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2018 Salish Sea Ecosystem Conference
(Seattle, Wash.)

Apr 4th, 2:15 PM - 2:30 PM

Water quality effects of fish habitat restoration at Lone Tree Creek

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Water quality effects of fish habitat restoration at Lone Tree Creek

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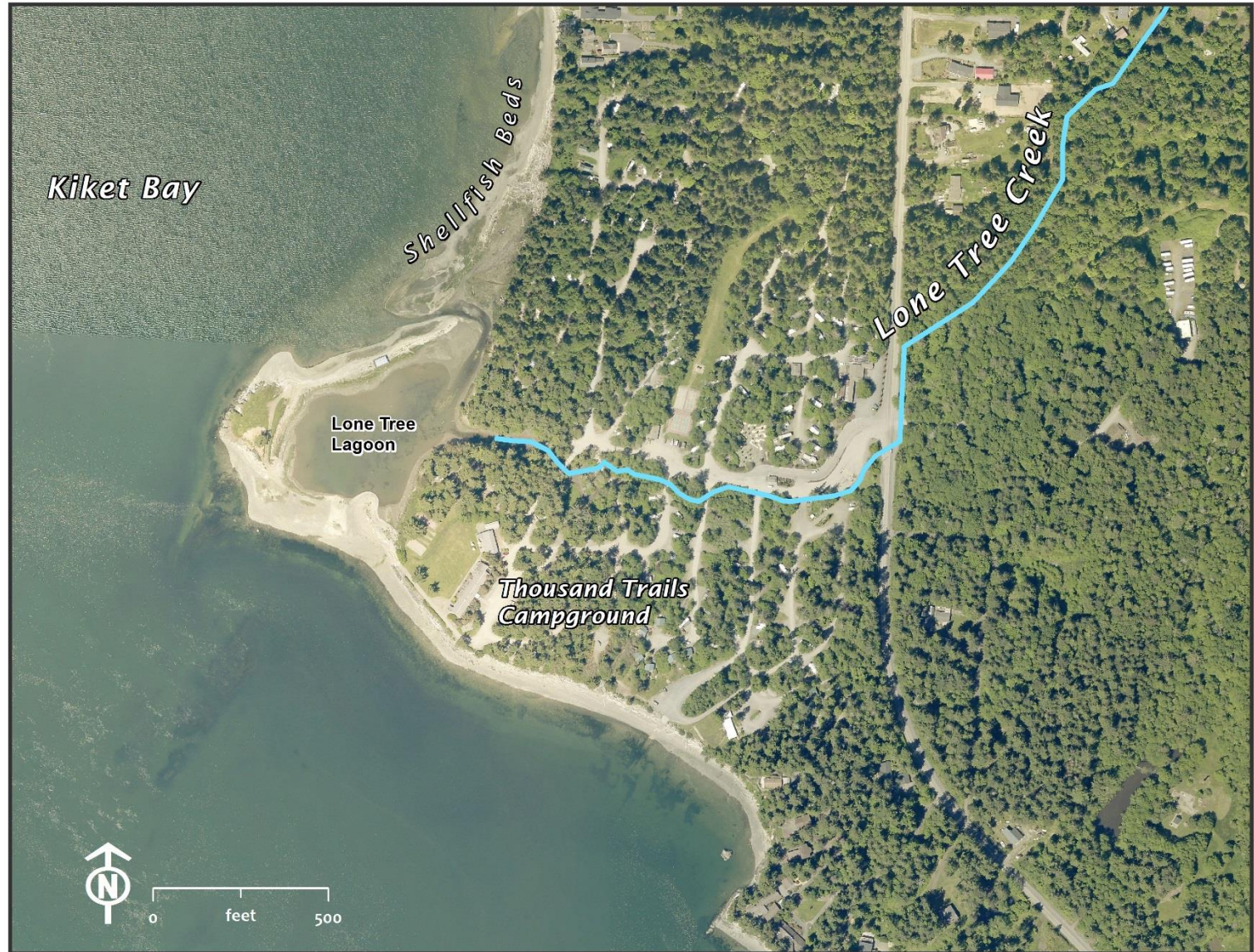
Salish Sea Ecosystem Conference
Seattle, WA
April 4, 2018

