Placer County Water Agency
Middle Fork American River Project
(FERC Project No. 2079)

DRAFT
FISH POPULATION MONITORING PLAN

Placer County Water Agency
P.O. Box 6570
Auburn, CA 95604

October 2010

TABLE OF CONTENTS

Page

List of Tables

List of Maps

List of Attachments

List of Acronyms

CDFG	California Department of Fish and Game
CO_2	Carbon Dioxide
FPMP	Fish Population Monitoring Plan
MFP	Middle Fork American River Project
PCWA	Placer County Water Agency
Project	Middle Fork American River Project
SD	Supporting Document
State Water Board	State Water Resources Control Board
TSR	Technical Study Report
USDA-FS	United States Department of Agriculture-Forest Service

1.0 INTRODUCTION

This Fish Population Monitoring Plan (FPMP) was developed for the Placer County Water Agency's (PCWA) Middle Fork American River Project (MFP or Project) located on the west slope of the Sierra Nevada range primarily in Placer County, California.

The goal of the FPMP is to obtain, for comparative purposes, periodic information on fish populations in selected bypass and peaking reaches associated with MFP under the flow regimes specified in the new license. This information will also be compared to historic fish population data collected during 2007, 2008, and 2009 for MFP relicensing (AQ 2 – Fish Population Technical Study Report [TSR] [2007–2009] [AQ 2 – TSR]; Supporting Document [SD] B) (PCWA 2010; SD B).

2.0 FPMP ORGANIZATON

The FPMP is organized into the following sections:

Section 3.0 FPMP Objective: This section defines the purpose of the FPMP.

Section 4.0 Monitoring Approach: This section describes the approach for monitoring fish populations over the term of the new license, including monitoring locations and schedule, and sampling and analyses methods.

Section 5.0 Reporting: This section outlines reporting that will be required over the term of the new license and describes agency consultation that would be conducted following the completion of each monitoring period.

Section 6.0 Literature Cited: This section provides a list of documents or other resources that are referenced in the FPMP.

3.0 FPMP OBJECTIVE

The objective of the FPMP is monitor fish species composition, abundance, condition factor, and population age class structure at select sites in the bypass and peaking reaches associated with the MFP over the term of the license. This information will be used to characterize the fisheries associated with the flow regimes specified in the license.

4.0 MONITORING APPROACH

This section describes the approach for monitoring fish populations over the term of the license, including monitoring locations and schedule, sampling methods, and analytical methods. The monitoring approach is based on the fish populations studies completed for the relicensing of the MFP (AQ 2 – TSR) (PCWA 2010; SD B).

4.1 MONITORING LOCATIONS AND SCHEDULE

Fish population monitoring sites in the bypass and peaking reaches are provided in FPMP Table 1. These monitoring locations are depicted on FPMP Map 1. Fish

populations at these locations were sampled in 2007–2009 as part of relicensing studies completed for the MFP (AQ 2 – TSR) (PCWA 2010; SD B). Specific information on these monitoring locations is provided in FPMP Table 1. Site lengths and the proportion of habitat types will be similar to those sampled in 2007–2009. The monitoring sites will be at least 328 feet long. The sites that include snorkeling will typically be much longer to include multiple habitat types (e.g., at least 1,000 feet in length).

Fish population monitoring will be conducted in Years 2, 3, 7, 8, 13, 14, and thereafter for two consecutive years during every ten-year period for the term of the license.

4.2 SAMPLING METHODS

A combination of electrofishing (shallow water) and/ or snorkeling (deep water) will be conducted to collect fish population data during the late summer/early fall base flow period of each monitoring period (FPMP Table 1). Sampling methods and field data forms will be consistent with those used during the 2007–2009 relicensing studies (AQ 2 – TSR) (PCWA 2010; SD B). Data forms are provided in Attachment A. Each of these methods is described below.

4.2.1 Electrofishing

Multi-pass electrofishing (e.g., Reynolds 1996; Van Deventer and Platts 1989; Rexstad and Burnham 1992) will be used to sample and estimate fish populations in shallow stream habitats (<1.5 m) at each monitoring site. The monitoring sites will be partitioned into mesohabitat types using block nets. Captured fish from each pass will be kept in separate live wells or buckets. Fish will be anesthetized (CO_2), enumerated, identified to species, and measured (fork length) and a subset of weights from various sizes of fish will be obtained. Fish will be returned to the monitoring site when the sampling is completed. Sampling protocols will be consistent with those in Flosi et al. 1998.

Multi-pass electrofishing will consist of a minimum of two very thorough electrofishing passes with equal sampling effort. Each individual pass will consist of an upstream shocking sweep and then a back downstream shocking sweep that will be used to collect missed fish (missed during the upstream sweep), particularly fish that may collect near or on the downstream blocking net. If depletions do not exceed approximately 65% between pass one and pass two, a third pass will be completed.

