RECLAMATION

Managing Water in the West

CVPIA 3406(b)(10)

Red Bluff Fish Passage Improvement

U.S. Department of the Interior
Bureau of Reclamation

Red Bluff Diversion Dam

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Minimize Fish Passage Problems for Adult and Juvenile Fish

- July 2008 Record of Decision to Replace the Function of the Diversion Dam With a New Pumping Plant
- CVP Operations Biological Opinion- Required Actions
  - Actions to Offset the Effects of Temporary Gate Operations During Pumping Plant Construction
  - Further Reduction in “Gates in Operation”
  - Green Sturgeon Studies
  - Spring-run Chinook Habitat Improvements

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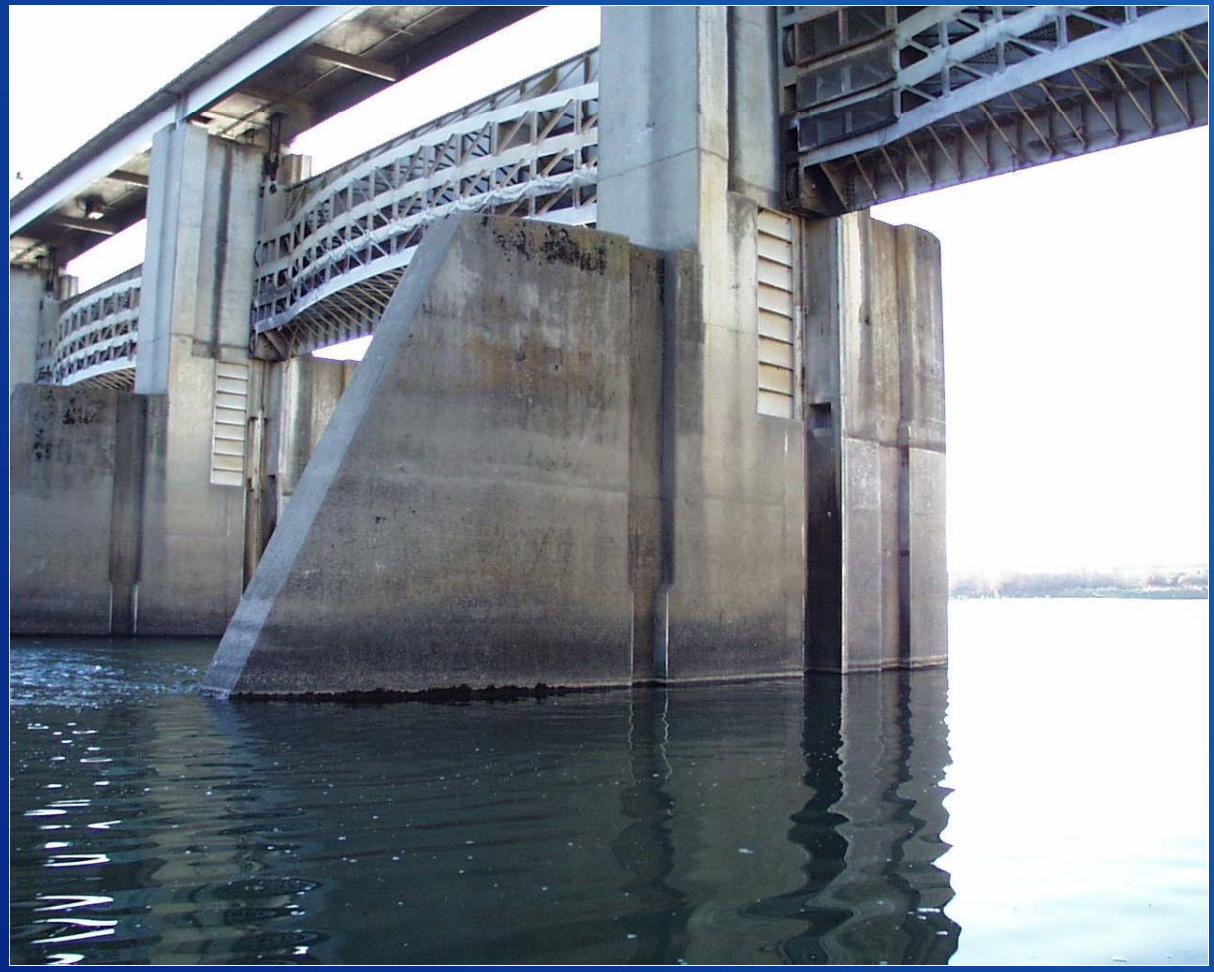
“Gates Up” Operation



