

More Than One Look: Using Hydrodynamic and Ecosystem Models to Predict Habitat Changes at Restoration Sites

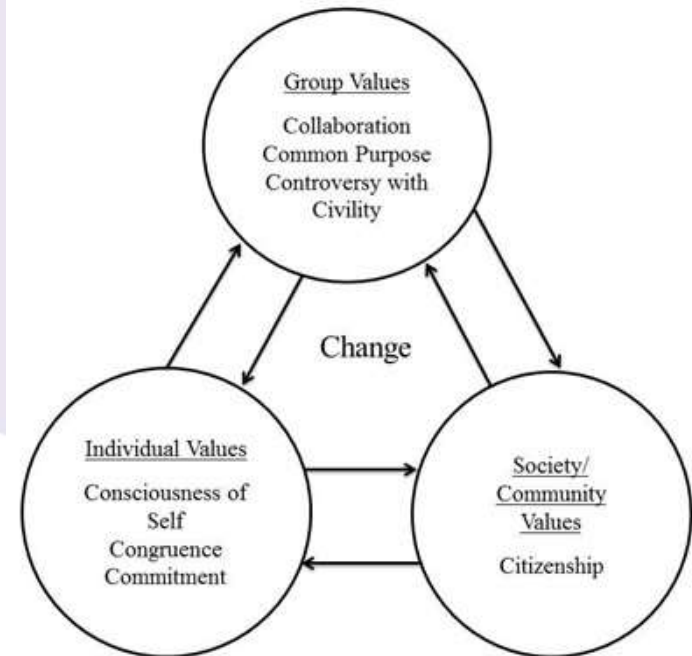
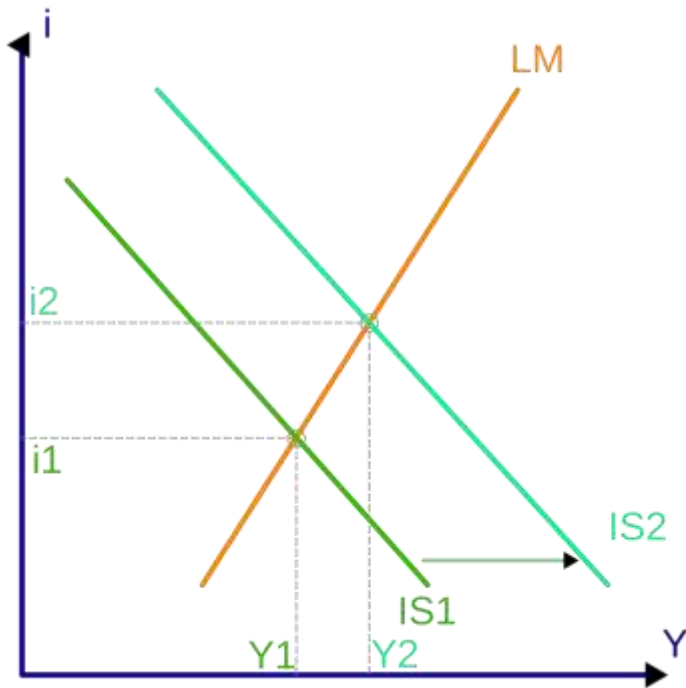
Columbia River Estuary Conference
