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photo credit: Julie Morse

Restoration Monitoring Lessons Learned

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photo credit: Tara Champion

Monitoring Lessons Learned: Restoration Project Overview

Port Susan Bay



Acres	Restoration Actions / Vegetation	Project Year
150	Dike setback / Passive	2012

Fisher Slough



Acres	Restoration Actions / Vegetation	Project Year
60	Dike setback, drainage ditches filled / Planted with marsh seed mix	2011

Restoration Project: Lessons Learned



■ Vegetation

- Seeding & natural recruitment
- Invasive plant (aka weed) management
- Other factors

■ Channel Development

■ Haul Routes



Lesson Learned: Vegetation recruitment

Dominant Vegetation Species Expected:

Skagit Delta marsh



- Lyngbyei's sedge
- Spike rush
- American three square
- Soft stem bulrush

Dominant Vegetation Species Observed:

Fisher Slough 2013



- Ribbonleaf pondweed
- Burr-reed
- Ovate spikerush
- Wapato
- Water-starwort

Fisher Slough 2015



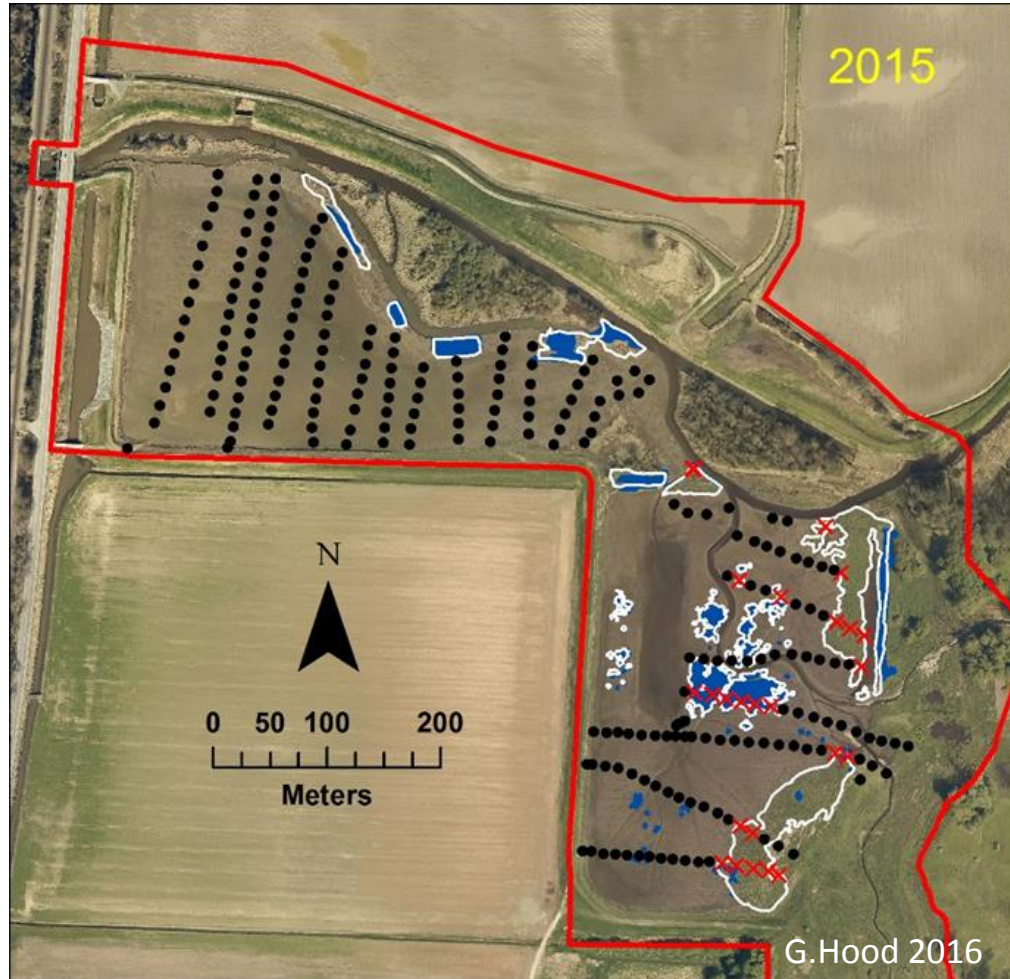
- Wapato
- Burr-reed
- Ovate spikerush
- Soft-stem bulrush

