ECOSYSTEM RESTORATION IN THE LOWER COLUMBIA RIVER AND ESTUARY: THE ROLE OF THE EXPERT REGIONAL TECHNICAL GROUP (ERTG)

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Purpose of the ERTG is…

- To *assign survival benefits units* (SBUs) for ocean- and stream-type juvenile salmon from estuary *habitat actions* being implemented by the BPA and USACE in response to the 2008/2010 Biological Opinion on operation of the Federal Columbia River Power System.
  - Although extensive improvements have been made to dam passage for juvenile fish, these alone are not meeting recovery targets
  - Focus is now on enhancing survival through estuarine floodplain, tidal wetland and surge plain habitat restoration, enhancement, creation, conservation and protection…*i.e. reactivating the floodplain.*
  - The recovery plan specifies goals for the number of survival benefit units (SBUs) associated with estuary restoration actions
- The ERTG was formed by the Steering Committee: USACE (Blaine Ebberts), BPA (Ben Zelinsky), NMFS (Lynne Krasnow)

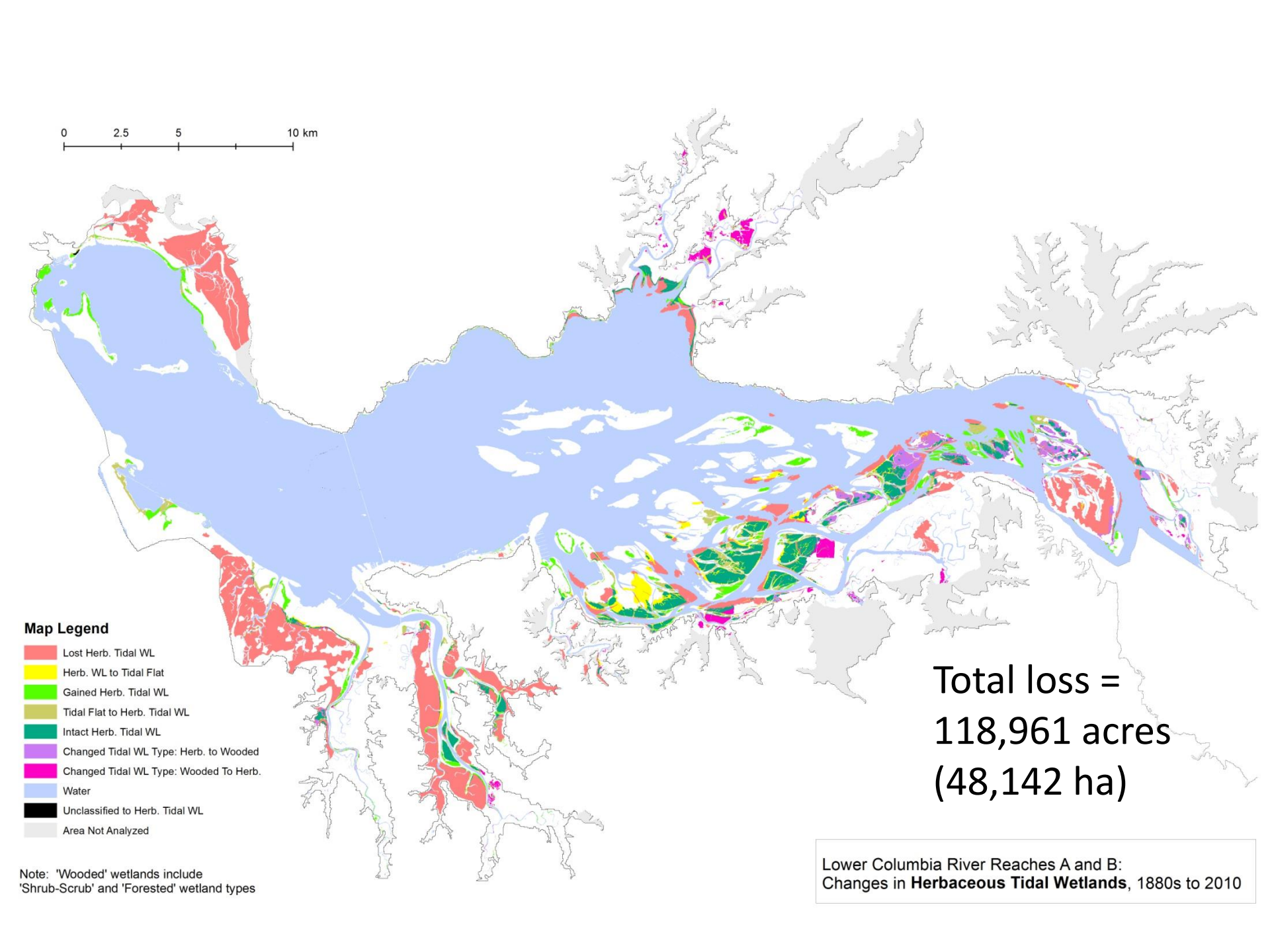
The ERTG Members Represent a Variety of Complimentary Experience

- Salmonid biology and ecology in PNW estuaries
- Fisheries management
- Ecology of estuarine habitats
- Geomorphology of estuarine ecosystems
- Restoration ecology
- Adaptive management
- Experimental design in aquatic ecosystems