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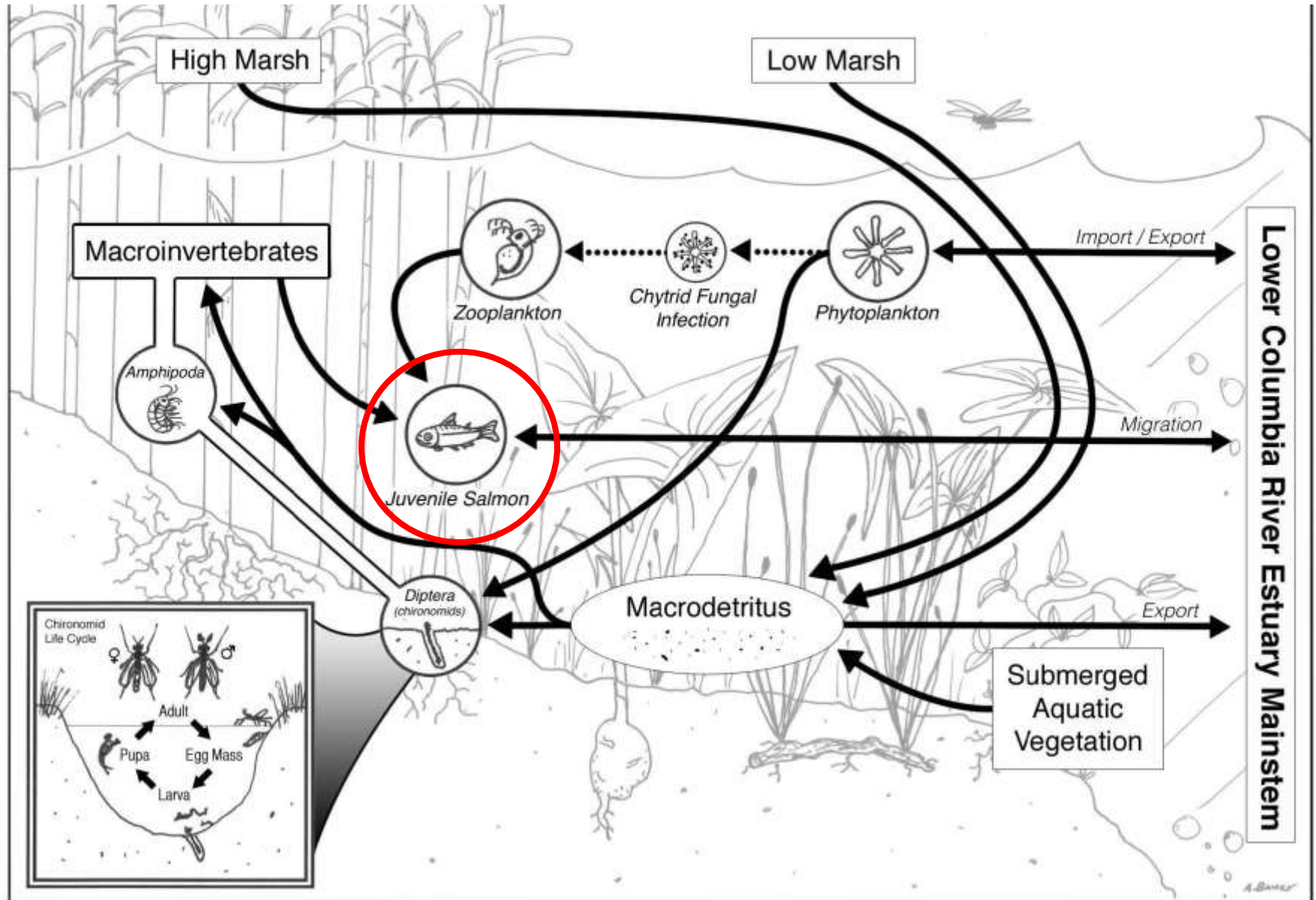
1. Lower Columbia Estuary Partnership
2. Washington Department of Wildlife
3. US Army Corps of Engineers Hydrologic Engineering Center



