



US Army Corps
of Engineers
Portland District

Hydrodynamic Modeling of Tidal Reconnection Restoration Projects

Uses and Limitations

Michael Ott

US Army Corps of Engineers



US Army Corps
of Engineers
Portland District

Overview

- **Modeling 101**
- **Modeling Strengths and Weaknesses**
- **Pre and Post Construction**
- **Case Study**



US Army Corps
of Engineers
Portland District

Modeling 101

- **What is a model**
- **Why should we model**
- **What type of model should be used**
- **Sensitivity**



US Army Corps
of Engineers

Portland District

Modeling Strengths and Weaknesses

Strengths

- **Communication medium**
- **A tool for quantifying various alternatives**

Weaknesses

- **Assumptions are made**
- **Only as good as the data used to develop**
- **Cost**
- **Static**



US Army Corps
of Engineers

Portland District

Pre and Post Construction

- **Monitoring**

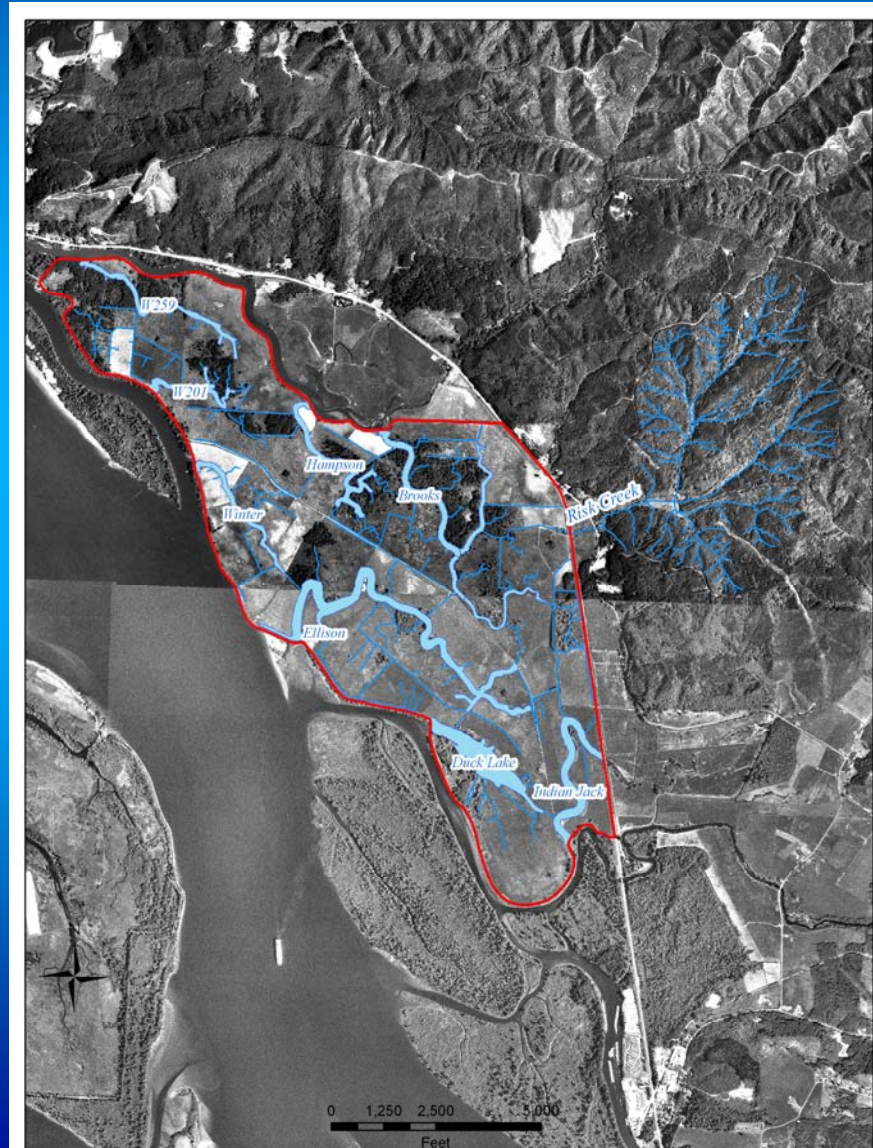
- **Verification**
 - ◆ Valid assumptions
 - ◆ System changes