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“Gates In” Operation

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Dam Operations

- **Dam Gates Were Closed June 16 in 2011. Reclamation Began Raising the Gates on September 1, and They Were Completely Out by September 4.**

- **Minimum Gate Openings Remained at 18 Inches for the Entire “Gates In” Period.**

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Green Sturgeon Studies

- **RPA Prescribed Research:**
  - **Genetic Evaluation of Spawning Population**
  - **Telemetric Studies of Adult Movements**

    Characterization of Spawning Habitat in Sac. River
  - **Telemetric Studies of Juveniles; Identify Rearing Habitat**
  - **Spawning Wild-Caught Sturgeon and Rearing Juveniles**
  - **Evaluation of Fish Screen Performance and Alternative Fish Exclusion Technologies**
- **Three-Year Research Program**

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Green Sturgeon Studies

- The Remaining Two Years of the Cooperative Agreement With U.C. Davis were Funded in 2011
- Continued Cooperation With USFWS
  - Green Sturgeon Egg and Larval Surveys
- Research Activities Continued During 2011:
  - Adults Were Tagged With Acoustic Transmitters
  - Adults Were Tracked With Fixed and Mobile Receivers
  - Spawning Areas Were Being Identified and Characterized
  - Larval and Juvenile Sturgeon Were Captured in Traps and Benthic Nets, and Are Being Reared for Telemetric Studies
  - Mortalities and Other Samples are being used for Genetic Studies

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Green Sturgeon Studies

- About 900 green sturgeon larval samples were collected in 2011 for genetic evaluation
- Genotypes will be created and estimates of 2010 and 2011 spawner contributions will be completed in 2012

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Green Sturgeon Studies

- A total of 22 adult green sturgeon were tagged in the study area in 2011
- Fourteen of these passed upstream of the dam before the gates were lowered
- Eleven of these fish passed downstream of the dam before the gates were lowered
- Two successfully passed under the dam gates
- One was last detected about 10 miles upstream of the dam on June 21 – probably the tag lost battery power, as the fish was tagged in 2005

Green Sturgeon Studies

- Eight tagged fish did not pass upstream of the dam
- A Vemco Acoustic Positioning System was deployed in the Antelope Creek vicinity to track fine-scale movements of tagged adult fish
- Fifteen sites were characterized, 5 each of:
  - Known spawning grounds
  - Confirmed sturgeon presence
  - No confirmed sturgeon presence
- Discharge, flow profiles, bathymetry

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Green Sturgeon Studies

- Sampling for egg and larval sturgeon in 2011 indicate that green sturgeon spawning occurred from early April to late June, and larvae are emerging from the spawning grounds between May and August
- Seven juvenile sturgeon captured by the U.S. Fish and Wildlife Service are being reared at UC Davis facilities – planning to tag them and learn more about rearing habitat
- Laval and juvenile green and white sturgeon swimming performance and behavior has been studied in the UC Davis laboratory – in relation to fish screens and guidance louvers

2012 Green Sturgeon Study Activities

- Adults Will Be Tagged With Acoustic Transmitters
- Adults Will Be Tracked With Fixed and Mobile Receivers
- Spawning Areas Will Be Identified and Characterized
- Eggs will be Collected; Larval and Juvenile Sturgeon Will Be Captured in Traps and Benthic Nets, and Reared for Telemetric Studies
- Mortalities and Other Samples are being used for Genetic Studies

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Spring-Run Chinook Salmon Habitat Improvements