What is a Model?



Emergent Wetlands Model



Multispecies World



Hydrology and Ecology

- There is a need to improve how restoration projects are evaluated in order to meet multiple species objectives
- Understanding the timing and frequency of hydraulic reconnection can be used to determine habitat changes at the site
- Ecological models help quantify habitat changes related to restoration actions

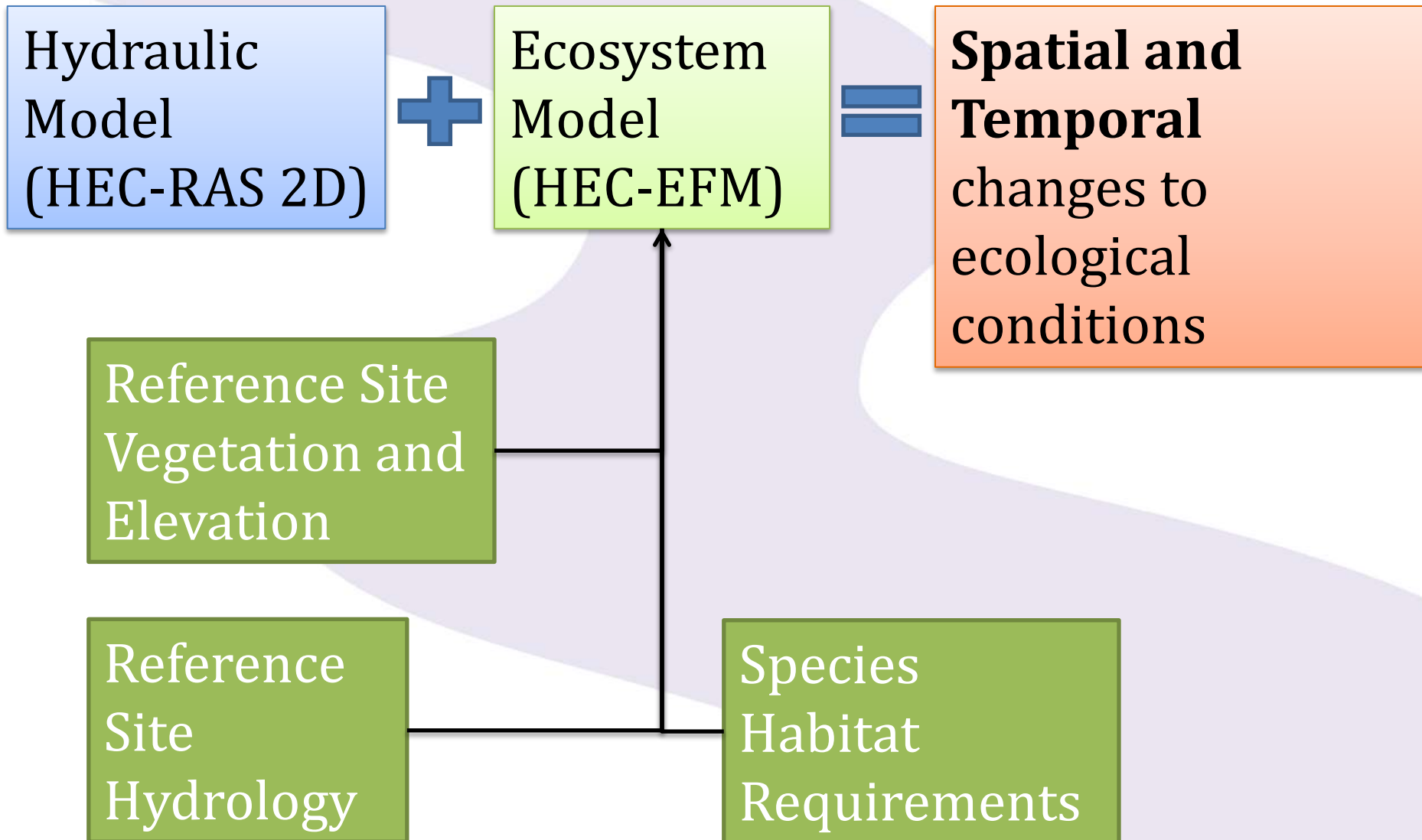


Hydrology and Ecology

- Most restoration projects have a hydraulic models
- Couple ecological data to model habitat changes to inform management decisions
- Hydraulic Engineering Center Ecosystems Functions Model (HEC-EFM)
 - HEC-EFM allows us to better understand how hydrology influences ecological conditions at restoration sites



