

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Red Bluff Fish and Wildlife Office 10950 Tyler Road Red Bluff, California 96080

September 28, 2001

Memorandum:

TO: Assistant Program Manager for the AFRP

FROM: Fishery Biologist/Habitat Restoration Coordinator for Area One

SUBJECT: Interim Intake Screen Report for Coleman National Fish Hatchery/Battle Creek

<u>Justification</u> – AFRP Actions #5 and #8: Prevent attraction of adult chinook into the powerhouse tailrace and screen the intakes to prevent entrainment of juvenile salmonids.

The attached report is intended as an update to the AFRP webpage/implementation plan for projects related to screening the intakes at Coleman National Fish Hatchery. AFRP Projects "98 L C-1a," "98 L C-1b," and "99 L B-1" have been completed; total project cost funded by AFRP amounted to \$267,000. We envision that the attached report can be posted on the AFRP webpage and/or distributed to interested parties (e.g. the Battle Creek Conservancy and Working Group).

Work completed as part of this effort was primarily designed to establish a set of four interim fixes to the unscreened intakes. These interim fixes are in place. This effort did not get to the stage of constructing a long term/permanent intake screening project, but it did culminate in two reports: the USBR Flat Plate Screen Evaluation Plan (Jones & Stokes, 1999) and the Intake Alternatives Analysis Report (Sverdrup, 1999). The second report documents the steps to develop, refine, rate and select four possible alternatives for a long term/permanent fix to the unscreened diversion. Both of these final reports are available at the the AFRP website: http://www2.delta.dfg.ca.gov/afrp/projlinks/

This project has been led by several people throughout the past few years. Originally, Tom Nelson (CNFH Project Leader) and Tricia Parker (Fishery Biologist, RBFWO) worked with Meri Miles (USBR). During the summer of the 2000, concurrent with personnel changes, the intake screening project was led by Scott Hamelberg, Project Leader at Coleman Fish Hatchery Complex and Mona Jefferies-Soniea as co-lead for the Bureau of Reclamation. Continued efforts to continue this project are underway and regular meetings are still being held. Contact Scott or Mona for more information (530-365-8622 or 916-978-5068 respectively).

cc: Project Leaders at RBFWO and CNFH Mona Jefferies-Soniea, co-lead, USBR

Project Report: Interim Screening for the Intakes at Coleman National Fish Hatchery

September 2001

Red Bluff Fish & Wildlife Office 10950 Tyler Road Red Bluff, CA 96080 Contact: Tricia Parker

Anadromous Fish Restoration Program
Projects "98 L C-1a," "98 L C-1b," and "99 L B-1"

Summary

The mission of the U.S. Fish and Wildlife Service is to conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefit of the American people. In Battle Creek, the Fish and Wildlife Service is especially interested in restoring the populations of naturally produced salmon and steelhead that were historically present in the upper portion of the watershed since Battle Creek represents some of the best potentially restorable spring run chinook and potential winter-run type habitat in the Central Valley. The high quality water in Battle Creek also led to the original placement of Coleman Hatchery on Battle Creek – instead of locating the hatchery on the mainstem Sacramento River closer to Shasta Dam. Since the early 1900's, upstream passage of salmonids had been precluded from much of the upper watershed due to the construction of hydropower dams. One of these hydropower facilities, the tailrace from Coleman Powerhouse, was modified to serve as one of the intakes for the Coleman National Fish Hatchery on lower Battle Creek. Two additional hatchery intakes divert water off the mainstem of Battle Creek. Prior to 1998, these intakes were either unscreened or improperly screened (i.e. the screen criteria established by NMFS and CDFG in 1997 were not being met).

The 1992 enactment of the Central Valley Project Improvement Act directed the Fish and Wildlife Service to establish the Anadromous Fish Restoration Program (AFRP) and Plan. The AFRP Plan calls for many actions to improve habitat in Battle Creek by resolving flow and passage issues. Two actions in the Anadromous Fish Restoration Program Plan (USFWS 1997, 2001) call for screening these hatchery water intakes to preclude entrainment of juveniles into the hatchery's water supply (AFRP Actions 5 and 8). Service biologists and management are supportive of these efforts to screen the intakes and have simultaneously chaired and participated in an interagency, interdisciplinary team of biologists, engineers and managers working to resolve this fish passage problem since 1997. During the spring of 1998, the team (below) decided on a two-phased approach that included: 1) **the interim set of four improvements that could be constructed within the next few months and that would be in place for 2-5 years (until a long-term fix could be constructed)** and 2) a thorough analysis of options leading to construction of a permanent fix. This report serves as documentation on the process and products that compose the "short term improvements" and the initial steps on the long-term improvements to the hatchery's intakes.

