

**DEPARTMENT OF WATER RESOURCES**

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June 10, 2009

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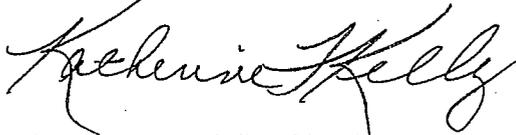
Dear Mr. Wilson/Ms. Goude:

Attached are draft materials prepared to meet the requirements of Sections 8.4 and 8.5 under the Department of Fish and Game (DFG) Incidental Take Permit 2081-2009-001-03 for Longfin Smelt and the US Fish and Wildlife Service (USFWS) Operations Criteria and Plan (OCAP) Biological Opinion (BO), Terms and Condition RPM 2. These materials for the North Bay Aqueduct, Roaring River Distribution System, Sherman Island and Skinner Fish Facility represent our initial efforts and request establishment of a workgroup with you and/or your staff to further develop these materials. This workgroup would help to ensure that we fully understand your agency's expectations written in the DFG permit and USFWS OCAP BO. In addition, we anticipate the workgroup would participate in development of materials for additional requirements under the permit and BO, including development of inspection, maintenance, and reporting plans.

Scott Wilson  
Cay Goude  
June 9, 2009  
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Please contact me at (916) 653-1099 if you have any questions. Otherwise, please contact Zaffar Eusuff at (916) 651-9239 to initiate coordination of the proposed workgroup.

Sincerely,



Katherine F. Kelly, Chief  
Bay-Delta Office

Attachments

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# **Draft Proposal for John E. Skinner Delta Fish Protection Facility Fish Screen Evaluation (DFG ITP 2081 for Longfin Smelt)**

## **Background and Objectives**

The California Department of Fish and Game (DFG) Longfin Smelt Incidental Take Permit (ITP) requires the Department of Water Resources (DWR) to develop a plan to monitor and evaluate the effectiveness and operation of the John E. Skinner Delta Fish Protective Facility (SDFPF).

The DFG Longfin Smelt ITP Section 8.5 states:

“...permittee shall develop and implement an effectiveness monitoring program for Skinner to ensure the minimization measures required by the permit are successfully reducing incidental take of LFS.”

The minimization measures are found in the DFG Longfin Smelt ITP Section 6.3 which states:

“...permittee shall ensure minimization measures to protect LFS are achieved as follows: 1) salvage according to DFG and DWR protocol<sup>1</sup> when exporting via Banks Pumping Plant; 2) timely reporting of unplanned salvage outages; and 3) consulting DFG to plan salvage outages.”

## **Objectives**

The objectives of the proposed plan for evaluation are:

1. To monitor effectiveness of salvage consistent with DFG and DWR protocols contained in the SDFPF Operations Manual dated October 19, 2005.
2. To monitor timely reporting of unplanned salvage outages at the Skinner SDFPF.
3. To monitor planning of salvage outages in consultation with DFG.

## **Project Site**

The John E. Skinner Delta Fish Protective Facility, constructed in 1966, is located west of the Clifton Court Forebay, two miles upstream of the Harvey O. Banks Pumping Plant. The SDFPF screens fish prior to approaching the Banks Pumping Plant that lifts water into the California Aqueduct. Large fish and debris are directed away from the facility by a 388-foot trash boom. Smaller fish are diverted from the intake channel into bypasses by guiding them through a series of metal louvers, while the main flow of water continues through the louvers and towards the pumps. The diverted fish pass through a secondary system of screens and pipes into seven holding tanks, where a subsample is counted and recorded. The salvaged fish are then returned to the Delta in oxygenated tank trucks.

## **Materials and Methods**

This proposal requests establishment of an interagency work group to coordinate development of this evaluation plan consistent with similarly proposed plans for other facilities (North Bay Aqueduct, Roaring River Distribution System, and Ag Water Diversions on Sherman Island). In particular, there should be a close coordination between this evaluation program and The US Fish and Wildlife Service's (USFWS) Operational Criteria and Plan (OCAP) Biological Opinion (BO) for delta smelt for NBA.

### **Salvage Consistency**

The SDFPF Operations Manual includes protocols for salvage operations. The proposed work group would establish methods for reviewing actual operations and consistency with established protocols. Modifications to operations and/or the Operations Manual will be determined by the work group and implemented in conjunction with fishery agencies.

