ¼ liter and gifted to other miners another ¼ liter. ¼ liter over a seven year period is less than significant! The lead and mercury collected by our dredges is carried home and reused or sold to recyclers.

We, dredgers, do not represent a danger to the public health nor the environment any more than the average household.

h.) Not a significant risk!

Hydrology and Water Quality

a) See above plus the discharge of hazardous substances is against State & Federal Law. If you think this is significant, enforce the law! Debris and trash left at campsites is also against the law. Hunters, fishermen and picnickers are as if not more guilty than dredgers.

National Marine Fisheries regulations require that dredges be equipped with drip pans. These pans should contain any spills of gas or oil that may occur. The discharge of un-burnt gas oil mix from outboard motors, which is directly discharged under the water, should be of greater concern than what dredgers might spill.

Turbidity form dredges is such short lived that it should not be considered significant.

Mercury Discharges) Suction dredging is neither a source of mercury nor any other heavy metal contaminates. Suction dredges only discharge what is already in the streambed sediments. Suction dredges capture and remove many heavy metal contaminates including but limited to mercury, lead and, tungsten.

"Mercury biomethylation is the transformation of divalent inorganic mercury (Hg(II)) to CH_3Hg^+, and is primarily carried out by sulfate-reducing bacteria that live in anoxic (low dissolved oxygen) environments, such as estuarine and lake-bottom sediments." USGS Website http://toxics.usgs.gov/definitions/methylmercury.html

Suction dredges remove mercury from the anoxic environments where bimethylation may occur and trap and remove at least 98% of the free mercury encountered. Ref. Staff Report Mercury Losses and Recovery, California Water Boards 2005.

Literature:
Re. Staff Report Mercury Losses and Recovery, California Water Boards 2005.

This study is flawed. Use of a dredge that did not contain miner's moss, shag carpet or multiple layers of screen, impaired its ability to trap mercury. Had the afore mentioned traps been used the capture rate would have been higher. There sampling methods leaves much to be desired. There conclusions that floured mercury may be more dangerous ignores the fact that the mercury was in all probability floured when it was lost from sluice boxes in the 1800's. Mercury will recoaless given the opportunity.

Michael Adams
1200 Cherry Maple Rd
Horse Creek, CA 96050

530 496-3346

December 2, 2009

Mark Stopher
California Department of Fish and Game
601 Locust Street
Redding, CA 96001

RE: Notice of Preparation of a Draft Subsequent Environmental Impact Report

Dear Mr. Stopher,

I am writing to express my concerns over the current moratorium on suction dredging and the pending environmental impact report. Setting all partisan-related issues aside, I will briefly focus on the effects of suction dredging on the immediate ecosystem, as I perceive it.

First, please allow me to clarify that, while I am a small-scale prospector and resident of California, I also hold a Master's of Science in Biology from Cal Poly State University - San Luis Obispo. My areas of expertise are in environmental microbiology and molecular biology. But I do have a basic understanding of environmental biology as related to ecosystems.

Modern suction dredging is generally performed using a gas-powered engine to drive a water pump mounted on a floating (in-stream) platform. Water is pumped under high-pressure to a nozzle, where a venturi-action creates the suction to vacuum sediments into a hose, and then delivers the sediments to a sluice box mounted on the afore-mentioned floating platform. As the sediments wash over the riffles of the sluice box, heavy minerals and metals are recovered and retained. The waste materials are released from the end of the sluice box, where rocks and heavy sediments not trapped by the riffles are deposit immediately-downstream of the dredge and lighter materials may drift a short distance before settling and depositing. Only fine, silt-like materials travel a notable distance from the dredge. In scope, this process is not unlike the natural redistribution of aquatic sediments caused by strong runoffs and flooding cycles, but on a significantly smaller, site-specific scale. Taking the design, function and operation of the modern-suction dredge into account, the following points of concern, as related to the impact on the aquatic ecosystem, come to mind.

- The operation of the suction dredge, being a mechanized device, could pose an immediate-threat to aquatic organisms if caught in the suction of the nozzle and passed through the sluice assembly. However, as this would require large organisms, such as fish, to come within inches of the nozzle during operation, the risk is of such occurrence is unlikely.

- The risk of aquatic life being pulled into the intake nozzle of the pump is very low, as the intake is screened and restricted by a foot valve, thus limiting the size of material inadvertently-pulled into the pump.

- The suctioning of gravels and sediments removes materials from the area of work, often to the point of exposing bedrock. The post-process material is then deposited within close proximity of the area worked, as limited by the size and power of the pump/engine, the length of hose between nozzle and dredge, and the effects of drift caused by the natural flow of water within the aquatic ecosystem (i.e. river or stream). Because mercury from both naturally-occurring deposits and residual-waste from early-mining operations can be liberated from the processed sediments, the formation of methyl mercury has been of concern. However, the abiotic-formation of methyl mercury may involve the presence of other methylated metals to serve as potential methyl donors. And the rate of methylation depends strongly on environmental factors such as pH, temperature, and the presence of complexing agents, especially chloride (1). While it is still unclear, the probability that the passing of mercury-containing sediment over the riffles of a sluice box will result in the formation of any detectable-amount of methyl mercury is highly-questionable.
- A majority of methyl mercury is reported to be formed biologically, through the metabolic activities of sulfate-reducing bacteria under anaerobic/anoxic conditions, such as those found in subsurface-sediments. And the equilibrium between inorganic and organic forms of mercury my change rapidly, depending on the conditions of the environment at any given time (2, 3). Thus, the disturbance of aquatic sediments by any means, to include redistribution of sediments associated with natural runoff cycles, may release trapped methyl mercury trapped within anaerobic sediments into the aquatic environment. Considering that suction dredging loosens packed sediments and may concomitantly-expose sulfate-reducing organisms to dissolved oxygen, the activity of dredging may pose some benefit in the context of reducing the biological formation of methyl mercury through the aeration of sediments. In addition, the action of the sluice box has been shown to recover mercury from the environment in earlier studies using primitive equipment. The design improvements of modern dredges may subsequently improve the efficiency of mercury recovery and could prove to be another benefit of suction dredging.
- If the formation and/or liberation of methyl mercury or other toxic compounds is a real product of suction dredging, then it should be identifiable through the definitive-impact on sentinel organisms, such as sensitive aquatic life and top predators within that ecosystem. Specifically, the decline in fish populations associated with dredging-related toxins would be evident through malformed embryos, the subsequent reduction in hatch, the premature die-off of fry, and a noticeable reduction in adult fish count. And any such decline in sentinel organisms would be most evident around and/or within areas experiencing high-frequencies of dredging activity.
- As noted in the recent DFG literature review on suction dredging, the use of suction dredges in California had occurred from the 1960s through the 1980s, and was later regulated by DFG through the issuance of permits to minimize the potential-impact of dredging on spawning fish populations. If suction dredging has a significant environmental impact of any kind, it would be evident through study of the records of fish populations – specifically those associated with areas most subjected to suction dredging. The study of such records would also potentially-elucidate variances in

populations between the unregulated and permit-regulated periods within the state of California.

- Lastly, the study of the environmental impact of suction dredging on various aquatic ecosystems and potentially-sensitive species within these ecosystems cannot be effectively-studied "*in-vitro*", using test equipment under simulated conditions, while being operated by inexperienced personnel. This study is best conducted through the monitoring of test areas open to permitted-operators, under real conditions – "*in-vivo*". This approach will produce the best data for analysis, and will better-afford the DFG to reevaluate guidelines for permitting to maintain compliance with CEQA and other environmental regulations. Thus, I propose the DFG petition to open a small number of test-sites within the state for the study of dredging activities under controlled-conditions using permitted dredge operators. To do anything less is equivalent to generating a "hearsay" dataset.

I thank you for your time, consideration and efforts in resolving these issues. I know you have a daunting challenge in front of you, with heated-interests lining both sides of the road ahead. I bid you well in executing the review as fairly and impartially as humanly-possible.

Sincerely,

Michael Braid, M.S.
186 Wellfleet Circle
Folsom, CA 95630

References:

1. Celo V, Lean DR, Scott SL, **Abiotic methylation of mercury in the aquatic environment.** Sci Total Environ. 2006 Sep 1;368(1):126-37. Epub 2005 Oct 14.

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From: Michael Braid <michaelbraid@yahoo.com>
To: <dfgsuctiondredge@dfg.ca.gov>
CC: <mstopher@dfg.ca.gov>
Date: 12/3/2009 1:32 PM
Subject: Letter of concerns regarding suction dredging SEIR

December 3, 2009

Mark Stopher
California Department of Fish and Game
601 Locust Street
Redding, CA 96001

RE: Notice of Preparation of a Draft Subsequent Environmental Impact Report

Dear Mr. Stopher,

I am writing to express my concerns over the current moratorium on suction dredging and the pending environmental impact report. Setting all partisan-related issues aside, I will briefly focus on the effects of suction dredging on the immediate ecosystem, as I perceive it.

First, please allow me to clarify that, while I am a small-scale prospector and resident of California, I also hold a Master's of Science in Biology from Cal Poly State University - San Luis Obispo. My areas of expertise are in environmental microbiology and molecular biology. But I do have a basic understanding of environmental biology as related to ecosystems.

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smaller, site-specific scale. Taking the design, function and operation of the modern-suction dredge into account, the following points of concern, as related to the impact on the aquatic ecosystem, come to mind.

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- The risk of aquatic life being pulled into the intake nozzle of the pump is very low, as the intake is screened and restricted by a foot valve, thus limiting the size of material inadvertently-pulled into the pump.
- The suctioning of gravels and sediments removes materials from the area of work, often to the point of exposing bedrock. The post-process material is then deposited within close proximity of the area worked, as limited by the size and power of the pump/engine, the length of hose between nozzle and dredge, and the effects of drift caused by the natural flow of water within the aquatic ecosystem (i.e. river or stream). Because mercury from both naturally-occurring deposits and residual-waste from early-mining operations can be liberated from the processed sediments, the formation of methyl mercury has been of concern. However, the abiotic-formation of methyl mercury may involve the presence of other methylated metals to serve as potential methyl donors. And the rate of methylation depends strongly on environmental factors such as pH, temperature, and the presence of complexing agents, especially chloride (1). While it is still unclear, the
probability that the passing of mercury-containing sediment over the riffles of a sluice box will result in the formation of any detectable-amount of methyl mercury is highly-questionable.
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mercury from the environment in earlier studies using primitive equipment. The design improvements of modern dredges may subsequently improve the efficiency of mercury recovery and could prove to be another benefit of suction dredging.
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- As noted in the recent DFG literature review on suction dredging, the use of suction dredges in California had occurred from the 1960s through the 1980s, and was later regulated by DFG through the issuance of permits to minimize the potential-impact of

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Michael Braid, M.S.
186 Wellfleet Circle
Folsom, CA 95630
michaelbraid@yahoo.com

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From: Michael Braid <michaelbraid@yahoo.com>
To: <dfgsuctiondredge@dfg.ca.gov>
Date: 12/2/2009 10:31 PM
Subject: Comments and Concerns regarding SEIR
Attachments: DFG_EIR_Letter.pdf

To whom it may concern,

Please find my letter attached.

Sincerely,

Michael Braid
186 Wellfleet Circle
Folsom, CA 95630
michaelbraid@yahoo.com

December 2, 2009

Mark Stopher
California Department of Fish and Game
601 Locust Street
Redding, CA 96001

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Michael Braid, M.S.
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Folsom, CA 95630

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SUCTION DREDGE PERMITTING PROGRAM
Supplemental EIR - CEQA Scoping Comment Form

Name:	Michael Dorn
Mailing Address:	8609 Songfest Dr. Pico Rivera, CA 90660
Telephone No. (optional):	562 949-3275 Cell 562 571 2231
Email (optional):	MADorn 9066 @ YAHOO.COM

Comments/Issues: Hello Mark, As a dredger it always seemed that we were helping the fish. (1) We remove lead and mercury. (2) We stir up food and create new environment for fish. (3) The tailing piles are ideal for the salmon to lay eggs. (4) We are the equivalent to a water runoff. During a flood there is no indication that dredging even existed. You have to know that we are not the reason for the salmon's depletion. Why are dredgers being specifically targeted? Don't fisherman "kill" fish? Why aren't they being targeted? Man and nature can live together in a harmonious way. The environmentalist movement has been taken too far sometimes and this is a prime example. By the time we're done, we won't be able to step off a trail without breaking a law. I realize that

Please use additional sheets if necessary.

SUBMIT WRITTEN COMMENTS (POSTMARKED BY 12/03/09) TO:

Mail: Mark Stopher
California Department of Fish and Game
601 Locust Street
Redding, CA 96001

Email: dfgsuctiondredge@dfg.ca.gov

Website: www.dfg.ca.gov/suctiondredge

Questions? Please call us at (530) 225-2275

SUCTION DREDGE PERMITTING PROGRAM
Supplemental EIR - CEQA Scoping Comment Form

Name:
Mailing Address:
Telephone No. (optional):
Email (optional):

Comments/Issues: this ~~letter~~ probably will not help very much, but I would hope that you would ask yourself one question. Is dredging hunting the fish? IF you really believe this, then you are doing a great job, but if not than you are destroying the rights of Californians to pursue happiness.

Thank you for reading my letter. I am a person who likes to bike, hike, fish, hunt and especially Dredge. OH, by the way, as I am writing this I am eating a big piece of salmon. LOL

Please use additional sheets if necessary.

SUBMIT WRITTEN COMMENTS (POSTMARKED BY 12/03/09) TO:

Mail: Mark Stopher
California Department of Fish and Game
601 Locust Street
Redding, CA 96001

Email: dfgsuctiondredge@dfg.ca.gov

Website: www.dfg.ca.gov/suctiondredge

Questions? Please call us at (530) 225-2275

30 November 2009

Michael E. Kissel
3477 Heron Lake Lane
Elk Grove, CA 95758
(916) 683-0353
LnMtimber@comcast.net

California Department of Fish and Game
Attn: Mark Stopher
Suction Dredge Program Comments
601 Locus Street, Redding, CA 96001

Re. Post Public Meeting - In-stream suction dredging Program Environmental Review Scope Comments

Sir:

I attended the California Department of Fish and Game (CDFG) suction dredge public meeting on 17 November 2009 at West Sacramento. I submitted a 3 page letter of scope objections regarding this supplemental environmental impact report (SEIR) at this meeting. I was impressed by the attendance of about 250 people with an interest in the suction dredge issue. I was pleased to learn that a vast majority of these people, like me, support the continued practice of suction dredging. Like many in this crowd, I find the "recreational" label offensive and inappropriate since we depend on it for our livelihood. I request that you discontinue the use of the "recreational" label for my profession and this study. It marginalizes and misrepresents the importance of this activity.

We own a total of five non-patented gold claims on the Klamath, American, and Consumnes Rivers. I operate three suction dredges: backpack, floating, and high banker units that are critical to the livelihood of family. None of these claims or my suction dredging activities affects any of the threatened species identified by Alameda County Superior Court Case No. GR 05211597. These assets continue to rack up significant out of pocket costs for me that cannot be offset with any feasible mining income under the suction dredge moratorium. The total ban of suction dredging will result in the destruction of billions of dollars of asset value and further undermine the fragile California economy.

My industry has been decimated by the incompetence of CDFG, the Karuk, the Alameda Superior Court, and the California Legislature. First, the CDFG and California Legislature failed to address the concerns of the Karuk, forcing the issue to Superior Court. This resulted in decisions about complex environmental and socio-economic

issues by a single superior court judge, hundreds of miles away from the ecosystem, without any environmental study, data, or analysis; and that decision is actually causing environmental harm to the fishery. Many of the people of the State of California are outraged at CDFG for its handling of this issue. CDFG was then derelict in its responsibilities when it did not deliver follow up environmental studies in 1997, putting the environment, fishery, its director and this industry at risk. The California Legislature then failed to fund required environmental studies. CDFG was not resourceful enough to finish what it had started. This series of incompetent missteps resulted that this moratorium on small family gold miners like me, that followed the regulations, did nothing wrong, and are bearing the full brunt of the incompetence of all these parties. We are outraged at this injustice and governmental incompetence! The overly expansive scope for the SEIR and CDFG's extreme conservatism it its environmental checklist proposal add insult to this moratorium injury.

This suction dredge moratorium is most devastating to small, family operated gold mining operations of self employed Americans that don't qualify for unemployment benefits. To add further insult to injury, CDFG and the California Legislature offered no rebate of license fees it collected and failed to honor this year. I was financially damaged by this action and I request full reimbursement. It costs more to file a state board of control claim against CDFG than the amount of the original permit, leaving us with no recourse against this outrage. To protect our families, communities, and the environment we need this issue resolved quickly, objectively, accurately, and fairly; and we need the suction dredge moratorium lifted sooner than latter.

The proposed scope of the supplemental environmental impact study accomplishes none of these objectives because:

- This SEIR makes no recognition of the existing Environmental Impact Report (EIR) and regulations, and the actual regulatory environment under which we operate. Starting over takes too much time and wastes too much money. The term Supplemental in this supplemental environmental impart report (SEIR) is wholly ignored by CDFG. It should not be.
- The baseline is technically wrong. It ignores the fact that suction dredging has been occurring since 1961. This study assumes suction dredging has't ever occurred and closes the door to any consideration of the environmental benefits of suction dredging. This is absolutely wrong and irresponsible. CDFG should at least provide a parallel comparison of both with dredging and without dredging in this SEIR.
- The proposed geographic area and scope of this SEIR study covers the entire State of California. This SEIR must be limited to the authorized direction provided to it by the California Legislature and Alameda County Superior Court limits the scope of this environmental document to the Klamath, Scott, and Salmon Rivers, listed as threatened or endangered after the 1994 EIR. For the rest of the State of California, suction dredging should de permitted under the proper

environmental determination for this suction dredge activity of Negative Declaration under CEQA. CDFG should not study the whole world in order to respond to your mandate under this moratorium by the court and the legislature. I doubt you have authority to expand this SEIR under your current funding constraints.

- CDFG's definition of fish is too broad and therefore inappropriate since the authorized direction provided to it by the California Legislature and Alameda County Superior Court limits the scope of this environmental document to the protection the Coho Salmon and/or other special status fish species in the watershed of the Klamath, Scott, and Salmon Rivers, listed as threatened or endangered after the 1994 EIR.
- At the public meeting, CDFG claimed this study would be fair and objective. This proposed scope is not. CDFG is using anticipated litigation concern criteria to drive this overly expansive SEIR rather than the science. This resulted in its unrealistic, overly conservative, and frankly wrong scope and constraints for this study. In the end, CDFG will be sued by environmental groups and the Karuk regardless of its findings or determinations. I request that you follow the law, science, and common sense to issue an objective and credible SEIR, since no document can be legally bullet proof. This SEIR should pass all tests, including legal, social, equity, and common sense.
- CDFG is going out of it way to engage in non-traditional and excessive practices for the SEIR, the extensive literature search is an example.
- While this case was litigated in Alameda Superior Court, CDFG undermined its own original environmental impact report work product, claiming it will expand the scope of this SEIR further to the extreme environmental protection left. Given CDFG had already determined the scope of the SEIR, what is the point of even soliciting public participation or comment? It is apparent from its actions that CDFG's lacks fairness or objectivity. The problem with this approach is that it is first wrong and second will result in excessive regulatory mitigations that will further undermine the feasibility of this industry while resulting in negligible if any environmental benefit. Either outcome will further harm those who victims of this debacle, the small, independent, family owner miner.

In my 17 November 2009 letter I objected to any expansion in scope of this SEIR beyond enabling legislation and court order, including but not limited to Sections 1 through Environmental Checklist Aesthetics of the proposed SEIR. I notified you that I would be submitting the following additional comments and concerns with the scope of the SEIR. Please respond to and incorporate these additional SEIR scope comments:

Environmental Checklist Section II AGRICULTURAL RESOURCES – I agree with the scope of this determination.

