



El Dorado Irrigation District

**El Dorado Project, FERC No. 184
Monitoring Program
2009 Annual Report**

DRAFT

May 20, 2010

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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 (January – November 2009)

The following meeting summaries describe the major topics and objectives discussed at ERC meetings during 2009. Complete meeting notes are available online at www.project184.org.

January 8, 2009 – Conference Call

- Conference call to review streamflows and current conditions at Caples Lake to determine if any changes to streamflows were necessary
- Participants agreed to maintain current operations (2 cfs minimum streamflow)
- A preliminary update on the Silver Lake emergency repair project was provided

January 22, 2009 – Conference Call

- Conference call to review streamflows and current conditions at Caples Lake to determine if any changes to streamflows were necessary
- Participants agreed to maintain current operations (2 cfs minimum streamflow)

February 12, 2009 – Conference Call

- Conference call to review streamflows and current conditions at Caples Lake to determine if any changes to streamflows were necessary
- Participants agreed to maintain current operations (2 cfs minimum streamflow)
- Reviewed the reservoir model, operational scenarios, and upcoming decisions related to the Caples streamflow plan
- Provided update on the Silver Lake emergency repair project

February 26, 2009 – Conference Call

- Conference call to review streamflows and current conditions at Caples Lake to determine if any changes to streamflows were necessary
- Participants agreed to maintain current operations (2 cfs minimum streamflow).
- Provided update on the Silver Lake emergency repair project

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March 12, 2009 Annual Meeting

- Convened annual resource agency meeting prior to the ERC annual meeting.
- Reviewed the 2009 Hydro Construction and Operations Plan
- Convened annual ERC meeting
- Reported the preliminary water year type is Dry per the current Bulletin 120
- Reviewed 2008 monitoring activities
 - Year one of water quality monitoring
 - Wildlife mortality report
- 2009 license implementation overview
 - Status of plans in approval process
 - Esmeralda Creek Restoration Plan – pending FS approval, filed with FERC
 - Geomorphology Sensitive Site Monitoring Plan – filed with FERC
 - Monitoring
 - Geomorphology Sensitive Site monitoring – Oyster Creek, Caples Creek, and Caples spillway channel
 - Water temperature monitoring
 - Plans
 - Oyster Creek/Caples feasibility study/Caples spillway channel – extension approved through October 2009
- Reviewed operational scenarios for Caples Lake storage and streamflows
 - Proposal to increase the Caples Creek streamflows to 5 cfs as soon as possible and then follow the streamflow pattern for a critically dry water year type for the rest of the year
- Discussed implementation of the Caples Lake Fisheries Management Plan
- Provided update on the Silver Lake emergency repair project

April 9, 2009

- Reviewed discussion from the fish enhancement fund meeting, which was held just prior to the ERC meeting
 - 2009 fish stocking for Caples Lake Fisheries Management Plan had to be revised to incorporate fish exchange with California Department of Fish and Game (DFG) due to a positive test for whirling disease at one of the hatcheries contracted to stock Caples Lake
 - No stocking is planned under the Fish Enhancement Fund in 2009 due to extensive stocking under fisheries management plan and disease at hatchery
- Reported the water year type is Below Normal per the current Bulletin 120
- Reviewed streamflows and current conditions at Caples Lake to determine if any changes to streamflows were necessary; no changes proposed
- Proposal to follow a critically dry water year type streamflow pattern filed with FERC on April 3, following FS, SWRCB, and ERC approval

May 14, 2009

- Reported the final water year type is Dry based on the May 1 Bulletin 120
- Reviewed 2009 Operating Plan

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- Announced that FERC approved the Caples Creek Interim Minimum Streamflow Release Plan on April 21, 2009
- Reviewed streamflows and current conditions at Caples Lake to determine if any changes to streamflows were necessary; no changes proposed
- Provided an update on the fish exchange between DFG and American Trout and Salmon hatchery
- EID and FS provided Caples Lake Boat Ramp project update
- Kirkwood Meadows Public Utility District presentation on the Kirkwood Meadows Power Line Reliability Project

June 11, 2009

- Reviewed under-release at Caples Lake on June 1, 2009, due to debris partially blocking the gate
- Caples Lake Fisheries Management Plan Implementation
 - DFG plans to stock Caples Lake
 - Trophy rainbows from Nebraska will be stocked in June
- Reviewed comments on the draft 2008 Annual Report

