

Estuary Restoration Planning for Fish and Wildlife: North Unit, Sauvie Island Wildlife Area (SIWA)

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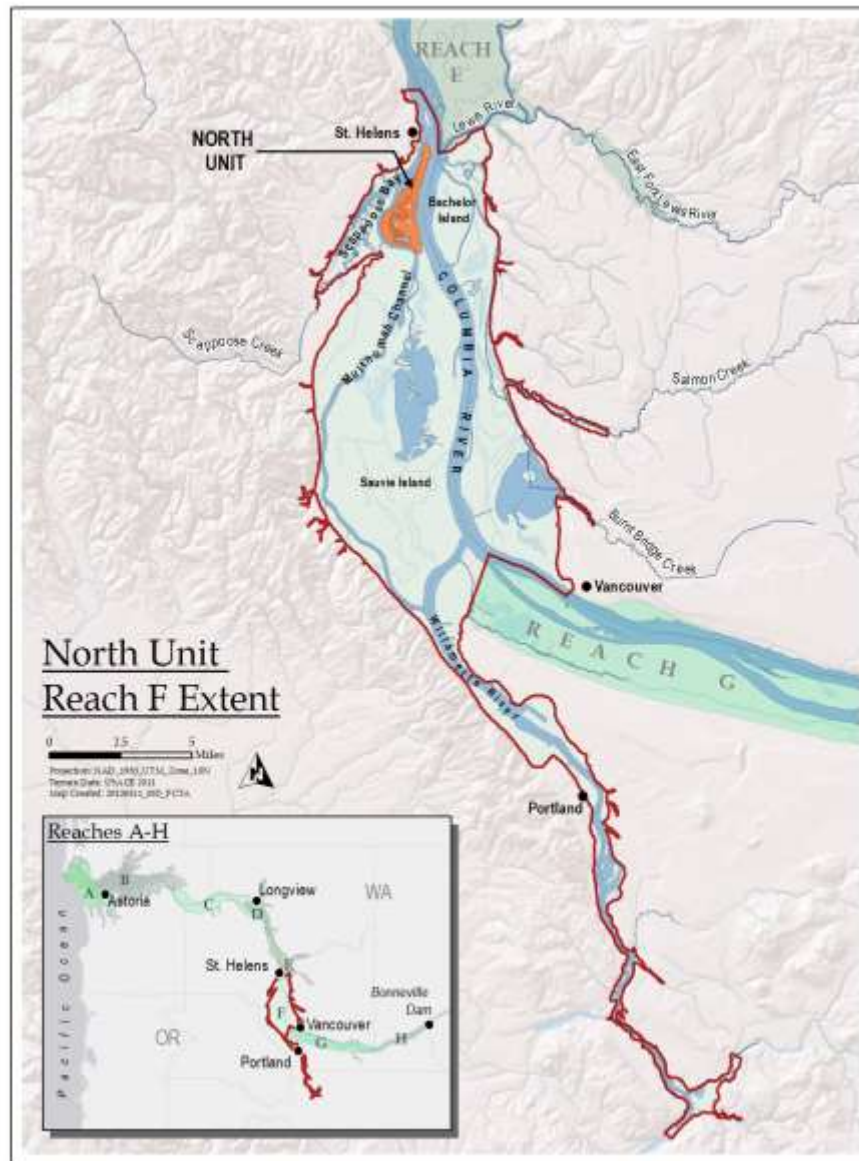
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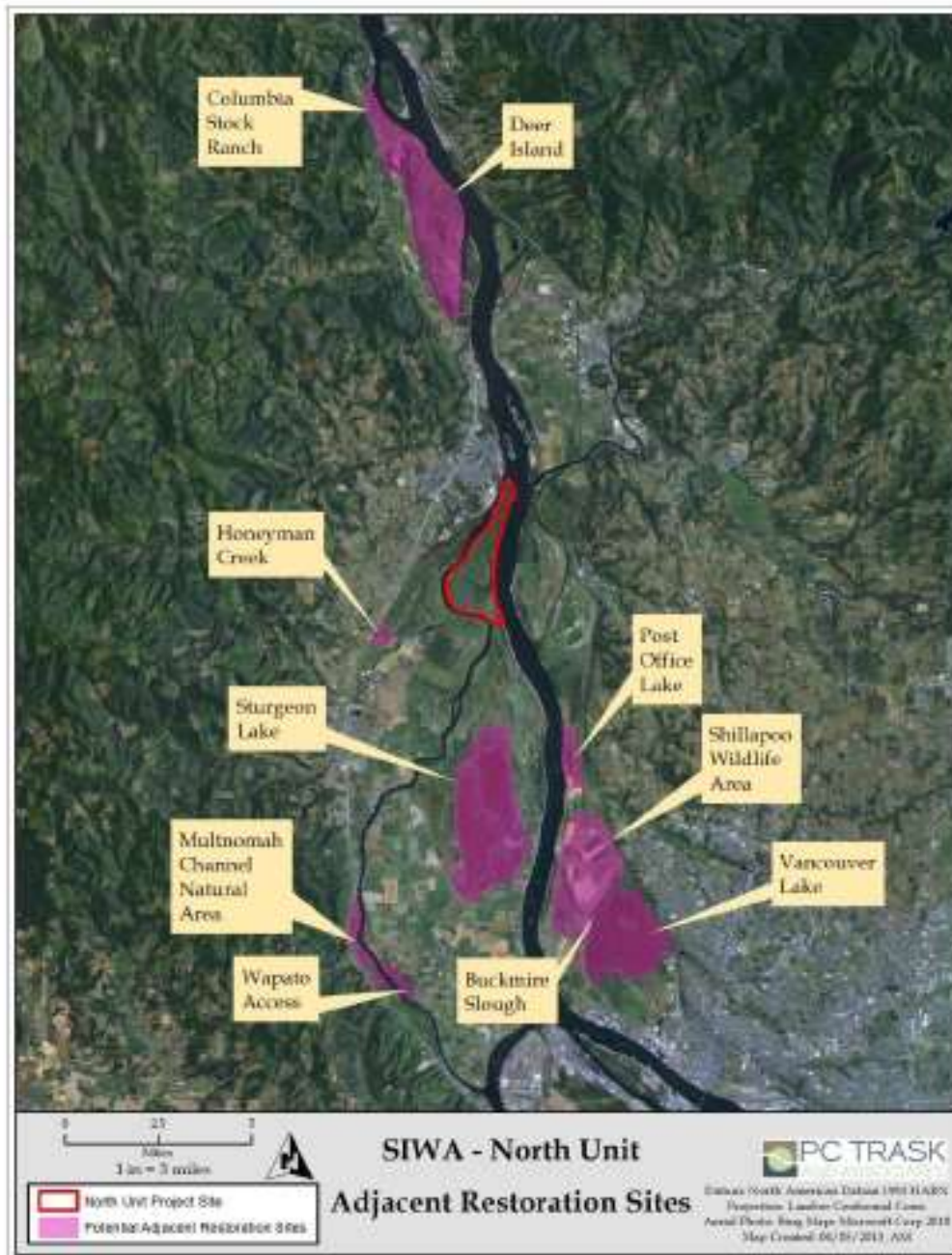