*** Dominate species observed isn't what was planted there is a lot of natural recruitment occurring.**

Lesson Learned: Invasive Plant Control

Fisher Slough

Reed canary grass – early control beneficial?



Port Susan Bay

Invasive Cattails – in the process of learning



*** Early efforts to control invasive plant species might have been beneficial.**

Lesson Learned: Other factors influence on vegetation

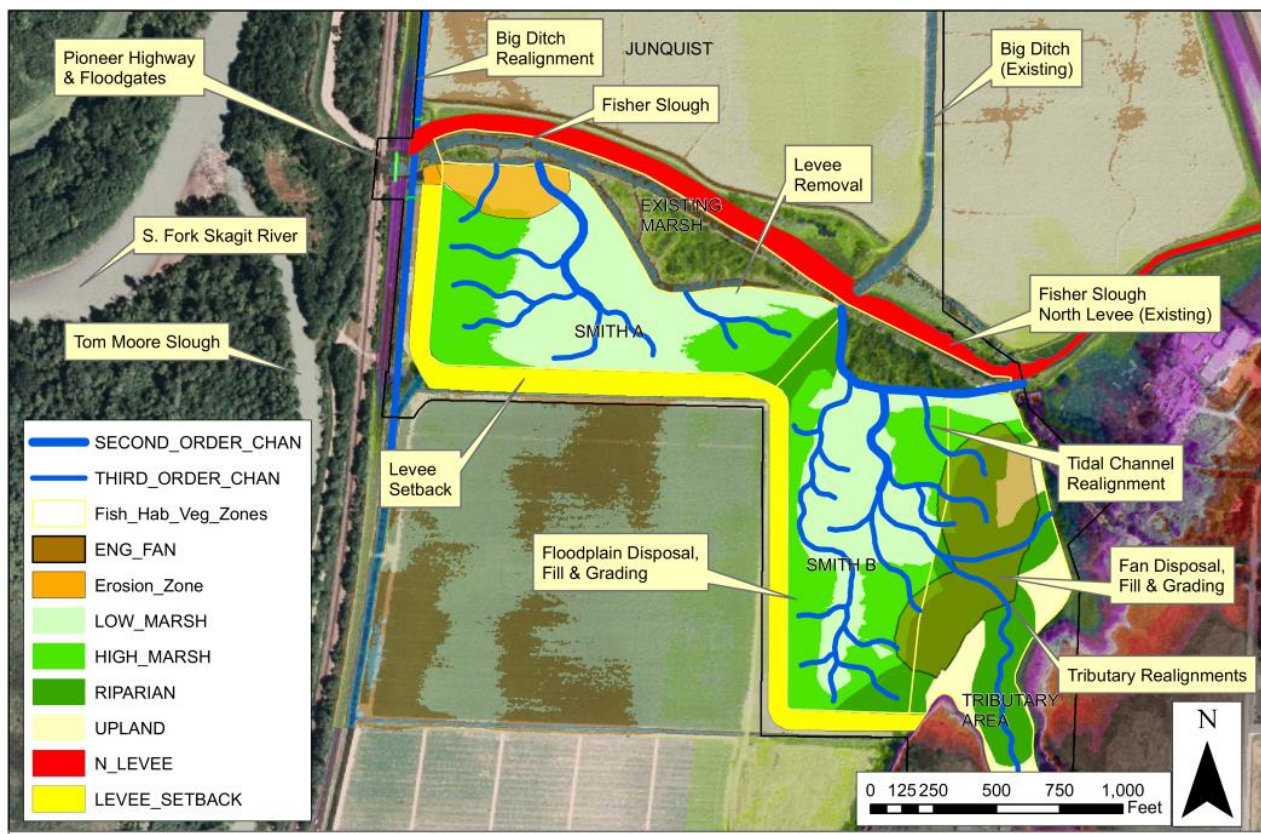


photo credit: Roger Fuller

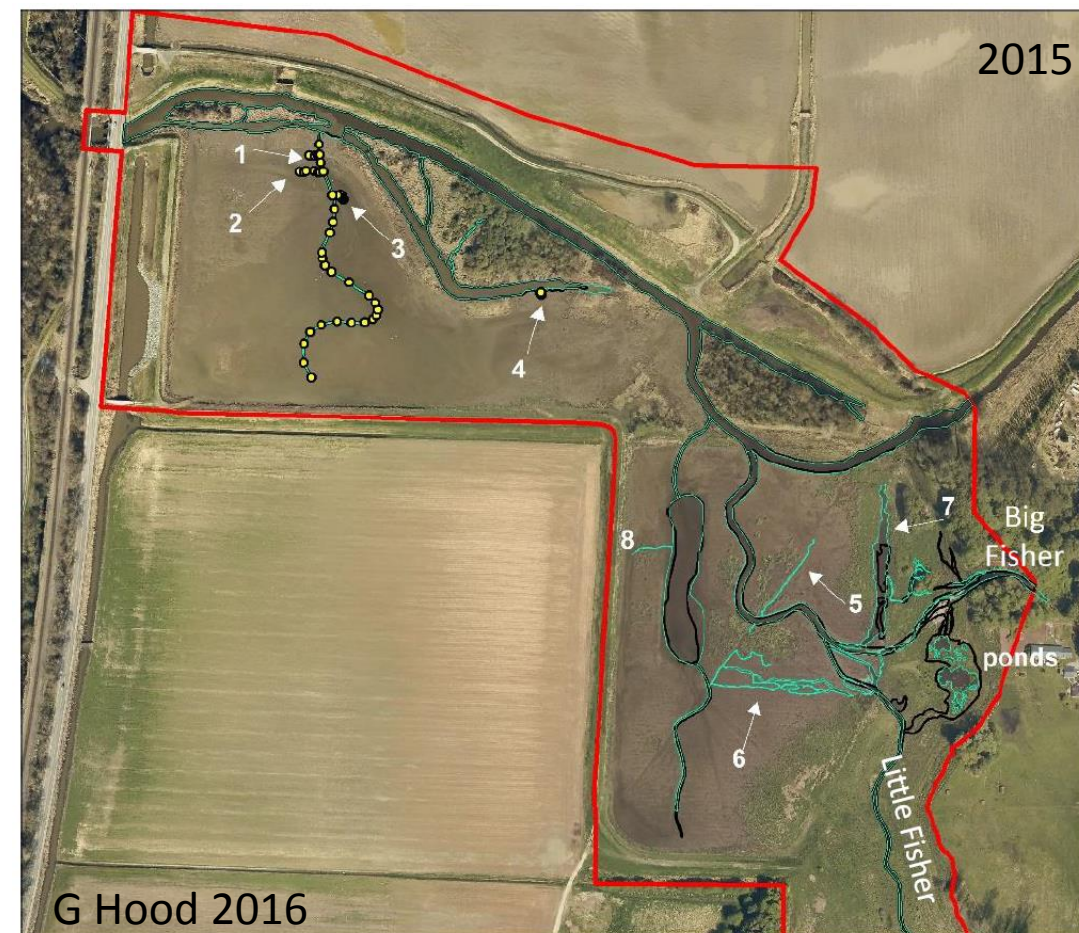
*** Outlier conditions could matter in the long term.**

Lesson Learned: Fisher Slough Channel Development

Baseline – 2009	2 years 2013	4 years 2015	Restoration Target	Allometric Prediction 90% (CL)	Geomorphic Modeling
4,858 ft	9,760 ft	14,730ft	9,664 ft	12,136 ft (3,840-38,400)	13,953 ft



