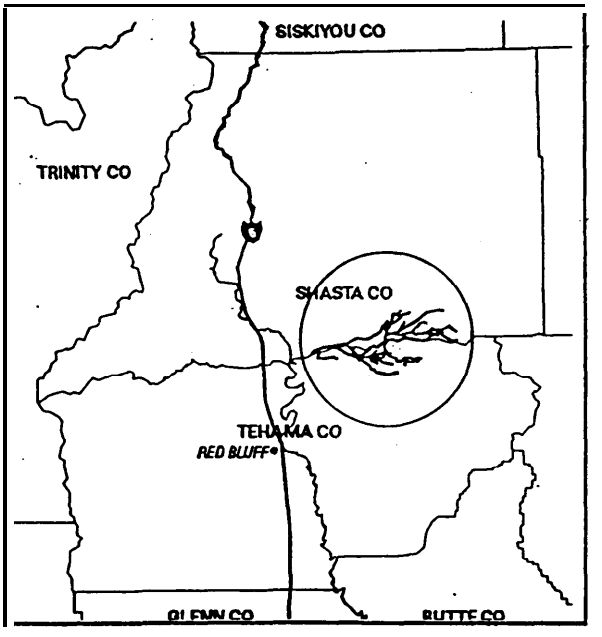
FINAL

ENVIRONMENTAL ASSESSMENT

for

TEMPORARY REDUCTION IN WATER DIVERSIONS FROM BATTLE CREEK



U.S. Bureau of Reclamation
Division of Resources Management
2800 Cottage Way
Sacramento, California 95825-l 898

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1.0 PURPOSE AND NEED FOR ACTION

1.1 Introduction

The Central Valley Project Improvement Act (CVPIA), signed into law on October 30, 1992 as Title 34 of Public Law 102-575 mandated changes in Central Valley Project (CVP) management, particularly to protect, restore and enhance fish and wildlife habitat. Section 3406(b)(l) of the CVPIA requires the development of a program that will make all reasonable efforts to ensure that by the year 2002, natural production of anadromous fish in the Central Valley rivers and streams will be sustainable on a long-term basis, at levels not less than twice the average levels attained during the period of 1967- 199 1. To meet this requirement, the U.S. Fish and Wildlife Service (USFWS) has developed the Anadromous Fish Restoration Program (AFRP).

The AFRP has released a Revised Draft Restoration Plan (Restoration Plan), dated May 30, 1997, which presents a programmatic-level description of the AFRP in broad and general terms, and will be used to guide the long-term development of the AFRP. Battle Creek is one of the tributaries identified in the Restoration Plan. The Restoration Plan (USFWS 1997a) presents the goals, objectives, and strategies of the AFRP; describes how the AFRP identified and prioritized reasonable actions and evaluations that are already underway or that may be implemented in the near future for various rivers and streams of the Central Valley, including Battle Creek. The Restoration Plan (USFWS 1997a) has been developed by the USFWS in coordination with other state and federal agencies, stakeholders, and other interested parties to assist in identifying what actions are reasonable and able to be implemented.

The Restoration Plan (USFWS 1997a) identifies eight actions that would help restore Battle Creek. One of the actions is to increase flows past Pacific Gas & Electric Company's (PG&E's) hydropower diversions to provide adequate emigration, migration, holding, spawning and rearing habitat for anadromous salmonids. PG&E owns and operates the Battle Creek Hydroelectric Project (Battle Creek Project) under Federal Energy Regulatory Commission (FERC) License' No. 1121, which expires in 2026.

Battle Creek, a tributary of the Sacramento River has been identified as having exceptionally high restoration potential (Restoration Plan (USFWS 1997a), Senate Bill 1086 Plan, Restoring Central Valley Streams: A Plan for Action(CDF&G 1993) Winter-run Chinook Recovery Plan (NMFS 1997)). Battle Creek and its tributaries lie on the volcanic slopes of Mount Lassen in Shasta and Tehama Counties. In Appendix A, Figure 1 illustrates the site location, as well as an overview of the drainage system and Figure 2 presents a schematic of the major structural features. The stream

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1 PG&E has a requirement under its FERC license for the Battle Creek Project to provide a minimum instream flow release of 3 cfs at Eagle Canyon and Wildcat diversions on North Fork Battle Creek and a minimum instream flow release of 5 cfs at the Coleman diversion facility on South Fork Battle Creek. Article 33 of PG&E's FERC license allows for the temporary modification of specified instream flow releases for fish management purposes upon the mutual agreement of PG&E and California Department of Fish and Game (CDF&G).

has a unique combination of desirable habitat features including an abundance of cold water springs, high natural flows (average annual runoff of 350,000 acre-feet), relatively constant flows throughout the year, and a history of supporting all the races of chinook salmon and steelhead (CDF&G 1997a. USFWS 1995, Yoshiyama 1995, Friebel 1994, CDF&G 1965, Rutter 1903). Adding to its high restoration potential is the willingness of PG&E to participate in restoration actions.

From mid-1995 to February 1998, through a partnering arrangement Reclamation had partially compensated PG&E for maintaining minimum year round flow rates of 30 cubic-feet-per second (cfs) downstream of the Wildcat and Eagle Canyon diversions on the North Fork of Battle Creek and below the Coleman Diversion on the South Fork of Battle Creek. This action was undertaken by the U.S. Bureau of Reclamation (Reclamation) under the authority of Section 3406(b)(3) of the CVPIA. This provision of the CVPIA allows for the acquisition of water in coordination and conformance with the AFRP. Without the partnering arrangement, in accordance with its FERC project license, PG&E would maintain minimum flow rates of 3 cfs downstream of the Wildcat and Eagle Canyon diversions on the North Fork of Battle Creek and 5 cfs downstream of Coleman Diversion on South Fork Battle Creek. Flow rates of 30 cfs are needed to provide adequate emigration, migration holding, spawning and rearing habitat conditions for the spring-run chinook salmon and steelhead anadromous fish species*.

Fish ladders, operated by PG&E under the authority of FERC and the California Department of Fish and Game (CDF&G) been closed at Eagle Canyon and Coleman diversion dams to limit the area that spring-run chinook salmon and steelhead spawners would use (CDF&G 1995) and to prevent entrainment into unscreened diversions and passage to habitat having insufficient flows. Fish ladders will remain closed until entrainment and flow problems are solved. (Harry Rectenwald (CDF&G) pers. com. 1998).

1.2 **Purpose and Need**

The purpose of the Proposed Action is to increase flows in Battle Creek and Baldwin Creek through reduction in diversions to PG&E's Battle Creek Project for hydropower generation. As discussed in the Restoration Plan, increased flows in Battle Creek are needed to provide adequate emigration, migration, holding, spawning and rearing habitat for spring-run chinook *salmon (Oncorhynchus tshawytscha)* and steelhead (0nchorhynchus *mykiss)* anadromous fish species. Increased flows are needed below Asbury Pump in Baldwin Creek to enable improved fish movement and prevent stranding and isolating of various life stages of salmon, steelhead and rainbow trout populations. In addition, increased flows in Baldwin Creek may marginally improve

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2 Although the flow schedule in the Draft Restoration Plan (USFWS 1997a) is recognized as preliminary, the current flow schedule and flexible ranges were negotiated in the course of developing an agreement to provide desired habitat improvements and obtain data on actual effects to compare with theoretical predictions used in development of the Restoration Plan. As part of this, the USFWS and the CDF&G have temporarily modified the recommended flow schedule included in the Restoration Plan (USFWS 1997a) to reflect the absence of fall-run chinook salmon above the Coleman National Fish Hatchery (Coleman NFH) weir.

water temperature conditions in pools in Battle Creek below the confluence with Baldwin Creek to the benefit of over-summering adult salmon and juvenile steelhead. This Environmental Assessment documents the existing condition of the Battle Creek hydrologic system, as well as the impacts to the system due to the proposed reduction in diversions to PG&E's Battle Creek Project for hydropower generation.

The Battle Creek Working Group (Working Group) has been formulated to coordinate the various Battle Creek restoration activities. The Working Group is comprised of various State, Federal and private entities with an interest or stake in activities in Battle Creek. The Proposed Action was discussed with Working Group members at several meetings. During discussions of the Proposed Action, concerns were raised regarding the cost of the Proposed Action and the effect on Coleman National Fish Hatchery (Coleman NFH). Both of these issues have been considered and addressed in this EA and the agreement between Reclamation and PG&E. The proposed temporary increase in flows in Battle Creek will require the approval of both FERC and CDF&G pursuant to Article 33 of the FERC License for the Battle Creek Project.

1.3 Related Projects and Documents

Coleman Fish Hatchery Improvements Environmental Assessment Final Report. 1997. Sacramento Field Office, U.S. Fish and Wildlife Service.

Draft Battle Creek Instream Flow Study: Specified Fisheries Investigations on Battle Creek, Shasta and Tehama Counties, dated June 22, 1995. Prepared for the California Department of Fish and Game, Redding California by Thomas R. Payne & Associates.

Draft Lower Battle Creek Temnerature Model: Eaele Canyon and Coleman Diversions To Coleman Powerhouse, dated November 5, 1996. Prepared for the US Fish and Wildlife Service, Sacramento, California by Thomas R. Payne & Associates.

Revised Draft Restoration Plan for the Anadromous Fish Restoration Program - A Plan to Increase the Natural Production of Anadromous Fish in the Central Valley of California, dated May 30, 1997 and prepared for the Secretary of the Interior by the U.S. Fish and Wildlife Service with assistance from the Anadromous Fish Restoration Program Core Group under authority of the Central Valley Project Improvement Act.

Spawning Gravel Resources of Battle Creek. Shasta and Tehama Counties, 199 1. Draft Report to Thomas R. Payne and Associates, Arcata, California. Prepared by G.M. Kondolf and M. Katzel.

Sunnlemental Environmental Assessment for USDOI Finding of No Significant Impact for Temporary Reduction of Water Diversions from Battle Creek for Power Generation, prepared in the Fall of 1996 for the U.S. Bureau of Reclamation, Mid-Pacific Regional Office, Sacramento California.

Ongoing Monitoring Programs:

* The California Department of Water Resources(DWR) and CDF&G: Five year temperature monitoring program throughout the anadromous portion of the Battle Creek watershed.

* The USFWS: Fisheries monitoring at Coleman NFH Barrier Weir.

Battle Creek Long Term Restoration:

The Working Group is coordinating various Battle Creek restoration activities, including, development of a Fisheries Technical Plan, community outreach and development of a Community Plan.

2.0 ALTERNATIVES

2.1 Proposed Action

The Proposed Federal Action is to compensate PG&E for temporarily reducing diversions from Battle and Baldwin Creeks to the Battle Creek Project for hydropower generation. The reduced diversions would meet the needed flows in Battle and Baldwin Creeks. Reclamation would compensate PG&E for approximately 3 additional years. Three years is the estimated maximum amount of time it will take for the completion of long-term restoration planning and implementation.

PG&E would maintain an annual minimum flow objective of 30 cfs downstream of the Wildcat and Eagle Canyon diversions on the North Fork of Battle Creek and at the Coleman Diversion on South Fork Battle Creek. As part of the action to achieve 30 cfs in the North Fork, flows from bedrock springs in the vicinity of Eagle Canyon shall enter the creek freely instead of being captured and diverted. PG&E would maintain a flow rate of 30 cfs by decreasing the amount of water it would otherwise divert from Battle Creek into the Battle Creek Project for hydropower generation. In addition, there is a possibility that when flow releases from Asbury Dam decrease to zero, PG&E may be willing to decrease diversions at the Asbury Pump Diversion, by approximately 5 cfs.

In an effort to share in the implementation of restoration efforts on Battle Creek, PG&E would provide the first 12.5 cfs on both the North and South Fork at no charge to Interior. Therefore, Reclamation would compensate PG&E only for flows at the various diversions described above which are between 12.5cfs and 35cfs (there is a +/- 5 cfs variability around the 30 cfs target flow rate), that would have otherwise resulted in hydropower generation. Table 1 below summarizes the flow rates associated with the Proposed Action.

TABLE 1
BATTLE CREEK FLOWS(a)

Diversion	Annual Flow Objective	Minimum Instream Flow Requirements	PC&E's Contribution	Flows(X) Subject to Compensation by Interior
Eagle Canyon and bedrock springs (North Fork)	30	3	12.5	12.5<x<35
Wildcat (North Fork)	30	3	(b)	(b)
Coleman (South Fork)	30	5	12.5	12.5<x<35
Asbury Pump (Baldwin Creek)	5	Not Applicable	Not Applicable	Approx. 5

a: All units are in cubic feet/second, and for all water year types.
b: All diversion to Wildcat Canal would be ceased. Interior would compensate PG&E for water released based upon historical Wildcat diversion.

2.2 No-Action Alternative

Under the No-Action Alternative PG&E would operate the Battle Creek Project pursuant to current operating permits and FERC license. PG&E would maximize diversions from Battle Creek for power generation while maintaining minimum instream flow requirements of 3 cfs required downstream of Eagle Canyon and Wildcat diversions on North Fork Battle Creek and 5 cfs downstream of Coleman Diversion on South Fork Battle Creek. PG&E would continue to pump water from Baldwin Creek in the amounts it has in the past and divert it into the Coleman Canal. Pursuant to FERC, there are no instream flow requirements for Baldwin Creek.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section describes the existing resources that have the potential to be affected by implementing the project alternatives. Additionally, it describes how these resources may be impacted.

3.1 Biological Resources

3.1.1 Fisheries

Affected Environment

Battle Creek historically provided habitat to steelhead, and fall, late fall, winter and spring-run chinook salmon (CDF&G 1997a, Yoshiyama 1995, Friebell994, CDF&G 1965, Rutter **1903).** Operations of fish hatcheries since 1895 and hydropower generation plants since 1901, however have impacted the fishery resources on Battle Creek (Yoshiyama, et al. 1995). Impacts

increased over time due to the implementation of more hydropower facilities beginning in the 1920's and the construction of a fish barrier at Coleman National Fish Hatchery (Coleman NFH) in the 1950's. Hydropower diversion dams were screened prior to flood events in the late 1950's. However screens washed out during the flooding and have not been replaced since then due to lack of funding (CDF&G File Correspondence). A high entrainment rate is expected because the unscreened diversions take such a high proportion of the streamflow. Entrainment rates are proportional to diversion rates, and diversion rates range as high as 95 percent during the drier portion of the year (CDF&G File Correspondence). The Coleman NFH fish barrier serves the purpose of containing anadromous fish species for hatchery production but seasonally inhibits fish from migrating upstream.

Despite the alterations, Battle Creek remains as the only tributary to the Sacramento River that has the characteristics to support all four races of chinook salmon and steelhead. The steelhead is a Federally-threatened species and a State species of concern which inhabits the Sacramento and San Joaquin rivers and tributaries. Of the four races of chinook salmon which inhabit the Sacramento River for spawning and juvenile rearing, only the winter-run chinook is listed as both a State and Federal endangered species. The spring-run chinook salmon is a Federally-proposed endangered species (NOAA, 1998) and a State candidate species (Fish & Game Code 2068: June 27, 1997) Fall and late-fall chinook salmon are currently Federally-proposed threatened species. In Appendix A, Figure 3 indicates the Relative Water Temperature (°F) Tolerances For Freshwater Life Stages of Chinook Salmon, Figure 4 illustrates the Life History Characteristics of Sacramento River Chinook Salmon at and Upstream of Red Bluff, California and Figure 5 illustrates Chinook Salmon Population Trends.

Battle Creek also provides habitat for native non-anadromous fish species. These species include the green ***sunfish (Lepomis cyanellus),*** speckled ***dace(Rhinichthys osculus),*** tule ***perch (Hysterocarpus traski ssp.),*** Sacramento ***sucker (Catostomus occidentalis),*** rainbow trout (Salmo ***gairdnerii),*** prickly sculpin (Cottus ***asper),*** Sacramento ***squawfish (Ptychocheilus grandis),*** and ***hardhead (Mylophardon conoephalus),*** and the non-native fish species small mouth black bass ***(Micropterus dolomieui)*** and brown trout (Salmo ***trutta).***

North Fork Battle Creek, especially in the Eagle Canyon area, contains deep, cold, and isolated pools that are ideal for holding spring-run Chinook salmon through the summer. In addition, about 186,000 square feet of spawning gravels are located between Coleman Powerhouse and Eagle Canyon Dam and between the powerhouse and the Coleman Diversion Dam on South Fork Battle Creek (Kondolf 1991). However, the value of this habitat is limited due primarily to hydroelectric power diverted flows, which results in low summer flows and high temperatures. Increased flows may attract increased numbers of adult fish into the South Fork. These improved flows will also benefit juvenile fish. Maintaining flows at 30 cfs to provide holding/survival habitat may be necessary for spring-run chinook after they are attracted in high flows.