Area Overview



Area Detail

Lone Tree Creek



Area Detail

Nearshore



Restoration

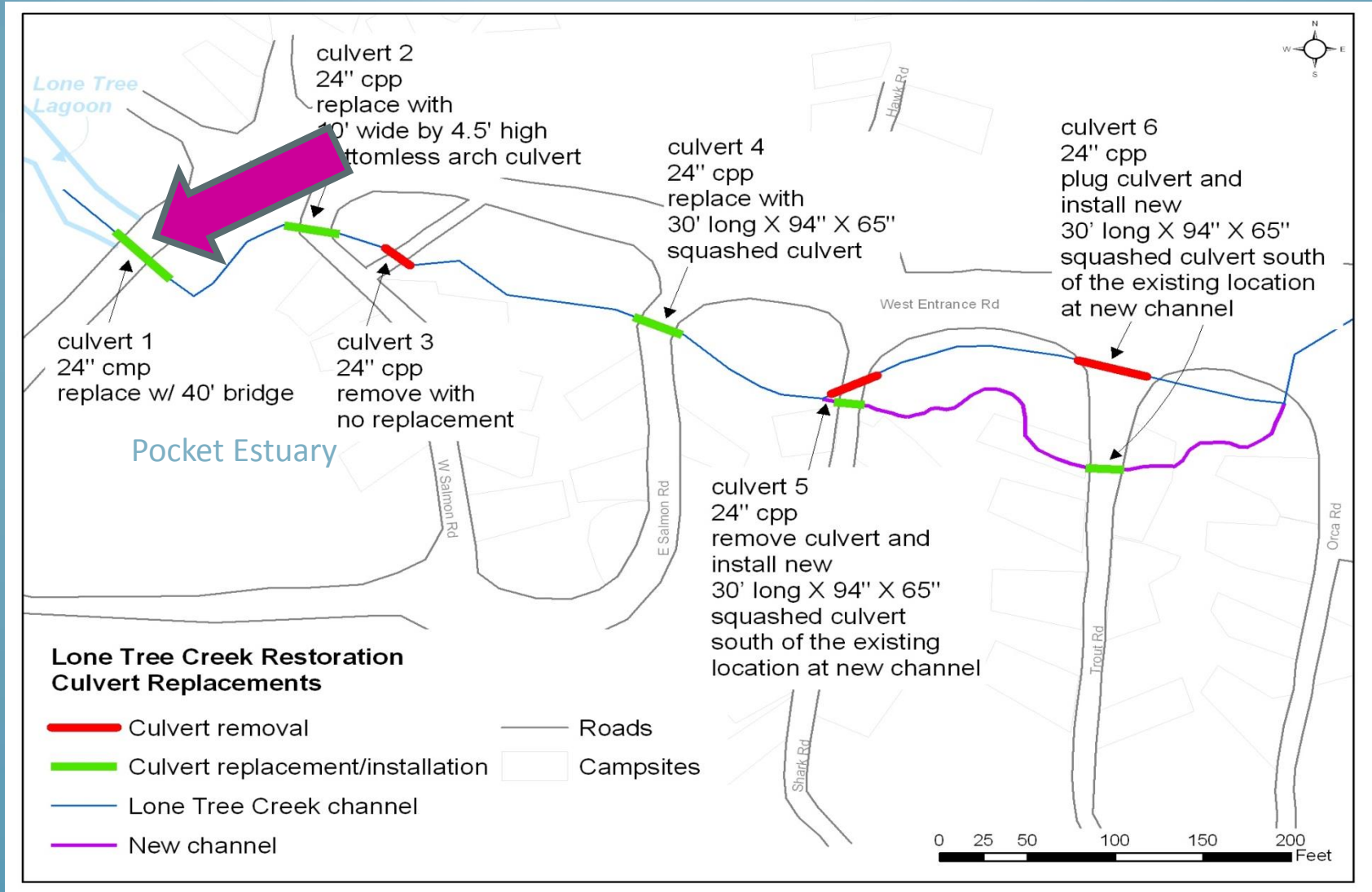
Goals

- Restore and enhance salmon habitat
- Improve water quality of Lone Tree Creek



Restoration

- Restore tidal influence to pocket estuary



Restoration

Before/After



24" perched culvert



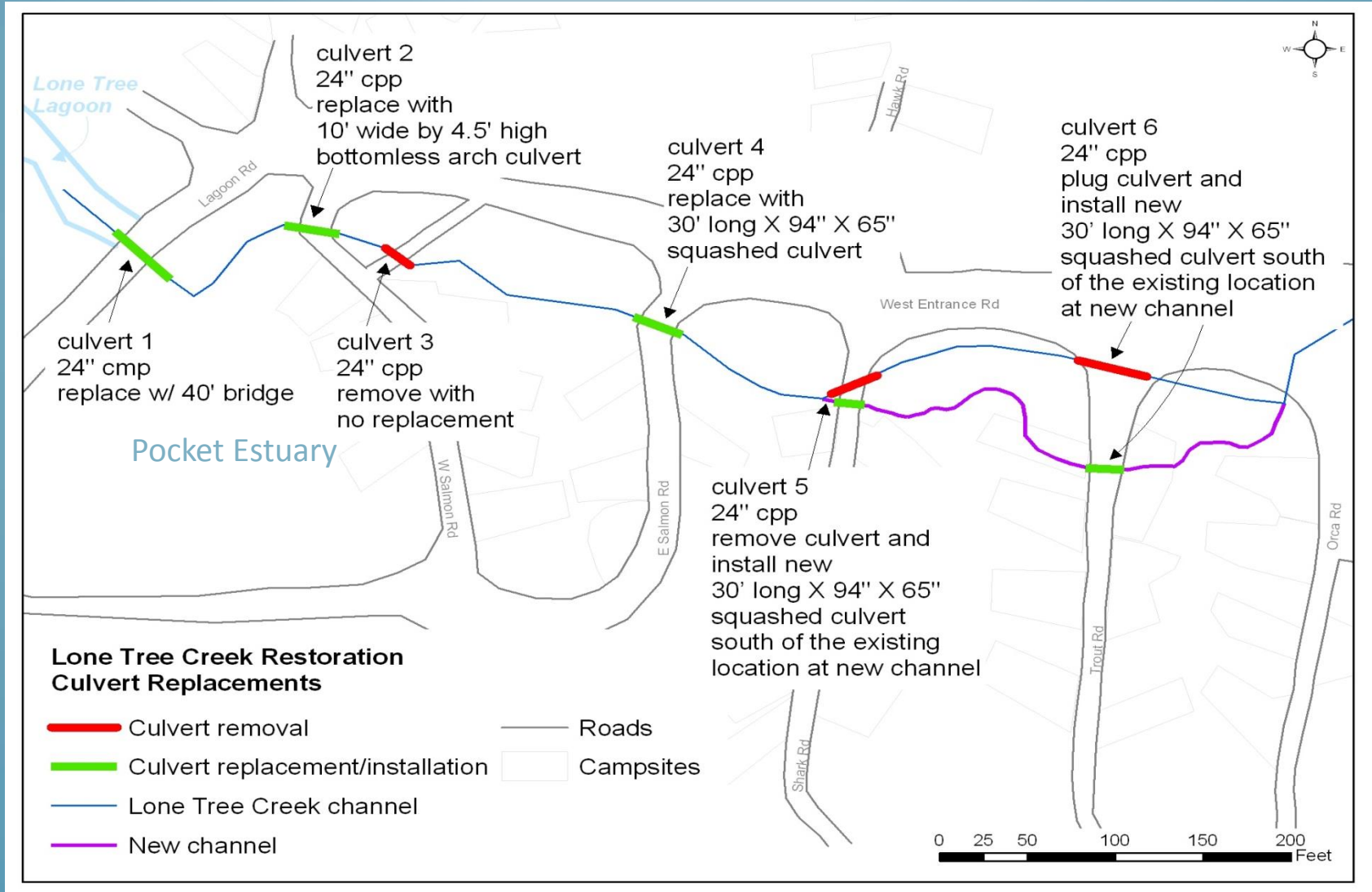
40' bridge

Water surface elevation

↑ 20cm

Restoration

- Enable fish passage



Restoration

- Enhance stream habitat

