Technical Meetings

- 3 meetings
- 1 workshop (tentative)
- Timeline: Through April to get draft in place for review and community vetting
- Purpose of Meeting #1: Assess information collected to date and relevance to understanding Limiting Factors of LCR Watersheds. Review straw goals and objectives
- Meeting #2: Discuss draft approach to defining restoration strategy
  - Establish technical foundation for strategic action plan based on existing datasets. .
- Meeting #3: Match project opportunities to test strategy

TAC Meeting #2 Agenda

- Purpose of Meeting #2: Establish technical foundation for strategic action plan based on existing datasets. .

Proposed Agenda:

- Introductions
- Summary of Meeting #1
- Review Purpose of Meeting and Agenda
- Understanding formative processes of LCRWC watersheds
  - Hydrogeomorphic approach to delineating subareas: Geologic snapshots in time
- Datasets available and relevance to strategy development
  - Review IP maps and completed habitat surveys
- LUNCH
- Feedback on SAP Goals and Objectives
- Brainstorm Strategies/Actions suitable for LC Watershed Subareas (30 minutes)
  - Clatskanie River reach example
- Next Steps and Meeting #3 Agenda (15 minutes)-All
- Adjourn

TAC Meeting #1 Takeaways

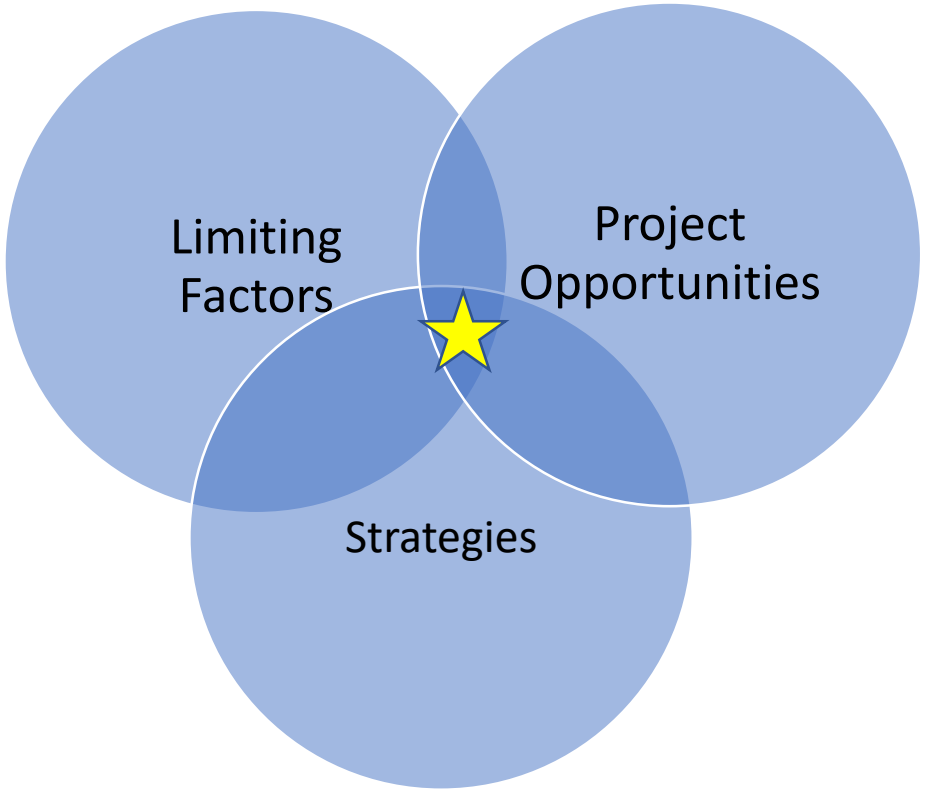
- Species Discussion
- Limiting Factors Application to LCR Watersheds
- Goals and Objectives
- Available Datasets

Action Development Guidance

- Match project opportunities to address limiting factors
- Focused outreach on key areas of watersheds current unexplored

(timber areas, tidal areas)

- Consider broader landscape view
  - Grouping of projects together synergistically
  - Adjacency to intact areas
  - Target areas in major gaps based on work completed to date
- Secure resources to close gaps on existing uncertainties (i.e. Rapid BioAssessment)

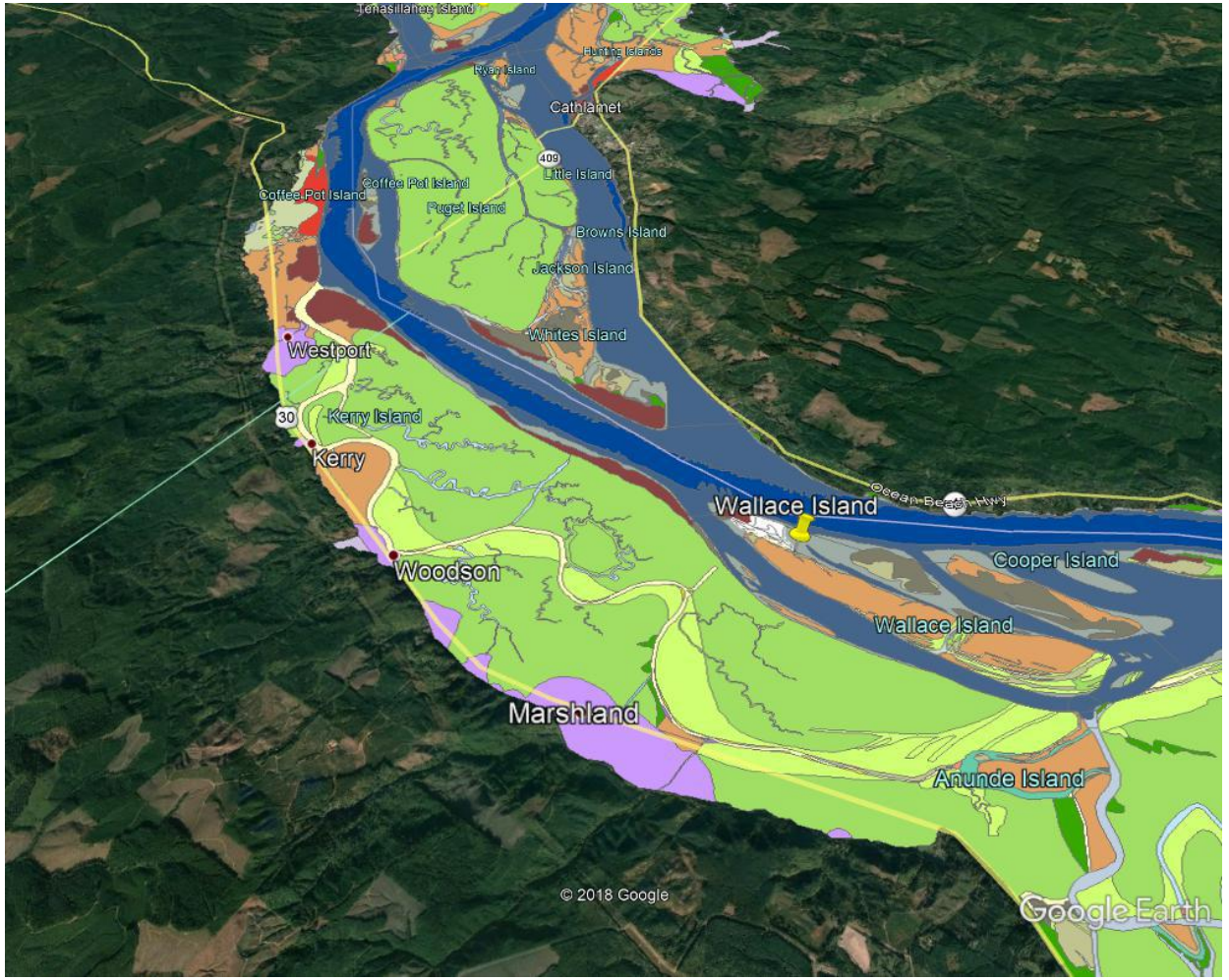


Geologic Snapshots in Time

Lower Columbia River
Watershed Council

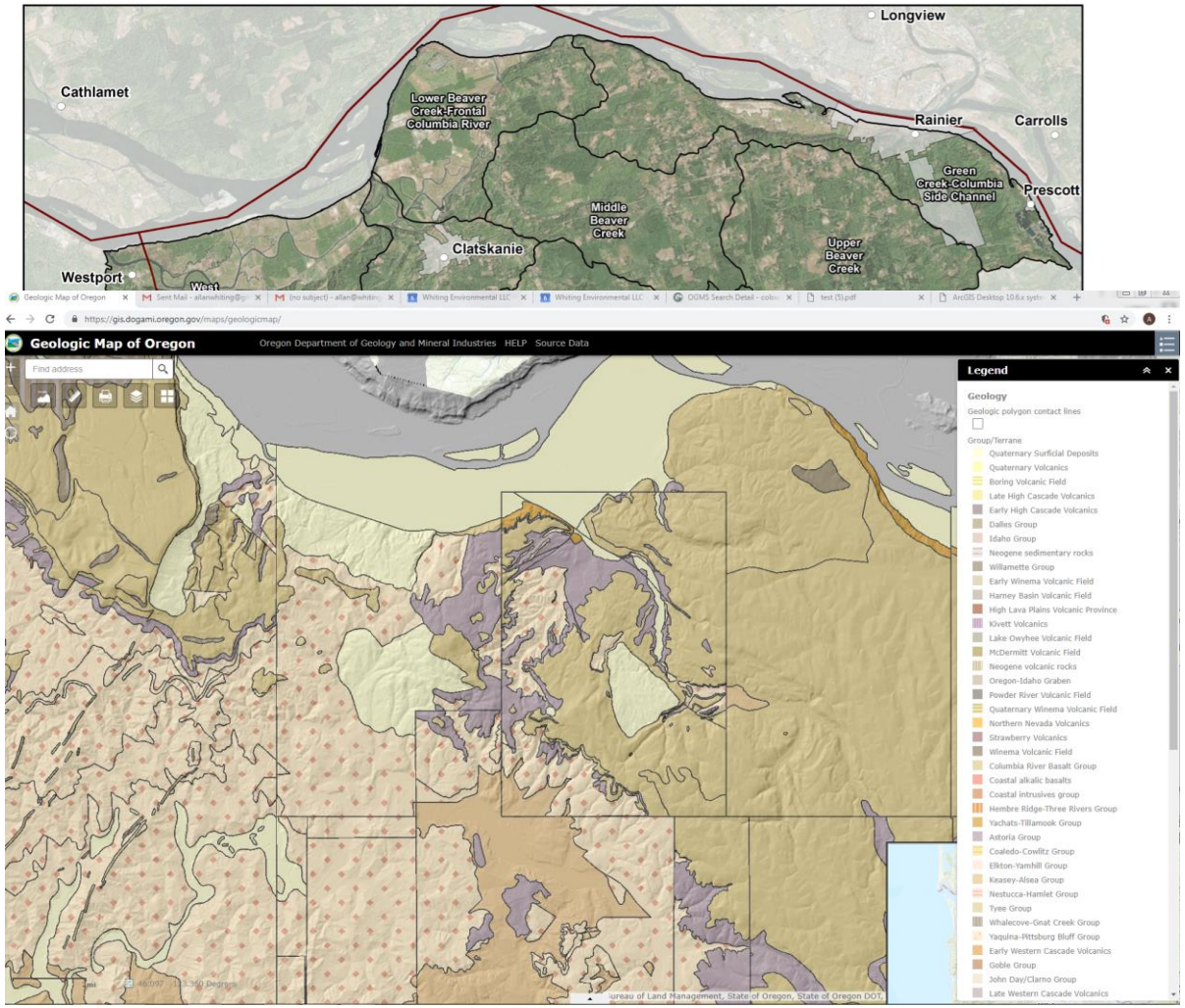
Why?

