



Marlin Greene/One Earth Images

Lessons Learned: North Puget Sound Estuary Restoration

Jenna Friebe, Washington Dept of Fish and Wildlife
Jenny Baker and Joeline Boyd, The Nature Conservancy

Port Susan Bay Project – Site History

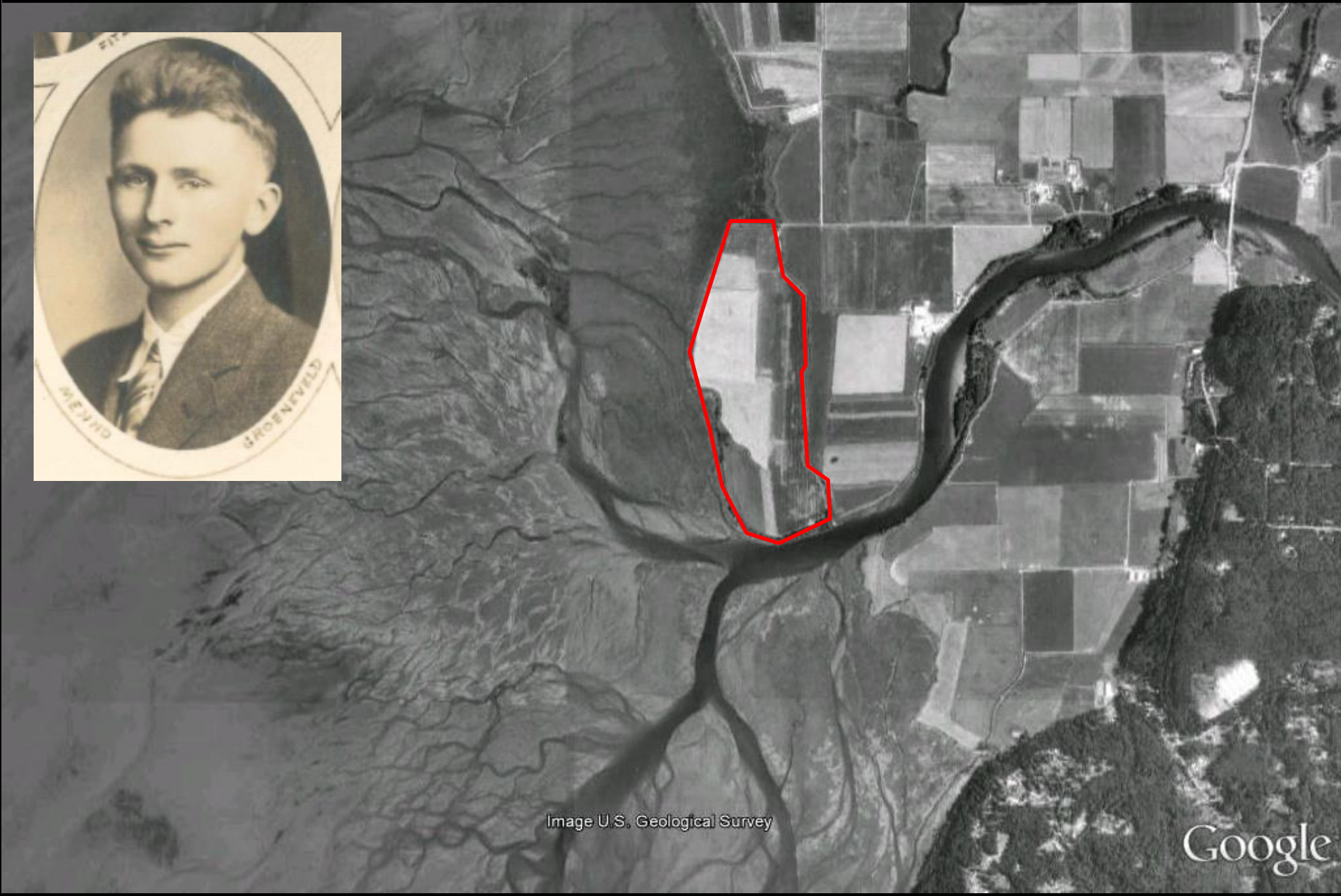
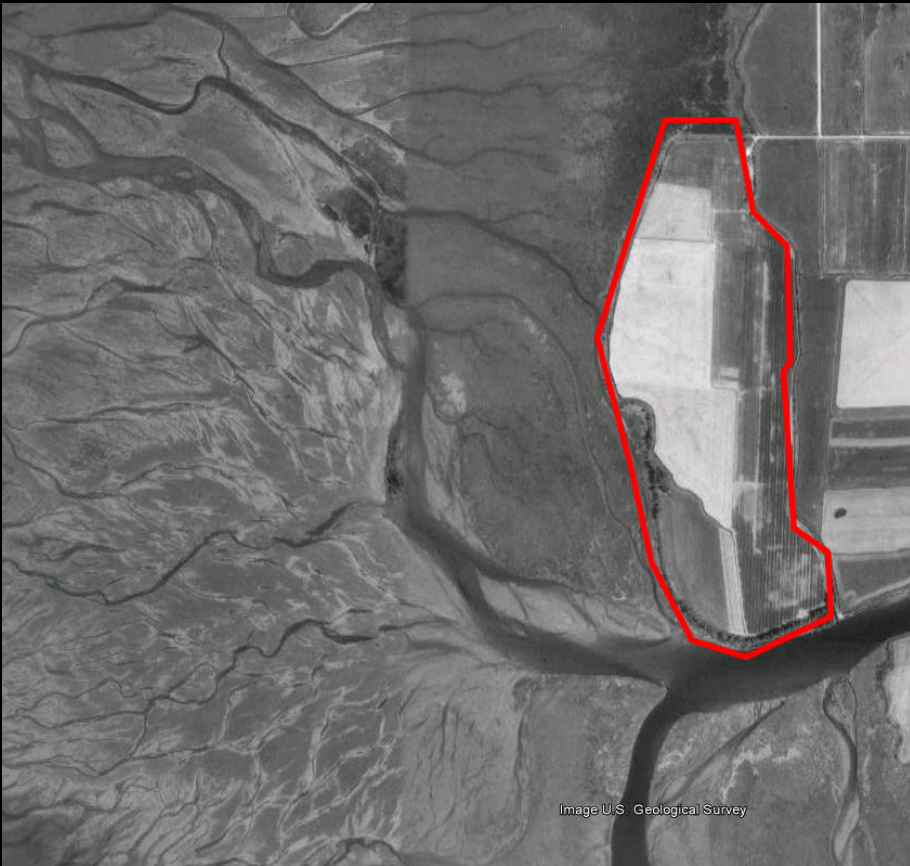