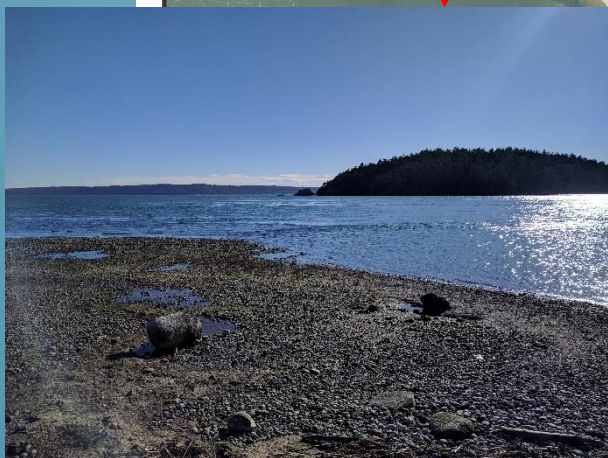


Monitoring

Water Quality

- Restore and enhance salmon habitat
- Improve water quality of Lone Tree Creek
 - *pH*
 - *Dissolved Oxygen*
 - *Temperature*
 - *Salinity*
 - *Turbidity*
 - *Bacteria (Fecal coliform)*





Analysis

Signed-rank Test for Stepwise Trend



Random
sample: all
years



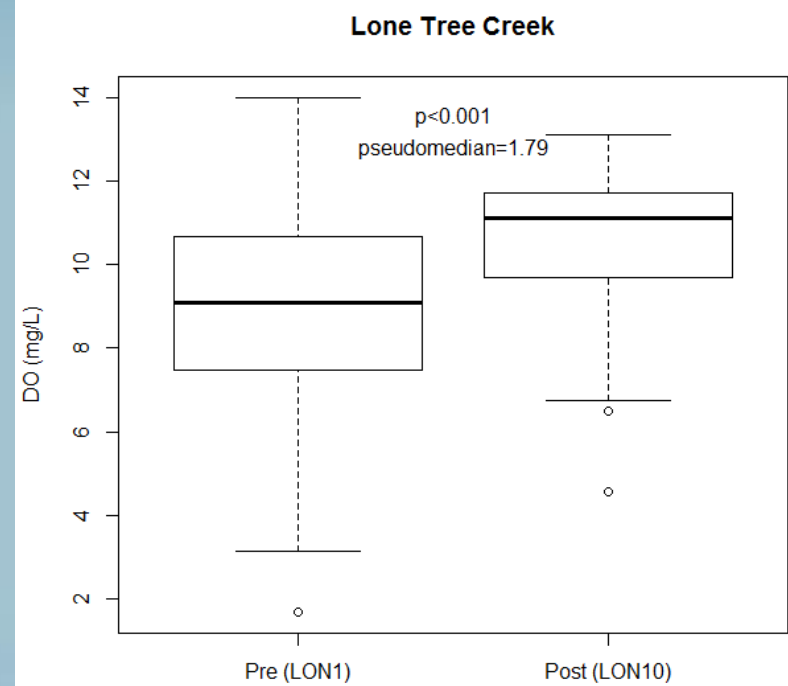
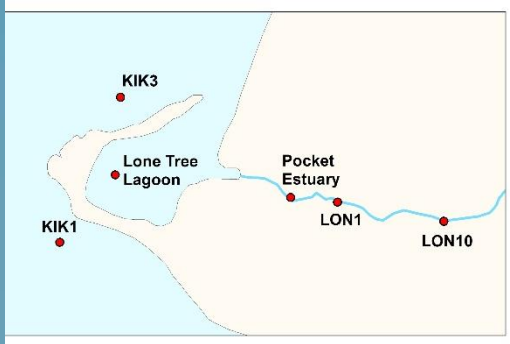
Pre-restoration
1997-2006
Flume location:
LON1

