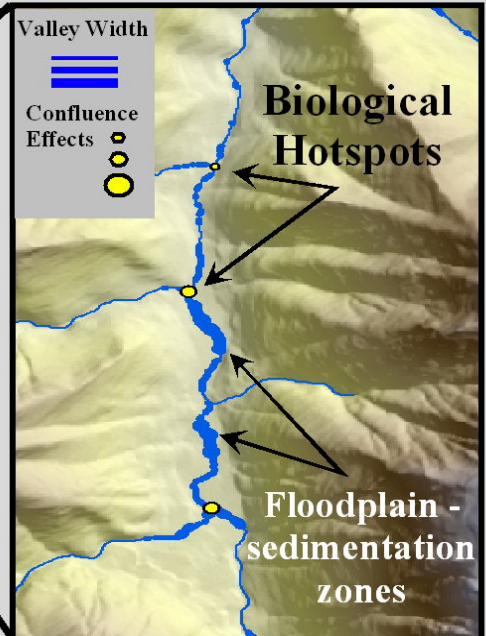
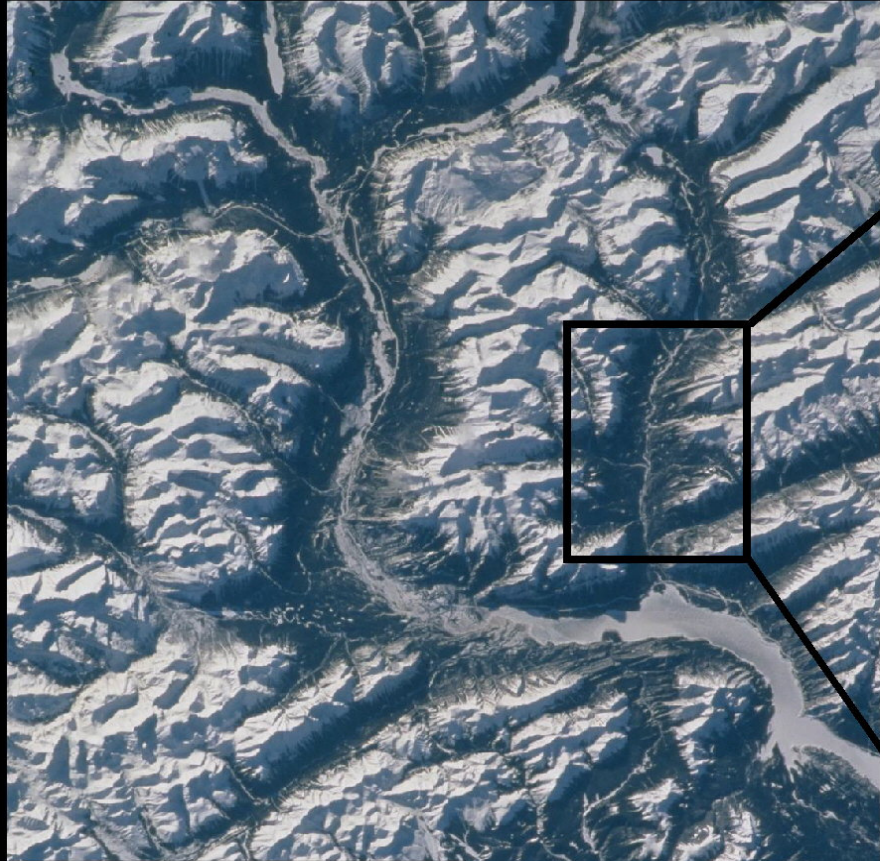


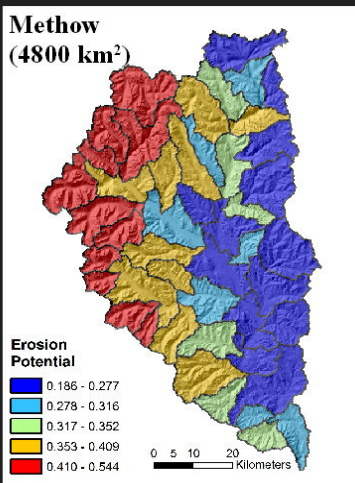
NetMap

Community Based
Watershed Science
Supporting
Natural Resource
Management



Map Environmental
Context, Ecological
Function

Methow
(4800 km²)



Decision Support:

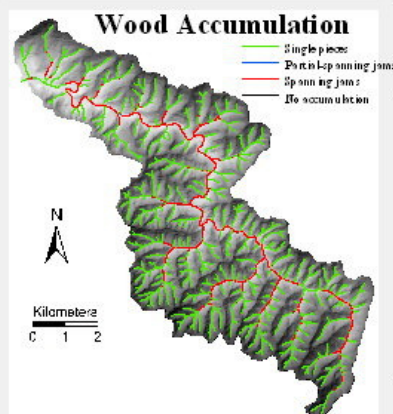
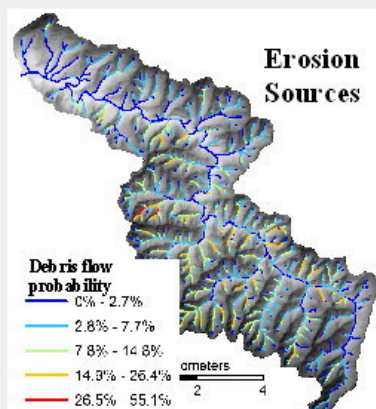
- Forest Management
- Fish Habitat Management
- Wildfire Planning
- Watershed Restoration
- Monitoring/Research
- Conservation