Presentation Outline

- Background
- Reach Context
- Existing Site Conditions
- Describe planning process used to engage SIWA staff and partners:
 - Goals and Objectives
 - Project Design Criteria
 - Restoration Concepts

Site Orientation





Reach F-Characteristics

- Hydro modifications
- Agricultural development
- Navigation channel
- Flood control infrastructure
- Water control management
- Urban inputs

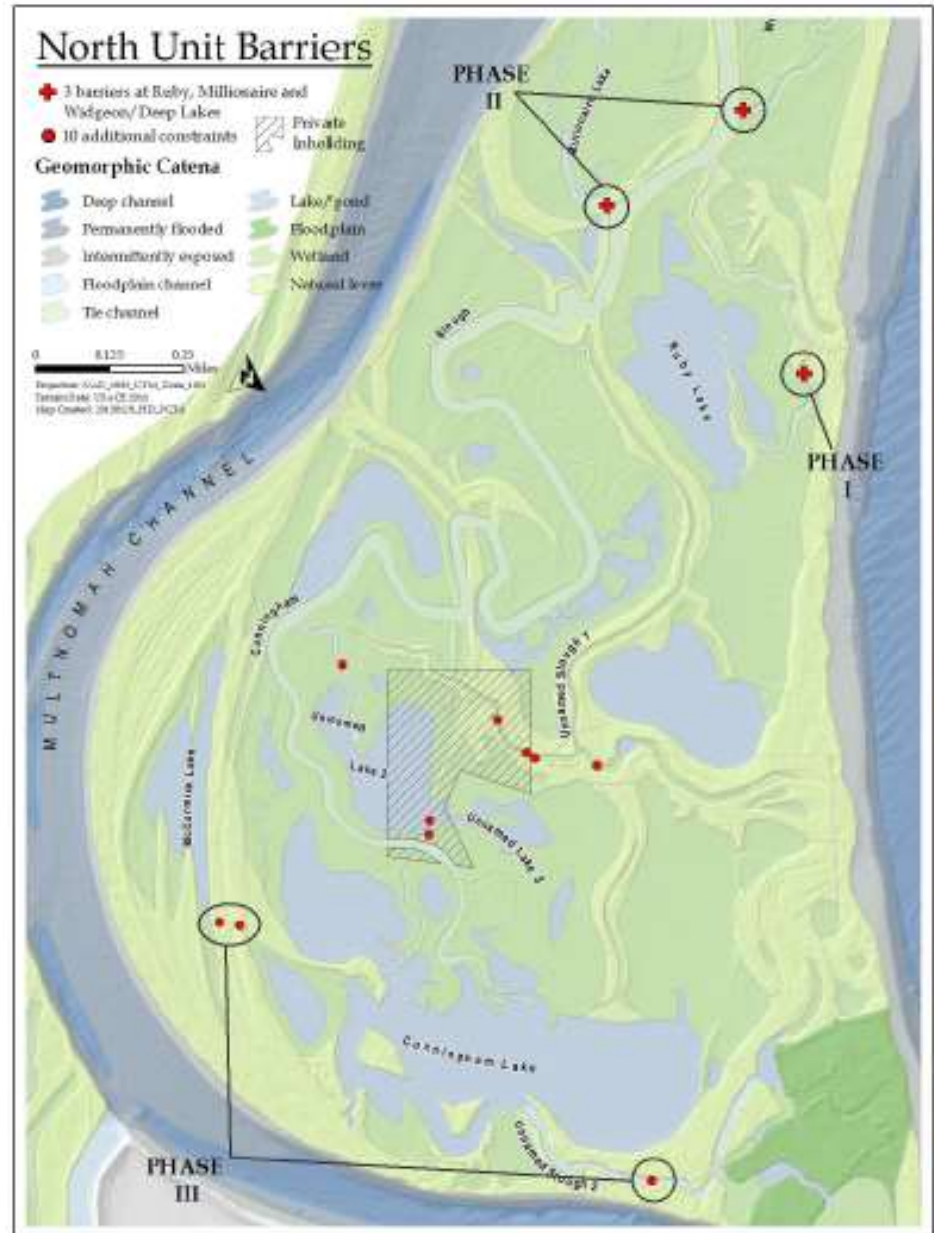


North Unit Orientation

- Owned and managed by Oregon Department of Fish & Wildlife for aquatic species and wildlife
- 1600 acres of sloughs, wetlands, backwater swamps, and bottomland forests
- Year 2000 water control structures installed in three major wetland areas for needs waterfowl and native wetland plant communities



