

## **8.11 Camino Dam Whitewater Boating Flow Biological Study Plan**

### **8.11.1 Pertinent Issues**

This study, performed in conjunction with the Camino Dam Reach Whitewater Boating Test Flow Study, is designed to address the effects of a release of a whitewater boating flow on aquatic resources in the Camino Dam Reach. This study plan is specific to this particular whitewater test flow event, currently scheduled for September 15, 2004, and additional studies may be necessary for whitewater boating flow releases at other times. In particular, additional biological studies are expected for any springtime flow events.

In general, the study plan is comprised of five separate investigations, each focused on the effect of the whitewater flow on different components of the aquatic environment. These are listed below and described in greater detail further in this study plan:

- Continuously monitoring of water temperature, total suspended solids, turbidity, and dissolved oxygen at three different sites in the affected reach before, during, and after the boating release.
- Qualitative evaluation of changes in FYLF distribution or presence/absence before and after the boating release.
- Documentation of changes in river stage, and by inference amphibian habitat, during the boating release at known areas of foothill yellow-legged frog (FYLF) presence.
- Sampling of the of the benthic macroinvertebrate (BMI) community at two sites in the affected reach and at a single control site in the South Fork American River before and after the boating release.
- .Evaluation of bed mobility at sites of documented FYLF populations.

### **8.11.2 Background**

The Camino Dam Reach Whitewater Boating Test Flow Study will involve the release of water from the Camino Reservoir. The increase of flow through the Camino Dam Reach will be performed on a single day in order to determine the feasibility of whitewater boating within this particular reach. The flow single flow that will be released for these purposes is 600 cfs. This flow will be released on September 15, 2004.

Flows will be ramped up to and down from the 600 cfs test flow. Flows will be ramped from the current minimum flow at a rate of one foot per hour.

### **8.11.3 Study Objectives**

The primary objectives of the water quality and biological monitoring are: 1) monitor the temperature, turbidity, total suspended solids, dissolved oxygen and flow stage during the whitewater flow release from the Camino Dam, 2) identify the change in the BMI community resulting from the release, and 3) measure changes in river stage at FYLF sites during the course of the whitewater flow.

### **8.11.4 Study Area**

The study area will include the Camino Dam Reach of Silver Creek. The Camino Dam Reach includes Silver Creek from immediately below Camino Dam downstream to the confluence with the South Fork American River. An additional study area for the BMI investigation will include a control site that has been previously used as a reference site for the Camino Dam Reach – the South Fork American River at Ice House Road.

#### 8.11.5 Study Methods and Schedule

##### Water Quality

The purpose of the water quality investigation is to evaluate the magnitude and duration of changes in specific water quality parameters before, during, and after the boating flow release. Four components will be monitored: (1) water temperature (°C), (2) turbidity (NTU), (3) dissolved oxygen (mg/L) and (4) total suspended solids (TSS). The first three parameters will be continuously monitored using temporarily installed instrumentation at three locations: 1) directly below Camino Dam; 2) approximately midway through the bypass reach, adjacent to the Camino Tunnel Adit spoil pile; and 3) at the mouth of Silver Creek. The instrument used to gather data on these parameters will be a Troll XP MPT 9000 *in situ* sampler, which will be programmed to record information every 15 minutes. The sampling instruments will be installed approximately one week prior to the release date and will be removed approximately one week after the release. Water quality parameters will be recorded beginning at least 48 hours before the test flow, and continuing at least 48 hours after the end of the test flow.

Total suspended solids, which cannot be monitored with the Troll XP MPT 9000 instrument, will be monitored by hand regularly during the boating release event. Sampling will consist of filling a 500ml polyethylene bottle every 1.5 or 2 hours during the course of the boating release event. Filled sample bottles will be chilled either in river water or in an ice bath and transported to a laboratory for analysis (EPA 160.2). TSS sampling will be performed below Camino Dam and adjacent to the spoil pile. TSS sampling will not be performed at the mouth of Silver Creek for logistical and safety reasons (see more detailed discussion of safety constraints in FYLF investigation).

##### Foothill Yellow-legged Frog

The purpose of the FYLF investigation is to qualitatively evaluate changes in FYLF distribution or abundance at previously surveyed sites in the Camino Dam Reach (Camino Tunnel Adit Site, and Silver Creek Confluence Site). Visual encounter surveys (VES) will be performed within a week prior to and 1-2 weeks after the boating release to: 1) verify the continued presence of FYLF at these sites, and 2) qualitatively evaluate changes in distribution or abundance of FYLF resulting from the test flow. The VES effort will cover the same areas and use the same methods as the previous VES.