Environmental Checklist Section III AIR QUALITY – CDFG's no section dredging baseline severely impacts, makes wrong, and significantly biases this SEIR scope and ultimately the final outcome. Since the number of permits has been less than 3500 per year for the past 15 years, there should be zero impedance of green house gas emissions since the 1992 levels and these emissions will have no cumulative impacts on federal or state ambient air quality standards. This study will surely recognize suction dredging in the future, but ignores that suction dredging has taken place in the past. This is technically wrong, excessively conservative, and prejudiced.

Environmental Checklist Section IV BIOLOGICAL RESOURCES - This is a SEIR not an initial EIR. CDFG has studied suction dredging to death (literally) and found no significant impacts. This activity cannot move enough material to make any significant environmental impact compared to the bed load movement during a single storm event. Section dredging technology has not changed since the last EIR. Your potentially significant impact determinations are wrong. CDFG should not be not starting over. By your own admission this is a supplemental environmental impact report. I implore you to plug any holes in the original study, consider any changes, then finalize this effort. Get it done. I object to a complete restart of this process as both a miner and a tax payer. It is both wrong and inefficient. The inappropriate geographic and species expansion of scope discussed above also apply here. This section is the best example of CDFG's inappropriate and overly conservative environmental bias for this study. The original narrow scope to a limited number of fish species and to rivers mostly in Siskiyou County has exploded to include: effects on wildlife, changes to channel morphology, off stream effects, recreational use, off road use, wetland protection, and wildlife movement to name just a few. This proposed scope is ridiculous and out of touch with the economic reality that this State is nearly bankrupt and CDFG is killing an environmentally and economically beneficial industry.

Environmental Checklist Section V CULTURAL RESOURCES - The finding of potentially significant impacts to historic, archeological, and human remains where suction dredging occurs is ridiculous. This activity occurs in the flood plan and is subject to violent destruction and constant movement. There is no way these resources could be identified, let along preserved underwater in these river environments. This excessive scope cannot be completed within this environment let alone within the proposed schedule.

Environmental Checklist Section VI GEOLOGY AND SOILS – There is no way this activity, which requires water and must be performed under water, could possibly in any way result in soil erosion or the loss of top soil, Period. High banking could result in an impact, but this study is on suction dredging, not high banking. This determination is clearly excessive and out of all measures of the authority of a suction dredging activity or suction dredging permit that CDFG issues.

Environmental Checklist Section VII HAZARDS AND HAZARDOUS MATERIALS – Potentially significant impact determinations for areas: a, b, c, and h are wrong. The quantities of fuels, chemicals, and other potentially hazardous materials are so small that they cannot be considered hazards. CDFG's own definition of suction dredges recognizes these units are operated on floats atop of water. Since water does not burn, there cannot be any significant impacts as a result of this activity.

Environmental Checklist Section VIII HYDROLOGY AND WATER QUALITY – this SEIR doesn't recognize existing regulations and therefore results in the wrong scope for potentially significant hydrology and water quality impacts. This activity takes place in stream. It doesn't add or remove any significant material by volume of the stream. It improves access for fish to use otherwise armored fish spawning gravels. This activity is inconsequential compared to natural storm event occurrences that create magnitudes greater disturbance to hydrology and water quality compared to suction dredging. Suction dredging does not result in the discharge of mercury since this material is retained in the sluice, not discharged. The scientific research and CDFG's own EIR makes this determination. This checklist fails to recognize a single environmental benefit such as this, it is prejudiced, and it is biased. Onsite and offsite erosion or siltation due to encampments is clearly out of the scope of any reasonable SEIR. Furthermore, you must remember that you are preparing a SEIR not a new EIR!

Environmental Checklist Section IX LAND USE AND PLANNING – I agree with the scope of this determination.

Environmental Checklist Section X MINERAL RESOURCES – I agree with the scope of this determination.

Environmental Checklist Section XI NOISE – Ambient noise produced by suction dredges operated under permit in California can in no way result in violation to existing noise standards. My expectation of CDFG is that you know something about the activity you are studying. This finding proves you do not. Potentially significant impact determinations for excessive general plan noise standards and ambient noise levels proves CDFG does not understand this equipment or noise science. The core issue driving this moratorium is not this suction dredging activity since SB 670 (Wiggins) permits this practice commercially, to protect infrastructure, and to promote navigation. What's driving this issue are extremist environmental groups and Indian tribes that do not want to share public lands and river resources, will limit access and activities to suit their own selfish uses at all costs, and which will bombard this process with endless litigation to kill this industry just as they have done to the timber and other natural resource based industries. CDFG's excessively broad scope of the SEIR opens the door to potential litigation rather than limiting it.

Environmental Checklist Section XII POPULATION AND HOUSING – I agree with the scope of this determination.

Environmental Checklist Section XIII PUBLIC SERVICES – CDFG's potentially significant impacts for fire protection cannot be correct for the same reasons as identified above under Environmental Checklist Section VII Hazards.

Environmental Checklist Section XIV RECREATION – I agree with the scope of this determination.

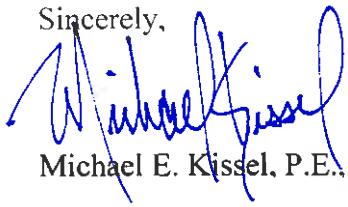
Environmental Checklist Section XV TRANSPORTATION/TRAFFIC – I agree with the scope of this determination.

Environmental Checklist Section XVI UTILITIES AND SERVICE SYSTEMS – I agree with the scope of this determination.

I object to the scope as defined by this SEIR. It was wrong for CDFG to expand the scope of this environmental review to consider statewide issues and to make that commitment to the Alameda County Superior Court without public participation and comment.

Though the environmental review process, I volunteer to participate as a subject matter expert or work group member at the request and pleasure of CDFG. I live in the Sacramento area and could participate either by telephone or in person, depending on the venue for this meeting.

Sincerely,



Michael E. Kissel, P.E., MBA

From: "Michael J. Morrison, Chtd." <venturelawusa@gmail.com>
To: <dfgsuctiondredge@dfg.ca.gov>
CC: "Michael J. Morrison, Chtd." <venturelawusa@gmail.com>
Date: 12/4/2009 2:13 AM
Subject: RE: Comments - Suction Dredging SEIR

December 4, 2009

Dear Mr. Stopher-

With the benefit of my long-time involvement in mining, the mining industry and as a mining lawyer, I have reviewed the comments submitted and respectfully submit that the most salient and compelling aspect of the current fact-based and scientifically supportable data submitted to you compels one inescapable and uncontrovertable conclusion: there is currently insufficient scientifically cognizable data available to reach any responsible conclusion regarding the subject SEIR.

Indeed, all of the currently available data cries out for more surveys, testing and data gathering, and to ignore this manifest need for additional, current and scientifically-based data, which is readily available through well-established and reliable surveying and testing protocols and processes, would, in my sincere opinion, be irresponsible and unfair to the public and the process. I respectfully submit that the public and the people of California deserve far better consideration on such an important and far-reaching decision, with potentially vast and irreversible ramifications.

In this regard, I also respectfully submit that, at this point, far more empirical data is required in order to make a responsible governmental and regulatory decision impacting such a critical, historically significant and well-recognized segment of the mining industry and use of public lands and waterways, and, therefore, I implore you to take steps to obtain such data and base any decision not on outdated historical information presently submitted to you, but rather, on currently available or easily obtainable and far more significant demonstrable scientific data.

Furthermore, I respectfully submit that any decision should also be based far less on self-serving, emotionally generated and motivated speculation and, quite significantly, disengenuous misinformation heretofore submitted to you, and far more on independent, current, fact-based information and readily available scientific and empirical data.

Thank you in advance for your reasoned consideration of these comments.

Most sincerely and respectfullysubmitted,

Michael J. Morrison, Esq.
Member, State Bars of California and Nevada
1495 Ridgeview Drive, Suite 220
Reno, NV 89519

From: Michelle <mmf418@yahoo.com>
To: <dfgsuctiondredge@dfg.ca.gov>
Date: 12/3/2009 3:12 PM
Subject: dredging comments
Attachments: dredging comments.doc

I have attached a word document of my comments, please let me know if you have any trouble opening it.

Thank you,

Michelle Fuller

December 3, 2009

Michelle Fuller
3458 Elizabeth St.
Eureka, CA 95503

Mark Stopher
601 Locust St
Redding, CA 96001

To Whom It May Concern:

I am writing to urge law makers to make the ban on suction dredging permanent.

I am well aware of the disruptive and destructive behaviors that accompany suction dredging. It would be irresponsible of state agencies to ignore the damage done to California's rivers and streams by this industry. Suction dredging degrades already impaired and impacted habitat in many California rivers. The creation of dredge holes in sensitive stream bed habitat is unacceptable for macroinvertabrate populations, fish populations, and human safety. Suction dredges glean streambed cobbles, destroying macroinvertabrate habitat, create noise and turbidity pollution which affects all downstream users, and create conditions where unstable gravels, which may be used by spawning salmonids, can 'blow out' and destroy entire egg populations.

The use of a suction dredge disrupts downstream users, creating highly turbid conditions that affect water quality. This behavior releases toxic contamination - gasoline, oil, or diesel exhaust and spills, and reintroduces remnant toxics like mercury in addition to fine sediment into the water column. In some instances, dredge sites are nearby or upstream of a major community water source. Many of California's rivers and streams face unacceptable levels of turbidity and contaminants; dredging makes these problems even worse.

Clearly, the banning of suction dredging on all California rivers is not only an issue of fish populations, habitat, and water quality, but also a matter of environmental justice for downstream communities reliant on these waters. Make the right decision using sound science and reason. Ban suction dredging permanently in all California rivers and streams.

Sincerely,

Michelle Fuller

From: "Elster" <melster@ulink.net>
To: <dfgsuctiondredge@dfg.ca.gov>
CC: <melster@ulink.net>
Date: 11/6/2009 2:43 PM
Subject: My Response To Suction Dredging

To Whom It May Concern, My name is Mike Elster and my wife is Judy. Our primary residence is in Roseville and we have a cabin in Trinity County, just south of Douglas City on Deer Lick Springs Rd. I purchased the cabin a little over 15 years ago and have completely renovated it in preparation for retirement. We are both now retired and pretty much live at the cabin from April through October. My property line (3290 Deer Lick Springs Rd.) on the west and south is bordered by BLM land and the south and east property lines extend across Deer Lick Springs Rd and halfway into Browns Creek. Even though I am an avid fisherman, I don't fish in Browns Creek as I prefer the serenity and have observed some Salmon and Steelhead over the past few years that are starting to re-inhabit the creek. My wife and I really enjoy sitting on the back deck in the early evening, listening to the creek and array of birds, frogs and crickets. That changed this past summer. Someone setup a dredge mining operation in Browns Creek about 100' off my back deck. They apparently had a mining claim issued by the BLM in Redding. The dredge turned the creek into a flowing mud pit and who knows what impact it had on the fish and other wildlife dependent on the creek. In addition, I could no longer sit on the back deck and enjoy the natural setting that I invested in as my retirement home. I had to constantly listen to the sound of the gas dredge from early in the morning to just before dark. I called the Trinity County Planning Department to find out if they issued the permit and they did some research and found out that the Permit had a Federal ID # and was issued out of Redding. I totally support the moratorium on Suction Dredging and would like to see it permanently implemented within our legal system. I'm also wondering why the BLM did not recognize the moratorium when they issued the permit in the first place. In the meantime, I would like to know what I and/or the DFG can do to have this particular mining claim revoked. Any advice on this matter is greatly appreciated. Thank you very much.

Mike Elster
633 Dawnridge Rd.
Roseville, CA 95678

December 2, 2009

Mr. Mark Stopher
California Department of Fish & Game
601 Locust Street
Redding, CA 96001

Hi Mark,

I attended the CEQA scoping meeting in Sacramento on November 17, 2009. Congratulations on holding a most excellent and informational meeting. I think some of the people would have taken the dredge ban out on you and your staff if the meeting were an open question forum. I liked the questions on the cards and the fact that they were collected during the session. Many of my questions were answered but a few remain. Namely, can the Kuruk Tribe dredge on the Klamath and other rivers on their reservation? Why wasn't a CEQA report performed before the ban on dredging for comparison? Without it I don't understand how conclusions can be drawn as to how dredging effects the environment in an adverse way.

I am retired and live on the Cosumnes River in Amador County just east of the Highway 49 Bridge. My neighbor across the river, John Henderson, lives in El Dorado County. Our property lines meet in the center of the river. Seven years ago we learned of dredging from another neighbor who lives upstream in El Dorado County. Because we met almost every afternoon down at the river, we decided to purchase a used dredge to deepen our swimming area and look for gold. We both got dredging permits in 2003 and have gotten them ever since.

Because of our close proximity to Highway 49 and the fact our dredge could been seen from the highway, each time we used it, we had to cover it and chain it to a tree. So, we only used it a couple times a week. Over the years our spouses became involved by panning for gold and later helping underwater for extended periods scowering the bedrock for gold. Other neighbors upstream have dredges. We go back and forth to each others places helping move rocks and dredging. Our experience is purely recreational and we're really pissed off it was taken away from us. We are all over 65 years old.

The Cosumnes River has very few fish. The salmon are long gone due to the excess ground water usage in the valley. The river dries up each summer near Elk Grove before spawning season and doesn't run again until we have substantial rains, some times as late as February. Because the Cosumnes does not have a dam and it is not stocked with trout, very few species of fish can be found here. But the Small Mouth Bass and occasional blue gill or Sacramento Sucker all hang out in the hole we dug with our dredge. Late summer flows are so low (many places under six inches deep) they like the cooler water in the deeper hole. The dredging doesn't seem to bother them. I never recall sucking one of them into the suction hose.

Over the years, we have moved no more than 15 yards of material from our hole. High winter flows have certainly moved more debris and silt down stream than we have. The Cosumnes water is extremely clean and clear during the summer despite others dredging upstream from us. West of the Highway 49 Bridge it is nearly impossible to put a dredge in for five miles to near the Latrobe Bridge. Our depth of disturbance is minimal. I don't believe we hurt the environment with the amount of activity here.

In our endeavor we have invested about $4000 between the used dredge and new engine, compressor and air system. We have removed about one ounce of gold and another ounce of gold covered in mercury. We're still looking for the big nugget!

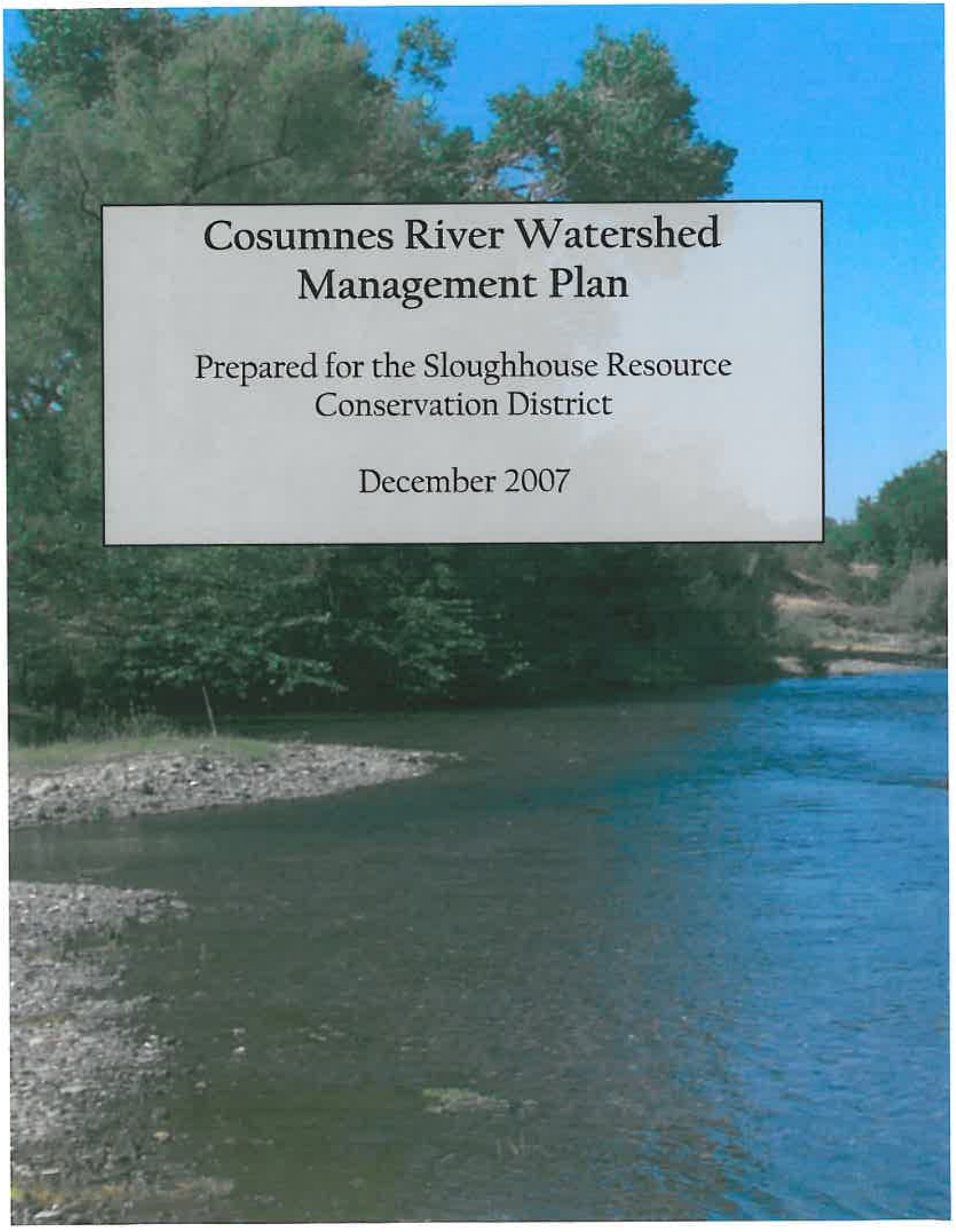
I'm enclosing a copy of the Cosumnes River Watershed Management Plan prepared in 2007. The report confirms the health of the Cosumnes River.

Thanks for this opportunity to present our situation.

Mike Hopkins

Mike Hopkins
9451 Cosumnes Drive
Plymouth, CA 95669
(209) 245-6563
jmhop@centralhouse.net

c. Assemblymember Alyson Huber



Cosumnes River Watershed Management Plan

Prepared for the Sloughhouse Resource Conservation District

December 2007

Tables

1.0 Background

1.1 Introduction

As we pass the 10 year anniversary of the largest flood in watershed history, it is important that we do not forget the devastation that occurred nor let the attention that flooding brought to watershed issues wane. This management plan is a synthesis of scientific research and community action in the watershed. Combining social science with science it attempts to show where the watershed has come from and where it is going to. It recognizes that science alone will not improve the watershed and that restoration without science is misinformed. This plan highlights the challenges that have been overcome and the challenges that still lie in front of us. It is intended to ignite the spark that moves us to a healthier, more intact watershed that is capable and ready to address future issues as they present themselves.

1.1.1 Introduction to the Plan

The Management Plan is segmented into four parts.

Part I

Part I places watershed issues in context by providing the social, scientific and land-use background of the watershed.

Part II

Part II discusses the major issues occurring in the watershed. A description of the issues is followed by an explanation of the causes. Once the causes are presented, all reasonable possible solutions are described with their benefits and drawbacks. For ease of understanding and to facilitate action, part II organizes 16 sub-issues into four overarching issues. The organization of the document was chosen to improve ease of understanding and to facilitate action. In reality, the issues are not clear cut, are intertwined and overlapping.

Part III

Part III narrows the possible solutions into the outline of an implementation plan. Projects that are obtainable, will have a direct impact on the watershed, and that facilitate public participation were selected. In some cases, a group decision-making process is needed to further determine a best course of action. For example there are several areas of the river in need of bank stabilization. An RCD led collaborative effort can identify the most effective projects, find willing landowners, and work through the permitting process.

