

## UPPER SACRAMENTO RIVER MONITORING PROJECT WORK TEAM

### March 14, 2007 Annual Coordination Meeting

Meeting Location: The Red Bluff Fish and Wildlife Office, 10950 Tyler Road, Red Bluff, CA 96080

**I. Welcome** and house keeping items by Bill Poytress (FWS), 2007 Meeting Coordinator.

**II. Announcements:** Two announcements were made (1) by Bill Poytress (FWS) and (1) Susan Strachan (CSU Chico) but those have been included in Project Updates below.

### **III. Introductions and Project Updates:**

*Bill Poytress (FWS-RBFWO):* CALFED ERP/DFG Directed Action Proposal funds have been secured in recent days and the Mainstem Juvenile Fish Monitoring Project at Red Bluff Diversion Dam (RBDD) is currently scheduled to continue on-going rotary trap sampling efforts year-round until June 30, 2009.

*Susan Strachan (CSU Chico):* Monitoring of landscape level changes in riparian vegetation using Native Plant Society protocols detailing changes in post restoration areas and remnant riparian forests noting geomorphic changes as well. Iron Canyon fish ladder to restore spring run migration to holding and spawning habitat on Big Chico Creek is currently in the final design phase. Chico State is planning on providing financial assistance to the project and construction is scheduled to begin next summer.

*Kurt Brown (FWS-CNFH):* No Update

*Josh Gruber (FWS-RBFWO):* No Update [RBDD adult fish ladder passage monitoring will occur during the RBDD gates lowered period, anticipated to occur May 15- September 15, 2007].

*Jim Smith (FWS-RBFWO):* Thanks for coming, this project work team meets annually to identify and coordinate monitoring efforts in the Upper Sacramento River. Group used to be smaller, but has increased in size in recent years as activity level has increased. Thanks for coming.

*Doug Killam (CDFG):* Salmon escapement monitoring to continue this year. The 2006 fall-run Chinook escapement estimate was slightly higher than last year in the upper Sacramento River, although escapement estimates for the entire Central Valley were low overall. The 2006 Winter-run Chinook escapement was a record high since 1982, leading to the consideration of ESA down listing winter-run Chinook as "Threatened" rather than current "Endangered" status. The 2006 late-fall escapement estimate was about average, but conditions in the river during the survey were tough. This year's survey should encounter ideal surveying conditions. More information to be presented after general updates.

*Jason Kindopp (CDWR):* As part of the Feather River spring-run Chinook monitoring project, DWR will continue to put individually numbered hallprint dart tags on adults in the spring time to investigate where fish go post release and prior to spawning. The tags are located near the dorsal fins (2 tags) and have contact information on them. If recovered, please call the number on the tags and leave message concerning recovery information (date, location, harvest or release, size etc...). Reward tags are in the system as well. If calls received from anglers for either tags, refer them to the number listed on the tags. Overall the program has been a success and allows the differentiation between fall and spring-run in an attempt to reduce the chance of interbreeding the different runs in the fall by the hatchery.

*Ryon Kurth (CDWR):* No additional updates. Noted that one of last year's spring-run tags was recovered in the Pyramid Lake, Nevada area and tag assumed to be transferred there via a pelican.

*George Edwards (CDFG):* Continuing two projects using CV rainbow trout/steelhead. One project, a genetics study, whereby they are taking rainbow trout tissue samples from the Upper Feather River, Butte Creek, Deer Creek, and lower and upper Yuba River for genetic analysis (Central Valley Steelhead Genetic and Population Structure Evaluation). Carlos Garza, NOAA Southwest Fisheries Science Center's Santa

Cruz laboratory, is performing the genetic analyses of these samples and comparing the samples to hatchery stocks, rainbow trout tissue samples collected from other Central Valley streams, and coastal steelhead stocks. A final report is expected in May or June of 2007. The second study, in its fourth year of operation due to lack of samples, is a life history study. Samples are being collected to analyze the strontium to calcium levels/ratios in the otoliths of rainbow trout to determine if fish are anadromous, non-anadromous, or of anadromous origins. Central Valley rainbow trout/steelhead are being collected from Deer Creek, the Sacramento River, and lower Yuba River and a report is expected in November of 2007. The samples are being analyzed by the USGS Science Center in Anchorage, Alaska.