- Basis for understanding formative process based on landforms or “bones” that drive hydrology
- Landforms shape size, shape, orientation and overall hydrologic patterns
- Less static that HUC system leaves room for dynamism (i.e. stream power, sediment transport, habitat structure)
- Inform actions that are sustainable, cost-effective



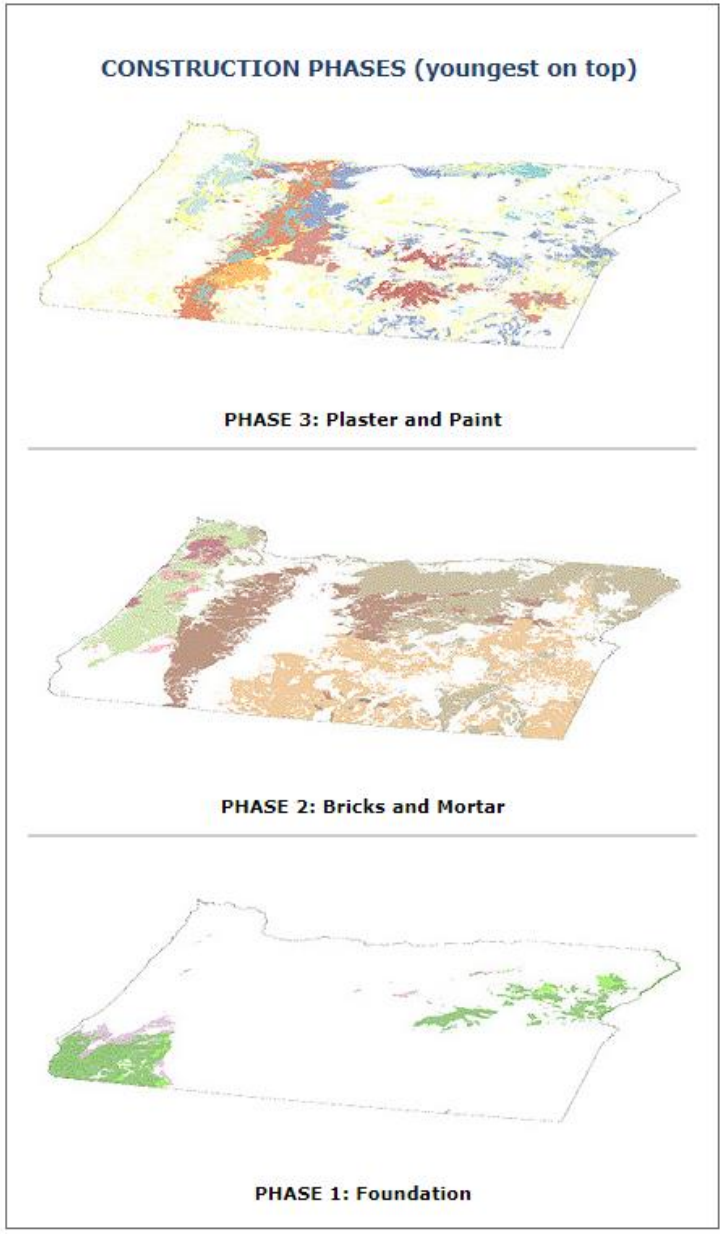
Geology of LCRWC

- Looks at restoration opportunities in broader landscape context
- Focuses restoration program toward cost-effective projects



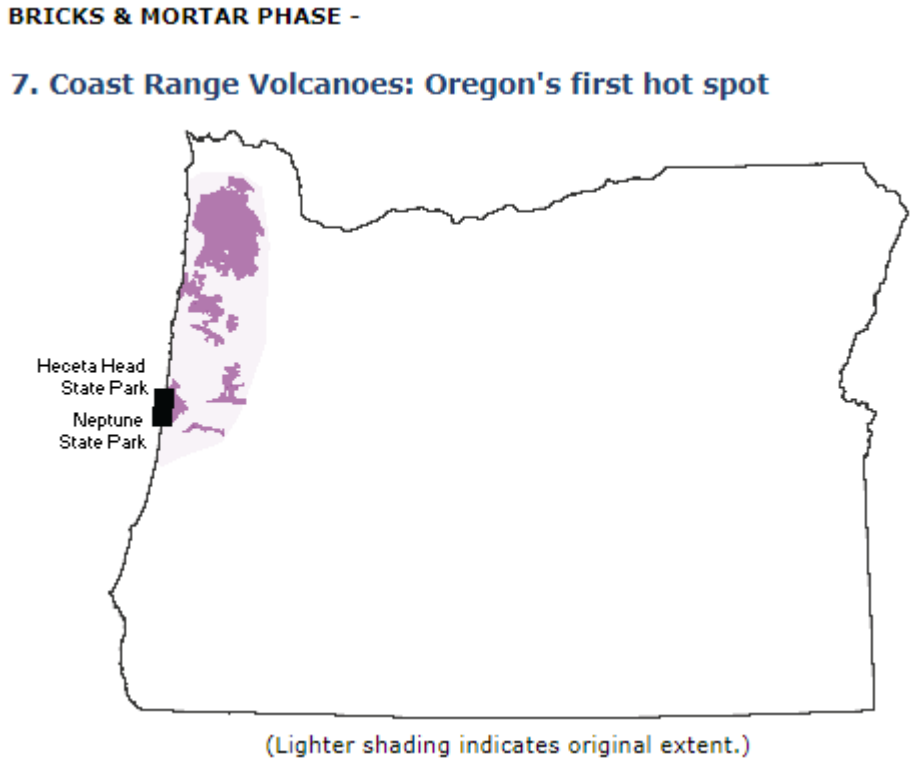
Geology of Oregon

- Foundation pieces=130-50 mya
- Bricks and Mortar=Volcanic and Ocean Sediments
- Plaster and Paint=Rivers, Ice, Landslides…eventual Subduction!



Geology LC Watersheds Factors

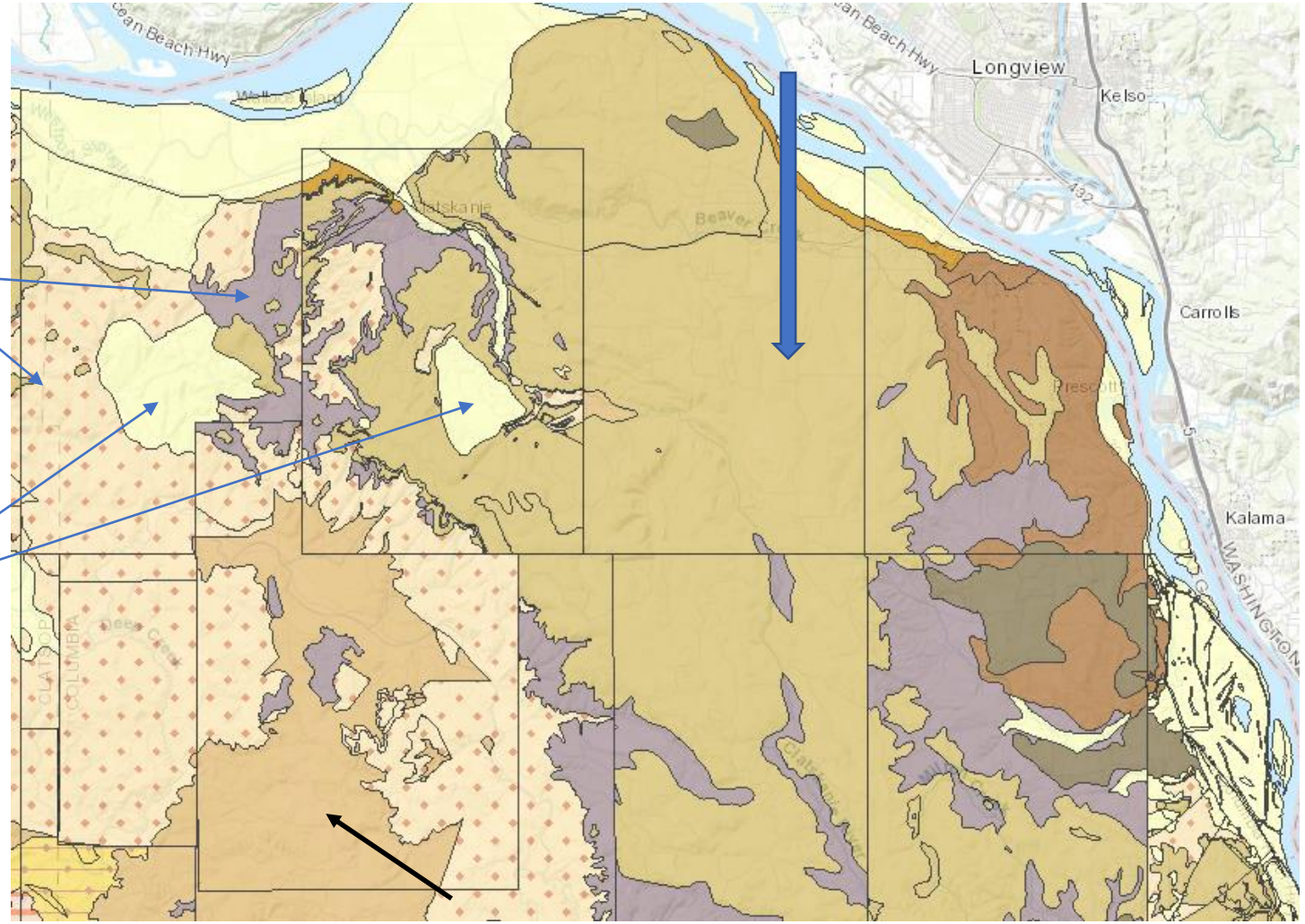
- Subduction Zone forms basis of Coastal Mountains
- 50 million years of sea level rise and fall deposited Marine Sediments
- Uplift, and foldling contributes to coastal mountains expansion interspersed with localized volcanism
- 15-17 million years ago Columbia River Lava Flows
- 2 mya to today-river and wind draping deposits
- 2 mya-10,000 glaciers and icedams contributing to stochastic flooding
- Regional volcanic
- Episodic flooding
- Landslides



