

2007 Annual Progress Report
of the
Robles Diversion Fish Passage Facility



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1.0 EXECUTIVE SUMMARY

Casitas Municipal Water District (CMWD) is implementing the Robles Fish Passage Facility (Robles Facility) Project described in the Biological Assessment (BA) proposed by Reclamation (USBOR 2003) and analyzed in the Biological Opinion (BO) prepared by National Marine Fisheries Service (NMFS 2003a). This 2007 Annual Progress Report of the Robles Facility, as required by the BO, is the culmination of monitoring and operational data collected during the reporting period of July 1, 2006 to June 30, 2007.

The monitoring and evaluation studies related to the Robles Facility conducted during the 2006-2007 reporting period are included in two main sections of this progress report. The fisheries monitoring section contains: upstream fish migration impediment evaluation, sandbar monitoring at the mouth of the Ventura River, fish attraction evaluation, and fish passage monitoring. The Robles Facility Operation section contains: information and data on the facility status, flow observations and control, costs associated with operation and monitoring, assessment of the effectiveness to provide fish passage, recommendations of priorities for future activities, and revisions deemed necessary to the operations. Four evaluations were not conducted during 2007. The upstream fish migration impediment evaluation was not conducted because of the lack of water. Water did not flow completely through the Robles Reach at any time during the 2006-2007 reporting period. The physical evaluation of the fish passage facility was not conducted also because of the lack of water; however, the study plan has been completed and is anticipated to begin in 2008 if sufficient water is available. The fish passage evaluation of migrants moving through the facility was not conducted during 2007 because a trap was not operated downstream of the facility. The trap was constructed and placed in the river, but was not operated because final approval for the 2007 study plan was not received from NOAA Fisheries. The evaluation of fish migration through the Robles Reach was also not conducted because fish traps were not operated. It is anticipated that both of these biological evaluations will be conducted during 2008 assuming there is sufficient water and approval from NOAA Fisheries is received.

2.0 INTRODUCTION

NOAA Fisheries listed the southern California steelhead, *Oncorhynchus mykiss*, as endangered in 1997 (NMFS 1997) under the Endangered Species Act (ESA) of 1973. Steelhead were organized into stocks (i.e., groups) of evolutionary significant units (ESU) and represented groupings that were considered to be substantially isolated from other steelhead stocks reproductively and were an important part of the evolutionary legacy of the species. The southern California steelhead ESU included, at the time, steelhead populations from the Santa Maria River in San Luis Obispo County south to Malibu Creek in Los Angeles County. The ESU was later extended to the US/Mexican border in San Diego County in 2002 (NMFS 2003b). In a later delineating approach, NOAA Fisheries recognized the anadromous life history form of *O. mykiss* as a distinct

population segment (DPS) under the ESA (NMFS 2005). The DPS policy differs from the ESU by delineating a group of organisms by “marked separation” rather than “substantial reproductive isolation”. In the case of *O. mykiss* of the southern California steelhead ESU, this marked separation between the two life history forms was considered valid because of physical, physiological, ecological, and behavioral factors related to its anadromous life history characteristics. Both resident and anadromous *O. mykiss*, where the two forms co-occur and are not reproductively isolated, are still part of the ESU; however, the anadromous *O. mykiss* (steelhead) are now part of a smaller subset identified as the southern California steelhead DPS.

Rainbow trout can be generally organized into four large groupings (Behnke 1992; Scott and Crossman 1973): 1) coastal rainbow trout that extend from northern Baja California to northern Alaska near the Kuskokwim River and also the Kamchatkan Peninsula of northeastern Asia, 2) redband trout of the inland Columbia and Frazer River basins, 3) redband trout of the central valley of California, and 4) trout of the Gulf of California drainages. The taxonomic group of coastal rainbow trout, *O. m. irideus*, exhibit two life history forms; anadromous and resident. The common name for the anadromous life history form is termed steelhead trout and the resident form is generally termed rainbow trout. Throughout the range of coastal rainbow trout, there is a widespread occurrence of the anadromous life history form (Behnke 1992). There are two general life history patterns exhibited by adult anadromous steelhead when they return from the ocean to spawn in fresh water. The patterns are group by either summer or winter spawning runs. There are many exceptions to this pattern, but this general characterization has been use to group steelhead spawning runs by the season in which the peak of spawning run occurs as they return from the ocean (Busby et al. 1996). Summer steelhead are generally found in river systems that drain from far inland like that of the Columbia Basin. Winter steelhead runs are typically found in the coastal areas where river systems is not as large and overall are the most abundant life history pattern within the natural range of the species (Busby et al. 1996).

3.0 MONITORING

The monitoring and evaluation studies and activities related to the modifications of the Robles Facility, as outlined in the BO (NMFS 2003a), were intended to achieve three main objectives:

- I. Monitor Fish Passage Facility operations and performance
- II. Determine if the Fish Passage Facility functions and operates in such a fashion that migrating steelhead:
 - a. Successfully navigate into and through the facility, and
 - b. Move through the facility in good physical condition.
- III. Determine if the operations at the Robles Diversion are enhancing the opportunity for:
 - a. Adult steelhead to migrate upstream to the Robles Facility, and
 - b. Smolts and kelts to migrate downstream through the Robles Reach.

3.1 Upstream Fish Migration Impediment Evaluation

Methods

The objective of the impediment evaluation was to assess factors that may impede steelhead's ability to migrate to the fish passage facilities (NMFS 2003a).

Selected critical passage features were to be surveyed multiple times during the fish migration season to determine water depth, velocity, and discharge. The method used to estimate stream discharge was to be the velocity-area method following the USGS methods in Nolan and Shields (2000). The selected sites were to be surveyed over a range of discharges from approximately 20-100 cfs (the upper limit dependent on the ability to safely conduct the surveys). The number of re-surveys was to be dependent on the number of significant rain events, the number of selected sites, access to sites, and time constraints due to other aspects of the monitoring and evaluation program. These surveys will most likely be conducted over a period of 2-3 years depending on water conditions. The selected sites will be surveyed as many times as needed to develop a statistically rigorous data set that could be used to evaluate fish passage using this method.

Results

No impediment evaluations were conducted during the reporting period because of the lack of flowing water through the Robles Reach.

3.1.1 Sandbar Monitoring

Methods

The primary objective of the sandbar monitoring was to determine if the criteria for initiation of the fish passage augmentation season have been met (NMFS 2003a). From December 13, 2006 to June 6, 2007 the mouth of the Ventura River was inspected 15 times to determine if the sandbar had been breached. Thirteen of the observations occurred during the fish passage augmentation season (January 1 to June 30) and two were made before of the season in December. During each sandbar inspection, observations and recordings were made for: date, time, status of the sandbar, general location of the mouth, tidal stage, water temperature, discharge at the Robles Facility and the USGS Foster Park gauging station, and index count of piscivorous birds.

Results

On all but one occasion, the sandbar was breached and the Ventura River was flowing into the Pacific Ocean allowing fish to volitionally enter or exit the estuary (Appendix 1).

The discharge at the USGS Foster Park gauge station ranged from about 6 to 10 cfs. The discharge at the Robles Facility ranged from 0 to 16 cfs. However, there was no surface water connection in the Ventura River between the Robles Facility and Foster Park (Robles Reach) during this time period. The Ventura River mouth remained on the west side of estuary during the monitoring period.

A total of 2,363 piscivorous birds were counted during nine index surveys of the Ventura River estuary (Appendix 2). The peak total counts generally covered a two month period from late March to late May. The bird that was observed the most were gulls at 1,488, followed by pelicans at 563, cormorants at 153, and terns at 146. Mergansers, egrets, grebes, and herons were counted less than six times each during the same period.

Discussion

Since the sandbar was already breached before January 1st, 2007, the fish passage augmentation season began on that date and continued through June 2007. The Ventura River, like many other California rivers, typically develops a seasonal sandbar at the mouth during the late spring or summer and is breached by higher river discharge in the late fall and winter. However, during 2007 the sandbar did not form during the fish augmentation season except during one observation. During 2006 and 2005, a sandbar also did not develop at the mouth. As detailed data are collected on this dynamic process, a better understanding of the Ventura River estuary will begin to be developed and how this process compares with other California systems. A lagoon that forms if a sandbar develops can provide important rearing habitat for steelhead juveniles, due to the abundant food resources available, and facilitate the physiological and behavioral changes associated with steelhead smoltification (Cannata 1998).