Existing Conditions

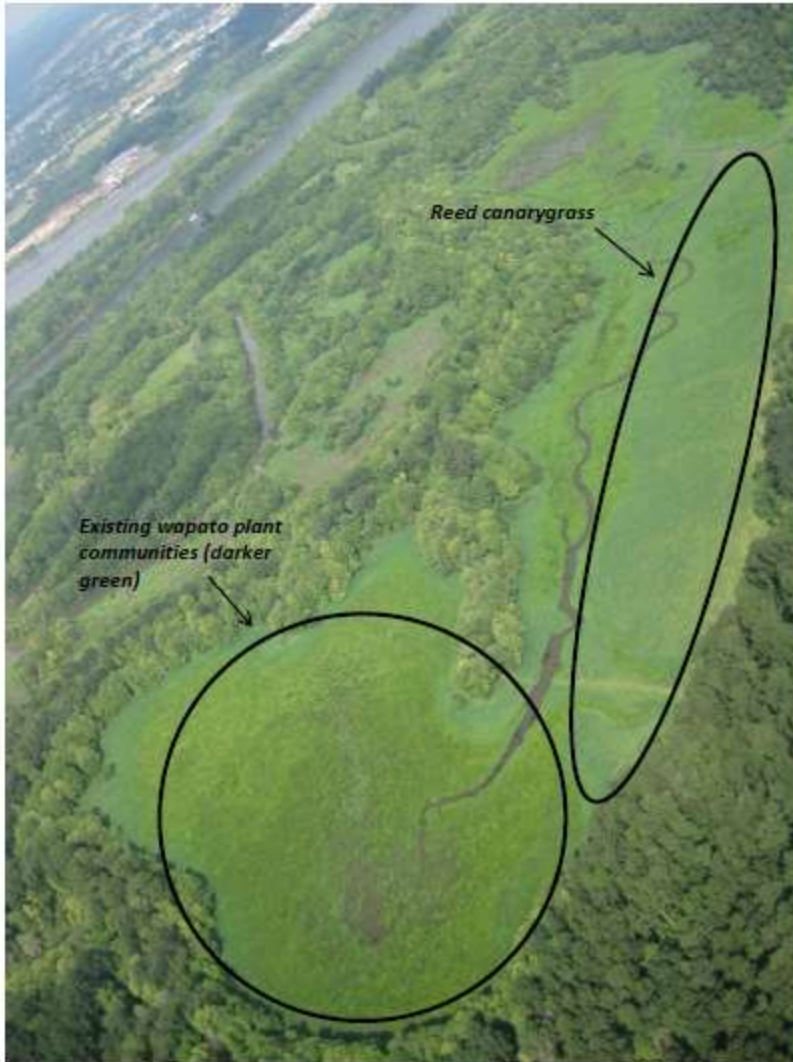


Existing Conditions

- Altered Hydrology from water control structures installed 2001-2002 for waterfowl and vegetation objectives
- Perched egress pipes (~10 feet NAVD88)



Existing Conditions

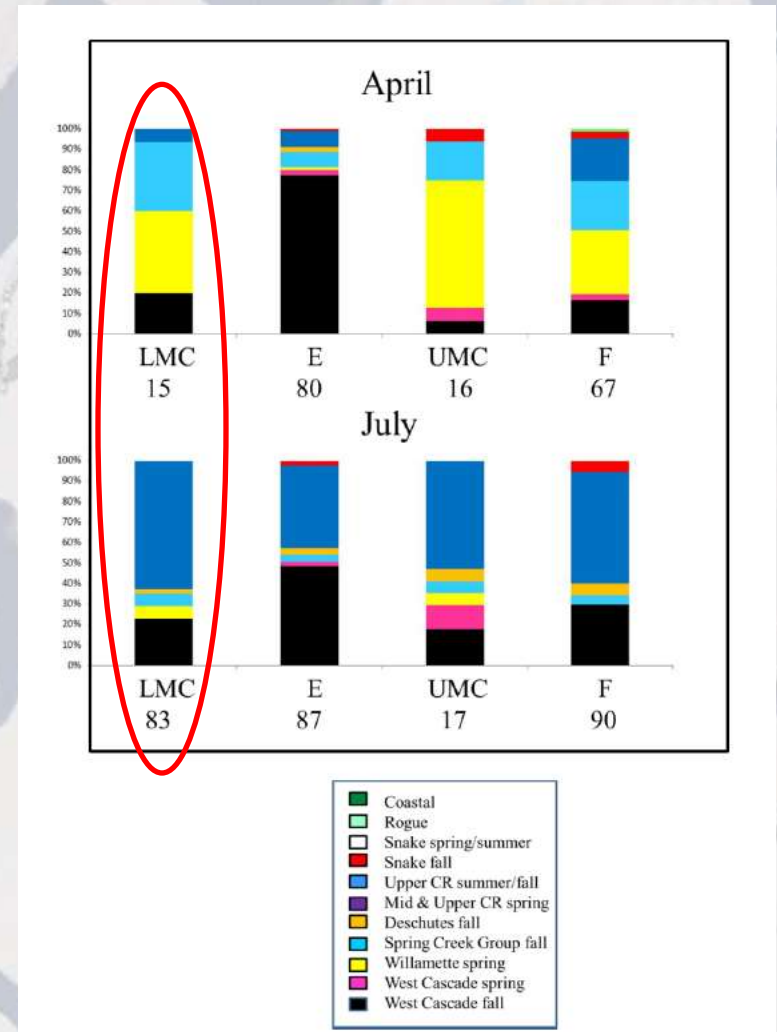
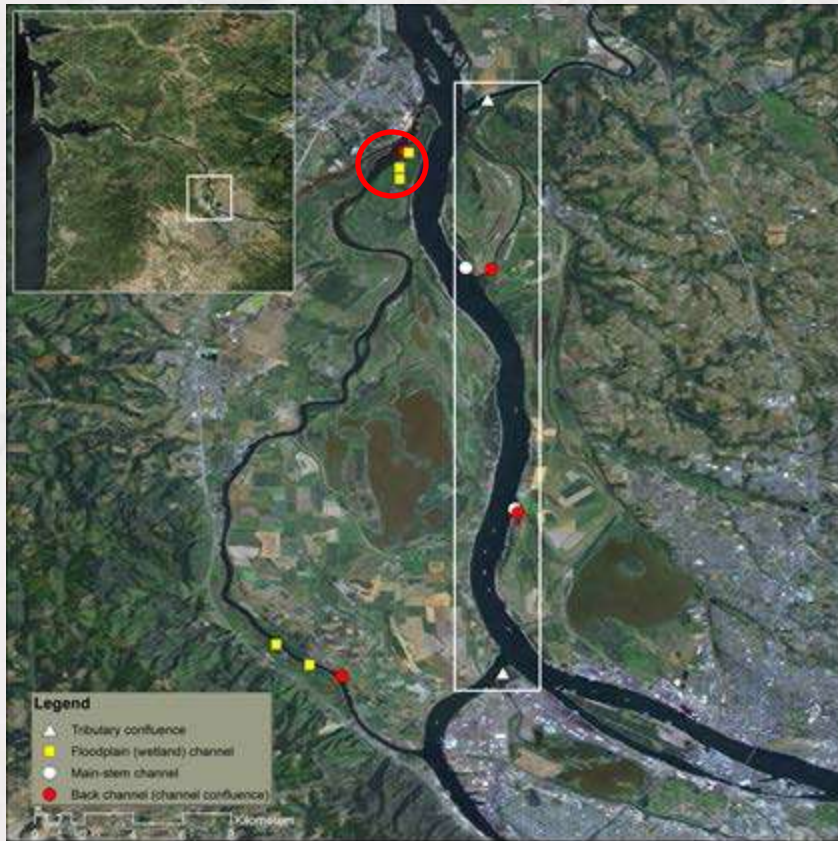


- Homogeneous Plant Structure
- Limited Sediment Transport



Existing Conditions

Fish Population Structure



Presentation Outline

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Goals and Objectives

Objective	Description
Goal 1: Re-establish the natural hydrology of the North Unit in order to increase estuarine habitat availability and capacity for salmonids, waterfowl, and shore birds.	
Objective 1a – Habitat Opportunity	Improve access to North Unit interior backwater ponds, wetlands and channels
Objective 1b – Habitat Quality	Improve habitat capacity for juvenile salmonids, waterfowl, and shore birds by reducing invasive plant species, increasing open water habitat, increasing wetland plant diversity, and expanding mudflat habitat.
Objective 1c – Ecological Function	Increase prey resource production and availability for juvenile salmonids
Goal 2: Establish the North Unit as a long-term demonstration and monitoring site that will highlight effective methods for restoring and enhancing habitats common to juvenile salmonids, waterfowl, shore birds, and ecosystem health.	
Objective 2a – Landscape Planning Framework	Use Landscape Planning Framework to test the validity of “Fish Habitat Catena” and associated metrics that are important to juvenile salmonid needs.
Objective 2b – Adaptive Management	Use monitoring results to inform adaptive management for future restoration and stewardship efforts.
Objective 2c – Sustained Stewardship	Identify and secure long-term stewardship resources for sustaining success of habitat restoration actions within the North Unit.

