Columbia Stock Ranch

Project Overview

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Sally Bird-Gauvin, Archeologist

Matt Fraver, Hydraulic Engineer

Portland, Oregon

July 8, 2016

US Army Corps of Engineers
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Section 536 overview
How is the Corps involved?

Project authority:

- Section 536 of the Water Resources Development Act of 2000, authorized appropriations for the Corps to restore aquatic ecosystems within the Lower Columbia River and Tillamook Bay estuaries.
- Estuary includes river reaches on the mainstem of the Columbia River in Oregon and Washington west of Bonneville Dam, and the tributaries of such reaches to the extent they are tidally influenced.

Section 536 overview
How is the Corps involved?

Authorized funding limit:

- First funded in FY03
- The maximum federal expenditure for this project is $15.1 million, which includes planning, design and construction costs.

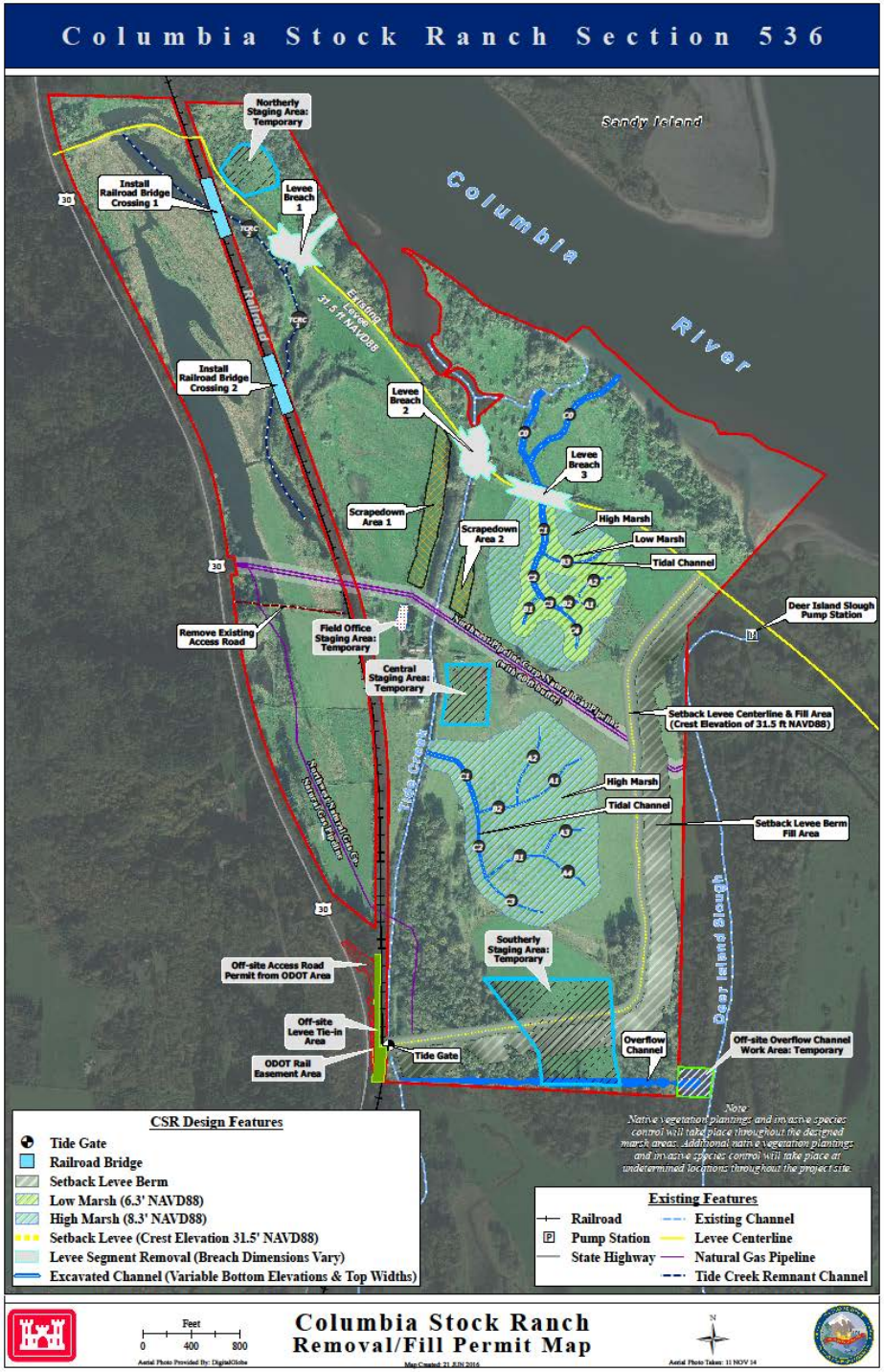
Section 536 overview

How is Bonneville Power Administration involved?

BPA requirements:

- Provide all lands, easements, rights-of-way, relocations and dredged material disposal areas necessary for ecosystem restoration projects to be carried out.
- Responsible for operating, maintaining, replacing, repairing, and rehabilitating all project features, including all costs associated with operations and maintenance.
- Note: the relationship for this project is between the Corps and BPA. BPA has relationships with CLT, and could develop additional 3rd party agreements.

Project map


Columbia Stock Ranch Section 536
Sandy Island
Columbia
River
Northerly Staging Area: Temporary
Install Railroad Bridge Crossing 1
Levee Breach 1
Existing Levee 31.5 ft NAVD88
Railroad
Install Railroad Bridge Crossing 2
Levee Breach 2
Levee Breach 3
Scrapedown Area 1
Scrapedown Area 2
High Marsh
Low Marsh
Tidal Channel
Deer Island Slough Pump Station
Remove Existing Access Road
Field Office Staging Area: Temporary
Central Staging Area: Temporary
Setback Levee Centerline & Fill Area (Crest Elevation of 31.5 ft NAVD88)
Tide Creek
High Marsh
Tidal Channel
Setback Levee Berm Fill Area
Deer Island Slough
Southerly Staging Area: Temporary
Off-site Access Road Permit from ODOT Area
Off-site Levee Tie-in Area
ODOT Rail Easement Area
Tide Gate
Overflow Channel
Off-site Overflow Channel Work Area: Temporary
Note:
Native vegetation plantings and invasive species control will take place throughout the designed marsh areas. Additional native vegetation plantings and invasive species control will take place at undetermined locations throughout the project site.
CSR Design Features
Tide Gate
Railroad Bridge
Setback Levee Berm
Low Marsh (6.3' NAVD88)
High Marsh (8.3' NAVD88)
Setback Levee (Crest Elevation 31.5' NAVD88)
Levee Segment Removal (Breach Dimensions Vary)
Excavated Channel (Variable Bottom Elevations & Top Widths)
Existing Features
Railroad
Pump Station
State Highway
Existing Channel
Levee Centerline
Natural Gas Pipeline
Tide Creek Remnant Channel
Feet
0 400 800
Aerial Photo Provided By: DigitalGlobe
Columbia Stock Ranch
Removal/Fill Permit Map
Map Created: 21 JUN 2016
Aerial Photo Taken: 11 NOV 14

Current status

- Construction documents advertised: July 15 – Aug. 15
  - Need letter of support from drainage district
  - MOA with State Historical Preservation Office
  - 12 real estate actions
    - Utilities
    - Railroad
    - ODOT
    - Drainage district
    - Overflow channel real estate
- Award construction contract: Sept. 30

