Puget Lowland Streams

Sentinel Sites Project

EPA Region 10 - Seattle

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Background

- Changes in climate will affect our ability to interpret monitoring data.

- Will we be able to discern climate signal from our current monitoring data?

- How can we start addressing climate change in our monitoring programs?

- Region 10 began a small pilot in 2009 to establish sentinel freshwater stream sites and to collect data to detect changes over the long-term.

Issues/Constraints

- Plenty of climate change research ongoing in the Region, but not addressing this monitoring question.
- States monitoring programs not yet accounting for climate change.
- Climate change detection requires long-term monitoring.
- But...agency budgets are not predictable in the long term.

More constraints

- EPA Region 10 has limited funds available for this effort...
  - no EPA HQ $$
  - no travel $$
  - no new staff
  - limited lab availability

This means that we need to...

-- Leverage partnerships
-- Focus on EPA strategic priorities
-- Maximize resources

Sentinel freshwater streams in the Puget Lowlands Ecoregion – Why?

- The Puget Sound region is a strategic priority for EPA Region 10.
- Most of the ongoing work in the Region is in the mountains.
- Most bioassessment monitoring is in small streams, build on existing efforts.
- State and other partners in the area receptive to the idea.
- The Ecoregion is within driving distance of the Region 10 office.

Oyster Creek

Reference sites

- States use reference sites to establish the ‘reference condition’.
- Sites are selected according to a set of explicit criteria that define conditions ‘least disturbed’ by human activities.
- Reference condition used to establish ecological condition thresholds to distinguish sites in relatively good condition from those that are clearly not.
- The concept of ‘sentinel sites’ is similar to reference sites, with a few additional criteria for site selection.

Sentinel Site Selection Criteria

- Currently in least disturbed condition and low likelihood of ***future*** human perturbation.

- Easy access for frequent sampling, (temperature monitoring).

- Hydrologic data record and continuous hydrologic gauge.

- Temperature record and past biological sampling a bonus.

- & for our project, all sites within Puget Lowlands ecoregion.

