Example of Applying Inventory and Characterization to SMP

Issaquah Creek Basin in the Lake Washington Watershed

Achieving an Ecosystem Based Approach to Planning in the Puget Sound

Stephen Stanley[1], Gino Luchetti[2], Margaret Macleod[3], Peter Rosen[3], Susan Shull[1], Susan Grigsby[1], Millie Judge[4]

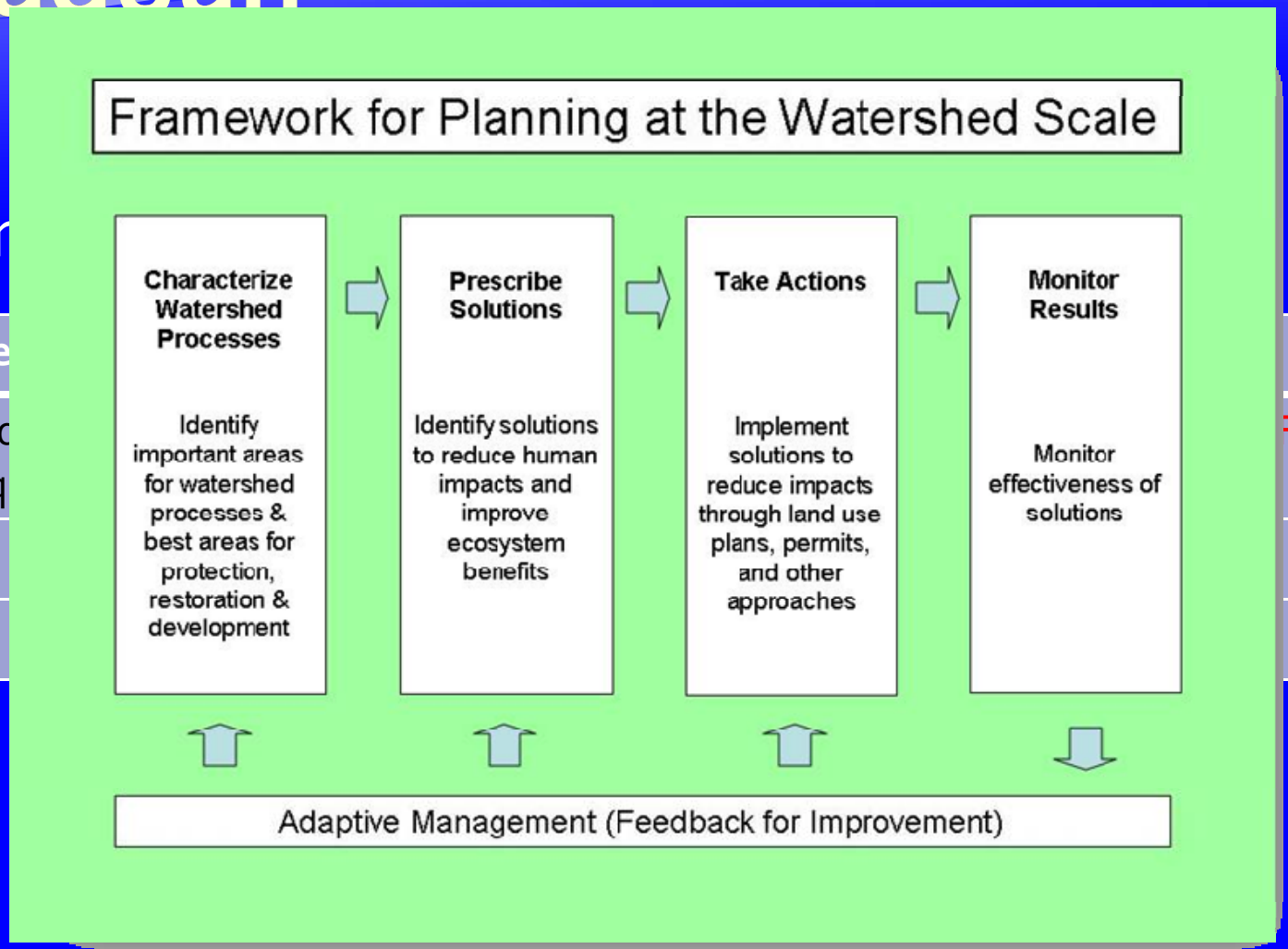
Introduction

To effectively protect aquatic and terrestrial ecosystems, government must focus on protecting or restoring key watershed processes affecting the interaction of water, sediment, plants and animals (Hidding and Teunissen 2002, Dale et al. 2000, Gove et al. 2001). The framework described herein

Developing the inventory for Issaquah

- Lin

Issue
Flooc Issaq



Conducting the characterization

- Use analysis template to address issues (Issaquah example)

Unimpaired Conditions: Assessment of watershed processes & functions	Level of impairment to processes & functions and associated issues	Solutions and Actions: Recommended protection & restoration measures and environment designations
What areas are important in the watershed for maintaining ecosystem processes at this reach	*How have the ecosystem processes been impaired?*	*What are the solutions and actions based on analysis of processes and functions (columns 1 and 2)?*
What shoreline functions are present at the site (un-impaired conditions)?	*How have the shoreline functions been impaired?*	*What are recommended designations, development standards and regulations?*

Characterizing the Watershed – Step 1

King County Developed Basin Plans in 1990

- Goal was to address surface water problems at multiple scales (broad, mid and fine)
- Centered on pragmatic solutions to address underlying causes at the watershed scale
  - Altered hydrology, hydraulics and sediment supply

Recent SMP Characterization (Stanley et al 2005)

- Rating of important areas for water flow process
- Rating of degree of impairment across the watershed

Characterizing the Watershed – Step 1

Basin Plans:

- Current and Future Conditions Report
  - Assessed hydrology, geology, water quality and aquatic habitat
  - Identified Current Problems (impairment)
  - Used hydro modeling to ID where problems could worsen

Characterize Watershed Processes

Identify important areas for watershed processes, level of impairment & best areas for protection, restoration & development

Characterizing the Watershed – Step 1

- Current and Future Conditions Report – Conclusions:

If upper basin developed

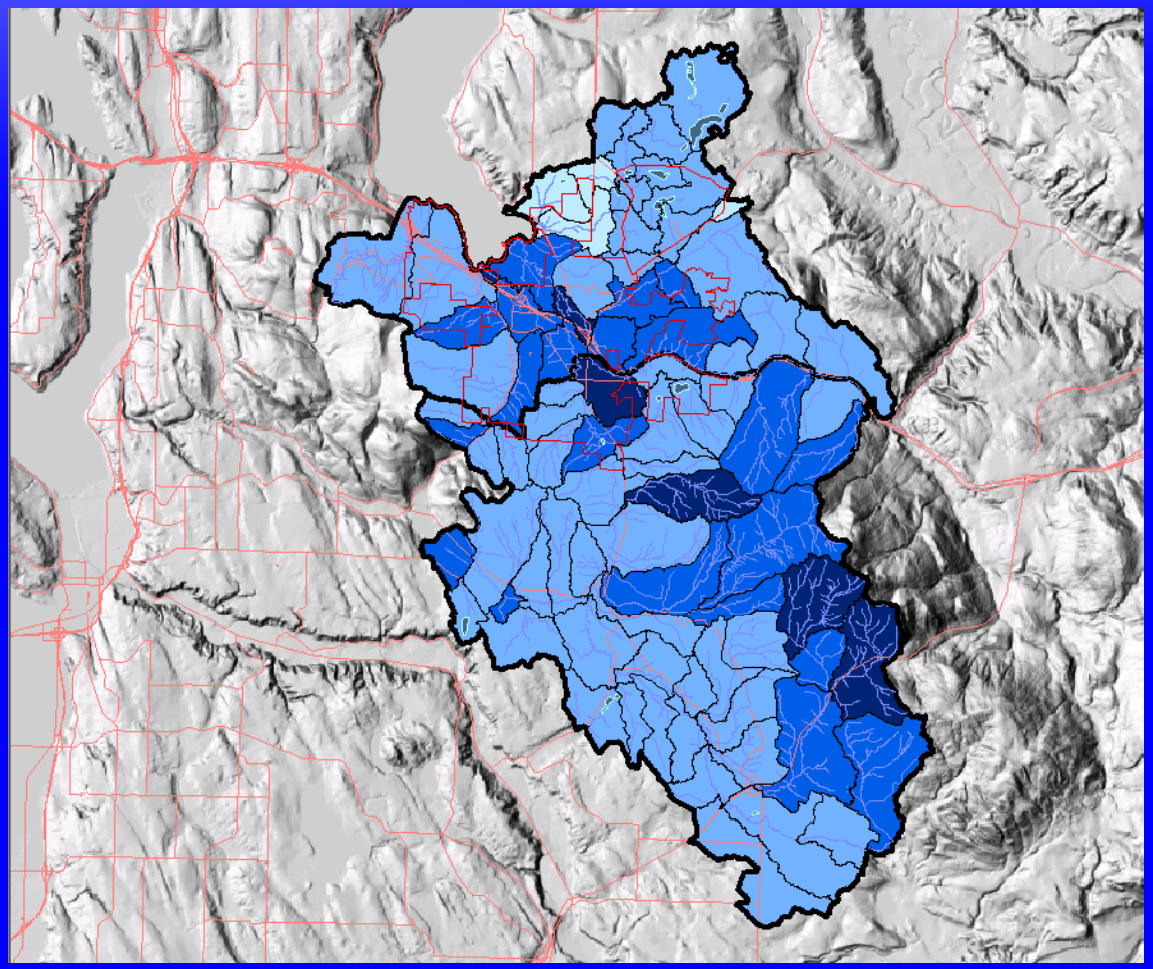
- Flooding in Issaquah would be severe
- Water quality would deteriorate
- Significant habitat impacts

Characterize Watershed Processes

Identify important areas for watershed processes, level of impairment & best areas for protection, restoration & development

SMP Characterization

Important Areas for Hydrologic Processes

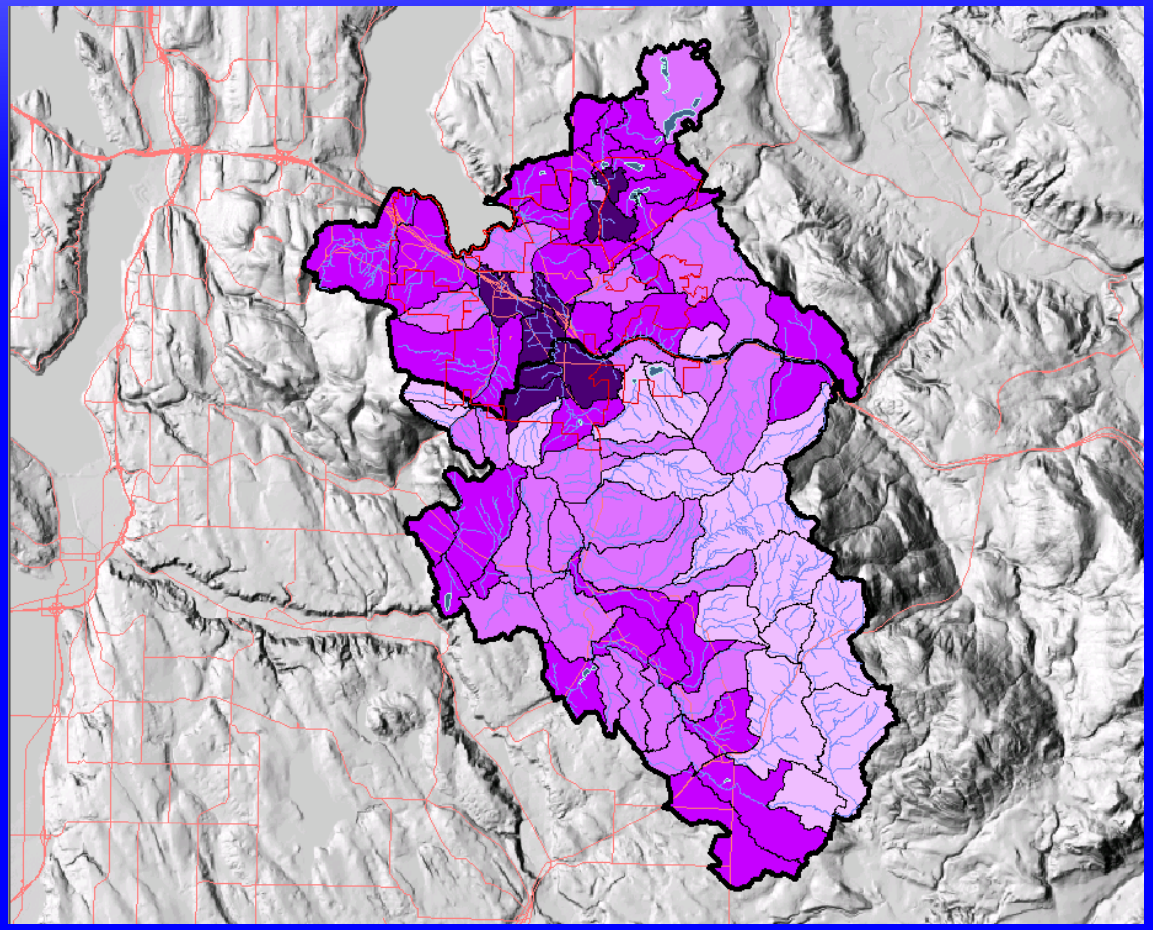


Characterize Watershed Processes

Identify important areas for watershed processes, level of impairment & best areas for protection, restoration & development

SMP Characterization

Level of Impairment



Characterize Watershed Processes

Identify important areas for watershed processes, level of impairment & best areas for protection, restoration & development

Step 2 – Solutions and Actions

- Use analysis template to address issues (Issaquah example)

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Prescribe Solutions – Step 2

- Current and Future Conditions Report:

  Protect Processes in Upper Watershed

  - Limit Forest Clearing
  - Limit Impervious Cover

Prescribe Solutions

Identify solutions to reduce human impacts and improve ecosystem benefits

Prescribe Solutions – Step 2

- Current and Future Conditions Report:

  Restore floodplain in Issaquah

  - Purchase homes
  - Remove channelization
  - Regulate location of new development

Prescribe Solutions

Identify solutions to reduce human impacts and improve ecosystem benefits

Actions – Step 3

- Upper Watershed, County Jurisdiction:

  County Adopted an Ordinance to:

  - Limit Forest Clearing to 35%
  - Limit Impervious Cover to 10%

Take Actions

Implement solutions to reduce impacts through land use plans, permits, and other approaches

Actions – Step 3

- Lower Watershed, City of Issaquah:

  City Initiated Issaquah Creek Waterways Project:

  - Began Purchasing Creek Properties and Removing Houses
  - 117 Acres Have Been Acquired

Take Actions

Implement solutions to reduce impacts through land use plans, permits, and other approaches

Actions – Step 3

Protection of Watershed, City of Issaquah and County:

Formed Squak, Cougar, and Tiger Interagency Committee

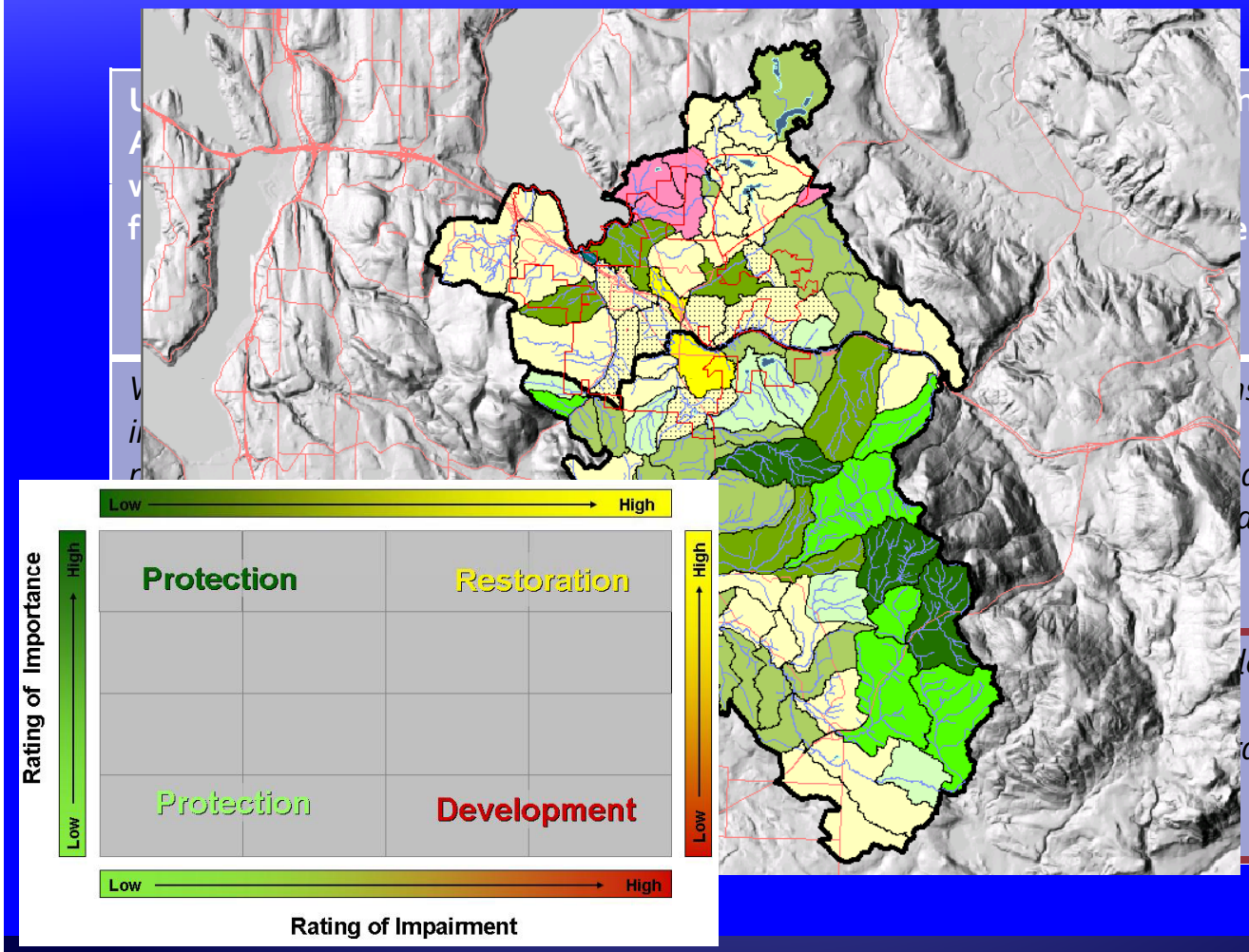
- Partnered with other non-profit groups (Mountains to Sound Greenway)
- Began Purchasing Properties
- Over 10,000 acres have been acquired

Take Actions

Implement solutions to reduce impacts through land use plans, permits, and other approaches

Actions – Step 3

Potential Areas for Protection and Restoration

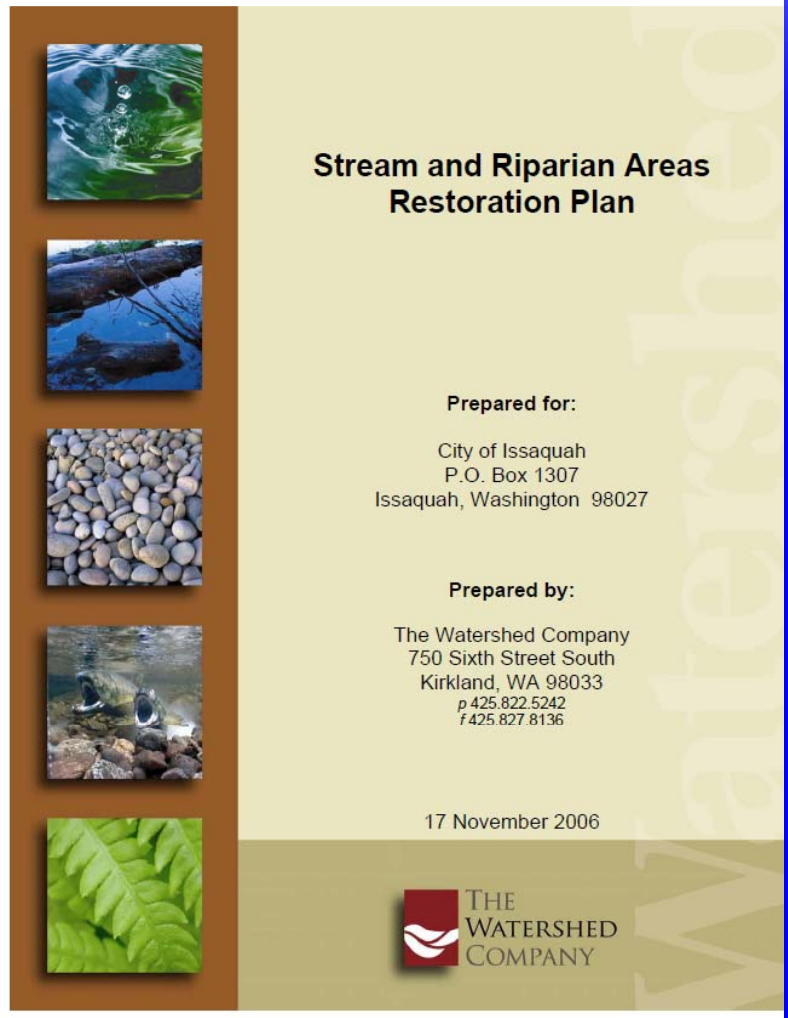


Prescribe Solutions

Identify solutions to reduce human impacts and improve ecosystem benefits

Solutions and Actions – Step 3

- Restoration of Watershed – City Developed a Restoration Plan as part of SMP



Stream and Riparian Areas Restoration Plan

Prepared for:

City of Issaquah
P.O. Box 1307
Issaquah, Washington 98027

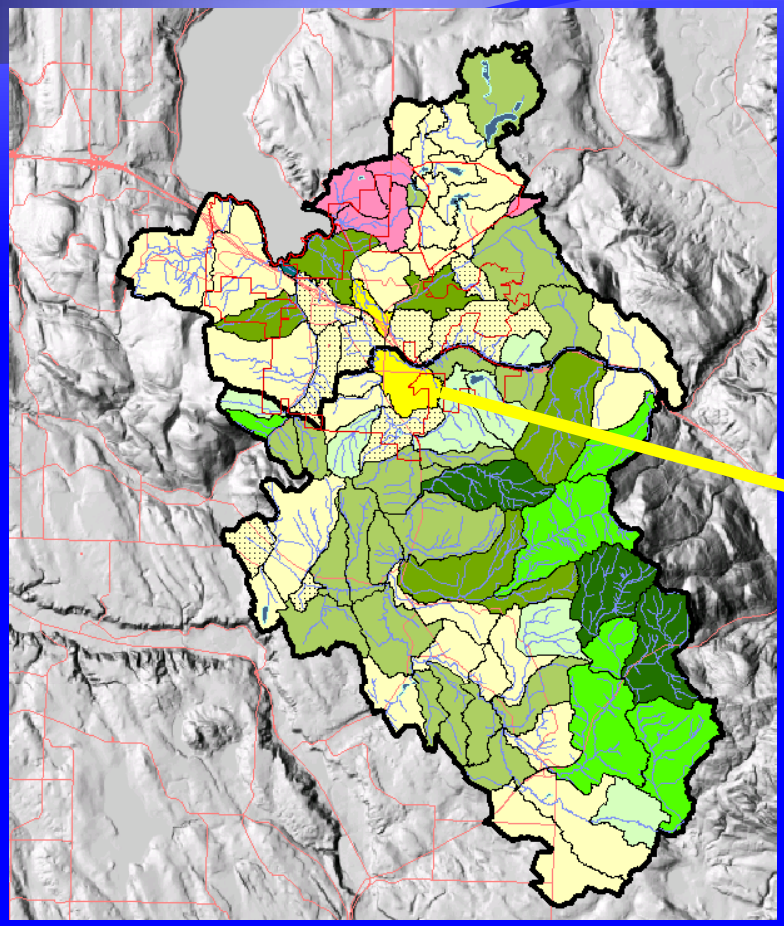
Prepared by:

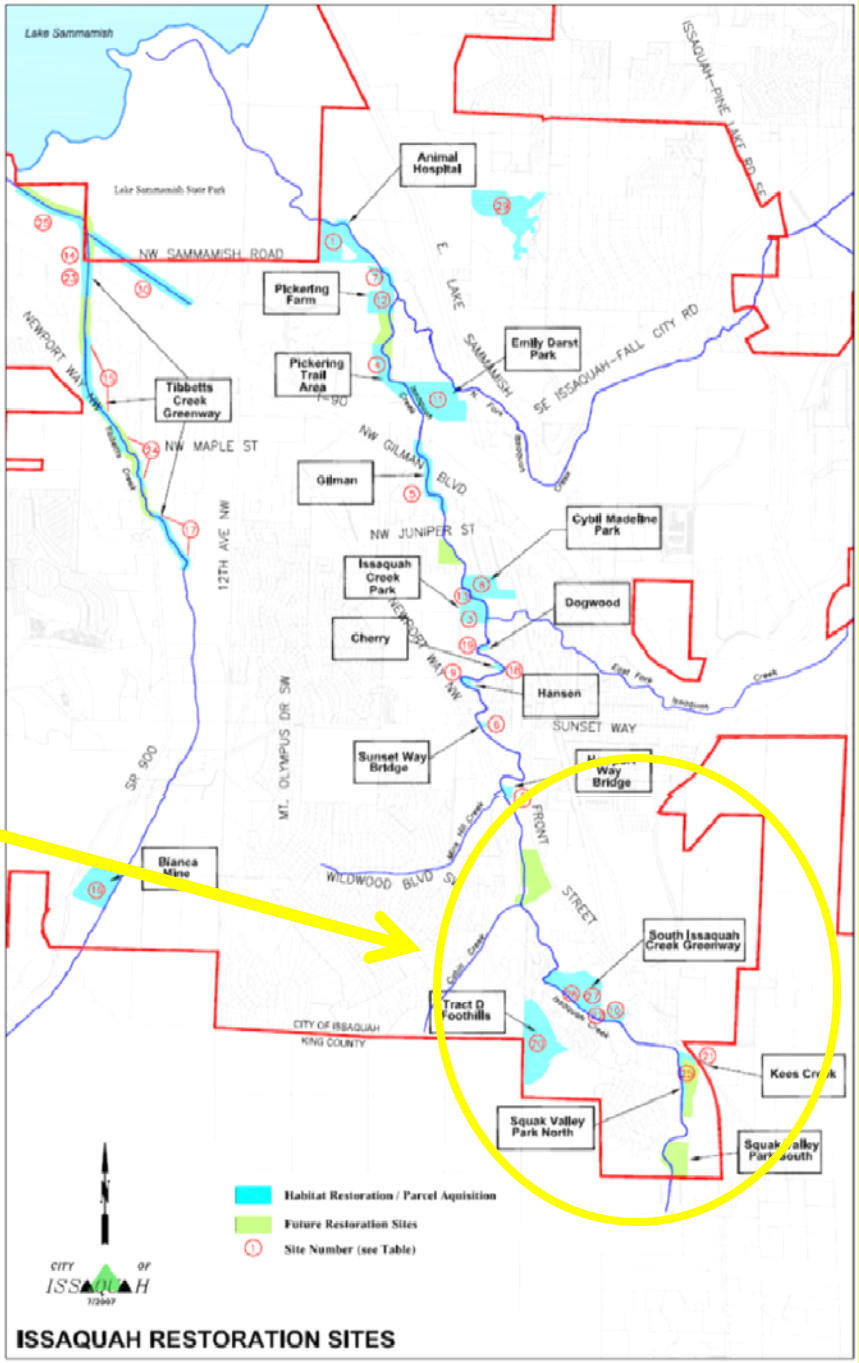
The Watershed Company
750 Sixth Street South
Kirkland, WA 98033
p 425.822.5242
f 425.827.8136

17 November 2006

THE WATERSHED COMPANY

Prioritize Using Characterization





South Issaquah Creek Greenway

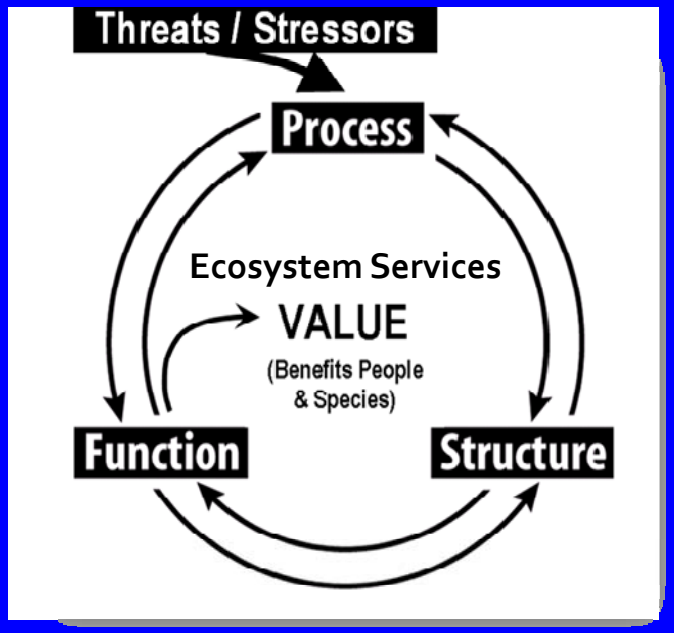
PUGET SOUND CHARACTERIZATION PROJECT

PRESENTATION TO NEW SMP ADOPTERS , JULY 15, 2009

Intro to Project - Purpose

- Sound-wide characterization of:
  - Freshwater processes
  - Nearshore processes
  - Wildlife habitat

- Focuses on Ecosystem processes and the effect of stressors



Objectives

- Produce and display data in manner useful to local government, tribal, NGO & agency planning