Post-restoration
2007-2016
Flume location:
LON10

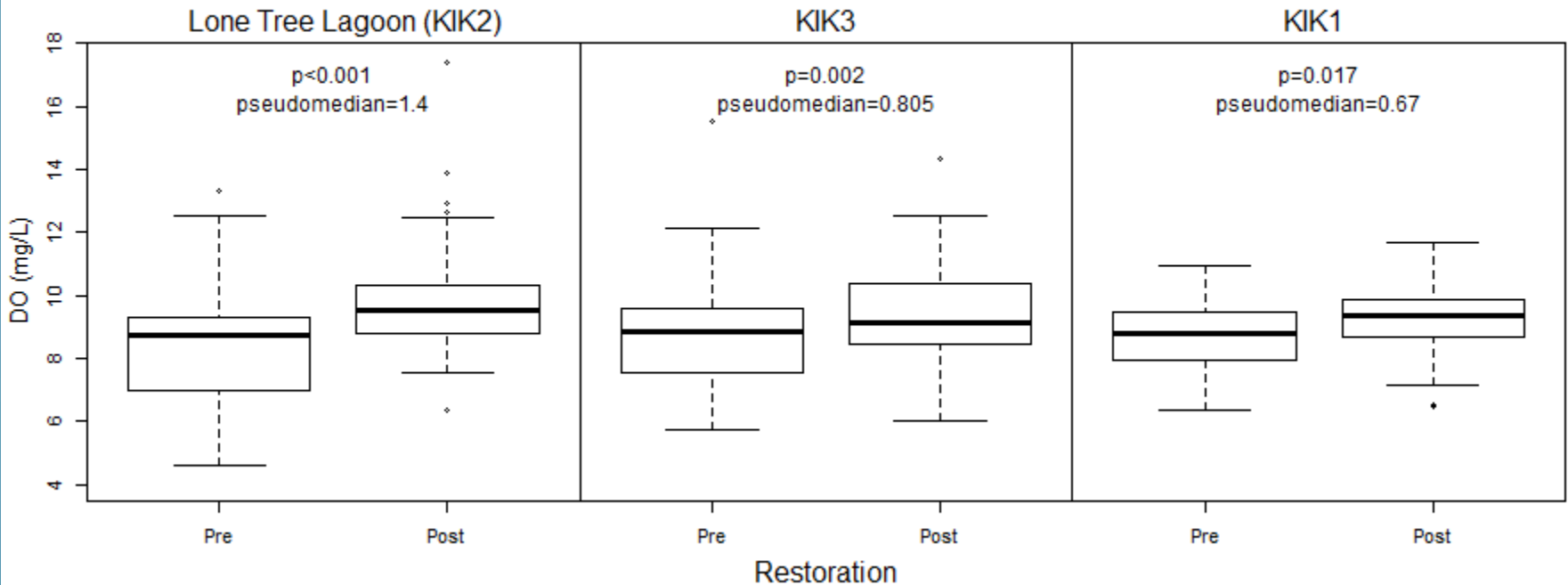


Analysis

Improved Dissolved Oxygen

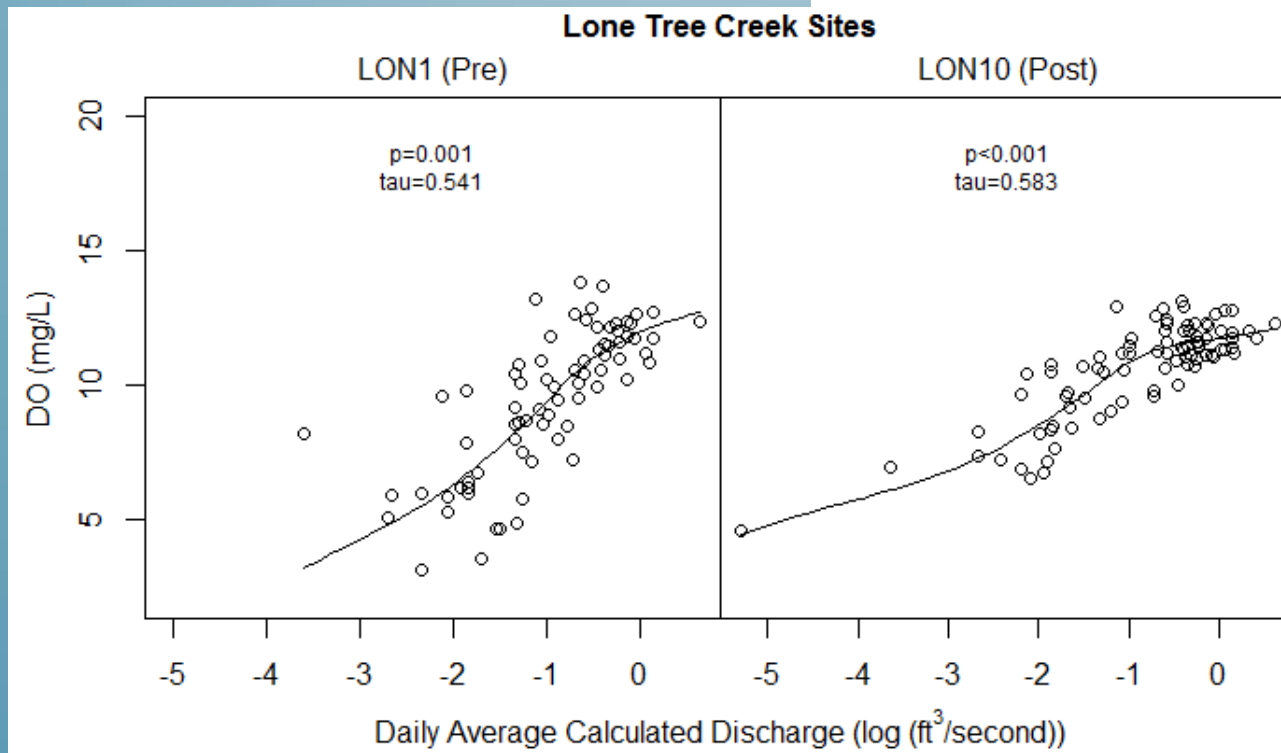
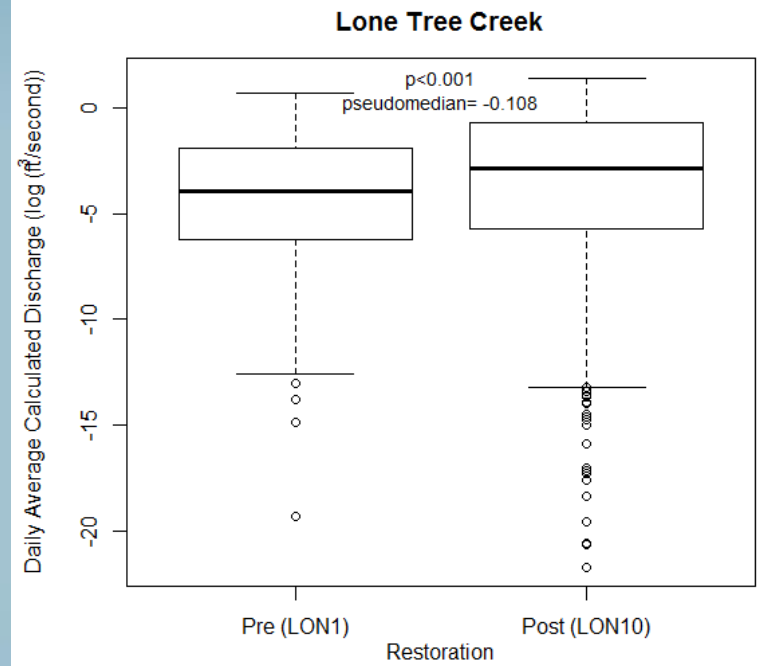
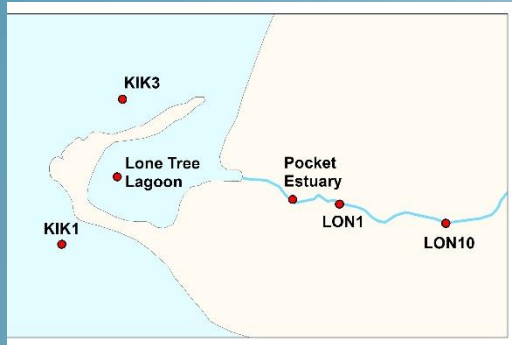