Part IV

Part IV holds a glossary of terms, a bibliography, and a complete list of species found in the watershed. All three augment this plan. In addition, the bibliography is intended to be a resource to all who wish to work or research in the watershed. To our knowledge, it is the only complete bibliography that combines technical documents intended for management and scientific articles.

1.1.2 What is a Watershed?

A watershed is an area of land that captures water in any form, such as rain, snow, or dew, and drains it to a particular stream, river, or lake. All land is part of a watershed for some creek, stream, river or lake. Some watersheds are immense; others are quite small. The Cosumnes Watershed encompasses 768 square miles emerging in the Sierra Nevada Mountains at an elevation of 7200 feet, extending 81 miles down to the convergence with the Mokelumne River. The Mokelumne River flows into the San Joaquin River and eventually into the bay-delta system.

More than just an area of land, a watershed provides us with a very useful way of looking at the area in which we live. Rivers and lakes don't stop at a state border, and neither does a watershed. Because all water in a watershed eventually drains into the same creek, river, lake, or bay, everyone in the watershed is connected through the water we use for drinking, recreational activities and industries.
(Definition thanks to the Smithsonian Environmental Research Center)

Watersheds are also where we live, work and play. They influence our communities and our communities influence our watersheds. It is thus advantageous to look at the whole watershed when addressing flood protection, water quality, or wildlife habitat issues, not just the stream and channel itself. An effective watershed plan considers these related natural features and human uses of the land within the context of the watershed as a whole.

1.1.3 Acronyms (definitions can be found in appendix I)

BMP- Best Management Practice
CFS- Cubic Feet Per Second
CRP - Conservation Reserve Program
CSP - Conservation Security Program
EQIP - Environmental Quality Incentives Program
OHWD- Omochumne-Hartnell Water District
NRCS- Natural Resource Conservation Service
RCD - Resource Conservation District
SWRCB- State Water Resources Control Board
UCD- University of California at Davis
USACOE- United States Army Corps of Engineers
USDA- United States Department of Agriculture
US EPA- United States Environmental Protection Agency
USFWS- United States Fish and Wildlife Service

1.2 Characterization of the Watershed

At 81 miles long, the Cosumnes River is neither the longest nor largest river in California. However, it retains a special significance both as the last river on the western slope of the Sierra Nevada Mountains without a major dam and as a critical contributor to the Bay-Delta ecosystem. The river has a natural flow regime, drying up in drought years

and flooding in wet years. The native flora and fauna located along and in the river and floodplains have evolved to depend on seasonal fluctuations. Seasonal fluctuations create a rich mosaic of habitats and support a large number of animal populations throughout the watershed.

The Cosumnes River is one of great diversity. While the headwaters are just 81 miles from the outlet to the delta, they are nothing alike. The headwaters begin in the El Dorado National Forest with little to no development. The river is surrounded by steep canyons carved out of the mountains by years of flowing water. Coniferous forests cover the steep slopes of the canyons and stand guard across the tops of the mountains. The area is largely untouched and the river is barely accessible to humans through much of this range. Little change has occurred to the river in this section due to its rock beds and remote access points.

By the time the Cosumnes reaches the area around Sly Park Reservoir, human presence is felt. Rural mountain houses dot the tops of the steep canyons and roads wind down to hidden access points to the river. The canyons are still present, but the canyon walls become less steep as the river flows toward the valley. Historically, this is the first section of the river actively mined for gold. Homes here are remote and threatened with fire danger and water scarcity. Mercury has reportedly been found in these areas.

As the mountains give way to the foothills, more agriculture and residential homes are present. But, residential and agricultural development in the foothills is limited by a lack of water. Deep historic fissures in the granite hold pools of water below the earth's surface that are tapped into, but have little chance of replenishment. Water scarcity makes it hard to eek out a living in the brush and deciduous forests of the foothills. Vineyards and commercial landscape stock are the main production crops of the region.

The foothills lead into the valley where agricultural operations can be found on as much as 90% of the land. Here cattle ranches and row crops dominate the land with homesteads tucked back behind crops that are scattered across the valley floor. The water, too, is tucked away as it braids its way through the valley floor winding around roads and homes and communities as it travels downstream. Water scarcity is also an issue on the valley floor, however, water comes from deep abundant aquifers that are tapped into to feed a growing residential population that is drying the aquifer, the river, and the land. The soils in the valley are mostly clay with patches of sand and gravel that make infiltration of water into the aquifer difficult. Water runs from the bottom of the foothills to the end of the valley taken up only by the growing crops, valley oaks, seasonal grasses, and the occasional animal with little ability to seep into the ground. The silt and sand that has been scoured from the granite of the upper watershed is deposited in these reaches giving rise to fertile soils, oak woodlands, cottonwoods, grasslands and rich agricultural production.

At the base of the valley the watershed changes again. At this point, the water is being called out to sea. The river bottom spreads into an alluvial fan that drains the water from the Cosumnes to the Mokelumne River in the broad pattern of an unwinding braid. Broad fingers spread out and flow across the land into the waiting river and eventually into the bay-delta system. Rather than the clay soils of the valley floor, the lower watershed is made of sand and gravel allowing water to sink deep in the earth and replenish the aquifer. The broad splay of water gives rise to wetlands, wildlife, and waterfowl. The first water flows of each year pause in this region to sink into the alluvial fan and must fill the space below the surface of the earth before the river can run on to the ocean.

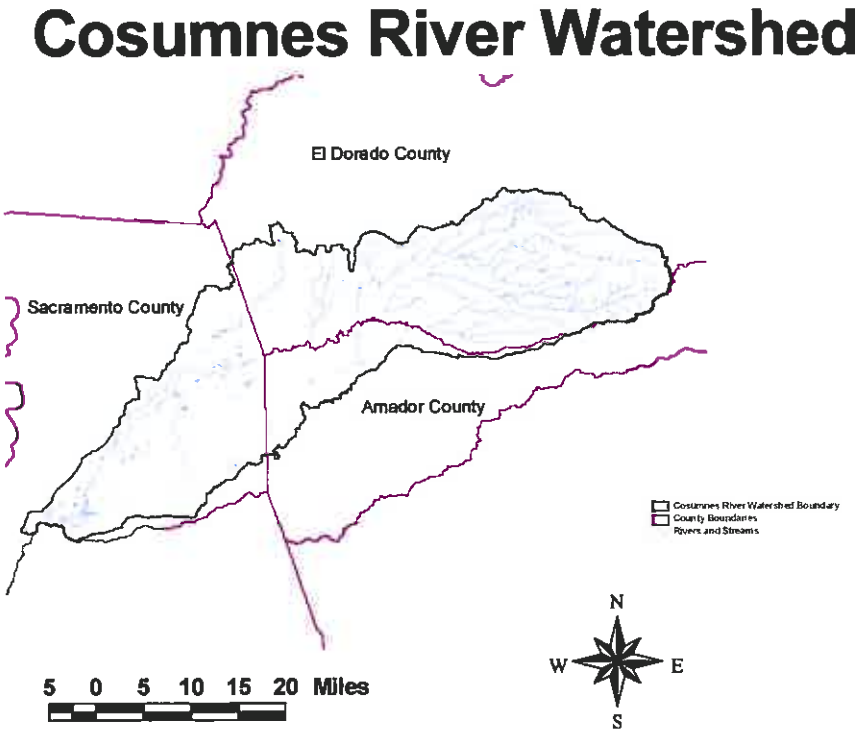


Figure 1.1 Map of the Cosumnes Watershed

1.2.1 History

For approximately 4,000 years, eight villages of Miwok Indians lived along the banks of the 81 miles of the Cosumnes River. The rich diversity of resources in the watershed supported over 11,000 Miwok within the watershed. Chinook salmon were an important resource to the Miwok both for food and spiritual purposes. Because of the salmon's importance, the river was named Cosumnes meaning "people who fish for salmon".

Agriculturists began moving into the valley just before the gold rush. Agricultural production originally grew to feed the increasing populations of miners that took up residence along the entirety of the river. The mining presence can still be felt throughout the watershed in the mine towns, mine tillings, equipment relics, and mercury that were left behind. Many foothill towns still celebrate their mining roots.

Because of the fertile deposition of sediment on the valley floor, farmers were able to find highly productive agricultural land throughout the Cosumnes watershed. Many of the farming families in the area can trace their family's tie to the land back to the mid 1800s. Since then, agriculturists have provided a stable backbone to the economy and produced a rich culture. Throughout the boom and bust gold rush, the seasonal floods and droughts of the river, and the modern expansion of residential communities, farmers have persisted. Writers such as John Steinbeck, William Saroyan and Mark Twain became captivated by life on the valley floor and frequently wrote about the unique culture that developed on it.

> "All of California quickens with produce, and the fruit grows heavy. The year is heavy with produce. And men are proud, for of their knowledge they can make the year heavy. They have transformed the world with their knowledge."
>
> -John Steinbeck 'Grapes of Wrath'

While agriculturists found the farmland along the Cosumnes River to be extremely productive, the river's seasonal flooding impeded the predictability of food supplies. To reduce the impacts of flooding and to provide a stable source of agricultural production, a series of levees were built along the Cosumnes in the early to mid 1900s. This allowed the land to be farmed year round and a greater diversity of crops to be produced. The levee system was successful in stemming the tide of the river for over half a century keeping the pattern of land use relatively constant. Farmers and ranchers weathered the occasional flood and the impacts and losses were tolerable. In recent times, however, flood levels have escalated and the effects have been felt throughout the watershed. Homes that have appeared along the upper reaches of the river have been carried downstream by floodwaters along with sheds, propane tanks and cars. The value and cost associated with residential homes and agricultural production have risen dramatically making the impact of flood events much more significant.

As the need to feed the mining and timber booms began to subside, the agricultural industry in the watershed matured. Agriculturists realized that the valley and foothills could produce a wide variety of specialty crops that could be sold locally, throughout the state and country. Today, this change is evident. Local agriculturists provide a broad array of agricultural products. In the valley, vegetable stands provide farm-fresh locally grown produce. In the upper-watershed vineyards and landscaping nurseries have become prominent creating a local tourism industry. The once rough mining towns are now filled with cafes, gourmet restaurants, antiques and boutiques.

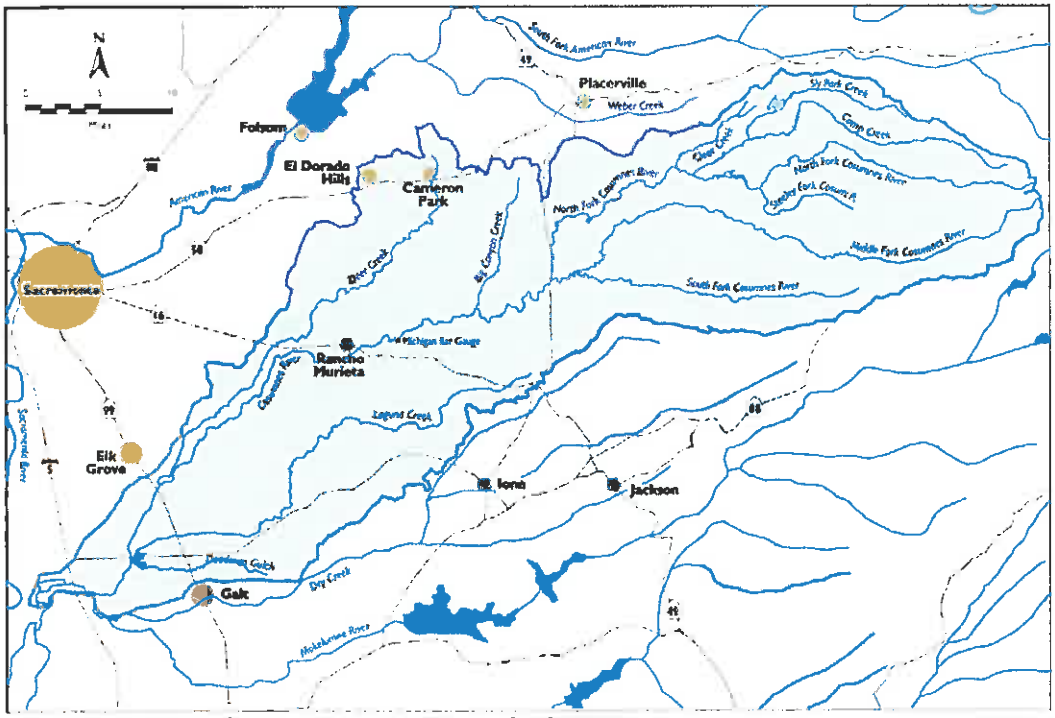


Figure 1.2 Map of the Cosumnes Watershed

Until recently, the towns of Galt, Elk Grove, Plymouth, Sloughhouse and Wilton mainly provided supplies and a city center to the populations of farmers that speckled the valley floor. In the last decade, however, the cities have developed rapidly. The City of Elk Grove was incorporated in 2000 with a population of 80,000 people. By 2005 that population had grown to 112,000 people, making it one of the five fastest growing cities in the country. Recently, The City of Elk Grove has expressed their intent to expand residential and commercial development to the Southeast of the city. While Elk Grove is showing the most dramatic growth, growth is occurring throughout the watershed. Empty lots are being bought and sold at an incredible pace and developments are springing up all over the watershed.

One impact of urbanization is a difficulty in obtaining water. In the upper watershed, individual wells and septic systems supply and treat water. The wells are drilled into granite fissures that lay below the earth's surface. The fissures are intermittent and unpredictable. In some areas, 200 ft wells produce rich supplies of water, in others, 600 foot wells produce nothing. In addition, neighboring wells compete for the water that is available. If one landowner drills a well deeper than their neighbor's, the neighbor's well can become dry. Water availability has limited growth in this area, yet it continues on. In the lower watershed, the aquifer is dropping at over a foot a year.

Table 1.1 Elk Grove Population Growth

	2000	2003	2006
Elk Grove Population	81,707	98,489	129,184

While the expansion of the urban environment has been economically beneficial to the watershed, the growing pains of urbanization are felt by everyone in the communities. Rising populations have increased property value and property taxes. The average home now sells for $425,000. Traffic congestion has increased and the small town feel of the communities has been lost. Many production agriculturists are unable to compete with the need for residential homes and farm land is quickly turning into housing developments. The tax structure is adding to the problem. For example, to pay inheritance taxes, agriculturists are often forced to sell agricultural land from estates to developers. The pressure to meet tax bills has turned countless acres of agricultural land into new homes.

The growing economic pressure on farmers and ranchers is not unique to this watershed. The American Farmland Trust predicts that the population of the State of California will increase by nearly two-thirds by 2040 accompanied by a loss of one million acres of irrigated farmland in the Central Valley. Agriculturists that persist will face higher costs of production and water acquisition. The ability to maintain agricultural production will only get more difficult which endangers the existence of farmland and disproportionately affects small family farms. Many small farmers provide critical habitat that allows endangered and threatened species to survive. With the loss of agricultural lands, family farmers, and the associated habitat, the survival of the natural world is also in question.

1.2.2 The Natural World

The natural world is feeling the growing pains of urbanization. Early depictions of the valley suggest an incredible abundance of resources. The resources found in the Cosumnes watershed were vast enough to support large populations of Miwok Indians. In later days, the diversity of the natural world was so rich that it inspired a style of writing. Steinbeck, Saroyan and Twain wrote about a natural world full of unique species, wonder and awe.

> "On the valley side the water is lined with trees- willows fresh and green with every spring, carrying in their lower leaf junctures the debris of the winter's flooding; and sycamores with mottled, white, recumbent limbs and branches that arch over the pool. On the sandy bank under the trees the leaves lie deep and so crisp that a lizard makes a great skittering if he runs among them. Rabbits come out of the brush to sit on the sand in the evening, and the damp flats are covered with the night tracks of 'coons, and with the spread pads of the dogs from the

ranches, and with the split-wedge tracks of deer that come to drink in the dark."- John Steinbeck of Mice and Men

In fact, it is the diversity of species itself that makes this ecosystem unique. The ecosystem is based on a variety of seasonal high-water levels that varies significantly during the course of any year, year to year, and over decades. Differing amounts of rainfall in various years provides different types of flood events that support and create a rich mosaic of habitat types and a broad diversity of species. Flooding of some kind naturally occurs on the river almost every year. In the upper watershed, floodwaters fill the rock fissure aquifers to provide water for human use. When the small rock-fissure aquifers overflow, they send a slow flow of water into the river which used to supply enough water to keep the river running all year. Floods in the lower watershed flow out onto the land creating floodplains and filling the clay soils. The floodplains play an important role in maintaining productivity, habitat, and as recharge for groundwater while occupying a small area of land. The water trapped in the clay soils flows back into the river over a long period of time which maintains a constant flow. Eventually this water runs over the alluvial fan at the base of the river where it soaks down into the aquifer that feeds the valley.

Currently, this unique watershed is home to 36 species of fish and over 46 species of plants and animals. Included in this list are 24 special status animal species including Swainsen's Hawks, Chinook Salmon and Giant Garter Snakes. Twenty-two special list habitat types or plants are found in the area. (A complete list of species in the watershed is in appendix IV). While the number of species may sound impressive for such a small basin, in reality, the watershed could be home to over 400 species based on habitat provisions. Many of the 82 species that are still present in the watershed are present in fewer numbers than they once were. The most significant decrease has been in salmon populations. In the 1950s more than 5,000 salmon spawned annually in the Cosumnes River. In recent years, that number has dwindled to a few hundred.

Species decline is led by the changes occurring on the river brought on by the depleting aquifer. The Cosumnes River is flowing for shorter periods of time and threatens to disappear altogether. The habitat of endangered species, migrating birds, and water dependent animals is vanishing, as is the river itself, spawned mainly from a drop in the sub-surface level of the ground water table. Sub-surface flow from the granite-fissure aquifers in the upper-watershed combined with water seeping from clay in the valley should provide a year-round flow in the river. Instead, the water drains almost immediately to fill the empty aquifer. As the aquifer drops in elevation, it takes more rainfall to produce a running flow in the Cosumnes, often delaying the flow of the river by two months. Many species are significantly affected by the reduction of flow, most notably salmon. Salmon wait outside the mouth of the river for the flow to begin so they can travel upstream and spawn in gravel beds. Salmon do not eat as they migrate so the extra months of waiting deplete valuable stored energy. In addition, while the salmon

wait, they are subject to large scale predation. With an extra two months of waiting and intensive predation, significantly fewer salmon complete their migration.

Salmon also face degraded habitat for the first few months of life. Normally, young salmon would live in the slow moving water of the floodplains where food sources are abundant. With the lowering water table and physical barrier of the levees, floodplains have become disconnected from the river. Growing salmon are forced to live in the current and spend energy swimming and searching for food rather than growing. The current produces weakened and smaller salmon and decreases survival rates. Fewer salmon migrate to the ocean and even fewer salmon return to spawn in subsequent years.

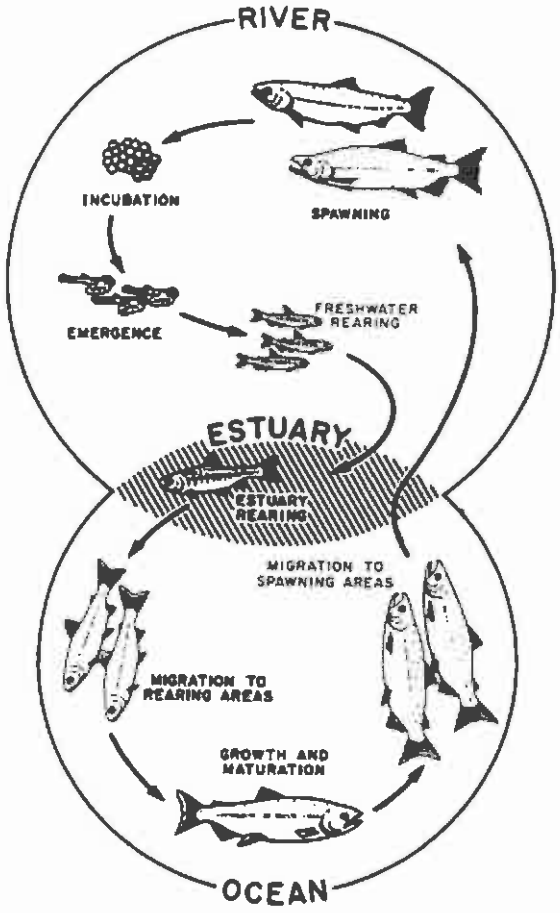


Figure 1.3 Salmon Life Cycle. Image courtesy of the USFWS

1.2.3 Groundwater, Levees and Water Quality

In 1993, the aquifer in the lower watershed was found to have been lowered by approximately 60 feet which translates to roughly a foot a year. The pace is likely increasing as urban population growth places greater demands on water supplies. Urban development has the largest impact on groundwater decline and will continue to be a large problem in the future. As increasing demand is placed on a drying aquifer, creative solutions will be needed to meet water needs.