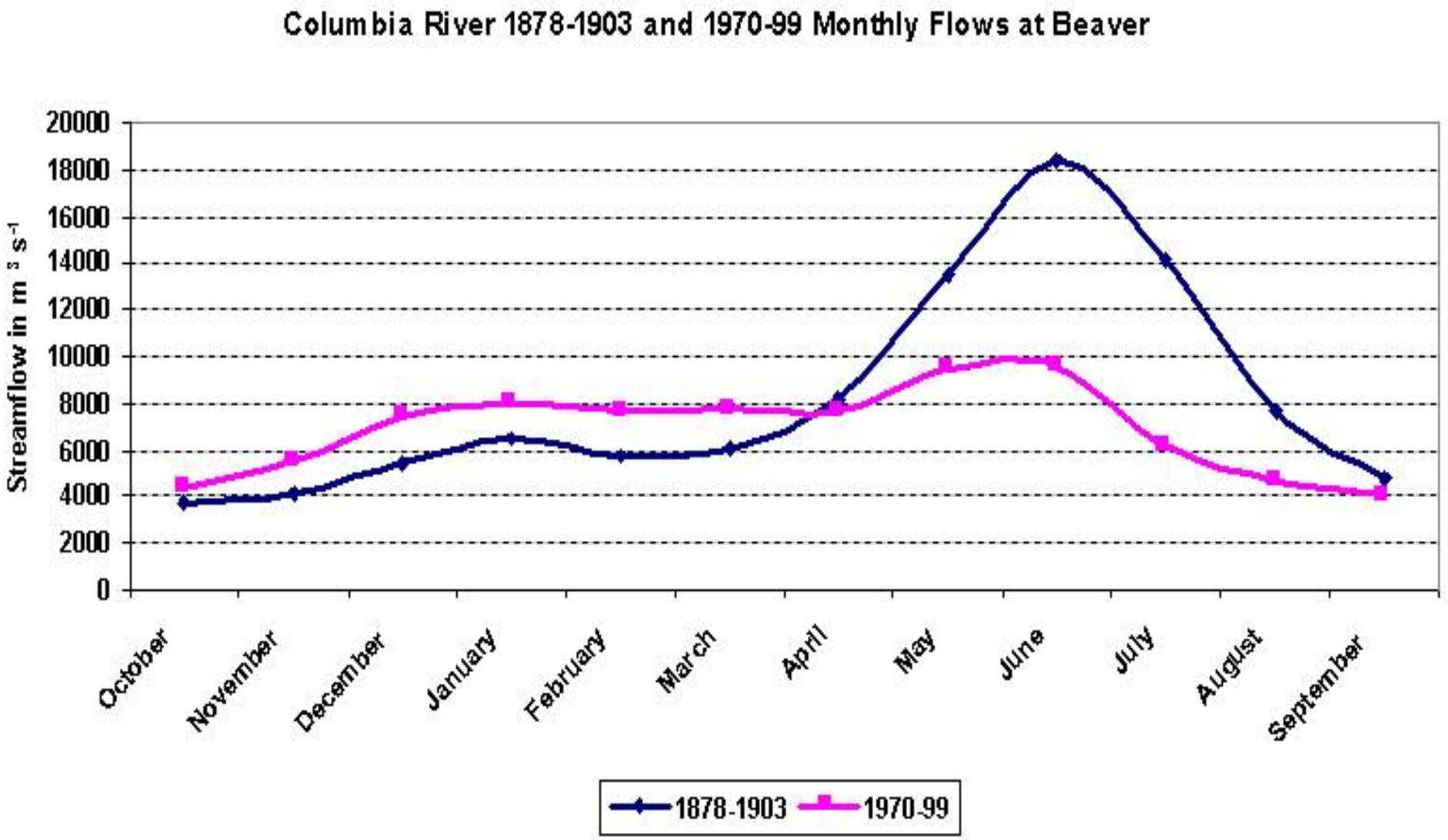

Washington
Oregon
Floodplain habitat loss has been extensive
Victoria
Seattle
WASHINGTON
Tacoma
82
Yakima
Richland
Longview
Portland
Salem
N
Diked Areas
Historic Floodplain
40
Kilometers

Tidal brackish and Freshwater Emergent Marshes Covered Large Areas


As did Tidal
Forested
Swamps

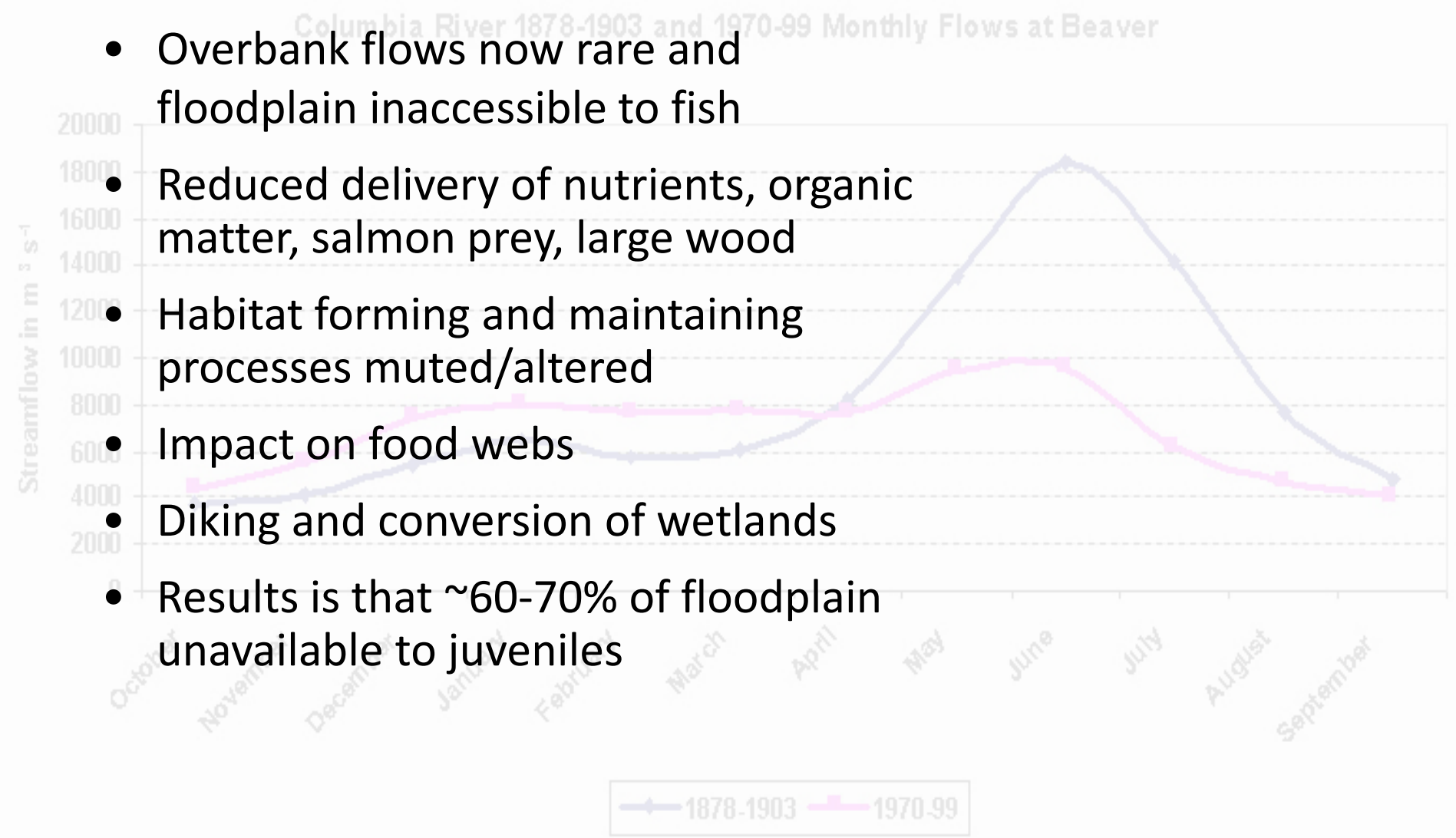

0
2.5
5
10 km
Map Legend
Lost Herb. Tidal WL
Herb. WL to Tidal Flat
Gained Herb. Tidal WL
Tidal Flat to Herb. Tidal WL
Intact Herb. Tidal WL
Changed Tidal WL Type: Herb. to Wooded
Changed Tidal WL Type: Wooded To Herb.
Water
Unclassified to Herb. Tidal WL
Area Not Analyzed
Note: 'Wooded' wetlands include 'Shrub-Scrub' and 'Forested' wetland types
Total loss = 118,961 acres (48,142 ha)
Lower Columbia River Reaches A and B:
Changes in **Herbaceous Tidal Wetlands**, 1880s to 2010

Flow Regulation has altered the amplitude and duration of the Spring-Summer pulse event (1878-1903 vs 1970-1999)



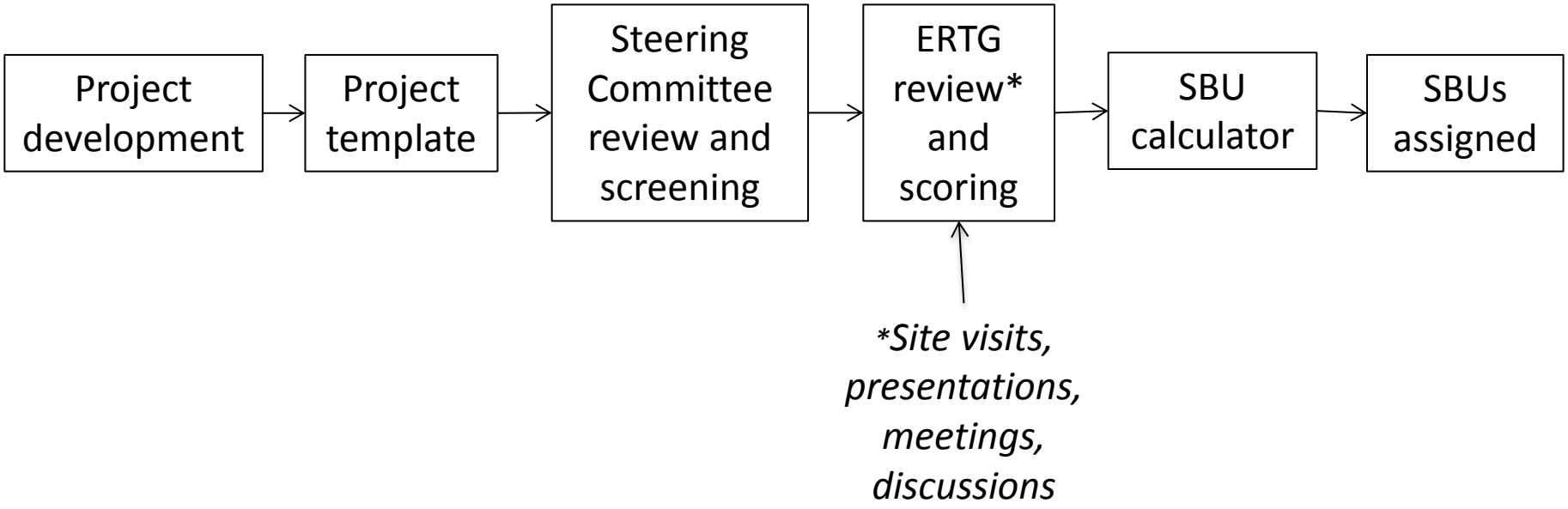
The Main Things Wrong in the System are…