- **$500,000 Funding Provided Toward Implementation of Adult Passage Improvements at Paynes Crossing in Antelope Creek**

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Red Bluff Fish Passage Improvement Project

Construction Progress Update

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Project Overview

- The prime objective of the construction is to construct a Pumping Plant that will initially provide 2,000 cfs flow to the Tehama Colusa Canal and the Corning Canal no later than May, 2012.
- The Pumping Plant will be able to be expanded to a full 11 pumps and 2,500 cfs flow in the future.
- Primary Components of the project include:
  - Pumping Plant with 11 bays,

    9 Pumps and Motors
  - Excavation of the Forebay
  - A Fish Screen (1,118 ft in length)

    Canals and a Siphon under nearby Red Bank Creek
  - Bridge over Red Bank Creek for service access
  - Closure of a Landfill

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West Bay Builders

- West Bay Builders were awarded a $21 M contract on December 19th, 2009 to construct the Bridge, Canals and Siphon.
- Their project also includes the clean closure of Parcel ‘A’ of the Pactiv Landfill.
- Current Status: Substantially Complete 22 December 2011
- **Challenges:**
  - Late arrival of Clean Closure Plan
    - Forced Contractor to reschedule their order of work

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West Bay Builders continued

- **Challenges (continued):**
  - **Construction of Siphon**
    - **Heavy rains in November/December flooded work area**
    - **High Flows in March flooded work area**
    - **Fish removal & disregard by onsite crews for permit requirements**
- **End Summary**
  - **West Bay completed late and Liquidated Damages and Claims are being sorted out.**

Before Construction Began – West Bay Construction Area

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Construction Progress by West Bay in June 2010

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West Bay Canal & Siphon in August 2010

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West Bay Pumping Concrete for Siphon, Oct 2010

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West Bay Siphon flooded & Landfill, Dec 2010

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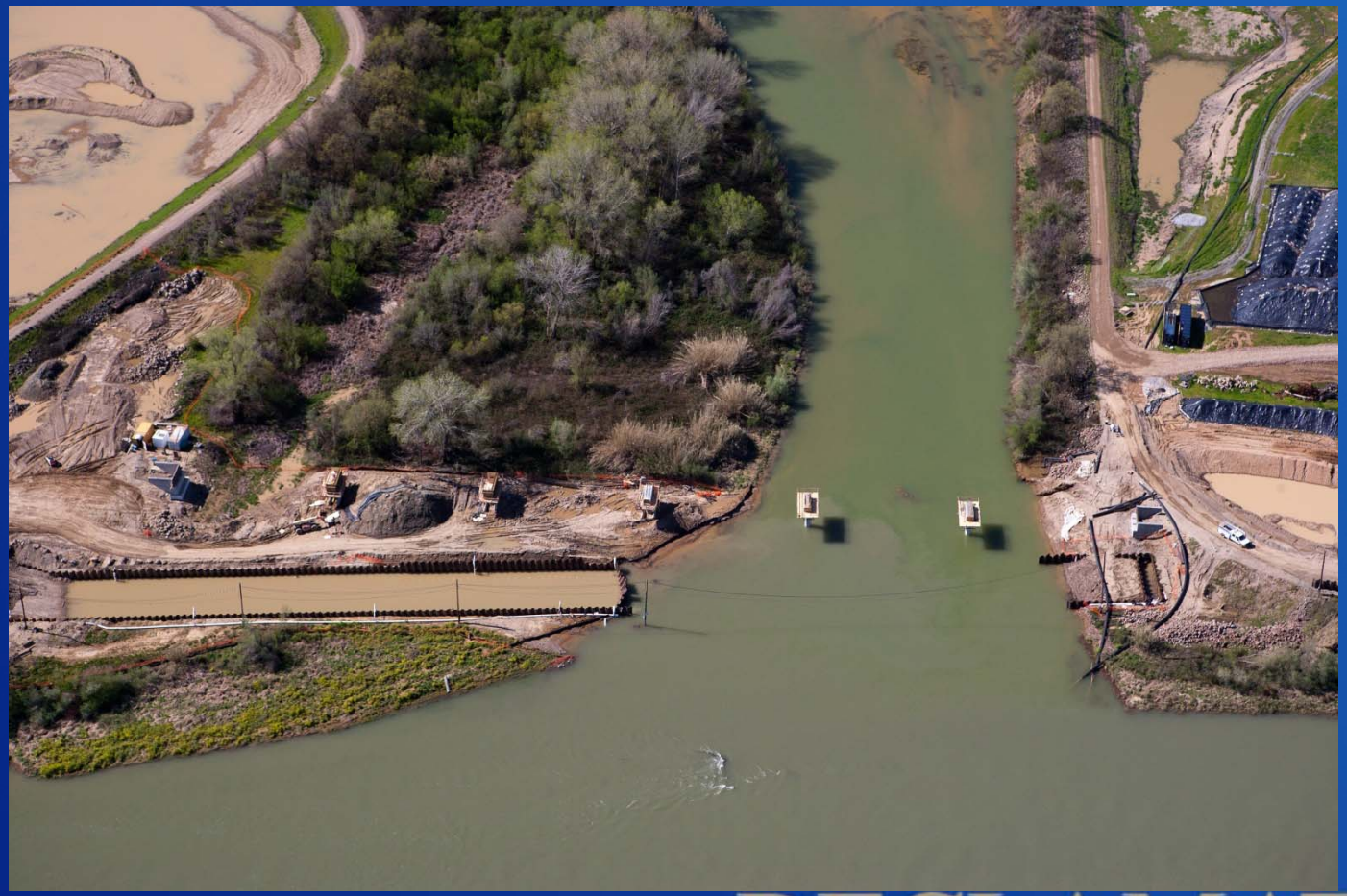
West Bay Siphon Phase 2 in March, 2011



