

UNITED STATES OF AMERICA 133 FERC ¶ 62,086  
FEDERAL ENERGY REGULATORY COMMISSION

United Water Conservation District

Project No. 2153-028

ORDER MODIFYING AND APPROVING GEOMORPHIC EFFECTS PLAN UNDER  
ARTICLE 401(A)

(Issued October 26, 2010)

1. On October 13, 2010, United Water Conservation District (licensee) filed its Geomorphic Effects Plan for the Santa Felicia Hydroelectric Project (FERC No. 2153), pursuant to article 401(a) of the project license.<sup>1</sup> The project is located on Piru Creek in Ventura County, California.

BACKGROUND AND LICENSE REQUIREMENTS

2. License article 401(a) requires that the licensee file various plans for the Federal Energy Regulatory Commission's (Commission) approval, as required by the National Marine Fisheries Service (NMFS) reasonable and prudent alternatives (RPA) contained in the final biological opinion for the project. RPA 1(a) requires that the licensee develop a plan to quantify the type, amount, and extent of geomorphic effects of Santa Felicia Dam and its operations on the quality and quantity of steelhead habitat in Piru Creek downstream of the dam. The RPA states that the plan should include: (1) a clear statement of the study objectives; (2) a description of the specific field methods that will be used to quantify the type, amount, and extent of geomorphic effects; (3) a description of the methods that will be used to condense, analyze, and interpret the collected field data; (4) a description of the elements of a findings report that will describe and present the results obtained from implementing the study plan; and (5) schedules to guide field sampling, data analysis, and preparation of the findings report. The plan is to be developed in consultation with NMFS, and should be implemented following NMFS and Commission approval.

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<sup>1</sup> See 124 FERC ¶ 62,193. Order Issuing New License (Issued September 12, 2008).

## LICENSEE'S PLAN

### Overview

3. The licensee states that the objectives of the geomorphic plan are two-fold. The first objective is to evaluate the potential effects of Santa Felicia Dam on: a) the quantity, quality, and availability of spawning gravels; b) the deposition and flushing of fine sediments; and c) the adequacy of overbanking flows in supporting riparian vegetation along lower Piru Creek. Based on the findings of the first objective, the licensee proposes to then determine the flow releases that are necessary to restore or enhance the geomorphic processes that promote a dynamic river ecosystem that will support steelhead, including: a) mobilizing the streambed every 1-2 years to promote pool scour and mobilization of the coarse layer on riffles; b) flushing sand from the gravel framework during the spawning and rearing season; and, c) reworking the channel morphology via overbank flows at a frequency of approximately every 5 years.

### Field Reconnaissance and Selection of Study Sites

4. The licensee proposes to conduct a field reconnaissance survey of lower Piru Creek to assess and characterize current stream conditions and to select representative study sites. The survey would include characterizing general channel conditions, such as substrate within the channel, channel shape, and other fluvial features. The licensee states that it anticipates dividing up lower Piru Creek into three geomorphic reaches for the study, which will include an upper reach situated between river mile (RM) 3.0 and 6.0, a middle reach between RM 1.7 and 3.0, and a lower reach between RM 0 and 1.7. The licensee states that it will establish one study site per reach, consisting of one pool and one riffle, and would be selected based on the criteria of safe access, physical geomorphic features, quality of steelhead spawning and rearing habitat, representativeness of channel type, and proximity to previous study sites. The licensee proposes to conduct the field reconnaissance surveys during the summer and fall of the first year of monitoring.

### Cross-Section and Longitudinal Profile Surveys

5. The licensee proposes to conduct cross-section and longitudinal profile surveys at each study site to characterize general channel conditions, evaluate changes in channel geometry, and assist in hydraulic model preparation. The surveys would include six cross-sectional surveys, one longitudinal profile, and additional surveys within pool habitats at each study site. Cross-sectional surveys would occur at the head, center, and tail of each designated pool and riffle by measuring ground elevations from the left to right bank at one or two foot intervals using a total station and prism or engineer's level and rod. As part of the cross-section surveys, the licensee proposes to identify and survey bankfull indicators, including topographic breaks in bank slope, the rooting of

perennial woody riparian vegetation, elevation of bank undercutting, significant changes in particle size of bank material, and height of depositional features within the active channel. Longitudinal surveys would also take place using the same equipment as the cross-section surveys and would survey over a distance of approximately 10 times the bankfull channel width. The licensee also proposes to collect data on the channel thalweg, water surface elevation, and channel geomorphic/habitat features. Finally, the licensee proposes to collect additional survey points within the pool habitat at each study site to provide data for generating contour maps of each pool. The licensee states that the surveys would be conducted during low flow conditions when the channel could be safely accessed and traversed. The licensee proposes to conduct the cross-section and longitudinal surveys during the summer and fall of the first year of monitoring, and during the spring and summer of the second year of monitoring following high flow releases.

