

Using Hydrodynamic and Ecosystem Models to Predict Habitat Changes at Restoration Sites

Science Work Group Meeting
September 27th, 2016



Multispecies World



Questions

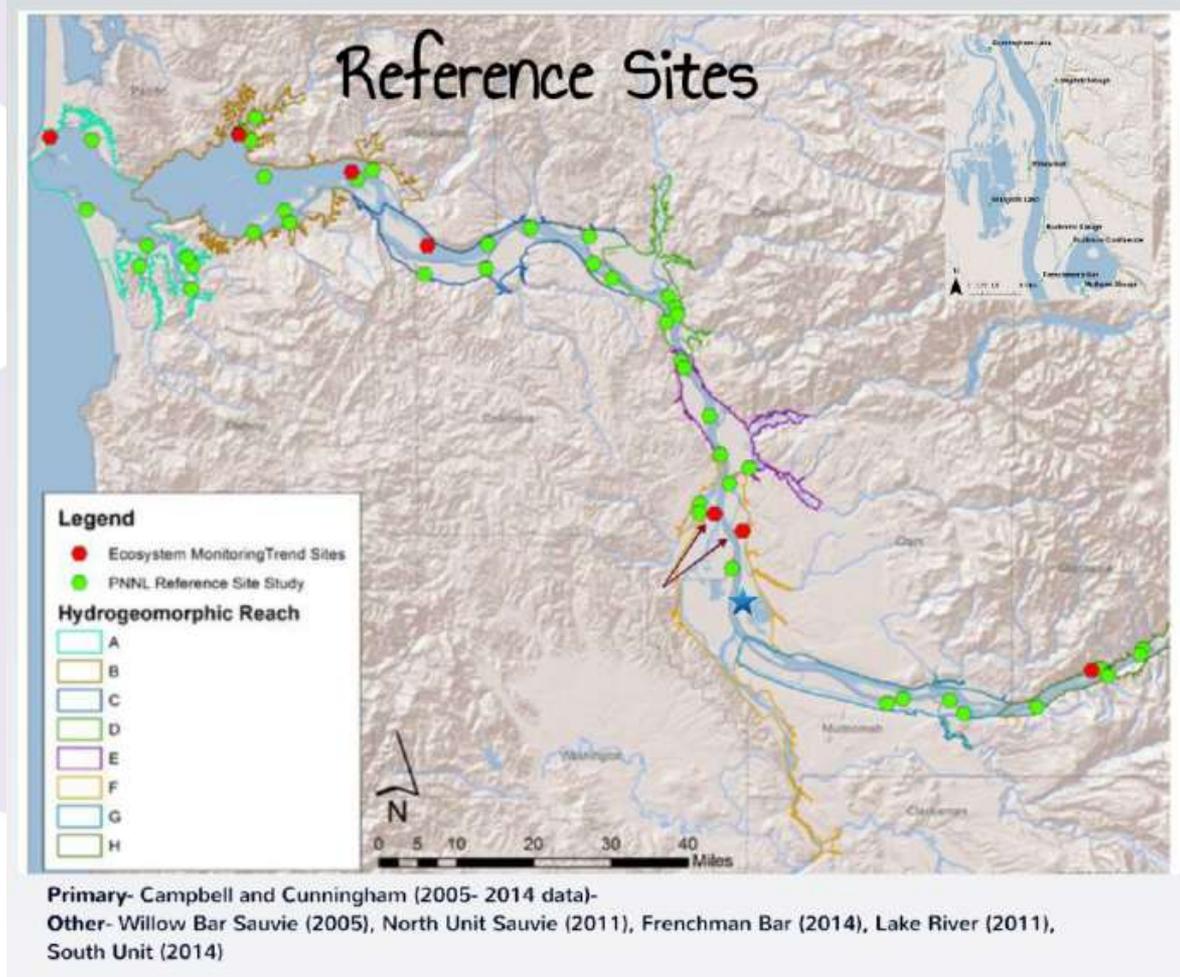
At the South Shillapoo site we wanted to know:

- Would levee breaching negative ley effect current dabbling duck habitat ?
- How much available habitat for juvenile salmonids?
- Would vegetation community change?