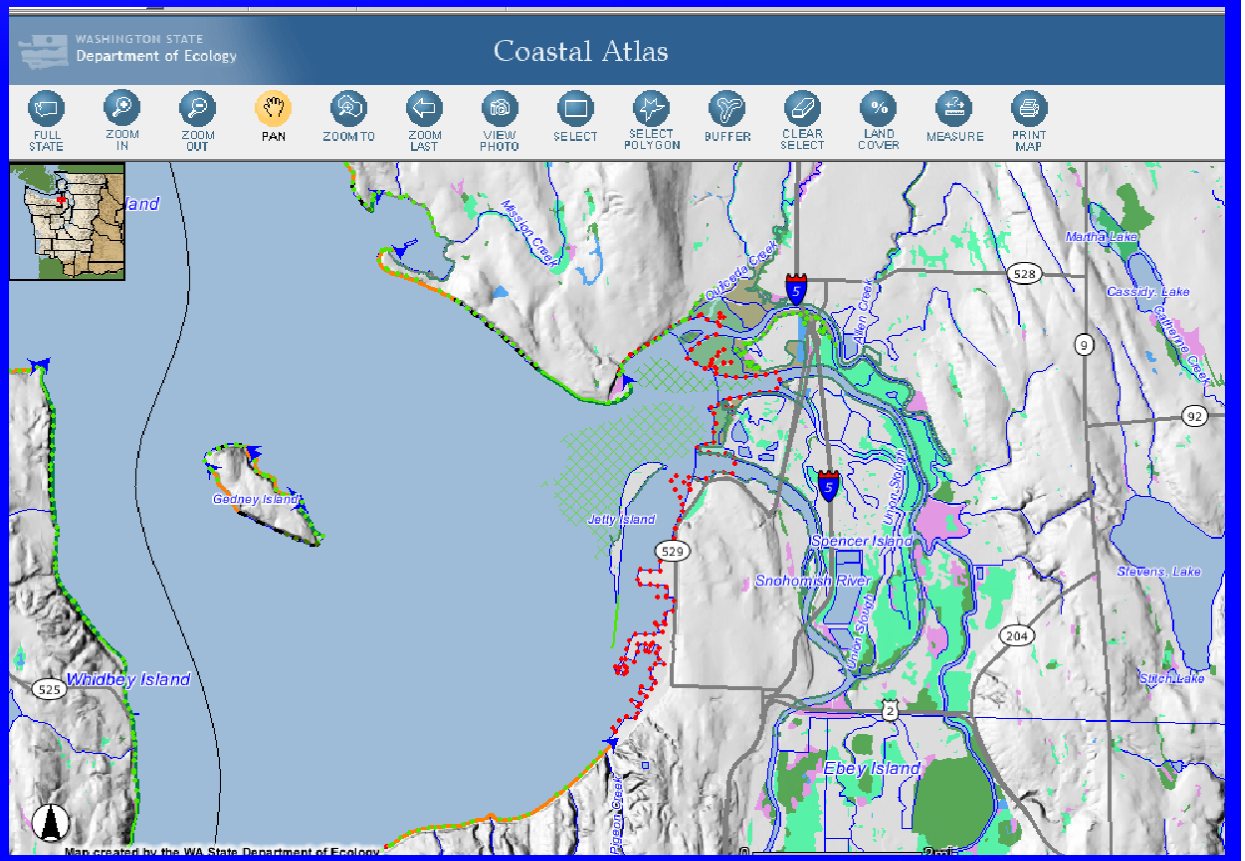
SMP updates

GMA updates

Specific Plans

Acquisition and Restoration Actions

Alternative Mitigation (Banks, In-Lieu Fee progams)



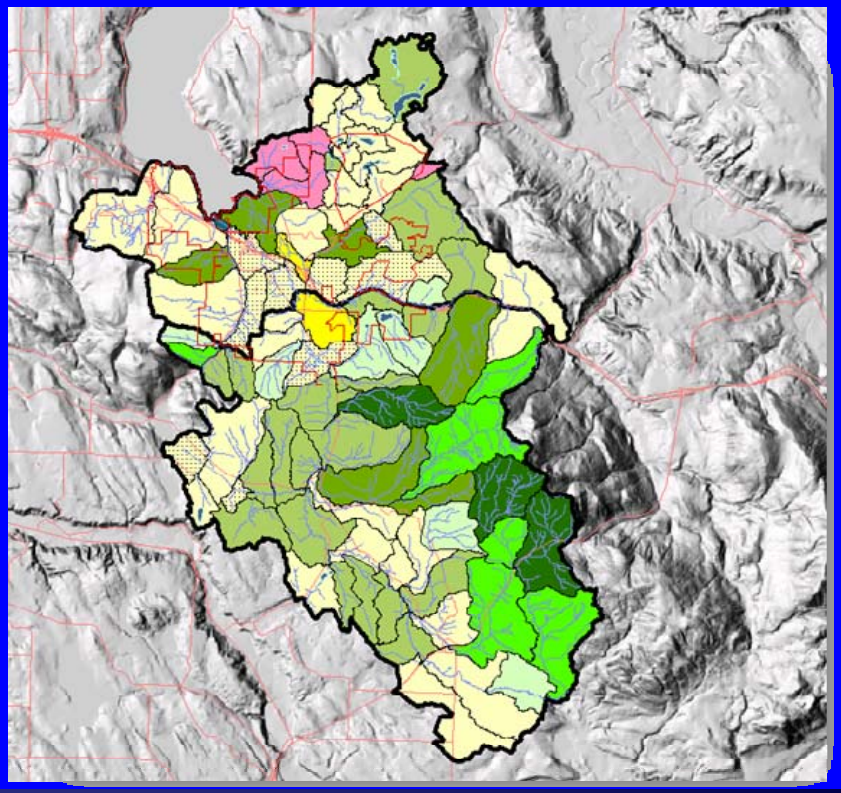
Objectives

- Provide Technical Assistance to local governments, tribes, NGO's and agencies in applying results (long term)

  SMP updates

  GMA updates

  Specific Plans



Assumptions

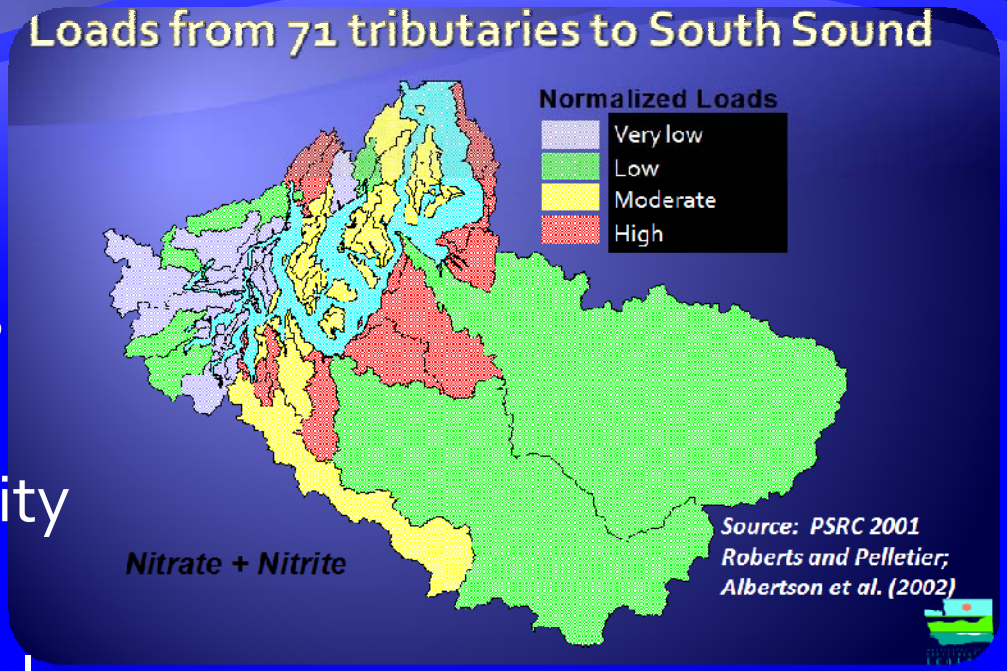
- Characterization of areas for protection and restoration due by end of year
- Have time /funding for 4 to 8 meetings over 4 to 6 months
- This will require
  - Reliance on existing methods/models
    - Can't reinvent the Wheel