3.2 Fish Attraction Evaluation

Methods

The objective of the fish attraction evaluation was to determine if any adult or smolt steelhead were holding in close proximity to the fish ladder entrance during the fish passage augmentation season (NMFS 2003a). The primary area of interest was the reach immediately downstream of the Robles Facility to the low-flow road crossing. The reach also included the area downstream of the low-flow road crossing within the four rock weirs. The distance of this reach was approximately 200 m. Bank surveys were completed from mid January through June of 2007. Bank surveys were conducted by one or two surveyors moving in an upstream direction while wearing polarized glasses. All fish species were identified and enumerated with the greatest amount of certainty that the conditions and fish densities would allow.

Results

The reach downstream of the fish facility was surveyed 21 times. The last two surveys in June were conducted only at the entrance pool below the Robles Facility because it was the only location that retained water at that time. A total of 3,831 m were surveyed from mid January through July. An estimated 2,255 fish were observed during all surveys (Appendix 3). Most of the fish observed were arroyo chub, *Gila orcutti*, (n= 1,628), followed by unidentifiable fry due to their small size, but were most likely arroyo chub fry because of their high adult abundance in the watershed. While arroyo chub were the most abundant species observed during the surveys, three-spine stickleback, *Gasterosteus aculeatus*, were the second most commonly observed species at 185. *O. mykiss* were observed throughout the reach and totaled 63. The water temperatures where *O. mykiss* were observed ranged from 6.7 °C in January to 22.0 °C at the end of May. Three green sunfish, *Lepomis cyanellus* were also counted during the surveys.

Discussion

Previous surveys and studies found fish species throughout the Ventura River similar to the surveys conducted in 2007 (EDAW 1978; Moore 1980; CMWD 1988, 2006; and Capelli 1997). The total count of 2,255 was most likely the result of multiple recounted fish. In particular, the count of 63 *O. mykiss* in the reach below the Robles Facility is the result of counting a population of approximately 10 fish multiple times. The highest count of *O. mykiss* during any one survey was 10 and typically ranged from about 4 to 9 fish. For a similar period of time during 2006, the highest count of *O. mykiss* was 3 fish (CMWD 2006). This difference was most likely real and the result of additional fish migrating downstream from upstream of the Robles Facility. In addition, fish could have migrated upstream as the surface flow retreated upstream through the reporting period. The fish immediately downstream of the facility remained in this area, this could have been due to an inability to migrate upstream through the fish ladder because of insufficient water depth in the ladder or a preference for the cooler water in the pool and a rejection of the warmer water coming from the ladder. On May 30, a temperature profile was conducted and it showed a strong stratification. The surface temperature was 26 °C and at 4 m it was 17 °C; the temperature of water flowing into the pool from the fish ladder was 26.7 °C.

3.3 Fish Passage Monitoring

Methods

Fish passage monitoring within the Robles Facility is accomplished using a Vaki Riverwatcher (Riverwatcher). The Riverwatcher consists of a scanner with light diodes that send infrared light beams to receivers through the water to a receiving scanner plate. When a fish swims through the infrared beams of light, it breaks the signal and a silhouette is recorded on a computer. In addition, when a fish swims through the infrared light beams, the scanner triggers an underwater camera to record a short video

clip. Only fish swimming upstream can be recorded because the camera is on the upstream side of the scanner. Other data recorded when the scanner is triggered are: date and time, length of the fish (from a length/height ratio), swimming speed (m/sec), and direction of the fish movement (upstream or downstream). The scanner is positioned in the center of an aluminum frame (fish crowder) covered with 1/2 inch aluminum bars, spaced apart 2 inches on center, with a resulting 1 1/2 inch spacing between the bars that crowds the fish and directs them to swim between the scanner plates. The crowder acts essentially as a bottleneck for the fish to swim through so they can be counted in both an up- and downstream direction.

Results

The crowder and Vaki Riverwatcher were not operated during the reporting period due to the low water conditions. The highest discharge recorded during the period was 16 cfs (Appendix 4) and a minimum of 35 cfs is needed to operate the Riverwatcher. A new fish crowder was designed and constructed and will be operational for the 2007-2008 diversion season (Appendix 5). The new design will have an additional camera to record downstream migrating fish on video. Overall, the new fish crowder is anticipated to improve the monitoring of fish passage through the Robles Facility in several respects that include:

1. New crowder will house the Vaki Riverwatcher scanner near the bottom of the fish bypass so that it may be operated at lower flows (about 10-15 cfs) than the current minimum of approximately 35 cfs.
2. With the scanner closer to the bottom of the fish bypass, it is hoped that the water velocities will be lower, therefore the fish swimming speed will also be lower, and allow for better detection and size estimation by the Vaki Riverwatcher.
3. The new crowder will have a longer scanner section creating better lighting conditions for improved fish detection and identification using the cameras.
4. The longer scanner section will also direct fish better through the camera field of view so that fish lengths can be verified (e.g., to determine the difference between a rainbow trout and steelhead).
5. The addition camera will allow for the verification and identification of fish moving downstream.

4.0 ROBLES FACILITY OPERATIONS

4.1 Facility Status

The Robles Fish Passage Facility started the 2006-2007 season complete. The 2006-2007 season was characterized by very little rainfall and subsequent lack of runoff. **No water diversions occurred during the year.**

The 2006 Report identified several projects to be completed during the summer and fall. These projects were:

- Repair of the interim weirs below the measurement weir.
- Repair of the auxiliary water flow meter.
- Repair of the diffuser panels and grating in the fish passage entrance box.
- Improvements to the brush system.
- Non native plant removal.
- Install digital surveillance cameras and recorder.
- Construct new Vaki Shroud (Crowder).

A brief description of each project and the project's status is listed below:

Repair of the Interim Weirs and Road Crossing Modifications-Two rock and cable weirs were repaired during the fall. California Conservation Corps (CCC) installed additional cables. Flows during the year were inadequate for the repaired weirs to seal or demonstrate their effectiveness.

The model studies for the Matilija Dam Removal Project indicate that accretion of sediment is likely in the Robles Reach. This accretion is significant enough to bury the proposed 15 weirs and the existing low flow crossing. Construction of the 15 additional weirs will not be pursued by Casitas until either the more refined model studies or the actual removal of the dam demonstrate that the weirs will not become buried and will be effective. Casitas will continue to maintain the interim weirs and make modifications as required to allow for fish passage through this reach.

Repair of the auxiliary flow meter-The auxiliary flow meter was not operational by the end of the 2005-2006 season. In the fall of 2006, when the entrance box could be drained, the transducers for the auxiliary flow meter were inspected. The mounting band holding the transducers was torn loose from the pipe. The band was damaged. To protect the instrument from further damage it was removed. Flows from the auxiliary pipeline can be estimated by the measurement weir at the low flow crossing. Repairs or replacement of the transducers is anticipated for the fall of 2007.

Repair the trash grate and diffuser panel in the entrance box-The winter storms of 2004-2005 damaged one of the vertical grates at the entrance/diffuser box. In the summer of 2005, Casitas staff was unable to close the entrance box gates and pump the box dry to facilitate the removal and repair of the grate. During the fall of 2006, the

gates were closed sufficiently to allow the entrance box to be pumped dry. This allowed for the inspection and repair of the trash grate. Temporary repairs were made to the diffuser panels. This pump out period also showed that the gates were not sealing and that the diffuser panels were clogged with debris. The diffuser panels were cleaned and reinstalled. Casitas is investigating a way to make the diffuser panels removable from the top of the entrance to facilitate cleaning and inspections. Currently, the diffuser panels are bolted to the concrete at the top and bottom.

Improvements to the Brush System – Casitas continued to modify the brush system in an attempt to reduce the periods when the fish screens become clogged with debris. Stiffer brushes were installed and other mechanical changes were made to improve the reliability of the system. The lack of rainfall prevented the evaluation of the modifications. MWH, a consulting firm formerly known as Montgomery Watson Harza, was hired by Casitas to make recommendations on the brush system. MWH produced a report with suggested modifications. Based on these recommendations, additional modifications will be made and tested over the next several seasons.

Removal of *Arundo donax* from the forebay and channel-Casitas contracted with the CCC for *Arundo* and other non-native species removal from the forebay, spillway, and downstream channel area.

Installation of Surveillance Cameras and Recorder – A closed circuit TV system with a digital recorder was installed at Robles to discourage vandalism. The system includes 8 cameras and a 9-channel digital recorder. The recorder is capable of storing approximately one week of data.

Construct New Vaki Shroud – Casitas received a grant from the Pacific States Marine Fisheries Commission through the California Department of Fish & Game to construct a new shroud for the Vaki Riverwatcher. The new shroud will allow for documentation of fish activity down to flows of about 15 cfs. The new shroud will also allow for the addition of a camera to document downstream fish movements. The new shroud was completed in May 2007. Casitas will continue to “fine tune” the new shroud during the summer and fall.