### **Reporting of Unplanned Outages**

Unplanned outages at the SDFPF occur due to a variety of factors (e.g., Power outages) beyond the control of the Delta Field Division (DFD). Under such events, the DFD reports the outage to DFG, including information on the expected length of the outage, to the extent that information is available. The proposed work group would review occurrences of unplanned outages and develop recommendations for minimizing such outages and/or the length of the outages to minimize the effects on longfin smelt. Modifications to operations and/or the Operations Manual will be determined by the work group and implemented in conjunction with fishery agencies.

### **Coordination of Planned Outages with DFG**

Planned outages at the SDFPF are scheduled in accordance with maintenance and inspection needs of the facility. During the planned outages, Banks Pumping Plant remains off, therefore, there is no salvage operation required at the facility. The proposed work group, in conjunction with the fishery agencies, would review the recent history of planned and actual outages, the current protocol for coordinating these outages with DFG, and determine if any changes in the protocol are needed.

### **Schedule and Reporting**

DWR will work with the proposed interagency work group to determine the timeline of the evaluation program and any reporting requirement.

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<sup>1</sup> Skinner Fish Facility Operations Manual version 2.0 October 19, 2005

## Draft Proposal for North Bay Aqueduct Fish Screen Evaluation (DFG ITP 2081 for Longfin Smelt)

### Background and Objectives

The California Department of Fish and Game (CDFG) Longfin Smelt Incidental Take Permit (ITP) requires the Department of Water Resources (DWR) to develop a plan to monitor and evaluate the effectiveness and operation of the North Bay Aqueduct (NBA) intake fish screen.

The CDFG Longfin Smelt ITP Section 8.4 states:

"...Permittee shall develop and implement effectiveness and performance monitoring program for the fish screens at the NBA, RRDS, and Sherman Island Diversions that covers the November through June period to ensure the minimization measures required by this permit are successfully reducing incidental take of the Covered Species. Proper maintenance and performance is critical to ensure screen effectiveness and shall include all pertinent criteria necessary to determine the effectiveness of the screens."

### Objectives

The objectives of the proposed plan for evaluation are:

1. To monitor the hydraulic performance of the NBA diversion fish screen including screen approach velocities & screen cleanliness.
2. To monitor impingement of Longfin Smelt at the NBA diversion.

### Project Site

The Barker Slough Pumping Plant diverts water from Barker Slough into the NBA for delivery in Napa and Solano Counties. Maximum pumping capacity is 175 cfs (pipeline capacity). The current maximum pumping rate is 140 cfs because an additional pump is required to be installed to reach 175 cfs. The NBA intake is located approximately 10 miles from the main stem Sacramento River at the end of Barker Slough. Each of the ten NBA pump bays is individually screened with a positive barrier fish screen consisting of a series of flat, stainless steel, wedge-wire panels with a slot width of 3/32 inch. This configuration is designed to exclude fish approximately one inch or larger from being entrained. The bays tied to the two smaller units have an approach velocity of about 0.2 ft/s.

### Materials and Methods

Although development of a detailed plan (including selection of the monitoring season) will require knowledge of specific field conditions, a general proposal is presented here for discussion with CDFG to coordinate in defining the specific tasks for the North Bay Aqueduct Fish Screen evaluation. In addition, this proposal requests establishment of an interagency work group to coordinate development of this evaluation with those proposed for other facilities (Roaring River Distribution System, Ag Diversions on Sherman Island, and Skinner Facility).

### **Hydraulic Evaluation**

The hydraulic evaluation will measure the flows and velocities at the fish screen and compare the results against the project design criteria as specified by the California Department of Fish and Game (CDFG), US Fish and Wildlife Services (USFWS), and National Marine Fisheries Service (NMFS). Hydraulic evaluations will be conducted on a monthly basis during the monitoring season.

A calibrated Sontek Acoustic Doppler Velocity (ADV) meter can be used to measure the approach velocities normal to the screens. Typically, approach velocity measurements are taken at three points on each screen panel (top, middle, and bottom). The velocity measurement unit is mounted 6 inches from the face of the screen, or as close as possible without interfering with the screen. Each point is assumed to be representative of the velocity through that screen area. Analog signals of velocity measurements are sent to a portable computer or a data-logger for statistical analysis.