Proposed Approach

- Three Phases :
  - Freshwater Models – June to July
  - Nearshore Models – July to August
  - Wildlife Models – August to September

Proposed Approach – Freshwater Models

- Review and Integrate:
  - DOE Water Flow Process Model
  - Ruckelshaus Water Quality Model
  - DOE Water Quality Models
  - ENVVEST Water Quality Model
  - Sparrow Water Quality Models
  - Invest Hydrology and Water Quality Models



Proposed Approach – Nearshore Models

- How to Integrate:
  - PSNER results with freshwater results

Shoreform Transition (Tier 1)

- Historic shoreforms
- Current shoreforms

Shoreline Alterations (Tier 2)

- Loss/gain intertidal wetlands
- Armoring
- Tidal barriers
- Breakwaters/jetties
- Overwater structures
- Nearshore fill
- Marinas
- Roads
- Railroads active
- Railroads abandoned

Adjacent Upland Change (Tier 3)

- Roads
- Railroads active
- Railroads abandoned
- Land cover
- Impervious surface
- Stream crossings

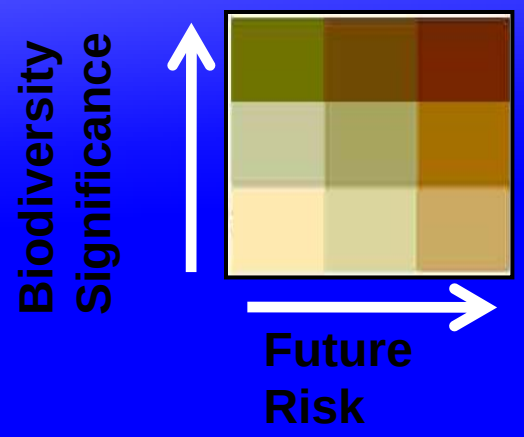
Watershed Area Change (Tier 4)

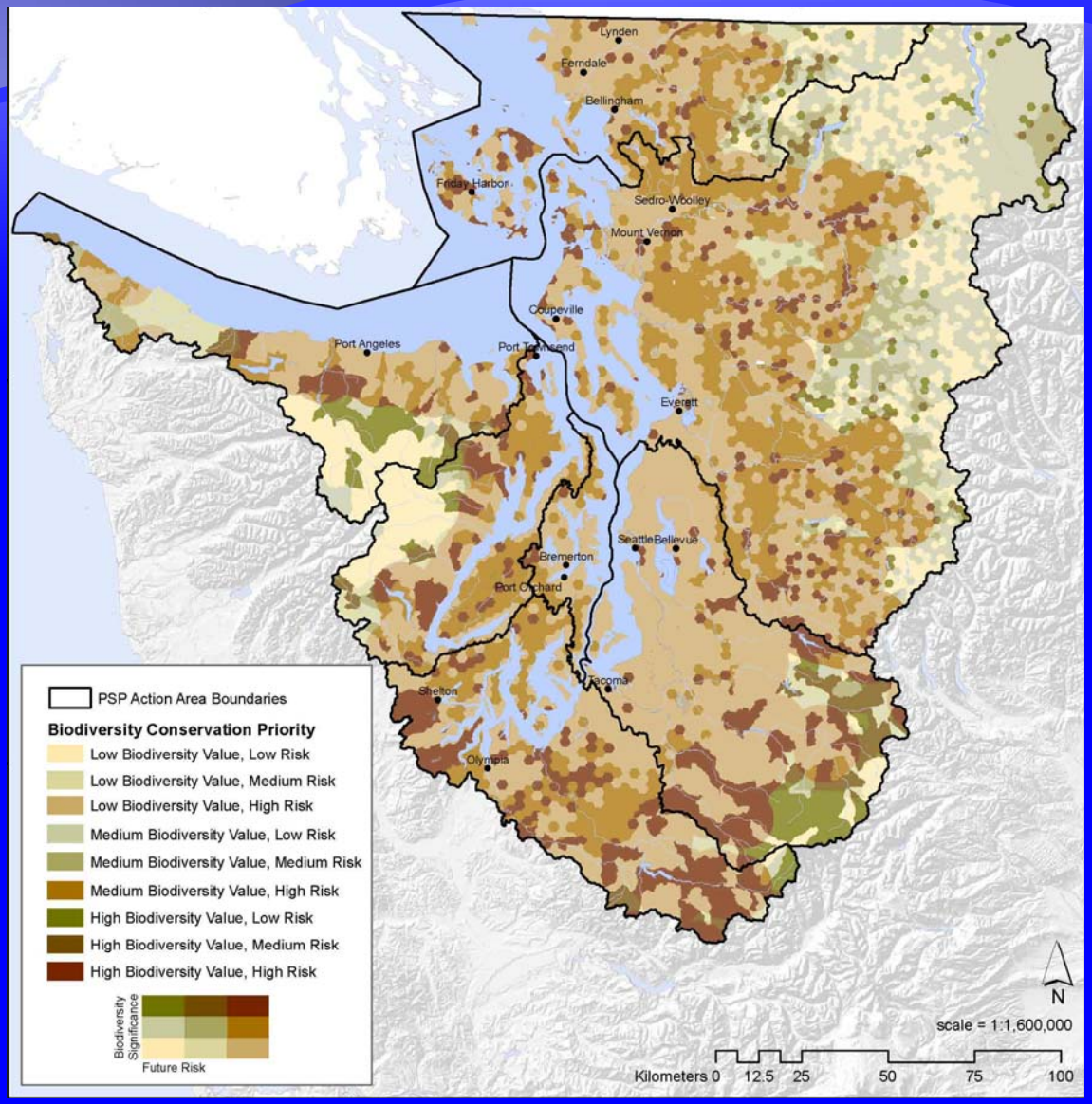
- Roads
- Railroads active
- Railroads abandoned
- Land cover
- Impervious surface
- Stream crossings
- Impounded drainage area (behind dams)
- Current drainage extent based on historic drainage extent

Proposed Approach – Wildlife

- Review and Integrate –what is most useful to locals:
  - WDFW Local Habitat Assessment
  - Biodiversity Council Wildlife Modeling