July 9, 2009

- Reviewed two under-releases
 - Minimum flow at Silver Fork of the American River decreased from 4.0 cfs to 3.73 cfs on June 30th due to debris blocking leakage from the stop logs; the leakage was contributing to the minimum streamflow
 - Minimum flow at South Fork American River below Kyburz Diversion Dam decreased from 120 cfs decreased to 112 cfs due to the premature transition from June to July minimum streamflows
- Announced return to license specified dry-year streamflows for Caples Creek for the remainder of 2009 since lake level target had been met
- Reviewed comments on the draft Annual Report
- Reviewed Geomorphology Sensitive Site Monitoring Plan Implementation – Caples Lake Spillway Channel
- Discussed Silver Lake spring-time operations related to reservoir refill rate

July 13, 2009 – Conference Call

- Follow-up discussion regarding the Caples Lake Spillway Channel Geomorphology Sensitive Site Monitoring

August 13, 2009

- Caples Lake spillway channel Geomorphology Sensitive Site Monitoring Update
- Presented the results of the Oyster Creek Geomorphology Sensitive Site Monitoring

November 12, 2009

- Caples Lake Boat Ramp project update
- Operations Update
 - Flow fluctuations

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- Spillway 47C release
- Kyburz Diversion dam by-pass valve release
- Spillway 10 release
- Foothill yellow-legged frog monitoring results
- Presented the results of the Caples Lake spillway channel Geomorphology Sensitive Site Monitoring
- Reviewed the revised Caples Lake outlet discharge rating curve, which was developed through hydraulic calculations following completion of the emergency repairs

3.0 Monitoring Program Study Plans

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 2009 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 electronic format on the accompanying compact disk (CD).

3.1 Fish Populations

No activities or monitoring required in 2009. Monitoring is scheduled to occur in 2011.

3.2 Macroinvertebrates

No activities or monitoring required in 2009. Monitoring is scheduled to occur in 2011.

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

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3.3.1 Foothill Yellow-legged Frog (FYLF)

Overview:

- No surveys required in 2009 for known site presence monitoring. Monitoring is scheduled to occur in 2011.
- Surveys are required June through September at any time the 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
 - Monitoring criteria triggered three times in 2009
 - Survey results provided to ERC via email and discussed at the November 12, 2009 ERC meeting
 - Reports for these activities were posted on the Project 184 website in December 2009 and are provided on the accompanying CD
 - Summary of these monitoring efforts is provided below

Findings:

1. Spillway 47C

- On August 12, 2009, an accidental release occurred from Spillway 47C (emergency spillway) on the El Dorado Canal which resulted in the release of approximately 85 cfs (~ 2.6 acre-feet) of water to the South Fork American River (SFAR)
- Amphibian surveys were conducted on August 17 and August 21 at four sites as specified in the P-184 FYLF Monitoring Plan
 - i. Site 120R - SFAR upstream of Silver Creek (the only site located downstream of Spillway 47C)
 - ii. Site 124R - SFAR upstream of Soldier Creek
 - iii. Site 213R - SFAR upstream of Ogilby Creek
 - iv. Site 220R - SFAR at Maple Grove
- Two adult FYLFs were observed at Site 120 and one FYLF tadpole, which had four fully developed legs and a tail, was observed at Site 213R
- The District provided a copy of the report to the Commission regarding the accidental release from Spillway 47C and reported the results of the FYLF surveys to the ERC via email on August 28, 2009

2. Kyburz Diversion Dam

- On August 25, 2009, the 36 inch by-pass valve at Kyburz diversion dam opened causing streamflows in the SFAR below Kyburz diversion dam to increase from approximately 24 cfs to 98 cfs for a period of approximately one hour.
- Amphibian surveys were conducted on August 31 and September 1 at the four sites specified in the P-184 FYLF Monitoring Plan.
- One FYLF tadpole was observed at Site 124R. Six young-of-the-year (YOY) FYLF and one FYLF tadpole were observed at Site 213R.
- Results reported to ERC via email on September 3, 2009.

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3. Spillway 10

- On September 16, 2009, Spillway 10 (preferred spillway) was accidentally opened which resulted in the release of 79 cfs (~1.3 acre-feet) of water to the SFAR.
- Amphibian surveys were conducted on September 21 and 22 at the four sites specified in the P-184 FYLF Monitoring Plan.
- One adult FYLF was observed at Site 120. One YOY FYLF was observed at Site 124R. Three YOY FYLF were observed at Site 213R.
- Results reported to ERC via email on September 25, 2009.