The problem in the upper-watershed is just as serious. The small granite fissures, from which residents draw their water, produce an inconsistent, erratic, and unpredictable water supply. When the water is gone, it is gone and there are few available sources to bring water into the watershed. In addition, water scarcity in the upper-watershed exacerbates problems throughout the lower-watershed. A portion of the water that sustains the flow of the Cosumnes on an annual basis comes from the overflow of the fissure aquifers that empty into the river by sub-surface flow.

Many costs are associated with a lowered groundwater table. Human impacts include increases in the cost of drilling wells, water extraction, and water per cubic foot. If water continues to become scarcer and populations continue to rise, the cost of water could become exorbitant. This cost disproportionately affects production agriculturists and their ability to produce a viable food source.

There could be long-term impacts from the overuse of groundwater. When groundwater is severely overused for a sustained period of time, rivers dry up, sinkholes and large depressions in land may occur, water may become impractical to extract, and saltwater may leak into the aquifer making it virtually unusable. If this were to occur in the central valley, millions of people would be left with no viable water source. In the upper watershed water may become virtually impossible to obtain threatening the livelihood of residents, agriculturists and businesses.

It has been feared that the levees in the lower watershed are contributing to the loss of groundwater by removing floodplains from the river channel. In some rivers, removing levees has allowed high waters to flood into fields and seep into the groundwater table. However, the Cosumnes is not likely to show the same results for two reasons. First, clay soils exist in much of the watershed and line the river. Clay soils will store some water that is slowly released back into the river, but the impermeable layer will not allow much water to seep into the aquifer. Second, there are only limited flood events in the watershed. High-water levels in the Cosumnes are limited to a few instances every few years and recede rapidly. Floods occur infrequently and rarely last more than 24 hours. Hydrographs of high water events are sharp with a quickly descending slope. Even the largest flood in watershed history lasted less than two days before draining back into the river. This does not allow adequate opportunity for water to seep into the aquifer.

Instead, the Cosumnes River replenishes its aquifer by storing floodwaters in the clay soils surrounding the river and the granite-fissure aquifers in the upper-watershed and

slowly releasing it into the river. The small amounts of water that remain in the clay soils and the overflow from the granite fissures create a baseline flow that keeps the river flowing year-round. As the water slowly flows over the alluvial fan at the end of the river, the sandy soils suck the water down into the aquifer. A slow, consistent flow is needed for maximum aquifer recharge. As the aquifer drops, the water stored in clays and soils is sucked downstream at a rapid pace to fill the empty space left in the aquifer, halting the flow of the river in the summer months. In addition to groundwater problems, the drying watershed creates a fire hazard in the upper-watershed. Dead and dry brush threatens to be consumed by wildfire and the fire season is extending for longer and longer periods of time each year.

The greatest potential for aquifer recharge comes from a slow and steady release of water over the recharge points. This flow can be augmented by holding high-water flows in storage basins or fields surrounding the Cosumnes. Water from the fields would travel into the river by a slow and steady sub-surface flow that would eventually reach the recharge points. Essentially, flooding fields would slow the progression of water and allow for a steady infiltration of water into the aquifer rather than letting it travel in floods at a rapid pace to the delta. The levees would be essential in this process to hold the high-water flows out of the river in order to extend the length of flow.

Another concern with levees is that they cause degraded water quality. However, data shows that water quality is high in the Cosumnes. The SWRCB completed a year long monitoring of the river in 2002 as part of a monitoring effort on the San Joaquin River. This data shows that the river is well within water quality targets:

> "When evaluated against water quality objectives ..., goals ..., targets ..., and guidelines ..., the water quality results indicate that, in general, there is no evidence of impairment for the following beneficial uses: municipal supply, aquatic life, irrigation supply, and recreation." – SWRCB draft report on sub-basin monitoring.

As recently required by state law, agriculturists are now beginning to report water quality data through an agricultural waiver program. While direct data from the Cosumnes is not available, the data taken at the confluence of the Mokelumne shows a pristine river that only exceeds TMDLs a few days a year. The few times when TMDLs are exceeded are events in which exceedances would be expected. For example, higher sediment levels follow the first major rain event of the year. In addition, Rancho Murieta removes water from the river for human consumption. Their tests show that water quality is high and very little treatment is needed in processing the water for human consumption. This data should continue to be monitored to ensure continued river health.

In theory, water quality should degrade under levee conditions. This has led many people within the watershed to become concerned for the water quality of the Cosumnes River. Decreased water flow during slow periods, exacerbated by increased usage should lead to

increased sedimentation. Using the analogy of a pipe, after a storm event, large flows of water are piped to the ocean. Once the rain stops, a slower flow follows behind. The slower flow allows sediment to collect at the bottom of the river cementing gravel beds and changing habitat. Sedimentation can occur downstream as velocities slow, or over time as velocities slow. Increased sedimentation not only degrades water quality and habitat, but also threatens the stability of bridges, bank vegetation, and levees. Without significant water quality data, it has been assumed that this is occurring on the Cosumnes. There is no evidence that this is the case. Some sedimentation is found in gravel beds, but water quality is high and bridge stability remains intact.

Mercury is a large concern in the upper watershed as elevated levels have been found in the food web. Mercury is of particular concern in areas that were used for gold mining because it was commonly used to extract gold. While no data is available on mercury levels in the river, anecdotally there are significant amounts. Liquid mercury has been found in the water and traces of mercury have been found in soil samples throughout the watershed.

1.2.4 Land Use

Currently, a majority of the watershed is in agricultural production. Cattle ranches, orchards, dry or irrigated farmland, row crops, grain crops, nursery stock, and vineyards are the main agricultural products. Vineyards have increased over the last few decades creating a wine and related tourist industry within the valley and foothills. A majority of the remaining land is in urban use. As previously mentioned, the urban population is growing rapidly in the watershed.

There are two additional land uses of note. First, timber extraction is taking place in the upper watershed. Timber from the El Dorado National Forest and surrounding lands has been harvested commercially since the early 1900s. Most of the foothill and mountain towns were founded as camps for either timber harvesting or gold mining operations, sometimes both. Large amounts of lumber were needed to feed growing urban populations and for building sluice boxes and other mining equipment. The land surrounding mining camps was stripped of earth, timber and minerals. Another timber boom occurred from approximately 1950-1970 to feed growing urban populations. Clear-cutting was the common practice used until the 1990's. At that time, both the Forest Service and private logging companies operating near the forest switched from clear-cutting to thinning and smaller harvest sites, though clear-cuts do occasionally continue. In 2001, the forest service limited the amount of harvest in the El Dorado National Forest to extraction directly required for fire protection and ecosystem health. The impact of harvesting in the upper watershed has been greatly reduced in scope and size in the last few decades and is now focused on a small portion of the upper watershed. Given the high water quality in the river and the relatively small scope of the operations, timber does not appear to have a significant impact.

The main threat to the watershed from forest land is the potential for fire. The dry climate and large amounts of wood could create a potentially devastating situation. A fire could destroy large areas of land and property, be life threatening, and could dump large amounts of debris and soil into the water. Projects are being completed in the upper watershed to reduce the potential impacts, but more work should be done to coordinate efforts and remove potentially dangerous fuel loads.

The second land use of note is mining. Historically, gold, silver, copper, clay, coal, sand, shale, and limestone have all been mined in the watershed. Gold mining was widespread along nearly the entire Cosumnes River during the Gold Rush. Mining spurred timber harvesting and the creation of urban centers. Early land uses significantly impacted the river we find today. Mining and timber operations removed entire hillsides and dumped large amounts of sediment and debris into the river, raising the riverbed and depositing sand and gravel throughout the watershed. Some of this gravel was removed by dredging during the 1950s and 1960s.

Mining relics can still be found along the river. The section of the watershed just southwest of Michigan Bar road through Rancho Murieta was also an active mining area. Mine tillings can still be found in abundance in this area. Large piles that mimic rolling hills are the last remnants of days and dreams gone by. Since mercury use was widespread in the extraction of gold during this period, it is likely that mercury is located beneath the surface of the entire watershed. Mercury poses a potential threat anytime the soil or riverbed is disturbed.

Currently, two clay mines, five sand and gravel operations, two coal operations, two stone mines and a shale mine are located within the watershed. One sand mine is active in stream. Studies in the late 1990s showed evidence of diamonds in the upper watershed. While excavation has been completed, no diamond operations are active at this time. Anecdotally, gold mining still occurs as a form of recreation

1.2.5 Historic Agricultural Uses of Water @ 1955-1977

When the Omochumne-Hartnell Water District (OHWD) was formed in 1956 to promote the Nashville Dam Project and building of the Folsom South Canal, it gave them the ability to contract for the purchase of supplemental water supplies. They constructed four flashboard dams that could be put in place during the dry season and removed during the wet season. The dams were used to pool water to be provided to agriculturists for supplemental irrigation water and to provide groundwater recharge.

In 1959 the district became aware that the El Dorado Irrigation District could not use all of its allotted water from The Sly Park Reservoir. OHWD contracted with the US Bureau of Reclamation to release water into the Cosumnes River to provide diversions onto agricultural lands. Between 1959 and 1974 32,481 acre feet of water were purchased and sent downstream for water diversions onto individual properties. In 1975, that water became unavailable. However, water from the Folsom South Canal was available for use.

From 1975- 1987 OHWD purchased water from the canal in place of the water from Sly Park. During this period, 16,348 acre-feet of water was purchased and diverted to agricultural lands. Approximately 57% of the diverted water reached agricultural properties, the remaining 43% was captured by the river. For more data from the releases, please see appendix III.

1.2.6 Dams on the Cosumnes

The Cosumnes River is typically referred to as an "undammed" river. While in-effect this is true, in reality, the Cosumnes contains five minor dams all within the valley portion of the river and one major dam that sits on a tributary to the Cosumnes. At river mile 34.5 is the upper most minor dam, Grandlee Dam. Grandlee Dam is owned and operated by the Rancho Murieta Community Services District. The Dam is a fixed weir type and includes two fish ladders to facilitate fish passage. The Dam's function is creation of a pumping pond to facilitate water right diversions. The remaining four dams are owned and operated by the Omochumne-Hartnell Water District (OHWD). All are operated to facilitate groundwater recharge by creating pools to allow owners with riparian water rights to utilize surface water in lieu of pumping groundwater. Additionally, these extended pools provide extended surface contact with the pervious river bed that enhances peculation. The OHWD dams are all seasonally installed demountable type.

The dams are:
Granlee- river mile 34.5
Rooney – river mile 24.0
Blodgett – river mile 22.8
Elk Grove Hop Ranch – river mile 16.2
Mahon – river mile 12.5.

In addition, Sly Park reservoir and dam is located just off the Cosumnes and is a major contributor of water to the Cosumnes. Water from the reservoir is used by the El Dorado Irrigation District for drinking water that is supplied through much of the foothills and mountains. The Sly Park Reservoir is a major recreation site in the upper-watershed including camping, swimming, and boating.

1.2.7 Political Landscape

Water resources in the Cosumnes Watershed fall under the jurisdiction of the Army Corps of Engineers, the US EPA, the US Fish and Wildlife Service, local water agencies, The California State Water Resources Control Board, cities, counties, and private landowners. Multiple water districts and organizations service the Cosumnes River Watershed. In 1996, a total of 133 water diversion rights existed on the Cosumnes River. The majority of the diversions in the Cosumnes River Watershed are used for urban water needs. Grazing and agriculture primarily obtain water from underground wells.

Irrigation Districts, Water Districts, and Water Services

Many organizations provide water to residents of the Cosumnes watershed by various names. Here are the major suppliers of the Cosumnes Watershed:

Many of the residents in the upper watershed get water from personal wells. Those that do not are service by The El Dorado Irrigation District (EID). Established in 1925, EID is a public agency, located in Placerville that provides water to residential and agricultural land within the upper watershed. EID also manages Sly Park Recreation Area for the United States Bureau of Reclamation. Annually, EID produces approximately 25,350 acre feet of treated water and treats approximately 5.2 million gallons of sewage daily at two wastewater treatment plants. The water reclaimed from wastewater operations is either sold for irrigation or is discharged into the Deer Creek basin in compliance with the requirements of the California Water Resources Control Board.

The Omochumne-Hartnell Water District (OHWD) is a locally elected board that makes decisions that affect groundwater and attempts to manage water resources in the best interest of the community. They also provide water to residents East of Grant Line Road into the foothills. OHWD was originally formed in 1956 to promote the building of the Nashville Dam Project and the building of the Folsom-South Canal. The boards work closely with the SWRCB and local government entities to coordinate efforts. Recently, they have been working with the Southeast Sacramento Agricultural Water Authority to create a groundwater management plan for Sacramento County.

The Elk Grove Water Service (part of the Florin Resource Conservation District) provides water for the lower watershed. They serve 35,000 water customers in Southern Sacramento County throughout Elk Grove and surrounding areas up to Grant Line Road. They also provide many educational opportunities for citizens and promote water conservation throughout the region.

Reclamation District
The levees are privately owned and were privately maintained until 1997. After the floods of 1997 the cost of levee repair became unmanageable to landowners. Reclamation District 800 began managing and funding levee maintenance through tax assessments to the local owners of the levees. Levee maintenance costs vary by year depending on water levels. The Reclamation District is under-funded and necessary repairs often go unfunded. Jones and Stokes found a majority of the levee banks to be degrading at significant rates.

Cities and Towns
Multiple cities exist within the watershed including Wilton, El Dorado Hills, Diamond Springs, Plymouth, Rancho Murieta, and Ione. The city with perhaps the greatest impact on the watershed is located just outside of the watershed boundary. While not technically inside the watershed, the City of Elk Grove withdraws the most water from the aquifer. Overuse of the aquifer is leading to the reduction of flow in the Cosumnes River. This makes them a major part of groundwater management decisions. Elk Grove was recently

incorporated (in 2000) and has added complexity to the political landscape. Services that used to fall under water boards and RCDS are now coming under the jurisdiction of the city. However, the transition has not gone smoothly. The roles of the agencies are not clear and several lawsuits have been filed between the city and various agencies. This tension promises to increase as the City of Elk Grove recently released a plan to expand commercial and residential zoning to the Southeast of the city. All the proposed zoning is located within the Cosumnes River Watershed.

Water Quality Monitoring

Recently two efforts have been initiated to monitor water quality. The State Water Board completed a year long monitoring project on the Cosumnes as part of a monitoring effort on the San Joaquin River. In addition, production agriculturists have recently been asked by the state to monitor the outflow of water from their property. Because the expense of monitoring is significant, several RCDs have adopted an agricultural waiver program in which agriculturists pay into a collective monitoring pool. The monitoring pool pays for required monitoring collectively, data is not collected on individual properties. If the pollution increases, the sampling sites will increase in order to determine the cause of the problem. Sample sites move throughout the watershed and change on an annual basis to gain indications of watershed health throughout the entire watershed including tributaries. Only preliminary data is available from this program, but the data that does exist has shown very clean water.

Ground Water Management Plan

A ground water management plan is in the process of being developed. The plan will identify a sustainable groundwater yield as 273,000 acre feet per year. Each of the three sub-regions within Sacramento County is responsible for identifying their water needs and maintaining them within sustainable yields. The Southern region of Sacramento County contains the Cosumnes River and is lead by the Southeast Sacramento County Agricultural Water Authority (SESCAWA). The SESCAWA is in the process of creating a management plan to balance water needs within the Southeast Basin.

1.3 Historic Flood

While concerns over the health of the watershed had been growing for several decades, the watershed changed on January 2, 1997 when the Cosumnes River Watershed experienced the most extensive flood event in recorded history. Water flows were documented to exceed a 100-year storm event, though some reports suggest that the flows approached a 500 year flood event (the exact level cannot be determined because the water gauges were only designed to measure the 100 year flood event). In the upper-watershed, large amounts were carried downstream including gas storage tanks, sheds, cars, and portions of houses. In the lower watershed, twenty-four levees broke resulting in the inundation of eighty homes and 24,000 acres of agricultural land including orchards, vineyards, ranches and farms. The flood waters lasted just over 24 hours, but the damage took years to repair. Estimates of financial losses reached $10.5 million to

row, field and croplands, $2 million to orchards and vineyards and $.5 million to pasture and rangeland. This does not include damage to houses and structures.

The damage done was exacerbated by two factors. First, as property values and production costs increase, the cost of damages increase dramatically. Since values continue to rise, damages from future floods can be expected to be even greater. Second, the size of the flood was greater than has been experienced in recorded history. Flood levels are also predicted to increase in coming years.

The 1997 flood brought the issues of the watershed into the consciousness of every community member. It became clear that things could not continue as normal and something needed to be done.

1.3.1 The Response

After the floods of 1997, the community began to seek ways to ensure that such extensive damage would not occur again. The Cosumnes River Task Force was formed to provide guidance to decision makers, government agencies, non-profit organizations and community members in flood prevention and ensuring watershed health. The task force is headed by the County Supervisor and is composed of 16 volunteers representing various interests in the watershed. Their mission is to "develop a long term strategy to encourage restoration of watershed health and improve flood management."

The task force met regularly from 1997 through 2004. During this time, they conducted studies on the watershed, initiated restoration activities, provided guidance to local planning agencies, and worked on various initiatives to improve the watershed and reduce flood impacts. The most significant projects completed were a Phase I and Phase II assessment of the watershed designed to gather the pertinent information needed to guide restoration work. The Phase I inventory was completed under a grant from the SWRCB. The phase II inventory was completed under a grant from the CalFed Watershed Management Program. Citations for both documents can be found in the bibliography.

Cosumnes River Task Force
Chair Don Nottoli, County Supervisor
Sacramento County Water Resources Division
Sloughhouse Resource Conservation District (RCD)
Eldorado National Forest
Amador RCD
Florin RCD
USDA-Natural Resources Conservation Service (NRCS)
The Nature Conservancy
Cattlemen's Association
Sacramento County Farm Bureau
Reclamation District 800
US Bureau of Reclamation
Sacramento County Flood Control Agency (SAFCA)
US Army Corps of Engineers
Jones & Stokes Associates, Inc.
Amador County USDA-NRCS

Figure 1.3 Membership of the Cosumnes River Task Force

The amount of work completed by the task force became limited by the busy schedules of the volunteers. In order to complete the level of work necessary to protect the watershed, a full-time person was needed. Two different grants provided a full time staff person from 1998 through 2004. In 2004, the Sloughhouse RCD applied for and received a Department of Conservation Watershed Coordinator Grant to fund a full-time watershed coordinator. The coordinator's main focus was to write this watershed management plan, but she also implemented projects for the betterment of the watershed. Projects included educating farmers, ranchers, and community members about their impact on the watershed, coordinating the efforts of those working on the watershed, furthering the work of the Task Force, implementing a watershed council and assisting production agriculturists in obtaining cost share grants to improve production equipment and/or methods.