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West Bay Construction in June, 2011

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West Bay Construction in early September, 2011

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West Bay Construction near Substantial Completion, November, 2011

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Moving Waters Industries

- **Moving Waters Industries (MWI) were awarded a $6.9 M contract to supply the pumps and motors for this project on January 16th, 2010.**
- **Primary Components of MWI Contract:**
  - **2 x 125 cfs pumps and associated motors (300 hp)**
  - **7 x 250 cfs pumps and associated motors (600 hp)**
  - **Installation assistance**
- **Status:**
  - **Substantially complete in September, 2011. Pumps installed in January, 2012 by Balfour-Beatty, Inc.**

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Balfour-Beatty Inc.

- Balfour-Beatty was awarded a $67 M contract on May 11th, 2010 to construct the Fish Screen and Pumping Plant.
- Their project also includes excavation of the Forebay, installation of the Switchyard, clean closure of Parcel 'B' of the Pactiv Landfill and now clean closure of the former GENIII property.
- Current Status:
  - Fish Screens nearing completion with Resource Agencies inspections being scheduled for late-March and April.
  - Forebay excavation complete
  - Pumping Plant 90% complete with some electrical work and testing remaining

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Balfour-Beatty Inc. continued

- **Challenges:**
  - **Changed Conditions**
    - **RWQCB dictating a clean closure of the former GENIII property based on materials found there.**
  - **Minor weather delays**
  - **Permanent Power Supply**

    Fish removal
    - **Between the West Bay contract and Balfour Beatty contract over 2700 fish were removed from the various structures.**
- **End Summary**
  - **Balfour-Beatty is on track to deliver water in May, 2012.**

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Balfour-Beattv Construction Area

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Balfour-Beatty Stockpiles in August 2011

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Balfour-Beatty Construction Site in September 2010

