

Study 2.4¹

BIOACCUMULATION

August 2011

1.0 Project Nexus

Impoundment of water (with the incidental accumulation of sediment) and operation of the Yuba County Water Agency's (YCWA or Licensee) Yuba River Development Project (Project) facilities have potential to increase the methylated mercury in the system, making it available for bioaccumulation through various trophic levels of the aquatic ecosystem.

2.0 Resource Management Goals of Agencies and Indian Tribes with Jurisdiction over the Resource Studied

YCWA believes that three state agencies have jurisdiction or management goals over bioaccumulation and human health risk in California: 1) the State of California's Office of Environmental Health Hazard Assessment (OEHHA); 2) the State Water Resource Control Board, Division of Water Rights (SWRCB), and 3) the California Department of Fish and Game (CDFG):

OEHHA

The OEHHA is the relevant fish consumption agency for consultation under the Federal Power Act Section 10(j) (16 U.S.C. § 803(j)). OEHHA's Fish and Water Quality Evaluation Unit evaluates chemical contaminants in fish and wildlife and develops fish consumption health advisories. Fish consumption advisories are published in the California Sport Fish Regulations and are part of a public communications program intended to help protect citizens, including sensitive subpopulations, against toxic chemicals. OEHHA provides specific consumption advice for fish taken from many water bodies in California.

SWRCB

SWRCB has authority under the federal Clean Water Act (33 U.S.C. §11251-1357) to restore and maintain the chemical, physical and biological integrity of the Nation's waters. Throughout the relicensing process the SWRCB maintains independent regulatory authority to condition the operation of the Project to protect water quality and the beneficial uses of stream reaches consistent with Section 401 of the federal Clean Water Act, the Regional Water Quality Control Board Basin Plans, State Water Board regulations, CEQA, and any other applicable state law.

CDFG

In its July 12, 2011 letter to FERC that provided comments on YCWA's Proposed Study Plan, CDFG stated that its mission is to manage California's diverse fish, wildlife, and plant resources,

¹ After consultation with Relicensing Participants, YCWA, at its own risk, agreed to begin this study in 2011 prior to FERC's Study Determination. If FERC includes this study in its Determination, YCWA will consider the study ahead of schedule.

and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public.

3.0 Study Goals and Objectives

The goal of the study is to provide OEHHA with the information needed, if any, to develop consumption recommendations for targeted species. The objective of the study is to characterize the concentration of methylmercury in resident, edible-sized sport fish in the Project's impounded waters including New Bullard's Bar Reservoir, Our House Diversion Dam impoundment, and Log Cabin Diversion Dam impoundment.

As it is practical to also analyze the collected samples for other metals, fish tissue will also be analyzed for arsenic, copper, selenium, and silver.

4.0 Existing Information and Need for Additional Information

Available information consists of existing regulatory plans and advisories for the watershed, as well as water quality data collected to date in the Project Area.²

4.1 Regulatory Status for Surface Water and Fish in the Project Area

Beneficial uses and water quality objectives for the Project Area are documented within the Central Valley Regional Water Quality Control Board's (CVRWQCB) *Water Quality Control Plan (Basin Plan) for the Sacramento and San Joaquin Rivers*, the fourth edition, which was initially adopted in 1998 and most recently revised in 2007 (CVRWQCB 1998). The Basin Plan's designations for Yuba River Development Project and the area downstream of the Project include freshwater aquatic habitat (COLD) and water contact recreation (REC-1), which incorporate the uses commercial or recreational collection of fish, shellfish, or organisms. Since the main concern with mercury is that it bioaccumulates in aquatic systems to levels that are harmful to fish and their predators, including humans, the presence of mercury in its bioavailable form (methylmercury) has the potential to impair Project waters due to toxicity.

The toxicity water quality objective states that "*...all waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.*"

Section 303(d) of the Clean Water Act (CWA) requires that every two years each State submit to the United States Environmental Protection Agency (EPA) a list of impaired rivers, lakes and reservoirs for which pollution control or requirements have failed to provide for water quality. Based on a review of this list and its associated Total Maximum Daily Load (TMDL) Priority

² The Project Area is defined as the area within the FERC Project Boundary and the land immediately surrounding the FERC Project Boundary (i.e., within about 0.25 mile of the FERC Project Boundary) and includes Project-affected reaches between facilities and downstream to the next major water controlling feature or structure.