Geomorphic Modeling Prediction, Tetra Tech 2009



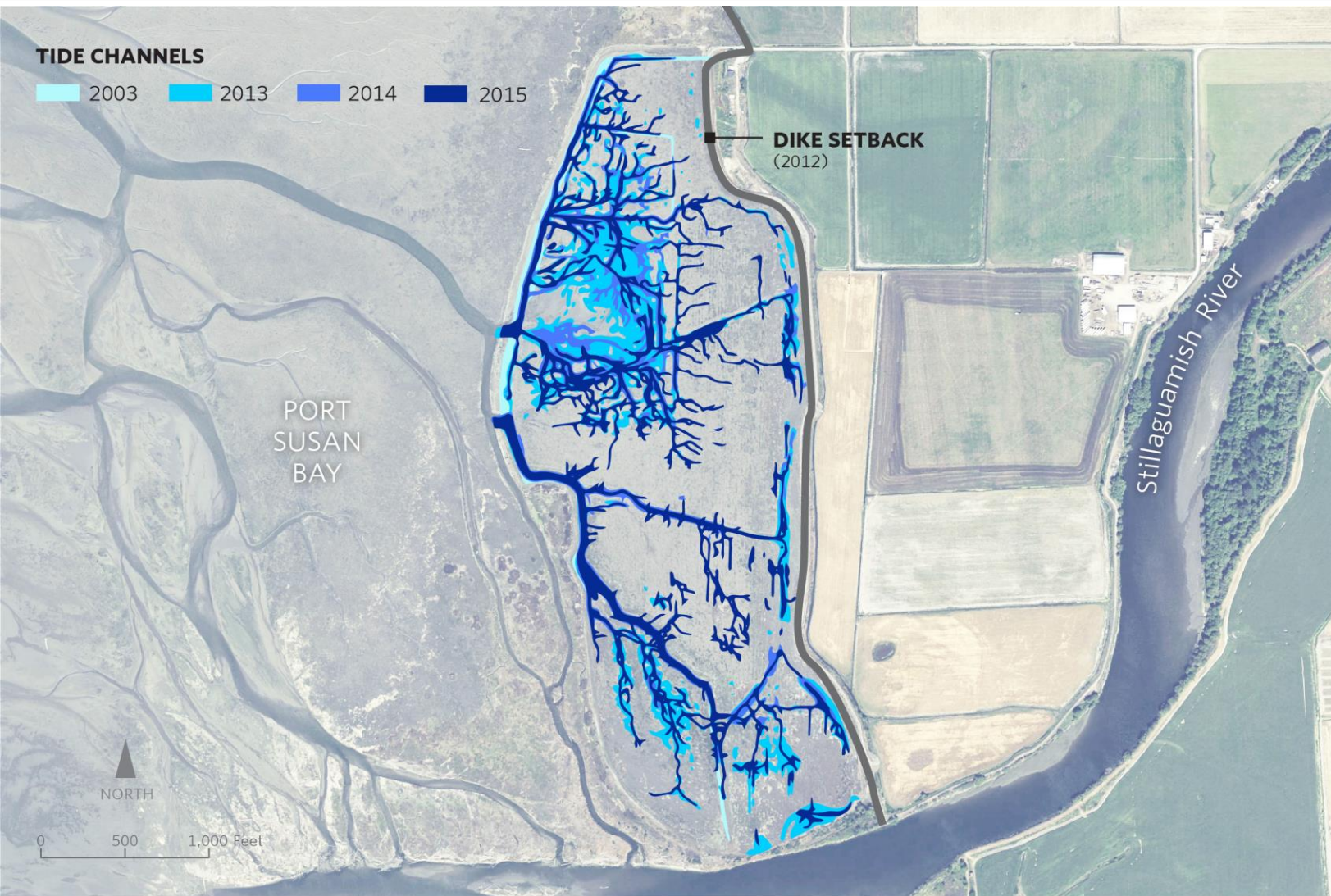
G Hood 2016

Lesson Learned: Fisher Slough Channel Development



*** If need immediate channel habitat (within 5yrs or less) best to build it.**

Lesson Learned: Port Susan Bay Channel Development



Baseline	7,579 ft
1 year 2013	60,522 ft
3 years 2015	76,332 ft
Allometric Prediction 95% (CL)	13,173 ft (upper limit 209,974 ft)



