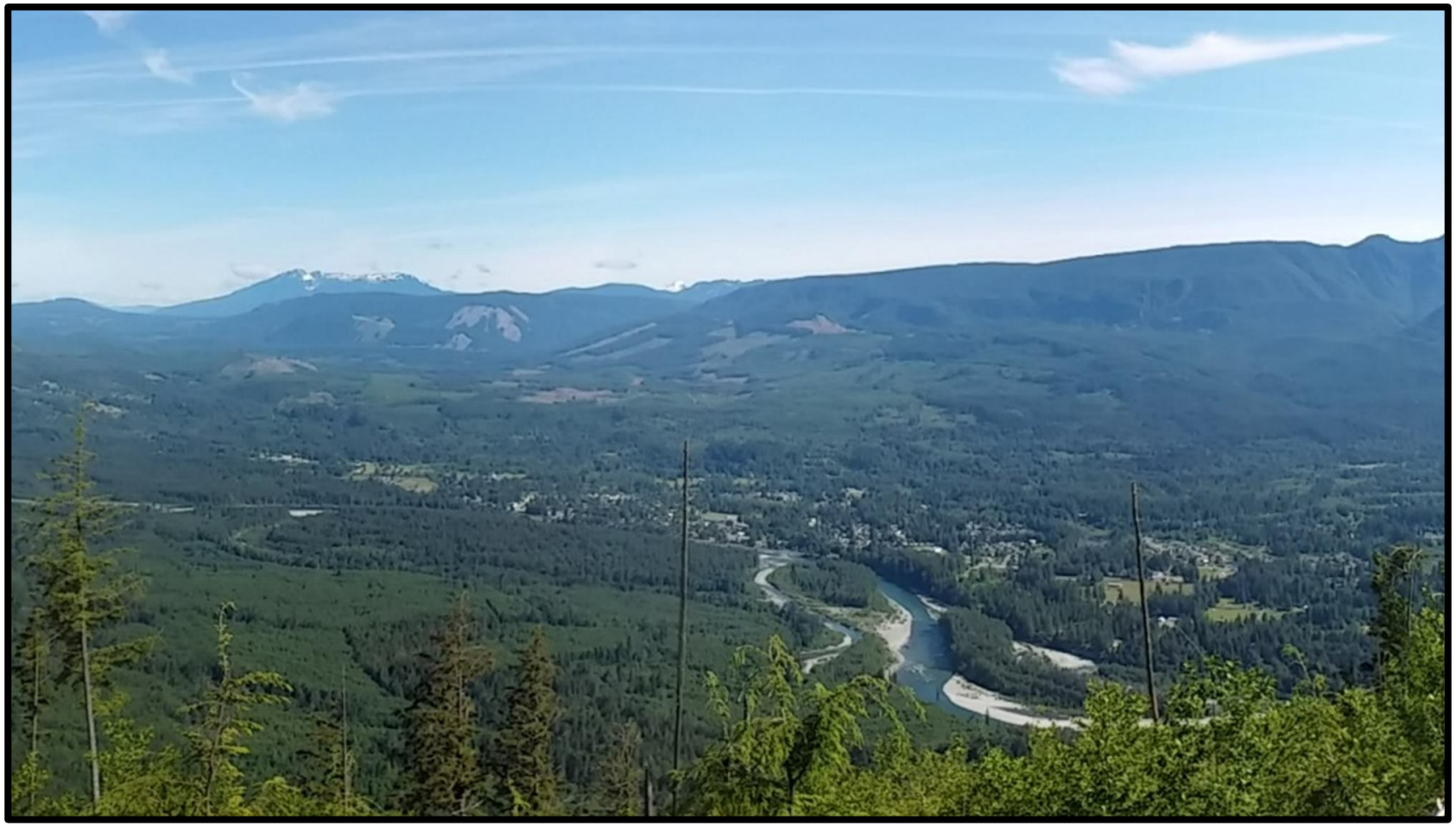
Snohomish Basin Floodplain Acquisition Strategy



Outline

- Purpose
- Goal
- Extent
- Background
- Overview of Draft Strategy
- Summary of Metrics and Scoring Criteria
- Premise behind each Metric and Preliminary Scoring
- Next Steps

Purpose

- **Guidance for implementation of Salmon Conservation Plan**
- **Prioritize parcels for conservation/restoration of floodplain/instream processes**
- **Potential to obtain proactive acquisition dollars**
- **Capitalize on opportunistic property availability**

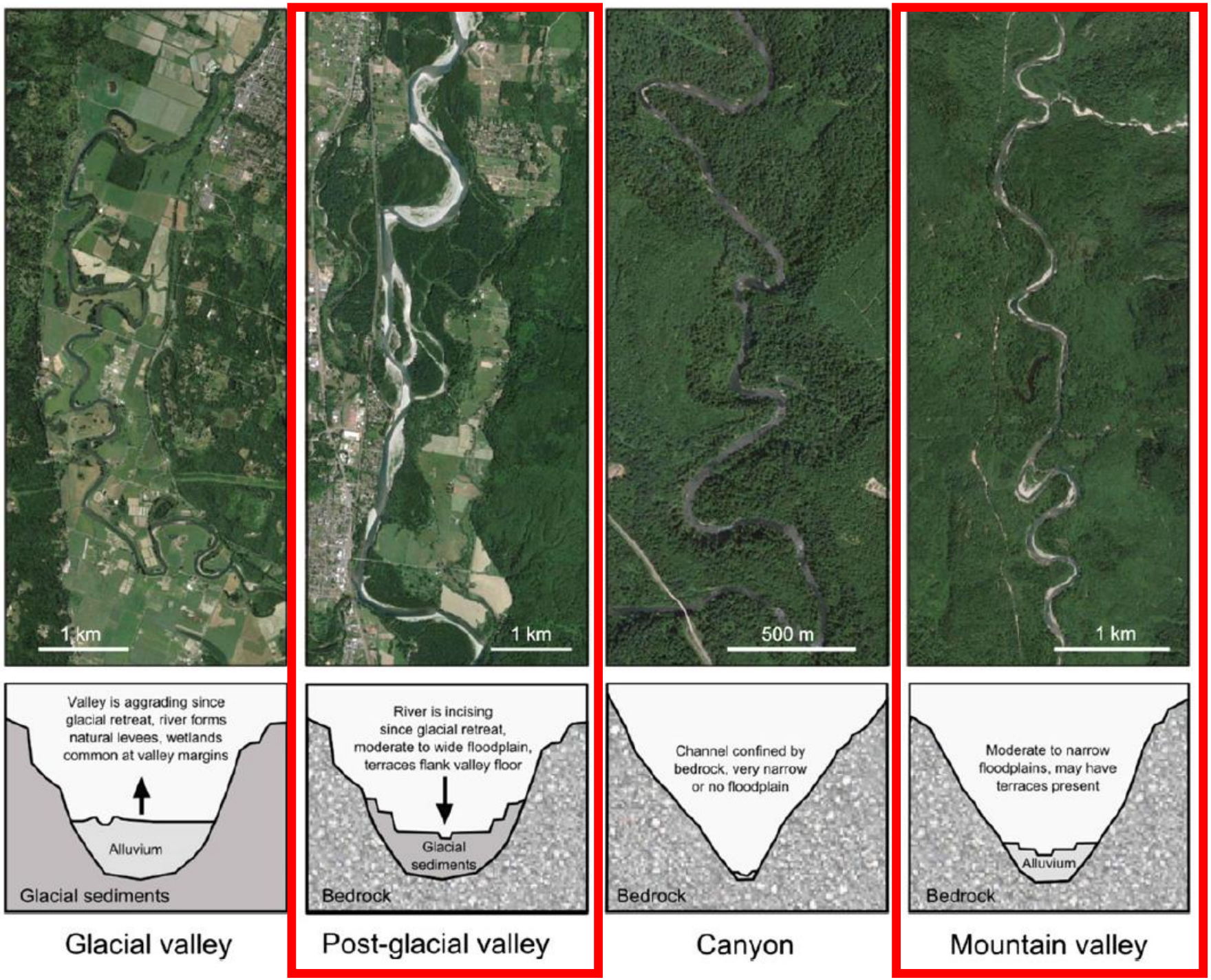
Goals

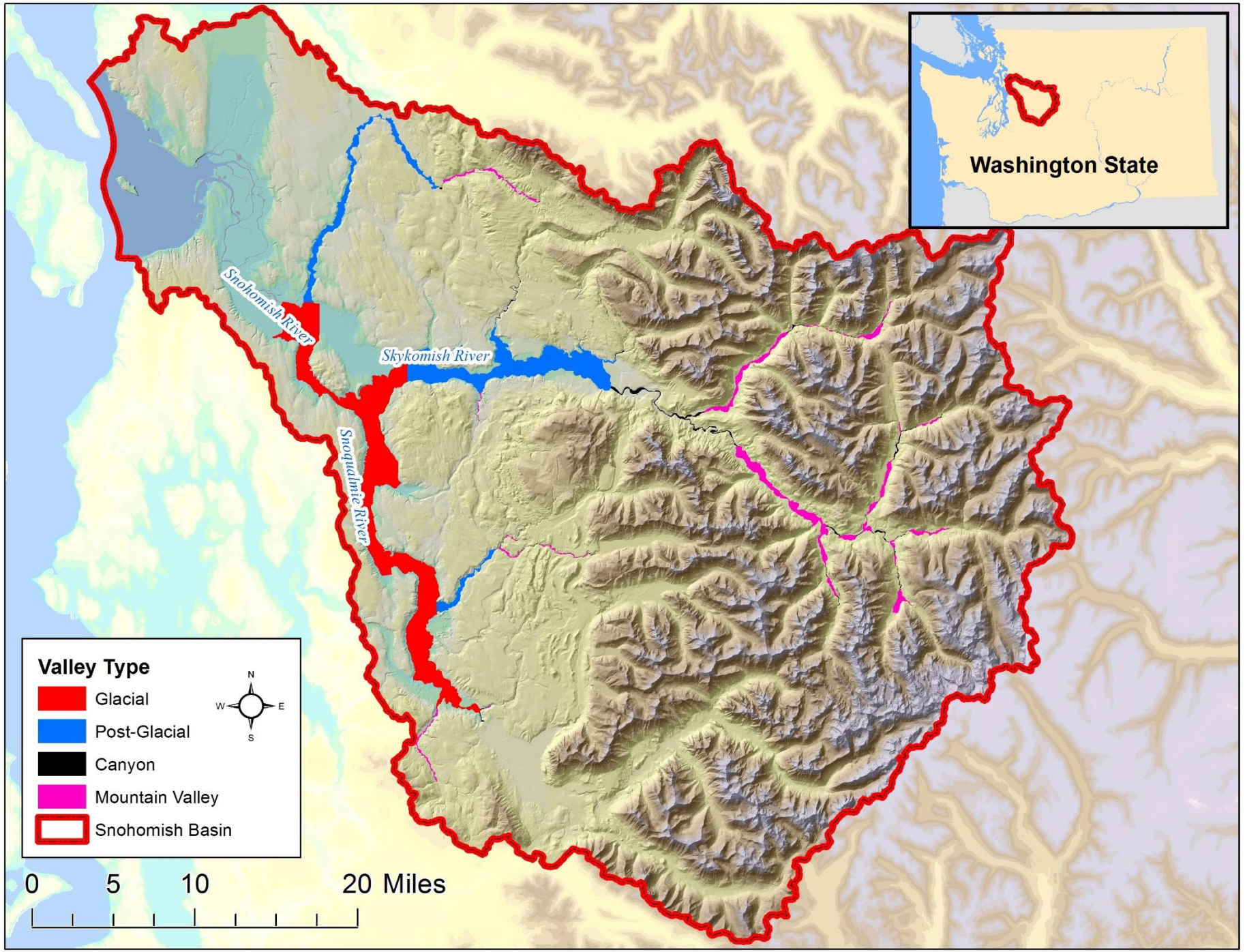
- Establish corridors of protected floodplains
- Accelerate restoration project implementation
- Flood storage/conveyance
- Human safety
- Decrease flood damage claims

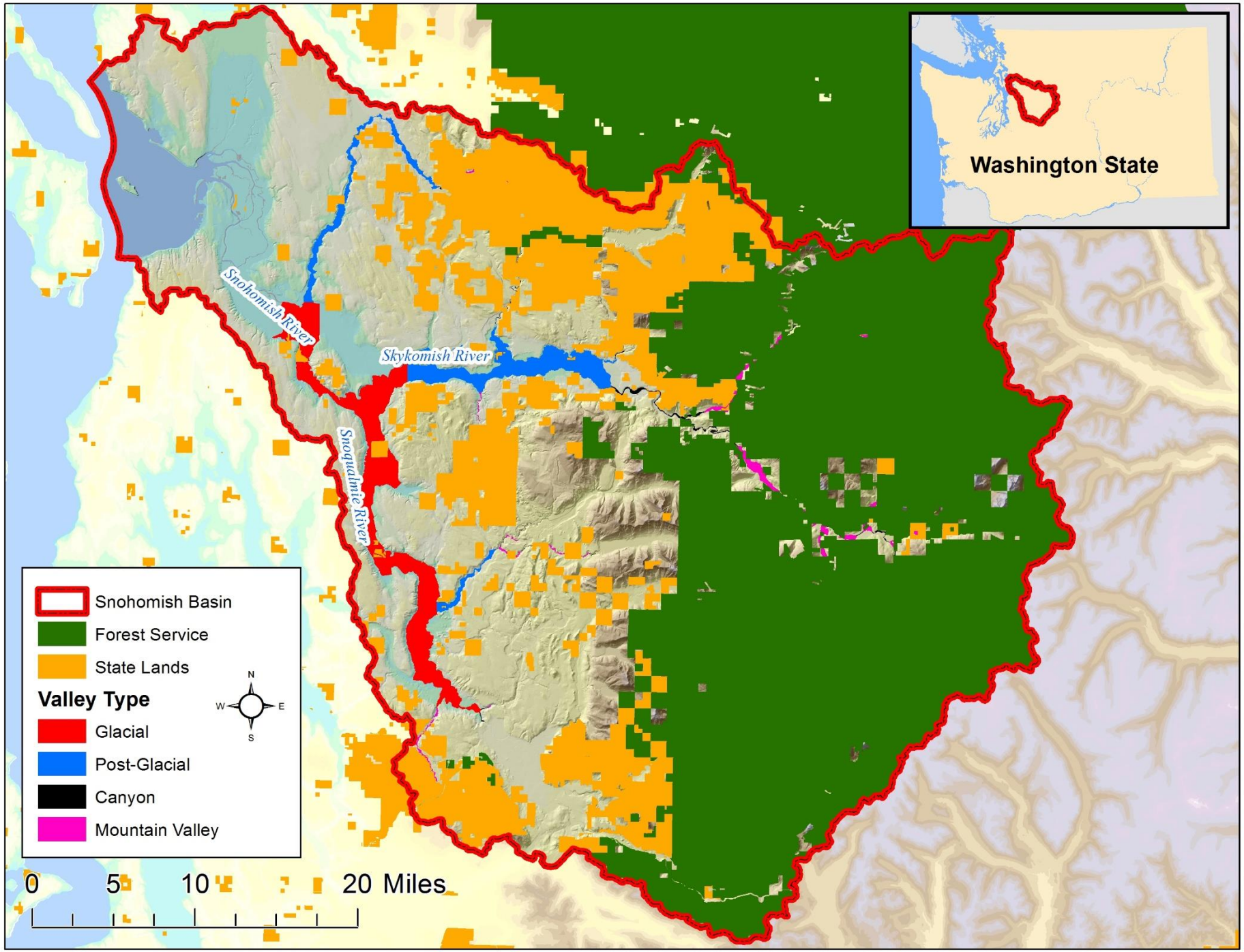
Washington State
Snohomish River
Skykomish River
Snoqualmie River
N
W
E
S
Potential Extent
Snohomish Basin
0
5
10
20 Miles

Extent Considerations

- Comparable Valley Types
- Relatively Contiguous
- Most Pressing Need
- Ending Near Upper Extent of Non-Protected Lands

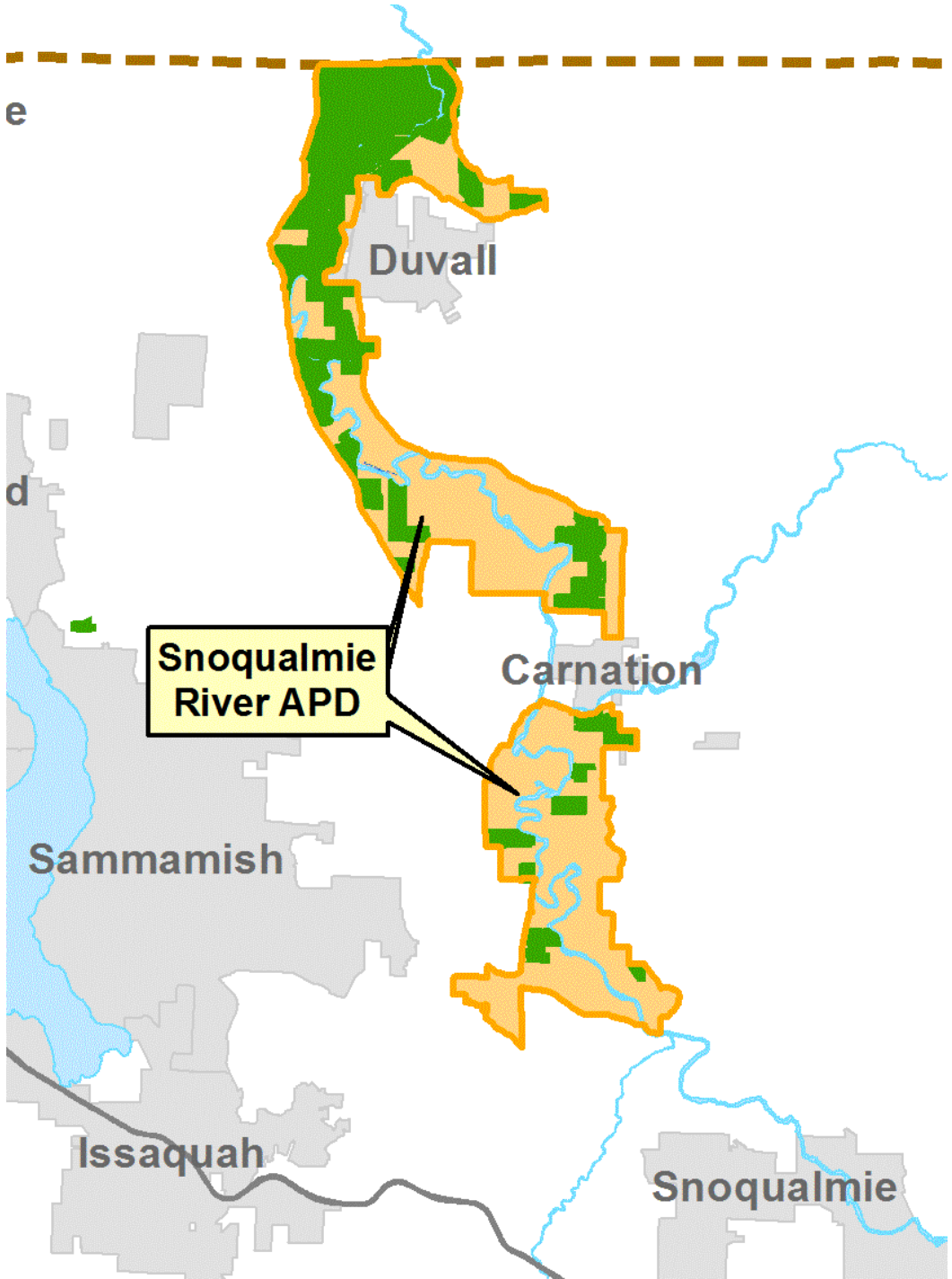

1 km
1 km
500 m
1 km
Valley is aggrading since glacial retreat, river forms natural levees, wetlands common at valley margins
Alluvium
Glacial sediments
River is incising since glacial retreat, moderate to wide floodplain, terraces flank valley floor
Glacial sediments
Bedrock
Channel confined by bedrock, very narrow or no floodplain
Bedrock
Moderate to narrow floodplains, may have terraces present
Alluvium
Bedrock
Glacial valley
Post-glacial valley
Canyon
Mountain valley

