Restoring Floodplain Processes on the Upper Willamette River

Troy Brandt, Fisheries Biologist
Chris Smith, PE
Pete Gruendike, Fisheries Biologist
Russell Bartlett, PE

RDG RIVER DESIGN GROUP

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- Property Owners
  - U.S. Fish & Wildlife Service
  - Oregon Parks and Recreation Department
  - Sponsors and private landowners

Willamette River Limiting Factors

- Impaired physical habitat from past and/or present land use practices
- Impaired access to off-channel habitat
- Reduced macrodetrital inputs from near elimination of overbank events and separation of the river from its floodplain
- Reduced peak flows leading to decreased channel complexity and diversity of fish habitat by reducing channel movement that is important for recruitment of gravel and large wood, and maintaining varying seral stages of riparian vegetation.

Willamette BiOp 2008

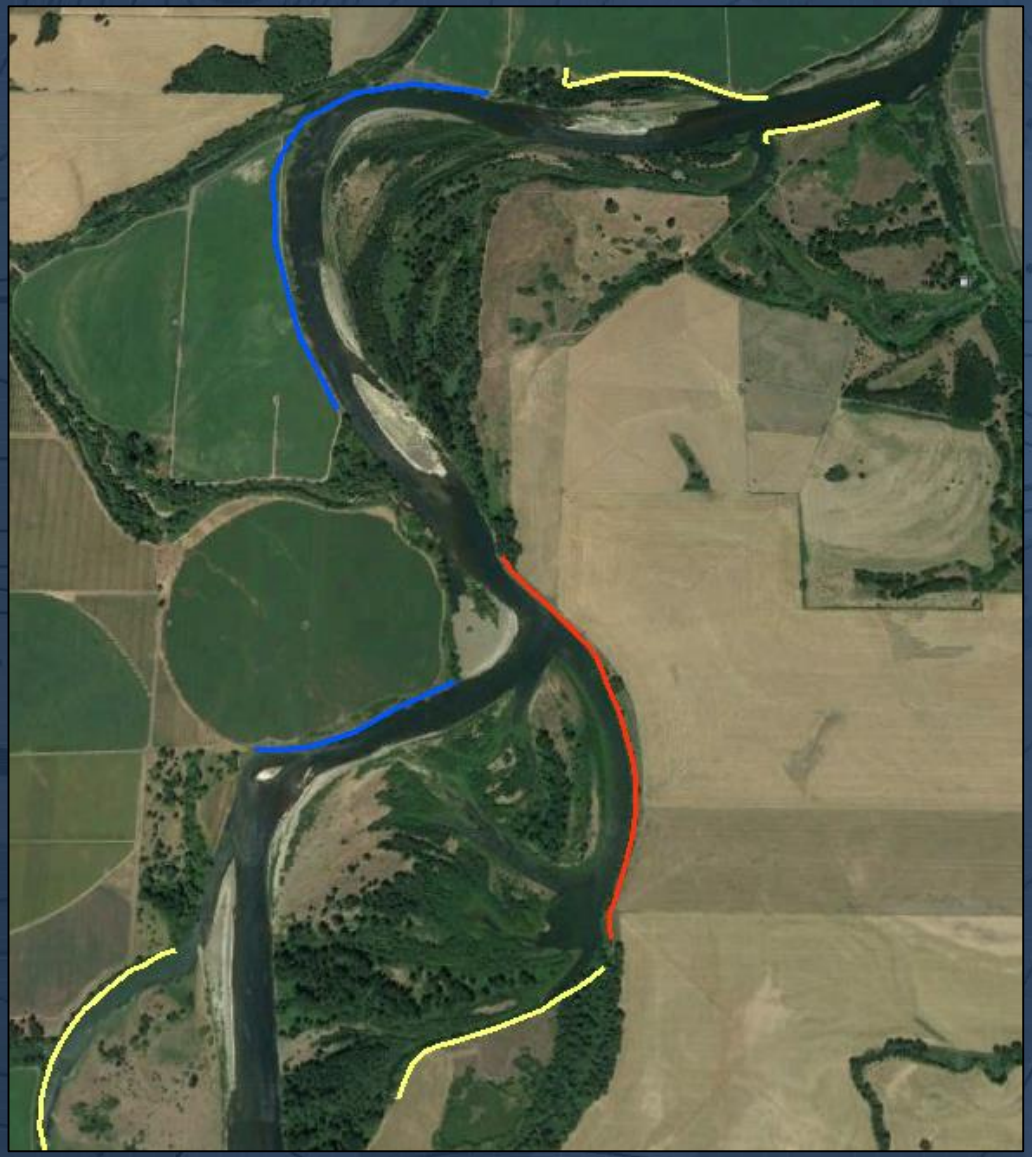
Off-channel Habitats

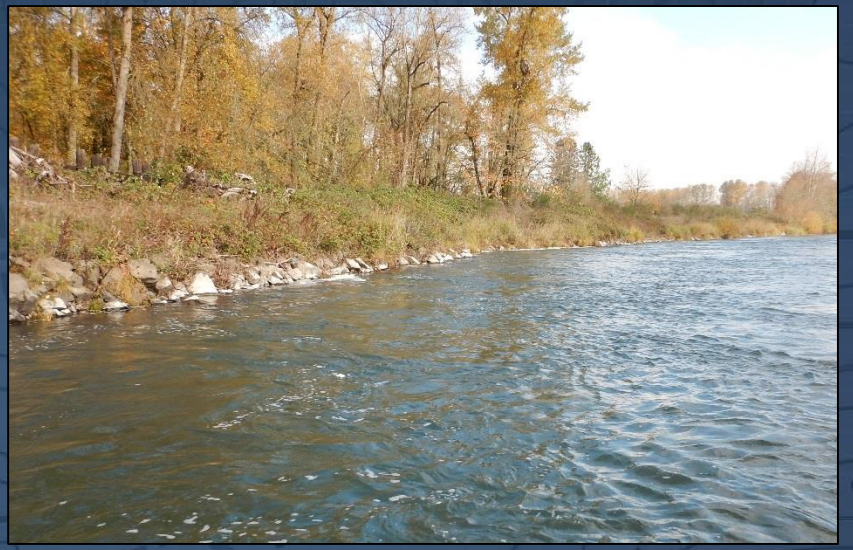
- Off-channel habitat use
  - Summer refuge - cold water
  - Winter refuge - velocity
  - Predator avoidance
  - Resource availability

Life History Stage	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Upstream migration												
Spawning in tributaries												
Intragravel development												
Juvenile rearing												
Juvenile out-migration												

Note: Light vertical-line shading represents low-level abundance; darker horizontal-line shading represents high abundance, and white represents rare or absent. After USACE 2000.