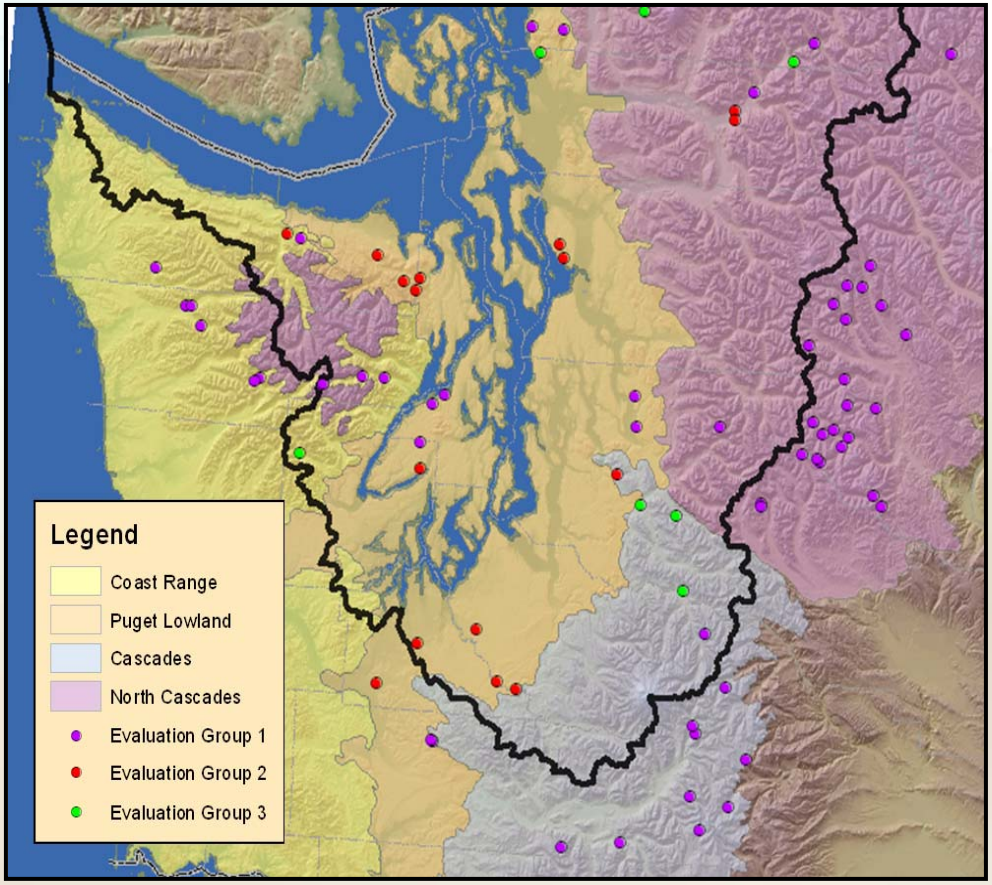
Site selection Process

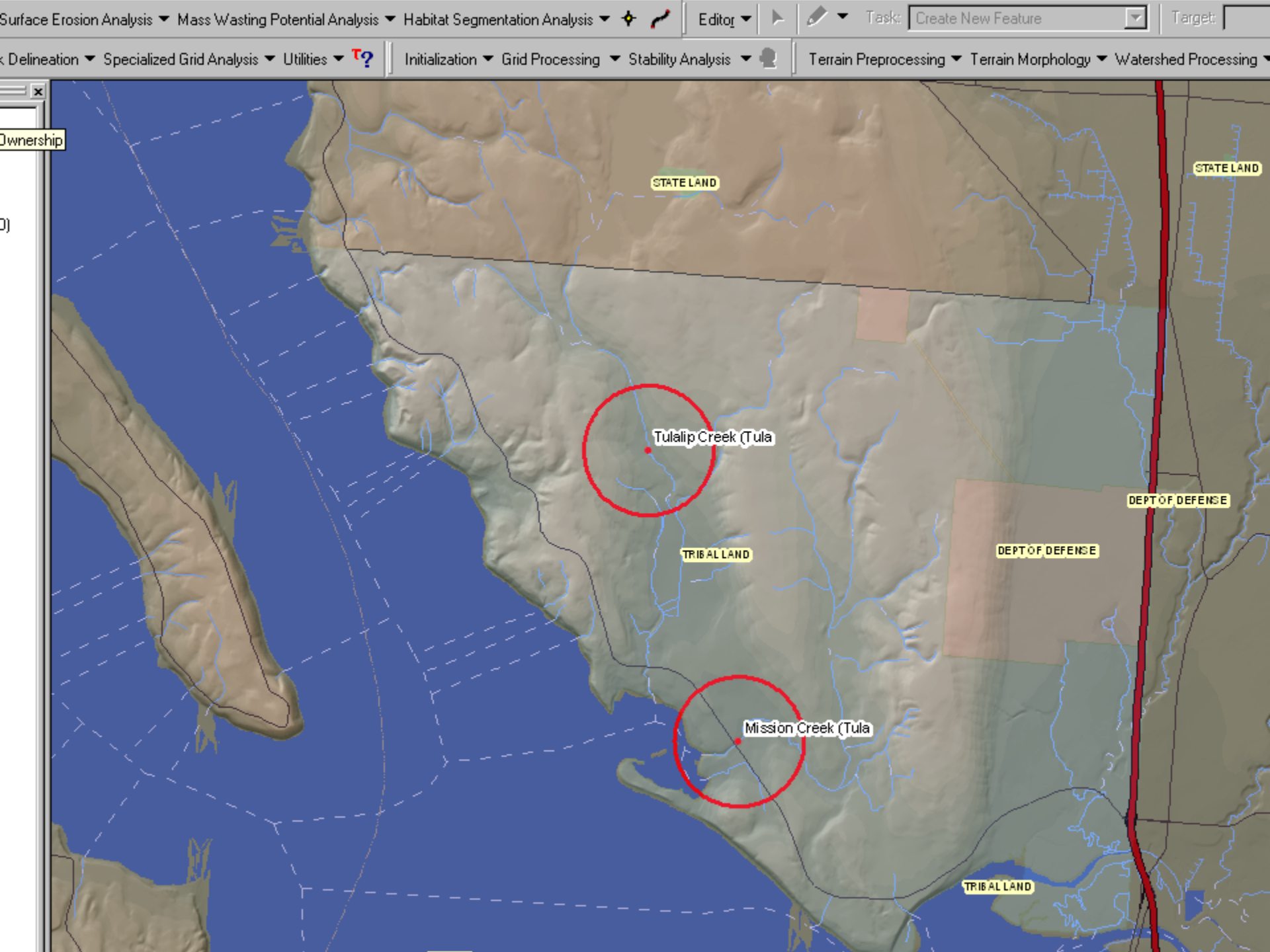
1) Find candidate sites:
- State/USGS gauge sites
- Past EMAP/REMAP/NRSA
- WA state biomonitoring
- Public lands
- Other protected lands