4.2 Flow Observations and Control

Some flow continued through the Robles Facility area of the Ventura River until mid June 2007.

The District collected flow information and verified flows where and when reasonably safe conditions existed in the Ventura River. Flow and level measurement devices are also located at various locations within the Robles Fish Passage Facility. The primary points of measuring and recording stream flows entering, flowing through and leaving the Robles Fish Passage Facility are:

- Matilija Creek at Matilija Hot Springs – located approximately 2,100 feet downstream of Matilija Dam – good rating for low to moderate flows – operated by Casitas Municipal Water District, formerly a USGS station;
- North Fork Matilija Creek – located approximately 3,000 feet upstream of its confluence with Matilija Creek – good rating for low to moderate flows – operated by the Ventura County Watershed District;
- Robles-Casitas Diversion Canal – located on the diversion canal approximately 1,300 feet downstream of the Robles Diversion Dam – trapezoidal channel with a good rating for flows up to 600 cfs;
- Ventura River near Meiners Oaks (VRNMO) – located approximately 540 feet downstream of the Robles Fish Passage spillway – concrete weir section – good rating to 70 cfs, use of equations above 70 cfs with poor ratings above 1000 cfs (no verifications at higher flows).
- Fish Ladder-A 4 path flow meter by Accusonics located near the Riverwatcher. Provides reasonable flow data in the 15 to 60 cfs range.
- Auxiliary Water Supply-An American Sigma flow meter currently not in operation.

All of the instruments can suffer from inaccuracies from time to time. The inaccuracies can be caused by clogging of bubbler lines, electronic creep, debris accumulating on sensors, changes to the measured cross sections, and equipment problems. As an example, the auxiliary water supply flow meter would not read above 25 cfs during a test conducted in March 2006. This instrument should read flows up to 120 cfs with the control gates fully opened. For this reason, the data is verified against field measurements and observations. The information gathered from each of these locations has been reduced to the daily reporting of flows in the form of cubic-feet per second-day (cfsd). The spreadsheets are in Appendix 6, entitled “Ventura River Flow Assessment for the Robles Fish Passage Facility – FY 06-07”.

No rain events provided sufficient runoff for full operation of the Fish Passage Facility during the 2006-07 rainfall season. At no time during the year was there surface flow continuity between the Robles Facility and the ocean. No diversions to Lake Casitas took place. The screens remained in place for the entire year.

No supplemental flow releases, as specified in the BA/BO, were required this year.

Facility Testing

Due to insufficient flows, no facility testing occurred this year. Testing will be completed next year if there are sufficient flows for testing.

4.3 Costs Associated with Operation and Monitoring

The BA/BO specified that the District provide the costs that are associated with the activity. The following is a summary of the direct costs incurred by the District during the 2006-07 fiscal years:

FY 2006-07

- **Fisheries Monitoring:**

Salaries	\$ 78,794
Equipment	\$ 10,473
Materials	<u>\$ 3,500</u>
	\$ 92,767

- **Facility Operations:**

Salaries	\$ 74,971
Materials	\$ 4,122
Outside Contract	\$ 2,317
Permit & Misc	\$ 2,316
Equipment	<u>\$ 3,564</u>
	\$ 87,290

- **Capital Improvements:**

- Fish Passage Facility**

Salaries	\$ 0
Equipment	\$ 0
Outside Contracts	<u>\$ 29,417</u>
	\$ 29,417

- Interim Weirs Repairs**

Salaries	\$ 1,823
Equipment	\$ 0
Outside Contracts	<u>\$ 31,686</u>
	\$ 33,509

- Vegetation Mitigation (Arundo)**

Salaries	\$ 0
Equipment	\$ 0
Permits	\$ 500
Outside Contracts	<u>\$ 6,245</u>
	\$ 6,745

- Security Camera Installation**

Salaries	\$ 0
Equipment	\$ 0
Outside Contracts	<u>\$ 14,048</u>
	\$ 14,048

- Vaki Shroud (Funded in part with a PSFMC Grant)**

Salaries	\$ 4,922
Equipment	\$ 626
Outside Contracts	<u>\$ 18,980</u>
	\$ 24,528

4.4 Assessment of the Effectiveness to Provide Fish Passage

There were insufficient flows this year to allow for passage of *O. mykiss* through the Robles Fish Passage Facility.

4.5 Recommendations Regarding the Prioritization of Future Activities

The District has completed its second season with the fish passage fully operational. Several projects have been identified to improve the functionality and reliability of the system. Other items require repairs. The summer and fall work list is attached Appendix 7.

4.6 Recommendations on any Revisions Deemed Necessary to the Operations

Casitas recommends that the construction of the 15-weir portion of the project be put on hold until the results of the more detailed model studies being conducted for the Matilija Dam Removal Project are known. Preliminary model studies show that the Robles Reach of the river will significantly accrete with the removal of the dam. The level of accretion could be sufficient to bury the weirs. The accretion of sediment in this reach would make the weirs unnecessary for grade control.

5.0 LITERATURE CITED

- Behnke, R. J. 1992. Native trout of western North America. American Fisheries Society Monograph 6.
- Bjornn, T. C., P. J. Keniry, K. R. Tolotti, J. P. Hunt, R. R. Ringe, C. T. Boggs, T. B. Horton, and C. A. Peery. 2003. Migration of adult steelhead past dams and through reservoir the lower Snake River and into the tributaries, 1991-1995. U.S. Army Corps of Engineers and Bonneville Power Administration. Portland, Oregon.
- Busby, P. B., T. C. Wainwright, G. J. Bryant, L. J. Lierheimer, R. S. Waples, F. W. Waknitz, and Lagomarsino. 1996. Status review of west coast steelhead from Washington, Idaho, Oregon, and California. National Marine Fisheries Service. NOAA technical memorandum NMFS-NWFSC-27, August 1996.
- Cannata, S. T. 1998. Observations of steelhead trout (*Oncorhynchus mykiss*), coho salmon (*O. kisutch*) and water quality of the Navarro River estuary/lagoon, May 1996 to December 1997. Draft report, Humboldt State University Foundation. Humboldt, CA.
- Capelli, M. H. 1997. Ventura River steelhead survey. Prepared for California Department of Fish and Game, Region 5.
- CMWD. 1988. Ventura River fisheries monitoring program monthly report, June, 1988. Casitas Municipal Water District, Oak View, CA.
- CMWD. 2005. Annual progress report for the Robles Diversion Fish Passage Facility and Ventura River impediment monitoring. Casitas Municipal Water District, Oak View, CA.
- Dettman, D. H. and D. W. Kelley. 1986. Assessment of the Carmel River steelhead resource, Volume 1. biological investigations. Monterey Peninsula Water Management District, Monterey, CA.
- Ebersole, J. L., W. J. Liss, and C. A. Frissell. 2001. Relationship between stream temperature, thermal refugia and rainbow trout *Oncorhynchus mykiss* abundance in arid-land streams in the northwestern United States. Ecology of Freshwater Fish, 10(1).
- EDAW. 1978. Draft environmental impact report: Ventura River conjunctive use agreement. Casitas Municipal Water District and the City of San Buenaventura.
- Entrix. 1999. Evaluations of natural passage barriers on the Ventura River downstream of Robles Diversion. Entrix, Walnut Creek, CA.

- Giorgi, A.E., L.C. Stuehrenberg, D.R. Miller and C.W. Sims. 1986. Smolt Passage Behavior and Flow-Net Relationship in the Forebay of John Day Dam. Portland, Bonneville Power Administration. Oregon.
- Harrison, L. R., E. A. Keller, E. Kelley, and L. A. K. Mertes. 2006. Minimum flow requirements for southern steelhead passage on the lower Santa Clara River, CA. University of California, Santa Barbara.
- Moore, M. R. 1980. Factors influencing the survival of juvenile steelhead rainbow trout (*Salmo gairdneri gairdneri*) in the Ventura River, California. MS Thesis. Humboldt State University, Humboldt, CA.
- Mosley, M. P. 1982. Critical depths for passage in braided river, Canterbury, New Zealand. *New Zealand Journal of Marine and Freshwater Research*, Vol. 16:351-357.
- National Marine Fisheries Service. 1997. Endangered and Threatened Species: Listing of Several Evolutionary Significant Units (ESUs) of West Coast Steelhead. Federal Register, 50 CFR Parts 222 and 227 [Docket No. 960730210-7193-02; I.D. 050294D] RIN 0648-XX65. Vol. 62, page 43937.
- National Marine Fisheries Service. 2003a. Biological opinion for the Robles diversion fish passage facility, Ventura River, CA. Protected Resource Division, Southwest Region, March 31, 2003.
- National Marine Fisheries Service. 2003b. Endangered and Threatened Species: Range Extension for Endangered Steelhead in Southern California. Federal Register, 50 CFR Part 224 [Docket No. 001025296-2079-02; I.D. 072600A] RIN 0648-AO05. Vol. 67 page 21586.
- National Marine Fisheries Service. 2005. Endangered and Threatened Species: Request for Comment on Alternative Approach to Delineating 10 Evolutionarily Significant Units of West Coast *Oncorhynchus mykiss*. 50 CFR Parts 223 and 224 [Docket No. 040525161-5274-05; I.D. No. 052104F] RIN No. 0648-AR93. Vol. 70 page 67130.
- Scott, W. B. and E. J. Crossman. 1973. Freshwater fishes of Canada. Fisheries Research Board of Canada, Ottawa, Bulletin 184.
- Shapovalov, L. and A. C. Taft. 1954. The life histories of the steelhead rainbow trout (*Salmo gairdneri gairdneri*) and silver salmon (*Oncorhynchus kisutch*), with special reference to Waddell Creek, California, and recommendations regarding their management. State of California Department of Fish and Game, fish bulletin No. 98.