- Overbank flows now rare and floodplain inaccessible to fish
- Reduced delivery of nutrients, organic matter, salmon prey, large wood
- Habitat forming and maintaining processes muted/altered
- Impact on food webs
- Diking and conversion of wetlands
- Results is that ~60-70% of floodplain unavailable to juveniles



Our Process for reviewing projects includes..

- A philosophy of being transparent, science-based, documented, repeatable.



- A monthly meeting to visit sites, hear presentations, advise proponents, discuss issues, score projects.

ERTG Developed a Semi-quantitative Process to Predict Effects of Actions…

- How much benefit will a proposed project action contribute to salmonid survival, and ultimately restoration of federally listed salmonid populations? (i.e., *what is the survival 'bump' from a project*?)
- How does this benefit translate into SBU's?
- ERTG improved a poorly specified yet legally constrained methodology to make it reproducible and standardized
- Process relies on regional research and monitoring, an organizing model, and expert opinion

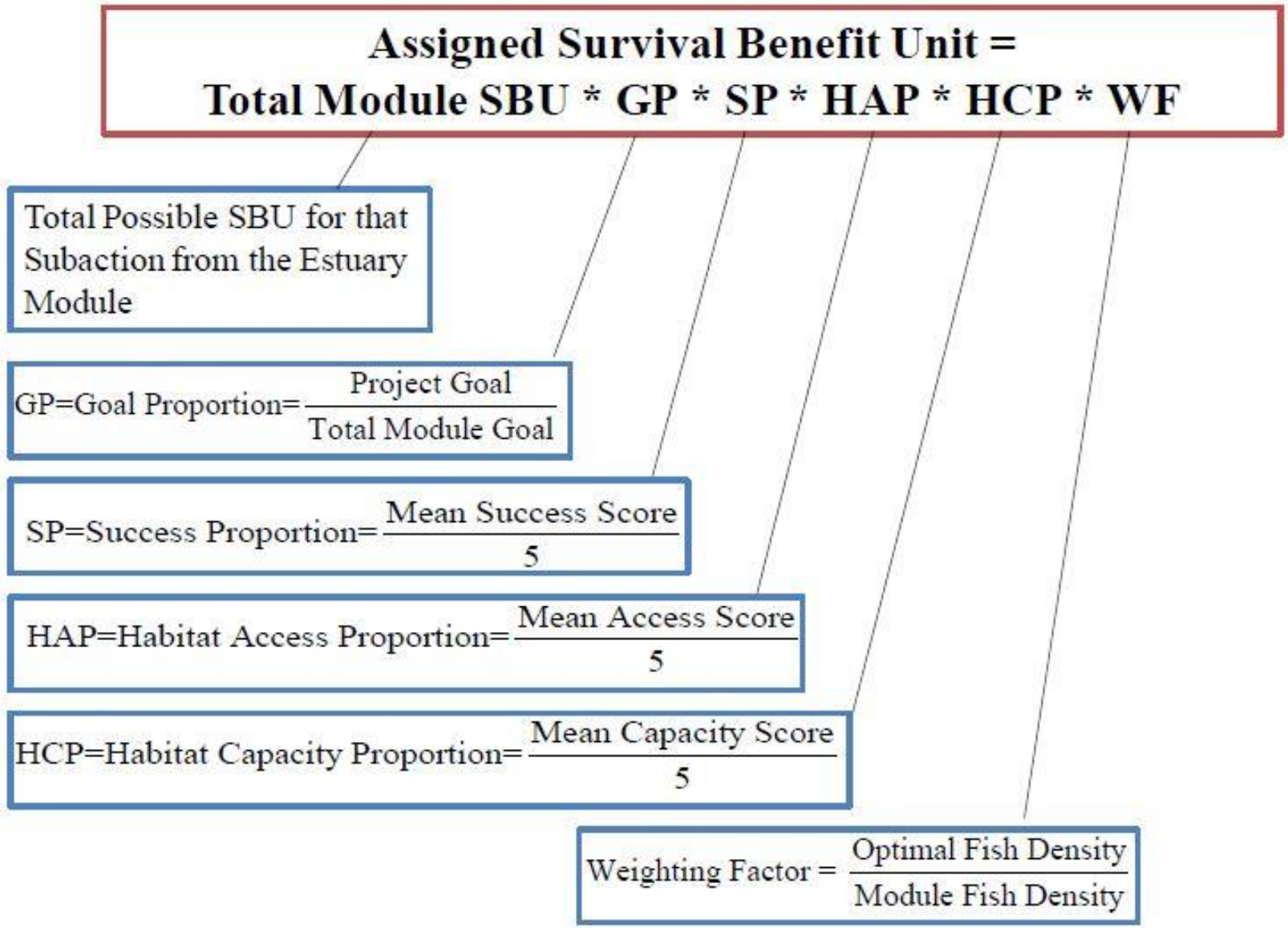
Elements of the ERTG Process are…

- ***Template*** for LCRE Habitat Restoration Projects – *standard format for all proposed projects; Specifically addresses topics related to scoring.*

- ***Scoring Criteria***, which defines the criteria and the scoring process –
  - *opportunity for fish to access or be served by the project,*
  - *capacity of the project to support salmonids (on and off site), and*
  - *the probability that the project will meet its goals*

- ***Calculator*** *– a simple model that uses criteria scores to calculate survival 'lift' for juveniles provided by the projects*

Calculator


Assigned Survival Benefit Unit =
Total Module SBU * GP * SP * HAP * HCP * WF
Total Possible SBU for that Subaction from the Estuary Module
GP=Goal Proportion= Project Goal / Total Module Goal
SP=Success Proportion= Mean Success Score / 5
HAP=Habitat Access Proportion= Mean Access Score / 5
HCP=Habitat Capacity Proportion= Mean Capacity Score / 5
Weighting Factor = Optimal Fish Density / Module Fish Density

The BiOP Specified Subaction Types and Goals that the ERTG Adjusted…

Module CRE	Description	Module Goal (acres or miles)	Module Fish Production (#/acre or mile)	Computed Module Fish Density (#/m^2)	ERTG Optimal Fish Density (#/m^2)	Weight*
CRE-1.4	Restore and maintain ecological benefits in riparian areas	28	2,500	0.625	0.1	0.16
CRE-9.4	Restore degraded off-channel habitats	6,000	25	0.006	0.1	16.7
CRE-10.1	Breach or lower the elevation of dikes and levees	5,000	65	0.016	0.1	6.25
CRE-10.2	Remove tide gates to improve the hydrology between wetlands and the channel	2,000	35	0.009	0.05	5.56
CRE-10.3	Upgrade tide gates	1,000	50	0.0125	0.025	2.0
CRE-15.3	Remove invasives	10,000	2.5	0.0006	0.0006	1.0

We Employ Three Criteria[1] for Scoring Projects Which are Graded from Low to High (Scale = 1-5)