In addition to the VES, a pair of amphibian specialists will be onsite at the Camino Tunnel Adit spoil pile study site during the flow release on September 15, in a safe and secure location along the river margin prior to the release. During the release, observations will be made of changes in habitat and hydraulic conditions in areas previously studied during the Amphibian Habitat Flow Study. These areas include polygons delineated during the prior study, as well as any known locations of egg deposition, tadpole observations, etc. Where safely feasible along the margin of the river, additional hydraulic measurements (depth and velocity) will be made to quantify changes in habitat during the high-test flow.

##### Flow and Stage Changes

The purpose of the flow and stage (water surface elevation) change task is to monitor stage changes at known FYLF sites during the test flow event, in order to help quantify the extent of habitat changes for FYLF. This task will be accomplished by regularly monitoring the stage of Silver Creek at known areas of FYLF use during the course of the boating flow passing through the bypass reach. At the Camino Tunnel Adit spoil pile study site, this will be accomplished by having the amphibian specialists monitoring a temporary staff gage every 15 minutes during the course of their other work for the FYLF habitat evaluation (described above). The staff gage will be digitally photographed at each 15-minute interval, to provide a visual record of the stage height and surrounding hydraulic conditions.

At the Silver Creek confluence site, the study area is not safely accessible during high flow events. Stage changes will be recorded by installing a digital water surface elevation logger (level loggers) (Levellogger model 3001, Solinst Canada Ltd.). Level loggers measure relative changes in river stage height to the nearest 0.01 ft (at 15 minute intervals) by measuring changes in total pressure, which includes both water and atmospheric pressure. To

correct for changes in atmospheric pressure, one level logger will be placed on the shore in a sheltered open-air location as a control. The instream level logger will be placed in a pool or backwater at least 2-3 ft deep and sheltered from high velocities and turbulence. Level loggers will be housed in metal casings and cabled to the stream bank. The loggers will be deployed in the week preceding the flow event, and removed after the flow event is complete.

#### Benthic Macroinvertebrates

The purpose of the BMI investigation is to evaluate changes to the BMI community associated with the whitewater boating release. The basic design of the investigation is a sequential pre- and post-boating release sampling effort. The BMI investigation will be performed at three sampling locations, two in the Camino Dam bypass reach, which will demonstrate the change in the BMI community between the pre- and post-sampling periods, and a third location that will serve as a control site. The control site will be located on the South Fork American River at Ice House Road, the same site that was used in the UARP BMI study as a reference. This site will serve as a control site, demonstrating changes in BMI communities occurring naturally between the pre- and post- sampling period. Natural changes in the BMI community may result from changes in water temperature among other factors.

The same field sampling procedure and laboratory processing protocol used in the previous BMI study of the UARP relicensing will be applied to this investigation. The same riffles will be selected for sampling at CD-I1, CD-I2, and SFAR in 2003. The BMI samples collected post-boating flow release will be collected along transects in the same riffles as pre-boating release samples, in an area just upstream of the previous sampling transect. A metal square or similar device will be used to more consistently delineate the sampling area that is disturbed upstream of the net.

The pre-boating release sampling effort will be performed approximately one week in advance of the September 15. The post-boating release sampling effort will be performed approximately 30 days after boating release, with a goal of detecting whether any substantial disruption of the BMI community is detectable 30 days after the test flow event. Changes in the BMI community of Silver Creek between the pre- and post-boating releases will be analyzed with respect to changes at the control site. Information from the previous years of sampling in the Camino Dam Reach will also be compared to the results of this investigation.

#### Streambed Mobility

The purpose of the streambed mobility task is to document whether the boating test flow results in mobilization or scouring of the streambed, resulting in potential effects on habitat for aquatic species. Prior to the boating test flow, a series of rocks in a line along the stream bottom will be marked *in-situ* with waterproof paint. The number of marked rocks, their approximate size distribution, and the endpoints of the survey line will be recorded. The sampling area will be photographed. Following the test flow, the area will be revisited and changes in the number and distribution of the marked rocks will be measured (e.g., number of rocks missing, displacement distance of rocks, size of displaced rocks, etc.) to provide an indication of bedload movement during the event.

#### 8.11.6 Study Output

The final study output will be a written report that includes the issues addressed, objectives, study area, methods, analysis and results.