Schedule, in the Project Vicinity,³ United States Army Corps of Engineer's (USACE) Englebright Reservoir has been identified by the State Water Resources Control Board (SWRCB) as CWA §303(d) State Impaired for potential toxicity due to mercury (SWRCB 2006). There are currently no approved TMDL plans for the Yuba River. Kanaka Creek, which is a tributary to the Middle Yuba River 4 miles upstream of Our House Diversion Dam, is listed under Section 303(d) of the Clean Water Act as "impaired" due to arsenic levels and contributes to the measured high levels of arsenic.

In 2009, the CVRWQCB recommended including additional surface waters in the Project Vicinity to the 303(d) list as impaired for mercury: New Bullards Bar Reservoir, the Middle Yuba River, the North Fork Yuba River from New Bullards Bar Dam to Englebright Reservoir, the South Yuba River from Lake Spaulding to USACE's Englebright Reservoir, and the Lower Yuba River from USACE's Englebright Reservoir to the Feather River (CVRWQCB 2009). These recommendations were based on fish tissue mercury data provided in SWRCB (2002) and Melwani et al. (2007) [See Section 4.2.] and the potential impairment of beneficial uses due to toxicity. These recommendations must be approved by the SWRCB and the United States EPA before the list is modified.

Along a parallel regulatory path, using available fish tissue data and risk-based methodologies, the Office of Environmental Health Hazard Assessment (OEHHA) has issued species-specific fish ingestion advisories for trout, sunfish and bass caught in USACE's Englebright Reservoir (OEHHA 2003, OEHHA 2009). In the Project Vicinity, fish ingestion advisories previously issued for Deer Creek, a tributary to the Yuba River, and the Lower Yuba River from USACE's Englebright Reservoir to the Feather River were recently retracted (OHHEA 2009).

4.2 Existing Methylmercury Bioaccumulation Information

Existing, relevant and reasonably available information found at the Project Area was documented in Section 7.2.9 of the YCWA's Pre-Application Document, or PAD (YCWA 2010) and is summarized below

Since the early 1990s, the upper Yuba River watershed has been studied by University of California, Davis, and the United States Geological Survey (USGS) (Alpers et al. 2005; Hunderlach et al. 1999; May et al. 2000; Slotton et al. 1995 *IN* May et al. 2000; and Slotton et al, *in preparation IN* OEHHA 2009). Findings from these studies indicate that significant amounts of Gold Rush era mercury still exist in sediments, surface water and fish of the upper Yuba watershed. Sediments are being transported downstream into reservoirs on the Yuba River, where they are largely trapped (Hunderlach et al. 1999; Alpers et al. 2005). Findings from these studies also indicate that fish tissue concentrations of mercury exceed the criteria established for protection of human health at some locations (Table 4.2-1).

³ The Project Vicinity is defined as the area surrounding the Project in the order of a United States Geological Survey 1:24,000 topographic quadrangle.

Table 4.2-1. Mercury concentrations measured in fish tissue in the Project Vicinity.