- **Opportunity/Access**
  - *Connectivity for most species and life history types; Priority sites on the mainstem; Unencumbered access*

[1]Based on - Simenstad and Cordell (2000); Thom et al. (2011)

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- **Certainty of Success**
  - *Natural processes/landforms; Proven method; Self maintaining; Risk of detrimental effects; Project complexity; Certainty of fish benefit; Risk of exotic/invasive species*

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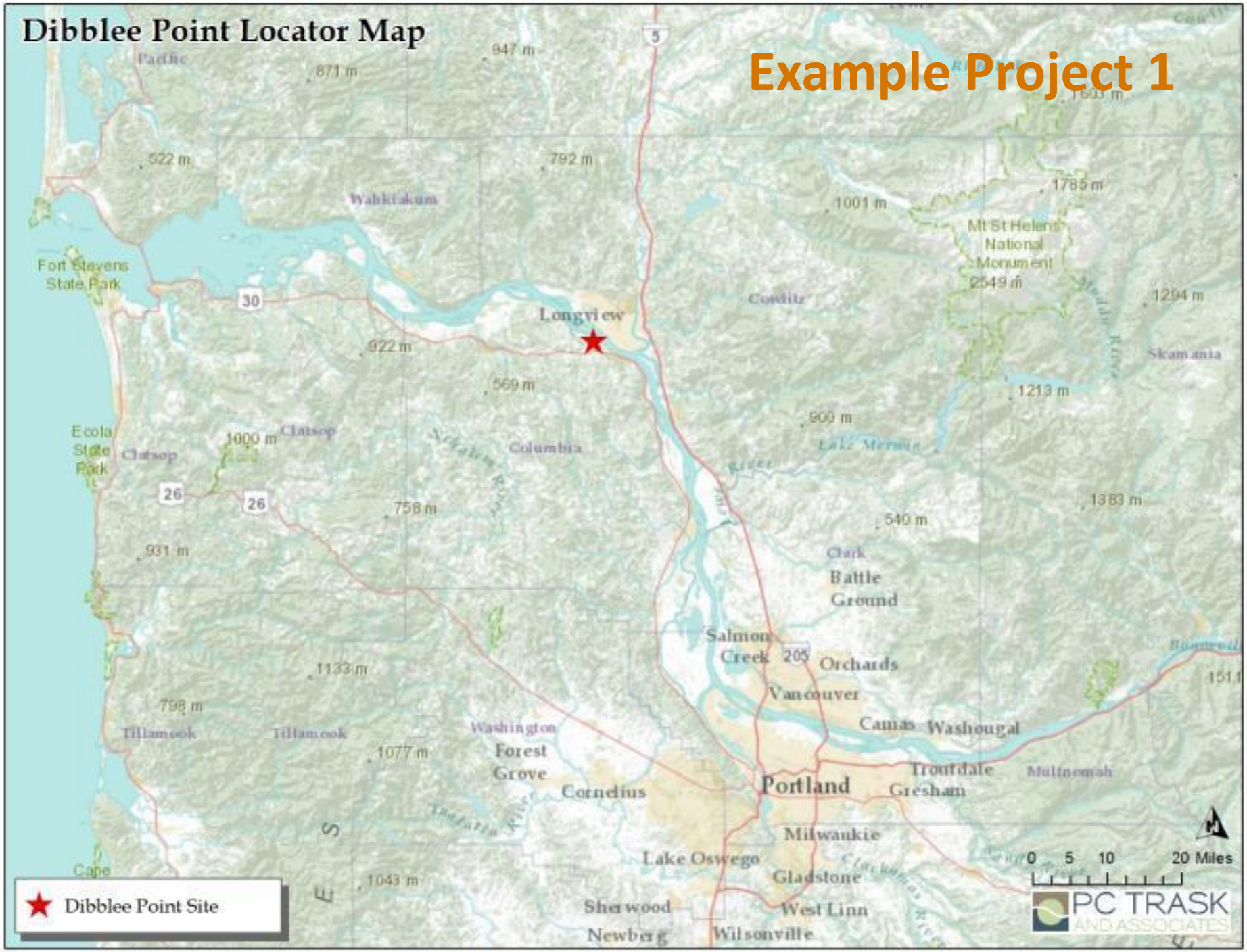

Dibblee Point Locator Map
Example Project 1
Longview
Portland
Vancouver
Camas
Washougal
Battle Ground
Salmon Creek
Orchards
Forest Grove
Cornelius
Hillsboro
Tillamook
Milwaukie
Lake Oswego
Gladstone
West Linn
Wilsonville
Sherwood
Newberg
Troutdale
Gresham
Multnomah
Fort Stevens State Park
Ecola State Park
Clatsop
Columbia
Cowlitz
Skamania
Mt St Helens National Monument
Lake Merwin
Washington
Clark
Pacific
Wahkiakum
947 m
871 m
522 m
792 m
1785 m
1001 m
2549 m
1294 m
922 m
569 m
1213 m
909 m
1000 m
758 m
931 m
1383 m
540 m
1133 m
798 m
1077 m
1043 m
1511
5
30
26
205
Dibblee Point Site
0 5 10 20 Miles
PC TRASK AND ASSOCIATES

Dibblee Point Landscape

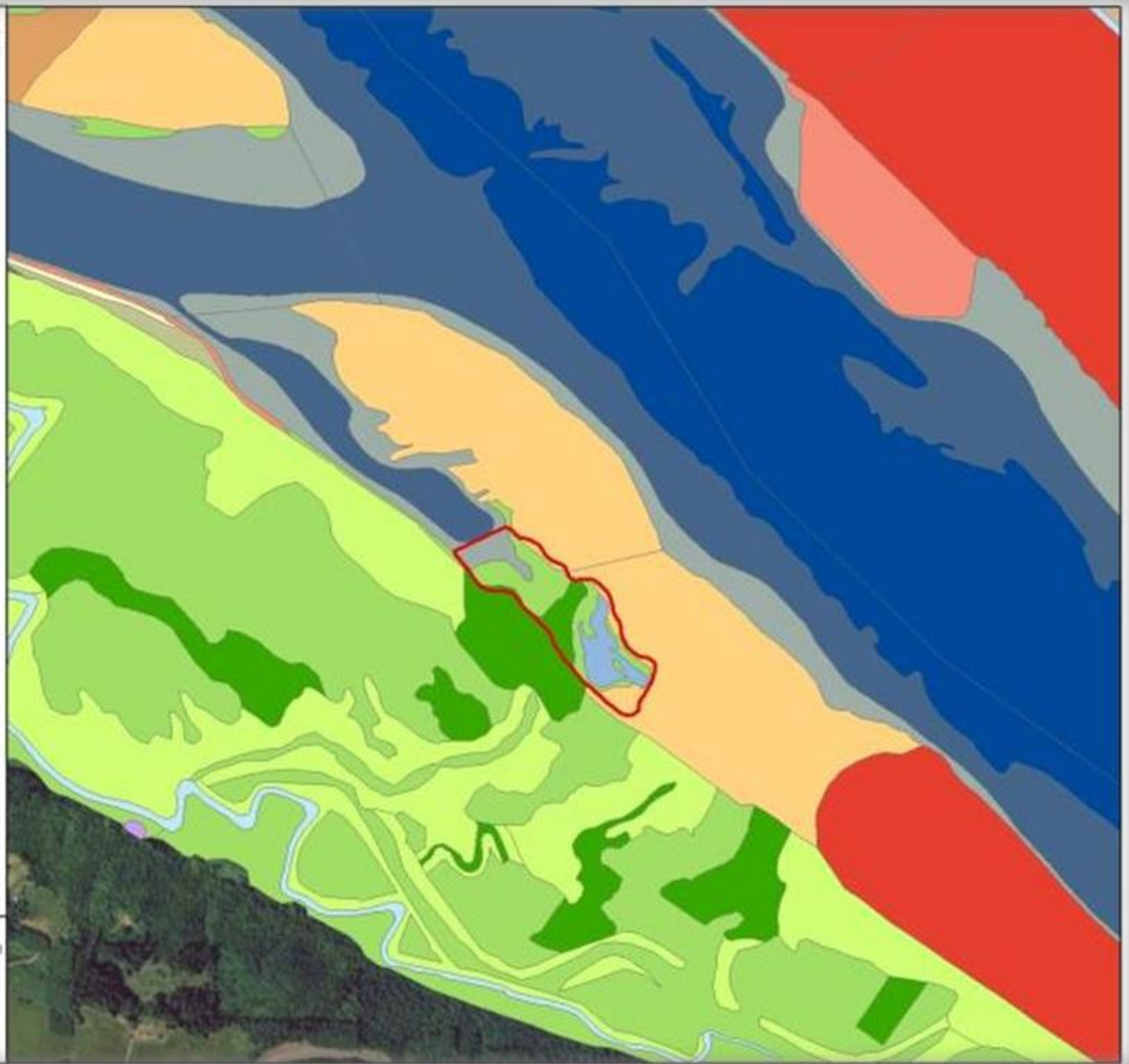
Landscape Planning Framework
Level 5: Geomorphic Catena