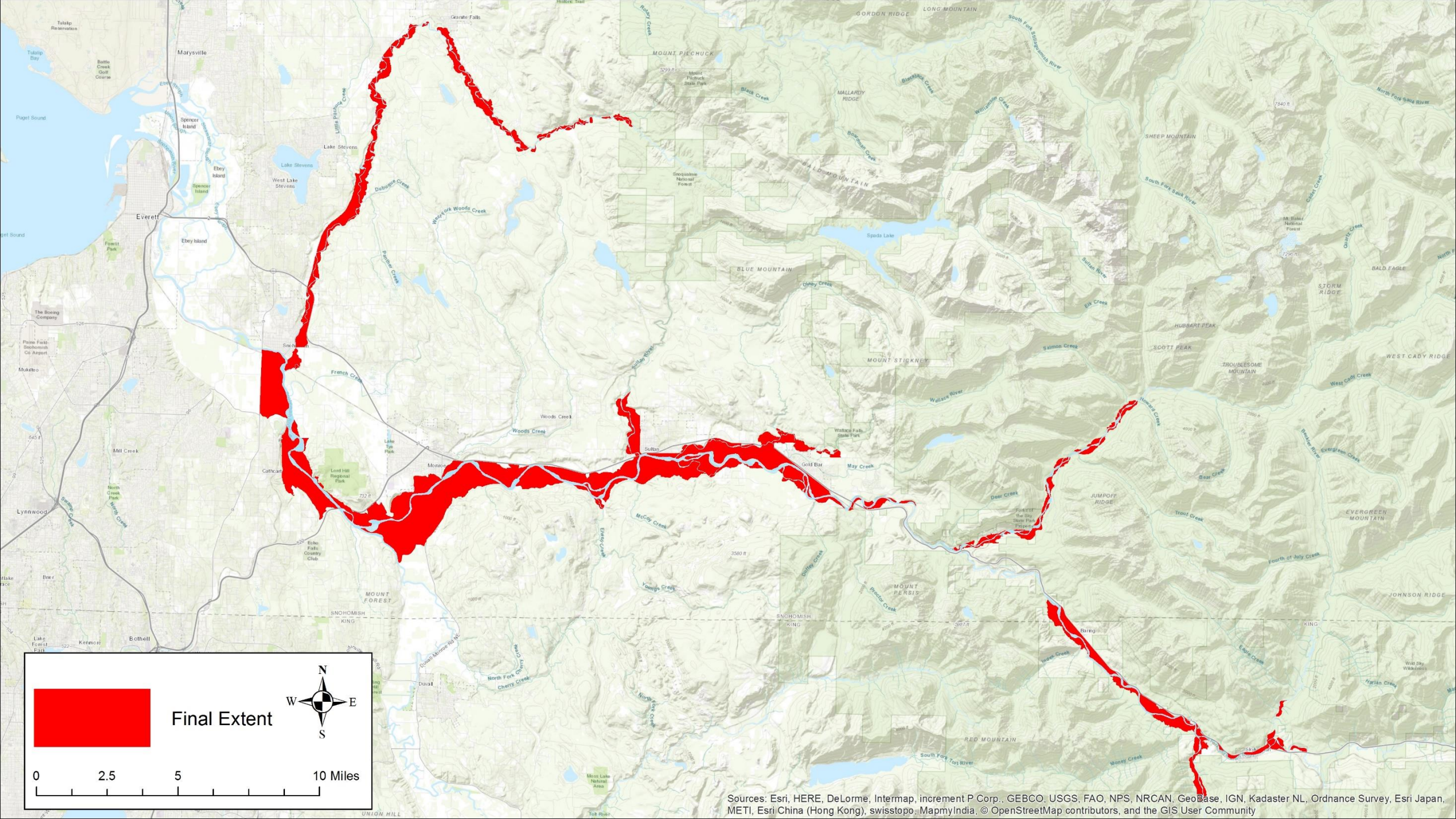

Washington State
Snohomish River
Skykomish River
Snoqualmie River
Valley Type
Glacial
Post-Glacial
Canyon
Mountain Valley
Snohomish Basin
N
W
E
S
0
5
10
20 Miles


Washington State
Snohomish River
Skykomish River
Snoqualmie River
Snohomish Basin
Forest Service
State Lands
Valley Type
Glacial
Post-Glacial
Canyon
Mountain Valley
N
W
E
S
0
5
10
20 Miles

King County Farmland Preservation

- Farmland Preservation Properties
- Agricultural Production Districts
- Incorporated Areas
- King County Boundary
- Major Roads



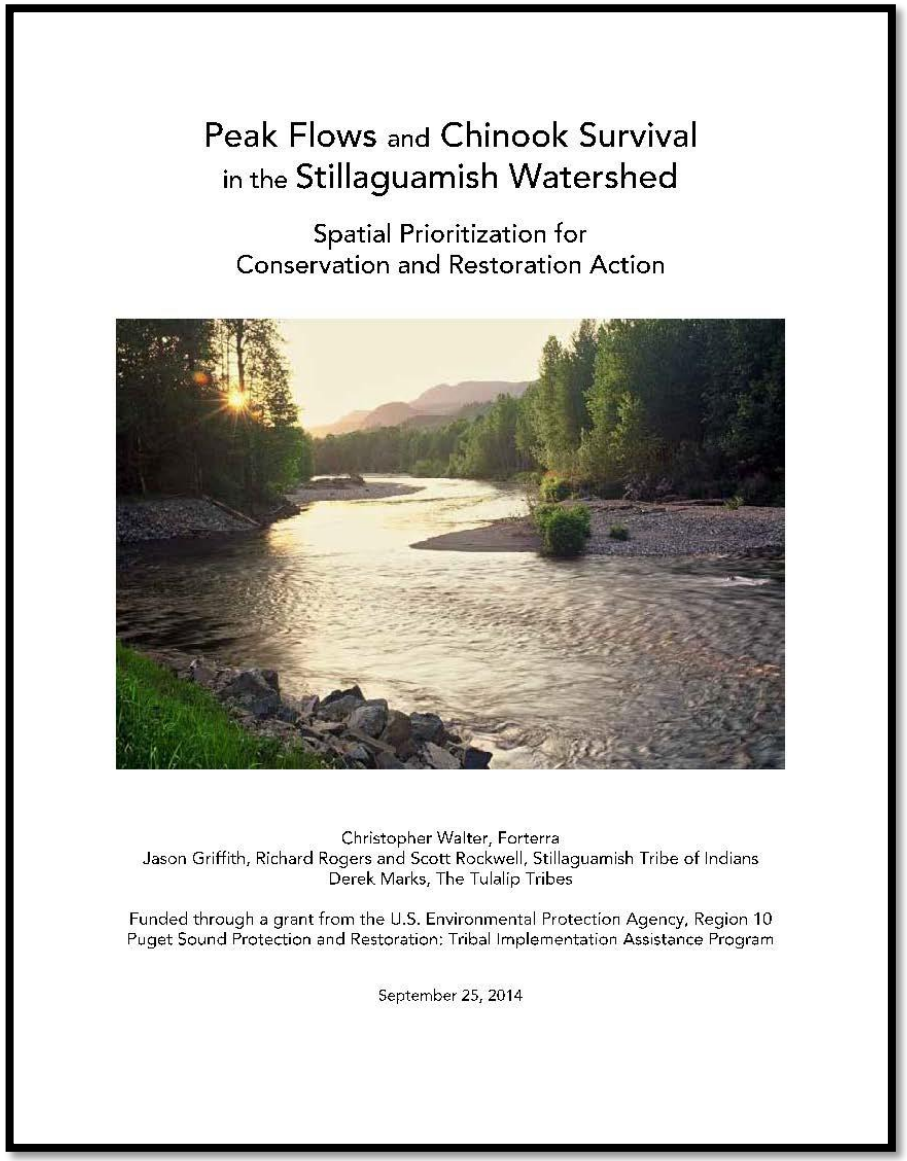

Final Extent
N
W
E
S
0
2.5
5
10 Miles
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Background

- Process based restoration is most effective (Beechie et al. 2010)
  - Channel migration, floodplain forest development, etc.
  - Requires large river adjacent areas and long time frames
- Connectivity is vital
  - Armoring/dike removal, etc.
- Long term opportunistic approach
- Only evaluates properties in a funding limited situation
  - All floodplain properties are high value
  - Prioritizes discrete units to be protected/restored incrementally

The Acquisition Strategy of the Stillaguamish Chinook Recovery Plan

- Draws Heavily from the EPA-funded Stillaguamish Peak Flows study
- Produced a GIS tool to prioritize floodplain areas
- Divides the active floodplain into “floodplain units” (FPUs)
- FPUs were ranked for conservation or restoration acquisitions
- Protected “corridor” approach



Peak Flows and Chinook Survival in the Stillaguamish Watershed

Spatial Prioritization for Conservation and Restoration Action

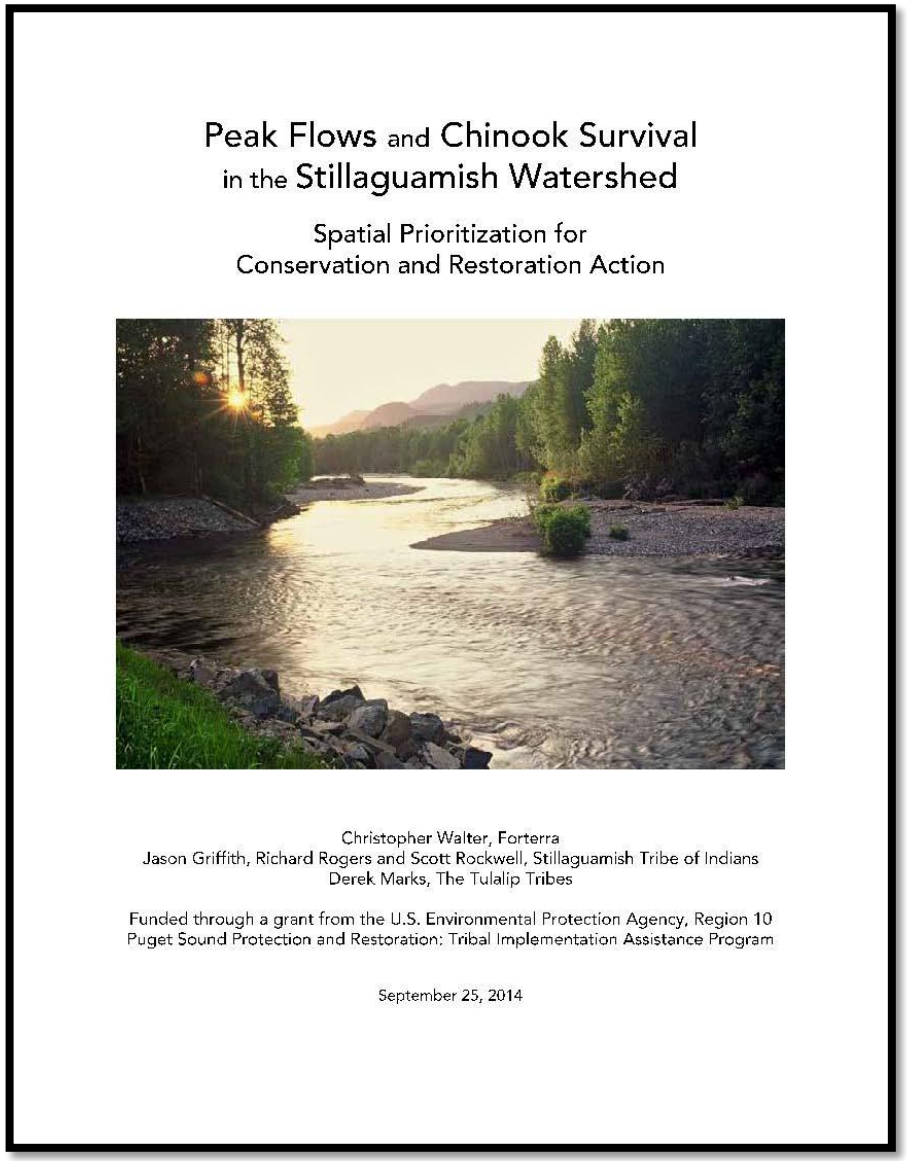
Christopher Walter, Forterra
Jason Griffith, Richard Rogers and Scott Rockwell, Stillaguamish Tribe of Indians
Derek Marks, The Tulalip Tribes

Funded through a grant from the U.S. Environmental Protection Agency, Region 10
Puget Sound Protection and Restoration: Tribal Implementation Assistance Program

September 25, 2014

The Acquisition Strategy of the Stillaguamish Chinook Recovery Plan

- Adopted by SWC 2015
- Closed on 312 Acres
- 7 Properties
- 400 Acres Pending
- Strategic Vision for Basin/Funders
- Visually Depicts Need/Scope
- Creates Acquisition Opportunities
  - (informs sellers)



Peak Flows and Chinook Survival in the Stillaguamish Watershed

Spatial Prioritization for Conservation and Restoration Action

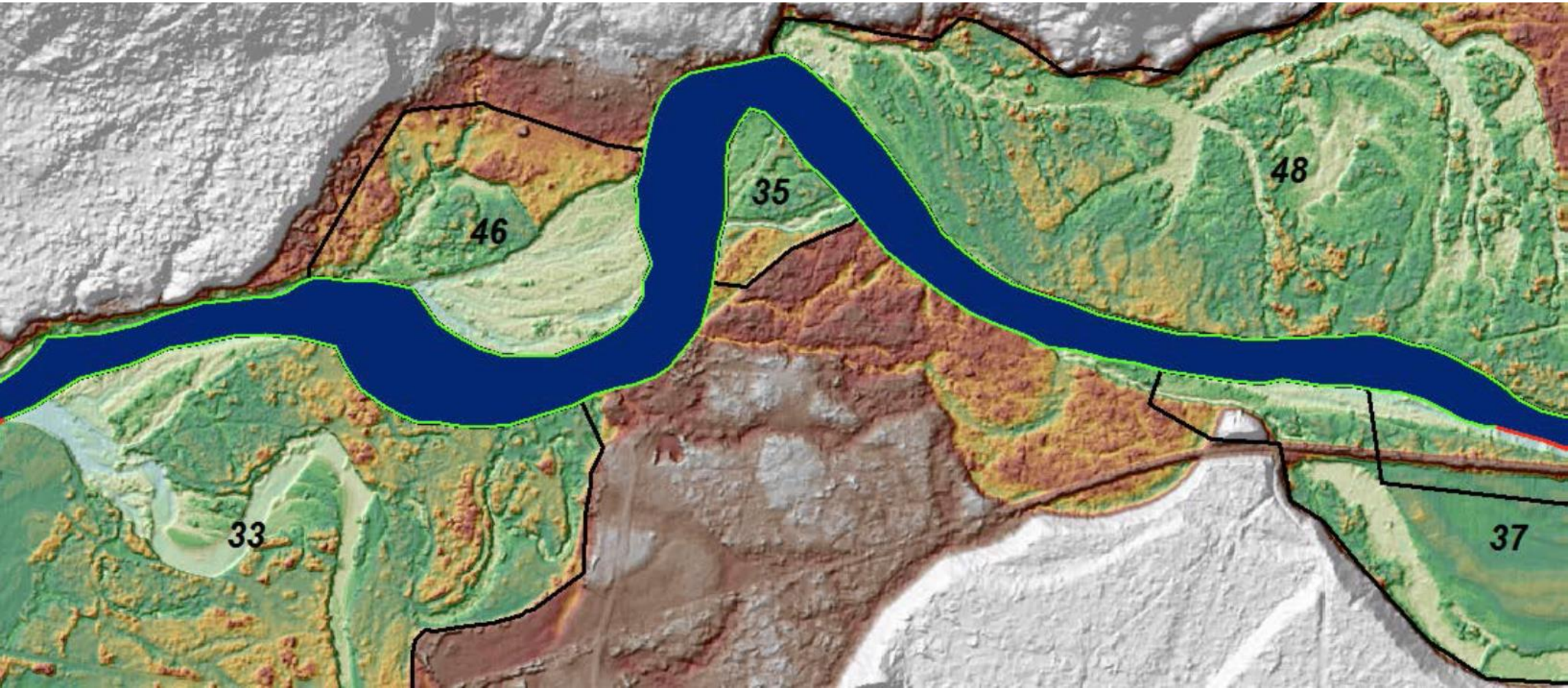
Christopher Walter, Forterra
Jason Griffith, Richard Rogers and Scott Rockwell, Stillaguamish Tribe of Indians
Derek Marks, The Tulalip Tribes

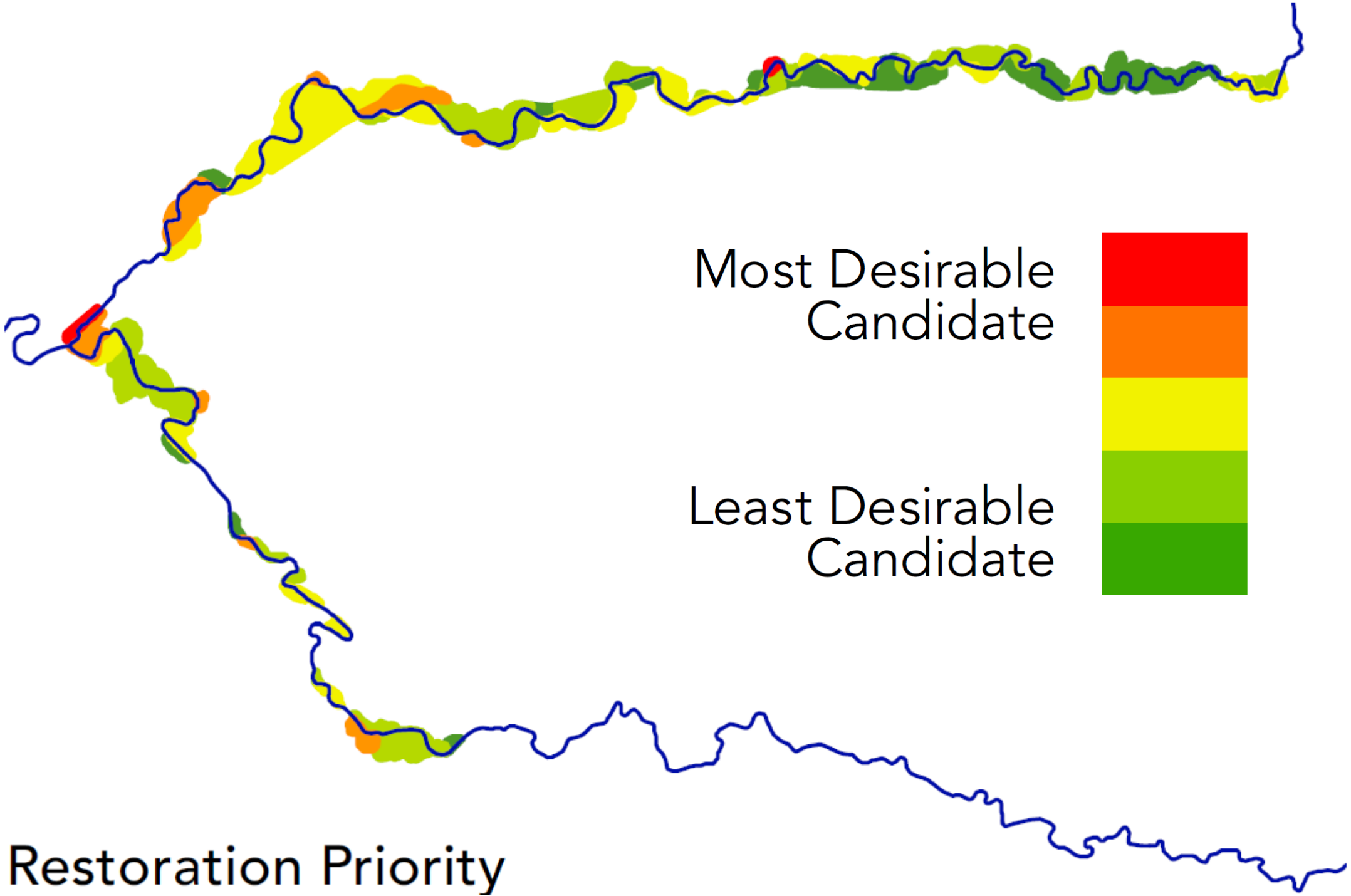
Funded through a grant from the U.S. Environmental Protection Agency, Region 10
Puget Sound Protection and Restoration: Tribal Implementation Assistance Program

