SANTA FELICIA PROJECT
FERC LICENSE NO. 2153

Santa Felicia
Dissolved Oxygen Monitoring Plan

JUNE 2015

UNITED WATER CONSERVATION DISTRICT
106 N. 8TH STREET
SANTA PAULA, CALIFORNIA 93060

1.0 Introduction

On December 2, 2014, the Federal Energy Regulatory Commission (FERC) issued an order amending the license issued to United Water Conservation District (United) for the Santa Felicia Project (FERC Project No. 2153) and approving the Santa Felicia Water Release Plan dated June 2012 (Water Release Plan). The license was amended to replace the interim flow requirements of article 403 with water release schedules contained in the Water Release Plan. The Water Release Plan was developed in accordance with article 401 of the license and the associated biological opinion issued by the National Marine Fisheries Service (NMFS), and intended to provide essential habitat function to support life history and habitat requirements of the endangered southern California steelhead.

On March 4, 2014, prior to FERC's issuance of the license amendment, the State Water Resources Control Board (State Water Board) issued a water quality certification (certification) pursuant to section 401 of the Clean Water Act for the Operational Changes at the Santa Felicia Project associated with the anticipated license amendment. Condition 2 of the certification requires United to develop and implement a Dissolved Oxygen Monitoring Plan (DOMP) to determine if flows released from the Santa Felicia Project are in compliance with *Water Quality Control Plan for the Los Angeles Region – Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties* (Basin Plan) dissolved oxygen water quality objectives. This document serves as the DOMP and describes the sampling methods including site locations and frequency, quality assurance/quality control (QA/QC) protocols, objective criteria, and contingency measures to be implemented in the event that objectives are not met.

2.0 Background/Rationale

Results from monitoring activities performed in lower Piru Creek in 2004 indicated that dissolved oxygen (DO) concentration in the release pool located below the Santa Felicia outlet works did not meet the water quality objectives established in the Basin Plan. Subsequent to these findings, infrastructure at the Santa Felicia outlet works was upgraded (providing improved aeration) and operations associated with water releases were modified. The objective of this DOMP is to determine if current operations of the Santa Felicia Project, in accordance with the Water Release Plan, are impacting compliance with the DO water quality objectives established in the Basin Plan.

The Basin Plan states "at a minimum the mean annual [DO] concentration of all waters shall be greater than 7 mg/L, and no single determination shall be less than 5.0 mg/L, except when natural conditions cause lesser concentrations." Condition 2 of the certification requires United to monitor DO concentration in lower Piru Creek downstream of the Santa Felicia outlet works (Lower Piru Creek) to determine if discharges from the Santa Felicia Project comply with Basin Plan DO water quality objectives. Condition 2 also stipulates that DO monitoring be conducted upstream of Lake Piru (Middle Piru Creek). The Middle Piru Creek sites are expected to provide a reference for natural DO concentration of water coming into Lake Piru. If monitoring indicates that DO concentration at Lower Piru Creek does not meet the Basin Plan DO objectives, then

data from Middle Piru Creek will be considered to help inform the appropriate DO levels for water exiting Lake Piru through the Santa Felicia outlet works.

3.0 Dissolved Oxygen Monitoring Measures

This section describes the measures that will be implemented to comply with Condition 2 of the certification. The implementation steps are outlined below.

1. Monitor ambient DO and temperature at Middle Piru Creek and Lower Piru Creek.
2. Evaluate monitoring data to determine if water released into lower Piru Creek from the Santa Felicia Project meets Basin Plan DO water quality objectives.
3. Report monitoring results along with the raw data collected in a Microsoft Excel format displaying date, time, DO reported in mg/L, and temperature.
4. Consult with State Water Board as appropriate to:
    a. Request approval to terminate monitoring activities if discharges into lower Piru Creek from the Santa Felicia Project are in compliance with Basin Plan DO water quality objectives.
    b. Request guidance from State Water Board to determine appropriate action if findings indicate that DO water quality objectives are not met at Lower Piru Creek, but DO concentrations at Lower Piru Creek are found to be comparatively better than DO concentrations at Middle Piru Creek upstream of Lake Piru.
    c. Develop a Dissolved Oxygen Improvement Plan (DOIP) if DO water quality objectives are not met, and DO concentrations at Lower Piru Creek are degraded compared to DO concentrations at Middle Piru Creek upstream of Lake Piru.

3.1 Monitoring Locations

DO monitoring will occur at Middle Piru Creek directly above the high water mark of Lake Piru (near Blue Point campground) and at Lower Piru Creek directly below the Santa Felicia outlet works (Figure 1). Two pool habitat sites will be monitored at each location (total of four monitoring sites). The two pools located below the dam will include the release pool directly below the Santa Felicia outlet works and a pool that was included as a designated site in a draft Habitat Improvement Plan (HIP) and draft Effectiveness Monitoring Plan (EMP) that are currently under review by FERC and NMFS (Figure 2). The two pools located upstream of Lake Piru will be designated during field reconnaissance activities prior to initiation of implementation of the DOMP and may vary seasonally depending upon hydrologic conditions and availability of pools in the vicinity (Figure 3). Photo points will be designated at each monitoring site. All pools will be photographed and pools and photo points will be mapped using a global positioning system (GPS) device. Following site selection, photographs and GPS coordinates will be sent to State Water Board staff.