4.2.2 Snorkeling

Snorkeling (e.g., Dolloff et al. 1996) will be used to assess fish populations in deep water habitats (≥1.5 m) at the monitoring sites. Snorkelers will survey in lanes along the river and identify, count, and estimate the length of each fish observed. Fish will be grouped into five size classes (0-3, 3-6, 6-12, 12-18, and >18+ inches). Fish data will be recorded by habitat unit type. Snorkeling protocols and field data forms will be consistent with those in Flosi et al. 1998. Juvenile minnows (i.e., hardhead, Sacramento pikeminnow, and/or California roach) will be recorded as a single category;

mixed minnow guild, where identification is uncertain (e.g., <3 inches in size). Very small fish that cannot be identified to species will be recorded as fry.

4.2.3 Physical Conditions

Routine observations will be made of habitat and physical conditions in the monitoring sites. These observations will include physical measurements of water temperature and specific conductance. Length, width, and depth of the area sampled will also be recorded to calculate fish abundance by length and area of stream sampled. Mesohabitat type data consistent with those taken during the 2006 Aquatic Habitat Characterization Study (PCWA 2007) will be collected at the monitoring sites.

4.3 ANALYSES METHODS

The following describes the analyses methods to be used.

4.3.1 Fish Abundance (Standing Crop)

Fish standing crop estimates will be generated for each species at each monitoring site as density (fish per mile and fish per acre) and biomass (pounds per mile and pounds per acre). For each monitoring site, the estimated number of fish (or biomass) will be divided by the length (or area) of the monitoring site to calculate fish standing crop estimates. Population estimates will be calculated for each mesohabitat unit sampled within each site and then summed to obtain a total for each site. Multi-pass electrofishing population estimates for shallow mesohabitat units will be calculated using the Van Deventer (1989) maximum likelihood method. For deep water mesohabitat units that will be sampled, the number of fish observed during snorkeling will be used to visually estimate fish abundance. The results will be compared to previous sampling periods, including 2007–2009 sampling conducted for the MFP relicensing studies, as well as those from the previous fish monitoring surveys.

4.3.2 Biomass

The biomass of rainbow and brown trout per acre will be calculated for each site. The biomass of other species will not be calculated because too few fish were collected in past survey efforts to develop meaningful biomass estimates. Trout biomass, either rainbow trout or brown trout, will be calculated as the average fish weight at a site multiplied by the estimated number of fish at the site. If fish are not weighed (only length measured) at a site, their weight will be calculated using a length-weight regression developed for the site. If an accurate site specific length-weight regression is not available, a general study-wide data set length-weight regression will be used. For snorkeling sites, the midpoint length of each fish size class bin will be used to calculate average biomass using either a site-specific or the study-wide length-weight regression. Snorkeling biomass estimated will be used as relative measures of biomass between snorkeling sites and between snorkeling and electrofishing sites. The estimates likely will not be as accurate as those at electrofishing only sites, as the fish were categorized into fish size bins using visual estimates (underwater visual observations calibrated with a ruler). The results will be compared to previous sampling

periods, including 2007–2009 sampling conducted for the MFP relicensing studies, as well as those from the previous fish population monitoring surveys.

4.3.3 Age Structure and Condition Factor

Age structure will be determined using length-frequency histograms for each fish species at each monitoring site. Fulton's condition factor (Ricker 1975) will be calculated for each trout species. Individual condition factors (K) will be calculated by

$K = \text{weight (g)} \times 100{,}000 / (\text{fork length [mm]})^3$

The average condition factor for adult trout will be calculated using individual condition factors for adult trout at each site.

4.3.4 Electronic Database

All fish sampling data (date, locations, fish species, fish size, sampling pass, etc) will be entered and stored in an electronic database (Excel spreadsheet or similar). The database will be provided to resources agencies upon request.

5.0 REPORTING

A Fish Population Monitoring Report summarizing the fish population data will be prepared by PCWA and distributed to the United States Department of Agriculture Forest Service (USDA-FS), State Water Resources Control Board (State Water Board), and California Department of Fish and Game (CDFG) for review and comment within 120 days following the completion of each monitoring year. The report will follow the general presentation layout for fish sampling data provided in the AQ 2 – TSR (PCWA 2010; SD B). A 60-day review period will be provided to the agencies. Based on the results of the monitoring and/or comments received during the review process, PCWA and the agencies may call a meeting to discuss the results or modify the monitoring program. Within 60 days of receipt of comments, or 60 days following any meeting, comments will be addressed and the final report will be filed by PCWA with the agencies (USDA-FS, State Water Board, and CDFG) and FERC.