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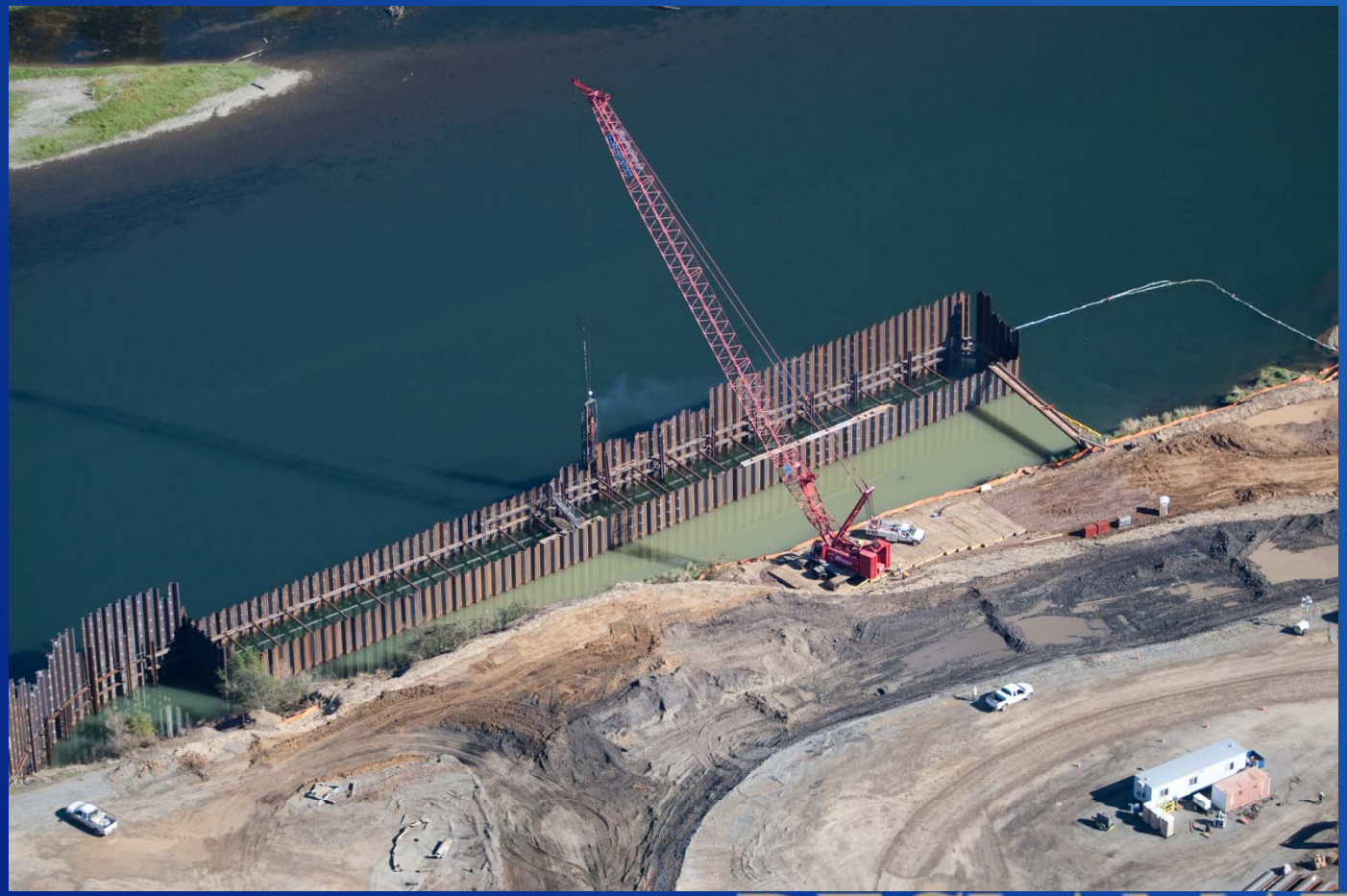
Balfour-Beatty Upstream Cofferdam, Oct 2010



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Balfour-Beatty Construction Site in November 2010

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Balfour-Beatty Construction Site in December

