

Kootenai River Habitat Restoration Program



Susan Ireland * Kootenai Tribe of Idaho * KVRI Meeting * July 19, 2021

Program Goal

Restore habitat conditions to support self-sustaining, healthy populations of native fish by addressing reach-scale limiting factors.



Program Overview

Reach-scale limiting factors

Reach-scale objectives

Reach-scale restoration strategy = multiple treatments

Project = multiple treatments grouped for construction and feasibility





1994

2002

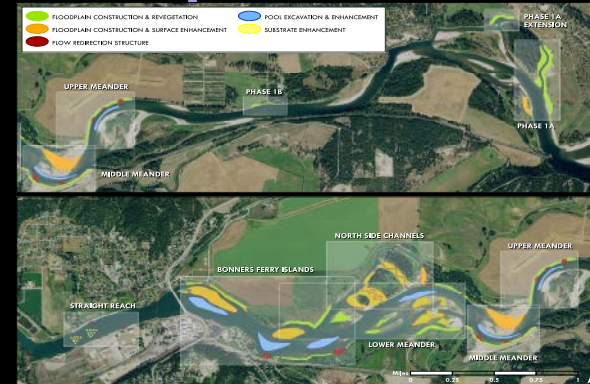
2006

2007

2009

2011 – 2018

2019 – 2025 +





Braided Reach Objectives

Improve Habitat for Native Aquatic Species

- Provide longitudinal “ladder” of deep pools to support upstream movement of Kootenai sturgeon
- Install structures that create hydraulic complexity, reduce bank erosion, provide cover, and establish streambank vegetation
- Enhance off-channel features (side channels, wetlands and alcoves) to improve habitat for wildlife, waterfowl and juvenile fish

Braided Reach Objectives

Food Web Support

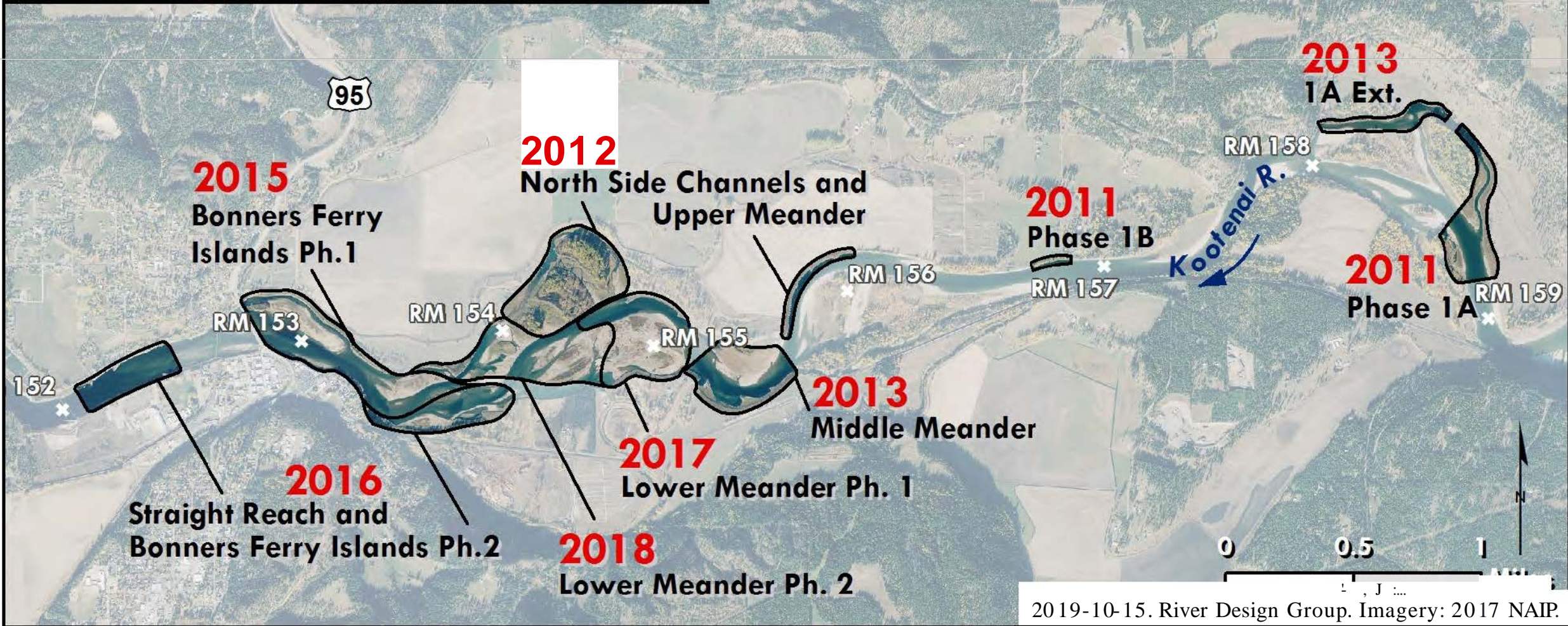
- Improve floodplain function by constructing floodplain surfaces that interact with the current Libby Dam hydrologic regime to promote riparian and wetland vegetation

River Stewardship

- Partner with landowners to implement projects on private land
- Address land use practices
- Reduce land loss



Completed Braided Reach Projects



Braided Reach Accomplishments

6 mega-pools constructed
over three river miles



Braided Reach Accomplishments

24,000 linear feet of
bank structures



Braided Reach Accomplishments

An aerial photograph of a river reach with a braided channel. The water is a deep greenish-blue. Along the left bank, there are several structures made of logs and brush, designed to create pools. The surrounding land is a mix of green grass and brown, dry vegetation. A fence line is visible in the background.

13 Pool-forming Structures

Braided Reach Accomplishments

An aerial photograph of a braided river reach. The river is composed of several interconnected channels of varying widths, separated by sandy and gravelly bars. The water is a deep blue color. The surrounding landscape is a mix of green grassy areas, dense evergreen forests, and some residential buildings. The sky is clear and blue.