Kiket Bay Sites



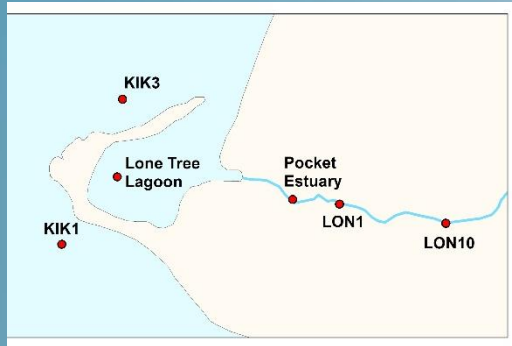
Analysis

Flume Location & Discharge

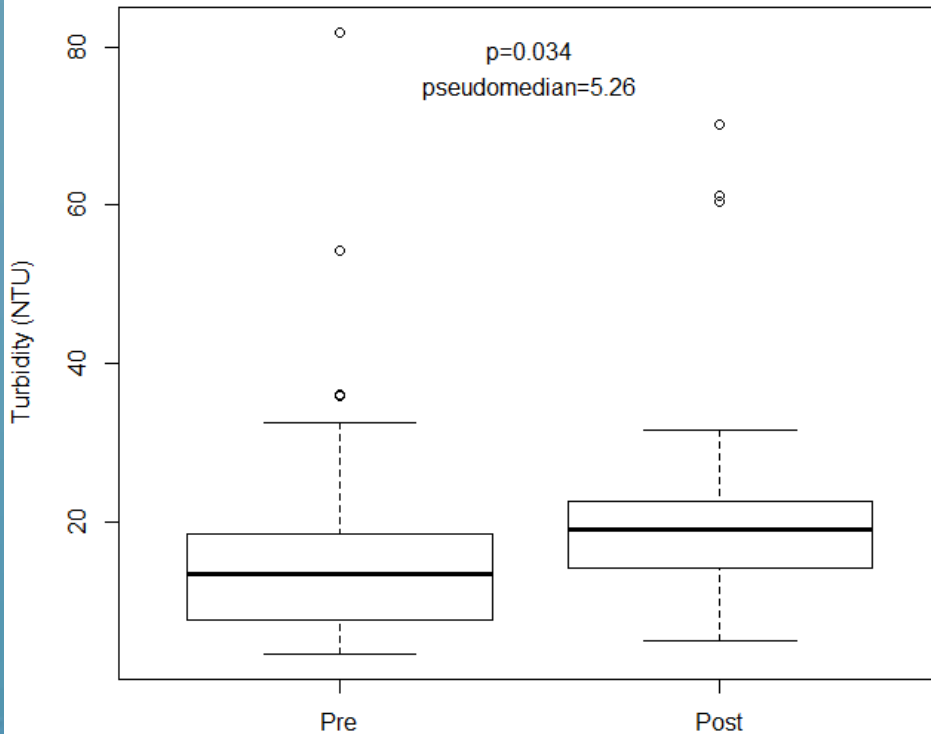


Analysis

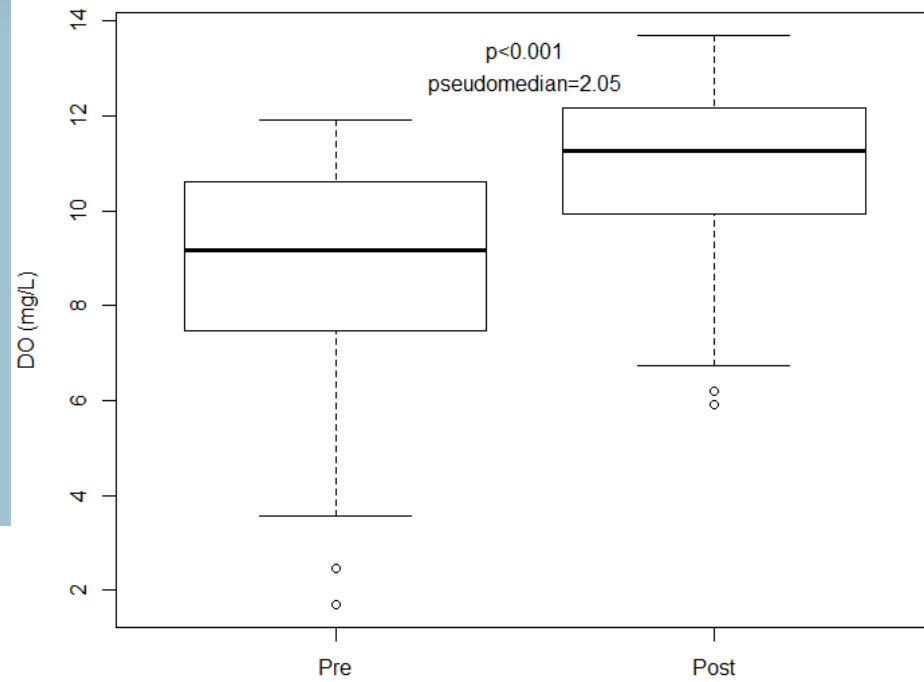
Pre v. Post Restoration at LON1



LON1 Restoration

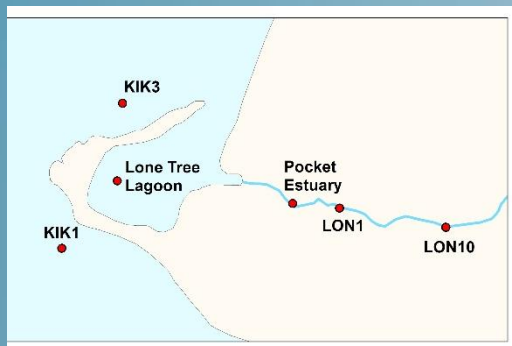