Dibblee Point Site

Geomorphic Catena

- Deep channel
- Developed floodplain
- Dredge spoils
- Filled areas
- Floodplain
- Floodplain channel
- Intermittently exposed
- Lake/pond
- Lower flooded
- Natural levee
- Permanently flooded
- Tidal channel
- Tributary fan
- Undifferentiated flooded
- Upper flooded
- Volcanogenic delta affected by Col. R. floods
- Wetland

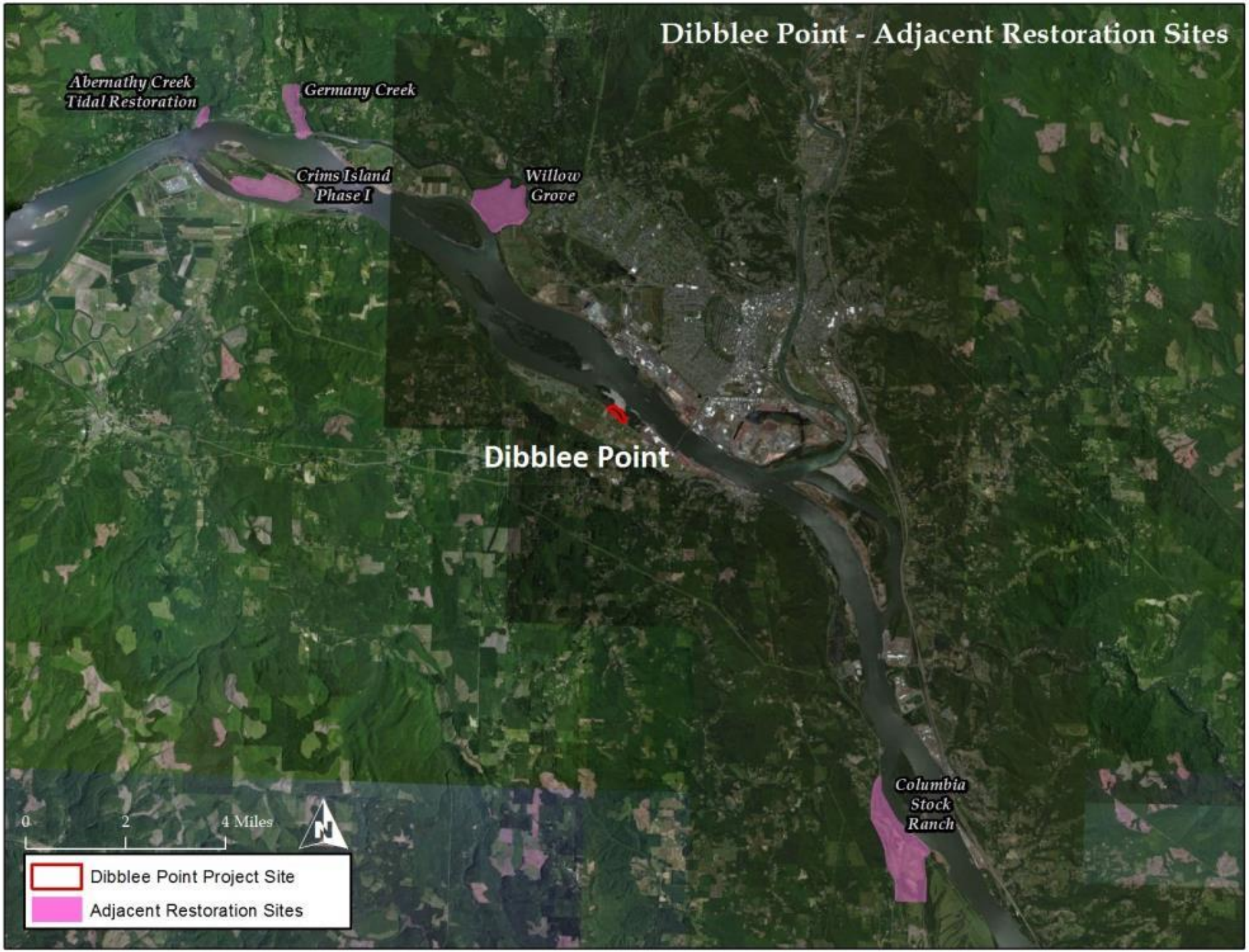
0 0.125 0.25 Miles

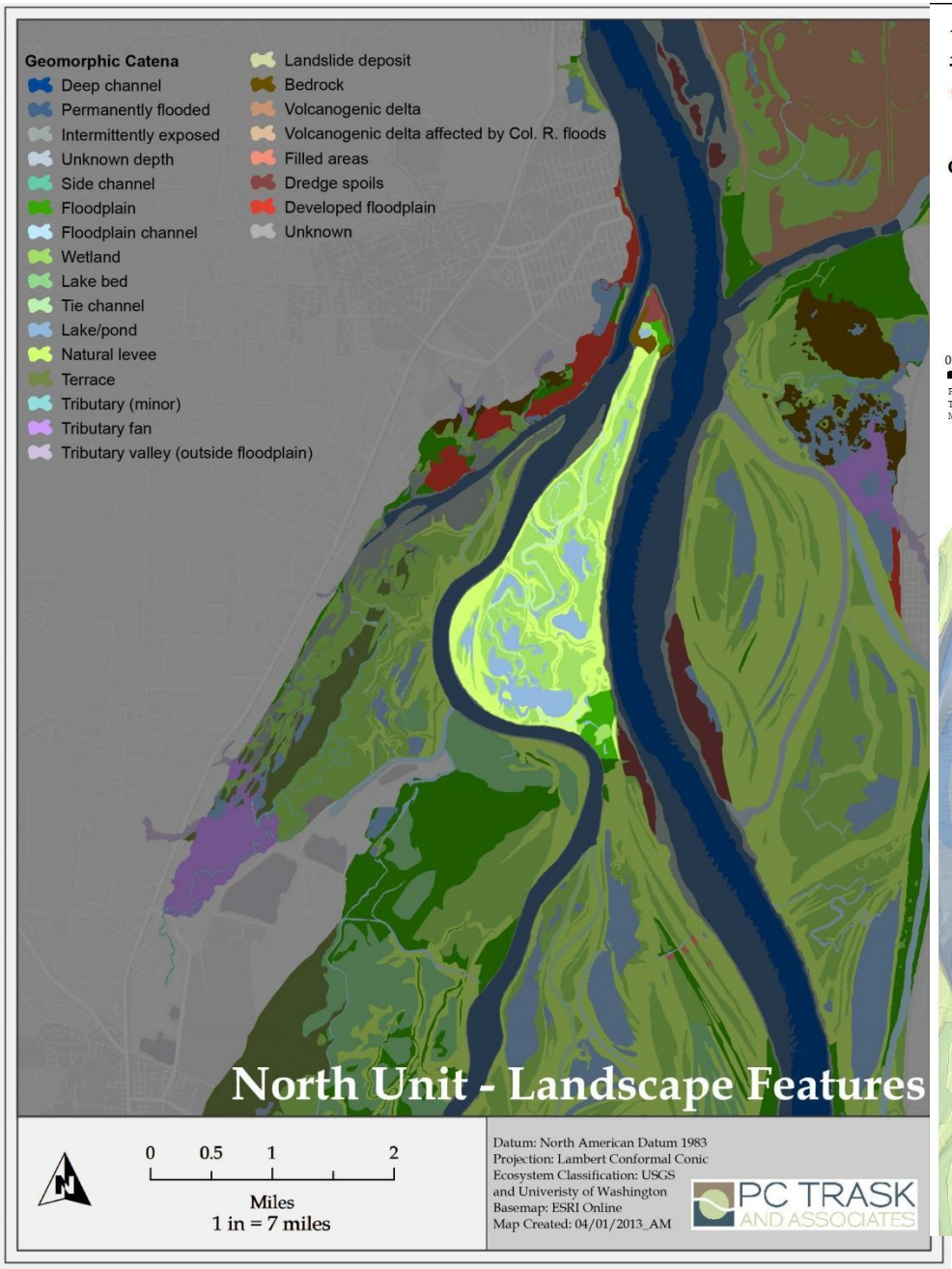


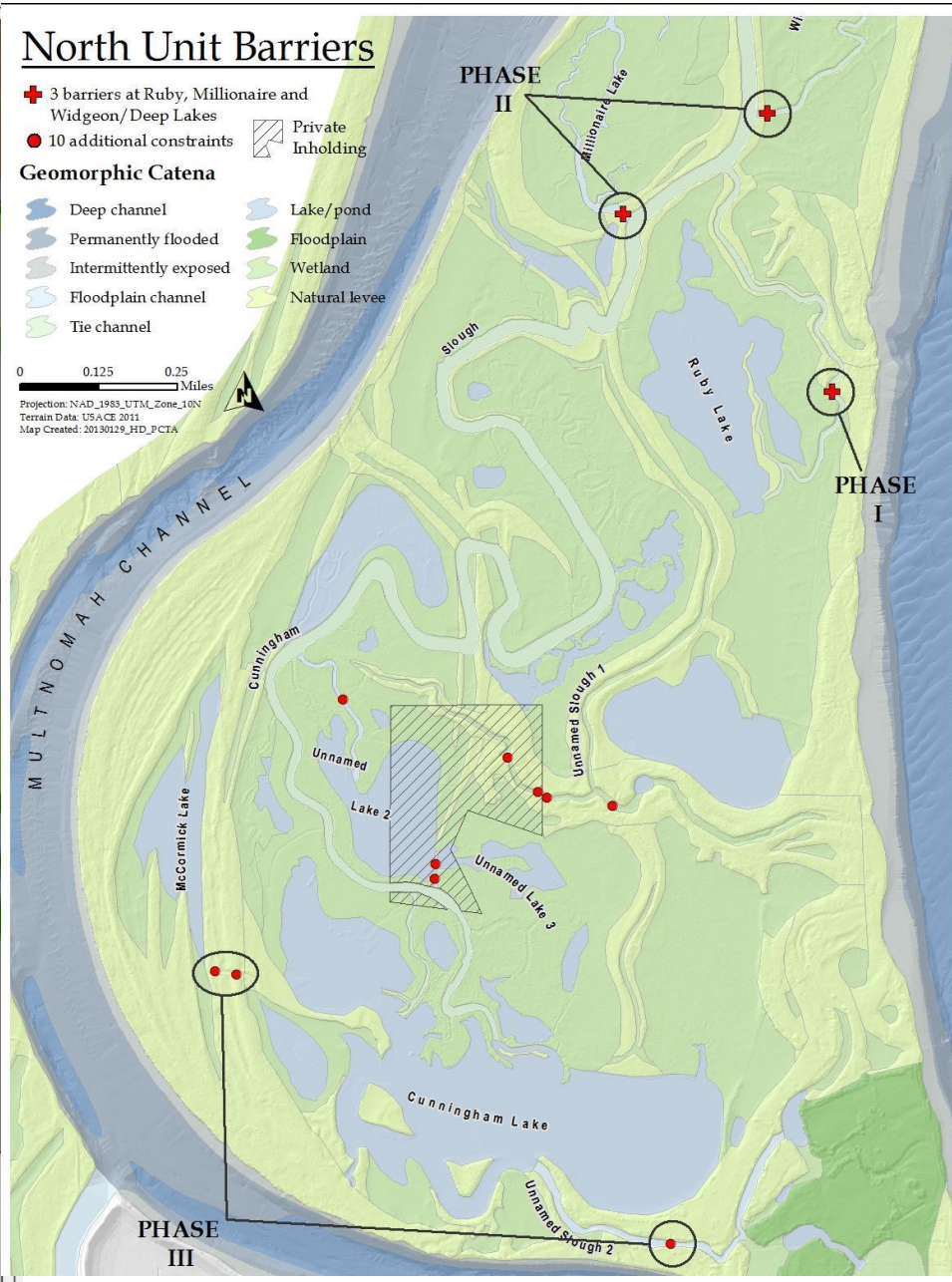
Source of Image: ESRI Online
Landscape layer: UW and USGS '12 (draft)
Projection: NAD_1983_HARN_StatePlane_Washington_South_FIPS_4602_Feet
Map Created: 03_06_13_AM