The Coleman NFH was constructed in 1942 to help preserve significant runs of chinook salmon threatened by the loss of natural spawning areas resulting from the construction of

Shasta Dam on the Sacramento River. The hatchery is located on the main stem of Battle Creek near the mouth, and is operated by the USFWS. Coleman NFH obtains water for use at the hatchery from the Coleman Powerhouse tailrace and at two other intake facilities drawing from Battle Creek. (USFWS 1993).

Similar to many State and Federal hatcheries, Coleman National Fish Hatchery operates a barrier dam on the mainstem of Battle Creek (see Figure 2) to direct steelhead, fall, and late fall chinook salmon into the hatchery. Fish are diverted from early July through late February (approximately). Ladder closure at the barrier dam inhibits fall and late fall chinook salmon from migrating upstream to prevent the introduction of pathogens into the water supply. Separate from hatchery operations, this ladder closure acts as a barrier to spatially separate spring and fall chinook salmon spawning habitat. Although the fish ladder is closed, many fish are able to jump over the barrier weir during high flows. From early March through June, the time period when ladder at this site is generally open, spring run chinook salmon are able to migrate upstream. Additionally during the time when the fish ladder is closed, adult steelhead in excess of Coleman NFH's broodstock needs are placed above the hatchery's fish barrier weir to naturally spawn.

Because population numbers are low for both spring-run chinook salmon and steelhead in Battle Creek, the ladders at Eagle Canyon and Coleman diversions have been closed to limit the area that the spawners would use (CDF&G, 1995). Limiting the area increases male to female mating encounters. In addition, ladder closures prevent entrainment into unscreened diversions and passage to habitat having insufficient flow. Once entrainment and flow problems are solved, the ladders will be opened (Harry Rectenwald(CDF&G) pers. com. 1998).

Baldwin Creek is a perennial stream that arises near Darrah Hatchery. The stream habitat below Asbury Darn is suitable for resident fish species and amphibians, and steelhead spawning and rearing.

Environmental Consequences

Overall, the Proposed Action could temporarily improve emigration, migration, holding, spawning and rearing habitat for the spring-run Chinook salmon and steelhead anadromous fish species, as compared to the No Action alternative. Pursuant to informal consultation with NMFS, the Proposed Action is likely to benefit Federally-listed and proposed anadromous fish fish species in the affected environment. Increase in flows could also improve resident fish species habitat.

Resident fish species may benefit from the Proposed Action due to an increase in aquatic habitat and food supply. With regard to anadromous fish species, the Proposed Action could provide approximately 90 percent of the attainable habitat values in 17 of the 35 miles within the mainstem and North and South Forks of Battle Creek (plus several miles of tributaries accessible for anadromous fish) for approximately the next three years based on the increase in streamflow rates over the No Action alternative (Kondolf 1991). The CDF&G sponsored studies to estimate the

increase in usable spawning and juvenile rearing habitat associated with the increased flows. The increase in weighted usable area (habitat), as shown in Figures 6 to 9 (located in Appendix A) ranges between 65% and 98% amongst species in all life history stages. The increased flows and the release of cold bedrock spring waters into the stream also provide for an improved temperature regime to support fishery uses. Temperatures could decrease by up to 5 °F depending on the stream reach and time of year.

The Eagle Canyon Canal and Cross Country Canal both convey cold spring water from the North Fork to the South Fork. The Proposed Action increases the amount of cold water habitat in the North Fork by reducing Eagle Canyon Canal diversions. The Proposed Action does not significantly affect the temperature regime of the South Fork at Coleman Dam (Harry Rectenwald (CDF&G) pers. com. 1998). The temperature of the Eagle Canyon Canal at its terminus is similar to the temperature of the Inskip Canal Flow. In addition to this, Inskip Canal is three times larger than Eagle Canyon Canal. Therefore, a significant change to the resultant temperature would not occur in the South Fork at Coleman Dam and Canal. However, increasing the flow in the South Fork reduces heat gain and temperature at its terminus. Similarly, heat gain in the mainstem, below South Fork is reduced with increased flow Figure 10 (located in Appendix A) illustrates temperature data in the North Fork.

The temperature regime in the two miles of South Fork habitat accessible to anadromous fish is marginal for supporting spawning and holding without the Proposed Action. Holding and spawning habitat will improve in the South Fork under the Proposed Action (Refer to Figure 7 in the Appendix A). The preferred spawning habitat in the South Fork is found at a much higher elevation above Coleman Dam where there are cold spring waters, cooler air temperatures and more topographic shading. Figure 11 (located in Appendix A) illustrates temperature data in the higher and lower reaches of the South Fork. It would be preferable to let the salmon ascend to this better habitat but unfortunately there are large unscreened diversions that make this action infeasible at this time. It is believed that the losses due to entrainment would decrease the survival benefits associated with lower temperature.

The Proposed Action does not affect any of the PG&E diversions above Wildcat, Eagle Canyon, or Coleman Diversion Dams. The capacities of the canals in the entire Battle Creek system are displayed in Table 2.

Water temperature and presence of pathogens in the water used at Coleman NFH is of concern. Increased flows, and therefore increased habitat for salmonids, may increase the possibility of disease transmission due to decaying carcasses occurring in Coleman NFH's water supply. However, temperature and pathogen monitoring and modeling results, associated with increase in flows for the last three years have not indicated any problems at the hatchery. The CDF&G and USFWS will continue to monitor the water temperature and are presently calibrating a temperature model and completing a variety of model runs which would enhance this monitoring effort.

TABLE 2
BATTLE CREEK FLOW CAPACITIES(a)

BATTLE CREEK FACILITIES	CAPACITY (cfs)
Facilities Upstream from South Powerhouse:	
Cross Country Canal	110
North Battle Creek Feeder Canal	50
South Battle Creek Canal	100
Union Canal	190
Facilities Upstream from Inskip Powerhouse:	
Inskip Canal	200
Eagle Canyon Canal	70
Facilities Upstream from Coleman Powerhouse:	
Coleman Canal	340
Wildcat Canal	18
Pacific Power Canal	25
Asbury Pipe	45

(a) Reference: Battle Creek System Project 1121: Application of Pacific Gas and Electric Company for License

During the critical hot, dry period occurring in August and September, the Proposed Action decreases the average monthly flow at the Coleman Powerhouse by approximately 15 percent [3] and increases the flow in the creek above the powerhouse by approximately 500 percent. The Coleman Powerhouse Canal (Intake #l) provides the main water supply for the hatchery making the flow reduction a potential temperature concern for the hatchery but not a supply concern because the remaining volume still exceeds the supply needs of the hatchery (USFWS 1997c). However, based on the last three years of temperature monitoring and temperature modeling (Payne and Associates Draft Temperature Model, 1996), there has been no adverse effect to temperature of water from Coleman Canal. In addition, the Proposed Action improves temperature of water available to the hatchery directly from Battle Creek (Intakes #2 and #3).

Based on the existing temperature records provided by Coleman Hatchery in Table 3, July and August are the months when temperature increases are of particular concern for production of

3 Based upon U.S. Geological Survey records for Battle Creek below Coleman Fish Hatchery, near Cottonwood, California (U.S. Geological Survey's Water Data Report CA-94-4, page 136).

hatchery fish[4] (steelhead and late fall-run chinook salmon) and mid-October for production of fall run chinook salmon eggs. The reported July temperature of 63.8 °F is approximately 1.5 °F less than that temperature when juveniles would cease growing even though they are being fed more to keep up with their elevated metabolism due to temperature (USBR 1996). The reported October temperature of 55.6 °F is approximately 1.5 °F less than that temperature which starts diminishing the survival of newly fertilized eggs (Reiser and Bjomn 1979). During October the hatchery typically begins taking eggs by the 10th of the month when the fall weather pattern diminishes the chance and magnitude of potential temperature increases.

Inhibited growth is not the only concern in regard to affects of elevated temperatures on salmonids. Excessive temperatures can also lead to adverse affects resulting from increased stress. Most notable of these affects is a decreased immune response and subsequent increased susceptibility to disease. Certain water-borne pathogens may also increase in abundance at higher temperature (e.g. *Ichthyophthirius multifiliis* or "Ich").

TABLE 3

MEAN MINIMUM AND MAXIMUM MONTHLY TEMPERATURES RECORDED AT COLEMAN **NFH FOR YEARS 1994 - 1997.**

a **Data provided by Dan Free USFWS via E-mail on 2/27/98.**

Month	Minimum Mean Monthly Water Temperature (“F)	Maximum Mean Monthly Water Temperature (“F)
January	40.8	51.1
February	42.5	52.7
March	44.1	55.6
April	46.1	60.5
May	50.1	64.5
June	54.4	67.8
July	56.8	69.8
August	59.5	69.4
September	53.4	64.8
October	47.9	60.5
November	45.3	53.5
December	42.9	51.0
Mean Annual		54.7

4 Temperature requirements for production of hatchery reared juveniles are known to differ from those of wild fish (Source: Central Valley Fish and Wildlife Management Study- Temperature and Flow Studies for Optimizing Chinook Salmon Production, Upper Sacramento River, California: USBR- 1986)

The CDF&G and USFWS would continue to monitor the responses of fishery resources to the Proposed Action. If the temperature monitoring indicates impacts to the temperature of the hatchery water supply, Interior (Reclamation & USFWS) and CDF&G would work together with PG&E to develop a response that would address the temperature concerns. If temperature impacts to the hatchery water supply do occur and actions are taken that significantly change environmental conditions, additional environmental documentation would be completed at that time.

Under the No-Action Alternative, releases at Asbury Dam would decline to zero at certain times of the year. Downstream of Asbury Dam the flow due to accretions from natural springs would be an estimated 4 cfs without releases from the dam. Under the Proposed Action, releases of 5 cfs would be made from Asbury Dam to enhance downstream flows and provide a combined total flow of approximately 9 cfs. The Proposed Action, as compared to the No Action Alternative may enable improved fish movement and prevent stranding and isolating of various life stages of salmon, steelhead, and rainbow trout populations. In addition, the 5 cfs may marginally improve cool water temperature conditions in pools in Battle Creek below the confluence with Baldwin Creek to the benefit of over-summering adult salmon and juvenile steelhead.

3.1.2 Vegetation

Affected Environment

The vegetation within the Battle Creek Watershed changes between valley floor and the headwaters. Battle Creek is in the Cascade region that supports a diverse vegetative community.

At the highest elevations at the boundary of the watershed, the alpine dwarf shrub community is the dominate species that can survive in areas that are snow covered for most of the year. Some of the steep barren slopes within Lassen Volcanic Park do not support vegetation. Red fir (*Abies magnifica)* is found near the headwaters with mixed conifer and Ponderosa pine (Pinus *ponderosa)* adjacent and further down the canyons.

The upper escarpment in the watershed is primarily mixed conifer with some Montane chaparral. The lower escarpment contains a mixture of Montane chaparral and Montane hardwood-conifer. Proceeding downstream, the canyon slopes are characterized by blue *oak (Quercas douglasi)* and foothill pine woodlands, while riparian vegetation is present along the stream. Riparian plant species in this area include black cottonwood (Populas *trichocarpa),* white alder (Alnus *rhombifolia),* willows (salix, *spp.)* and elderberry bushes (Sambucus, *spp.)* and are limited by the narrow width of the canyon in many areas. As the stream approaches the valley floor, the annual grasslands begin to predominate with some occurrences of vernal pools. The canyon floor becomes wider and contain pockets of large riparian vegetation. The area below Coleman NFH has had some conversion to irrigated cropland and some orchards. There are some significant occurrences of Valley-Foothill riparian vegetation in the lower area, as well.

Environmental Consequences

The No Action alternative would have no effect on vegetation in the project area. Implementing the Proposed Action would increase the amount of water flowing in Battle Creek and Baldwin Creek which would raise the elevation of the groundwater on the flood terraces adjacent to the stream reaches receiving the flows. Raising the water table would improve the health of the pockets of riparian vegetation along the stream. The riparian area that would be most impacted is in the eight miles of the mainstem of Battle Creek between Coleman Powerhouse and the confluence of the North and the South Forks.

Increased flows may promote the growth of riparian vegetation along Battle Creek and increase shaded riverine aquatic (SRA) habitat. Productive interaction and synergism between terrestrial and aquatic habitats is associated with SRA habitat (USFWS 1992). This habitat consists of overhanging or submerged vegetation found along irregular, eroding river banks. It provides diversity, cover and a cooler, shaded environment for fish and other aquatic organisms.

3.1.3 Wildlife

Affected Environment

The wildlife of the Battle Creek watershed is diverse, corresponding to the diversity of habitat types. The upper elevation reaches are characterized by conifer-dominated habitats with chaparral, blue oak woodland, and riparian vegetative types predominating as elevation decreases. Common mammal species inhabiting this area include black bear (Ursus ***americanus),*** mountain lion (Fe1is ***concolor), deer(cervidae, spp.), coyote (Canus latrans),*** racoon (Procyon ***lotor),*** bobcat (Felis ***rufus), squirrels(Sciuridae, spp.)*** and a number of smaller mammals (CDF&G 1997). Specifically, the riparian area may provide habitat for the long-tailed ***weasel (Mustela freneta),*** river ***otter (Lutra canadensis),*** and ***muskrat (Ondatra zibethicus).***

Avian species which may utilize the area include the bald ***eagle (Haliaeetus*** leucocephalus), a Federally-threatened species, California Valley quail (Callipepla ***californica),*** wild ***turkey (Meeagris gallopavo),*** great blue ***heron(Ardea herodias),*** golden ***eagle (Aquila chrysaetos),*** scrub ***jay (Aphelocoma coerulescens),*** canyon ***wren (Catherpes mexicanus),*** red-tailed hawk(Buteo ***jamaicensis),*** American kestrel (Falco ***sparverius),*** northern harriers (Circus ***cyaneus),*** turkey ***vultures (Cathartes aura),*** and acorn ***woodpeckers (Melanerpes formicivorus).*** In addition, migratory waterfowl utilize the area.

Some amphibians and reptiles common in riparian areas are the gopher ***snake (Pituophis melanoleucus),*** western rattlesnake (Crotalus ***varieties),*** western fence ***lizard (Sceloporus occidentalis),*** a variety of garter snakes, bullfrog, western pond ***turtle (Clemmy 's marmorata)*** and Pacific tree ***frog (Hyla regilla).*** In addition, the foothill yellow-legged ***frog (Rana boylii)*** and the red-legged ***frog (Rana aurora),*** a Federally-threatened species are amphibian species which have the potential to occur within the watershed.

The Valley elderberry longhorn beetle (Desmocerus *californicus dimorphus)* is a Federally-threatened insect and a State species of concern that requires elderberry bushes for larval and adult life cycles. Elderberry bushes are present in the riparian area within the watershed.

Environmental Consequences

Overall the Proposed Action has the potential to enhance habitat for stream dependent wildlife as compared to the No Action Alternative. The consequences of the proposed flow increase on the terrestrial environment is expected to be confined to the montane riparian habitat found in the Battle Creek system. All riparian habitats have exceptionably high value for many wildlife species (Thomas 1979, Marcot 1979, Sands 1977). Such areas provide water, thermal cover, mitigation corridors and diverse nesting and feeding opportunities. The range of wildlife that uses the Montane Riparian Habitat for food, cover and reproduction include the amphibians, reptiles, birds and mammals identified in the "Affected Environment" discussion of this section.

The primary effect of the flow increase would be to increase the production of both resident and anadromous fish. Fish are an important part of the ecosystem in Battle Creek, especially salmon that have the capability to add tremendous biomass to the system due to rich feeding grounds at sea. Fish provide an important food source to riverine dependent wildlife such as fish eating mammals and birds. The most significant riverine dependent wildlife species in the watershed are the two nesting pairs of bald eagles both of which are located within approximately ten air miles of Eagle Canyon. One pair nests on the North Fork and the other pair nests on the lower mainstem of Battle Creek. Another potential nest sight has been observed in Eagle Canyon but has yet to be confirmed by wildlife biologists (Patricia Parker and Steve Croci (USFWS) pers. com. 1998).