#### Pebble Counts

6. The licensee proposes to analyze sediment characteristics at each study site by conducting a pebble count of the bed particle size. Pebble counts would be conducted using the “first blind touch” method, with particles measured on their intermediate axis. The pebble count data would be used to prepare cumulative particle size distribution curves, and the final classification of dominant particle sizes for each study site would be determined. Pebble counts would also be conducted during low flow conditions. The licensee proposes the pebble counts during the summer and fall of the first year of monitoring, and during the spring and summer of the second year of monitoring following high flow releases.

#### Gravel Inventory, Bulk Sampling, and Gravel Transport

7. The licensee proposes to characterize the amount and quality of spawning gravels by conducting a spawning gravel inventory, inter-gravel sand deposition inventory, collecting bulk samples of spawning gravels, and evaluating gravel transport using tracer gravels and scour chains. The specifics of each these surveys are outlined below.

8. The licensee states that spawning gravel inventories would be conducted along a 0.5-mile representative section within each of the three stream reaches. At each survey section, the licensee proposes to measure the surface area of spawning gravel (6 to 52 mm diameter) deposits. In areas that are not accessible or wadeable, the licensee would perform visual estimates of the surface area of the gravel deposit. Additionally, the licensee proposes to map surface sand deposits and to record habitat types, embeddedness, and saturation of sand deposits at each survey section. Spawning gravel inventories would occur during the summer and fall of the first year of monitoring.

9. The licensee also proposes to collect two bulk samples of spawning gravels within each spawning gravel survey section. The samples would be used to characterize the quality of spawning gravel and would be collected from the surface layer of the streambed. During sample collection, the licensee proposes to conduct and record visual observations of gradation changes with water depth. The particle size composition would then be compared to published information for gravel diameters and fines in order to estimate the relative capacity of the sampled gravels to support successful steelhead spawning. Bulk gravel samples would also occur during the summer and fall of the first year of monitoring.

10. Finally, the licensee proposes to evaluate gravel transport using tracer gravels and scour chains. At each sample location, the licensee would collect, measure, paint, and place 50-gravel size particles into the stream channel in their original location. The licensee also proposes to install a scour chain at each location to evaluate scour depth and subsequent deposition associated with flow events. If site conditions make it unfeasible to install scour chains, the licensee proposes to paint gravel in-situ using Kevlar epoxy coating along taglines with different colored paint for each transect. If feasible, the licensee also proposes to install infiltration bags in riffle habitat to evaluate sand infiltration dynamics at locations where gravel tracer studies are being conducted. Following high flow events, the licensee proposes to revisit the study locations to determine if tracer gravels were mobilized and to evaluate the scour depth and deposition. If particles were mobilized, the licensee proposes to locate the mobilized particles and measure the distance transported. The licensee would also measure the amount of fine sediment deposited in the gravel above the infiltration bags. Tracer gravels, scour chains, and infiltration bags would be deployed during the summer and fall of the first year of the study and subsequent monitoring would occur during the fall/winter of years 1-2 of monitoring and during the spring and summer of the second year of monitoring.

#### Hydraulic and Sediment Transport Data

11. During the annual high-flow “conservation releases,” the licensee proposes to collect hydraulic and sediment transport data at each study site to assist in the characterization of sediment conditions. Hydraulic data collection would consist of water surface elevation measurements using a crest-stage or staff gage, coupled with velocity measurements across the wetted channel at each designated riffle cross-section, if conditions allow. The licensee also proposes to collect suspended sediment and bedload transport data at accessible riffle cross-sections during high flow events. If possible, the licensee proposes to collect hydraulic and sediment transport data over a range of flows to assist in establishing stage-discharge relationships and to characterize the sediment transport regime under a range of flow conditions. The licensee proposes to install the crest stage and staff gages during the summer/fall of the first year of monitoring. Subsequent stage-discharge data and sediment/bedload transport data would be collected during the fall and winter of years 1-2 of monitoring.

### Data Analysis and Hydraulic Model

12. The licensee proposes to use the collected field data to develop a hydraulic model to assist in characterizing hydraulic conditions over a range of flows. The model would be developed using the HEC-RAS computer model and would characterize sediment transport conditions, including the flows required to mobilize the streambed every 1-2 years and flush sand from gravels and assist in determining the magnitude for overbank flows required to re-work the channel morphology and support riparian vegetation. The licensee proposes to perform its data analysis during the summer and fall of the second year of monitoring.