LON1 Restoration

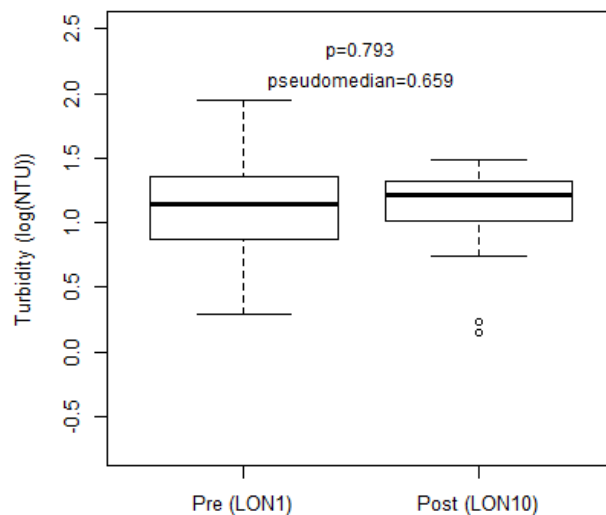


Analysis

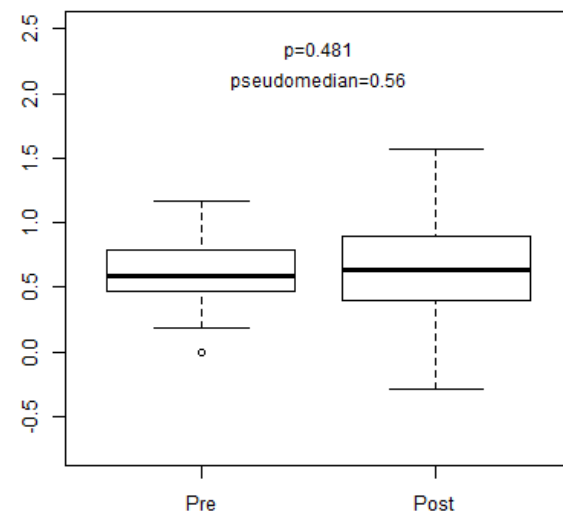
Turbidity Increases



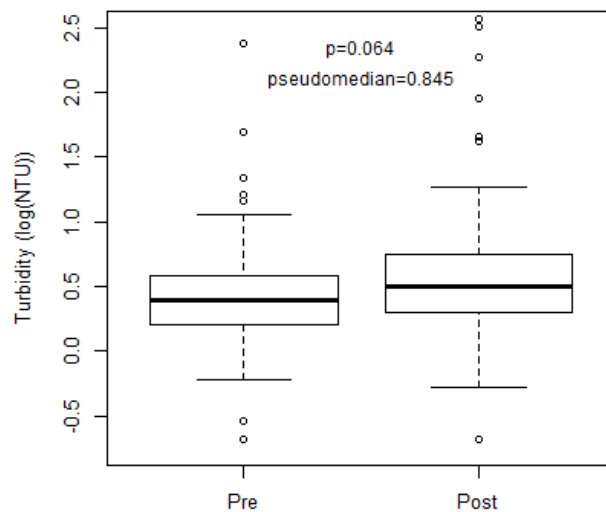
Lone Tree Creek



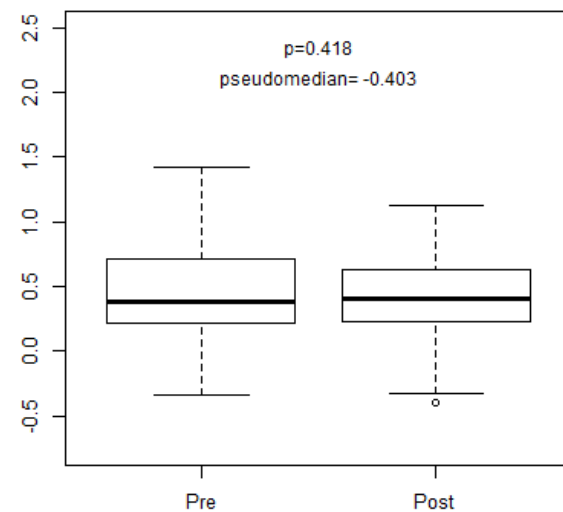
Lone Tree Lagoon (KIK2)