Analysis:

- The results of the 2009 flow fluctuation surveys were compared to the Round 3 (August) and Round 4 (September) results of 2007 visual encounter surveys for the four sites referenced above
- No FYLF egg masses were observed during 2007 or 2009 surveys conducted in August and September
- FYLF tadpole observations decreased from August to September in both years (n=22 to n=0 in 2007; n=2 to n=1 in 2009)
- More YOY FYLF (n=29) were observed in September 2007 than in September 2009 (n=10)
- Three FYLF adults were observed during 2009 surveys and two FYLF adults were observed during 2007 surveys.
- It is unlikely that the flow fluctuations resulted in adverse effects to FYLF egg masses or tadpoles because the flow fluctuations occurred in mid August – September
 - FYLF egg masses were not observed during 2009 surveys and have not been observed at this time of year during previous surveys, which is also consistent with published life history data
 - FYLF tadpole observations tend to decrease in August and YOY FYLF observations increase as tadpoles metamorphose into juvenile frogs

3.3.2 Mountain Yellow-legged Frog

No surveys required in 2009 for known site presence monitoring. Monitoring is scheduled to occur in 2011.

Surveys of downstream ponds and habitat are required if Lake Aloha spills. The District notified the Commission on July 30, 2009 that Lake Aloha did not spill in 2009; therefore, no mountain yellow-legged frog monitoring was conducted pursuant this condition in 2009.

3.4 Riparian Vegetation Species Composition

No activities or monitoring required in 2009. Monitoring is scheduled to occur in 2011.

3.5 Riparian Vegetation Recruitment

No activities or monitoring required in 2009. Monitoring is scheduled to occur in 2011.

3.6 Geomorphology (Sensitive Site Investigation & Mitigation Plan Development)

Overview:

The Project 184 Geomorphology Sensitive Site Monitoring Plan includes three monitoring locations: Oyster Creek, Caples Lake Spillway Channel, and Caples Creek. The following summary describes the status of each component of the Project 184 Geomorphology Sensitive Site Monitoring Plan.

Oyster Creek

- Monitoring at Oyster Creek was conducted in spring 2009.
- Presented the results of the Oyster Creek Geomorphology Sensitive Site Monitoring at the August 13, 2009 ERC meeting.
- Notified the FS, ERC, and SWRCB via email on August 28, 2009 that the Oyster Creek Geomorphology Sensitive Site Monitoring Report was posted on the Project 184 website.

Caples Creek Spillway Channel

- Monitoring at Caples Lake Spillway Channel was conducted in July 2009.
- Presented the results of the Caples Lake Spillway Channel Geomorphology Sensitive Site Monitoring at the November 12, 2009 ERC meeting.
- Notified the FS, ERC, and SWRCB at the February 11, 2010 ERC meeting that the Caples Lake Spillway Channel Geomorphology Sensitive Site Monitoring Report was posted on the Project 184 website.

Caples Creek

- Monitoring at Caples Creek is scheduled to occur in 2010.

Findings:

An overview of objectives and findings for the Oyster Creek and the Caples Spillway Channel components of the Project 184 Geomorphology Sensitive Site Monitoring Plan are presented below. The complete report for each of these monitoring efforts is included on the accompanying CD and posted on the Project 184 website.

Oyster Creek

- Study objectives described in the Project 184 Geomorphology Sensitive Site Monitoring Plan include:
 - Determine the causes of instability in the channel
 - Determine channel reaches in need of restoration/stabilization
 - Determine the sediment transport dynamics and hydraulic forces affecting formation of the present channel and use this information as a basis of design for stabilization measures

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- Consider and develop mitigation measures to be addressed in Stabilization Plan
- Site characterization included field assessments (conducted from August to September 2007, and May to June 2009) to determine the extent and causes of instability in the channel
 - Topographic survey
 - Reach delineation
 - Habitat descriptions
 - Geomorphic assessments
 - Bank stability
 - Channel geometry
 - Bed material composition
 - Bedload sampling
 - Bed mobility (modeled)
 - Sub-surface investigation in the vicinity of the bedrock step
 - Soil sampling and analysis of streambank material
- Topographic survey
 - A topographic map with 2-foot contours was developed using ground survey control and ortho-rectified photography
- Reach delineation
 - 12 reaches were delineated between the Oyster Creek-Silver Fork confluence and Oyster Lake
- Habitat descriptions
 - In general, the channel is dominated by riffle-run habitat with scattered pools
 - In steeper portions of the channel there are step-pools, and in the more sinuous sections scour pools have developed
- Geomorphic assessments
 - Bank stability
 - Bank stability evaluation used the Bank Erosion Hazard Index (BEHI)
 - BEHI rates erosion potential as very low, low, moderate, high, very high or extreme
 - 4 reaches were ranked low; 5 reaches moderate; and 3 reaches high
 - BEHI method may overestimate the actual erosion potential for some reaches
 - Channel geometry
 - 9 cross-sections were surveyed throughout the project area
 - 3 cross sections that were surveyed 1999 were located and surveyed
 - Lateral migration is occurring in Reach 6
 - Erosion rates are relatively high at cutbanks on the outer bends of meanders
 - Overall, the streambed elevation remains stable
 - Bed material composition
 - Pebble counts used to characterize bed material
 - Bed is composed primarily of small to medium size cobble with some gravel in downstream reach
 - Bed is composed primarily of medium sized gravels in the middle and upper reach