Today's meeting

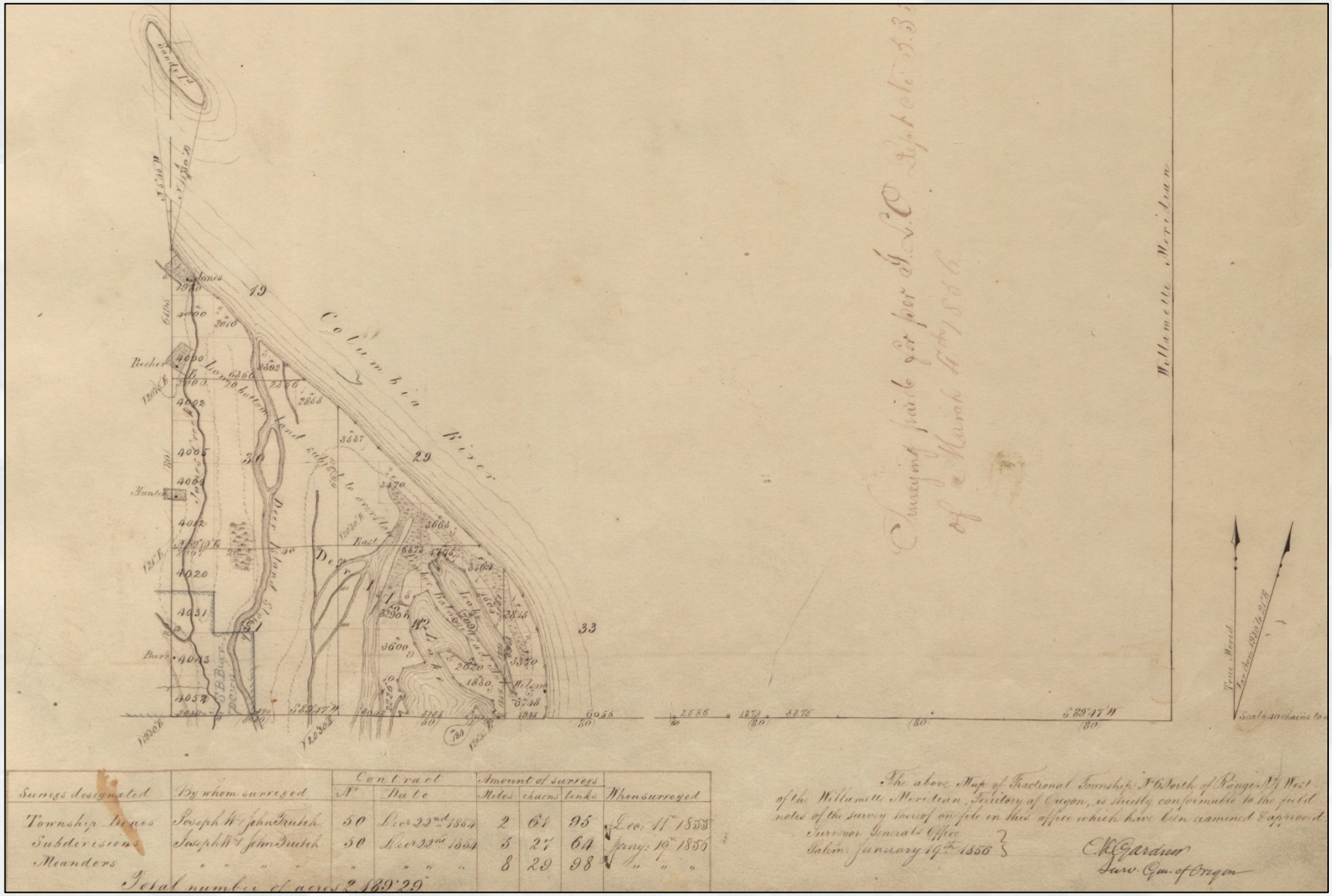
Purpose: Ensure community concerns are understood, technical information is understood, work together to develop acceptable solutions

- Discuss historic properties
  - Sally Bird-Gauvin
- Discuss hydraulic and hydrologic concerns
  - Matt Fraver

Concerns

- Technical
  - Historical structures
  - Increase in maximum water level
  - Increase in frequency/duration/severity of fields flooding
  - Increase in frequency/duration/severity of basement flooding
  - Change in pump operations, maintenance and costs
  - Change in connection to remnant Tide Creek
- Non-technical
  - Loss of tax base revenue due to setback levee

Historic Columbia Stock Ranch



Cultural resource laws

- National Historic Preservation Act
  - Requires a federal agency to take into account the effects of their activities and programs on historic properties.
- Archaeological Objects and Sites (Oregon State Statute 358.905-961)
  - Defines archaeological sites in Oregon
  - 75 years or older
  - Prohibits the sale and exchange of cultural items or damage to sites on public and private lands
  - An archaeological excavation permit is required

Ranch historic timeline

- 1806 Lewis and Clark noted a location of an “old Indian Village” along Deer Island
- Historically the Ranch had two Donation Land Claims (DLC), Jackson Peacher and John H. Jones (circa 1852)
- 1884 Northern Pacific Railway line is through Columbia County
- Community of Hunters (became Charlton circa 1915), appears to be north of the project area – post office 1888 -1893
- 1897 Jackson Peacher dies and John H. Jones DLC for sale
- 1903-1908 Oregon reclaims land south of project boundary under the Swamp Lands Act
- 1918-1922 Arthur Canfield regularly appears in local papers

Ranch historic timeline

- 1928 Metsker maps indicate Arthur Canfield is landowner for portions of the property
- 1929 Aerial photo identifies structures east and north of the current house and barn complex, as well as several structures at the house and barn complex
- 1939 Aerial photo identifies the house and barn complex and the dwelling to the north, the structure to the east is gone
- 1942 The Columbia River Levee is complete
- 1948 Dwelling to the north is gone
- 1951 Arnold Leppin buys property
- Prior to 1966 several structures within the house and barn complex are removed

1929 aerial

COLUMBIA
ISLAND
N
Tide
Creek
Log
S P & S RY
COLUMBIA RIVER HIGHWAY
Strucure
Structure
Structure
Farm & Barn Complex
1929 Aerial Photo

Next steps

Consultation and mitigation

- The Corps is consulting with the State Historic Preservation Office to mitigate adverse effects to the historic properties
- Mitigation may look like:
  - Detailed documentation of historic structures
  - Written historic documentation
  - Provide historic documentation to local and state historical societies and the Oregon Encyclopedia project

Concerns vs. measures

- Increase in max water level
- Increased flooding in fields
- Increased flooding in basement
- Increase in pump costs
- More challenging pump operations
- Decreased capacity to de-water Tide Creek

- Maintenance of existing facilities
- Alarm system and training for operations
- Improvement of existing outlets
- Additional low-flow pump
- Additional equipment for flood fight
- Structure flood-proofing
- Lowering overflow channel

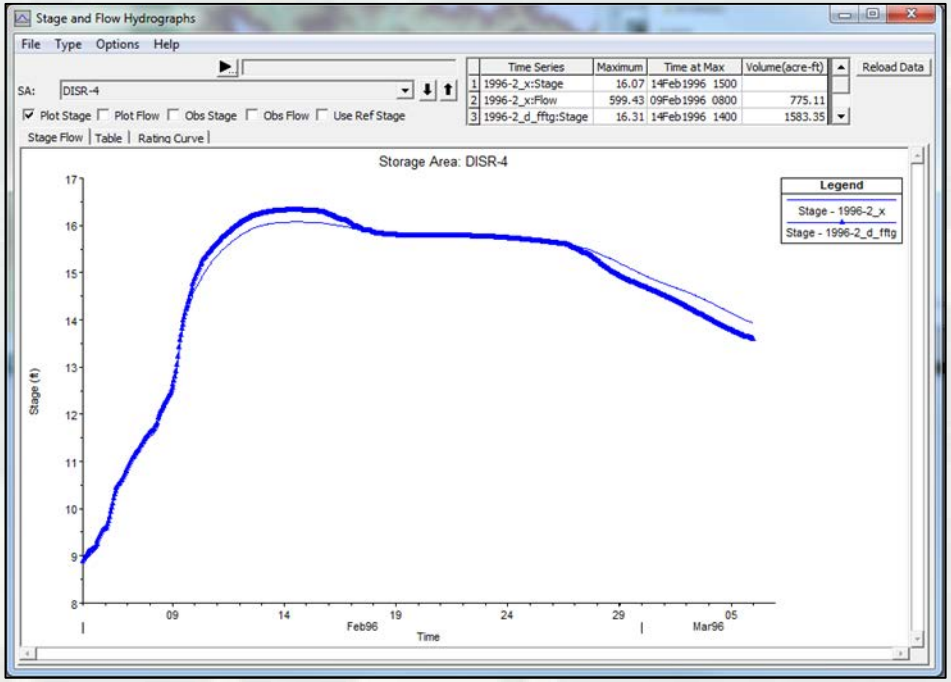
Hydraulic and hydrologic analysis

Objective:

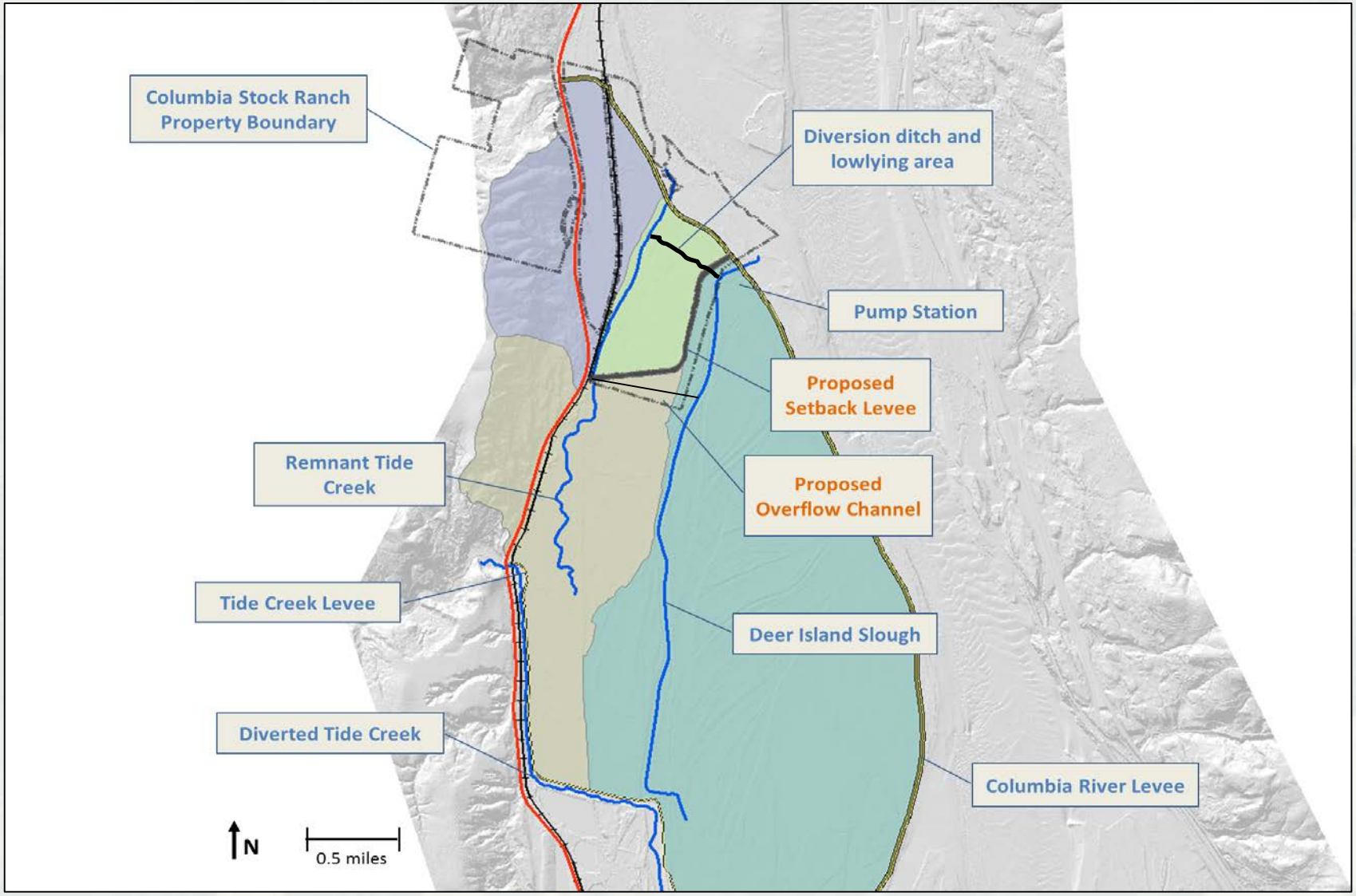
Determine potential impacts of the CSR project to adjacent properties

Approach:

Comparative analysis



Area description



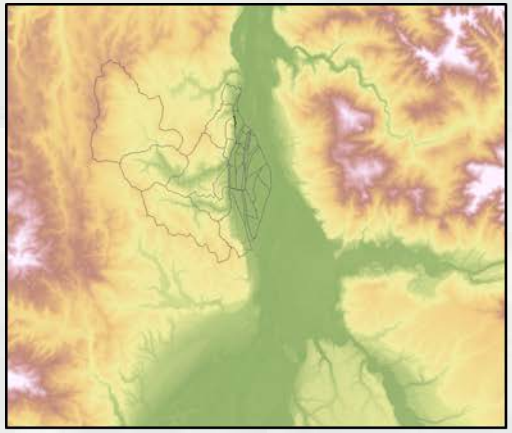
Overview of Deer Island hydrology

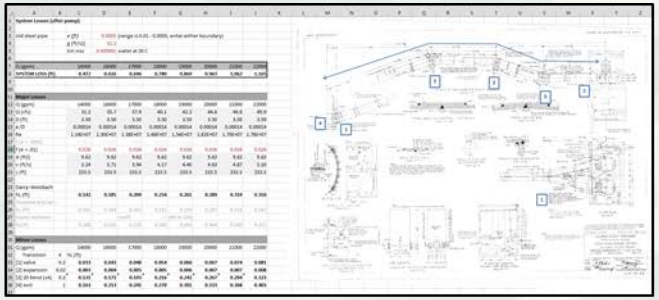
- Inflow
  - Rainfall
  - Seepage/groundwater
  - Tide Creek
- Outflow
  - Drainage through tidegates
  - Pumping
- Storage capacity

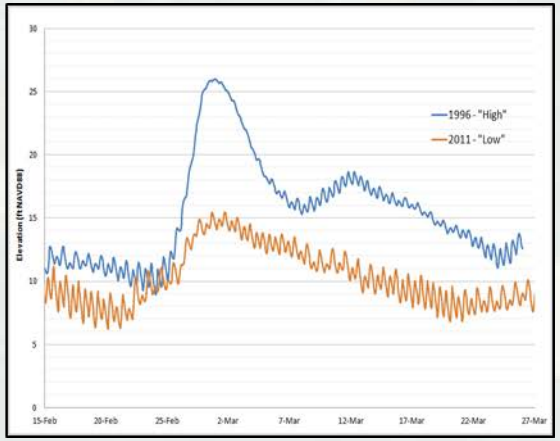
Potential changes due to CSR project

- Decrease in storage capacity
  - Increase in rate of change of water level
  - Increase in average and maximum water level assuming inflow is the same (assumption for freshet and Tide Creek breakout events)
- Increase in outlet capacity
  - Increase in rate of change of water level dropping
  - Decreased duration of flood stage on tail-end of high water conditions
- Pump operations

Information needed for building a hydraulic model







- Terrain data (topographic, bathymetric)
- Structure data (pumps, culverts, bridges)
- Hydrologic data (rainfall runoff, seepage/groundwater, other)

Assumptions and limitations to CSR model

Information used

- LiDAR data from November 2010
- As-built drawings and field survey of culverts/bridges
- Pumping logs from 2008 supplied by Drainage District
- Best available pumping data from manufacturer

Assumptions and limitations to CSR model

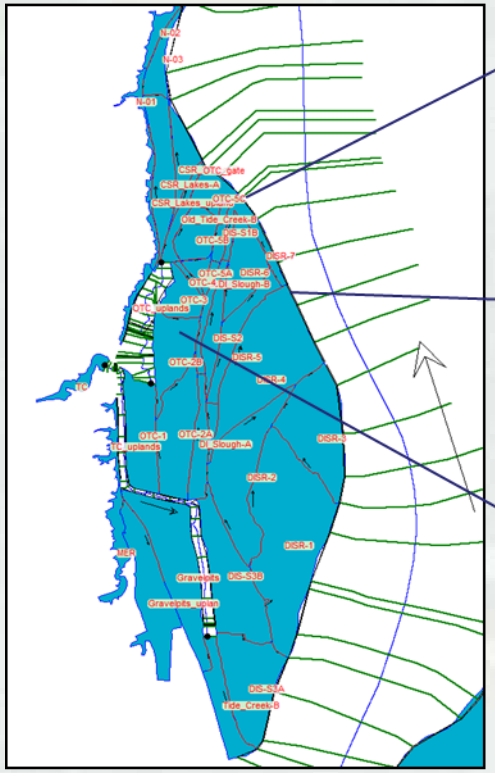
Assumptions

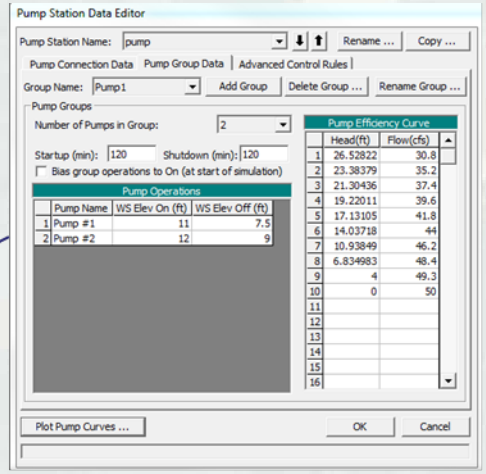
- Pumps and tide gates are functional
- Seepage driven by Columbia River stage

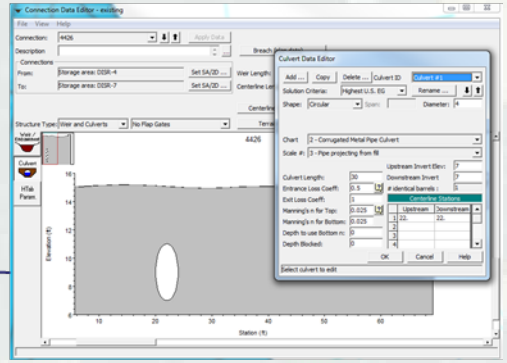
Limitations

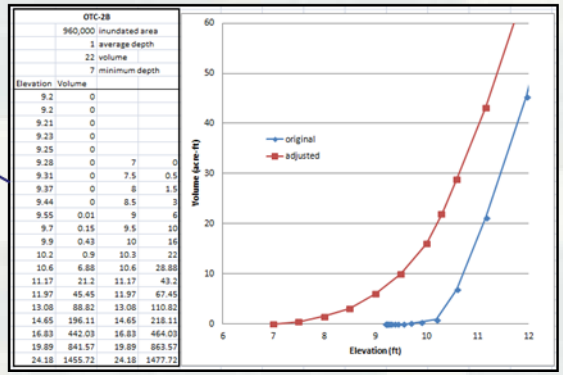
- Storage area model - low hydraulic grade during flooding conditions
- Pump operation automated, a function of water level
- Accuracy adequate for comparative analysis only