One objective of the RCD was the need to expand the role of citizen input into the watershed management plan beyond the task force. When writing the DOC watershed coordinator grant, they included the objective of creating a watershed council to be broader in focus and composition than the task force. The council aimed to bring the entire community together to identify watershed issues and work toward the betterment of the watershed. The community-wide effort included government agencies, community groups, private business representatives, producers, and citizens attended the meetings that convened in 2005 and 2006.

1.3.2 The Results

The task force and the council made several conclusions. The most significant conclusion was that a large amount of research was being completed or had been completed on the Cosumnes Watershed. Given its unique status as the last un-dammed river on the western slope of the Sierra Nevada Mountains and its proximity to UCD, over 60 studies have been completed on various aspects of the Cosumnes Watershed (see appendix II for a complete list). A majority of these studies were completed by the UCD Cosumnes Research Group. In addition, the Cosumnes River Preserve has spent many years assessing and cataloguing the biotic features of the watershed. Finally, with many active agencies and organizations in the watershed, many technical documents have been created.

The second most significant finding was how much is still unknown about the river. There is not enough information to solve many critical management decisions. While much remains to be learned about the Cosumnes River, the community has taken important steps through the studies, task force meetings and council meetings to identify the priorities, issues, and solutions that are meaningful to the community. They have outlined the important issues that need to be addressed in order to maintain a vibrant community, a healthy ecosystem, productive agricultural land, and a sufficient quantity and quality of water for all the members of the watershed. It is clear that the natural world, farming communities, and residential needs of the watershed are at a crossroads. Where we go from here is imperative to the livelihood of a time honored way of life, the health of the environment, the existence of endangered species and the productivity of a growing urban area.

2.0 Current Issues and Possible Solutions

The following section summarizes the major issues within the Cosumnes watershed. An attempt is made to list all practical solutions. They are listed in no particular order. The issues are grouped into four categories: Water Supply Reliability, River Conditions, Habitat and Coordination. The problems have been categorized for ease of presentation and to encourage action, however, they are intertwined. Thus their solutions are multi-faceted and often overlapping. In section 3.0 a recommended "package" of solutions will be outlined.

2.1 Water Supply Reliability

2.1.1 Flooding

The extreme nature of the floods of 1997 was devastating to the people living near the Cosumnes River. Over 13 million dollars of damage was done to homes and agricultural land and six million dollars were spent repairing levee breaches. Future flood events are predicted to be more catastrophic as citizens increasingly rely on levees to hold back floods as they build further into the floodplains. The impervious surfaces that accompany urbanization reduce the amount of ground water recharge and water storage in the watershed creating larger flood events. In addition, the damage associated with future floods will increase as the value of property and equipment rises.

Flooding is also predicted to occur more frequently in the future. A study by the UCD Cosumnes River Research Team characterized the types of flood events that have occurred and plotted their occurrence over time. The study showed that in the last two decades the years in which wet winters were followed by dry springs have increased. Years typified by this weather pattern are often years of heavy flooding. The occurrence and magnitude of flooding is likely to continue to increase.

Why Are Floods Increasing?

1. *Changing weather patterns*- The weather patterns have been changing over the last few decades making rainfall unpredictable. Overall, California has received significantly less water than was expected, but the cycles have been "boom and bust." The boom periods have far exceeded expected values. Human constructs like levees were not built to maintain such large levels of rainfall.

2. *Increased Impervious surfaces*- As the watershed urbanizes, larger percentages of land become covered in impervious surfaces (parking lots, driveways, roofs, sidewalks, etc.) Impervious surfaces concentrate water drainage into smaller areas. With less drainage to accommodate the heavy flows of water that follow a storm event, the water pools and floods.

Figure 2.1 Flood Increases

While the floods dramatically impact people and the production of the valley, high water levels offer an opportunity for groundwater recharge. Spreading the water contained in high water flows across large areas of land and allowing them to slowly drain into the river creating a sustained flow into the water table may be the only opportunity we have for groundwater recharge. If this water is not allowed to recharge groundwater systems, it will be sent directly into the bay delta much like letting water run down a sink.

Possible Solutions:

a) Build stronger levees

While levees could not be built high enough to maintain the highest magnitude floods, building stronger and higher levees would reduce the impact of many floods. However, the cost of building and maintaining levees becomes exponentially more expensive based on the amount of water they are built to hold. Levees built high enough to retain large flood events will be expensive and will need to be repaired more frequently. The current levees are already not maintained as well as they should be. Analysis of flood regimes compared with economic cost estimates of larger levees could be done to determine if higher and/or stronger levees would provide an economically beneficial solution.

In addition, further removing the floodplains from the river will perpetuate the cycle of water loss. As levees are built higher, more water leaves the system. As more water leaves the system, less water is available for groundwater recharge. As water becomes scarcer, water extraction will become more expensive and greater investments will be needed to obtain water. Thus building higher levees will result in higher water costs in the future.

b) Increase water storage

It would be nearly impossible to stop floods of the magnitude of 1997 from occurring, but the impact of smaller flood events may be reduced by increasing water storage. There are many ways to increase water storage ranging from building setback levees to encouraging water storage equipment on landowner's properties.

Setback Levees

Establishing set-back levees has been proposed as an alternative to traditional levees. By setting the levees at the edge of the natural floodplain rather than along the river bank, water storage capacity increases and natural river processes re-emerge. Habitat is reinstated and animals can exist more comfortably and compatibly with human uses of the river. In addition, removing levees from the constant flow of the river will likely reduce the necessity and magnitude of annual levee repairs.

Setback levees are calculated to be expensive. In 1999, the cost of building setback levees was estimated to be $2.5 million per river mile. Most of this expense is to buy rights to farmland. If the floodplains within the levees are able to be used for agriculture some of this expense may be reduced. The entire river wouldn't need to be setback at once. High priority sections of the levees could initially be setback. As practice informs process, building setback levees would become more efficient. If set-back levees prove to be beneficial, further setback levees can then be built. Since a majority of the land along the Cosumnes (including the levees) is privately owned, landowners would need to consent to and be compensated for any land that is established in setback levees.

Over time the setback levees may actually save money. Levees are broken down as water flows across them creating a need for annual repairs. Years of heavier rains translate to higher repair costs. With less contact with the river, costs for repair will likely be reduced. Economic analysis should be completed to determine the cost effectiveness of building set-back levees.

Two notes of caution need to be made. First, disturbing the river may cause more harm than the repairs would solve. Currently the Cosumnes has very high water quality. Disturbing levees may significantly degrade water quality. Large amounts of sediment added to the river may interfere with critical habitat (such as salmon spawning grounds) and may not provide significant benefits. It is also possible that mercury may be released into the water from disturbed areas. It is important that the goals of setback levies be identified clearly and weighed against the risks and alternatives before a decision is

made. If setback levees are selected to be a management tool, careful analysis should be completed to make sure this practice will be beneficial.

Second, the practice of setting back levees is still relatively new. The science has not yet been determined. Some of the initial projects that have built set-back levees on neighboring rivers have found that the scientifically established widths of floodplains have been too small to have significant impact on habitat and water storage. It is unclear whether the floodplains do not have as large an impact as predicted or whether the floodplains need to be much larger than expected. It would be a waste of sorely needed resources to setback levees at $2.5 million per river mile only to find that there is no significant impact. Two setback projects are being completed in the general area. Both the Feather and Bear Rivers are currently installing setback levees. These projects should be carefully examined before similar levees are placed on the Cosumnes.

Mitigated Floodplains

A much less expensive option than setting back levees would be to establish mitigated floodplains. During the wet season, water could be pumped over the levees into surrounding fields. Landowners could be paid to keep the land out of production during the wet season to allow water to recharge groundwater supplies and store water within the watershed. Careful analysis of the ground would need to be completed to ensure that toxins are not carried into the stream as part of sub-surface flows.

Most, but not all of the benefits that are associated with setback levees would also occur from flooding mitigated floodplains. The two exceptions would be the filtering of sediment from the river and an increase in habitat for young salmon. There are not sediment problems in the river making sediment filtering a non-issue. There are options to build shelter for growing salmon (such as in-stream eddies or habitat boxes) that should be researched if this option is selected.

Figure 2.3 Floodplains on the Cosumnes

Build wetlands
Wetlands can be built throughout the watershed to increase water storage. Unlike the mitigated floodplains, the proximity to the river would not be essential. Thus any land with depressions and low-lying areas can be transformed into wetlands of various sizes. Landowners in urban, agricultural and industrial areas can be encouraged in a variety of ways to develop wetlands to reduce the volume of water flowing into the river during peak flows. This option may be easy to implement because development has been rapid in the watershed. Development regulations require the establishment of mitigated lands at a 1:1 ratio. This land could be used to create wetlands.

Water Storage Equipment
Landowners can be encouraged to install water storage equipment based on the size of their land and water needs. Homeowners can install rain barrels to store water and reduce future water needs. Production agriculturists can build retention ponds or install water storage containers to store water within their property. Regulations apply to ponds that are built on agricultural land that should be followed. Cost-share assistance may be available to assist in installation.

This may be the only option available to the upper watershed and is of particular importance in this region. Water stored in storage tanks can be used for fire-safety.

not built with the capacity to control record floods both because floods were not expected to reach the levels found in 1997 and because the cost of building and maintaining levees increases exponentially with the amount of water they are designed to hold. As people have begun to rely on the levees as a form of flood prevention rather than flood reduction, they have begun to expect more from the levee system than it can provide. The current levee system was built to control a five year flood event (approximately 20,000 cfs). The flood event of 1997 was recorded at 93,000 cfs, but was likely much higher since it exceeded the capacity of the gauge.

Levee maintenance is required annually with more maintenance needed in high rainfall years. In 1999, maintenance costs per mile of levee ran between $3,500 and $20,000. The Cosumnes River levee maintenance usually runs on the low end of the scale. However, levee repairs and enhancement vary with the size of the project. Years with higher water levels cost more to repair. After the 1997 floods, 14 breaks along a 30-mile stretch of the Cosumnes were repaired at a cost of $6.3 million to the state, federal and county governments. This cost is underestimated because funding was only provided for the replacement of the levee system and not for enhancement. Individual landowners made additional levee enhancements. Maintenance is often delayed or not completed due to funding and strict permitting needs. Should levees fail due to poor maintenance, the results could be catastrophic.

Bank instability and streambed incision

Bank instability is often a concern associated with levees. This may or may not be an issue in the Cosumnes. Excessive bank erosion and streambed incision has occurred in the area between Twin Cities Road and Highway 16. Between 1957 and 1996, the Cosumnes River channel was downcut between 2 and 10 feet due to excessive erosion (information prior to 1957 is not available). It is suspected that the downcut has stabilized. If erosion were actively occurring at excessive rates, it would be expected that high levels of turbidity and sedimentation would be found downstream. This does not appear to be the case. The water quality data from the SWRCB in 2002 shows that when compared to the rest of the river, there is only a slight increase in turbidity and total organic carbon at Twin Cities Road which is consistent with wildlife uses. In addition, the bridge was inspected for stability in 2002. The stability of the structure was found not to be compromised. Thus while incision did occur at one point, it is not likely that the incision continues to occur at a significant rate.

The downcut should be monitored to see if it has stabilized. Monitoring will provide clues to the cause of the incision and data that will determine whether repair is necessary. If the downcut has stabilized, the best course of action is monitoring. Gravel may be added to the stream to supplement salmon beds and provide coarse sediment to the stream, but no major action would be needed. If the downcut is active, stabilization may be needed. In addition an aggressive supplanting of course debris may be needed to maintain channel stability. The major concern with the incision is that when a river

incises, the groundwater table also incises. This reduces the total storage capacity of the aquifer.

There are three possible explanations for the downcut that have been proposed. First, the downcut could be a result of the levees. The levees channelize the river, increasing the velocity of the current which scours banks and carries debris downstream. If the river were in a natural meandering pattern, the velocity would be slowed as would the rate of erosion. The result of constricting the channel with levees can be downcutting, bank erosion and flooding. Excessive erosion can cause the bank to collapse which dumps vegetation and sediment into the river channels and threatens downstream habitat and structures.

Second, it is possible that the downcut was caused by the constriction of the river by the building of several bridges. The bridges altered the flow of the river exposing previously protected areas to downcut and incision and increasing the velocity of the flow as it passes under constriction points (bridge structures).

Finally, it is possible that the river bed levels found in the 1950's were artificially high due to large amounts of sediment deposited in the river from gold mining. This has been found to be true in neighboring rivers. Since the Cosumnes was a highly active mining location, it is likely that large amounts of debris were deposited in the river. The excessive erosion and downcutting from 1957-1996 may have been a removal of mining debris. Most of the mining debris removal in neighboring rivers was completed by the mid-1960s. However, this was mainly completed by dredging in surrounding rivers. Given the timeframe, it is likely that the incision was a removal of mine debris.

Jones and Stokes found significant bank erosion throughout the foothills and valley regions of the river. A majority of the erosion is found on levees. This is due to a lack of funding for levee repair and maintenance. In addition, many of the areas they found to be eroded were covered in vegetation. Since the survey was completed by aerial methods, the banks were not always seen clearly. On visual inspection of the banks, the Jones and Stokes finding is likely over reported. However, there are areas of concern. The area below Michigan Bar Road to the top of the levees does contain sections of significant erosion. Some of these areas are of particular concern because they are located directly above salmon spawning habitat.

River meander

Another major concern of the levee system is that it affects the natural course of the river. Rivers meander. Levees were built to reduce meander as they provided shorter, faster flows to the outlet. The path of any unrestricted river is not exactly the same from one year to the next. The flood plain ecosystem (including habitat, river functioning and human health) relies on the fluctuation of the river. The meander is caused by the incremental erosion of consistent flows and the large change events of high flows. Only the lower reaches of the Cosumnes River naturally meander. The mountains and foothills

are lined by deep rock canyons and thus the riverbed is literally set in stone. The river from the end of the foothills to the convergence with the Mokelumne has potential for meander.

Meander is most prominent in the area of the convergence at the end of the valley floor. As the river spreads across the alluvial fan and flows overland into the Mokelumne, channels are constantly changing, converging, diverging and shifting. This meander is limited by low water flows. With the Cosumnes Preserve and several levee breeches in this region, the natural meander has come closer to retaining its natural course.

Meander also helps filter sediment by creating floodplains. The floodplains catch and retain sediment and pollutants, keeping them out of the river channel. In turn, deposited sediment provides nutrients that support plant communities. Levees impede the natural filtering process by physically preventing water from flowing onto floodplains. Meander also creates a diversity of habitats by varying the speed of water. Floodplains play a critical role in habitat and river health while encompassing a very small area of land (Seventy- two percent of riparian forest is found within 100 meters of the active channel). Floodplains would historically be found along the Cosumnes River from the foothills throughout the valley. When the levees were built they lined the banks of the river separating the river from the floodplains. As the river flows have decreased and as the river has incised, floodplains have developed within the levee walls. Riparian plant communities have established within the levee walls. This is called "terracing". The river has established its equilibrium at a new, lower elevation. Since the river rarely runs at high flows, the floodplains are active most of the year.

Groundwater recharge

The major challenge to groundwater recharge is that most of the soils in the valley are clay. Clay creates an impermeable layer that blocks water from seeping into the groundwater table. Floodwaters never sit long enough on open ground to filter down into the aquifer and even the highest flood events to drain in just a few days. However, once the river reaches the alluvial soils, the soils change from clay to sand. Sand allows for quick infiltration to the water table. The best opportunity for ground water recharge is to allow a slow consistent, steady flow of water to run through the alluvial soils.

Removing the levees would not change the pace of drainage in the river. High flow events would still run through the system quickly and low flows would move close to their current paces. Groundwater recharge needs a slow consistent flow to cross the alluvial fan where recharge occurs. One option that may support groundwater recharge and agricultural livelihood would be to flood the fields adjacent to the river during high water periods. Water would be pumped onto fields over the top of the levees. The levees would then hold water on the fields for an extended length of time. While some of the water would seep through the clay, the major benefit for groundwater recharge would come from the extended length of the flows. Water from the fields would slowly move into the river by subsurface flows extending the length and volume of river flow. Having

an extended flow of water over the alluvial soils would allow more water to seep into the aquifer. Agriculturists that own the fields would be compensated to keep winter crops out of production to allow flooding. Compensating farmers to keep land out of production would also increase the viability of agriculture in the basin.

The depleted aquifer in the lower watershed is exacerbated by the depleted granite-fissure aquifers in the upper watershed. During flood events, the granite-fissure aquifers should overflow creating a sub-surface flow. The sub-surface flow should create a baseline flow in the river that lasts year-round.

Why is meander so important to habitat?

River composition is based on the natural meander of a river. The meander is caused by upstream rock and soil being worn away and carried downstream by the flow of the river. Twists and turns slow the river making it unable to carry larger particles. Larger particles are dropped onto the bed of the river creating habitat. The flora and fauna of a river system have adapted to rely on the specific components of that river. When the river is restricted, the channel moves faster and natural sediments are often not deposited on the river bottom. The habitat that animals and plants rely on is significantly changed.

Speed of the water is also a form of habitat. Some animals, insects and plants are adapted to living in fast moving water, others in slow moving water. When a slow velocity river is accelerated, aquatic insects and young fish have trouble surviving. In turn, the species that eat insects and small fish lose their food source. Habitat is compromised along with the health of the populations that depend on it. Without a natural meander, rivers tend to adopt a uniform speed and support a uniform habitat rather than a diversity of habitats.

Figure 2.4 Meander and Habitat

Agricultural Productivity

Levees alter the productivity of agricultural land. The high productivity of the soil in the Central Valley is historically due to the annual influx of nutrient rich sediment from the Sierra Nevada Mountains. The river gathers mineral-rich silt from the bedrock of the mountains and deposits it onto the valley floor. Crops thrive on the constant renewal of minerals. When the land becomes removed from the river, the natural deposits of minerals are also removed. Farm land becomes less productive and more minerals are carried into the bay-delta, altering the composition of the delta. In order to compensate for the loss of productivity, expensive and sometimes damaging fertilizers are added to the land.

Possible courses of action:

a. Improve Levee Maintenance

Levee maintenance is currently under-funded and under-staffed which increases the likelihood of levee failure even in moderate flood years. Additional funding is needed to proactively identify and repair weaknesses, plan for future floods, and properly maintain existing infrastructure. Rip-rap or other structures can be placed along the levees to ensure stability. Professional consultation should be sought before work is completed on a levee. This is particularly pertinent in a climate of increased scrutiny following the levee failure associated with Hurricane Katrina. Great attention and funding are being given to levee system maintenance. There may be opportunities to receive funding to improve and restore the levee system. It should be noted that currently agriculturists living along the river entirely bear the cost of levee maintenance. While they directly benefit from the levee system, so do all of the property owners in the area, many of whom do not pay into levee maintenance.

b. Set back levees

Set back levees could be placed outside the edge of the flood plain. Floodplains would be reestablished, habitat would be restored, a natural meander pattern would return, and the levees would be able to hold more water. The river composition, health and stability would likely be improved and groundwater recharge would be increased. See section 2.1.1 for more detail and cautions about setback levees.

c. Mitigated Flooding

Mitigated flooding would pump water over the levees during high river flows onto surrounding fields. Mitigated flooding would allow groundwater recharge and remove nutrients from the river by placing them on agricultural fields. See section 2.1.1 for more detail on the benefits of mitigated flooding.

d. Non-repair of levee breaches

By letting the levees wash out, the river would return to its natural course. Once a wash-out occurs, the setback levees could be established without the cost of dismantling current levees. However, the results could be catastrophic for individual farmers and the random nature of the process would make it nearly impossible to study scientifically. Without the guidance of research, high restoration value areas may be neglected while less productive areas are restored. Alternative flood control would have to be instated to keep the river from causing significant damage to property on an annual basis, likely at a high cost. This is unlikely to happen unless significant amounts of funding could be found. Since the levees and surrounding land are privately owned, landowners would need to be convinced to and compensated for not restoring levee breeches.