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- Bedload sampling
 - Two techniques to measure bedload transport
 - Bedload traps
 - Helley-Smith sampler
 - Bedload sampling data indicate
 - Flows approximating maximum leakage and bankfull discharges mobilize a small fraction of the bed material in terms of both size and quantity
 - Sediment transport rates are balanced through the project reach at flows approximating bankfull discharge
- Bed mobility (modeled)
 - Bed mobility was evaluated using the hydraulic model developed for the project area
 - Bed substrate mobility was evaluated for a range of discharges at the five channel cross-sections that are co-located with the pebble count data
 - Modeling results predict
 - Maximum leakage flow would mobilize the D₁₆ fraction of the bed material
 - D₅₀ fraction in cross-section 2 would also be mobile at maximum leakage discharge
 - Shear stress ratio for D₅₀ fraction is close to 1 for the 2-year event
 - Channel is at or near equilibrium conditions from a bed mobility standpoint
- Sub-surface investigation in the vicinity of the bedrock step
 - Reconnaissance-level sub-surface investigation was conducted to examine the extent and elevation of bedrock adjacent to the channel
 - Bedrock exposures were found to be elevated above the bedrock at the thalweg by approximately 3 feet
 - Exposures confine the channel to the current alignment, suggesting that flanking and subsequent headcut initiation is unlikely to occur
 - Because of the importance of this location with respect to long-term channel stability, it should be monitored through repeated cross-section survey as a component of License Condition 37.9, Geomorphology (Continuing Evaluation of Representative Channel Areas)
- Soil sampling and analysis of streambank material
 - Soil texture was determined to be sandy loam comprised of 63 % sand, 26.5 % silt and 10.5 % clay
 - The high sand content in the soil results in poor particle cohesion, causing the soil to be prone to erosion
- Factors contributing to historical instability
 - Hydro-modification/flow augmentation
 - Historical grazing practices
 - Effects of SR 88
- Conclusion
 - Oyster Creek channel has adjusted to the hydrology associated with leakage from Silver Lake and is trending toward recovery from historical incision

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- Though the stream profile is generally stable, streambanks will continue to erode, particularly during large flow events as part of the natural recovery process of incised channels
- Stabilization measures that would expedite the recovery process and ensure long-term ecological function of the meadow adjacent to the channel were presented in the Stabilization Plan, which was completed under separate Project 184 license conditions

Caples Creek Spillway Channel

- Study objectives described in the Project 184 Geomorphology Sensitive Site Monitoring Plan include:
 - Field assessment of spillway channel stability
 - Hydraulic modeling to predict velocities, depths, and shear forces on bed and banks, needed to provide a basis for developing stabilization measures
 - Perform a test flow release to provide hydraulic model calibration; observations of bed/bank stability, and conduct empirical sediment balance/sediment transport studies
- Channel geomorphology and erosion
 - The spillway channel has two distinct sections based on channel type:
 - Upper cascade channel type ~2,200 feet (ft) in length
 - Lower pool-riffle channel type ~840 ft in length
 - Two significant sites with bank instability and erosion were identified
 - Upper site ~350 ft in length (250 ft unstable)
 - Lower site ~500 ft in length
- Longitudinal bed profile survey
 - A topographic survey of the spillway channel was performed to determine channel gradient and to provide data for input into hydraulic modeling
 - Upper cascade channel gradient = 8.7%
 - Unstable reach gradient = 3.2%
 - Lower pool-riffle gradient = 0.06%
 - Unstable reach gradient = 0.06%
- Cross-section surveys
 - Twelve channel cross-sections were surveyed to characterize channel morphology and for input into a hydraulic model
- Bed and bank material characteristics
 - Lower site
 - Pebble counts at three cross sections indicate median particle size (D50) is gravel, but widely ranging from 2.8mm to 59.9mm
 - Two bulk samples indicate that 70 – 84% of the bed and bank material is sand-size material (0.063 mm to 2 mm), with the remainder largely fine and medium size gravel
 - Upper site
 - Visual observations indicate bed material size is much coarser, predominantly cobbles and small boulders, with a small proportion of gravel and sand present.

