

Observations of Large Woody Debris at Reference Sites in the Lower Columbia River

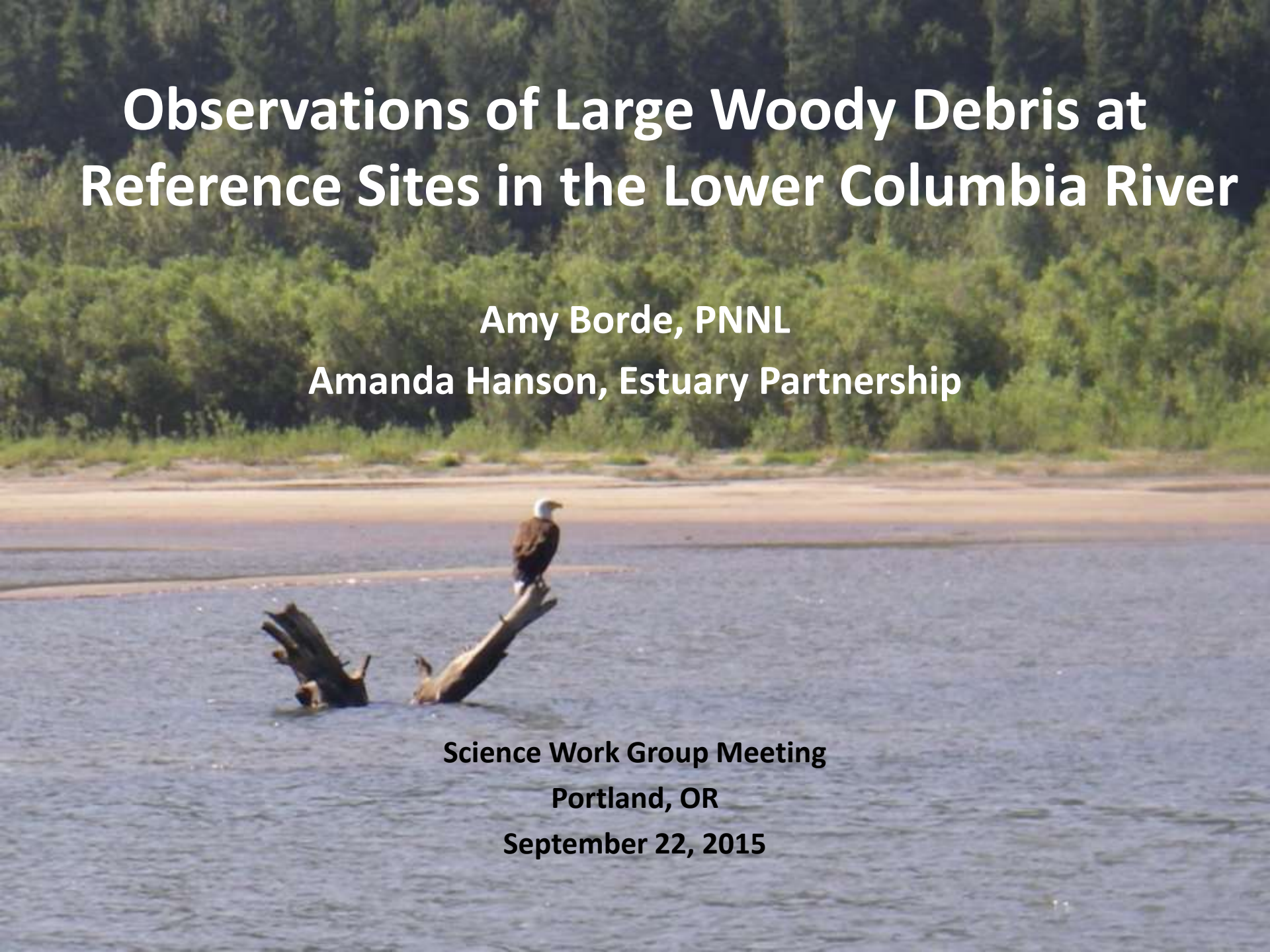
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Importance of LWD

- Drives physical, ecological processes
 - Channel morphology and floodplain-channel dynamics
 - Development of aquatic habitat mosaic
- Biological benefits
 - Complexity and cover
 - Salmon prey resources (e.g., aquatic insects)
 - Complex microhabitats for lower trophic organisms
 - Colonization surfaces for primary/secondary producers
- Availability and influence of LWD - ecosystem structure and function

Changes to LWD in the Columbia River

- Pre-European settlement:
 - LWD structure evolved with geomorphology, ecology and connectivity between mainstem/floodplain
 - River was channelized (shoals/sand bars), channels shallow and dynamic
 - Large LWD structures (e.g., snags, jams)
- Reduced LWD recruitment in basin
 - River/land management practices (logging, flood plain conversion)
 - Large-scale wood removal efforts (navigation, settlement)
 - Reduction in floodplain connectivity (diking)
 - Fragmentation of river (dam construction)
 - Flow regulation decreases recruitment of stored wood at channel margins
 - Removal of logs for timber sales, firewood, fishing

Current State of LWD in Lower Columbia River

- Fewer/smaller pieces of LWD delivered to lower river
- “Supply chain” from upland habitats to channels is nearly diminished
- Likelihood of LWD aggregations is lower
 - Current river morphology differs from historical
 - Large “key” pieces are scarce
 - Majority of LWD is likely flushed through system quickly due to simplified/deepened channel
- LWD uncertainties
 - Natural feature in tidal marshes?
 - Transitory/moveable structure?
 - Densities in tidal habitats?
 - Benefits to salmon?

