

# Evolution of Riparian Designs based on Site Conditions and Wildlife Conflicts

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*Funded by Bonneville  
Power Administration*





# The importance of riparian vegetation





# Hangman Creek Riparian Restoration Challenges

- Channel Conditions & Hydrology
  - Deeply incised channel designed to keep water off floodplain
  - Perched Water Table





Hangman RM 11.5  
3<sup>rd</sup> Year Survival Rates  
with watering and hog panel enclosures  
Hardwoods: 30-50%



# Addressing Water Needs for Riparian

- Channel Restoration First with Goals to:
  - Fill man made channels designed to get water off the landscape
  - Activate relict channels or create new channels with natural sinuosity and bankfull dimensions
  - Promote Overbank Flow
  - Increase Ground water infiltration
  - Create Side channels and seasonal wetlands
  - Create low flow channels that decrease solar radiation input
  - Partner with Beaver to do the work for you
    - Plant veg for building material, winter and summer food
    - Build Beaver Dam Analogs to support beaver complexes
  - Monitor groundwater depth of perched water table







# Phase 1: Completion of Fill of Existing Channel





# Phase 1: Revegetating Relict Channel Willow Poles-2015





# Typical Section of the 1<sup>st</sup> Relict Channel Activated after 3 years





# Phase 1: Beaver Dam on Relict Channel





# Downstream Reach of Restoration Properties



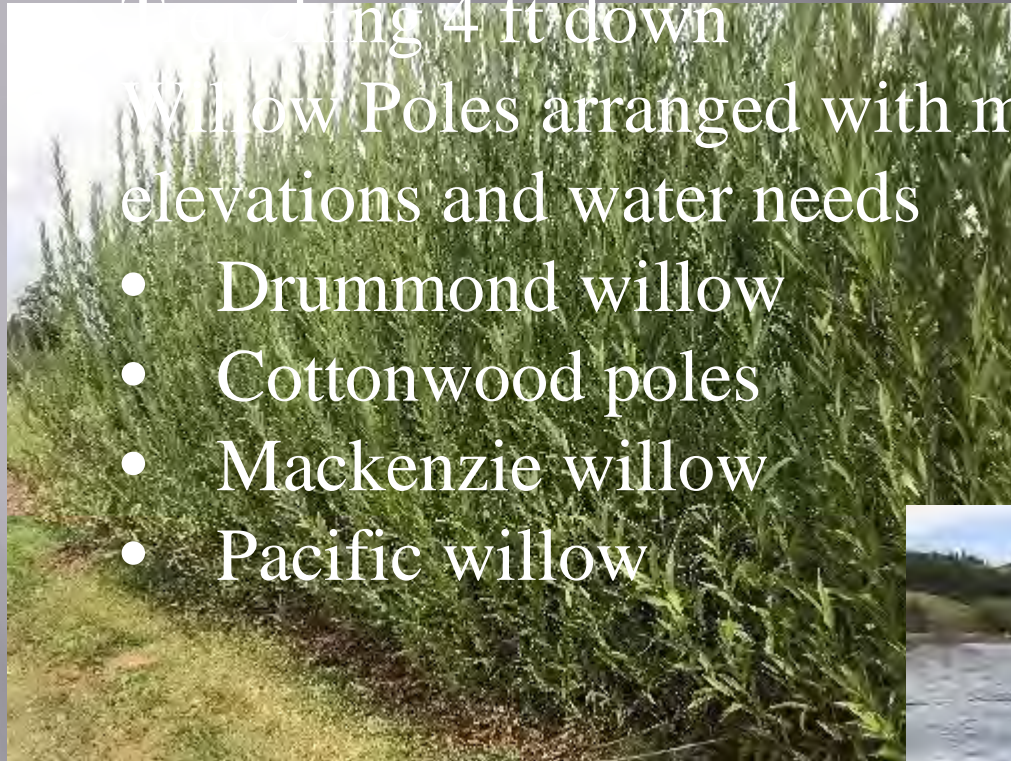


# Trenching Willows

Trenching 4 ft down

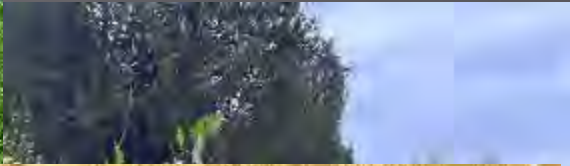
Willow Poles arranged with matching elevations and water needs