- **Short coming solutions**
 - ◆ Adaptive Management
 - ◆ Phased Construction (for projects with multiple sites)
 - ◆ Design guidelines vs. rigid design criteria

Case Study: Julia Butler Hansen Wildlife Refuge



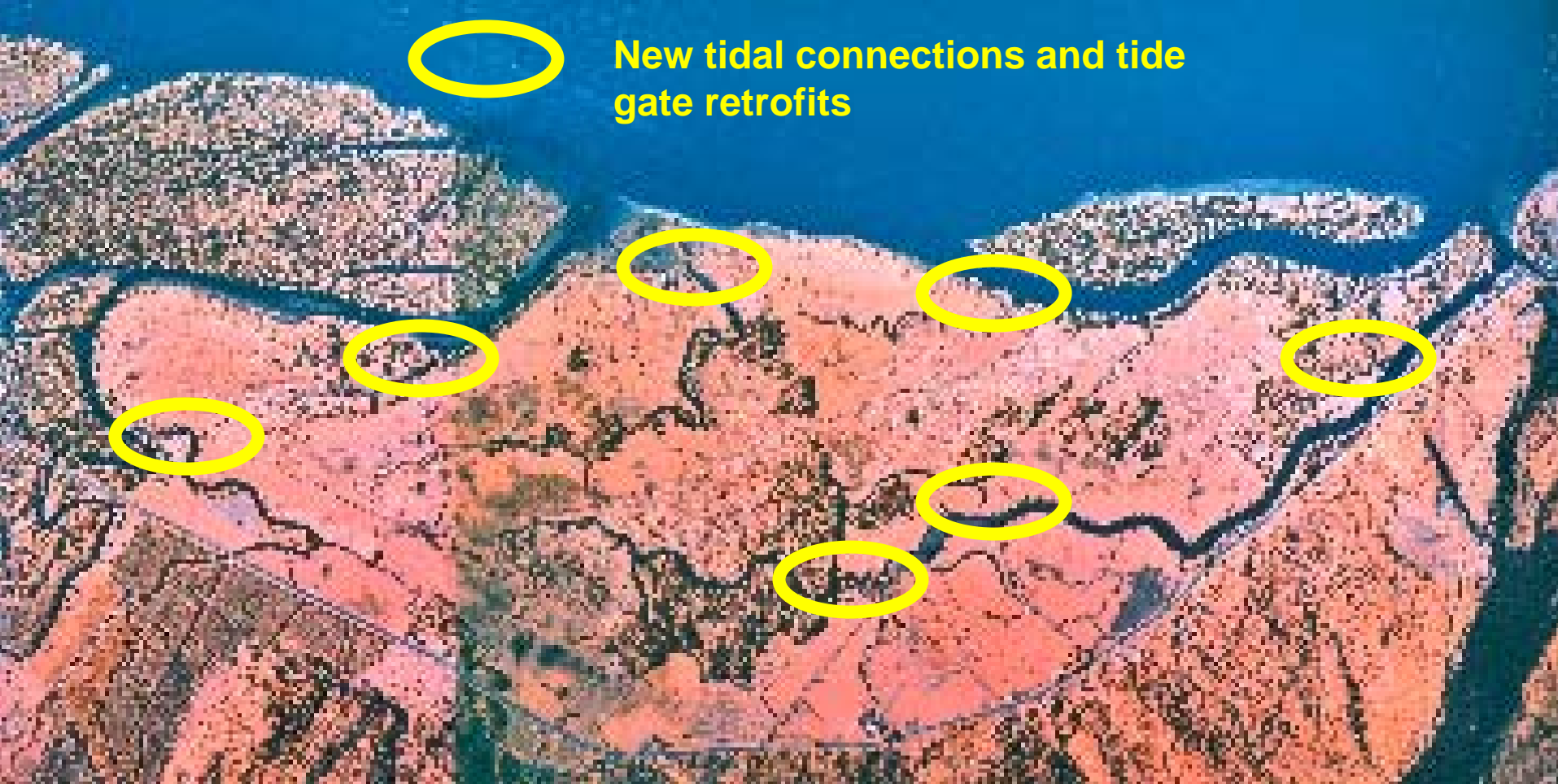
US Army Corps
of Engineers
Portland District