Increasing the streamflow Baldwin Creek to 9 cfs, in the forks of Battle Creek to 30 cfs and the mainstem of Battle Creek to 60 cfs primarily represents a dry season or summertime flow increase since wet season flows typically exceed these values by two to ten times. Since the flow increase is below the normal wet season runoff flows, the increase would not cause loss of riparian habitat due to bank erosion or scour.

Almost exclusively the flow increase and the associated environmental effects would occur during the dry season. The flow increase would raise the ground water level in the stream terraces supporting riparian vegetation. Increased water availability to the riparian vegetation during the summer growing season should produce more vigorous stands of vegetation. In addition, the elevated water surface elevations are expected to produce more standing water in backwater areas, depressions in the terraces and side channels thereby improving habitat for amphibians.

The species of terrestrial vertebrates that occur in the montane riparian habitat are expected to respond positively to the improvements in the vegetation, increased wetland areas and more abundant food supply. There are 249 species that could potentially be found in the montane riparian habitat on Battle Creek according to the Wildlife Habitat Relationship Analysis (CDF&G

1997b) for this watershed. It must be acknowledged that wildlife populations are inherently dynamic in space and time and competition, barriers and historic over harvesting also influence wildlife population. Therefore, differences between predicted and observed species lists would occur.

3.1.4 **Threatened and Endangered Species**

The Proposed **Action affects** species associated with the montane riparian habitat and the aquatic habitat of the stream itself. The Federally listed species associated with these habitat types within the Battle Creek watershed are bald eagle, winter-run chinook salmon, steelhead trout, red-legged frog and the Valley elderberry longhorn beetle.

Affected Environment: Bald Eagle

The bald eagle was listed as a Federally-endangered and State-endangered species, as a result of a severely declining population. The bald eagle, however was reclassified as Federally-threatened within the last few years. Historically, declines in bald eagle populations resulted from. uncontrolled shootings by humans, contamination of prey by pesticides and loss of habitat. Currently, human disturbance and habitat loss are probably the most significant threats to eagles **(CDF&G** 1997b). The reported number of known bald eagle nesting territories has increased steadily over the past 15 years.

Bald eagles are predatory birds that rely mostly on fish; however, they are opportunistic and would feed on birds, mammals and carrion if readily available. They require large bodies of water or free flowing streams with abundant fish and adjacent snags or perches for hunting (CDF&G 1997b). Bald eagles may feed gregariously in groups, especially on spawning fish, by swooping from perches or soaring flight to pluck fish from the water.

Bald eagle wintering areas are generally near rivers, especially around riparian areas to forage in marshy areas or open water for fish and waterfowl. The most important component of wintering habitat is an adequate food source (Evans 1992). Distributions of bald eagles along the Pit River in Shasta County California were related to prey biomass and prey-size variability along the river (Hunt 1987 & USFWS 1997b).

Breeding takes place from February through July in California, with peak activity from March to June. Bald eagles usually nest in the same territories each year and often repair and reuse the same nest, adding new materials to it each year (USFWS 1997b). There is a nesting territory near the point where Battle Creek leaves the foothills and enters the valley floor and on Lake McCumber on the North Fork Battle Creek. Another potential nest sight has been observed in Eagle Canyon but has yet to be confirmed-by wildlife biologists (Patricia Parker and Steve Croci, (USFWS) pers. com. 1998). Optimal nesting habitat is characterized by availability of live or carrion prey, the presence of suitable nest sites, and minimal human disturbance (Peterson 1986).

Breeding areas in California are mostly restricted to Butte, Lake, Lassen, Modoc, Plumas, Shasta, Siskiyou, and Trinity Counties (Leheman 1983) with about 45 percent of the California nests occurring in Shasta County (USFWS 1986). Bald eagles that breed in California may make only local winter movements in search of food. About half of the California wintering population is in the Klamath basin.

Environmental Consequences: Bald Eagle

The No Action alternative will have no effect on bald eagles. Pursuant to informal consultation with the USFWS, the Proposed Action is not likely to adversely affect the bald eagle. The Proposed Action would allow for a temporary increase in abundance of resident and anadromous fish, as well as salmon carrion, which in turn relates to a temporary increase in food supply for bald eagles.

Affected Environment: Winter-run Chinook Salmon

The winter-run chinook salmon was listed as Federally-endangered on January 4, 1994 (59 FR 440) and State-endangered in May 1989 (California Code of Regulation, Title XIV, Section 670.5) and was listed. Critical habitat for this species was listed from Keswick Dam to the Golden Gate Bridge on June 16, 1993 (58 FR 33212). Although Battle Creek was historically in the range of winter-run chinook (Yoshiyama, et al. 1995) it currently is not designated as critical habitat due to the absence of the species at this time.

The NMFS Proposed Recovery Plan for the Sacramento River Winter-run chinook salmon discusses the appropriateness of Battle Creek. Objective 3 of the proposed recovery plan is to evaluate re-establishing additional natural winter-run chinook populations. Under this objective are two recommended actions: 1) Conduct a feasibility analysis of establishing viable, naturally self-sustaining populations in other rivers and creeks within Sacramento Creeks and within the Sacramento watershed and 2) Based on information from the feasibility analysis, develop and implement recommendations for establishing supplemental populations. Under the first recommendation, two locations - Battle Creek and the Calaveras River are suggested due to historical accounts of winter run chinook salmon (NMFS 1997).

Battle Creek would be particularly valuable to the winter-run population if they are successfully reestablished because drought resistant habitat is limited. The critical spawning and incubation habitat in the Sacramento River is subject to the catastrophic affect of extreme drought, even with the Shasta Temperature Control Device (USBR 1988 and USBR 1992). The National Marine Fisheries Service (NMFS) is currently preparing studies to develop the criteria for an acceptable founding population for the reintroduction.

Coleman NFH produced winter-run chinook salmon can be found in Battle Creek. These hatchery-origin winter-run chinook were inadvertently introduced into the creek as a result of improper imprinting of juveniles produced from the U.S. Fish and Wildlife Service's winter-run

chinook salmon propagation program. The primary objective of the propagation program was to supplement the mainstem population. Efforts are currently in place to rectify this imprinting problem by rearing winter-run chinook salmon juveniles directly on Sacramento River water?.

The USFWS has monitored the numbers and the spawning timing and distribution of returning hatchery-origin winter-run chinook salmon since 1995. The USFWS estimated that 88, 237, and 266 [6] hatchery origin adult winter-run chinook salmon returned to Battle Creek in 1995, 1996 and 1997 respectively. For comparative purposes, the winter-run chinook salmon estimates for the mainstem Sacramento River were 1,361, 940, and 841 in 1995, 1996 and 1997 respectively (CDF&G 1997c). Additionally, in 1997, the USFWS initiated a winter-run chinook salmon trapping operation at the Coleman NFH barrier dam in Battle Creek. Once trapped, identified hatchery origin winter-run chinook salmon were relocated to the mainstem Sacramento River. This trapping and relocation operation was conducted in an attempt to meet the original objective of the propagation program (i.e., hatchery-origin winter-run chinook salmon returning to the mainstem Sacramento River).

Environmental Consequences: Winter-run chinook salmon

The No Action alternative will have no effect on winter-run salmon. Pursuant to informal consultation with the NMFS, the Proposed Action is likely to benefit winter-run salmon. The action expands the safe area for spawning, incubation and rearing of this Federally-endangered species, by increasing the release of cold spring waters to the Eagle Canyon section of the stream.

Affected Environment: Steelhead

Steelhead is a Federally proposed endangered species which inhabits the Sacramento and San Joaquin Rivers and tributaries. Historically, this species spawned and reared in the most upstream portions of the Upper Sacramento River and most of its perennial tributaries. Throughout the Central Valley, water and land development has led to a 95% reduction (from 6,000 to 300 river miles) in spawning and rearing habitat (Reynolds 1993). Because of the modified and unnatural flow and temperature regimes throughout the basin, steelhead can be found as adults in every month of the year (USBR 1997).

As an anadromous species, steelhead migrate to sea as juveniles and typically return to inland waterways as two- to four-year-old adults to spawn. Upstream migration occurs in August through March. Adult steelhead rarely feed while they are in freshwater. Unlike chinook and other

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5 Livingston Stone National Fish Hatchery (Shasta Winter Run Rearing Facility), an off-site incubation and rearing facility for winter-run chinook salmon is currently exists at the base of Shasta Dam.

6 Preliminary data for 1997 returns.

Pacific Salmon, all steelhead trout do not die after pawning, and a small portion survive to become repeat spawners (USBR 1997).

Natural spawning of steelhead in the Sacramento River system has been greatly reduced by dams and other barriers to their historical spawning grounds. As a result, steelhead are highly dependent on hatchery production to maintain their populations. Spawning in the Sacramento River takes place primarily in December through April, with most spawning from January through March (USBR 1997).

The timing of upstream steelhead migration coincides with the timing of upstream migration of fall-, late fall-, and winter-run chinook salmon. Consequently, flow, water, temperature, and passage-related factors affecting upstream migration of adult steelhead in the Sacramento River system are similar to those affecting chinook salmon (USBR 1997).

Environmental Consequences: Steelhead

The No Action alternative will have no effect on steelhead. Pursuant to informal consultation with the NMFS, the Proposed Action is likely to benefit steelhead. The action could temporarily improve emigration, migration, holding, spawning and rearing habitat for the steelhead. The CDF&G sponsored studies to estimate the increase in usable spawning and juvenile habitat associated with the increased flows. Figures 6 to 9 (located in Appendix A), illustrates the increases in weighted usable area (habitat) for steelhead.

Affected Environment: Valley Elderberry Longhorn Beetle

The Valley elderberry longhorn beetle (VELB) was classified as a Federally threatened insect species in 1980 (45 FR 52803: August 8, 198O). VELB is endemic to moist valley oak woodlands along the margins of rivers and in streams . This beetle requires elderberry bushes for larval and adult life cycles. Any elderberry plant with one or more stems, measuring 1 .O inch or greater in diameter at ground level is considered habitat for the beetle.

During the past 150 years more than 90 percent of the riparian habitat in California has been destroyed by agricultural and urban development. Although the entire historical distribution of VELB is unknown , the extensive destruction of riparian forests of the Central Valley of California strongly suggests that the beetle's range may have shrunk and become greatly fragmented (USFWS Species Account and Environmental Database).

Environmental Consequences: Valley Elderberry Longhorn Beetle

Elderberry bushes are present in the riparian area within the watershed. The Proposed Action may enhance the growth of these bushes and provide a larger area for VELB development, as compared to the No Action Alternative. Pursuant to informal consultation with the USFWS, the Proposed Action is not likely to adversely affect the Valley elderberry longhorn beetle.

Affected environment: Red-legged Frog

The red-legged frog is a Federally-threatened species which has the potential to occur in the project area. This frog is the largest native frog in the western United States, ranging from 1.5 to 5 inches in length. It has an olive or brown, back and a reddish-colored belly and undersides of the hind legs. It lives mostly in wetlands and streams that have deep water pools and dense stands of overhanging vegetation. (USF WS 1996).

Today the red-legged frog has disappeared from 70% of its original range, and many of the remaining populations appear to be declining rapidly. It is known to occur in about 240 streams or drainages primarily in the central coastal area of California. Only three areas within its historic range may currently support more than 350 adults. (USFWS 1996)

Over the last two decades, scientists have noted a widespread decline of frogs and other amphibian species, the causes of which are not fully understood. The decline of the California red-legged frog is attributed to the spread of exotic predators such as bullfrogs, and the widespread habitat changes that have fragmented habitat, isolated populations, and degraded streams. Its decline signals a loss of diversity and environmental quality in wetlands and streams that are essential to clean water and to the survival of many fish and wildlife species. (USFWS 1996).

The California red-legged frog was harvested for food in the San Francisco Bay area and the Central Valley during the late 1800's and early 1900's. About 80,000 frogs were harvested annually between 1890 and 1900. The market eventually dwindled as red-legged frogs became more rare, but the species continued to decline as agricultural and urban development eliminated its habitat. It was gone from the floor of the Central Valley by 1960. Remaining populations in the Sierra foothills were fragmented and later eliminated by reservoir construction, exotic predators, grazing and drought.

Environmental Conseuences: Red-legged frog

The No Action alternative will have no effect on any existing red-legged frogs. Pursuant to informal consultation with the USFWS, the Proposed Action is not likely to adversely affect the red-legged frog. The Proposed Action would allow for a temporary increase in water surface elevations, which could create standing water, or pools in backwater areas, as well as depressions in terraces and side channels; all of which is suitable red-legged frog habitat.

3.2 Physical Factors

3.2.1 Surface Water

Affected Environment

Battle Creek is the largest, spring-fed tributary to the Sacramento River between the Feather River and Keswick Dam with a mean September flow of 275 cfs. It drains the western slope of Mount Lassen and enters the Sacramento River approximately 5 miles southeast of the town of Cottonwood. A schematic of the Battle Creek system and project area are shown in Figures 1 and 2. The North Fork and the South Fork join approximately 17 miles above the confluence of the Sacramento River. Flow in Battle Creek is regulated by several facilities, including several power-generation related facilities and agricultural diversions. The most significant of these is the extensive hydroelectric power generation projects operated by PG&E and known as the Battle Creek Hydroelectric Project.

The Battle Creek Project surface water facilities include two storage reservoirs (North Battle Creek and Macumber), three forebays (Grace, Nora, and Coleman), five diversions on North Fork Battle Creek (North Battle Creek Feeder, Wildcat, Eagle Canyon, Keswick, and Al Smith), three diversions on South Fork Battle Creek (South, Inskip, and Coleman), Asbury Pump on Baldwin Creek, numerous diversions on smaller tributaries and springs, and a network of canals, ditches, flumes, and pipelines. In addition to the power diversions, two agricultural diversions, Orwick and Gover, are located on the main stem of Battle Creek.

Coleman NFH operates as a flow through facility. Water is obtained for use at the hatchery from the Coleman Powerhouse tailrace and at two other intake facilities drawing from Battle Creek. The primary intake for the hatchery is Coleman Canal; diversions at the Coleman Powerhouse tailrace range from 50 to 75 cfs (USFWS 1993). Downstream of Coleman NFH, flows in Battle Creek are similar to unimpaired flow conditions, with minor changes resulting from limited upstream storage releases and agricultural diversions.

Environmental Consequences

The Proposed Action would increase stream flows in Baldwin Creek and the lower reaches of the North and South Forks of Battle Creek, as well as in the mainstem above the Coleman Powerhouse in a manner that could temporarily improve emigration, migration, spawning, rearing and holding habitat conditions for spring-run chinook salmon and steelhead trout. Coleman NFH would continue to divert approximately 50-75 cfs of water from the tailrace of the Coleman Powerhouse. Flows from Coleman NFH to the mouth of Battle Creek would not change under the Proposed Action as compared to the No Action alternative. Therefore, water availability to the two agricultural diversions of Orwick and Gover would not be affected. Flow conditions in the Sacramento River would not change under the Proposed Action; therefore, and operations of the Central Valley Project (CVP) and other water supply projects would not be affected.

3.2.2 Groundwater

Affected Environment

The Battle Creek watershed is underlain by volcanic rock. Groundwater availability is limited and used primarily to meet agricultural and aquacultural needs. Droughts can severely impact groundwater supplies du to the extended interval necessary for groundwater percolation. There are no known groundwater quality concerns in this area.

Environmental Consequences

The Proposed Action would not impact use of surface water for consumptive use purposes, and therefore, would not cause changes in groundwater use. However, implementing the Proposed Action would increase the amount of water flowing in Battle Creek, as compared to the No-Action Alternative, which shall raise the elevation of the groundwater on the flood terraces adjacent to the stream reaches receiving flows. Raising the water table would increase the health of the pockets of riparian vegetation along the stream.

3.2.3 Geology and Erosion

Affected Environment

Geologic formations within the Battle Creek Watershed consist primarily of Cascade Range volcanic formations. The headwaters of the creek lie on the volcanic slopes of Mount Lassen located in the center of the basin. The predominate formation in the watershed consists of volcanic flows of basalt and andesite with some volcanic mudflows.

The topography of the stream basin can be divided into four distinct zones: an upper and lower plateau of gently rolling hills, an escarpment above the upper plateau dominated by steep terrain, and stream channels located in sheer gorges or steep canyons. The North and South Forks of the Creek are located on the boundaries of the watershed due to outward displacement by periodic lava flows down the middle of the basin. There are numerous large springs flowing 15 to 30 cfs located at the foothill plateaus between the tributaries indicating that groundwater flows are concentrated in some ancient stream channels buried by lava flows.