6 Side Channels

90 Acres of New Floodplain Surfaces

Braided Reach Accomplishments

27,000 Plantings

40,000 Cuttings

Nearly 8 Miles of Fence



Braided Reach Accomplishments



93,000 Pieces of Wood

Braided Reach Accomplishments



Project implementation for 8 consecutive years
(including 2014 SEPP)



6 mega-pools constructed over three river miles



24,000 linear feet of bank structures and 13 pool-forming structures



90 acres of new floodplain surfaces and 6 side channels



27,000 plantings on 40 acres protected by nearly 8 miles of fence



93,000 pieces of wood added



762,000 cubic yards of earthwork



Summary Braided and Straight Reaches

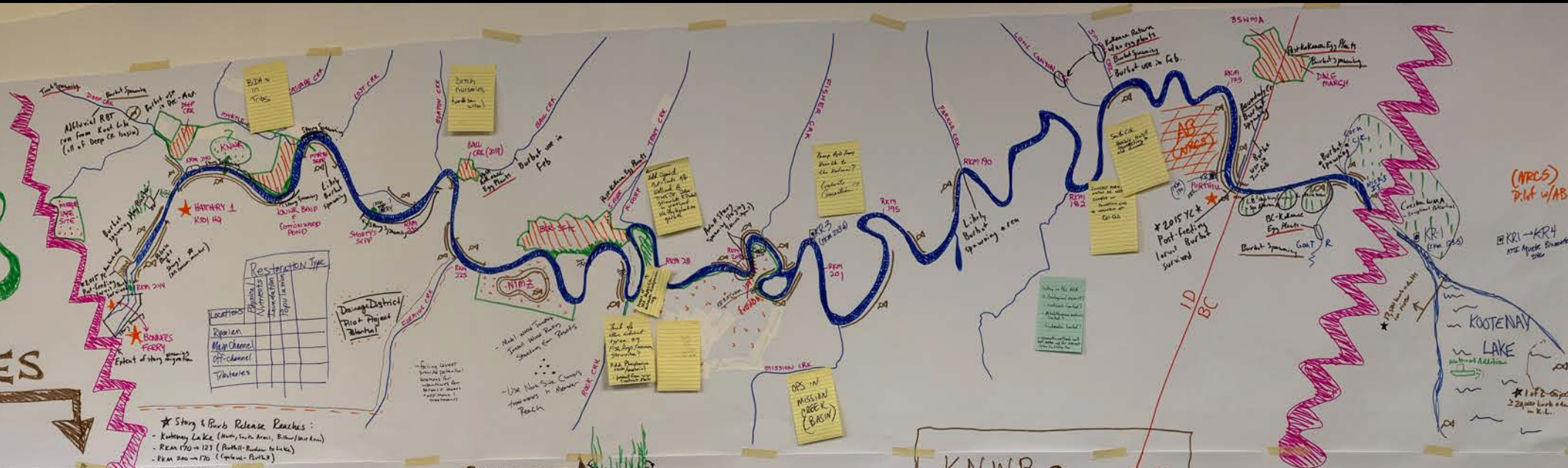
- Transformation of a degraded river corridor
- Increased habitat complexity and diversity
- Sturgeon movement upstream
- Native salmonid use
- Increased river metabolism
- Increased recreational use
- New generation of cottonwoods
- Successful collaborations with landowners
- Excellent construction safety, and environmental compliance record

Sharing Information to Identify Lessons

KRHRP DAY 2

BRAIDED & STRAIGHT REACHES

TOP 3



POOL LADDER?

SOMETHING IMPORTANT WE MISSED?

(FOSNESS) REACH-SCALE

STURGE ON MOVEMENT

KNWR

TO THE OTHER DIMENSION

BOUNDARY - SMITH WMA

A collection of numerous sticky notes in various colors (yellow, blue, green, pink) providing detailed notes and observations related to the river management project. The notes are organized into sections corresponding to the headers above.

PLANT JAIL!

Do we need more treatments?