*Colleen Harvey-Arrison (CDFG)*: Spring Chinook life history studies primarily on Mill, Deer and Antelope Creeks. CDFG Red Bluff performs spawning distribution surveys on all three creeks; adult counts on Deer and Antelope Creeks via snorkel surveys and redd counts, water temperature, and flow monitoring on Mill Creek. Juvenile monitoring using rotary traps will continue to look at occurrence and size class data of Chinook and Steelhead, no abundance estimates. Biweekly juvenile spring-run rearing surveys are also being conducted at the headwaters to look at relative growth of spring-run to help identify juveniles in rotary traps since traps are located in fall run spawning habitat. Additionally, fall run escapement surveys are done on Clear Creek, Mill Creek and Antelope Creek (tag and recapture) and a multi-year study on Mill Creek fish passage (critical flows needed to pass adult fish which will be presented later in the meeting).

*Sarah Giovannetti (FWS-RBFWO)*: Update on Battle (BC) and Clear Creek (CC) adult and juvenile monitoring projects. BC: currently no juvenile monitoring occurring due to lack of funds associated with BC restoration project. Limited rotary trap sampling occurred from December through mid-February. Anticipate sampling to restart in July or August, depending on availability of funds. Coleman National Fish Hatchery Barrier Weir is currently being operated. Genetic samples are being taken by a fin punch, steelhead trout on dorsal and Chinook on lower caudal. Spring Chinook spawning ground surveys to occur this summer. CC: Two rotary traps operating with gear efficiency trials being conducted using Bismark brown staining techniques with upper or lower caudal clips. Currently finishing up steelhead and late-fall Chinook redd and carcass kayak surveys and Juvenile Habitat Suitability Index surveys in junction with Sacramento FWS Office Instream Flow Incremental Methodology study. Snorkel surveys for spring-Chinook will likely begin in April.

*Aric Lester (CDWR)*: The passage of California State Proposition 84 will provide money to continue planning for the North-of-the-Delta Off Stream storage projects and plans are being developed. SB 59, the federal bill to construct the project, is currently meeting opposition from water user groups and environmental groups and therefore the outcome is uncertain. More information on NODOS project during a presentation later in the meeting.

*Richard Corwin (USBR)*: The newest internal helical (centrifugal) pump at the Red Bluff Research Pumping Plant has been in operation 2400 hours since installation was completed in 2006. Monitoring of associated fish entrainment has been conducted for 700 hours. The results of the monitoring indicate that 67% of the fish entrained are Chinook salmon with a mortality rate of 4.1%, which is comparable to the rate of previous studies.

*Eric Volkman (FWS-STFWO)*: Conduct juvenile salmonid monitoring in Delta, Sacramento River, San Joaquin River, and San Pablo and upper San Francisco Bays using seines, mid-water trawl, and Kodiak trawls. Data summaries are available contact [eric\\_volkman@fws.gov](mailto:eric_volkman@fws.gov). Additionally, the Stockton office will be conducting studies at Liberty Island and continuing to perform acoustic monitoring as a component of John Bureau's (USGS) larger acoustic fish monitoring study in the Delta. If tagged fish are recovered, release if alive and do not freeze if mort. Results from the study are to be presented at the 2007 National AFS meeting in San Francisco, CA.

*Josh Israel (UCD)*: Currently finishing up dissertation on green sturgeon conservation genetics research. Post doctorate work to evaluate California salmon and trout with Peter Moyle (UCD) to begin this year. Also noted was a Directed Action Proposal study on green sturgeon juveniles scheduled to begin this year whereby Dr. Pete Klimley, Dr. Joe Cech and others were planning on acoustic tagging upper Sacramento

River juveniles and researching physiological salt water tolerance of individuals. Juveniles to be used in the studies have been proposed to be acquired from the RBDD rotary trapping operation conducted by FWS.

*James Lyons (CDFG):* Creel census on the upper Sacramento River to be headed up by James and associates. His group will be surveying 10 sections throughout the upper river attempting to acquire angler catch data and coded wire tag information.