Environmental Consequences

The erosion potential in the Battle Creek Watershed is driven by slope and soil type. The predominant soil type is derived from volcanic rocks. In general there is moderately low erosion potential in the basin. Much of the foothill reach of the watershed is not particularly erodible due to the lack of deep soil overlying the pavement-like lava flows and the flatter plateaus that predominate this portion of the basin. Therefore, an increase in erosion is not anticipated under the

Proposed Action or the No Action alternative because of the presence of volcanic erosion resistant rock and the lack of soil overlying the rock.

3.3 Socioeconomic Factors

3.3.1 Energy

Affected Environment

The Battle Creek Hydroelectric Project consists of five powerhouses (Volta, Volta II, South, Inskip, and Coleman), two storage reservoirs (North Battle Creek and Macumber), three forebays (Grace, Nora, and Coleman), five diversions on North Fork Battle Creek (North Battle Creek Feeder, Wildcat, Eagle Canyon, Keswick, and Al Smith), three diversions on South Fork Battle Creek (South, Inskip, and Coleman), numerous tributary diversions, and a network of about 20 canals, ditches, flumes, and pipelines. Diverted water is used to produce hydroelectric power, and is returned to the creek at downstream locations.

Environmental Consequences

The Wildcat, and Coleman diversions affect power production at Coleman Powerhouse and Eagle Canyon affects power production at both Inskip and Coleman Powerhouses. The plant load to water duty ratios for these plants range from 335 to 420 kilowatt-hours/acre-feet. The Proposed Action to reduce diversions to the Powerhouses could result in up to 1,300 and 2,700 acre-feet/month of reductions in water diversions through the Inskip and Coleman powerhouses, respectively as compared to the No-Action Alternative. This could result in a loss of generation of about 1,500,000 kilowatt-hours/peak generation month. However, this loss would not be realized in every month because high flows satisfy both diversion and instream requirements during several months of the year. The impact of the short-term provisions on the Battle Creek Project would be on the order of six percent. Because each water year is different, the actual percentage could be higher or lower. This loss would represent less than 0.01 percent of hydroelectric power generated in California and less than 0.005 percent of all power generated in California.

3.3.2 Aquaculture

Affected Environment

The Battle Creek watershed is one of the most heavily used regions for trout and salmon aquaculture in the State. The supply of high quality spring water in the watershed make it excellent for aquaculture of cold water fish. Coleman NFH uses Coleman Canal as its main water supply. Coleman is the largest chinook salmon hatchery in the state raising predominantly fall-run chinook, late fall chinook and steelhead. Darrah Springs Hatchery has a large spring fed water supply (28 cfs) and is operated by the Department of Fish and Game to produce a wide variety of trout for the sport fishery in the northern state, including Eagle Lake. Mt. Lassen Trout is a private

operation consisting of thirteen facilities located on various springs throughout the watershed. Mt. Lassen Trout is one of the largest supplier of domestic trout eggs in the United States.

Environmental Consequences

The Proposed Action may reduce disease risk at Coleman NFH, as compared to the No Action Alternative. Increase in flows would dilute levels of pathogens associated with the presence of fall and late-fall salmon. Darrah Springs and Mt. Lassen Trout are not affected directly by the Proposed Action because they are operated using isolated spring water supplies. However, increasing the number of salmonid fish in the area also increases the encounters with organisms that prey upon salmon or Salmonid carrion. These carrion eaters or predators act as a vector to transport fish disease, which is a concern of private hatcheries. Currently there is exclusionary fencing at hatcheries and production ponds to manage for existing predation/disease transport concerns.

3.3.3 **Environmental Justice**

Environmental Justice refers to the fair treatment of people of all races, income and cultures with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment implies that no person or group of people should shoulder a disproportionate share of negative environmental impacts resulting from the execution of environmental programs.

Environmental impacts associated with the Proposed Action and No Action alternatives will not fall disproportionately on minority and/or low-income members of the community; therefore there are no environmental justice issues associated with either action.

3.4 Indian Trust Assets

Indian Trust Assets (ITA's) are legal interests in property rights held by the United States for Indian Tribes or individuals. Trust status originates from rights imparted by treaties, statutes, or executive orders. ITAs are lands, including reservations and public domain allotments, minerals, water rights, hunting and fishing rights, other natural resources, money or claims. Assents include real property, physical assents, or intangible property rights. ITAs cannot be sold, leased, or otherwise alienated without Federal approval. ITAs do not include things in which a tribe or individuals have no legal interest such as off-reservation sacred lands or archeological sites in which a tribe has no legal property interest.

There are no impacts associated with ITAs because they do not exist within the vicinity of the PG&E facilities or along the banks of Battle Creek.

3.5 Cultural Resources

As stated in Section 101 (b)(4), 42 U.S.C.§ 433 1 of the National Environmental Policy Act, one responsibility of the Federal Government is to "preserve important historic, cultural and natural aspects of our national heritage". Under Section 106 of the National Historic Protection Act, Federal agencies are required to take into account the effect of any Federal activity on cultural resources.

Because the Proposed Action does not involve the removal or modification of structural facilities and the changes in flows are within the range of natural flows, there are no impacts to cultural resources.

3.6 Cumulative Impacts

According to section 1508.7 of the Council on Environmental Quality (CEQ) regulations, cumulative impact is defined as the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

The past action of compensating PG&E to reduce diversions in an effort to improve flows on Battle Creek from 1995-l 998, in combination with the Proposed Action would have the cumulative effect of maintaining increased flows needed to provide improved migration, holding, spawning and rearing habitat for spring-run chinook salmon and steelhead anadromous fish species. The continued increase in flows is also needed to enhance habitat for resident fish species and stream dependent wildlife.

A **current action** underway is the completion of the ozonation plant at Coleman NFH (USFWS 1993). This action, combined with the Proposed Action would minimize disease concerns associated with fall and late-fall chinook salmon.

Potential **future actions** involving the hydro system are currently in the planning stage of development and are being discussed through a consensus building process. Some potential future actions are as follows:

Mainstem Battle Creek - Placing a barrier at the Coleman Powerhouse tailrace for pathogen reduction and to prevent adult salmon and steelhead from ascending into the tailrace canal where they or their eggs are subjected to mortality when the tailrace flows are turned off or on. In addition, the barrier would reduce risk to Coleman NFH due to the proximity of Intake #l . This would eliminate fish ascending into the tailrace above Intake #l .

North Fork Battle Creek - Continued increased flows below Wildcat and Eagle Canyon Dam with remedies for impaired passage and canal entrainment that could include installation of modern fish screen and ladder systems or dam removal. Installation of a fish screen and modification of fish ladders at the North Battle Creek Feeder Diversion may be a consideration in the future.

South Fork- Continued increased flows below Coleman Diversion with remedies for impaired passage and canal entrainment that could include structural modification or dam removal facilitated by connecting Inskip Powerhouse to the Coleman Canal. Increase flows below Inskip Dam and South Diversion with remedies for impaired passage and canal entrainment that could include installation of modem fish screen and ladder systems.

The installation of fish screens and/or the removal of dams and diversions would preclude the presence of anadromous fish that are potential disease vectors in power canals. An indirect effect of increasing the biomass of resident and anadromous fish in Baldwin Creek and Battle Creek is an increase in riverine dependent wildlife that are known to prey on hatchery product and can potentially transmit disease. The hatchery and production ponds, however have exclusionary fencing to manage against predation.

The Proposed Action of improving flows, in combination with other future habitat restorations in the long term may present an opportunity to reintroduce winter-run chinook into Battle Creek, and depending on the outcome of the feasibility analysis present the opportunity for the development of a founder population (NMFS 1997). This action is particularly important due to the fact that the Sacramento River populations are subjected to catastrophic loss on the spawning grounds during extreme drought (USBR 1988). Meanwhile, there are spring-fed reaches of Battle Creek that are completely survivable during those same severe droughts (as shown by temperature records of the springs during droughts).

Ultimately the Proposed Action when combined with all other actions (past, present and future) has the potential to increase the anadromous fish runs by an estimated 4,500 fall run, 4,500 late fall-run, 2,500 winter-run and 2,500 spring run salmon and 5,700 steelhead trout (USFWS 1995).

4.0 ENVIRONMENTAL COMMITMENTS

Environmental commitments are written statements of intent made to monitor and mitigate for potential adverse environmental impacts associated with any phase of planning, construction and operation and maintenance activity. The following environmental commitment is associated with the Proposed Action.

The CDF&G and USFWS would continue to monitor the responses of fishery resources to the Proposed Action. If the temperature monitoring indicates impacts to the temperature of the hatchery water supply, Interior (Reclamation & USFWS) and CDF&G would work together with PG&E to develop a response that would address the temperature concerns. If temperature impacts

to the hatchery water supply do occur and actions are taken that significantly change environmental conditions, additional environmental documentation would be completed at that time.

5.0 CONSULTATION AND COORDINATION

The following list of agencies and organizations were contacted during the preparation of this EA to obtain information or to review information contained in this document.

U.S Fish and Wildlife Service
National Marine Fisheries Service
Pacific Gas and Electric Company
California Department of Fish and Game
California Department of Water Resources

On March 3, 1998 a conference call took place between Mary Marshall (Reclamation), Jean Oscamou (PG&E), Tricia Parker and Dan Free (USFWS), Ian Gilroy (NMFS) and Harry Rectenwald(CDF&G) to reach consensus on ladder closure, Coleman NFH, unscreened diversion, bald eagle, and cumulative impact issues.

Public negotiations were held with PG&E during development of the agreement. On May 15, 1998, a Negotiation Advisory was sent to numerous press agencies and members of the Battle Creek Working Group.

On June 3, 1998 a conference call took place between Mary Marshall and Kellye Kennedy (Reclamation), Jean Oscamou (PG&E), Tricia Parker and Dan Free (USFWS) and Harry Rectenwald(CDF&G) to reach consensus on Baldwin Creek flows.

The following is the "Distribution List for the Draft EA".

* Nat Bingham, Pacific Coast Federation of Fisherman's Association(PCFFA)
* Ian Gilroy, NMFS
* Richard Jewell, USFWS: Sacramento
* Patricia Parker, Scott Hamelberg & Jim Smith, USFWS: Red Bluff
* Dan Free, Kimberly True & Tom Nelson, USFWS: CA-NV Fish Health Center/Coleman National Fish Hatchery
* Harry Rectenwald, CDF&G
* Bill Kier & Mike Ward, Kier Associates
* Serge Birk & Jason Peltier, Central Valley Project Water Association(CVPWA)
* Laurie Aumack & Bob Lee, Battle Creek Watershed Conservancy
* Jean Oscamou &Angela Risdon, PG&E
* Barry Mortimeyer, R.W. Beck
* Steve Hirsch, & Walt Hoye, Metropolitan Water Department(MWD)
* Jim Buell, Buell and Associates

* Nannette Engelbrite, Western Area Power Association(WAPA)
* Tim Livingston, Sierra Pacific Industries
* Chuck DeJournette, Tehama Fly Fishers
* Marsha Wickland, Trust for Public Lands
* Maureen Rose, Friends of the River
* University of California at Berkley, Water Resources Center Archive
* Richard Welsh, USBR-Willows Construction Office
* Bill Wright, Shasta Land Services
* Renee Henry, Environmental Defense Fund
* Brad Carter, Mount Lassen Trout
* Harry Modi, Northern California Power Association (NCPA)
* Erin Brainerd
* Gaspare Jenna, Water Strategist
* Edward Roman, Sacramento Municipal Utility District(SMUD)
* Nancy Matthewson
* Kelly Sackheim, Henwood Energy Services

Comments received during the public comment review period and the responses to these comments are located in Appendix B.

6.0 COMPLIANCE WITH ENVIRONMENTAL STATUTES

This EA has been prepared in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969, as amended. As part of the NEPA process, Reclamation is also complying with other applicable laws including the Clean Water Act of 1977, the Endangered Species Act of 1973, as amended and the National Historic Preservation Act of 1966, as amended.

The action proposed in this document is a joint activity of Reclamation and the U.S. Fish and Wildlife Service and therefore, have met any consultation/coordination requirements that may exist pursuant to the Fish and Wildlife Coordination Act.

To satisfy requirements of the Endangered Species Act, Reclamation informally consulted with the USFWS and NMFS regarding the effects of the Proposed Action on Federally-listed species, and developing specific compliance measures. Reclamation has received letters of concurrence from the USFWS and NMFS that the Proposed Action is not likely to adversely affect or is likely to benefit Federally listed threatened and endangered species. Their letters are provided in Appendix C.

7.0 LIST OF PREPARERS

Preparer	Task(s)
Mary Marshall Environmental Specialist **U.S.** Bureau of Reclamation	EA Preparation and Coordination
Harry Rectenwald Environmental Specialist CA Department of Fish and Game	EA Preparation and Review
Patricia Parker and Dan Free Fisheries Biologists U.S. Fish and Wildlife Service	EA Preparation and Review
Ian Gilroy Fisheries Biologist National Marine Fisheries Service	EA Preparation and Review
Jean Oscamou, Supervising Engineer **and Angela Risdon,** License Coordinator PG&E	EA Preparation and Review
Kellye Kennedy Water Acquisition Program Manager U.S. Bureau of Reclamation	EA Preparation and Review

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APPENDIX A:

FIGURES

FIGURE 1

Battle Creek Site Location and Drainage Area

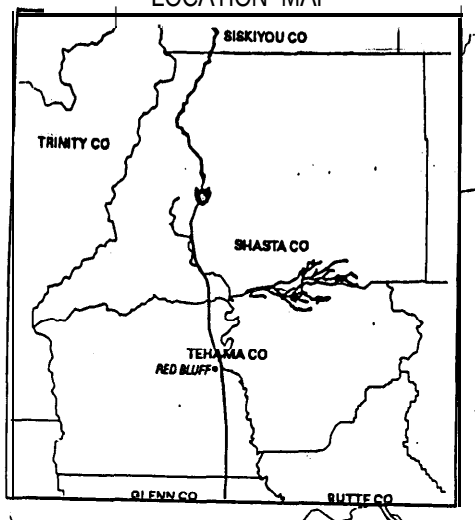
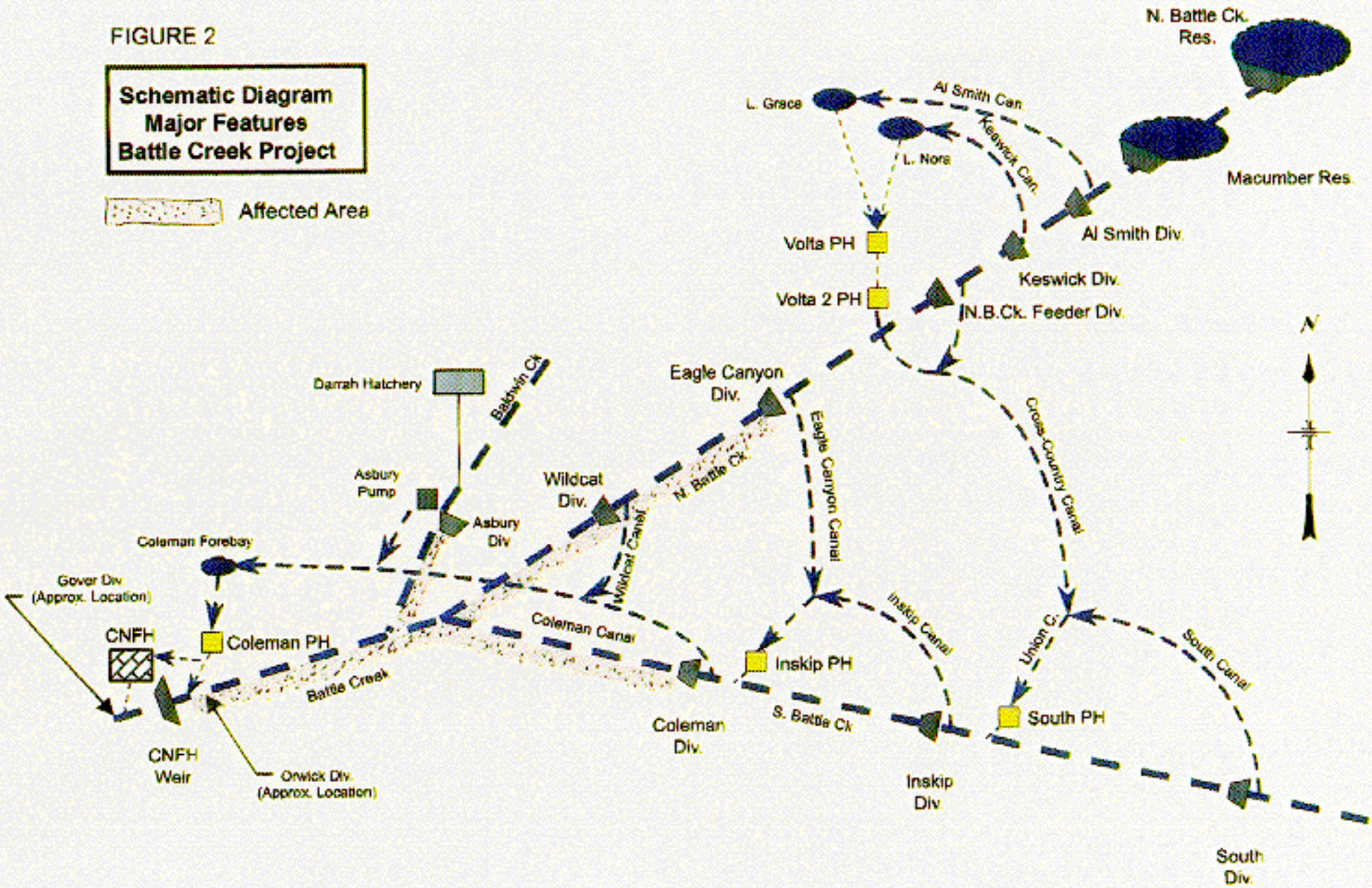