US Army Corps
of Engineers
Portland District

Julia Butler Hansen NWR Ecosystem Restoration

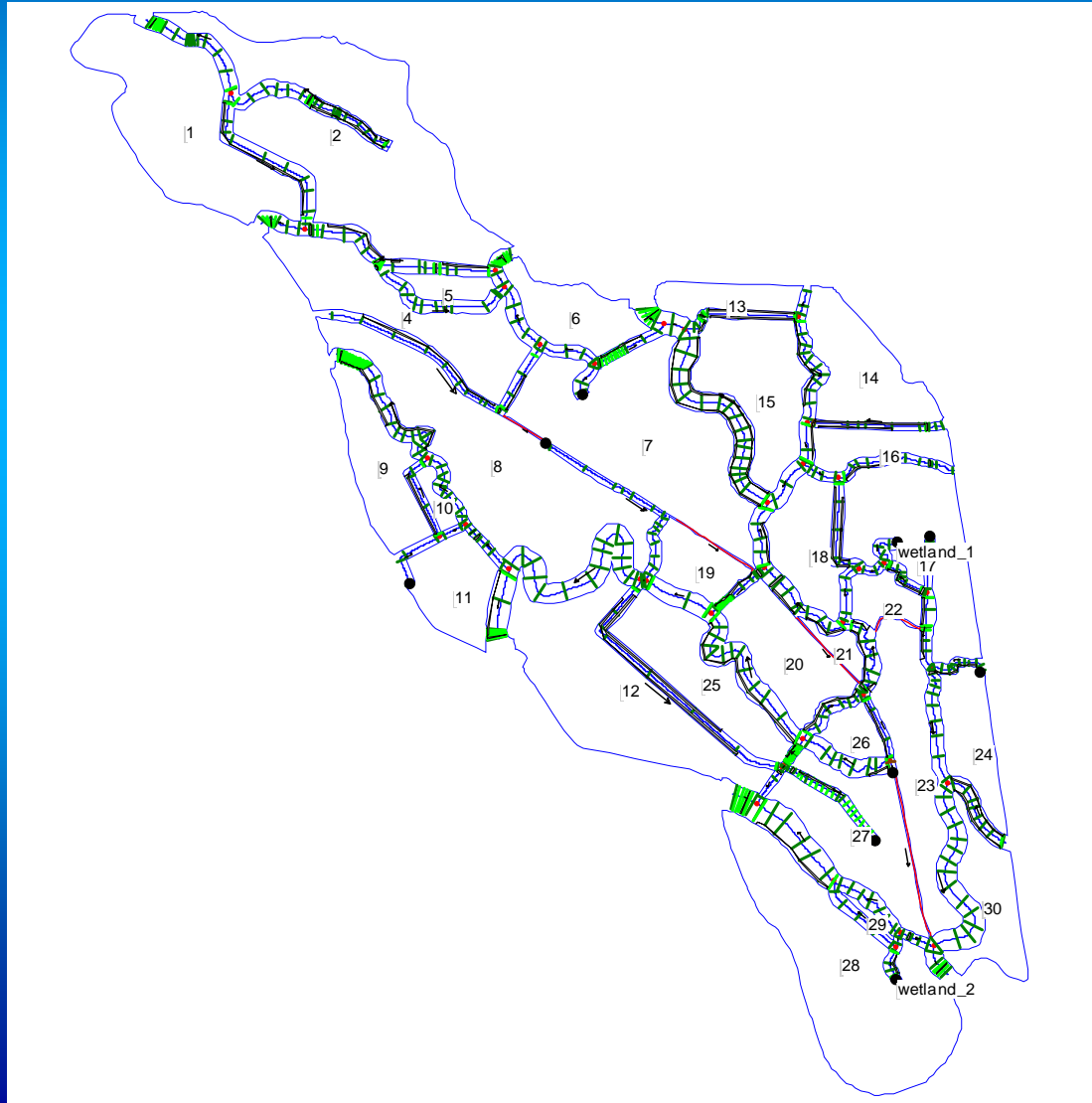


New tidal connections and tide