*Bob Null (FWS-RBFWO):* Fish for the 2007 Winter-run Chinook broodstock for the Livingston Stone National Fish Hatchery (LSNFH) are being trapped at the Keswick fish trap. Thus far, no fish positively identified as winter-run have been acquired. Fish are sampled for genetic composition prior to use as brood stock. Other activities planned for the year include a winter-run Chinook carcass survey (joint effort with Fish and Game), video monitoring on Battle Creek, and a third year of acoustic tagging of steelhead kelts from Coleman National Fish Hatchery (CNFH) to evaluate repeat spawning and migration. Acoustic tagged adults will also have an elastomer tag near right eye for ID purposes. Furthermore, standard CNFH evaluations will continue and include CWT extraction and reading of returning adults (bio-sampling) and juvenile hatchery fish release notifications.

*Amy Lyons (CDFG):* Working primarily on CALFED ERP databases and environmental documentation.

*Doug Nemeth (FWS-RBFWO):* No Update.

*Laurie Soule (CDWR):* NODOS work and no additional update.

*Jim Ham (CDWR):* Working on data dissemination using Google Earth. Looking to add all types of data located by geographic area. Examples include:

City of Redding GIS Division <http://ci.redding.ca.us/devserv/gis/KMLresources.html>

SRCAF <http://www.srcafprojectracker.org/datapage.html>

KML data <http://www.justmagic.com/GM-GE.html#Anchor-00004>

*Terri Wegener (CDWR):* NODOS work and no additional update.

*David Grant (CDFG):* Working primarily on CALFED ERP databases and NODOS.

*Joe Johnson (CDFG):* Keeping tabs on the Knight's landing rotary trapping operation, but has been assigned to work on the Lake Davis Northern Pike Eradication project scheduled for Fall of 2007. As for Knight's Landing, DFG saw the majority of fish pass during February storm period (~17,000 CHN), but have seen very few LSNFH 2006 winter-run Chinook smolts this year and only 33 CWT'd steelhead.

*Beverly Anderson (SRCAF):* Working on the Good Neighbor Program to foster volunteer participation and local support with private land owners for restoration projects along the Sacramento River. Using data from Google Earth to locate riprap areas along the Sacramento River for possible removal.

*Tim Hamaker (CH2MHill):* Currently re-engaged with Bureau of Reclamation and Tehama Colusa Canal Authority over the Red Bluff Diversion Dam EIS/EIR for fish passage improvement plans. An alternative may be selected soon.

*Erin Chappell (CDWR):* Monitoring Delta Fish Facilities salvage operations. Erin requests that any in-river CWT releases be made known to the Stockton Fish and Wildlife Office, as they typically process the majority of juveniles captured throughout the Delta Region (including the facilities). Doug Killam recommended a spreadsheet be made available with all CWT release info. Bob Null noted a website would be most useful and was to be created.

*Alice Low (CDFG):* Coordinating the constant fractional marking program of Central Valley Fall Chinook salmon production. All four mass marking trailers are in California with two currently at CNFH and two at the Feather River Hatchery. Thus far ~2.5 million Feather River fish have been processed; first tag

retention group had a 98.3% tag retention rate. At CNFH, ~ 4 million fish have been processed. So far, pleased with the progress of the program. One day at CNFH, 350,000 fish were processed by one trailer (double shift). Some of the Feather River fish have some diseases issues and this has resulted in slow growth. One trailer may be moved to the Mokelumne River hatchery to start on fall Chinook produced there. For the future, plans include expanded ocean recovery efforts and an associated CWT processing facility for ocean and inland recoveries located in Santa Rosa. Alice has scheduled two groups to tour the operations of the marking trailers, please contact her if interested in tour information ([alow@dfg.ca.gov](mailto:alow@dfg.ca.gov)).

*Greg Golet (TNC)*- The Nature Conservancy (TNC) plans to continue work on the development and implementation of eight restoration projects for the Sacramento River. TNC has the goal of performing sound restoration work with minimal deleterious effects on local economies. Additionally, they plan to repeat the Mud Creek survey to detect changes since restoration activities. Monitoring and assessment of prior Sacramento River restoration projects and the development of management plans will continue. TNC/Greg Golet is also preparing for the Restoration Science Conference to be held at CSU Chico on April 9-10. For more information see: [http://www.watershedportal.org/calendar/detail\\_html?ID=353](http://www.watershedportal.org/calendar/detail_html?ID=353)