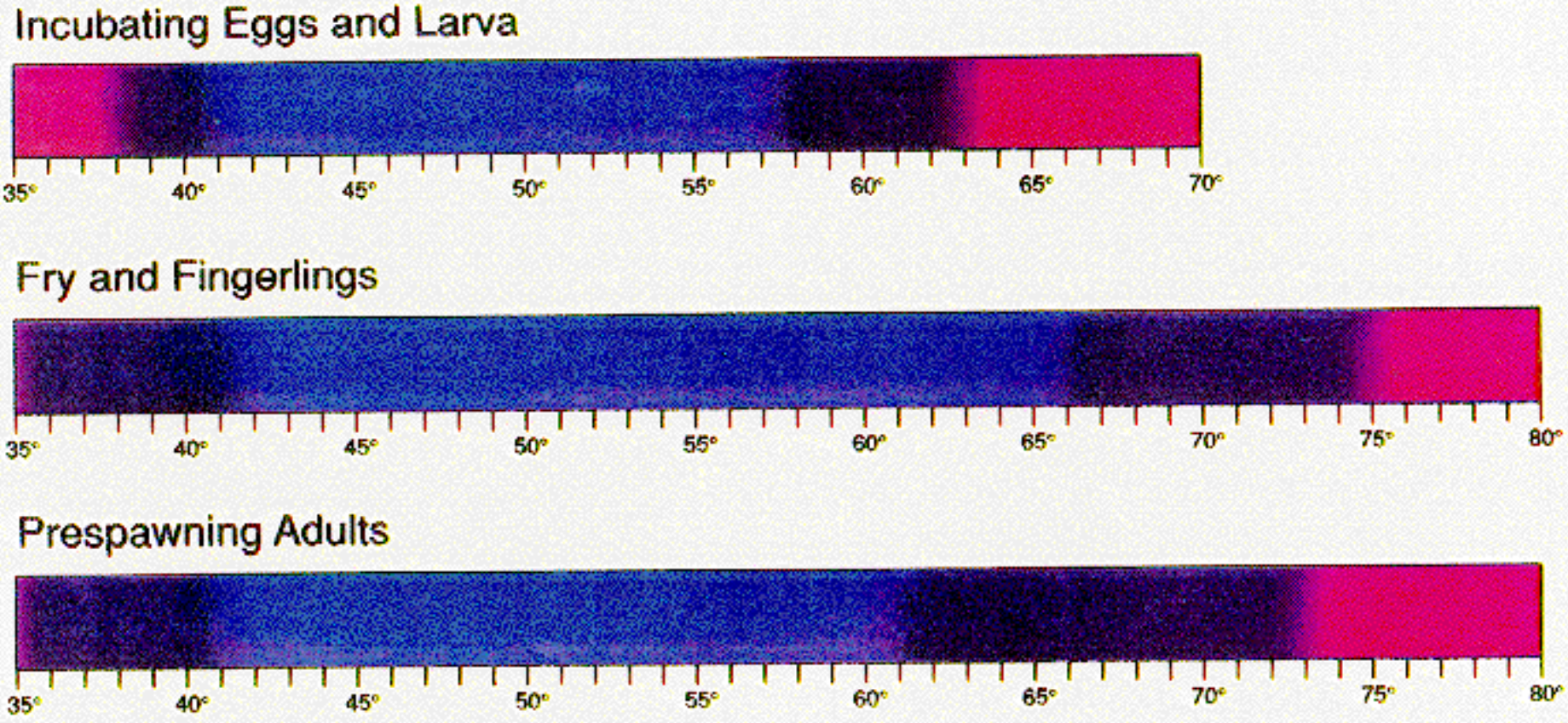
FIGURE 2

Schematic Diagram
Major Features
Battle Creek Project

Affected Area



(Baseline Figure Source: Jean R. Oscamou (PG&E) - 6/1/99)



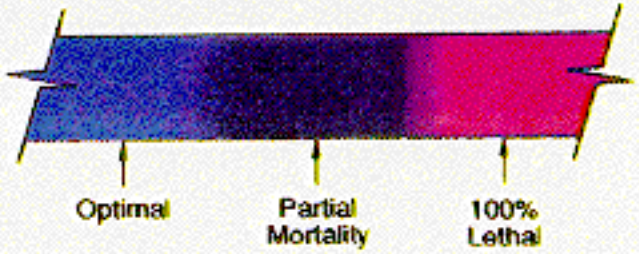
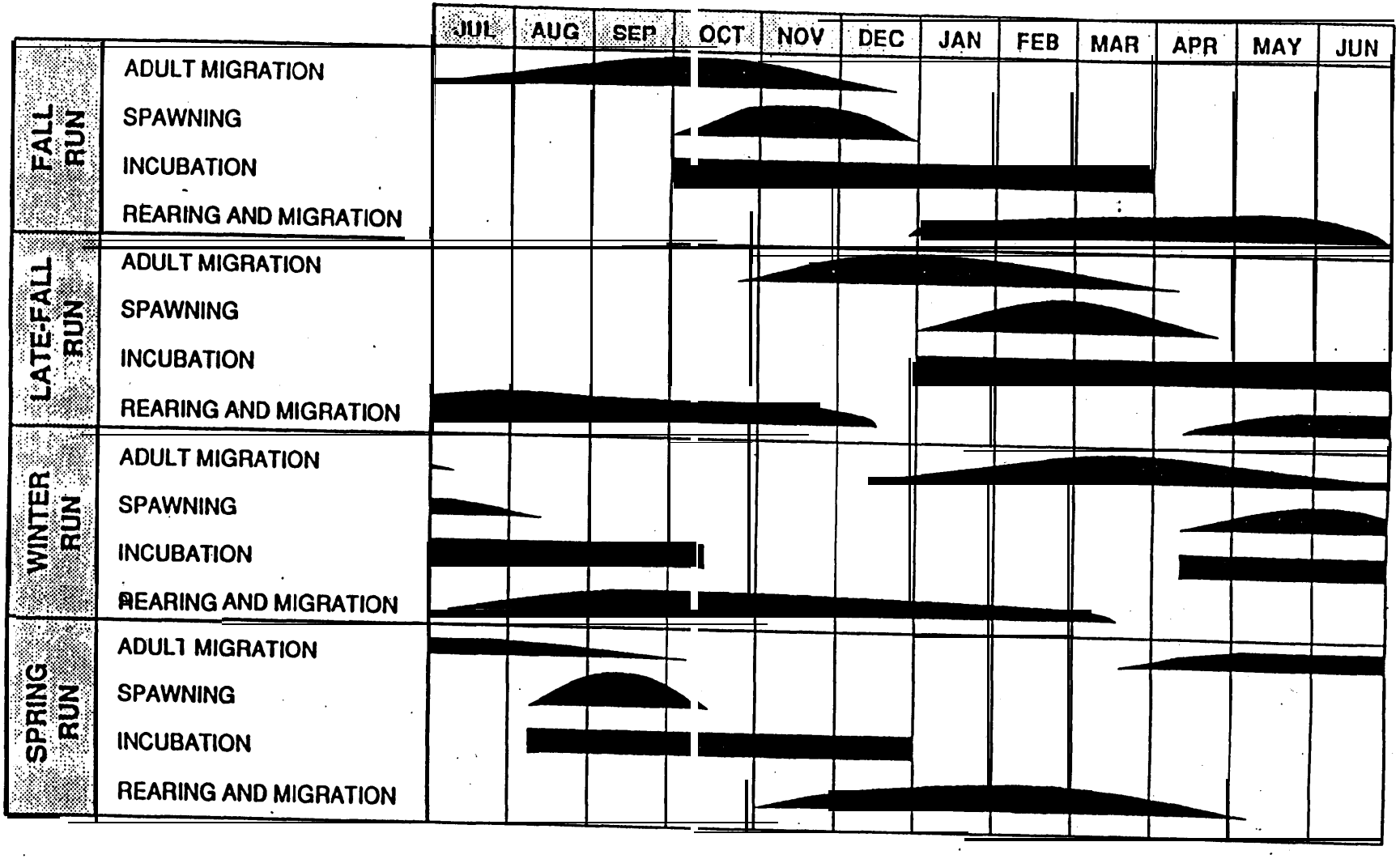


FIGURE 3

RELATIVE WATER TEMPERATURE (°F) TOLERANCES FOR THE FRESHWATER LIFE STAGES OF CHINOOK SALMON

(Data from Brett 1952, Healy 1979, Hinze *et al* 1956, Seymour 1956.)

(SOURCE: VOGEL 1991)



LEGEND

DENOTES PRESENCE AND RELATIVE MAGNITUDE

DENOTES ONLY PRESENCE

FIGURE 4

LIFE HISTORY CHARACTERISTICS OF SACRAMENTO RIVER CHINOOK SALMON AT AND UPSTREAM OF RED BLUFF

U.S. BUREAU OF RECLAMATION

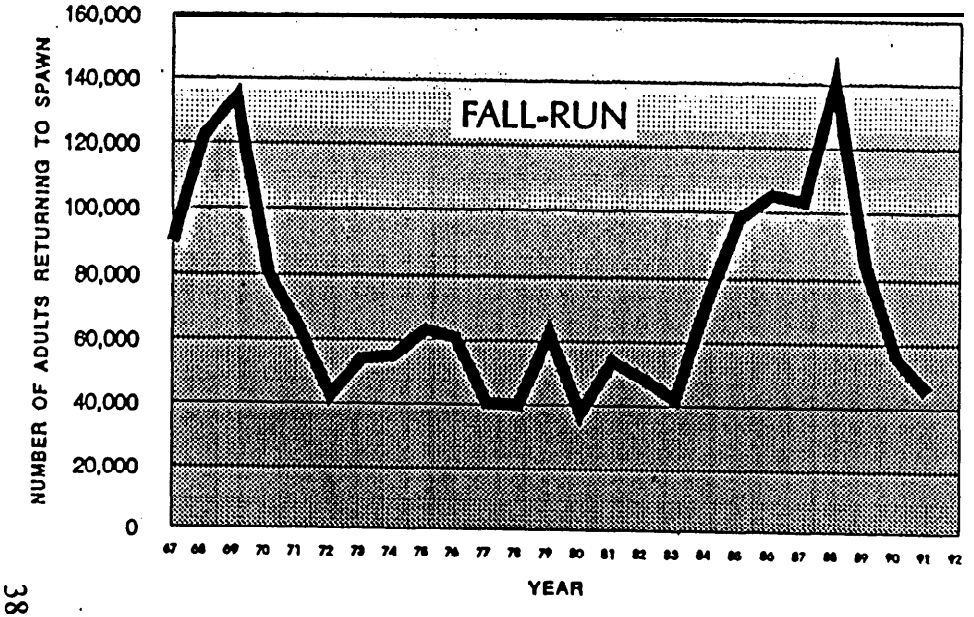
(SOURCE: VOGEL 1991)

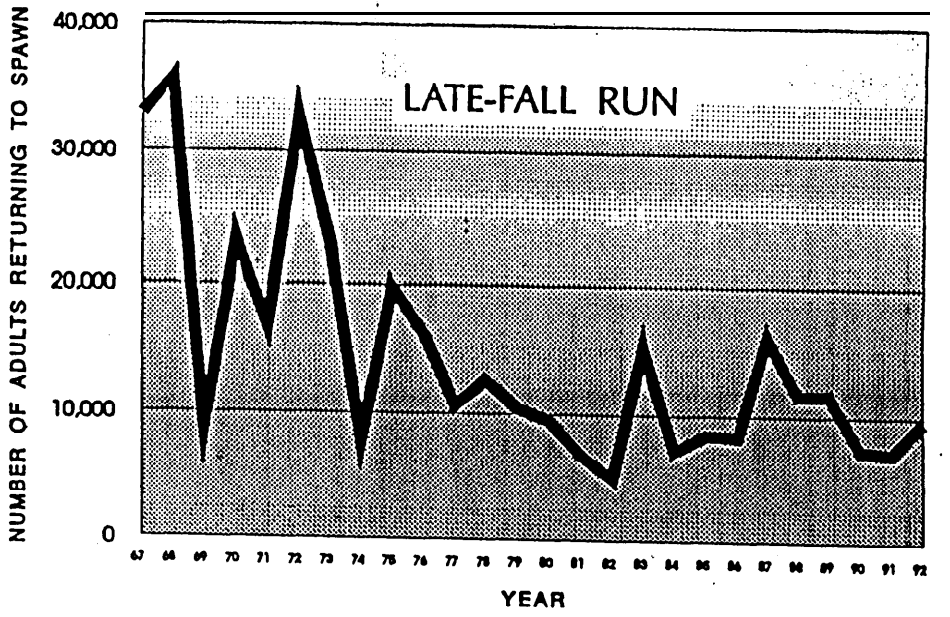
FIGURE 5

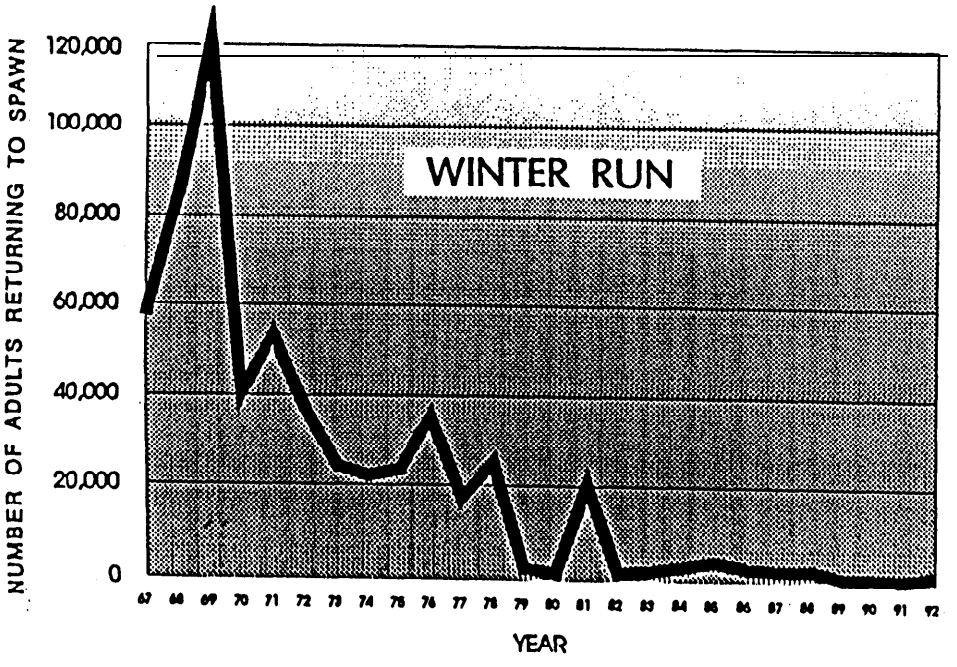
CHINOOK **SALMON** POPULATION TRENDS

1967 to **1992**

(DATA FROM MILLS 1993)







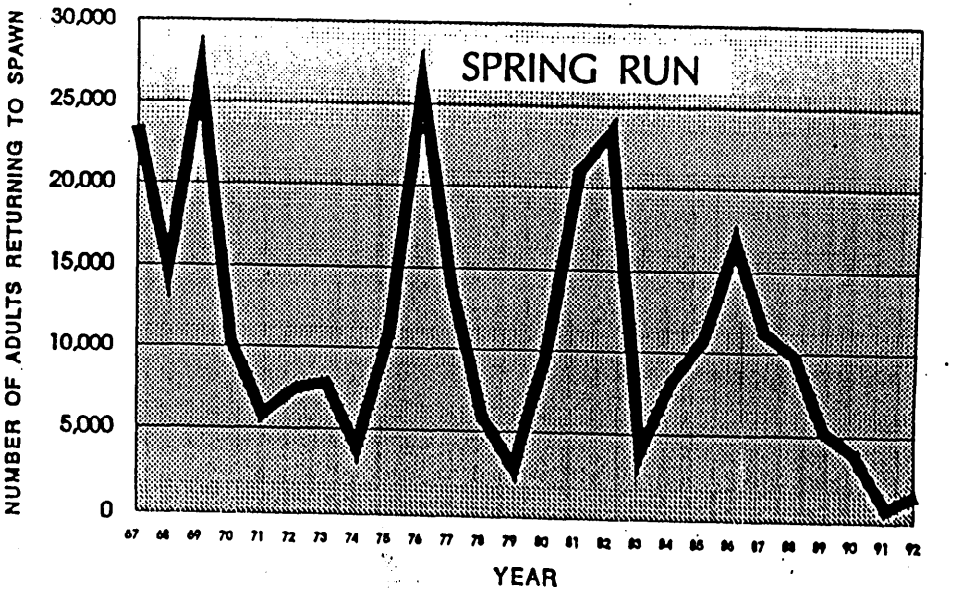


FIGURE 6

AFRP, PG&E, and FERC minimum flows compared to flows required to equal or exceed specified amounts of habitat expressed as fractions of the maximum possible weighted usable habitat for the Wildcat Reach of Battle Creek.