Restoration Steps Developed to engage project sponsor and partners:

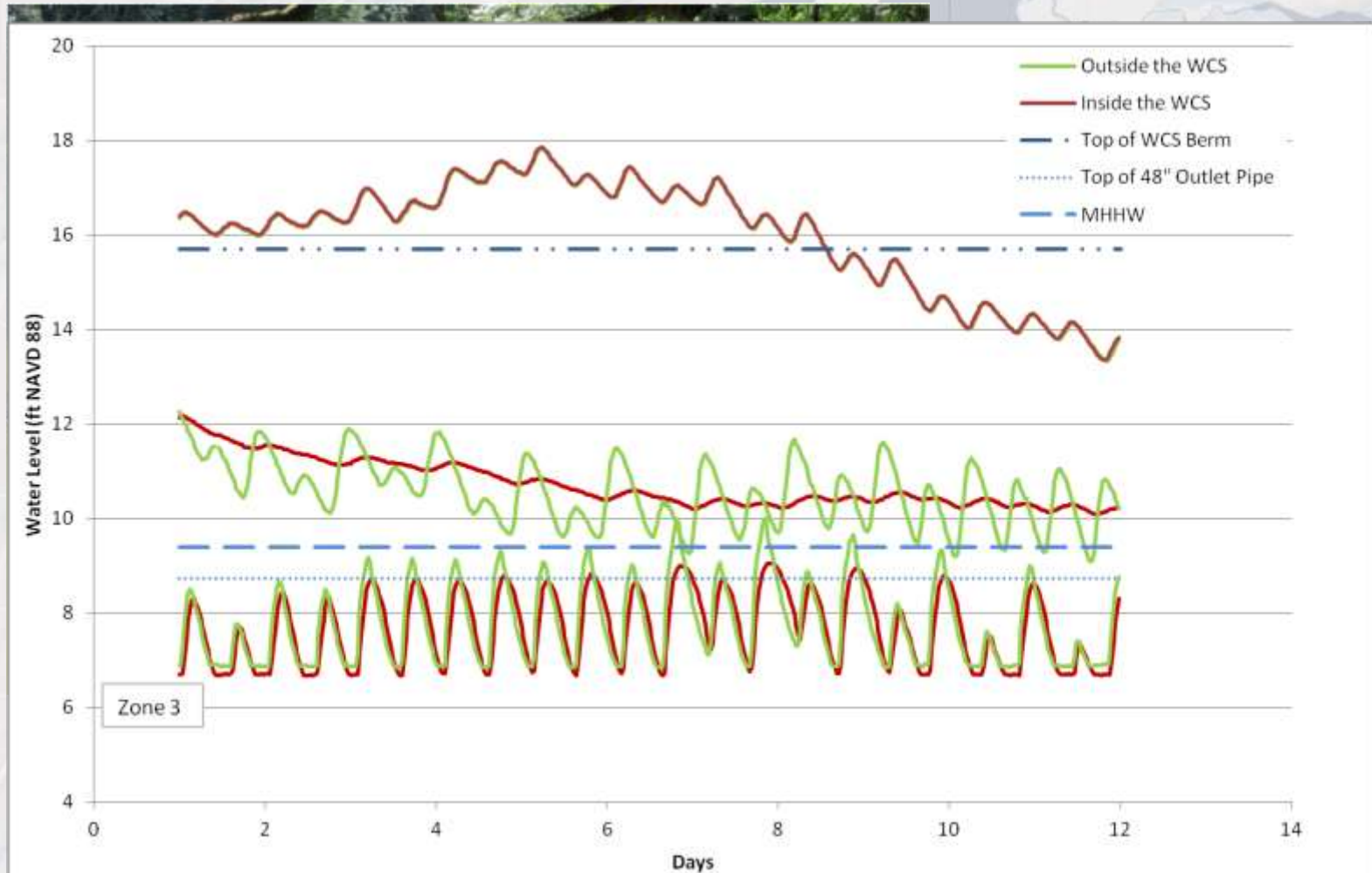
- **Develop Project Design Criteria using:**
 - Current Understanding of Habitat Requirement for SIWA Priority Species of Interest
 - Water Level Collection and Analysis
 - Vegetation Survey
 - Topo Survey
- **Develop Restoration Concepts using:**
 - Geomorphic Assessment
 - Hydrodynamic Modeling
- **Restoration Concepts for Design:**
 - Barrier Removal
 - Elevation Manipulation
 - Riparian Plantings