2.1.3 Drought

As the "boom and bust" cycle of weather intensifies and as water is removed from the watershed, the likelihood of drought increases. Research from UCD has shown that the occurrence of wet winters followed by dry springs has increased in the last few decades. This means that drought years are likely to increase in the coming decades. Drought years are difficult for production agriculturists and habitat alike. Irrigation and obtaining feed

for livestock becomes more expensive. Most significantly, drought years deplete the aquifer at a faster rate and allow less opportunity for water recharge, diminishing crucial resources. The river dries up much earlier in the year reducing habitat. For example, salmon spawning habitat is reduced when the fall flows begin late or stop flowing early. Migrating birds also find a disruption of habitat. Drought places a great burden on all the inhabitants of the watershed.

Possible Solutions

a) Irrigating perched aquifers

A study published by UCD suggests that the highest potential for maintaining stream flow during critical salmon spawning periods is to target perched aquifers near the river. A perched aquifer is an area of land that has impermeable soils (like rock or clay) below the surface. Since water cannot seep through the rock or clay, it runs sideways into the river. Water temperatures, mineral composition and sustained flows will be more natural than putting water directly into the channel. Water can be drawn from the Folsom Canal. While this practice may be compatible with agriculture by growing water tolerant crops, the study suggests that the recharge land should be kept relatively free of vegetation in order to allow a maximum amount of water to reach the stream channel. Experimentation should be done to see if this practice is effective and can be compatible with production.

The fields selected for irrigation in spring and fall may be the same fields that are used to facilitate agricultural recharge in winter. Agriculturists that are already paid to keep land out of production during the wet season can begin the flooding in the fall timed with salmon runs.

b) Water storage in wet years

Water can be stored during years of high rainfall to replenish the water table. Holding water in pond basins, fields, and flood plains during high precipitation years will help recharge groundwater. Re-establishing wetlands would be an important part of this effort. Both urban and rural landowners can be encouraged financially and ethically to recreate wetlands on their property. Increasing water recharge will lessen the impacts of water use during drought years making them less significant to the overall aquifer overdraft. See section 2.1.1 for a more detailed explanation of storage options.

2.1.4 Depleted Aquifer

The depleted aquifer is the most important issue facing the Cosumnes River. Due to the lowered water table, the river is running for shorter periods of time at lower velocities and the entire watershed is drying. The river is being sucked into the aquifer at a pace much greater than can be sustained. Without fixing this problem, the river may literally disappear. Thus it is essential that this issue be given the highest priority.

The causes of the dropping aquifer are two-fold. First, water is being extracted at an ever greater rate and second, water is not being replenished.

Increased water consumption
As urbanization increases water consumption, water is being removed from the aquifer at greater rates, reducing the level of groundwater. As the aquifer drops, the river becomes disconnected from the river as the two no longer touch. When the two become disconnected, initial rainfall must first flow underground to rewet the area below the river then begin to fill the channel creating a river flow. The result is a shorter and lower annual flow of the river. In many years, the flow of the river is shortened by a few months. The shorter flow affects habitat, especially for salmon. Salmon have two months less to spawn and face greater predation. Migratory birds also have a shorter availability of wetland habitat to complete their migration.

Reduced groundwater recharge
When the river becomes disconnected from the floodplain, the replenishment of groundwater is reduced. When water does not flow onto the floodplain, it moves to the ocean without much opportunity to seep into groundwater and the aquifer is not recharged. The river needs a prolonged, steady flow of water over the alluvial fan at the end of the river to recharge the aquifer.

Long-term impacts of a reduced aquifer could potentially be devastating to the communities that rely on it. It is not clear how long the aquifer will last if the water table continues to drop. Long –term effects of a dropping aquifer could include increased sedimentation in the water as it becomes harder to pump, sink-holes, salinization and greater expense in reaching needed water supplies.

Problems in the upper watershed are just as severe as problems in the lower-watershed. In the upper-watershed, rock fissure aquifers provide unreliable, inconsistent waterflows. As the aquifers are depleted, there are no alternative sources to rely on for water needs.

Possible Solutions:
a. Pre-wetting the river.
A coalition of agencies in the watershed led by The Omochumne-Hartnell Water District has undertaken a project to "pre-wet" the river in advance of fall rainfall. By pre-wetting the ground with water from the Folsom Canal, the area directly below the river becomes saturated. The first rains of fall can then initiate the flow of the river rather than being absorbed below the ground. The river will flow much closer to its natural rate and salmon will be able to migrate closer to their normal pattern. While promising, no data is yet available for this practice. In the first year that pre-wetting was to occur (2006), the Cosumnes River experienced an unusually wet season and the river ran all year long. The method was not needed.

b. Maintain the flow of the channel by irrigating land over perched aquifers.
(See section 2.1.3)

c. Change forestry practices.

The headwaters of the Cosumnes are located in the El Dorado National Forest. This area is heavily forested and used mainly for recreation but does have some forest harvesting as well. Scientific studies over the last few decades have tested the affects of forest management practices on the production of water with greater or lesser results. The Forest Service should establish water production as one of the key objectives of its management and adopt appropriate management practices. While just 16% of the water in the watershed comes from melting snow, this yield may be increased through forest management. Snow melt is particularly important because it feeds the river in late spring, a time when the river often dries up. More water present in this crucial time will extend the flow of the river, help replenish the aquifer, and allow salmon hatchlings more time grow before voyaging out to sea.

d. Reduce water consumption.
A reduction in water consumption will reduce the pressure placed on water resources. Municipalities, water districts, citizens, industrialists and agriculturists need to be encouraged to reduce their consumption of water. This can include financial incentives, education, mitigation, demonstrations of beneficial practices and a call to social responsibility. Education and incentives will be presented more comprehensively in section 3.4.

e. Replenish the aquifer.
Replenishing aquifers is still a relatively new field of study with mixed results. More research should be completed to determine the correct methods, location, timing and actions of replenishment. Current research results should be monitored in order to implement successful practices as they become available.

f. Increase water storage
The use of water storage options including rain barrels, water catchment systems, building wetlands, and restoration should be encouraged throughout the watershed. Maintaining water within the watershed, even if only for short periods of time, will help restore the natural functioning of the river and reduce water consumption. See section 2.1.1 for more details on water storage options.

2.2 River Condition

2.2.1. Erosion and Sedimentation

The Cosumnes River has a "boom and bust" nature that is characterized by intermittent flood events followed by low to no-flow periods that has significantly altered sedimentation and erosion. The "boom and bust" cycling would naturally occur in the river, however, it has been exacerbated by the drying climate, the levees, and the lowering of the aquifer. Rather than a consistent meander through the valley, the river has become a pipe moving at high velocities followed by low velocities. The result is two-fold. First, the high velocities of the current erode the stream banks. Second, during low velocities, sediment is deposited in the gravel beds of the river. This can occur over both time and space. Once the sediment deposits, it "cements" the beds making it difficult to

remove and compromising its ability to support salmon spawning. Future high water flows rarely clean out the beds.

While sedimentation and erosion has been altered in this river, it is not currently causing any significant problems. Water quality is high and with the exception of a few places along the river, erosion is not occurring at a rapid pace. It appears the most significant impact on the Cosumnes River from sedimentation may be the cementing of salmon spawning gravel beds. Action should be taken to ensure that the problem does not worsen, to stabilize the areas that are eroding, and to improve salmon habitat.

Possible Solutions:
a) Reconnect the floodplains
Reconnecting the channel to floodplains in strategic places will help maintain the levees that already exist, reduce the scouring of banks, and filter sediment before it cements gravel beds. Floodplains serve as natural filters and "speed bumps" for the river. Restoring high-ecological value floodplains in targeted areas can help restore the natural functioning of the river. See 2.1.1 for more discussion.

Figure 2.5 Floodplain in the Cosumnes

b) Gravel can be deposited in the river to compensate for the loss of salmon spawning habitat. The Granless dam currently serves as a catchment for gravel from higher

elevations. This gravel could be relocated to lower portions of the stream where salmon spawn. Research should be done to ensure that the disturbance caused by gravel removal will not have unintended consequences that outweigh the benefits from creation of habitat. For example, if removing gravel stirs up large amounts of sediment, the newly placed gravel could be cemented at faster rates making the practice irrelevant. If it appears that removing the gravel from the river will cause significant sedimentation or release stored mercury, gravel from other sources can be used. Demonstration sites should be attempted before large scale adoption of the practice.

A recent study in the Mokelumne River has show gravel transplant to be effective. Salmon were found to spawn in the transplanted gravel beds within 2 months of placement and the positive effects of transplanted gravel were found to last 3 years. The Mokelumne River has higher levels of sediment than the Cosumnes, so it can be expected that the Cosumnes may have an even longer lasting result in gravel transplant.

Figure 2.6 Gravel in the Cosumnes

c) Clean gravel beds

Gravel beds can be manually cleaned on an annual basis to ensure sufficient spawning habitat. This practice will be time consuming and may or may not be effective.

d) Restore plants in un-vegetated portions of the river

Restoring vegetation along the riverbanks will increase habitat, help to slow the velocity of the river, and filter sediment. Increasing vegetation will also help reduce water temperatures, stabilize banks, and increase storage capacity within the river. There are only a few places along the river that are not currently vegetated or are not lined with levees. These few places along the river should vegetated. Since almost the entirety of the river is privately owned, private landowners will need to be found that are willing to allow the plantings.

Restoration projects are generally expensive, but assistance is available. Grants may be available to help through programs like WHIP, CRP, and CSP and through federal, state and local restoration grants. In addition, groups like Tree Trust may be able to assist in obtaining vegetation. A private Cosumnes River fund could be established to help restore the river. Work should be done to identify areas in which landowners are interested in restoring habitat and community resources should be placed into restoring those properties.

2.2.2 Bank Instability

Channelization of the river has increased the velocity of the water during high flows causing bank instability. A fast moving river channel scours the banks carrying debris, sand and silt into the river. Bank strength is reduced, the bank is undercut and eventually bank failure results. Once bank failure occurs, large amounts of sediment and debris are carried into the river. Both water quality and bank stability are expensive and time consuming to repair once they have become compromised. The main way to increase bank stability is to reduce the velocity of the river.

Jones and Stokes found bank erosion throughout the watershed. The upper river was not a concern since most of the banks are bedrock. The main area of concern is the section southwest of Michigan Bar road past Rancho Murieta to the top of the levees. Within this area sections of bank are eroding into the river. Some of the eroding banks are located directly above salmon spawning habitat and could threaten gravel beds with sedimentation. If left as is, these sections have the potential to degrade water quality and threaten roads. Because of the expense of restoration including permitting, the banks have not been restored. These sections are small, could be easily repaired and should be a high priority area for restoration. While Jones and Stokes found severe degradation throughout this area, this result is over-reported. They completed their survey by aerial photos and did not verify by visual inspection areas that were covered in vegetation. Through informal inspection, these banks are in better condition than reported. The levees also have problems with erosion, but they are mainly caused by improper maintenance and thus have different solutions.

Figure 2.7 Sluffing bank on the Cosumnes

Possible solutions

a) River meander

A meander works like "speed bumps" to slow the flow of the river and reduce its impact on banks. By slowing the velocity of the river, banks become more stable. While restoring a natural meander would improve many rivers, it would likely not have much impact on the problems in the Cosumnes. The river flow is low and does not come in contact with the banks for most of the year. See section 2.1.1 for more details on restoring the river.

b) Restore vegetation on river banks

Increasing vegetation on river banks helps increase the stability of banks and reduces the speed of the riverflow. It also keeps the river narrower and deeper rather than broader and shallower which will increase the river's storage capacity. There are very few sites along the river that are not vegetated and are not in levees. Levees are not allowed to be planted in vegetation. This leaves several high priority restoration sites that could be easily planted. See section 2.2.1 for more details.

c) Increase large debris in the river

Increasing debris in the river will slow the velocity. Placing large items liked downed trees in the river may help slow the velocity of the river and provide habitat. While extra debris will help, it will provide only a minimal impact. It is important that the material entering the channel is compatible with the ecosystem and will not threaten banks and bridges if carried downstream. Rip-rap cages are often installed where debris is held in

place so that a natural filtering can occur and the velocity of the river can be lessened. If improperly placed, debris in the river may make the problem worse. Engineers should be consulted before implementation. Given the timing of high flows in the river, debris is likely to cause more harm than good.

d) Banks can be lined with biological material
Biological material could keep the river from coming in direct contact with a fast moving stream. By anchoring logs or equivalent material to the bank, the biological material will receive the impact of the river, not the bank. Care should be taken to ensure that the materials are compatible with the ecosystem. This method has been attempted across the country. Study results should be examined before installation is attempted. Levees can be included in such practices, however, an engineer should be consulted before performing work on levees.

2.2.3 Channel Constriction

Channel constriction can lead to bank erosion, sedimentation and damage to in-stream structures such as bridges. Constriction points on the Cosumnes River are a concern. During flood events, water backs up behind bridges and narrow points increasing water levels upstream placing pressure on the levee system. Four specific areas were identified by watershed stakeholders as possible river constriction areas: between Interstate 5 and the railroad crossing, between Highway 99 and the railroad crossing, Wilton Road Bridge and Dillard Road Bridge. In April 2000, at the request of the Cosumnes River Task Force project committee, the Dillard Road Bridge site was assessed by the Public Works Agency. The Dillard road site was found not to be a significant threat to the health of the river, stability of the bank, or bridge. Further studies are needed to determine if channelization threatens any additional structures. If these sites are found to significantly affect the river, appropriate restoration should be explored.

2.2.4 Water Quality

The main issue in addressing water quality is the lack of data. In order to better understand the problem, the State of California has recently required production agriculturists to test the water exiting their fields. Water quality testing is expensive. As a compromise, agriculturists and local RCDs have established a cooperative arrangement called "agricultural waivers" in which farmers contribute to a fund that collectively tests the water at various points along the river. Test sites move through the river and tributaries annually. If water quality problems are found, further test sites will be implemented to determine the cause of the water quality issues. Producers then have incentive to keep water clean in order to avoid increased expense of testing and/ or possible fines. Limited data is beginning to become available and show high water quality. If significant problems are found, further monitoring would be necessary.

Preliminary data from the agricultural waiver program and data collected from the SWRCB have shown that the river has very high water quality. TMDLs are only exceeded a few times a year at times when exceedences can be expected. The

exceedences that do occur are not extreme. Two areas of concern are slightly elevated, though are not in excess of TMDLs. First, pathogens are slightly elevated near the campground at Sly Park Reservoir. This is expected for a recreation area. Second, levels of nutrients increase slightly south of Twin Cities Road. This level is normal for a wildlife preserve and does not exceed TMDLs.

Part of the reason the river has such high water quality is due to proactive work of agriculturists in the watershed. Local agriculturists have received over $6 million dollars in EQIP CRP and CSP funds in the last 5 years to implement conservation practices on over 6,000 acres of land. Since this money comes through matching grants, local agriculturists have also spent $6 million dollars on conservation for a total of $12 million. Continued efforts will help preserve this valuable resource.

Possible Solutions:

a. Augment farmer incentive programs

Farmer incentive programs like EQIP, CRP, and CSP provide money for environmental projects on private lands. EQIP is a cost share program through the federal government that allows farmers to upgrade outdated equipment to reduce pollution and water use. CRP and CSP provide federal dollars to develop habitat on agricultural land. Locally, hundreds of projects are proposed for these programs every year, yet only about 20% are able to be funded. Farmer incentive programs are particularly useful since they require matching dollars which double the amount of money spent on conservation. Local supplemental funding would increase the impact of these programs, fund projects that would otherwise not be completed, and help ensure water quality. Money provided goes directly into practical conservation practices.

b. Increase outreach

An agricultural assistant could proactively seek out problems in the watershed in order to identify and assist producers in reducing negative impacts. While many producers have participated in restoration projects, many have not, leaving large potential for change. Outreach could be cost effective in seeking out new producers to participate in conservation programs. The assistant could help producers correct problems while they are eligible for cost share measures and before expensive fines are levied. It is important that this effort be lead through a special district like an RCD or outside actor rather than a regulatory agency so that the producers can seek help without threat of being penalized.

c. Increase water flow

Increasing water flow will dilute pollution in the waterway. Any of the proposed steps to reduce water consumption and increase water production (many examples have already been provided) should be thoroughly investigated.

2.2.5 Ground Disturbance and Fire Safety

When ground is disturbed, sediment, chemicals, and debris are carried into the river with rainfall runoff. A majority of ground disturbance occurring in the upper watershed is a

result of forest harvest and vineyard conversion. Forest harvest can cause large ground disturbance depending on the methods employed. If best management practices are used, limited impact should occur. Since harvest has been reduced significantly in the last two decades and water quality is high, it is not likely that this remains a large concern.

Conversion of land to vineyard has occurred rapidly in the watershed in the last decade. Vineyards can adversely affect the watershed in many ways including the erosion of soil that is open and exposed between the rows of vines. Fortunately, by implementing simple best management practices, the impacts can be significantly reduced. In response to potential hazards, the vineyards in the watershed have been held to rigorous BMPs including nitrogen fixing cover crops planted between the rows of grapes. Because water quality is high in the Cosumnes and there are no signs of ill-impact, it appears that the BMPs are working. In addition, vineyards are beginning to face greater financial difficulties and the trend toward vineyards is likely decreasing.

Figure 2.7 Vineyard

In the lower watershed, urbanization is causing large-scale soil disturbance. Every time a new building is built, the ground is disturbed. With rapid urbanization occurring in the watershed, a large amount of soil is being impacted. While builders are required by law to install best management practices to reduce impact, practices are not always installed

properly or maintained to the level necessary. The city of Elk Grove has education programs and permitting requirements to ensure compliance. However, this program is under-funded and enforcement is not adequate. Augmenting education and enforcement activities could lead to more consistent implementation.

Fire Danger

Fire is one of the greatest threats to residents and ecosystem health in the upper-watershed and could provide a future source of ground disturbance as the land in the upper watershed has not burned in recent times. In addition to threatening homes and public safety, fire could contribute large amounts of soil and debris to the river for many years to come and ecologic recovery could take decades. A large scale fire could prove devastating to the health of the watershed. This is a particular concern in a drying climate as drought years bring catastrophic fires to the Western States. Fuel load reduction in the form of woody debris removal is being completed by various agencies. Local fire councils have developed in most communities and federal agencies, state agencies, and RCDs are implementing projects. However, coordination and resource sharing does not appear to be occurring in any significant way. By combining efforts and sharing knowledge among active partners, the efforts could be much more effective.

Possible Solutions:

a) Increased monitoring of construction sites.

Ensuring that best management practices are being employed is crucial to the health of the watershed. It is important that construction sites are monitored often and builders are reminded of best management practices. Fines levied could fund additional education programs and outreach activities to builders.

b) Outreach to vineyards

BMPs for vineyards should be advertised and distributed widely. Surveys can be completed to identify future needs of vineyard owners and funding and technical assistance should be provided to the vineyard owners in correcting problems.

c) Develop a fire mitigation plan

A plan should be developed to ensure river health in the event of a fire. Fires happen quickly with little time for mitigation while mitigation often takes time and requires permits from multiple agencies. Quick action to mitigate damages (like placing structures in streams to capture debris) can reduce the overall impact. The quicker action is taken, the more likely the river is to recover.

d) Coordinate fire safe efforts

Increasing the coordination of various agencies working on fire issues will increase the effectiveness of all the efforts. Local volunteer efforts can be augmented with the technical knowledge of government agencies and government agencies can be more effective with local input and volunteer efforts.

2.3 Habitat

2.3.1 Levees and a lowered water table

Increased water use combined with the accelerated drainage caused by levees is dropping the water table at the rate of over a foot a year. The entire watershed is feeling the impact of a drying landscape and riparian habitat has been reduced. The loss of habitat has been particularly detrimental to native salmon. Salmon populations have dwindled and face further declines if the water table continues to drop.