KNWR

BOUNDARY - SMITH WMA



Importance of Meander Reach

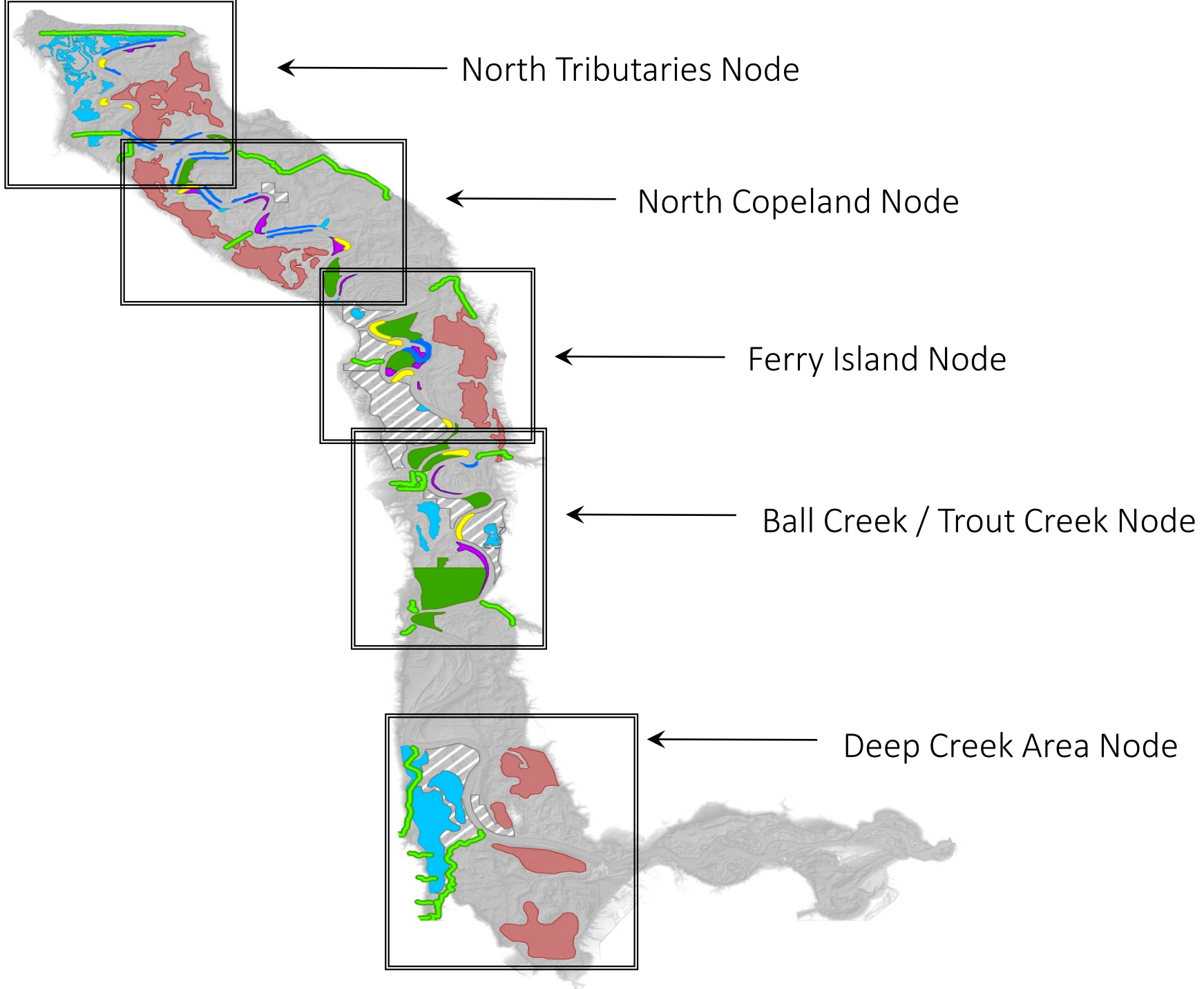
- Wetlands, off-channel, and floodplain habitat critical to ecosystem
- Floodplains provide food and nutrients
- Important larval and juvenile rearing habitat (sturgeon and burbot)
- Adult staging, holding and spawning habitat
- Connection to Kootenay Lake
- Includes ESA Critical Habitat
- Tributary habitat and access (kokanee, salmonids)



Meander Reach Restoration Strategy

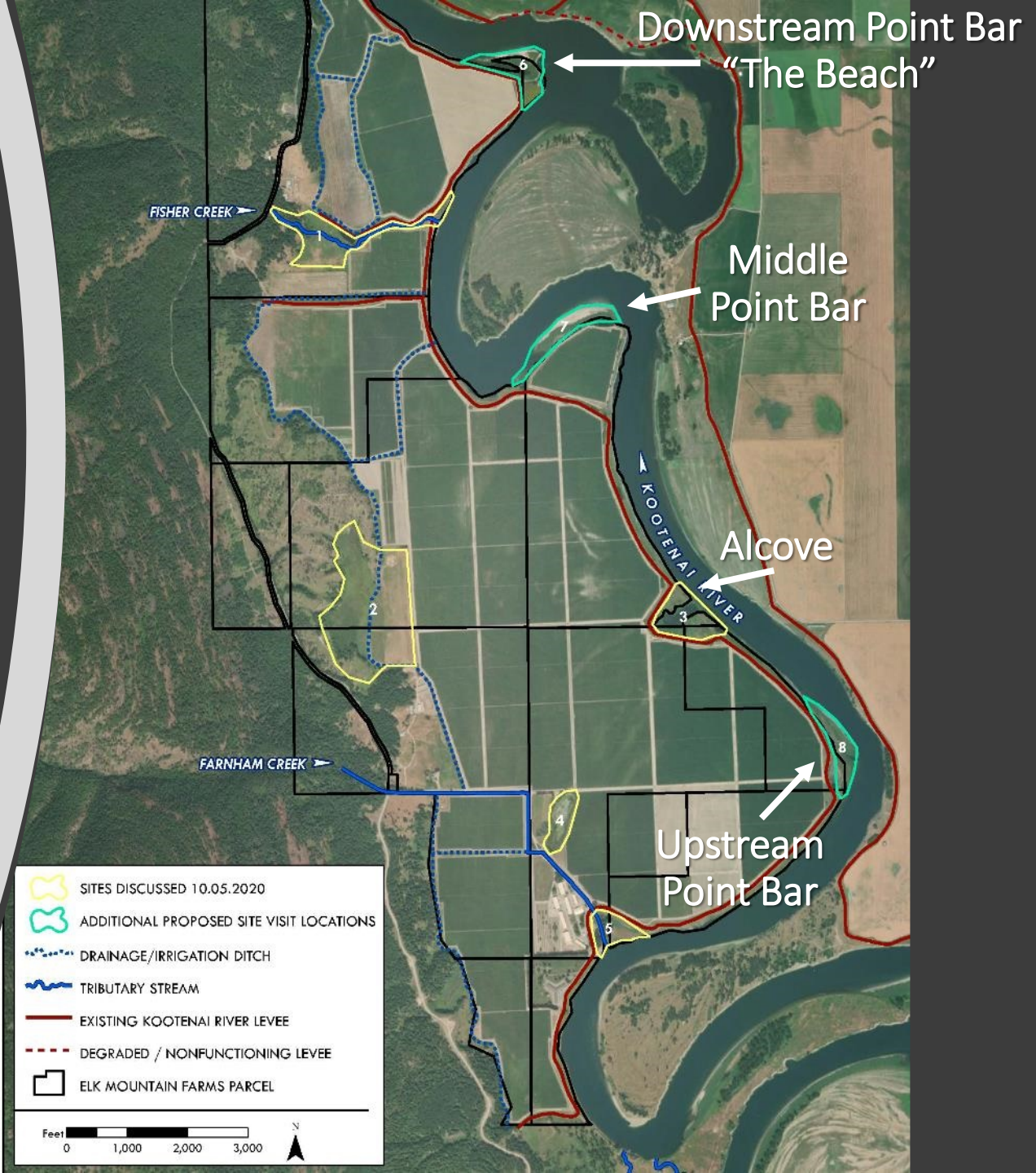
- Improve the food web by increasing nutrient inputs to develop a “nutrient ladder”
- Reconnect the floodplain where possible
- Create more complex and diverse habitats for fish (e.g., off-channel habitat)
- Increase ecosystem function





