El Dorado Irrigation District

El Dorado Project, FERC No. 184
Monitoring Program
2011 Annual Report

May 30, 2012

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1.0 Introduction

This annual report is being submitted to the Federal Energy Regulatory Commission (Commission) by the El Dorado Irrigation District (District), after review by the Ecological Resources Committee (ERC), the U.S. Forest Service (FS), and the State Water Resources Control Board (SWRCB), in accordance with FS 4(e) Condition 37 of the El Dorado Hydroelectric Project License (Project 184), Condition 14 of the 401 Water Quality Certification, and Section 7 of the El Dorado Relicensing Settlement Agreement (Settlement) Monitoring Program, with respect to the following paragraph:

> The licensee shall file with FERC by June 30 of each year an annual report fully describing the monitoring efforts of the previous calendar year. The FS, ERC, and SWRCB shall have at least 30 days to review the report prior to filing with FERC. The licensee shall provide copies of the annual report to the FS, ERC, and SWRCB.

2.0 ERC Meetings Major Topics (March – September 2011)

The following meeting summaries describe the major topics and objectives discussed at ERC meetings during 2011. Complete meeting notes are available online at www.project184.org.

<u>March 10, 2011 - Annual Meeting</u>

- Convened annual resource agency meeting in conjunction with ERC annual meeting
- Reported the current water year type is below normal (113%) per the March 1 Bulletin 120
- Reviewed the 2011 Annual Review of Ecological Conditions and Operation and Maintenance Plan
- Reviewed 2010 monitoring activities
    - Caples Creek Geomorphology Sensitive Site Monitoring
    - Water Temperature
    - Water Quality
    - Wildlife Mortality Report
    - Lake Aloha Trout Removal and MYLF surveys
- 2011 license implementation overview
    - Status of plans in approval process
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        - Geomorphology Continuing Evaluation of Representative Channel Areas

    - Water Temperature
- Described District's intent to provide a proposal to discontinue use of the 800 number that provides real-time streamflow and lake-level information due to lack of use
- ENTRIX presented the results of the Caples Creek component of the Geomorphology Sensitive Site Monitoring Plan
    - DFG requested additional information regarding shear stress by particle size for Caples Meadow and Jake Schneider Meadow

April 14, 2011

- Reported the water year type is above normal (122%) per the April 1 Bulletin 120
- ENTRIX presented Caples Creek pulse flow recommendations based on monitoring conducted for the Caples Creek component of the Geomorphology Sensitive Site Monitoring Plan
- Distributed Caples Creek Geomorphology Sensitive Site Monitoring Report for review
- Reviewed and distributed shear stress by particle size data for Caples Meadow and Jake Schneider Meadow as requested by DFG at March ERC meeting

September 8, 2011

- Reported that Caples Lake pulse flow releases (345 cfs) began on Tuesday, June 20
- Reported on the June 28-29, 2011 rain-on-snow event which required the District to make releases greater than 60 cfs from the Caples Dam auxiliary spillway
    - Spillway releases reached a maximum of approximately 230 cfs on June 29, 2011 as necessary dam safety measures
    - Spillway releases were completed on June 30, 2011
    - June end of month lake level target for Caples Lake was not achieved due to the large snowpack and the June 28, 2011, rain-on-snow storm event
- Provided an overview of the of the District's plan to conduct fall maintenance repairs at Silver Lake Dam and the need to modify normal fall reservoir operations to facilitate the repairs
- Presented information regarding the process for implementing pulse flow recommendations for Caples Creek as described in the Caples Creek Channel Geomorphology Monitoring Report
- Presented an overview and rationale of the proposed one-year extension requests for the Caples Feasibility Study and Caples Spillway Channel Stabilization Plan.
- Described the proposed changes to the Preferred Canal Drainage Structure and Release Point Plan Update, which was distributed to the ERC via email on August 17, 2011
    - Improvements to spillways 11 and 47C
- Provided an update on the fish stocking conducted in 2011 under the Fish Enhancement Fund and the Caples Lake Fishery Management Plan
    - Convened a conference call with Fish Enhancement Fund Committee on May 18, 2011 to review the annual stocking plan
    - Participants recommended stocking in 2011 following the size classes and ratios identified in the current Fish Enhancement Fund plan

3.0 Monitoring Program Components

Section 7 (Monitoring Program) of Appendix A to the Settlement, the 401 Certification, and FS 4(e) conditions require individual study plans for monitoring of the following subjects:

- Fish Populations
- Macroinvertebrates
- Amphibians (Habitat Evaluation & Determination of Species Presence/Distribution)
- Riparian Vegetation Species Composition
- Riparian Vegetation Recruitment
- Geomorphology (Sensitive Site Investigation & Mitigation Plan Development)
- Geomorphology (Continuing Evaluation of Representative Channel Areas)
- Water Temperature
- General Water Quality
- Trout Monitoring at Lake Aloha
- South Fork American River Flow Fluctuations Monitoring
- El Dorado Canal Monitoring for Wildlife
- Heritage Resource Monitoring
- Recreation Survey
- Review of Recreation Developments
- Target Lake Levels Evaluation

The monitoring activities conducted in 2011 pursuant to these plans are described below. A summary of the findings is also provided in this report and the complete monitoring reports are included in Appendix A and posted on the Project 184 website.

3.1 Fish Populations

Overview:

Fish population monitoring was conducted in 2011 pursuant to the approved Project 184 Rainbow Trout Monitoring Plan and the Hardhead Monitoring Plan

Rainbow Trout Monitoring

Post-license monitoring for rainbow trout is required for two consecutive years at the beginning of each five-year period (including 2011 and 2012)

The mean rainbow trout biomass for 2011 and 2012 monitoring efforts will be used to evaluate if targeted rainbow trout biomass indices are being met in the project reaches

Electrofishing surveys (multiple-pass depletion technique) for rainbow trout were conducted at six locations in 2011:

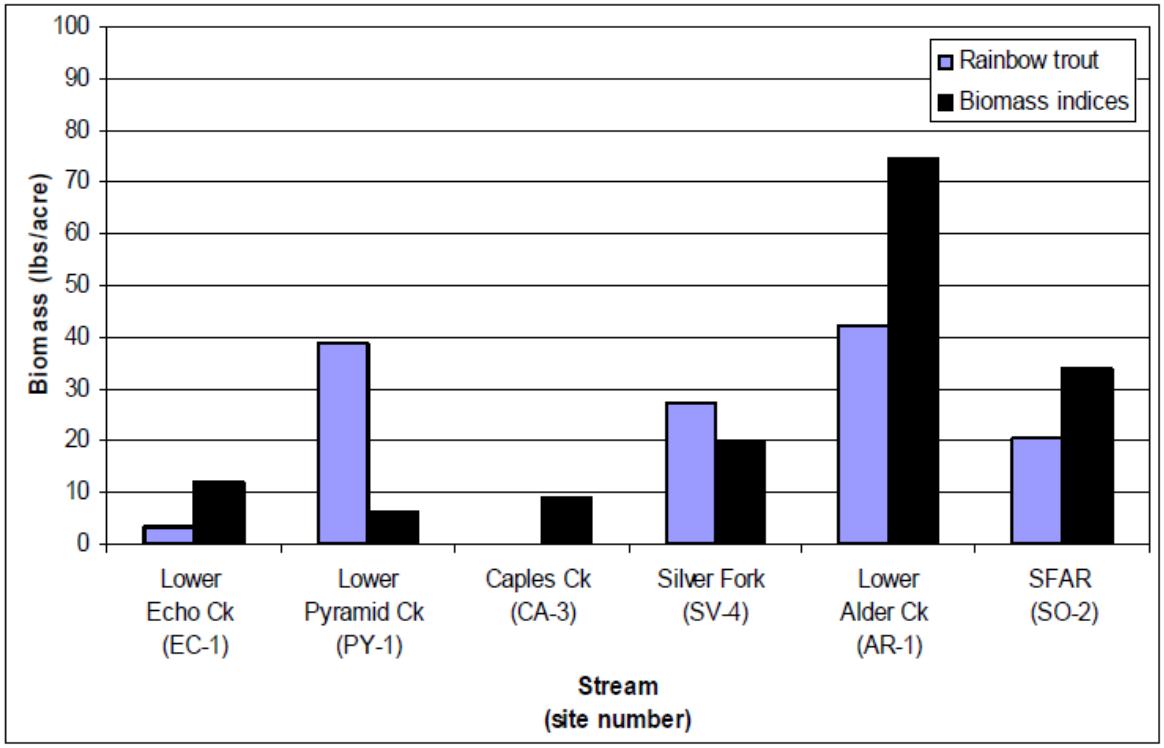
- South Fork American River (SFAR) below Carpenter Creek (SO-2)
- Lower Alder Creek (AR-1)

- Lower Pyramid Creek (PY-1)
- Lower Echo Creek (EC-1)
- Silver Fork American River at Forgotten Flat (SV-4)
- Caples Creek below Kirkwood Creek (CA-3)

Surveys were conducted on September 13 and 14, 2011 at Silver Fork American River and the South Fork American River to facilitate data collection prior to annual releases from Silver Lake; surveys were conducted at the remaining sites from October 11 – 13, 2011

Findings:

The estimated rainbow trout biomass for the six study sites sampled in 2011 and the biomass indices established from 1998-2001 surveys are summarized in the figure below:



Estimated rainbow trout biomass and biomass indices for the six study sites, Fall 2011

Rainbow trout biomass estimates exceeded resource objective index values at:

- Pyramid Creek (2011 = 38.8 lbs/acre; index = 6.5 lbs/acre)
- Silver Fork American River (2011 = 27.4 lbs/acre; index = 19.7 lbs/acre)

Rainbow trout biomass estimates were under resource objective index values at:

- SFAR (2011 = 20.6 lbs/acre; index = 33.9 lbs/acre)

- Alder Creek (2011 = 42.2 lbs/acre; 74.7 lbs/acre)
- Echo Creek (2011 = 3.5 lbs/acre; index = 11.8 lbs/acre)
- Caples Creek (2011 = 0 lbs/acre; 9.1 lbs/acre)

Reporting:

- The District notified the FS, ERC, and SWRCB of the availability of the 2011 Rainbow Trout Monitoring Report on the Project 184 website via email on February 29, 2012
- The District reviewed the results of the 2011 rainbow trout monitoring effort at the March 8, 2012 ERC Meeting
- The complete report for this monitoring effort is included in Appendix A and posted on the Project 184 website

The next rainbow trout monitoring effort is scheduled to occur in 2012

Hardhead Monitoring

Hardhead surveys conducted in 2004 and 2005 provide baseline biomass estimates for comparison to post-license biomass estimates

At least 3 years of post-license surveys for hardhead are required; thereafter, monitoring may continue at 5-year intervals, if determined necessary

Post-license surveys were conducted in 2007 and 2011

The hardhead study area is located on the SFAR in the vicinity of Akin Powerhouse, and extending upstream for approximately 2.5 kilometers

Hardhead surveys were conducted on October 19 and 20, 2011 at the following locations:

- Electrofishing (multiple-pass depletion technique) in South Fork American River immediately downstream of Akin Powerhouse
- Snorkel surveys (two-pass quantitative technique) in eight pools located upstream of the powerhouse

In 2011, fall storm events resulted in higher streamflows than experienced during previous surveys as summarized in the table below:

Stream discharge measurements for 2004, 2005, 2007, and 2011 monitoring events

Date	Flow (cfs) at electrofishing site	Flow (cfs) at SFAR gage downstream of Kyburz
October 13 - 14, 2004	77	48
October 18 - 19, 2005	N/A	52
October 18 - 19, 2007	N/A	42
October 19 – 20, 2011	168	121

High flows in 2011 created deep water (non-wadeable) areas with high velocities within the electrofishing reach, especially at the downstream end of the established 120-meter site

- Conditions precluded setting the lower block net in the same position as previous surveys
- The downstream end of the reach was relocated approximately 20-meter upstream to a location where the block net could be safely set

Findings:

No hardhead were observed during the electrofishing or snorkel surveys

The results of the electrofishing site are summarized in the tables below:

Catch data for fish collected within the electrofishing site, October 2011

Species	Pass 1	Pass 2	Pass 3	Total	Population Estimate	Standard Error
Rainbow trout	3	7	2	12	19	13.5
Sacramento sucker	10	4	2	16	16	1.1
Sacramento pikeminnow	3	9	3	15	41	70.0
Riffle sculpin	11	10	2	23	25	3.0
Totals	27	30	9	66	88	15.3

Summary of length and weight data for fish captured within the electrofishing site, October 2011

Species	Length Range (mm)	Mean Length (mm)	Mean Weight (g)	Mean Condition Factor	Estimated Biomass (g)	Biomass/Area (g/acre)
Rainbow trout	58 - 212	124.9	38.2	1.1	*	*
Sacramento sucker	21 - 175	49.2	5.1	1.0	*	*
Sacramento pikeminnow	25 - 141	40.7	2.3	0.6	*	*
Riffle sculpin	39 - 127	75.6	7.5	1.1	*	*
* Biomass estimates not available due to low numbers of fish.						

Schools of juvenile minnows were observed in some of the pools during snorkel surveys

- No hardhead positively identified
- Juvenile Sacramento pikeminnow and hardhead are extremely difficult to visually differentiate underwater

Rainbow trout, Sacramento suckers, speckled dace, riffle sculpin, Sacramento pikeminnow, and brown trout were also observed during snorkel surveys

Low numbers of juvenile and adult individuals of each species captured during the electrofishing surveys did not allow for calculation of a length-weight regression or biomass estimates from the snorkel survey data

Reporting:

- The District distributed the raw data collected during this monitoring effort to the FS, ERC, and SWRCB via email on January 31, 2012
- The District notified the FS, ERC, and SWRCB of the availability of the 2011 Hardhead Monitoring Report on the Project 184 website via email on February 23, 2012
- The District reviewed the results of the 2011 hardhead monitoring effort at the March 8, 2012 ERC Meeting
- The complete report for this monitoring effort is included in Appendix A and posted on the Project 184 website
- The electronic spreadsheet with the raw data for this monitoring effort will be E-filed with this report and is posted on the Project 184 website

The next monitoring event will be determined in consultation with the FS, SWRCB, and ERC

3.2 Macroinvertebrates (BMI)

Post-license monitoring for BMI is required for two consecutive years at the beginning of each five-year period (including 2011 and 2012)