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- Banks are comprised of sand-size material similar to that collected from the lower erosion site.
- Channel Hydraulics
 - A controlled flow release study was conducted from July 22-24, 2009 in the spillway channel at the lower and upper erosion sites
 - The objectives of the flow study were to provide target flow releases of 10 cfs, 30 cfs, and 60 cfs so that field measurements could be taken to:
 - Measure water surface elevations and stage for use in developing and calibrating hydraulic models
 - Measure suspended load and bedload transport
 - Measure bank erosion rates
 - Photo document channel conditions
- Sediment Transport and Bank Erosion
 - Two techniques to measure bedload transport
 - Bedload traps
 - Helley-Smith sampler
 - Bedload transport results
 - Bedload traps were not an effective method of sampling bedload for this study because the nets filled with organic debris and could not trap any sediment
 - Bedload transport results are based on the eight measurements collected with the Helley-Smith samplers.
 - 80%-90% of the bedload material was sand with the remainder a mixture of silt/clay and very fine to fine gravel sizes
 - Coarsest material transported was 6 mm (fine gravel)
 - Highest calculated bedload transport rate was approximately 140 tons/day at 58 cfs
 - 0.8 tons/day of sediment (silt/clay) was transported at 9.5 cfs
 - Suspended load transport results
 - Suspended load increases from 0.5 tons/day at 9.5 cfs to over 60 tons/day at 58 cfs.
 - Median particle size of the suspended load increases with increasing discharge from silt size sediment to fine sand
- Bank erosion results
 - Nine erosion pins were installed at 5 locations within the lower erosion monitoring site
 - A negligible amount of bank erosion occurred at 9.5 cfs for all sites
 - Bank erosion cumulatively ranged from 0.01 ft to 0.55 ft by the 24 cfs release, and from 0.01 ft to 0.97 ft by the completion of the 58 cfs release
 - Note that the 58 cfs release was conducted for a period of approximately 2 hours before the controlled flow was shut-off, whereas the previous releases proceeded for a period of approximately 24-hrs each
- Conclusion
 - All of the data required by the Project 184 Geomorphology Sensitive Site Monitoring Plan for the Caples Spillway Channel have been collected
 - Field assessment of spillway channel stability

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- Test flow releases
- Data collection needed for hydraulic modeling
- Model development and calibration
 - Determine the flow depths, velocity, and shear stress for the maximum design flows potentially up to 250 cfs for the stabilization plan
 - Hydraulic modeling will be completed as soon as the maximum design flow capacity needed for the spillway channel stabilization is determined
 - Design flow for the spillway channel is dependent upon the maximum flow release capacity of Caples Dam into Caples Creek
 - Maximum flow release capacity of Caples Lake main dam outlet will be measured in spring 2010 if sufficient water is available

3.7 Geomorphology (Continuing Evaluation of Representative Channel Areas)

No activities or monitoring required in 2009. Monitoring is scheduled to occur in 2011.

3.8 Water Temperature

Overview:

- Water temperature monitoring was conducted in 2009 pursuant to the approved Project 184 Water Temperature Monitoring Plan
- The District posted the raw data collected during this monitoring effort on the Project 184 website and notified the FS, ERC, and SWRCB on January 29, 2010
- The District distributed the 2009 Water Temperature Monitoring Report the FS, ERC, and SWRCB via email on March 4, 2010 and posted on the Project 184 website on March 10, 2010
- Two comments were received during the February 11, 2010 ERC meeting on the format of the raw data spreadsheet
 - Review March data because data show high temperatures at that time
 - March data shows air temperatures recorded before loggers were installed; this data has been deleted from the raw data spreadsheet
 - Freeze the header frame on the electronic spreadsheet to allow the column titles to be viewed when scrolling
 - Header frame added to spreadsheet
- The complete report and electronic spreadsheet for this monitoring effort are included on the accompanying CD and posted on the Project 184 website

Findings:

- The CVRWQCB (1998) mandate to maintain cold- and warm-water temperature objectives stipulates that “at no time or place shall the temperature of COLD or WARM intrastate waters be increased more than 5°F (2.8°C) above natural receiving water temperature”. Two stream diversions (Kyburz and Alder Creek) were operational during at least a portion of the 2009 monitoring period (April 1 – October 31). Water temperatures measured below these diversions were within 5°F of the receiving waters while diversions occurred; therefore, the condition for maintaining coldwater beneficial uses was met. Furthermore, the daily water temperatures above and below these two

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diversions (T8-T9 Kyburz; T11-T12 Alder Creek) were suitable for trout and other coldwater species.