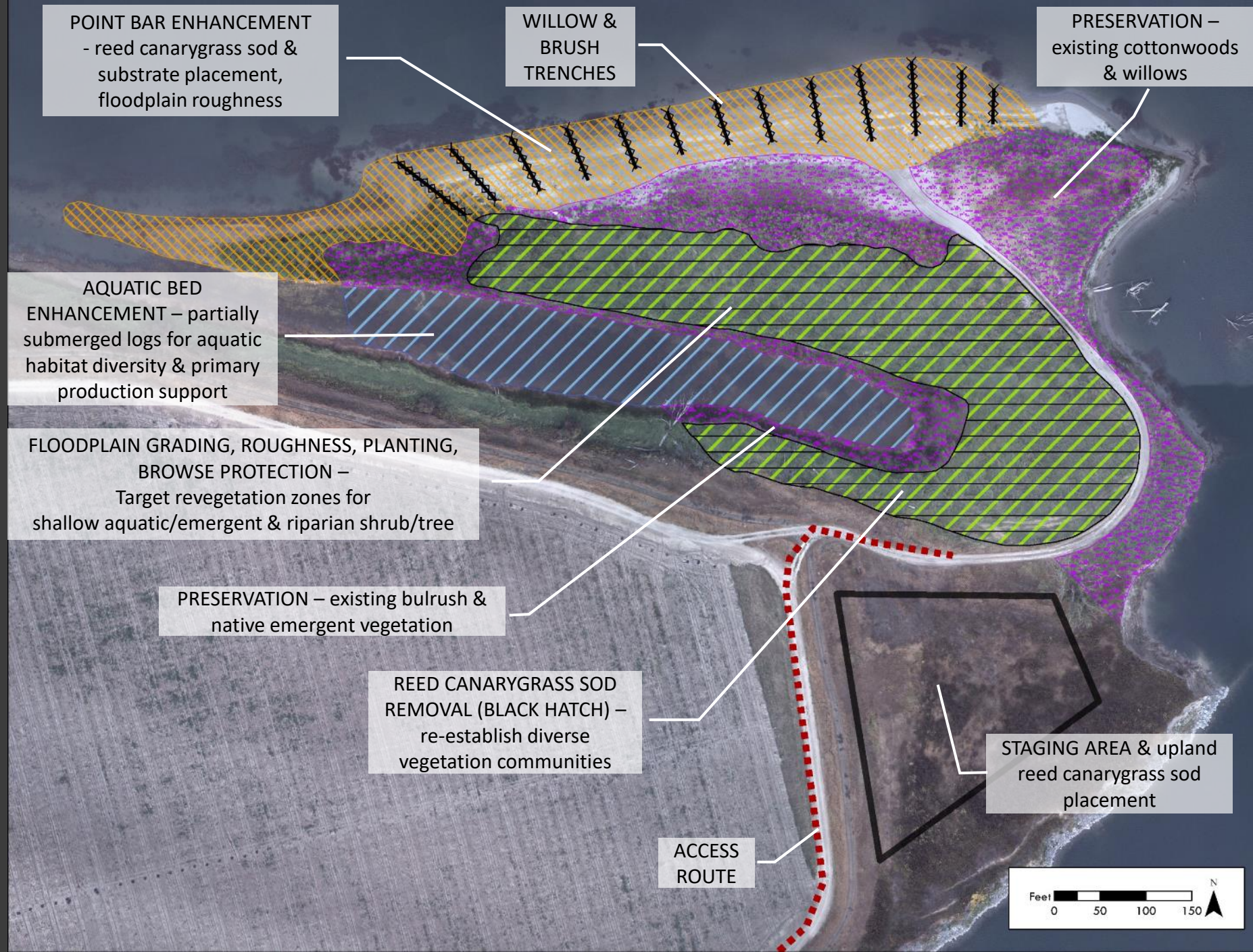
Elk Mountain Farms Restoration Overview

- Identified 8 sites potential restoration sites within Elk Mountain Farms – narrowed to 4 sites along the river
- KRHRP Goals/Objectives to be Addressed:
 - Enhance & expand floodplain & point bar habitats
 - Increase aquatic & riparian habitat diversity
 - Improve primary productivity
 - Increase area of riparian shrub and forest habitat



Downstream Point Bar Restoration Concept

- Individual treatment descriptions presented in the following slides
- Treatments are similar for all Elk Mountain Farms sites.





Aquatic Bed Enhancement

- Add partially submerged logs to open water areas in alcoves to:
- Provide substrate for algae and other aquatic vegetation growth – increase primary production
- Increase aquatic habitat diversity