- Drummond willow
- Cottonwood poles
- Mackenzie willow
- Pacific willow





# More Riparian Restoration Challenges





# 3 Beaver Lodges on Property Now





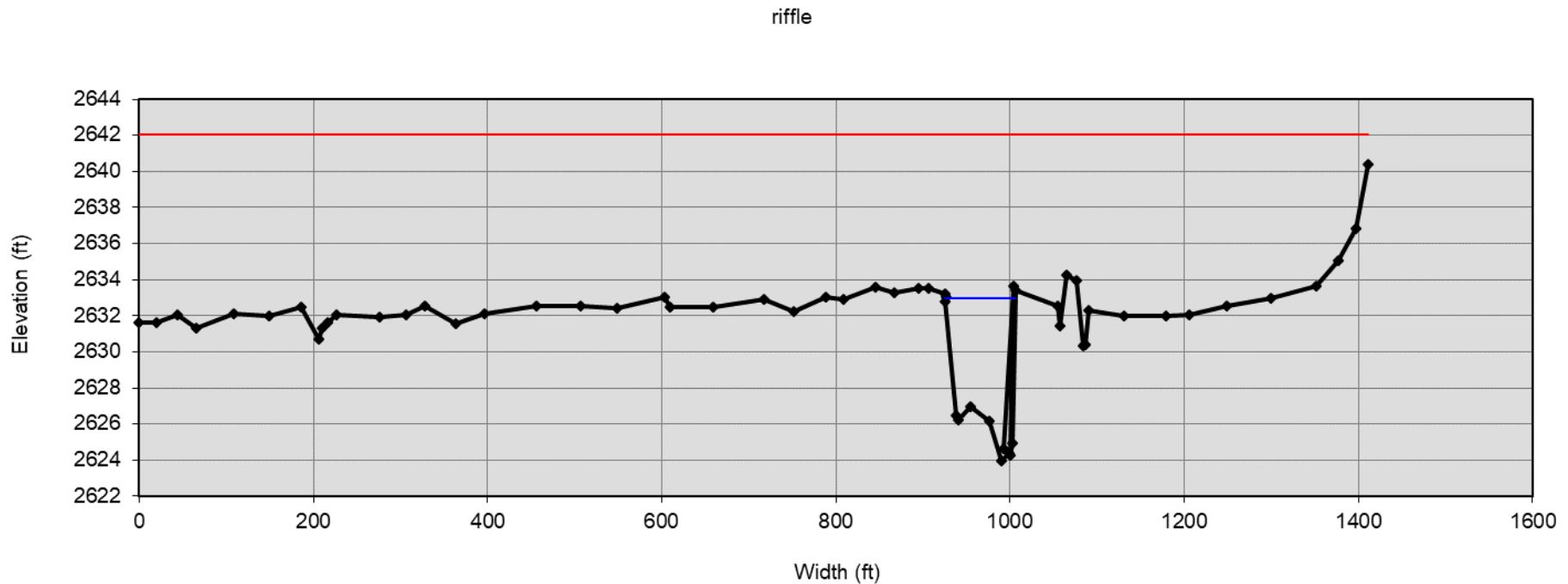
# Current Tree Protection Methods



- 6ft Screen Wrap
- 8 ft Wildlife Exclusion Fence
- 3 ft fence around trenched willows
- Cones, chicken wire for big trees
- Garlic sticks, blood spray
- Aspen cuttings for beaver