Floodplain Modifications





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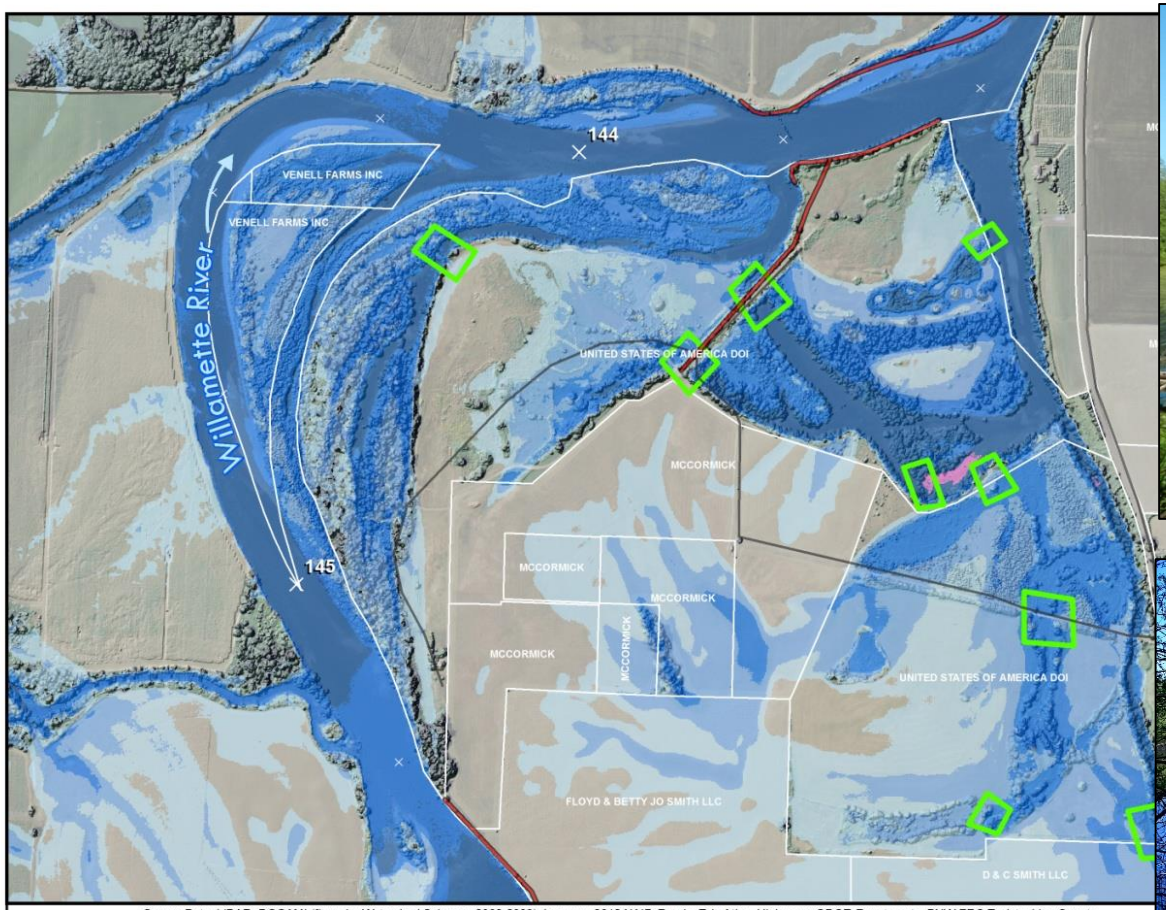
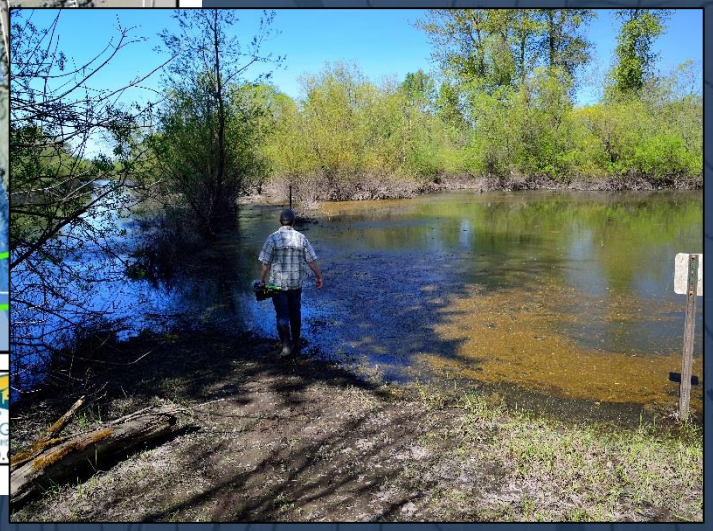
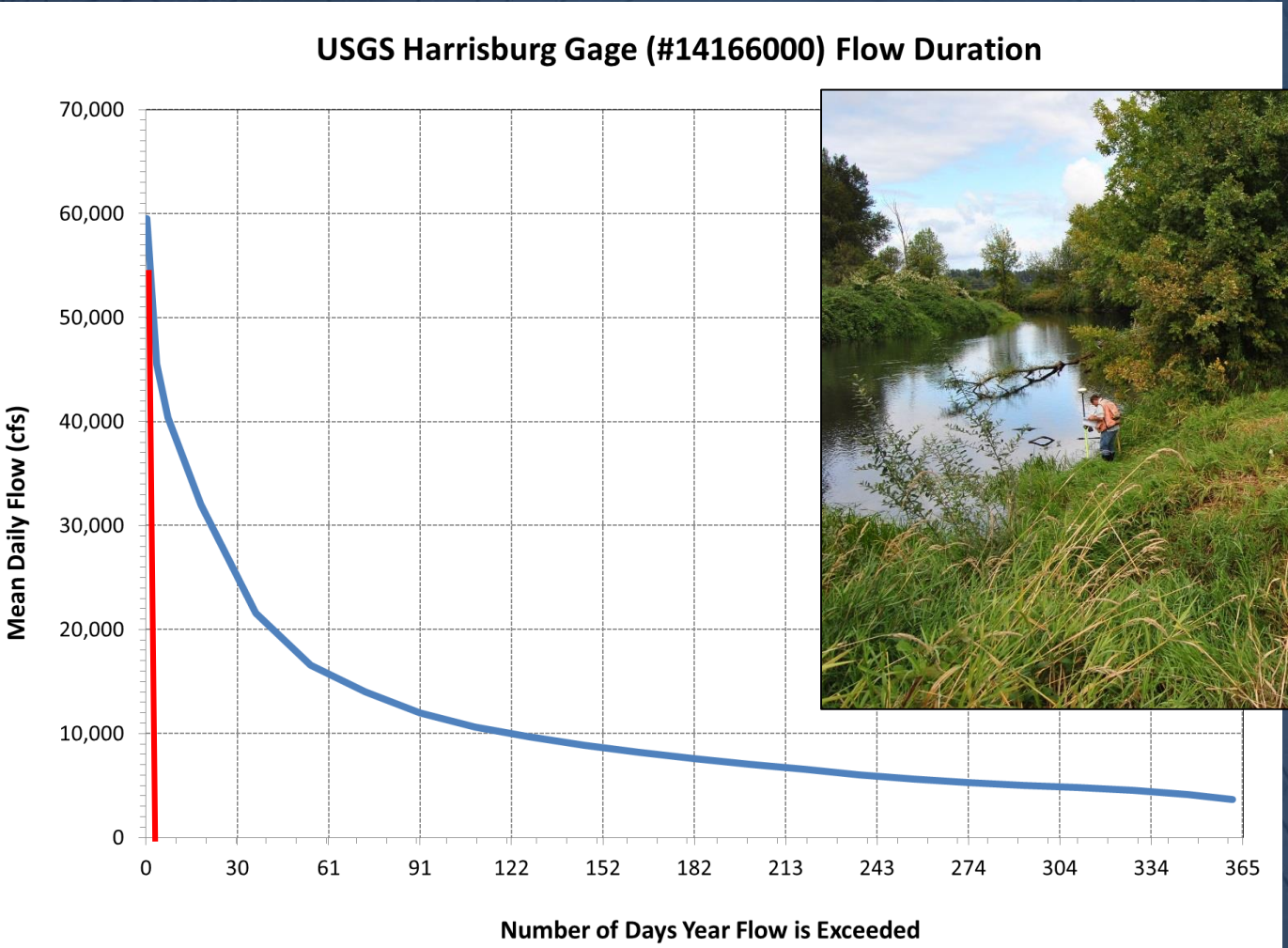




