

Minimum Instream Flow Recommendations: Butte Creek, Butte County



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Preface

The Department of Fish and Game (Department) has interest in assuring that water flows within streams are maintained at levels which are adequate for long-term protection, maintenance and proper stewardship of fish and wildlife resources. The Department has developed recommended minimum stream flows for Butte Creek, Butte County for transmittal to the State Water Resources Control Board (Water Board) and consideration as set forth in 1257.5 of the Water Code. Submission of these flow recommendations to the Water Board complies with Public Resources Code Section 10001-10002.

The Department is recommending minimum instream flows for Butte Creek from Centerville Head Dam downstream to Parrot-Phelan Diversion Dam. The recommendations are separated into two water year types (normal and dry), and are presented in form of an annual schedule, with each containing a brief summary of the justification for the recommendation, including reference to the data source(s) and method(s).

The Department files the enclosed set of minimum instream flow recommendations for Butte Creek that we believe to be comprehensive and substantially complete based on information currently available. The recommendations were based upon information gathered through the Department's role pursuant to the Federal Power Act Section 10(j) for the Federal Energy Regulatory Commission's (FERC) Project No. 803 hydropower relicense analysis for the Butte Creek DeSabra-Centerville Hydroelectric Project (CDFG, 2008b). The Department has established an administrative file in the Water Branch that contains the cited references. We will make these files available upon request.

The Department may revise the attached recommended minimum instream flows for Butte Creek at a later date based upon new information; specifically new information that may become available through the FERC process as a result of physical and/or operational changes required by the new FERC license.

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Statement of Findings

Butte Creek is a significant watercourse for which minimum instream flow levels need to be established in order to assure the continued viability of stream-related fish and wildlife resources. Butte Creek was selected for development of flow recommendations because it is a significant watercourse with high resource value, and because it is one of only three streams (in addition to Deer and Mill Creek) that harbor a genetically distinct, sustaining population, of Spring Run Chinook Salmon (SRCS), *Oncorhynchus tshawytscha* (CDFG, 1998).

Background

The flow recommendations for Butte Creek apply between Centerville Head Dam and Parrot-Phelan Diversion Dam. This reach of the creek provides critical habitat for holding and spawning of steelhead and Spring Run Chinook Salmon (SRCS; Figure 1). Outlined below are the background information on the SRCS population status in Butte Creek and associated life history requirements, in addition to background information on the current hydrology, and water quality (temperature) of Butte Creek. Following the background information is an overview of the data sources and water year type definitions used to develop the minimum instream flow recommendations. Lastly, the flow recommendations are outlined, followed by an overview of the uncertainty associated with climate change impacts and the Department's commitment to minimizing such impacts to the State's natural resources.

Spring Run Chinook Salmon

SRCS in the Sacramento River drainage were listed as Threatened under California Endangered Species Act in February 1999. SRCS, Central Valley Environmentally Significant Unit, was listed as Threatened under the federal Endangered Species Act in September 1999, and re-affirmed in June 2005 (70 FR 37160; June 28, 2005). The listings were due to significant declines beginning in the late 1960's. The federal Central Valley Project Improvement Act, Public Law 102-575, 1991 (CVPIA) baseline period average for the years 1967 through 1991, was 364 adults with a high of 1,300 during 1988 and 1989, and low of 10 in 1979 (CDFG, 1998). Since 1991 the Butte Creek SRCS population has averaged 5,254 with a high of 20,212 during 1998 and low of 474 during 1994.

SRCS have a unique life history in which adults enter fresh water in the late winter and spring, spending up to eight months in fresh water prior to spawning. This extended fresh water residency requires that adults have access to suitable habitat characterized by deep, cool, highly oxygenated pools to survive the high summer temperatures in the Central Valley. While historically, SRCS populations were found in most of the eastern tributaries of the Sacramento and San Joaquin Rivers, large dams and water development eliminated access to all but the few remaining tributaries such as Deer, Mill, and Butte Creeks (CDFG, 1998).