# Surveying Channel and Valley X-Sections

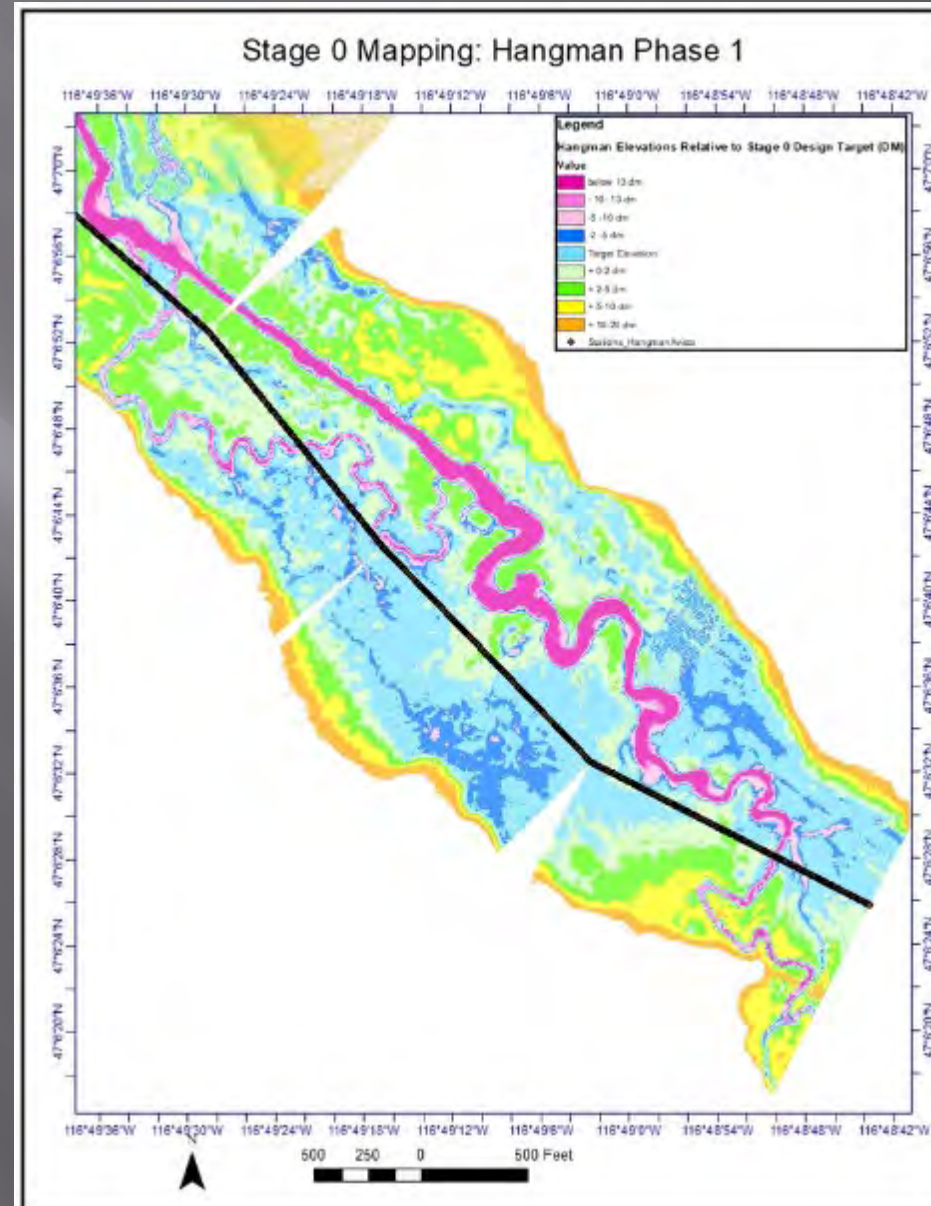
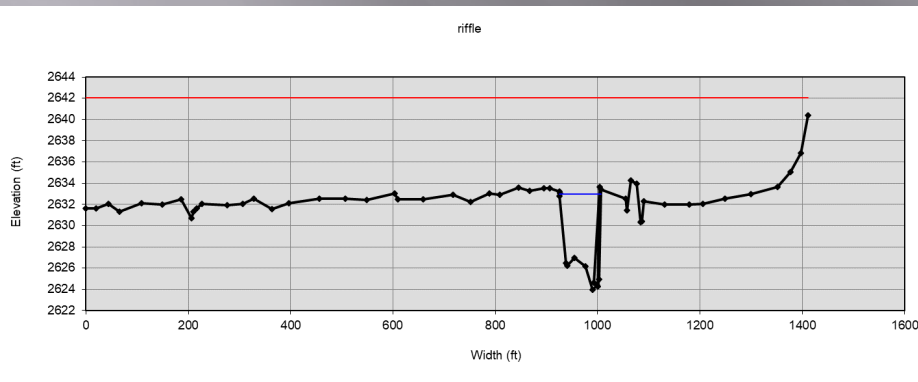


- Biologist, Engineer, and Riparian Ecologist team
- Future Restoration Reach
  - Remove Railroad Berm at 1400ft
  - Fill Army Corps Channel at 1000 ft
  - Activate Channel at 200 ft



# Surveying Channel and Valley X-Sections

- LiDar and GPS based surveying data combined to create an elevation map
- Pink is deepest areas, then dark blue





# Riparian Planting Designs

- Survey channel and valley bottoms
- Access Groundwater Well Data if available
- Flag Planting Zones for Lower, Mid, and Upper Bank
- Assess potential herbivory and protection options
  - Can a wildlife exclusion fence be constructed for terrestrial species
  - Are beaver in the area
  - Consider plant species that are less palatable
- Assess habitat conditions for Various Plants
  - Substrate for gravel dependent species
  - Anticipated water velocities for high flow tolerant species
  - Assess existing canopy for sun intolerant species