Species/ Life History Stage	Minimum flows (cfs) and fraction of maximum possible weighted usable area (%)						Range of discharge (cfs) required to equal or exceed specified fractions of the maximum possible weighted usable area[1]						
	AFRP Recommended		PG&E Target		FERC Minimum								
	Flow	WUA	Flow	WUA	flow	WUA	≥ 75%	≥ 80%	≥ 85%	≥ 90%	≥ 95 %	≥ 99%	100%
Steel head Juvenile Rearing	30	100%	NA	NA	3	29%	11-139	13-118	15-97	19-62	23-48	28- 36	30
Steelhead Spawning	50	96%	NA	NA	3	<I%	37 - 101	39 - 95	41 - 90	45-84	49 - 77	57 -69	60
Fall Chinook Rearing	50	97%	NA	NA	3	13%	17-143	19-101	22 - 80	25-67	29-56	35-45	40
Spring Chinook Rearing	30	96%	NA	NA	3	13%	17 - 143	19- 101	22 - 80	25-67	29-56	35-45'	40
Fall Chinook Spawning	30	92%	NA	NA	3	3%	23-75	24-71	26 - 66	29-61	33-55	38-40	45
Spring Chinook Spawning	30	98%	NA	NA	3	10%	11-53	11-49	12-44	13-39	15-35	21 -28	25

1 Discharge values were interpolated using linear regression from WUA values taken from an IFIM study performed by TRPA.

FIGURE 7

AFRP, PG&E, and FERC minimum flow compared to flows required to equal or exceed specified amounts of habitat expressed as fractions of the maximum possible weighted usable habitat for the Coleman Reach of Battle Creek.

Species/ Life History Stage	Minimum flows (cfs) and fraction of maximum possible weighted usable area (%)						Range of discharge (cfs) required to equal or exceed specified fractions of the maximum possible weighted usable area[1]						
	AFRP Recommended Flow	WUA	PG&E Target Flow	WUA	FERC Minimum Flow	WUA	≥ 75%	≥ 80%	≥ 85%	≥ 90%	≥ 95%	299%	100%
Steelhead Juvenile Rearing	30	96%	25	91%	5	31%	16-132	18-118	21-102	25-86	29-65	37-51	45
Steel head Spawning	50	59%	25	19%	5	<1%	70-190	77-176	84-164	92-152	107-140	118-124	120
Fall Chinook Rearing	50	99%	25	72%	5	9%	27-136	29-122	33-105	37-91	42-77	50-61	55
Spring Chinook Rearing	30	81%	25	72%	5	9%	27-136	29-122	33-105	37-91	42-77	50-61	55
Fall Chinook Spawning	50	81%	25	51%	5	1%	45-145	49-133	54-124	60-61, 67-118*	75-106	81-94	90
Spring Chinook Spawning	50	100%	25	85%	5	12%	19-110	22-105	25-100	30-64, 70-93*	38-62	46-60	55

* Fall and spring chinook spawning WUA curves were bimodal.

[1] Discharge values were interpolated using linear regression from WUA values taken from an IFIM study performed by TRPA.

FIGURE 8

AFRP, PG&E, and FERC minimum flows compared to flows required to equal or exceed specified amounts of habitat expressed as fractions of the maximum possible weighted usable habitat for the Eagle Reach of Battle Creek.

Species/ Life History Stage	Minimum flows (cfs) and fraction of maximum possible weighted usable area (%)						Range of discharge (cfs) required to equal or exceed specified fractions of the maximum possible weighted usable area[1]						
	AFRP Recommended		PG&E Target		FERC Minimum								
	Flow	WUA	Flow	WUA	Flow	WUA	≥ 75%	≥ 80%	≥ 85%	≥ 90%	≥ 95%	≥ 99%	100%
Steelhead Juvenile Rearing	30	100%	25	97%	3	30%	11-142	13-123	15-102	19-63	23-48	28-36	30
Steel head Spawning	50	99%	25	40%	3	<1%	35 - 112	37-106	39 -90	42 - 83	46 - 75	53-65	60
Fall Chinook Rearing	50	98%	25	90%	3	13%	17-166	20-132	22 - 87	25-69	29 - 57	35-45	40
Spring Chinook Rearing	30	96%	25	90%	3	13%	17-166	20-132	22 -87	25-69	29-57	35-45	40
Fall Chinook Spawning	30	94%	25	83%	3	3%	23 - 73	24 - 69	26 - 63	28-57	31 - 51	35-43	40
Spring Chinook Spawning	30	99%	25	100%	3	12%	11-50	12-46	13-42	14-38	17-34	23-28	25

[1] Discharge values were interpolated using linear regression from WUA values taken from an IFIM study performed by TRPA.

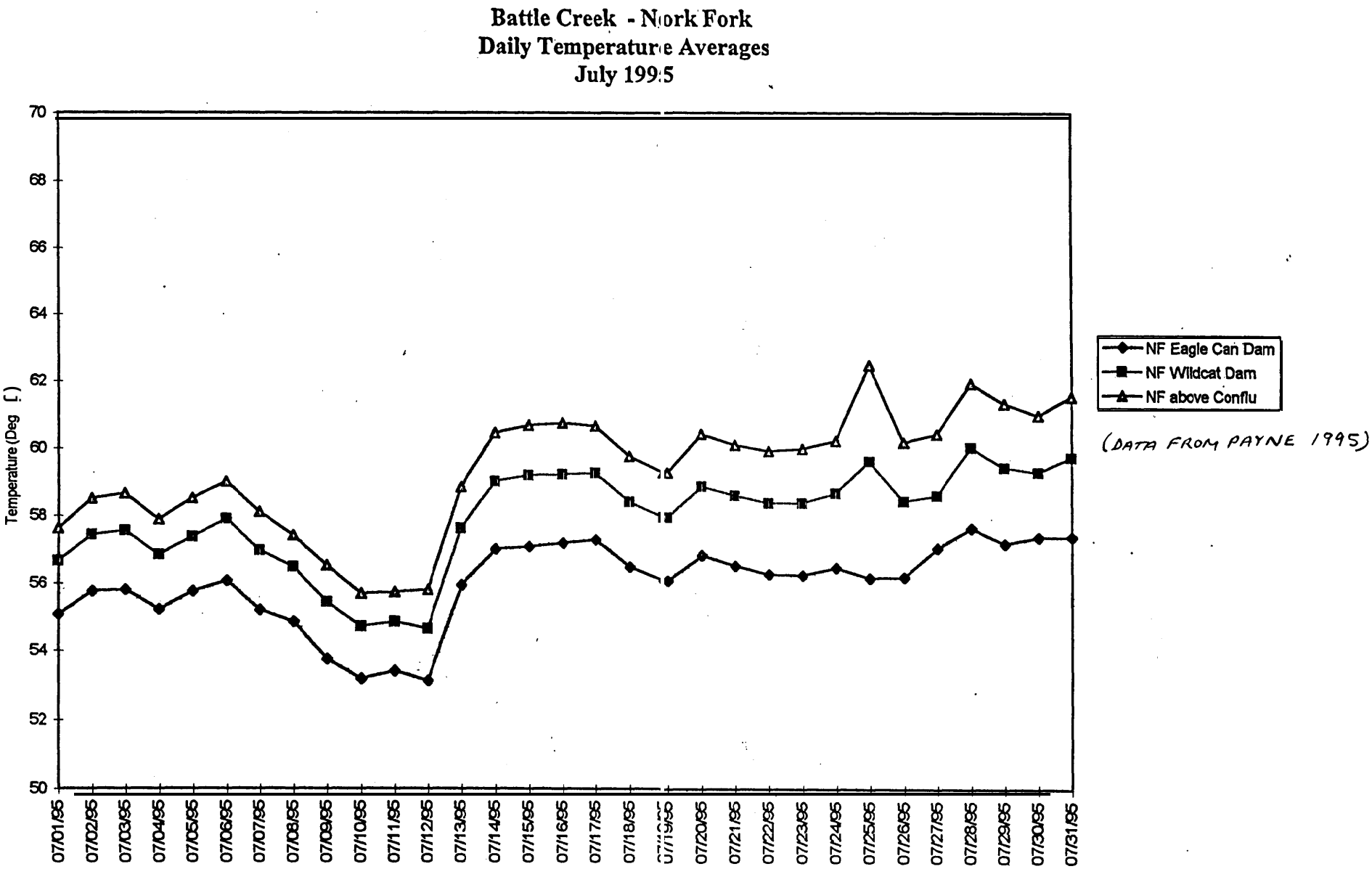
FIGURE 9

AFRP, PG&E, and FERC minimum flows compared to flows required to equal or exceed specified amounts of habitat expressed as fractions of the maximum possible weighted usable habitat for the Mainstem Reach of Battle Creek

Species/ Life History Stage	Minimum flows (cfs) and fraction of maximum possible weighted usable area[1]						Range of discharge (cfs) required to equal or exceed specified fractions of the maximum possible weighted usable area[2]						
	AFRP Recommended		PG&E Target		FERC Minimum								
	Flow	WUA	Flow	WUA	Flow	WUA	≥ 75%	≥ 80%	≥ 85%	≥ 90%	≥ 95%	≥ 99%	100%
Fall Chinook Rearing	100	97%	50	96%	8	32%	28-180	32-163	36-147	41-130	49-110	62-88	71
Spring Chinook Rearing	60	99%	50	96%	8	32%	28-180	32-163	36-147	41-130	49-110	62-88	71
Fall Chinook Spawning	80	100%	50	87%.	8	6%	42-177	45-155	48-140	53-123	60-107	74-96	86
Spring Chinook Spawning	80	84%	50	99%	8	29%	23 - 101	24-87	27-78	29-73	34-62	43-52	46

[1] Flows for the Mainstem Reach have been determined by adding the flows from the Wildcat and Coleman reaches.
[2] Discharge values were interpolated using linear regression from WUA values taken from an IFIM study performed by TRPA.

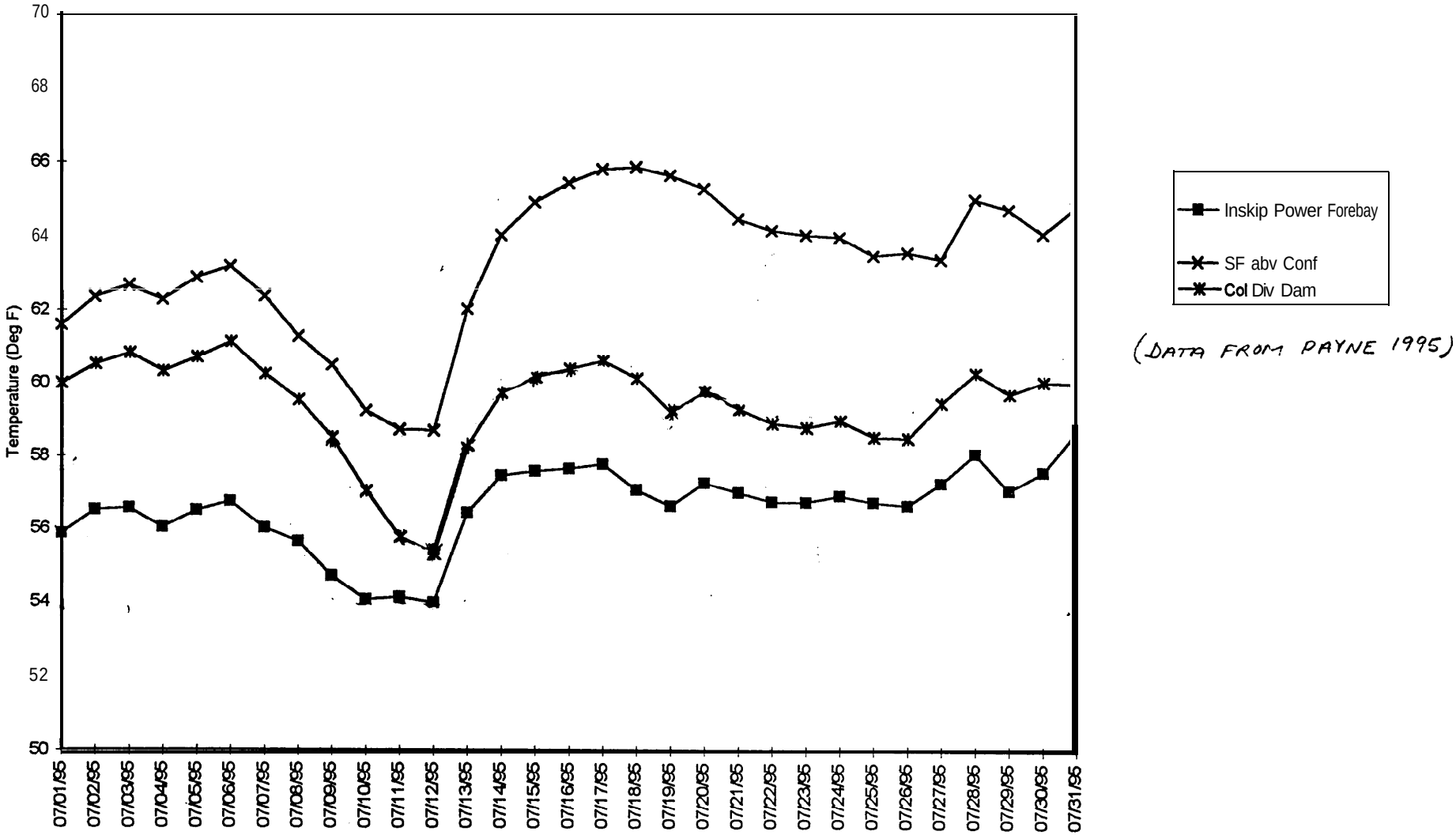
FIGURE 1



(DATA FROM PAYNE 1995)

FIGURE 11

Battle Creek - South Fork
Daily Temperature Averages
July 1995



(DATA FROM PAYNE 1995)

APPENDIX B:

Comment Letters and Responses to Comments

The following comment letters were received during the public review period for this EA:

* Mt. Lassen Trout
* Terraqua Environmental Consulting
* National Marine Fisheries Service.
* PG&E
* Sacramento Municipal Utility District
* DOI: U.S. Fish and Wildlife Service - Sacramento

In addition to the letters received, a "marked-up" copy of the Draft EA with comments was received from the following:

1) California Department of Fish and Game

2) DOI: U.S. Bureau of Reclamation, Mid-Pacific Region:
   - MP-150 (Divison of Environmental Affairs)
   - Northern California Area Office

LETTER #1

28125 Hwy36E
Red Bluff,CA 96080

(916)597-2222
Fax: (916)597-2068

January 20, 1998

BUREAU Oi RECLAMATION
OFFICIAL FILE COPY
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Division of Resources Management
Bureau of Reclamation
Mid-Pacific Regional Office
2800 Cottage Way
Sacramento, CA 95825-1898

Ms. Marshall,

We at Mt. Lassen Trout are glad to be accounted for in the Bureau's Environmental Assessment for Temporary Reduction in Water Diversions from Battle Creek draft dated January 1998.