September 25, 2014

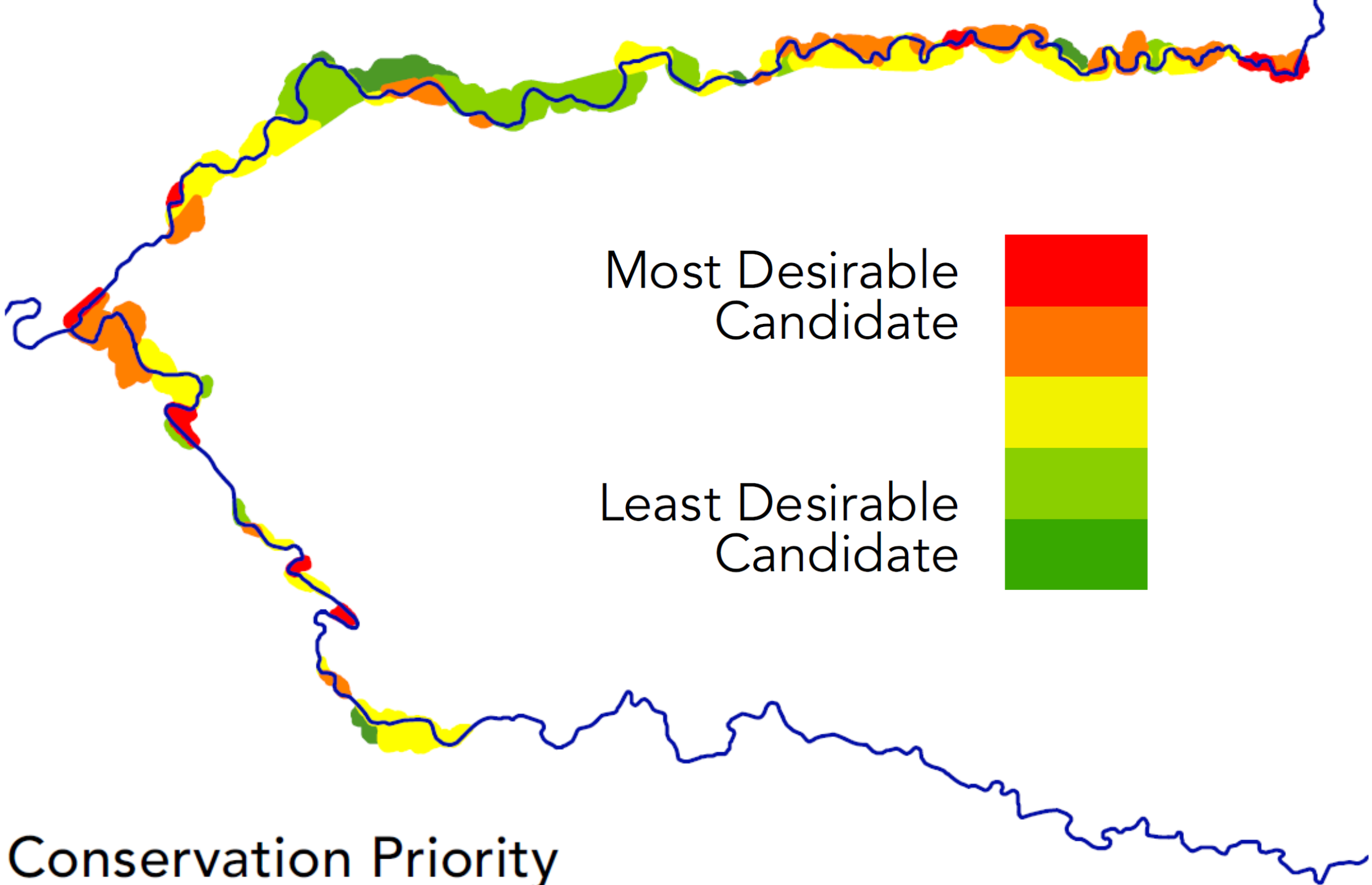
Floodplain Units

- Discrete portion of the floodplain that are expected to be affected as a “unit” if channel migration is allowed to resume
- ≤ 5’ above 100 year floodplain elevation
- Do not span the adjacent stream BFW
- Constrained by major transportation corridors (RR grades, Highways, etc.)
- Larger than 5 acres and substantially larger than the adjacent BFW
- Split where hydrologically distinct

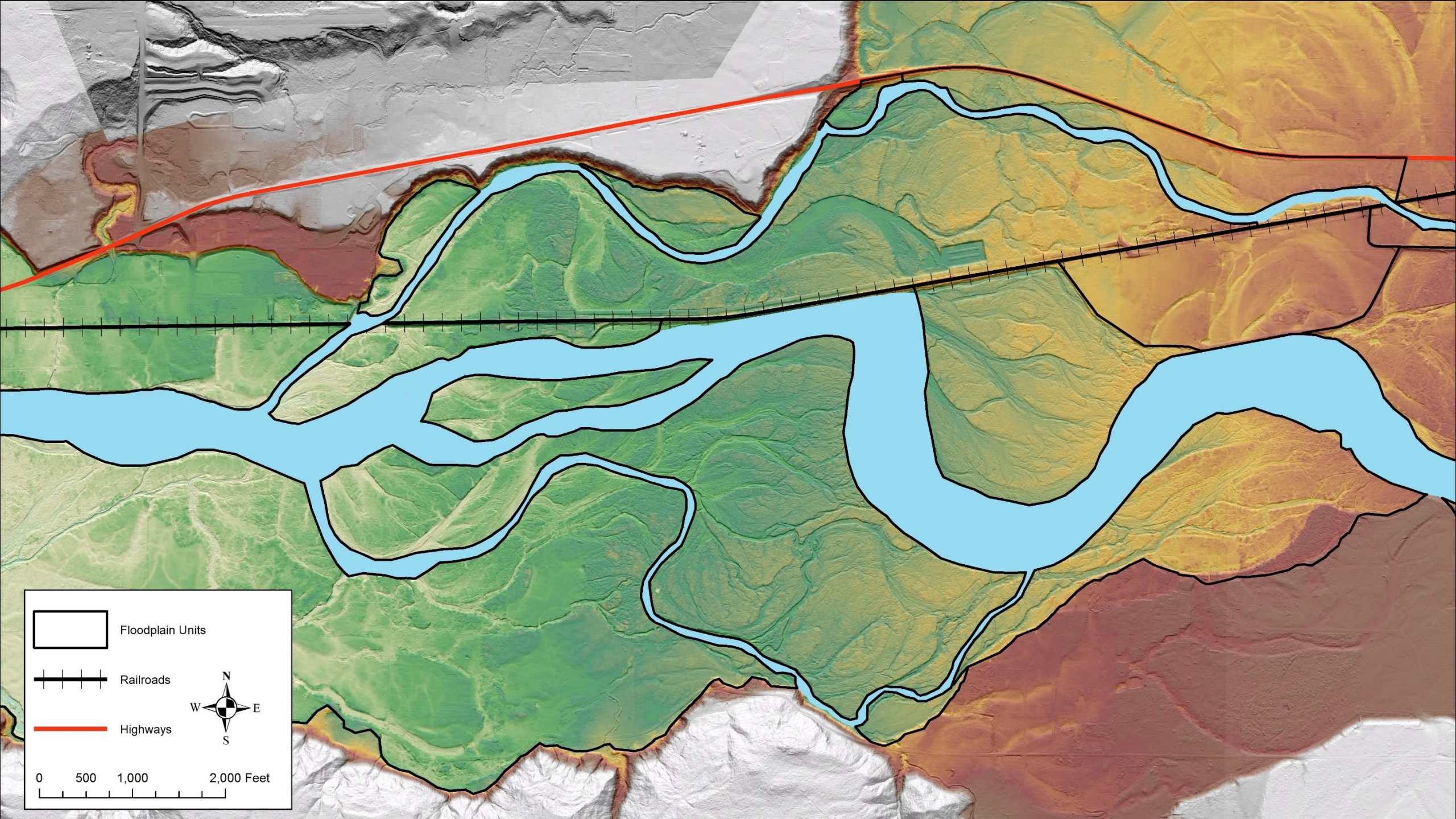

46
35
48
33
37

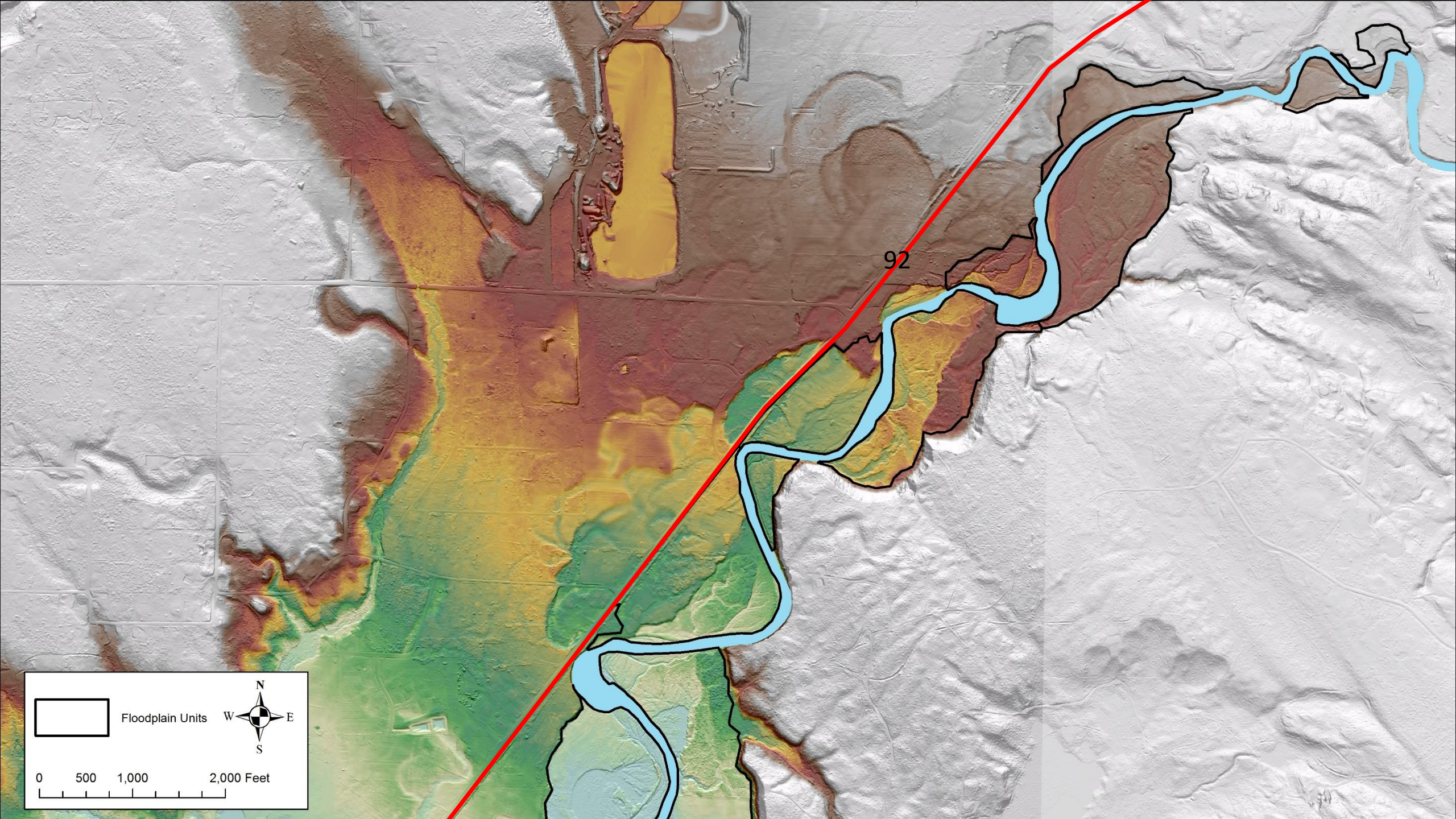


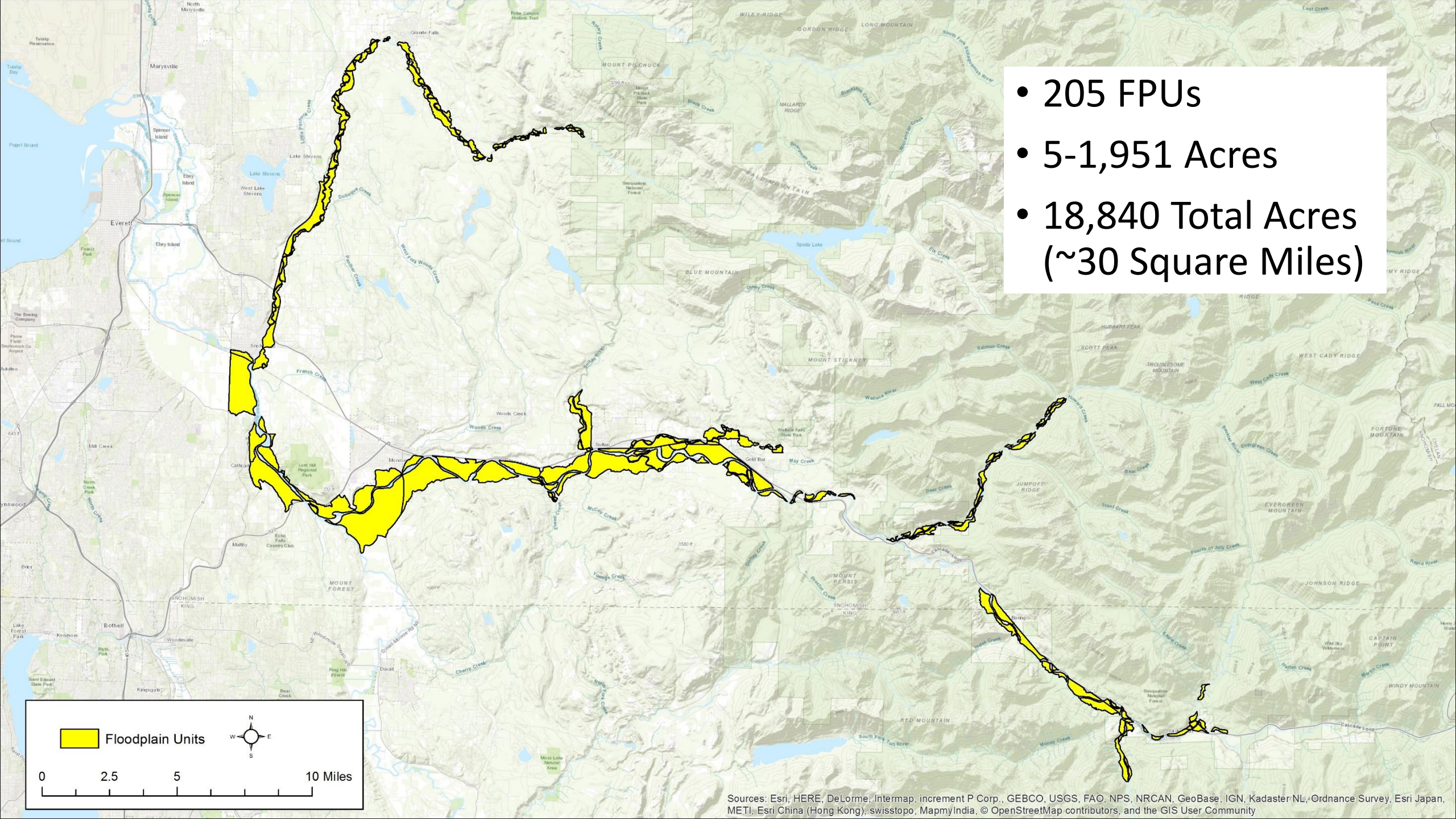
Restoration Priority



Conservation Priority


Floodplain Units
Railroads
Highways
N
W
E
S
0
500
1,000
2,000 Feet


92
Floodplain Units
N
W
E
S
0
500
1,000
2,000 Feet



- 205 FPUs
- 5-1,951 Acres
- 18,840 Total Acres (~30 Square Miles)

Category	FPU Metric	Scoring Criteria
Importance	Relative Elevation	FPU Elevation Relative to the 100-Year Flood Elevation
	Flow Importance	FPU Water Flow Importance (Delivery, Discharge, Recharge, & Surface Storage)
	Sub-Basin Strategy Group	FPU in Mainstem/Headwaters & Primary/Secondary
	Habitat Potential	Length of Potential Floodplain Channels and River Frontage per FPU
Feasibility	Land Use Type	FPU in Land Uses More or Less Compatible with Restoration/Conservation
	Number of Landowners	Number of Landowners in the FPU
	Landowner Density	Density of Landowners in the FPU
	Percent Protected	Percent of the FPU Currently Protected
Degradation	Armoring	Percentage of FPU River Frontage Armored
	Channel Constriction	Actual BFW Compared to Expected BFW Adjacent to the FPU
	Sinuosity	River Centerline Distance Compared to Straight Line (Euclidean) Distance Adjacent to the FPU
	Water & Vegetation Cover	Percent of the FPU with Course Vegetation and Water Cover
	Flow Degradation	FPU Water Flow Degradation (Delivery, Discharge, Recharge, & Surface Storage)

Parcel Metric	Scoring Criteria
Adjacency	Number of Adjacent Protected Parcels

Final Parcel Acquisition Scoring

- **3 Final Scores For Every FPU and Parcel**
  - **Restoration Score**
  - **Conservation Score**
  - **Total Score**

Final Parcel Acquisition Scoring

- **Restoration Score =** Importance + Feasibility + Degradation + Adjacency

- **Conservation Score =** Importance + Feasibility + Inverse Degradation + Adjacency

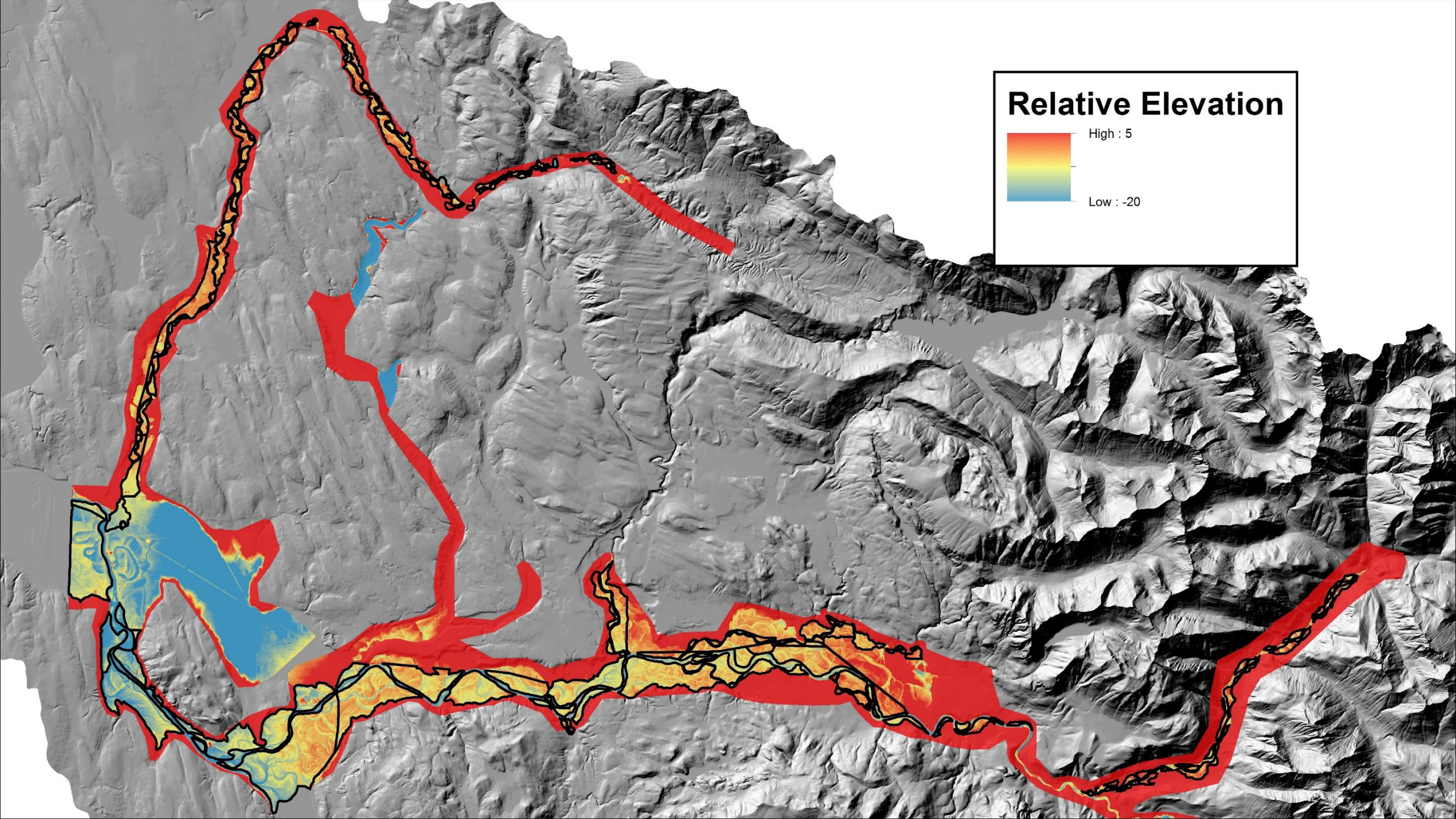
- **Total Score =** Importance + Feasibility + Adjacency

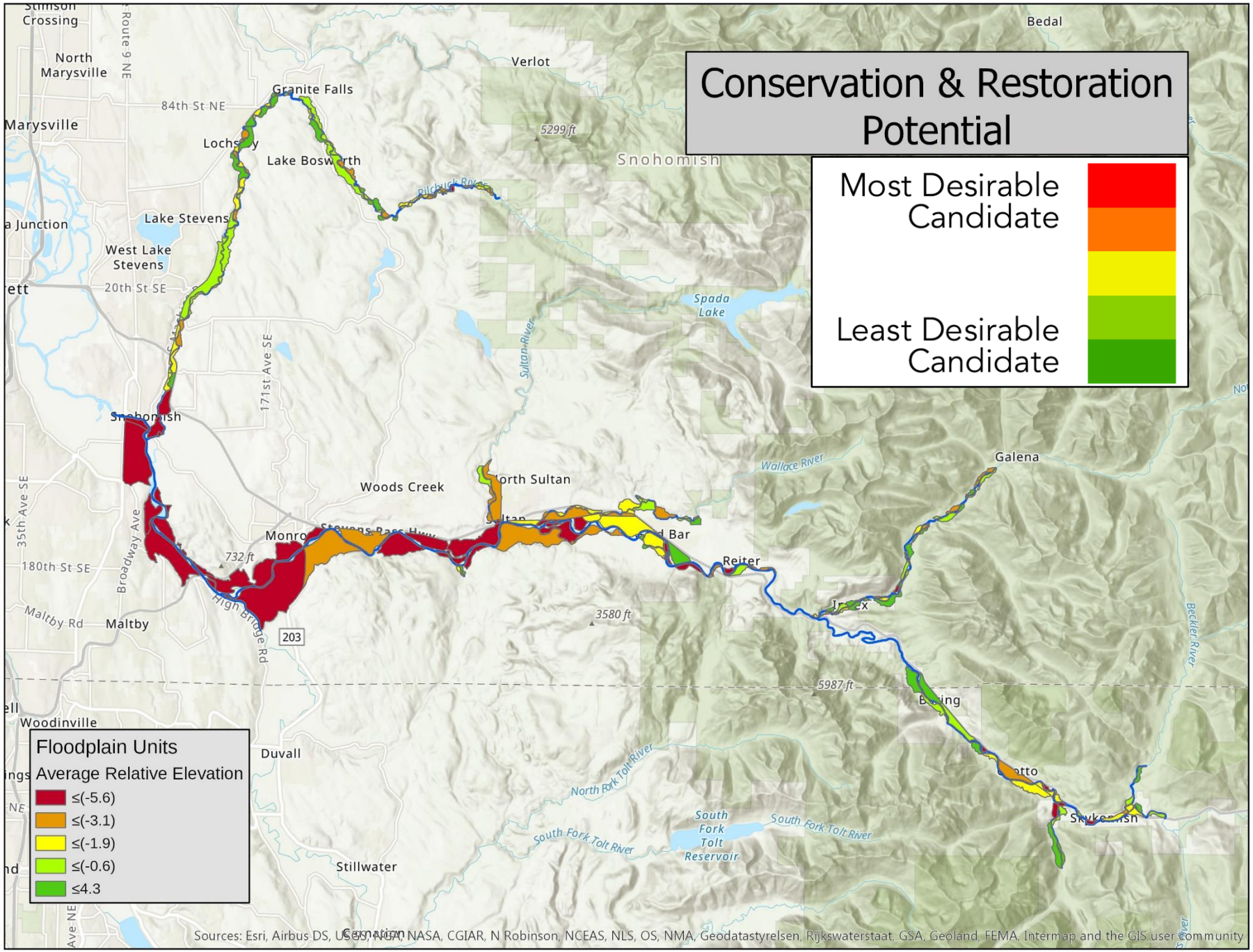
Importance Metrics

- **Relative Elevation**
- **Flow Importance**
- **Sub-Basin Strategy Group**
- **Habitat Potential**

Floodplain Elevation

- Premise: Floodplain Units having a lower average depth relative to the FEMA 100-year flood elevation are more desirable targets for restoration/conservation.