Monitoring efforts conducted during the Project 184 relicensing process between 1999 and 2001establish the ecological resource objective for BMI

- BMI indices (metrics) in Project-affected reaches should be similar to those in reference reaches located within and outside of the SFAR and Upper Truckee River drainages
- The upstream sample site locations on the feeder tributaries to the El Dorado Canal will serve as the reference sites for those locations

The next SWAMP monitoring effort is scheduled for fall 2012; the combined results of both the 2011 and 2012 survey efforts will be used to evaluate benthic data from Project-affected and reference reaches in the context of the ecological resource objective

Bioassessment surveys conducted between 1999 and 2011 followed the California Stream Bioassessment Procedure (CSBP)

2011 surveys followed the State's Surface Water Ambient Monitoring Program (SWAMP) Standard Operating Procedures for Collecting Benthic Macroinvertebrate Samples and Associated Physical and Chemical Data for Ambient Bioassessments in California which officially replaced the CSBP as the statewide standard for ambient bioassessment in 2007

BMI monitoring was conducted at a total of 18 sites in 2011:

- Echo Creek (Site EC-B1)
- Pyramid Creek (Site PY-B1)
- Caples Creek (Site CA-B1)
- Silver Fork American River (Site SV-B2)
- South Fork American River (Site SO-B1)
- No Name Creek (Sites NN-B1 and NN-B2)
- Alder Creek (Sites AR-B1 and AR-B2)
- Bull Creek (Sites BU-B1 and BU-B2)
- Ogilby Creek (Sites OG-B1 and OB-B2)
- Esmeralda Creek (Sites ES-B1 and ES-B2)
- Strawberry Creek (Site SB-B1)
- Sherman Canyon Creek (Site SH-B1)
- Woods Creek (Site WC-B1)

Field sampling was performed between September 29 and November 15, 2011

Findings:

Overall, samples collected from Project-affected reaches scored slightly lower on average in terms of certain richness, composition, tolerance, and functional feeding group measures than those collected from reference reaches during 2011 SWAMP surveys

In general, scores for the multimetric Hydropower-IBI averaged 16 percent higher overall in references reaches than Project-affected reaches

An estimated 85,000 benthic macroinvertebrates were collected from the 18 sites in the Project 184 area in both Targeted Riffle Composite (TRC) and Reach Wide Benthos (RWB) samples

- 14,530 specimens were identified
- 217 different taxa from more than 67 families and 15 taxonomic orders

- Average number of taxa per sample was 44
- Most common taxa included
  - Caddisflies of the genera *Micrasema* and *Lepidostoma*
  - Nemourid stonefly *Zapada cinctipes*
  - Clinger mayflies of the genera *Cinygmula*, *Ironodes*, and *Epeorus*
  - Stoneflies of the genus *Sweltsa*
  - Aquatic earthworms of the class Oligochaeta
  - Mayflies of the genus *Ephemerella*
  - Netspinning caddisflies of the genus *Hydropsyche*
  - Ubiquitous mayfly *Baetis tricaudatus*

On average, collectors were the dominant functional feeding group (30%), followed by scrapers (22%), shredders (19%), predators (18%), filterers (5%), macrophyte herbivores (4%), omnivores (2%), and piercer herbivores (<1%)

BMI density

- Averaged 363 individuals/ft^2 for all samples
- Density lowest in sample from Woods Creek above Caples Lake (Site WC-B1)
  - 39 individuals/ft^2
- Density highest in sample from lower Alder Creek below the diversion (Site AR-B1)
  - 1,245 individuals/ft^2
- Mean BMI density was generally lower in reference reaches than Project-affected reaches (256 vs. 437 individuals/ft^2)

BMI richness

- Richness of individual samples ranged from 68 taxa collected from upper Ogilby Creek (Site OG-B2), to 31 taxa collected from Caples Creek below Caples Lake (Site CA-B1)
- Total taxa richness averaged 25% higher in reference reaches versus Project-affected reaches (55 vs. 44, respectively)

BMI diversity

- Diversity of individual samples ranged from 3.67 from upper Ogilby Creek (Site OG-B2), to 2.00 from lower Alder Creek below the diversion (Site AR-B1)
- Shannon Diversity averaged 9% higher at reference sites versus Project-affected sites (3.01 vs. 2.90, respectively)

BMI composition

- Averages values for most composition measures were very similar for reference and Project-affected reaches

- Overall percentage of insects was high for all samples (74% to 90%)
    - Mayflies (Order Ephemeroptera), beetles (Order Coleoptera), and true flies (Order Diptera) were more abundant on average in samples from reference reaches
    - Caddisflies (Order Trichoptera) and stoneflies (Order Plecoptera) were more abundant in samples from Project-affected reaches
- Non-insect taxa were much less abundant overall than insects
    - Aquatic earthworms (Class Oligochaeta) and clams (Order Bivalvia) were more abundant on average in samples from reference reaches
    - Freshwater mites (Class Acari) and snails (Class Gastropoda) were more abundant in samples from Project-affected reaches
    - Reference reaches had a slightly higher percentage of non-insect taxa on average than Project-affected reaches (12% vs. 7%, respectively)
- Average weighted tolerance values were relatively low (*i.e.*, good) for both reference and Project-affected reaches
    - Average percent composition of tolerant organisms was very low for all samples (<1% to 5%)
    - Average percent composition of intolerant organisms was typically high (31% to 76%)

Reporting:

- The District notified the FS, ERC, and SWRCB of the availability of the 2011 BMI Monitoring Report on the Project 184 website via email on February 23, 2012
- The District reviewed the results of the 2011 BMI monitoring effort at the March 8, 2012 ERC Meeting
- The complete report for this monitoring effort is included in Appendix A and posted on the Project 184 website

The next BMI monitoring effort is scheduled to occur in 2012

3.3 Amphibians (Habitat Evaluation & Determination of Species Presence/Distribution)

Amphibian monitoring was conducted in 2011 pursuant to the approved Project 184 FYLF Monitoring Plan and the MYLF Monitoring Plan

3.3.1 Foothill Yellow-legged Frog (FYLF)

Post-license monitoring for FYLF in the SFAR is required at 5-year intervals

Surveys are also required June through September at any time the South Fork American River (SFAR) flow is 100 cfs or less and the reach between Kyburz Diversion Dam and Silver Creek changes 50 cfs or more in 1 day

- No flow fluctuations occurred in 2011

Four rounds of visual encounter surveys (VES; two egg mass surveys, one tadpole survey, and one metamorph survey) were conducted at nine sites along the SFAR in 2011:

- Site 105R – SFAR at Akin Powerhouse
- Site 106R – SFAR upstream of Akin Powerhouse
- Site 110R – SFAR downstream of Silver Creek
- Site 120R – SFAR upstream of Silver Creek
- Site 124R – SFAR at confluence with Soldier Creek
- Site 207R – SFAR at Ogilby Creek
- Site 213R – SFAR upstream of Ogilby Creek
- Site 220R – SFAR at Maple Grove
- Site 246R – SFAR at Alder

In addition, three tributaries were also surveyed at least once:

- Site 115T – Silver Creek
- Site 210DT – Ogilby Creek
- Site 125T – Soldier Creek

The timing of surveys is determined by a combination of river flow levels and water temperature