HEC-RAS model geometry existing conditions









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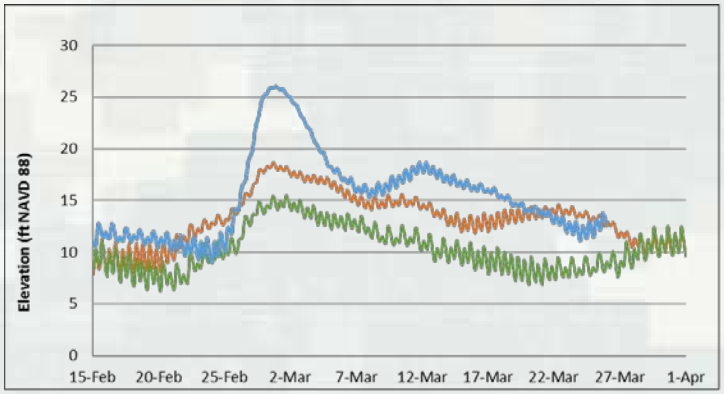
Hydrologic inputs

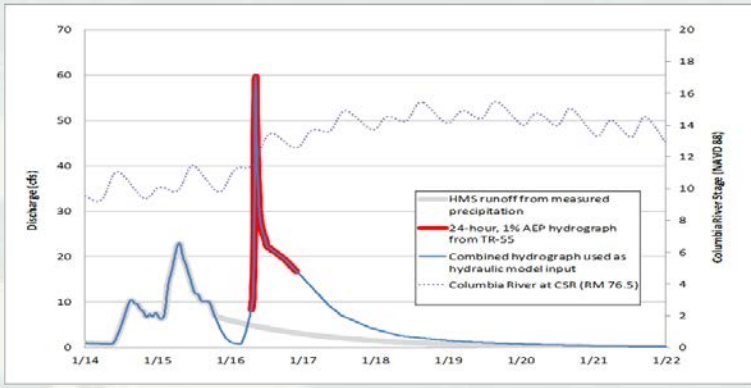
Exterior stage (Columbia River)

- Historic winter floods
  - January 2011, 2-year event
  - February 1982, 10-year event
  - February 1996, >100-year event
- Spring freshet
  - 2012

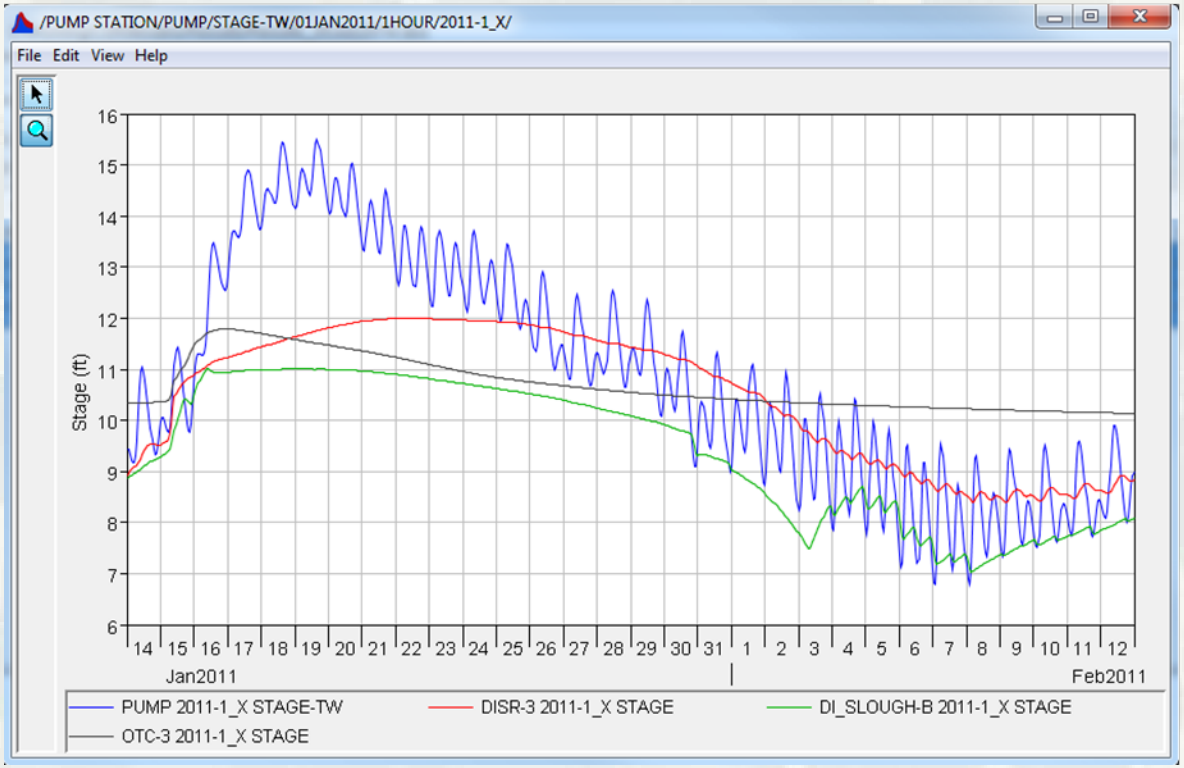


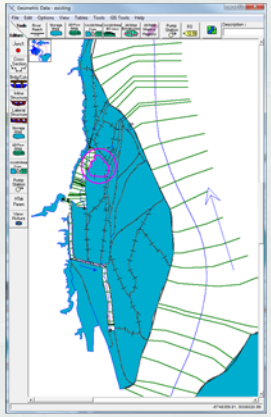
Interior rainfall-runoff

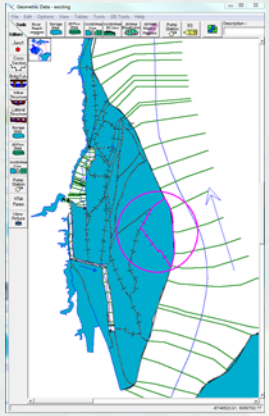
- 100-year, 24-hour flood
  - Occurring during dry period
  - Occurring during wet period
- Weekly flows based on rainfall data