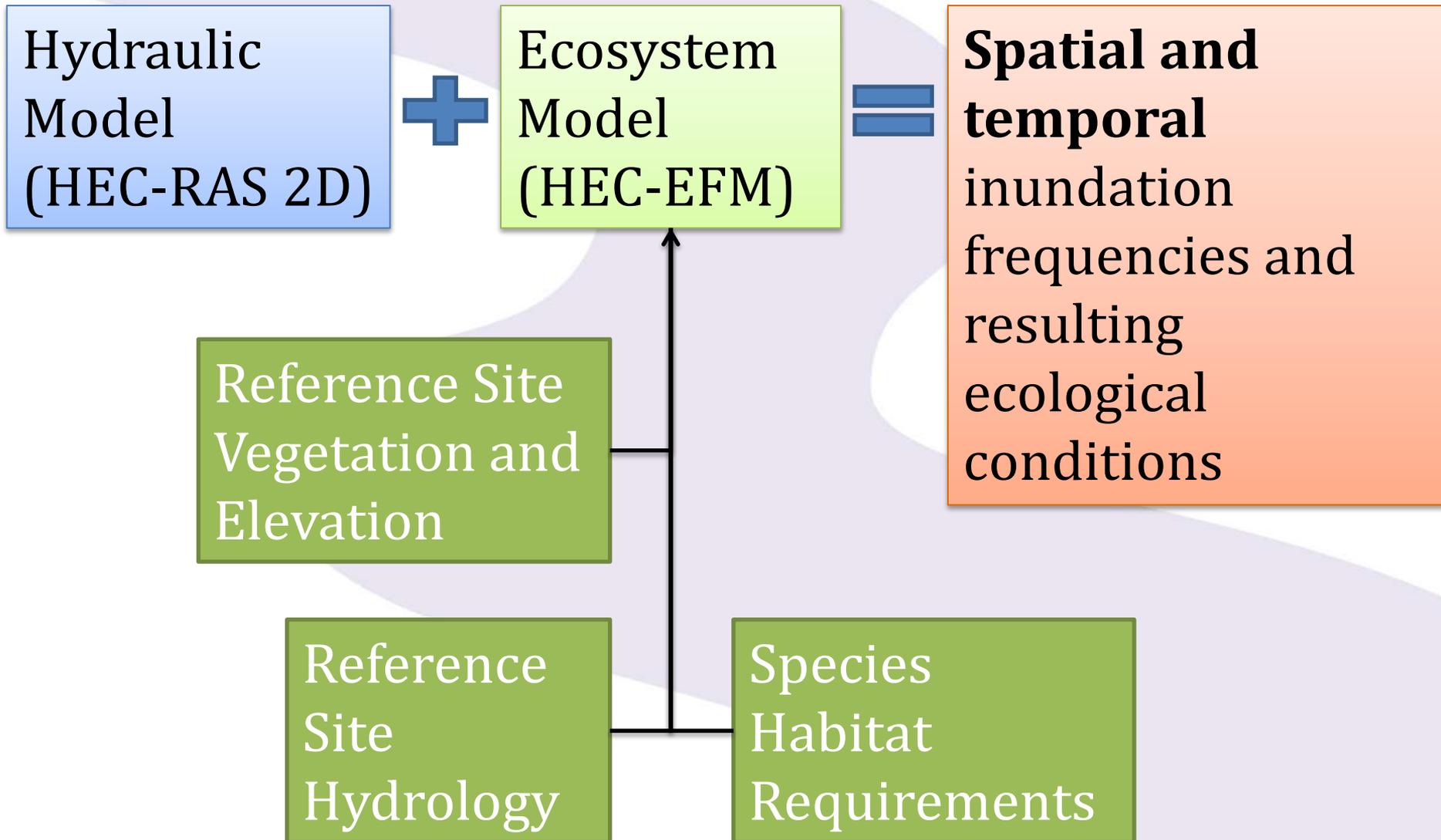


Ecological Functions Model (EFM)