Earth Systems Institute
www.netmaptools.org

NASA Photo

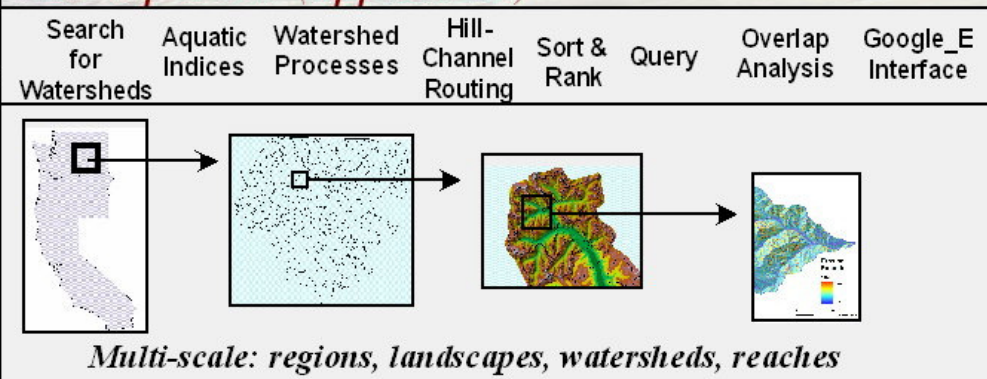
Watershed Catalogue, Analysis Tools, and Reference Materials

- Keying on Environmental Variability for Natural Resource Mgmt
- Providing Landscape Context for Watershed to Project Level Studies



NetMap consists of a watershed catalogue containing terrain parameters (presently covering hundreds of watersheds and over 30 million acres in WA, OR, & CA) and a set of analysis tools that are used to to conduct analyses on the types, abundance, and spatial distribution of riverine habitats, degree of habitat diversity and disturbance potential, erosion and inputs of sediment, wood and heat, and their change by land uses.

NetMap Tools (approx. 50)



NetMap Tools & Scale

Hillslope attributes such as erosion, sediment, and road density are *aggregated down* to the channel scale (20-200 m) allowing unique analyses, and they are accumulated downstream revealing patterns over multiple spatial scales.

Watershed attributes are *aggregated up* to subbasin scales allowing comparative analyses across landscapes and millions of acres.

NetMap Analyses & Parameters (approx. 60)

- Habitat types, diversity, & core habitat areas
- Erosion sensitivity, delivery, & significance
- Automated searches for key habitat parameters
- Office & field-based watershed and channel query tools
- Search for overlaps of roads and sensitive hillsides and channels
- Search for overlaps of fire risk & burn severity with sensitive areas
- Sediment, wood, and heat loading & relationships to natural & land use activities
- *Link NetMap output with 3-D Google Earth Images*

NetMap tools and watershed databases comprise a "community" based system whereby new stream layers, databases, maps, & analysis tools are made immediately available to all users

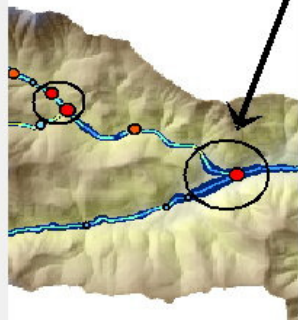
see www.netmaptools.net

Decision Support: Project Planning (Individual watersheds)

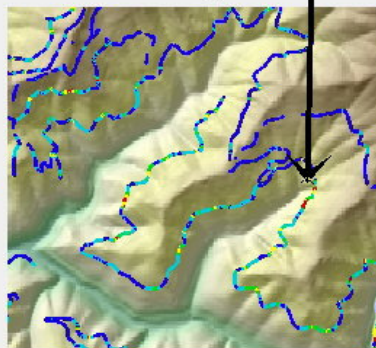
Upland and River Management

Natural resource management can be tailored to reflect variations in landforms and stream systems at scales of valley segments to individual watersheds. NetMap Tools support project level work.

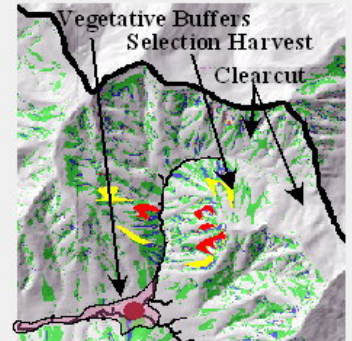
Identify potential biological hotspots



Search for sensitive road crossings

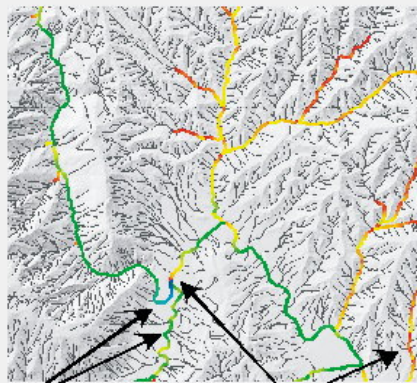


Detect overlap between sediment sources and quality habitats



Match land uses to landforms

Monitoring and Research



Sediment exposure from tributaries



More suitable

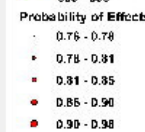
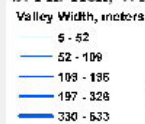
Less suitable

Selecting appropriate stream monitoring or research sites should take into account landform patterns within watersheds. Certain parts of watershed networks have intrinsic properties related to erosion, sediment, large wood, and temperature. NetMap Tools can enhance data collection, interpretation of results, and extrapolation of conclusions. For example, some areas are more prone to disturbance and therefore potentially less suitable for in-stream monitoring projects.

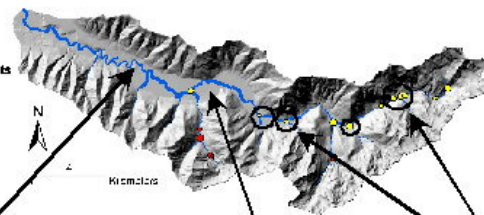
Restoration and Conservation

Quality aquatic and riparian habitats are unevenly distributed across watersheds and landscapes. NetMap Tools can be used to identify the intrinsically best habitats within single watersheds or across populations of watersheds for adding protection or for other conservation strategies. Terrain information could be used to create a watershed context for restoration planning, including targeting the best sites for engineering projects.

S. Flk. Hoh, WA



Targeting High Quality Diverse Habitats



Wide Floodplain Segments

Transition from unconstrained to constrained channels (hyporheic upwelling)

Geomorphically Significant Tributary Confluences

NetMap Coverage & Analyses

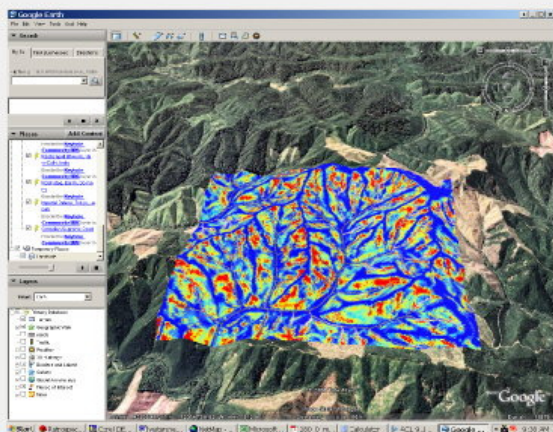
A base NetMap analysis includes: i) A routed stream- hillslope layer, consistent with regional NetMap coverage; ii) Development of calibration functions for various watershed parameters, depending on available data; iii) Development of over 60 watershed parameters; iv) QA/QC for all data layers; v) All NetMap tools (50+ functions), and vi) one-day training seminar. See www.netmaptools.org.

Other NetMap analyses can support research, conservation, resource management, watershed and stream restoration, pre- and post-fire planning, monitoring, and ecological mapping. Supporting analyses include:

- 1) Conducting research about the interrelationships among geologic, topographic, vegetative, river network and biotic ecosystem components;
- 2) Building habitat models, including core habitat areas and habitat diversity;
- 3) Developing watershed contexts for restoration projects (e.g., identifying suitable areas for engineered restoration and areas of naturally high disturbance potential that may represent zones of natural restoration);
- 4) Creating prioritization strategies for restoration (watershed and stream segment scale);
- 5) Predicting erosion potential (shallow landslide, debris flow, and generic), including sediment delivery;
- 6) Predicting thermal loading sensitivity at the watershed scale;
- 7) Predicting LWD loading potential using existing vegetation conditions (other veg. scenarios could be added);
- 8) Evaluating road erosion and drainage diversion potential, including post fire;

Field validation of NetMap: Numerous parameters predicted by NetMap (channel gradient, valley width, habitat potential, etc.) should be measured in the field and validated. NetMap databases can be corrected if comparison between predicted and measured values reveals significant inconsistencies.

For these and other supporting analyses, contact ESI for detail.



NetMap also can be used as an educational tool

**Visit NetMap's website,
www.netmaptools.org
for information on accessing
existing tools & databases and
using the forums &
advisory groups**

**To develop new NetMap
watershed coverage, please
contact us at:
www.netmaptools.org or
at:
leebenda@earthsystems.net
danmiller@earthsystems.net**