### **Screen Cleanliness and Impingement Evaluation**

The screen cleanliness and impingement will be evaluated using a DIDSON (Dual frequency IDentification SONar) acoustic camera to document the presence of debris or fish impinged on the screen. The camera uses sound waves to detect acoustic echoes of objects in the water and then converts them into digital images, which can be viewed on a computer. These same sound waves give DIDSON the ability to produce clear images in dark or turbid waters, unlike standard underwater cameras that rely on a light source to produce an image. The DIDSON camera will be deployed from a boat and video footage of each screen panel will be recorded. Subsequently, the approximate percentage of screen area blocked by debris will be calculated. To the extent possible, any fish observed impinged on the screen will be enumerated. DIDSON evaluations will be conducted on a monthly basis during the monitoring season.

### **Entrainment monitoring**

The design of the NBA diversion does not allow access behind the screens (screens are immediately in front of pumps which feed into a pipeline), therefore, traditional monitoring of entrainment behind the screens is not feasible due to the restrictive physical configuration of the pumping facility (see attached Figure 1). This proposal suggests the interagency work group review site conditions and possibly develop an alternative approach for monitoring entrainment at this facility.

### **Schedule and Reporting**

DWR will work with the proposed interagency work group to determine the timeline of the evaluation program and any reporting requirement.

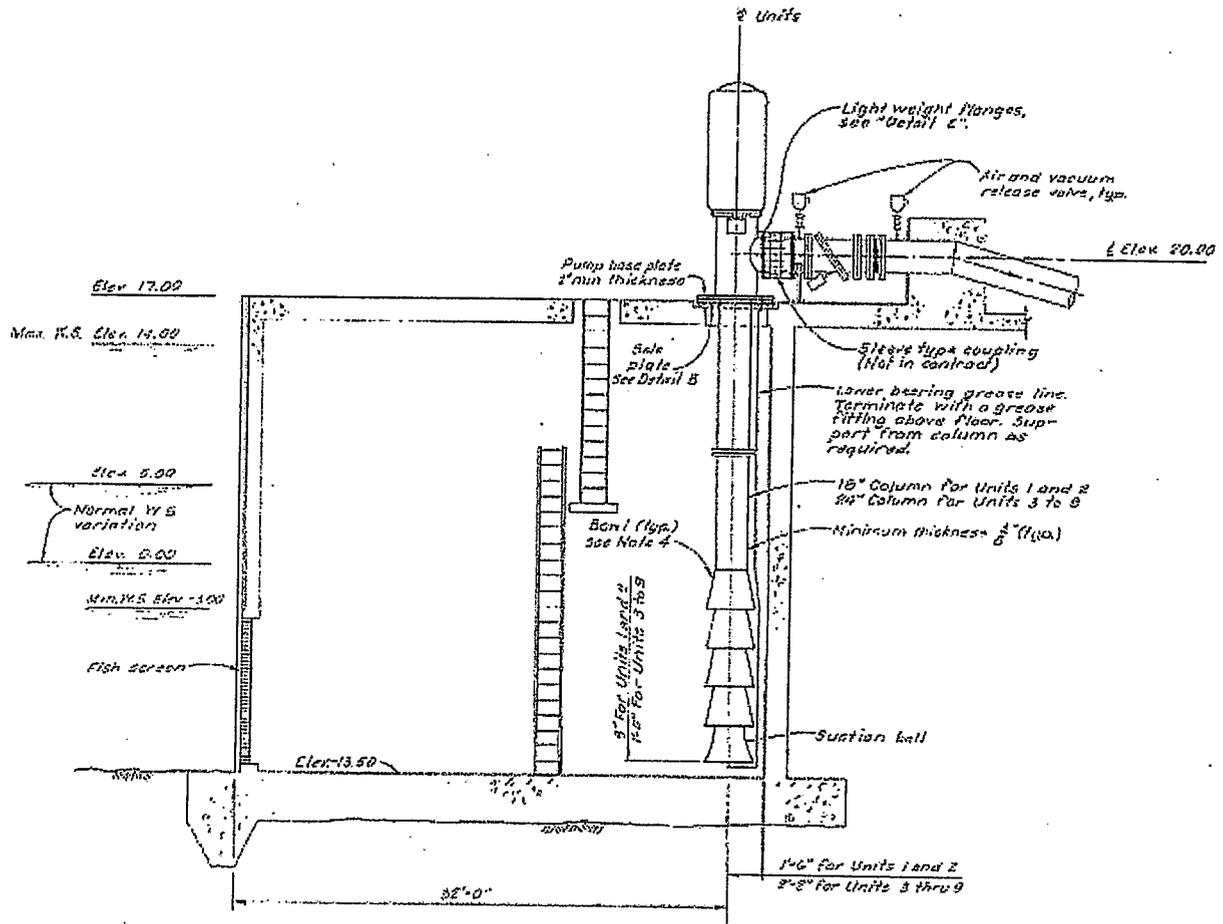


Figure 1 – A Cross-Section of NBA Pumping Units

# **Draft Proposal for Roaring River Distribution System (RRDS) Fish Screen Evaluation (DFG ITP 2081 for Longfin Smelt)**