6.0 LITERATURE CITED

Dolloff, A., J. Kershner, and R. Thurow. 1996. Underwater Observation. Pages 533-554 in B.R. Murphy and D.W. Willis, editors. Fisheries techniques, 2nd edition. American Fisheries Society, Bethesda, Maryland.

Flosi, G., S. Downie, J. Hopelain, M. Bird, R. Coey and B. Collins. 1998. California Salmonid Steam Restoration Manual, Third Edition. State of California, The Resources Agency, California Department of Fish and Game, Inland Fisheries Division, Sacramento, CA.

Placer County Water Agency (PCWA). 2007. PCWA Middle Fork American River Project (FERC Project No. 2079), Pre-Application Document (PAD), Submitted to FERC on December 13, 2007.

____. 2010. AQ 2 – Fish Population Technical Study Report (2007–2009). Available in PCWA's Application for New License – Supporting Document B.

Rexstad, E. and K. Burnham. 1992. User's Guide for Interactive Program CAPTURE. Colorado Cooperative Fish and Wildlife Research Unit, Colorado State University, Fort Collins, CO.

Reynolds, J.B. 1996. Electrofishing. Pages 83-120 in B.R. Murphy and D.W. Willis, editors. Fisheries techniques, 2nd edition. American Fisheries Society, Bethesda, Maryland.

Ricker, W.E. 1975. Computation and interpretation of biological statistics of fish populations. Fisheries Research Board of Canada, Bulletin 191, Ottawa, Ontario, Canada.

Van Deventer, J.S. and W.S. Platts. 1989. Microcomputer software system for generating population statistics from electrofishing data-User's guide for MicroFish 3.0. US Department of Agriculture, Forest Service. Intermountain Research Station, General Technical Report INT-254.

Van Deventer, J.S. 1989. Microcomputer Software System for Generating Population Statistics from Electrofishing Data-User's Guide for MicroFish 3.0. USDA Forest Service, General Technical Report INT-254. 29 p.

TABLES

FPMP Table 1. Fish Population Monitoring Locations.

Study Location Description	Monitoring Sites	Reach Type	
		Peaking Reach	Bypass Reach
Middle Fork American River Downstream of Ralston Afterbay			
Middle Fork American River from Volcano Canyon Creek confluence to Canyon Creek confluence	MF14.1	●	
Middle Fork American River from Ralston Afterbay to Volcano Canyon Creek confluence	MF23.5	●	
Middle Fork American River from Middle Fork Interbay to Ralston Afterbay			
Middle Fork American River from Middle Fork Interbay to Ralston Afterbay	MF26.2		●
Middle Fork American River Upstream of Middle Fork Interbay			
Middle Fork American River from French Meadows to confluence with Duncan Creek	MF44.7		●
Rubicon River			
Rubicon River from Long Canyon Creek confluence to Ralston Afterbay	R3.5		●
Rubicon River from Deer Creek to Long Canyon Creek confluence	R20.9		●
Rubicon River from Hell Hole Reservoir to Deer Creek	R25.7		●
South Fork Long Canyon Creek			
South Fork Long Canyon Creek from Diversion to confluence with Long Canyon Creek	SFLC2.3		●
North Fork Long Canyon Creek			
North Fork Long Canyon Creek from Diversion to confluence with Long Canyon Creek	NFLC1.9		●
Duncan Creek			
Duncan Creek from Diversion to confluence with Middle Fork American River	D6.3		●

MAPS

ATTACHMENT A

Fish Population Monitoring Data Forms

Electrofishing Field Form

Page _____

Site _____ Date _____ Time _____

Team _____

Unit # _____ Wypt. _____ Pass _____

Unit Type _____ N _____ Efforts _____

Mean Length _____ E _____ Frequency _____

Mean Width _____

Mean Depth _____ Conductivity (µs/cm) _____ Pass _____

Max Depth _____ Temp. Water° _____ Efforts _____

Air° _____ Frequency _____

Photos

Pass	Species	Length (mm)	Weight (g)	Pass	Species	Length (mm)	Weight (g)	Pass	Species	Length (mm)	Weight (g)	Pass	Species	Length (mm)	Weight (g)

Notes:

Snorkeling Field Form

Page _____

Site _____ Date _____

Team _____

Unit # _____ Time _____

Unit Type _____

Mean Length _____ Wypt. _____

Mean Width _____ N _____

Mean Depth _____ E _____

Max Depth _____

Conductivity (µs/cm) _____

Temp. Water° _____

Air° _____

Photos

	Size Class				
Species					

	Size Class				
Species					

Unit # _____ Time _____

Unit Type _____

Mean Length _____ Wypt. _____

Mean Width _____ N _____

Mean Depth _____ E _____

Max Depth _____

Conductivity (µs/cm) _____

Temp. Water° _____

Air° _____

Photos

	Size Class				
Species					

	Size Class				
Species					