Relative Elevation
High : 5
Low : -20

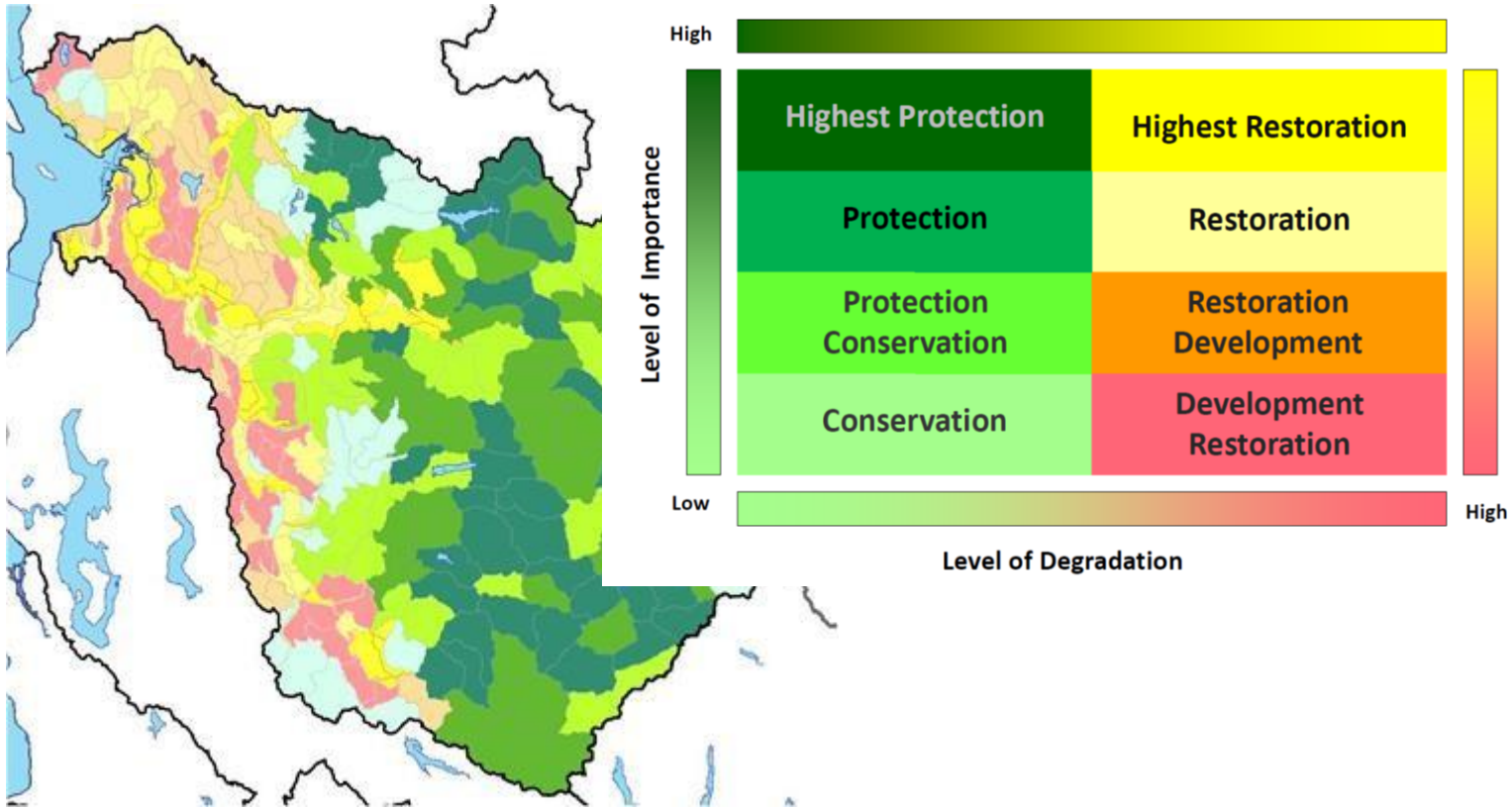

Conservation & Restoration Potential
Most Desirable Candidate
Least Desirable Candidate
Floodplain Units
Average Relative Elevation
≤(-5.6)
≤(-3.1)
≤(-1.9)
≤(-0.6)
≤4.3
Stimson Crossing
North Marysville
Route 9 NE
Marysville
84th St NE
Granite Falls
Verlot
Bedal
5299 ft
Snohomish
Lake Stevens
West Lake Stevens
20th St SE
Spada Lake
Sultan River
171st Ave SE
Snohomish
Woods Creek
North Sultan
Wallace River
Galena
Monroe
Stevens Pass Hwy
Bar
Reiter
732 ft
180th St SE
Broadway Ave
35th Ave SE
Maltby Rd
Maltby
High Bridge Rd
203
3580 ft
Beckler River
5987 ft
Woodinville
Duvall
North Fork Tolt River
South Fork Tolt River
South Fork Tolt Reservoir
Stillwater
Carnation
Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community

Flow Importance

- Premise: Floodplain Units of more importance to water flow quantity and timing are more desirable targets for restoration/conservation.

Puget Sound Watershed Characterization Project

- Importance and Degradation of Water Flow:
  - Delivery
  - Discharge
  - Recharge
  - Surface Storage



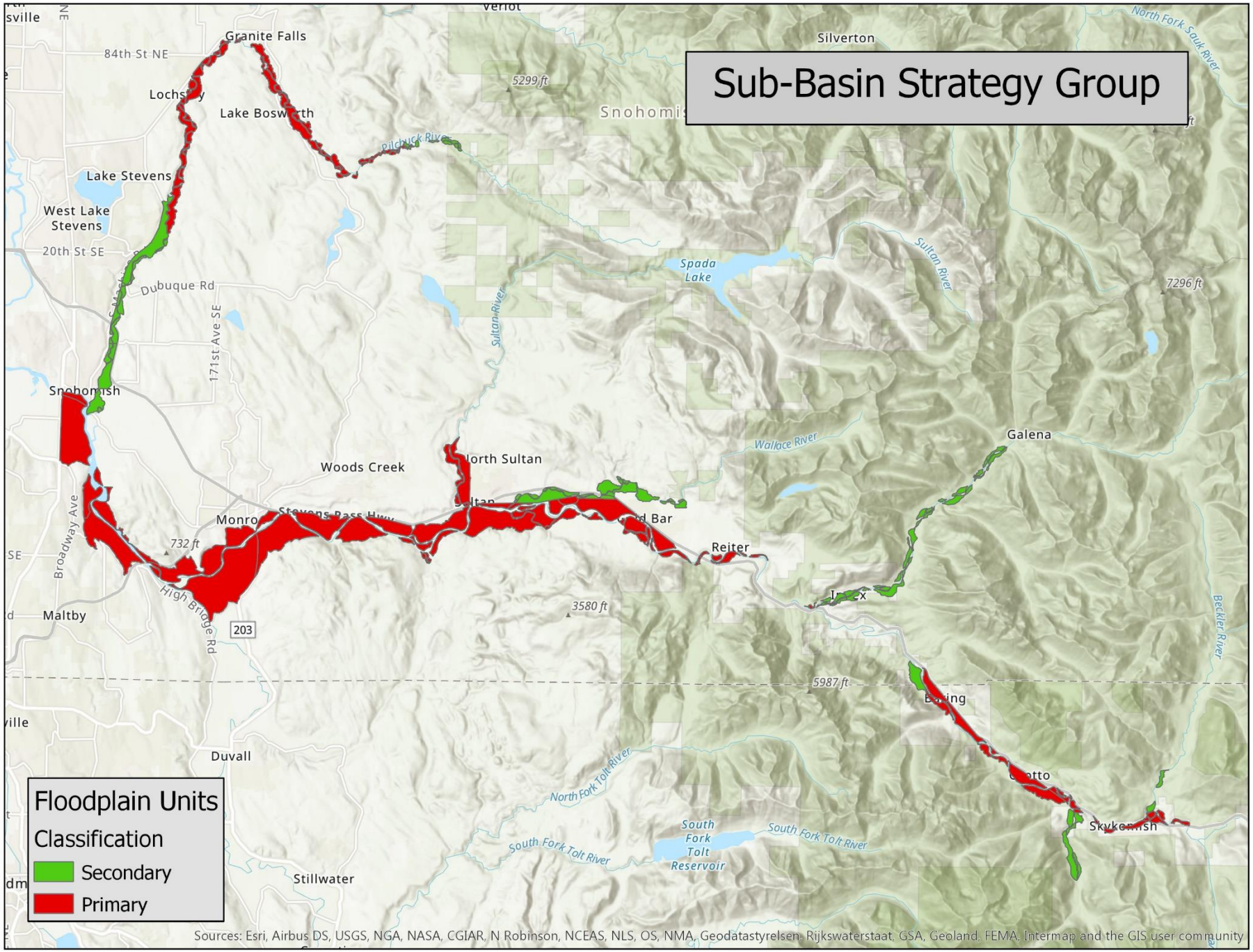
SNOHOMISH BASIN PROTECTION PLAN

Flow Importance

Delivery	Movement		Loss
	Surface Storage	Recharge, Subsurface Flow, Storage & Discharge	Not Modeled
Precipitation	Depressional wetlands & lakes	Permeability	
Snow & rain on snow	Unconfined & moderately confined floodplains	Slope wetlands & higher permeable floodplains	

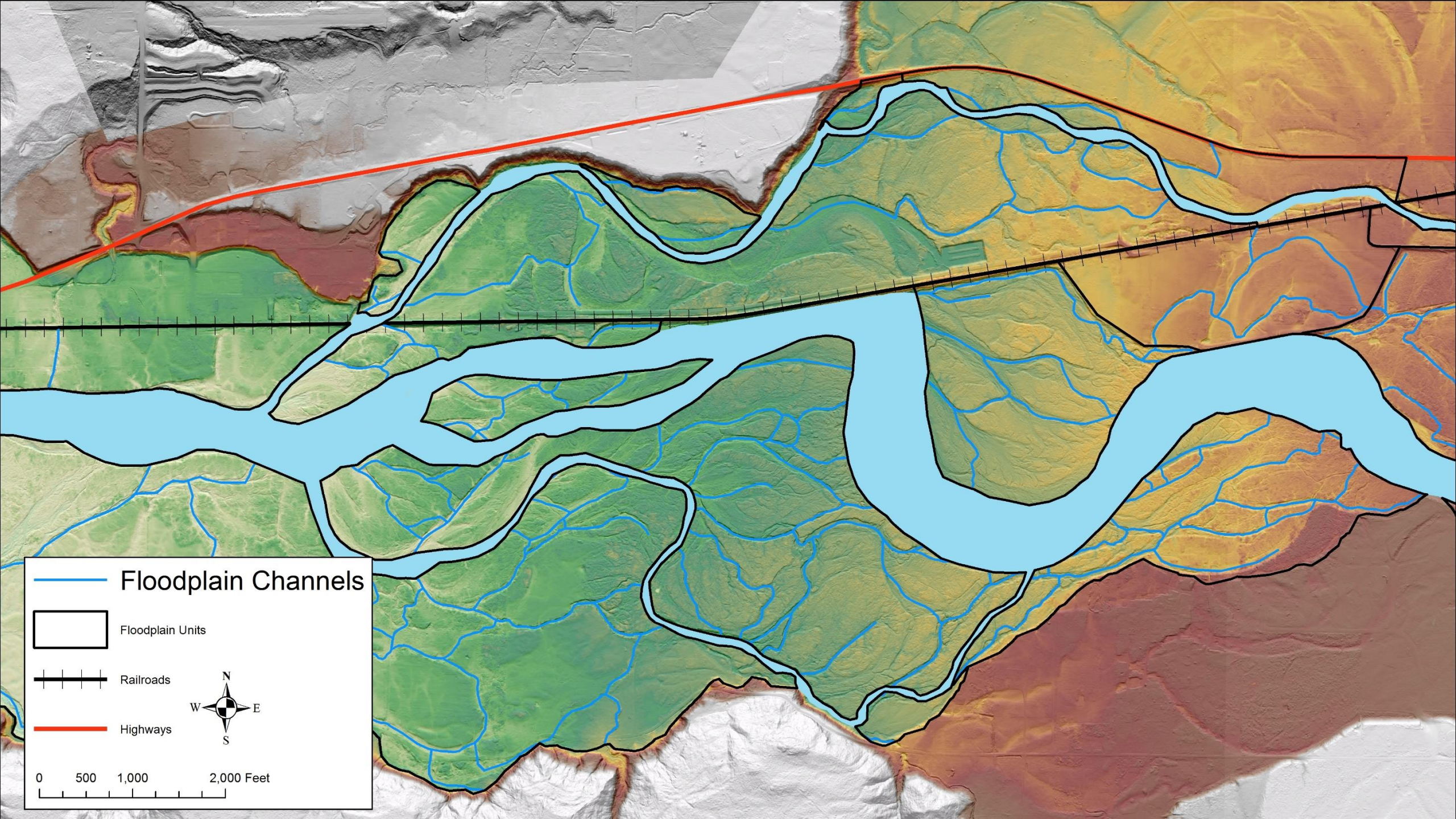
Sub Basin Strategy Group

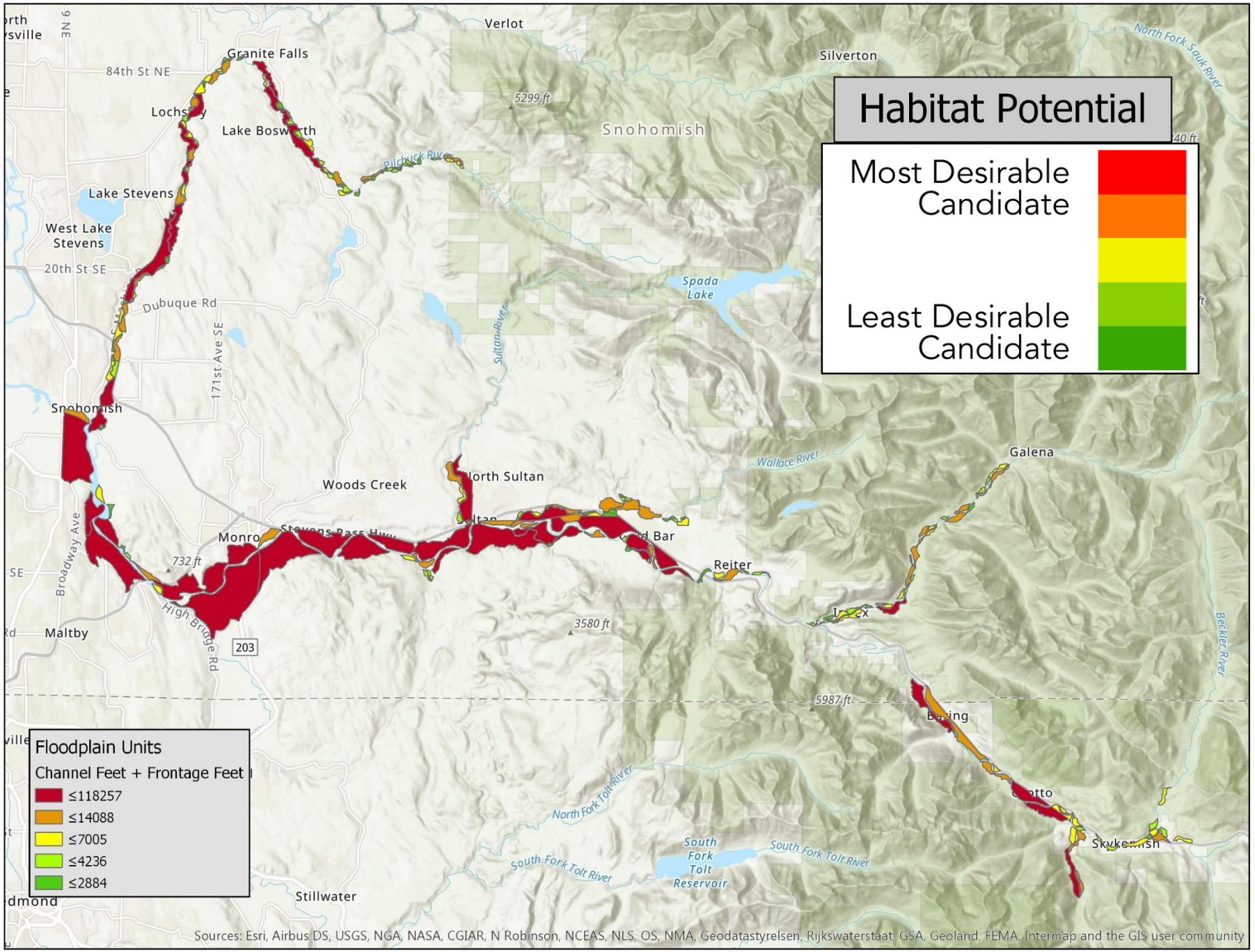
- Premise: Primary strategy groups are more desirable targets for restoration/conservation than secondary groups.


Sub-Basin Strategy Group
Floodplain Units
Classification
Secondary
Primary
Granite Falls
84th St NE
Lake Bosworth
Lake Stevens
West Lake Stevens
20th St SE
Dubuque Rd
171st Ave SE
Snohomish
Silverton
5299 ft
Pilchuck River
Spada Lake
Sultan River
7296 ft
North Fork Sauk River
Wallace River
Galena
Woods Creek
North Sultan
Sultan
Monroe
Stevens Pass Hwy
Gold Bar
Reiter
Index
732 ft
Broadway Ave
High Bridge Rd
203
Maltby
3580 ft
Beckler River
5987 ft
Baring
Grotto
Skykomish
Duvall
North Fork Tolt River
South Fork Tolt River
South Fork Tolt Reservoir
Stillwater
Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community

Habitat Potential

- Premise: Floodplain Units with a higher length of river frontage and potential floodplain channels are more desirable targets for restoration/conservation.