SYRTAC (Santa Ynez River Technical Advisory Committee). 1999. Adult steelhead passage flow analysis for the Santa Ynez River. Santa Ynez River Consensus Committee, Santa Barbara, CA.

SYRTAC. 2000. Lower Santa Ynez River fish management plan. Santa Ynez River Consensus Committee, Santa Barbara, CA.

Thompson, K. 1972. Determining stream flows for fish life. Pacific Northwest River Basins Commission, instream flow requirements workshop. Portland, Oregon. Proceedings: 31-50.

U.S. Bureau of Reclamation. 2003. Revised biological assessment for diversion operations and fish passage facilities at the Robles Diversion, Ventura River, CA. South-Central California Area Office, February 21, 2003.

6.0 APPENDIXES

Appendix 1. Ventura River Sandbar Monitoring during the 2007 migration season.

Date	Sandbar Breeched (Y/N)	Tide Time (24h)	Tide Height (ft)	Tidal State	High Tide		Low Tide		Temp (°C) ^a	Discharge at Foster ^b	Discharge at Robles	Notes
					Time (24h)	Height (ft)	Time (24h)	Height (ft)		(cfs)	(cfs)	
12/13/06	Y	14:15	2.74	flood	16:29	3.19	11:26	2.09	13.44	10.0	5	River on west bank
12/28/06	Y	11:10	1.14	slack	16:38	3.18	11:02	1.14	11.37	7.6	5	River on west bank
01/04/07	Y	11:30	4.71	ebb	09:07	6.41	16:34	-1.16	11.55	7.5	6	River on west bank
01/17/07	Y	10:45	3.42	ebb	07:30	6.22	15:03	-1.13	8.21	7.6	6	River on west bank
01/30/07	Y	10:00	3.70	ebb	07:00	6.12	14:31	-1.18	12.71	13.0	6	River on west bank
02/15/07	Y	11:15	2.03	ebb	07:17	6.10	14:36	-1.19	13.20	8.2	7	River on west bank
02/27/07	Y	15:00	-0.25	flood	20:10	3.85	13:36	-0.8	14.46	10.0	7	River on west bank
03/16/07	Y	13:00	0.32	flood	07:59	5.68	14:57	-0.91	16.58	6.6	6	River on west bank
03/28/07	Y	10:15	2.54	ebb	06:55	4.81	14:02	-0.42	15.40	7.8	5	River on west bank
04/11/07	N	10:45	0.45	ebb	04:21	4.23	12:20	0.01	17.27	7.7	5	River on west bank
04/20/07	Y	10:30	1.72	flood	13:20	3.26	06:47	-1.1	15.07	9.0	1	River on west bank
04/24/07	Y	10:30	0.16	ebb	03:52	4.28	11:39	-0.09	17.43	9.0	1	River on west bank
05/09/07	Y	10:20	0.10	slack	17:49	3.56	10:20	0.1	19.52	8.8	1	River on west bank
05/22/07	Y	10:30	0.12	flood	16:55	3.78	09:37	-0.14	18.78	6.3	1	River on west bank
06/06/07	Y	10:30	0.40	flood	15:44	3.70	08:32	-0.16	19.18	6.8	1	River on west bank

^aDaily mean temperature of Ventura River at Main St. Bridge.

^bUSGS gauging station 11118500, downstream of Foster Park.

Appendix 2. Ventura River Estuary Piscivorous Bird Survey. All surveys were conducted during 2007.

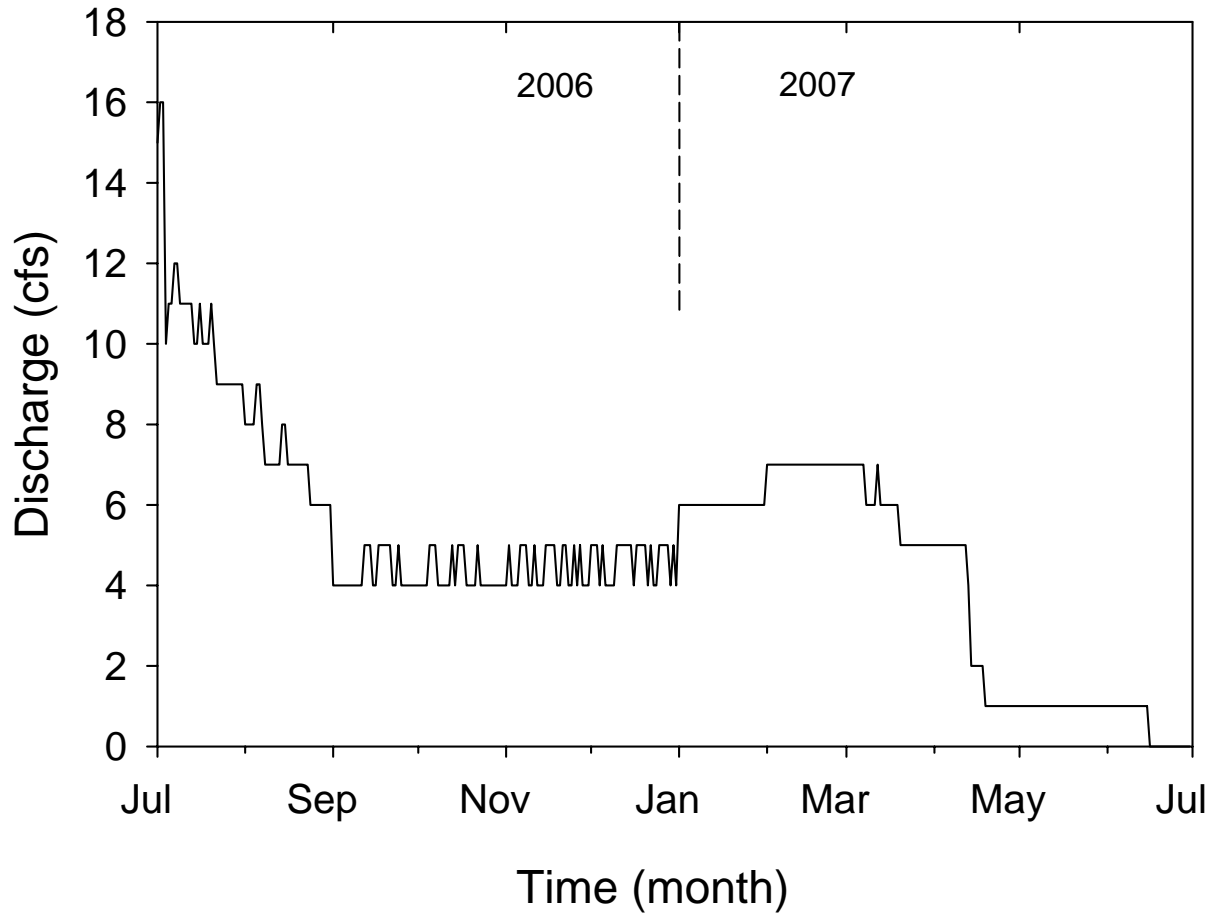
Common Name	Date									Total
	7-Feb	27-Feb	16-Mar	28-Mar	11-Apr	24-Apr	9-May	22-May	6-Jun	
Gull	41	15	86	490	10	16	530	300	41	1,488
Pelican		25	49	38	2	3	195	180	71	563
Cormorant	13	4	17	22	28	22	32	25	3	153
Tern					4	9			133	146
Merganser		4	1							5
Egret				3						3
Greeb						1	1	1		3
Heron						1		1		2
Total	54	48	153	553	44	52	758	507	248	2,363

Appendix 3. Fish attraction evaluation downstream of Robles Facility.