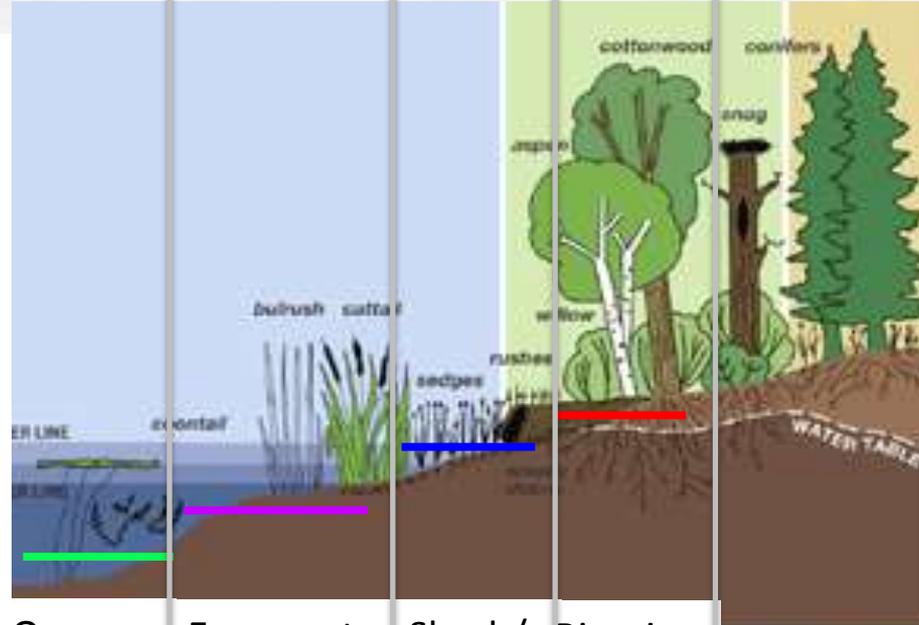
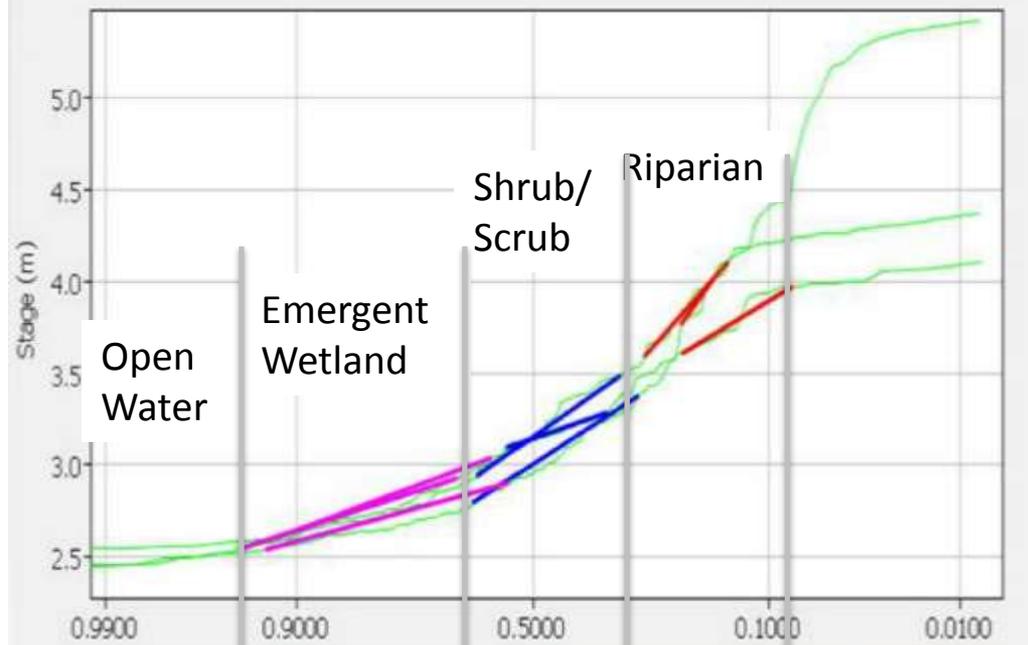
- Ecosystem monitoring & reference site data (LCEP)
- Gage data (USGS)
- Treaty model (USACE)
- Terrain model (USACE)



Basic Approach



Ecosystem Model (HEC-EFM)