Floodplain Channels
Floodplain Units
Railroads
Highways
N
W
E
S
0
500
1,000
2,000 Feet


Habitat Potential
Most Desirable Candidate
Least Desirable Candidate
Floodplain Units
Channel Feet + Frontage Feet
≤118257
≤14088
≤7005
≤4236
≤2884
Verlot
Granite Falls
84th St NE
Lochsley
Lake Bosworth
Lake Stevens
West Lake Stevens
20th St SE
Dubuque Rd
171st Ave SE
Snohomish
Silverton
Snohomish
Pilchuck River
5299 ft
Spada Lake
Sultan River
North Fork Sauk River
Wallace River
Galena
Woods Creek
North Sultan
Monroe
Stevens Pass Hwy
Reiter
Broadway Ave
732 ft
High Bridge Rd
Maltby
203
3580 ft
5987 ft
Beckler River
North Fork Tolt River
South Fork Tolt River
South Fork Tolt Reservoir
Stillwater
Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community

Feasibility Metrics

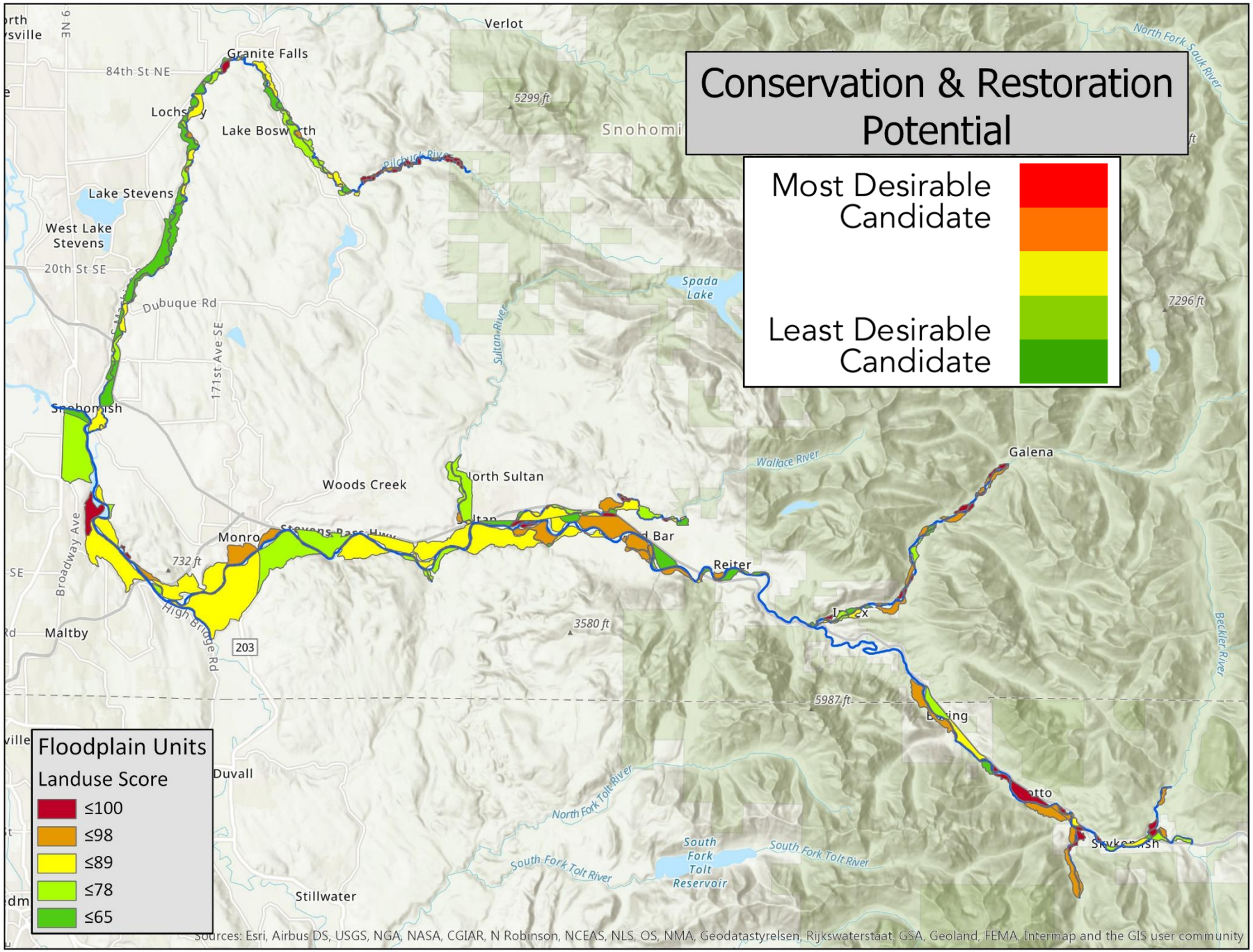
- **Land Use Type**
- **Number of Landowners**
- **Landowner Density**
- **Percent Protected**

Land Use Types

- Premise: Floodplain Units having a larger percentage of area in land uses more compatible with restoration/conservation (i.e. forestry, open space, agricultural, etc.) are more desirable targets for restoration/conservation.

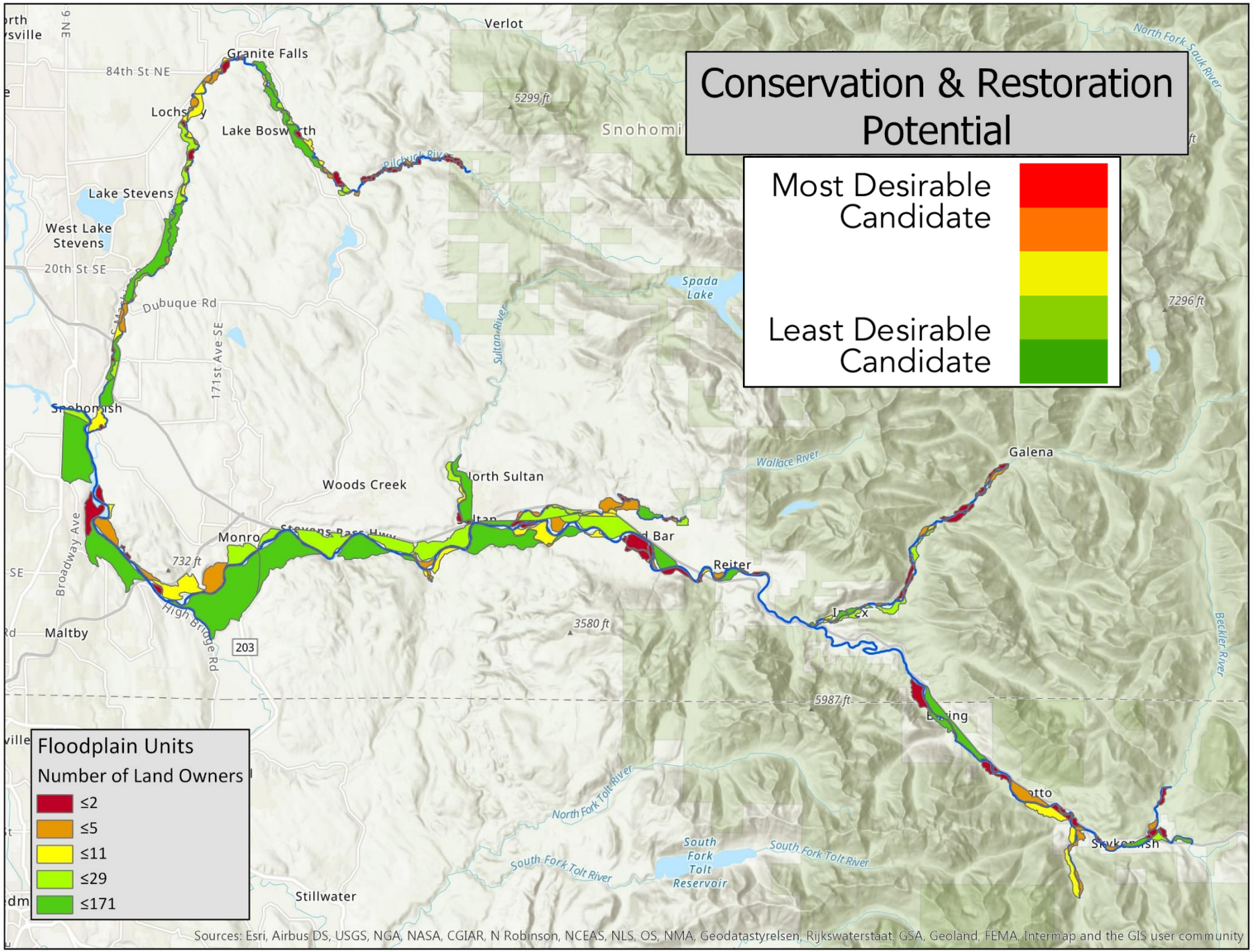
Land Use Types

- 100 = Water Area
- 100 = Undeveloped/Vacant
- 100 = Mining
- 90 = Forestry
- 90 = Park/Open Space
- 80 = Agriculture (current tax use)
- 70 = Recreation
- 50 = Agriculture (other than current use)
- 50 = Residential
- 30 = Social or Governmental Services
- 20 = Infrastructure (transportation/utility)
- 10 = Commercial
- 10 = Industrial


Conservation & Restoration Potential
Most Desirable Candidate
Least Desirable Candidate
Floodplain Units
Landuse Score
≤100
≤98
≤89
≤78
≤65
Verlot
Granite Falls
84th St NE
Lake Stevens
West Lake Stevens
20th St SE
Dubuque Rd
171st Ave SE
Snohomish
Woods Creek
North Sultan
Monro
Stevens Pass Hwy
Broadway Ave
High Bridge Rd
Maltby
203
Duvall
Stillwater
Reiter
Galena
Spada Lake
Sultan River
Wallace River
North Fork Skykomish River
Beckler River
North Fork Tolt River
South Fork Tolt River
South Fork Tolt Reservoir
5299 ft
7296 ft
732 ft
3580 ft
5987 ft
Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community

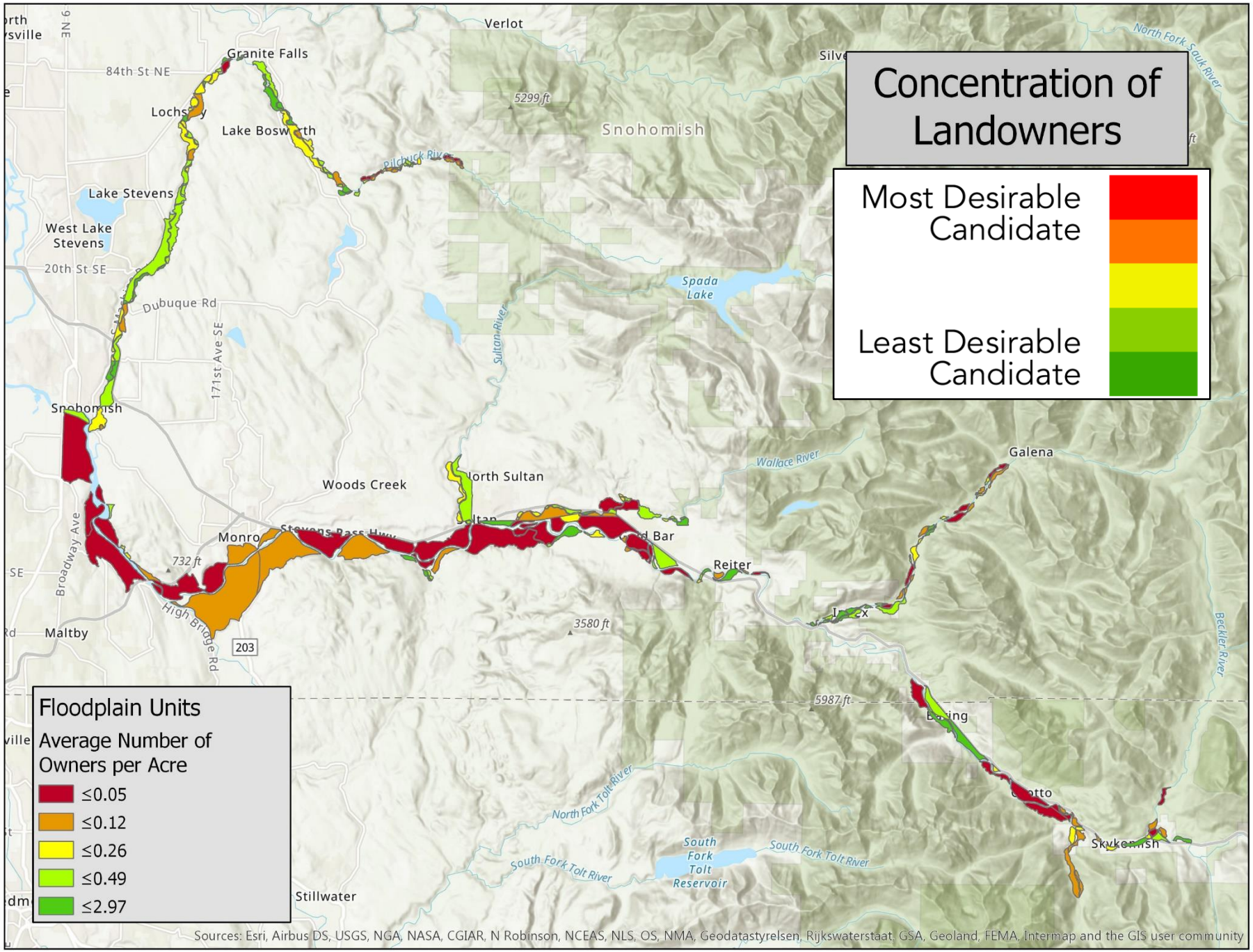
Number of Landowners

- Premise: Floodplain Units held by fewer landowners are more desirable targets for conservation/restoration.


Conservation & Restoration Potential
Most Desirable Candidate
Least Desirable Candidate
Floodplain Units
Number of Land Owners
≤2
≤5
≤11
≤29
≤171
Verlot
Granite Falls
84th St NE
Lochsley
Lake Bosworth
Snohomish
Lake Stevens
West Lake Stevens
20th St SE
Dubuque Rd
171st Ave SE
Snohomish
Woods Creek
North Sultan
Monroe
Stevens Pass Hwy
Broadway Ave
Maltby
High Bridge Rd
203
732 ft
5299 ft
Pilchuck River
Sultan River
Spada Lake
Wallace River
Galena
Reiter
Index
3580 ft
5987 ft
North Fork Tolt River
South Fork Tolt River
South Fork Tolt Reservoir
Stillwater
Beckler River
North Fork Sauk River
7296 ft
Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community

Landowners Density

- Premise: Floodplain Units with a lower density of landowners are more desirable targets for conservation/restoration.

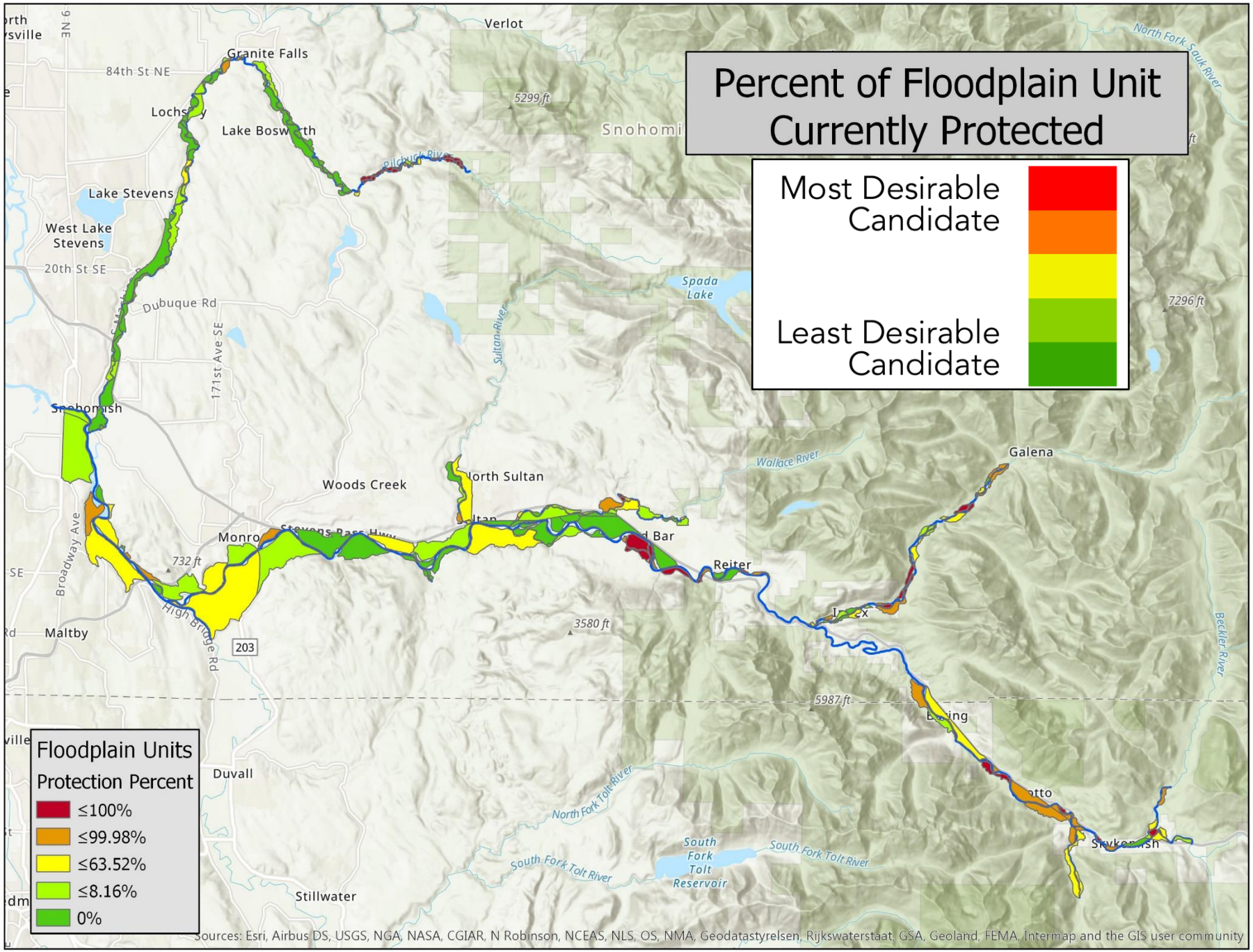

Concentration of Landowners
Most Desirable Candidate
Least Desirable Candidate
Floodplain Units
Average Number of Owners per Acre
≤0.05
≤0.12
≤0.26
≤0.49
≤2.97
Verlot
Granite Falls
84th St NE
Lake Bosworth
Snohomish
5299 ft
Pilchuck River
Lake Stevens
West Lake Stevens
20th St SE
Dubuque Rd
171st Ave SE
Spada Lake
Sultan River
Snohomish
Woods Creek
North Sultan
Wallace River
Galena
Monroe
Stevens Pass Hwy
Bar
Reiter
732 ft
Broadway Ave
High Bridge Rd
Maltby
203
3580 ft
Beckler River
5987 ft
North Fork Tolt River
South Fork Tolt River
South Fork Tolt Reservoir
Stillwater
Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community

Percent Protected

- Premise: Floodplain Units with a higher percentage of protected lands are more desirable targets for restoration/conservation.

Protected Parcel Definition

Under a conservation easement, managed under State, Federal, or industrial forest rules, or otherwise owned by a governmental entity <u>AND</u> managed for natural resources protection and long term natural process function.