*Ryan Luster (TNC)*- The Nature Conservancy plans to restore 840 acres on the Sacramento National Wildlife Refuge this spring through CALFED ERP grant money. The total acreage restored by TNC between 1990 and 2007 is 4,500. Water rights have been acquired on Mill Creek to benefit fish in the creek. A total of 60,000 – 70,000 acres in easements have been acquired along Deer Creek, Mill Creek, and Battle Creek through CALFED and WCB. TNC is working with Hamilton City and the Army Corp of Engineers to design a 6.7 mile levee and restore 1,425 acres of habitat on the newly opened flood plain. Construction scheduled to begin in the spring of 2009. Update on the State of the System report (SOS): 350 comments were received and TNC is hoping to finish up addressing the comments within a month. A workshop to present results of the study is planned for late summer, no date has been finalized. The Sacramento flows tool is currently in development which will include an analysis of the effects of Sites reservoir and the raising of Shasta Dam on the hydrological characteristics of the river.

*Joe Silveira (FWS-SRNWR)*: Continuing work on restoring Sacramento River National Wildlife Refuge riparian and floodplain habitats, with restoration partners, TNC (above) and River Partners (RP): RP began implementing restoration actions on 400 acres of the Refuge in 2006. In 2007 there are 14 research and monitoring investigations occurring at the Refuge, with an additional four planned, pending funds. Investigations include geology, floodplain geomorphology, vegetation succession, understory plant recruitment, weed suppression, agricultural pests and predators, small mammals, wintering migratory birds, valley elderberry longhorn beetle, and western yellow-billed cuckoo with investigators from CSU-Chico, UC Santa Cruz, UC Berkeley, PRBO-Conservation Science, Cerus Consulting, California Department of Water Resources-Red Bluff, and the US Geological Survey-Menlo Park.

*Bill Poytress (FWS-RBFWO)*: *Mini presentation and information sharing on IEP websites.*

The IEP home page can be found at <http://www.iep.ca.gov/> Information regarding active and inactive project work teams can be found at <http://www.iep.ca.gov/pwt.html> The Upper Sacramento PWT mission statement and notes can be found at [http://www.iep.ca.gov/central\\_valley\\_salmon/](http://www.iep.ca.gov/central_valley_salmon/) Finalized notes from this meeting and available notes from previous years' meetings will be available soon.

## **Morning Break**

### **IV. Presentations:**

*Doug Killam (CDFG)*: *VIDEO STATION UPDATES: Results for Cow and Battle Creeks and updates on future efforts*

The Cow Creek and Battle Creek overhead video fish monitoring project began as an experimental effort, yet over the last four years has proven to be a reliable method for monitoring fall Chinook escapement. Camera images are recorded and viewed by tape readers. Counts of salmon and any adjustments result in the final estimate. The collaborative effort, comprised of CDFG, USFWS, WSRCD, and PSMFC, began in 2003 and currently operates from late-August to mid-November/early December. The overhead video

stations are located below the primary fall run spawning areas, respectively. From the Battle Creek monitoring efforts it has been noted that Julian week 41 [early October] is the typical peak of fall run upstream migration past the video station (except in 2005; week 43). Additional results include consistent taping of fish migration with the dual cable approach for the overhead camera, only one site needed to perform survey (eliminates need for whole creek access), and the analog VCR approach is simpler, has a higher ambient temperature tolerance, and uses less power than current digital video recorders. The entire monitoring station can be assembled in ~ four to five hours. It was noted that the Battle Creek station operates on solar power while Cow Creek operates off conventional power from an old well pump on private property. Criteria needed to start a new video monitoring station include 1) site must be downstream of spawning areas, 2) smooth flowing shallow water (~2 ft deep), 3) access to vehicles, but away from public traffic, 4) permission to access the site 7 days/week for the entire season, and 5) access to conventional power or money to front the cost of solar power.

Reports are available for Battle Creek (3 years) and Cow Creek (1 year), contact [dkillam@dfg.ca.gov](mailto:dkillam@dfg.ca.gov) for electronic or written annual reports.

Comments/Q&A Summary: Try to find a narrow V in river for sample site about 2 feet deep, steelhead trout tough to discern with overhead camera, lamprey were able to get through fencing material in some years, the watershed group was positive about research and results, sampling begins at the onset of migration into watersheds, sampling discontinued due to lack of funds, the CNFH barrier weir counts were very similar to video counts by comparison, and real-time data assists CNFH personnel for broodstock management.