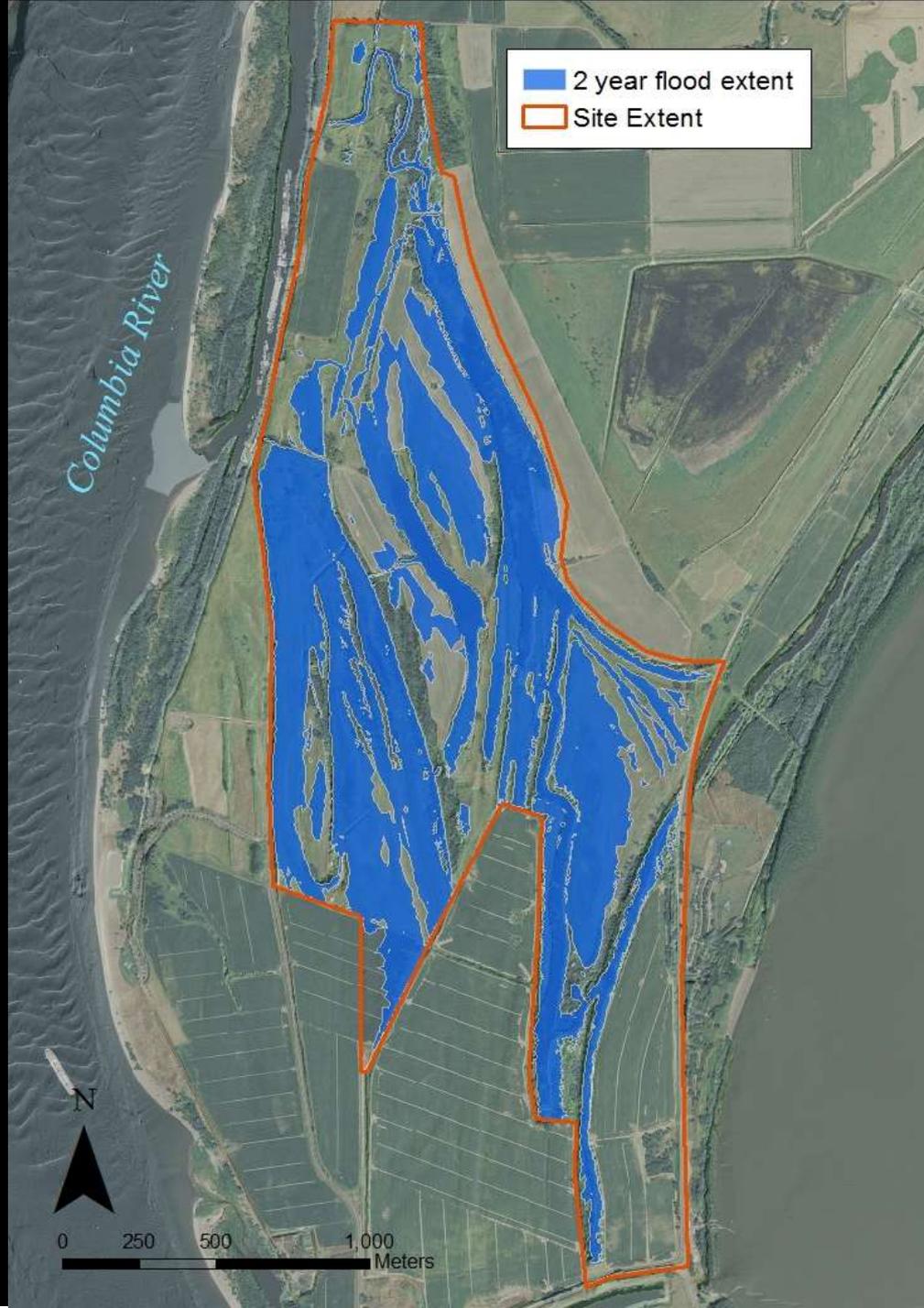
Open Water

Emergent Wetland

Shrub/Scrub

Riparian

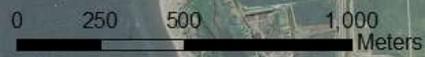
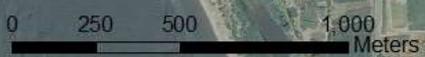
UPLAND