Kiket Bay 3

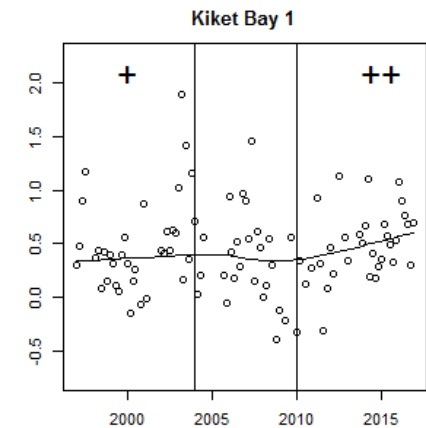
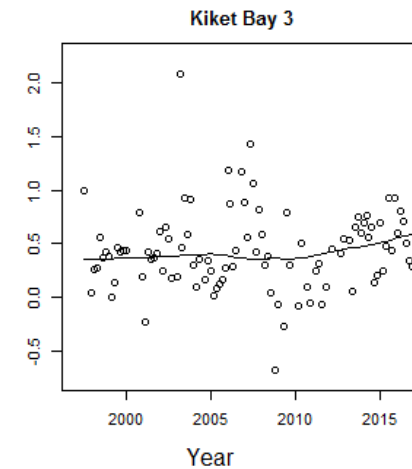
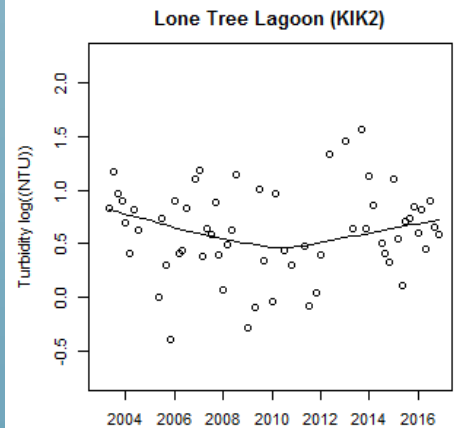
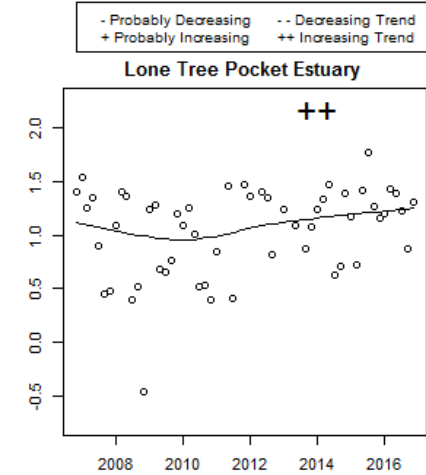
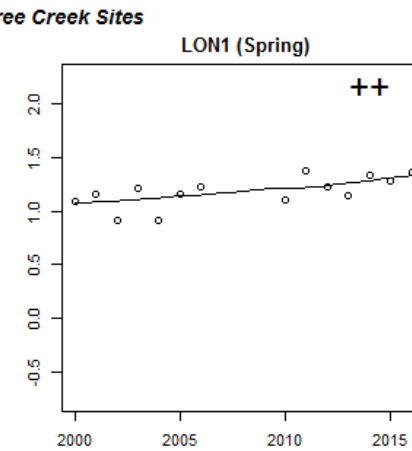
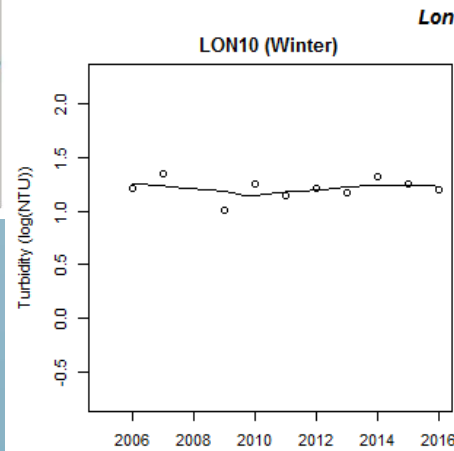
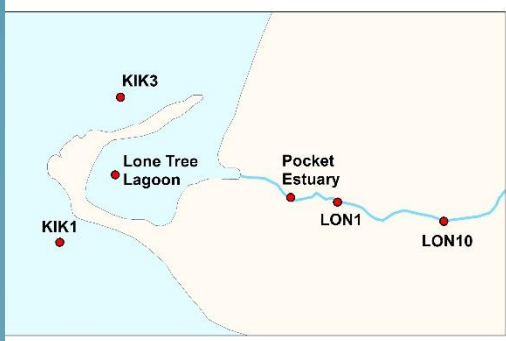


Kiket Bay 1



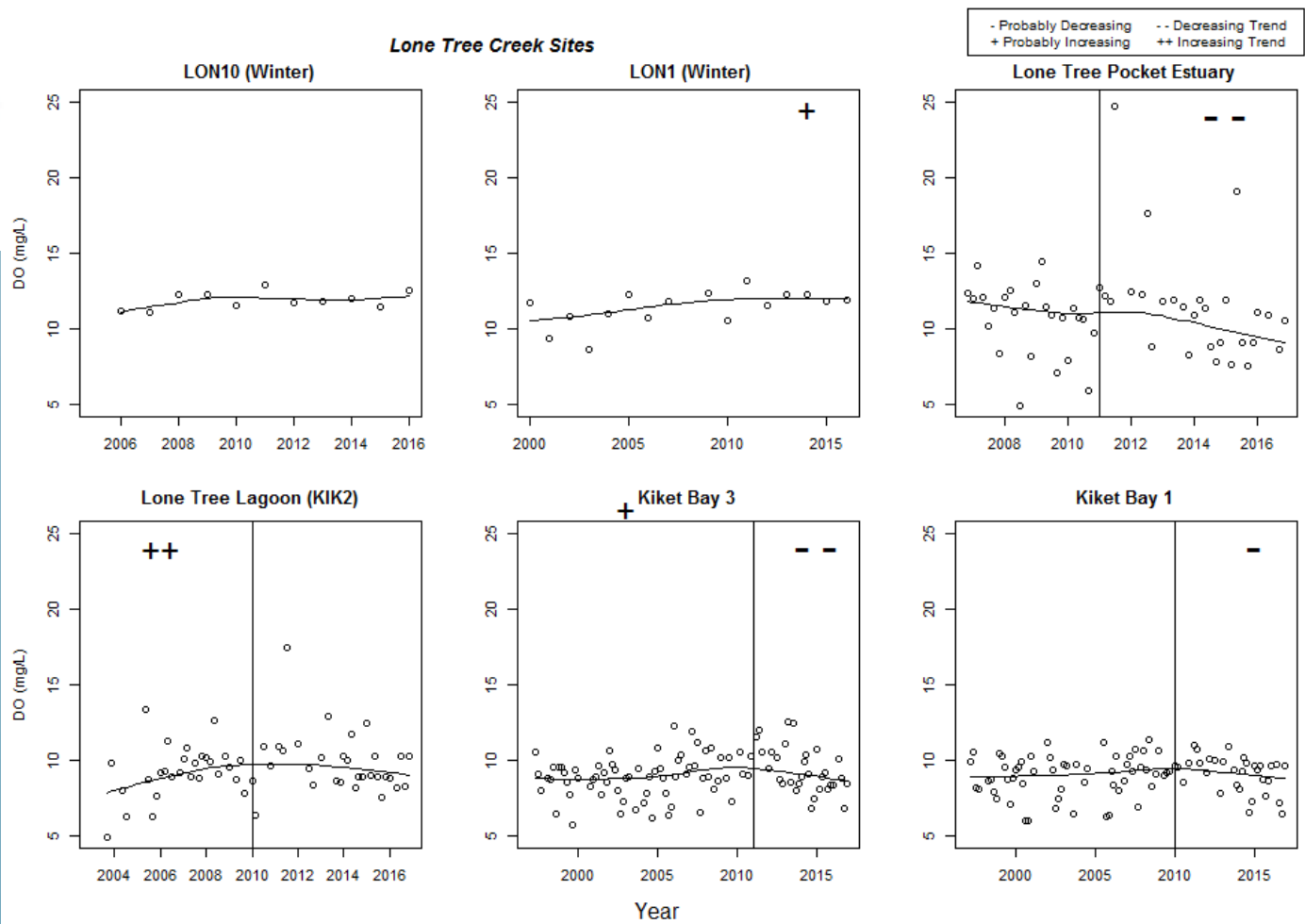
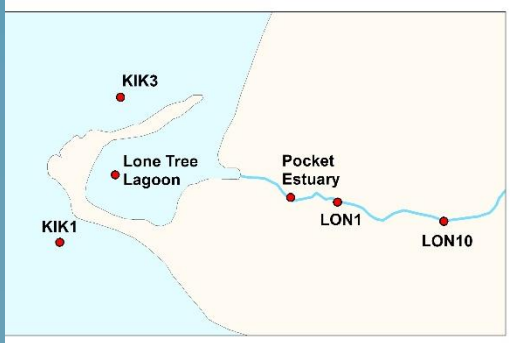
Analysis