Coleman National Fish Hatchery: Intake Improvements Team May 1998 - May 2000

Gary Blefgen, Engineer: USFWS Portland
Jim Buell, Consulting Biologist: Buell & Associates
Vern Edwards, Maintenance: USFWS/Coleman
Ed Forner, Supv. Biologist: USFWS/Portland
Dan Free, Biologist: USFWS/Coleman
George Heise, Engineer: DFG/Sacramento
Joel Medlin, Supv. Biologist: FWS/Sacramento
Steve Hirsch, Special Assignment: USFWS/Sacramento
Harry Rectenwald, Enviro. Specialist: CDFG/Redding
Buford Holt, Enviro. Specialist: USBR/Redding
John K. Johnson, Engineer: NMFS/Santa Rosa

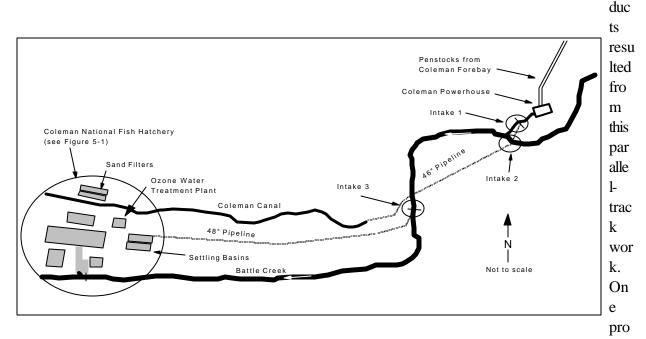
Mary Marshall, Engineer: USBR/Sac
Tom Nelson, Manager: USFWS/Coleman
Will Neves, Maintenance:USFWS/Coleman
Dan Odenweller, Biologist: CDFG Sacramento
Greg O'Haver, Engineer: USBR/Shasta Dam
Tricia Parker, Biologist: USFWS/Red Bluff
Fred Peery, Maintenance: USFWS/Coleman
Mike Ryan, Area Manager: USBR/Shasta Dam
Jim Stow, Engineer: USFWS/Portland
Rolf Wielick, Engineer: Sverdrup Civil Inc.
Phil Warner, Biologist: CDFG/Redding

Background

In addition to the Anadromous Fish Restoration Program (AFRP) Plan (USFWS 2001) calling for actions to screen the hatchery's three intakes, the April 3, 1998, position paper, signed by Wayne White, states that the Service will pursue: "modifications to the intake structures to ensure adequate water supply (quality and quantity) and installation of state-of-the-art fish screens to exclude naturally produced fish from the hatchery's water intake [s]." Stakeholders and the multiple agencies represented around the table all agreed that it is especially important to screen these diversions due to the pending re-opening of habitat that will be occurring with the modifications to the hydropower system. This re-opening of habitat is due to the 1998 Memorandum of Understanding (http://www.mp.usbr.gov/regional/battlecreek/mou/index.html).

As stated earlier, the team working on screening the intakes fixes decided on a two-phased approach to implement a set of interim improvements and provide the foundation for a permanent fix.

Tw o pro



duct is **the set of four interim intake fixes** (described below); the other product was **the long-term fix report**, the Intake Alternative Analysis prepared by Sverdrup Inc (1999).



The set of four interim fixes to screen the hatchery's intakes

The interim intake fix consisted of four components at three intakes (see Figure 1). Following is a description of the intake then a description of the action taken to protect naturally produced salmonids.