gate retrofits



US Army Corps
of Engineers
Portland District

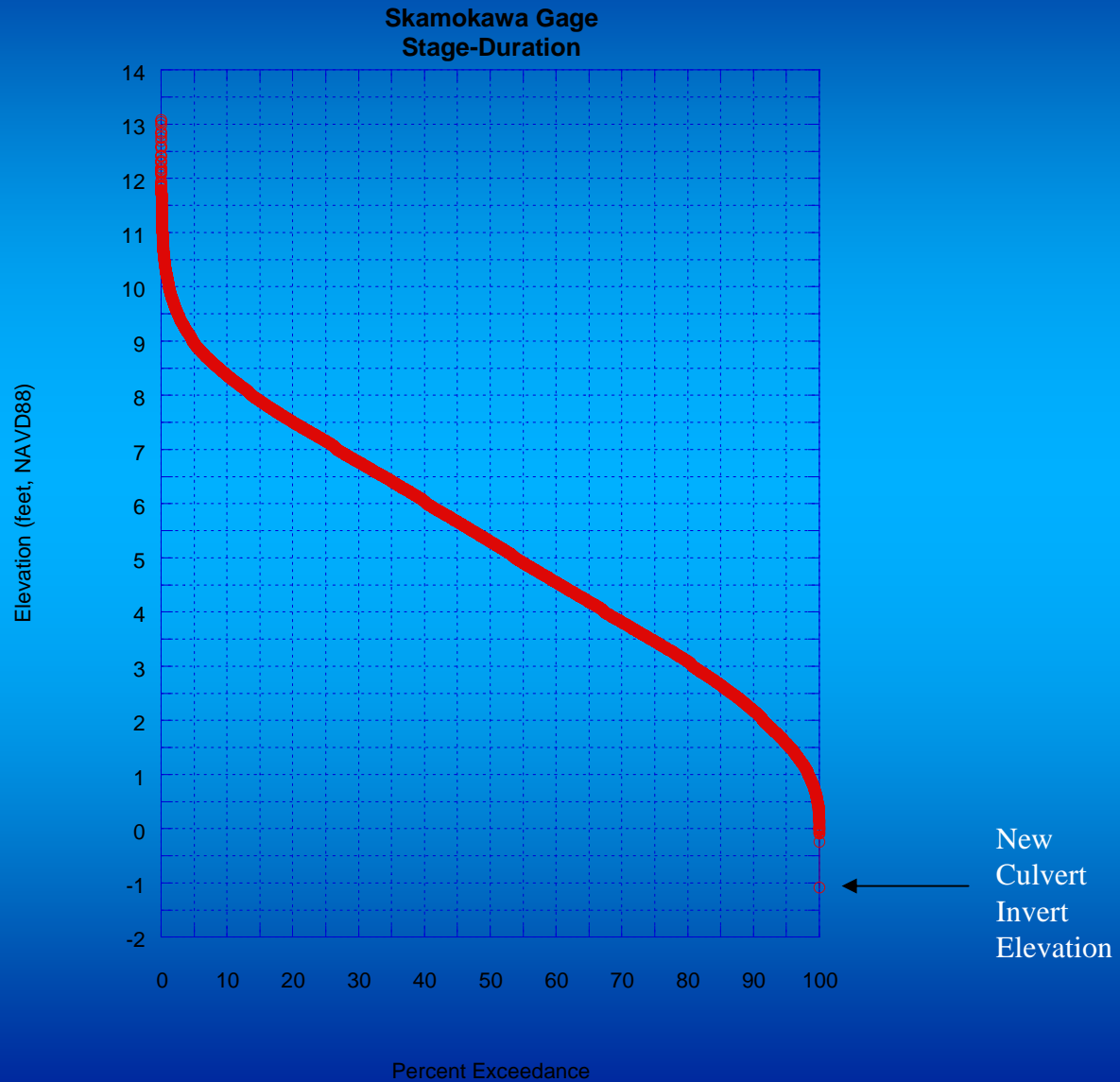
Julia Butler Hansen HEC- RAS Model Schematic