- Initial egg mass surveys conducted when SFAR water temperature measured at the powerhouse has reached 12°C and river flows are less than 150 cfs
- Water temperatures reached 12°C by early July; however, SFAR unimpaired flows were greater than 150 cfs until early August due to the wet hydrological conditions experienced in 2011

VES surveys were conducted between August 4 and October 4, 2011, following a reconnaissance survey at easy-to-access sites (105b, 105c, 105d, 213R, 220a, 220b, 220c, and 246R) on July 27, 2011, to evaluate if sites could be safely accessed and surveyed

Findings:

Locations of FYLF observed in 2011 at established monitoring sites and incidentally between sites are described below:

Four egg masses were observed in 2011 at Site 213R - SFAR upstream of Ogilby Creek

Twenty-one tadpoles in three groups were observed in 2011 at Site 213R

- Fifteen tadpoles were observed on August 4
- Five observed on August 18
- One tadpole was observed on September 14

Young-of-the-year frogs were not observed during surveys conducted in 2011

A single juvenile frog was observed 15 meters upstream of the bottom of Site 120a – SFAR upstream of Silver Creek in 2011

Two adult frogs (one male, one undetermined) were observed at Site 125T on August 4, 2011

In 2011, three incidental FYLF observations were made including one captured upstream of Site 106c, one adult at the confluence with Silver Creek, and another adult observed upstream of the top of Site 213R

The results of five-years (2002, 2004, 2005, 2007 and 2011) of amphibian surveys are summarized in the table below:

Summary of Visual Encounter Survey Results Conducted in 2002, 2004, 2005, 2007, and 2011

Survey Year	FYLF Life Stage				
	Egg Masses	Tadpoles (groups)	Young-of-the-year (YOY)	Juveniles	Adults
2002	0	118 (5)	12	14	24
2004	24	1822 (61)	151	6	38
2005	12	695 (19)	15	1	12
2007	5	1015 (42)	108	11	9
2011	4	21 (3)	0	1	2
Total	45	3671 (130)	286	33	85

Surveys conducted in 2011 and 2007 followed the same survey methodologies and included the same survey sites. As such, comparison of these two years provides a relative assessment of the status of the population from 2007 to 2011.

Observations of various FYLF life stages were greater in 2007 compared to 2011

- Decreased detections in 2011 compared to 2007 likely reflect the different water year types
    - In 2007, a critically dry water year, conditions for breeding were ideal with low, stable base flows throughout the breeding season
    - In 2011, a wet water year, had conditions less suitable for successful breeding because unimpaired flows remained elevated during May, June and July during the period when breeding had occurred during prior years

Reporting:

- The District notified the FS, ERC, and SWRCB of the availability of the 2011 FYLF Monitoring Report on the Project 184 website via email on February 23, 2012
- The District reviewed the results of the 2011 FYLF monitoring effort at the March 8, 2012 ERC Meeting
- The complete report for this monitoring effort is included in Appendix A and posted on the Project 184 website

The next FYLF monitoring effort is scheduled to occur in 2016

3.3.2 Mountain Yellow-legged Frog (MYLF)

Post-license monitoring for MYLF is required at 5-year intervals

MYLF monitoring was conducted in 2011 at the sites identified in the MYLF monitoring plan:

MYLF site descriptions

Mountain Yellow-legged Frog Sampling Summary					
	2002	Settlement Agreement	2004	Future	Refined Site Description
Echo Lake – Camp Harvey and assoc. ponds (440 T/L)	Y	Y	Y	Y	Up to 0.5 mile from confluence depending on suitable habitat
Silver Lake (750LP)	Y	Y	Y	Y	Southern and eastern shorelines
Camp Silverado (753IT)	Y	Y	Y	Y	Up to 0.5 mile from confluence depending on suitable habitat
Unnamed Silver Lake Tributary (752IT)				Y	Up to 0.5 mile from confluence depending on suitable habitat
Caples Lake (895LP)	Y	Y	Y	Y	Southern shoreline
Lake Aloha and assoc. downstream ponds (550LP)	Y	Y	Y	Y	Southern shoreline; add tributary along western shoreline; coordinate ponds with CDFG
Upper Echo Lake (455LP)	Y		Y	Y	Vicinity of Camp Harvey Tributary
Emigrant Creek (897IT)	Y			Y	Up to 1.0 mile from confluence depending on suitable habitat

Source: MYLF Monitoring Plan and August 23, 2005 ERC meeting notes available online at http://www.project184.org/doc_lib/documents/2006/ERC/ERC_Minutes20050823.pdf

MYLF VES were conducted in late August and early September 2011

MYLF surveys in the ponds downstream of the auxiliary dams at Lake Aloha are required following a spill event

- Lake Aloha spilled on two occasions during the 2011 spring runoff period
  - July 6 to July 12
  - July 31 to August 8

Findings:

Results of the 2011 MYLF surveys indicate that the numbers of MYLF observed at these sites in 2011 were generally similar to that observed in 2004 during the initial survey efforts

- 2011 observations indicate that the MYLF population at all sites are fairly robust and population numbers appear to be relatively stable
- A comparison of the 2011 VES results with previous survey results are provided in the table below:

Comparison of MYLF VES Results for 2011 Relative to Previous Survey Efforts

Survey Year	Survey Sites	MYLF Present	MYLF Breeding Observed	# Adults	# Subadults	# Juv.	# Larvae	# Egg Masses
2004								
	440 IT/L, Subsite C	Yes	Yes	-	-	2	-	-
	753 IT	Yes	Yes	6	-	1	-	-
	550 LP	Yes	Yes	40	>60	>25	100s	-
	24 Ponds Downstream of Lake Aloha	-	-	-	-	-	-	-
2007								
	24 Ponds Downstream of Lake Aloha	Yes	Yes	19	31	-	4	-
2010								
	24 Ponds Downstream of Lake Aloha	Yes	Yes	19	29	-	35	-
2011								
	440 IT/L, Subsite C	Yes	Yes	-	-	-	1	-
	Site 752 IT	Yes	Yes	1	-	-	-	-
	550 LP	Yes	Yes	130	73	18	402	-
	24 Ponds Downstream of Lake Aloha	Yes	Yes	13	19	12	34	-

Lake Aloha spilled during spring runoff between July 6 and 12, 2011, and again from July 31 – August 8, 2011

- MYLF surveys were conducted in conjunction with trout removal efforts from August 29 – 31, 2011
- MYLF were observed in 19 of the 24 ponds downstream of Lake Aloha
    - MYLF were observed in 19 ponds in 2010 and 16 ponds in 2007
- Increased numbers of frogs observed in 2010 and 2011 relative to 2007 may be associated with the later survey period
    - Surveys conducted in August 2011 and August 2010 relative to July 2007
    - May also reflect improved breeding conditions and/or recruitment during 2010 and 2009 compared to 2006
- In 2011, MYLF were observed in Pond A (where 1 brook trout was captured in 2011 and 2 were captured in 2004), Pond I (where 4 brook trout were captured in 2010), and Pond J (where 4 brook trout were captured in 2011, 12 were collected in 2010, and 2 were captured in 2007)
- Results of the trout removal effort are discussed later in this report

Reporting:

- The District notified the FS, ERC, and SWRCB of the availability of the 2011 MYLF Monitoring Report on the Project 184 website via email on February 23, 2012