Geology LC Watersheds Factors-Clatskanie River

Columbia River Basalts

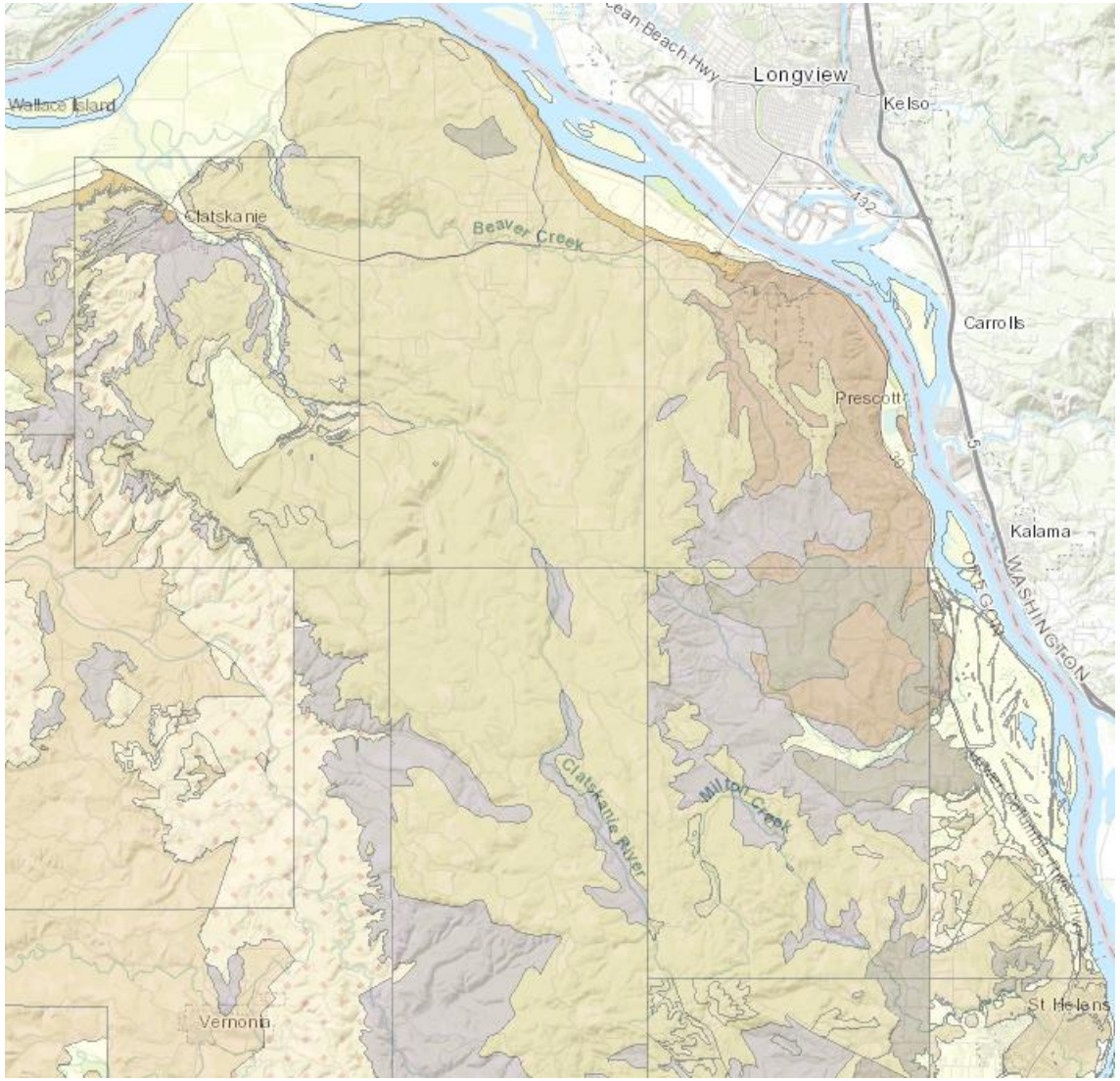
- Marine Sediments (newer)



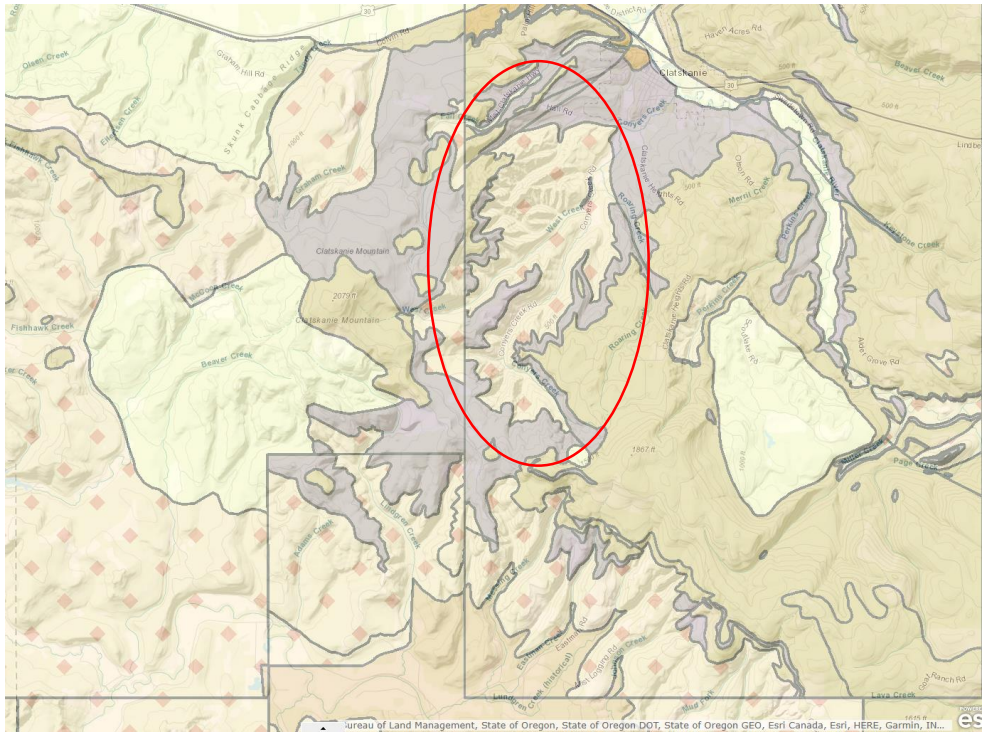
Landslides

Marine Sediments (older)

So what?