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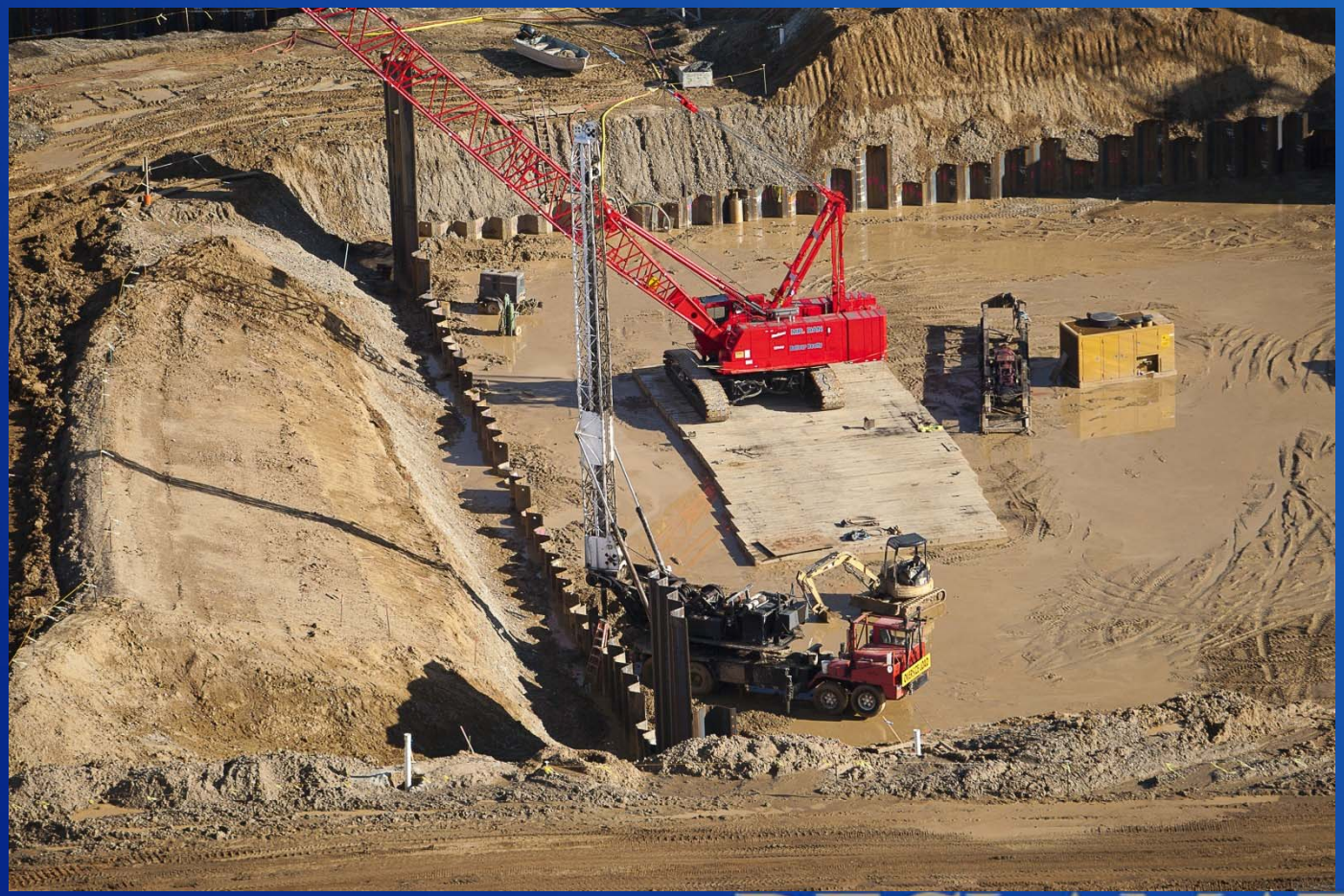
Balfour-Beatty Pumping Plant excavation, Dec



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Balfour-Beatty Fish Screen & Forebay, Jan

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Balfour-Beattv Construction Area. March 2011