Design Criteria: Habitat Requirements for SIWA Species

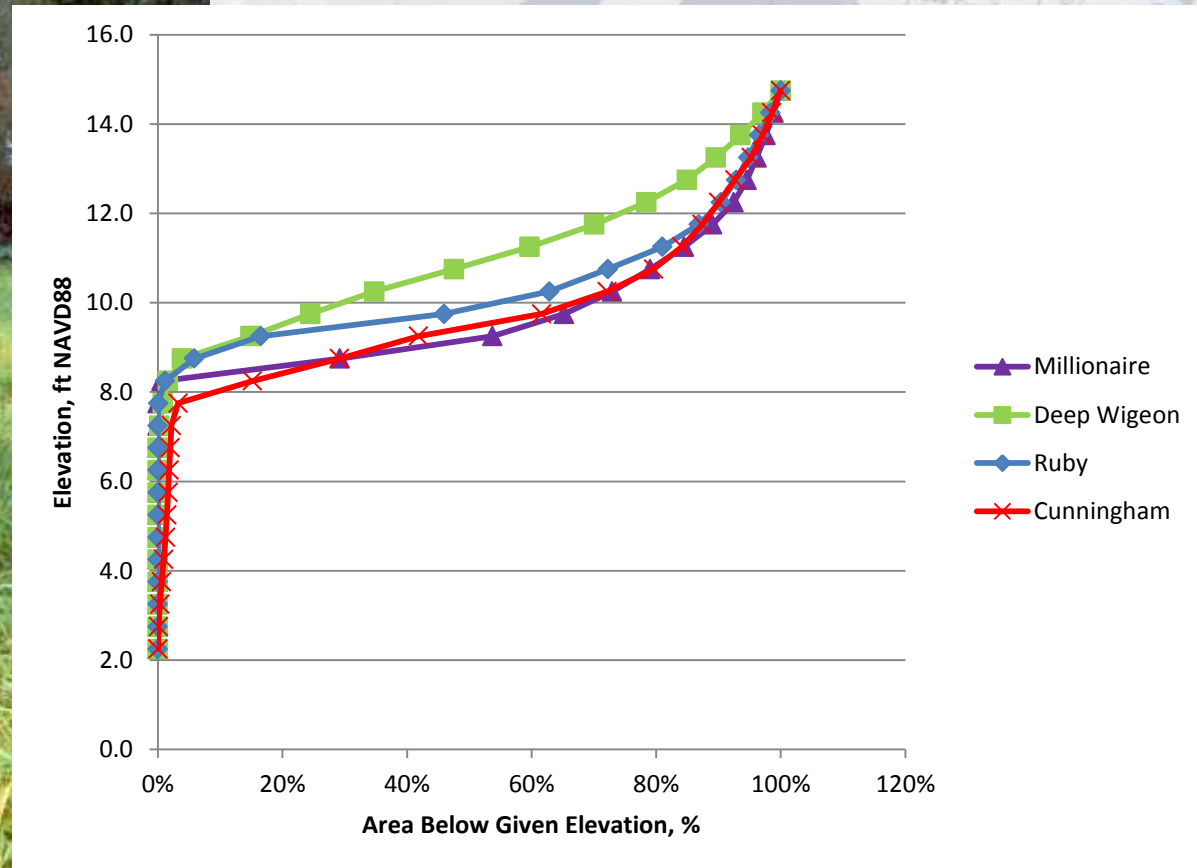
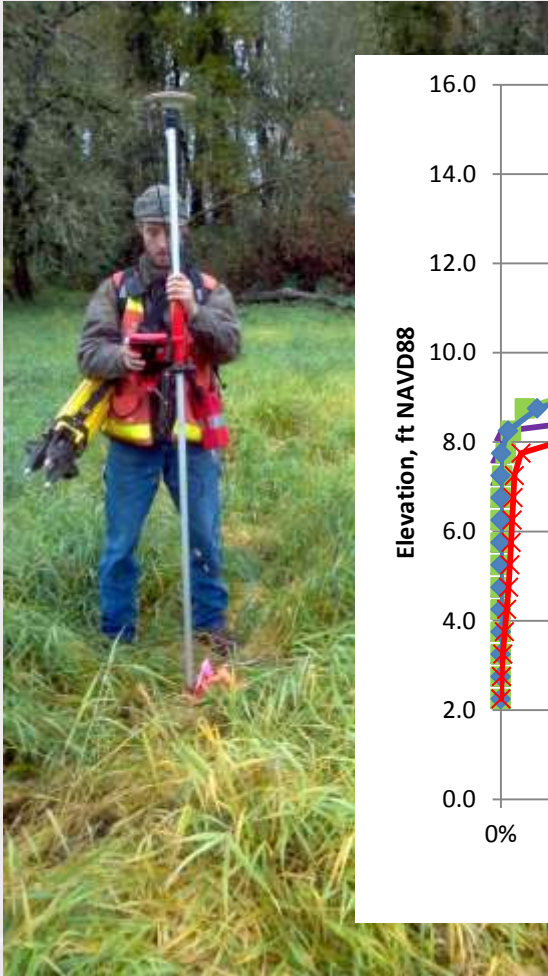
- Water birds
- Native Wetlands
- Juvenile Salmon



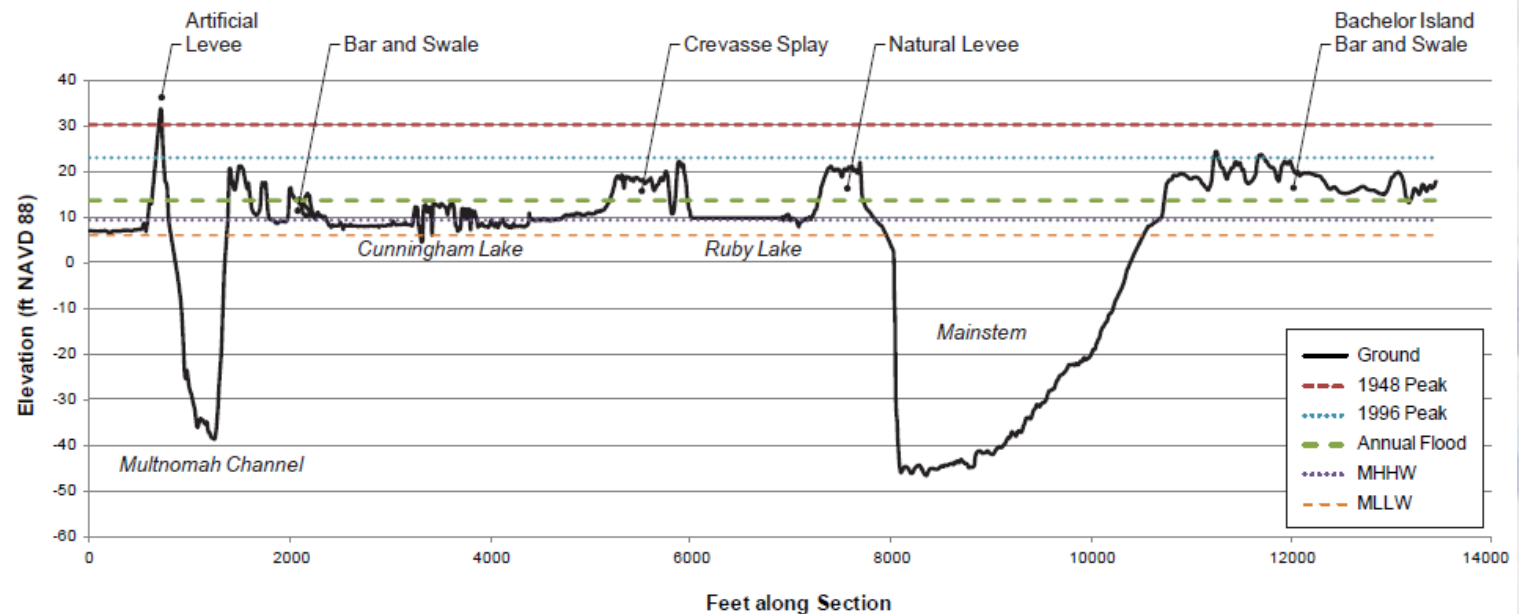
Design Criteria: Water Level Observations