Location	Species Sampled	Number of Fish	Mercury, Total (ppm) ¹	Total Length (mm)	Data Source
UPSTREAM OF THE PROJECT AREA					
North Yuba River near Canyon Creek	Rainbow trout	5	0.19 – 0.14 (avg 0.11)	236 - 311	Slotton et al. (1997)
Middle Yuba River one mile upstream of Plumbago Road	Rainbow trout	5	0.05 - 0.19 (avg 0.11)	292 - 415	Slotton et al. (1997) <i>IN</i> CVRWQCB (2009)
Middle Yuba River upstream of Kanaka Creek [one mile upstream of Tyler Foote crossing]	Rainbow trout	9	0.10 - 0.24 (avg 0.16)	210 - 387	
Middle Yuba River just upstream of Oregon Creek and Highway 49	Rainbow Trout	3	0.15-0.21 (avg 0.18)	204 - 278	Slotton et al. (1997) <i>IN</i> CVRWQCB (2009)
	Sacramento Pikeminnow	2	0.56 and 0.81	321 - 339	
Middle Yuba River one mile downstream of the Highway 49 crossing	Sacramento Pikeminnow	4 (composite)	0.64	≥ 150	SWRCB (2002) <i>IN</i> CVRWQCB (2009)
South Yuba River below Lake Spaulding	Brown trout	2	0.07 and 0.07	224 -249	Slotton et al. (1997) <i>IN</i> CVRWQCB (2009)
	Rainbow trout	3	0.06-0.11 (avg 0.080)	180 - 228	
South Yuba River at Washington	Rainbow trout	13	0.10 - 0.30 (avg 0.15)	183 - 345	Slotton et al. (1997) <i>IN</i> CVRWQCB (2009)
DOWNSTREAM OF THE PROJECT AREA					
South Yuba River just downstream of Edwards Crossing	Rainbow trout	2	0.09 and 0.15	182 - 270	May et al. (2000) <i>IN</i> CVRWQCB (2009)
South Yuba River near Bridgeport	Smallmouth Bass	3 (composite)	0.69	≥ 150	SWRCB (2002) <i>IN</i> CVRWQCB (2009)
New Bullards Bar Reservoir--East Arm near its confluence with the West Arm	Smallmouth Bass	13	0.22 - 0.68 avg 0.39	≥ 150	SWRCB (2002) <i>IN</i> CVRWQCB (2009)
New Bullards Bar Reservoir--East Arm near the Willow Creek inlet	Bluegill	3	0.12-0.39 (avg 0.21)	≥ 150	Melwani et al. (2007) <i>IN</i> CVRWQCB (2009)
	Carp	11	0.34-0.83 (avg 0.52)	≥ 150	
	Largemouth Bass	1	0.61	≥ 150	
	Smallmouth Bass	10	0.29-0.72 (avg 0.48)	≥ 150	
	Carp	6 (composite)	0.61	≥ 150	SWRCB (2002) <i>IN</i> CVRWQCB (2009)
	Smallmouth Bass	5 (composite)	0.63	≥ 150	
New Colgate Powerhouse Reach, approximately 1.3 miles upstream of USACE's Englebright Reservoir	Smallmouth Bass	5	0.27 - 0.56 avg of 0.38	≥ 150	SWRCB (2002) <i>IN</i> CVRWQCB (2009)
USACE's Englebright Reservoir—South Yuba Arm, Hogsback Ravine Arm, and mid-section.	largemouth smallmouth and spotted bass	56	0.45 (mean)	338 (mean)	May et al. (2000) and Slotton et al. (1997) <i>IN</i> CVRWQCB (2001); Slotton et. al. in press <i>IN</i> OEHHA (2009)
	Bluegill and green sunfish	31	0.30 (mean)	161 (mean)	
	Rainbow trout	49	0.08 (mean)	290 (mean)	
	Carp	1	0.88	440	Slotton et al. (1997)
	Hardhead	1	0.47	540	
	Sacramento sucker	5	0.41-0.89	410-523	
Narrows 2 Powerhouse Reach, Lower Yuba River, approximately 2.2 miles downstream of Englebright Dam	Rainbow Trout	9	0.07 - 0.13 avg 0.10	≥ 150	Slotton et al. (1997) <i>in</i> CVRWQCB (2009)

Table 4.2-1. (continued)

Location	Species Sampled	Number of Fish	Mercury, Total (ppm) ¹	Total Length (mm)	Data Source
IN THE PROJECT AREA (continued)					
Little Deer Creek at Pioneer Park, less than one mile from the confluence with Deer Creek (tributary to Yuba River)	Brown trout	6	0.23 - 0.39 avg 0.32	≥ 150	May et al. (2000); SWRCB (2002) <i>IN</i> CVRWQCB (2009)
DOWNSTREAM OF THE PROJECT AREA					
Daguerre Point Dam Reach, Lower Yuba River, approximately 0.9 miles upstream of its confluence with the Feather River	Rainbow Trout	1	0.02	≥ 150	SWRCB (2002) <i>IN</i> CVRWQCB (2009)
	Sacramento Pikeminnow	1	0.46		
	Sacramento Sucker	2	0.22 and 0.38		
	Smallmouth Bass	4	0.26-0.72 (avg 0.43)		
Lower Yuba River, approximately 3.6 miles upstream of its confluence with the Feather River	Sacramento Pikeminnow	2	0.31 and 1.43	≥ 150	Davis et al. (2002) <i>IN</i> CVRWQCB (2009)
	Sacramento Sucker	5 (composite)	0.39		
	Rainbow Trout	3	0.08-0.1 (avg 0.09)	310 (avg)	Grenier et al. (2007) <i>IN</i> CVRWQCB (2009)
	Sacramento Pikeminnow	5	0.19-1.58 (avg 0.84)	≥ 150	
	Sacramento Sucker	3	0.11-0.73 (avg 0.26)	420 (avg)	

¹ All concentrations are in wet-weight.