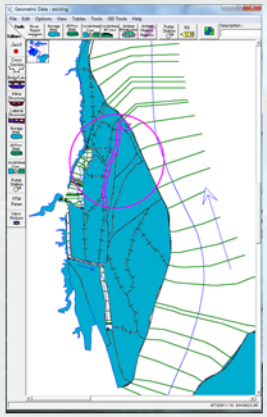


Model results existing conditions

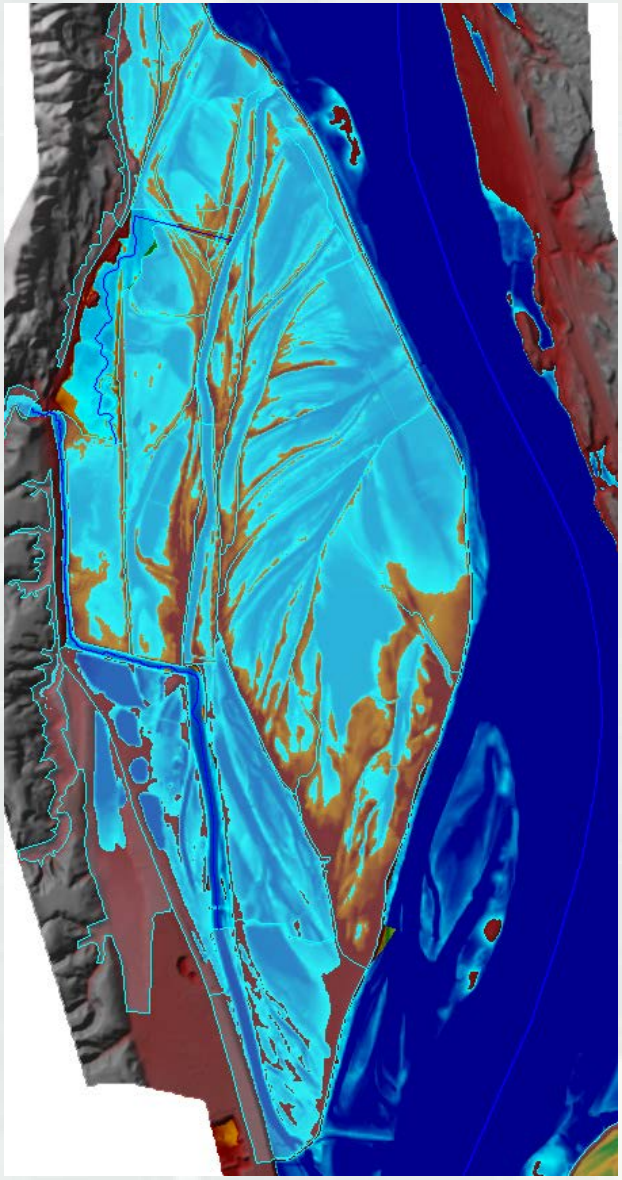




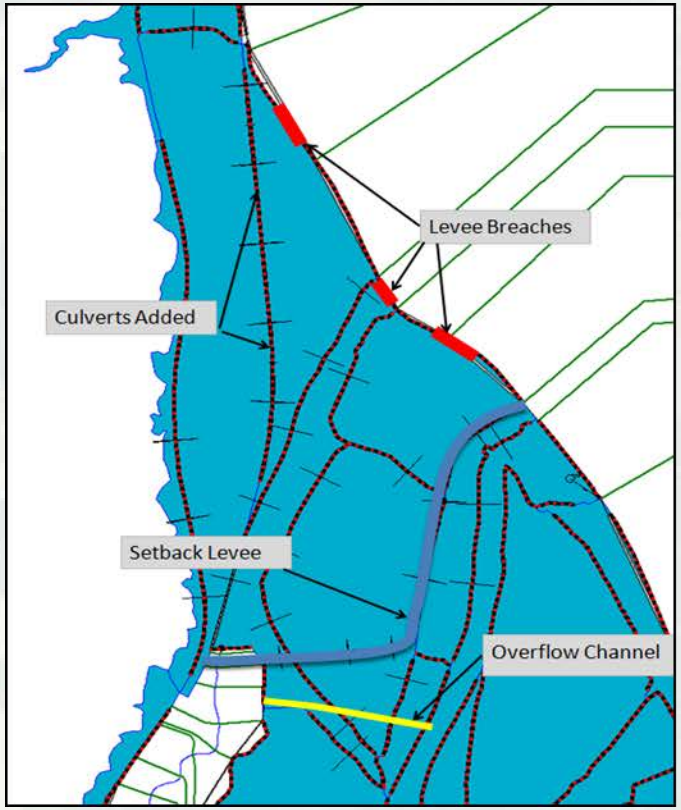


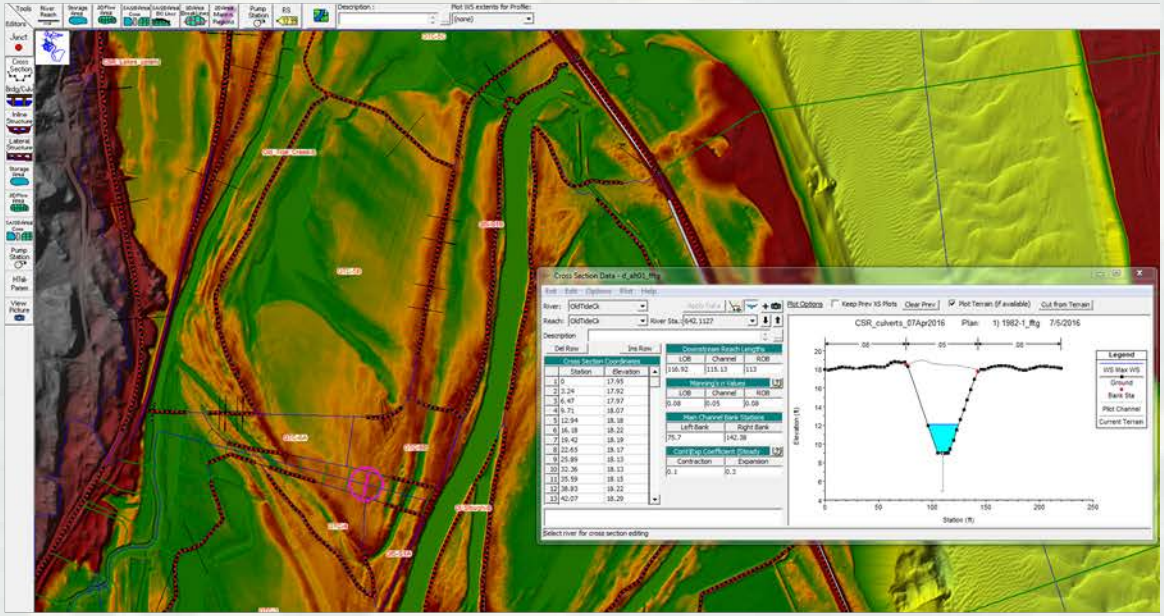


Existing conditions model validation

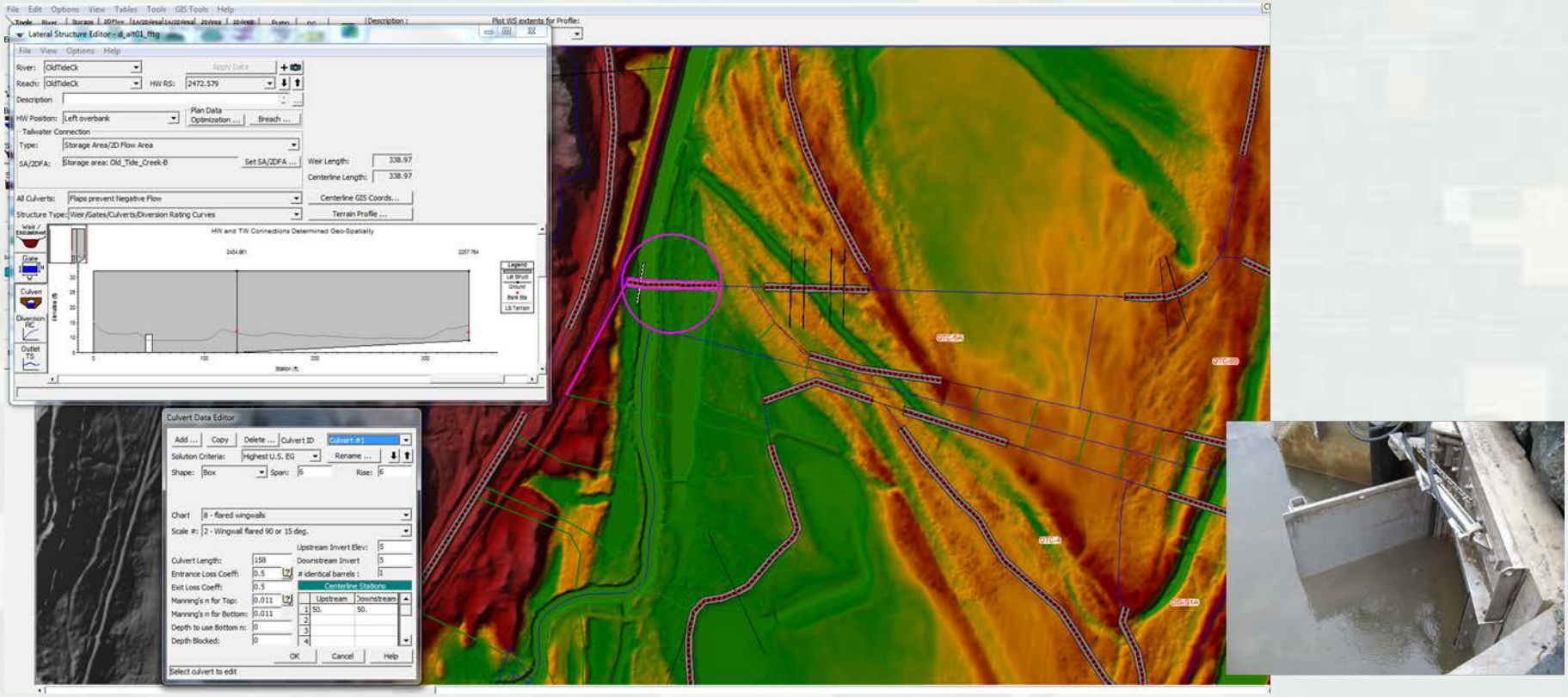


Model geometry with-project conditions





Model geometry with project conditions



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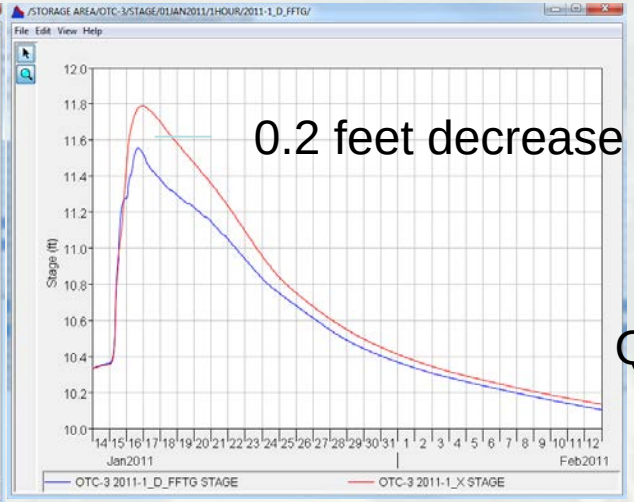
Example model result