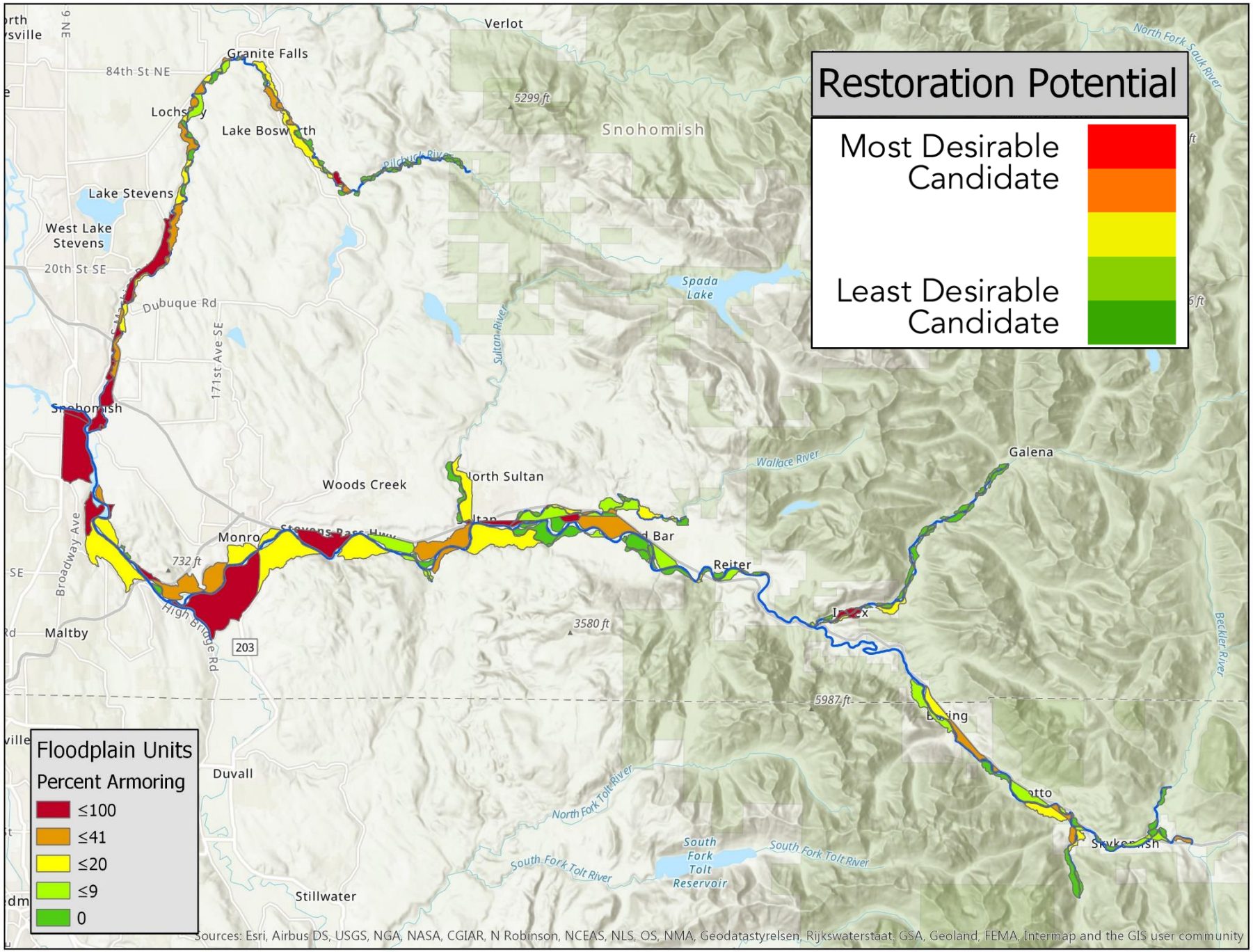

Percent of Floodplain Unit Currently Protected
Most Desirable Candidate
Least Desirable Candidate
Floodplain Units
Protection Percent
≤100%
≤99.98%
≤63.52%
≤8.16%
0%
Verlot
Granite Falls
84th St NE
Lake Stevens
West Lake Stevens
20th St SE
Dubuque Rd
171st Ave SE
Snohomish
Woods Creek
North Sultan
Monroe
Stevens Pass Hwy
Reiter
Galena
Maltby
Duvall
Stillwater
Spada Lake
Sultan River
Wallace River
North Fork Sauk River
Beckler River
North Fork Tolt River
South Fork Tolt River
South Fork Tolt Reservoir
Broadway Ave
High Bridge Rd
203
5299 ft
7296 ft
732 ft
3580 ft
5987 ft
Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community

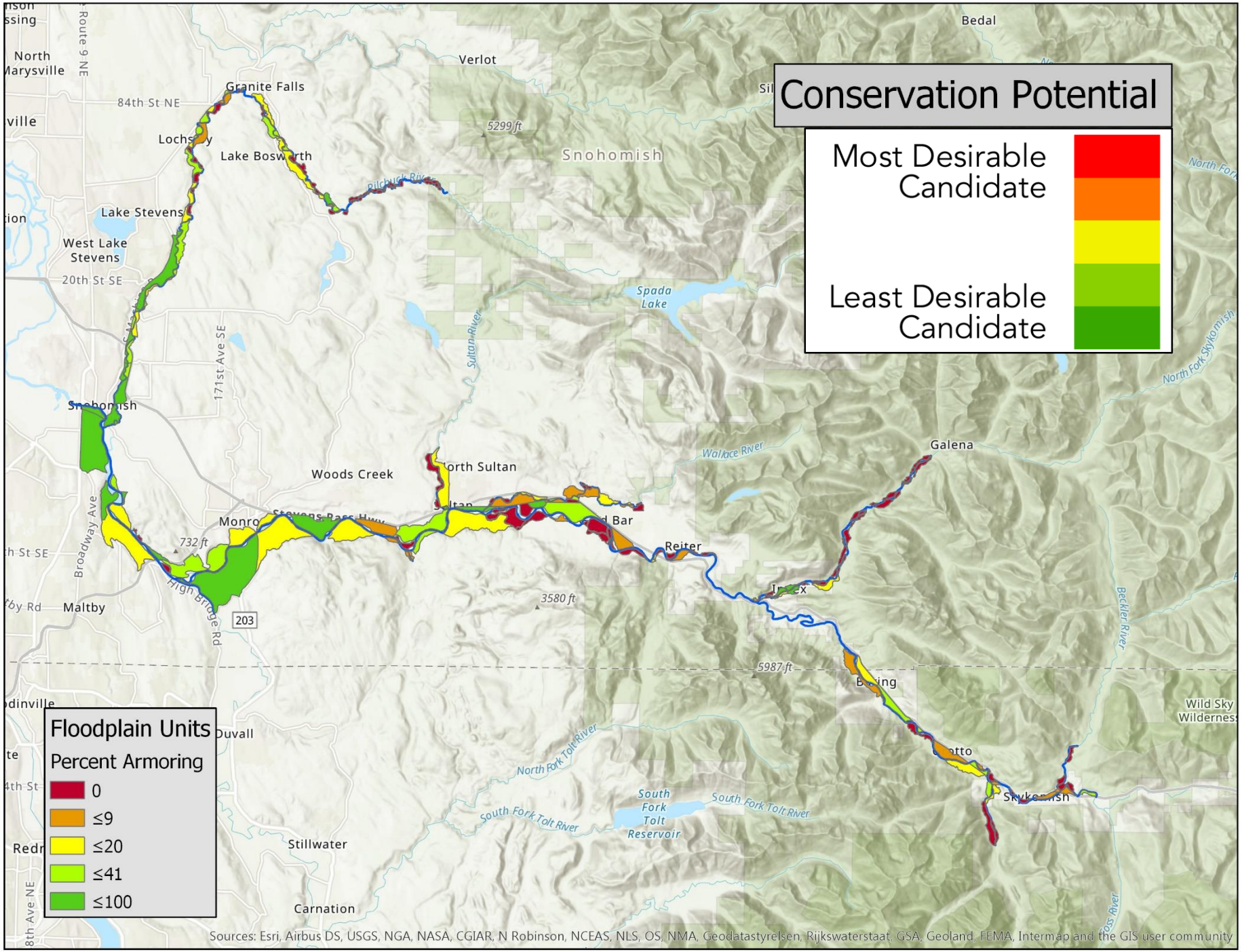
Degradation Metrics

- **Armoring**
- **Channel Constriction**
- **Sinuosity**
- **Water and Vegetation Cover**
- **Flow Degradation**

Armoring

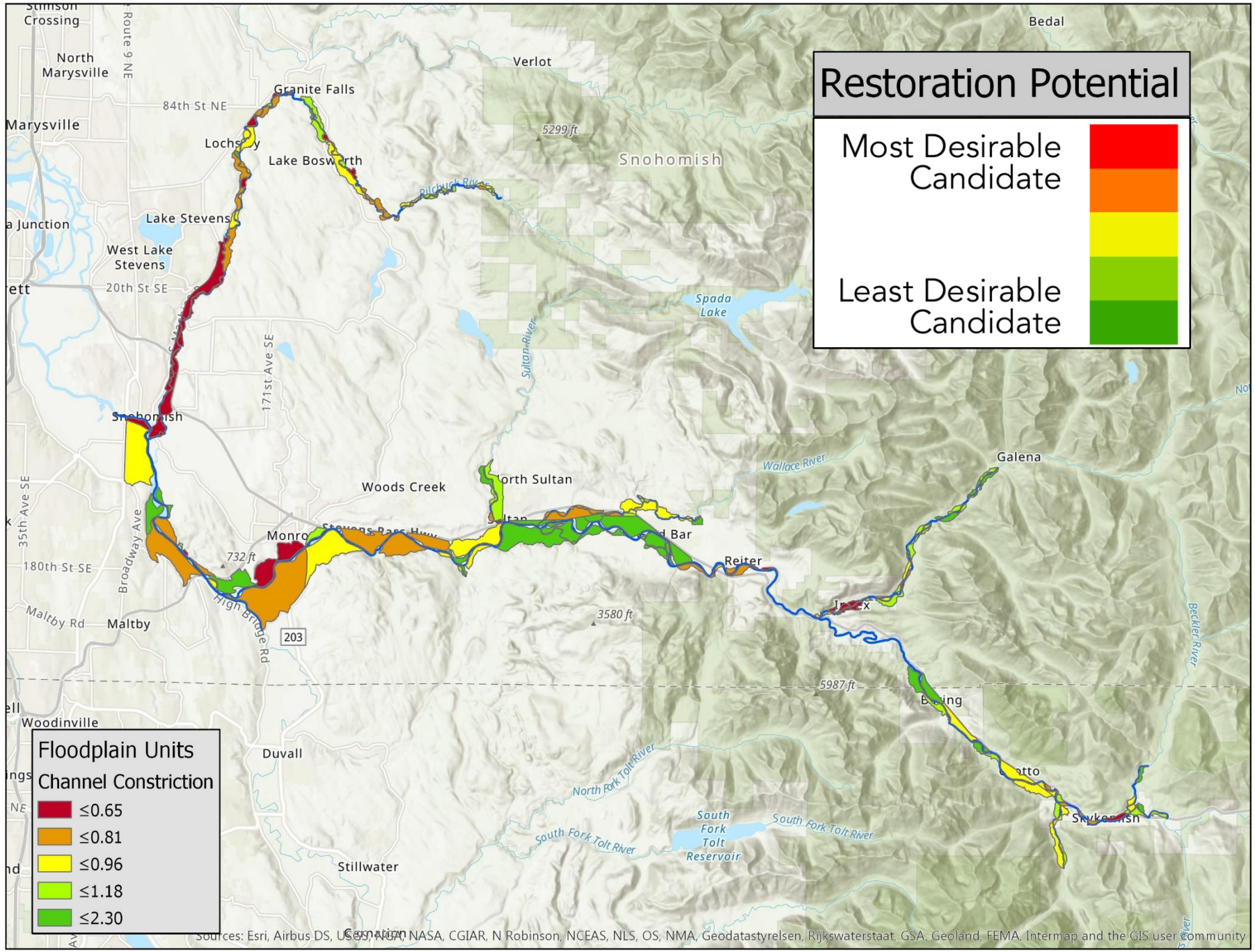
- Premise: Floodplain Units with a greater proportion of armoring are more desirable targets for restoration. Floodplain units with a lesser proportion of armoring are more desirable targets for conservation.

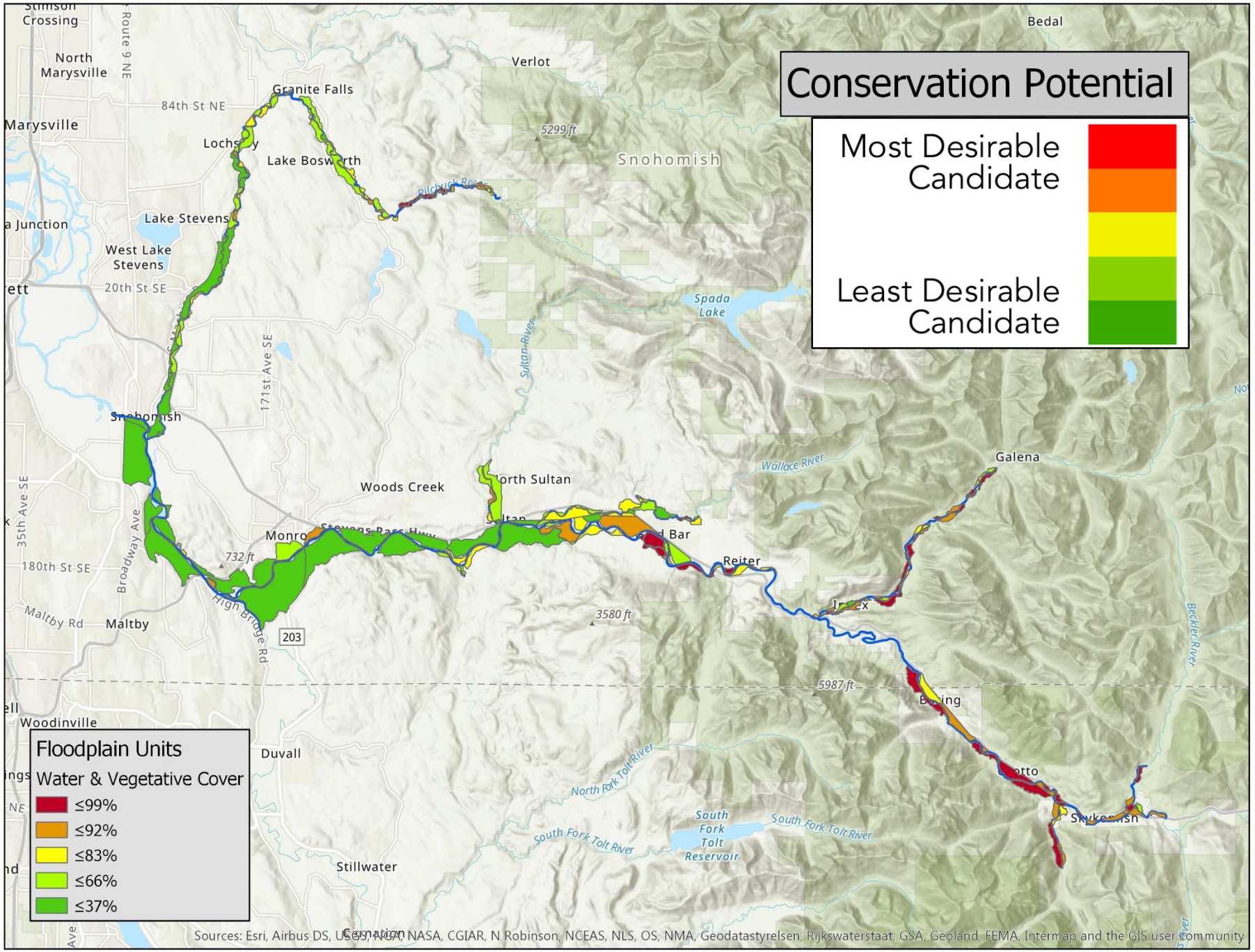

Restoration Potential
Most Desirable Candidate
Least Desirable Candidate
Floodplain Units
Percent Armoring
≤100
≤41
≤20
≤9
0
Verlot
Granite Falls
84th St NE
Lake Stevens
West Lake Stevens
20th St SE
Dubuque Rd
171st Ave SE
Snohomish
Snohomish
5299 ft
Pilchuck River
Spada Lake
Sultan River
North Fork Skykomish River
Wallace River
Galena
Woods Creek
North Sultan
Monroe
Stevens Pass Hwy
Bar
Reiter
Broadway Ave
732 ft
High Bridge Rd
Maltby
203
3580 ft
5987 ft
Beckler River
Duvall
North Fork Tolt River
South Fork Tolt River
South Fork Tolt Reservoir
Stillwater
Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community


Conservation Potential
Most Desirable Candidate
Least Desirable Candidate
Floodplain Units
Percent Armoring
0
≤9
≤20
≤41
≤100
Bedal
Verlot
Granite Falls
84th St NE
Lochsley
Lake Bosworth
Snohomish
Lake Stevens
West Lake Stevens
20th St SE
Spada Lake
Sultan River
171st Ave SE
Snohomish
Woods Creek
North Sultan
Wallace River
Galena
Monroe
Stevens Pass Hwy
Bar
Reiter
Broadway Ave
732 ft
High Bridge Rd
Maltby
203
3580 ft
5987 ft
Beckler River
Wild Sky Wilderness
Duvall
North Fork Tolt River
South Fork Tolt River
South Fork Tolt Reservoir
Stillwater
Carnation
Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community

Channel Constriction

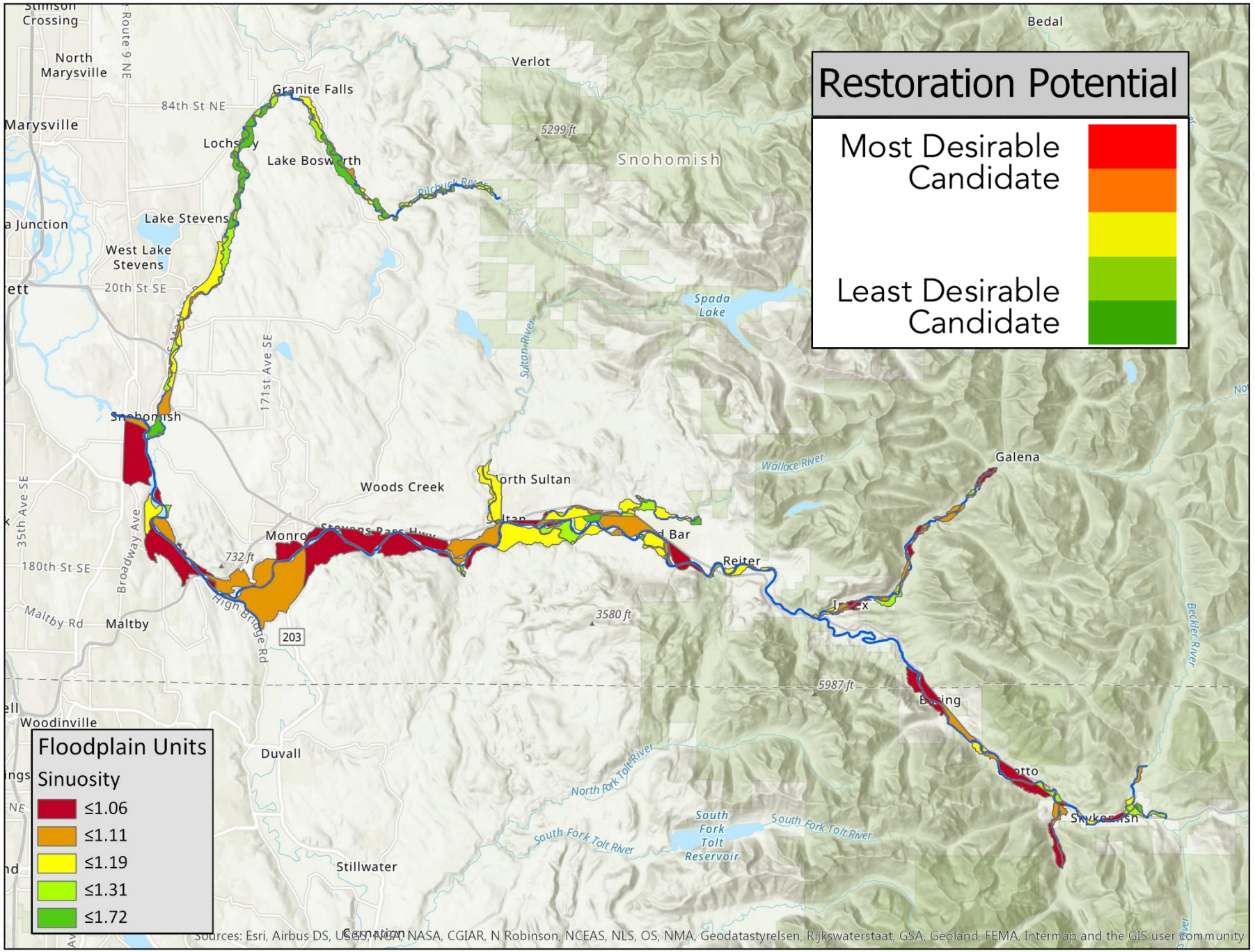
- Premise: Floodplain Units along more constricted river channels are more desirable targets for restoration. Floodplain units along less constricted river channels are more desirable targets for conservation.