Turbidity Increases



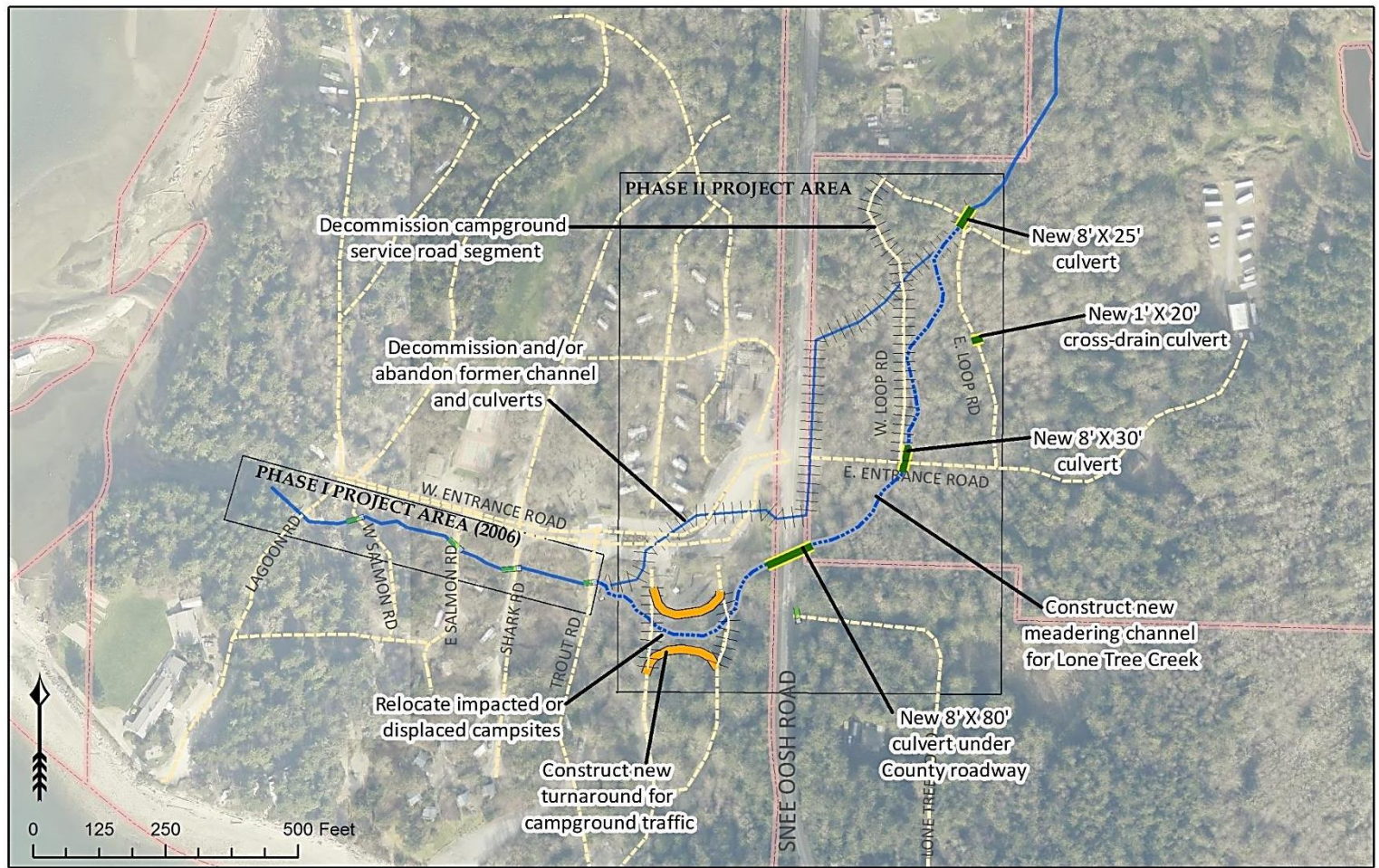
Analysis

DO Time Series



Next Steps

Restoration Phases 2 and 3



Lone Tree Creek - Proposed Actions

- Project Actions**
- Project Area
 - Existing culvert
 - Vicinity roads
 - Construct turnaround for vehicles
 - Decommission service road
 - New culvert installation
 - New creek alignment with riparian buffer installed
 - Existing Lone Tree Creek alignment
 - abandon / decommission creek alignment



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Swinomish Tribe

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Karen R. Mitchell– Hydrologist, Department of Land Management

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Water Quality Techs and Specialists over the years:

Tanisha Gobert, Sarah Grossman, Tiffany Hoyopatubbi, Rachel Lovell-Ford, Brendon Kasayuli, Joe Quintasket, Jason Thompson

Questions?

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Poster Presentation (Thursday during lunch):
“Long-term water quality trend analysis in the Lone Tree Creek watershed and surrounding marine waters”