Date	Survey Method	Location	Length (M)	Temp (°C)	Turbidity (NTU)	Discharge from Robles (cfs)	Species Code ^a	Quantity
01/18/07	Bank	Robles entrance pool to d/s most rock weir	200	6.7	0.6	6	OMY	1
02/02/07	Bank	Robles entrance pool to d/s most rock weir	200	8.2	3.0	7	NFO	
02/09/07	Bank	Robles entrance pool to d/s most rock weir	200	13.2	1.9	7	OMY	1
02/16/07	Bank	Robles entrance pool to d/s most rock weir	200	13.4	1.2	7	NFO	
02/22/07	Bank	Robles entrance pool to d/s most rock weir	200	12.6	2.2	7	NFO	
02/27/07	Bank	Robles entrance pool to d/s most rock weir	200	15.1	4.2	7	NFO	
03/08/07	Bank	Robles entrance pool to d/s most rock weir	200	11.3	1.6	6	NFO	
03/16/07	Bank	Robles entrance pool to d/s most rock weir	200	16.1	2.4	6	NFO	
03/25/07	Bank	Robles entrance pool to d/s most rock weir	200	15.1	1.6	5	NFO	
04/04/07	Bank	Robles entrance pool to d/s most rock weir	200	16.8	1.1	5	OMY	9
04/12/07	Bank	Robles entrance pool to d/s most rock weir	200	15.2	1.7	5	NFO	
04/19/07	Bank	Robles entrance pool to d/s most rock weir	200	18.4	0.8	1	OMY	6
04/24/07	Bank	Robles entrance pool to d/s most rock weir	200	19.3	1.6	1	OMY	9
							STB	11
							ARC	16
							FRY	20
05/04/07	Bank	Robles entrance pool to d/s most rock weir	200	16.3	8.6	1	OMY	5
							ARC	14
							STB	8
							FRY	6
05/09/07	Bank	Robles entrance pool to d/s most rock weir	200	21.1	7.8	1	OMY	6
							ARC	315
							STB	35
							GSF	3
							FRY	50
05/17/07	Bank	Robles entrance pool to d/s most rock weir	200	18.3	1.1	1	OMY	7
							ARC	350
							STB	50
							FRY	100
05/22/07	Bank	Robles entrance pool to d/s most rock weir	200	19.5	1.8	1	OMY	5
							ARC	150
							STB	15
05/29/07	Bank	Robles entrance pool to d/s most rock weir	200	22.0	1.3	1	OMY	10
							ARC	183
							STB	34
							FRY	200
06/05/07	Bank	Robles entrance pool to d/s most rock weir	200	19.9	1.3	1	OMY	4
							ARC	600
							STB	32
06/18/07	Bank	Robles entrance pool	25	—	—	0	NFO	
6/25/07	Bank	Robles entrance pool	6	22.5	—	0	NFO	

^aFish Species Codes: O. mykiss = MYK, threespine stickleback = STB, arroyo chub = ARC, no fish observed = NFO, fry unknown species = FRY, green sunfish = GSF.

Species	Total
arroyo chub	1,628
fry unknown species	376
threespine stickleback	185
O. mykiss	63
green sunfish	3
Total	2,255



Appendix 4. Discharge (cfs) below the Robles Fish Passage Facility for the reporting period from July 1, 2006 through June 31, 2007.



Appendix 5. Photo of the new fish crowder that directs migrants through the Vaki Riverwatcher scanner. The crowder is out of fish bypass and not operational in photo. Also in the photo is an A-frame and hoist that was completed and will allow for easy removal of the crowder for cleaning and repair.

Appendix 6. Ventura River Flow Assessment for the Robles Fish Passage - FY 06-07.

Annual Flow Summary - Robles Fish Passage Facility - FY 06-07							
	(1)	(2)	(1)+(2)	(3)	(4)	(5)	(4)+(5)
	Source Stream Daily Flows			Robles Facility Daily Flows			
	Matilija Ck D/S Dam* (cfsd)	North Fork Matilija Ck.* (cfsd)	Sum of Creek Flows (cfsd)	Fishway Ladder ** (cfsd)	VRNMO Weir (cfsd)	Diversion Canal (cfsd)	Total Inflow (cfsd)
Jul-06	390		421	0	330	0	330
Aug-06	265		296	0	220	0	220
Sep-06	210		240	0	129	0	129
Oct-06	221		283	0	132	0	132
Nov-06	210		270	0	133	0	133
Dec-06	217		310	0	144	0	144
Jan-07	222		315	0	186	0	186
Feb-07	223		293	0	196	0	196
Mar-07	191		253	0	182	0	182
Apr-07	155		215	0	86	0	86
May-07	155		217	0	31	0	31
Jun-07	150		180	0	15	0	15
Jul-07	155		186	0	0	0	0
Aug-07	135		166	0	0	0	0
Sep-07	98		127	0	0	0	0
Total	2997		3772	0	1784	0	1784

* Preliminary flow information provided by the Ventura County Watershed Protection District. North Fork Data is estimated. To be confirmed by VCWPD. Refer to the Operations section of the Report to determine operational reasons for flow variances.

** Flow in the Fish Passage was too low to be measured by the Accusonics Flowmeter. Flow needs to be greater than 15 CFS for reasonable flow measurements.

Jul-06	Source Stream Daily Flows			Forebay Avg. Depth (ft)	Robles Facility Daily Flows				Robles Diversion (AF)	Field Measurements	
	Matilija Ck D/S Dam* (cfsd)	North Fork Matilija Ck. * (cfsd)	Sum of Creek Flows (cfsd)		Fishway Ladder** (cfsd)	VRNMO Weir (cfsd)	Diversion Canal (cfsd)	Total Inflow (cfsd)		Matilija Crk (cfs)	VRNMO (cfs)
1	16	1	17			15	0	15	0		
2	16	1	17			16	0	16	0		
3	16	1	17			16	0	16	0		
4	15	1	16			10	0	10	0		
5	15	1	16			11	0	11	0		
6	15	1	16			11	0	11	0		
7	15	1	16			12	0	12	0		
8	15	1	16			12	0	12	0		
9	14	1	15			11	0	11	0		
10	14	1	15			11	0	11	0		
11	14	1	15			11	0	11	0		
12	14	1	15			11	0	11	0		
13	14	1	15			11	0	11	0		
14	11	1	12			10	0	10	0		
15	11	1	12			10	0	10	0		
16	11	1	12			11	0	11	0		
17	11	1	12			10	0	10	0		
18	11	1	12			10	0	10	0		
19	11	1	12			10	0	10	0		
20	12	1	13			11	0	11	0		
21	11	1	12			10	0	10	0	24	9
22	11	1	12			9	0	9	0		
23	10	1	11			9	0	9	0		
24	10	1	11			9	0	9	0		
25	11	1	12			9	0	9	0		
26	11	1	12			9	0	9	0		
27	11	1	12			9	0	9	0		
28	11	1	12			9	0	9	0	13	8
29	11	1	12			9	0	9	0		
30	11	1	12			9	0	9	0		
31	11	1	12			9	0	9	0		
Totals	390	31	421			0	330	0	330		

Aug-06	Source Stream Daily Flows			Forebay Avg. Depth (ft)	Robles Facility Daily Flows				Robles Diversion (AF)	Field Measurements	
	Matilija Ck D/S Dam (cfsd)	North Fork Matilija Ck. (cfsd)	Sum of Creek Flows (cfsd)		Fishway Ladder (cfsd)	VRNMO Weir (cfsd)	Diversion Canal (cfsd)	Total Inflow (cfsd)		Matilija Crk (cfs)	VRNMO (cfs)
1	9	1	10			8	0	8	0		
2	9	1	10			8	0	8	0		
3	9	1	10			8	0	8	0		
4	9	1	10			8	0	8	0		
5	9	1	10			9	0	9	0		
6	9	1	10			9	0	9	0		
7	9	1	10			8	0	8	0		
8	9	1	10			7	0	7	0		
9	9	1	10			7	0	7	0		
10	9	1	10			7	0	7	0		
11	9	1	10			7	0	7	0		
12	9	1	10			7	0	7	0		
13	9	1	10			7	0	7	0		
14	9	1	10			8	0	8	0		
15	10	1	11			8	0	8	0		
16	9	1	10			7	0	7	0		
17	9	1	10			7	0	7	0		
18	9	1	10			7	0	7	0		
19	9	1	10			7	0	7	0		
20	9	1	10			7	0	7	0		
21	9	1	10			7	0	7	0		
22	9	1	10			7	0	7	0		
23	8	1	9			7	0	7	0		
24	8	1	9			6	0	6	0		
25	8	1	9			6	0	6	0	6.5	
26	7	1	8			6	0	6	0		
27	7	1	8			6	0	6	0		
28	7	1	8			6	0	6	0		
29	7	1	8			6	0	6	0		
30	7	1	8			6	0	6	0		
31	7	1	8			6	0	6	0		
Totals	265	31	296			0	220	0	220		