### Reporting

13. Following completion of the field studies and data analysis, the licensee proposes to prepare a report that presents the study methods and findings, including recommendations for flushing and overbank flows. The licensee also states that the report would provide recommendations for future monitoring or additional studies, if warranted. The report would also include figures presenting the study area and locations, tables summarizing collected data, cross-section and longitudinal profiles, sediment transport and hydraulic model results, and field notes. The licensee proposes to complete this report during the fall/winter of years 2-3 following the commencement of monitoring.

### AGENCY CONSULTATION

14. On August 19, 2009, the licensee submitted a draft of its plan to NMFS, with a copy to the Commission. NMFS filed comments on the licensee's plan on December 15, 2009. NMFS requested that the licensee include a section in the plan that focused on quantifying the effects of dam operations on the geomorphology, and spawning and rearing habitat of Piru Creek. With regard to the proposed quantitative field studies, NMFS recommended that a minimum of three permanent sites be surveyed at the head, center, and tail of a riffle and pool, for a minimum of six cross-sections per pool-riffle monitoring site. NMFS also recommended that higher-resolution topographic surveys be conducted in the pools to develop contour maps that can be used to compare pool scour and sand flushing following flow releases. Concerning spawning gravel inventories, NMFS commented that bulk gravel sample should capture both the particle size and sand content in the streambed surface. NMFS also requested that sand content be mapped and sampled in riffles using infiltration bags. Regarding sediment transport studies, NMFS recommended that the licensee install two to four Bunte-type bedload traps below the monitored riffles and paint gravel in-situ in the event that scour chains are unfeasible. Finally, NMFS requested that the licensee install crest-stage gages at selected monitoring locations.

15. The licensee responded to NMFS comments on April 27, 2010. The licensee stated that it would revise its plan to address the geomorphic process goals, including a description of methods for investigating what flow magnitudes would be required to achieve these goals. Regarding, NMFS request for cross-section monitoring, the licensee responded that it would monitor three study sites with six permanent cross-sections within each reach, for a total of 18 cross-sections. In response to NMFS comments on the spawning gravel inventory, the licensee proposed to modify its bulk and sand sampling procedures to include the use of infiltration bags and sampling to capture particle size and sand content in the streambed surface. The licensee also agreed to paint gravel in-situ should scour chain installation not be reasonable, but questioned the effectiveness of deploying Bunte-type bedload traps due to difficult site conditions. Finally, the licensee agreed to install crest-stage gates at selected monitoring locations.

16. On October 7, 2010, NMFS filed a letter with the Commission stating that the licensee's Geomorphic Effects Study Plan was approved.

## DISCUSSION AND CONCLUSIONS

17. The licensee's plan includes measures to conduct extensive sediment and bedload monitoring downstream of the Santa Felicia Dam. In particular, the licensee proposes to conduct: a field reconnaissance survey of lower Piru Creek; cross-sectional and longitudinal profile surveys; pebble counts; gravel inventory, bulk sampling; gravel transport surveys; and hydraulic and sediment transport data collection. The licensee also proposes to prepare a hydraulic model from the monitoring results and prepare a final report of the geomorphic monitoring results. The licensee proposes to complete the report by the fall/winter of year 2-3 following the commencement of monitoring. However, the licensee's plan did not propose to file the final report with the Commission. In order to assess the licensee's compliance with the requirements of the plan, the license should also be required to file their monitoring report with the Commission within 60 days of formal NMFS approval or acknowledgement of the report. The licensee's filing should also include documentation of correspondence with NMFS. In conclusion, the licensee's plan includes the elements necessary to evaluate the geomorphic effects of Santa Felicia Dam and its operations on the quality and quantity of steelhead habitat in Piru Creek downstream of the dam, and as modified above, should be approved.

### The Director Orders:

(A) United Water Conservation District's (licensee) Geomorphic Effects Plan, filed October 13, 2010, pursuant to Article 401(a) of the project license, as modified in ordering paragraph (B), is approved.

(B) The licensee shall file its Geomorphic Effects Plan Monitoring Report with the Federal Energy Regulatory Commission within 60 days of acknowledgement or

approval by the National Marine Fisheries Service. The licensee's filing shall also include documentation of correspondence with the National Marine Fisheries Service.

(C) This order constitutes final agency action. Any party may file a request for rehearing of this order within 30 days from the date of its issuance, as provided in section 313(a) of the FPA, 16 U.S.C. § 8251 (2006), and the Commission's regulations at 18 C.F.R. § 385.713 (2010). The filing of a request for rehearing does not operate as a stay of the effective date of this order, or of any other date specified in this order. The licensee's failure to file a request for rehearing shall constitute acceptance of this order.

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Document Content(s)

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