- The District reviewed the results of the 2011 MYLF monitoring effort at the March 8, 2012 ERC Meeting

- The complete report for this monitoring effort is included in Appendix A and posted on the Project 184 website

The next MYLF monitoring effort is scheduled to occur in 2016 or following a spill event at Lake Aloha

3.4 Riparian Vegetation Species Composition

Overview:

Post-license riparian species composition monitoring is required at 5-year intervals

Monitoring is intended to assess whether:

- Herbaceous riparian meadow communities along regulated and unregulated streams in the project region differed in their vegetation lifeform composition
- Noticeable differences in composition have taken place over time with streamflow regulation

Regulated streamflow reaches (n=7 transects)

- Caples Creek downstream from Caples Lake
- SFAR downstream from the Echo Lake conduit at Audrain Meadow
- SFAR in the vicinity of Phillips

Unregulated streamflow reaches (n=7 transects)

- Foster Meadow
- Bryan Meadow
- Benwood Meadow
- Round Meadow
- Kirkwood Meadow

In 2011, all sites were re-sampled except for the SFAR at Phillips, because it is located on private property and access was denied

- SFAR at Phillips transect moved to the SFAR at Audrain site

Riparian vegetation species composition monitoring was conducted in August and September 2011

Findings:

Riparian vegetation composition monitoring results indicate that both regulated and unregulated stream sites have robust and diverse herbaceous riparian communities with no obvious ecological conversion to upland conditions

- Species composition did not statistically differ between regulated and unregulated streamflow sites
- Among sites, vegetation differed in the relative composition by lifeforms, but these differences were not statistically significant
    - Differences in cover or frequencies of vegetation lifeform categories between regulated and unregulated sites were generally biologically insignificant (means differed little between site types) and/or statistically insignificant when analyzing transect-level data
- Absolute and relative cover values did not significantly differ between regulated and non-regulated streams for any vegetation or cover category
- Vegetation frequency data indicate cover by sedges/rushes and forbs was significantly greater on unregulated streams than on regulated streams
    - Differences noted in forb cover (greater at regulated sites in 2000 and trending towards greater at unregulated sites in 2011) are ecologically inconclusive, since forbs as a group are not a reliable hydrological indicator

- More statistical differences were found in 2000 than in 2011 indicating that differences between regulated and unregulated sites for most measured variables have, if anything, lessened over time

Reporting:

- The District distributed the 2011 Riparian Vegetation Species Composition Monitoring Report to the FS, ERC, and SWRCB via email on February 23, 2012
- The District reviewed the 2011 Riparian Vegetation Species Composition Monitoring Report at the March 8, 2012 ERC Meeting
- The complete report for this monitoring effort is included in Appendix A and posted on the Project 184 website

The next riparian vegetation species composition monitoring effort is scheduled to occur in 2016

3.5 Riparian Vegetation Recruitment

Overview:

Post-license riparian recruitment monitoring is required at 5-year intervals

Riparian vegetation recruitment monitoring was conducted on Caples Creek (regulated) and Kirkwood Creek (unregulated) as part of the relicensing of Project 184

Monitoring elements

- Qualitative recruitment observations
- 23 photomonitoring sites

2011 monitoring activities

- Qualitative recruitment observations
    - Presence or absence of any form of plant regeneration on fluvial deposits
    - Flowering and fruiting of willows
    - Herbivory
    - Notable land-use impacts
- Revisit photomonitoring sites on two occasions
    - Mid-summer (August 8-10)
    - Summer (September 19-21)
- All of the established monitoring locations were relocated in 2011 based on previous monitoring photographs

Findings:

More flowering and fruiting of willows (both S. lemmonii and S. lucida) was observed this year than in previous monitoring years

- First monitoring visit appears to have occurred after the peak period of willow flowering/fruiting (the female flowers observed were already in fruit)
- Willow flowering/fruiting was limited and not widespread at either site during this monitoring visit

No willow seedlings (i.e., willows having germinated from seed this year) were observed at any site

Observations made during these monitoring studies indicate that willow recruitment at these sites may be more frequently via root layering from terraces or by rooting of cuttings that wash downstream

Several young willow sprouts observed on fluvial deposits this year were from rooted plant fragments that had likely washed downstream and deposited during high flows

- These recently rooted cuttings were only apparent as such when they were pulled from the ground and their root structure exposed
- Some of these fragments were cleanly cut, suggesting they resulted from beaver activity, but others appeared to be branches broken by flooding or other disturbance
- Other young willow sprouts were observed at many sites that could have established either by layering, rooted fragments, or from seed.

Photographs taken at each site during each monitoring period are presented in four appendices to the report

- Appendix A presents photographs taken by Harris and Lindquist in 2000
- Appendix B presents photos taken by EIP Associates in 2002
- Appendices C and D present photographs taken by AECOM in August and September of 2011, respectively

Reporting:

- The District distributed the 2011 Riparian Vegetation Species Composition Monitoring Report to the FS, ERC, and SWRCB via email on February 23, 2012
- The District reviewed the 2011 Riparian Vegetation Species Composition Monitoring Report at the March 8, 2012 ERC Meeting
- The complete report for this monitoring effort is included in Appendix A and posted on the Project 184 website

The next riparian vegetation recruitment monitoring effort is scheduled to occur in 2016

3.6 Geomorphology (Sensitive Site Investigation & Mitigation Plan Development)

Monitoring at Caples Creek, the final component of the Geomorphology Sensitive Site Monitoring Plan, was completed in August 2010

- The results of the monitoring effort were reviewed at the March 10, 2011, ERC meeting
- The Caples Creek Channel Geomorphology Monitoring Report, which included recommendations to revise the pulse flows currently required by the Project 184 license, was reviewed and distributed on April 14, 2011
- Comments were requested by June 16, 2011
    - One ERC member requested additional information be provided
        - HEC-RAS files for Caples Meadow and Jake Schneider Meadow
        - Shear stress by particle size for Caples Meadow and Jake Schneider Meadow
        - The District provided this information via email on April 28, 2011
    - One comment received during the April 14, 2011, ERC meeting pointed out two incorrect dates in the report that required correction
        - The District made the appropriate corrections to the report
    - One ERC member provided comments via email on June 18, 2011, which focused on implementing of the recommendations provided in the Report
        - The District provided a response to these comments via email on June 20, 2011
    - No other comments that would require revisions to the Report have been received

The final report was submitted to FERC on July 5, 2011(EID, 2011a)

FERC issued an order on November 30, 2011 stating the filing adequately fulfills the requirement to file a report of the fluvial geomorphic properties of Caples Creek

The Geomorphology Sensitive Site Investigation & Mitigation Plan Development condition required by the Project 184 license is completed

The District continues to seek approval from the FS and SWRCB to implement the pulse flow recommendations provided in the report

3.7 Geomorphology (Continuing Evaluation of Representative Channel Areas)

Post-license monitoring for geomorphology is required at 5-year intervals

Monitoring of permanent cross-sections, longitudinal profiles, and bed and bank properties is required at the following sites:

- Caples Creek Spillway Channel
- Caples Creek at Caples Meadow

- Caples Creek at Girl Scout Access
- Caples Creek at Jake Schneider Meadow
- Oyster Creek below Highway 88
- South Fork American River at Sand Flat
- Silver Fork American River at Forgotten Flat
- Lower Echo Creek