Image U.S. Geological Survey

Google

Port Susan Bay Project – Historic Channel Changes



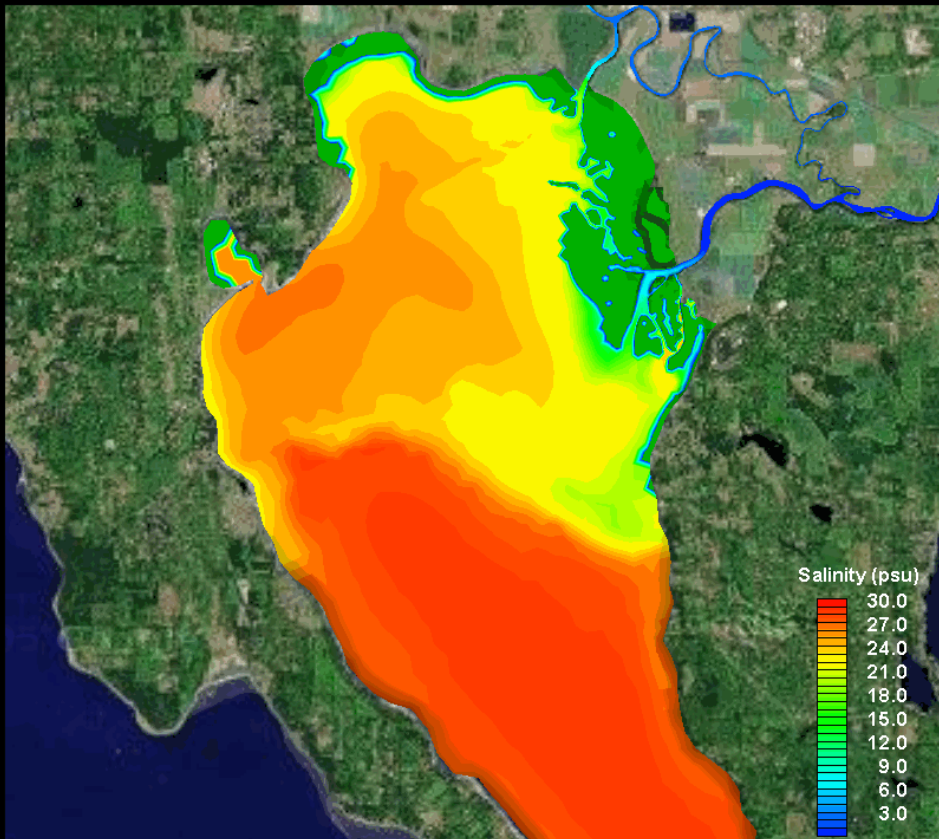
1990



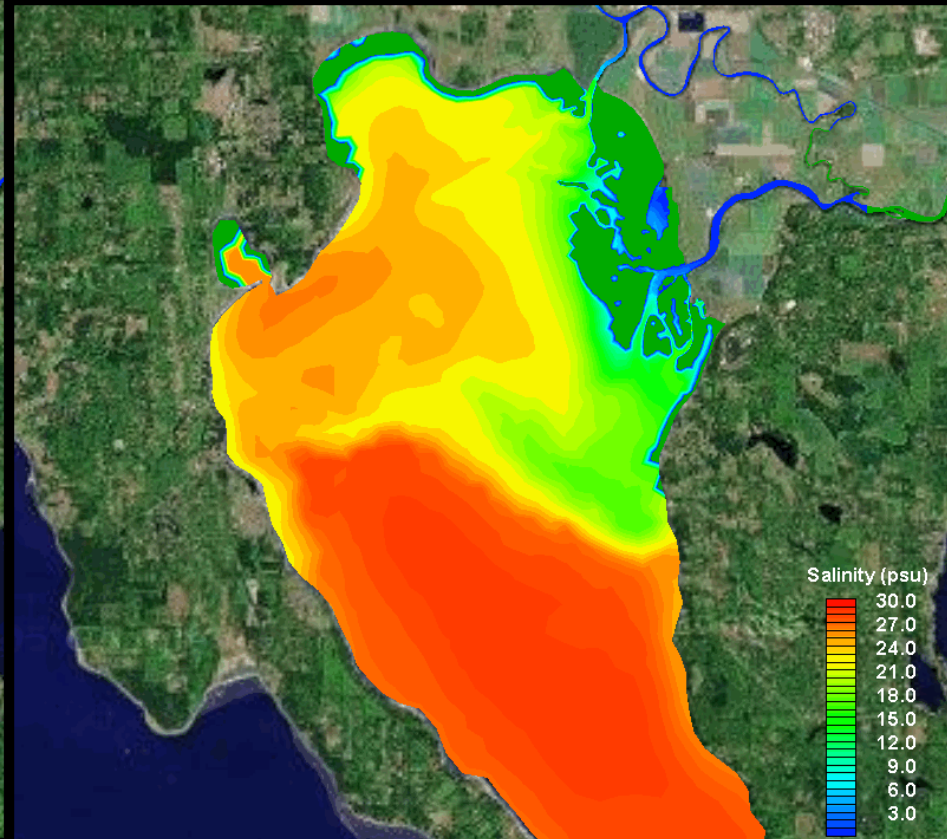
2010

Port Susan Bay Project - Hydrodynamic Model