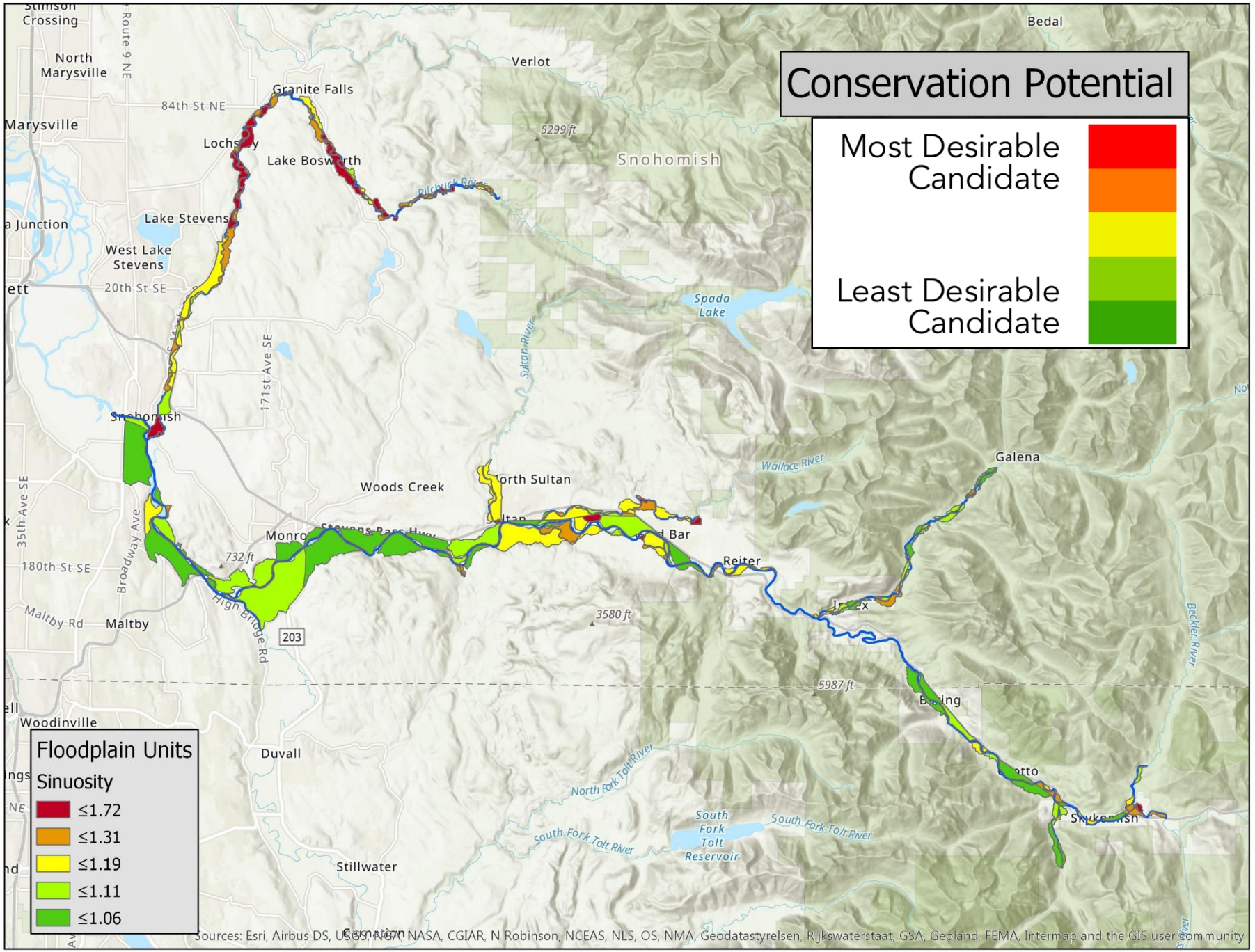

Restoration Potential
Most Desirable Candidate
Least Desirable Candidate
Floodplain Units
Channel Constriction
≤0.65
≤0.81
≤0.96
≤1.18
≤2.30
Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community
Granite Falls
Lake Stevens
West Lake Stevens
Snohomish
Woods Creek
Monroe
Maltby
Duvall
Stillwater
Galena
Reiter
Verlot
Bedal
Spada Lake
South Fork Tolt Reservoir
North Fork Tolt River
South Fork Tolt River
Wallace River
Sultan River
Beckler River
Pilchuck River
Broadway Ave
High Bridge Rd
Maltby Rd
84th St NE
20th St SE
171st Ave SE
35th Ave SE
180th St SE
Route 9 NE
5299 ft
732 ft
3580 ft
5987 ft
203


Conservation Potential
Most Desirable Candidate
Least Desirable Candidate
Floodplain Units
Water & Vegetative Cover
≤99%
≤92%
≤83%
≤66%
≤37%
Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community
Bedal
Verlot
Granite Falls
Lake Bosworth
Snohomish
Lake Stevens
West Lake Stevens
Spada Lake
Galena
Woods Creek
North Sultan
Reiter
Maltby
Woodinville
Duvall
Stillwater
South Fork Tolt Reservoir
Sultan River
Wallace River
Beckler River
North Fork Tolt River
South Fork Tolt River
Pilchuck River
Broadway Ave
High Bridge Rd
Maltby Rd
84th St NE
20th St SE
171st Ave SE
35th Ave SE
180th St SE
Route 9 NE
5299 ft
732 ft
3580 ft
5987 ft
203

Sinuosity

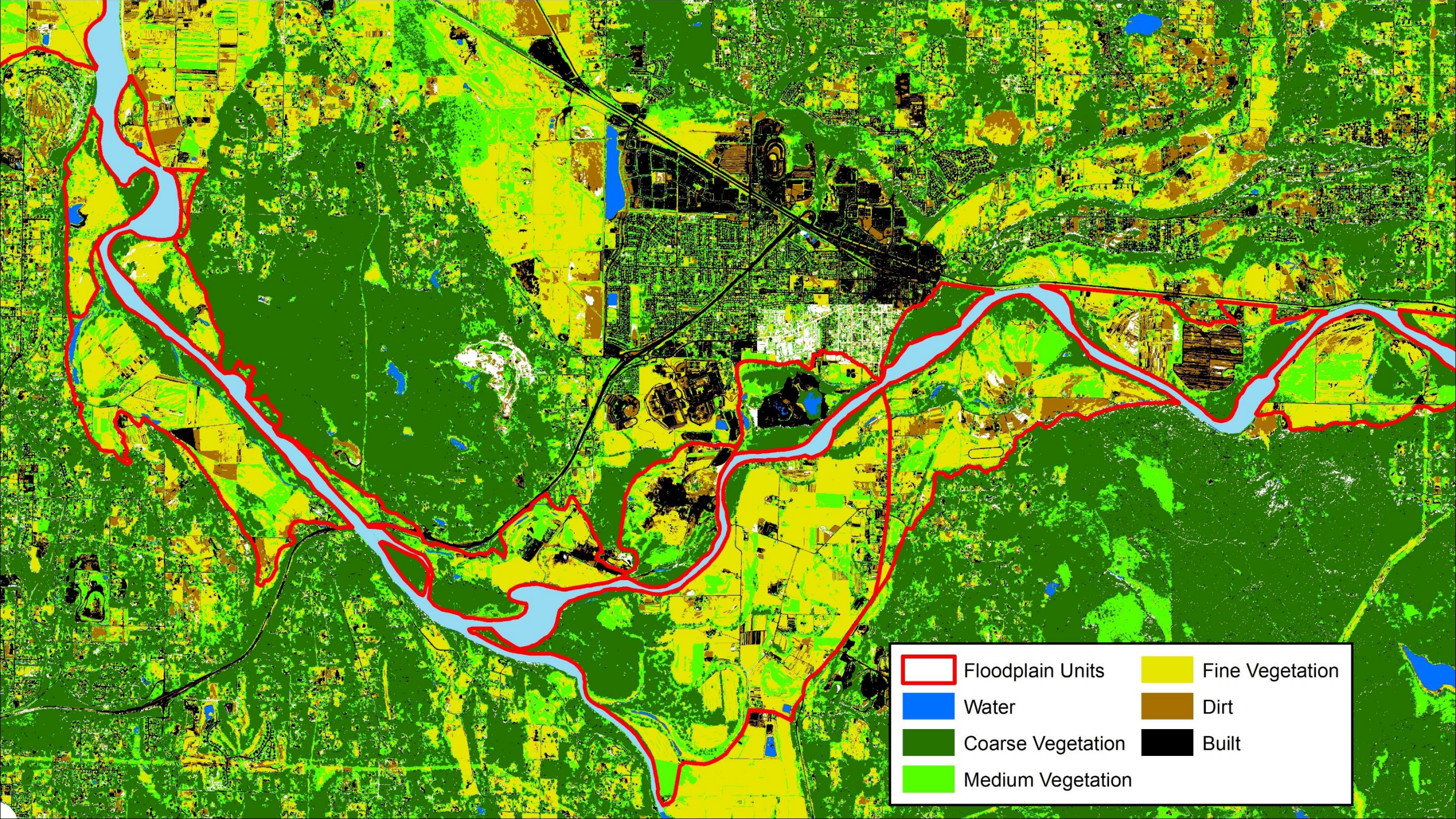
- Premise: Floodplain Units along less sinuous river channels are more desirable targets for restoration. Floodplain units along more sinuous river channels are more desirable targets for conservation.

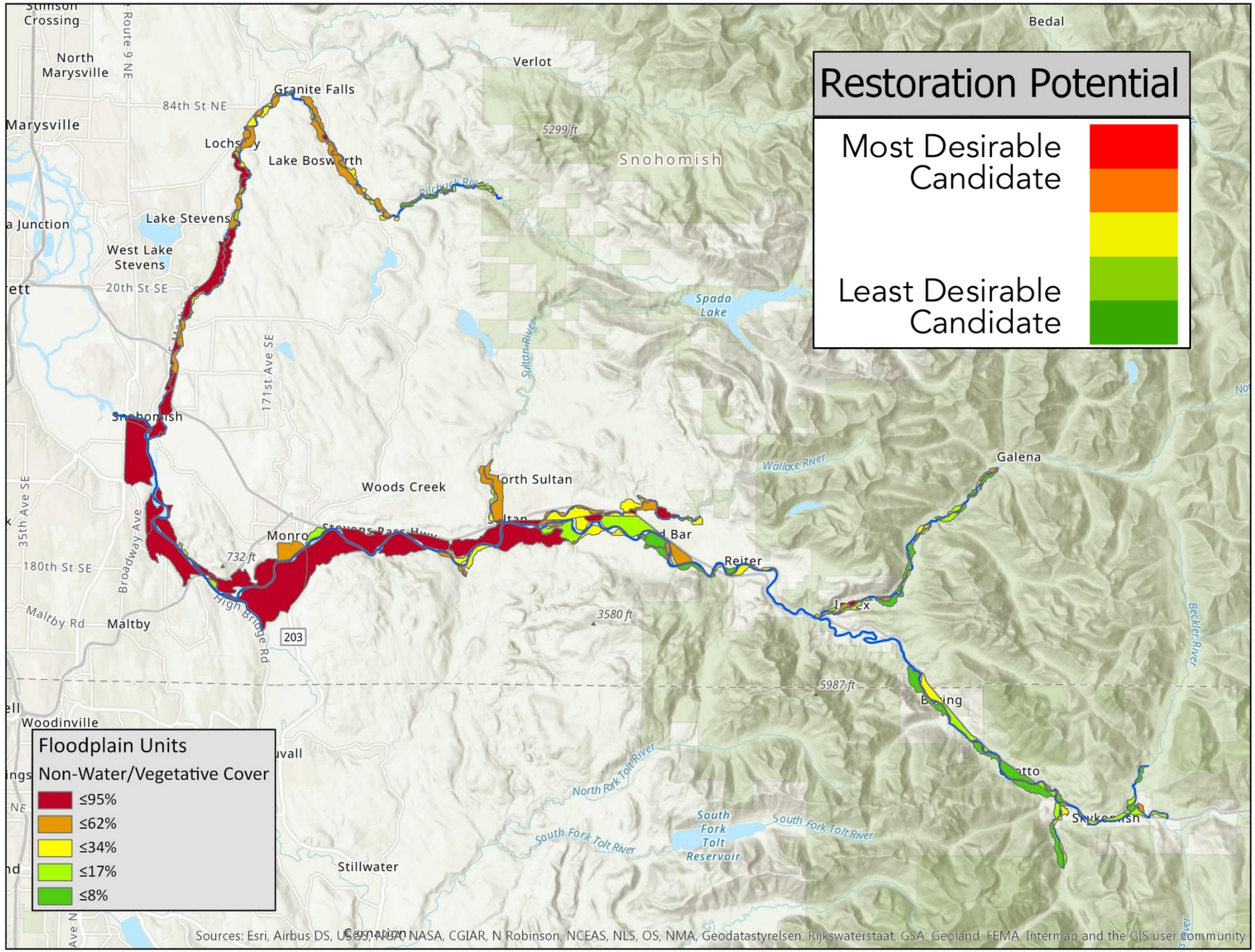

Restoration Potential
Most Desirable Candidate
Least Desirable Candidate
Floodplain Units
Sinuosity
≤1.06
≤1.11
≤1.19
≤1.31
≤1.72
Stimson Crossing
North Marysville
Marysville
Route 9 NE
84th St NE
Granite Falls
Verlot
Bedal
5299 ft
Snohomish
Lake Bosworth
Pilchuck River
Lake Stevens
West Lake Stevens
20th St SE
Spada Lake
Sultan River
171st Ave SE
Snohomish
Woods Creek
North Sultan
Wallace River
Galena
Monroe
Stevens Pass Hwy
Bar
Reiter
732 ft
180th St SE
Broadway Ave
35th Ave SE
Maltby Rd
Maltby
High Bridge Rd
203
3580 ft
Index
Beckler River
5987 ft
Baring
Woodinville
Duvall
North Fork Tolt River
South Fork Tolt River
South Fork Tolt Reservoir
Stillwater
Carnation
Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community

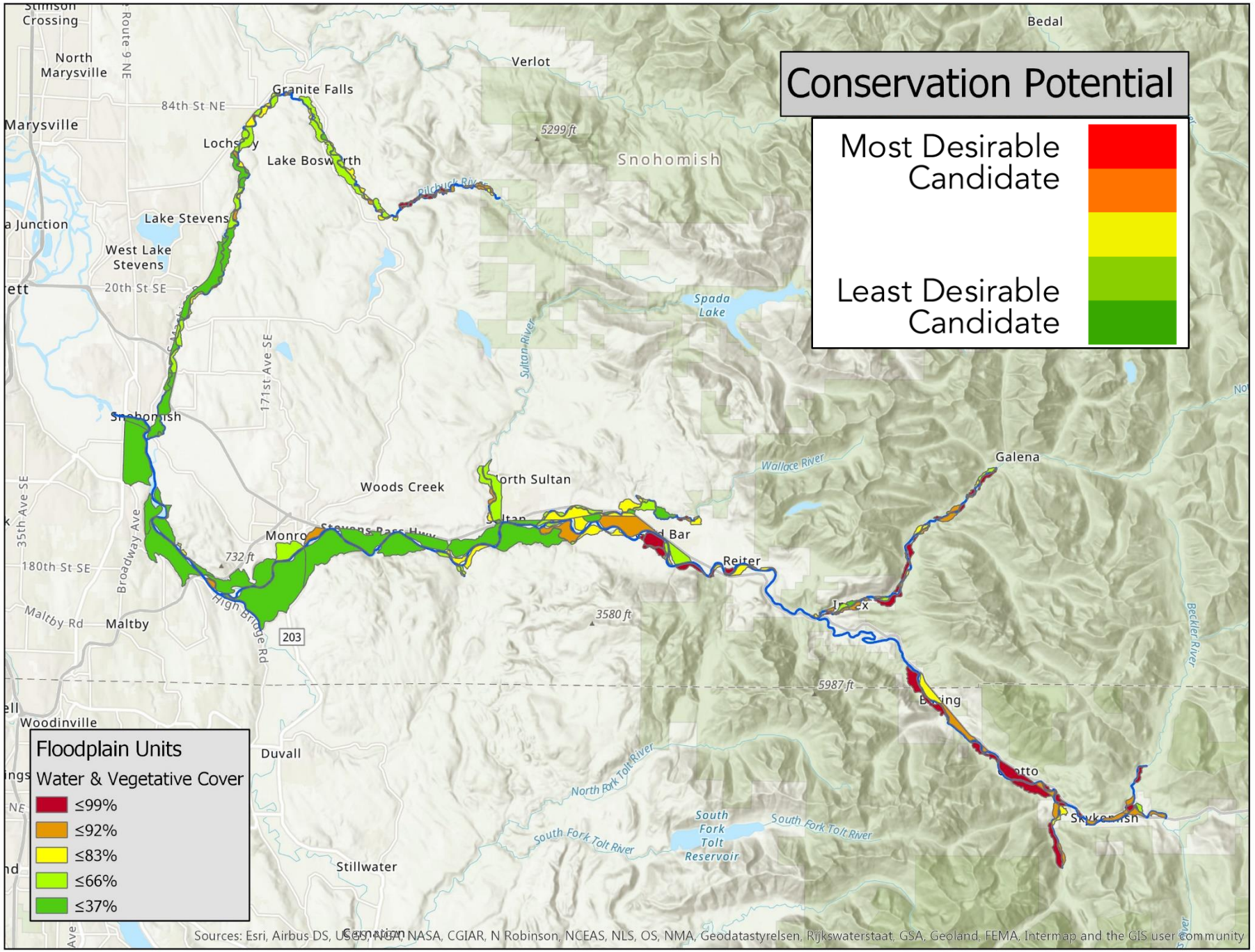

Conservation Potential
Most Desirable Candidate
Least Desirable Candidate
Floodplain Units
Sinuosity
≤1.72
≤1.31
≤1.19
≤1.11
≤1.06
Stimson Crossing
North Marysville
Route 9 NE
84th St NE
Marysville
Granite Falls
Lochsley
Lake Bosworth
Verlot
5299 ft
Snohomish
Bedal
Lake Stevens
West Lake Stevens
20th St SE
Spada Lake
Sultan River
171st Ave SE
Snohomish
Woods Creek
North Sultan
Wallace River
Galena
Monroe
Stevens Pass Hwy
Bar
Reiter
732 ft
180th St SE
Broadway Ave
35th Ave SE
Maltby Rd
Maltby
High Bridge Rd
203
3580 ft
Index
Beckler River
5987 ft
Baring
Woodinville
Duvall
North Fork Tolt River
South Fork Tolt River
South Fork Tolt Reservoir
Stillwater
Carnation
Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community

Water and Vegetation Cover

- Premise: Floodplain Units with lower water and course vegetation coverage are more desirable targets for restoration. Floodplain units with higher water and course vegetation coverage are more desirable targets for conservation.


Floodplain Units
Water
Coarse Vegetation
Medium Vegetation
Fine Vegetation
Dirt
Built

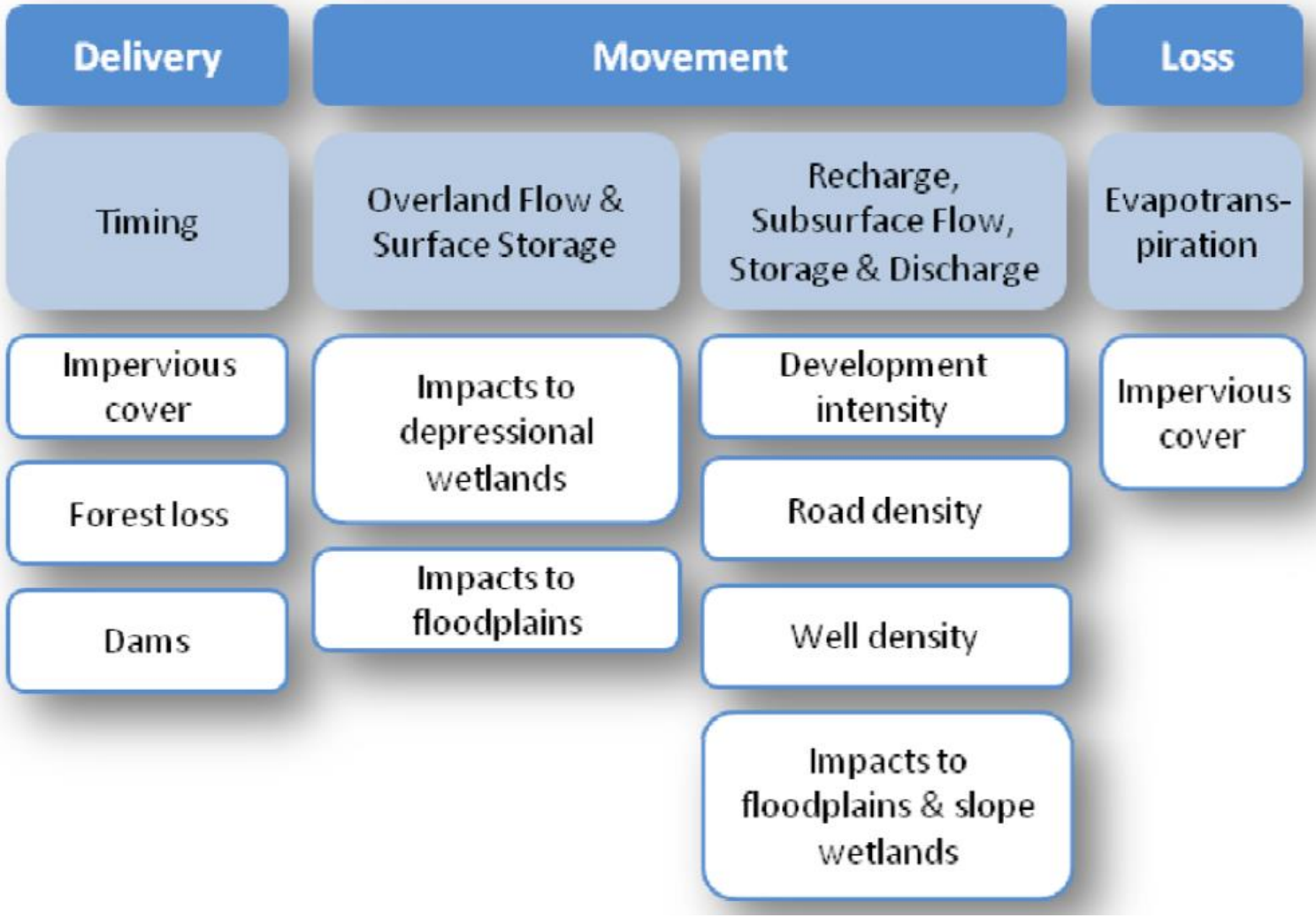

Restoration Potential
Most Desirable Candidate
Least Desirable Candidate
Floodplain Units
Non-Water/Vegetative Cover
≤95%
≤62%
≤34%
≤17%
≤8%
Stimson Crossing
North Marysville
Marysville
Route 9 NE
84th St NE
Granite Falls
Verlot
Bedal
5299 ft
Snohomish
Lake Bosworth
Pilchuck River
Lake Stevens
West Lake Stevens
20th St SE
Spada Lake
Sultan River
171st Ave SE
Snohomish
Woods Creek
North Sultan
Wallace River
Galena
Monroe
Stevens Pass Hwy
Bar
Reiter
732 ft
180th St SE
Broadway Ave
35th Ave SE
Maltby Rd
Maltby
High Bridge Rd
203
3580 ft
Index
Beckler River
5987 ft
Baring
Woodinville
North Fork Tolt River
South Fork Tolt River
South Fork Tolt Reservoir
Stillwater
Carnation
Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community