Sep-06	Source Stream Daily Flows			Forebay Avg. Depth (ft)	Robles Facility Daily Flows				Robles Diversion (AF)	Field Measurements	
	Matilija Ck D/S Dam (cfsd)	North Fork Matilija Ck. (cfsd)	Sum of Creek Flows (cfsd)		Fishway Ladder (cfsd)	VRNMO Weir (cfsd)	Diversion Canal (cfsd)	Total Inflow (cfsd)		Matilija Crk (cfs)	VRNMO (cfs)
1	7	1	8			4	0	4	0		
2	7	1	8			4	0	4	0		
3	7	1	8			4	0	4	0		
4	7	1	8			4	0	4	0		
5	7	1	8			4	0	4	0		
6	7	1	8			4	0	4	0		
7	7	1	8			4	0	4	0		
8	7	1	8			4	0	4	0		
9	7	1	8			4	0	4	0		
10	7	1	8			4	0	4	0		
11	7	1	8			4	0	4	0		
12	7	1	8			5	0	5	0		
13	7	1	8			5	0	5	0		
14	7	1	8			5	0	5	0		
15	7	1	8			4	0	4	0		
16	7	1	8			4	0	4	0		
17	7	1	8			5	0	5	0		
18	7	1	8			5	0	5	0		
19	7	1	8			5	0	5	0		
20	7	1	8			5	0	5	0		
21	7	1	8			5	0	5	0		
22	7	1	8			4	0	4	0		
23	7	1	8			4	0	4	0		
24	7	1	8			5	0	5	0		
25	7	1	8			4	0	4	0		
26	7	1	8			4	0	4	0		
27	7	1	8			4	0	4	0		
28	7	1	8			4	0	4	0		
29	7	1	8			4	0	4	0		
30	7	1	8			4	0	4	0		
Totals	210	30	240			0	129	129			

Oct-06	Source Stream Daily Flows			Forebay Avg. Depth (ft)	Robles Facility Daily Flows				Robles Diversion (AF)	Field Measurements	
	Matilija Ck D/S Dam (cfsd)	North Fork Matilija Ck. (cfsd)	Sum of Creek Flows (cfsd)		Fishway Ladder (cfsd)	VRNMO Weir (cfsd)	Diversion Canal (cfsd)	Total Inflow (cfsd)		Matilija Crk (cfs)	VRNMO (cfs)
1	7	2	9			4	0	4	0		
2	7	2	9			4	0	4	0		
3	7	2	9			4	0	4	0		
4	7	2	9			4	0	4	0		
5	7	2	9			5	0	5	0		
6	7	2	9			5	0	5	0		
7	8	2	10			5	0	5	0		
8	7	2	9			4	0	4	0		
9	7	2	9			4	0	4	0		
10	7	2	9			4	0	4	0		
11	7	2	9			4	0	4	0		
12	7	2	9			4	0	4	0		
13	7	2	9			5	0	5	0		4
14	7	2	9			4	0	4	0		
15	7	2	9			5	0	5	0		
16	7	2	9			5	0	5	0		
17	7	2	9			5	0	5	0		
18	7	2	9			4	0	4	0		
19	7	2	9			4	0	4	0		
20	7	2	9			4	0	4	0		
21	7	2	9			4	0	4	0		
22	7	2	9			5	0	5	0		
23	7	2	9			4	0	4	0		
24	7	2	9			4	0	4	0		
25	7	2	9			4	0	4	0		
26	7	2	9			4	0	4	0		
27	7	2	9			4	0	4	0		
28	7	2	9			4	0	4	0		
29	8	2	10			4	0	4	0		
30	8	2	10			4	0	4	0		
31	8	2	10			4	0	4	0		
Totals	221	62	283			0	132	0	132		

Nov-06	Source Stream Daily Flows			Forebay Avg. Depth (ft)	Robles Facility Daily Flows				Robles Diversion (AF)	Field Measurements	
	Matilija Ck D/S Dam (cfsd)	North Fork Matilija Ck. (cfsd)	Sum of Creek Flows (cfsd)		Fishway Ladder (cfsd)	VRNMO Weir (cfsd)	Diversion Canal (cfsd)	Total Inflow (cfsd)		Matilija Crk (cfs)	VRNMO (cfs)
1	7	2	9			4	0	4	0	11	
2	7	2	9			5	0	5	0		
3	7	2	9			4	0	4	0		
4	7	2	9			4	0	4	0		
5	7	2	9			4	0	4	0		
6	7	2	9			5	0	5	0		
7	7	2	9			5	0	5	0		
8	7	2	9			5	0	5	0		
9	7	2	9			4	0	4	0		
10	7	2	9			4	0	4	0		
11	7	2	9			5	0	5	0		
12	7	2	9			4	0	4	0		
13	7	2	9			4	0	4	0		
14	7	2	9			4	0	4	0		
15	7	2	9			5	0	5	0		
16	7	2	9			5	0	5	0		
17	7	2	9			5	0	5	0	7.81	
18	7	2	9			5	0	5	0		
19	7	2	9			4	0	4	0		
20	7	2	9			4	0	4	0		
21	7	2	9			5	0	5	0		
22	7	2	9			5	0	5	0		
23	7	2	9			4	0	4	0		
24	7	2	9			4	0	4	0		
25	7	2	9			5	0	5	0		
26	7	2	9			4	0	4	0		
27	7	2	9			5	0	5	0		
28	7	2	9			4	0	4	0		
29	7	2	9			4	0	4	0		
30	7	2	9			4	0	4	0		
Totals	210	60	270			0	133	0	133		

Dec-06	Source Stream Daily Flows			Forebay Avg. Depth (ft)	Robles Facility Daily Flows			Total Inflow (cfsd)	Robles Diversion (AF)	Field Measurements	
	Matilija Ck D/S Dam (cfsd)	North Fork Matilija Ck. (cfsd)	Sum of Creek Flows (cfsd)		Fishway Ladder (cfsd)	VRNMO Weir (cfsd)	Diversion Canal (cfsd)			Matilija Crk (cfs)	VRNMO (cfs)
1	7	3	10			5		5	0		
2	7	3	10			5		5	0		
3	7	3	10			5		5	0		
4	7	3	10			4		4	0		
5	7	3	10			5		5	0		
6	7	3	10			4		4	0		
7	7	3	10			4		4	0		
8	7	3	10			4		4	0		
9	7	3	10			4		4	0		
10	7	3	10			5		5	0		
11	7	3	10			5		5	0		
12	7	3	10			5		5	0		
13	7	3	10			5		5	0		
14	7	3	10			5		5	0		
15	7	3	10			5		5	0		
16	7	3	10			4		4	0		
17	7	3	10			5		5	0		
18	7	3	10			5		5	0		
19	7	3	10			5		5	0		
20	7	3	10			5		5	0		
21	7	3	10			4		4	0		
22	7	3	10			5		5	0		
23	7	3	10			4		4	0		
24	7	3	10			4		4	0		
25	7	3	10			5		5	0		
26	7	3	10			5		5	0		
27	7	3	10			5		5	0		
28	7	3	10			5		5	0		
29	7	3	10			4		4	0		
30	7	3	10			5		5	0		
31	7	3	10			4		4	0		
Totals	217	93	310			0		144			

Jan-07	Source Stream Daily Flows			Forebay Avg. Depth (ft)	Robles Facility Daily Flows				Robles Diversion (AF)	Field Measurements	
	Matilija Ck D/S Dam (cfsd)	North Fork Matilija Ck. (cfsd)	Sum of Creek Flows (cfsd)		Fishway Ladder (cfsd)	VRNMO Weir (cfsd)	Diversion Canal (cfsd)	Total Inflow (cfsd)		Matilija Crk (cfs)	VRNMO (cfs)
1	7	3	10			6		6	0		
2	7	3	10			6		6	0		
3	7	3	10			6		6	0		
4	7	3	10			6		6	0		
5	7	3	10			6		6	0		
6	7	3	10			6		6	0		
7	7	3	10			6		6	0		
8	7	3	10			6		6	0		
9	7	3	10			6		6	0		
10	7	3	10			6		6	0		
11	7	3	10			6		6	0		
12	7	3	10			6		6	0		
13	7	3	10			6		6	0		
14	7	3	10			6		6	0		
15	6.6	3	9.6			6		6	0		
16	6.6	3	9.6			6		6	0		
17	6.6	3	9.6			6		6	0		
18	6.6	3	9.6			6		6	0		
19	7	3	10			6		6	0		
20	7	3	10			6		6	0		
21	6.6	3	9.6			6		6	0		
22	7	3	10			6		6	0		
23	7	3	10			6		6	0		
24	7	3	10			6		6	0		
25	7	3	10			6		6	0		
26	7.7	3	10.7			6		6	0		
27	8	3	11			6		6	0		
28	8	3	11			6		6	0		
29	8.5	3	11.5			6		6	0		
30	8.5	3	11.5			6		6	0		
31	8.5	3	11.5			6		6	0		
Totals	222.2	93	315.2			0	186	0	186		