- The four Project storage reservoirs affected water temperatures in the outflow streams by effectively muting the daily temperature fluctuations measured below the outflow. During the summer months, spring and tributary influences apparently cooled Pyramid and Echo creek water from upstream to downstream before it reached the South Fork American and Truckee rivers, respectively. Water temperatures measured below each of these storage reservoirs were suitable for coldwater species.
- Caples Lake releases have a pronounced influence on the temperature of the Silver Fork American River. Water released from Caples Lake (T5) during July and August was significantly cooler than was measured at other high elevation locations, and cooled the Silver Fork during the hottest part of the summer (late July and early August). Water temperatures measured below the Kyburz Diversion (T9) on average were colder (-0.3°C) than the receiving waters measured above the diversion (T8) between July 23rd and August 22nd.
- Water temperatures within the project tributaries were suitable for trout and other cold water species throughout the study period. These tributaries are well shaded by vegetation (i.e., mixed conifer forest) and orientation (i.e. generally north facing slope).
- Water temperatures in the middle (T25) and lower (T10) reaches of the Project Area begin to warm at lower elevations. The upper reaches of the Project Area support cold water species assemblages (e.g., rainbow trout assemblage), while the middle and lower reaches are grading into warmer water, and have a transitional species assemblage (pikeminnow-hardhead-sucker assemblage) reflective of this natural change and incrementally warmer water.
- At all sites water temperatures measured during 2009 as related to project operations demonstrated that the water temperatures were within the suitable range for cold water species throughout the monitoring period.

3.9 General Water Quality

No activities or monitoring required in 2009. Monitoring is scheduled to occur in 2010.

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. The District notified the Commission on July 30, 2009 that Lake Aloha did not spill in 2009; therefore, no trout removal was necessary in 2009.

3.11 El Dorado Canal Monitoring for Wildlife

The District distributed and reviewed the 2009 Wildlife Mortality Report at the Annual ERC Meeting on March 11, 2010. The 2009 Wildlife Mortality Report was submitted to FERC on

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May 12, 2010. In summary, four deer perished in the Project 184 canal system in 2009. In each case, there were no visible signs of entry, nor were any gates left open.

In accordance with the Canal Wildlife Fencing Plan, the fencing on the upslope and downslope sides of the Canal between Flume 3 and the Alder Creek Siphon and from Flume 31 and Plum Creek Siphon was relocated / upgraded during the summer of 2009. All necessary fence upgrades, realignment, and wildlife crossing improvements required by the Canal Wildlife Fencing Plan were completed in 2009 and approved by the Commission on April 28, 2010.

The District also inspected the canal fencing, crossings, and approaches in the spring and fall prior to deer migration. The spring inspection was conducted on May 13, 2009, and the fall inspection was conducted on November 5, 2009. During each inspection, the fencing and crossings were intact with minimal repairs required. Because the canal fencing upgrades are completed and the fence is now visible from the canal bench, future inspections will occur during routine facility inspections, including in the spring and fall prior to deer migration, rather than during specific fence inspection events as in the past. This will provide a more frequent assessment of fencing and crossing condition and result in more timely completion of necessary repairs.

The Project 184 2009 Wildlife Mortality Report and the Project 184 2009 spring / fall Canal Fencing Inspection reports are included in Appendix A.

3.12 Heritage Resource Monitoring

No heritage resource monitoring was performed in 2009 pursuant to the Heritage Properties Management Plan.

3.13 Recreation Survey

No activities or monitoring required in 2009. Monitoring is scheduled to occur in 2012.

3.14 Review of Recreation Developments

No activities or monitoring required in 2009. Monitoring is scheduled to occur in 2012.

3.15 Target Lake Levels Evaluation

No activities required in 2009. Report is scheduled to be prepared in 2011.

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4.0 Caples Lake Main Dam Emergency Repairs Monitoring Activities

Consistent with the 2008 Annual Report, a summary of the monitoring activities associated with the Caples Lake emergency repair project is included within the Annual Report. These activities include: fisheries surveys in Caples Creek upstream and downstream of the confluence of Kirkwood Creek, water quality monitoring in the reservoir and in Caples Creek, and riparian vegetation community and stream channel monitoring along Caples Creek.

Fisheries Monitoring

Overview:

- The FS, DFG, District, and volunteers conducted three pass depletion electrofishing surveys at two sites on Caples Creek on November 19, 2008 and November 4, 2009.
- The surveyed stream reaches are located upstream and downstream of the confluence of Kirkwood Creek.

Findings:

- The total number of fish captured during 2008 and 2009 is provided in Table 1.

Table 1. Total number of fish captured at each stream reach in 2008 and 2009.

	2008		2009	
	Upstream	Downstream	Upstream	Downstream
Rainbow trout	3	11	0	19
Brook trout	99	88	55	131
Brown trout	15	44	18	39
Lake trout	0	2	0	0
Sucker spp.	135	48	43	1
Speckled dace	3	0	0	0
Unknown cyprinid	59	34	220	3

- The “unknown cyprinid” category was either tui chub or Lahontan redbside. Small fish size precluded positive species identification.
- The “sucker spp.” category consists of observations of Sacramento sucker and Tahoe sucker.
- A final report is being prepared that includes a discussion of how 2008-2009 data compare with 1998-2000 data.