Design Criteria: Topographic Survey

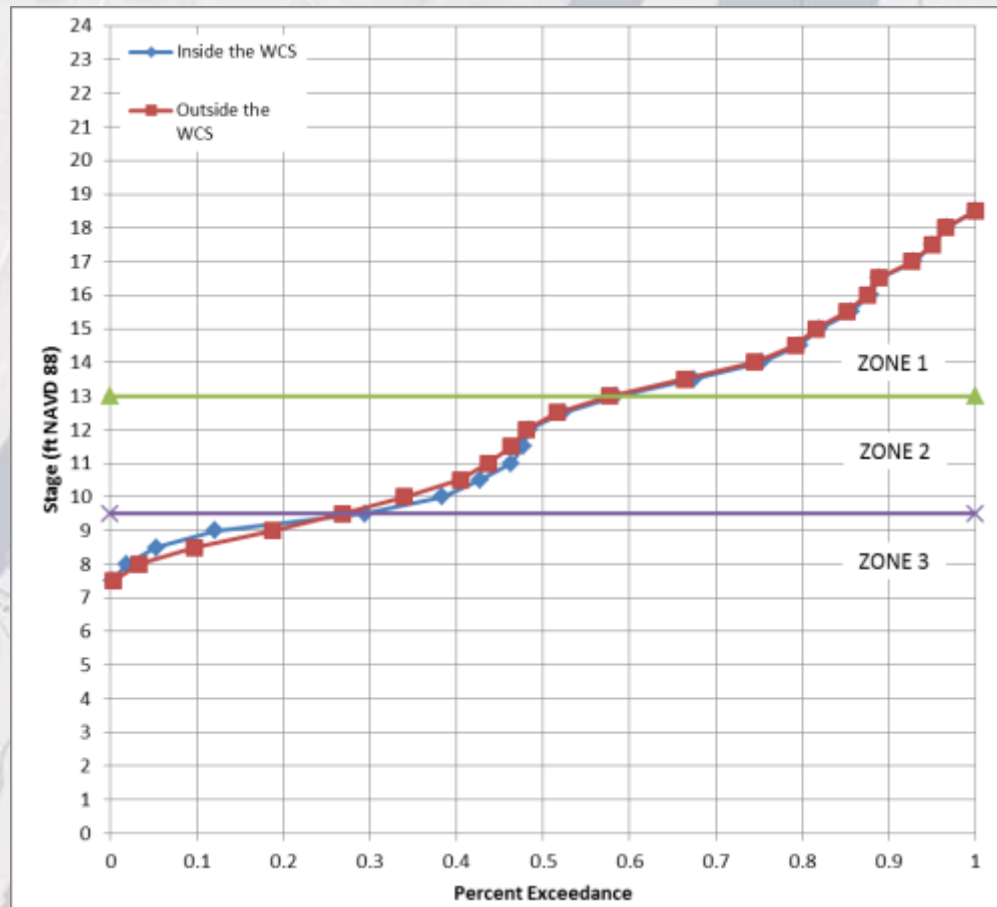


Design Criteria: Topographic Survey Survey

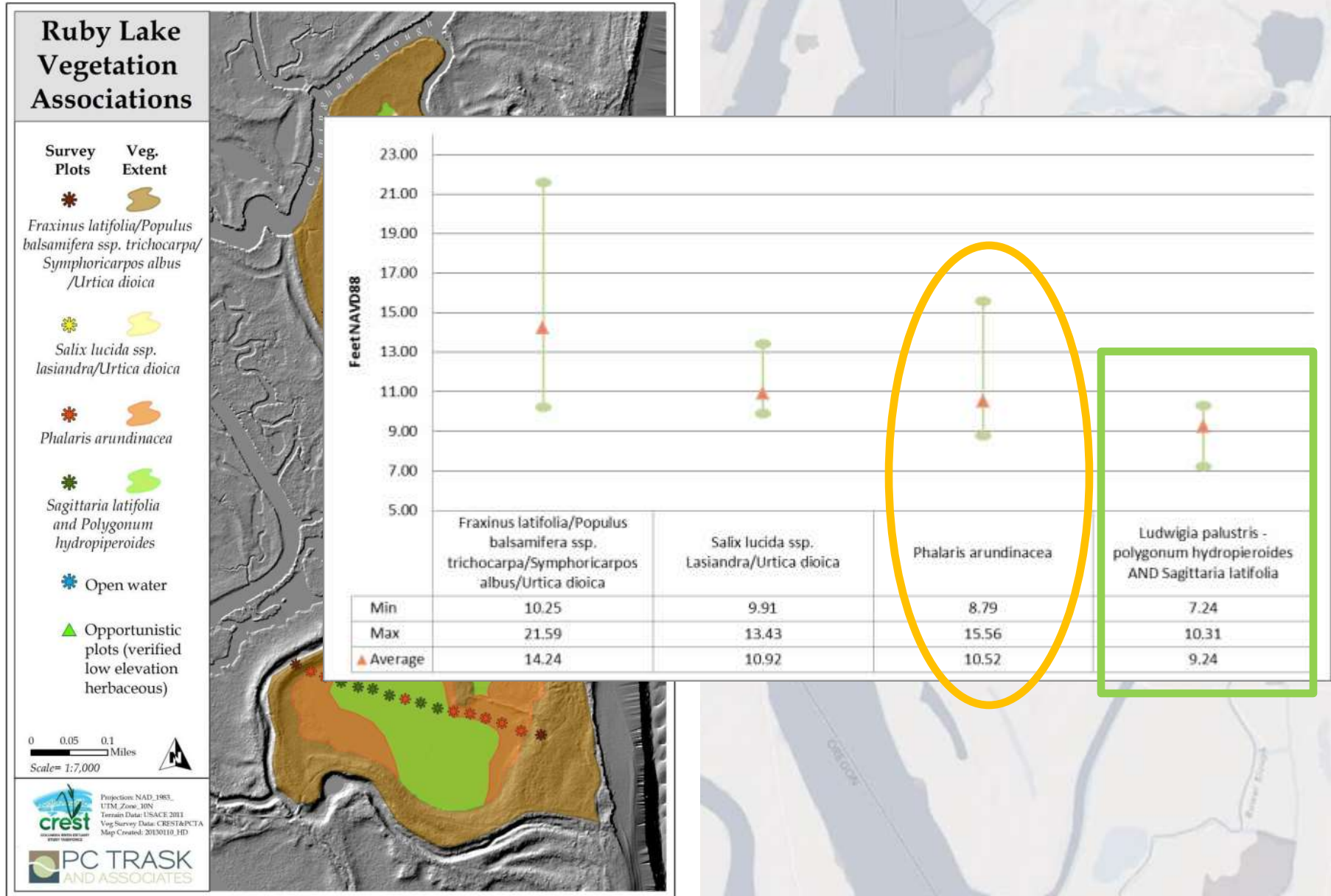


Source: LIDAR and bathymetry provided by PC Trask. Augmented in Cunningham and Ruby Lakes with on-site survey collected by Statewide (2012).