<u>Intake #1 Description:</u>

The current entry point of water into P.G.&E's Coleman Powerhouse canal, and thus Intake #1, is above a barrier that is impassable to adult anadromous salmonids (e.g. P.G.&E's Coleman Diversion Dam). To prevent juvenile salmonids from being entrained, Coleman Diversion Dam would need to be screened. Since the MOU calls for decommissioning this dam and the Coleman Canal will soon have water delivered from another hydropower diversion instead of diverting off Battle Creek, the need for a screen to prevent entrainment of naturally produced juvenile salmonids will soon be unnecessary. As described in Sverdrup (1999) and the Biological Assessment (USFWS, 2001), the hatchery's primary intake (Intake 1) is located in the tailrace of Pacific Gas and Electric's (PG&E) Coleman Powerhouse, on the north bank of Battle Creek. The tailrace empties into Battle Creek approximately 1.6 miles upstream of the hatchery property. Water taken through Intake 1 is conveyed to the Coleman Canal by a 46-inch diameter conveyance pipe. A separate problem, that of adult salmonids being attracted into the tailrace, is a problem for which an interim fix has been implemented

Action taken to protect naturally produced salmonids:

A picket weir was installed at this site early in 2001 to prevent adult salmon and steelhead from being falsely attracted into the tailrace. (See Appendix A for the detailed description of this activity).

Intake #2 Description:

As described in Sverdrup (1999) and the Biological Assessment (USFWS, 2001), Coleman NFH Intake 2 is located on the south bank of Battle Creek, opposite of Intake 1. Intake 2 draws water directly from Battle Creek, and is used as an emergency back-up to Intake 1. Intake 2 supplies water to the hatchery only during periods when water can not be supplied through the powerhouse tailrace (e.g., failure of the Inskip intake, penstocks, or turbine generator). Over the last 10-years of operations, the average amount of time that hatchery water could not be supplied through Intake 1 was 412 hours (17.2 days) annually. Intake 2 shares the 46-inch conveyance pipe with Intake 1.

Action taken to protect naturally produced salmonids:

As an interim fix, a flapgate was installed to prevent Intake 2 from attracting/entraining salmonids.

Intake #3 Description:

As described in Sverdrup (1999) and the Biological Assessment (USFWS, 2001), Intake 3 draws water directly from Battle Creek, approximately 0.4 miles downstream of Intake 2, and 1.2 miles upstream of the hatchery. Water diverted through Intake 3 is conveyed to the

hatchery through 4,600 feet of 48-inch diameter pipeline. In the fall of 1998, a smaller-mesh, emergency removable perforated plate fish screen was added to Intake 3. Intake 3 was constructed as a screened intake in 1990. Mechanical and debris problems caused the plates covering the trash racks to be removed in 1996.

Action taken to protect naturally produced salmonids:

Two actions have occurred to remedy the fish entrainment problem at this intake. The improperly designed 1990 screen has been greatly improved and an experimental modular screen (i.e. the USBR screen) was installed for testing and possible use (see detailed description in Appendix B). An Emergency Action Plan was also developed pursuant to NMFS' (John Johnson) request to FWS (Tricia Parker) on May 11, 1998). The specific situations that would cause the Emergency Action Plan to be carried out include any situation in which the minimum water surface elevation is not maintained, sediment accumulation causes low water pressure or juvenile salmonids are not able to migrate downstream safely.

Emergency Action Plan: for the two intake fixes at Intake #3.

Intake #3 will consist of two systems to divert water: a) the existing screen (i.e. floor screen with an air burst cleaning system and a new (Aug '98) vertical bar screen with a "rake" cleaning system) and b) the modular units of an experimental (USBR) screen.

Assuming that an automated gate is installed between the existing screen and the experimental modular screens, and assuming that a vertical bar screen <u>on sliders</u> is installed at the existing intake.

<u>IF</u> <u>THEN</u>

the modular screens fail, the differential pressure sensors set off an alarm (at 4"

pressure differential) and the gate automatically shunts water

into the existing screen (floor screen)¹

the existing screen plugs, the vertical bar screen (on sliders) is utilized to divert water

the vertical bar screen plugs, vertical screen pulled out of the way using sliders²