Upland

# Riparian Planting Zones

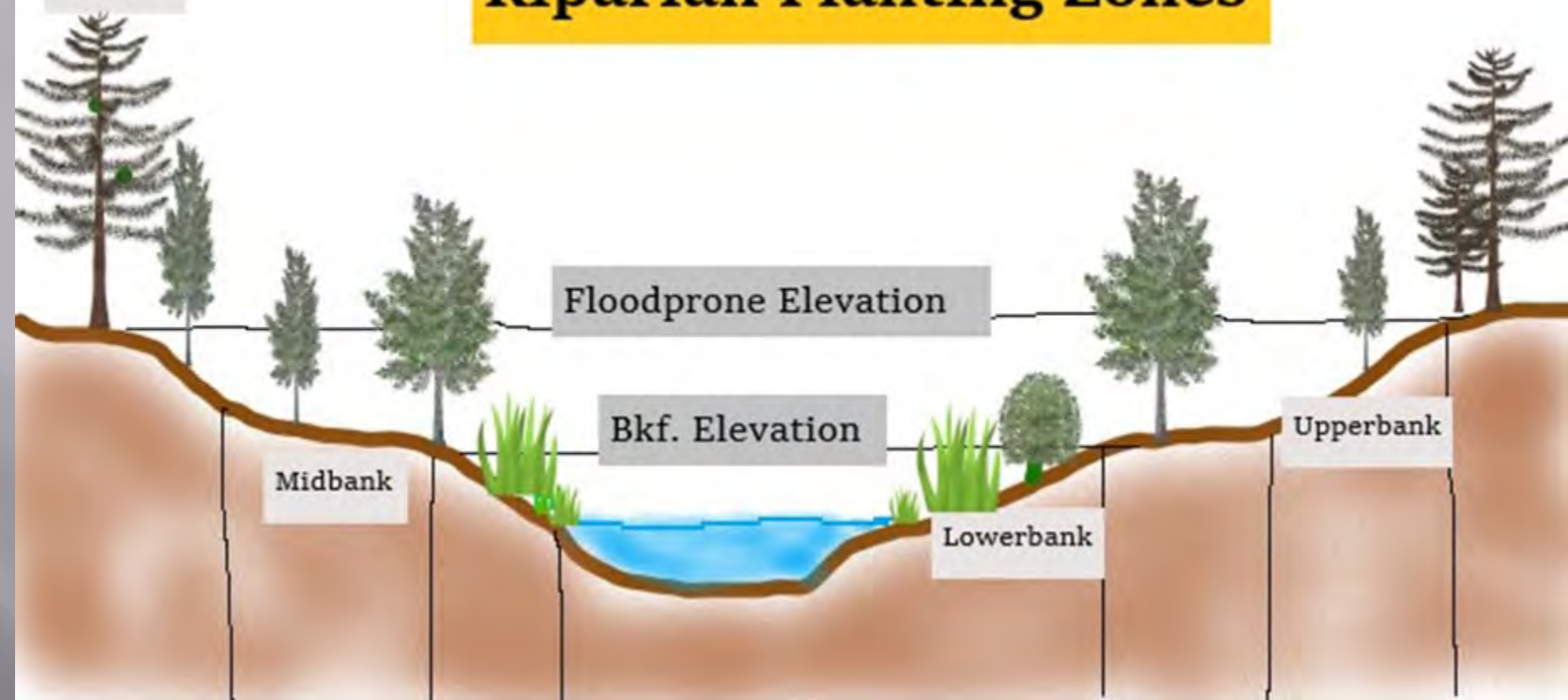
Floodprone Elevation

Bkf. Elevation

Midbank

Lowerbank

Upperbank





# Hepton Lake Willow Nursery

40,000 willow poles





# Acknowledgements:

- Coeur d'Alene Tribe
- Bonneville Power Administration
- Western Native Trout Initiative
- Spokane Falls Chapter Trout Unlimited
- Environmental Protection Agency
- Spokane Riverkeeper

Prioritize Reaches

Thoroughly Assess Existing Habitat

Restore Channel and Valley  
Connections

Start Small, Monitor & Adapt

Saw-Beak Sedge (*Carex stipata*)





# Questions?

- Jacob
- Walt
- Cary Janson
- Dan
- Bruce