Feb-07	Source Stream Daily Flows			Forebay Avg. Depth (ft)	Robles Facility Daily Flows				Robles Diversion (AF)	Field Measurements	
	Matilija Ck D/S Dam (cfsd)	North Fork Matilija Ck. (cfsd)	Sum of Creek Flows (cfsd)		Fishway Ladder (cfsd)	VRNMO Weir (cfsd)	Diversion Canal (cfsd)	Total Inflow (cfsd)		Matilija Crk (cfs)	VRNMO (cfs)
1	8	2.5	11			7		7	0		
2	7.5	2.5	10.0			7		7	0		
3	8	2.5	11			7		7	0		
4	8	2.5	11			7		7	0		
5	8	2.5	11			7		7	0		
6	8	2.5	11			7		7	0		
7	8	2.5	11			7		7	0		
8	8	2.5	11			7		7	0		
9	8	2.5	11			7		7	0		
10	8	2.5	11			7		7	0		
11	8	2.5	11			7		7	0		
12	8	2.5	11			7		7	0		
13	8	2.5	11			7		7	0		
14	8	2.5	11			7		7	0		
15	8	2.5	11			7		7	0		
16	8	2.5	11			7		7	0		
17	8	2.5	11			7		7	0		
18	8	2.5	11			7		7	0		
19	8.5	2.5	11.0			7		7	0		
20	8.5	2.5	11.0			7		7	0		
21	8	2.5	11			7		7	0		
22	8	2.5	11			7		7	0		
23	8	2.5	11			7		7	0		
24	8	2.5	11			7		7	0		
25	8	2.5	11			7		7	0		
26	7.5	2.5	10.0			7		7	0		
27	7.7	2.5	10.2			7		7	0		
28	7.5	2.5	10.0			7		7	0		
Totals	223.2	70	293.2			0	196	0	196		

Mar-07	Source Stream Daily Flows			Forebay Avg. Depth (ft)	Robles Facility Daily Flows				Robles Diversion (AF)	Field Measurements	
	Matilija Ck D/S Dam (cfsd)	North Fork Matilija Ck. (cfsd)	Sum of Creek Flows (cfsd)		Fishway Ladder (cfsd)	VRNMO Weir (cfsd)	Diversion Canal (cfsd)	Total Inflow (cfsd)		Matilija Crk (cfs)	VRNMO (cfs)
1	7	2	9			7		7	0		
2	7	2	9			7		7	0		
3	6.6	2	8.6			7		7	0		
4	6	2	8			7		7	0		
5	6	2	8			7		7	0		
6	6	2	8			7		7	0		
7	6	2	8			7		7	0		
8	6	2	8			6		6	0		
9	6	2	8			6		6	0		
10	6	2	8			6		6	0		
11	6	2	8			6		6	0		
12	6	2	8			7		7	0		
13	6.3	2	8.3			6		6	0		
14	6.3	2	8.3			6		6	0		
15	6.3	2	8.3			6		6	0		
16	6.3	2	8.3			6		6	0		
17	6.3	2	8.3			6		6	0		
18	6.6	2	8.6			6		6	0		
19	6	2	8			6		6	0		
20	6	2	8			5		5	0		
21	6.3	2	8.3			5		5	0		
22	6	2	8			5		5	0		
23	5.7	2	7.7			5		5	0		
24	6	2	8			5		5	0		
25	6	2	8			5		5	0		
26	6	2	8			5		5	0		
27	6	2	8			5		5	0		
28	6	2	8			5		5	0		
29	6	2	8			5		5	0		
30	6	2	8			5		5	0		
31	6	2	8			5		5	0		
Totals	190.7	62	252.7			0	182	0	182		

Apr-07	Source Stream Daily Flows			Forebay Avg. Depth (ft)	Robles Facility Daily Flows				Robles Diversion (AF)	Field Measurements	
	Matilija Ck D/S Dam (cfsd)	North Fork Matilija Ck. (cfsd)	Sum of Creek Flows (cfsd)		Fishway Ladder (cfsd)	VRNMO Weir (cfsd)	Diversion Canal (cfsd)	Total Inflow (cfsd)		Matilija Crk (cfs)	VRNMO (cfs)
1	6	2	8			5		5	0		
2	5.5	2	7.5			5		5	0		
3	6	2	8			5		5	0		
4	5.5	2	7.5			5		5	0		
5	5.5	2	7.5			5		5	0		
6	5.5	2	7.5			5		5	0		
7	5.5	2	7.5			5		5	0		
8	5	2	7			5		5	0		
9	5	2	7			5		5	0		
10	5	2	7			5		5	0	6.18	
11	5	2	7			5		5	0		
12	5	2	7			5		5	0		
13	5	2	7			4		4	0		
14	5	2	7			2		2	0		
15	5	2	7			2		2	0		
16	5	2	7			2		2	0		
17	5	2	7			2		2	0		
18	5	2	7			2		2	0		
19	5	2	7			1		1	0		
20	5	2	7			1		1	0		
21	5	2	7			1		1	0		
22	5	2	7			1		1	0		
23	5	2	7			1		1	0		
24	5	2	7			1		1	0		
25	5	2	7			1		1	0		
26	5	2	7			1		1	0		
27	5	2	7			1		1	0		
28	5	2	7			1		1	0		
29	5	2	7			1		1	0		
30	5	2	7			1		1	0		
Totals	154.5	60	214.5			0		86			

May-07	Source Stream Daily Flows			Forebay Avg. Depth (ft)	Robles Facility Daily Flows				Robles Diversion (AF)	Field Measurements	
	Matilija Ck D/S Dam (cfsd)	North Fork Matilija Ck. (cfsd)	Sum of Creek Flows (cfsd)		Fishway Ladder (cfsd)	VRNMO Weir (cfsd)	Diversion Canal (cfsd)	Total Inflow (cfsd)		Matilija Crk (cfs)	VRNMO (cfs)
1	5	2	7			1		1	0		
2	5	2	7			1		1	0		
3	5	2	7			1		1	0		
4	5	2	7			1		1	0		
5	5	2	7			1		1	0		
6	5	2	7			1		1	0		
7	5	2	7			1		1	0		
8	5	2	7			1		1	0		
9	5	2	7			1		1	0		
10	5	2	7			1		1	0		
11	5	2	7			1		1	0		
12	5	2	7			1		1	0		
13	5	2	7			1		1	0		
14	5	2	7			1		1	0		
15	5	2	7			1		1	0		
16	5	2	7			1		1	0		
17	5	2	7			1		1	0		
18	5	2	7			1		1	0		
19	5	2	7			1		1	0		
20	5	2	7			1		1	0		
21	5	2	7			1		1	0		
22	5	2	7			1		1	0		
23	5	2	7			1		1	0		
24	5	2	7			1		1	0		
25	5	2	7			1		1	0		
26	5	2	7			1		1	0		
27	5	2	7			1		1	0		
28	5	2	7			1		1	0		
29	5	2	7			1		1	0		
30	5	2	7			1		1	0		
31	5	2	7			1		1	0		
Totals	155	62	217		0	31	0	31			