Conservation Potential
Most Desirable Candidate
Least Desirable Candidate
Floodplain Units
Water & Vegetative Cover
≤99%
≤92%
≤83%
≤66%
≤37%
Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community
Bedal
Verlot
Granite Falls
Lake Bosworth
Snohomish
Lake Stevens
West Lake Stevens
Spada Lake
Galena
Woods Creek
North Sultan
Reiter
Maltby
Woodinville
Duvall
Stillwater
South Fork Tolt Reservoir
Sultan River
Wallace River
Beckler River
North Fork Tolt River
South Fork Tolt River
Pilchuck River
Broadway Ave
High Bridge Rd
Maltby Rd
84th St NE
20th St SE
171st Ave SE
35th Ave SE
180th St SE
Route 9 NE
5299 ft
732 ft
3580 ft
5987 ft
203

Flow Degradation

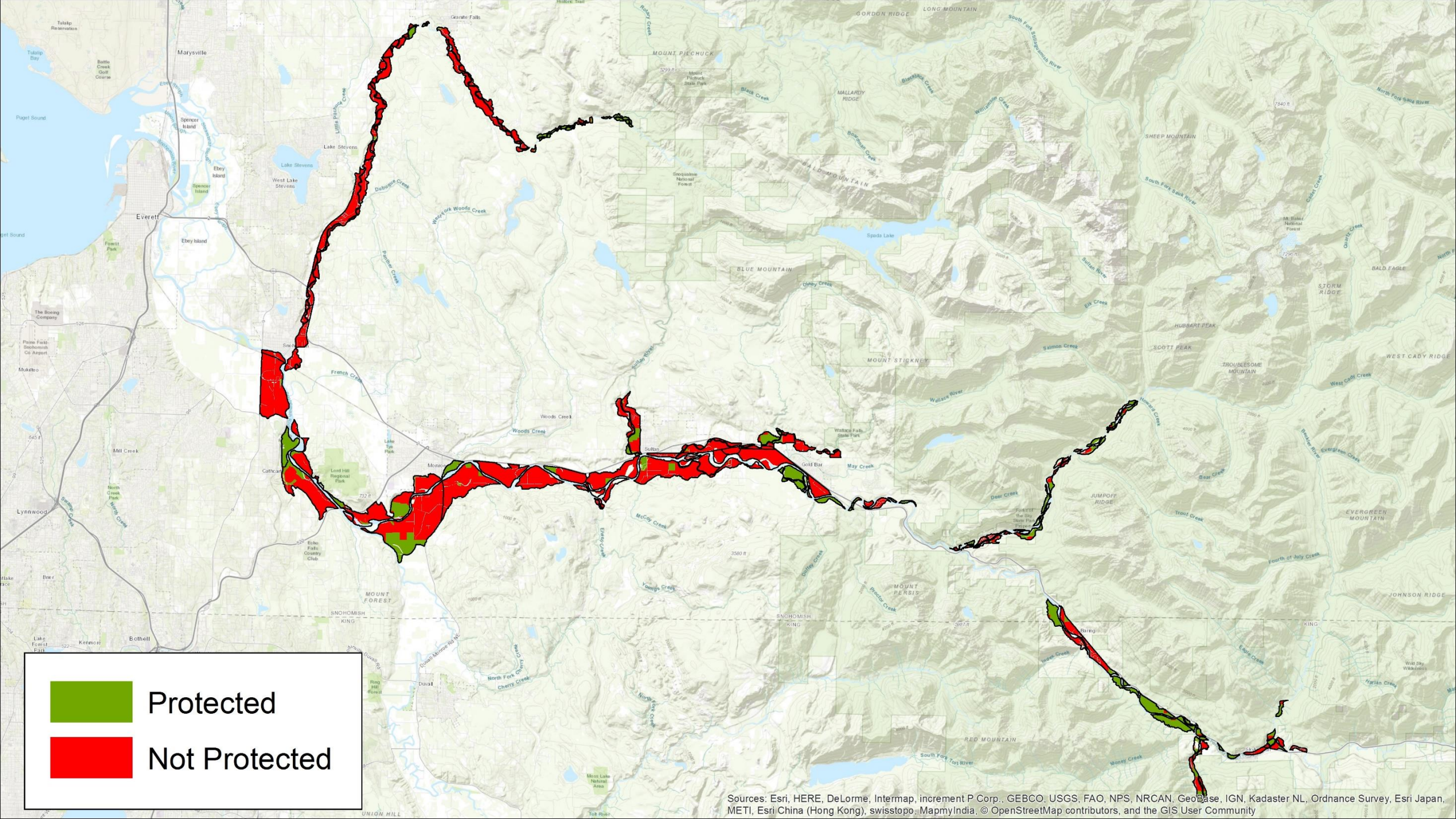
- Premise: Floodplain Units with more degraded water flow quantity and timing are more desirable targets for restoration. Floodplain Units with less degraded water flow quantity and timing are more desirable targets for conservation.

Puget Sound Watershed Characterization Project
Flow Degradation



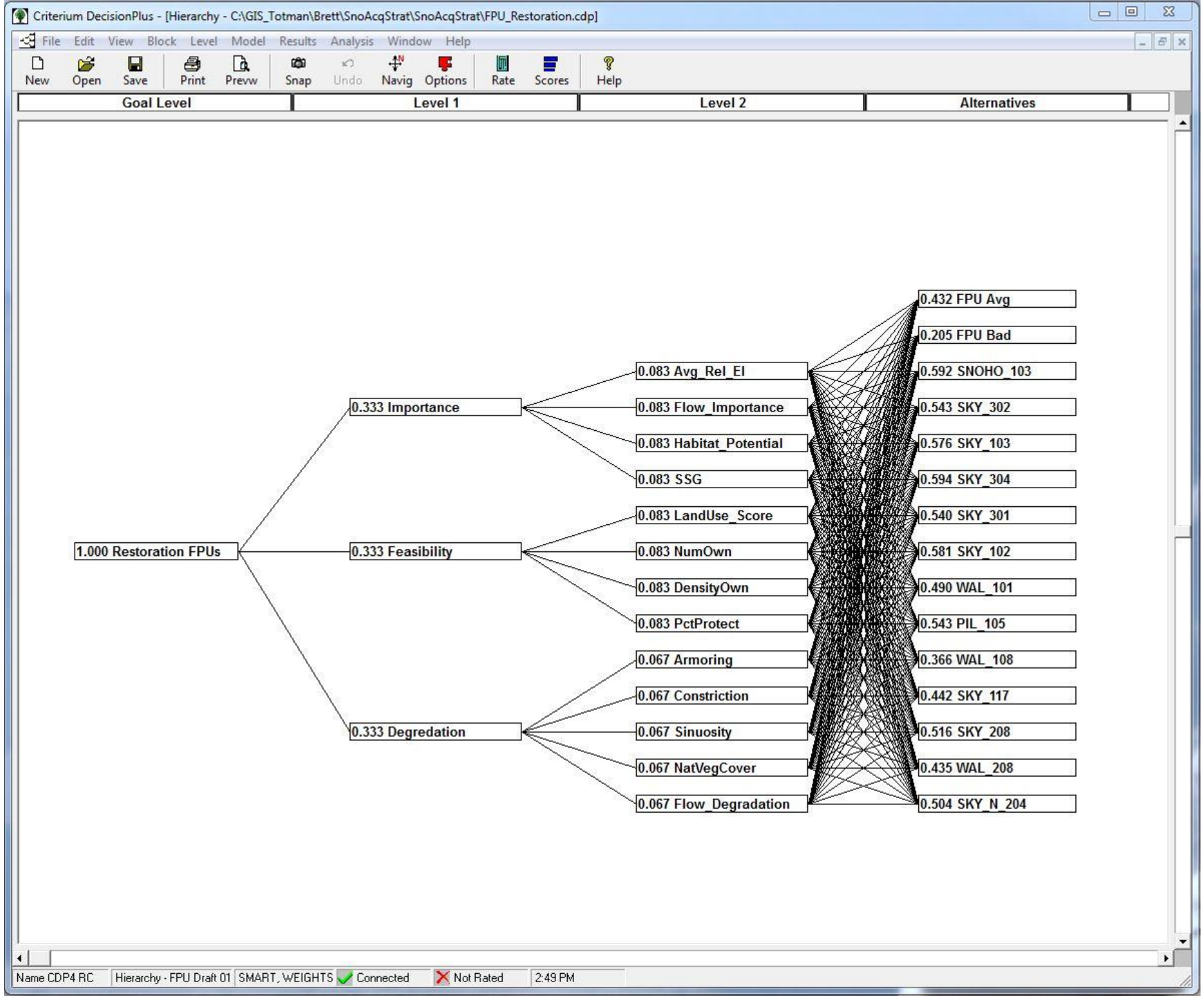
Adjacency (Parcel Scale)

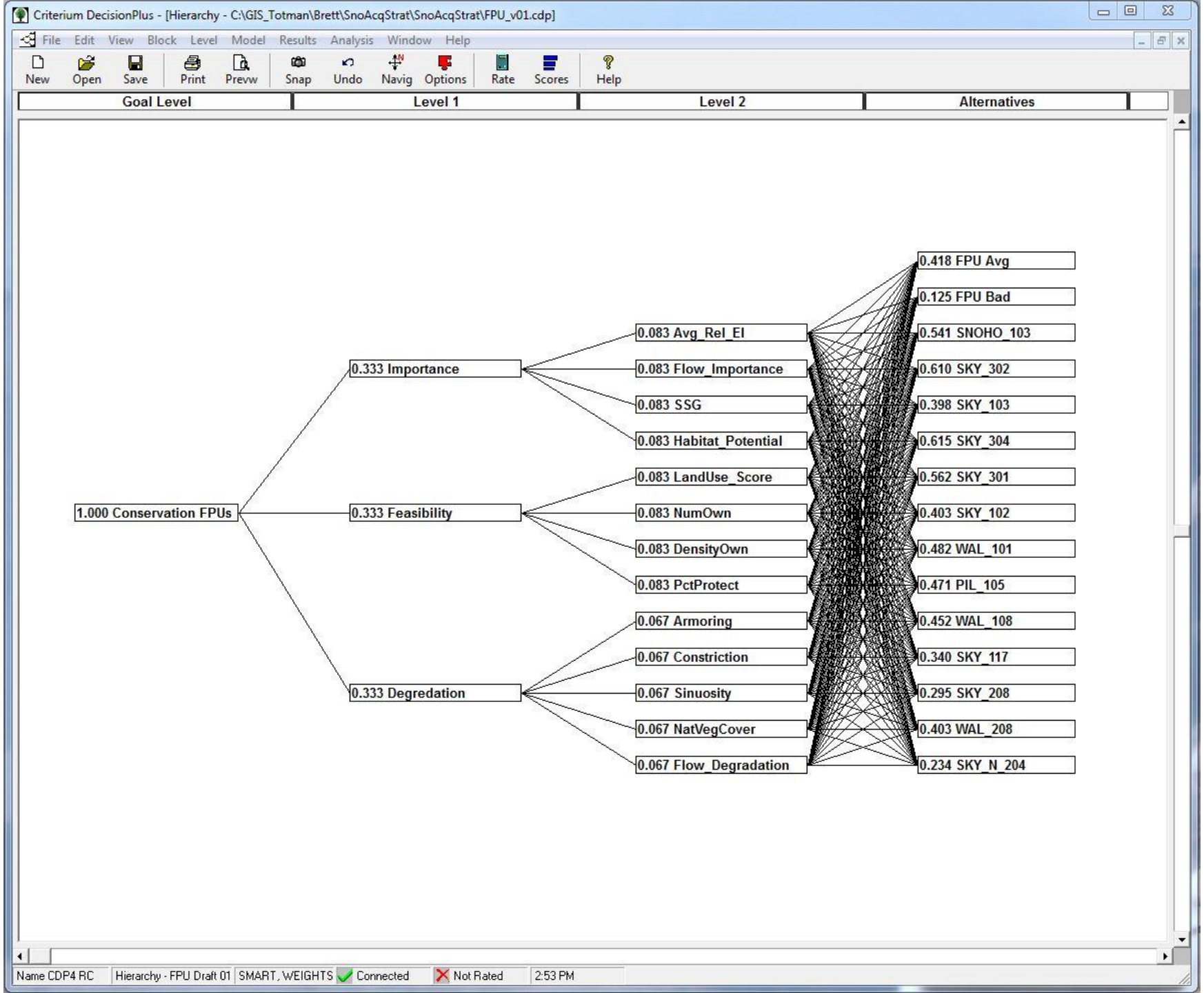
- Premise: Parcels adjacent to other protected parcels are more desirable targets for conservation/restoration.

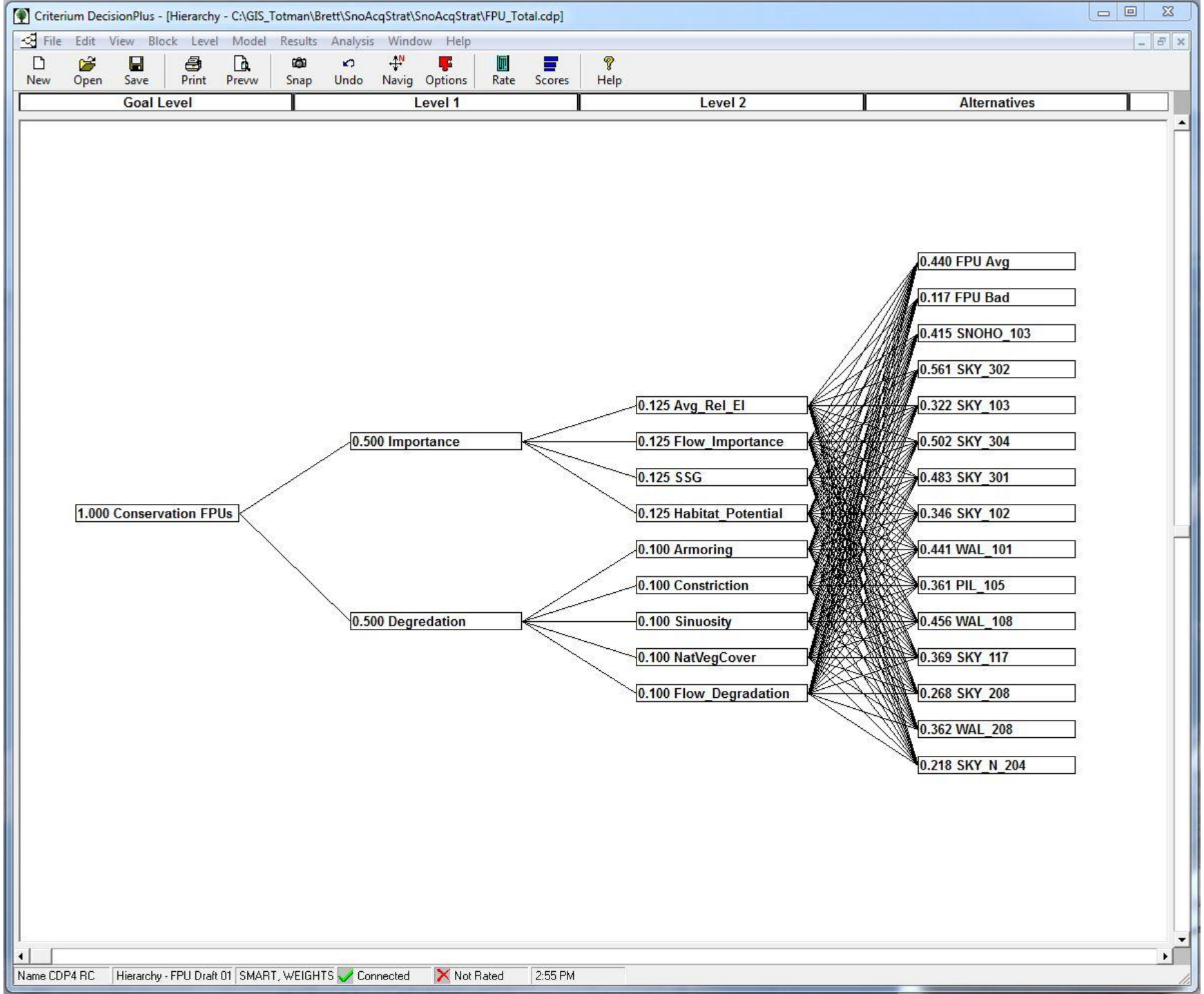

Protected
Not Protected
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Next Steps

- Finish Metrics
- Normalize and Weight Metrics
  - Criterion Decision Plus (CDP)
  - Ecosystem Management Decision Support System (EMDS)
- Generate Final Scoring (Restoration, Conservation, Total)
- Discuss Potential Adoption by the Snohomish Basin Salmon Recovery Forum
- Discuss Potential Inclusion as an Update to the Conservation Plan


Criterium DecisionPlus - [Hierarchy - C:\GIS_Totman\Brett\SnoAcqStrat\SnoAcqStrat\FPU_Restoration.cdp]
File Edit View Block Level Model Results Analysis Window Help
New Open Save Print Prevw Snap Undo Navig Options Rate Scores Help
Goal Level
Level 1
Level 2
Alternatives
1.000 Restoration FPUs
0.333 Importance
0.333 Feasibility
0.333 Degredation
0.083 Avg_Rel_El
0.083 Flow_Importance
0.083 Habitat_Potential
0.083 SSG
0.083 LandUse_Score
0.083 NumOwn
0.083 DensityOwn
0.083 PctProtect
0.067 Armoring
0.067 Constriction
0.067 Sinuosity
0.067 NatVegCover
0.067 Flow_Degradation
0.432 FPU Avg
0.205 FPU Bad
0.592 SNOHO_103
0.543 SKY_302
0.576 SKY_103
0.594 SKY_304
0.540 SKY_301
0.581 SKY_102
0.490 WAL_101
0.543 PIL_105
0.366 WAL_108
0.442 SKY_117
0.516 SKY_208
0.435 WAL_208
0.504 SKY_N_204
Name CDP4 RC
Hierarchy - FPU Draft 01
SMART, WEIGHTS
Connected
Not Rated
2:49 PM


Criterium DecisionPlus - [Hierarchy - C:\GIS_Totman\Brett\SnoAcqStrat\SnoAcqStrat\FPU_v01.cdp]
File Edit View Block Level Model Results Analysis Window Help
New Open Save Print Prevw Snap Undo Navig Options Rate Scores Help
Goal Level
Level 1
Level 2
Alternatives
1.000 Conservation FPUs
0.333 Importance
0.333 Feasibility
0.333 Degredation
0.083 Avg_Rel_El
0.083 Flow_Importance
0.083 SSG
0.083 Habitat_Potential
0.083 LandUse_Score
0.083 NumOwn
0.083 DensityOwn
0.083 PctProtect
0.067 Armoring
0.067 Constriction
0.067 Sinuosity
0.067 NatVegCover
0.067 Flow_Degradation
0.418 FPU Avg
0.125 FPU Bad
0.541 SNOHO_103
0.610 SKY_302
0.398 SKY_103
0.615 SKY_304
0.562 SKY_301
0.403 SKY_102
0.482 WAL_101
0.471 PIL_105
0.452 WAL_108
0.340 SKY_117
0.295 SKY_208
0.403 WAL_208
0.234 SKY_N_204
Name CDP4 RC
Hierarchy - FPU Draft 01
SMART, WEIGHTS
Connected
Not Rated
2:53 PM


Criterium DecisionPlus - [Hierarchy - C:\GIS_Totman\Brett\SnoAcqStrat\SnoAcqStrat\FPU_Total.cdp]
File Edit View Block Level Model Results Analysis Window Help
New Open Save Print Prevw Snap Undo Navig Options Rate Scores Help
Goal Level
Level 1
Level 2
Alternatives
1.000 Conservation FPUs
0.500 Importance
0.500 Degredation
0.125 Avg_Rel_El
0.125 Flow_Importance
0.125 SSG
0.125 Habitat_Potential
0.100 Armoring
0.100 Constriction
0.100 Sinuosity
0.100 NatVegCover
0.100 Flow_Degradation
0.440 FPU Avg
0.117 FPU Bad
0.415 SNOHO_103
0.561 SKY_302
0.322 SKY_103
0.502 SKY_304
0.483 SKY_301
0.346 SKY_102
0.441 WAL_101
0.361 PIL_105
0.456 WAL_108
0.369 SKY_117
0.268 SKY_208
0.362 WAL_208
0.218 SKY_N_204
Name CDP4 RC
Hierarchy - FPU Draft 01
SMART, WEIGHTS
Connected
Not Rated
2:55 PM