2) Review landscape data

3) Apply other criteria

4) Field reconnaissance

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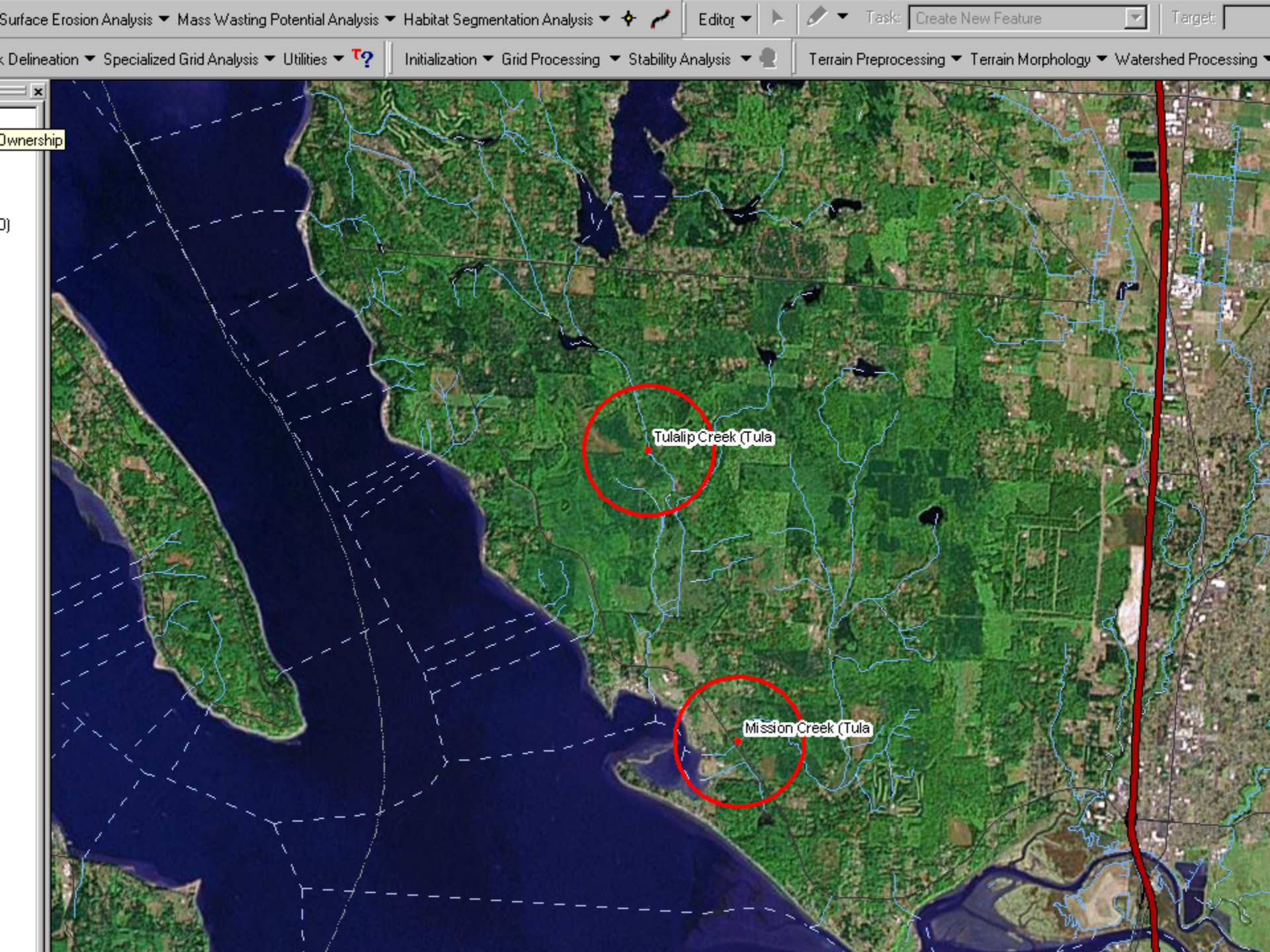
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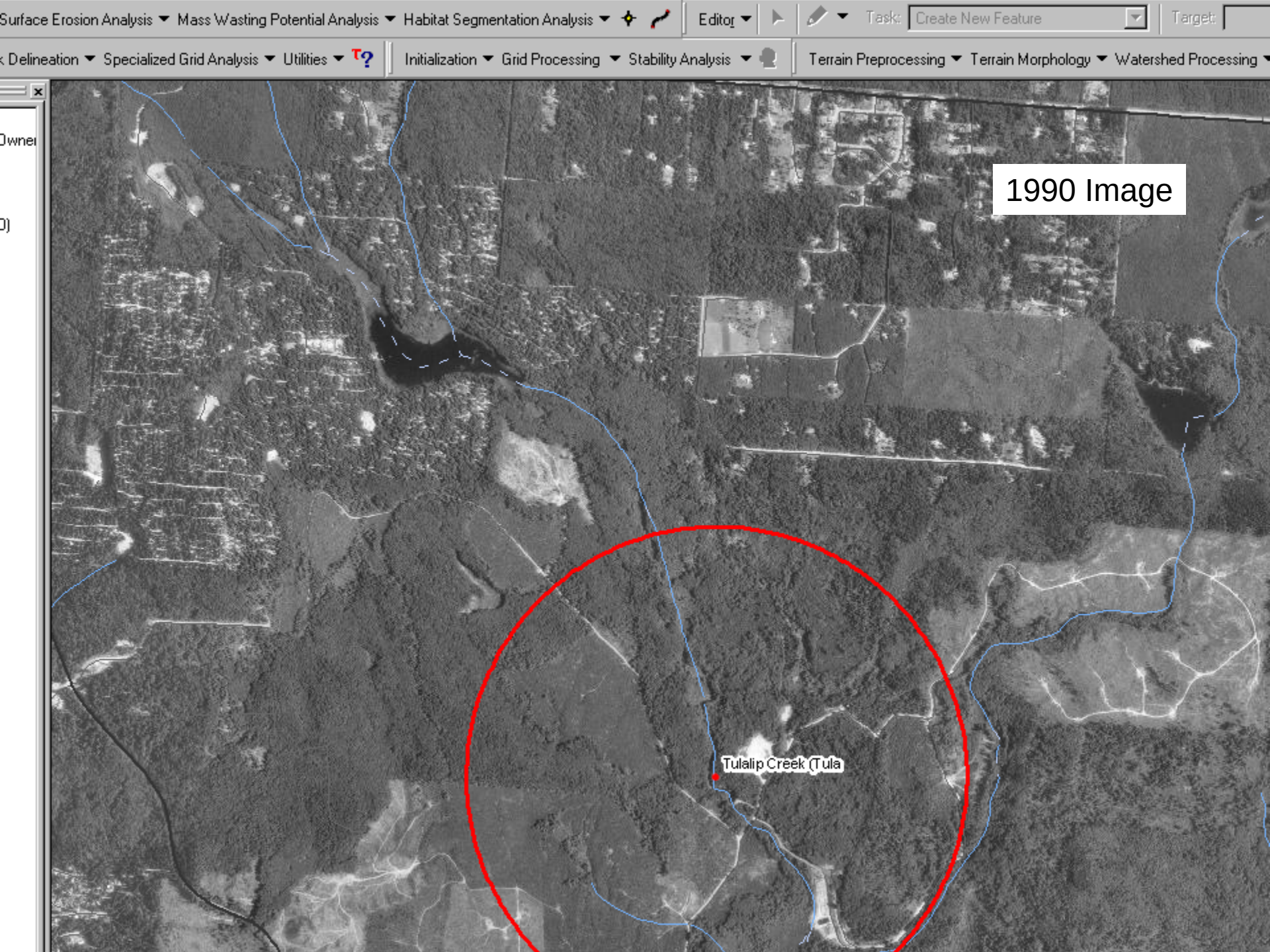
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1990 Image
Tulalip Creek (Tula