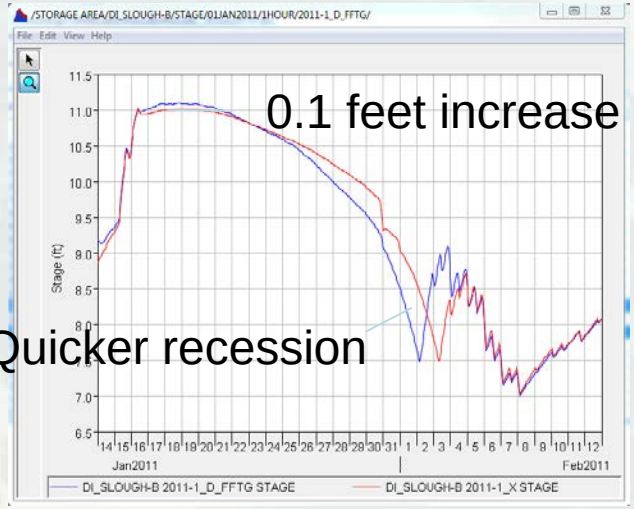
winter flood water levels
existing vs. with project conditions

Deer Island Stock Ranch

Tide Creek fields



Deer Island Slough

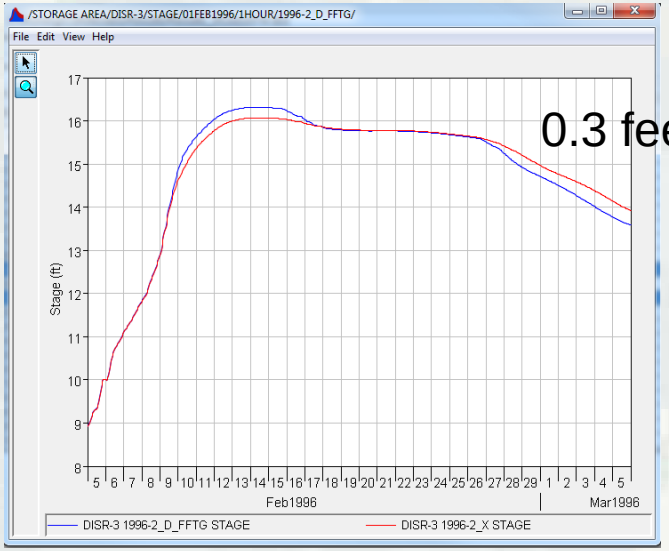


Simulation: 2011 dry = 100-year interior rainfall event occurring with two-year Columbia River stage

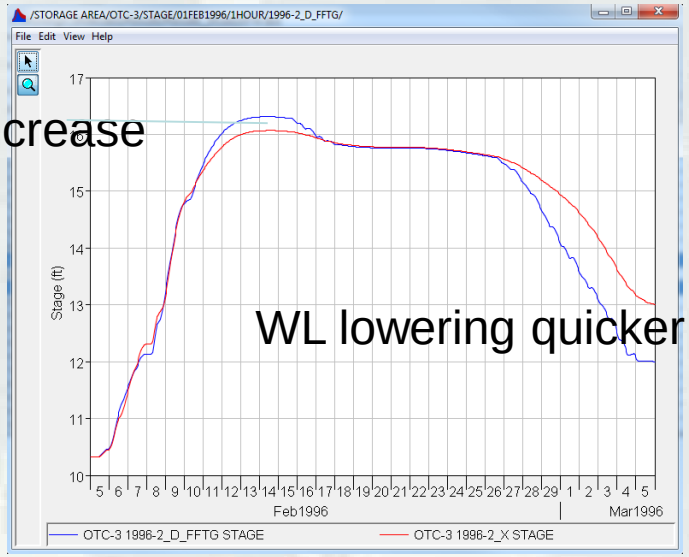
Example model result

winter flood water levels
existing vs. with project conditions

Deer Island Stock Ranch



Tide Creek fields

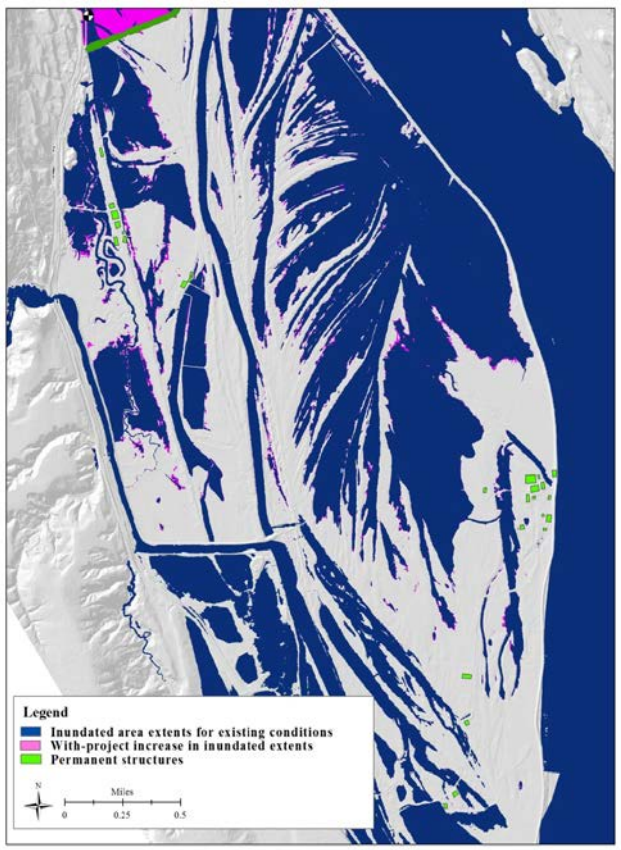


0.3 feet increase

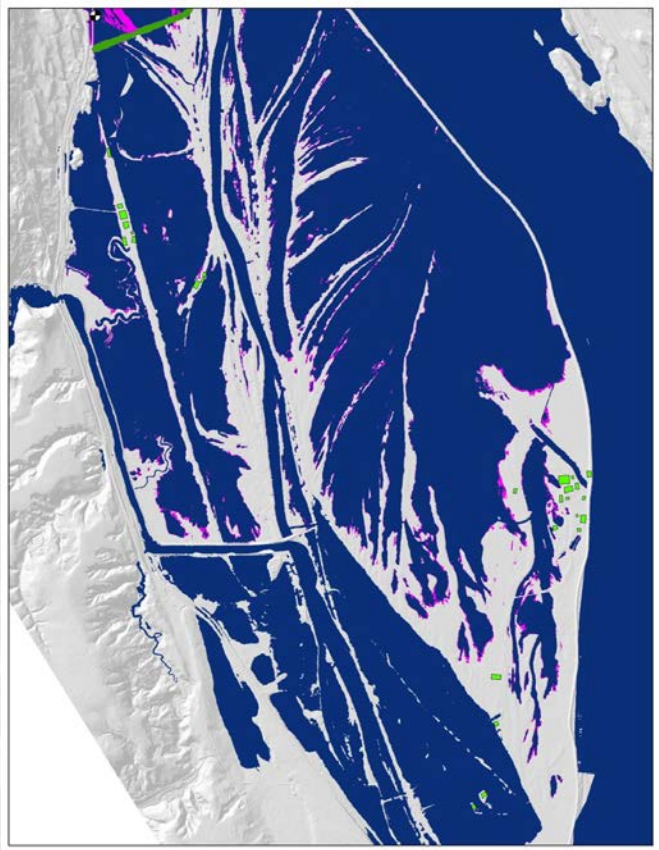
WL lowering quicker

Simulation: 1996 wet = 100-year interior rainfall event occurring with >100-year Columbia River stage