Average Winter .1 -7 ft Depth

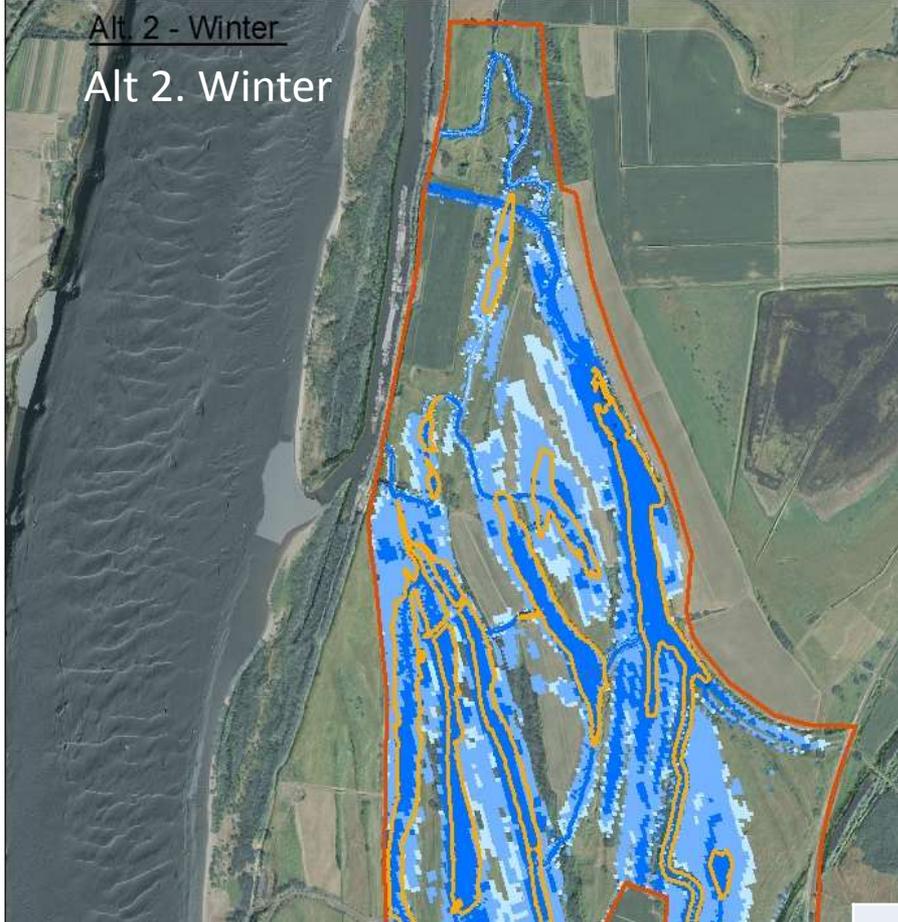


Columbia River



Alt 2 - Winter

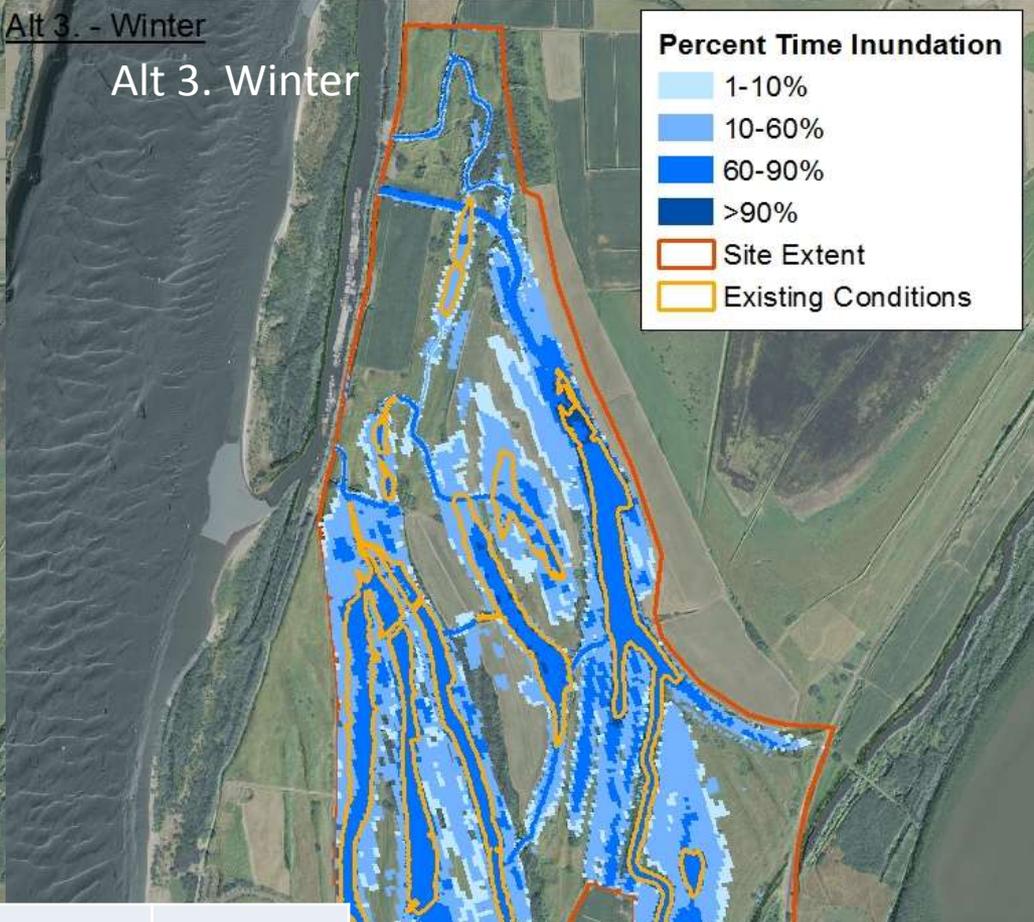
Alt 2. Winter



Waterfowl Habitat Opportunity	Alt. 2 Winter Acres (Dec - Jan)
.1-7 ft	
1-10%	49.5
10-60%	188.5
60-90%	161.5
>90%	0.8
Total	400.3

Alt 3. Winter

Alt 3. Winter



Waterfowl Habitat Opportunity	Alt 3. Winter Acres (Dec - Jan)
.1-7 ft	
1-10%	48.4
10-60%	178.6
60-90%	159.6
>90%	8.25
Total	394.8