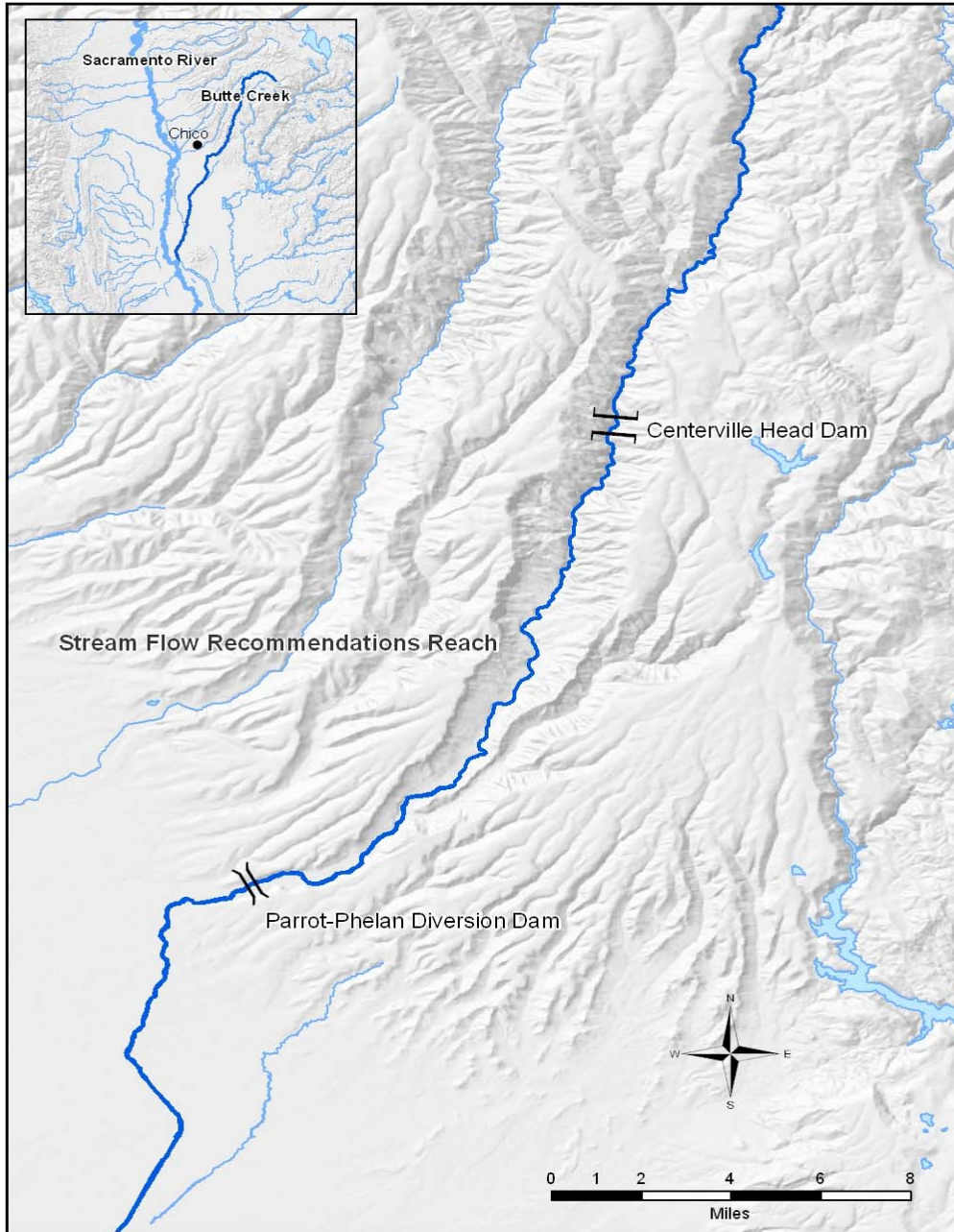


Figure 1: Map of Butte Creek

Hydrology

In addition to SRCS, steelhead and resident trout, Butte Creek is also currently home to the Pacific Gas and Electric Company's (PG&E) DeSabra-Centerville hydroelectric power project. The power project is currently in a relicensing phase through the Federal Energy Regulatory Commission's (FERC) Project No. 803. The project generally consists of three reservoirs, three powerhouses, 14 diversion and feeder dams, 5 canals, and associate equipment and transmission facilities located on Butte Creek and the West Branch Feather River (PG&E, 2007). In 1992 FERC required releases of 40 cubic feet per second (cfs) from June 1 through September 14, in all water year types. The current project license expires on October 2009 and PG&E is seeking a new license to continue operation under FERC.

The hydrology of Butte Creek is complex as a result of PG&E's hydroelectric power project. PG&E diverts Butte Creek water from the Butte Head Dam via the Butte Canal to DeSabra Powerhouse. Approximately 12 miles downstream of Butte Head Dam, the Forks of Butte Diversion Dam diverts water from Butte Creek to the Forks of Butte Powerhouse and returns the water back to Butte Creek immediately upstream of the Centerville Head Dam. Water from the West Branch of the Feather River is diverted at Hendricks Head dam through the Hendricks/Toadtown Canal. The diverted water from Butte Creek and the West Branch of the Feather River combine and flow through DeSabra Forebay, which provides water to DeSabra Powerhouse, where the water is released back to Butte Creek. Just downstream of DeSabra Powerhouse, water is diverted at Centerville Head Dam to the Centerville Canal, which runs through the Centerville Powerhouse and is discharged back into Butte Creek approximately 9 miles upstream of the Parrot-Phelan Diversion Dam.