More in-depth analysis and Solutions to this problem are presented in section 2.1

2.3.2 Urbanization

Habitat loss accompanies residential development. Because development is occurring at a dramatic pace, habitat is being reduced at record levels. While development can not be stopped, its impact on the environment can be reduced through simple actions by residents (such as planting native and low-wateruse plants). This issue is particularly ripe for change given the large number of new residents and general environmental attitudes. Seventy percent of Americans consider themselves to be environmentalists yet most do not know how their actions impact the environment. Education has the potential to significantly reduce urban impacts. In addition, as urbanization occurs, wildlife corridors are often blocked by fences, houses, and dense development. Corridors are particularly important in the upper-watershed given its interface with wildlife. Impacts of development on wildlife can still have an impact on protecting habitat.

Possible Solutions:

a. Educate homeowners

Many landowners live within a few miles of the Cosumnes River, the Mokelumne River or one of its tributaries, yet most people do not realize these rivers exist. It is important that residents become aware of their direct impact on the river and riparian habitat. By implementing simple practices like reducing the length of showers, providing backyard habitat, collecting rain water, creating rain gardens, not watering driveways and streets, and using chemicals sparingly and properly, residents can reduce their impact on the environment. The information can include tips on keeping animal corridors open on newly developed properties. Education should be intensive and comprehensive.

b. Encourage the use of native plants and low-water use plants

Lawns are the number one use of water in the urban landscape and use approximately 3 acre feet of water per year. By removing grass and planting grass alternatives, low-water use plants and native species, homeowners can significantly reduce water-use. Encouraging water-wise plants through incentives and education will help reduce water consumption and provide habitat.

Education can include the cost savings of water reduction, the benefit to wildlife, and practical strategies to maintain water-wise yards. It also should address the stigma many homeowners have about native gardens. Some homeowners do not want to plant native

species because they feel that native landscapes look unkempt or are labor intensive. Education should focus on ways to make native gardens look more traditional and illustrate how plants take less effort and resources than lawns.

Several decades ago, the Sloughhouse RCD sold low-water use plants at cost to the public. It may be appropriate to resume this practice.

c. Build the capacity of native plant nurseries
A network that connects native plant nurseries, homeowners, and agencies together would make water-wise gardening easier for homeowners. The network could create demonstration gardens, provide classes, develop a native plant tour, build the capacity of greenhouses that sell native plants, provide cost incentives for planting native species, show the beauty of natural landscapes and work with homeowners to connect them to resources. By establishing a support network, it will become easier and less expensive for homeowners to install and maintain native plants.

d. Incentives for water-saving practices
Incentives for low water-use appliances, rain barrels, and other water-saving practices should be provided. A rebate (possibly in coordination with water districts) could be provided to assist homeowners in installing water saving measures. Hard to find items like rain barrels could be offered through the water district at a low price. Advertising for these services should accompany the program.

e. Home audit personnel
While utility companies are required by law to provide home audit staff, these services are not well publicized and staffing is often minimal compared to the demand. The service should be more readily available, advertised at a greater rate, and more highly staffed. Personnel should be available to assist home owners in improving their practices, finding cost-share incentives, finding resources and designing water-wise gardens.

2.3.3 Fire Danger
Fire has the potential to destroy vast amounts of habitat throughout the watershed. Many animals would not be able to leave fast enough to escape the fire, those that did may not be able to find necessary resources such as food. The first impact would be on habitat directly destroyed by the fire, but a ripple affect would follow. The river would carry debris down the river and pollute habitats downstream. If significant rainfall followed the fire before vegetation could re-root, mudslides could follow.

Possible Solutions
Solutions to fire issues are presented in the previous sections.

2.4 Coordination
2.4.1 Management

The political atmosphere of the watershed is changing in pace with the growing urban population. This is especially true with the recent incorporation of the City of Elk Grove. Services that used to fall under water boards and RCDS are now coming under the jurisdiction of the city. However, the transition has not gone smoothly. In spring of 2007, the city filed multiple law suits against multiple agencies. It is not the intention of this report to place blame or dictate who should be in charge of the water. It is in the interest of the watershed, the water resources, and everyone who uses the water supply to establish a clear jurisdiction over water and to provide a forum in which all actors in the watershed can come together to share knowledge, resources, directions, and plans.

Possible actions:
a. The various agencies responsible for water resources need to establish an effective and clear chain of control for water so that it can be properly and effectively managed.

b. RCD coordination
The local RCDs can take a stronger role in watershed management by combining efforts. With joint efforts problems can be solved from a more holistic viewpoint. Issues can be addressed throughout the watershed with a greater potential for impact.

2.4.2. Activities

Many projects, policies, and activities affect water within the watershed. One of the strengths of having a watershed coordinator is the ability to streamline resources by bringing projects in coordination with each other. An actor working solely for the betterment of the watershed can greatly increase the effectiveness of everyone working in the watershed. By coordinating, sharing resources, linking the efforts of people working in the watershed and continuing to focus on the priorities and objectives of this report, the watershed will work much more effectively.

Possible Solutions:
a. The continuation of the watershed coordinator after the completion of the initial watershed coordinator grant ends would help to ensure the continuity of watershed efforts.

b. Reconvening the watershed council can help with the coordination of watershed activities and grow interest in watershed work. The council can provide a forum in which people can exchange ideas and share resources. Keeping key members of the watershed focused on its improvement will help to advance the restoration of the watershed.

c. RCD coordination
The local RCDs can take a stronger role in watershed management by combining efforts. With joint efforts problems can be solved from a more holistic viewpoint. Issues can be addressed throughout the watershed with a greater potential for impact.

2.4.3 Research

The work completed by the Cosumnes Research Team was informative and comprehensive in nature. Coordinating the efforts of many researchers helped with the effectiveness of the information to guide management decisions. However, the team released its final report in 2006. There are still questions that need further research. This will be particularly important as actions in the management plan are put into practice. Research can guide management by evaluating management strategies and developing further alternatives. Not only will this help guide efficient use of resources in restoring the Cosumnes River, but will also provide insight into restoring watersheds throughout the region and possibly throughout the world.

Possible Solutions:

A. Continue Cosumnes Research Team

Research needs and objectives should continue to be identified, prioritized and shared between researchers throughout the watershed. Effort should be made to further connect management with research.

B. Watershed coordinator involvement with research efforts

The watershed coordinator should work with the research team to ensure that management is being guided by research. Coordination between the two will make both more effective.

2.4.4 Recycled Water

Waste water is treated and converted to recycled water that can be used for irrigation and purposes that do not compromise human health. Using recycled water can greatly reduce the water needs of a watershed. Because of the potential for water conservation, many entities within the area have begun to produce recycled water including Rancho Murieta, Sacramento Regional Wastewater Plant, Freeport Sewage, the City of Plymouth and The Galt Treatment Plant.

All of the entities creating recycled water have found that their production far exceeds the demands. Because recycled water can not be discharged directly into rivers and streams, thousands of gallons of excess water are left in the hands of treatment facilities. While each plant has its own plan for distributing excess water, an overall scheme has not yet been developed to transport recycled water outside their immediate production area to reach agriculturists and others that could use that water. It is in the best interest of that watershed that this water be used efficiently. This problem could be easily remedied in the best interest of the producing entities, agriculturists and the watershed.

In addition, individual recycling equipment can be encouraged on individual properties. Water can be used for landscaping and as a resource for fire safety applications.
Possible Solutions:

A. A stakeholder group of local agriculturists, industrial interests and recycled water producing agency representatives should form an ad hoc committee to come to an agreement that would serve everyone's interests.

B. Individual recycling systems can be encouraged through technical and financial assistance.

3.0 Implementation Plan

3.1 Coordinated planning

3.1.1 Watershed Coordinator

The watershed coordinator is essential to completing the work outlined in this watershed management plan. Coordinating efforts helps with the efficient use of resources, communication among active groups in the watershed and streamlining efforts. It is important that this position is extended to lead the enactment of the watershed management plan.

3.1.2 RCD Coordination

The watershed would be improved by coordinating the RCDs that work along the Cosumnes River. Currently, the RCDs are each implementing projects and coordinating efforts within their own region. There is very little interaction or integration of activities. By sharing resources and addressing problems throughout the watershed rather than just locally, the efforts can be much more effective.

3.1.3 Watershed Council

The RCD led watershed council should be brought together to address the major issues of the watershed. Monthly meetings should resume to establish priorities, identify opportunities, and coordinate the enactment of the management plan.

3.1.4 Watershed Council Subgroups

Subgroups of the council can be established to guide the implementation of specific objectives. The council can identify needed subgroups and then the RCDs can take the lead in creating subgroups including: an education subgroup, a funding subgroup, and a restoration subgroup.

3.1.5 Landowner Council

The RCDs can take the lead in developing a council for landowners of river property. By bringing these landowners together, they would have the opportunity to share resources, identify work projects, set priorities, and inform each other of the challenges and opportunities they face on their land. It would also serve as an excellent forum to promote opportunities like EQIP grants and to educate landowners about new and emerging issues.

3.1.6 Ad Hoc Committees

Several ad hoc committees should be formed by the RCDs with the express purpose of addressing key river issues. Mitigating flood plains is one example. An ad hoc committee can be formed to identify partners, create strategies, find resources, and implement projects. The watershed coordinator can convene these committees. It also may be relevant to address these issues through the Cosumnes River Task Force. The Task Force is comprised of the constituents that would be needed to put a project of this type into action and has the credibility to work with the necessary landowners.

3.1.7 Watershed Level Planning Committee for Mitigated Lands

Mitigated lands are being implemented throughout the watershed largely spurred by development. Builders are required to establish habitat areas to mitigate the impacts of their developments. However, there is no coordination of the mitigated land to ensure that a variety of habitat types are being created. Coordination could help ensure that a mosaic of habitat types is created throughout the watershed to support a maximum number of species in the watershed.

An RCD led committee could create a database of potential mitigation land with suggested habitat types to make mitigation more efficient for animals, builders and landowners alike.

3.1.8 Fire Safety Coordination

Many groups in the watershed are removing brush, evaluating landowner properties and developing plans for fire safety. This work is both time and money intensive. These efforts could be greatly helped by coordinated efforts.

An RCD led committee of fire-safe agencies in the region could promote a more efficient use of resources.

3.2 Restoration and Prevention

The Cosumnes River is in relatively good health with just a few areas that are in need of restoration. The areas that are in need of restoration could be healed easily greatly increasing the viability of habitat for critical species like salmon. Restoration work should be a high priority for this river because the work that is needed is practical and large returns can be reaped from relatively minimal input. It is also important to the health of habitat and the Cosumnes River Preserve at the base of the river that the water quality does not degrade. Fixing the few problems that are occurring along the river will help to ensure the continued health of this river.

3.2.1 Reconnect the floodplains to the river

Effort should be made to reconnect floodplains to the river. Creating mitigated floodplains seems to be the best alternative as it will likely be the most cost-effective option. It is also reversible. If mitigated floodplains do not show significant changes in groundwater recharge and habitat, other alternatives can be sought with only a minimum of wasted expenditure. The only habitat that will not be improved by this plan will be the

habitat for fingerling salmon. Efforts should be made to recreate this habitat within the channel. Riprap cages or large woody debris could slow the velocity of the river in sections accessible to gravel beds.

The watershed coordinator can convene a committee of relevant interested parties to explore the best alternatives and form a coalition of agencies.

3.2.2 Restore habitat throughout the watershed

The highest yield restoration value will be in restoring the few sites directly adjoining the river that are in need of restoration. They should be the first priority. Once these are completed, a larger plan to reestablish a mosaic of habitats throughout the watershed should be explored.

River sites

There are two priorities for restoration in riparian areas. The first is restoring native vegetation for river health and to create habitat. With the exception of a few sites, most of the river is already in native vegetation. Since there are only a few sites in need of vegetation, it makes restoration much easier. These sites should be sought out and work should be done to make the projects amenable to landowners. Site-by-site restoration plans can be created with willing landowners that identify opportunities for work, restoration, and funding. No work can be attempted without the permission of landowners since a majority of the land is private property.

The second priority for restoration is the stabilization of river banks. Again, minimal work is needed, but the sites that do need work may provide a substantial improvement in habitat. Several of the unstable banks occur in the exact area where salmon are spawning. If the gravel beds become cemented with sediment, salmon will lose their habitat. In addition, roads and power lines may be affected if banks continue to slough into the river.

Restoration sites should be sought based on need and options for restoration should be negotiated with landowners. Landowner cooperation should not be a large obstacle as there are several projects that landowners would like to see completed. The large obstacles to these restoration projects will be cost and permitting. Permitting to complete bank restoration on even small sections of the river can cost significant amounts of money. Relevant agencies should be brought together to determine the most efficient way to achieve the desired results. It is likely that solutions can be found that allow the habitat to be restored without placing undue burden on those that wish to restore it. There are also several grant funding opportunities for restoration work of the magnitude needed on the Cosumnes that could be sought for restoration.

Mitigated lands

When new developments are built, builders are required to buy equal plots in other parts of the watershed to mitigate environmental impacts. This land can be turned into high quality habitat for endangered species including Swainson's hawks. Some of the land can

be used as research sites in which new methods of restoration can be tested or conservation practices can be demonstrated. Contact should be made with local builders to research the scope, magnitude and location of sites and a committee should explore restoration needs. A watershed focus should be taken on these lands to ensure that a mosaic of habitats is restored. Researchers should be part of this effort so habitat can be developed that can be used for critical research needs. Coordination will be essential to ensure a balance of habitat types.

3.2.3 Mitigated Lands Database

There are many landowners that have land that they would like to offer for mitigation projects and many builders looking for mitigation lands. A database could streamline these efforts and build restoration connections. A database could facilitate a diversity of habitats so that mitigation projects do not focus on one type of habitat, but rather create a mosaic of habitats throughout the watershed.

3.2.4 Potential Restoration Project Database

There are many landowners that have restoration projects they would like to see completed on their property. Often the projects are not completed due to a lack of funding, time, and technical knowledge. There are also many enthusiastic actors in the watershed that would like to complete restoration projects. This is particularly true on the Cosumnes given its unique status as a pristine, un-dammed river. A database of potential projects could connect restoration agencies with needed projects. This database could greatly advance restoration efforts and could build critical links of community throughout the watershed.

3.2.5 Increase water storage capacity

Increasing water storage is important in reducing the impact of flooding, decreasing water consumption and recharging groundwater. Water storage can be increased on both urban and production land. It can also be increased on lands adjacent to the river and land throughout the watershed.

Urban Landowners

Rain barrels

Rain barrels catch water from residential roofs that can later be applied to household uses, reducing overall household water consumption. In addition, rain barrels reduce the volume of water runoff in the crucial period of high-velocity currents that immediately follow a rain event. This is important because it reduces the channelization of the river caused by high water flows. Use should be encouraged by providing low-cost rain barrels, education and rebates. Rain barrels are particularly important in the upper-watershed.

Rain gardens

Rain gardens are small wetlands created in the middle of properties designed to catch rainwater. Storing rain water in rain gardens reduces the amount of water running off

wetlands. Additional money should be provided locally to supplement this funding or replace it when it's not available.

Streamlined permitting should be investigated to make catchment systems easier for agriculturists to implement. In addition, safe harbor laws may be essential to encourage agriculturists to install wetlands without fear of future ramifications.

Tailwater irrigation systems.
Tailwater irrigation systems reduce water consumption by recycling water back through fields rather than letting used irrigation water flow off-property. These systems reduce the amount of dirt and chemicals that are carried from fields into waterways with irrigation water. Tailwater systems should be a high priority in the watershed. The watershed coordinator or an agricultural assistant can work with agriculturists to provide information, find funding, and provide technical assistance. A set of voluntary BMPs should be created.

Maintain vegetation on fields during fallow periods
Maintaining vegetation on fields during fallow periods increases water storage in the region by increasing infiltration, decreasing run-off, and stabilizing soil. In addition, planting nitrogen fixing plants can improve the quality of soils. Agriculturists should be encouraged to adopt this practice through financial and technical assistance.

3.2.6 Salmon Habitat

The restoration of salmon habitat is important as salmon populations have been severely reduced due to the lower flows of the river.

Perched aquifer study
One of the barriers to salmon spawning is the shortened time period of river flow due to the dropping aquifer. The length of the salmon season can be extended by adding water to the river during the fall and late spring. UCD suggests irrigating over perched aquifers to maintain a constant, relatively natural flow into the river during critical salmon spawning times. Trial runs of this project should be developed. If successful, a plan should be established to perform this effort every year.

Gravel beds
The restoration of gravel beds is important to the survival of salmon. The gravel beds should be examined for viability to assess the need for restoration. If needed, a gravel augmentation project like the project completed on the Mokelumne River could be recreated on the Cosumnes. Potential spawning beds can be identified and gravel can be placed in stream. Consultation should be sought from the Mokelumne study team to identify an appropriate source of gravel (either in-stream source or other local source). If possible, historic information about spawning beds should be used. If this practice does not prove to be effective, cleaning existing gravel beds should be attempted. If neither of

these alternatives works in practice, further research should be done to find potentially beneficial practices.

In addition, deteriorating river banks in salmon spawning areas should be stabilized to reduce the amount of sediment deposited directly into gravel beds.

Flood plains
If flood plain restoration is implemented, it should occur near gravel beds to provide habitat for salmon hatchlings. Floodplain ecosystems are best for young salmon because the water is slow moving and provides ample food supplies. If floodplains can not be established, it may be possible to create side currents where waterflow can be slowed by installing rip-rap or other barriers. In effect "salmon nurseries" would be created. More research should be done to find ways to supplement floodplain habitat in the short run and restore floodplains in the long-run.

3.2.7 Fire Safety Efforts
Efforts should be coordinated to remove brush, establish fire evacuation and safety plans, and assist landowners with property safety and maintaining defensible space.

The RCDs should lead an effort to bring agencies to the table, catalogue efforts and identify areas where resources can be shared in order to prevent a duplication of efforts and create the most efficient strategy for fire management.

3.3 Funding
All of the projects suggested by this management plan will require economic resources. This section identifies funding sources.

3.3.1 Farmer Incentive Programs
Creating more environmentally friendly farmland has proven to protect small farmers and critical habitat. With both farmland and habitat facing record declines, their fate is becoming intertwined. It is therefore crucial to find ways to promote the interests of both. Programs like EQIP, CRP, and CSP are providing funding to support wildlife needs on agricultural lands. But these programs are under-funded and only sponsor about 20% of proposed projects in any given year. Many highly restorative projects are left undone due to lack of funding. Because EQIP grants require a 50% match from the agriculturist, unfunded projects leave private match dollars on the table that could be used for critical restoration projects. While the programs are under-funded, over 6 million federal dollars and 6 million private dollars have been spent on restoration projects in the watershed in recent years. Over 6,000 acres of farm land have been impacted. It is important that incentive programs continue to promote the health of the watershed. These programs are particularly important in the Cosumnes given that a large portion of the watershed is in agricultural production.

Local funding

Local funding should be established to supplement the current programs. Funding additional projects will strengthen the impact of already successful programs and improve the watershed while supporting small farms. Sources of additional funding should be sought to supplement this critical work.

Agricultural assistant
An agricultural assistant could expand the scope of the programs by fund raising, advertising programs and seeking available funding opportunities. They can also provide technical assistance to agriculturists and identify important restoration projects on private lands.

3.3.2 Restoration Fund
Given that restoration is expensive and grant funding is unpredictable, private funding is crucial to the effort. Donations to a restoration fund should be sought through private donations, fund raising, corporate partnerships, and payment for services. A subgroup of the watershed council can identify the appropriate governing body to manage the fund and the appropriate guidelines and procedures for use. Active fundraising should then begin to provide funding for the efforts outlined in this management plan.

3.3.3 Grants
A majority of the efforts within the watershed will likely be grant funded. Federal, state and private grant monies can be obtained to complete work in the watershed. The watershed coordinator should identify potential funding sources and work with the council to establish priorities, submit grants, and complete the objectives of this management plan.

3.3.4 Partnerships
The watershed coordinator and council should seek out partnerships and engage the community around watershed issues. There are many natural partnerships in the watershed, some obvious, some more obscure. By combining efforts and resources, a greater amount of work can be completed.