2009 –
Data collected at 10 sentinel sites

- Continuous temperature over the summer
- Basic water column chemistry
- Physical habitat and riparian condition
- Benthic macroinvertebrates

Data collected using the State of Washington Status and Monitoring Protocols (very similar to EMAP/NRSA)

2010 - Data collected at the same 10 sentinel sites

- Fish assemblage sampling
- Water chemistry
- Continuous temperature monitoring
- Partners collected macroinvertebrates and habitat

Future Plans:

- Continue monitoring sites 10 sites
- Expand site network in Puget Lowlands ecoregion
- Expand partnerships with other monitoring groups
- Add in other waterbody types (especially lakes) as time & resources allow

Get lucky

- Exploit areas of high interest (Puget Sound).
- Exploit areas of existing data (REMAP, NRSA or State biomonitoring sites, existing gauges & new gauges by partners).
- Selecting sites based on practical concerns plus scientific ones (not always the absolute perfect site, but it has a gauge, state interest...etc.).
- Connections open up access (Tribes, university).
- Methods...use existing methods (used state methods, QAPP, training, data management – also similar to NRSA).
- Keep WQ analytes simple, so your lab will do it for you w/out a big to-do.

Partners

- Washington Department of Ecology
- EPA Office of Research and Development, Global Change Research Program
- EPA Office of Environmental Information, Environmental Analysis Division
- EPA Office of Water, Office of Science and Technology
- Tulalip Tribes
- King County

Questions that we still have….

- How much is enough (frequency of sampling, it varies by indicator)?
- What if you don’t have a gauge?
- How to keep it in front of management (at some point it won’t be the shiny penny anymore)?
- How do we keep it on our plates?

Chuckanut Creek