In the Project Area, Slotton et al. (1997) also observed notably lower invertebrate mercury concentrations below many of the foothill reservoirs, as compared to concentrations in similar biota upstream. Specifically, the invertebrates below New Bullard's Bar Dam were considerably lower in mercury than those collected upstream of the reservoir on the North Yuba River. Similarly, the invertebrates collected below the USACE's Englebright Reservoir were consistently far lower in mercury than samples collected upstream of the reservoir on the Middle and South Yuba River. In contrast, however, reservoir dwelling fish had higher mercury tissue concentrations than fish collected from Coastal Range reservoirs, near historic mercury mines. This would suggest that mercury in the Sierra Nevada reservoirs is in a more bioavailable form than mercury in the Coastal Range reservoirs (Slotton et al. 1997).

Historic data demonstrates mercury concentration in fish; however, additional information regarding some sport fish species in the Project's New Bullards Bar Reservoir would be useful.

In 2009, 66 fish were collected and analyzed from five reservoirs upstream of or near the Project as part of the Federal Energy Regulatory Commission relicensing of Nevada Irrigation District's Yuba-Bear Hydroelectric Project (FERC Project No. 2310) and Pacific Gas & Electric's Drum-Spaulding Project (FERC Project No. 2266) (NID and PG&E 2010). In addition to mercury, which is discussed above, fish tissue were also analyzed for copper, selenium and silver in fish collected from Jackson Meadows Reservoir, Faucherie Lake, Bowman Lake, Fordyce Lake and Lake Spaulding. The fish species examined included rainbow trout, brown trout, kokanee, and Chinook salmon. Copper was found in both fish tissue and surface water collected from the same reservoirs. Selenium was found in fish tissue, but was not detected in surface water. Silver was not detected in any sample, nor was it found in surface water at the low reporting limits

employed. Arsenic was found in trace quantities in surface water, but was not analyzed for in fish tissue. All of these metals can be found in chemical forms known to bioaccumulate, but at much lower rates of uptake than mercury.

It would be practical to also analyze the collected samples for other metals, such as copper, selenium, and silver, to be consistent with upstream studies, and arsenic a bioaccumulative constituent of concern in the watershed.

5.0 Study Methods and Analysis

The sampling and analysis plan (SAP) and quality assurance project plan (QAPP) of the SWRCB's Surface Water Ambient Monitoring Program's (SWAMP) on-going statewide survey of contaminants in lake and reservoir sport fish will be followed (Davis et al 2007; Bonnema 2007).

5.1 Study Area

The study will be conducted within: 1) the reservoir habitat of New Bullards Bar Reservoir, 2) the impounded stream waters behind Our House Diversion Dam, and 3) the impounded stream waters behind Log Cabin Diversion Dam.

5.2 General Concepts and Procedures

The following general concepts and practices apply to the study:

- Personal safety is the most important consideration of each fieldwork team.
- Licensee will make a good faith effort to obtain permission to access private property where needed well in advance of entering the property.
- Field crews may make minor variances to the FERC-approved study in the field to accommodate actual field conditions and unforeseen problems. When minor variances are made, Licensee's field crew will follow the protocols in the FERC-approved study.
- When Licensee becomes aware of major variances to the FERC-approved study, Licensee will issue an e-mail to the Relicensing Contact List describing the variance and reason for the variance. Licensee will contact by phone the Forest Service (if the variance is on National Forest System land), USFWS, SWRCB and CDFG to provide an opportunity for input regarding how to address the variance. Licensee will issue an e-mail to the Relicensing Contact List advising them of the resolution of the variance. Licensee will summarize in the final study report all variances and resolutions.
- Licensee's performance of the study does not presume that Licensee is responsible in whole or in part for measures that may arise from the study.
- Global Positioning System (GPS) data will be collected using either a Map Grade Trimble GPS (sub-meter data collection accuracy under ideal conditions), a Recreation Grade Garmin GPS unit (3 meter data collection accuracy under ideal conditions), or similar units. GPS

data will be post-processed and exported from the GPS unit into Geographic Information System (GIS) compatible file format in an appropriate coordinate system using desktop software. The resulting GIS file will then be reviewed by both field staff and Licensee's relicensing GIS analyst. Metadata will be developed for deliverable GIS data sets. Upon request, GIS maps will be provided to agencies in a form, such as ESRI Shapefiles, GeoDatabases, or Coverage with appropriate metadata, that is useful for interactive data analysis and interpretation. Metadata will be Federal Geographic Data Committee (FGDC) compliant.⁴