Winter Connections

- Remove blockages to improve access



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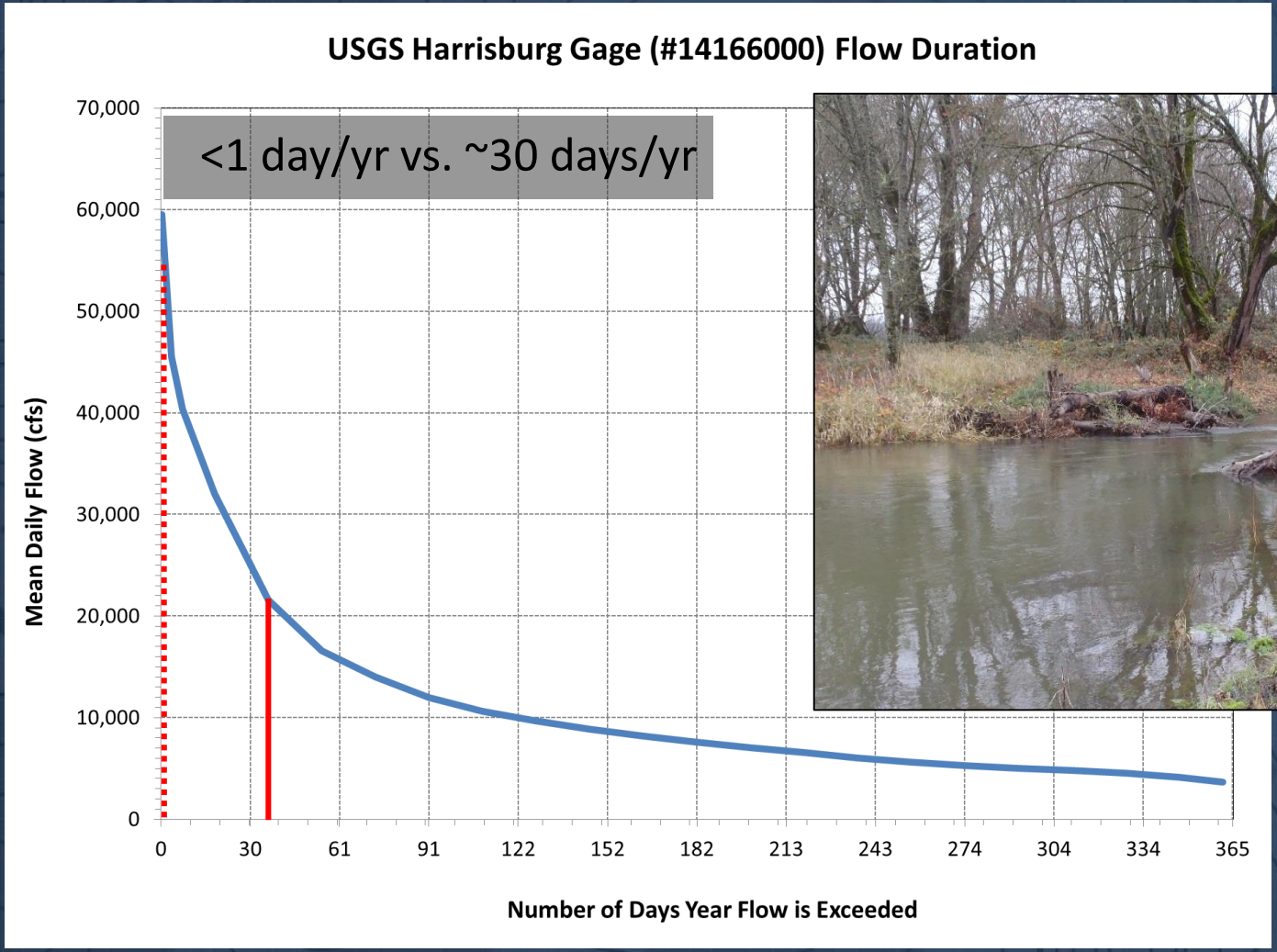
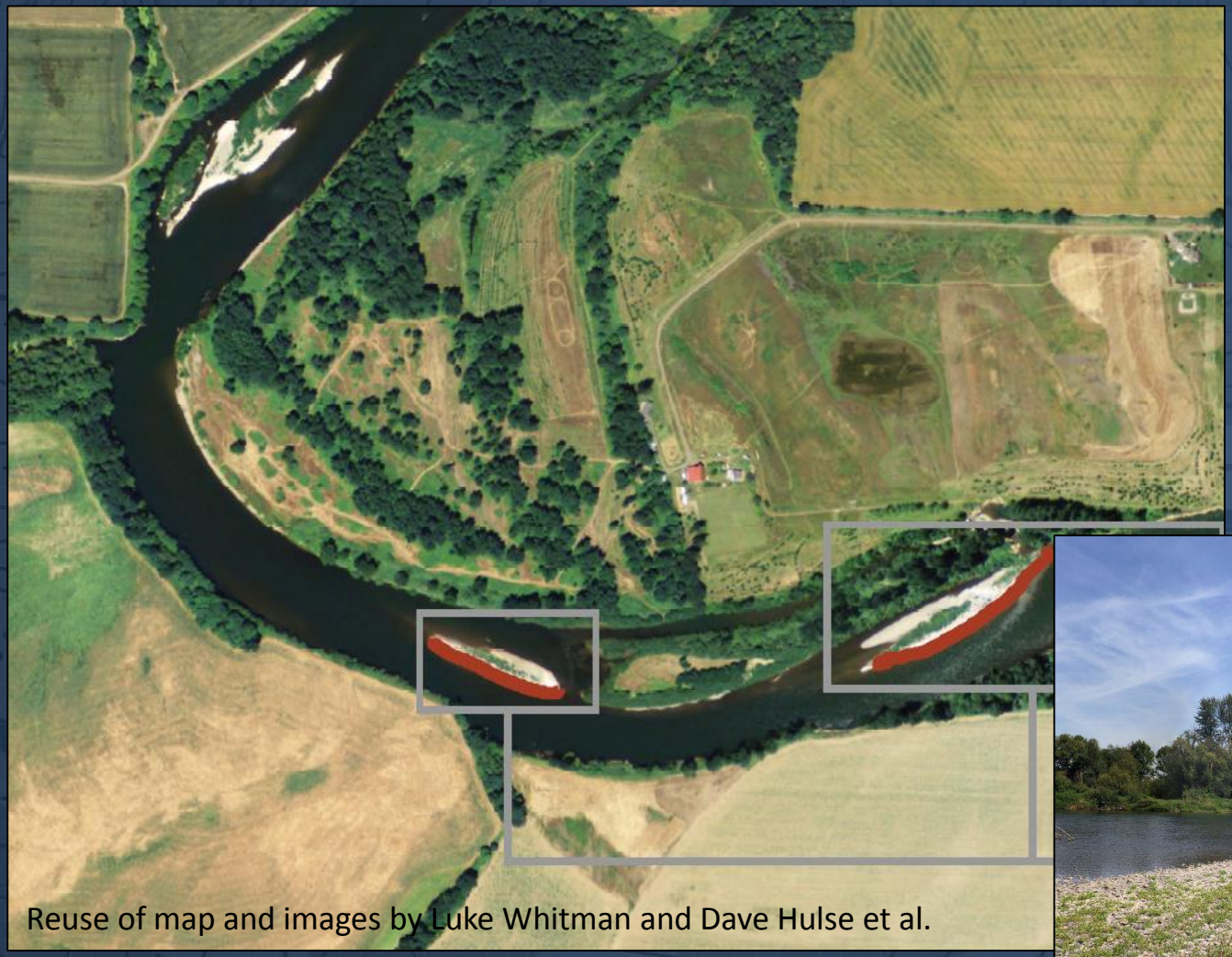


Summer Connections

- Remove obstructions
- Minimize flow through connections

Juvenile Chinook Summer Habitat

- Inside bends
- 1/3 gravel

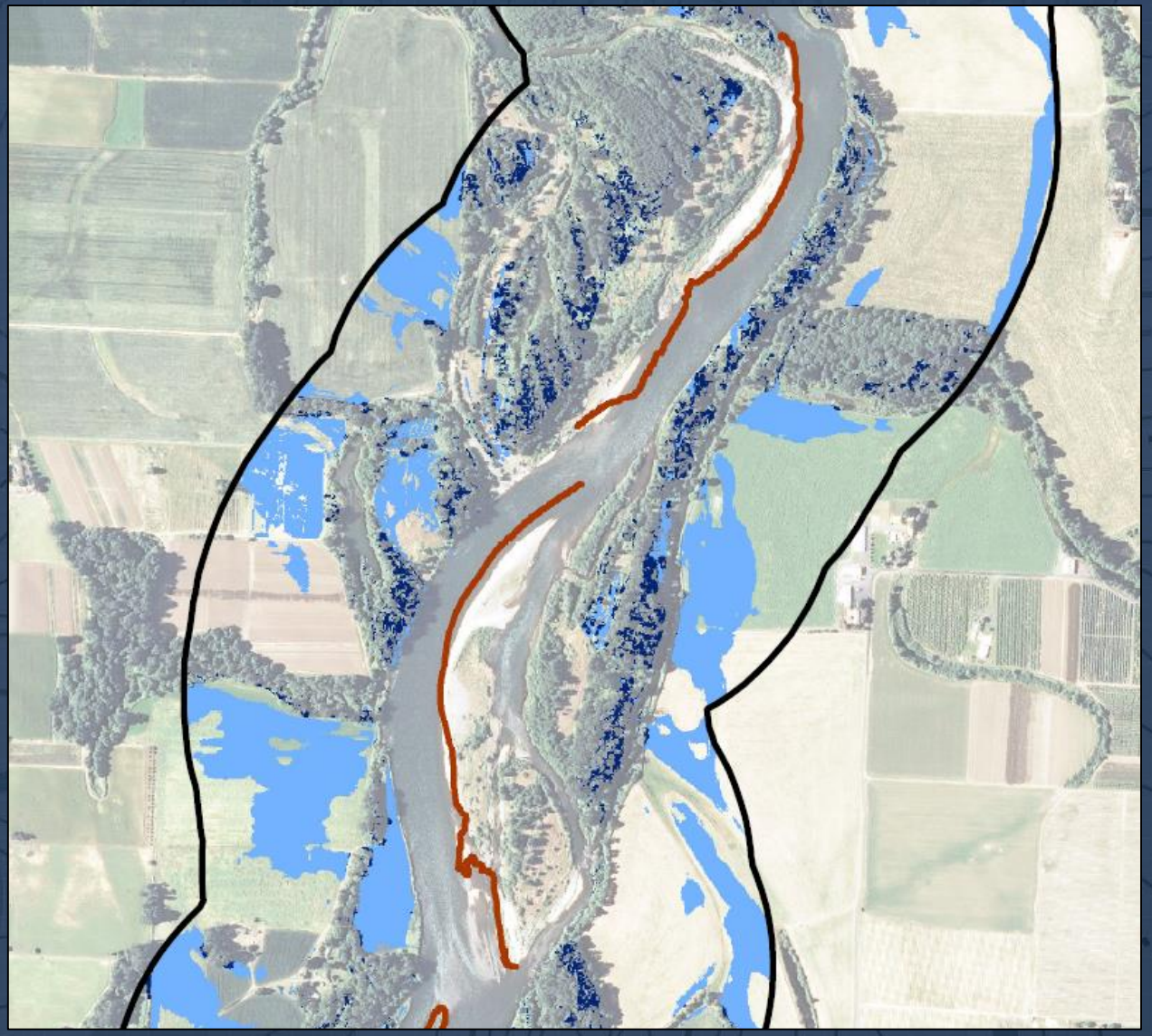


Reuse of map and images by Luke Whitman and Dave Hulse et al.