Water Quality Monitoring

Overview:

- The draft report was provided to the FS, SWRCB, and the ERC via email on August 6, 2009 for review.
- The SWRCB provided comments via email on August 20, 2009.
 - These comments were incorporated into the final Report.
 - No other comments or recommendations were received.

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- The District filed the report with the Commission on September 1, 2009 pursuant to Order dated January 14, 2009.
- The Commission approved the report on April 6, 2010.
- The complete report for this monitoring effort is included on the accompanying CD.
- The findings for this effort are presented below.

Findings:

- The Licensee monitored water quality in Caples Creek and Caples Lake for the following *in situ* parameters: water temperature, turbidity, conductivity, dissolved oxygen, and pH. Additionally, grab samples were collected to monitor for detection of petroleum hydrocarbons.
- Water temperature, conductivity, and dissolved oxygen were within specified target criteria for the duration of the monitoring.
- Turbidity levels were highly variable due to low reservoir elevations and wind/wave action.
- Depressed pH levels were observed during monitoring events; the depressed pH levels observed during monitoring events were the result of naturally occurring condition that is associated with the low buffering capacity of Sierra Nevada soils and waters and consistent with ongoing water quality monitoring results collected for Project 184.
- All water samples were non-detect for total petroleum hydrocarbons in the diesel and gasoline ranges.

Riparian Vegetation Community and Stream Channel Monitoring

Overview:

- The draft report was provided to the FS via email on September 14, 2009 for review.
- No comments or recommendations were received.
- The findings for the Riparian Vegetation Community and Stream Channel Monitoring are presented below.
- The complete report for this monitoring effort is included on the accompanying CD.

Findings:

- The primary objectives of the monitoring effort were to:
 - Determine if flows were sufficient to maintain riparian habitat
 - Identify any changes to health in riparian vegetation
 - Evaluate qualitative changes to channel stability and condition.
- Monitoring included a site assessment of the stream channel and riparian community at the designated sites in November 2008 followed by monthly follow-up evaluations of those sites beginning in the spring of 2009.
- Follow-up monitoring was conducted in June and July 2009, at which time, the Project 184 license specified lake level target for Caples Lake was met and minimum streamflows in Caples Creek resumed.
- There were no significant, detectable adverse changes to riparian vegetation health, riparian species composition, or channel stability associated with implementation of the Project.

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- The short duration of reduced streamflows, coupled with the timing of those flows (when flows are normally low and plants are dormant), did not appear to cause any permanent change or damage to the riparian vegetation or stream channel based on the results of this monitoring effort.
- The District also documented 14 sample site photopoints on Caples Creek and compiled a report with 2002 and 2008 photographs.

El Dorado Project, FERC No. 184 Monitoring Program

5.0 References Cited

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APPENDIX A

**2009 WILDLIFE MORTALITY REPORT
AND
CANAL WILDLIFE FENCING INSPECTION REPORTS**



FERC Project 184 2009 Wildlife Mortality Report

The Federal Regulatory Energy Commission (FERC) Order Issuing New License dated October 18, 2006, includes the Project 184 Forest Service (FS) 4(e) Conditions as Appendix A. FS Condition 43 states that “The licensee shall provide the FS *and* ERC by April 1 of each year an annual report describing the date, location, and species information (deer or other wildlife) found in the El Dorado Canal.”

El Dorado Irrigation District (EID) provides this report in compliance with Condition 43 – Wildlife and Sensitive Plant Protection Measures.

In 2009, four deer perished in the Project 184 canal system; details are as follows:

04/30/09

A 75 lb buck was found in Forebay. No gates were left open.

06/23/09

A 75 lb buck and a 65 lb buck were found at Camp 1. No gates were left open.

09-30-09

A 60 lb buck was found at Camp 1. No gates were left open.

In accordance with Years 3, 4, and 5 of the approved Canal Wildlife Fencing Plan (Plan), the fencing on the upslope and downslope sides of the Canal between Flume 3 and the Alder Creek Siphon (Beat One) and from Flume 31 and Plum Creek Siphon (Beat Three) was relocated/upgraded during the summer of 2009. In addition to the sections completed in 2008, all upgrades to the canal fencing have been completed according to the Plan.

EID continues to be committed to proactively monitoring, evaluating, and improving project operations to minimize wildlife mortalities along the Project 184 Canal System.