Snow and icing conditions in October and November curtailed the 2011 field efforts and prevented completion of all data collection

- Continued data collection is planned for 2012
- Remaining data collection includes the following
  - Oyster Creek below Highway 88 – longitudinal profile survey
  - Lower Echo Creek – longitudinal profile survey and GPS survey of headpins
  - South Fork American River at Sand Flat –cross-section survey completion, longitudinal profile survey, pebble counts, GPS survey of headpins, and bank stability assessment
  - Silver Fork American River at Forgotten Flat – cross-section survey completion, longitudinal profile survey, pebble counts, GPS survey of headpins, and bank stability assessment
  - Caples Spillway Channel – longitudinal profile survey, pebble counts, GPS survey of headpins, and bank stability assessment.
- A report addendum that presents the 2012 data and analyses will be prepared

Findings:

Caples Creek at Caples Meadow

Channel cross-sections

- Three cross-sections surveyed in 2007 were re-occupied
- All cross-sections show some net aggradation,
  - XS-2 shows most change due primarily to the growth of the left bank bar
- All cross-sections show a similar degree of absolute percent change
  - Indicates a similar amount of bed elevation variability (i.e., localized scour and deposition) at each cross-section
- Summary of cross-section change metrics for Caples Creek at Caples Meadow is provided in the table below:

Channel cross-section change metric	XS-1 (Upper)	XS-2 (Middle)	XS-3 (Lower)
Net % change in channel area	3%	27%	12%
Absolute % change in channel area	26%	29%	26%

Longitudinal profile

- Comparison of the 2007 and 2011 profiles shows a slight increase in reach-average slope (from 0.0027 to 0.0032)
- Noticeable increases in bed elevation just upstream of XS-2 (likely associated with localized bar deposition)
- Decrease in bed elevation upstream and downstream of XS-3, associated with apparent localized pool scour

Bed particle size distributions

- Bed is predominantly finer than very coarse gravel (< 32 mm) with the median particle size at all cross-sections being medium to coarse gravel (between 11 and 18 mm)
- Comparison of 2011 data with 2007 data at XS-1 shows very little to essentially no change in the bed sediment size over the past 5 years

Bank erosion potential

- Banks at the upper and middle cross-sections (XS-1 and XS-2) are currently relatively stable with very low erosion potential
- Banks at the lower cross-section (XS-3) has a relatively high erosion potential
    - Flow is concentrated on the right bank during high flow events
    - Results in an actively eroding cut bank

General geomorphic assessment

- The Caples Creek at Caples Meadow study site appears to be currently stable to moderately aggradational overall, with areas of local scour

Caples Creek at Girl Scout Access

Channel cross-sections

- Three cross-sections surveyed in 2007 were re-occupied
- Channel bed at XS-3 shows moderate channel incision (i.e., negative net percent change in channel area) over the past 5 years and a moderate amount of absolute percent change
    - Entire bed essentially incised in a uniform fashion across the width of the cross-section
- Cross-sections XS-B and XS-C both show a similar degree of very low net percent change (i.e., very little bed elevation change) and low absolute percent change (i.e., modest bed elevation variability).
- Summary of cross-section change metrics for Caples Creek at Girl Scout Access is provided in the table below:

Channel cross-section change metric	XS-3 (Upper)	XS-B (Middle)	XS-C (Lower)
Net % change in channel area	-20%	1.5%	4.2%
Absolute % change in channel area	21%	11%	11%

Longitudinal profile

- Reach-average slope is 0.0016
- an assessment of longitudinal profile change over the past 5 years was not conducted because2007 longitudinal profile data was not available for this site

Bed particle size distributions

- Bed is predominantly finer than very coarse gravel (< 32 mm) with the median particle size at all cross-sections being medium gravel (< 16 mm)
- 2007 bed particle size data available at one cross-section (XS-3)
    - Comparison of 2011 data with 2007 data
    - XS-3 shows a noticeable fining of the bed sediment size over the past 5 years
        - XS-3 is within a pool where finer sediment deposits between high flow events

Bank erosion potential

- All banks have the essentially the same degree of moderate bank erosion potential

General geomorphic assessment

- The Caples Creek at Girl Scout Access study site appears to be moderately stable to stable, with some localized erosion at the pool near the upstream end of the reach.

Caples Creek at Jake Schneider Meadow

Channel cross-sections

- Three cross-sections surveyed in 2007 were re-occupied
- All three cross-sections show very little net percent change and a similar low degree of absolute percent change over the past 5 years.
- Summary of cross-section change metrics for Caples Creek at Jake Schneider Meadow is provided in the table below:

Channel cross-section change metric	XS-B (Upper)	XS-C (Middle)	XS-2[1] (Lower)
Net % change in channel area	-0.3%	1.6%	-3.6%
Absolute % change in channel area	6%	6%	7%

Longitudinal profile

- Comparison of the 2007 and 2011 profiles shows a decrease in reach-average slope (from 0.0022 to 0.0014)
- Noticeable decreases in bed elevation at a deep scour pool between XS-B and XS-2

Bed particle size distributions

- Bed particle size data were not collected at cross-sections XS-C or XS-2 in 2007

- 2011 data shows considerable variability among sampled cross-sections, indicating the differences in channel geomorphic features
    - D50 ranges from fine gravel (5 mm) at XS-C (tail end of a run) to very coarse gravel (58 mm) at XS-2 (riffle crest)
    - D84 ranges from medium gravel (16 mm) at XS-C to fine cobble (104 mm) at XS-2
- Comparison of 2011 data with 2007 data at XS-1 shows a noticeable coarsening of the bed sediment size over the past 5 years at XS-B
    - XS-B is located at a riffle that has been flushed of finer sediment during several high flow events over the past few years

Bank erosion potential

- All banks have the essentially the same degree of low bank erosion potential

General geomorphic assessment

- The Caples Creek at Jake Schneider Meadow site appears to be moderately stable to stable, with some coarsening occurring at the riffle near the upstream end of the reach and some scouring at a pool near the downstream end of the reach

Oyster Creek below Highway 88

Channel cross-sections

- Three cross-sections surveyed in 2007 were re-occupied
- All cross-sections show a low degree of net percent change in channel area (with XS-6 showing net incision)
    - Negative net percent change at XS-6 is associated with active erosion along the right bank where the bank has retreated approximately 6 feet
- Absolute percent change in channel area varies from moderate (XS-5) to low (XS-7)
    - Examination of the cross-section plots for XS-5 suggests that there is active left bank erosion and channel aggradation occurring
- Summary of cross-section change metrics for Caples Creek at Girl Scout Access is provided in the table below:

Channel cross-section change metric	XS-7 (Upper)	XS-6 (Middle)	XS-5 (Lower)
Net % change in channel area	1%	-7%	4%
Absolute % change in channel area	4%	14%	20%

Longitudinal profile

- Longitudinal profile survey could not be conducted during the 2011 field effort due to snow and ice conditions
- Survey is planned to occur during a follow-up field effort in 2012

Bed particle size distributions

- Bed particle size data were not collected at cross-sections XS-5 or XS-6 in 2007

- Particle size distribution data is very similar for all cross-sections, showing that the bed is medium gravel (< 32 mm) with the median particle size at all cross-sections being medium gravel (between 10 and 16 mm)

Bank erosion potential

- Bank erosion potential ranges from moderate to high, with the lower two cross-sections having the highest bank erosion potential
- Moderate to high channel sinuosity causes flow acceleration and high shear stresses at channel bends, resulting in steep, exposed banks that have a moderate to high bank erosion potential

General geomorphic assessment

- The Oyster Creek site appears to have a relatively stable channel bed elevation with steep banks and high erosion potential at meander bends.