if the intake opening plugs, overflow water enters intake from the top

if the top plugs, utilize portable pumps

Notes

Analysis of the performance of the interim fixes

Naturally produced salmonids are reaping the benefits of not being entrained or misdirected from their natural migratory patterns at any of the hatchery's intake facilities. At Intake 1: the picket weir is in place and working well; there is a 70-80% improvement in the number of adult salmonids that are remaining in Battle Creek as opposed to being misdirected into the powerhouse tailrace. At Intake 2, the flapgate is in place and functioning well. (Although, the engineering design was more complicated than anticipated so the flapgate is not quite as effective as envisioned; therefore some salvage of fish is still required. At Intake 3, the experimental modular screens have been removed, but the retrofitted existing screens are working well (pers. comm. M. Keeler, 2001). In summary, of the four interim improvements, three components have served well to achieve the goal of protecting naturally produced salmonids from being entrained in the hatchery's intake diversions (i.e. the picket weir at Intake 1, the flapgate at Intake 2, and the improved screen at Intake 3). The fourth component, the "experimental"

¹ The alarm alerts the hatchery staff that a problem with the water level has occurred at intake #3. Hatchery personnel will drive up to the intake to physically investigate and assess the problem.

² If the vertical screen becomes plugged or inoperable, then it could be lifted to provide for an unscreened supply of water to the hatchery. We understand that during extreme flood events, access to remove the vertical screen could be impaired. In this case, additional water could flow through the top of the intake structure. Since the top of the intake structure is also subject to plugging, the overall discharge for intake #3 may be reduced.

Universal Stream Bottom Retrievable (USBR) modular screen did not function properly, was repaired several times, and was finally removed during summer 2000.

Since the intake structures for the Coleman NFH are considered deficient in terms of the NMFS and DFG screening criteria, hatchery staff conduct periodic salvage operations to rescue fishes entrained in the hatchery's water delivery system. As described in the Biological Assessment (USFWS, 2001), salvage protocol were developed in consultation with NMFS, and are summarized as follows: Salvage efforts are conducted both in the Coleman NFH water delivery canal (to rescue fishes diverted through Intake 2) and the sand settling basins (to rescue fishes diverted through Intake 3). Fish rescue is conducted by a variety of methods including seining, angling, dip nets, cast nets, and electroshocking. The timing of salvage operations are limited to periods when the hatchery's water needs are reduced. For example, salvage of fishes entrained in the conveyance canal is limited to May when hatchery's water demand is low and can be fully supplied by Intake 3. Salvage of fishes in the hatchery's sand settling basins requires the basins be drained and must be conducted when Intake 3 is not used. Results of fish salvage operations conducted during 1999 and 2000 are indicated in Attachment 4-1 of the Biological Assessment (USFWS, 2001).

Costs

The Anadromous Fish Restoration Program (AFRP) funded \$103,000 towards this project to construct interim fixes (98 L C-1b) at the intakes for Coleman NFH's water delivery system. The project is considered complete. Of the \$103,000: \$18,200 was spent on a flapgate for Intake 2 and several projects were funded at Intake 3: \$17,610 was spent for a generator, \$25,850 was spent on a butterfly valve, and \$7,340 was spent on a sliding gate. AFRP also provided \$34,000 in funds for the experimental modular screen study plan.

The U.S. Bureau of Reclamation also spent \$200,000 on the experimental Universal Stream Bottom Retrievable (USBR) modular screening system. These modules were built under contract to the Bureau (#1425-98-SP-20-20039) with CVPIA funding (pers. comm. D. Stotts, 2001).

Position of Interested Parties:

The Intake Improvement Process has received verbal support from participants in the Battle Creek Work Group (e.g. landowners, Bureau of Land Management, Bureau of Reclamation, California Department of Fish and Game, National Marine Fisheries Service, Department of Water Resources, water users, sportfishing groups).

Long Term Improvements

As described in Sverdrup (1999), the long list of possible long term improvements was narrowed down to ten developed alternatives (see Table 6.1 in Sverdrup for a summary). Each alternative was carefully assessed in terms of its applicability to eight criteria: water quality and quantity, system reliability, redundancy, access, fish protection, maintenance, long term performance and water rights. The list was further refined to four alternatives by following a process modeled along the lines of "value engineering". The estimated costs of the four possible improvements range from \$3.7 to \$5.8

million. Regular updates were given on the status of the intake screening project/long term improvements at the monthly meetings of the Battle Creek Work Group.