US Army Corps
of Engineers
Portland District

Stage Duration at Skamokawa Gage near Columbia River Mile 36



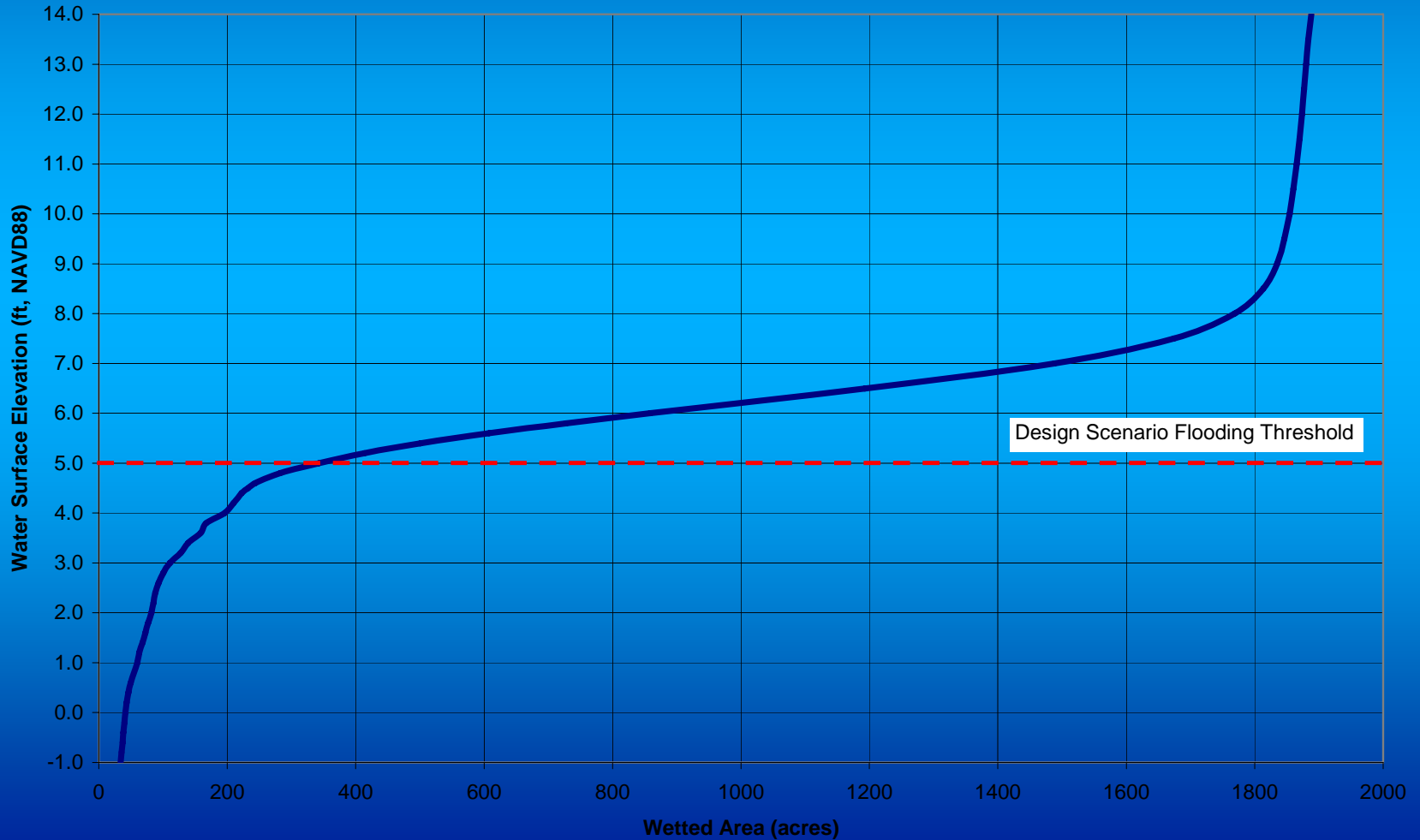


US Army Corps
of Engineers

Portland District

Available Surface Area for Columbia White-tailed Deer Habitat at JBH NWR