3.2 Materials and QA/QC

A single Onset® Hobo U-26 dissolved oxygen logger will be placed at mid-depth near the deepest area of each pool. This logger also measures temperature. The Hobo U-26 DO logger has an optical sensor with a measurement range of 0-30 mg/L and has an accuracy of 0.2 mg/L. To maintain this accuracy, the sensor cap must be replaced every 6 months. United will replace each cap at least every 6 months as long as monitoring occurs under this plan. The accuracy of this logger is guaranteed by Onset for one year (based on personal communication with technical

support). Each logger will be attached to a fence post with zip ties and a carabineer for easy access and uploading. Barometric pressure monitoring is required when measuring percent saturation but not required when measuring mg/L, therefore barometric pressure will not be monitored. Each pool will be checked for any potential hyporheic influences that could affect the ambient water quality parameters being monitored. Divers will check the bottom of each pool by feel for presence/absence of hyporheic cold seeps. Loggers will be calibrated as specified by the manufacturer.

3.3 Monitoring Frequency

United will initiate implementing the DOMP within 60 days of approval of the DOMP by the Deputy Director or within 60 days of receipt of all necessary approvals if such approvals are received subsequent to Deputy Director approval.

The data loggers will be programmed to take a measurement every hour for a minimum of two weeks in each water release schedule, as required by Condition 2 of the certification[1]. During monitoring, each logger will be checked for fouling and monitoring data will be uploaded weekly. If fouling occurs, the frequency of logger checks will be increased. The loggers' internal clocks are synchronized with a handheld data shuttle during data download to ensure that the internal time clock remains accurate. In the event that a logger is found to be missing or not functioning properly, it will be replaced within 3 working days (from the time the problem is identified).

DO data collection will occur on an ongoing basis for the duration of the monitoring period. The Water Release Plan and certification prescribe the minimum water releases. The DOMP prescribes DO monitoring of the minimum water releases. If DO concentrations measured during the minimum required habitat water release of 7 cfs demonstrate compliance with DO Basin Plan objectives, United may request the approval of the Deputy Director to discontinue DO monitoring activities.

3.4 Data Analysis

Monitoring data will be analyzed using a two-sided one-sample T-test. The mean annual dissolved oxygen level will be compared to the Basin Plan water quality objective of 7.0 mg/L. The number of hours (or days) with dissolved oxygen values below 5.0 mg/L will be tabulated.

3.5 Reporting

By March 31 of each year following monitoring, United will prepare and submit a report to the Deputy Director that describes the monitoring efforts of the previous calendar year (i.e., January-December), including the data collected and associated analyses. The Deputy Director may provide comments on the report. If the Deputy Director does not provide comments on the annual report within 30 days of submittal, United will file the report with FERC. If the Deputy Director provides comments, United will revise the report to include the Deputy Director's comments and United's response to those comments and submit the revised report to FERC and the Deputy Director within 30 days of receipt of comments.

[1] The water release schedules are triggered by natural events (such as rainfall). As a result United may be unable to monitor DO for two continuous weeks in each water release schedule.

3.6 Consultation

If monitoring indicates that DO concentrations at Lower Piru Creek are in compliance with the DO Basin Plan water quality objective of 7.0 mg/L (annual mean) and DO concentrations did not fall below 5 mg/L (unless natural conditions create lesser concentrations), United may request the approval of the Deputy Director to cease DO monitoring efforts.

If monitoring indicates DO concentrations at Lower Piru Creek are out of compliance with DO Basin Plan water quality objectives described above, DO monitoring results at Lower Piru Creek will be compared to the monitoring results at Middle Piru Creek for the same time period. If DO at Lower Piru Creek is found to be comparatively better than DO at Middle Piru Creek, United will consult with State Water Board staff to determine if United can terminate DO monitoring.

In the event that DO concentrations at Lower Piru Creek do not comply with DO Basin Plan objectives, and data indicate that DO at Lower Piru Creek is degraded compared to Middle Piru Creek, the Deputy Director may direct United to develop a DOIP. United will consult with State Water Board staff in developing the DOIP, and will submit it to the Deputy Director for approval within three months of notification that an improvement plan is needed. If the Deputy Director approves the DOIP, United will file the DOIP with FERC for approval within 30 days of approval by the Deputy Director. If the Deputy Director provides comments, United will revise the DOIP to address these comments and include an explanation of United's responses to comments. United will resubmit the revised DOIP to the Deputy Director for review within 30 days of receipt of comments. United will file the DOIP with FERC for approval within 30 days of approval by the Deputy Director. United will initiate implementation of the DOIP within 60 days of approval by FERC or within 60 days of receipt of all necessary approvals if such approvals are received subsequent to approvals by the Deputy Director and FERC.