Doug Heiken

Restoration Opportunities

- Floodplain habitat near good summer habitat
- Identify areas for restoration and conservation



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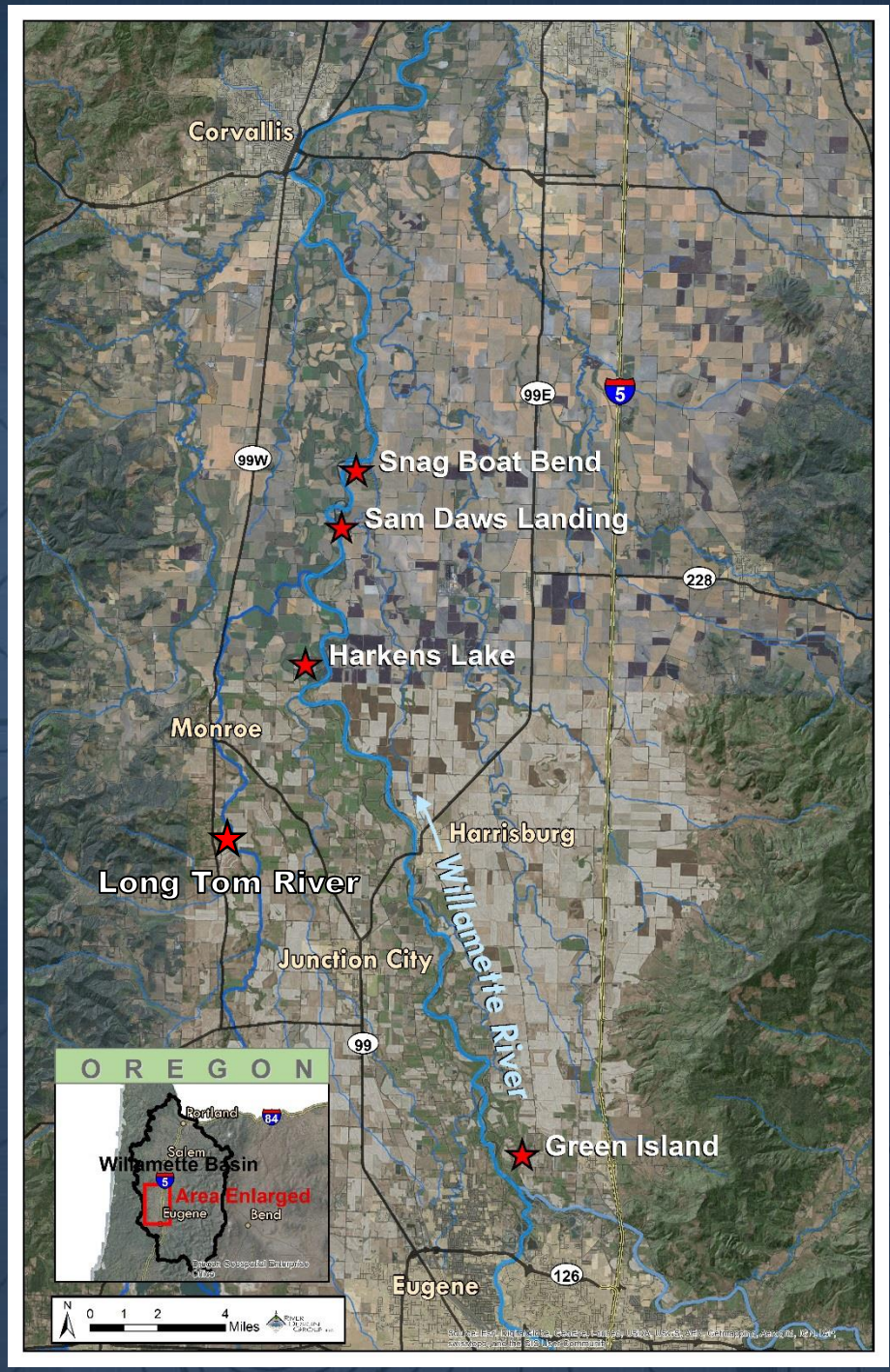
River Corridor Restoration Goals

- Restore connectivity – seasonal, multi-directional
- Meet landowner needs – uncertainty and risk
- Meet funding constraints

- Considerations
  - Connect at high flows, disconnect at low flows
  - Prioritize access to cold water sites
  - Habitat enhancement?
  - Riparian structure?