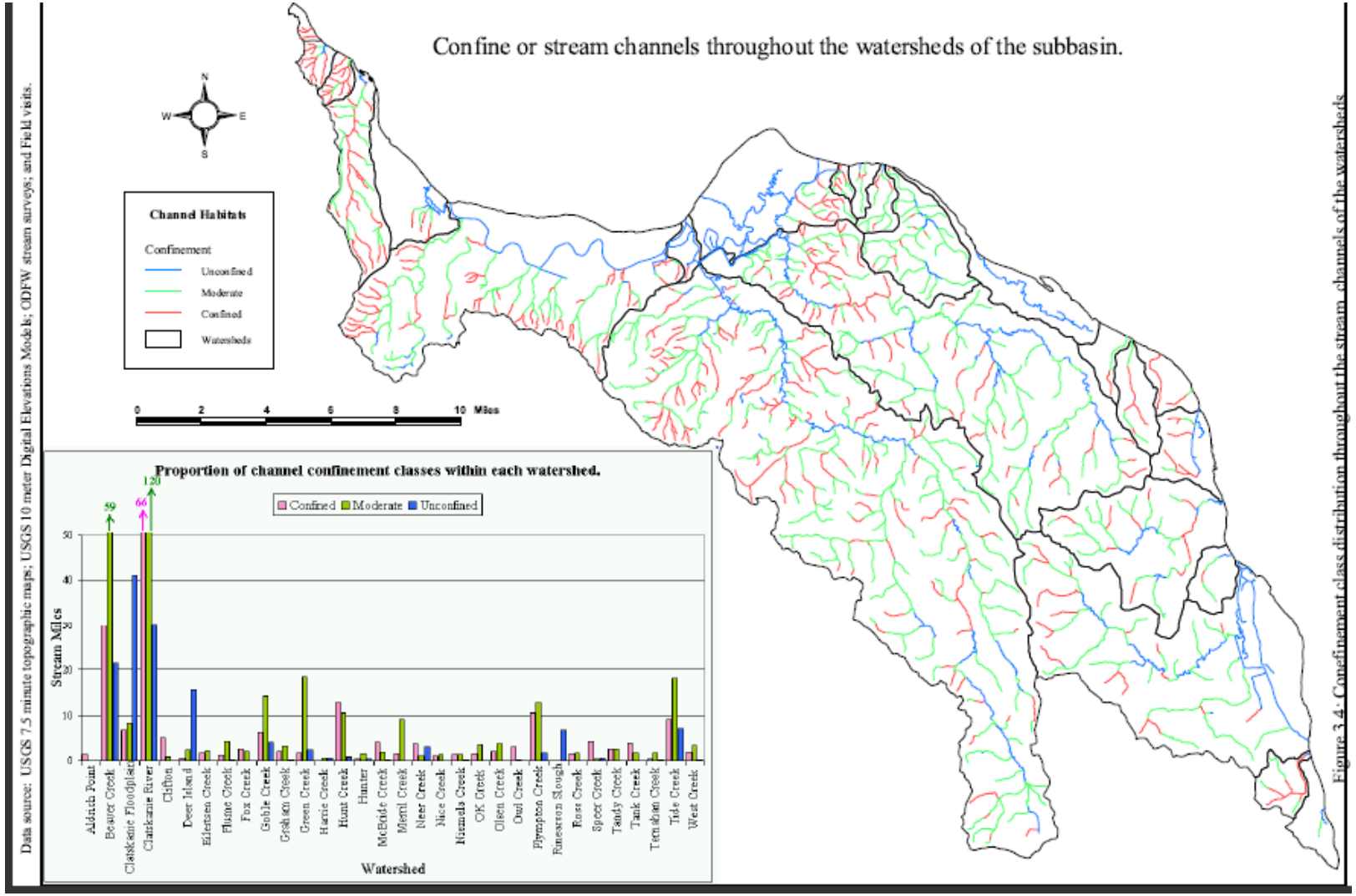


Clatskanie River-Basalt Dominated

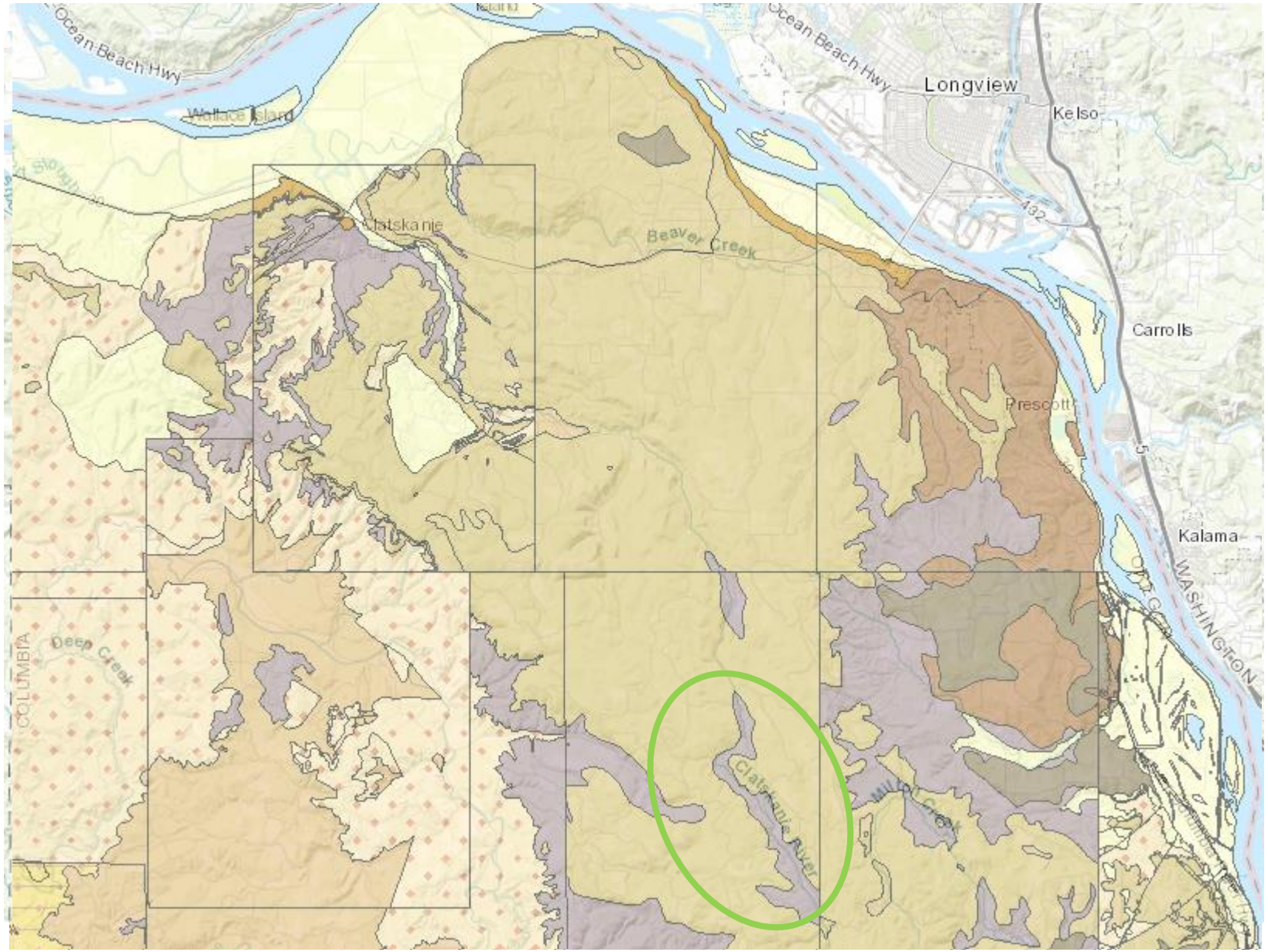


Conyers Creek-Marine Sediment Dominated

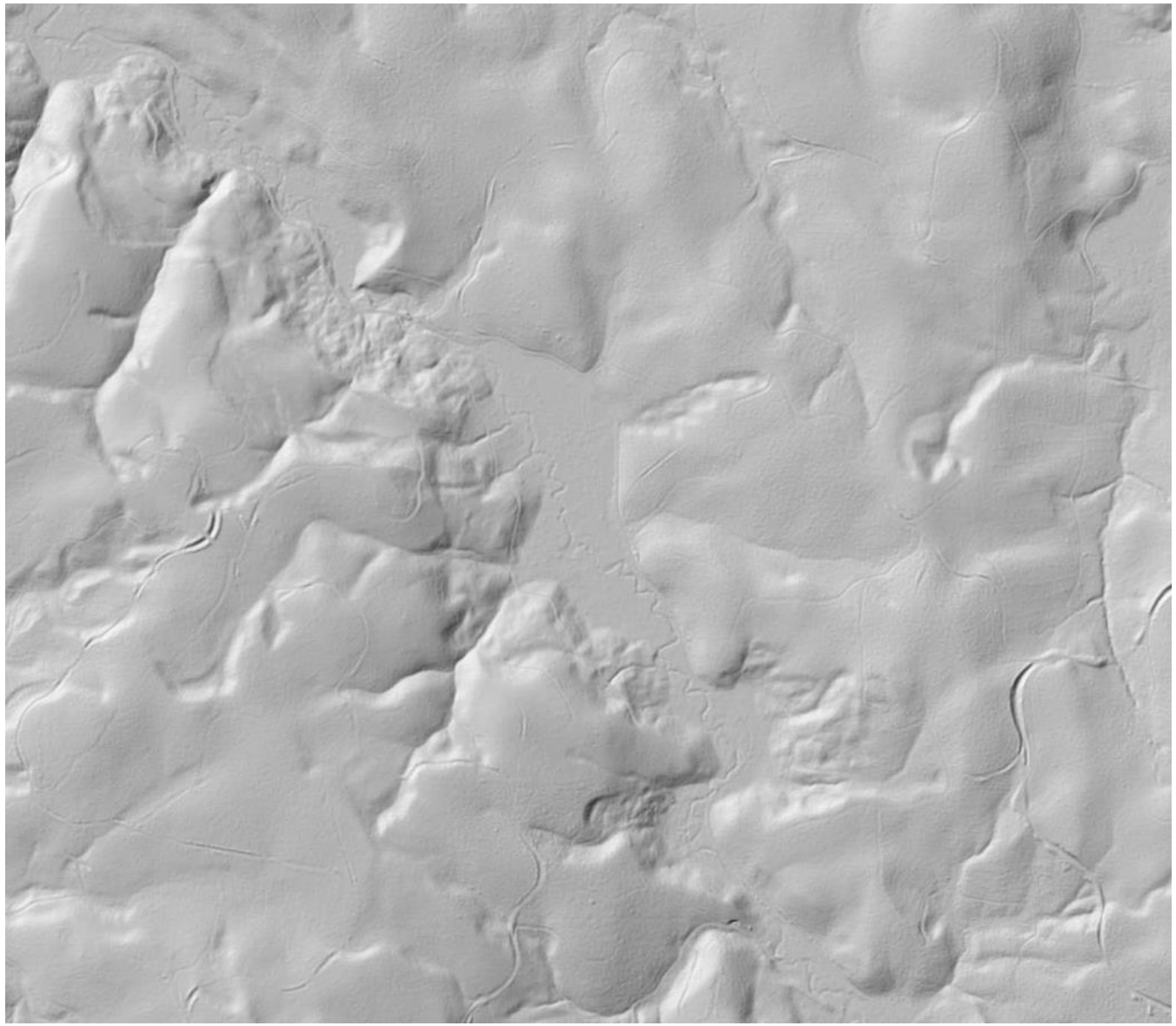
Structure of Floodplain Habitats-LCR Watersheds



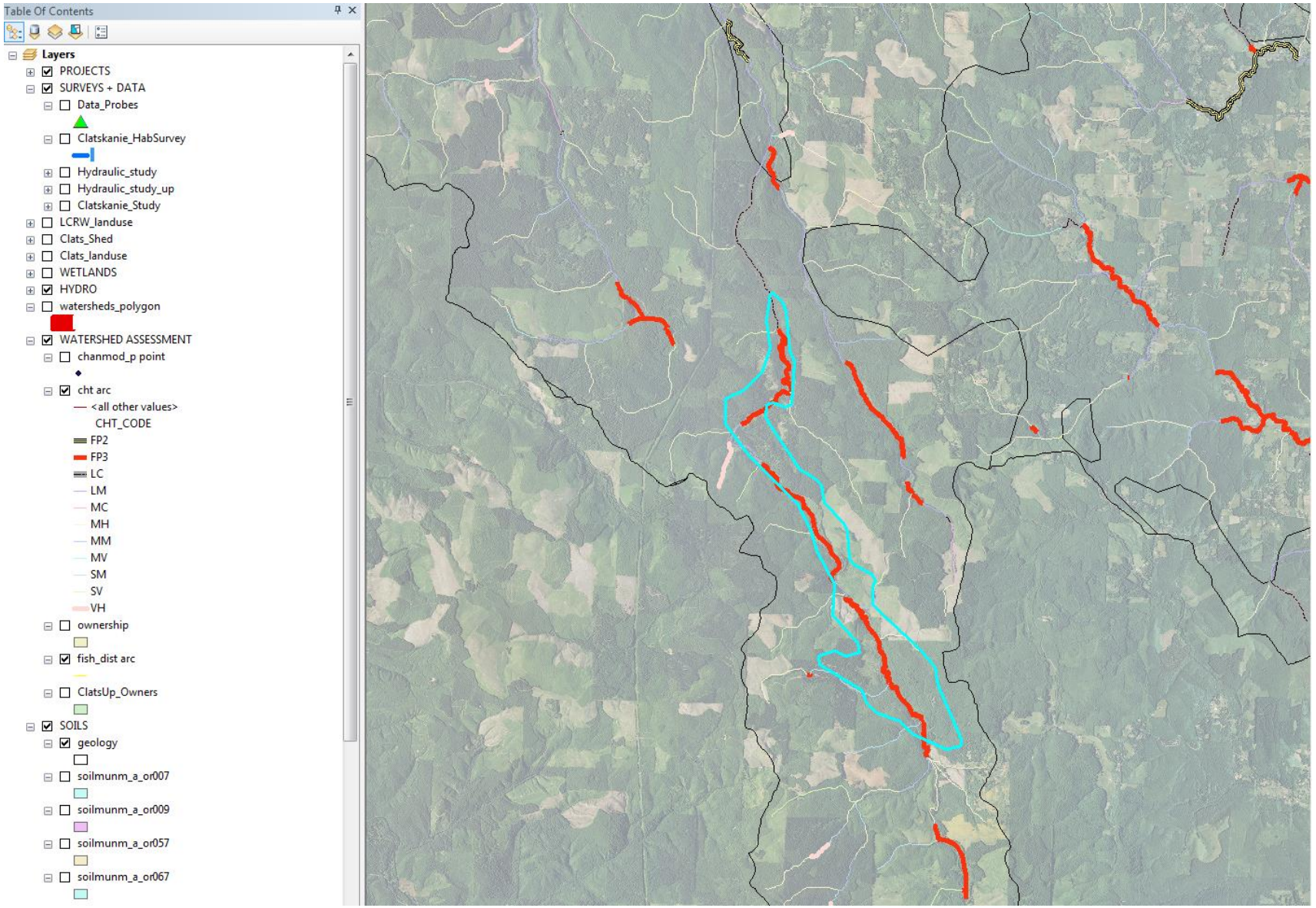
So what?