As reported in Sverdrup, 1999, Alternative 10 (with the addition of the powerhouse bypass pipe) was chosen as the alternative which best fit the evaluation criteria and would provide the best design to meet the hatchery's needs. This was chosen as the recommended alternative to be presented in the NEPA documentation, along with the no-action alternative and Alternatives 3, 7 and 9, in that order. The no-action alternative would be included only to fulfill a NEPA requirement and is actually not a realistic alternative because it does not address the requirement for approved fish screening at water diversions on Battle Creek. Any of the four longterm solutions will take approximately 3 years to complete. If initiated promptly, one of these solutions could be in place during the timeframe in which the hydropower and flow modifications are scheduled for completion (June 1999 MOU). Ideally, CNFH could be compliant with the 1997 National Marine Fisheries Service and California Department of Fish and Game screening requirements prior to completion of the hydropower modifications. Note that at the time that the team was identifying alternatives, the group considered alternatives that would allow for additional water diversions to meet future, possible water needs. Since then, the process has narrowed its focus to only consider alternatives that utilize the existing water right (122 cfs) for the hatchery.

Steps undertaken to improve passage for naturally produced salmonids Status

1. Formation of the Intake Improvement Team	Completed: Feb '98
2. Identification of Interim Intake Improvements	Completed: June '98
3. Environmental documentation for the interim improvements	Completed: June '98
4. Construction of the interim improvements	Completed: Feb '01
5. Long-term Intake Alternative Analysis: 4 alternatives identified	Completed: May '99
6. Environmental documentation for selection of the permanent fix	Initiated*
7. Construction of Screens for the Intakes	Pending funding*

^{*} As the process continued for the selection of a permanent fix, additional alternatives were identified (by stakeholders and other agencies) that have since lengthened the process.

Next steps

An ongoing, stakeholder-involved process continues to seek a permanent solution for screening each of these water intake components at this federal fish hatchery. The next steps will be completing the environmental documentation to select the preferred alternative and funding the construction to improve the hatchery's water intakes.

Summary of correpondence related to compliance with NEPA and ESA

June 1998	Categorical Exclusion Checklist prepared by USBR for intake repairs
July 1998	NMFS "no adverse affect on listed species or habitat"
Mar 1999	Biological opinion describing the modular screens and project area
Aug 1999	NMFS biological opinion prepared in response to request for reinitiation of consultation
	"not likely to jeopardizenot likely to destroy or adversely modify habitat"

Nov 1999 Reinitiation of consultation requested for the additional 15 cubic yards of gravel at intake

3 to correct the back-eddy problem with the experimental screen.

Jun 2000 Biological opinion and two conditions received from NMFS

Appendices

Appendix A: Details regarding the installation of the picket weir at Intake 1

Appendix B: Details regarding the USBR modular screen trial at Intake 3

Appendix C: Study Plan for the Universal Stream Bottom Retrievable (USBR) Modular Screen,

Montgomery Watson Harza, 1998

[bound separately, also available on AFRP website]

<u>Literature cited:</u>

Montgomery Watson/Jones & Stokes. 1999. Evaluation Plan for the Universal Stream Bottom Retrievable (USBR) Flat Plate Modular Screen at Coleman National Fish Hatchery Intake No.

- 3. Report to the U.S. Fish and Wildlife Service, Contract No. 14-48-001-96044.
- 21 pp. plus attachments.

Sverdrup Civil, Inc. and KCM, Inc. 1999. Intake alternatives study for Coleman National Fish Hatchery. Report to the U.S. Fish and Wildlife Service, Contract No. 14-48-001-93044. 115 pp. plus attachments.

United States Bureau of Reclamation (USBR). 1998. Categorical exclusion checklist: Coleman National Fish Hatchery [Interim] Intake Repairs.

United States Fish and Wildlife Service (USFWS). 2001. Biological Assessment of Artificial Propagation at Coleman National Fish Hatchery and Livingston Stone National Fish Hatchery.