Conservation Opportunity Framework





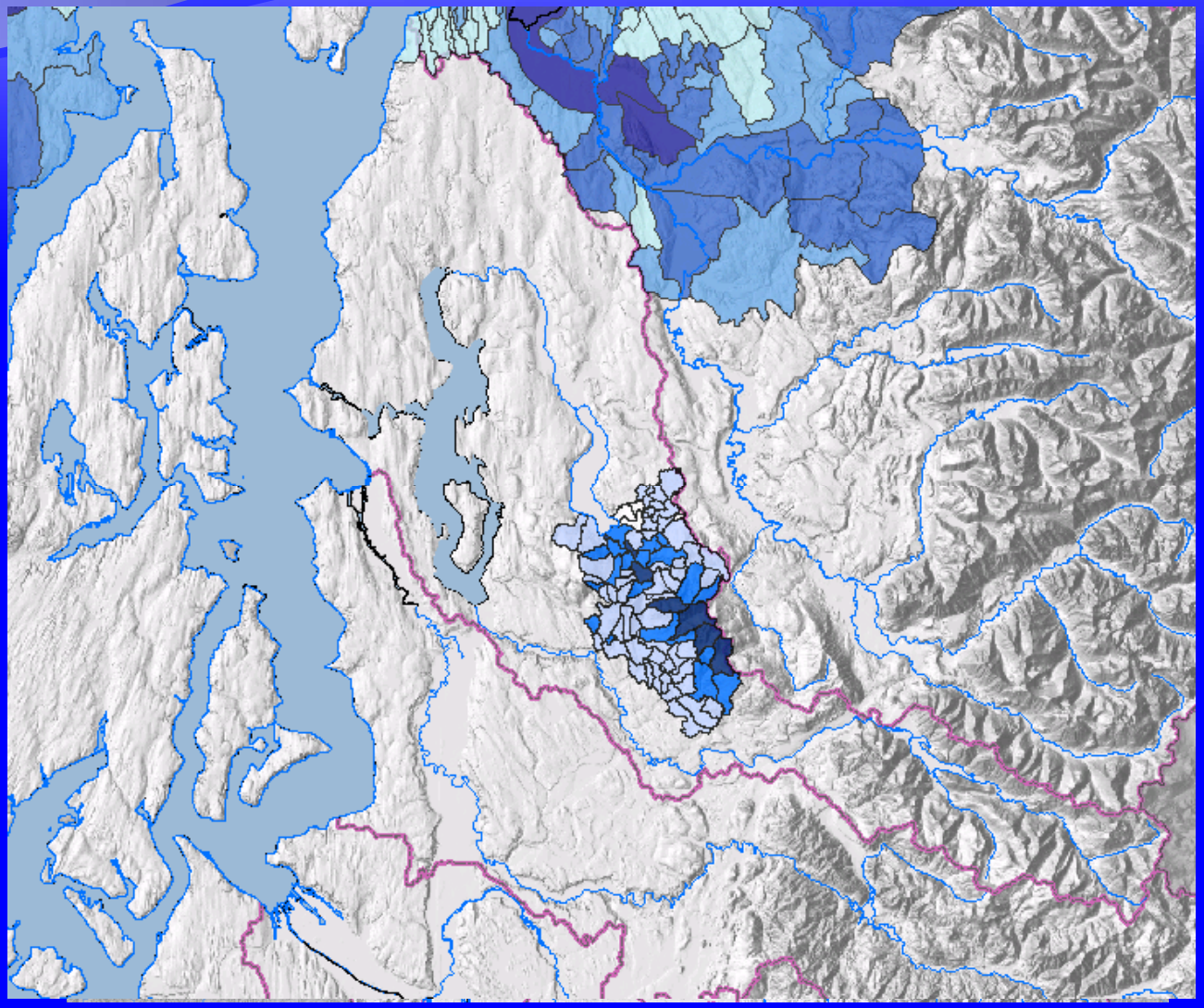
Propose to do analysis at several scales:

"Example results"