Basic Approach



Case Study

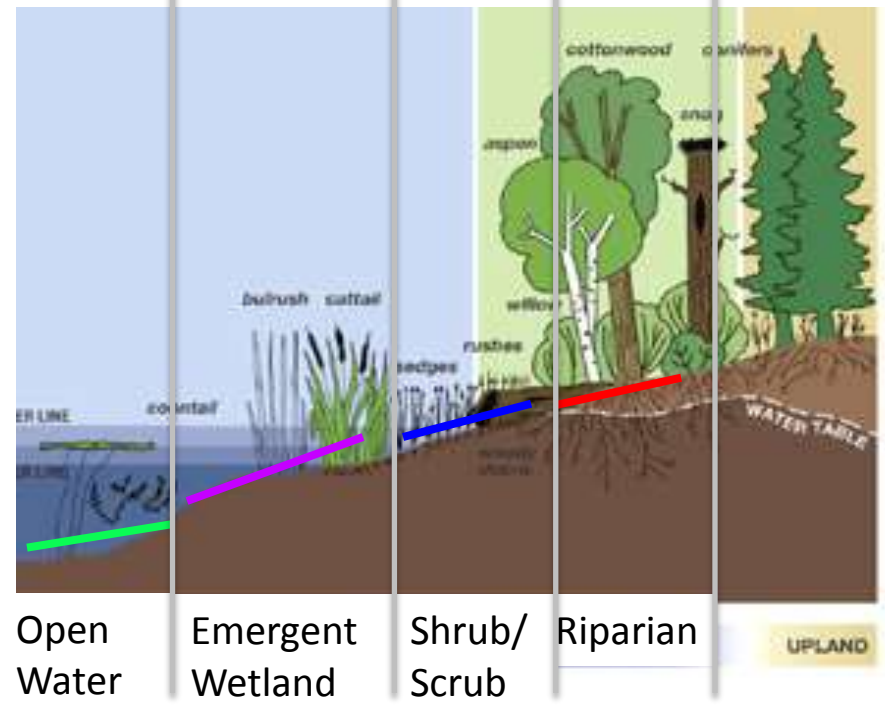
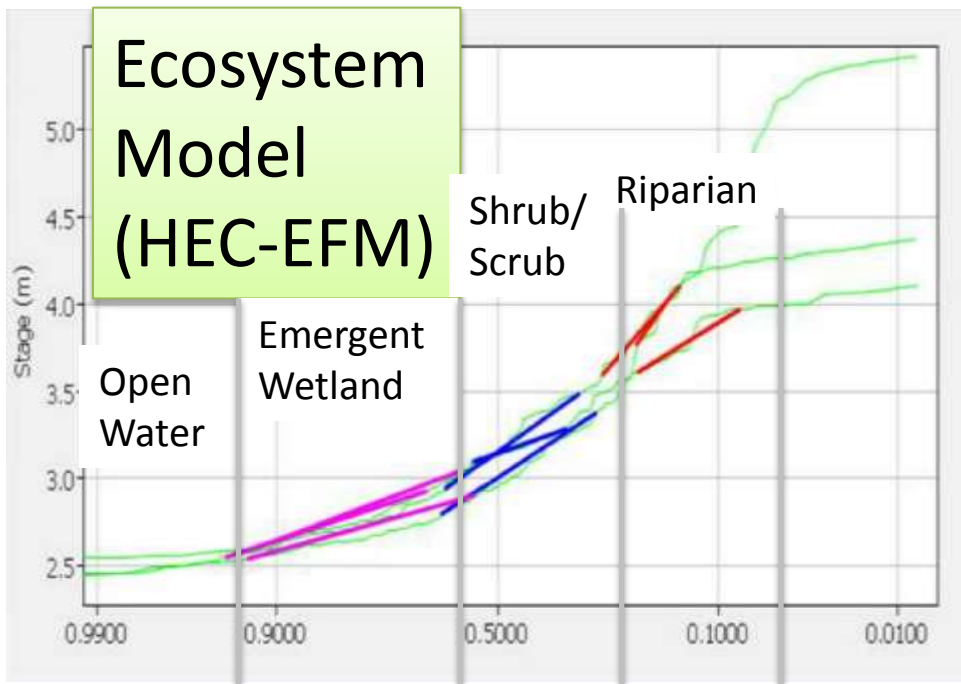
Hydraulic Reconnection Project

Modeling Objectives:

- Determine resulting vegetation assemblages
- Seasonal timing and distribution of waterfowl habitat
- Seasonal timing and distribution of salmonid habitat
- Other wildlife impacts



Hydraulic Model (HEC-RAS 2D)