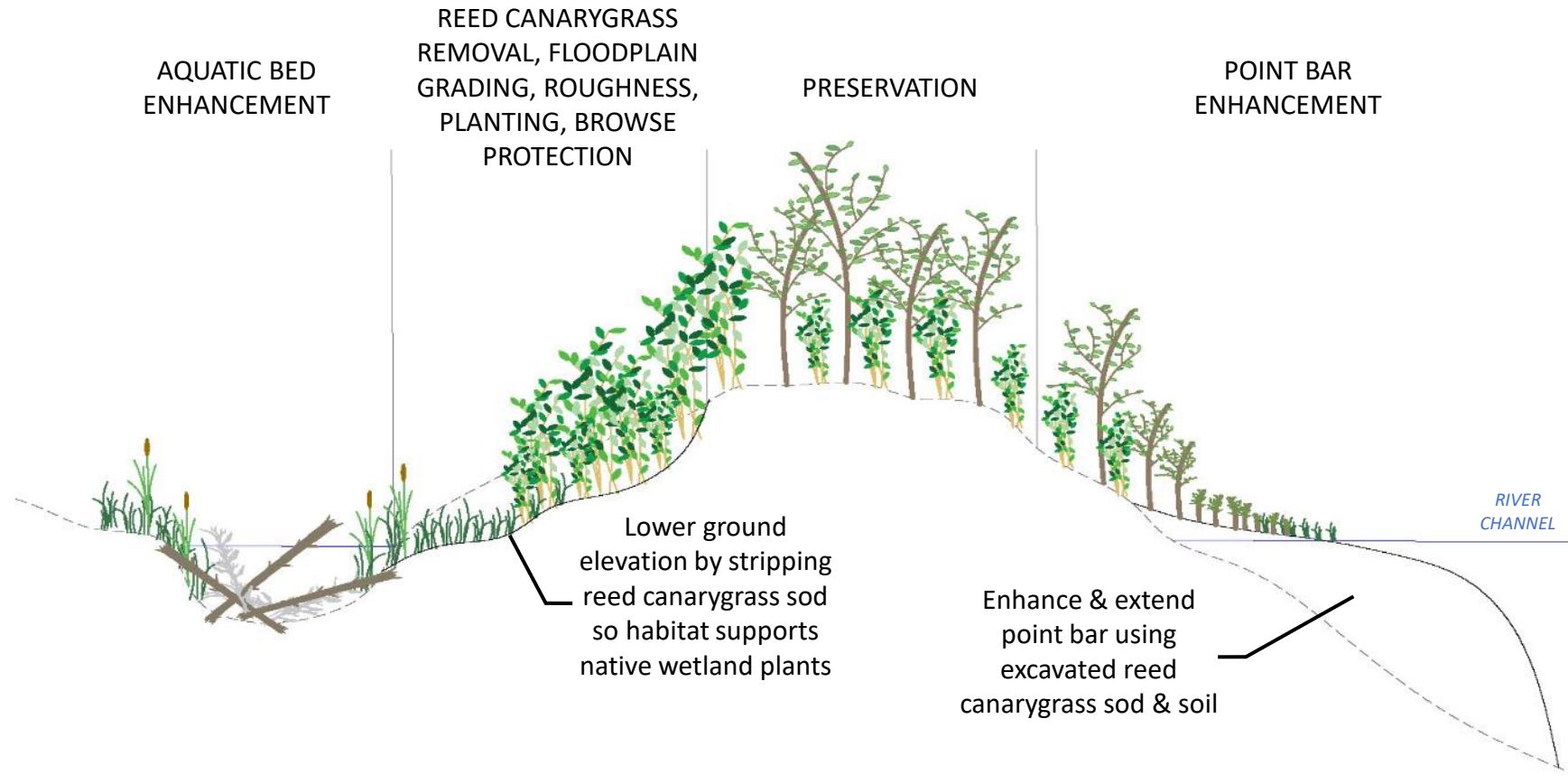
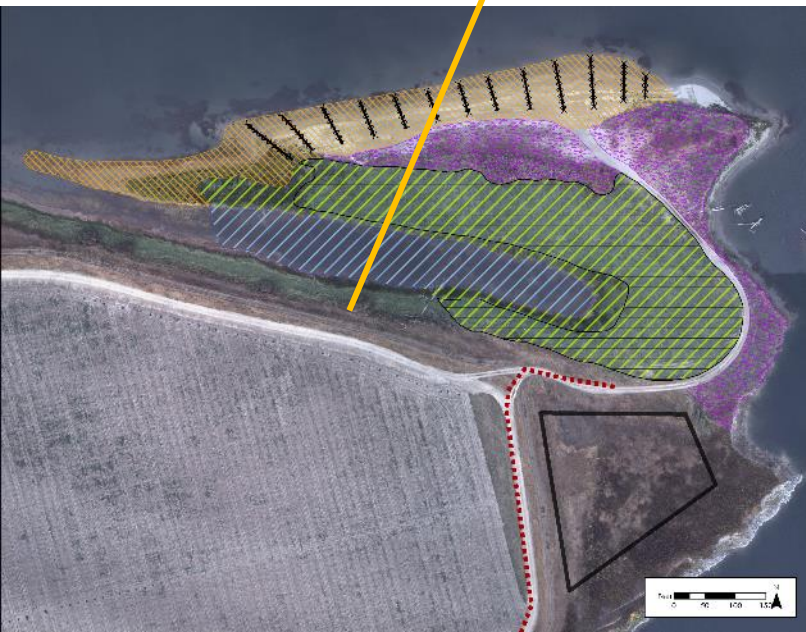


Reed Canarygrass Removal

- Remove reed canarygrass sod
- Prepare for native revegetation – woody and herbaceous species
- Salvage for use in point bar enhancement

Floodplain Grading

Example cross-section



Create floodplain elevations to support a range of vegetation communities:

- Shallow aquatic vegetation
- Emergent, wetland vegetation
- Shrub & tree vegetation

Balance cut/fill within project extents as much as possible

Point Bar Treatments

- Submerge reed canarygrass sod at deep elevations along outside edge of point bar
 - Place substrate to increase the area of connected floodplain
 - Install floodplain roughness to create microsites to support natural colonization
-
- Place willow cuttings and brush in trenches to:
 - Promote revegetation
 - Disperse surface flows
 - Increase floodplain habitat complexity





Floodplain Roughness

Partially bury wood & brush in the floodplain to:

- Create diverse microsites
- Support natural recruitment



Planted Brush

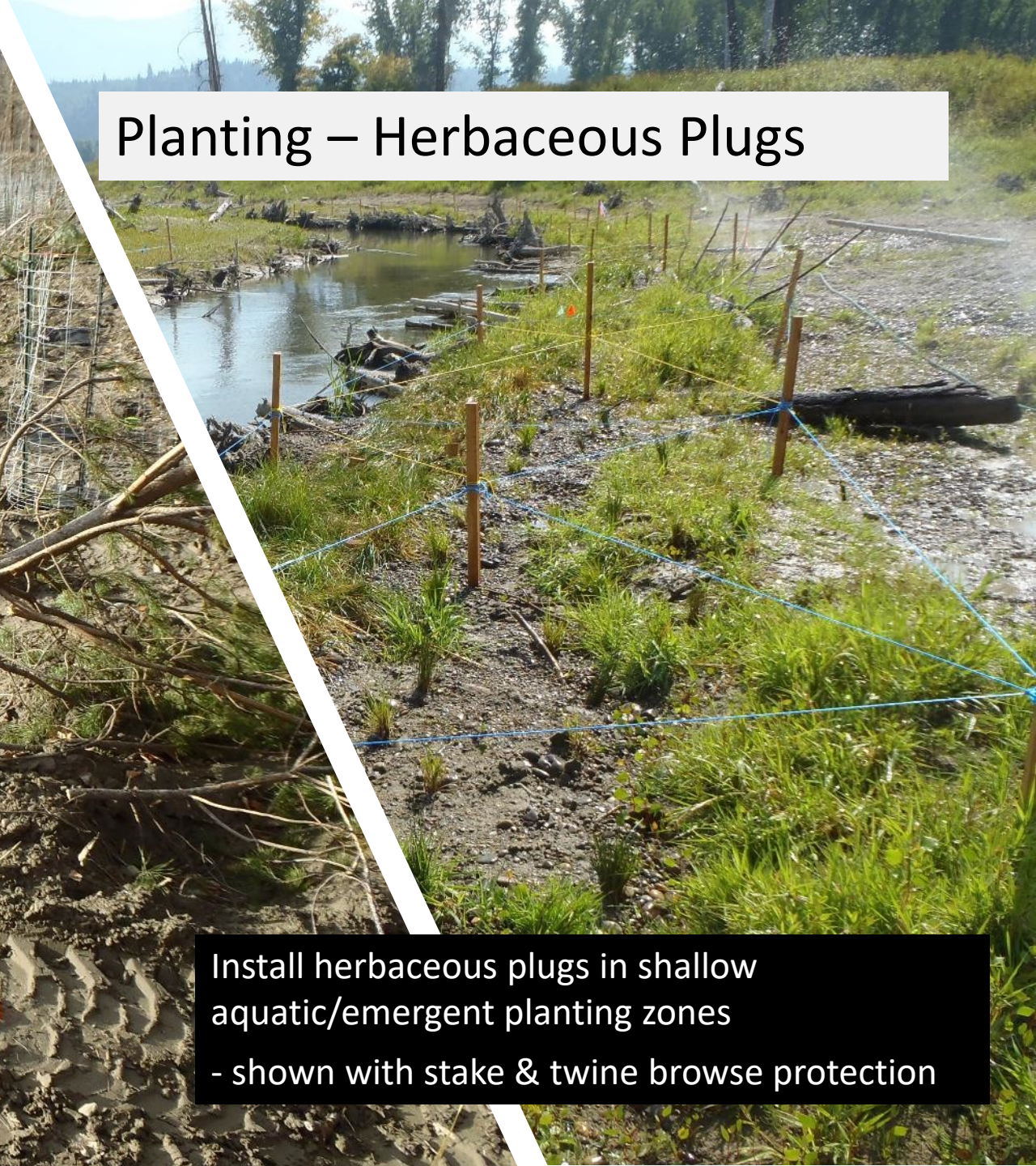
Install brush bundles vertically in the floodplain to:

- Provide browse protection
- Create habitat complexity



Planting – Trees & Shrubs

Install container-grown trees and shrubs
- shown with weed mats at base & individual
browse protector cages