- Licensee's field crews will record incidental observations of aquatic and wildlife species observed during the performance of this study. All incidental observations will be reported in the appropriate Licensee report (e.g., incidental observations of special-status fish recorded during fieldwork for the Special-Status Turtles – Western Pond Turtle Study will be reported in Licensee's Stream Fish Populations Study report). The purpose of this effort is not to conduct a focus study (i.e., no effort in addition the specific field tasks identified for the specific study) or to make all field crews experts in identifying all species, but only to opportunistically gather data during the performance of the study.
- Field crews will be trained on and provided with materials (e.g., Quat) for decontaminating their boots, waders, and other equipment between study sites. Major concerns are amphibian chytrid fungus, and invasive invertebrates (e.g., zebra mussel, *Dreissena polymorpha*). This is of primary importance when moving: 1) between tributaries and mainstem reaches; 2) between basins (e.g., Middle Yuba River, Yuba River, and North Yuba River); and 3) between isolated wetlands or ponds and river or stream environments.

5.3 Methods

This study will include five steps: 1) sample collection, 2) laboratory analysis, 3) evaluation of measured methylmercury fish tissue concentrations for consistency with the screening-level human health protective thresholds, 4) quality assurance, and 5) report preparation. Each of the steps is described below.

5.3.1 Step 1 – Sample Collection

Field samples will be handled in a manner consistent with the SWRCB Surface Water Ambient Monitoring Program (SWAMP) Bioaccumulation Oversight Group (BOG) Quality Assurance Project Plan (QAPP) (Bonnema 2007). The SWAMP BOG QAPP incorporates the collection methods outlined in the California Environmental Protection Agency's (Cal EPA) *General Protocol for Sport Fish Sampling and Analysis* (Cal EPA 2005) and California Department of Fish and Game's (CDFG) Method #MPSL-102a (CDFG 2005) for handling of fish. Being consistent with the SWAMP BOG QAPP ensures that tissue results would be consistent with SWAMP's ongoing statewide fish tissue sampling campaign (Davis et al 2009; Davis et al. 2010).

⁴ The Forest Service and CDFG each have requested that a copy of the GIS maps be provided to them when the maps are available.

OEHHA requires at least nine individual fish from a species at a water body to advise for that species (OEHHA 2009). Sport fish species of edible size, as defined in Cal EPA (2005), will be targeted for collection (Table 5.3.1-1). Resident salmonid species (*Oncorhynchus nerka* and *O. mykiss*) and smallmouth bass (*Micropterus dolomieu*) will be the target species for New Bullards Bar. Rainbow trout and brown trout (*Salmo trutta*) are the fish of interest in the diversion impoundments.

Table 5.3.1-1. Target fish species, sizes and numbers by location.

Sampling Location ¹	Species	Target Number of Fish for Collection ²	Edible Size ³ (minimum total length)
NORTH YUBA RIVER			
New Bullards Bar Reservoir	Smallmouth bass	9	≥305 millimeters
	Kokanee salmon ⁴	9	≥200 millimeters
	Rainbow trout ⁴	9	≥200 millimeters
OREGON CREEK			
Our House Diversion Dam Impoundment	Rainbow trout	9	≥200 millimeters
	Brown trout	9	≥200 millimeters
MIDDLE YUBA RIVER			
Log Cabin Diversion Dam Impoundment	Rainbow trout	9	≥200 millimeters
	Brown trout	9	≥200 millimeters

¹ Fish will be collected over one or two visits.

² OEHHA (2009)

³ Appendix I of Cal EPA (2005)

⁴ Kokanee salmon (*Oncorhynchus nerka*) and rainbow trout (*O. mykiss*), are the fish species most routinely sought by fishermen in New Bullards Bar. (Brady, pers. comm)

The Marine Pollution Studies Laboratory (MPSL) of the CDFG at Moss Landing will collect the fish from New Bullards Bar for this study. Fish will be collected by electroshocking, fishing line or gill nets over one or two visits. For each fish collected, the following attributes will be recorded: species, total length or fork length in millimeters (mm), as appropriate, and weight in grams (g). Electroshock, gill net and line fishing sites will be recorded using a hand-held GPS unit.

5.3.2 Step 2 – Perform Analysis

Fish tissue samples will be delivered by the MPSL-CDFG to their laboratory in Moss Landing, California, a California-certified analytical laboratory. Analytical methods will be consistent with the SWRCB SWAMP BOG QAPP, which includes the criteria for data quality acceptability, testing (including deviations), calibration, and preventative and corrective measures (Bonnema 2007). Individual samples will be analyzed for total mercury, which is assumed to be comprised primarily of methylmercury.⁵ Tissue will also be analyzed for arsenic, copper, selenium and silver. The methods and reporting limits for mercury and the four additional metals in fish tissue are provided in Table 5.3.2-1.