PC TRASK AND ASSOCIATES

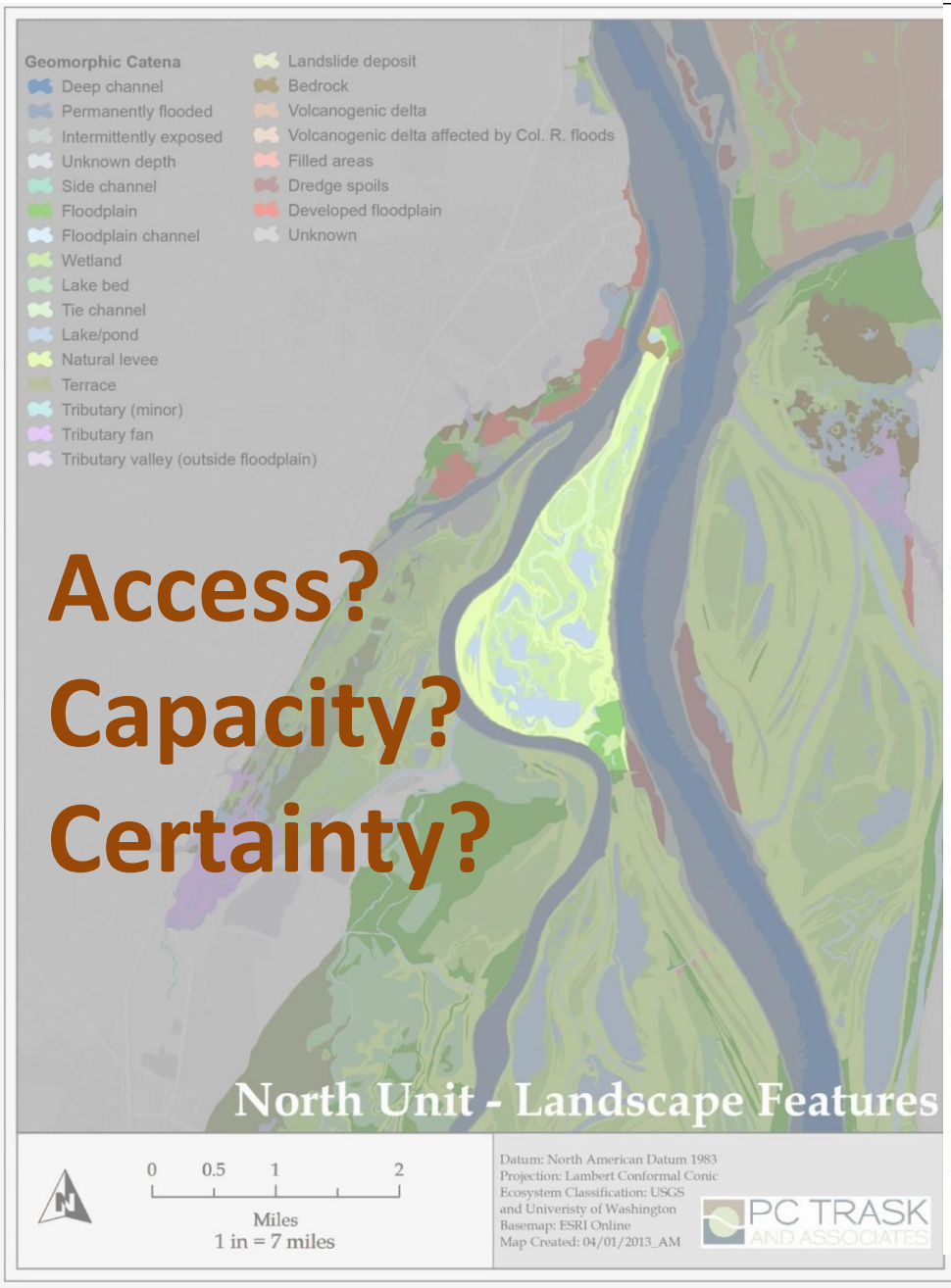

Dibblee Point Restoration Plan
Install pedestrian bridge
Replace existing 18 inch cuvlert with 14 foot culvert
Current topography effected by barrier removal = 11.2 acres at 2-year flood.
Scrape down road berm
Additional inundated acreage as result of excavation = .9 acres at 2-year flood.
Raise Road to 18ft
0 0.025 0.05 Miles
Sub-Actions
CRE 1.4 (.4 miles)
CRE 9.4 (1.1 acres)
CRE 10.1 (.2 acre)
CRE 10.2 (12.1 acres)
Inundation at 2 year flood = 14.1 ft
CRE 15.3 - Emergent and Riparian Plant Zone (2.1 acres)
Large wood installation
Elevation in ft NAVD88
High : >30 ft
Low : < 0 ft
CREST
PC TRASK AND ASSOCIATES
Terrain Model: USACE 2010
Excavation extent: ESA
Projection: NAD_1983_UTM_Zone10
Elevations in ft NAVD88
Map Created: 20130305_HD

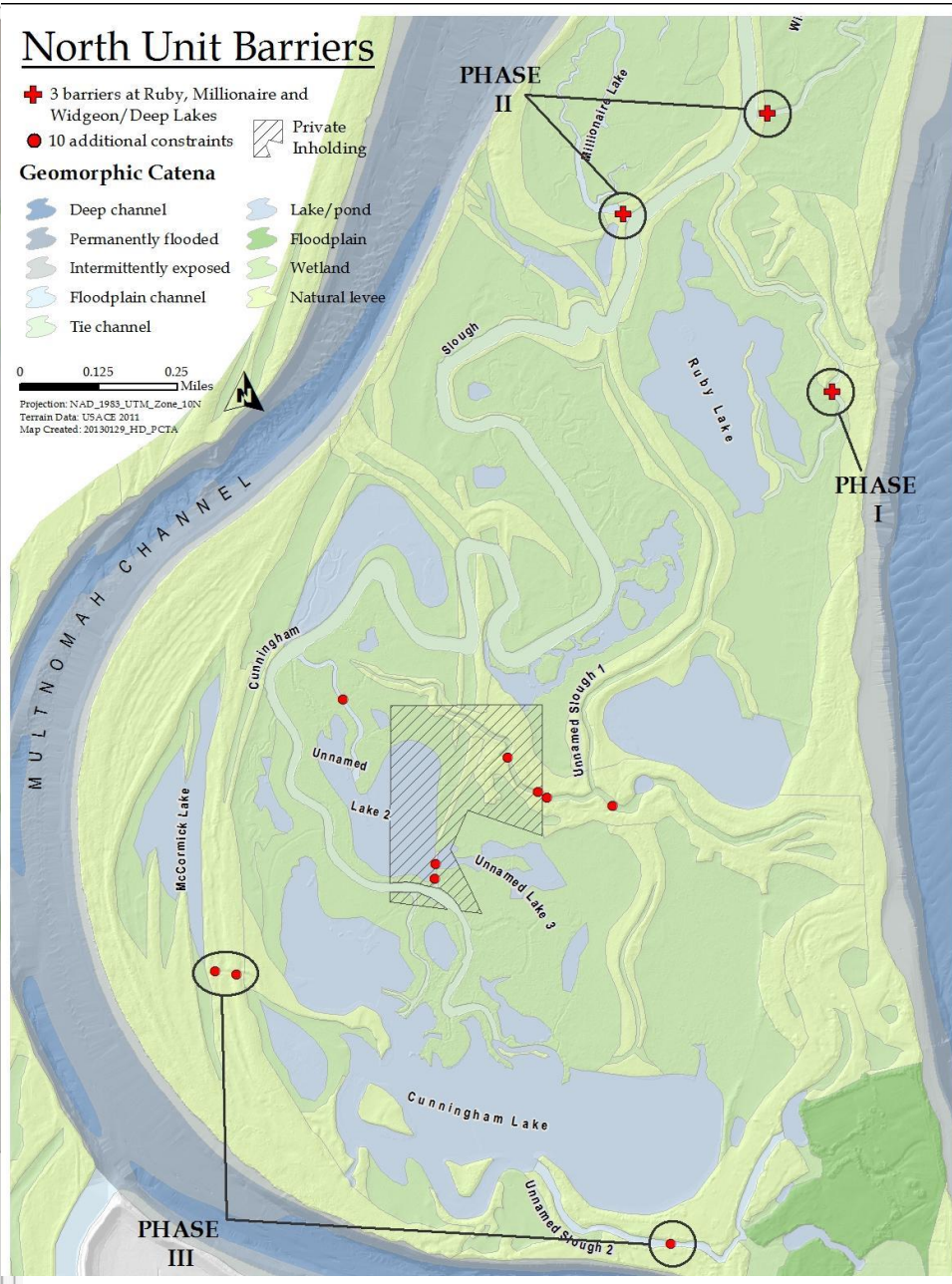

Dibblee Point - Adjacent Restoration Sites
Abernathy Creek Tidal Restoration
Germany Creek
Crims Island Phase I
Willow Grove
Dibblee Point
Columbia Stock Ranch
0
2
4 Miles
N
Dibblee Point Project Site
Adjacent Restoration Sites