Julia Butler Hansen Wildlife Refuge Wetted Area-Elevation Curve

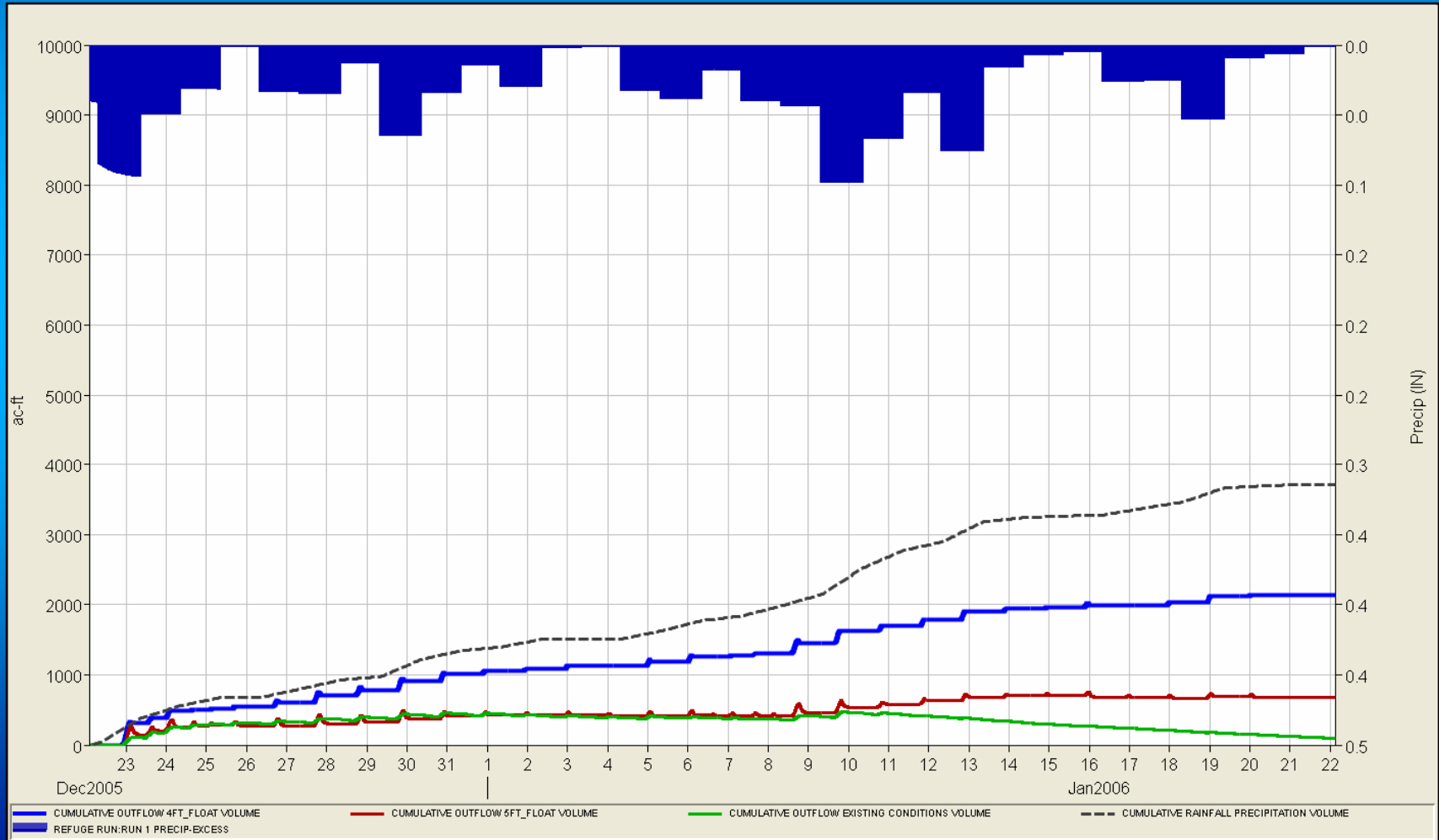




US Army Corps
of Engineers

Portland District

Cumulative Performance of Existing and New Tide Gates Compared with Rainfall for Design Scenario