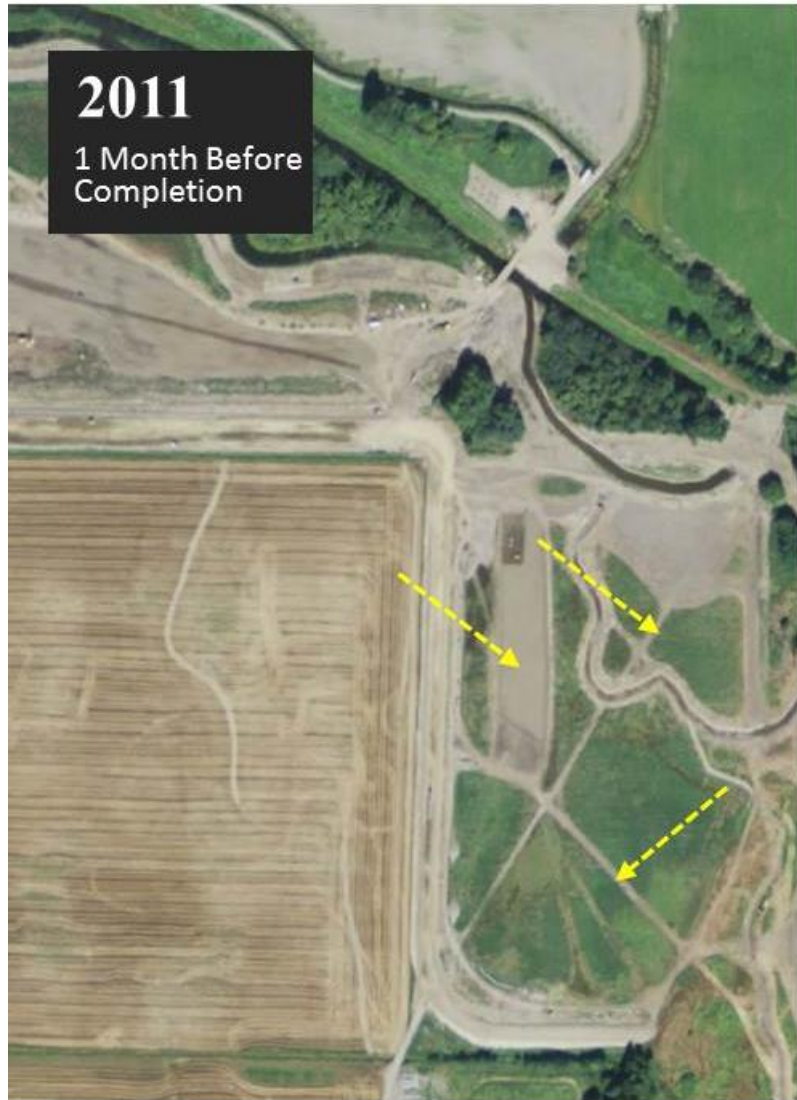
*** Still learning what the lesson(s) might be...**

Lesson Learned: Port Susan Bay Haul Routes



*** Haul routes are still visible and acting as channels in some instances years after construction.**

Lesson Learned: Fisher Slough Haul Routes



* Haul routes are still visible and acting as channels in some instances years after construction.

Lessons Learned: Summary

Vegetation

- Consider pre-project control of invasive species
- Seeding may not be needed – need to balance likely seed sources (native and weed)

Channel Development

- When filling borrow ditches, ensure soil is compacted enough to resist erosion.
- If you need it now - build it. Consider connectivity and number of access points in designing layout.

Haul Routes

- Keep all haul routes off the restored marsh since they appear to persist.