

# I. BATTLE CREEK RESTORATION PROJECT DESCRIPTION

## I.A. Setting

Battle Creek is a tributary of the Sacramento River located in Tehama and Shasta Counties. This cold, spring-fed stream has exceptionally high flows during the dry season, making it important habitat for anadromous fish. Battle Creek may be the only remaining stream other than the main stem of the Sacramento River that can successfully sustain breeding populations of steelhead and all four runs of Chinook salmon. Battle Creek is also unique and biologically important because its numerous cold-water springs provides habitat opportunities during drought years for winter-run Chinook salmon.<sup>1</sup>

Pacific Gas and Electric Company (PG&E) owns and operates several hydroelectric power diversion facilities on the North and South Forks of Battle Creek, including Coleman Division Dam, Inskip Diversion Dam, South Diversion Dam, Wildcat Diversion Dam, Eagle Canyon Diversion Dam, and North Battle Creek Feeder Diversion Dam, and dams on Ripley Creek, Soap Creek, and Baldwin Creek. PG&E controls the majority of the flows in the anadromous fish reaches of the Battle Creek watershed.<sup>2</sup>

Salmonid populations, in general, can be affected by a recurring suite of limiting factors. In Battle Creek, many of these typical problems are unlikely to occur due to particular watershed features, including:

- No surface water diversion occur in the forks or mainstem of Battle Creek within the project area (i.e. between Coleman Powerhouse and the upstream limits of anadromy) other than the hydroelectric project; this limits the number of dams and diversions that need to be considered.
- The existing hydro system has negligible effect on high-flow events and the wet season hydrograph due to the absence of reservoirs with significant storage capacity. This limits the projects effects on channel maintenance and stability, flushing flows and smolt out migration.
- High volume, cold (52°F) springs in both forks of the creek can be redirected to adjacent stream reaches to form cold-water refuges. Battle Creek is the most spring dominated watershed within the remaining anadromous habitat of Central Valley.
- Existing hydro system dams do not significantly alter sediment routing through the system at high flows. The dams are low (10 to 28 ft. in height) narrow structures full of sediment leaving them with little or no trap efficiency. In addition, the dams all include large sluice gates 10 to 25 sq. ft. operated several times a year during high flow to pass any accumulated sediment in the vicinity of the gates.

---

<sup>1</sup> MOU 1.1

<sup>2</sup> MOU 1.2

- Land use dominated by large ranches (average parcel size is 400 acres in anadromous zone) that isolate the creek from development and public access disturbances. Conservation easements are being established throughout the watershed to further buffer the stream.
- Topography in anadromous habitat, especially steep inner canyons, virtually isolate the stream from typical threats like cattle grazing, roads, and near stream logging.
- Geology/soil types of the anadromous zone and much of the rest of the watershed is resistant to surface erosion and mass-wasting,
- Within the watershed there are key activities under the control of other entities that are closely linked to the Restoration Project; specifically the operation of the Coleman National Fish Hatchery (CNFH) which is being addressed by the California Bay-Delta Authority (CBDA) Science Program workshop and reconsultation under Endangered Species Act (ESA) when the Restoration Project is complete. The potential role of the CNFH is also addressed in the current Winter-run Recovery Plan (1997). The Greater Battle Creek Watershed Working Group provides an open forum for coordinating adaptive management activities among various entities.

Several of the problems which typically affect salmonid populations are believed to occur in Battle Creek due to particular watershed features, including:

- Inadequate instream flow during the base flow period when approximately 97 percent of the unimpaired runoff is diverted out of the stream channel into adjacent canals. (See attached water budget from Thomas R. Payne Associates (TRPA) Battle Creek Hydrology Study)
- Passage problems due to low flow over natural obstacles in the stream channel and inadequate ladders on dams. Ladders fail current standards of conveying 10 percent of the stream flow by one order of magnitude. In addition, ladders are vulnerable to failure from debris (especially Alaska Steep pass units) and they are all situated on dams where they cannot be cleared of debris during wet season.
- Temperature problems for cold-water fish species result from diversion of cold-water springs on both forks directly into canals and away from adjacent stream channels. In addition, lower flows resulting from hydropower diversions increase the heat gain as the water travels down the canyon.
- Entrainment resulting from no fish screens and extremely high percentage of flow diverted (up to 97 percent of base flow).
- Powerhouse operations disrupt stream function and stability by: 1) causing rapid flow fluctuations of up to 200 cfs which can lead to redd-dewatering, and stranding and isolation of juvenile fish, 2) causing rapid changes in water temperature regime, and 2) diverting as much as 97 percent of the water from the North Fork into the South Fork leading to potential false attraction of returning adults to non-natal habitat that is at risk of rapid, detrimental fluctuations in water temperature.