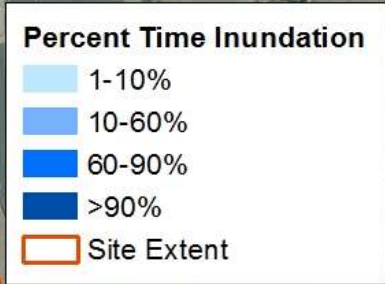


Open Water Emergent Wetland Shrub/Scrub Riparian UPLAND



Average Winter .1 -7 ft Depth

401.6 Acres



2 Year Flood Extent

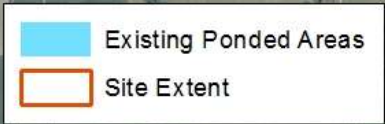
397.7 Acres



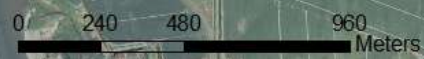
Columbia River



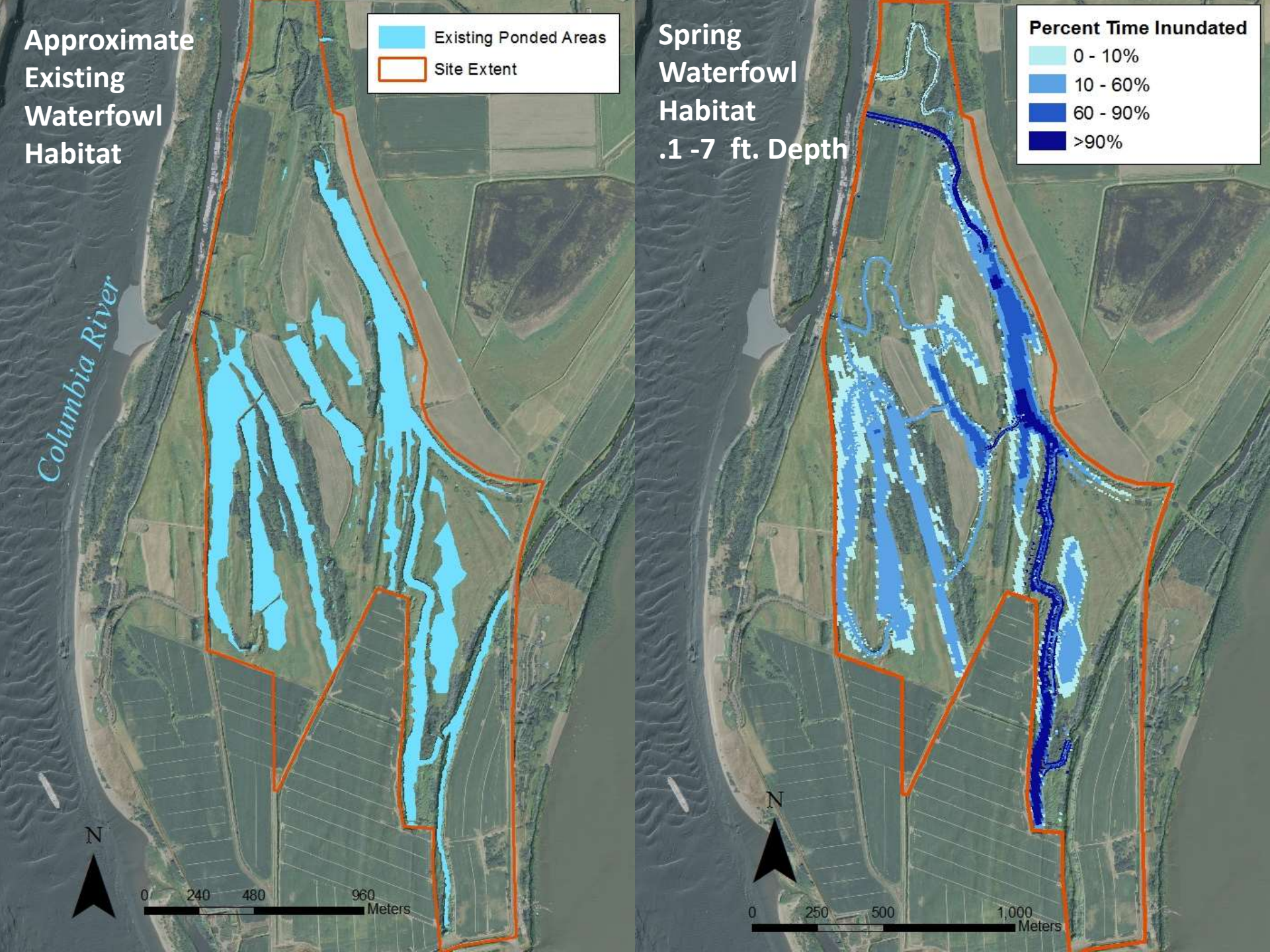
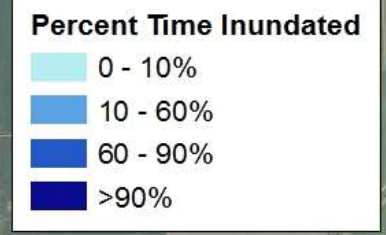
Approximate Existing Waterfowl Habitat