Ocean Beach Hwy
Wallace Island
Ocean Beach Hwy
Longview
Kelso
Beaver Creek
Carrolls
Prescott
Kalama
WASHINGTON
COLUMBIA
Deep Creek
Clatskanie River
Mill Creek

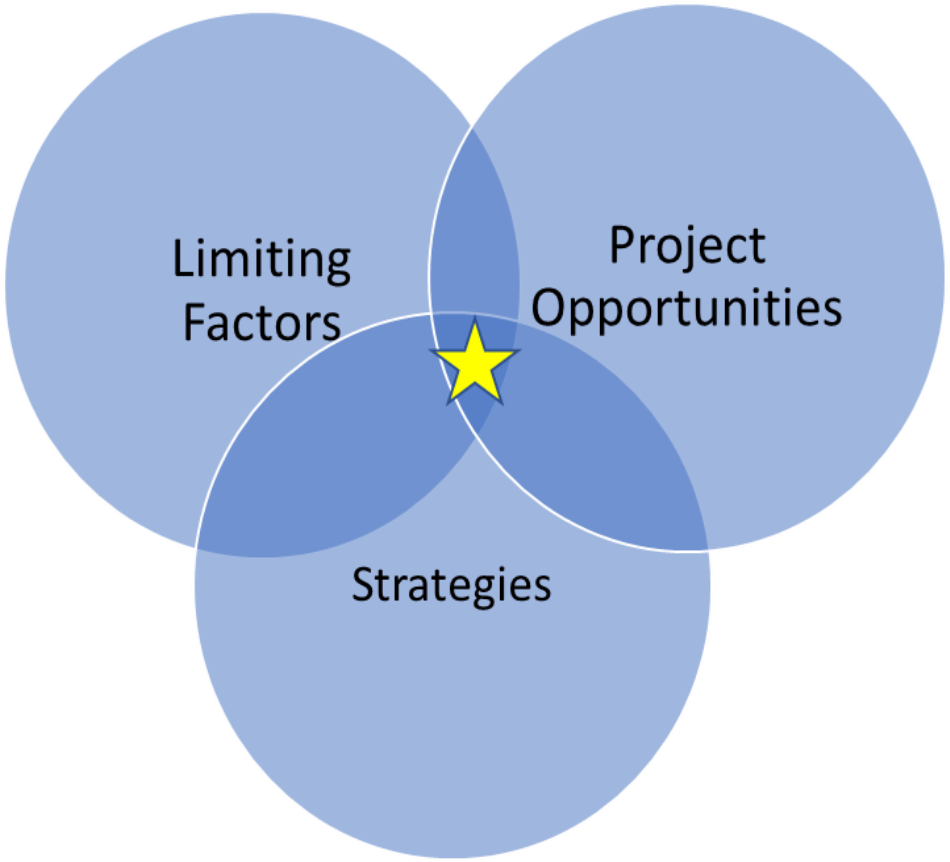
Floodplain, Unconfined Channel Type



Floodplain, Unconfined Channel Type



Strategy/Action Brainstorm



IP Primer

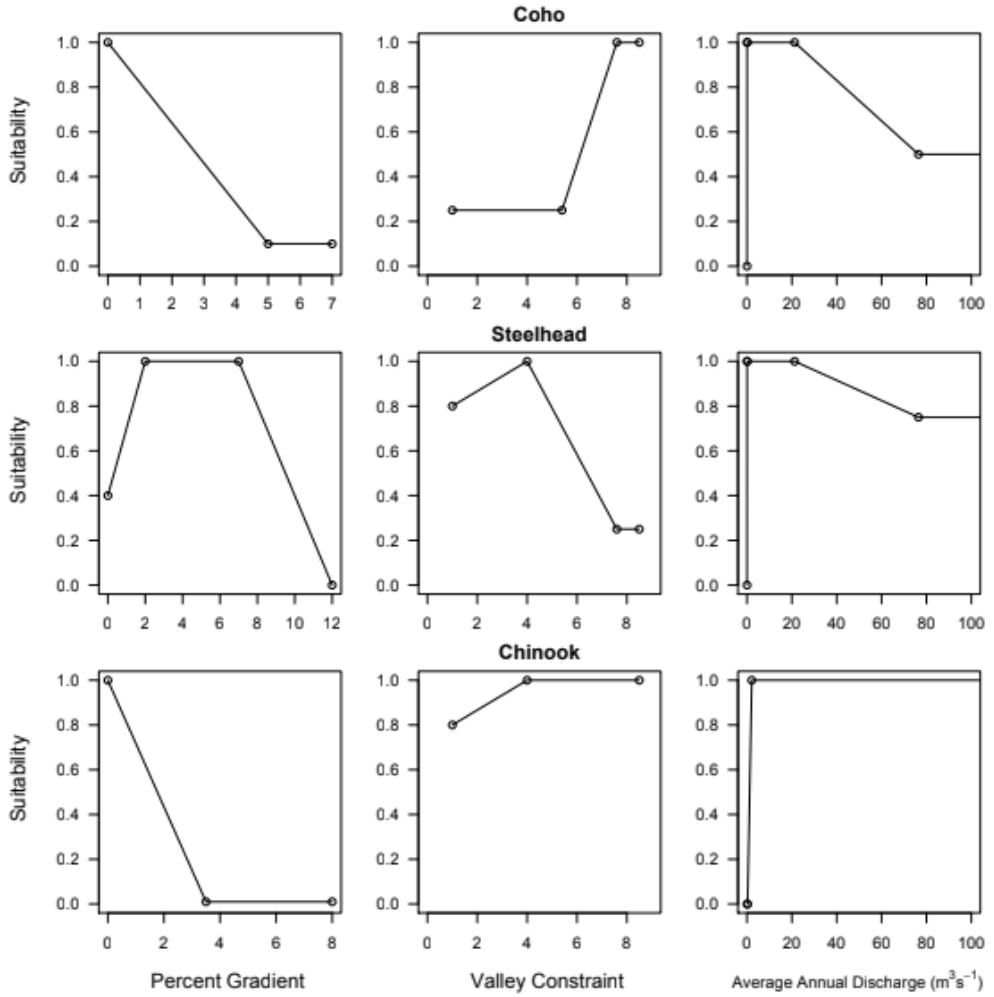
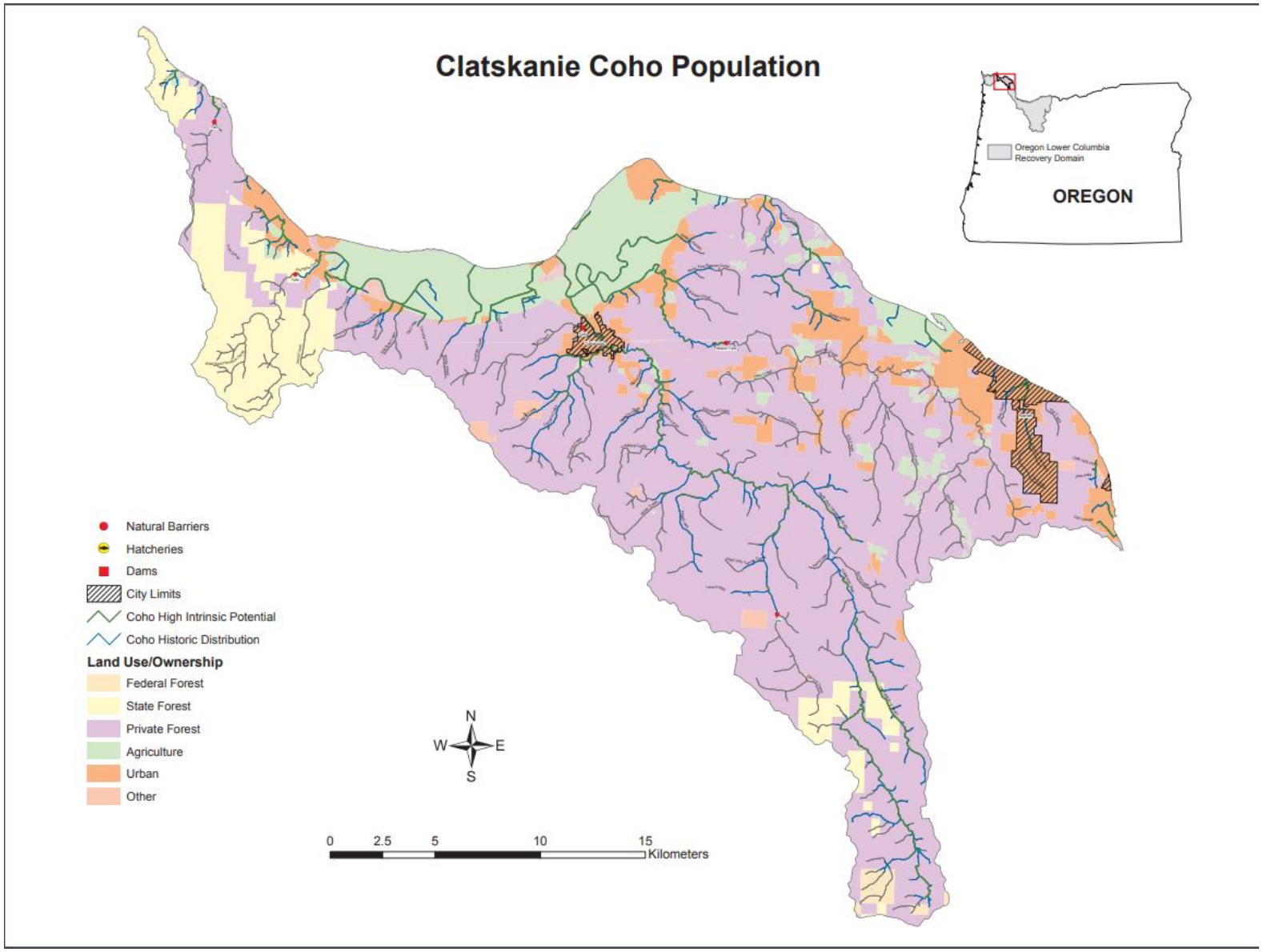
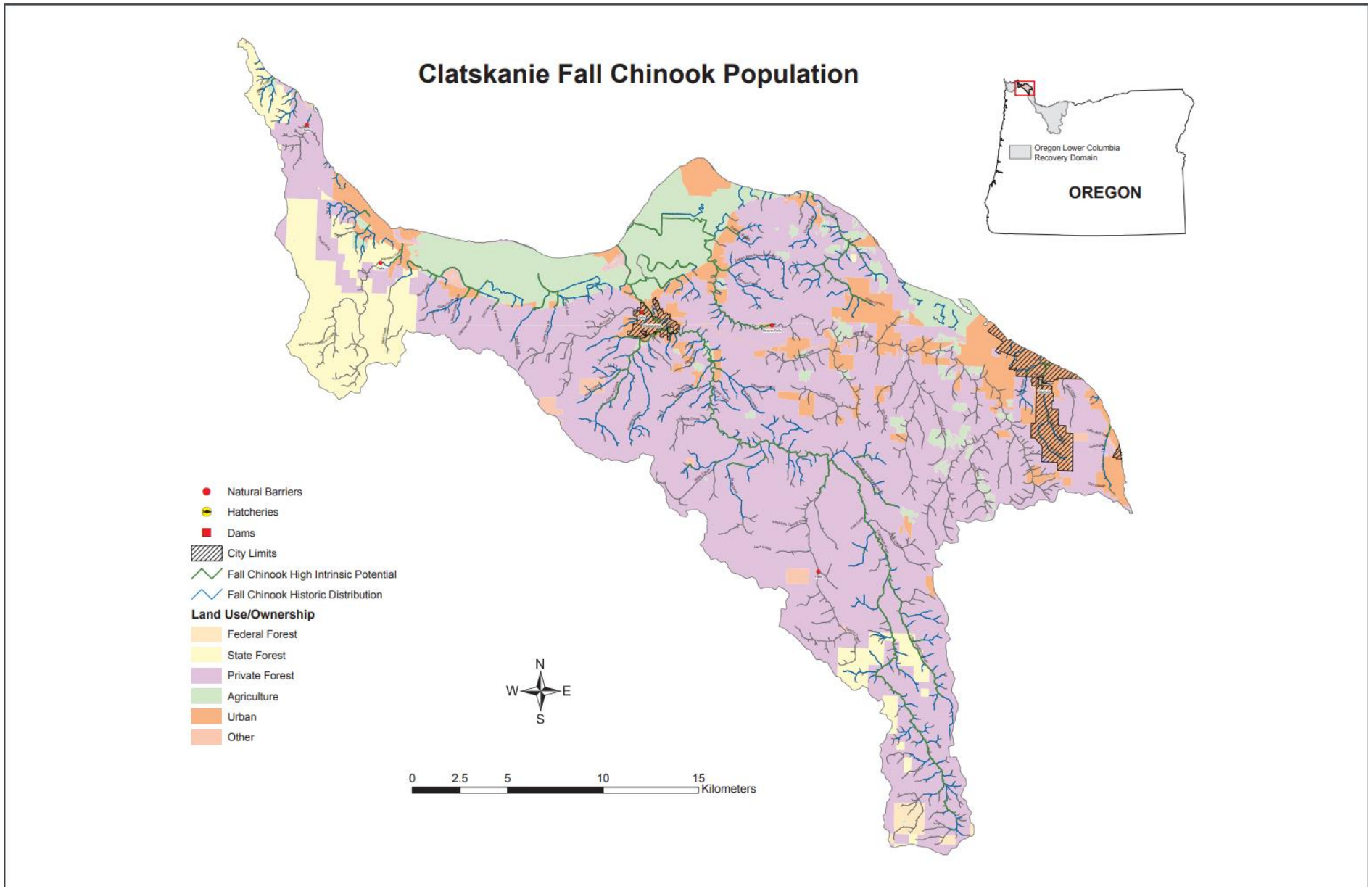