Water Level Analysis (Ruby Wetlands)



Design Criteria: Vegetation



Design Criteria (link to project objectives)

Objective 1a – Habitat Opportunity

Design Criteria 1: Establish full volitional access to interior wetlands of existing backwater areas by 100% channel width ingress/egress (free and open connection)

Design Criteria 2: Expand access to interior channel edge network by 25%

Design Criteria 3: Expand surface water area connection and duration to interior wetlands and channels by 20 acres (seasonality)

Design Criteria 4: No adverse impacts on in channel habitat conditions: velocity < 2 ft/s and depths > 0.5 feet (90% of the time)

Objective 1b – Habitat Quality

Design Criteria 5: At strategic locations, lower/maintain ground elevation to 7.5-8.5 feet NAVD88 to induce native plant propagation

Design Criteria 6: Maintain 2 feet of water level elevation over wetland surface during February-March to restrict germination capacity of invasive species

Design Criteria 7: Increase area of native plant community by 25%

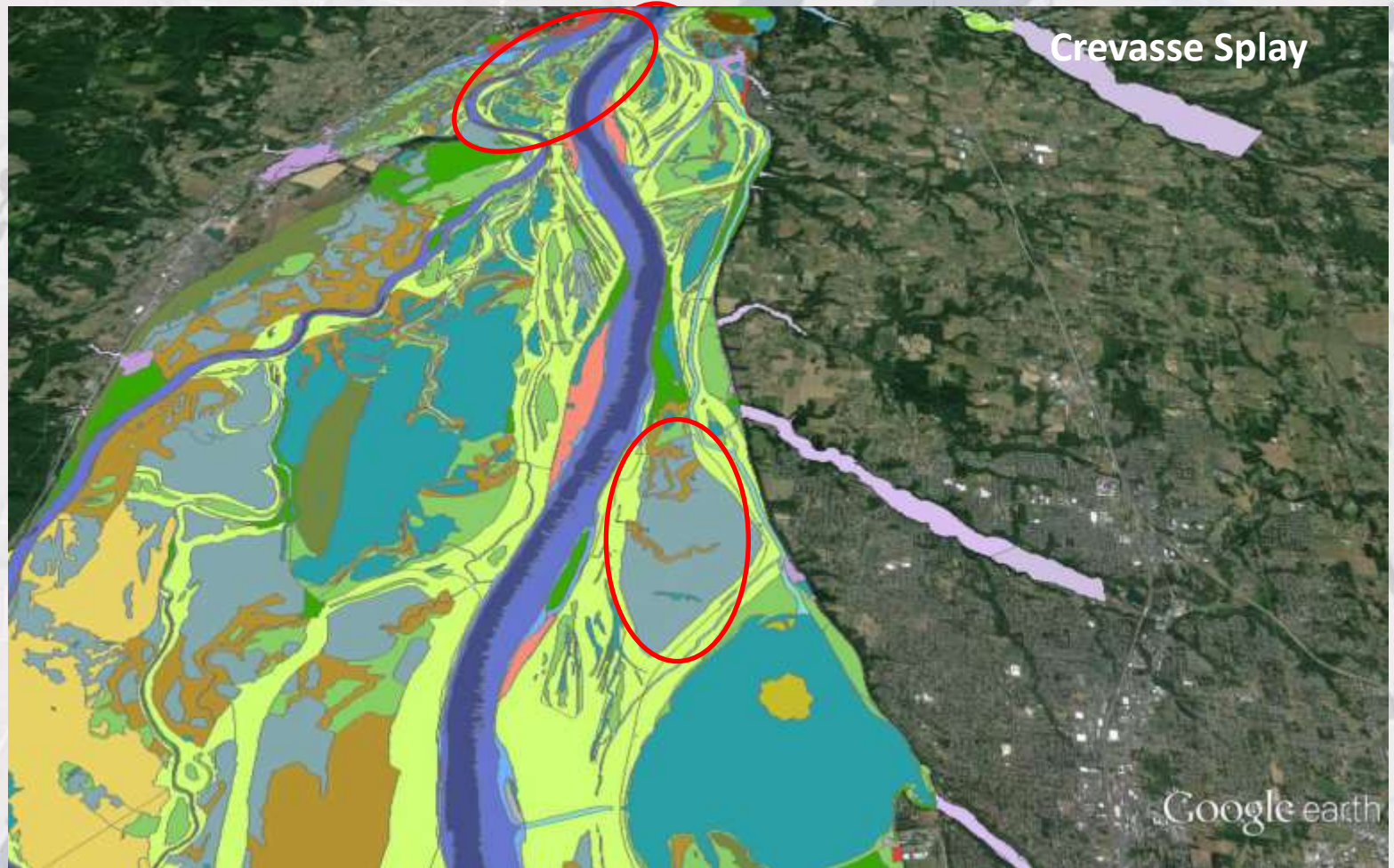
Objective 1c – Ecological Function

Design Criteria 8: Maintain floodplain activation zone (shrub-scrub, woody vegetation layer) at >9.0 feet NAVD88 to increase estuarine food web capacity during juvenile rearing period (November-June)

Restoration Steps Developed to engage project sponsor and partners:

- **Develop Project Design Criteria using:**
 - Current Understanding of Habitat Requirement for SIWA Priority Species of Interest
 - Water Level Collection and Analysis
 - Vegetation Survey
- **Develop Restoration Concepts using:**
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 - Hydrodynamic Modeling
- **Restoration Concepts for Design:**
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 - Elevation Manipulation
 - Riparian Plantings