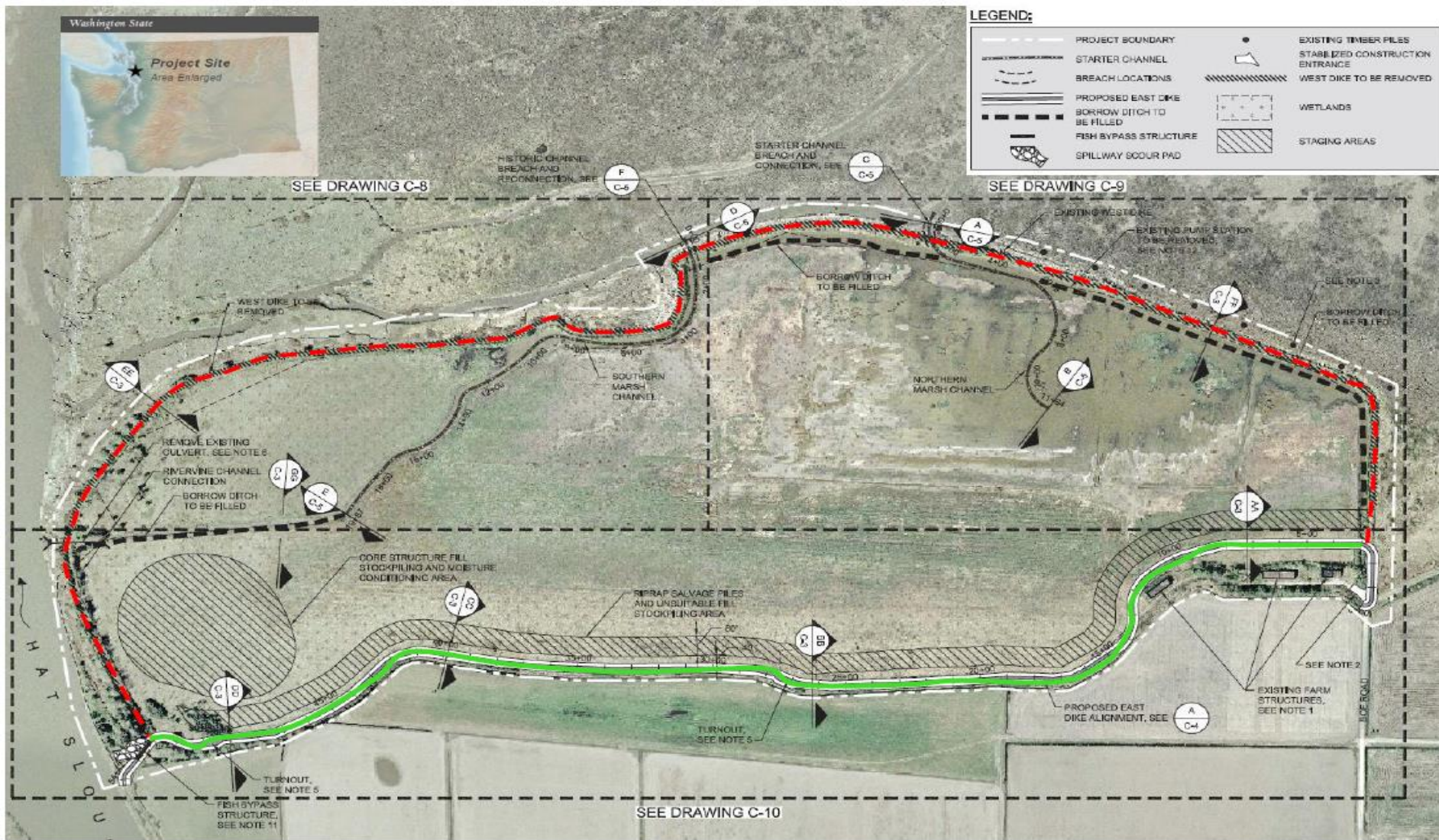
Pre-Restoration



Post-Restoration



Port Susan Bay Project - Design

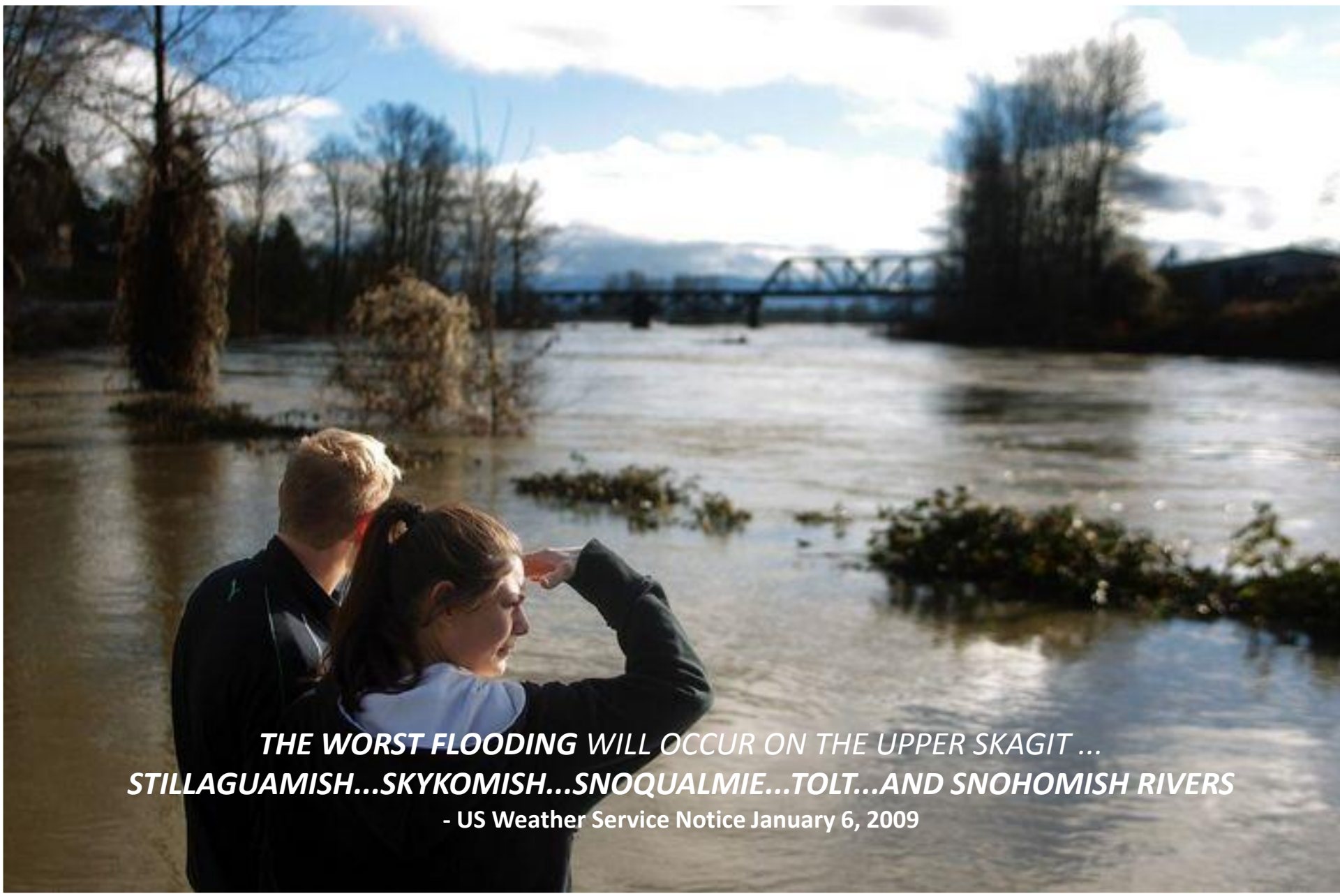


Port Susan Bay Estuary Restoration
Restoration Site Map

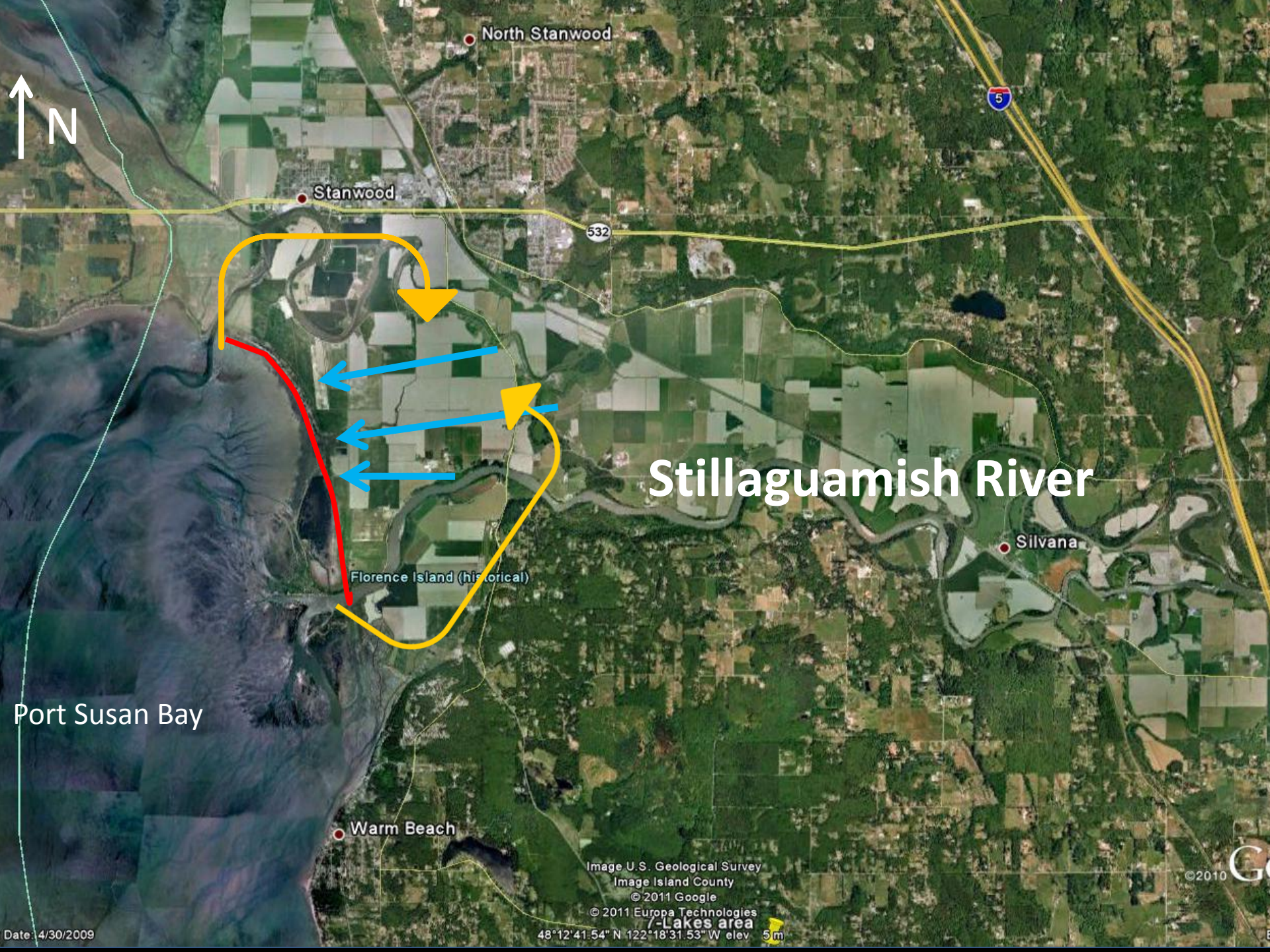
--- Existing Dike to be Removed
--- New Dike to be Constructed



Stillaguamish Flood: January 7, 2009



***THE WORST FLOODING WILL OCCUR ON THE UPPER SKAGIT ...
STILLAGUAMISH...SKYKOMISH...SNOQUALMIE...TOLT...AND SNOHOMISH RIVERS***
- US Weather Service Notice January 6, 2009



North Stanwood

Stanwood

532

5

Stillaguamish River

Silvana

Florence Island (historical)

Warm Beach

Port Susan Bay

Image U.S. Geological Survey
Image Island County
© 2011 Google
© 2011 Europa Technologies