*Josh Gruber (FWS-RBFWO): Evaluation of Digital Technology for Fish Counting at RBDD*

The RBDD fish counting program began in 1966 with the lowering of the dam gates. Fish counters originally watched fish pass the viewing window and recorded the data manually. Video Cameras were first purchased in 1967 as a replacement. Current methods of counting the three fish ladders (east, middle and west ladders, respectively) include live video recorded with color video cameras from 6:00 to 20:00 each day counting fish species (Chinook salmon, Steelhead trout, Pacific lamprey, American shad, and Sacramento pikeminnow) as they pass the RBDD. In 2006, a digital system was purchased by the USBR to evaluate the use of the new technology. The system included (3) Bosch LTC 0485/21 video cameras, (1) 16 channel Honeywell Fusion DVR, and (2) 400 GB external hard drives. The objectives of the evaluation were to:

- Test the reliability of DVR
- Test the effectiveness of the motion detection software
- Compare DVR counts to live fish counts
- Evaluate time requirements of fish counting
- Identify the potential to perform 24 hours fish counts
- Eliminate the need for VCR and VHS tape.

Recording schedules included: continuous recording during the entire evaluation and testing the motion detection software Mondays and Thursdays for 24 hr periods. Review methods included a review of each ladder individually whereby the reviewer could pause, rewind and fast forward to obtain fish identification, a count of the time spent reviewing video, and a comparison of fish passage captured using motion detection software versus standard analog fish counting methods. Discrepancies were confirmed using continuous video feeds. The results included: A) improved image quality with new cameras, B) continuous operation of DVR throughout testing period, C) zero Chinook were missed using motion detection on the East and West fish ladders, and D) the center ladder did not perform well using motion detection due primarily to orientation of video camera (overhead vs. underwater). Overall the time spent counting fish was greatly reduced compared to traditional methods due to the motion detection abilities of the digital system. The time reduction varied depending on magnitude of fish passage, but was still significantly less time to view fish even at peak abundance. Multiple video clips were shown highlighting the superior image quality of the digital system. Future efforts may include replacing the center ladder video camera with an underwater camera to take advantage of the motion detection capabilities. A report



on this project is currently in draft form and a final should be available. For more information contact [josh\\_gruber@fws.gov](mailto:josh_gruber@fws.gov)

Comments/Q&A: Estimates of data stored: east and west ladders were at highest resolution and recorded ~25 Gigabytes per day. All 800 Gigabytes were filled by August. If data needed to be saved it would require more memory.

*Colleen Harvey-Arrison (CDFG): Determining Flow Objectives for Fish Passage in Mill Creek.*

Recent events have led to the Lower Mill Creek Water Management study. Components of the study include a water use efficiency study (of conveyance facilities), a water management plan (to obtain permanent rights for fish passage), a conjunctive use study (interactions between ground water and surface water use), and anadromous fish monitoring study (to determine how much and when flow is needed to pass adult fish upstream on Mill Creek). Multiple documents covering many years have indicated the need to study what flows are needed for fish to pass, yet little has been accomplished on the ground. It was even noted in the 1993 CDFG Central Valley Action Plan "Mill Creek could be the cornerstone in the protection and restoration of spring-run Chinook salmon if flows and fish passage problems are resolved". Only recently have stream gauges been installed above and below diversion sites and investigations performed to investigate flow-temperature relationships. FWS recommended passage flows have varied over the years from 50 cfs in the 1940's to more recent IFIM Modeling data recommending 111-157cfs (noted as > baseline flows). It was noted that the IFIM flows assume a minimum of 8" depth over 10% of the migration channel, yet field observations contradict this assumption.

For the purpose of the fish flow study the following questions were to be addressed:

- What is the sustained flow for unimpaired passage from the river past 1<sup>st</sup> irrigation dam?
- In the absence of sustained flow, will a pulse flow trigger passage?
- In the absence of sustained flow, will a combination of minimum flows and riffle modification provide passage?
- When and for how long are bypassed flows needed?