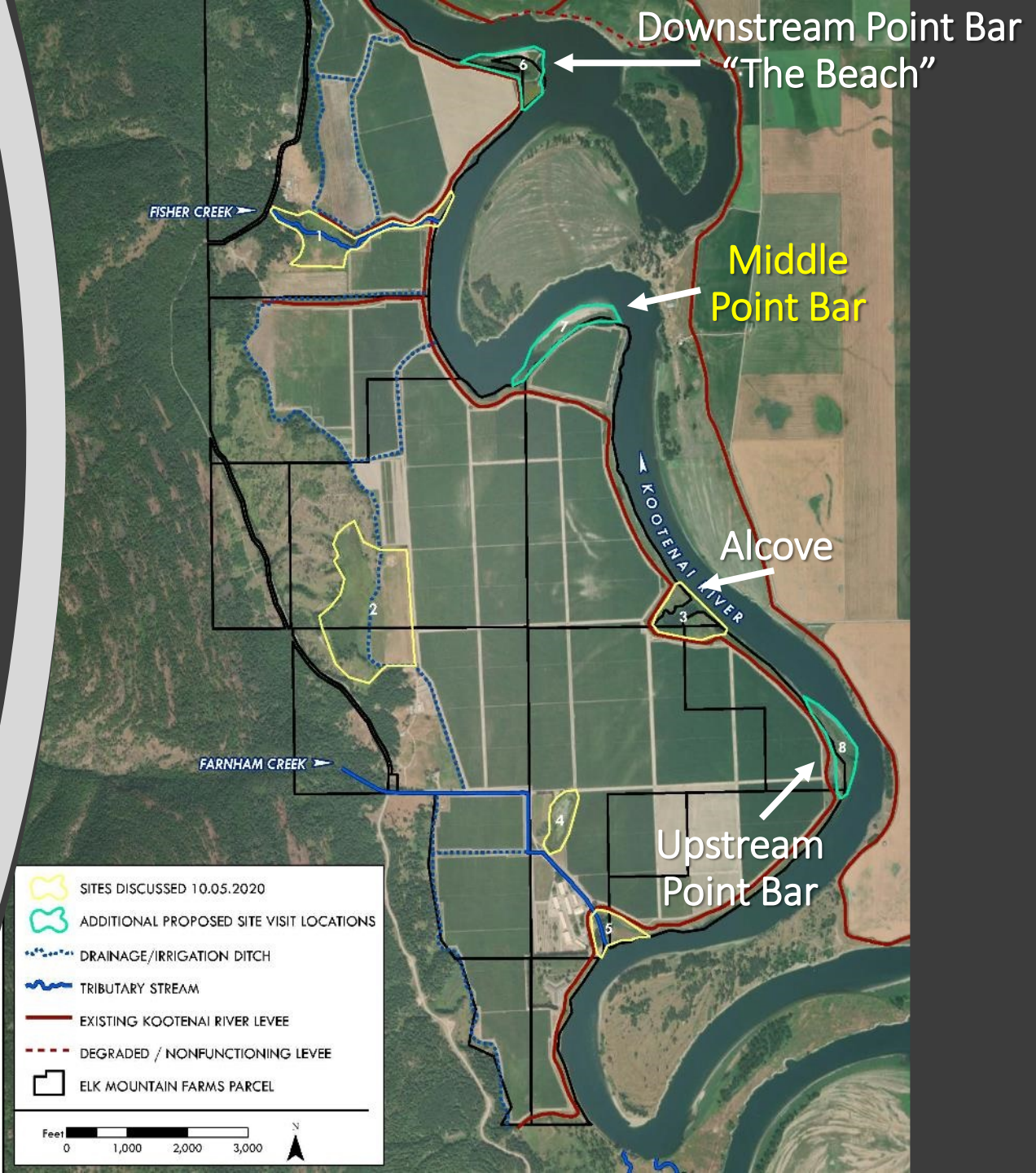


Planting – Herbaceous Plugs

Install herbaceous plugs in shallow
aquatic/emergent planting zones
- shown with stake & twine browse protection

Elk Mountain Farms Restoration Overview

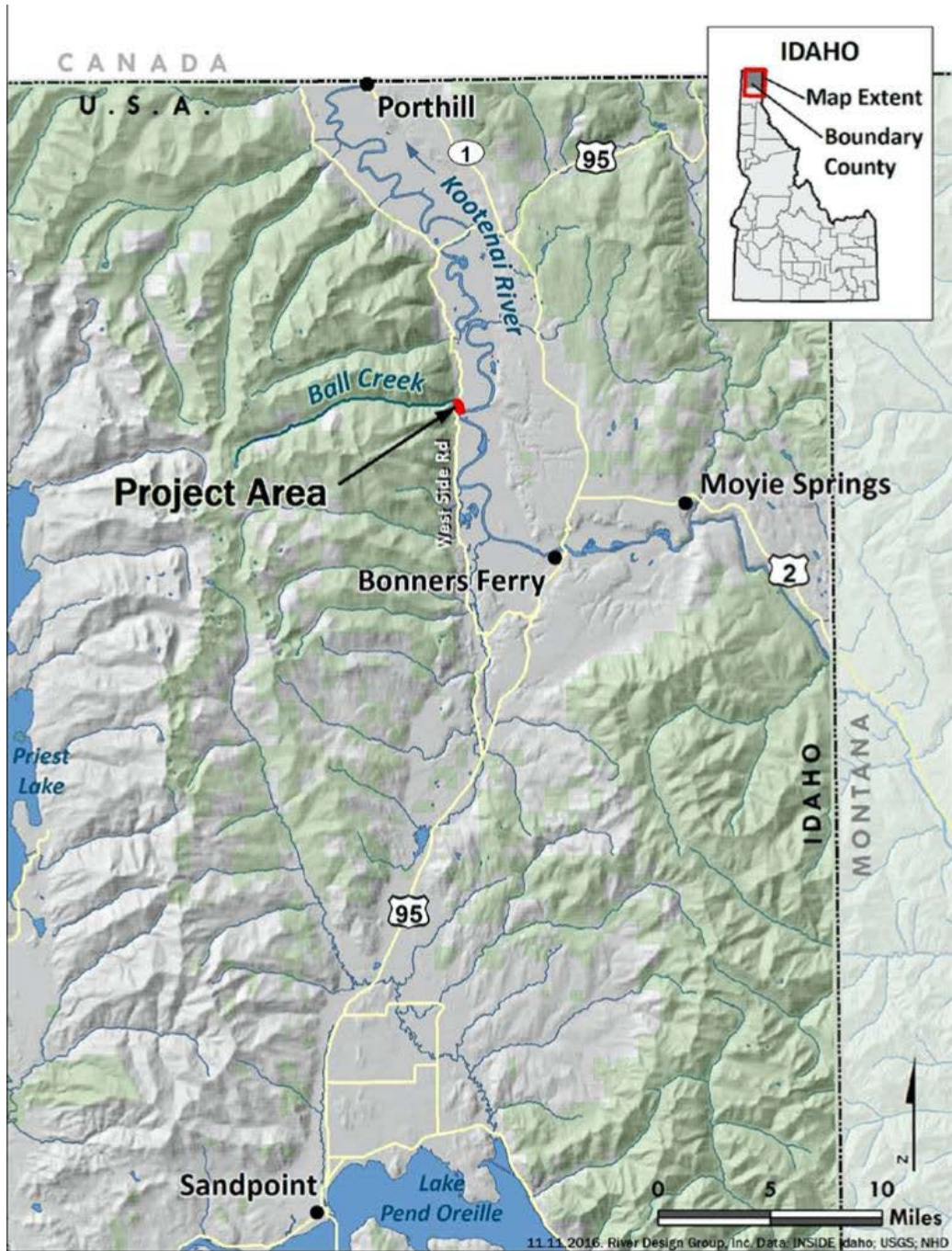
- Identified 8 sites potential restoration sites within Elk Mountain Farms – narrowed to 4 sites along the river
- KRHRP Goals/Objectives to be Addressed:
 - Enhance & expand floodplain & point bar habitats
 - Increase aquatic & riparian habitat diversity
 - Improve primary productivity
 - Increase area of riparian shrub and forest habitat



Feasibility Issues Evaluated

- Compatibility with EMF operations
 - Locate staging area outside levee
 - Haul truck & construction traffic on EMF roads
- Constructability
 - Wet working conditions for heavy equipment
- Erosion Risk:
 - Model effects to opposite streambank & upstream end of point bar
- Maintenance & Evaluation
 - Arrange future access for KRHRP monitoring and maintenance