Geomorphic Assessment

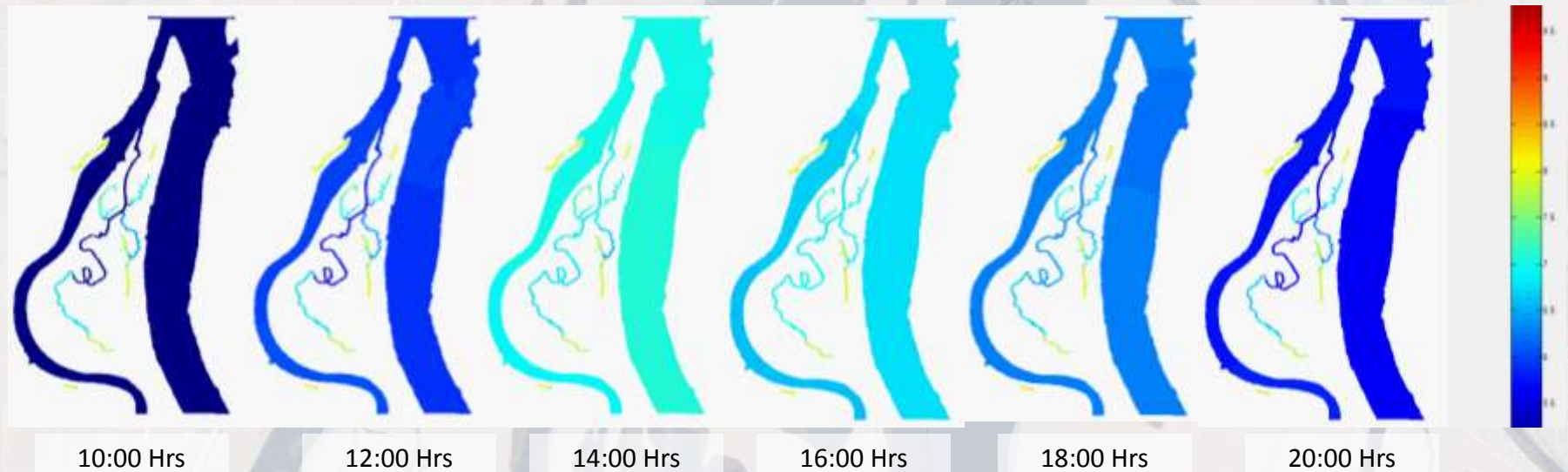


Geomorphic Assessment

- Crevasse Splays
- Backswamps
- Natural Levees
- Bar and Scroll
- Slough Channels



Hydrodynamic Modeling– Zone 3 (September)



Planning process used to engage project sponsor and partners:

- **Develop Project Design Criteria using:**
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 - Geomorphic Assessment
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- **Restoration Concepts:**
 - Barrier Removal
 - Elevation Manipulation
 - Riparian Plantings

REVISIONS

NO.	DATE	DESCRIPTION
1	01/15/10	ISSUED FOR PERMIT
2	02/10/10	REVISED FOR COMMENTS
3	03/10/10	REVISED FOR COMMENTS
4	04/10/10	REVISED FOR COMMENTS
5	05/10/10	REVISED FOR COMMENTS
6	06/10/10	REVISED FOR COMMENTS
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100	04/18/18	REVISED FOR COMMENTS</

Modeling Results from preferred alternative (Zone 2)

- ✓ No change in water levels from WCS removal + 81% increase in depth from large scrapedown:
 - 66% increase in 1-2 feet depth
 - 83% increase in 2 feet or greater
- ✓ Increase in 5 acre feet more volume from restoration (tidal); 30-40% from existing condition

Construct: Barrier Removal



Construct: Elevation Manipulation



Construct: Riparian Plantings



Managing Uncertainty: Adaptive Management Plan

ANNOTATED OUTLINE

Preliminary Management Plan North Unit restoration project

North Unit, Sauvie Island Wildlife Area

Prepared for Oregon Department of Fish and Wildlife
Columbia River Estuary Study Taskforce
By PC Tysak & Associates, Inc.

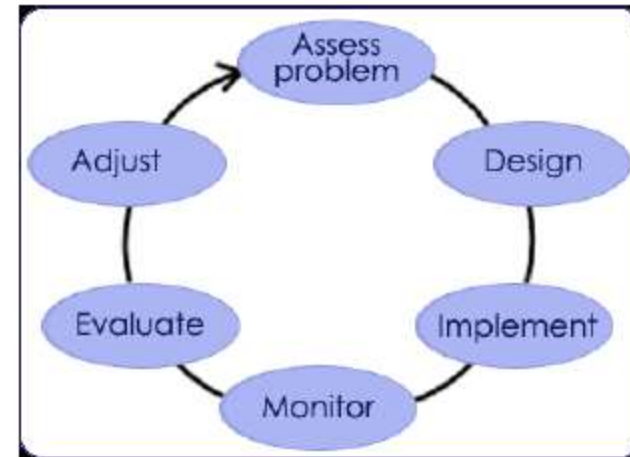


Figure 1. Monitoring Plan for the North Unit Project.

Project Objectives	Design Criteria	Questions/ Working Hypothesis	Performance Criteria	Selected Parameter	Methods	Suggested Frequency
Objective 1a- Habitat Opportunity-improve access to North Unit interior backwater ponds, wetlands and channels	Design Criteria 1a Establish full vertical access to interior wetlands of existing backwater areas by 20% channel width ingress/egress (free and open connection)	Removal/modification of water control structure will increase access for juvenile salmonids Removal/modification of water control structure will change timing, frequency, and duration of hydrology	TBD	Presence/Absence Depth	Snorkeling, diving Continuous depth probe	1-2 x/month from December-July 24-hour bracketing inside/outside lake
	Design Criteria 1b Expand access to interior channel edge network by 20%					
	Design Criteria 1c Expand surface water area connection and duration to interior ponds, wetlands and channels by 8 acres (seasonality)					
	Design Criteria 1d No adverse impacts on in-channel habitat conditions: velocity < 2 ft/s and depths > 0.5 feet (50% of the time)					
Objective 1b – Habitat Quality-improve habitat capacity for juvenile salmonids, waterfowl, and shore birds by reducing invasive plant species, increasing open water habitat, increasing wetland plant diversity, and expanding mudflat habitat.	Design Criteria 2a At strategic locations, lower/maintain ground elevation to 7.5-8.5 feet NAVD88 to reduce native plant propagation	Restoration measures will increase wetland plant diversity through increased saturation of soil during peak weed propagation and plant colonization	TBD	Vegetation composition	Transsects, quadrants,	1x/ year for 1st 2 years, then every 3-5 years
	Design Criteria 2b Maintain 2 feet of water level elevation over wetland surface during February-March to restrict germination capacity of invasive species					
	Design Criteria 2c Increase area of native plant connectivity by 20%					
Objective 1c – Ecological Function-increase prey resource production and availability for juvenile salmonids.	Design Criteria 3a Maintain floodplain saturation zone (1800-creek, woody vegetation layer) at > 90 feet NAVD88 during juvenile rearing period (November-June)	Amount of floodplain area inundation that will expand estuarine food web productivity	TBD	Prey Resources	Sediment Cores, Fall out traps	1x/month

Future North Unit Stewards



Summary

- Combination of planning process and baseline monitoring leads to collective knowledge of unique Reach F system
- Goals, objectives, design criteria development key to meeting needs of multiple, estuary-dependent species
- Geomorphology key for development of cost-effective restoration measures
- Uncertainty mitigated in part by evolving adaptive management plan as system responds to restoration
- Template for future work in seasonally inundated reaches of Columbia River Estuary

Gratitude!

- Bonneville Power Administration
- Institute for Applied Ecology
- Sauvie Island Habitat Partnership
- Sauvie Island Academy
- Statewide Surveying