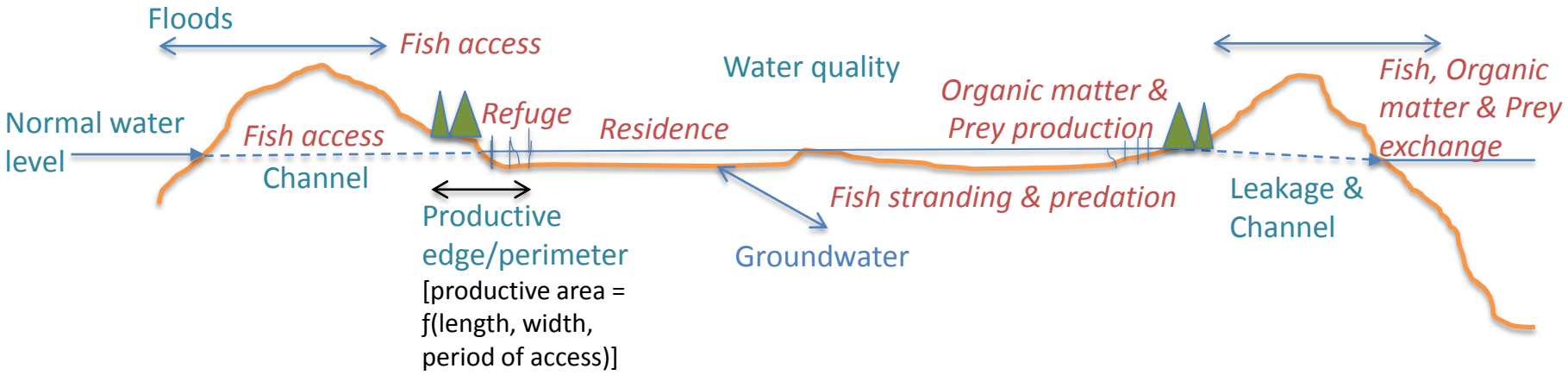


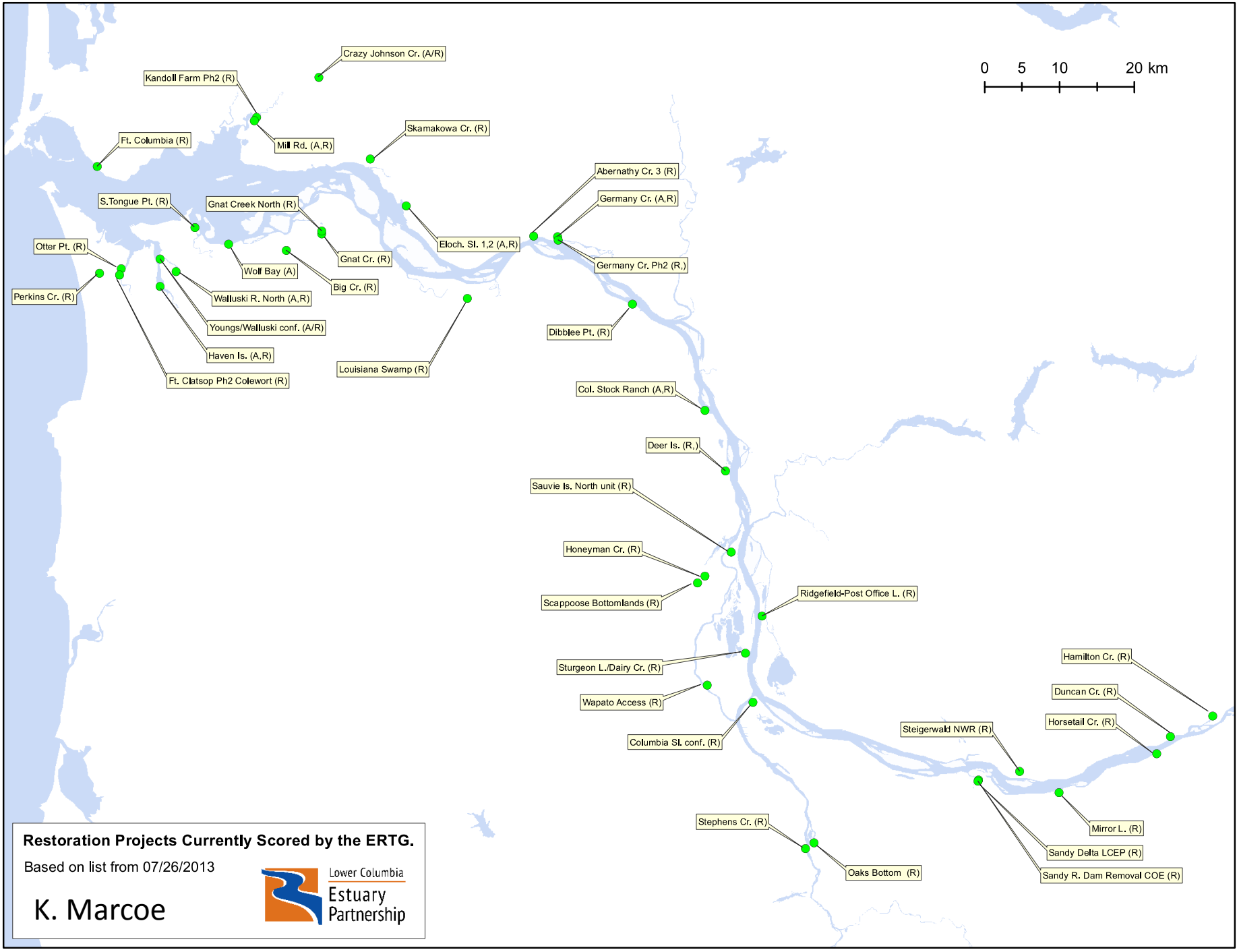
Example Project 2


Geomorphic Catena
Deep channel
Permanently flooded
Intermittently exposed
Unknown depth
Side channel
Floodplain
Floodplain channel
Wetland
Lake bed
Tie channel
Lake/pond
Natural levee
Terrace
Tributary (minor)
Tributary fan
Tributary valley (outside floodplain)
Landslide deposit
Bedrock
Volcanogenic delta
Volcanogenic delta affected by Col. R. floods
Filled areas
Dredge spoils
Developed floodplain
Unknown
Access?
Capacity?
Certainty?
North Unit - Landscape Features
0 0.5 1 2
Miles
1 in = 7 miles
Datum: North American Datum 1983
Projection: Lambert Conformal Conic
Ecosystem Classification: USGS and Univeristy of Washington
Basemap: ESRI Online
Map Created: 04/01/2013_AM
PC TRASK AND ASSOCIATES


North Unit Barriers
3 barriers at Ruby, Millionaire and Widgeon/Deep Lakes
10 additional constraints
Private Inholding
Geomorphic Catena
Deep channel
Permanently flooded
Intermittently exposed
Floodplain channel
Tie channel
Lake/pond
Floodplain
Wetland
Natural levee
0 0.125 0.25 Miles
Projection: NAD_1983_UTM_Zone_10N
Terrain Data: USACE 2011
Map Created: 20130129_HD_PCTA
PHASE II
PHASE I
PHASE III
Millionaire Lake
Slough
Ruby Lake
MULTNOMAH CHANNEL
Cunningham
Unnamed Slough 1
Unnamed Lake 2
McCormick Lake
Unnamed Lake 3
Cunningham Lake
Unnamed Slough 2

We Developed a Floodplain Lake Conceptual Model to Organize the Understanding of These Systems and Reveal Uncertainties





Restoration Projects Currently Scored by the ERTG.

Based on list from 07/26/2013

K. Marcoe

Lower Columbia Estuary Partnership

Restoration Projects and Subactions Reviewed by ERTG (as of July 2013)

Number of projects reviewed	56
Number of projects scored	41
Number of subactions scored:	136
Riparian restoration (1.4)	34
Channel restoration (9.4)	36
Complete levee breach (10.1)	17
Removal of tide gate (10.2)	10
Upgrade tide gates (10.3)	9
Remove invasive species (15.3)	27

Guidance Documents and Work Products are Developed to Address Issues, Inform Proponents, and be Transparent

- Project template
- Scoring criteria
- History of process and calculator
- Feedback on calculator
- Subaction guidance
- Meeting notes and SBU reports
- Uncertainties affecting scoring
- Elevation for delineating effective action area
- Floodplain Lake Considerations (drafted)
- Habitat creation (next)

In Summary, the ERTG…

- Developed a reproducible, standardized, defensible, transparent process
- Reconciled SBU calculations through best available science
- Utilizes ecosystem-based principles of ecosystem structure, processes and functions
- Can improve the process with new information
- Continues efforts to deal with nuances
- Continues efforts to make the process clear to proponents

Thanks for listening

- Contacts for more information:
  - Blaine Ebberts for copies of ERTG documents(blaine.d.ebberts@usace.army.mil)