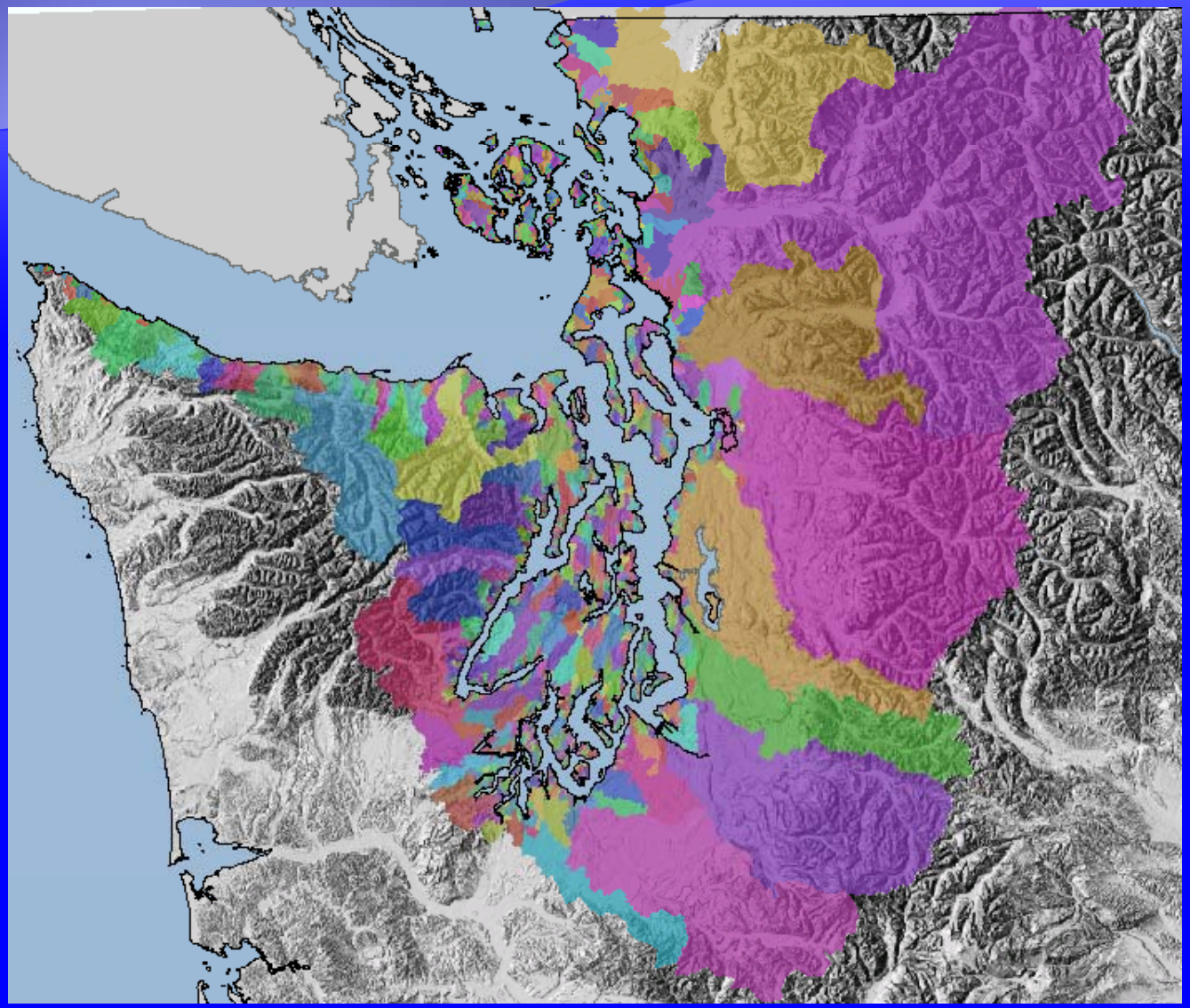
- Sound Wide
- Mid Scale 1

Decide 1st 2 months

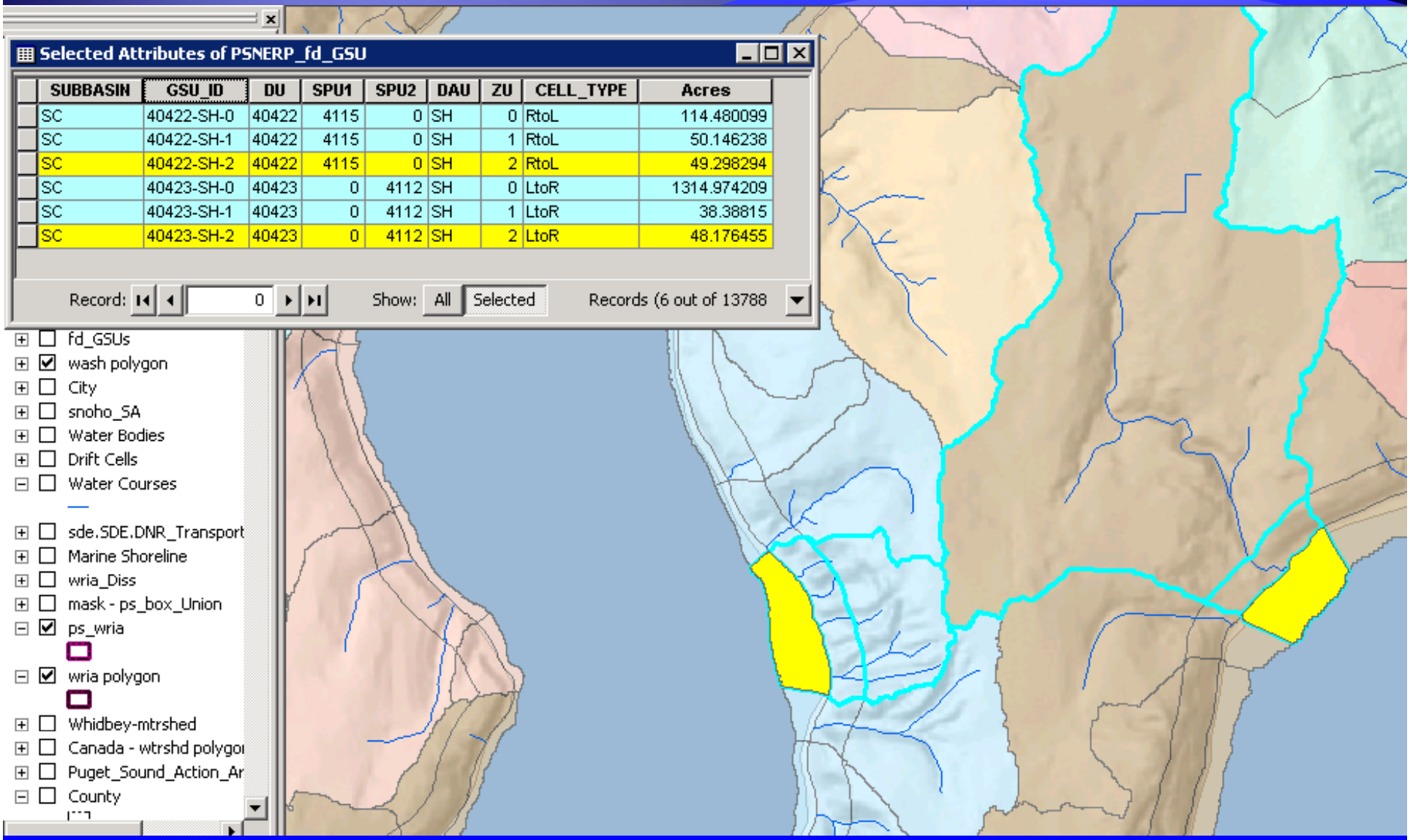
- Mid Scale 2



PSNERP Drainage Units

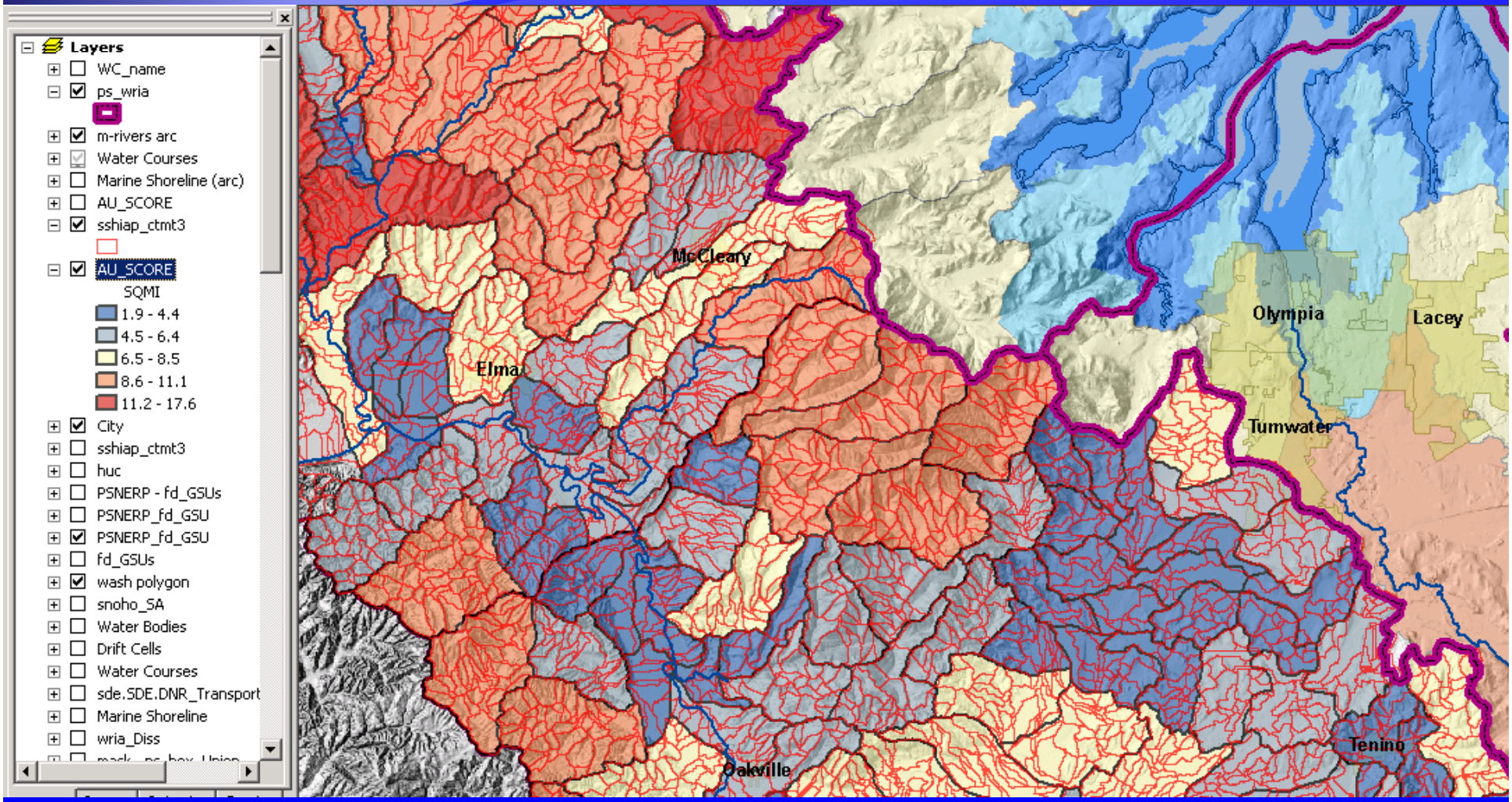


PSNERP Drainage Units



SUBBASIN	GSU_ID	DU	SPU1	SPU2	DAU	ZU	CELL_TYPE	Acres
SC	40422-SH-0	40422	4115	0	SH	0	RtoL	114.480099
SC	40422-SH-1	40422	4115	0	SH	1	RtoL	50.146238
SC	40422-SH-2	40422	4115	0	SH	2	RtoL	49.298294
SC	40423-SH-0	40423	0	4112	SH	0	LtoR	1314.974209
SC	40423-SH-1	40423	0	4112	SH	1	LtoR	38.38815
SC	40423-SH-2	40423	0	4112	SH	2	LtoR	48.176455

PSNERP catchments (Sound)
"HUC 8th" units (Chehalis, black outlines)
SSHIAP generated drainages (Chehalis, red outlines)



Agreements Reached By Technical Team

- Size of the analysis units
  - Use NWIF basin delineation and "aggregate units upward"
- Freshwater analysis would extend down to OHWM
- PSNERP drift-cell based units for near shore