

Placer County Water Agency
 Middle Fork American River Hydroelectric Project
 (FERC Project No. 2079)
 Draft Aquatic Technical Studies Development Worksheet

Potential Resource Issue ¹	Project Nexus ²	Potential Affected License Condition ³	Information Needs ⁴	Technical Studies ⁵
Aquatic Resources				
1. Alteration of natural hydrograph	Project operations modify the flow regime in bypass reaches	Instream flow releases	<ul style="list-style-type: none"> Compare unimpaired and impaired flows downstream of the Project facilities 	Hydrology Study
2. Maintain or enhance riverine aquatic populations and their habitat	Project operations modify the flow regime in bypass reaches	Instream flow releases	<ul style="list-style-type: none"> Characterize existing aquatic habitat 	Aquatic Habitat Characterization Study
			<ul style="list-style-type: none"> Quantify the relationship between flow and aquatic habitat Quantify aquatic species limiting factors (e.g., habitat, bioenergetics, non-native species) Quantify food availability. 	Instream Flow Study
			<ul style="list-style-type: none"> Determine fish population abundance and distribution (including growth, age class distribution, and health) 	Fish Population Study
			<ul style="list-style-type: none"> Document the special-status amphibians and reptiles and their habitat Quantify the relationship between flow and amphibian and reptile habitat (e.g., spawning and rearing) 	Special-Status Amphibian and Reptile Study
3. Protect fish, amphibian, and macroinvertebrate populations and riparian resources in the peaking reach downstream of Oxbow Powerhouse	Project peaking operations result in daily instream flow fluctuations	Instream flow fluctuations	<ul style="list-style-type: none"> Quantify the effects of flow fluctuations on macroinvertebrates, fish, amphibians, and riparian vegetation. Quantify travel time and attenuation of flow fluctuations along the length of the reach 	Instream Flow Study
4. Maintain fish passage	Project operations modify the flow regime in the bypass reaches and cause fluctuations in water surface elevations in tributary inputs. Project facilities and roads could create passage barriers	Instream flow releases or project facilities	<ul style="list-style-type: none"> Identify passage barriers/impediments Determine the amount of potential spawning/rearing habitat upstream of passage barriers/impediments Determine the relationship between flow and fish passage 	Fish Passage Study
5. Maintain or enhance riparian resources	Project operations modify the flow regime in bypass reaches	Instream flow releases (riparian maintenance flows)	<ul style="list-style-type: none"> Evaluate and characterize the distribution of existing riparian resources Evaluate the condition of existing riparian resources (regeneration, encroachment into channel, health, and vigor). Evaluate the relationship(s) of riparian resources and hydrologic regime 	Riparian Resources Study
	Project operations (reservoir drawdown) could affect riparian resources around the reservoir shorelines	Reservoir operations	<ul style="list-style-type: none"> Evaluate and characterize the distribution of existing riparian resources (along reservoir shorelines) Evaluate the relationship between reservoir water surface elevations and riparian resources 	
6. Maintain stable channel form and fluvial processes	Project operations modify the flow regime in bypass reaches and capture sediment in project reservoirs and diversion pools	Instream flow releases (channel maintenance flows)	<ul style="list-style-type: none"> Identify stream channel geomorphic classification Characterize sediment supply and recruitment conditions Characterize channel stability Quantify sediment transport flows, and compare historical and existing high flow regime (frequency, magnitude, and duration) 	Geomorphology Study
		Sediment management practices	<u>Project facilities</u> <ul style="list-style-type: none"> Identify historic and current sediment loads Characterize facility operation and maintenance practices Develop potential engineering and operational solutions Characterize need for current and future sediment removal from Project impoundments (quantity, frequency, and fate) <u>Bypass Reaches</u> <ul style="list-style-type: none"> Evaluate sediment recruitment and transport downstream of Project facilities 	
7. Comply with Basin Plan objectives and water quality standards	Project operations and maintenance could affect water quality	Project operations or maintenance activities	<ul style="list-style-type: none"> Assess study water quality against regulatory standards and criteria Quantify macroinvertebrate species compositions, abundance, and distribution (in selected locations where water quality issues are identified) 	Water Quality Study
	Project operations modify the flow regime in bypass reaches	Instream flow releases	<ul style="list-style-type: none"> Measurement of existing temperature and meteorological data Determine fish and amphibian temperature requirements 	Temperature Monitoring Study
			<ul style="list-style-type: none"> Determine the relationship between flow and temperature 	Temperature Modeling Study
			<ul style="list-style-type: none"> Determine the relationship between fish growth and temperature 	Bioenergetics Study

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Aquatic Resources				
8. Maintain or enhance reservoir fish habitat	Project operations could affect availability of reservoir fish habitat and woody debris dynamics	Reservoir operations	<ul style="list-style-type: none"> Characterize the relationship between reservoir levels and reservoir fish habitat Characterize the effect of reservoirs on woody debris dynamics 	Reservoir Fish Habitat Study
9. Evaluate fish entrainment	Project diversions could result in entrainment of fish	Project facilities or operations	<ul style="list-style-type: none"> Identify potential fish entrainment areas and determine population effects 	Entrainment Study

¹**Potential Resource Issue:** An environmental or cultural resource objective that may be affected by Project operation or maintenance.

²**Project Nexus:** The connection between Project operations or maintenance activities and their potential effect on environmental or cultural resources.

³**Potential Affected License Condition:** A potential new requirement given to the Placer County Water Agency (PCWA) by the Federal Energy Regulatory Commission (FERC) as part of relicensing (permitting) to operate and maintain the Project for energy generation.

⁴**Information Needs:** Data necessary to fully evaluate potential Project effects on environmental and cultural resources and develop potential license conditions that balance resource interests.

⁵**Technical Studies:** Information gathering and analysis designed to evaluate the potential effects of the Project on environmental and cultural resources.