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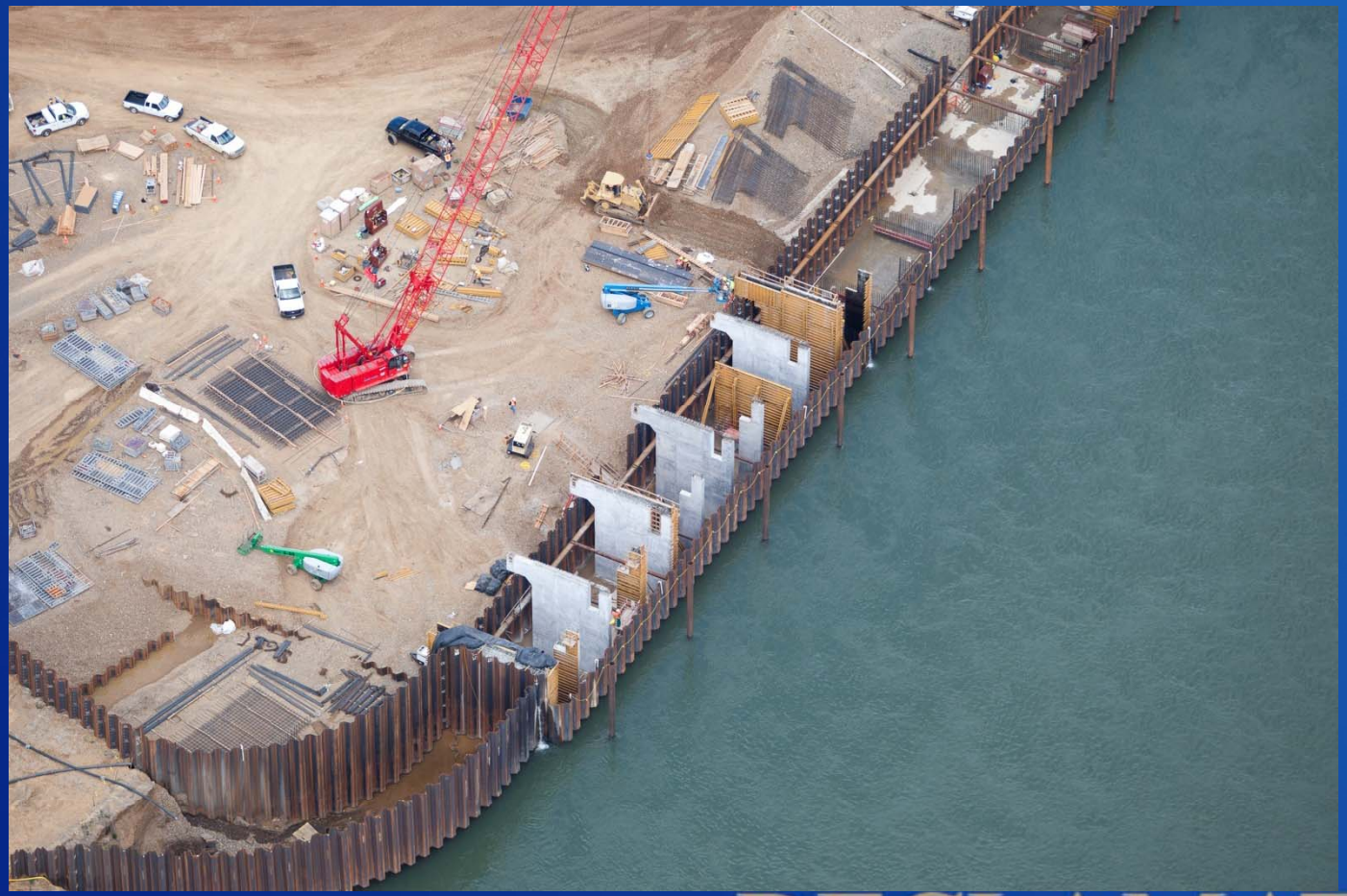
Balfour-Beattv Fish Screen. June 2011



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Balfour-Beatty Pumping Plant Foundation,

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Balfour-Beatty Pumping Plant & Fish Screen,

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Balfour-Beattv Construction Area. Nov. 2011

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Balfour-Beattv Construction Area. Jan. 2012

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Balfour-Beatty Pump Assembly, Jan. 2012

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Final Product

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