Columbia River

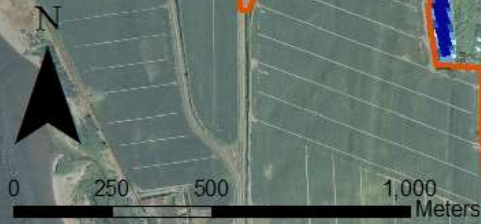
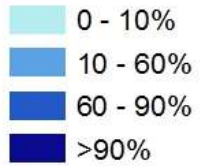


Spring Waterfowl Habitat .1 -7 ft. Depth



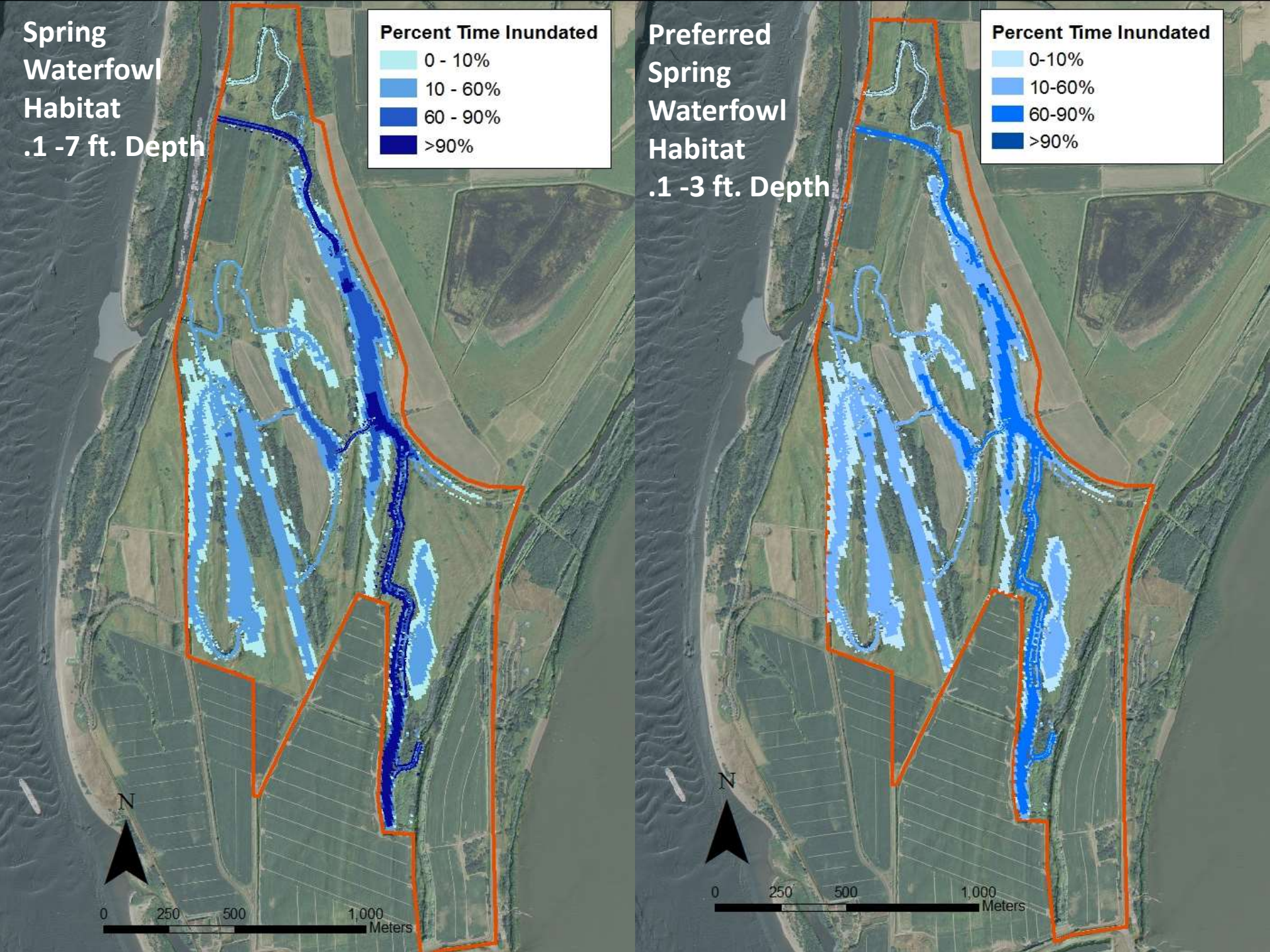
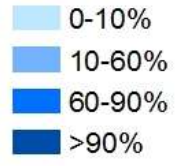
**Spring
Waterfowl
Habitat
.1 -7 ft. Depth**