## **Background and Objectives**

The California Department of Fish and Game (CDFG) Longfin Smelt Incidental Take Permit (ITP) requires the Department of Water Resources (DWR) to develop a plan to monitor and evaluate the effectiveness and operation of the Roaring River Distribution System (RRDS) fish screen.

The CDFG Longfin Smelt ITP Section 8.4 states:

“...Permittee shall develop and implement effectiveness and performance monitoring program for the fish screens at the North Bay Aqueduct, Roaring River Distribution System, and Sherman Island Diversions that covers the November through June period to ensure the minimization measures required by this permit are successfully reducing incidental take of the Covered Species. Proper maintenance and performance is critical to ensure screen effectiveness and shall include all pertinent criteria necessary to determine the effectiveness of the screens.”

## **Objectives**

The objectives of the proposed plan for evaluation are:

1. To monitor the hydraulic performance of the RRDS fish screen including screen approach and sweeping velocities & screen cleanliness.
2. To monitor impingement of Longfin Smelt at the RRDS diversion.

## **Project Site**

The Roaring River Distribution System is located near the eastern end of Montezuma Slough, just downstream of the Suisun Marsh Salinity Control Gates. It is designed to tidally pump water from Montezuma Slough to provide for the seasonal water management needs of Suisun Marsh landowners and the Department of Fish and Game on a number of islands. The system was completed and became operational in 1980.

Flow enters the Roaring River System through eight 2.5 ft radius culverts. Fish screens were installed and tested on two intake culverts in 1980 and on the remaining six culverts in 1983. The fish screens at the Roaring River intakes were originally designed for an average approach velocity of 0.5 feet per second. An approach velocity of 0.2 feet per second has since been required by the Fish and Wildlife Service for protection of Delta Smelt. During 1997, DWR automated the slide gates on the diversion culverts to throttle diversion flow and maintain 0.2 feet per second screen velocity.

## **Materials and Methods**

Although development of a detailed plan (including selection of the monitoring season) will require knowledge of specific field conditions, a general proposal is presented here for

discussion with CDFG to coordinate in defining the specific tasks for the RRDS Fish Screen evaluation. In addition, this proposal requests establishment of an interagency work group to coordinate site visits and development of this evaluation with those proposed for other facilities (North Bay Aqueduct, Ag Diversions on Sherman Island, and Skinner Facility).

### **Hydraulic Evaluation**

The hydraulic evaluation will measure the flows and velocities at the fish screen and compare the results against the project design criteria as specified by the California Department of Fish and Game (CDFG), US Fish and Wildlife Services (USFWS), and National Marine Fisheries Service (NMFS). Hydraulic evaluations will be conducted on a monthly basis during the monitoring season.

A calibrated Sontek Acoustic Doppler Velocity (ADV) meter can be used to measure the approach velocities normal to the screens. Typically, approach velocity measurements are taken at three points on each screen panel (top, middle, and bottom). The velocity measurement unit is mounted 6 inches from the face of the screen, or as close as possible without interfering with the screen. Each point is assumed to be representative of the velocity through that screen area. Analog signals of velocity measurements are sent to a portable computer or a data-logger for statistical analysis.

### **Screen Cleanliness and Impingement Evaluation**

The screen cleanliness and impingement will be evaluated using a DIDSON (Dual frequency Identification SONar) acoustic camera and systematic surveys to document the presence of debris or fish impinged on the screen. The camera uses sound waves to detect acoustic echoes of objects in the water and then converts them into digital images, which can be viewed on a computer. These same sound waves give DIDSON the ability to produce clear images in dark or turbid waters, unlike standard underwater cameras that rely on a light source to produce an image. The DIDSON camera will be deployed from a boat and video footage of each screen panel will be recorded. Subsequently, the approximate percentage of screen area blocked by debris will be calculated. Additionally, any fish observed impinged on the screen will be enumerated. DIDSON evaluations will be conducted twice monthly during the monitoring season.