The results of field studies indicate that "extra bypass flows" are not needed on an annual basis provided it is a wet spring, there is substantial snowmelt, or it is an above average water year overall (e.g. 2002 – 2006). Temperatures and flows are correlated. In contrast (e.g. 2001) flows and temperatures may limit fish passage especially when using estimated minimum migration flows. From the 7/15/07 field survey, thirteen low flow riffles were identified in lower Mill Creek (below Ward Dam). Three were selected as representative subsamples of the thirteen low flow riffles and lateral and longitudinal channel characteristics (bottom profile, water surface elevations and velocities) were mapped. During the fall of 2005 no water flow was reaching the mouth of Mill Creek, CDFG arranged for a metering of fall flows (high flows in spring precluded completion of survey during spring run migration) beginning mid-October whereby the flow in the lower section of the creek was incrementally increased from 0 cfs to 90 cfs. It was noted during the survey that fall run fish needed ~7" of water depth to navigate upstream. The study has been extended an additional year due to wet springs that have occurred in recent years.

Comments/Q&A Summary: Linear riffle measurements were recorded, critical riffle locations changed between years, water temperatures for juvenile outmigrants were not of concern as they were considered to be more tolerant of higher temperatures in comparison to adults.

## **LUNCH BREAK**

### **IV. Presentations Continued:**

*Aric Lester (CDWR): North-of-the-Delta Off Stream Storage (NODOS) Monitoring and Study Needs*

The purpose of the presentation was to briefly review the NODOS project, provide a brief update of NODOS Fishery Impact assessment process, to go over preliminary ideas for study and monitoring needs for NODOS, and to stimulate feedback and opportunities for coordination. The goal of the NODOS project

is to increase flexibility to manage the Sacramento River water system (water diversions, storage, flow) by constructing Sites Reservoir, an off stream storage site.

To assess fishery impacts of the proposed project requires assessment of green sturgeon adult spawning locations and timing, timing of outmigrating juveniles at each of the diversion sites, knowledge of Chinook outmigrant timing, distributions, and relative abundance for different size classes above and below the proposed Sacramento River pumping plant (near Maxwell, CA) at various flows, environmental conditions, and fish densities. Data is also needed to estimate the loss of fall-run eggs and pre-emergent fry from redd dewatering and stranding on the Sacramento River as well as a re-assessment of the availability of spawning habitat based on substrate, velocity and depth criteria. Determination of critical juvenile salmonid habitat features within the meander reach that should be sustained and increased and estimated baseline seasonal predator density and distribution and prey preferences at the diversion sites under different environmental conditions are needed as well. Finally there are issues to address in the Delta.

Current needs include sturgeon data and there may be funds available. CDWR is entering into a contract with CDFG for assistance with assessment of impacts from the project. Also, CDWR is entering into conversations with various agencies to determine study needs and ways to address research questions. The Draft EIS/EIR is scheduled to be out August of 2008.

Additional project notes, *Terri Wegener (CDWR - Sacramento office)*: Preliminary formulation and modeling report has been drafted for feasibility and incorporates multiple models (e.g. winter Chinook, State of the System etc..). Input is needed from various subject matter experts as to which models should be included to address impacts to various species.

*Joshua Israel (UCD): Update on Conservation Genetics in Green Sturgeon Management*

Basic life history information was presented to begin and it was noted that of the three known spawning populations, spawning occurs during the summer and juveniles spend one to three years rearing in the estuary before migrating to the ocean. Non spawning populations tend to aggregate in various estuaries and populations may have variable life histories. From Josh's genetic work he has discovered that the Sacramento population is genetically distinct from other natal river populations. He noted that Southern Distinct Population Segment (DPS) green sturgeon (those occurring south of the Eel River) aggregate in Northern DPS estuaries. The result of this information is that California and Washington have changed fishing regulations to eliminate green sturgeon sport catch and commercial fishery. Management in coastal estuaries should include mixed-stock fishery monitoring for conservation and recovery of Southern DPS sturgeon. He notes that continued research should be pursued to assess annual, seasonal, and within-estuary variation in stock composition. As noted by NMFS 2003, "it is essential that immediate efforts be undertaken to implement population monitoring for this DPS (Southern) using methods that directly assess population status". Critical determinants of sturgeon recruitment include:

- Greater proportions of dead white sturgeon eggs when spawning continued after 18°C (Parsley et al. 1993)
- Low temperatures negatively influence Russian sturgeon's reproductive effectiveness on the Volga River (Khoroshko 1972)
- Volume of freshwater flows through estuaries positively associated with sturgeon recruitment (Kolhorst et al. 1991)
- First few months of life during larval drift and exogenous feeding positively correlated with year-class strength (Nilo et al 1997)

Therefore, a novel approach for estimating population size needed to be developed. The objectives include:

- Methodology for surveying rare species
- Provide some degree of certainty (statistics)
- Assess accuracy with simulations of model
- Aim for consensus among observed and modeled

The data is comprised of experimental families crossed at UC Davis and 5 years of juvenile green sturgeon captured by RBDD rotary traps. The approach being inter-individual relationships would represent

pedigrees and kin group data can be used to estimate local breeding populations. Results from the RBDD 2005 samples indicated 21 full sibling clusters resulting from an estimate of 22-36 spawners. Literature suggests >50 reproducing individuals are necessary for maintaining a genetically viable population [Note: RBDD RST samples represent an unknown proportion of the actual spawning population in any given year (i.e. spawning is believed to occur above and below RBDD)].

A multi-year collaborative research effort to be initiated in 2007: UC Davis is entering into a contract with USBR to increase green sturgeon monitoring in the upper Sacramento River. Research will include evaluation of green sturgeon around Red Bluff Diversion dam (telemetry studies), verification of spawning activity through egg and juvenile sampling (develop indices of juvenile production within reaches of the river above and below RBDD), refine knowledge of spawning grounds and habitat associations of adult green sturgeon in the Sac. River, and yield essential information for protection and recovery of Southern DPS green sturgeon.

Additional project notes, *Richard Corwin (USBR)*: USBR is currently working through a cooperative contract process with UC Davis and plans to initiate studies this spring and summer.

*Kathy Russick (SRWP): Sacramento River Watershed Program Overview*

The SRWP mission is: working together to sustain, restore and enhance our watershed's resources while promoting our long-term social and economic vitality. Currently there is not a fishery component in the monitoring program and no involvement by fish agencies. The SRWP defines the Sacramento River Watershed as Goose Lake (OR. Border) to the North and I Street Bridge in Sacramento to the South.

The SRWP was founded in 1996 and is a collaborative, consensus-based group of stakeholders with long-term interests in sustaining and enhancing the 27,000-square-mile Sacramento River Watershed. SRWP was formed through a 3-way collaboration between the Sacramento Regional County Sanitation District, EPA Region 9, and the Central Valley Regional Board and since 2002 has been a non-profit organization.

The SRWP has four main programs:

Watershed Monitoring—The SRWP conducts its own mainstem river monitoring program and encourages the efforts of others to conduct monitoring in their local watersheds.

Public Education—The SRWP conducts watershed education and outreach at various levels to educate stakeholders about the watershed they live in and how to protect it.

Watershed Support Services—The SRWP provides information, technical, financial, and networking assistance to local watershed efforts.

\*Rural Residential Development Initiative—The SRWP is exploring a fourth program to inform stakeholders about the extent and impact of ranchette development in the watershed.

The history of the SRWP monitoring program began in 1996 when SRWP and the Toxics Subcommittee began working with stakeholders to develop a monitoring plan. After a year of development, monitoring began in 1998 and was conducted in coordination with other major monitoring efforts in the watershed (e.g. Regional Board, DWR, DFG, USGS, City of Redding etc...).

The goals of the monitoring program are: 1) to develop a cost-efficient and well coordinated long-term monitoring program to establish baseline conditions in the mainstem river and major tributaries; if and how beneficial uses are being met, and the causes, effects and the extent of pollutants that affect beneficial uses, and 2) provide data to determine effect of management strategies.

In terms of operations of the monitoring program, this occurs through on-going stakeholder input with a monitoring plan developed each year. The extent of monitoring varies year to year depending on funding (currently ~\$600K/year), but seeks to maintain the baseline monitoring program (i.e. baseline sites ( $N = 12$ ; ~every 50 miles), monitoring parameters, quarterly or monthly sampling). The monitoring parameters are



composed of water chemistry (mercury/methylmercury, drinking water :TOC/DOC, UVA 254, TSS, TDS, nutrients and pesticides), aquatic toxicity, fish tissue and bio-assessment.