11.11.2016. River Design Group, Inc. Data: INSIDE Idaho; USGS; NHD





Ball Creek Tributary – Phase 1 Observations

- Constructed, seasonal side channel activated in Year 1 – dispersed water into northern floodplain



- Northern floodplain wetlands dominated by reed canarygrass are inundated & saturated to support wetland conversion

Ball Creek Tributary – Phase 2

Proposed Actions

- Construct additional seasonal side channel
- Wetland grading for reed canarygrass management & wetland enhancement to establish native emergent wetland & shrub communities

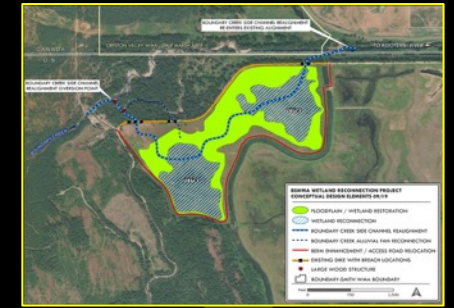


Ball Creek Tributary (2019)

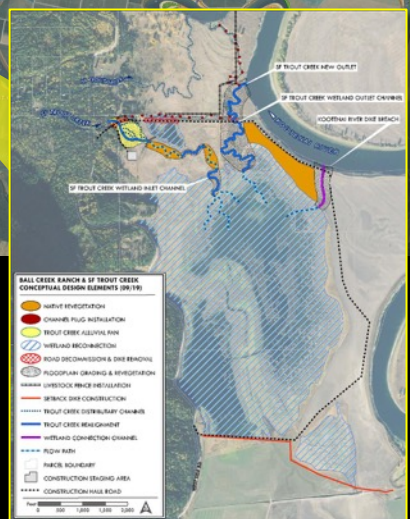
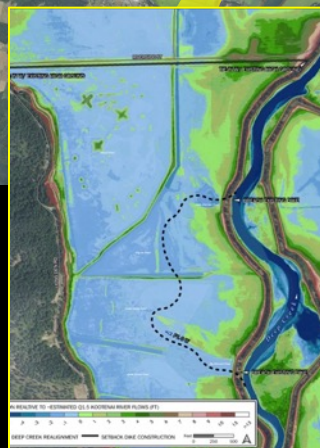
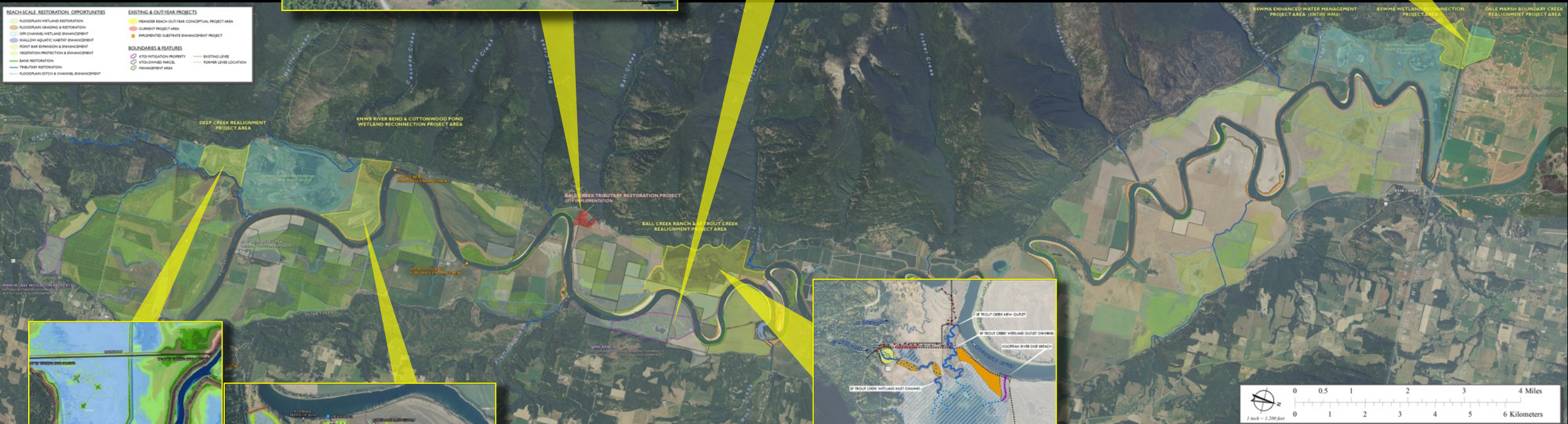


KTOI Nimz Ranch
North Quad

Boundary-Smith Wildlife
Management Area
(Date TBD)



- | REACH SCALE RESTORATION OPPORTUNITIES | EXISTING & OUT-YEAR PROJECTS |
|---|---|
| <ul style="list-style-type: none"> FLOODPLAIN WETLAND RESTORATION FLOODPLAIN GRADING & RESTORATION OFF-CHANNEL WETLAND ENHANCEMENT SHALLOW AQUATIC HABITAT ENHANCEMENT POINT BAR DIMENSION & ENHANCEMENT VEGETATION PROTECTION & ENHANCEMENT BANK RESTORATION TRIBUTARY RESTORATION FLOODPLAIN DITCH & CHANNEL ENHANCEMENT | <ul style="list-style-type: none"> HEAVYER REACH OUT-YEAR CONCEPTUAL PROJECT AREA CURRENT PROJECT AREA IMPLEMENTED SUBSTRATE ENHANCEMENT PROJECT |
| BOUNDARIES & FEATURES <ul style="list-style-type: none"> KTOI MITIGATION PROPERTY KTOI-OWNED PARCEL MANAGEMENT AREA | <ul style="list-style-type: none"> EXISTING LINE KOOTENAI LINE LOCATION |



Kootenai National
Wildlife Refuge
(Date TBD)

Ball Creek Ranch / South Fork
Tributary Creek (postponed)