Appendix A: Details regarding installation of a picket weir at the Coleman Powerhouse Tailrace Summary of the multi-agency fish habitat improvement efforts at the Coleman Powerhouse Tailrace -- February 6, 2001

The U.S. Fish and Wildlife Service's Anadromous Fish Restoration Program (AFRP) calls for a multi-agency effort to improve habitat conditions in the upper reaches of the Battle Creek Watershed. Specifically, AFRP Plan Action 5 calls for screening the tailrace of Coleman Powerhouse to eliminate attraction of adult chinook salmon and steelhead into an area with little spawning habitat...

Purpose:

On February 6, 2001, an interagency group of people worked to fix the fish straying issue at PG&E's Coleman Powerhouse Tailrace (streammile 7 on Battle Creek). The main problem is that fish enter an area with extremely poor spawning habitat; if they had continued upstream, they would have been able to access high quality spawning habitat and optimizing the potential for reproductive success.

Specific call to action:

In early February 2001, DFG Wardens and a NMFS Special Agent identified a law enforcement concern -- approximately 100 rainbow trout/steelhead had congregated in this tailrace. These law enforcement agents were concerned that these fish could easily be poached (poaching paraphernalia had been found nearby). The NMFS Special Agent was concerned about preventing an ESA "take" situation. Staff from all 6 neighboring resource agencies (DFG, NMFS, USFWS, BLM, USBR and P.G.&E.) were called upon to help.

Background:

Northern California Power Company constructed Coleman Canal, Powerhouse and Tailrace in the early 1900's (circa 1910). The tailrace serves to return water to Battle Creek after being used for hydro power generation at the Coleman Powerhouse. In 1942, the water supply for Coleman National Fish Hatchery was diverted from the tailrace. Because water in the tailrace originates from the North Fork of Battle Creek, fish enter the tailrace. If these fish would continue upstream, they would be able to access high quality spawning habitat.

Remedies to this attraction problem have been identified in several documents. For example, Action 5 in the Restoration Plan for the Anadromous Fish Restoration Program (USFWS 2001) and Action 6 in The Working Paper (USFWS 1995) both show support for installation of a fish barrier at this site. Specifically, Action 6: calls for "Screening the tailrace of Coleman Powerhouse". The tailrace flow attracts upstream-migrating adult steelhead and salmon where there is limited spawning habitat and where the fish or the resulting spawn could be dewatered in the event of a powerhouse shutdown.

In 1998, the group of people working on the CNFH interim intakes improvements project considered the inclusion of this straying problem as a component of the "CNFH interim intake fixes". Due to the geographic proximity to other types of improvements that could be occurring at CNFH's Intake #1, remedies to the tailrace attraction problem were identified as part of the package of 4 interim intake improvements described in the Categorical Exclusion Checklist (1998). The picket weir project had not been completed to-date for a variety of reasons (e.g. concern by DFG that redds already in the

tailrace would be dewatered, the landowner had not expressed willingness to allow access, and the ongoing negotiations to transfer land ownership at the site to BLM). Now, in February 2001, the time was right to remedy this long standing concern.

Participants in the February 6, 2001 Picket weir installation at P.G.& E's Coleman Powerhouse Tailrace:

PG&E Chip Stalica, Mike Karry, Mike Oelrichs

BLM Francis Berg, Brant Guttermuth (Kelly Williams)

DFG Region: Terry Healey, Doug Killam, Jim Early

Wardens: Steve Kallan, Dwayne Little, Mitch Hawthorne

Screenshop: Phil Warner, Cal Crawford, Tony Robles, Gary Devine, Cliff Akers

FWS Red Bluff: Jack Williamson, Tricia Parker

CNFH: John Scott, Fred Peery, JB Hooper, Jason Fookes, John Silva, Ralph Winstead,

Jeff Laurie, (Mike Keeler), Scott Hamelberg

NMFS Enforcement Tom Gaffney USBR Louie Campbell

Note: People whose names are shown in parenthesis were instrumental in putting this concerted effort

together -- although they could not be present on the 6th.

Details of the picket weir installation/steelhead relocation at the Coleman Powerhouse Tailrace

Gear: 2 20' seines, 1 gillnet, 8 buckets/tubs, 8 dipnets, 2 ladders, 3 drysuits, 1 wetsuit, 2 fish

distribution trucks (with drivers), 24 people (on site), trash rake, and <u>many</u> pairs of waders. DFG Screen shop provided the picket weir, staff, and tools (note: the picket weir was loaned to the powerhouse tailrace for this project; DFG specified that this weir would need to be moved to another location in the near future, so additional funding would be needed

to secure a long-term fix).