Jun-07	Source Stream Daily Flows			Forebay Avg. Depth (ft)	Robles Facility Daily Flows				Robles Diversion (AF)	Field Measurements	
	Matilija Ck D/S Dam (cfsd)	North Fork Matilija Ck. (cfsd)	Sum of Creek Flows (cfsd)		Fishway Ladder (cfsd)	VRNMO Weir (cfsd)	Diversion Canal (cfsd)	Total Inflow (cfsd)		Matilija Crk (cfs)	VRNMO (cfs)
1	5	1	6			1	0	1	0		
2	5	1	6			1	0	1	0		
3	5	1	6			1	0	1	0		
4	5	1	6			1	0	1	0		
5	5	1	6			1	0	1	0		
6	5	1	6			1	0	1	0		
7	5	1	6			1	0	1	0		
8	5	1	6			1	0	1	0		
9	5	1	6			1	0	1	0		
10	5	1	6			1	0	1	0		
11	5	1	6			1	0	1	0		
12	5	1	6			1	0	1	0		
13	5	1	6			1	0	1	0		
14	5	1	6			1	0	1	0		
15	5	1	6			1	0	1	0		
16	5	1	6			0	0	0	0		
17	5	1	6			0	0	0	0		
18	5	1	6			0	0	0	0		
19	5	1	6			0	0	0	0		
20	5	1	6			0	0	0	0		
21	5	1	6			0	0	0	0		
22	5	1	6			0	0	0	0		
23	5	1	6			0	0	0	0		
24	5	1	6			0	0	0	0		
25	5	1	6			0	0	0	0		
26	5	1	6			0	0	0	0		
27	5	1	6			0	0	0	0		
28	5	1	6			0	0	0	0		
29	5	1	6			0	0	0	0		
30	5	1	6			0	0	0	0		
Totals	150	30	180			0	15.0	0	15.0		

Jul-07	Source Stream Daily Flows			Forebay Avg. Depth (ft)	Robles Facility Daily Flows				Robles Diversion (AF)	Field Measurements	
	Matilija Ck D/S Dam (cfsd)	North Fork Matilija Ck. (cfsd)	Sum of Creek Flows (cfsd)		Fishway Ladder (cfsd)	VRNMO Weir (cfsd)	Diversion Canal (cfsd)	Total Inflow (cfsd)		Matilija Crk (cfs)	VRNMO (cfs)
1	5	1	6			0	0	0	0		
2	5	1	6			0	0	0	0		
3	5	1	6			0	0	0	0		
4	5	1	6			0	0	0	0		
5	5	1	6			0	0	0	0		
6	5	1	6			0	0	0	0		
7	5	1	6			0	0	0	0		
8	5	1	6			0	0	0	0		
9	5	1	6			0	0	0	0		
10	5	1	6			0	0	0	0		
11	5	1	6			0	0	0	0		
12	5	1	6			0	0	0	0		
13	5	1	6			0	0	0	0		
14	5	1	6			0	0	0	0		
15	5	1	6			0	0	0	0		
16	5	1	6			0	0	0	0		
17	5	1	6			0	0	0	0		
18	5	1	6			0	0	0	0		
19	5	1	6			0	0	0	0		
20	5	1	6			0	0	0	0		
21	5	1	6			0	0	0	0		
22	5	1	6			0	0	0	0		
23	5	1	6			0	0	0	0		
24	5	1	6			0	0	0	0		
25	5	1	6			0	0	0	0		
26	5	1	6			0	0	0	0		
27	5	1	6			0	0	0	0		
28	5	1	6			0	0	0	0		
29	5	1	6			0	0	0	0		
30	5	1	6			0	0	0	0		
31	5	1	6			0	0	0	0		
Totals	155	31	186		0	0	0	0			

Aug-07	Source Stream Daily Flows			Forebay Avg. Depth (ft)	Robles Facility Daily Flows				Robles Diversion (AF)	Field Measurements	
	Matilija Ck D/S Dam (cfsd)	North Fork Matilija Ck. (cfsd)	Sum of Creek Flows (cfsd)		Fishway Ladder (cfsd)	VRNMO Weir (cfsd)	Diversion Canal (cfsd)	Total Inflow (cfsd)		Matilija Crk (cfs)	VRNMO (cfs)
1	5	1	6			0	0	0	0		
2	5	1	6			0	0	0	0		
3	5	1	6			0	0	0	0		
4	5	1	6			0	0	0	0		
5	5	1	6			0	0	0	0		
6	5	1	6			0	0	0	0		
7	5	1	6			0	0	0	0		
8	5	1	6			0	0	0	0		
9	5	1	6			0	0	0	0		
10	5	1	6			0	0	0	0		
11	5	1	6			0	0	0	0		
12	5	1	6			0	0	0	0		
13	5	1	6			0	0	0	0		
14	5	1	6			0	0	0	0		
15	5	1	6			0	0	0	0		
16	4	1	5.0			0	0	0	0		
17	4	1	5.0			0	0	0	0		
18	4	1	5.0			0	0	0	0		
19	4	1	5.0			0	0	0	0		
20	4	1	5.0			0	0	0	0		
21	4	1	5.0			0	0	0	0		
22	4	1	5.0			0	0	0	0		
23	4	1	5.0			0	0	0	0		
24	4	1	5.0			0	0	0	0		
25	4	1	5.0			0	0	0	0		
26	4	1	5.0			0	0	0	0		
27	4	1	5.0			0	0	0	0		
28	4	1	5.0			0	0	0	0		
29	4	1	5.0			0	0	0	0		
30	4	1	5.0			0	0	0	0		
31		1	1			0	0	0	0		
Totals	135	31	166			0	0	0	0		

Sep-07	Source Stream Daily Flows			Forebay Avg. Depth (ft)	Robles Facility Daily Flows				Robles Diversion (AF)	Field Measurements	
	Matilija Ck D/S Dam (cfsd)	North Fork Matilija Ck. (cfsd)	Sum of Creek Flows (cfsd)		Fishway Ladder (cfsd)	VRNMO Weir (cfsd)	Diversion Canal (cfsd)	Total Inflow (cfsd)		Matilija Crk (cfs)	VRNMO (cfs)
1	4	1	5.0			0	0	0	0		
2	4	1	5.0			0	0	0	0		
3	4	1	5.0			0	0	0	0		
4	4	1	5.0			0	0	0	0		
5	4	1	5.0			0	0	0	0		
6	4	1	5.0			0	0	0	0		
7	4	1	5.0			0	0	0	0		
8	4	1	5.0			0	0	0	0		
9	4	1	5.0			0	0	0	0		
10	4	1	5.0			0	0	0	0		
11	4	1	5.0			0	0	0	0		
12	3	1	4.0			0	0	0	0		
13	3	1	4.0			0	0	0	0		
14	3	1	4.0			0	0	0	0		
15	3	1	4.0			0	0	0	0		
16	3	1	4.0			0	0	0	0		
17	3	1	4.0			0	0	0	0		
18	3	1	4.0			0	0	0	0		
19	3	1	4.0			0	0	0	0		
20	3	1	4.0			0	0	0	0		
21	3	1	4.0			0	0	0	0		
22	3	1	4.0			0	0	0	0		
23	3	1	4.0			0	0	0	0		
24	3	1	4.0			0	0	0	0		
25	3	1	4.0			0	0	0	0		
26	3	1	4.0			0	0	0	0		
27	3	1	4.0			0	0	0	0		
28	3	1	4.0			0	0	0	0		
29	3	1	4.0			0	0	0	0		
30	3	1	4.0			0	0	0	0		
Totals	98	30	127			0	0	0			

Appendix 7. Robles Fish Passage Facility work list for the summer/fall of 2007.

TASK	STATUS	WORK DONE BY
Annual Tasks		
Inspect all of the Facilities using the check list	Pending	Everyone
Inspect the canal and the drainages	Pending	P & Maint
Lubricate all gates	Pending	M & E
Check all gate gear boxes	Pending	M & E
Test limit switches	Pending	M & E
Calibrate level sensors including canal terminus	Pending	M & E
Maintain standby generator	Pending	P
Back up PLC data and programs	Pending	M & E & Dirk
Clean and adjust fish screens	Pending	P
Function test (Around the third week in September)	Pending	Everyone
Conduct safety inspection & training (1 st week in October)	Pending	P
Clean transducers	Pending	M & E
One time (hopefully) Items		
Cut rebar in spillway	Pending	P
Fill in scour hole at the diffuser (entrance) box w/rock	Pending	P or Eng
Arundo/non native plant removal	Pending	Eng & CCC
Repair trash grate in the entrance box	Pending	P
Install raw water pump for screen cleaning	Pending	P
Repair or replace auxiliary pipeline flowmeter	Pending	M & E, Eng, P
Eliminate or reduce error caused by the VFD on the other instrumentation	Complete?	M & E
Clean area behind the fish screens	Pending	P
<u>Implement MWH recommendations</u>		
Recommendation 1-4		Dirk, M&E
Recommendation 6-9, 17		P, Eng
Vaki shroud enhancements	Pending	P
Overshot gate seals	Pending	Eng & P

Add air system per Yakima Screen Shop suggestion	<u>Pending</u>	?
Adjust openings in the diffuser panels	<u>Pending</u>	?
Replace diffuser panels with larger opening panels	<u>Pending</u>	Delayed

P – Pipeline Crew

Maint – Maintenance Crew

M & E – Mechanical & Electrical Section

Eng – Engineering

? – Decision on whether to proceed is waiting further information or investigation.