Lower Echo Creek

Channel cross-sections

- Three cross-sections were established because there are no existing cross-sections or geomorphic study sites on Lower Echo Creek
- Cross-section locations were selected that are representative of average reach-wide conditions

Longitudinal profile

- Longitudinal profile survey could not be conducted during the 2011 field effort due to snow and ice conditions
- Survey is planned to occur during a follow-up field effort in 2012

Bed particle size distributions

- Bed particle size distribution data show considerable variability among cross-sections
- Representative bed particle sizes for Lower Echo Creek

Representative particle size (mm)	Monitoring year	XS-0 (Upper)	XS-1L (Middle)	XS-1R (Middle)	XS-2L (Lower)	XS-2R (Lower)
D_{16}	2007	--	--	--	--	--
	2011	7	4	6	30	19
D_{50}	2007	--	--	--	--	--
	2011	72	24	42	65	42
D_{84}	2007	--	--	--	--	--
	2011	116	90	82	110	90

Bank erosion potential

- All banks have a low to very low bank erosion potential

General geomorphic assessment

- No historical data at this site for comparison, so no general geomorphic assessment is provided

- Observations from the 2011 field campaign suggest the channel currently has moderately stable to stable channel morphology (e.g., moderately stable to stable bed elevation and low bank erosion potential throughout).

Reporting:

- The District distributed the Geomorphology Continuing Evaluation of Representative Channel Areas Monitoring Report to the FS, ERC, and SWRCB via email on March 26, 2012
- The complete report for this monitoring effort is included in Appendix A and posted on the Project 184 website

As described above, a 2012 field effort is necessary to complete the geomorphic monitoring at sites where data collection was not possible in 2011 due to snow and ice conditions

Following completion of the 2011/2012 effort, the next geomorphology monitoring effort is scheduled to occur in 2016

3.8 Water Temperature

Overview:

Post-license monitoring for water temperature is required annually; 2011 is the fourth year the District has conducted water temperature monitoring

Temperature monitoring is required during spring months to help evaluate breeding conditions for amphibians and summer to determine if coldwater beneficial uses are being met in designated Project reaches

Monitoring objectives

- Characterize the temperature in stream segments by continuously monitoring from April to October
- Gather and analyze data to determine if water temperatures in the Project Area protect coldwater habitat beneficial uses
- Identify any project-controllable temperature resource measures that may be necessary for the protection, mitigation, and enhancement of beneficial uses, if applicable

The generalized criteria for evaluating water temperatures for trout and other coldwater species including amphibians for this effort are provided in the table below:

Mean Daily Water Temperatures	Coldwater Species Response
< 20 °C	Optimal growth and survival
20 - 23 °C	Suitable; increased susceptibility to stressors
>23 - 26 °C	Physiological stress and behavioral shifts to compensate
> 26 °C	Adverse effects and potential mortality

The water temperature monitoring plan requires continuous recording temperature probes at 25 locations from April 1 through October 31:

- T1 Pyramid Creek downstream of Lake Aloha Dam
- T2 Pyramid Creek upstream of South Fork American River
- T3 Echo Creek downstream of Echo Lake Dam
- T4 Echo Creek upstream of Upper Truckee River
- T5 Caples Creek downstream of Caples Lake Dam
- T6 Silver Fork American River downstream of Silver Lake Dam
- T7 Silver Fork American River upstream of South Fork American River
- T8 SFAR upstream of Silver Fork Confluence
- T9 SFAR downstream of Kyburz Diversion
- T10 SFAR upstream of Powerhouse
- T11 Alder Creek upstream of Diversion Dam
- T12 Alder Creek upstream of South Fork American River
- T13 No Name Creek upstream of Diversion Dam
- T14 No Name Creek upstream of South Fork American River
- T15 Mill Creek upstream of Diversion Dam
- T16 Mill Creek upstream of South Fork American River
- T17 Bull Creek upstream of Diversion Dam
- T18 Bull Creek upstream of South Fork American River
- T19 Ogilby Creek upstream of Diversion Dam
- T20 Ogilby Creek upstream of South Fork American River
- T21 Esmeralda Creek upstream of Diversion Dam
- T22 Esmeralda Creek upstream of South Fork American River
- T23 Carpenter Creek upstream Diversion Dam
- T24 Carpenter Creek upstream of South Fork American River
- T25 SFAR at Bridal Veil Picnic Area

The FS, SWRCB, ERC, and FERC approved a one-year variance to discontinue monitoring at Mill Creek (T15 and T16) and Carpenter Creek (T23 and T24) in 2011 since the diversion structures on these creeks are not operational

Based on recommendations in the Project 184 2010 Water Temperature Monitoring Report (EID, 2011b), the District added six new monitoring locations in 2011 to better understand the water temperature characteristics along the length of the Silver Fork American River

- T26 SFAR downstream of the confluence with the Silver Fork American River and upstream of the Kyburz Diversion Dam
- T27 Silver Fork American River near China Flat Campground
- T28 Silver Fork American River near Devils Gulch Road (Owens Camp)
- T29 Silver Fork American River near Silver Fork Campground (near Fitch Rantz Bridge)
- T30 Silver Fork American River upstream of the confluence of Caples Creek
- T31 Caples Creek upstream of the confluence with Silver Fork American River

Probes were successfully placed at four of the six new monitoring locations in 2011
At the conclusion of the monitoring season, it was determined that field crews placed probes for two monitoring locations at incorrect sites:

- T30 was installed in Silver Fork American River upstream of Fitch Rantz Bridge instead of Silver Fork American River upstream of the confluence of Caples Creek
- T31 was installed in Sherman Canyon Creek upstream of the confluence with Silver Fork American River instead of Caples Creek upstream of the confluence with Silver Fork American River
- Monitoring data for T30 and T31is not included in the report

Findings:

- Water temperatures measured below each of the four Project reservoirs and in the Project tributaries were suitable for trout and other coldwater species, including amphibians throughout the study period
- Comparison of water temperatures above and below the Kyburz Diversion (T26 and T9)
    - Hourly data
        - Average temperature difference was 0.05°C (0.1°F)
        - Maximum difference was 0.93°C (1.7°F)
    - Average daily data
        - Average temperature difference was 0.05°C (0.1°F)
        - Maximum difference was 0.19°C (0.3°F)
    - Water temperatures recorded above and below the Kyburz Diversion (T26 and T9) were within the optimal range for trout and other coldwater species, including amphibians
- Water temperatures in the middle (T25) and lower (T10) reaches of the Project Area begin to warm at lower elevations

- Upper reaches of the Project Area support cold water species assemblages (e.g., rainbow trout assemblage)
- Middle and lower reaches are grading into warmer water, and have a transitional species assemblage (e.g.,pikeminnow-hardhead-sucker assemblage) reflective of this natural change and incrementally warmer water