Figure 1: Suitability curves for each of the three IP components (Gradient, Valley Constraint and Discharge) for juveniles of each of the three species (coho, steelhead and chinook). Note the scale change (abscissa) across each species for the gradient attribute.

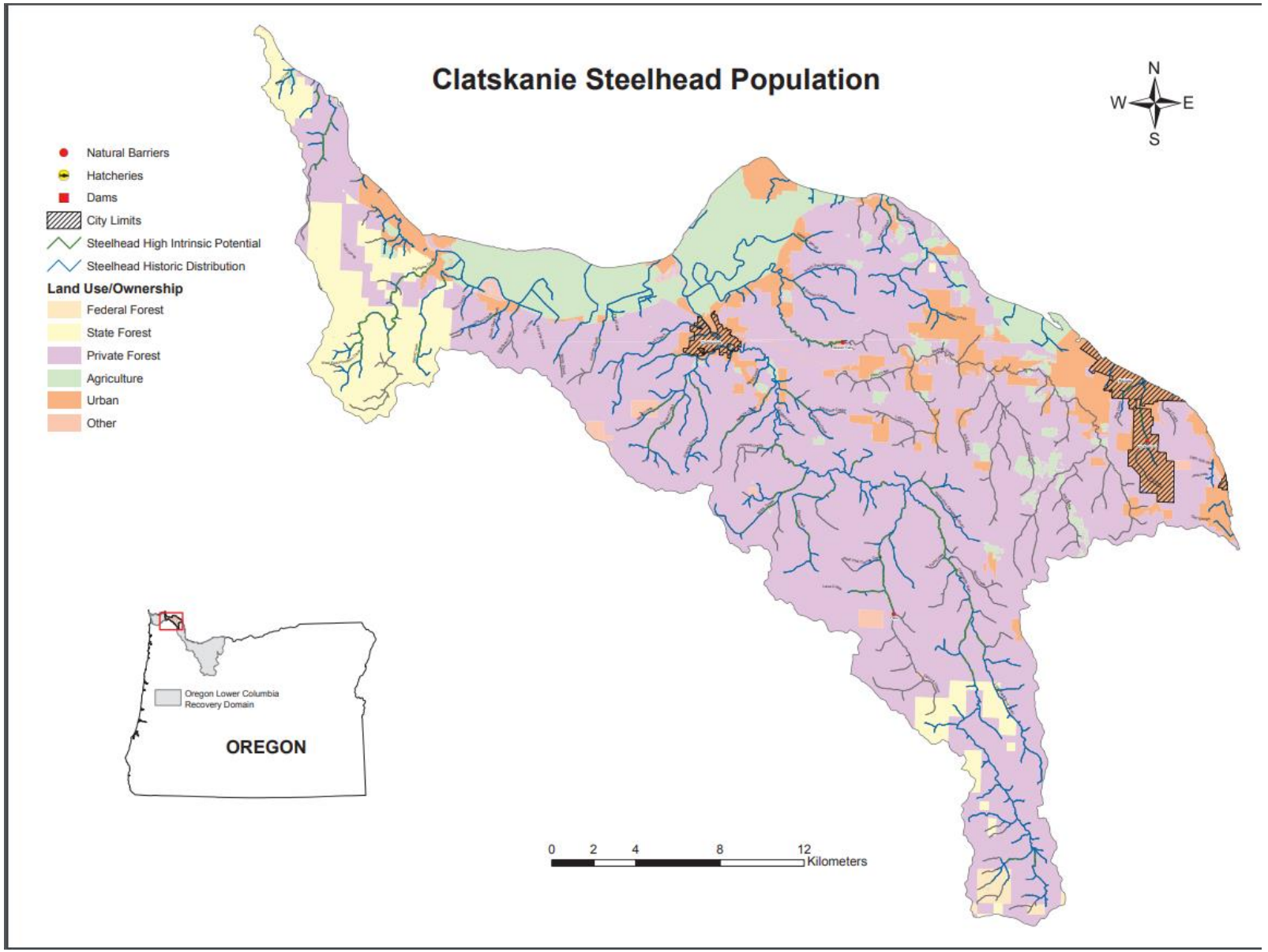
Intrinsic Potential-Coho Salmon



Intrinsic Potential-Chinook Salmon



Intrinsic Potential-Steelhead



Summary of effort to date

- Fish passage projects
- Streambank stabilization
- Estuarine
- Riparian
- Channel reconfiguration
- Instream complexity project types

Strategy/Action Brainstorm

A. Strategies to Address Physical Habitat Quality

Description: Past and current land use have impaired access to off-channel rearing areas. This has also increased sediment sources through road building and land clearing activities.

List of Strategies Include:

- Increase LWD in channel
- Expand riparian and wetland quality and diversity
- Engage upper watershed landowners to increase roughness upstream to reduce sediment inputs

Strategy/Action Brainstorm

B. Strategies to Address Estuarine Food Web Productivity

Description: Loss of estuarine habitat from diking and impoundments from upper river dams have shifted food-web productivity from a macro-detrital to a micro-detrital system.

List of Strategies include:

- Increase connectivity of estuarine habitats through culvert replacements and/or dike removal increasing nutrient exchange and estuarine foodweb productivity
- Reduce impacts of invasive species to increase estuarine plant diversity thereby expanding available prey resources

Strategy/Action Brainstorm

E. Action Items for Addressing uncertainties/Closing DataGaps

1. **Monitoring Questions**

   A) PRODUCTIVITY

   B) FLOOD PROFILES/GAGE DATA

2. **Rapid BioAssessment**
3. **Side channel inventory**
4. **Applied Research**
5. **Climate Change and Resiliency Planning**

Plan Components

- Vision
- Goals
  - Technical
  - Programmatic
- Project Opportunities
- Action Items
- Implementation Schedule

V. GOALS

A. **Vision Statement**

Improve watershed function though the implementation of a diversity of restoration projects for the long-term community sustainability and resiliency.