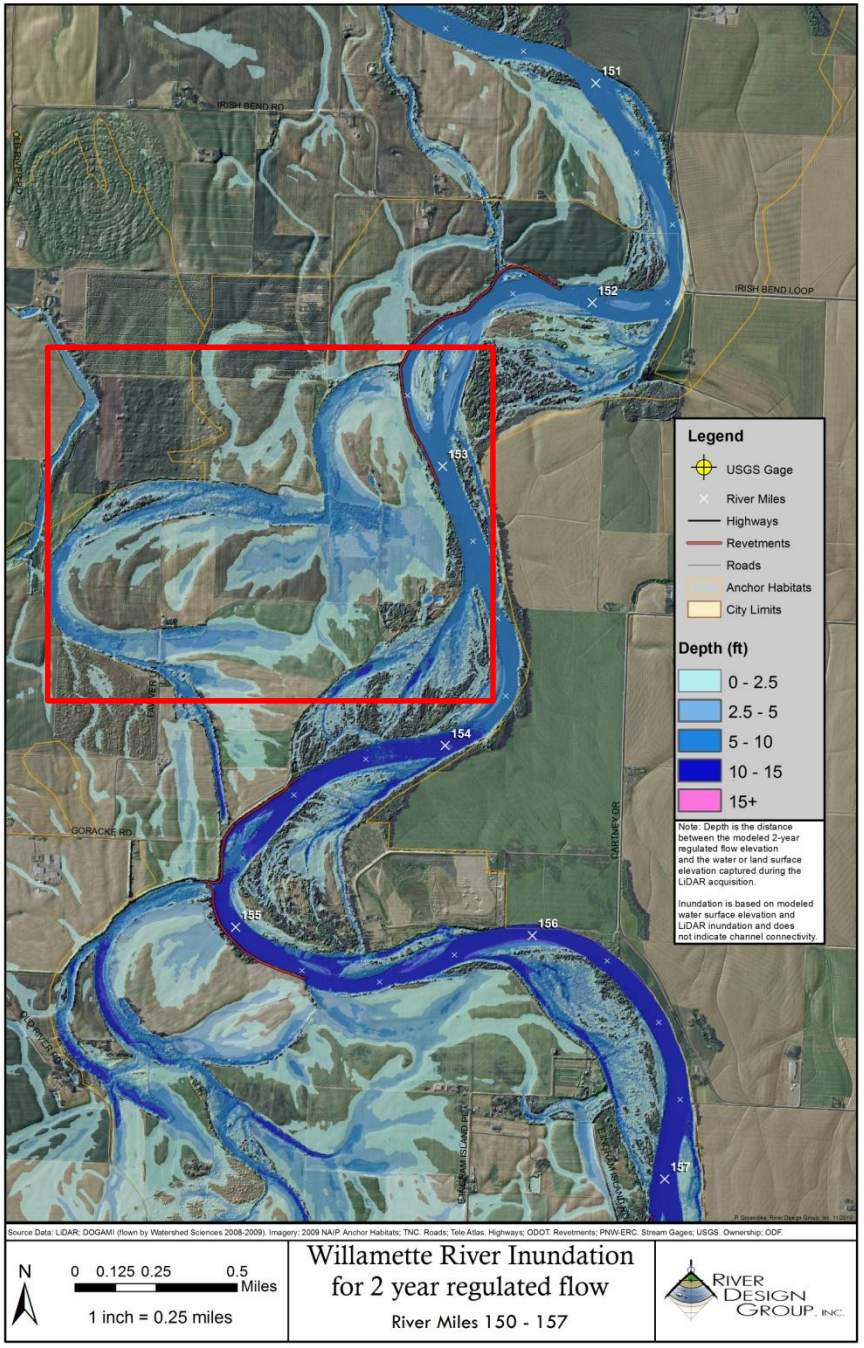
Project Areas

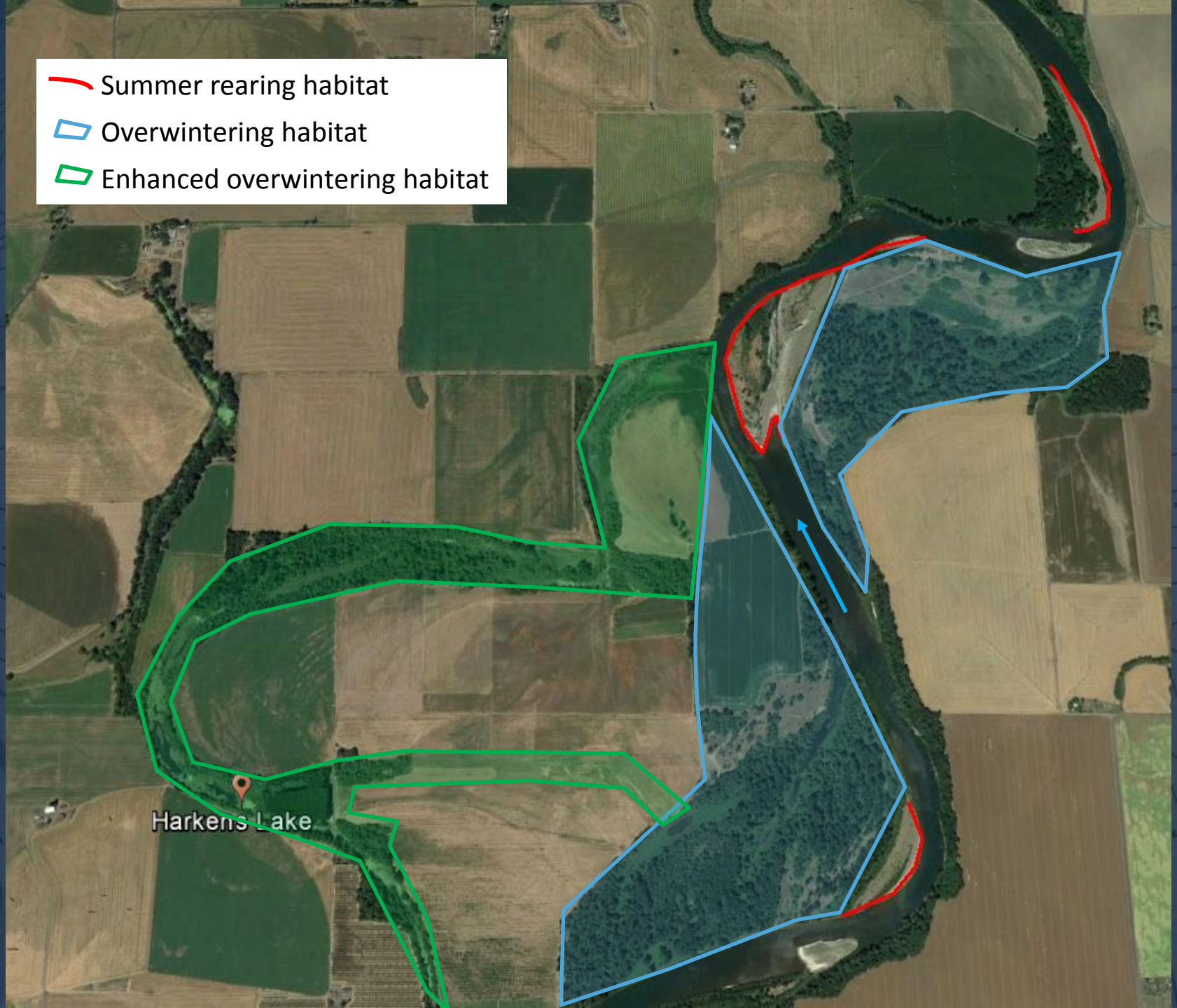
- Harkens Lake
- Sam Daws Landing
- Snag Boat Bend
- Long Tom River



Harkens Lake

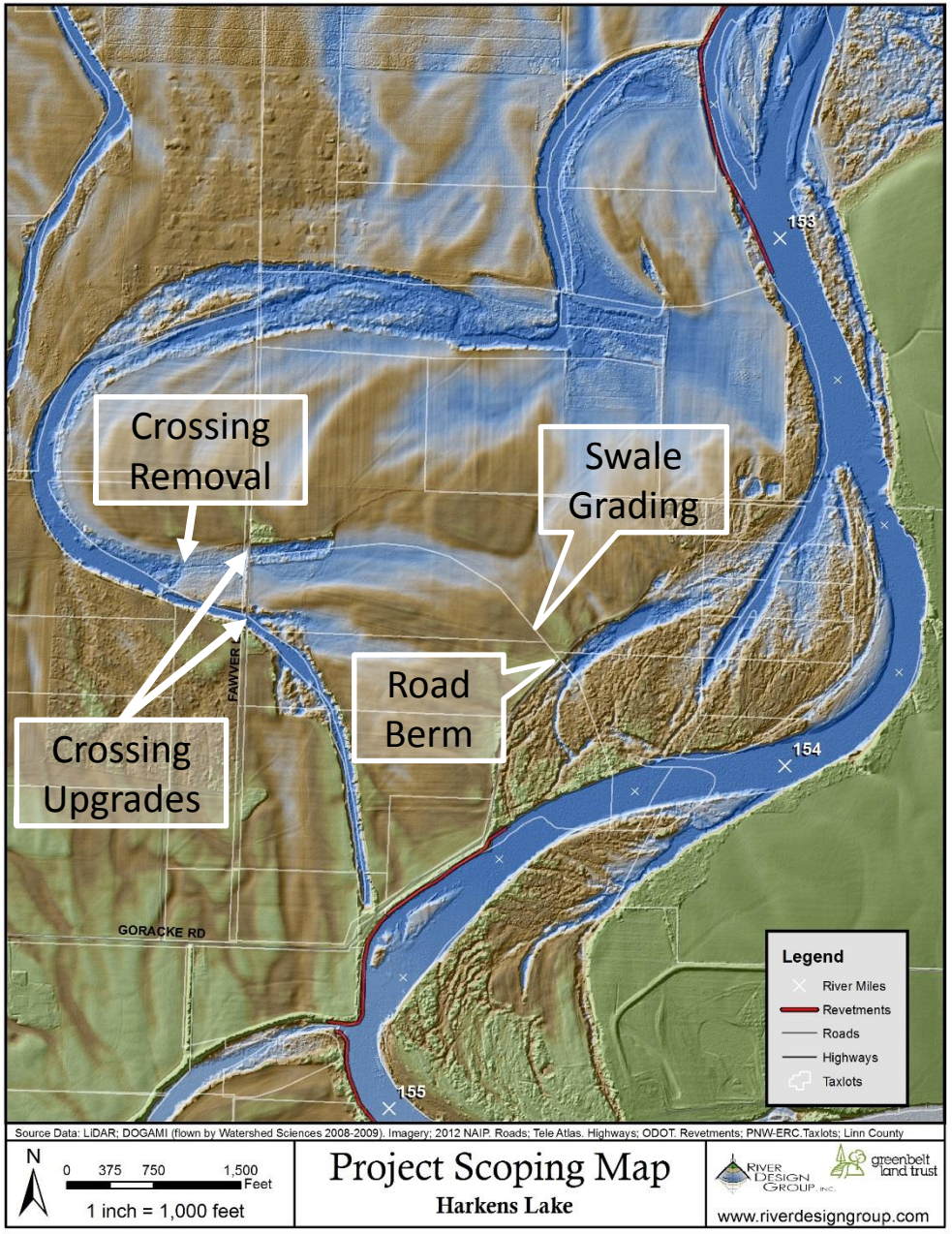
- Relic side channel
- Conservation easement
- Floodplain reforestation




Summer rearing habitat
Overwintering habitat
Enhanced overwintering habitat
Harkens Lake