FERC Project 184
Canal Wildlife Fencing
Spring 2009 Inspection Report

An annual canal fencing inspection is required by the United States Forest Service (USFS) 4(e) Condition 43 contained in Appendix A of October 18, 2006, Federal Energy Regulatory Commission (FERC) Order Issuing License for Project 184. Condition 43.1.a states:

Condition No. 43 - Wildlife and Sensitive Plant Protection Measures

1. *To protect wildlife from the hazards of open canals and other Project facilities, the licensee for the term of a new license for the Project shall maintain and operate in working condition all devices and measures for wildlife along the El Dorado Canal that are deemed necessary by the FS and CDFG.*
 - a. *Ensure that all canal crossings and canal fencing on National Forest System lands and licensee adjoining property are maintained in functioning condition. The fencing, canal crossings, and approaches shall be inspected at least twice per year, in the spring and fall prior to deer migration. Fencing repairs or replacement necessary to prevent wildlife from entering the canal will be made and canal crossings will be maintained in a manner that will continually allow their use by wildlife. The licensee shall report the results of inspections and maintenance at the annual review meeting described in Condition No. 45.*

The spring 2009 inspection of the El Dorado Canal (Canal) wildlife fences, gates, and crossings was conducted on May 13, 2009, by El Dorado Irrigation District (EID) staff for the fencing along both sides of the Canal from Flume 2A to the Alder Creek Siphon (Beat One) and from Bull Creek to the Plum Creek Siphon (Beat Three). As previously reported in the Canal Wildlife Fencing Plan, the condition of the canal fencing ranged from excellent to poor. The fence was intact and minimal repairs were made during the inspection. Due to the flume replacements at Flumes 31 and 31A, temporary fencing is currently in-place; however, within the next 30 days it will be replaced per the approved specifications. The fence is located in the Eldorado National Forest paralleling Hwy 50 on the south, uphill side. The terrain is steep to rolling with many sections heavily forested. Most of the fencing is accessible only by foot. In addition to the required semi-annual inspections, EID Hydroelectric Operations staff completes a visual inspection of the fencing during their regular patrols of the Canal.

In accordance with Years 1 and 2 of the Plan, the fencing on the upslope and downslope sides of the Canal between Flume 2 and Flume 3 (approximately 1 mile) was relocated during the summer of 2008. The remaining segments of the canal fencing on both sides of the canal, identified in the Plan, are scheduled for upgrade or relocation in the summer of 2009.

EID continues to be committed to proactively monitoring, evaluating, and improving project operations to minimize wildlife mortalities along the Project 184 Canal System.



FERC Project 184
Canal Wildlife Fencing
Fall 2009 Inspection Report

An annual canal fencing inspection is required by the United States Forest Service (USFS) 4(e) Condition 43 contained in Appendix A of October 18, 2006, Federal Energy Regulatory Commission (FERC) Order Issuing License for Project 184. Condition 43.1.a states:

Condition No. 43 - Wildlife and Sensitive Plant Protection Measures

1. *To protect wildlife from the hazards of open canals and other Project facilities, the licensee for the term of a new license for the Project shall maintain and operate in working condition all devices and measures for wildlife along the El Dorado Canal that are deemed necessary by the FS and CDFG.*
 - a. *Ensure that all canal crossings and canal fencing on National Forest System lands and licensee adjoining property are maintained in functioning condition. The fencing, canal crossings, and approaches shall be inspected at least twice per year, in the spring and fall prior to deer migration. Fencing repairs or replacement necessary to prevent wildlife from entering the canal will be made and canal crossings will be maintained in a manner that will continually allow their use by wildlife. The licensee shall report the results of inspections and maintenance at the annual review meeting described in Condition No. 45.*

The Fall 2009 inspection of the El Dorado Canal (Canal) wildlife fences, gates, and crossings was conducted on November 5, 2009, by El Dorado Irrigation District (EID) staff for the fencing along both sides of the Canal from Sand Flat Campground to the Alder Creek Siphon (Beat One) and from Bull Creek to the Plum Creek Siphon (Beat Three). The fence sections identified within the Canal Wildlife Fencing Plan (Plan) have all been relocated and upgraded per the approved specifications; therefore the condition of the canal fencing is excellent. Since our previous inspection the temporary fencing between Flumes 31 and 31A has been replaced per the approved specifications. The fence is located in the Eldorado National Forest paralleling Hwy 50 on the south, uphill side. The terrain is steep to rolling with many sections heavily forested. Most of the fencing is accessible only by foot. In addition to the required semi-annual inspections, EID Hydroelectric Operations staff completes a visual inspection of the fencing during their regular patrols of the Canal.

In accordance with Years 3, 4, and 5 of the approved Plan, the fencing on the upslope and downslope sides of the Canal between Flume 3 and the Alder Creek Siphon (Beat One) and from Flume 31 and Plum Creek Siphon (Beat Three) was relocated/upgraded during the summer of 2009.

As indicated above, the upgrades to the fencing sections, which were previously identified in the Plan, have been completed during the 2008 and 2009 construction seasons. EID continues to be committed to proactively monitoring, evaluating, and improving project operations to minimize wildlife mortalities along the Project 184 Canal System.