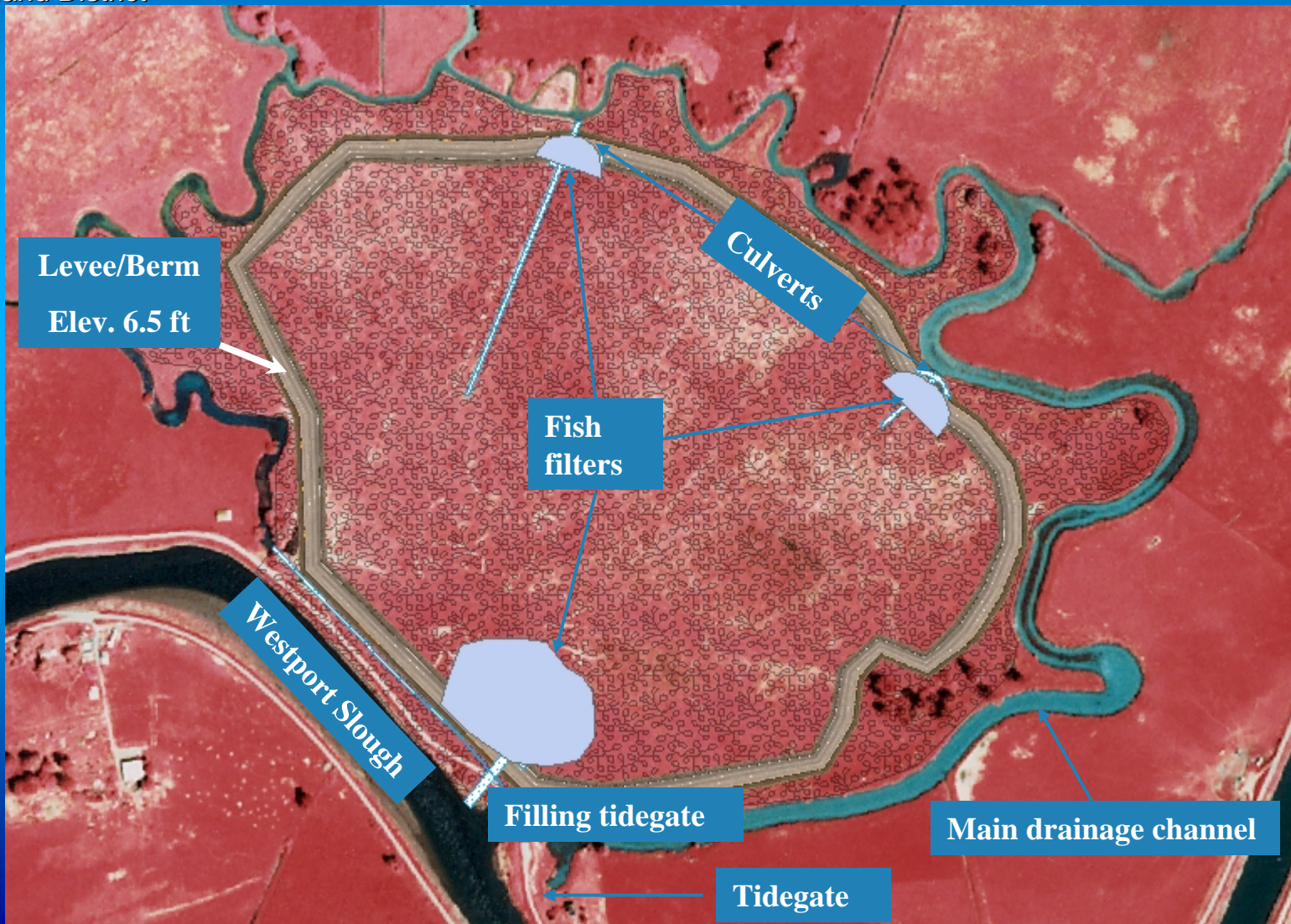




US Army Corps
of Engineers

Portland District

Webb Wildlife Mitigation – Managed Wetland





US Army Corps
of Engineers
Portland District

Webb Wetland Mitigation HEC-RAS Model Schematic