The only comments we would like to submit concerning this draft are the following:

#1 1. The times on page 18 and the once on page 20 (and any other place I may of missed) where our company is mentioned as "Lassen Trout Farms" (page 18) or as "Lassen Trout" (page 20) should be changed to "Mt. Lassen Trout".

#2 2. For the record where we are described on page 18 would be better if corrected from: "Lassen Trout Farms are a private operation consisting on a number of facilities located on various springs throughout the watershed. Lassen Trout is the largest supplier of domestic trout eggs in the United States" to:

"Mt. Lassen Trout is a private operation consisting of a number of facilities located on various springs throughout the watershed. Mt. Lassen trout is one of the largest suppliers of domestic trout eggs in the United States?

Thank you for your time and consideration.

Respectfully,

Bradley E. Carter

Brad Carter, Hatchery Manager
Mt. Lassen Trout

Classification ENV 6.00
Project CVP
Control No 980005082
File 5663

RESPONSES TO LETTER #l

Letter From: Mt. Lassen Trout
Dated: January 20, 1998
Signed By: Brad Carter, Hatchery Manager

Response #l: The EA has been revised in response to this comment.

Response #2: The EA has been revised in response to this comment.

LETTER #2

From: "Michael B. Ward" <wardski@televar.com>
To: ibr2dm10.ibr2smtp("mmarshall@mp.usbr.gov")
Date: **l/30/98** 2:58pm
Subject: Question re: Battle Cr. Flow EA

Hi Mary,

I work with Rier Associates and prepared the flow numbers that **were** presented in Figures 6 - 9 of the Battle Cr. Flow EA.

Having finished reviewing the EA, I have a couple questions and comments pertaining mostly to flows:

#1 p.5, Table 1: the Flow Subject To Compensation By The Interior, for Eagle Canyon, should read something like - "12.5 c x c 30" to specify the upper limit described in the text.

#2 p7, paragraph 3, line 4: The numbers "500 - 900 percent' are correct.
p7, paragraph 3, line 7: I don't understand what the following means: 'increased a factor of 100 to 200 for spawning" - I double checked all the flow numbers and every combination of calculations that I could think of and I'm still confused at how these numbers were arrived at and what they mean, Can you clear this up for me?

#3 p12, para 4, line 2: The numbers "500 - 900 percent" are correct.
p12, para 4, line 3: The phrase "500 percent in the mainstem" should be "650 percent in the mainstem" because 8 cfs increased to 60 cfs equals **a** 52 cfs increase. 52/8=6.5 and 6.5*100=650%

Thank you - MW

Michael B. Ward
Terraqua Environmental Consulting
2360 Hwy. 20
P.O. Box 85
Wauconda, WA 98859
tel.: (509) 486-2426
fax: (509) 486-2423
wardski@televar.com

cc: ibr2dm10.ibr2smtp(iwkier@mail.hooked.net")

RESPONSES TO LETTER #2

From: **Michael Ward, Terraqua Consulting**
Dated: **January 30, 1998**
Signed By: **Michael Ward**

Response #l: The EA has been revised in response to this comment.

Response #2: The EA has been revised in response to this comment.

Response #3: The EA has been revised in response to this comment.

LETTER #3

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
777 Sonoma Ave. Rm 325
Santa Rosa CA 95404-6528
(707)575-6050; Fax(707)578-3435

February 11, 1998

Ms. Mary Marshall
Bureau of Reclamation
Mid-Pacific Regional Office
Division of Resources Management
2800 Cottage Way,
Sacramento, CA 95825-1898

Dear Ms. Marshall:

Thank you for the opportunity to comment on the draft report "Draft Environmental Assessment for the temporary reduction in water diversions from Battle Creek (January 13, 1998)." The proposed project would increase the amount of-water that Pacific Gas and Electric (P.G.&E) releases into Battle Creek at four possible locations. Flows would increase above the Federal Energy Regulatory Commission (FERC) required minimum instream flow releases 1) from 3 to 30 cubic feet per second (cfs) below the Wildcat and Eagle Canyon diversion on the north fork and 2) from 5 to 30 cfs below the Coleman diversion on the south fork. Further, P.G.&E may decrease its Asbury Pump diversion in Baldwin Creek, a tributary to lower Battle Creek, to provide approximately 5 cfs of flow.

The Environmental Assessment (EA) indicates that the project meets goals 1 and 2 of the draft Anadromous Fish Restoration Plan authorized by the Central Valley Project Improvement Act (CVPIA) for Battle Creek. Three years ago an agreement was signed between the U.S. Bureau of Reclamation, P.G.&E, California Department of Fish and Game (CDFG) and the U.S. Fish and Wildlife Service (USFWS); it was signed under the authority provided in section 3406(b)(3) of the CVPIA. P.G.&E provided the first 12.5 cfs at no cost,but the BOR paid P.G.&E for flows from 12.5 cfs to 30 cfs. This agreement would continue under the proposed project.

The following comments are provided for the draft EA:

Page 3, 1.2 - Purpose and Need:

Some of this section appears to have some background information that could be moved into the introduction. The purpose and need should be very clear.

#2 Page 3, 1.2 - Purpose and Need, first paragraph, second sentence:

Descriptions should be broken'out by species and be consistent throughout the document.

#3 Page 3, 1.2 - Purpose and Need, last paragraph, last sentence:

The last sentence should be broken out by species and be consistent throughout the document.

*4 Page 4, **1.3** - Related Projects and Documents:

Was there a report on spawning gravel distribution **prepared** by Dr. Kondolf?

*5 Page **4, 2.1** - Proposed Action, first paragraph, third sentence:

"Reclamation would compensate P.G.&E for approximately 3 additional years." Our understanding from the coordination meetings is that the agreement was to be for one year and would assist us in developing the long term agreement. It could be extended for three years if needed._

#6 Page 5 Table 1, - Battle Creek Flows:.

The column titled "Flows subject to Compensation by Interior should read "flows fewer than 30 and greater than 12.5 cfs" to be consistent with the above paragraph.

#7 Page 6, **3.1.1** - Fisheries, first paragraph, last sentence:

This sentence implies that the diversions were never screened. It should be clarified that the diversions were' screened prior to flood events of the late 1950's, and that these screens were washed out and never replaced, possibly due to the barrier weir at Coleman National Fish **Hatchery (CNFH)** in the 1950's.

#8 Page 6, 3.1.1 - Fisheries, 5th paragraph, second sentence:

A citation is needed identifying the source of specific information collected (Kondolf or Payne?).

#9 Page 7, 3.1.l- Fisheries, first paragraph, first sentence:

This sentence is misleading. CNFH limits anadromous fish passage upstream of the hatchery to ensure capturing spring, fall, and late-fall chinook and steelhead that are used. for mitigation and propagation. The populations are low for both spring-run chinook and steelhead in Battle Creek. The ladders at Eagle Canyon and Coleman diversions have been closed to constrict the available area for spring-run chinook and steelhead, increasing male-to-female mating' encounters. Both Eagle Canyon and Coleman diversions would be laddered and screened (once the numbers of returning fish increase to adequate levels), restoring access above the diversions.

#10 Page 7, **3.1.1** - Fisheries, Environmental Consequences, fifth paragraph:

If the water temperature is marginal, with or without the proposed project, then the positive or negative environmental consequence of increasing the flows should be fully described. If there is no benefit, then this document should justify paying for the water.

#11 Page 11, 3.1.2 - Vegetation, second full paragraph, second sentence:

A citation would be useful that supports this statement':

#12 Page 11, 3.1.3 - Wildlife, third paragraph, last sentence:

The red-legged frog is a federally-listed species and should **be** noted as such.

#13 Page 13, 3.1.3 - Wildlife, top of page:

It is mentioned that Montana bald eagle populations are growing and that they are dependant on kokanee salmon which depend on flow increases in the Pit River. The purpose of the inter-relationship should be fully described and its

#13 applicability to Battle Creek explained.

#14 Page **13, 3.1.4** - Threatened and Endangered Species:

This section needs improvement. Several species are omitted including steelhead trout that are proposed for listing and the listed red-legged frog.

#15 **Page 13, 3.1.4** Threatened and Endangered Species, Bald Eagles, first paragraph:

This sentence needs more information, more clarity, and a direct relationship to flow increases in Battle Creek.

#16 Page **14, 3.1.4** - Threatened and Endangered Species, Winter-run Chinook salmon:

This section needs modification. A good description of the listing history is available in the proposed winter-run chinook salmon recovery plan. Specifically, the Sacramento River winter-run chinook salmon was listed as endangered, January 4, 1994 (59 FR 440). Critical-ha-bitat was identified June 16, 1993 from Keswick Dam to the Golden Gate Bridge (58 FR 33212).

The recovery plan does not exclusively recommend Battle Creek restoration. Rather, Chapter 5, page V-84, Objective. 3 states that an evaluation is needed of re-establishing additional natural winter-run chinook populations and recommends two actions: 1) conduct a feasibility analysis of establishing viable, natural self-sustaining populations in other rivers and creeks within the Sacramento River watershed, and 2) based on information developed from the feasibility analysis, develop and implement recommendations for establishing supplemental populations. Under recommendation 1, it suggests two locations based on historical accounts of winter-run chinook in Battle Creek and Calaveras River.

#17 Page 15, **3.1.4** - Threatened and Endangered Species, Winter-run Chinook salmon, first paragraph:

This paragraph needs correcting. The numbers given are for Battle Creek, not.for the entire mainstem Sacramento River. Battle Creek data should be confirmed with the

#17 USFWS. Please identify the years that USFWS sampled Battle Creek and the mainstem Sacramento River and include estimates for Battle Creek and the Sacramento River for those years sampled. In 1997,. what was the estimate of winter-run in Battle Creek.and how many fish were trapped and relocated in the mainstem Sacramento River?

#18 Page 15, 3.1.4 - Threatened and Endangered Species, Winter-run Chinook salmon, second paragraph, last sentence:

The proposed action does not close the ladders at Eagle Canyon and Coleman Diversions. Therefore, this sentence should.be omitted, as well as part of the previous sentence that describes reduced entrainment into powerplants.

#19 Page 16, 3.2.1 - Surface Waters, fourth complete paragraph:

This statement should be broken out by species and by **needs** to maintain consistency throughout the document.

#20 'Page 18, 3.3.2 - Aquaculture, fourth sentence:

Add winter-run chinook salmon to the list of speciesthat CNFH raises; and possibly a sentence on the future of the winter-run program.

#21 Page 20, 3.6 Cumulative Impacts, **past** action:

The first sentence should be broken out by species and needs to be consistent throughout the document.

#22 Page 20, 3.6 - Cumulative. Impacts, Mainstem Battle Creek:

Pathogen reduction should be included.

#23 Page 20, 3.6 - Cumulative Impacts, North Fork Battle Creek, last sentence:

Why is there a requirement to screen the diversion at this location? It was stated that there is little value in opening up the small volume.of habitat above this location, and that the ladder there would be closed. This needs to be clarified by CDFG.

#24 Page 21, 3.6 - Cumulative Impacts, first full paragraph:'

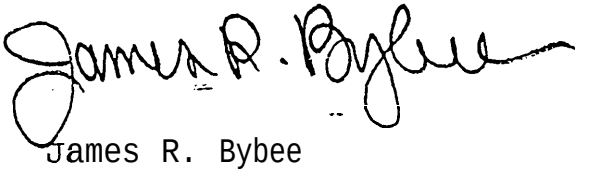
#24 The proposed **action** does not provide the opportunity to re-introduce Sacramento River winter-run chinook. When combined with the long-term agreement (initial stages of development), an opportunity may exist for re-introduction. This will depend on the outcome of the feasibility analysis for developing a founder population.

#25 Appendix A: Figures:

Figures 2, 5, 10, and 11 should include a reference or citation for the graphics.

If you have questions concerning these comments, please contact Mr. Ian dilroy of my staff at (707) 575-6053 or by e-mail at Ian.Gilroy@noaa.gov.

Sincerely,



James R. Bybee
Habitat Conservation Manager
Northern California

cc: CDFG, H. Rectenwald
USFWS, P. Parker
USFWS, D. Free
PG&E, J. Oscamou
USBR, K. Kennedy

RESPONSES TO LETTER #3

From: **NOAA, National Marine Fisheries Service**
Dated: **February 30, 1998**
Signed By: **James Bybee**

Response #l: Background information has been moved to the Introduction Section in the **EA.**

Response #2: Revision has been made to the EA.

Response #3: Revision has been made to the EA.

Response #4: Information has been added to the EA.

Response #5: Three years is a conservative estimate. The agreement will be for up to three years while long term planning efforts continue.

Response #6 Revision has been made to the EA.

Response #7: Information has been added to the EA.

Response #8: Information has been added to the EA.

Response #9: The entire paragraph has been revised in the EA.

Response #l0: The entire paragraph has been revised in the EA.

Response #ll: Information has been added to the EA.

Response #12: Information has been added to the EA.

Response #13: This information has been removed from the EA.

Response #14: Additional threatened and endangered species information has been incorporated.

Response #15: The Affected Environment and Environmental Consequences Sections for the Bald Eagle have been revised in the EA.

Response #16 Section has been modified in the EA.

Response #17 Revisions and additional information has been added to the EA.

RESPONSES TO LETTER #3
(Continued)

Response #18: Comment Noted. Revision has been made to the EA.

Response #19: Comment Noted. Revision has been made to the EA.

Response #20: The Coleman NFH winter-run chinook rearing program has been moved to the base of Shasta Dam.

Response #21: Comment Noted. Revision has been made to the EA.

Response #22: Comment Noted. Information has been added to the EA.

Response #23: Comment Noted. Last sentence of this paragraph was revised to reflect that "Installation of a fish screen and modification of fish ladders at the North Battle Creek Feeder Diversion may be a consideration in the future."

Response #24: Comment Noted. Information has been incorporated into this section of the EA.

Response #25: Comment Noted. References and/or Citations have been added to the noted Figures.

LETTER #4

Pacific Gas and Electric Company

Camp One Headquarters
15449 Humbug Road
Magalia, CA 95954

Jean R Oscamou, P.E.
Supervising Engineer
(916) 896-4405
FAX (916) 896-4414
E-mail JR03@PGE.com

February II, 1998

Ms. Mary Marshall
Division of Resources
Bureau of Reclamation
United States Department of the Interior
MP-400
2800 Cottage Way
Sacramento, CA 95825-l 898

Subj: Draft Environmental Assessment
Temporary Reduction in Water Diversions from Battle Creek

Dear Ms. Marshall,

Thank you for the opportunity to review the draft Environmental Assessment for the temporary reduction of water diversions at some-of our Battle Creek Project hydro facilities. Pacific Gas and Electric Company's comments on the draft are as follows:

#1	Sec. 1 .I, 3rd para.	The third sentence of this paragraph ignores both the cooperative posture taken by PG&E in this endeavor and the fact that PG&E is sharing in the burden of the increased releases and cessation of diversion to Wildcat Canal. This needs to be rewritten to indicate the partnership nature of the effort and the sharing of the foregone energy impacts.
#2	Sec. 1.2, 1st para.	Strike the last sentence. The releases are intended as an interim measure to meet a portion of the AFRP goals for anadromous fish while a more comprehensive long-term plan is developed. There has been no need established regarding resident fish species and this editorial comment is out of place in this document.
#3	Sec. 1.2, 3rd para.	In line 1, 'Creeks" should be "Creek's"
#4	Sec. 1.2,4th para.	As with the first comment above, the tone of this paragraph is that Reclamation is solely responsible

#4		or the fact that flows have been increased since 1995. To more accurately reflect the situation, the start of this sentence. should read, 'Since 1995, through a partnering arrangement Reclamation has partially compensated PG&E..." In the secondsentence, modify the start of the sentence to read, 'Without the partnering arrangement and in accord with its FERC project license, PG&E would maintain..."
# 5	Sec. 1.3, 1st para.	The Battle Creek Instream Flow Study is still in draft form and that fact should be reflected in the citation.
#6	Sec. 2.1, 2nd para.	In the first line, insert "minimum" between annual and flow. The Asbury Pump Diversion release noted in the last sentence is purely speculative. If it is to remain in this document, no changes sbould be made to **the** language that indicates this is anything more concrete than a possibility.
#7	Sec. 2.1, 3rd para.	In the fourth line, the "less than 30 cfs" statement is incorrect. There is a +/- 5 cfs variability provision around the 30 cfs target. Consequently, Reclamation compensates PG&E for flows between 12.5 cfs and 35 cfs.
#8	Sec. 2.2	The last sentence is misleading. PG&E would continue to pump Baldwin Creek water in the amounts it has in the past. That is not necessarily 'all of the water from Baldwin Creek."
#9	Sec. 3.1.1, 1st para.	In the fourth line, 'overtime" should be two words. Strike the last sentence of this paragraph or modify it. We are unaware of any documentation that there have been fisheries entrainment problems at the hydro power diversions. Further, there have been fish screens at several of these facilities in the past and they were removed due to damage and ineffectiveness.