B. **Technical Goals**

1. **Improve riparian condition**
2. **Increase stream complexity**
3. **Remove barriers**
4. **Improve estuary habitat**
5. **Upland/Watershed Processes**

C. **Organizational Goals**

1. **LCRWC governance**
2. **Outreach Plan**

D. **Community Goals**

1. **Preserve rural character and values**
2. **Sustainability**

   A) E.G ENCOURAGE SUSTAINABLE FOREST PRACTICE

3. **Resiliency**

VI. ACTION PLAN

A. **Project Type X: Stream Corridor/Riparian**
B. **Project Type Y: Upland Terrestrial**
C. **Project Type Z: Addressing uncertainties**

1. **Monitoring**
2. **Assessment**
3. **Applied Research**
4. **Resiliency Planning**

D. **Organization/Programmatic Actions**

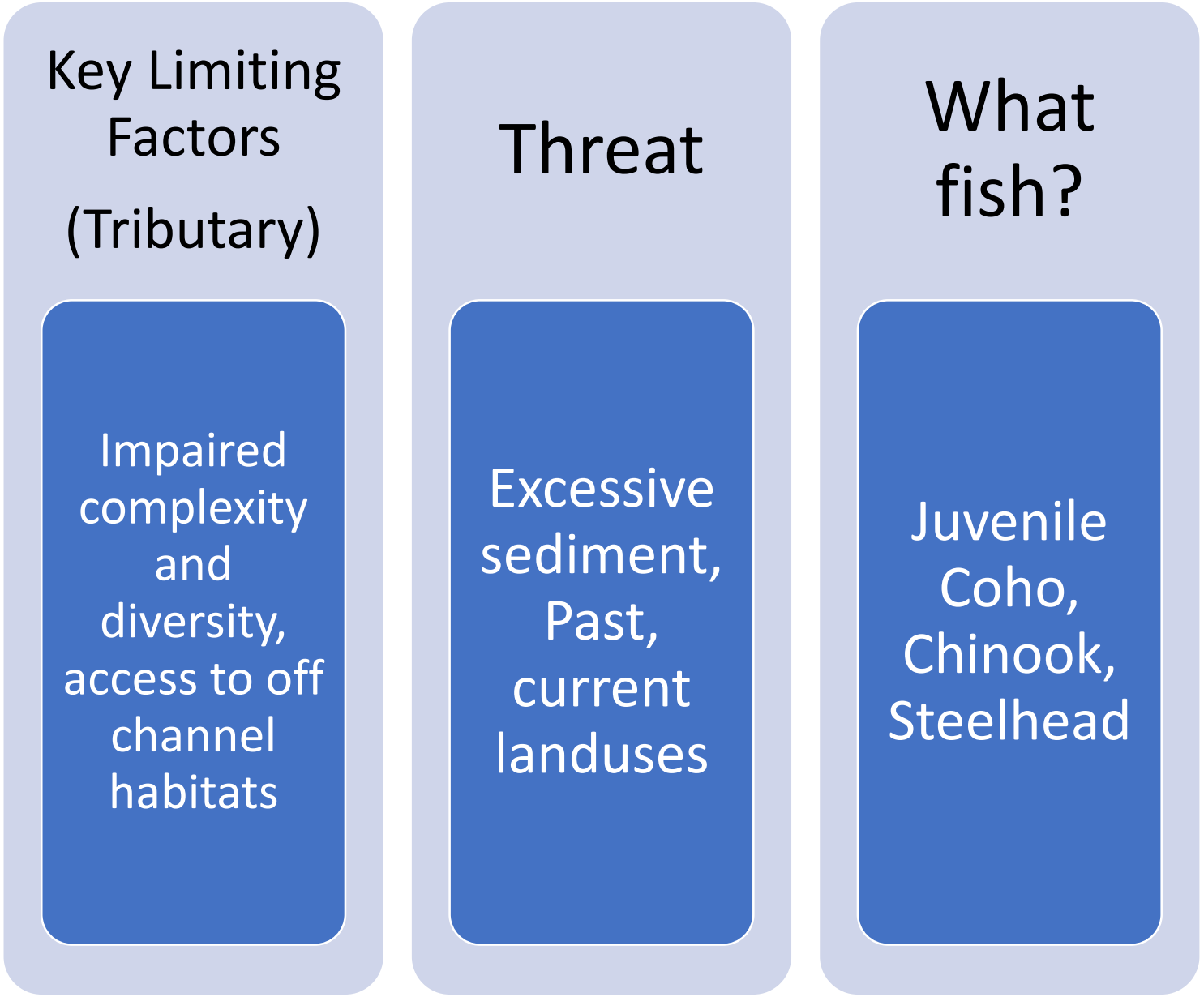
1. **Outreach and Education**
2. **Board Recruitment and Development**

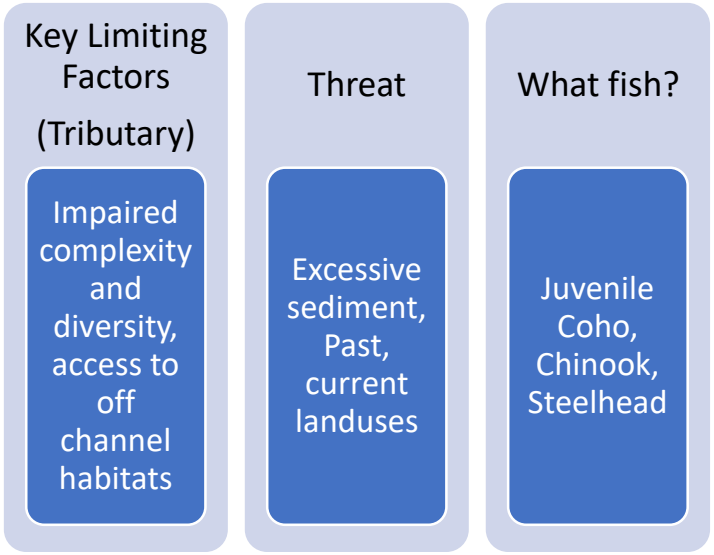
Scientific Basis for Strategy

- Lower Columbia Recovery Plan
- Watershed Assessment
- Habitat Surveys
- Additional Studies
  - WQ Monitoring
  - RCPP Project

Limiting Factors, Clatskanie River

Key Limiting Factors	Limiting Factors Description	Habitat Type	Threat Description	Speices
Physical Habitat Quality*	Imparied complexity and diversity Access to off-channel habitats	Tributary	Past, current land uses	Junvenile Coho, Chinook, Steelhead
Foodweb	Reduced Macrodetrital Inputs	Estuary	Hydrosystem, revetments, dredged material	All juvenile salmonids
Water Quantity	Hydrosystem impacts, access to offchannel habitats	Estuary		Junvenile Coho, Chinook
Harvest Management	Consumptive, targeted fishery			Adult Coho, Chinook
Hatchery Management	Stray hatchery fish interbreeding with wild fish			Adult Chinook only
Secondary Limiting Factors	**Limiting Factors Description**	**Habitat Type**	**Threat Description**	**Speices**
Water quantity*	Upslope Land Uses	Tributary	Shifts in local hydrographs from ag and forestry practices	All juvenile salmonids
Physical Habitat Quality*	Excessive fine sediment, loss of habitat complexity and diversity; access to off-channel habitats	Tributary	Rural roads and Land Use	All juvenile salmonids
Water Quality*	Elevated water temperature	Tributary	Excessive fine sediment, loss of habitat complexity and diversity, access to off-channel habitats	Junvenile Coho, Steelhead
Competition	Hatchery Fish	Estuary	Smolts from all Columbia Basin hatcheries	Junvenile Coho only
Physical Habitat Quality	Excessive fine sediment, loss of habitat complexity and diversity; access to off-channel habitats	Estuary	Channelization, diking, navigation channel	All juvenile salmonids
Water Quality	Elevated water temperature	Estuary	Flow regulation, reservoirs	All juvenile salmonids
Water Quality	Toxins from agricultural practices	Estuary	Upper basin impacts from pesticides	All juvenile salmonids
Water Quality	Toxins from urban and industrial sources	Estuary	Upper basin impacts from trace metals, PCBs, PAHs	All juvenile salmonids
Predation	Avian species (Caspian terns, cormorants)	Estuary		All juvenile salmonids


Key Limiting Factors
(Tributary)
Impaired complexity and diversity, access to off channel habitats
Threat
Excessive sediment, Past, current landuses
What fish?
Juvenile Coho, Chinook, Steelhead



Example Strategies to address limiting factors:

- More LWD in-channel
- Increase riparian condition and wetland diversity in non-tidal areas
- Remove barriers/constraints to off-channel habitats
- Road decommissioning in upperwatershed
- Other ideas

Limiting Factors, Estuarine areas

Key Limiting Factors	Limiting Factors Description	Habitat Type	Threat Description	Speices
Physical Habitat Quality*	Imparied complexity and diversity Access to off-channel habitats	Tributary	Past, current land uses	Junvenile Coho, Chinook, Steelhead
Foodweb	Reduced Macrodetrital Inputs	Estuary	Hydrosystem, revetments, dredged material	All juvenile salmonids
Water Quantity	Hydrosystem impacts, access to offchannel habitats	Estuary		Junvenile Coho, Chinook
Harvest Management	Consumptive, targeted fishery			Adult Coho, Chinook
Hatchery Management	Stray hatchery fish interbreeding with wild fish			Adult Chinook only
Secondary Limiting Factors	**Limiting Factors Description**	**Habitat Type**	**Threat Description**	**Speices**
Water quantity*	Upslope Land Uses	Tributary	Shifts in local hydrographs from ag and forestry practices	All juvenile salmonids
Physical Habitat Quality*	Excessive fine sediment, loss of habitat complexity and diversity; access to off-channel habitats	Tributary	Rural roads and Land Use	All juvenile salmonids
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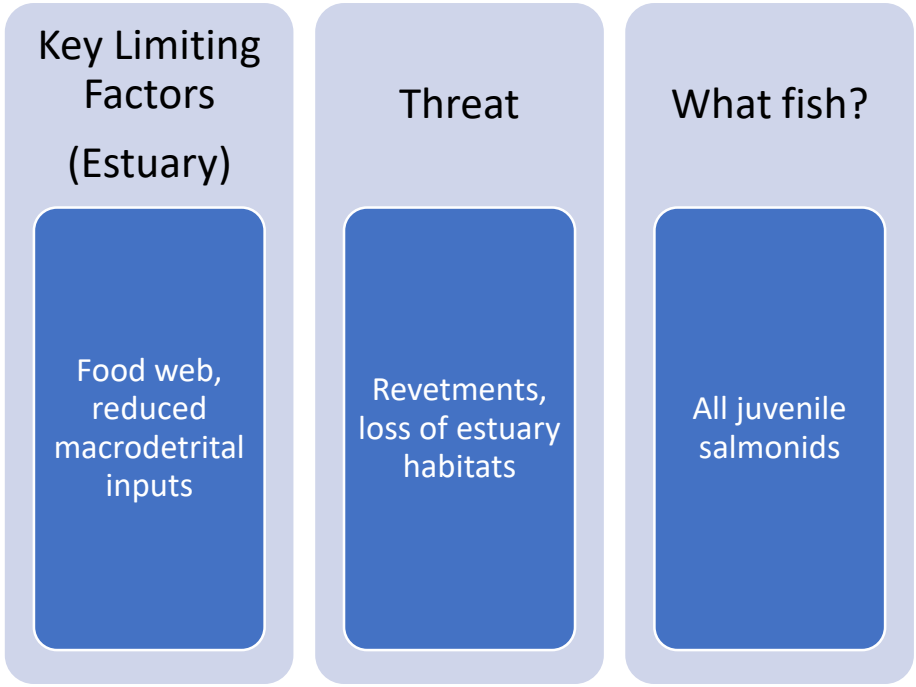
Water Quality	Toxins from urban and industrial sources	Estuary	Upper basin impacts from trace metals, PCBs, PAHs	All juvenile salmonids
Predation	Avian species (Caspian terns, cormorants)	Estuary		All juvenile salmonids

Key Limiting Factors (Estuary)	Threat	What fish?
Food web, reduced macrodetrital inputs	Revetments, loss of estuary habitats	All juvenile salmonids



Example Strategies to address limiting factors:

- Tidal hydrology reconnection-Levee, tidegate removal
- Expand rearing edge density
- Increase marsh and swamp habitats
- Increase estuarine plant community diversity
- Reduce invasive plant infestation

Goals and Objectives

Vision (from Council Charter):

- A balanced ecosystem approach that supports a healthy watershed and provides for sustainable natural resources and for an economic base and viable communities.