Ilwaco Slough

Baker Bay, Rkm 6 (Reach A)

February 2014



February 2015



**Mouth of
Chinook River**
Rkm 12 (Reach A)



Mouth of the Chinook River

August 2009



Mouth of Chinook River

June, August 2008, November 2010



Secret River

Rkm 37, Reach B

August 2008



Secret River

December 2011



Secret River

Three regions of LWD accumulation:

- Channel
- High Marsh
- Along tree line



Secret River

Three regions of LWD accumulation:

- Channel
- High Marsh
- Along tree line



Secret River

Three regions of LWD accumulation:

- Channel
- High Marsh
- Along tree line



Secret River - 2009



Secret River - 2012



Secret River - 2014



Quinn Island
Rkm 52 (Reach B)
April 2014



Welch Island
Rkm 56 (Reach B)
May 2014



Jackson Island

Birnie Slough, Rkm 71 (Reach C)

July 2010



Whites Island

Rkm 72 (Reach C)

~200 m from mainstem



Whites Island



Whites Island - 2005



Whites Island - 2010



Whites Island - 2012



Wallace Island
Rkm 77 (Reach C)
September 2007



Reach C
September 2007



Bradbury Slough
Rkm 91
March 2009



Prescott Slough
Rkm 107 (Reach D)
November 2010



Goat Island
Rkm 131 (Reach E)
November 2010

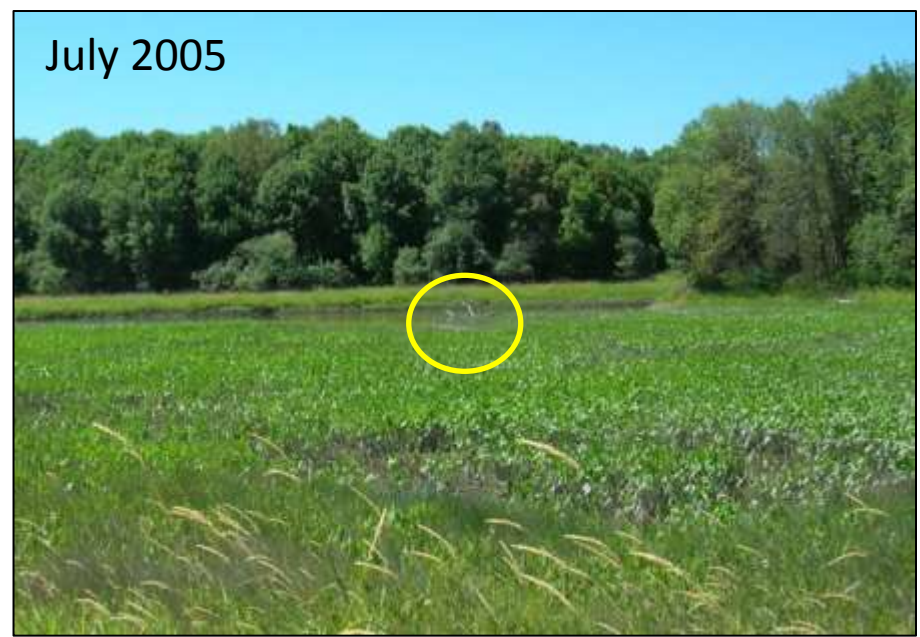


Burke Island
Rkm 131 (Reach E)
July 2011, 2012



Campbell Slough
Rkm 149 (Reach F)

July 2005



May 2014



February 2012



Crooked Creek
Rkm 37 (Reach B)

June 2010



August 2009



Westport Slough

Rkm 73 (Reach C)

July 2010



Coal Creek
Rkm 98 (Reach C)

July 2008



August 2009



August 2009



Gee Creek

Rkm 141 (Reach F)

July 2010



Summary

- Recruitment is certainly less than historical levels, but still occurs as follows:
 - in relatively undisturbed tidal habitats in the lower Columbia River
 - in depositional areas along the high tide line
 - in or near forested areas, which act as a source
- LWD persists at emergent wetland sites for many years.
- Some movement of LWD occurs at reference sites, likely under high flows.
- LWD is present more frequently in the lower estuary, with few observations upstream of Sauvie Island.
- Densities of LWD in emergent marshes is currently uncertain.