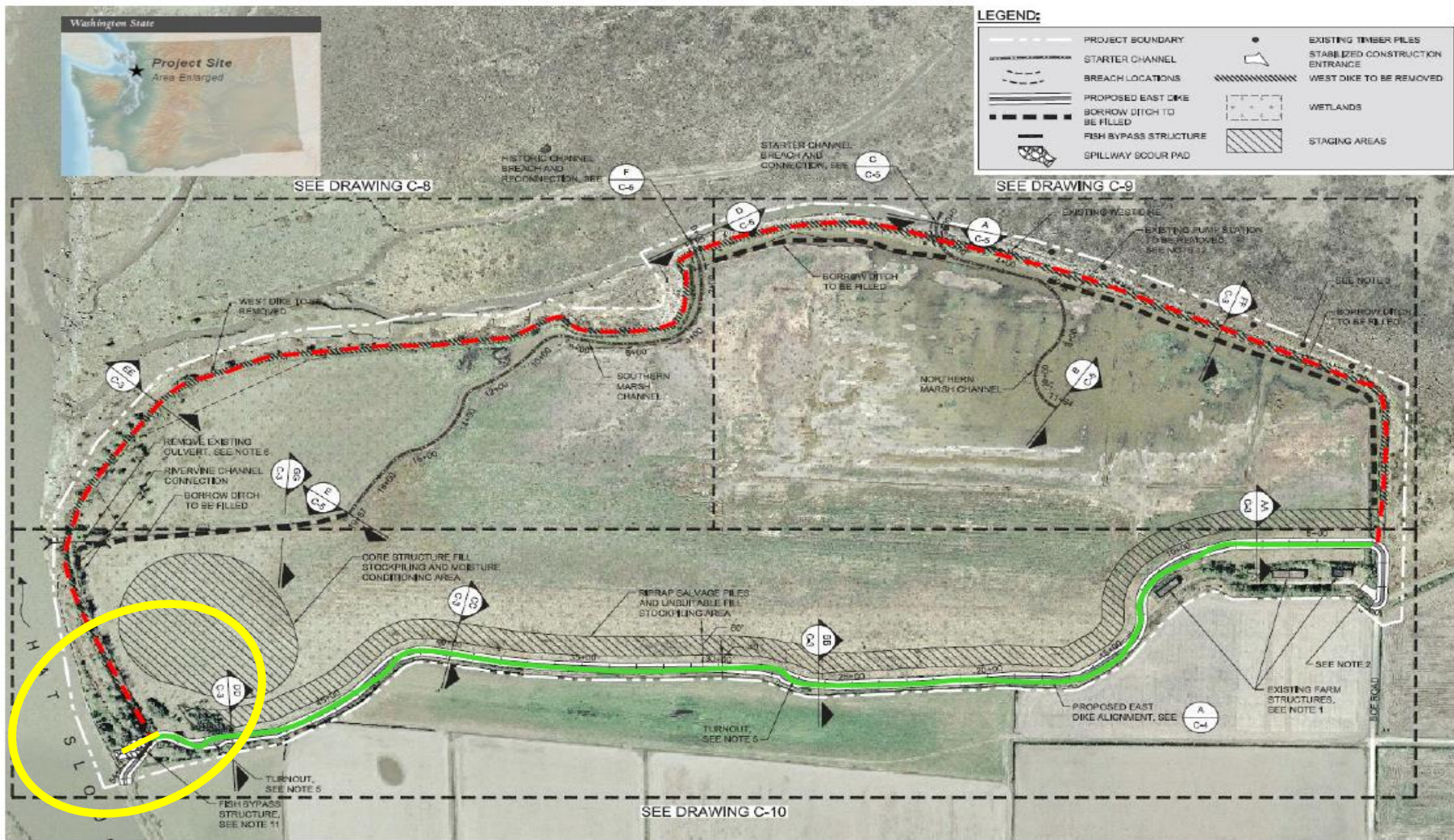
7-Lakes area
48°12'41.54" N 122°18'31.53" W elev 5m

Date: 4/30/2009

Port Susan Bay Project – Emergency Flood Control Structure



Port Susan Bay Project – Emergency Flood Control Structure



Port Susan Bay Estuary Restoration
Restoration Site Map

--- Existing Dike to be Removed
--- New Dike to be Constructed
--- Emergency Flood Control Structure



The Nature Conservancy
Protecting nature. Preserving life.

Port Susan Bay Project - Objectives

- Restore tidal wetlands
- Improve juvenile salmon access to restored habitats
- Increase the connection between the river and northeastern Port Susan Bay
- Provide flood attenuation to neighboring landowners



Port Susan Bay Project - Partners and Roles

Project Technical Advisory Committee (TAC):

Army Corps

Conservation District

Funders

Flood Control District

Neighbors

NOAA

Permitters

Tribes

USFWS

WDFW

Engineering/Project Management Sub-Committee:

Army Corps

Conservation District

Flood Control District

Tribes

Twin City Foods (landowner)

Post-Project Owners:

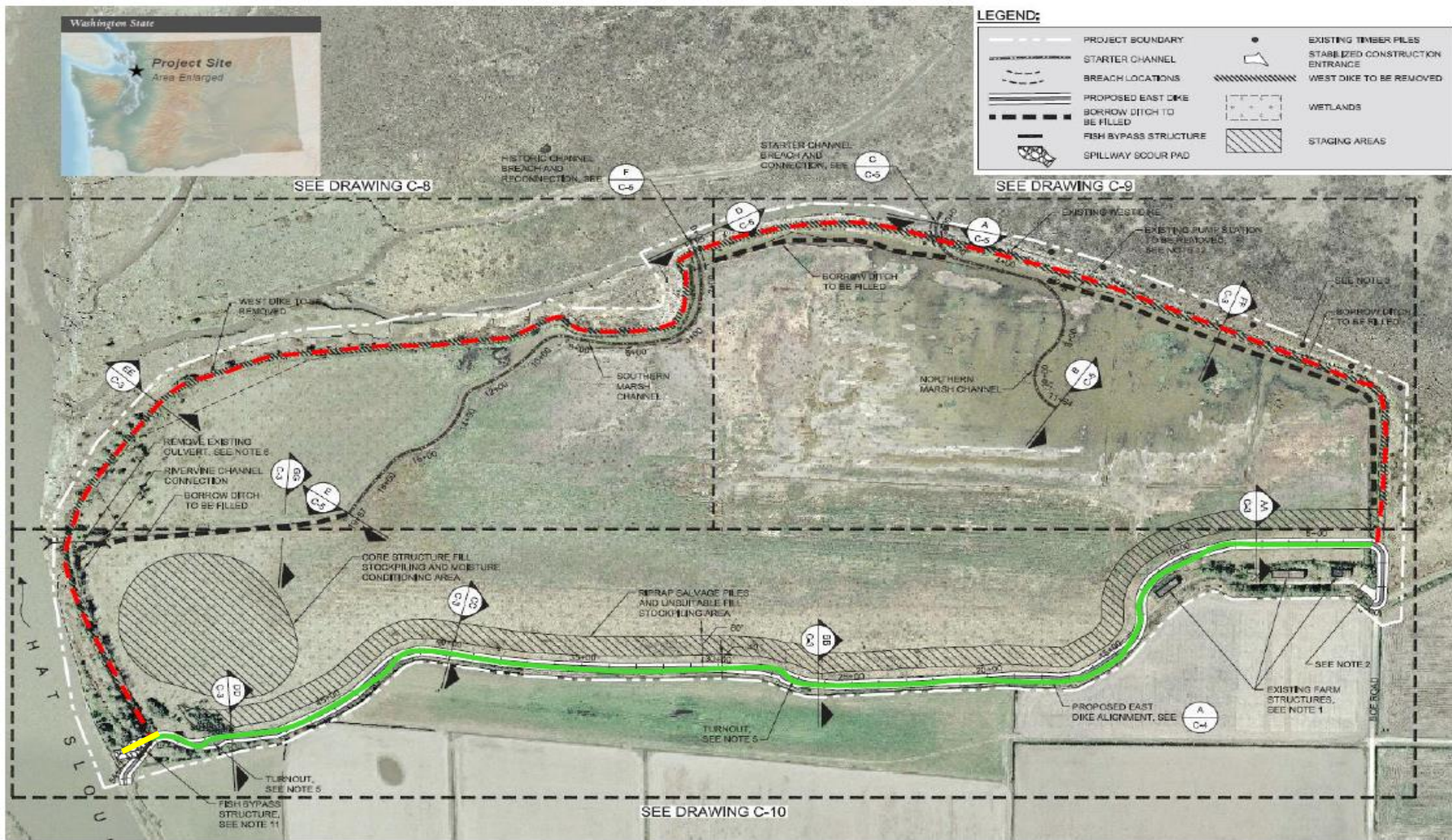
The Nature Conservancy

Flood Control District

Twin City Foods



Port Susan Bay Project - Restoration Activities



Port Susan Bay Estuary Restoration
Restoration Site Map

- Existing DiKE to be Removed
- New DiKE to be Constructed
- Emergency Flood Control Structure