Project Elements

- 3 crossings
- Road berm and swale



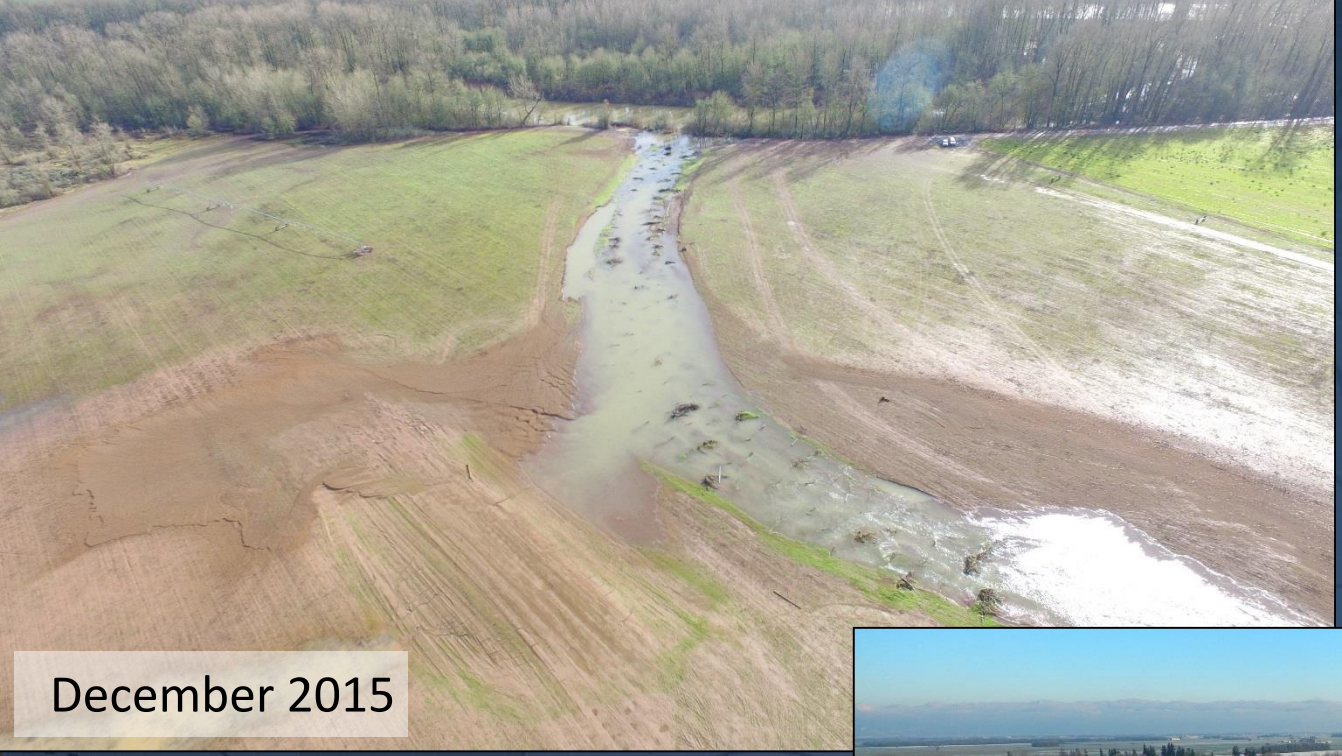
Crossings

Road Berm and Swale

- Remove berm and grade floodplain swale
  - >75,000 cfs vs. 32,000 cfs
  - <1 d/yr vs. ~21 d/yr


Former Berm/New Inlet


Road Berm



December 2015

December 2016

- Connection Periods
  - Target: 20 days
  - 2016 WY – 20 days
  - 2017 WY – 2 days

December 2015

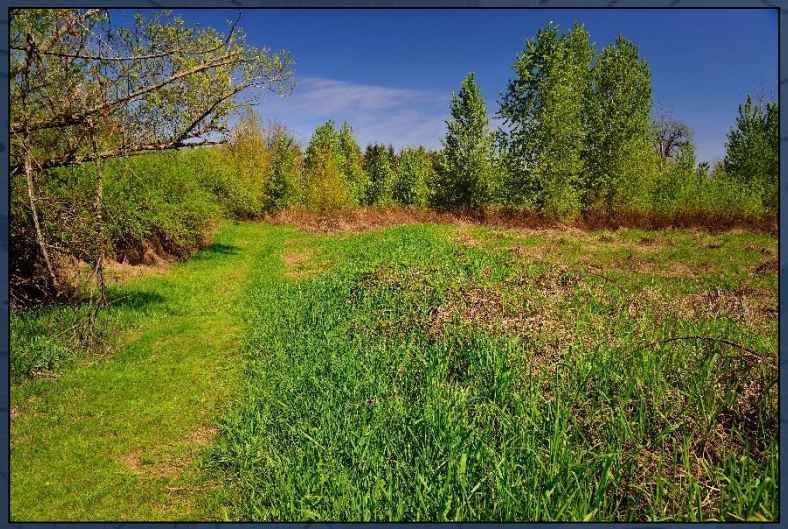
- Connection Periods
  - Target: 20 days
  - 2016 WY – 20 days
  - 2017 WY – 2 days