Recommendations:

Continue monitoring at locations T26, T27, T28, T29, T30, and T31 in 2012

EID recommends amending the approved Project 184 Water Temperature Monitoring Plan (Plan; EID, 2008) to discontinue monitoring on the tributaries that divert directly into the El Dorado Canal because three years of water temperature monitoring data has demonstrated that project operations do not affect water temperature at these locations:

- T11 Alder Creek upstream of Diversion Dam
- T12 Alder Creek upstream of South Fork American River (SFAR)
- T13 No Name Creek upstream of Diversion Dam
- T14 No Name Creek upstream of SFAR
- T15 Mill Creek upstream of Diversion Dam
- T16 Mill Creek upstream of SFAR
- T17 Bull Creek upstream of Diversion Dam
- T18 Bull Creek upstream of SFAR
- T19 Ogilby Creek upstream of Diversion Dam
- T20 Ogilby Creek upstream of SFAR
- T21 Esmeralda Creek upstream of Diversion Dam
- T22 Esmeralda Creek upstream of SFAR
- T23 Carpenter Creek upstream Diversion Dam
- T24 Carpenter Creek upstream of SFAR

Reporting:

- The District distributed the raw data collected during this monitoring effort to the FS, ERC, and SWRCB via email on January 31, 2012
- The District distributed the 2010 Water Temperature Monitoring Report to the FS, ERC, and SWRCB via email on February 23, 2012
- The District reviewed the 2011 Water Temperature Monitoring Report at the March 8, 2012 ERC Meeting
- The complete report for this monitoring effort is included in Appendix A and posted on the Project 184 website
- The electronic spreadsheet with the raw data for this monitoring effort will be E-filed with this report and is posted on the Project 184 website

The next water temperature monitoring effort is scheduled to occur in 2012

3.9 General Water Quality

No activities or monitoring required in 2011; monitoring is scheduled to occur in 2012

3.10 Trout Monitoring at Lake Aloha

Removal of trout in the ponds downstream of the auxiliary dams at Lake Aloha is required if Lake Aloha spills

- Lake Aloha spilled during spring runoff between July 6 and 12, 2011, and again from July 31 – August 8, 2011
- Trout removal efforts were conducted in conjunction with MYLF surveys from August 29 - 31, 2011
- Fish were removed from ponds with gill nets; visual surveys using mask and snorkel were also conducted in order to verify the presence/absence of fish in ponds, as well as to evaluate the efficacy of the fish removal method
- 24 ponds were surveyed in the study area; brook trout were observed in 2 ponds
- A total of 5 brook trout were captured in 2011
    - Four fish were captured in Pond J
    - One fish was captured in Pond A
    - Both ponds are in the overflow pathway from the auxiliary dam spillway
- The distribution of fish captured during the 2011 trout removal efforts suggests that trout are moving upstream into the lower ponds from Channel Lake during high runoff periods (i.e., from Channel Lake up through Ponds S and R and into Pond J
- One fish was captured in Pond A located just below Lake Aloha which suggests fish may also move downstream from Lake Aloha over the auxiliary dams during spill events
    - Fish were not observed or captured in Pond A in either 2007 or 2010, although two brook trout were captured in Pond A during the initial trout removal effort in 2004
    - Other potential means of trout entering Pond A include fisherman catching and releasing trout into the ponds or upstream migration through the ponds during years when Lake Aloha spills over the auxiliary dams

Reporting:

- The District notified the FS, ERC, and SWRCB of the availability of the 2011 Lake Aloha Trout Removal Monitoring Report on the Project 184 website via email on February 23, 2012

- The District reviewed the results of the 2011 Lake Aloha Trout Removal monitoring effort at the March 8, 2012 ERC Meeting

- The complete report for this monitoring effort is included in Appendix A and posted on the Project 184 website

The next Lake Aloha trout removal monitoring effort will occur following a spill event at Lake Aloha

3.11 El Dorado Canal Monitoring for Wildlife

The District inspected the canal fencing, crossings, and approaches during routine facility inspections throughout the year, including in the spring and fall prior to deer migration

- In 2011, the fencing, crossings, and approaches were intact with minimal repairs required

One bear and three deer perished in the Project 184 canal system in 2011

The District distributed and reviewed the 2011 Wildlife Mortality Report at the Annual ERC Meeting on March 8, 2012

The 2010 Wildlife Mortality Report is included in Appendix A.

3.12 Heritage Resource Monitoring

No heritage resource monitoring was necessary in 2011 pursuant to the Heritage Properties Management Plan

3.13 Recreation Survey

No activities or monitoring required in 2011; monitoring is scheduled to occur in 2012

3.14 Review of Recreation Developments

No activities or monitoring required in 2011; monitoring is scheduled to occur in 2012

3.15 Target Lake Levels Evaluation

Overview:

The Project 184 license conditions require the District to prepare a report every five years describing whether the target lake levels have been achieved, and if not, the reasons and time periods when the target lake levels were not achieved

Each Project No. 184 reservoir has unique lake level targets as defined in the Project No. 184 license conditions

All monthly target lake levels, as specified in the Project No. 184 license, were consistently achieved at Echo Lake, Silver Lake, and Lake Aloha during water years 2007 – 2011

Target lake levels for Caples Lake vary from year to year based on water year types; the water year types for the first five-years of license implementation are provided in the table below:

Water Year Types for Project No. 184; Water Years 2007 – 2011

Water Year	April through July Forecast of Unimpaired Inflow to Folsom Reservoir	Final Water Year Designation
2007	43 %	CRITICALLY DRY
2008	61 %	DRY
2009	74 %	DRY
2010	110 %	ABOVE NORMAL
2011	172 %	WET

Caples Lake target monthly lake levels were not achieved on six occasions during water years 2007 – 2011. These events are summarized in the table below:

Water Year Types for Project No. 184; Water Years 2007 – 2011

Date	End of the month lake level (AF)	Target lake level for designated water year type (AF)	Difference (AF)
July 2007	18,303	18,413 (CD)	-110
July, August, and September 2008*	Reservoir drawdown to facilitate emergency repairs		
June 2010*	22,234	22,338 (AN)	-104
July 2010	21,884	22,338 (AN)	-454
September 2010	17,716	18,006 (AN)	-290
June 2011*	21,118	22,338 (Wet)	-1,200

*****Target lake level intentionally missed due to operational safety concerns

Recommendations:

Based on operational experience gained during water years 2007 to 2011, the District has identified several potential changes to current lake level targets

- Improve operational flexibility to manage unpredictable environmental conditions
- Reduce the need for unnecessary reporting when targets are not achieved by modest amounts

Recommendations may include, but are not limited to:

- Develop an acceptable range or margin of error for target lake levels at Caples Lake that allows the District to consider snowpack and runoff conditions while attempting to meet target lake levels

- Eliminate June end of month lake level targets at Caples Lake due to the fact that the District is required by FERC license conditions to manage reservoir stage to avoid spill

- Reduce end of month lake level targets at Caples Lake for certain months and water year types

These recommended changes are conceptual and require additional analysis and definition to be able to determine if they are feasible options

The District plans to develop these recommendations into a subsequent detailed proposal for review and consideration by the FS, SWRCB, ERC, and FERC

4.0 References Cited

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APPENDIX A

2011 MONITORING REPORTS