Water Quality - Temperature

Butte Creek is unique among the remaining SRCS streams in that all of the holding and spawning area for SRCS is below 285 m (931 ft) elevation, while Deer and Mill Creek do not have barriers to passage and SRCS all hold and spawn in areas above that elevation. Due to the lower elevation habitat, Butte Creek exhibits temperatures above the ideal temperatures for holding and spawning Chinook salmon (Ward et al., 2003). At the time of this recommendation, PG&E, the Department, US Forest Service, USFWS, and NOAA Fisheries are exploring various physical and operational modification options to the DeSabra-Centerville hydropower project to be submitted to FERC to consider in their alternatives analysis prior to issuing a new License for FERC Project 803. Additionally, the Water Board has an independent statutory duty under the federal Clean Water Act and the applicable regional water quality control plan to ensure that the operation of the project will not adversely affect water quality or the beneficial uses of the affected lakes and stream reaches, and must issue water quality certification before a license to

operate a hydropower project may be issued by FERC. Physical and/or operational modifications to FERC Project 803 may result in significant changes to temperatures within the reach. Until FERC issues a new License for the project, the Department has no way to predict what physical and/or operational changes may be mandated in the new license. Therefore, the Department reserves the right to revise the attached minimum instream flows for Butte Creek at a later date based upon new information that may become available as a result of new FERC license conditions.

Data Sources

There have been many studies conducted as a result of the modified hydrology of Butte Creek and subsequent water management operations by the PG&E hydroelectric power project. The sources of data used to develop the flow recommendations for Butte Creek included: CDFG, 1998; CDFG, 2008b; PG&E, 2007; USFWS, 2003; and USDOJ, 2008. CDFG (2008b) contains the Department's findings pursuant to FERC 10(j) relicensing process for PG&E's DeSablantville hydroelectric power project. The Department filed with FERC a set of minimum instream flow recommendations for Butte Creek that we believe to be comprehensive and substantially complete based on information currently available.

Water Year Types

The Department's recommended minimum instream flow schedules have been separated into two water year types for Butte Creek: Normal and dry. The water year type is based on the forecast of unimpaired runoff of the Feather River at Oroville for the period April through July as provided by the California Department of Water Resources (DWR) Bulletin 120 report of water conditions in California (CDWR, 2003). Each February, March, April, and May, the water year type shall be determined based on the DWR Bulletin 120 forecast for the period April through July and shall operate for that month based on that forecast. The May forecast shall be used to establish the water year type for the remaining months until the next February, when forecasting shall begin again. The water year types are defined as follows:

- Dry: Fifty percent or less of the average April through July unimpaired runoff of the Feather River at Oroville;
- Normal: Greater than fifty percent of the average April through July unimpaired runoff of the Feather River at Oroville.

The Department's minimum instream flow recommendations are intended to preserve the processes and functions of the river ecosystem. The minimum instream flow recommendations are each presented below as an annual schedule, with each also containing a brief summary of the justification for the recommendation, including the method(s) used.

Flow Recommendations

The Department's minimum instream flow recommendations are outlined in Table 1. These recommendations are based on an analysis of the percentage of available habitat (Weighted Useable Area = WUA) using a 2-dimensional hydraulic and habitat model (USFWS, 2003) for spawning SRCS, an analysis of historical regulated flows data including inter-basin water transfer from the West Branch of Feather River to Butte Creek data (CDFG, 2008b), and water quality (temperature) benefits (CDFG, 2008b). Spawning habitat was identified as a limiting-factor for SRCS in Butte Creek based on a considerable amount of redd superimposition observed during data collection efforts by the United States Fish and Wildlife Service (USFWS, 2003; USDO, 2008). The Department's minimum instream flow recommendations for Butte Creek would allow for greater dispersal of redds and reductions in redd superimposition.

Table 1. The Department's Recommendations for Minimum Instream Flows by Month and Water Year Type for Butte Creek.

| Butte Creek | Department's Recommended Minimum Instream Flows (cfs) by Water Year | |
|-------------|---|-----|
| | Normal | Dry |
| Month | | |
| Oct | 100 | 75 |
| Nov | 100 | 75 |
| Dec | 100 | 75 |
| Jan | 100 | 75 |
| Feb | 100 | 75 |
| Mar 1-14 | 100 | 75 |
| Mar 15-31 | 80 | 75 |
| Apr | 80 | 75 |
| May | 80 | 65 |
| Jun | 40 | 40 |
| Jul | 40 | 40 |
| Aug | 40 | 40 |
| Sep | 100 | 75 |

The maximum SRCS spawning habitat WUA in the reach ranged from 190 cfs to 410 cfs (USFWS, 2003). However, an analysis of current water availability indicates there is not enough water to obtain reliable flows above 100 cfs (PG&E, 2007). Therefore, the Department

recommends, in a normal year, a minimum instream flow of 100 cfs after the onset of SRCS spawning activity. In dry years, the Department recommends a minimum instream flow of 75 cfs. The recommended minimum instream flows during the summer months remain at the current flows of 40 cfs until current efforts through the FERC process that include an investigation of the design and implementation of potential physical modification to DeSabra Forebay are explored.

Climate Change

The Department is committed to minimizing to the maximum extent practical the effects of climate change on the state's natural resources. Changes in temperature and precipitation could result in alteration to existing fresh water systems and an overall reduced availability of water for fish and wildlife species. In addition, these changes may impact groundwater recharge and over drafting as well as impacting hydropower and hatchery project operations, fish populations' passage issues, and water diversion projects. Given the uncertainty associated with climate change impacts, the Department reserves the right to modify the flow recommendations for Butte Creek as the science and understanding of climate change evolves.

DRAFT

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