Table 5.3.2-1. Analytical methods and reporting limits.

Metal	Analytical Method	Reporting Limit (µg/g wet-weight)
Mercury	EPA 7473 ¹	0.03
Arsenic	EPA 200.8	0.30

⁵ Of the total amount of mercury found in fish muscle tissue, methyl mercury comprises more than 95 percent (ATSDR 1999; Bloom 1992).

Table 5.3.2-1. (continued)

Metal	Analytical Method	Reporting Limit (µg/g wet-weight)
Copper	EPA 200.8	0.20
Selenium	EPA 200.8	0.40
Silver	EPA 200.8	0.01

[†] EPA 7473 analyzes for mercury in solids and solutions by thermal decomposition, amalgamation and atomic absorption spectrometry (EPA 1998)
 µg/g = micrograms per gram or parts-per-million

Results will be reported in wet-weight; however percent moisture will be measured and reported.

5.3.3 Step 3 – Consistency with Human Health Protective Thresholds

Methylmercury water quality objectives are expressed as fish tissue concentrations.⁶ Consequently, results of mercury analyses will be compared to California’s threshold level for determining the potential impairment of a body of water based on pollutants in fish tissue (Davis et al. 2009). Measured mercury tissue concentrations will be compared to the OEHHA’s current Advisory Tissue Level (ATL) of 0.070 ppm mercury wet-weight (Klasing and Brodberg 2008). The threshold from Klasing and Brodberg (2008) corresponds to a concentration at which OEHHA would begin to consider advising limiting consumption by children and women of child-bearing age to fewer than eight meals per month. Similarly, OEHHA may recommend no consumption by children and women of child-bearing age when fish tissue methylmercury concentrations are greater than or equal to 0.44 ppm wet-weight. By way of comparison, the ATL for an adult male ingesting one serving of fish per week is 0.44 ppm to 1.3 ppm wet-weight.

As agreed with the SWRCB, YCWA will report the concentrations of arsenic, copper, selenium and silver in fish tissue, but for these metals will not discuss consistency with human health or other criteria/objectives/thresholds.

5.3.4 Step 4 – Quality Assurance

Field and laboratory quality assurance will be ensured by following standard protocols, consistent with the SWRCB SWAMP BOG QAPP (Bonnema 2007).

MPSL-CDFG is a California-certified laboratory. Analytical methods will be consistent with the SWRCB SWAMP BOG QAPP (Bonnema 2007), which includes the criteria for data quality acceptability, testing (including deviations), calibration, and preventative and corrective measures. Laboratory quality assurance documentation will be attached to the report.

5.3.5 Step 5 – Prepare Report

YCWA will prepare a report that includes the following sections: 1) Study Goals and Objectives; 2) Methods; 3) Results; 4) Discussion; and 5) Description of Variances from the FERC-approved

⁶ For example, the Federal ambient water quality criterion for mercury is 0.3 mg/kg (or ppm) methylmercury/fish tissue wet-weight, regardless of a person’s age or meal frequency (USEPA 2001).

study proposal, if any. Fish tissue concentrations greater than the mercury ATL will be highlighted. MPSL-DFG's field data, laboratory report, and quality assurance information will be attached. Mercury arsenic, copper, selenium and silver data will be available in Microsoft Excel format.

6.0 Study-Specific Consultation

This study does not require any study-specific consultation.

7.0 Schedule

YCWA anticipates the schedule to complete the study proposal as follows assuming FERC's Study Plan Determination is deemed final on September 16, 2011 and the study is not disputed by a mandatory conditioning agency:

Collect Data (Step 1).....	October-November 2011
Lab Analysis (Step 2).....	December 2011 – February 2012
Consistency with Thresholds (Steps 3).....	March – April 2012
Quality Assurance (Step 4).....	May – June 2012
Report Writing	July – September 2012

8.0 Consistency of Methodology with Generally Accepted Scientific Practices

The methods discussed above are consistent with the study methods followed in several other relicensings. The methods presented in this study plan also are consistent with those used in recent relicensings in California.

9.0 Level of Effort and Cost

YCWA estimates that the cost to complete this study in 2011 dollars is between \$80,000 and \$100,000.

10.0 References Cited

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