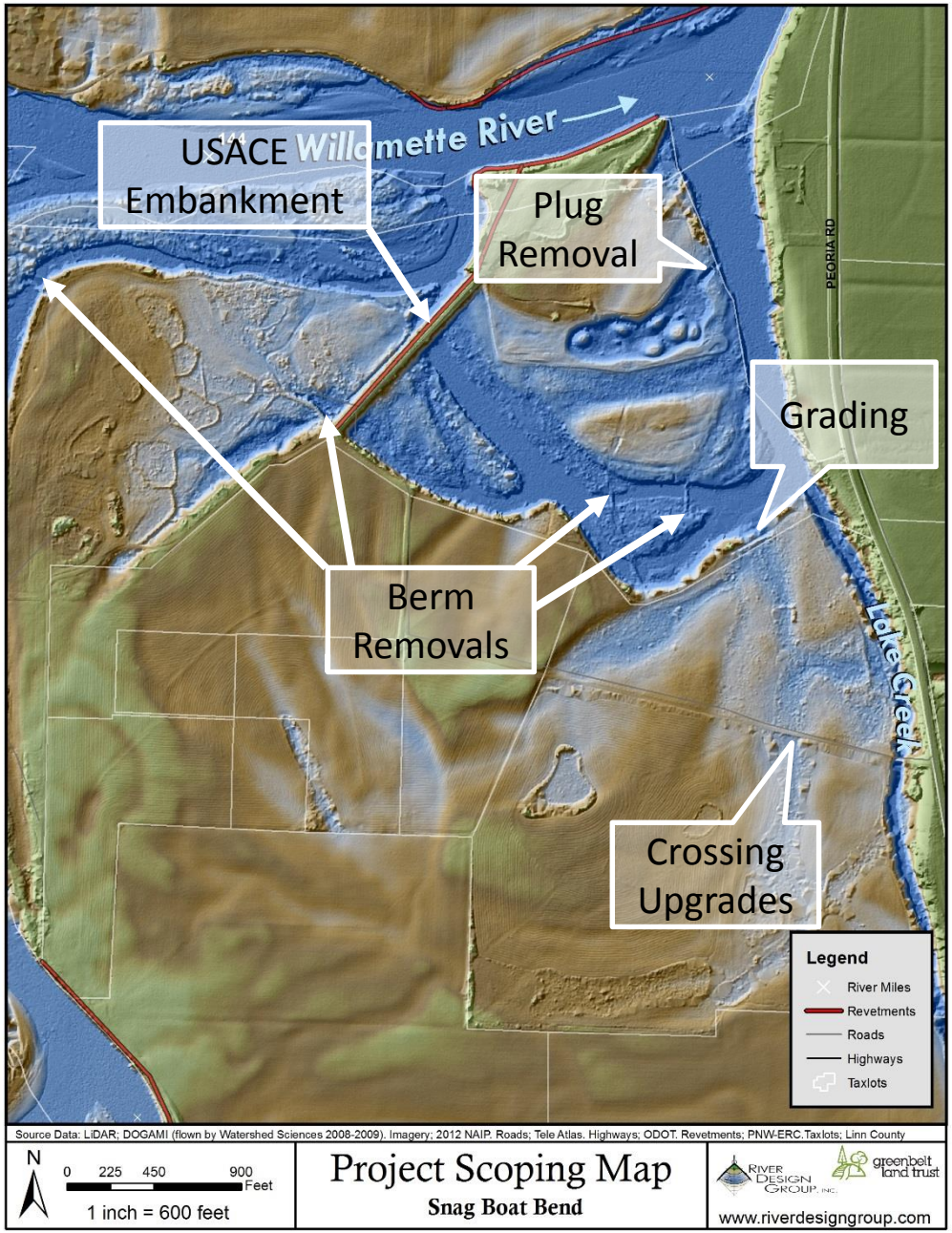
December 2016

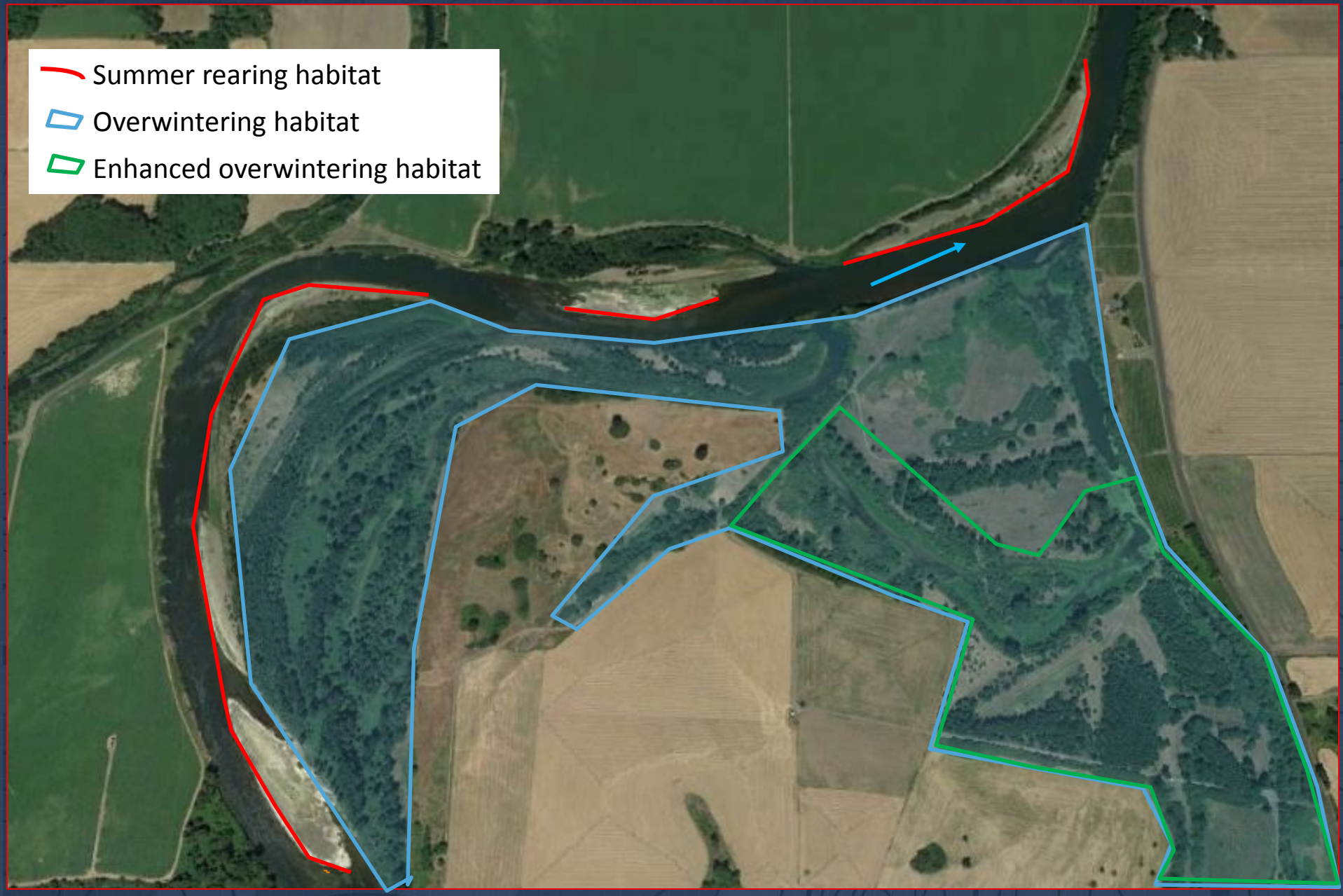
Swale

Snag Boat Bend

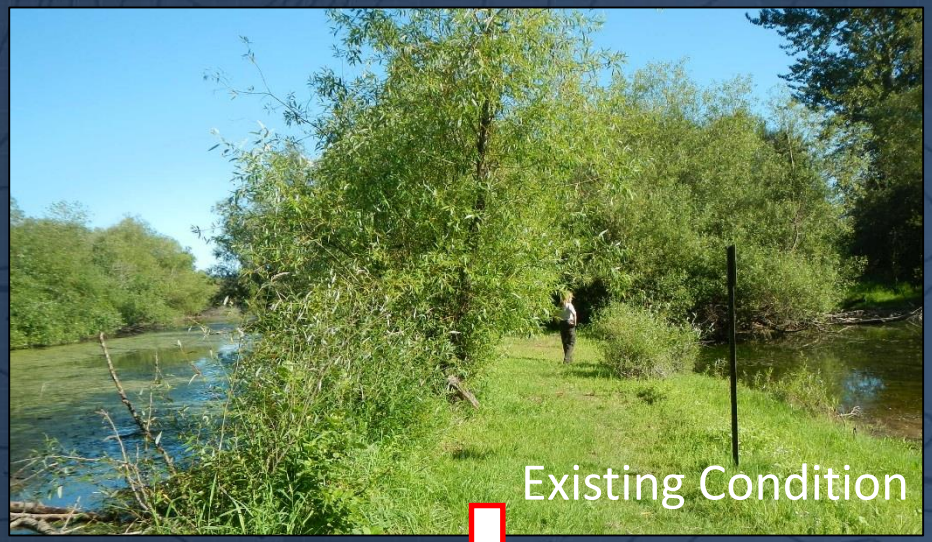
- Crossing upgrade
- 9 berm removals
- 52 ac & 2.4 miles of disconnected side channels