Since monitoring began in 1998, the program has successfully implemented a major regional monitoring program that is entering its 8<sup>th</sup> year. The plan is coordinated with other monitoring efforts in the watershed, the data is trusted and used by others, annual reports are peer reviewed, the QAPP is a model for others, and a water quality baseline database has been developed (available online [http://bdat.water.ca.gov/Php/Data\\_Summaries/data\\_summaries\\_by\\_agency.php](http://bdat.water.ca.gov/Php/Data_Summaries/data_summaries_by_agency.php)).

Overall findings from the monitoring program include: drinking water quality is high, bacteria concentrations rarely above levels considered unsafe for contact recreation, mercury levels in fish is a concern but are lower than loadings in the watershed would suggest. Results for aquatic life indicate that toxicity is: most prevalent at urban runoff sites, is rare in the mainstem river. Metals are generally not a problem despite historic mining contamination (are not analyzed currently).

Currently, the program is funded through EPA and Prop 50 grants, but those opportunities are ending. The SRWP committee and workshop discussion over the past few years have reinforced the desire to continue a mainstem monitoring program, the need for a continuous funding source, and the use of the SF Bay Area's Regional Monitoring Program as a funding model.

Comments/Q&A: Fish species monitored are noted in the report and include Largemouth Bass, Catfish and others. More information available at <http://www.sacriver.org>

### **Brief Afternoon Break**

### **V. Open Discussion:**

*Information Sources:* Websites like BDAT are good, but they do not incorporate geographic component. Group members appear to be interested in obtaining data similar to how Google Earth shows hotels and other features using maps as a platform.

*Establishment of a Sturgeon PWT:* Project work teams have been created and dissolved over the years as they are needed. The proposal of a Sturgeon PWT has been talked of, but currently no one has stepped up to organize or facilitate a coordinated group of interested stakeholders. There seemed to be support for such a group to meet, at least annually, to coordinate research and monitoring efforts and to collaborate on information gained through various activities. Josh Israel (UCD) expressed interest in organizing a team of members.

*Status of Middle River Sampling:* It was noted that CDFG had put in for a Directed Action Proposal to sample rotary traps in the "Black hole" section of the Sacramento River. No update as to the status of the project was known by remaining group members.

*Upcoming PSP opportunities:* A CALFED Science Program Fellows PSP was believed to be coming out soon. No other Science or Monitoring PSP's were known by the group to be forthcoming this year. As for CALFED, it was noted that the Proposition 50 money will be exhausted this year and that Proposition 84 money would likely be the source of CALFED funds, albeit there is expected to be less money available compared to recent years. Water users money may also be available in future years. The question of how to make funding needs known was brought up. The reply given was to use the CALFED ERPiams standard format and submit it to them for evaluation.

*Future study needs and/or plans:* Red Bluff FWS rotary trapping operation may seek funds to perform wild-stock tagging of juvenile winter-run Chinook. The proposal is currently in development.

The use of the ACID Dam to separate spring Chinook from Fall is currently on hold. The use of the ACID fish trap as an alternate to the Keswick trapping operation to obtain winter-run Chinook for LSNFH broodstock is still in the design and planning stages.

Development of a plan to phase out LSNFH needs to be developed, but it was noted that LSNFH CWT'd fish are important to research concerning winter-run distribution in the ocean.

*Incorporation of climate change predictions into resource management:* Awareness of the issues are building, yet not a central theme or used currently in planning efforts. CDWR has created a climate change team. It was noted that this should be incorporated into the Delta Vision. Models such as CalSim still use historic data. Shasta enlargement project asked to incorporate climate change models and may be heading in that direction. It was noted that climate change was a component of one of the recent Science PSP's. Apparently some work is being pursued (UCD/USGS) to investigate climate change as it relates to fish.

## VI. Conclusion and wrap-up:

The group agreed to meet next year on Wednesday, March 12, 2008. The location will be the Conference Room of the U.S. Fish and Wildlife Service, Red Bluff. The coordinating agency will be the U.S. Bureau of Reclamation; the tentative POC will be Richard Corwin (530-528-0512). The Agency "on-deck" for 2009 was not discussed.

### Meeting Attendee List

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