Model results inundated area comparison

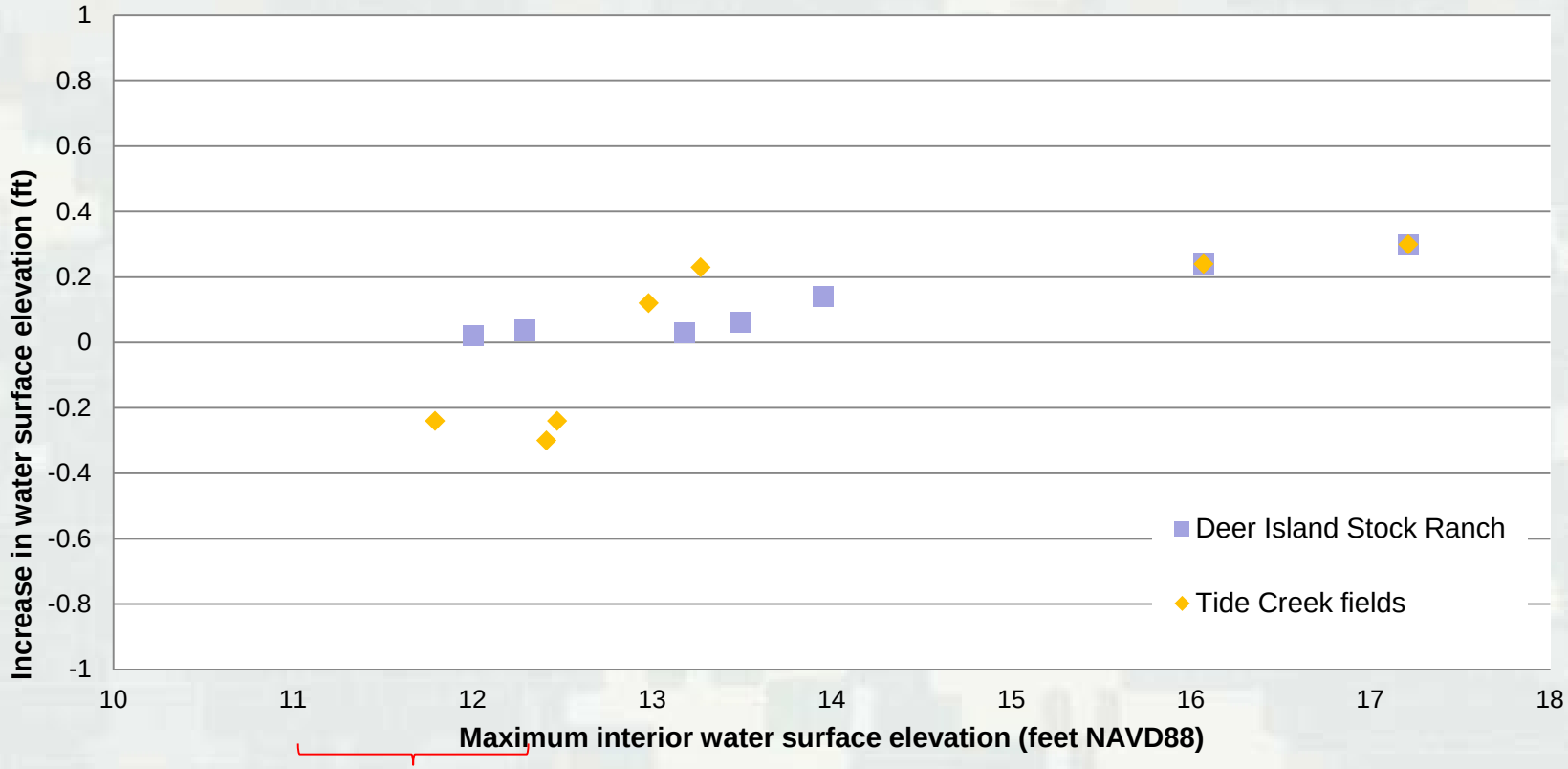


13 to 14 feet NAVD



15 to 17 feet NAVD

Model results summary
comparison of maximum water levels

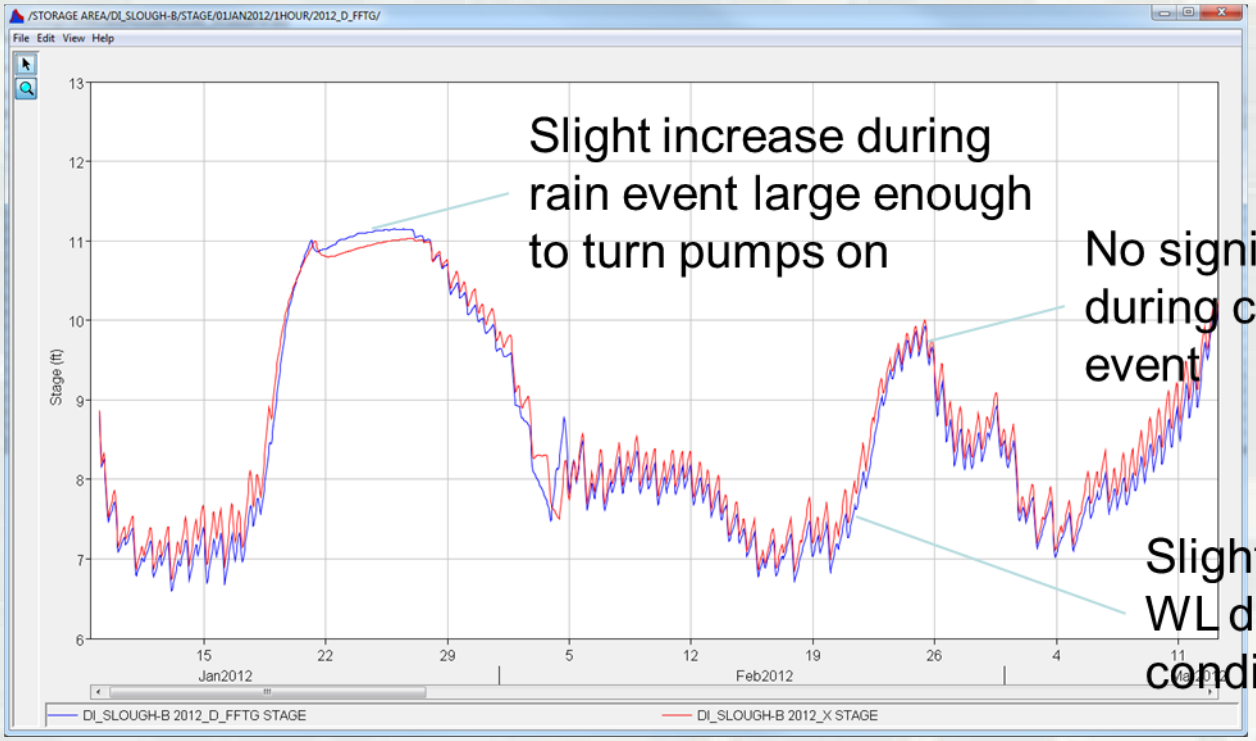


Pumps turned on

Fields wetting

Model results
normal water conditions
existing vs. with project conditions

Deer Island Slough

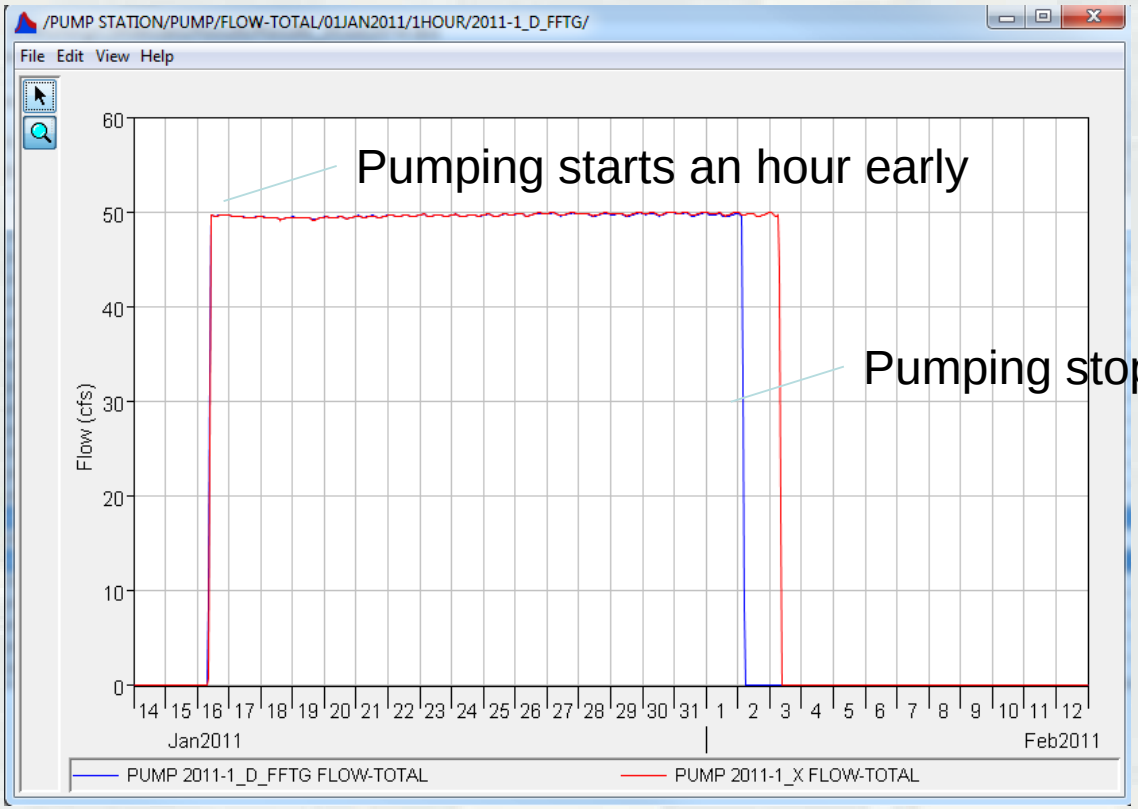


Slight increase during rain event large enough to turn pumps on

No significant change during common rain event

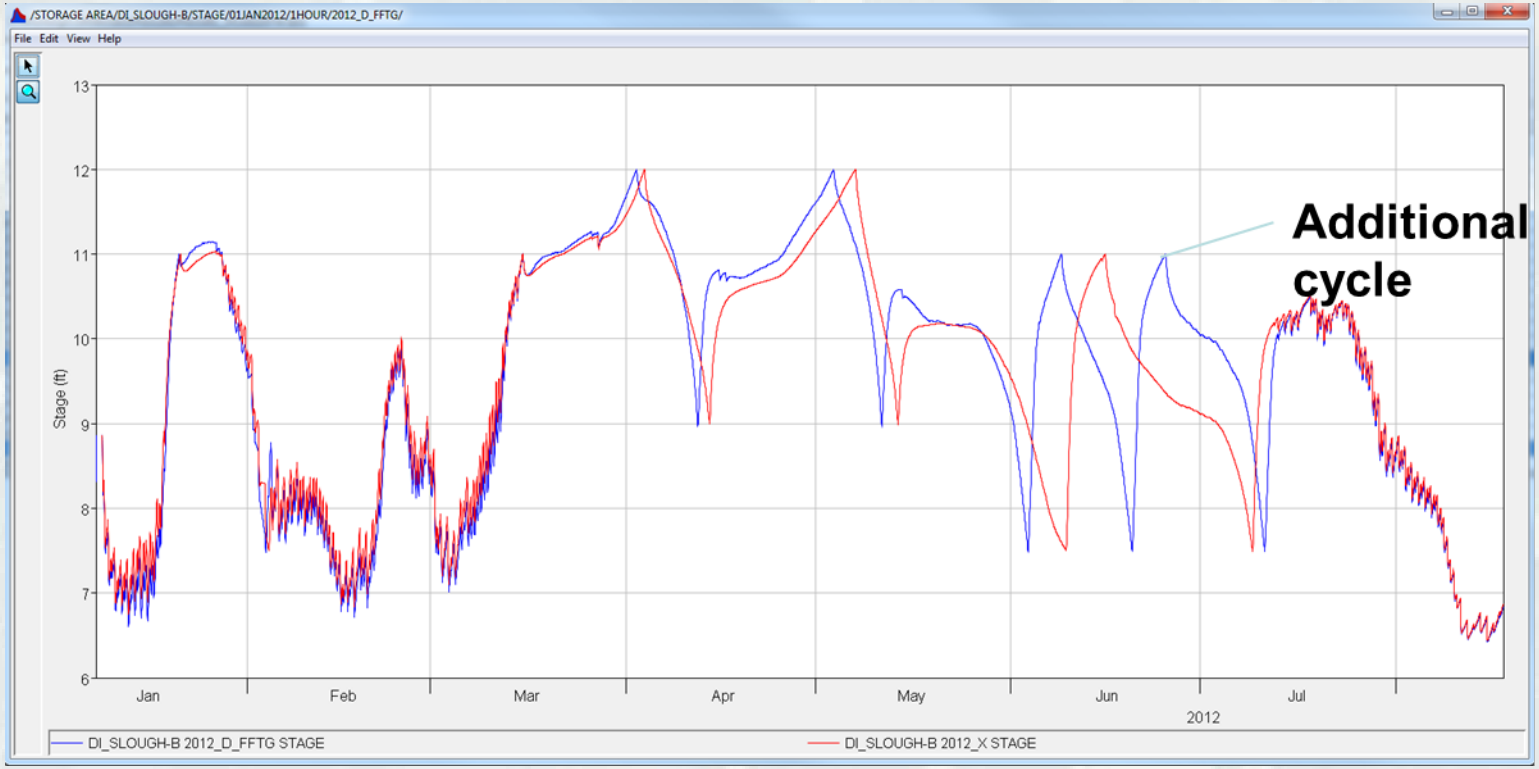
Slight decrease WL during normal conditions

Model results
pumping
existing vs. with project conditions



Simulation: 2011 dry = large interior rainfall event occurring with two-year Columbia River stage

Model results
2012 spring freshet
existing vs. with project conditions



Model results summary
change in pumping operations