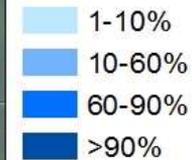
Percent Time Inundation



Alt 2. Spring

Alt 3. Spring

Percent Time Inundation



Site Extent

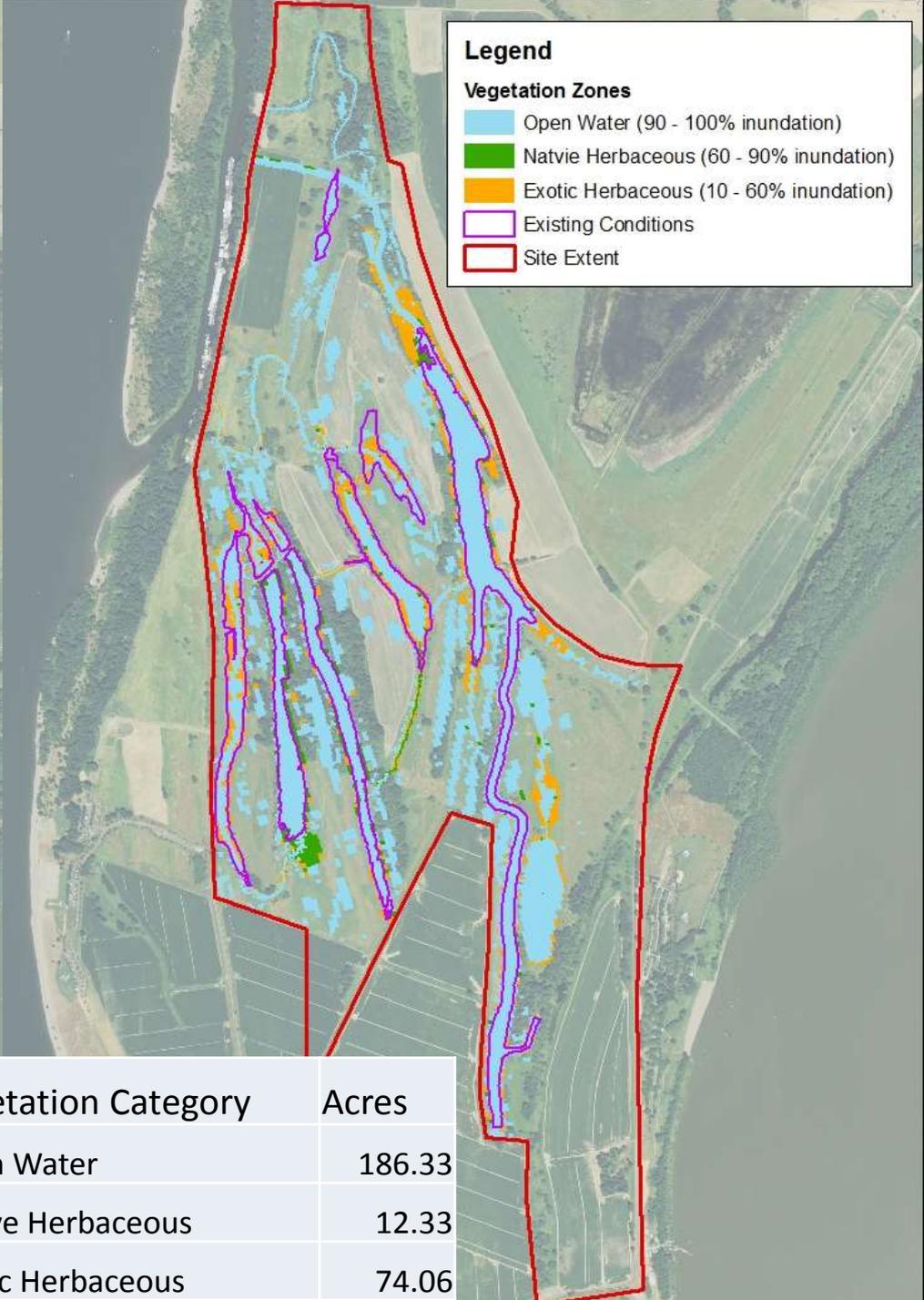
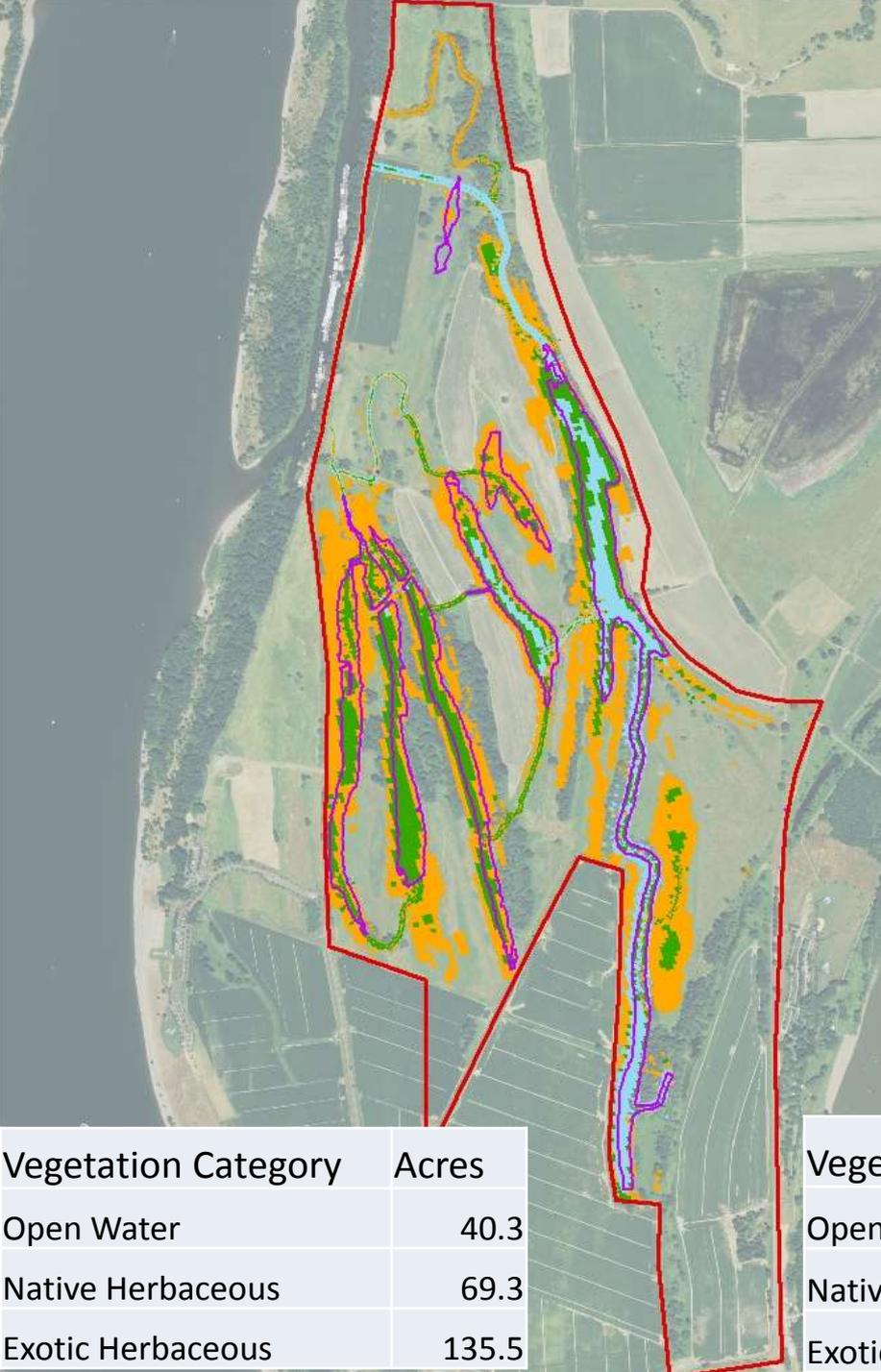
Existing Conditions