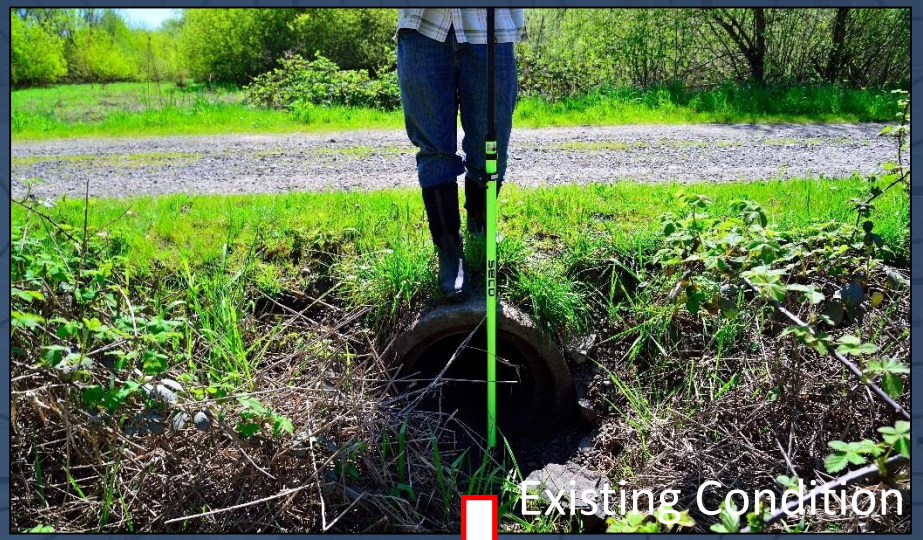


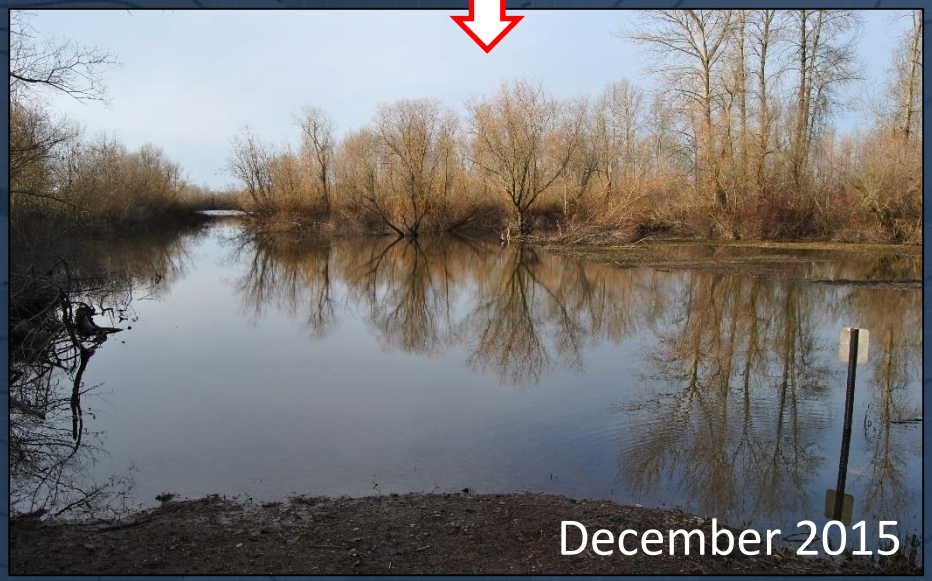



Summer rearing habitat
Overwintering habitat
Enhanced overwintering habitat

Berm Removal & Grading





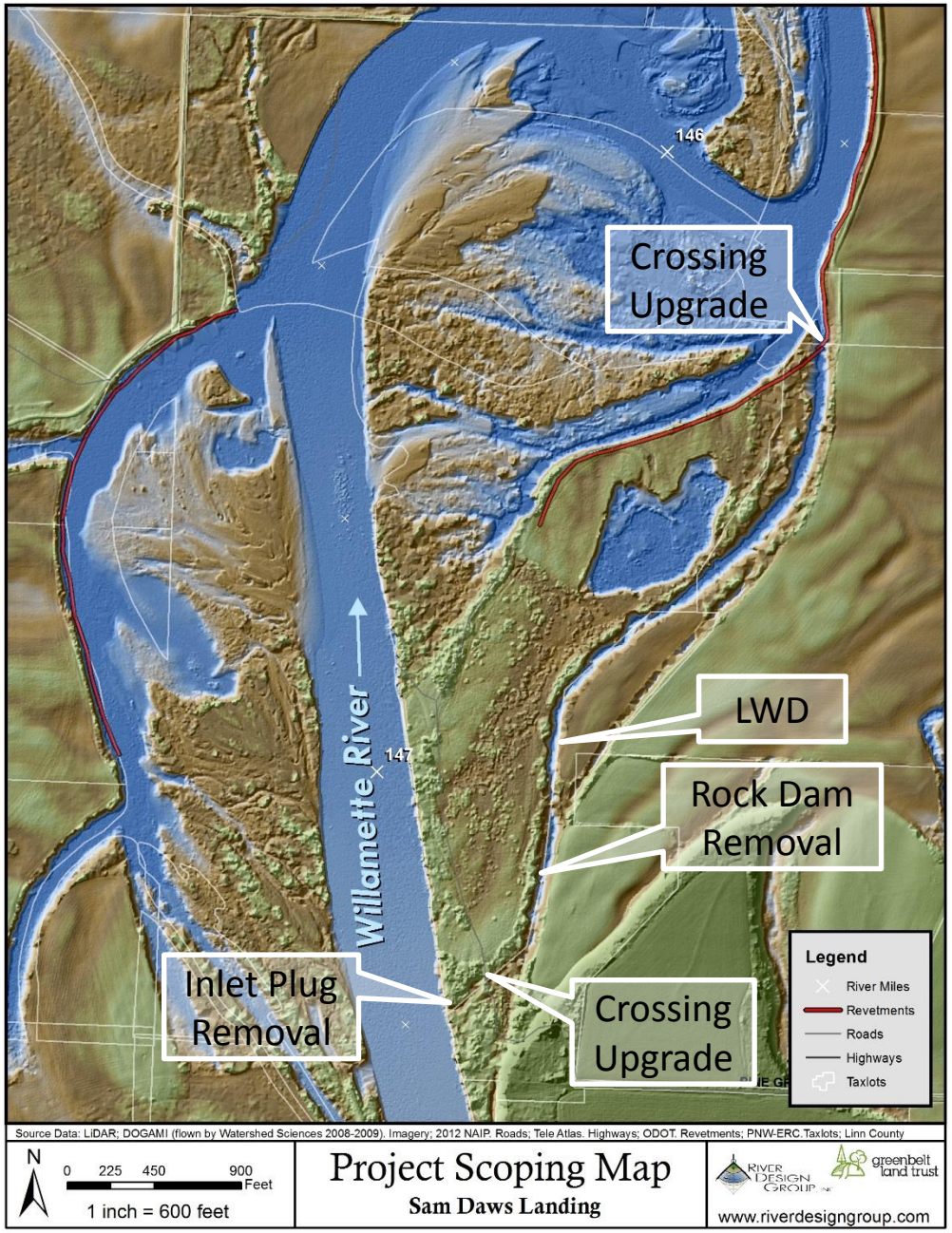



• Connection Periods
- Target: 40 days
- 2016 WY – 50 days
- 2017 WY – 16 days


Porter Dam Levee

Sam Daws Landing

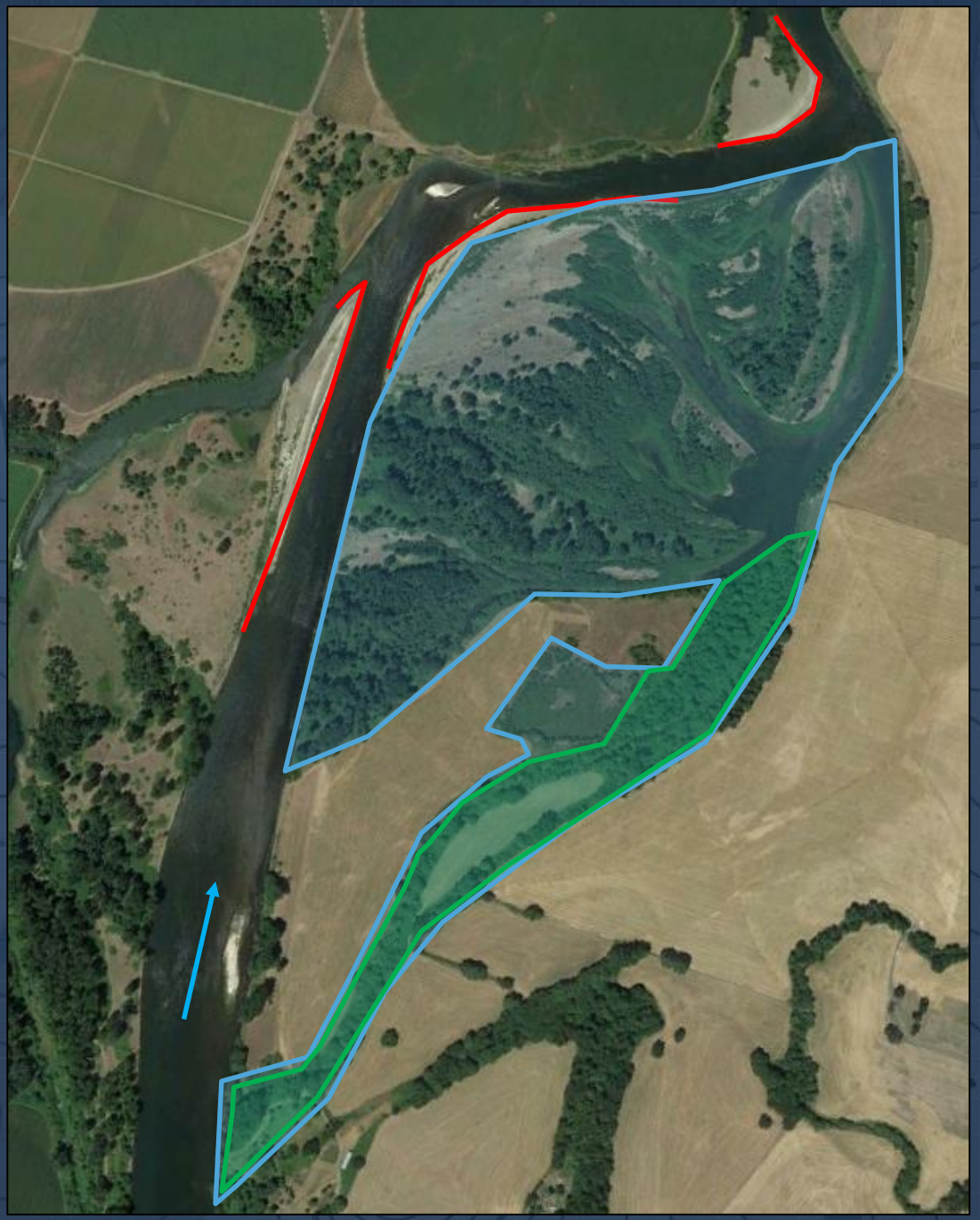
- Inlet plug removal
- Low water crossing upgrades
- Rock dam removal
- Large wood structures



Summer rearing habitat

Overwintering habitat

Enhanced overwintering habitat



- Connection Periods
  - Target: 30 days
  - 2016 WY – 39 days
  - 2017 WY – 13 days

Side Channel Connection

Dec. 2016 at 26,000 cfs

Long Tom River