### **Entrainment monitoring**

Biological monitoring will be conducted behind the fish screen during the monitoring season and any captured species identified, enumerated, and measured. Biological sampling will be conducted utilizing a method acceptable to CDFG. The net mesh size(s) used will be efficient for capturing the targeted life stage of listed species potentially present in the study area (larval and adult longfin smelt, juvenile Chinook salmon, larval and adult delta smelt, Sacramento splittail, and steelhead). Measurements of diversion volume will be used to establish a relationship between diversion volume and potential entrainment rates. Frequency of entrainment monitoring will be determined in consultation with CDFG.

### **Schedule and Reporting**

DWR will work with the proposed interagency work group to determine the timeline of the evaluation program and any reporting requirement.

## **Draft Proposal for Sherman Island Water Diversions Fish Screen Evaluation (DFG ITP 2081 for Longfin Smelt)**

### **Background and Objectives**

The California Department of Fish and Game (CDFG) Longfin Smelt Incidental Take Permit (ITP) requires the Department of Water Resources (DWR) to develop a plan to monitor and evaluate the effectiveness and operation of the screened agriculture water intakes/diversions on Sherman Island.

The CDFG Longfin Smelt ITP Section 8.4 states:

“...Permittee shall develop and implement effectiveness and performance monitoring program for the fish screens at the NBA, RRDS, and Sherman Island Diversions that covers the November through June period to ensure the minimization measures required by this permit are successfully reducing incidental take of the Covered Species. Proper maintenance and performance is critical to ensure screen effectiveness and shall include all pertinent criteria necessary to determine the effectiveness of the screens.”

### **Objectives**

The objectives of the proposed fish screen evaluation are:

1. To monitor the hydraulic performance of the fish screens including screen approach and sweeping velocities & screen cleanliness.
2. To monitor fish impingement and entrainment of Longfin Smelt at the diversions.

### **Project Site**

State of California owns most of the lands on Sherman Island, majority of which are leased to private farmers. There are many existing diversions (siphons through the island levee) with flow capacity ranging from 5 to 40 cfs. Not all existing diversions are screened. Twelve diversions, ranging in size from 8” to 16” pipe diameter, have been screened (cylindrical stainless steel fish screens) in 1998 and 1999 as part of the restoration efforts of the CVPIA and CALFED. DWR screened nine of those diversions in partial fulfillment of mitigation requirements for the Temporary Barrier Project. These fish screens were designed to exclude delta smelt larger than 25 mm and have a maximum approach velocity of 0.2 ft/s.

### **Materials and Methods**

Although development of a detailed plan (including selection of the monitoring season) will require knowledge of specific field conditions, a general proposal is presented here for discussion with CDFG to coordinate in defining the specific tasks for the Fish Screen evaluation. In addition, this proposal requests establishment of a work group consisting agency staff and farmers to coordinate site visits. Also, a coordinated effort will be necessary between the groups in-charge of the development of a plans for other similar facilities. Monitoring water diversions on Sherman Island may pose a great challenge in terms of obtaining owner permission to perform activities on the field side. Historically, owners fear restriction on water diversion if take is high.

**Hydraulic Evaluation**

The hydraulic evaluation will measure the flows and velocities at the fish screen and compare the results against the project design criteria. Hydraulic evaluations will be conducted on a monthly basis during the monitoring season.

A calibrated Sontek Acoustic Doppler Velocity (ADV) meter can be used to measure the approach velocities normal to the screens. Typically, approach velocity measurements are taken at three points on each screen panel (top, middle, and bottom). The velocity measurement unit is mounted 6 inches from the face of the screen, or as close as possible without interfering with the screen. Each point is assumed to be representative of the velocity through that screen area. Analog signals of velocity measurements are sent to a portable computer or a data-logger for statistical analysis.

**Screen Cleanliness and Impingement Evaluation**

Currently, screens on Sherman Island are inspected by contracted divers, and cleaned bi-monthly during May- October irrigation season. Inspection is done quarterly during November – April period.

**Entrainment monitoring**

Fish presence at the diversion facilities may vary depending on tide, size and orientation of water intake pipe, type of use in the field, and the users as most of the diversions are unmetered. However, in general, the plan is to conduct fish entrainment monitoring at the field end of the diversion pipes using hooped plankton nets or any other method acceptable to CDFG. Measurements of diversion volume will be used to establish a relationship between diversion volume and potential entrainment rates. Frequency and period of monitoring will be determined in consultation with CDFG.

**Schedule and Reporting**

DWR will work with the proposed interagency work group to determine the timeline of the evaluation program and any reporting requirement.