Salmon Habitat Opportunity .1-7 ft	Alt. 2 Spring Acres (Feb - Jun)
1-10%	9.9
10-60%	170.3
60-90%	63.8
>90%	17.4
Total	261.4

Salmon Habitat Opportunity .1-7 ft	Alt. 3 Spring Acres (Feb - Jun)
1-10%	0.2
10-60%	72.9
60-90%	28.7
>90%	150.45
Total	252.3

1,000 Meters

1,000 Meters



Legend

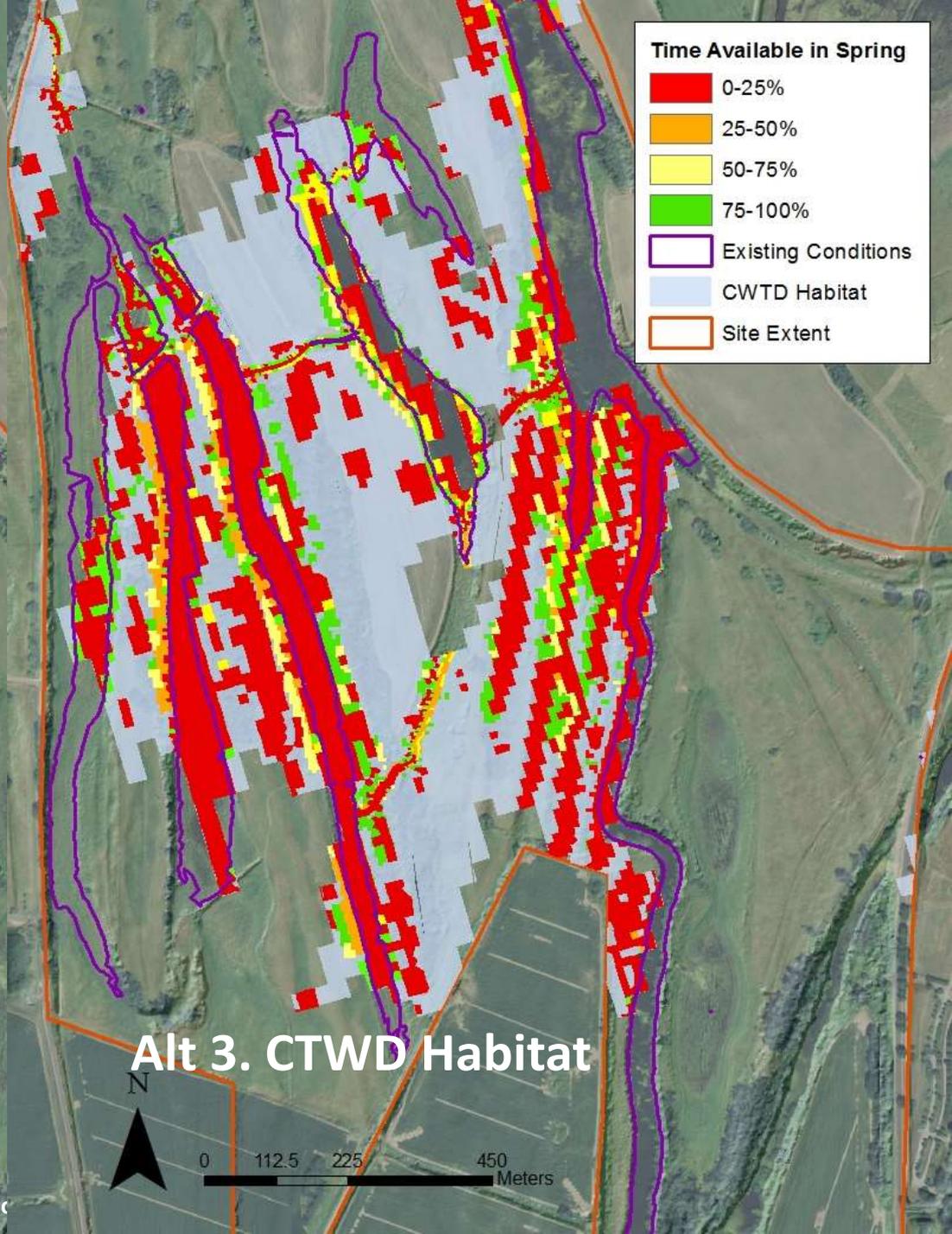
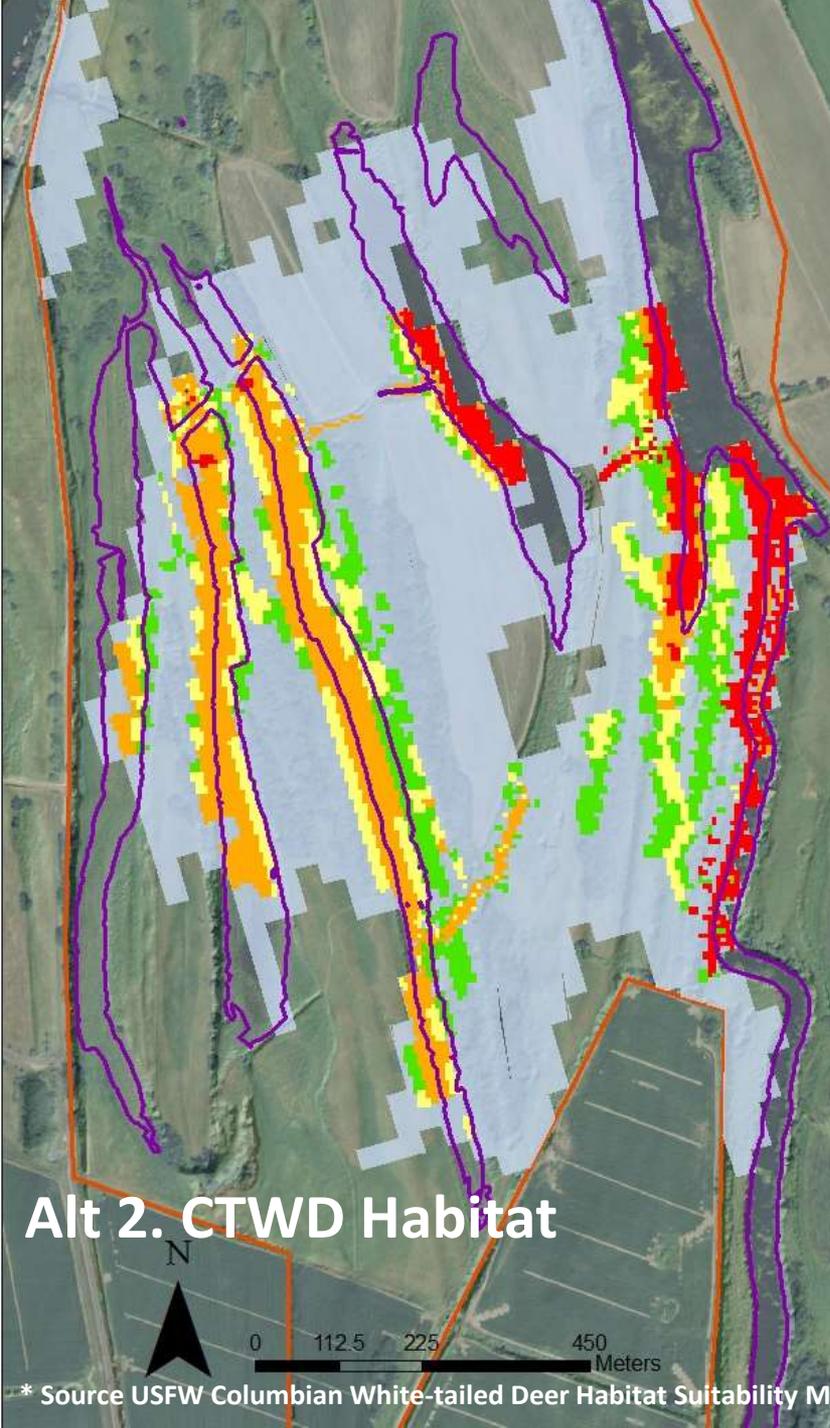
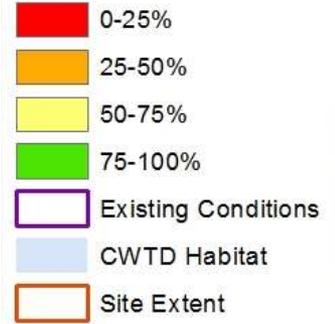
Vegetation Zones

- Open Water (90 - 100% inundation)
- Native Herbaceous (60 - 90% inundation)
- Exotic Herbaceous (10 - 60% inundation)
- Existing Conditions
- Site Extent

Vegetation Category	Acres
Open Water	40.3
Native Herbaceous	69.3
Exotic Herbaceous	135.5

Vegetation Category	Acres
Open Water	186.33
Native Herbaceous	12.33
Exotic Herbaceous	74.06

Time Available in Spring



* Source USFW Columbian White-tailed Deer Habitat Suitability M...

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



Questions and Discussion