Logistics: Prior to the 6th: PG&E required a 3 day notice to prepare for the shut-down. Mike Keeler

(CNFH) served as lead for lining up the 5 staff from CNFH to serve as

dipnetters/carriers, lining up 2 fish distribution trucks plus drivers, and conferring with Phil Warner (DFG) and Terry Healey (DFG) in regards to the organization of the day. Mike

named John Scott to head the hatchery crew on the 6th.

On Feb 6th: On the morning of the powerhouse shutdown, staff, gear and trucks were on site by 8:00 am. Prior to work beginning, Chip Stalica (P.G.& E) held a brief pre-activity meeting to overview the objectives and safety protocol. Power generation at the Coleman Powerhouse ceased at 9 am to provide the necessary low water conditions needed to work in the tailrace. Terry Healey (DFG) agreed to serve as our interagency "lead". We asked him to specifically provide guidance in regards to <u>concluding</u> the effort. The fish salvage/relocation took a total of 4 hours (8 am until noon). DFG Picket weir installation

took about 2 hours.

Conditions: Water temperature 41 degrees F, air temperature 50-60 degrees F. Steep sided canal,

ranged from approx. 3-20 feet deep. Substrate large cobbles with easily suspended fines

(led to turbid water conditions).

Compliance:

- NMFS (Mike Aceituno) gave approval of these emergency law enforcement activities in a letter dated Feb 2, 2001.
- BLM (Kelly Williams) addressed the other potential endangered species concerns by confirming that there would not be a problem with elderberry bushes in the access areas; access to the PG&E right of way/tailrace would be over BLM land.

Maintenance:

This temporary weir lacks safety structures (e.g. catwalk) to perform routine maintenance. Provided that safety structures and protocol are developed, USFWS personnel could maintain this weir. In case of extreme conditions (e.g. high flows, high debris loads), USFWS personnel will alert DFG and/or PG&E to remedy the situation.

Picket weirs usually require daily maintenance (e.g. raking of leaves and debris). Fortunately, the water in P.G.&E's tailrace carries only a minimal amount of leaves and debris because of the short distance from the powerhouse and because P.G.&E staff rake debris off the trash rack in Coleman Forebay prior to the water dropping down the hill and into the powerhouse.





term fix: \$200,000 (estimate)

Figure 4 Results of the February 6, 2001 interagency effort to relocate fish back into Battle Creek to access optimum spawning habitat.

Fish species relocated	Marked?	Lower reach	Upper Reach	Total
rainbow/steelhead O. mykiss	Yes	46	37	83
rainbow/steelhead O.mykiss	No	3	13	16
rainbow/steelhead O.mykiss	Unknown*	20 (estimate)*	0	20 (estimate)*
Total ~119			~119	
tule perch		0	1	1
sculpin	_	3	1	4
roach	_	3	1	4

^{*} These fish were either crowded out of the lower tailrace reach using seine nets or immediately released right over the top of the new picket weir back into the mainstem of Battle Creek. The exact count and their marked/unmarked status was not determined.

Steelhead produced at Coleman National Fish Hatchery are 100% marked (i.e. adipose fin clipped off all the fish).



Appendix B: Details regarding the USBR modular screen trial at Intake 3

At Intake No. 3 two complementary intake improvements were identified. One was rebuilding a screen at the existing intake site. The other improvement was the experimental use of the "Universal Submersible Bottom Retrievable (USBR) modular screen" developed by U.S. Bureau or Reclamation Engineer Greg, O'Haver. Concurrent with the choice of this methodology, the interagency team adamantly expressed that **this experimental technology only be used at this site only if it could be comprehensively studied** to assess its ability to meet the screening criteria set by National Marine Fisheries Service and California Department of Fish & Game in 1997. The Service agreed with NMFS and CDFG to carefully monitor and test this interim screening device prior to considering it for long term usage.

Study plan for the USBR modular screen

The intake improvement team worked with biologists involved in the Anadromous Fish Screening Program (part of the CVPIA) to develop an outline of the study plan that would need to be developed for the modular screen.