Before



After

Port Susan Bay Project - East/Setback Dike



During



During



Before



After

Port Susan Bay Project - Emergency Flood Control Structure



During



Before



After



Port Susan Bay Project - West/Outer Dike Removal

During



During



Port Susan Bay – 150 acres restored on site



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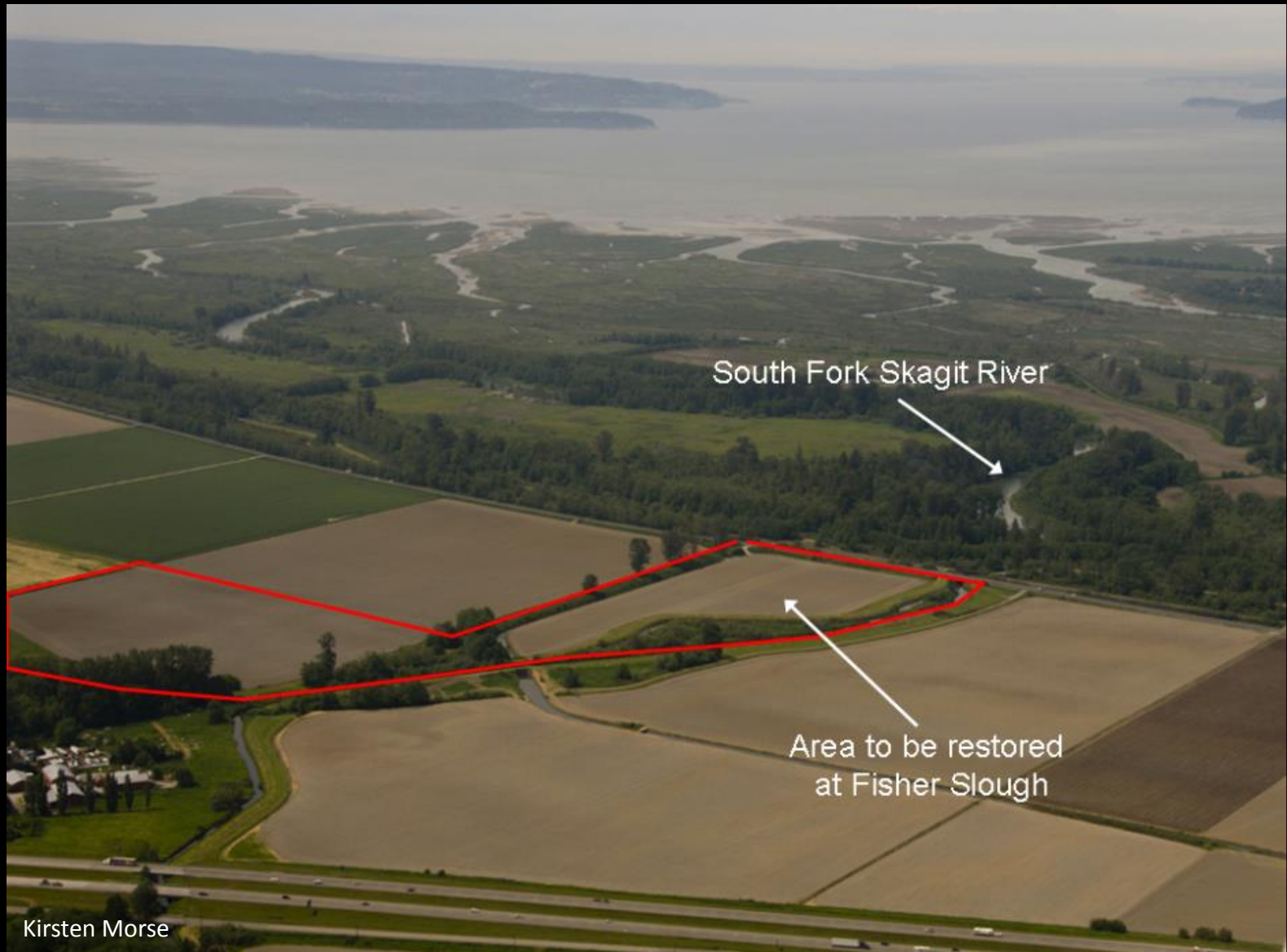
Port Susan Bay - Project Timeline

- Land purchase process: 1991 - 2001
- Land Purchase: 2001
- Feasibility: 2001-2006
- Preliminary design: 2006-2009
- Final Design: 2009 - 2012
- Permitting: 2010 - 2012
- Construction: 2012
- Monitoring: 2010 – 2017*



*full monitoring through 2017 is not fully funded; water level, sediment and salinity monitoring is funded

Fisher Slough - Multiple Benefits on One Project Site



Fisher Slough - Project Elements



Fisher Slough— 60 acres restored



Marlin Greene/One Earth Images

Fisher Slough - Landowner and Partner Agreements



Risks and Uncertainties: *Its all about risk management*

Cultural resources

Community /stakeholder opposition

Flooding/tides

Schedule constraints/sequencing

Soil/levee settlement

Conflicts/lack of clarity in plans & specifications

Wet weather

“Other” unexpected conditions in the field

Changing budget needs

Lessons Learned



Give everyone a reason to support the project.

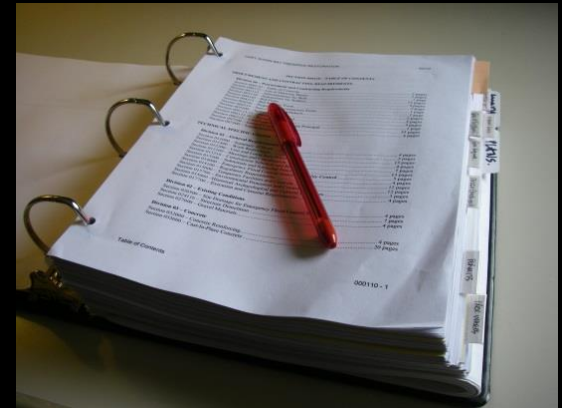


Weigh risks and benefits and make informed decisions.



Manage risks via contract requirements.

Have your bid documents reviewed.



Lessons Learned

Plan carefully for cultural resources.

Have an experienced construction manager and onsite inspector on your team.



Be realistic in your budgets and include contingencies.

Expect the unexpected and be ready to adapt!

Acknowledgements

Port Susan Bay Funders:

Washington Department of Fish & Wildlife

Estuary and Salmon Restoration Program

Washington Salmon Recovery Funding Board

Estuary Habitat Restoration Council (*NOAA;*

EPA; USFWS; USDA/NRCS; USACOE)

Jobs Bill, administered by Dept. of Natural

Resources

Fisher Slough Funders:

Dike District 3

Drainage and Irrigation District 17

National Oceanic and

Atmospheric Administration

Environmental Protection Agency

National Fish & Wildlife

Foundation

Washington Department of Fish &

Wildlife Estuary and Salmon

Restoration Program

Washington Salmon Recovery

Funding Board

Private donors



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Questions?