3.4 Education
Seventy percent of Americans consider themselves to be environmentalists, yet most people do not realize the impact they are having on their immediate environment. Thus, educating landowners has the potential to be highly productive for relatively little expense. Education should be a high priority throughout the watershed.

3.4.1 Urban Land Owners
An extensive education program is needed to inform landowners about practices both inside and outside of the home that can reduce their impact on the watershed. Given that most of the people living in the urban environment have purchased their homes in the last ten years, they are particularly ripe for an education campaign. Topics should include: storm water pollution prevention, water catchment, water conservation, water-wise

gardening, appropriate use of chemicals, weed recognition and control, backyard habitat, and citizen water monitoring. A separate effort should be made to educate about maintaining wildlife corridors on newly developing properties.

Develop informational brochures
Informational brochures, door hangers, and top ten lists should be developed to inform homeowners about water pollution and conservation. The watershed coordinator can use existing materials to develop these brochures with the guidance of the watershed council.

Use existing networks to distribute information
In order to increase effectiveness, existing resources should be identified and used to distribute educational materials. Groups that already distribute information to the public can make the fliers available. Examples may include RCD offices, government agency offices, water providers, city offices, environmental groups, and homeowner associations. In addition, brochures can be distributed at nurseries including the nurseries at large stores like Target and Home Depot. Brochures about the proper use of chemicals can be distributed everywhere chemicals are sold. The watershed coordinator can identify specific outlets for distribution.

Include information in water bills
Information about water conservation and water pollution prevention can be included in water bills. By working with utility providers, education material can be distributed to every citizen in the watershed. This effort is already underway by the City of Elk Grove Storm Water Pollution Department. The Coordinator should work with the city to augment efforts and expand the reach outside Elk Grove City Limits to ensure that all members of the watershed are reached.

Press Coverage
Many local newspapers are in need of stories. By establishing relationships with reporters and developing press releases, information can be distributed via news outlets.

Door knocking campaign
Door knocking is the most time consuming and expensive method of distributing information. However, it can also be the most effective. Volunteers and interns can distribute information door to door and answer questions. The first priority should be areas in direct contact with waterways. Information regarding chemical application should be a high priority in these areas.

Sprinkler Adjustment Campaign
Drive down any street in the watershed and you will see improperly adjusted sprinklers sending thousands of gallons of water into gutters. Water that streams down driveways and gutters carries with it pollutants and sediment that drain directly into our rivers and streams. A sprinkler adjustment team can go door to door to properly adjust sprinklers. Education materials can be distributed that includes estimates of the cost and amount of

water lost through inefficient sprinklers. This program can be created in two ways. First, a grant or city funds can hire high school and college students as summer employment to go door to door. Second, the program can be used as a fundraiser for high school environmental clubs. Students can charge a nominal fee per homeowner to perform the service and use the fees to fund the club budget.

3.4.2 Schools

As water becomes scarcer, water conservation becomes an essential knowledge for every citizen. A comprehensive water curriculum should be developed and implemented in classrooms throughout the watershed.

Elementary schools

A storm water pollution and water conservation curriculum should be developed for the elementary schools within the watershed. The curriculum can be offered to every teacher in the district.

Junior and senior high schools

The junior and senior high school curriculums can be more in-depth versions of the elementary school curriculum. They should include practical applications like storm-water audits of the school, water testing, and a citizens' water quality monitoring program. Students can also be encouraged to start their own water conservation clubs and initiate water conservation activities on their campuses. Student clubs can be encouraged to participate in such events as enviro-thon and speak-off and scholarships can be established to help students attend enrichment activities. Interested students can be trained to present the elementary school curriculums. A sprinkler-adjustment campaign can be used as a fund raiser for clubs.

College campuses

The watershed coordinator should work with community college campuses to provide practical applications for classes that study watersheds. For example, classes that require water testing as a lab can put their work to practical use by taking samples in critical areas of the watershed. A citizens' water quality program can be established in the colleges to report findings. In addition, college students can serve as mentors to the high school groups. They can teach high school students how to take water samples and assist with club activities.

Connections should be made to UCD to see where educational opportunities overlap with watershed needs.

Education staff

Volunteers and interns can be drawn from high school and college groups as well as the public at large to perform classes that meet educational standards in elementary, junior high, and high school classes. Programs can also be offered to after-school programs and extra-curricular clubs (like the boy and girl scouts). Training educators will expand the

knowledge base within the watershed, build community connections and provide valuable educational opportunities to school programs.

3.4.3 Production Agriculturists

It is important that production agriculturists are updated on new technologies and new opportunities available to them.

Tours

Annual tours are currently being held that allow production agriculturists, agency staff and community members to tour farms and ranches that are implementing habitat restoration or conservation practices. Tours allow participants to share ideas, network, and become aware of resources that are available to them. The tours should continue on an annual basis.

Voluntary Best Management Practices

Voluntary Best Management Practices (BMPs) should be established for agricultural activities. A subgroup of the watershed council should be established to determine which practices are most in need of BMPs. These BMPs can then be distributed through groups that work with agriculturists, at trade shows, and through direct contacts.

Outreach

An agriculture assistant should be hired to outreach to agriculturists. The assistant should identify high priority restoration sites, work with landowners to help correct problems, answer questions, provide technical assistance and find funding sources. The assistant should work for an RCD or other non-regulatory group in order to insure that agriculturists can work without fear of enforcement.

If a landowner council is created, it can be used to distribute pertinent information, listen to concerns, and develop programs that support agriculturists in protecting the river.

Training workshops

Training workshops should be provided throughout the year on topics that are pertinent to agriculturists. Topics should be determined by talking with agriculturists to determine needs and through researching new technologies that producers may not be familiar with. The workshops should be free or low-cost. Tying workshops to the efforts of the NRCS would make them more efficient as the NRCS already has strong outreach and education programs within the watershed.

3.4.4 Native and low-water use gardening

Urban lawns are the number one use of water in any home and therefore have the most potential for water use reduction. As water prices rise, homeowners are looking for alternatives to water intensive lawns. That makes this issue ripe for change. Efforts to promote water-wise gardening can include efforts towards maintaining and providing wildlife corridors and habitat on urban lands.

Native Plant Network
A network should be established to link native plant nurseries, landscapers, agencies, the native plant society, and homeowners together. The network can provide advice, classes, services, and low-cost plants to make it easier for homeowners to make water-wise landscaping choices. Effort should be made to grow the capacity of small local nurseries that provide native plant services.

Low-cost Native Plants
The Sloughhouse RCD used to provide low-water use plants to the public at cost. An exploratory committee led by the RCD to determine whether this service would be appropriate to resume.

Demonstration gardens
Demonstration gardens can be created throughout the watershed. Mitigated land from new developments and willing landowners in high traffic areas should be sought to house demonstration gardens. Several styles of water-wise and native gardens should be represented including more traditional English-style gardens. Several types of lawn alternatives can also be shown. Self-guided and guided tours can be established that allow interested citizens to view multiple gardens, get ideas, and get more comfortable with the idea of planting native gardens.

The demonstration gardens can include ideas to maintain wildlife corridors and to provide habitat in urban lands.

Native plant day in the watershed
The native plant network can sponsor a native plant day in the watershed which includes tours of demonstration gardens, classes, plant sales, information booths, and equipment like rain barrels. Printed brochures of tour routes can be distributed and tours can be lead by master gardeners. The day can include a special focus on lawn alternatives.

3.5 Research
The research provided by the UCD Cosumnes Research Team has been invaluable in providing insight into the functioning of the Cosumnes Watershed as well as watersheds in general. This work should continue. In addition, the watershed coordinator should regularly communicate with the team in order to be able to apply the latest findings to a field setting and communicate needs for future research. This will be particularly important in guiding and evaluating restoration projects.

4.0 Appendixes
4.1 Appendix I – Glossary

Channelization- The confining of the river into a single channel by removing the natural meander. Many actions channelize a river, levees are one example.

Conservation Reserve Program (CRP)- A program administered through the USDA that pays farmers to remove marginal lands from production agriculture to place in habitat.

Conservation Security Program (CSP)- A program administered by the USDA that pays farmers to implement habitat on their production agriculture lands. Examples include creating hedgerows, altering harvest schedule around habitat needs, reducing the use of heavy equipment, and leaving grain in the field to provide food sources.

Environmental Quality Incentives Program (EQIP)- A program established by the US Department of Agriculture that provides matching grants to farmers that purchase equipment. The equipment must reduce the environmental impact of production on the environment.

Resource Conservation District (RCD)- Special Districts established by the State of California in 19 to serve as an intermediary between the state and private property owners. The districts have no enforcement capabilities and thus can provide information to agriculturists that want to take corrective action on environmental problems located on their properties.

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4.3 Appendix III Historic water diversions

A tabulation of historical purchases and diversions of supplemental water supply for the Cosumnes River area within Omochumne-Hartnell Water District is as follows:

HISTORICAL PURCHASES AND DIVERSIONS OF SUPPLEMENTAL WATER SUPPLY FOR THE COSUMNES RIVER AREA WITHIN OHWD

YEAR	CVP SLY PARK (A.F)	FOLSOM-S. CANAL (A.F.)	RIVER DIVERSIONS (A.F.)	DELIVERY EFFICIENCY %
1959	2,610		1,411	54
60	3,150		1,825	58
1961	3,474		1,950	56
62	1,116		316	28
63	0		0	0
64	2,027		1,220	60
65	0		0	0
66	5,300		1,980	37
67	0		0	0
68	4,000		1,430	36
67	0		0	0
70	3,271		1,757	54
1971	0		0	0
72	4,006		2,684	67
73	2,737		2,261	83
74	790		808	102
75		500	343	69
76		8,697	6,350	73
77		0	0	0
78		785	306	39
79		371	371	100[1]
80		72	72	100[2]
1981		2,950	1,539	52
82		107	107	100[2]
83		40	40	100[2]
84		86	86	100[2]
85		2,048	791	39
86		648	648	100[2]
87		44	44	100[2]
TOTAL	32,481	16,348	28,339	57%[3]

1 Early storm commingled with purchased water, unable to determine losses.

2 Direct diversion from Folsom-South Canal via siphons, not delivered into river channel.
3 Excludes footnoted years.

4.4 Appendix IV Complete list of species within the watershed

(Species list thanks to the Cosumnes River Preserve, updated 2002)

Fish

Native

california roach (*Lavinia symmetricus*)
chinook salmon (*Oncorhynchus tshawytscha*)
hardhead (*Mylopharadon conocephalus*)
hitch (*Lavinia exilicauda*)
pacific lamprey (*Lampetra tridentata*)
prickly sculpin (*Cottus asper*)
pikeminnow (*Ptychocheilus grandis*)
rainbow trout (*Oncorhynchus mykiss*)
sacramento sucker (*Catostomus occidentalis*)
splittail (*Pogonichthys macrolepidotus*)
tule perch (*Hysterocarpus traski*)

Non-native

american shad (*Alosa sapidissima*)
bigscale logperch (*Percina caprodes*)
black bullhead (*Ictalurus melas*)
bluegill (*Iepomis macrochirus*)
brook trout (*Salvelinus fontinalis*)
brown bullhead (*Ameiurus nebulosus*)
brown trout (*Salmo trutta*)
carp (*Cyprinus carpio*)
channel catfish (*Ictalurus punctatus*)
crappie (black) (*Pomoxis nigromaculatus*)
fathead minnow (*Pimephales promelas*)
golden shiner (*Notemigonus crysoleucas*)
goldfish (*Carassius auratus*)
green sunfish (*Lepomis cyanellus*)
inland silverside (*Menidia beryllina*)
largemouth bass (*Micropterus salmoides*)
western mosquitofish (*Gambusia affinis*)
redear sunfish (*Lepomis microlophus*)
smallmouth bass (*Micropterus dolomieu*)
spotted bass (*Micropterus punctulatus*)

striped bass (*Morone saxatilis*)
threadfin shad (*Dorosoma petenense*)
wagasaki (*Hypomesus nipponensis*)
warmouth (*Lepomis gulosus*)
white catfish (*Ameiurus catus*)

Amphibians and Reptiles
Native
California Tiger Salamander *Ambystoma californiense*
California Whipsnake *Masticophis lateralis*
Common Garter Snake *Thamnophis sirtalis*
Common Kingsnake *Lampropeltis getulus*
Giant Garter Snake *Thamnophis gigas*
Gopher Snake *Pituophis catenifer*
Pacific Tree Frog *Hyla regilla*
Racer *Coluber constrictor*
Southern Alligator Lizard *Elgaria multicarinata*
Western Fence Lizard *Sceloporus occidentalis*
Western pond turtle *Clemmys marmorata*
Western Rattlesnake *Crotalus viridis*
Western Spadefoot Toad *Spea hammondii*
Western Toad *Bufo boreas*

Non-Native
Bullfrog *Rana catesbiana*
Eastern Box Turtle *Terrapene*
Painted Turtle *Chrysemys picta*
Slider *Pseudemys scripta*

Birds
Acorn Woodpecker
American Avocet
American Bittern
American Coot
American Crow
American Goldfinch
American Kestrel
American Pipit
American Robin
American White Pelican
American Wigeon
Anna's Hummingbird
Ashthroated Flycatcher
Baird's Sandpiper
Bald Eagle
Bank Swallow
Barn Owl
Barn Swallow
Barrow's Goldeneye
Bell's Vireo
Belted Kingfisher
Bewick's Wren
Blackandwhite Warbler
Blackbellied Plover
Blackchinned Hummingbird
Blackcrowned Night Heron
Blackheaded Grosbeak
Blacknecked Stilt
Black Phoebe
Black Swift
Black Tern
Blackthroated Gray Warbler
Blue Grosbeak
Bluegray Gnatcatcher
Bluewinged Teal
Bonaparte's Gull
Brewer's Blackbird
Brown Creeper
Brownheaded Cowbird

Bufflehead
Bullock's Oriole
Burrowing Owl
Bushtit
California Gull
California Quail
California Towhee
Canada Goose
Canvasback
Caspian Tern
Cattle Egret
Cedar Waxwing
Chipping Sparrow
Cinnamon Teal
Cliff Swallow
Common Goldeneye
Common Merganser
Common Moorhen
Cooper's Hawk
Common Snipe
Common Yellowthroat
Darkeyed Junco
Doublecrested
Cormorant
Downy Woodpecker
Dunlin
Dusky Flycatcher
Eared Grebe
Eurasian Wigeon
European Starling
Ferruginous Hawk
Forster's Tern
Fox Sparrow
Gadwall
Glaucouswinged Gull
Grasshopper Sparrow
Great Blue Heron
Great Egret
Greater Roadrunner
Greater Yellowlegs
Greater Whitefronted
Great Horned Owl
Goldencrowned Kinglet
Goldencrowned
Sparrow
Goose
Green Heron
Greenwinged Teal
Hairy Woodpecker
Hammond's Flycatcher
Hermit Thrush
Hermit Warbler
Herring Gull
Horned Lark
Hooded Merganser
Hooded Oriole
House Finch
House Sparrow
House Wren
Hutton's Vireo
Indigo Bunting
Killdeer
Lark Sparrow
Lazuli Bunting
Least Sandpiper
Lesser Goldfinch
Lesser Scaup
Lesser Yellowlegs
Lincoln's Sparrow
Loggerhead Shrike
Longbilled Curlew
Longbilled Dowitcher
Longeared Owl
MacGillivray's Warbler
Mallard
Marbled Godwit
Marsh Wren
Merlin
Mew Gull
Mountain Bluebird
Mourning Dove
Nashville Warbler
Northern Flicker
Northern Harrier
Northern Mockingbird
Northern Pintail
Northern Roughwinged-
Swallow
Northern Shoveler
Nuttall's Woodpecker
Olivesided Flycatcher
Orangecrowned Warbler
Osprey
Pacificslope Flycatcher
Palm Warbler
Pectoral Sandpiper
Peregrine Falcon
Piedbilled Grebe
Pine Siskin
Plain Titmouse
Prairie Falcon
Purple Finch
Purple Martin
Redbreasted Sapsucker
Redhead
Redshouldered Hawk
Redtailed Hawk
Ringnecked Duck
Ross' Goose
Roughlegged Hawk
Ruddy Duck
Sandhill Crane
Semipalmated Plover
Sharpshinned Hawk
Shortbilled Dowitcher
Snow Goose
Snowy Egret
Sora
Swainson's Hawk
Redbreasted Nuthatch
Rednecked Phalarope
Redwinged Blackbird
Ringbilled Gull
Ringnecked Pheasant
Rock Dove
Rock Wren
Rubycrowned Kinglet
Ruff
Savannah Sparrow
Say's Phoebe
Shorteared Owl
Solitary Sandpiper
Solitary Vireo
Song Sparrow
Spotted Sandpiper
Spotted Towhee
Steller's Jay
Swainson's Thrush

Swamp Sparrow
Thayer's Gull
Townsend's Solitaire
Townsend's Warbler
Tricolored Blackbird
Tree Swallow
Tufted Duck
Tundra Swan
Turkey Vulture
Varied Thrush
Vaux's Swift
Vesper Sparrow
Violetgreen Swallow
Virginia Rail
Warbling Vireo
Western Bluebird
Western Kingbird
Western Meadowlark
Western Sandpiper
Western ScreechOwl
Western ScrubJay
Western Tanager
Western WoodPewee
Whimbrel
Whitebreasted Nuthatch
Whitecrowned Sparrow
Whitefaced Ibis
Whitetailed Kite
Whitethroated Sparrow
Whitethroated Swift
Wild Turkey
Willet
Willow Flycatcher
Wilson's Phalarope
Wilson's Warbler
Winter Wren
Wood Duck
Wood Thrush
Wrentit
Yellowbilled Magpie
Yellowbreasted Chat
Yellowgreen Vireo
Yellowheaded Blackbird
Yellowrumped Warbler
Yellow Warbler

Mammals

Native

Badger *Taxidea taxus*
Beaver *Castor Canadensis*
BlackTailed Hare *Lepus californicus*
Bobcat *Lynx rufus*
Botta's Pocket Gopher *Thomomys bottae*
California Ground Squirrel *Spermophilus beecheyi*
California Mole *Scapanus latimanus*
California Vole *Microtus californicus*
Coyote *Canis latrans*
Desert Cottontail *Sylvilagus auduboni*
Gray Fox *Urocyon cinereoargenteus*
Heermann's Kangaroo Rat *Dipodomys heermanni*
Hoary Bat *Lasiurus cinereus*
Mexican FreeTailed Bat *Tadarida brasiliensis*
Mink *Mustela vison*
Mountain Lion *Puma concolor*
Mule Deer *Odocoileus hemionus*
Ornate Shrew *Sorex ornatus*
Raccoon *Procyon lotor*
River Otter *Lontra Canadensis*
Western Gray Squirrel *Sciurus griseus*
Western Harvest Mouse *Reithrodontomys megalotis*
Western Striped Skunk *Mephitis mephitis*

Non-Native

Black Rat *Rattus rattus*
Domestic Cat *Felis cattus*
Eastern Fox Squirrel *Sciurus niger*

House Mouse *Mus musculus*
Muskrat *Ondatra zibethica*
Norway Rat *Rattus norvegicus*
Virginia Opossum *Didelphis virginiana*

From: <jmmynrrs@att.net>
To: <dfgsuctiondredge@dfg.ca.gov>
Date: 11/20/2009 10:27 AM
Subject: mining/porspecting

Its a dam shame we are loseing every thing we in america hold dear.just because some EPA thinks we'll hurt a wittle fish,,,mabe some of you jerks that pass all these law need to go out and try it...and watch the wittle fishees swim around...while your dredge..only one hurting the wittle fishees is the EPA..this earth has been here a heck of a lot longer than a wacko EPA and it be hear when there gone..

and the gold we find would help our econimy...the land will heal. will people when there starving...stop the banning and help the cause...I hear leave some of the nxt gineration ha ha ha what by the time the EPA get though the nxt gineration want have any thing...

STOP STEALING OUR RIGHTS...