<u>DRAFT</u> July 9, 1998

STUDY PLAN OUTLINE: Test the USBR/O'Haver type screen as a component of intake #3 for Coleman National Fish Hatchery.

GOAL: A scientifically valid, site specific test will be performed on the two modules of the Universal Stream Bottom Retrievable (USBR) screen at Intake #3 for Coleman National Fish Hatchery.

Note: Since this type of screen is designed as a retrievable screen for seasonal usage on high stream order systems, and since this application of the screen is for year-round usage on a lower stream order system, this test will not provide an evaluation of the screen's ability to be retrieved and may not be applicable for many other screening needs/sites.

(Draft) OBECTIVES:

- 1. Measure and describe the physical attributes of the module
- 2. Describe and quantify the biologic attributes.
- 3. Identify needed modifications (e.g. module removal).
- 4. Provide a formal record of the results of the results of testing this experimental product.

Study Plan

- I. Description of screen modules at Intake #3 in Battle Creek (requested from NMFS)
 - A. Screen top elevation*
 - B. Minimum water surface elevation*
 - C. Maximum design flow through the screen*
 - D. Design approach velocity*
 - E. Screen mesh type and size*
 - F. Hydraulics (at low, medium, and higher water elevations)
 - 1. Map Velocities @ 2' c-c*
 - a. Approach
 - b. Sweeping
 - c. Perimeter
 - 2. Measure Diversion Rates
 - 3. Confirm flow balancing approaches
 - 4. Observe & document sediment deposition patterns over a winter
 - 5. Observe & document debris snagging
 - G. Null hypothesis H_o : $V_T V_E = 0$ (where T = test, E = expected) hence the evaluation is to determine if screen criteria are as expected.
 - 1. There is no exceedence of approach velocities (0.33fps) at _ flow/s (high, med, low)
 - 2. sweeping velocity (twice the approach velocity) at _ flow/s (high, med, low)
- II. Physical attributes to be monitored
 - A. Screen effectiveness between air bursts (e.g. degree of plugging under various debris conditions, give examples of how debris conditions will be quantified)
- III. Biologic attributes to be documented/analyzed
 - A. Creation of predator habitat (i.e. back eddies)*
 - B. Swimming behavior near modules (e.g. effect from air blasts)*
 - C. Avoidance*
 - D. Success of safe passage downstream
 - E. Testing at various flow levels/seasons/timeframes
 - F. Fish impingement*
 - G. Verify fish-tight sealing
 - H. Verify no undue delay or holding

^{*} requested by NMFS

Prior to installing the experimental modular screen in Battle Creek, a study plan was developed and funded by the Anadromous Fish Restoration Program (\$34,000). The scope of work for the study plan, as well as the study plan itself, were subjected to peer review to insure a quality product. In December 1998, the study plan was sent to a team of reviewers consisting of:

National Marine Fisheries Service
Dan Free, John Johnson, Ian Gilroy

California Department of Fish & Game Dan Odenweller, Harry Rectenwald, George Heise

USFWS: CA/NV Fish Health Center Scott Foott

U. S. Fish & Wildlife Service: Red Bluff
Jim Smith, Rich Johnson, Tricia Parker

USFWS: Coleman National Fish Hatchery Tom Nelson, Roger Shudes U. S. Fish & Wildlife Service: Engineering Jim Stow

U. S. Bureau of Reclamation: Denver Charlie Liston

The steps that occurred in the efforts for testing this experimental device included:

<u>Date</u>	Step
June 1998	Construction contract awarded to for modular screen placement
July 1998	Work initiated
Dec 1998	U.S. Bureau of Reclamation issued a statement of the project being "Substantially
	Complete"
Mar 1999	Air hose coupling on purge line broke
Aug 1999	Modules removed from Battle Creek for repair at U.S. Bureau of Reclamation's Shasta
	Dam office/shop
Sept 1999	Modules reset in Battle Creek following repair
Oct 1999	Continued problems with screen modules, no work to be done until June 2000
June 2000	Modular screens removed

The Service was prepared to "study" this experimental device with the high quality plan drafted by Montgomery Watson Associates as a subcontractor to Jones and Stokes Associates (Appendix C). The study design was set, but the USBR screen never functioned well enough to be studied.