#10	Sec. 3.1.1, 3rd para.	No reference is made regarding the. current status of spring-run Chinook, although the steelhead is mentioned as being proposed for endangered species status. Either delete the reference to steelhead and retain only the winter-run Chinook listing reference or include the situation regarding spring-run Chinook status.
#11	Sec. 3.1 .I, 9th para.	In the third line, '42 miles" is no longer accurate. A natural barrier discovered on North Baffle Creek a short distance upstream of North Battle Creek Feeder Diversion limits fish access. The 42 miles was a derivation of the Payne Study that did not recognize this natural barrier. A more accurate number would be approximately 35 miles.
#12	Sec. 3.1.1, 10th para.	In the second line, change "provides" to "provide."
#13	Sec. 3.1. 1, 1 1th para.	The second sentence of this paragraph is fractured. Rewrite to clearly convey the thought intended.
#14	Sec. 3.1.1, 12th para.	The necessity of this paragraph is questionable. If releases to the South Fork do not improve the habitat in the 2 miles cited, why do it at all? The last two sentences are also questionable. It is true that there are large unscreened diversions. However, the ladders have not 'been shown to be inadequatefor fish passage. In fact, adult salmon have been observed above these diversions, apparently using the ladders at lnskip and South Diversion Dams. The dams themselves are too high to accommodate fish passage over the main body during high flows, contrary to the situation at a lower dam such as the CNFH weir. Further, while some fish may be lost due to unscreened diversions, many more would survive. Rather than not have any fish production, would it not be preferable to obtain at least some while waiting for installation of screens?
#15	Sec. 3.1.1, 18th para.	This paragraph is misleading. There is no concurrence from PG&E regarding a release at

#15		Asbury Pump Diversion. There already is a base flow in Baldwin Creek downstream of the diversion, estimated at 4 cfs in the Payne study. Stranding and isolation issues are conjecture. The improvement of cool water conditions in the main stem of Battle Creek would be marginal at best with less than a 10% contribution of flow associated with the implied 5 cfs release. In the absence of factual data for Baldwin Creek on a par with the Payne study data for Battle Creek, this paragraph needs to be rewritten in that context or eliminated.
#16	Sec. 3.1.3, 10th para.	Extending the Pit River experience to Battle Creek by-implication is an unsupportable stretch. The size of the watercourses and surrounding terrain are markedly different. The primary prey species of the bald eagles in the reach used as an example are non-game fish. The IO cfs cited as dam leakage is not representative of the flow in the stream reach; natural accretions provided a flow on the order of 50 cfs prior to the initiation of the 150 cfs release. The experience cited for Mcdonald Creek in Montana may likewise be inappropriate for implied transfer to Battle Creek.
#17	Sec. 3.1.4, 5th para.	The last sentence does not have credibility. Flight maneuvering space for eagle foraging is extremely limited, particularly in the canyon of the North Fork. The foraging conditions presented for the nesting pairs at Macumber Reservoir and at the valley section of Battle Creek will not be replicated due to the nature of the stream sections and confined space in the narrow canyons of the stream reaches most affected by this proposed action.
#18	Sec. 3.1.4, 9th para.	The first sentence of this paragraph is fractured and needs to be rewritten.
#19	Sec. 3.1.4, 11th para.	In the first line, replace 'effect" with "affect."

#19		In the next to fast line, eliminate the word 'power" following "shutting off."
#20	Sec. 3.6, 4th para.	The word 'hydrosystem' should be two words.
#21	Sec. 3.6, 8th para.	The first two sentences should be deleted. Entrainment of salmon and steelhead in Coleman Canal is not an issue. Further, CNFH draws water from Battle Creek as well as from Coleman PH tailrace. The only thing screens or diversion removal will do is prevent occurrence of andadromous fish themselves in hydroelectric conduits. The disease vectors cited will be present in virtually all the natural and man-made waterways of the Battle Creek system.

As a general comment, authors of various sections of the document have used differing grammatical criteria. Notably, "Chinook" is capitalized in some sections and not in others. The document needs to be scanned for this type of discrepancy and corrected for uniformity.

Thank you again for the opportunity to review the draft document.

Sincerely,

Jean R. Oscamou

Jean R. Oscamou
Supervising Engineer

JRO:jo

cc: ACRisdon
CHBolger

RESPONSES TO LETTER #4

Letter From: Pacific Gas and Electric Company (PG&E)
Dated: February 11, 1998
Signed By: Jean Oscamou, Supervising Engineer

Comment #1: The Introduction has been revised in the EA to reflect the comment.

Comment #2: The sentence was taken out of this paragraph. However, increased flow has the potential to enhance resident fish species and stream dependent wildlife, and is disclosed as such as part of the EA.

Comment #3: Comment noted, however the paragraph containing the word "Creek's" has been removed from the EA.

Comment #4: Information has been revised and moved from the Purpose and Need Section to the Introduction Section.

Comment #5: Revision has been made to the EA.

Comment #6: Revisions have been made to the EA.

Comment #7: Revision has been made to the EA.

Comment #8: Revision has been made to the EA.

Comment #9: Revisions have been made to the EA. The first paragraph of Section 3.1.1 has been rewritten.

Comment #10: Revision has been made in the EA to reflect the status of Threatened and Endangered Species.

Comment #11: Revision has been made to the EA.

Comment #12: Revision has been made to the EA.

Comment #13: Revision has been made to the EA to reflect the intent of the noted sentence.

Comment #14: Paragraph has been revised in the EA.

Comment #15: Paragraph has been revised in the EA.

RESPONSES TO LETTER #4
(Continued)

Comment #16: Paragraph has been removed from the EA.

Comment #17: Paragraph has been revised in the EA.

Comment #18: Sentence has been revised in the EA.

Comment #19: "May effect" has been replaced has been replaced with is not likely to adversely affect. The sentence with the words "'power" and "shutting off" has been removed from this paragraph.

Comment #20: Revision has been made in the EA.

Comment #21: Paragraph has been revised in the EA.

LETTER #5

SMUD

SACRAMENTO MUNICIPAL UTILITY DISTRICT ☐ P.O. Box 1'5830, Sacramento CA 95852-1830, (916) 452-3211
AN ELECTRIC SYSTEM SERVING THE HEABT OE CALIFORNIA

PC 98-026

February 18, 1998

Ms. Mary Marshall
Division of Resources Management
Bureau of Reclamation
Mid-Pacific Regional Office
2800 Cottage Way
Sacramento, California 958251898

Subject: **Draft Environmental Assessment for Temporary Reduction In Water Diversions From Battle Creek**

Dear Ms. Marshall:

As the single largest Preference Power Customer of the Central Valley Project (CVP) and a large contributor to the Central Valley Project Improvement Act (CVPIA) Restoration Fund, SMUD has a direct interest in the how the CVPIA Restoration Fund moneys are used to further the-goals of the CVPIA. To this end, SMUD offers the following comments on the draft Environmental Assessment (EA), for the *Temporary Reduction In Water Diversions From Battle Creek* which would otherwise be used for hydropower production at Pacific Gas and Electric Company's (PG&E) hydroelectric facilities. These comments are submitted to assist the U.S. Bureau of Reclamation (Reclamation) in balancing the interests of the various stakeholders.

Our comments:

Table of contents

#1 The page numbers that are displayed in the Table of Contents do not all correspond to the page numbers shown in the narrative section of the draft EA report.

Section 1.2 - Purpose and Need (page 1)

#2 No mention was made in the draft Environmental Assessment of the fact that the Bureau of Reclamation and the US. Fish and Wildlife Service (Service) reached an agreement with Pacific Gas & Electric Company (PG&E) that provided PG&E a payment of 3.48 cents per kilowatt, hour (kWh) of electrical energy foregone for the remainder of 1996, and that the agreement also provides a payment of 3.84 cents per kWh for the period of January 1, 1997 to February 28, 1998.

#2 In a letter, dated January 27, 1997, to Reclamation and the Service, Sacramento Municipal Utility District (SMUD) stated that the payment rate to PG&E for foregone power generation is excessive, based on today's average market rates. SMUD is interested in reducing expenditures from the CVPIA Restoration Fund so that more restoration is obtained for each dollar spent. In a letter from the Northern California Power Agency (NCPA), dated August 15, 1997, SMUD and other CVP Preference Power Customers suggested either reducing the amount of direct payments to PG&E for foregone energy by indexing the value of such energy on the California Power Exchange, or by replacing the foregone electrical power with power purchased from the open market.

Section 2.0 **- Alternatives (pages 4 & 5)**

#3 **The** draft Environmental Assessment (EA) provides only two alternatives: the Proposed Action and the No-Action Alternative. It would have been helpful if several more alternatives had been explored, whereby a range of possible actions could have been suggested in order to meet the needed flow rates to provide adequate holding, spawning and rearing habitat conditions for the anadromous fish species of concern.

Section 2.1 - Proposed Action (pages 4 & 5)

#4 Though, it is recognized that the scope of the proposed action is for temporarily reducing diversions from Battle Creek, the final decision on any action should not preclude future actions that would allow minimizing the use of the ozone water treatment system at the Coleman National Fish Hatchery (CNFH). It seems logical that any action that can provide a clean and healthy supply of water to the CNFH, without the need for treatment, would be superior and certainly more energy efficient as compared to a system that requires ozonation and filtering of the incoming water supply.

Reclamation should provide, in the EA, an estimate of what Reclamation assumes that it will need to pay PG&E for foregone energy, or if replacement energy can be provide in lieu of any direct dollar payments to PG&E. This should be provided for both the Proposed Action and the No-Action Alternatives. The basis for the assumed rate of payment for foregone energy should also be provided.

Section 3.3.1 - Energy (pages 17 & 18)

#5 Under the Environmental Consequences subsection, it would be helpful if the percentage of the impact to the power generated at PG&E's Battle Creek hydroelectric operations was provided in the EA. Though the percentage values provided for the impacts to all hydroelectric power generated in California, and to all the power generated in California is of interest, having the above suggested percentage value would display clearly what the impact of the proposed action would be on the output of the local generating facilities.

Additionally, it would be helpful if the EA could provide an estimate on the number of pounds of pollutants, if any, that would be generated to replace the lost hydroelectric generation; if thermal generation is assumed to replace the hydroelectric -generation, Reclamation may wish to assume a single-cycle combustion turbine as the basis for these estimates.

SMUD appreciates the opportunity to provide these comments on the proposed Draft EA and encourages Reclamation to continue to work with all interested Stakeholders to reach a solution in the near-term that will provide not only an opportunity for the development of natural anadromous fish habitats and populations in the lower portions of the north and **south** branches of Battle Creek, but one that will ultimately provide a way to operate the Coleman National Fish Hatchery, in a cost-efficient way.

Furthermore, SMUD appreciates the opportunity to submit these comments beyond the suggested date for comments. As you may know, SMUD did not receive a copy of the above referenced EA until late in the day on February 12, 1998. For future reference, please add SMUD, attention Ed Roman, to your distribution list for all publicly-distributed documents related to Battle Creek. Thank you.

You may contact me if you have any questions pursuant to this letter. I can be reached at phone number (9 16) 7324667, or e-mail address eroman@smud.org.

Sincerely,

Edward J. Roman

Edward J. Roman
Senior Power Contracts Specialist

cc: Nannette Engelbrite, WAPA
Barry Mortimeyer, R.W. Beck
Hari Modi, NCPA
Greg Wang, CVPWA

RESPONSES TO LETTER #5

Letter From: Sacramento Municipal Utility District(SMUD)
D a t e d : February 18, 1998
Signed By: Edward Roman

Comment #1: The Table of Contents has been revised.

Comment #2: Information discussed in the comment is revealed in the previous agreement with PG&E.

Comment #3: Public Scoping occurred during the development of the previous EA and this EA. Additional alternatives were not identified scoping for either EA.

Comment #4: Information discussed in the comment is identified in the agreement with PG&E.

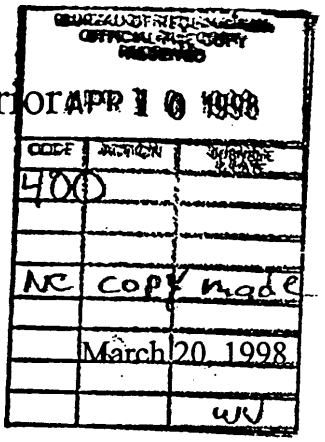
Comment #5: Information regarding impact to power generated at PG&E's Battle Creek hydroelectric operations has been added to the EA in response to this comment. Pollutant discharge information was not obtained.

APPENDIX C:
Consultation Letters

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Sacramento Fish and Wildlife Office
3310 El Camino Avenue, Suite 130
Sacramento, California 95821-6340



IN REPLY REFER TO:

1-1-98-1-0957

Memorandum

To: Regional Resources Manager, Bureau of Reclamation, Mid-Pacific Region, Sacramento, California

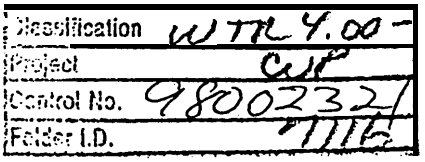
From: Field Supervisor, Sacramento Fish and Wildlife Office, Sacramento, California

Subject: Informal Consultation for Water Acquisition at Battle Creek

This responds to your letters dated January 21 and February 26, 1998, requesting concurrence with the determination that the proposed action, the water acquisition at Battle Creek, is not likely to adversely affect federally listed threatened and endangered species. At issue are potential impacts to the California red-legged frog (*Rana aurora draytonii)* and bald eagle *(Haliaeetus Ieucocephalis).* We have reviewed the material transmitted with your correspondence and concur with this determination, providing the mitigation measures identified in this documentation are followed. Therefore, unless new information reveals effects of the proposed action that may affect listed species in a manner or to an extent not considered, or a **new** species or critical habitat is designated that may be affected by the proposed action, no further action pursuant to the Endangered Species Act of 1973, as amended, is necessary.

Please contact Mr. Kenneth Sanchez of my staff at (916) 979-2749, if you have questions **regarding this** response.

Wayne S. White



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UNITED STATES DEPARTMENT **OF COMMERCE**
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 908024213

FEB 20 1998

F/SWR4:IG

Ms. Mary Marshall
Bureau of Reclamation
Mid-Pacific Regional Office
Division of Resources Management
2800 Cottage Way
Sacramento, California 95825-1898

Dear Ms. Marshall:

Thank you for your letter of January 20, 1998, requesting. informal consultation and concurrence with the determination of the effect of water acquisition. The action is described in the report: "Draft Environmental Assessment for Temporary Reduction in Water Diversions from Battle Creek."

The project would increase the amount of water that Pacific Gas and Electric (PG&E) releases into Battle Creek (Anderson, California) at four locations. Flows would increase above the Federal Energy Regulatory Commission's minimum instream flow releases: (1) from 3 to 30 cubic feet per second (cfs) required below the Wildcat and Eagle Canyon diversion on the north fork; and (2) from 5 to 30 cfs below the Coleman diversion on the south fork. In addition, PG&E may decrease their Asbury Pump diversion in Baldwin Creek, a tributary to lower Battle Creek, to provide approximately 5 cfs of instream flow.

Based on the best available information, I concur that the proposed action is likely to benefit federally listed or proposed species. If the project remains unchanged, no further consultation under section 7(a)(2) of the Endangered Species Act with NMFS will be necessary. Should project plans change, or if additional information on the listed or proposed species become available, this determination may be reconsidered.

Ref: 9800503

If you have questions concerning these comments, please contact Mr. Ian Gilroy at (707) 575-6053 or by e-mail at Ian.Gilroy@noaa.gov.

Sincerely,

for William T. Hogarth, Ph.D.
Regional Administrator