-SAP Goal Statement-

Improve watershed function though the implementation of a diversity of restoration projects for recovery and sustainability of salmon populations and community resiliency.

Goals and Objectives

- **Technical Goals**
  - **Increase access to spawning habitat to maximize reproduction capacity of adult salmon**
  - **Improve riparian condition (LFA Goal=16.4 miles) for LWD recruitment and minimize elevated temperature trends**
  - **Increase stream complexity through strategic placement of LWD**
  - **Increase habitat connectivity between side channel/confluence areas**
  - **Improve estuary rearing capacity for needs of juvenile salmonids**
  - **Protect/enhance watershed processes**
  - **Improve water quality in degraded reaches for bacteria and temperature**
  - **Address existing uncertainties for:**
    - **PRODUCTIVITY**
    - **GROUNDWATER**

Goals and Objectives

- **Organizational Goals**

  LCRWC governance-Strengthen agreements and project management roles with local partners through regular project coordination meetings

  Outreach-Increase diversity of community partners through formal and informal activities outlined in outreach plan.

  Board Recruitment-Increase board membership to represent diversity of broader lower Columbia community.

  Expand environmental education opportunities in collaboration with local schools.

Goals and Objectives

- **Community Goals**

  <u>Sustainability-</u>Support natural resource managers in timber and agricultural community to apply new technologies that promote sustainable natural resource practices.

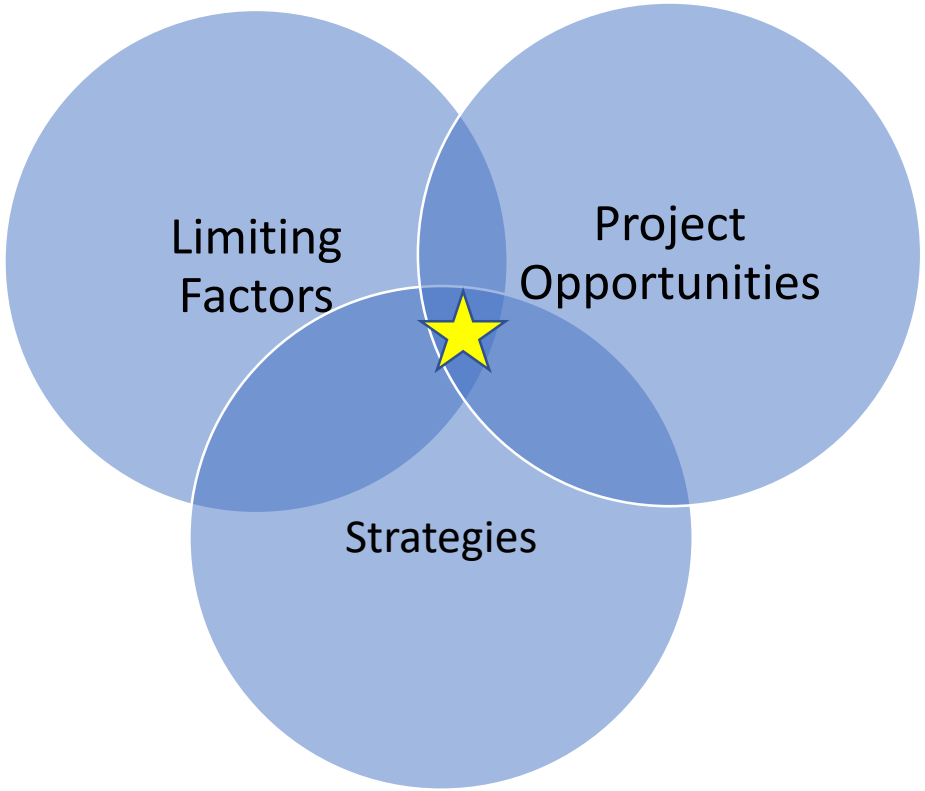
  <u>Resiliency</u>-Serve as a resource to municipalities and community interest to design projects for existing vulnerabilities to climate change (i.e. coastal storminess/flooding, temperatures, sea level rise)

Action Development Guidance

- Match project opportunities to address limiting factors
- Focused outreach on key areas of watersheds current unexplored

(timber areas, tidal areas)

- Consider broader landscape view
  - Grouping of projects together synergistically
  - Adjacency to intact areas
  - Target areas in major gaps based on work completed to date
- Secure resources to close gaps on existing uncertainties (i.e. Rapid BioAssessment)



Formulation Strategy

- Landscape based
- Potential metrics
  - Nearest neighbor to anchor habitat
  - Patch density
  - Size
  - Edge density (i.e. complexity)
  - Node/confluence in section
- Candidate for resiliency planning

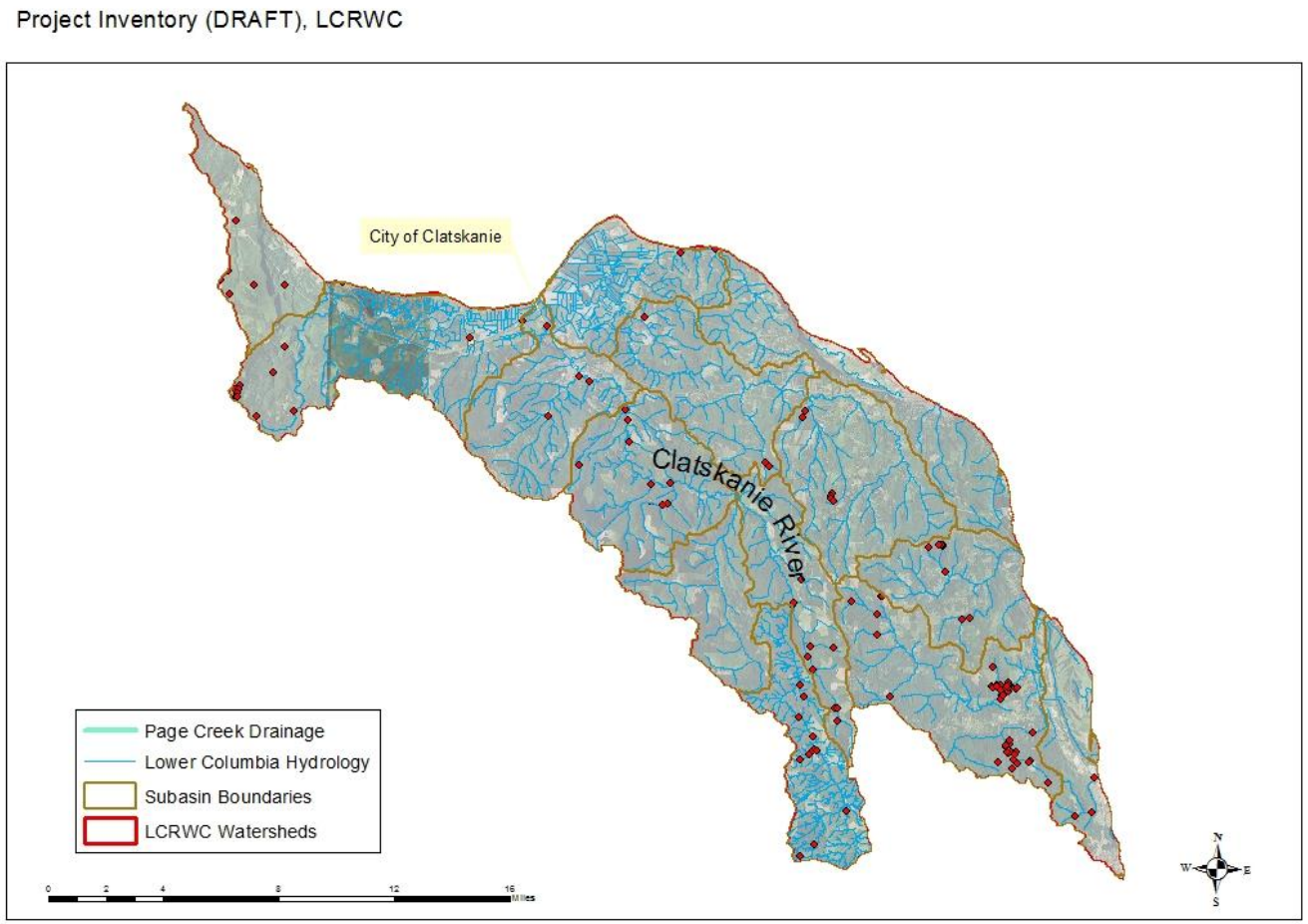
Project Examples/Profiles

Year 1 timeline (2019)

Year 2 timeline (2020)

Years 3-5 timeline (2021-2023)

Spatial Lens



Project Implementation Schedule

Project Name	Project Type	Relevant Strategies	Implementation Schedule				
			2019	2020	2021	2022	2023
Page Creek	Culvert Replacement		X				
Dribble Creek	Culvert Removal,		X				
Little Clatskanie	Apiary Crossing/Bridge installation		X				
Perkins Creek (Olson Road)	Fish passage, wetland enhancement			X			
Reach 10	channel enhancement, riparian vegetation			X			
Keystone (Alder Rd. /Sweetown County roads)	culvert replacement??			X			
Stewart Creek Crossing	Potential culver replacement				X		
Olson Creek Passage	fish passage				X		
Graham Creek/Colvin Rd	fish passage				X		
Divide Creek	fish passage				X		
Plympton Creek	Channel enhancement					X	
Tank Creek	Estuary rearing					X	
Deadman Slough (sweettown road)	Estuary rearing						X
Carcass Creek	LWD Placement, multiple project types at reach level						X
Clatskanie City Reach	Streambank Protection						X
Fox Creek	Fish passage						X
Carr Slough	Estuarine/Floodplain						X
Tandy Creek	Potential culver replacement						X