3.7 Dissolved Oxygen Improvement Plan Implementation and Follow Up

If a DOIP is determined to be necessary, United will continue to monitor DO conditions at the designated monitoring sites to evaluate the effectiveness of DOIP implementation. By March 31 of each year following monitoring, United will submit a report to the Deputy Director that describes the effectiveness of DOIP implementation, data collected and associated analyses. The Deputy Director may provide comments on the report. If the Deputy Director does not provide comments on the report within 30 days of submittal, United will file the report with FERC. If the Deputy Director provides comments, United will revise the report to address the comments and/or include the Deputy Director's comments and United's response to those comments. United will then submit the revised report to FERC and the Deputy Director within 30 days of receipt of comments.

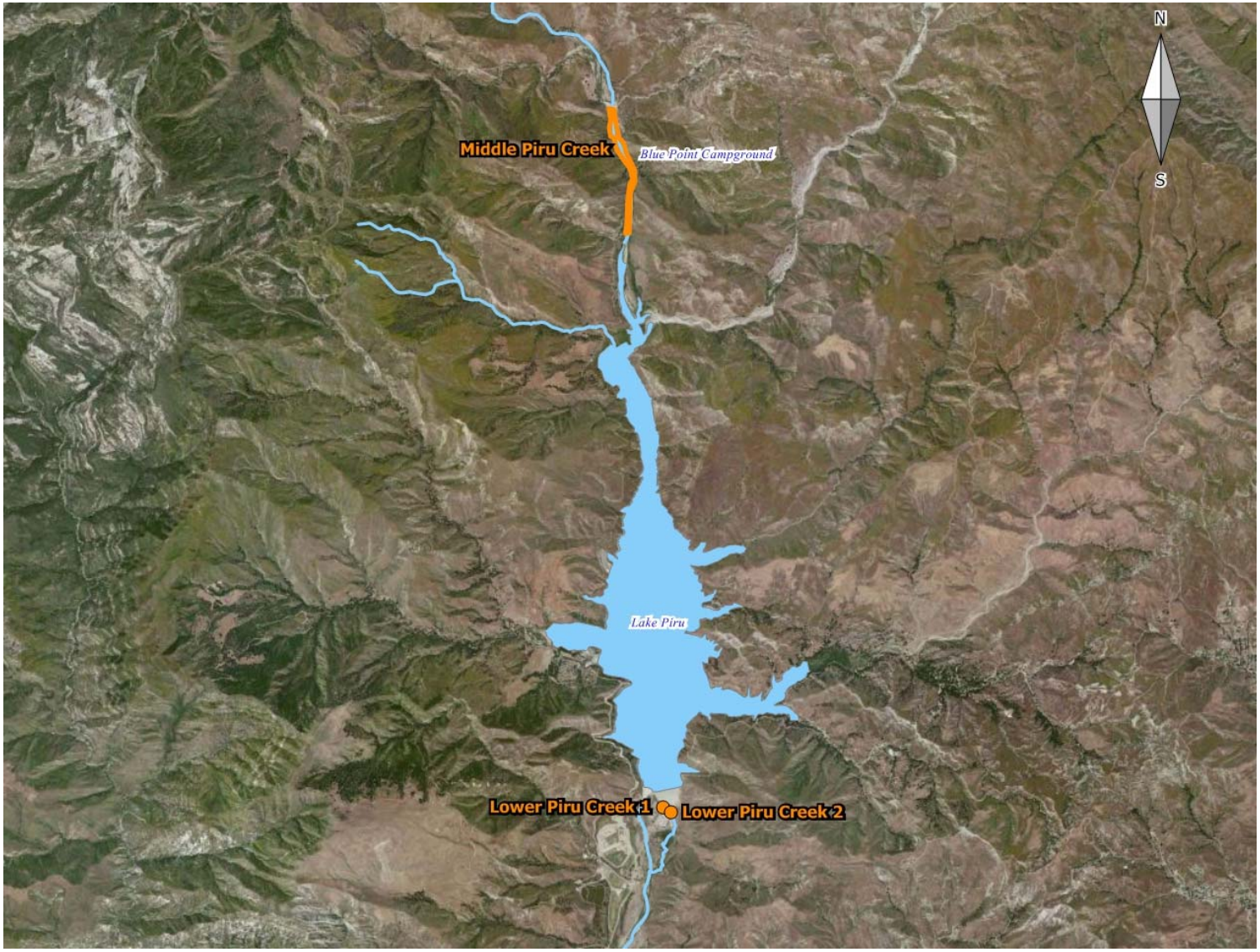

Figure 1 - Site map showing two designated monitoring sites at Lower Piru Creek and the reach of Middle Piru Creek where two monitoring sites will be identified during site reconnaissance prior to implementation of monitoring plan.

Figure 2 - Locations of monitoring sites at Lower Piru Creek.

Figure 3 - Reach of middle Piru Creek where two pool monitoring sites will be identified during site reconnaissance prior to implementation of monitoring plan.