- Pumps turned on slightly earlier but overall decrease pump duration typical with single events
- Occasional need for an additional pump cycle occurring with very long duration freshet
- Pumps need to be monitored more closely at low water due to increased rate of change at low elevation

Concerns vs. measures

- Increase in max water level
- Increased flooding in fields
- Increased flooding in basement
- Increase in pump costs
- More challenging pump operations
- Decreased capacity to de-water Tide Creek

- Maintenance of existing facilities
- Alarm system and training for operations
- Improvement of existing outlets
- Additional low-flow pump
- Additional equipment for flood fight
- Structure flood-proofing
- Lowering overflow channel

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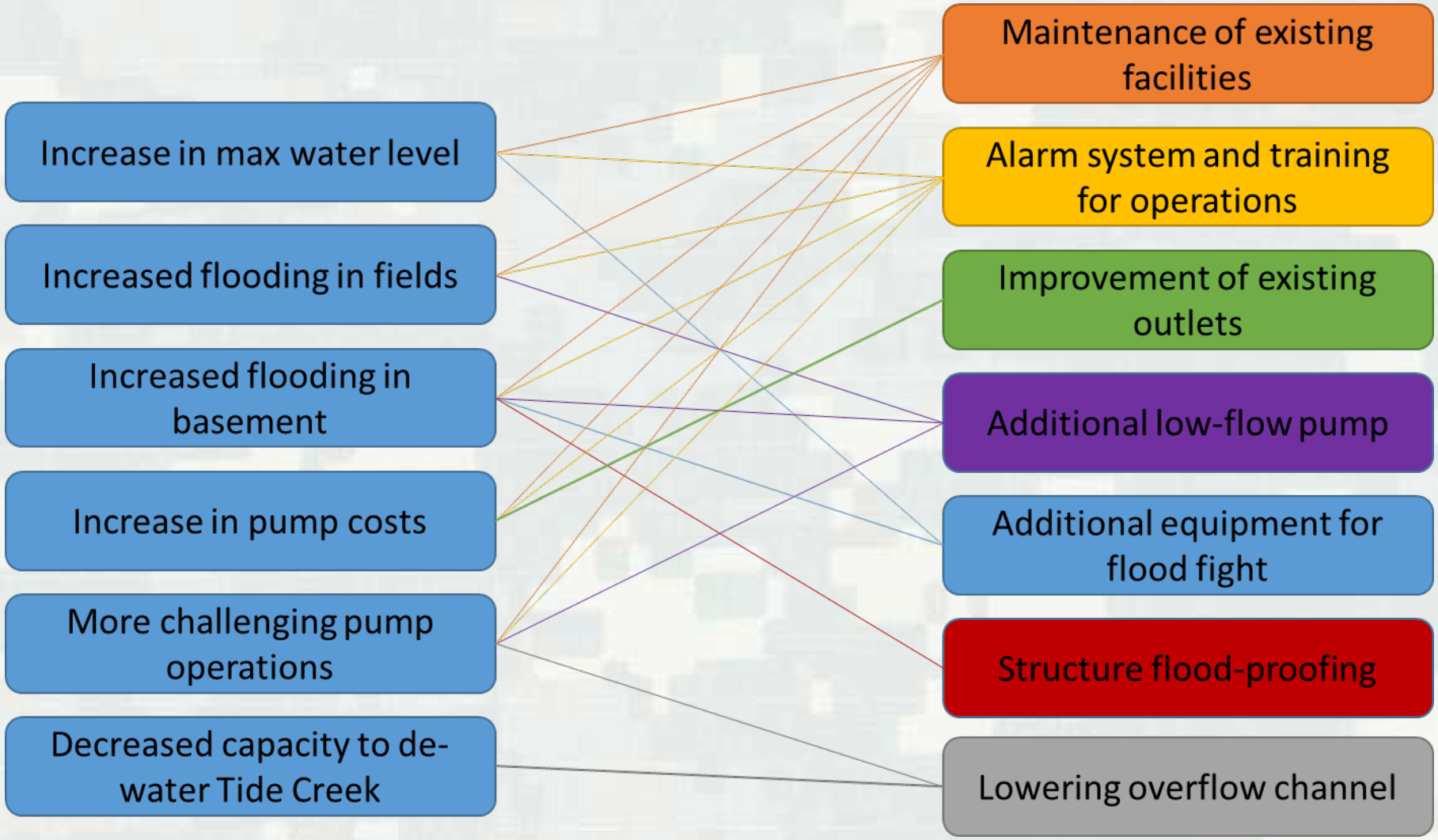

Questions/Discussions