Percent Time Inundated



**Preferred
Spring
Waterfowl
Habitat
.1 -3 ft. Depth**

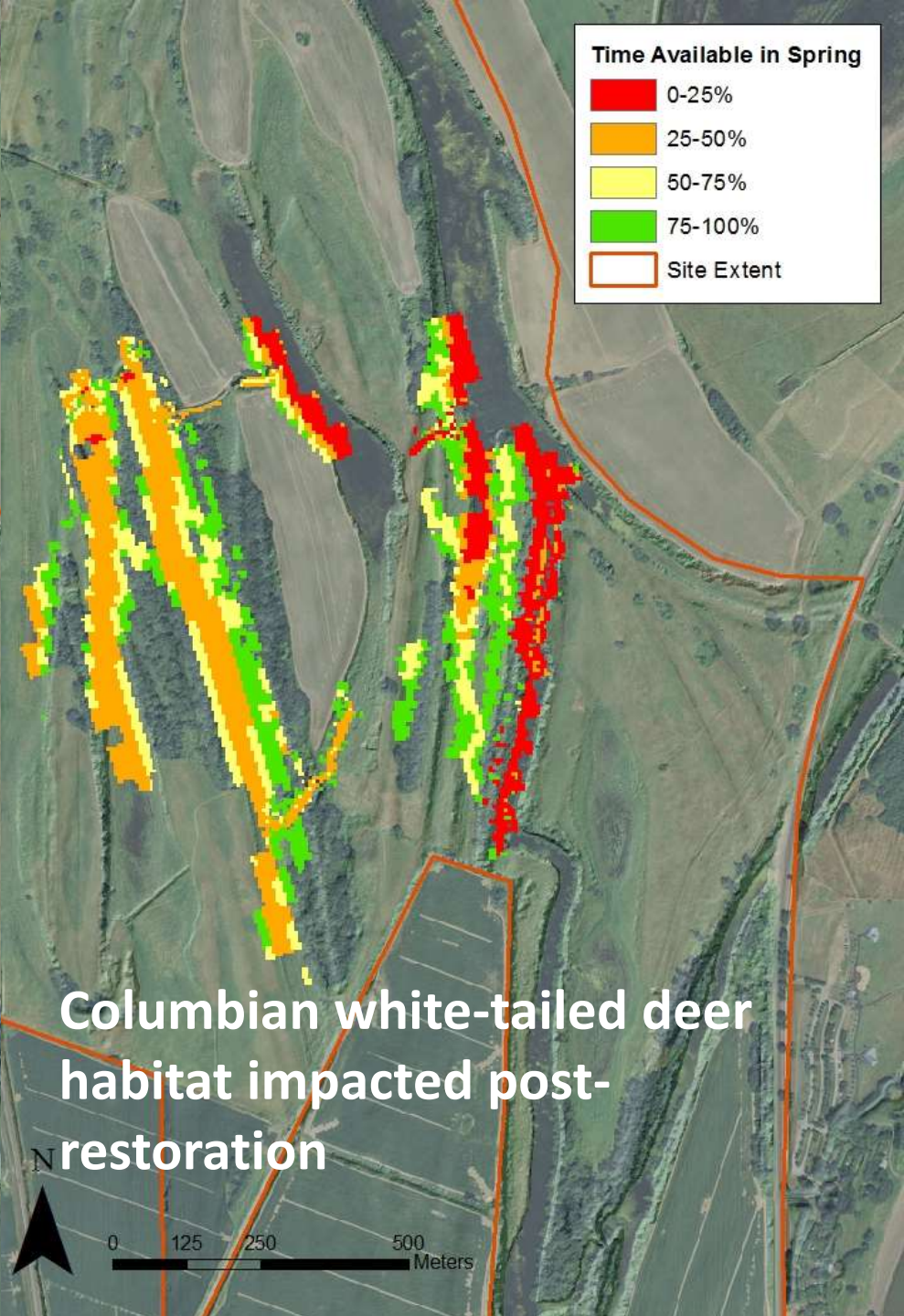
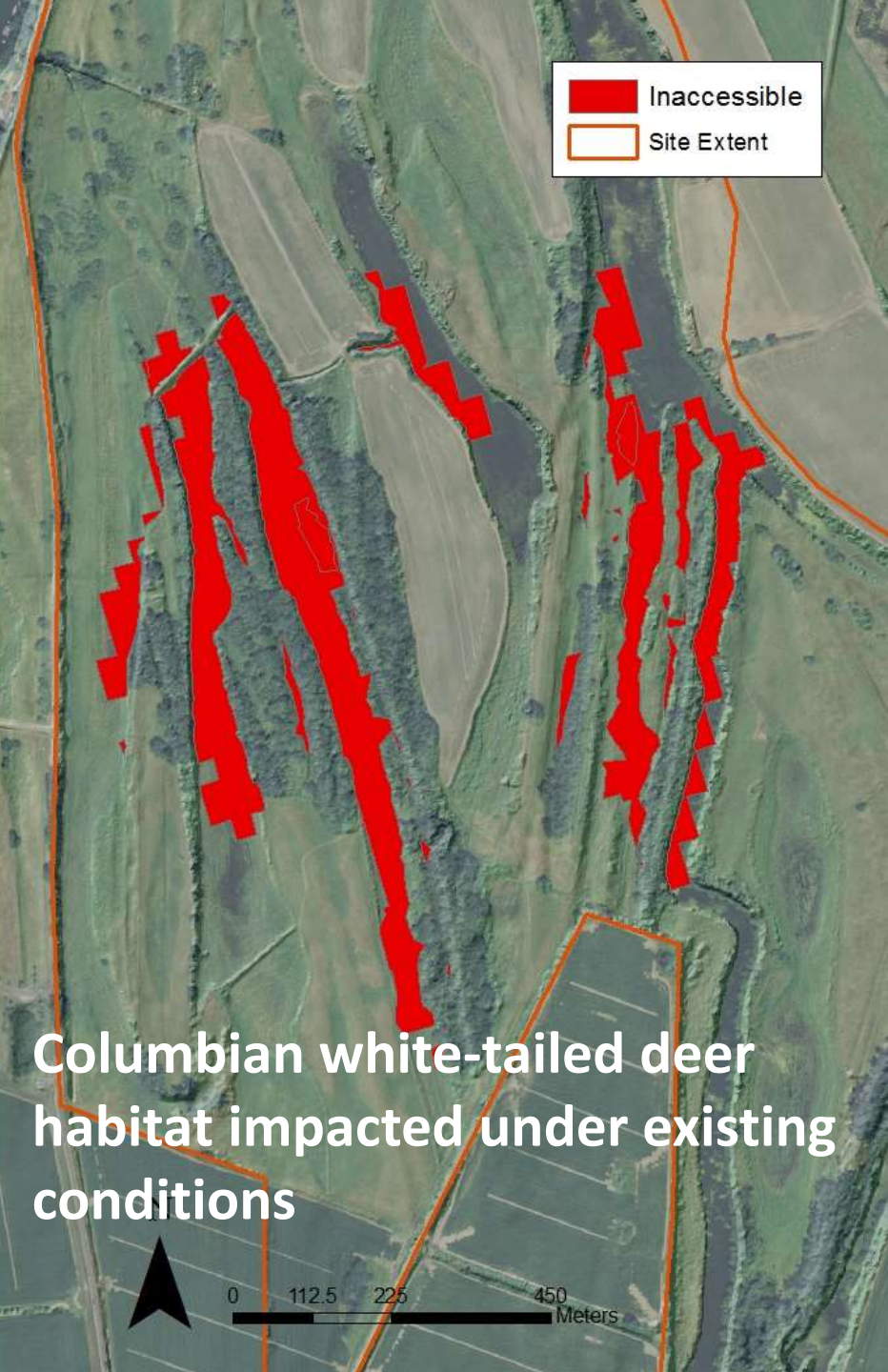
Percent Time Inundated



Vegetation

Vegetation Category	Acres
Open Water	35.3
Native Herbaceous	63.2
Shrub Scrub	130.5
Upland	512.5





Summary

- Coupling a hydraulic model with a ecological model can quantify habitat changed for multiple species related to restoration actions
- A better understanding of how habitat will change at a site can help restoration design and help managers evaluate sites with multi-species objectives



Conclusion



Sandhill Cranes
Yakobson Lake, WA
in March 2010

Questions?

Acknowledgements:

