



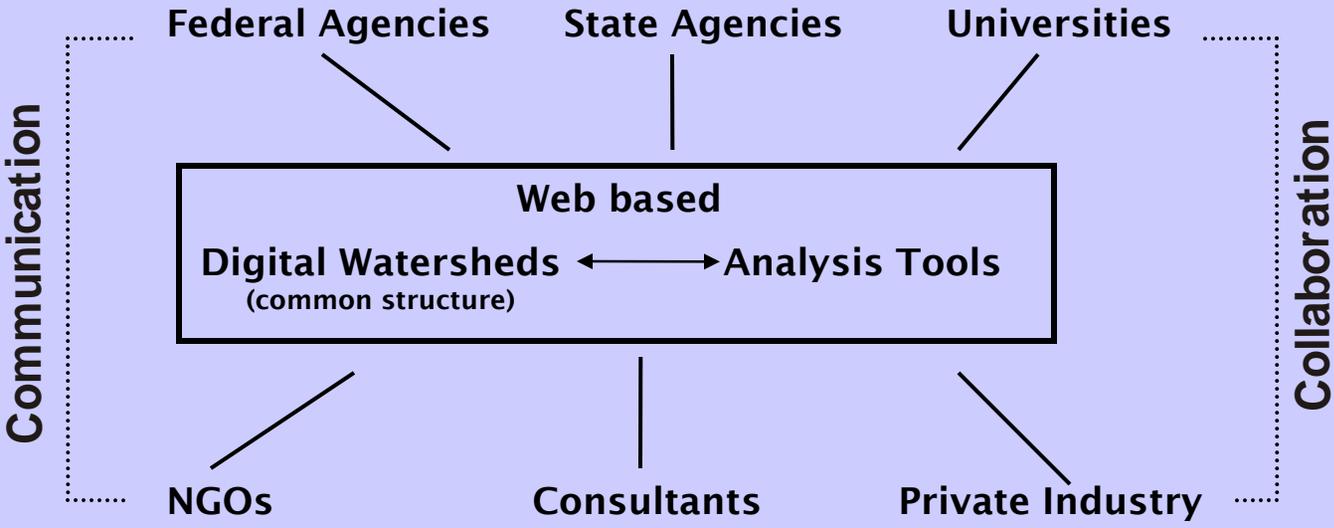
# NetMap

Community Digital Watersheds & Shared Analysis Tools

Earth Systems Institute  
Seattle/Mt. Shasta



# Community Concept



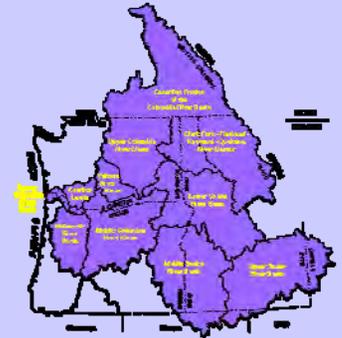
In: EOS (AGU) 2009 'Future of Applied Watershed Science at Regional Scales'  
(download at [www.netmaptools.org](http://www.netmaptools.org))

# Why a community based system?



Increasing spatial scale of land use planning and overlapping agency jurisdictions (USFS-Regions, NWFP, GNLCC, NGOs, Councils)

Similar questions, data, and analysis tool needs



Flat or declining budgets and reduced staff

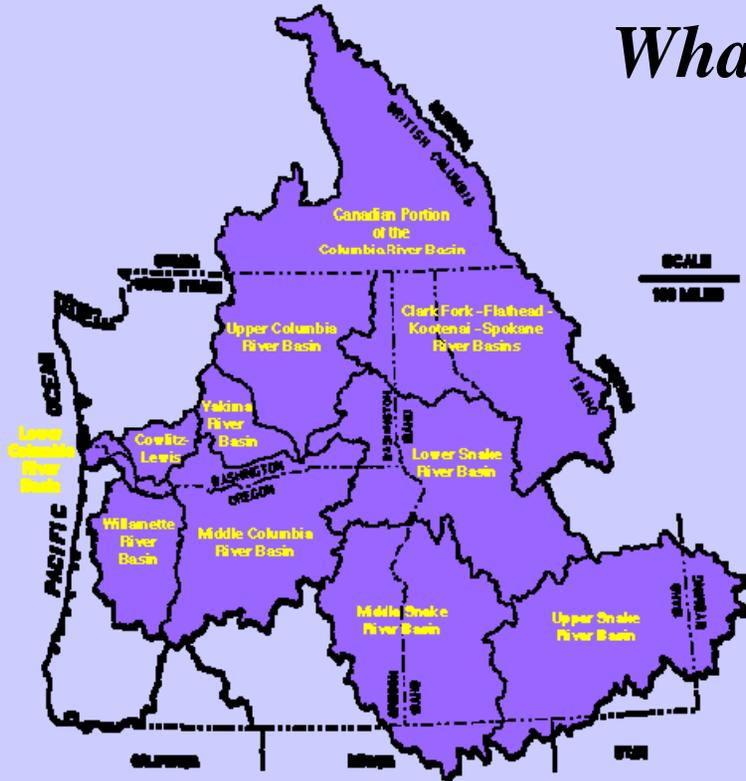
(community = powerful form of leveraging ideas, funding, talent)



In the last decade:

- ✓ High resolution digital data
- ✓ Fast computers w/vast storage
- ✓ Advanced GIS
- ✓ Watershed process models
- ✓ Web
- ✓ Cloud computing

## *What is a community based system?*



*-A geographically extensive & uniform landscape databases of common data structure*

*-User friendly analysis tools that use the database for decision support*

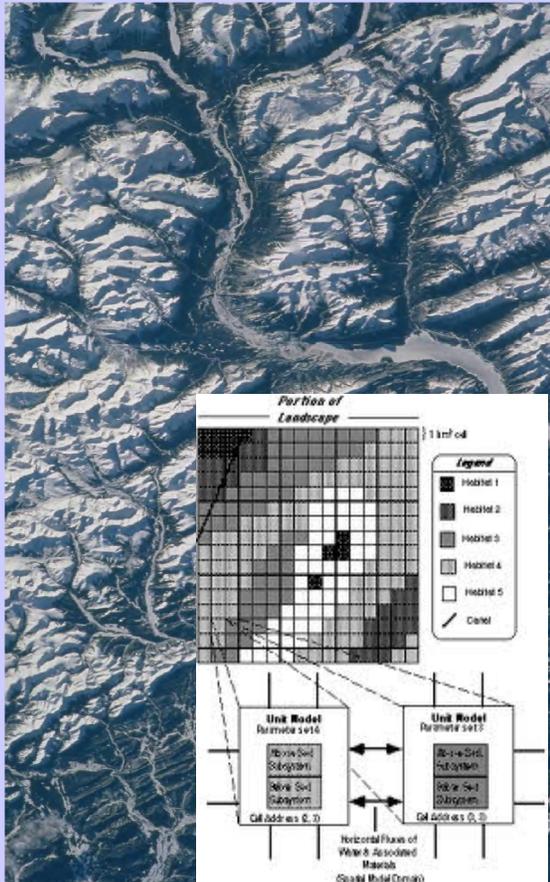
*-Community (stakeholder) supported design & development of shared databases & tools*

# *Research science is moving towards community-based watershed data & modeling systems:*

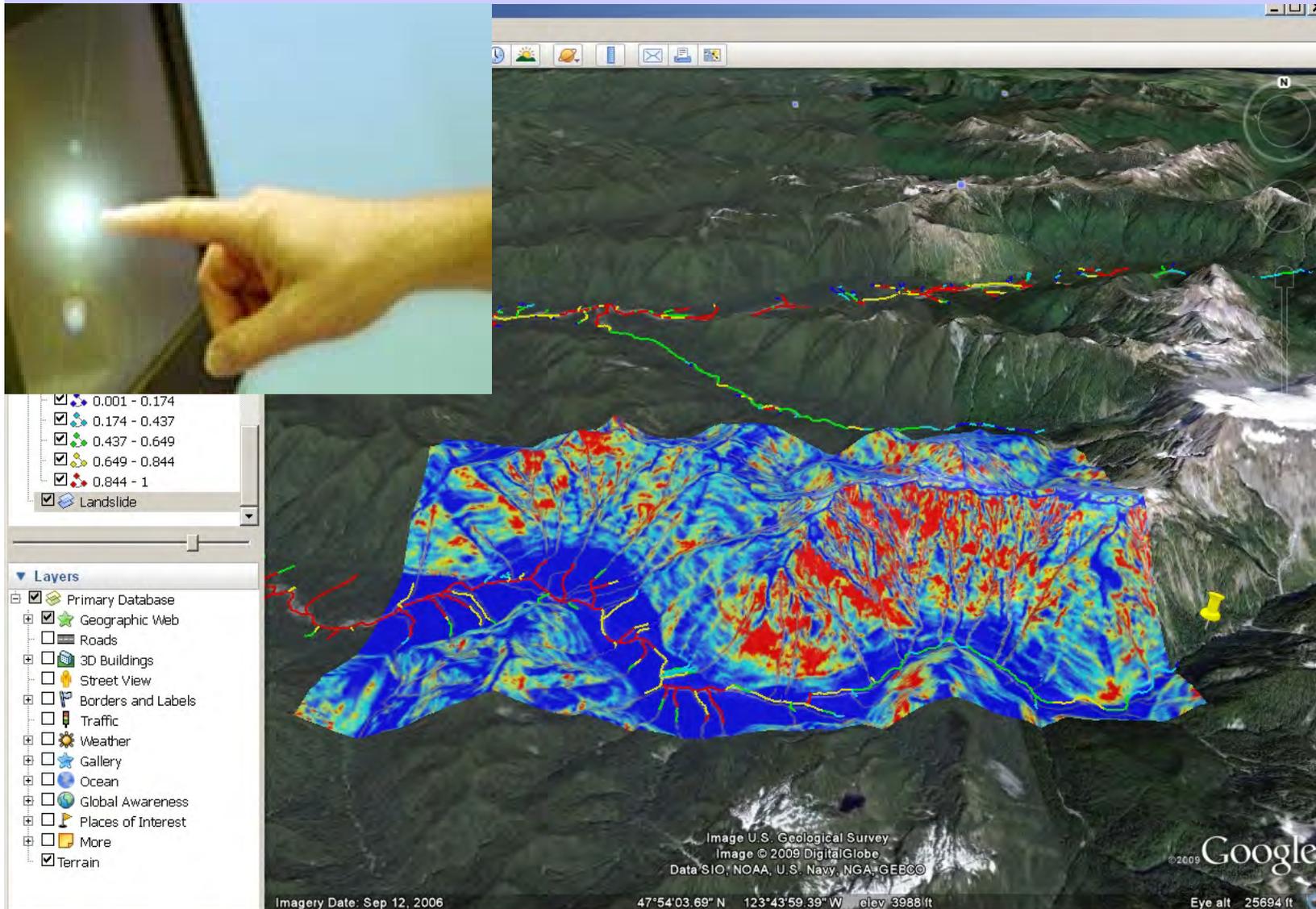
*-Michigan State Univ. Digital Watershed Tool*

*-Universities allied for water research-  
Hydrologic information system*

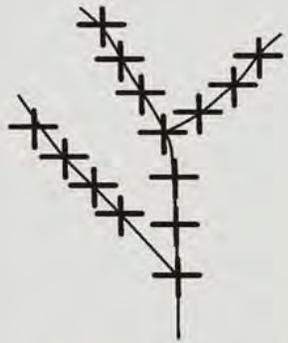
*-Community hydrologic modeling platform  
(NSF funded)*



# *It is time for a community based system in the applied watershed sciences*



# NetMap's Structure

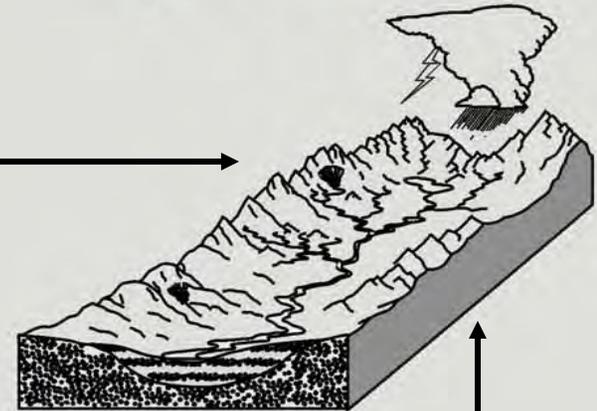


Node based  
(custom)  
stream layer

Watershed  
Explorer



Digital Landscapes



Support



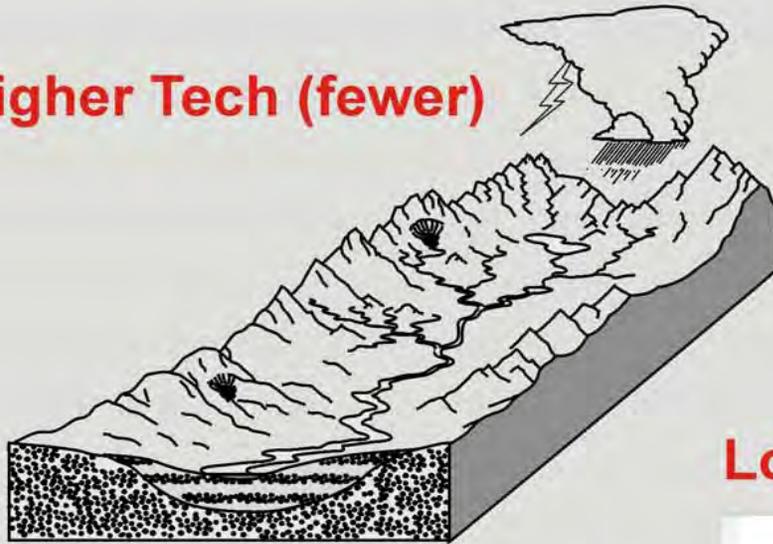
Tech Help



Analysis Tools

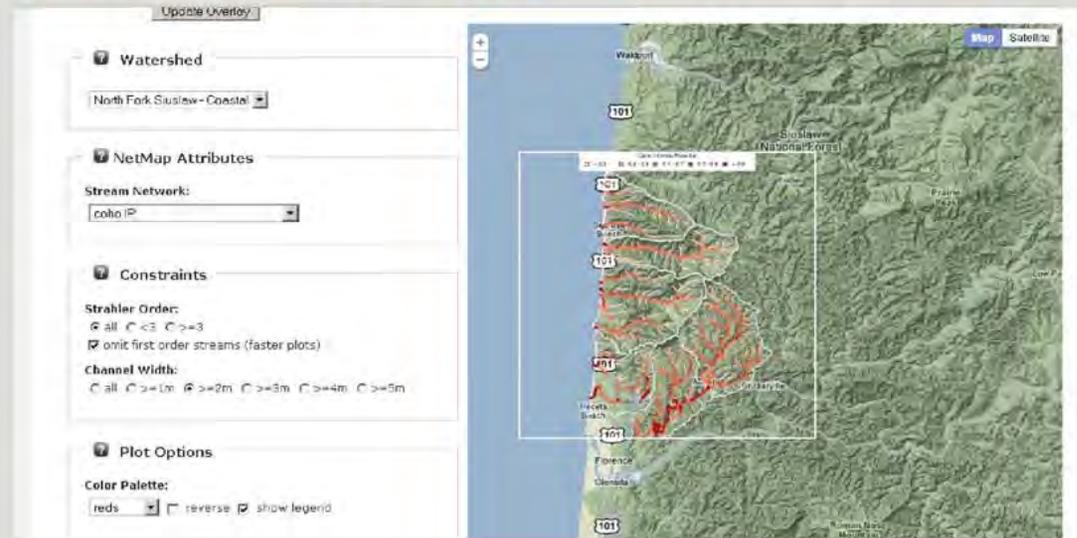
# NetMap's Accessibility

Higher Tech (fewer)



Lower Tech (many)

Digital Landscapes & Analysis Tools (ArcGIS)



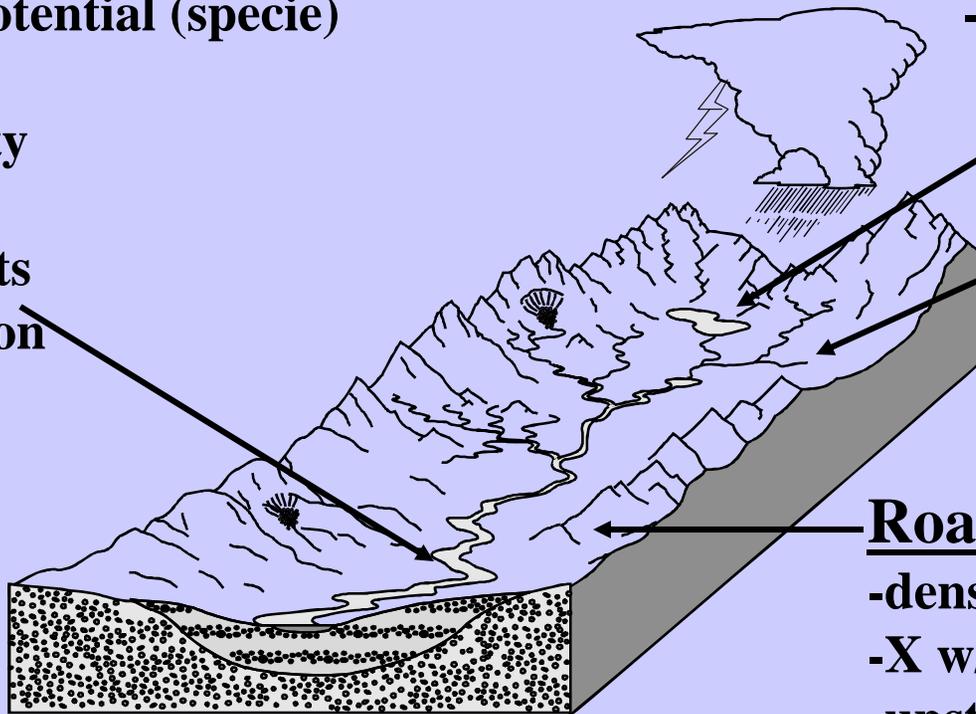
Watershed Explorer (web browser)

# *NetMap's Shared Analysis Tools*

*(ArcMap 9.3, 10)*

## Aquatic habitat indices

- intrinsic potential (specie)
- core areas
- connectivity
- diversity
- bio-hotspots
- classification



## Watershed Processes

- erosion/sediment supply
- LWD supply
- thermal loading/temp

## Vegetation

- forest age
- fire risk
- burn severity

## Roads

- density (multi-scale)
- X w/fish
- upstream hab. length/quality
- stability
- drainage diversion
- surface erosion

## Query/Overlap tools & others

- menu driven: search & prioritize
- e.g., high erosion w/best habitat,  
high road density + high  
erosion + sensitive habitat

Google Earth Interface/hyperlinked tech help

# Shared Tool Development

(~100 tools)

## Aquatic habitat indices

- Habitat intrinsic potential models
- Core areas
- Channel classification
- Floodplains **EPA**
- Connectivity

## Watershed Processes

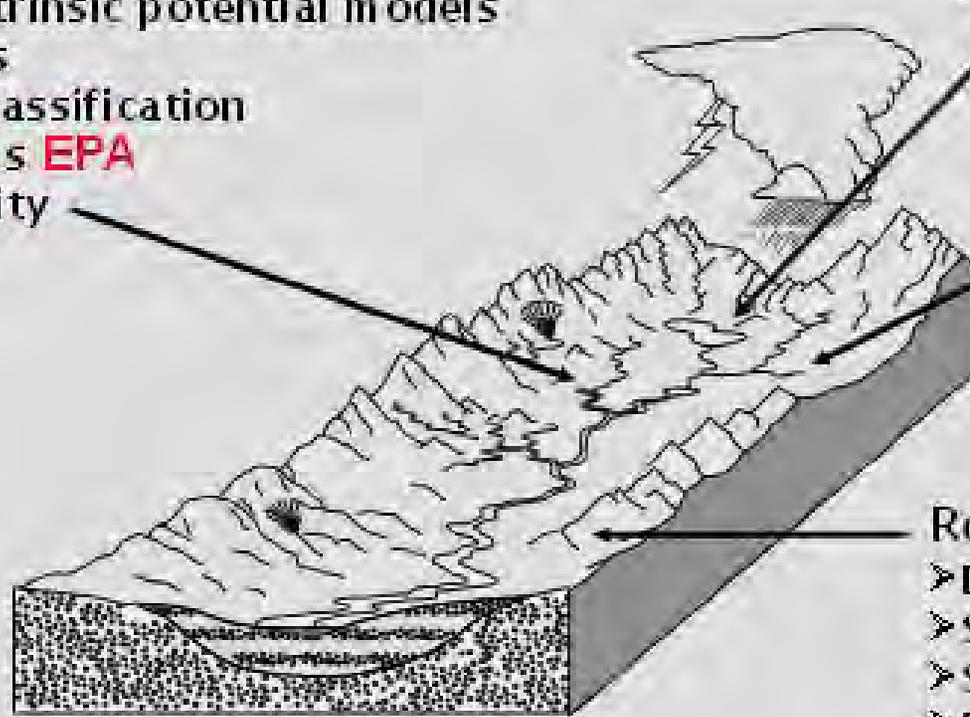
- Sediment
- Wood **USFS**
- Thermal

## Vegetation

- Forest conditions
- Fire risk
- Burn severity

## Roads

- Drainage diversion **NOAA**
- Surface erosion
- Stability
- Floodplains etc.

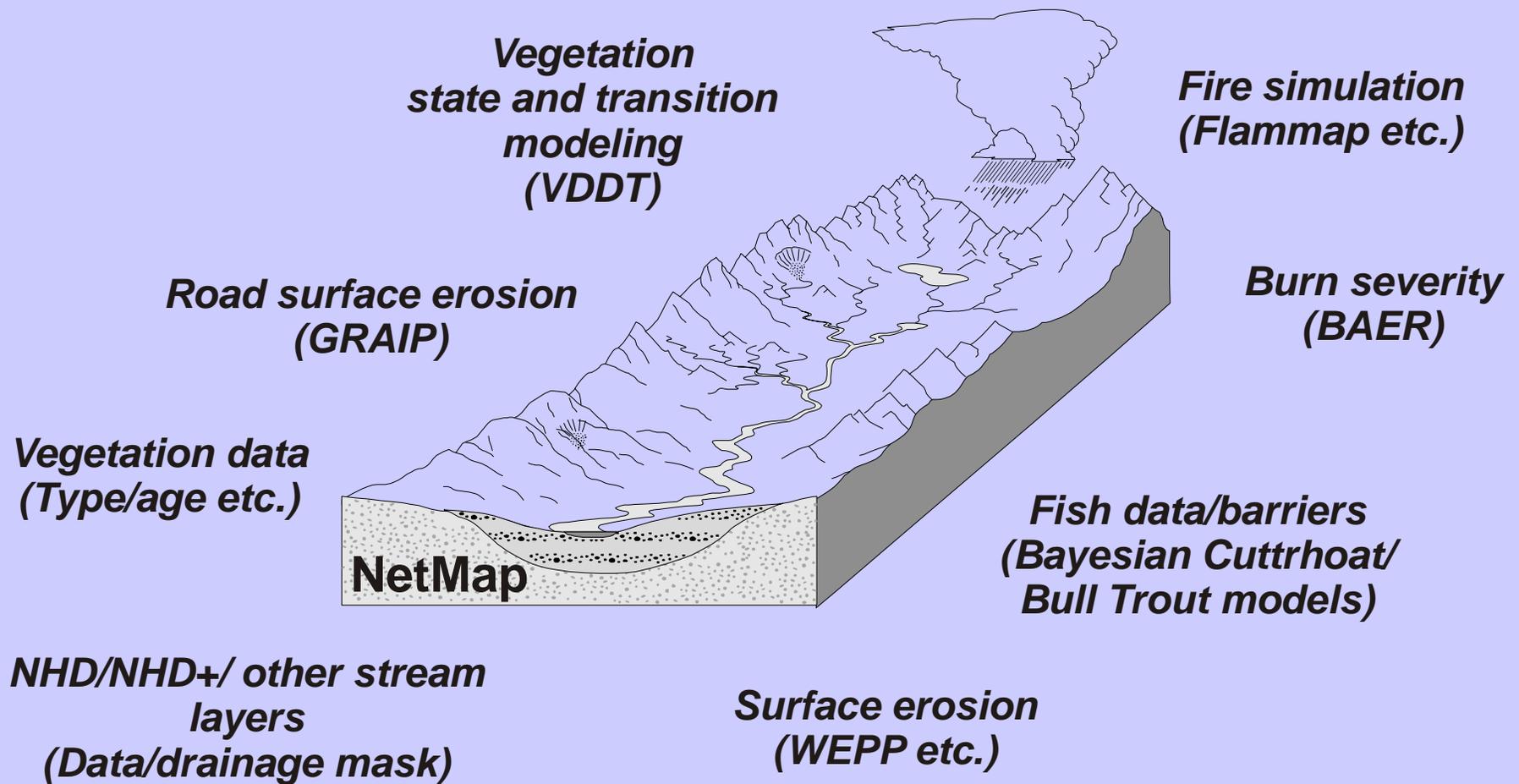


Automated GIS (search, sort & rank, query), Google Earth, Technical Help **Wild Salmon Center**

## Ground-Up Tool Design



# *NetMap is a platform for other tools*



# Applications

Forestry: Timber harvest  
riparian mgmt



Roads



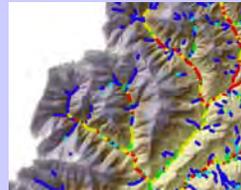
Restoration



Conservation



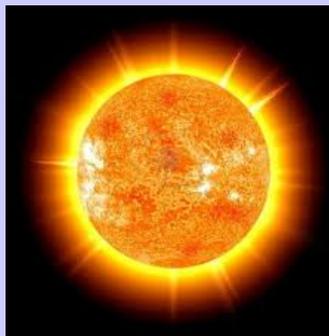
*Aquatic  
Habitats*



Pre-fire planning



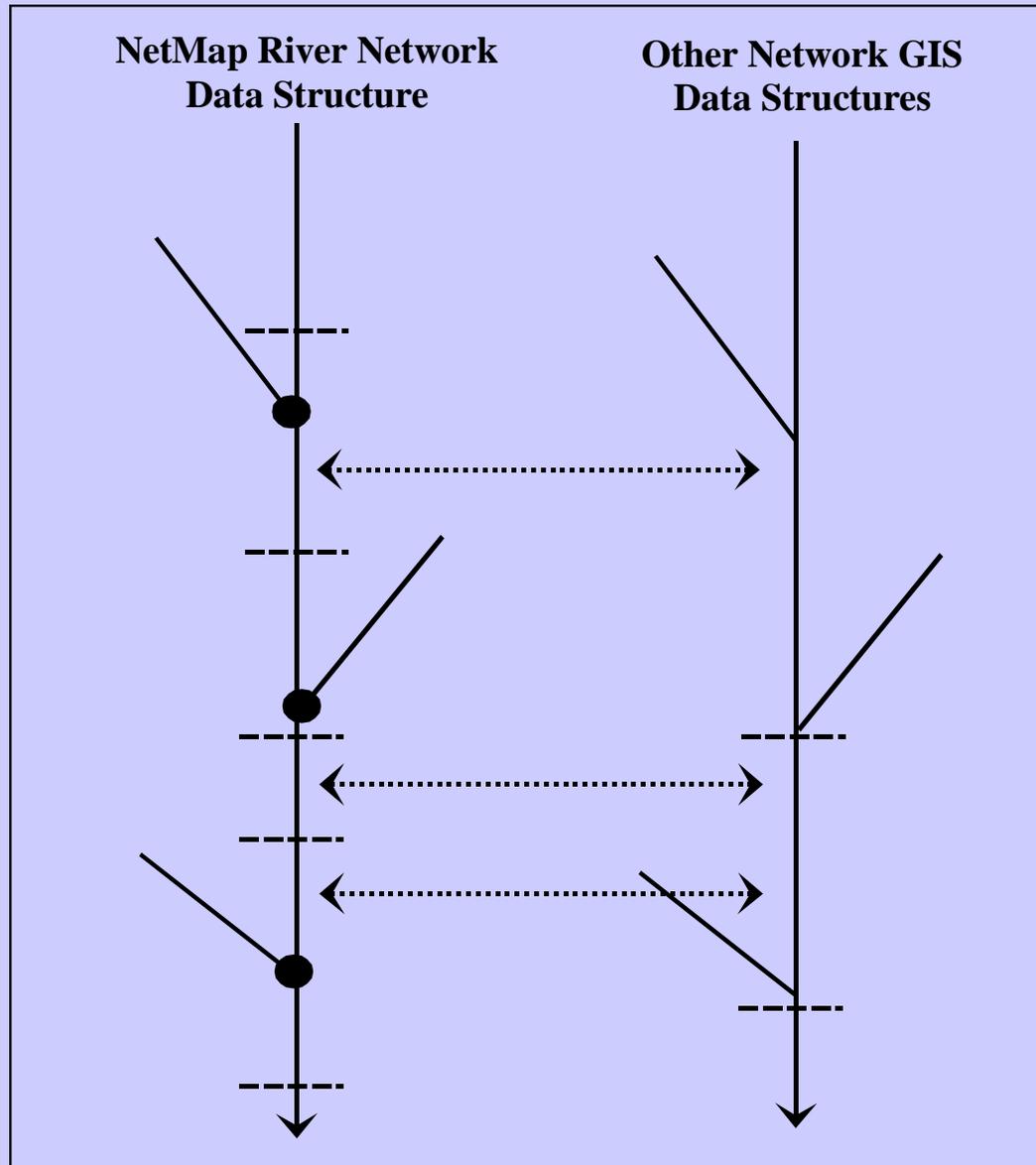
Climate  
change



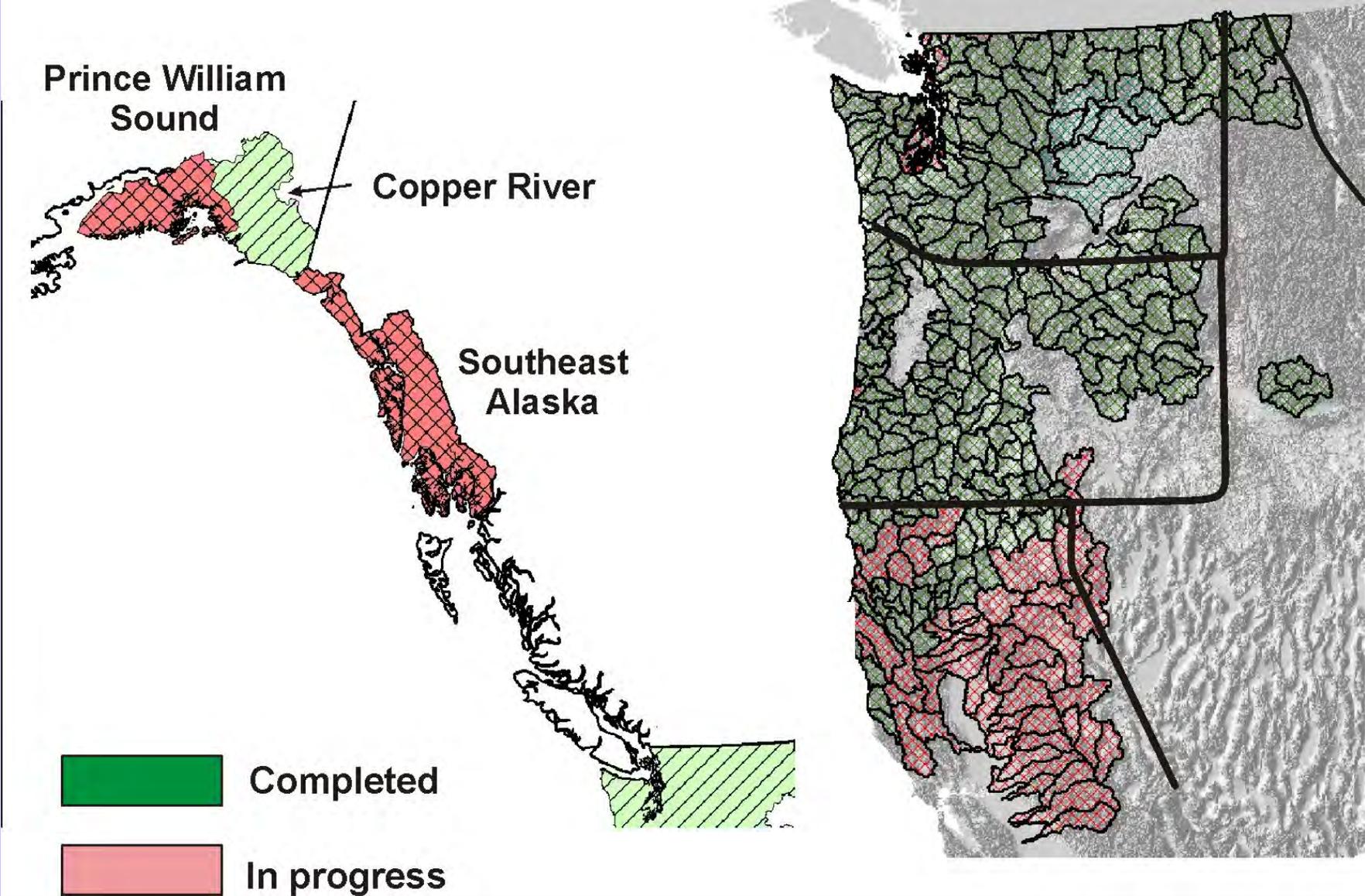
Post-fire (BAER) planning



# Information transfer between NetMap and other stream databases (including NHD)



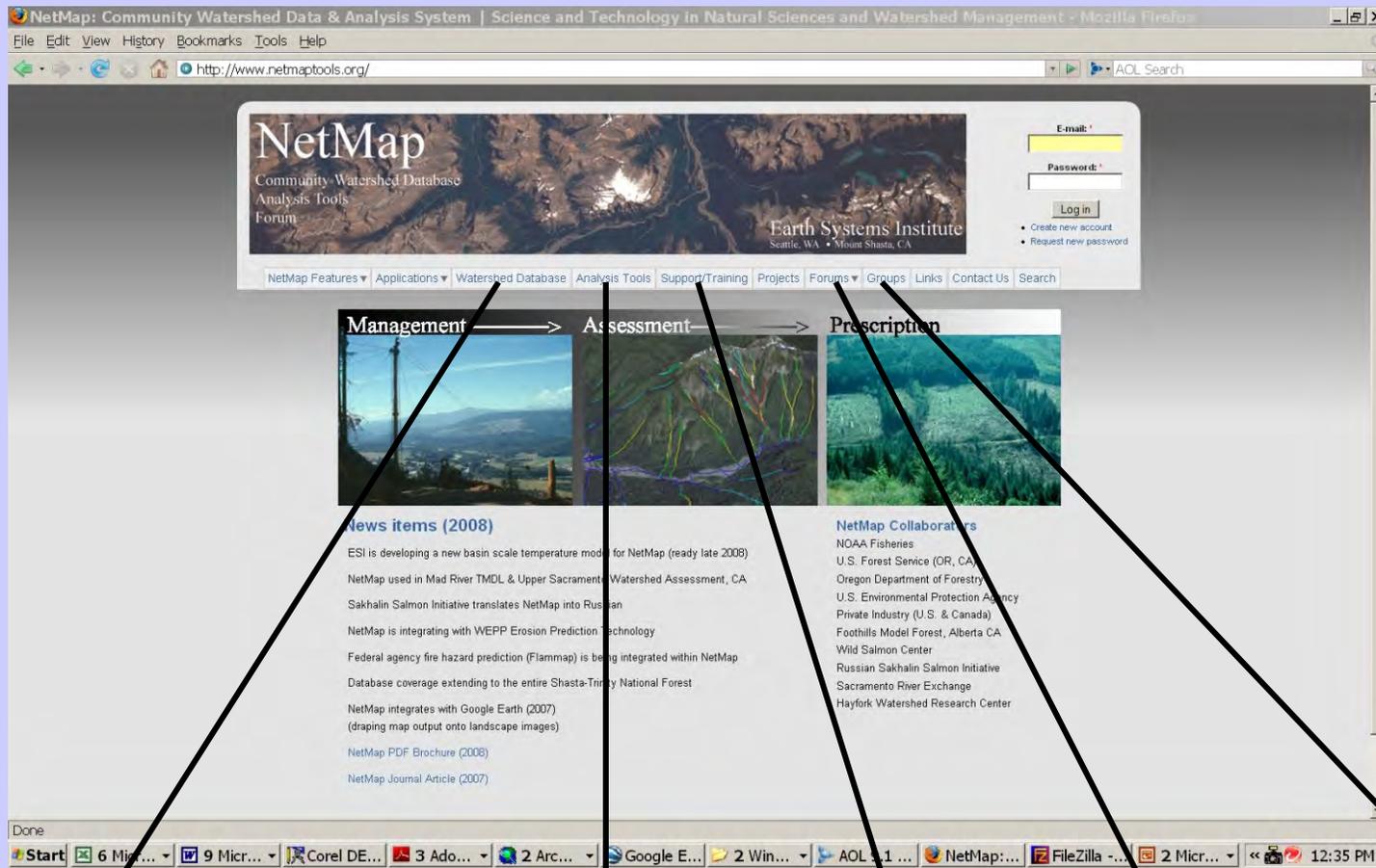
# *Current and pending (community) coverage*



## *Funders/Users since 2008*

- USFS, National Forests (WA, OR, NCA, AK, ID)
- USFS: PSW, PNW
- EPA (Puget Sound)
- NOAA (E. OR; W. WA/Section 7 ESA)
- BLM (OR)
- Oregon Dept. Forestry
- ODFW/WDFW
- Wild Salmon Center/Ecotrust/TNC/TU
- Washington Coastal Sustainable Salmon P.
- Kalispel Tribe/Salmon Board
- Watershed Councils
- Universities
- Private timber (Canada)

# *Tools and databases accessed via www.netmaptools.org*



*Watershed  
Databases*

*Analysis Tools*

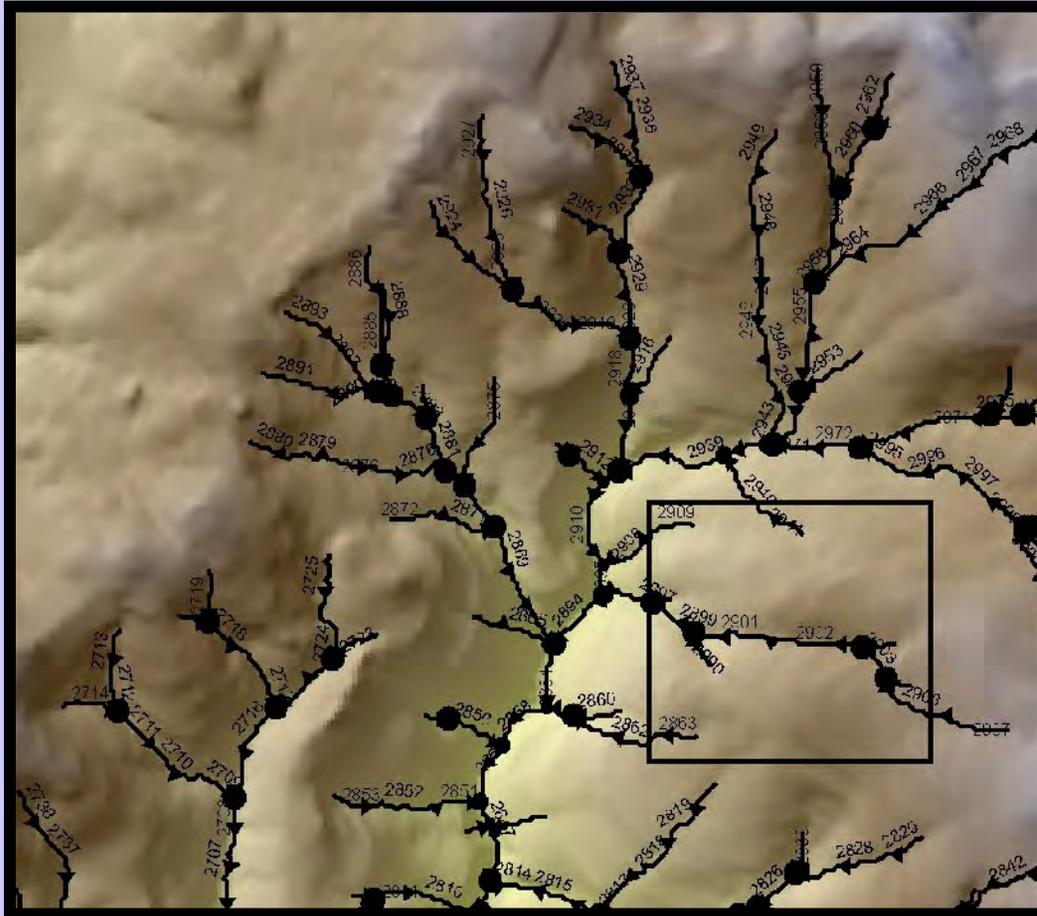
*Support/  
Training*

*Forums*

*Advisory  
Groups*

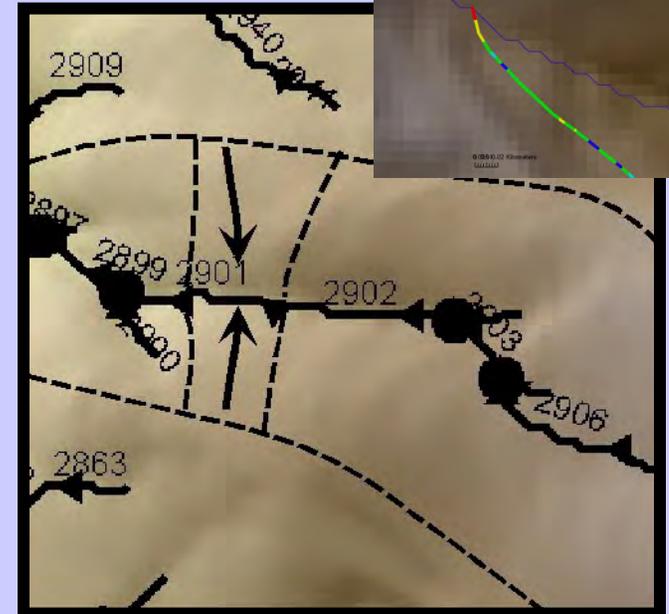
# *NetMap's topographic-channel data structure*

**Uniform data structure**



*Stream*

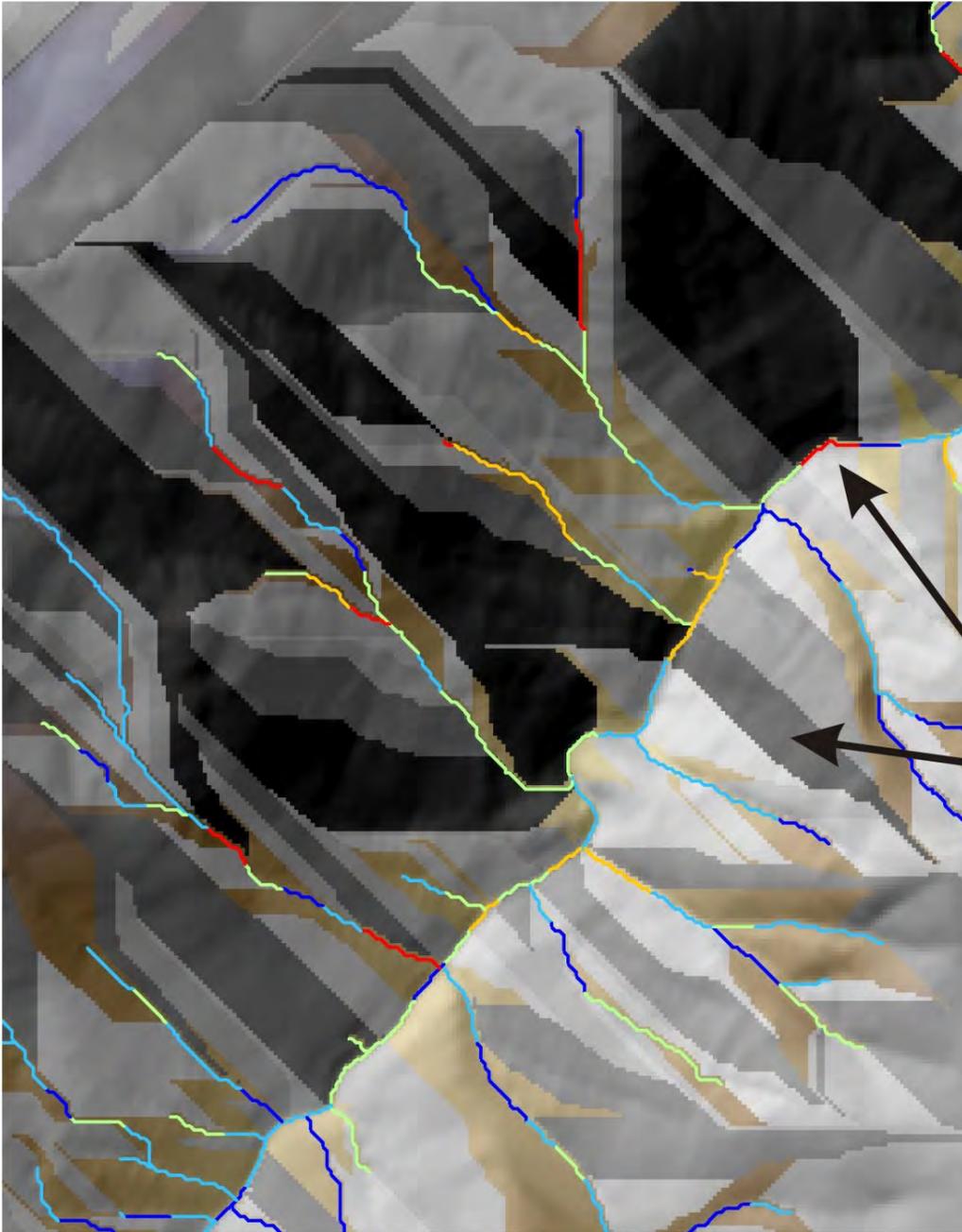
*Roads*



*Hillslope*

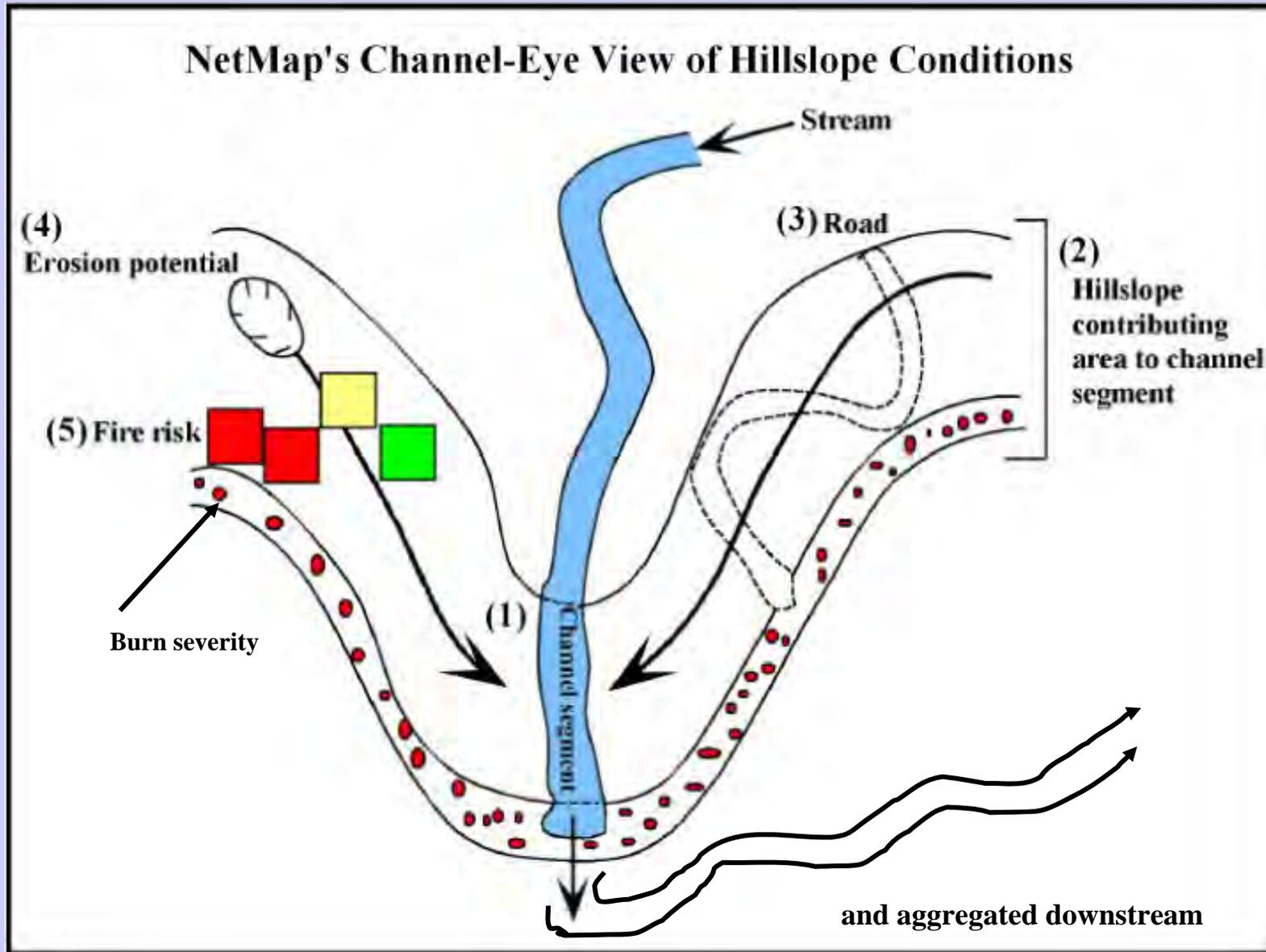
- full flow dispersion
- flow direction grid
- local channel drainage area
- attributed segments



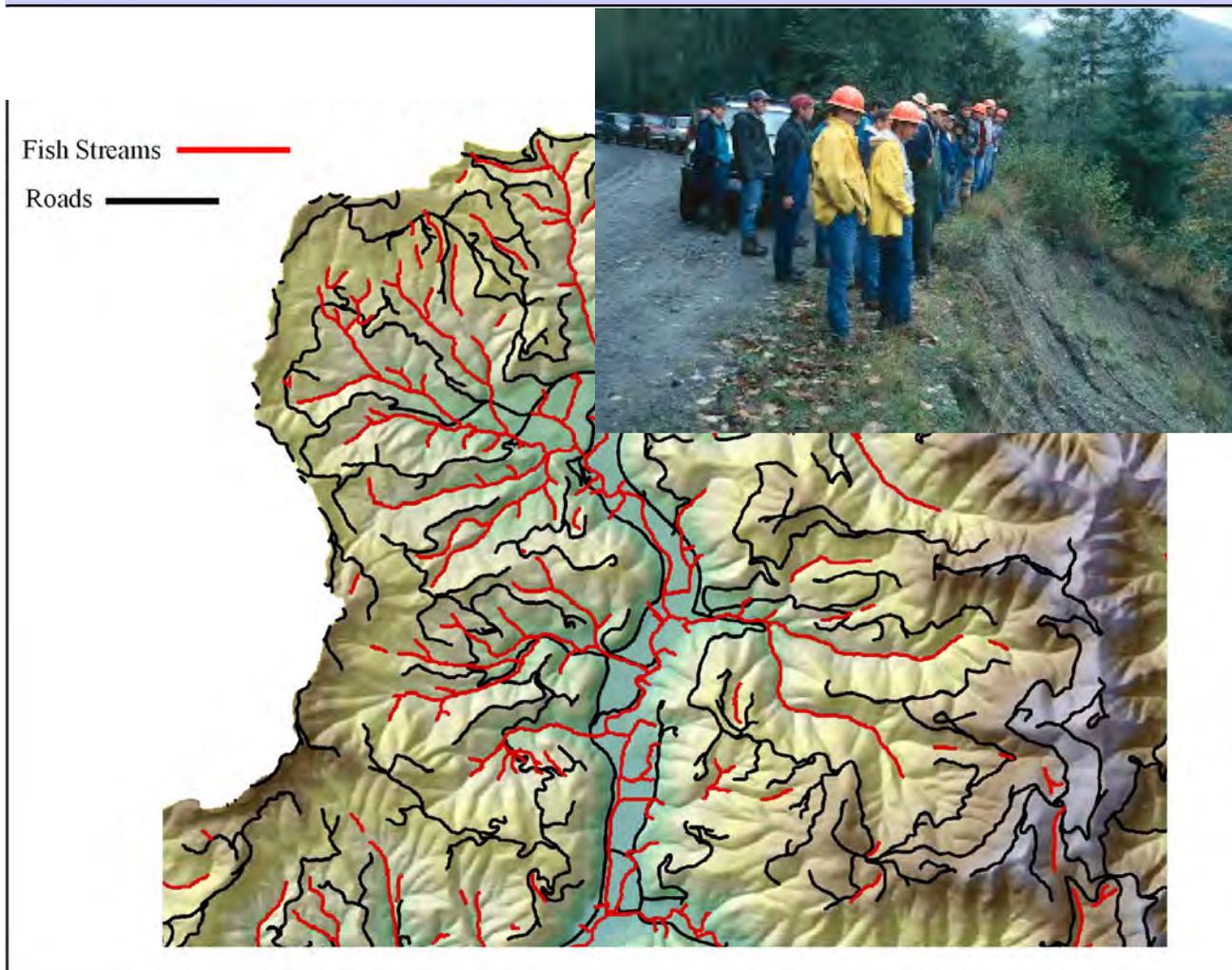


**Individual  
channel  
segment  
drainage  
wings**

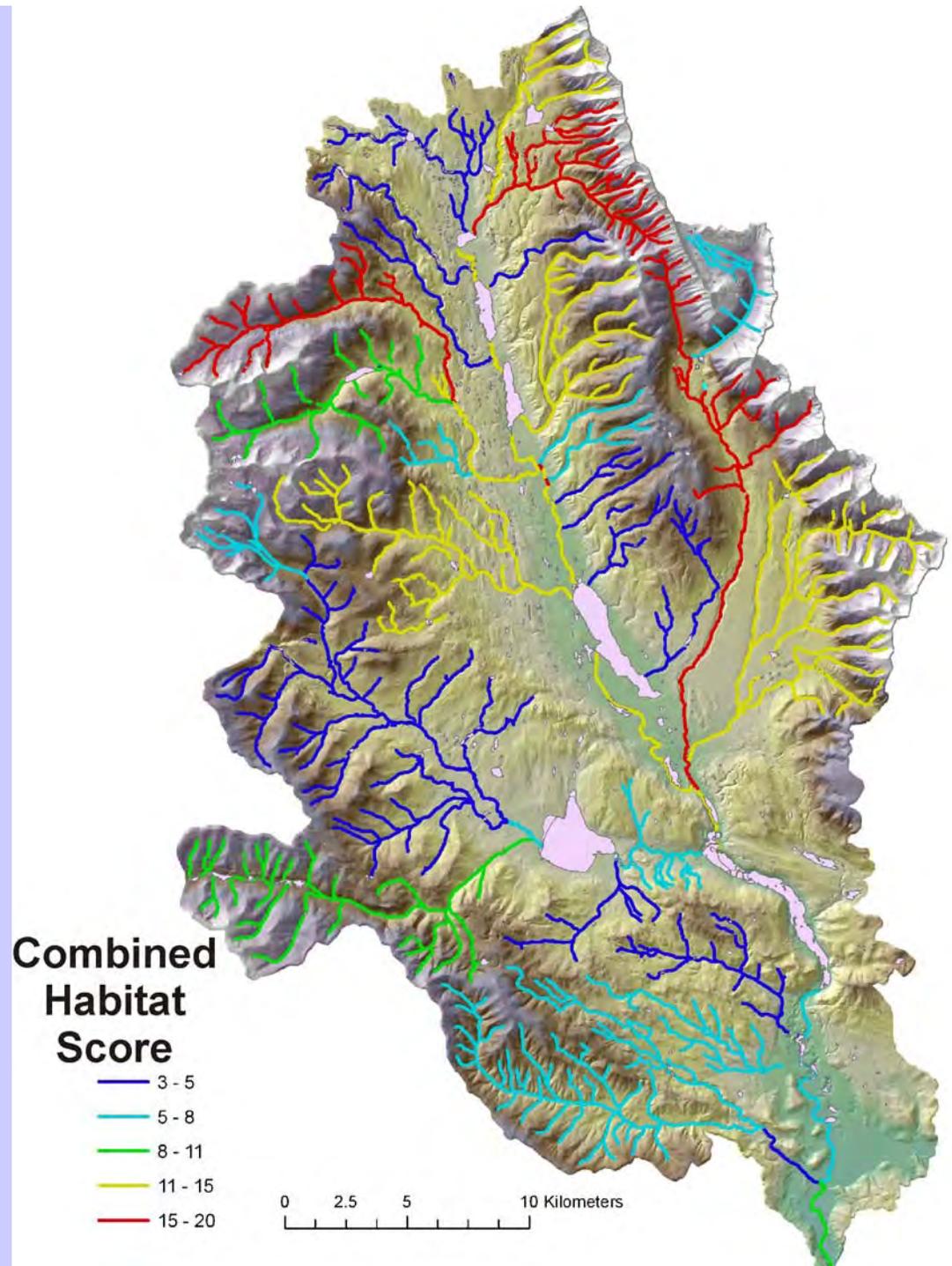
# Multi-scale analysis & routing of spatial data



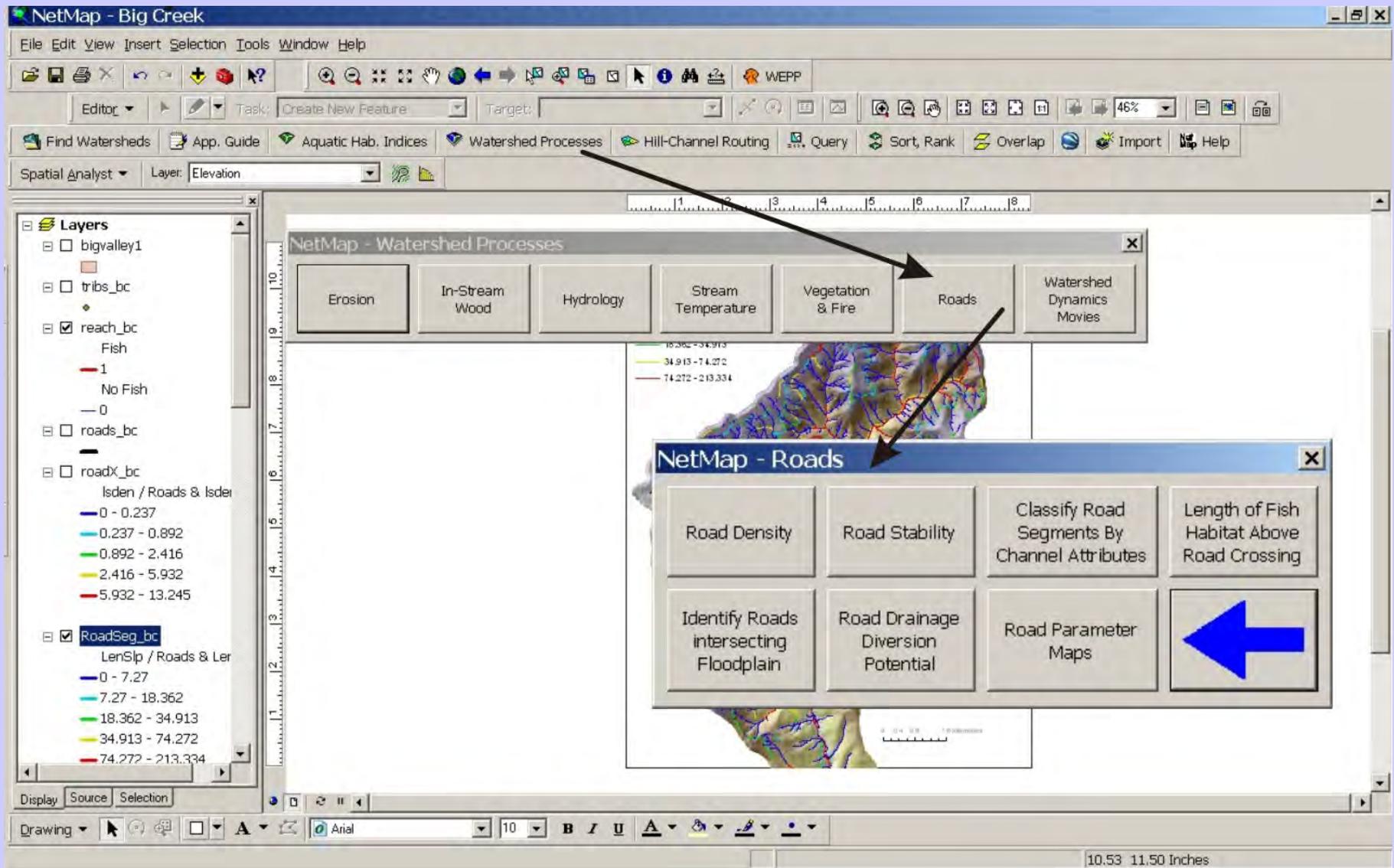
*In the Clearwater, of the hundreds to thousands of road segments and road-stream crossings, how does one prioritize actions?*



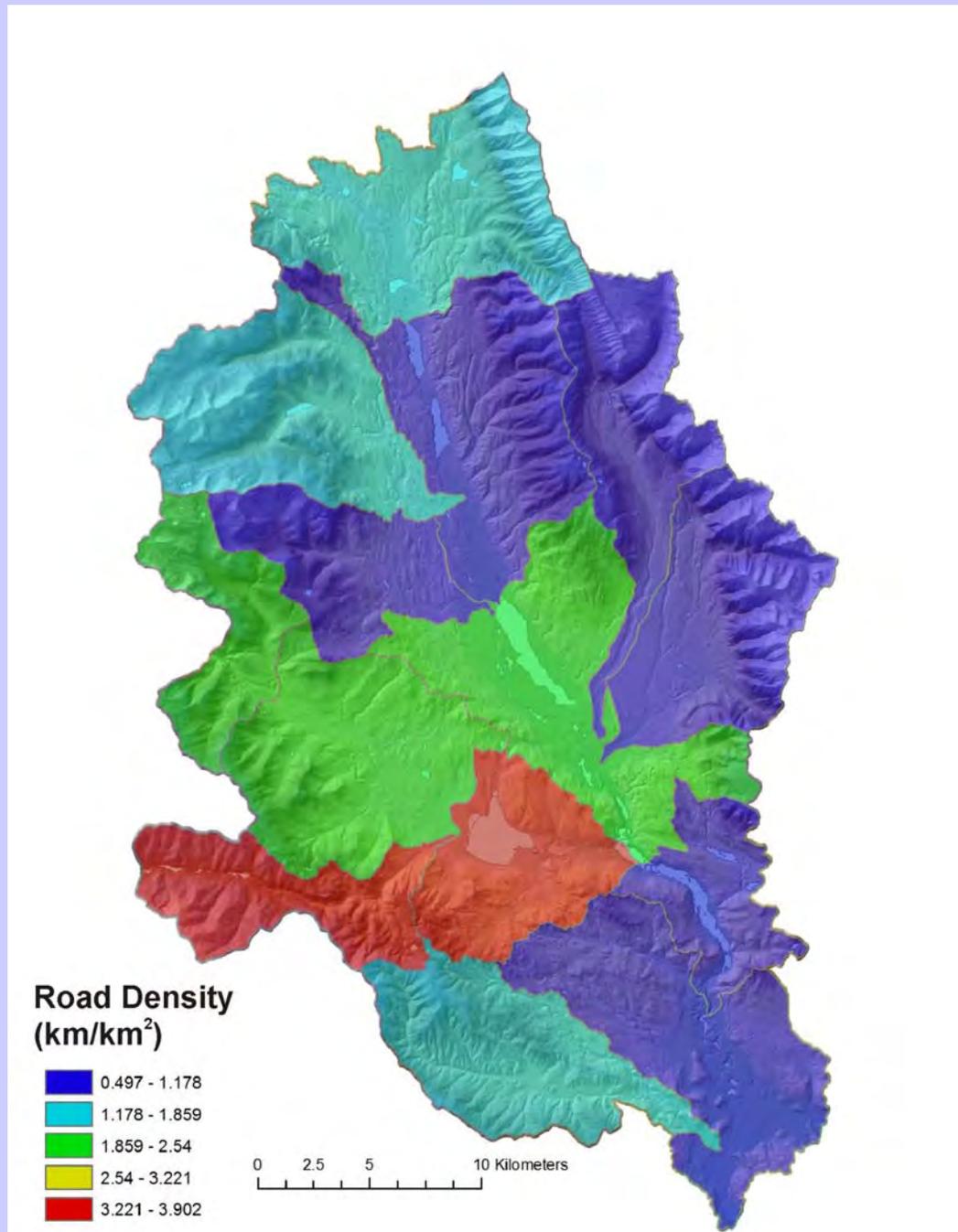
*Bull trout  
and  
cutthroat  
habitat score  
combined*



# NetMap road analysis tools

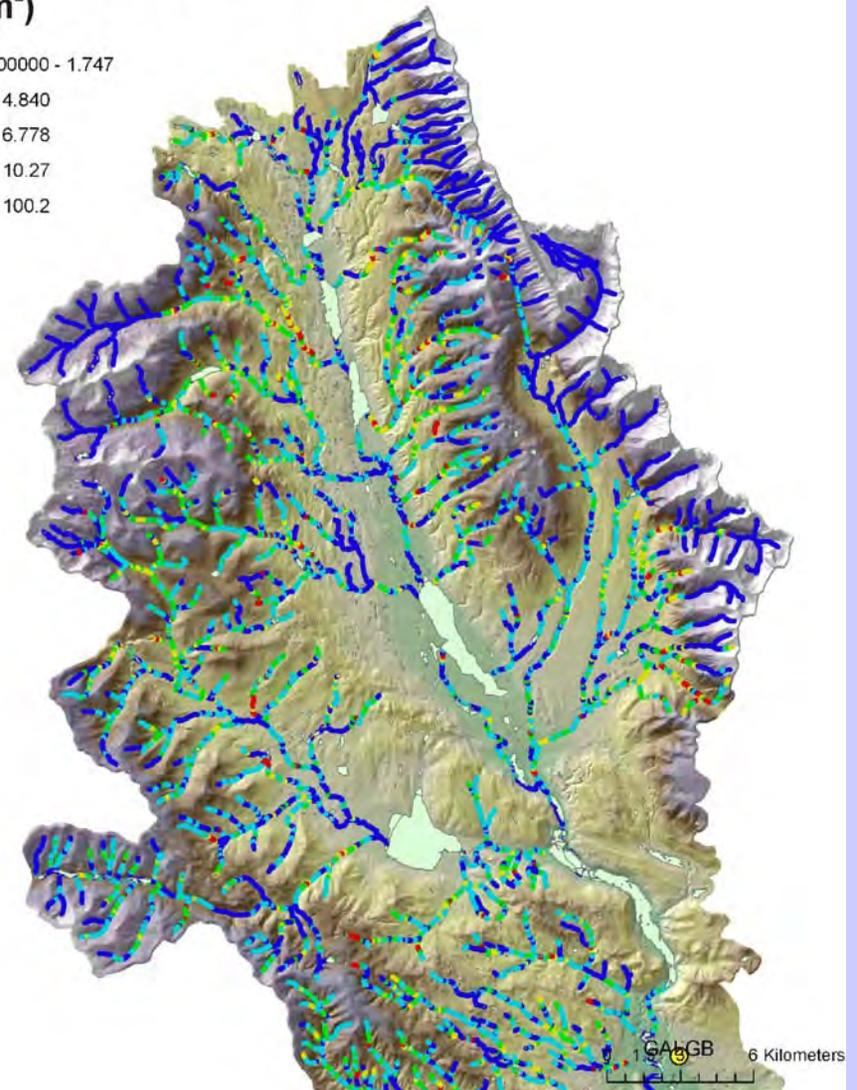
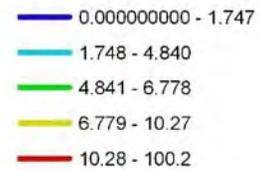


*Road density  
is often used  
as a surrogate  
for impacts*

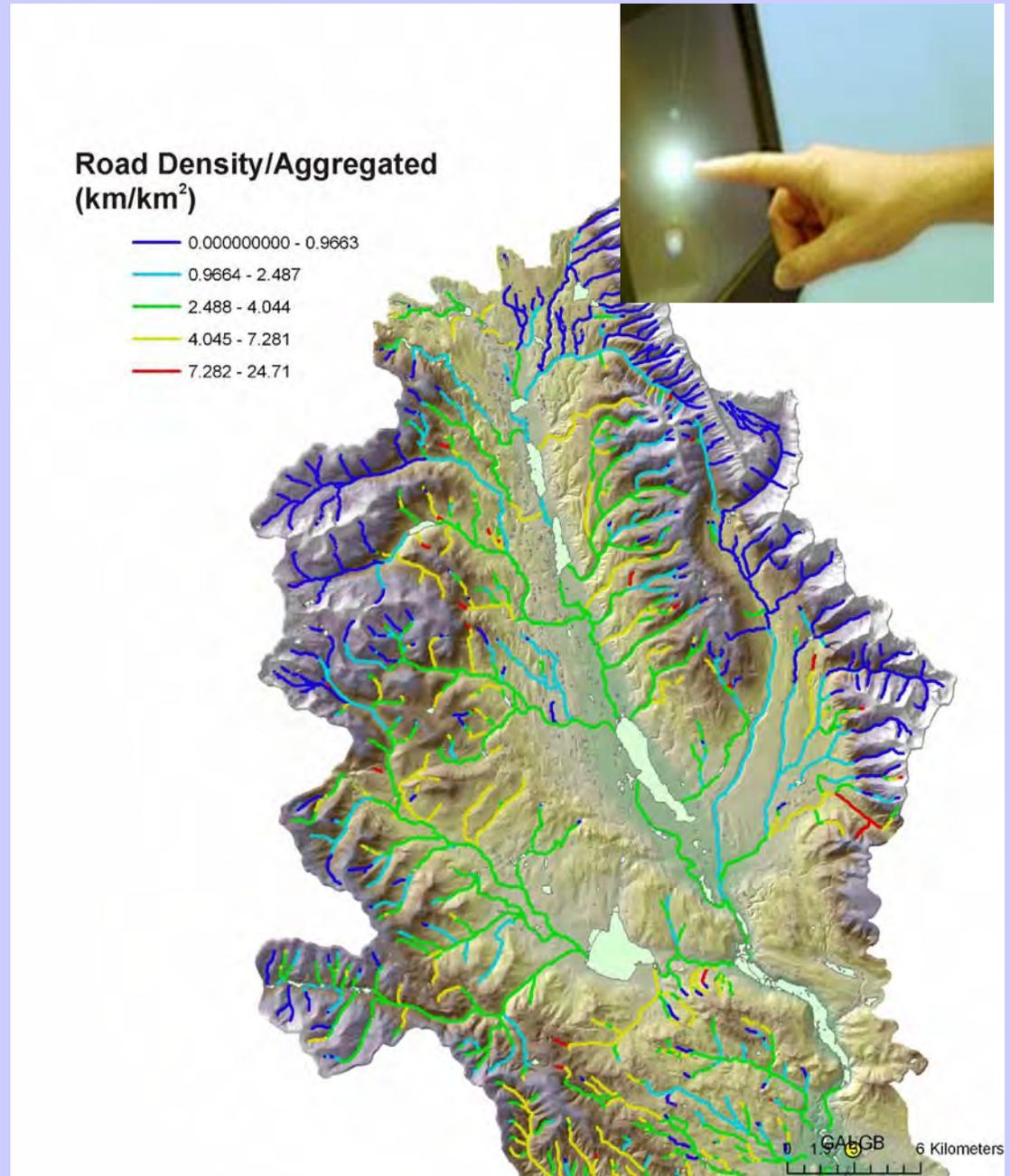


# *Calculate road density at the scale of stream reaches (100 m)*

## Road Density/Segment (km/km<sup>2</sup>)

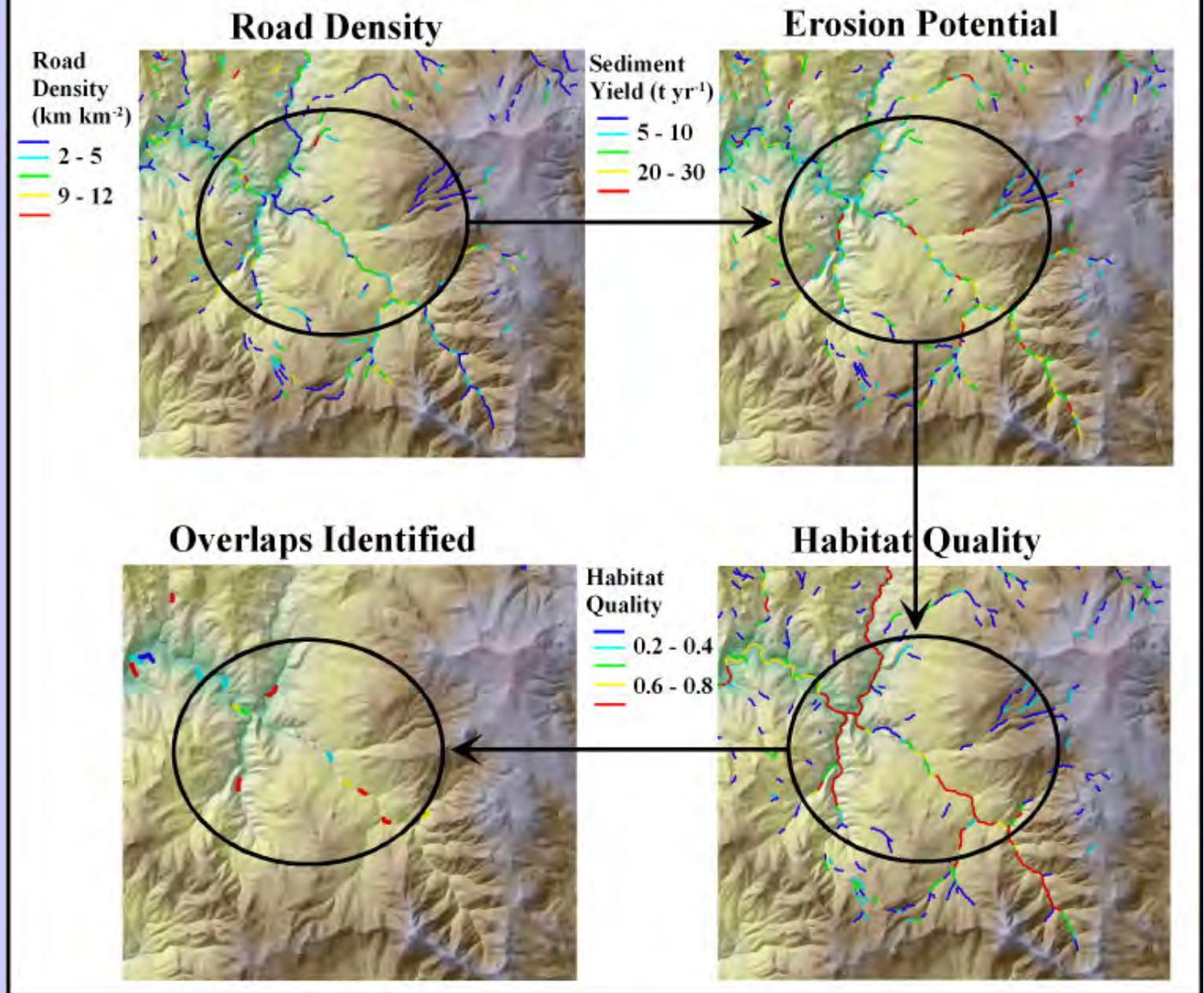


# *Calculate spatial variations in road density at multi scales*

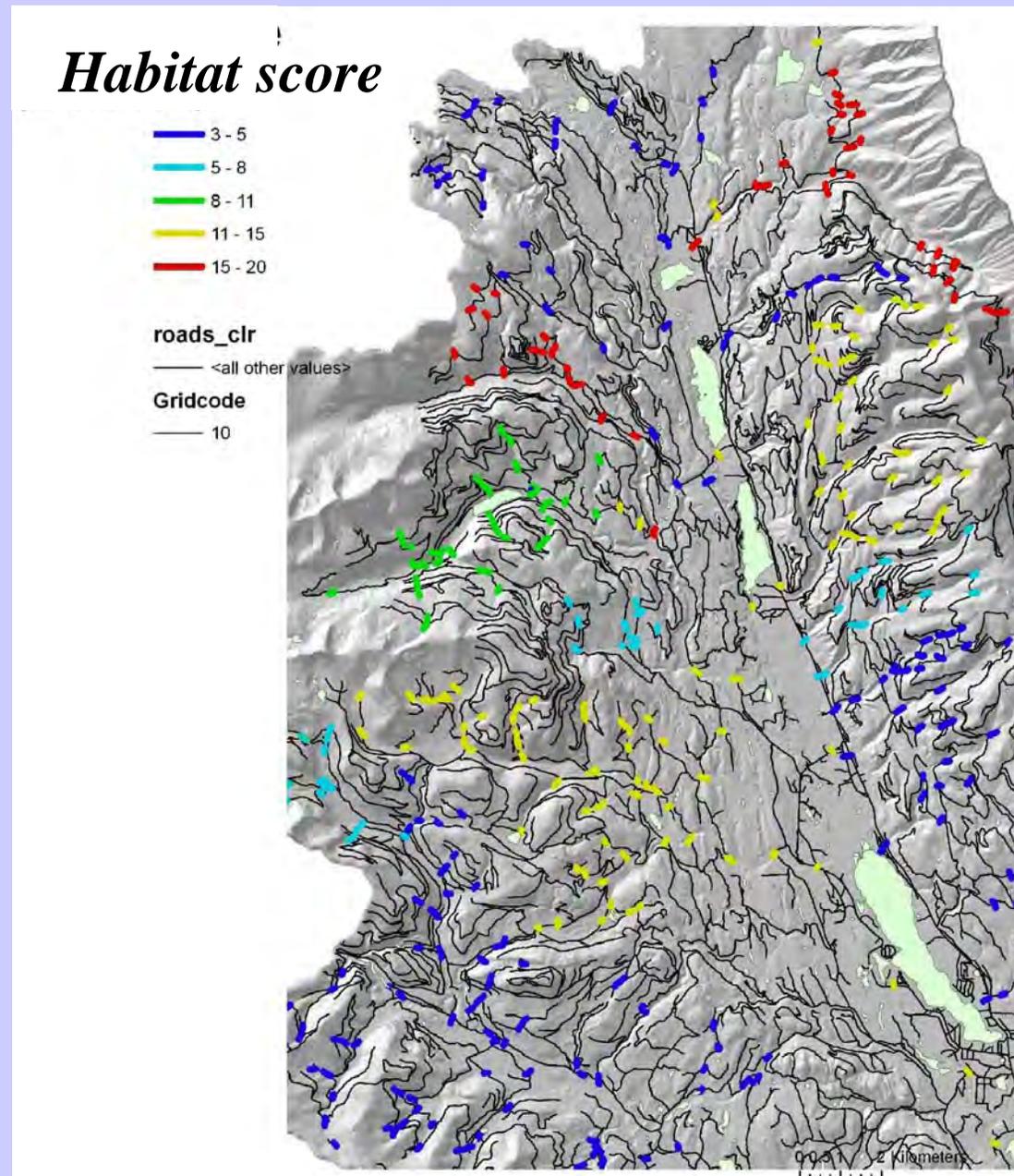


*Link road density with hillslope erosion potential and habitat sensitivity*

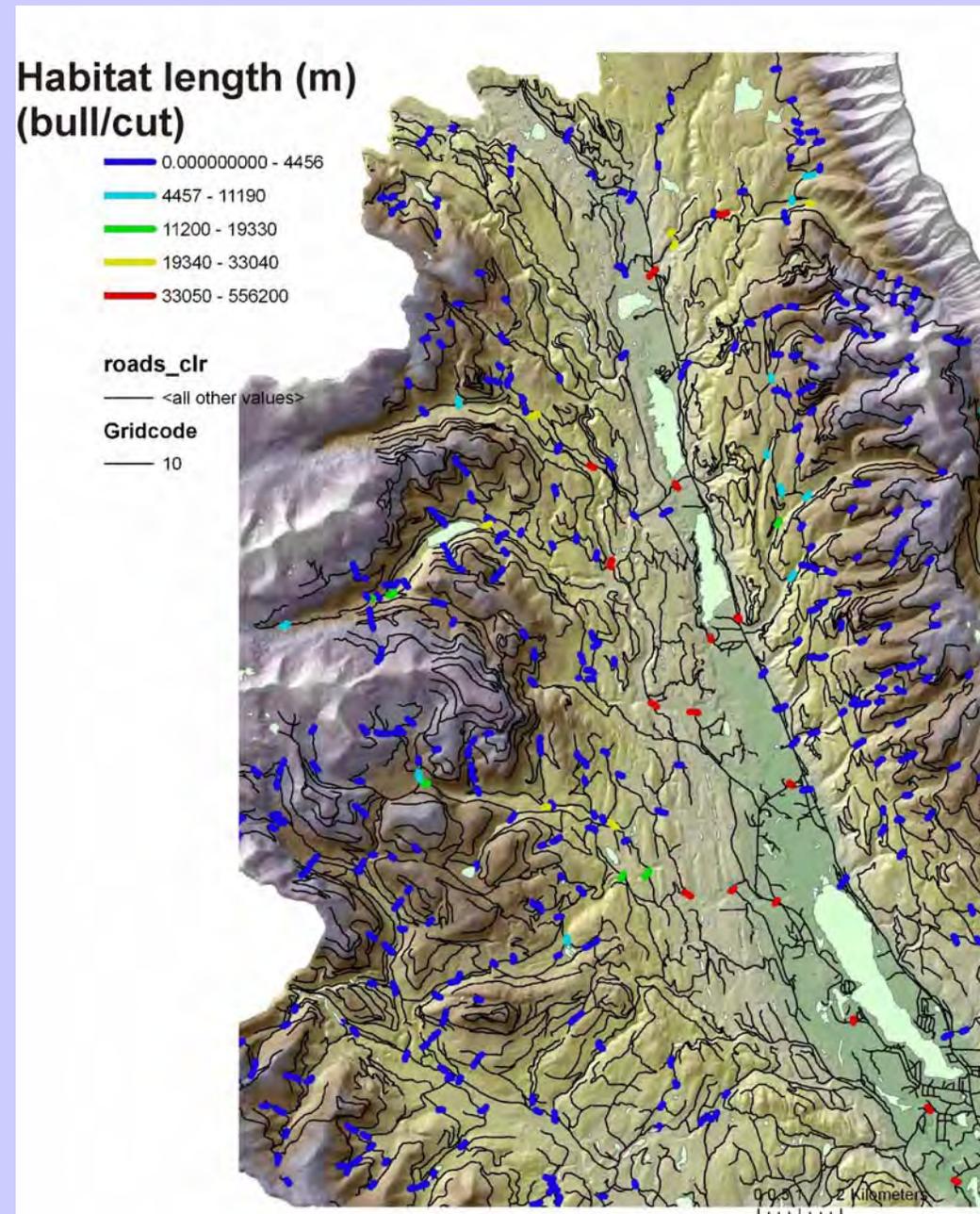
*Search for overlaps: concentrations of roads, erosion potential & habitats*



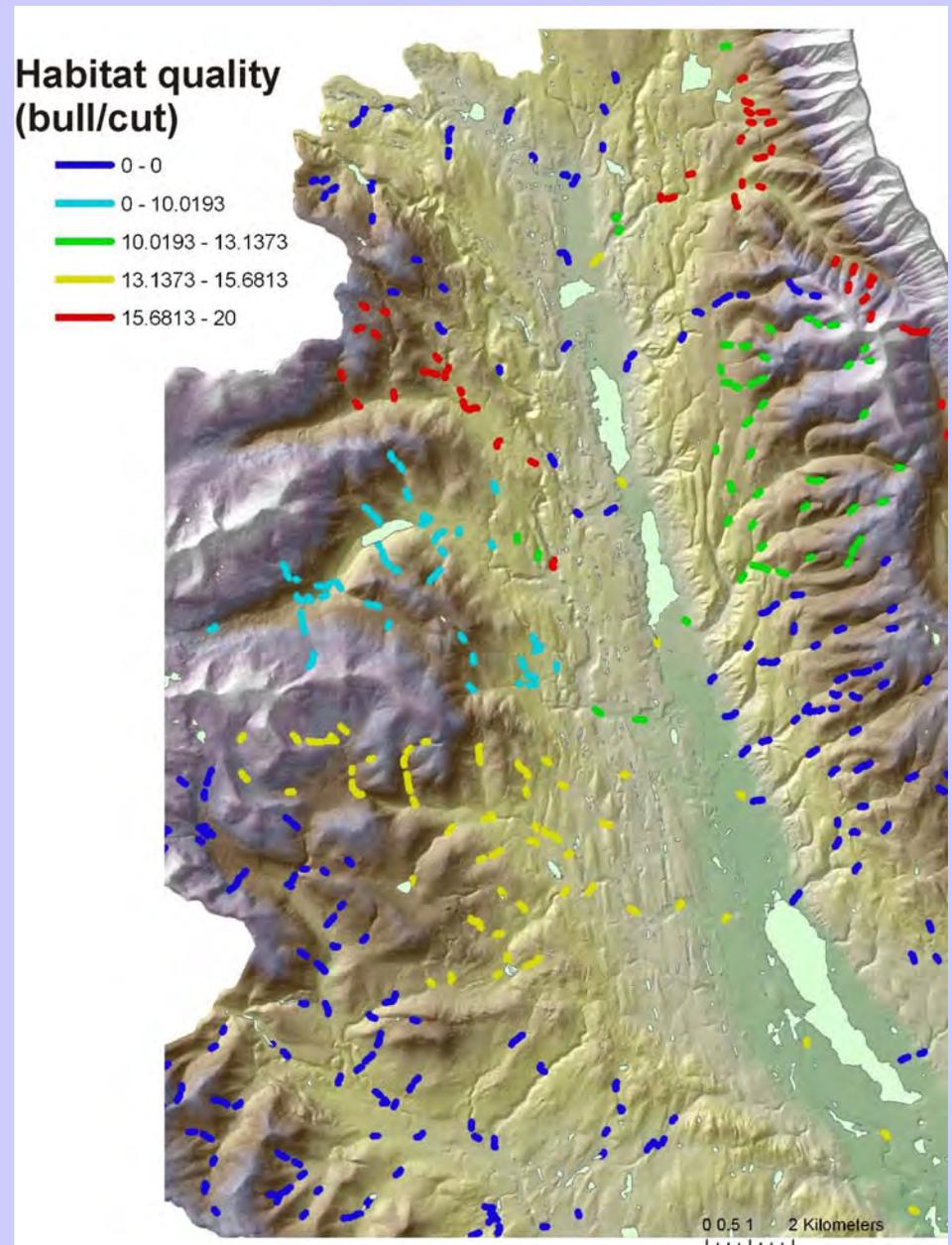
# *Search for overlaps between roads and habitat potential/sensitivity*



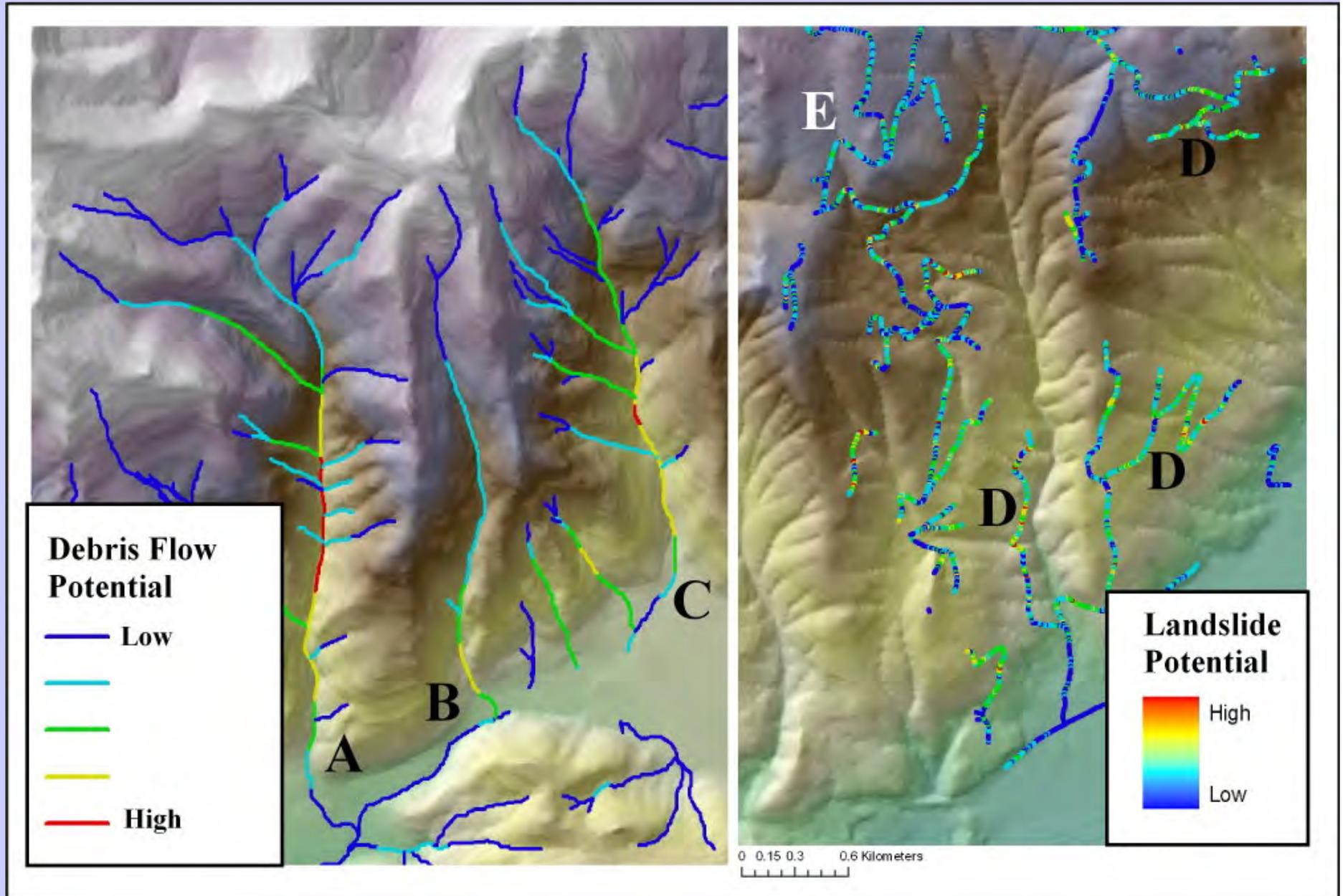
# *Characterize habitat above every road*



# *Characterize habitat above every road*

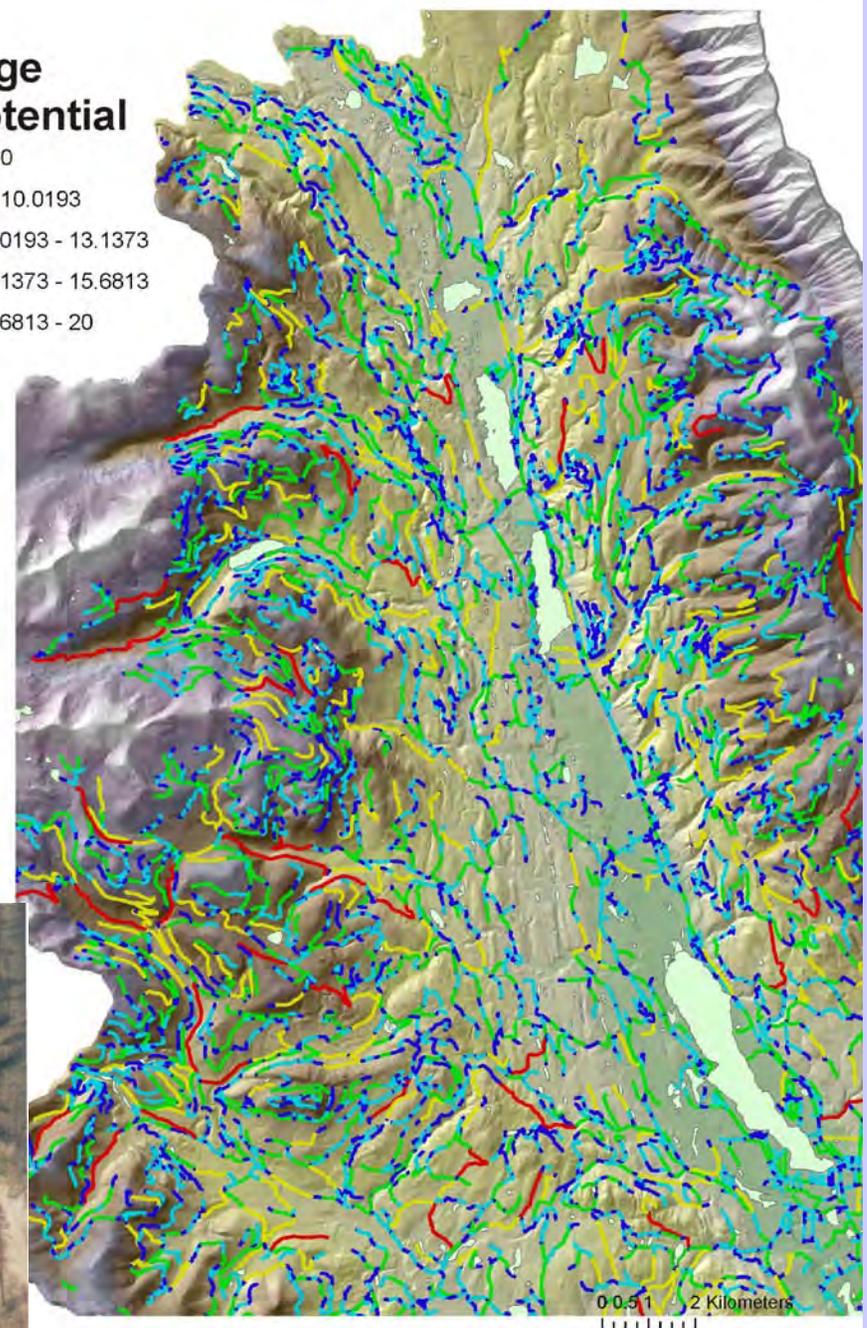


# *Predict road failure potential*



# *Calculate road drainage diversion potential*

**Road Drainage  
Diversion Potential  
(m)**



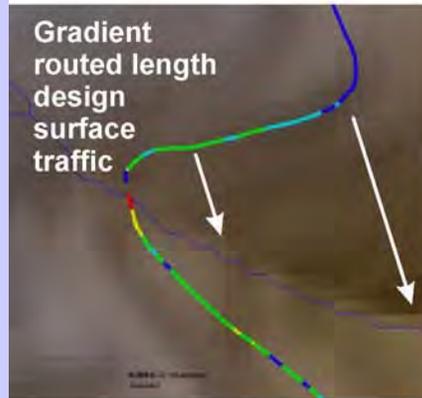
# Predict road surface erosion

The screenshot shows the NetMap software interface with the WEPP interface for Road Erosion. The main map displays a 3D terrain model with a network of roads overlaid. The roads are color-coded by erosion potential, with red indicating the highest potential and blue indicating the lowest. A black arrow points to a specific area where red roads overlap with blue stream channels. The WEPP interface on the right contains the following settings:

- Climate File:** Climate file: Click the button below to go to the USFS WEPP page and select an appropriate climate file. Save the file to: F:\Work\NetMap\WEPP\_Roads\climate.cli  
<http://forest.moscowfs.wsu.edu/cgi-bin/fswcpp/rc/rockclim.pl>
- Soil Type:** Clay Loam, Silt Loam, **Sandy Loam**, Loam
- Rock %:** 20
- Road Design:** Insloped, bare ditch; **Insloped, vegetated or rocked ditch**; Outsloped, rutted; Outsloped, unrutted
- Fill:** Gradient: 0.5 %, Length: 5 meters
- Buffer:** Gradient: 0.25 %, Length: 50 meters
- Road options:** Traffic Level:  High  Low  None; Road Surface:  Native  Gravel  Paved; Road Width: 4 meters;  Set maximum road length? 50 m
- Simulation:** Simulating 50 years
- Buttons:** Run WEPP, Display WEPP:Roads results, Get Help For This Tool

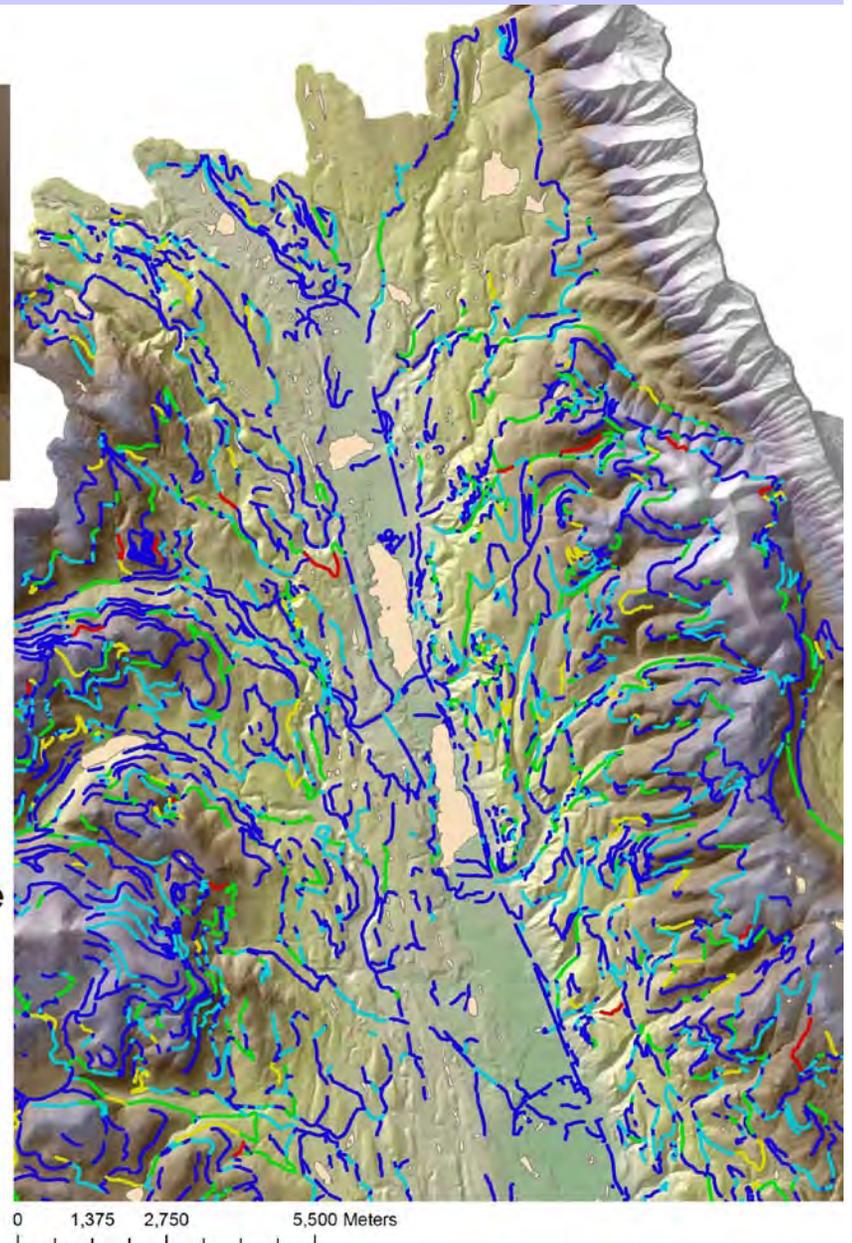
*Areas of higher potential road surface erosion (overlaps with fish habitat?)*

*Stratify road  
by erosion  
potential  
for maintenance  
&  
monitoring*



**Road surface  
erosion (t)**

- 0.001 - 0.268
- 0.268 - 0.822
- 0.822 - 1.811
- 1.811 - 3.817
- 3.817 - 10.056



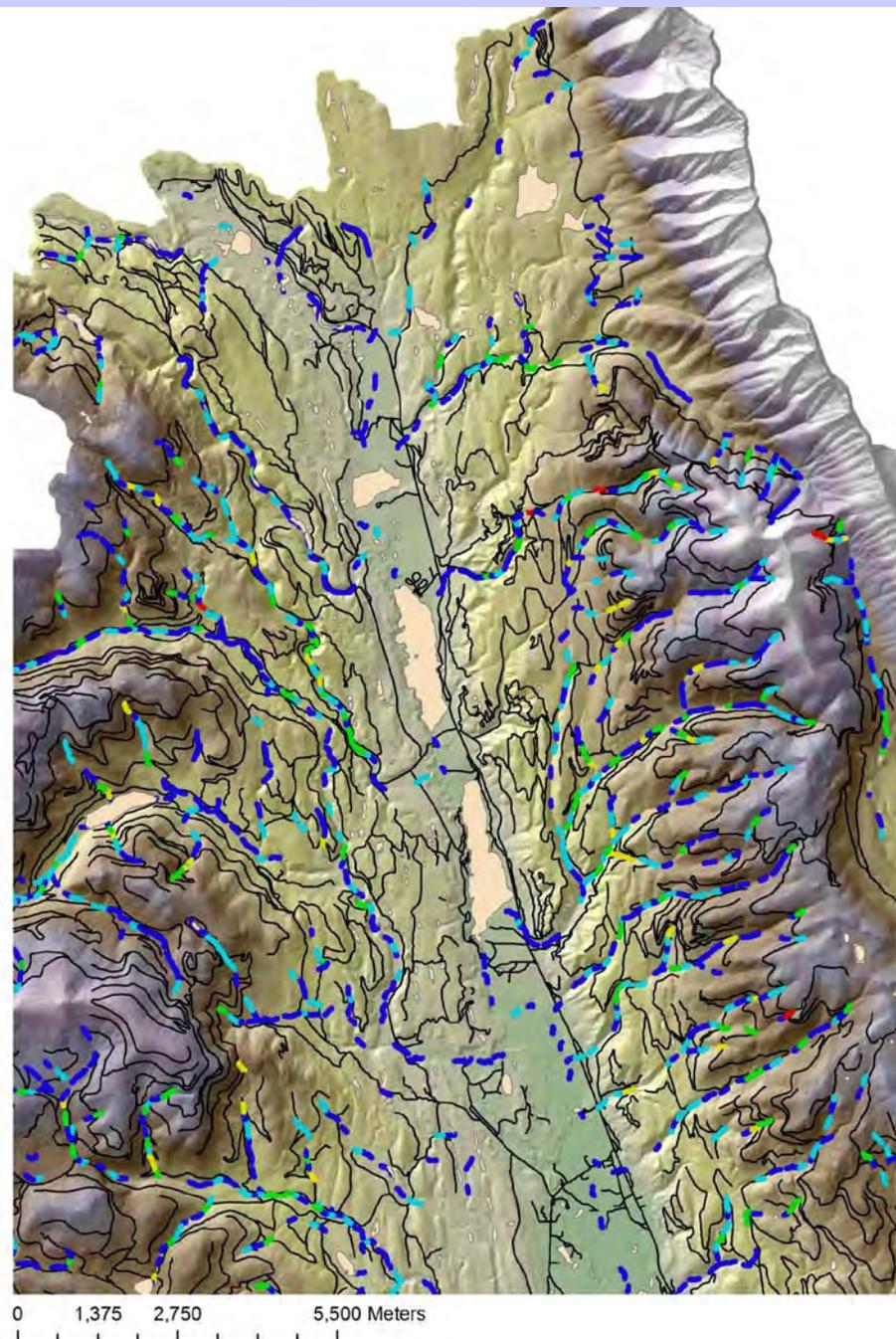
# *Predict road surface erosion into streams and habitat*



**Road surface erosion to streams (t)**

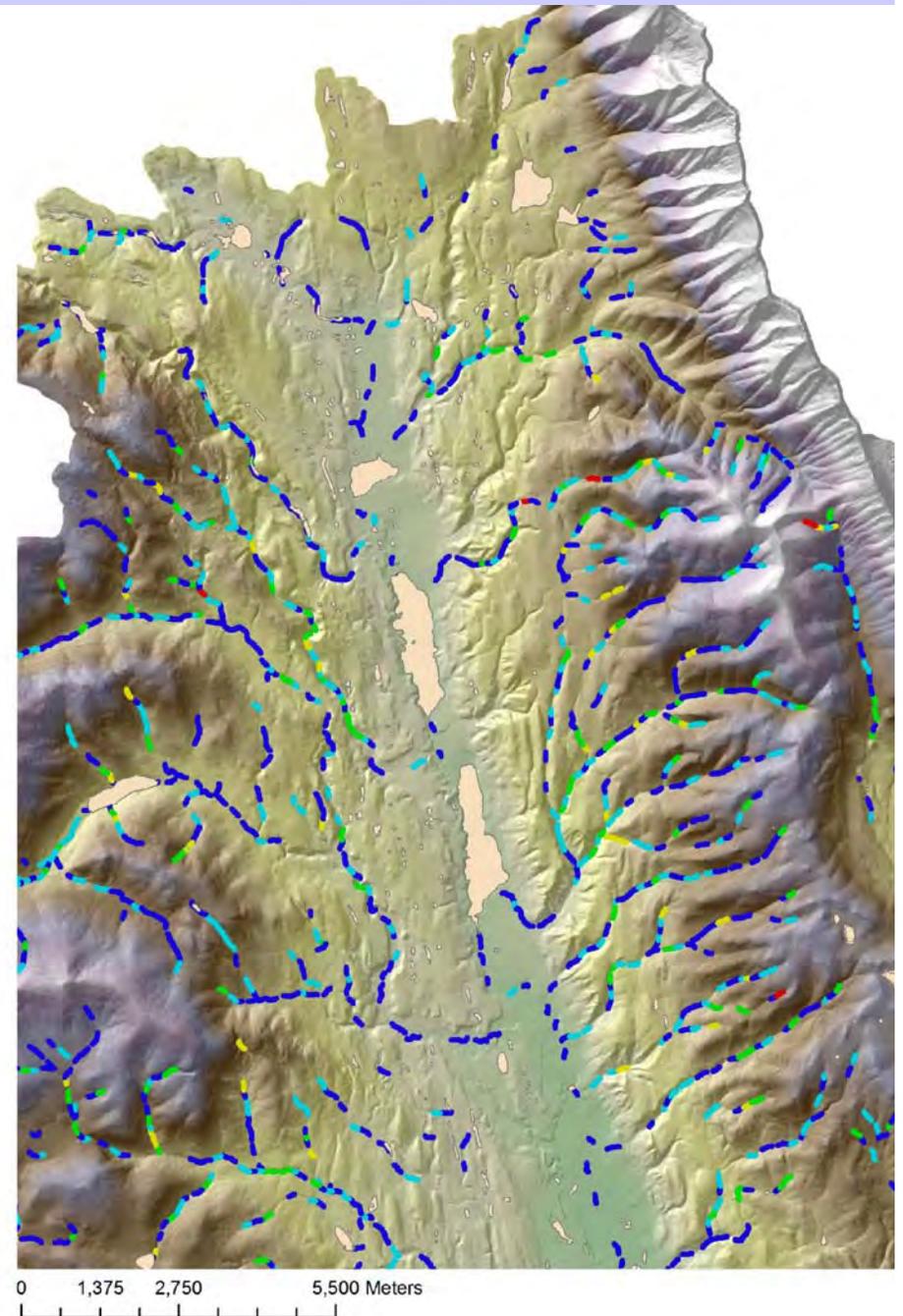
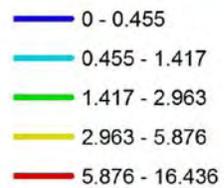
- 0 - 0.455
- 0.455 - 1.417
- 1.417 - 2.963
- 2.963 - 5.876
- 5.876 - 16.436

roads\_clr

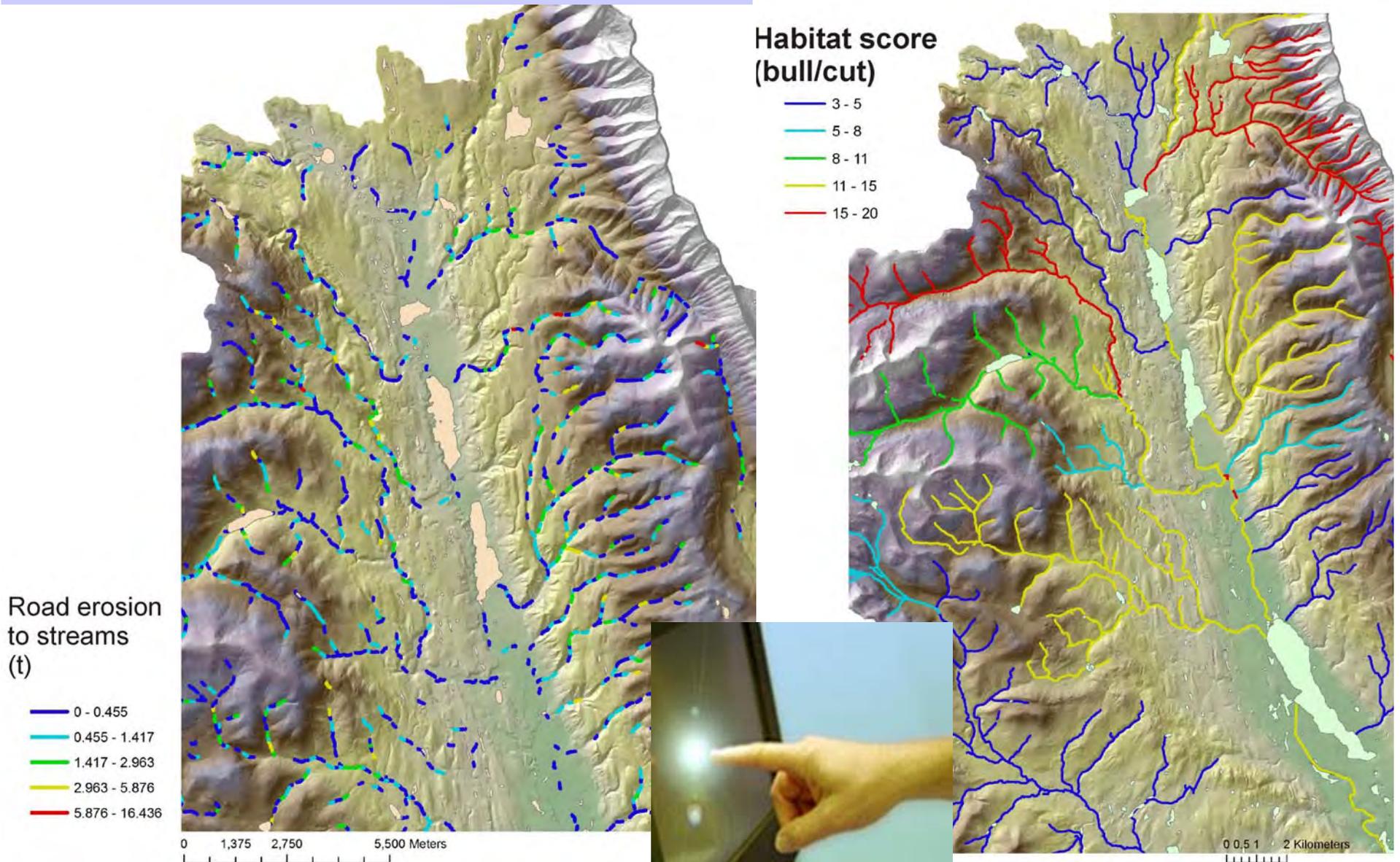


# *Predict road surface erosion into streams and habitat*

Road erosion  
to streams  
(t)



# *Contrast road erosion delivery to streams with habitat scores*



# User automated tools to search for overlaps between erosion & habitat

The screenshot displays the NetMap software interface. The main window shows a map of a watershed with various colored points (red, green, yellow, blue) overlaid on a topographic map. The left sidebar contains a legend with several layers, including 'reach\_clr' with a 'CombHab' attribute and 'Hillshade'. The 'reach\_clr' layer is expanded, showing a legend with color-coded ranges: 10-10 (blue), 10-12 (cyan), 12-13 (green), 13-14 (yellow), and 14-20 (red). The 'Hillshade' layer is also expanded, showing a legend with a value range from 0 to 254. The 'reach\_clr' layer is checked, and the 'CombHab' attribute is selected. The 'Hillshade' layer is also checked, and the 'Value' attribute is selected. The 'reach\_clr' layer is expanded, showing a legend with color-coded ranges: 10-10 (blue), 10-12 (cyan), 12-13 (green), 13-14 (yellow), and 14-20 (red). The 'Hillshade' layer is also expanded, showing a legend with a value range from 0 to 254. The 'reach\_clr' layer is checked, and the 'CombHab' attribute is selected. The 'Hillshade' layer is also checked, and the 'Value' attribute is selected.

**NetMap Proximity and Overlap Search - CutHa Fish Definition**

This tool searches for overlaps between specified hillslope and channel parameters. Some of the hillslope parameters are differentiated according to left or right side of the channel (looking downstream). Thus searches can be made more accurate if a right and then left search is done in sequence - it will reveal overlaps with greater spatial accuracy. Right-left sensitive hillslope attributes include road length and density, generic erosion potential (GEP), landslide density, fire risk, burn severity, and vegetation age. This tool can also be used to search for overlaps between only hillslope parameters such as fire risk and erosion potential. This requires selecting a channel attribute such as channel gradient with the threshold set to the lowest value, then all areas meeting the hillslope overlap criteria will be identified.

Check for right/left distinction

Left

Right

Check to search within fish-bearing network

**Select attributes for hillslope:**

Attribute	Range	Input Threshold
WEPP Yield - Roads > Channels	Click arrow	13

**Select attribute for channel:**

Bull and Cutthroat Summed Habitat Score		10
---	--	----

**Tips**

You can view parameter maps or distribution of values in legend editor to determine appropriate parameter thresholds for analysis.

Go Get Help For This Tool

Done!

# Map floodplain extent and roads in floodplains

The screenshot displays the NetMap software interface. The main map shows a topographic view of a watershed with a network of channels and floodplains. The floodplains are highlighted in yellow, and the channels are color-coded by rank. The Layers panel on the left lists the following layers:

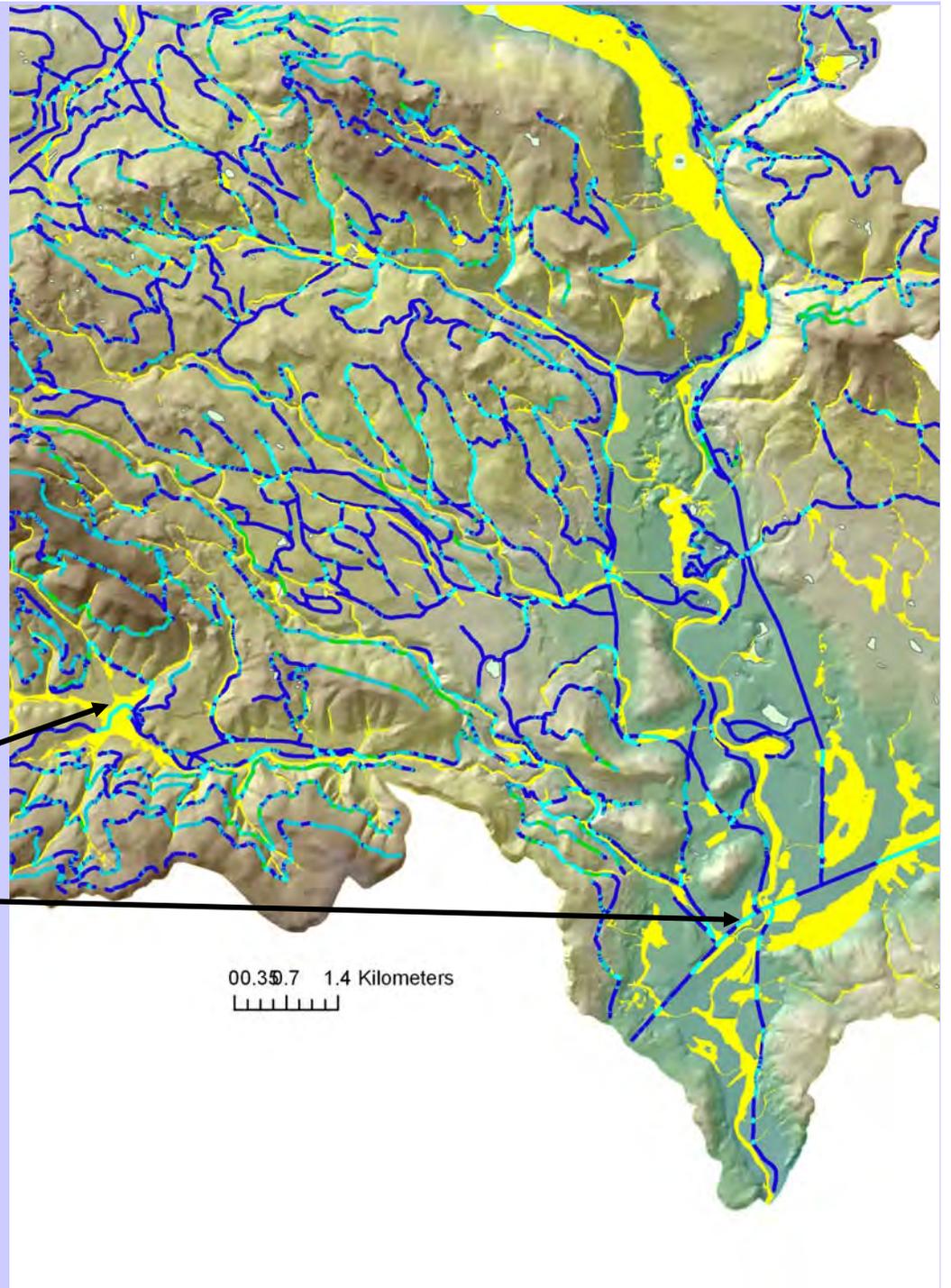
- flood2 (checked)
- basin\_cr
- rank
  - 0 - 4 (blue)
  - 4 - 8 (cyan)
  - 8 - 12 (green)
  - 12 - 16 (yellow)
  - 16 - 20 (red)
- Lakes (checked)
- tribs\_cr
- reach\_cr
  - CombHab
    - 10 - 10 (blue)
    - 10 - 12 (cyan)
    - 12 - 13 (green)
    - 13 - 14 (yellow)
    - 14 - 20 (red)

The Floodplain Width Tool dialog box is open, showing the following options:

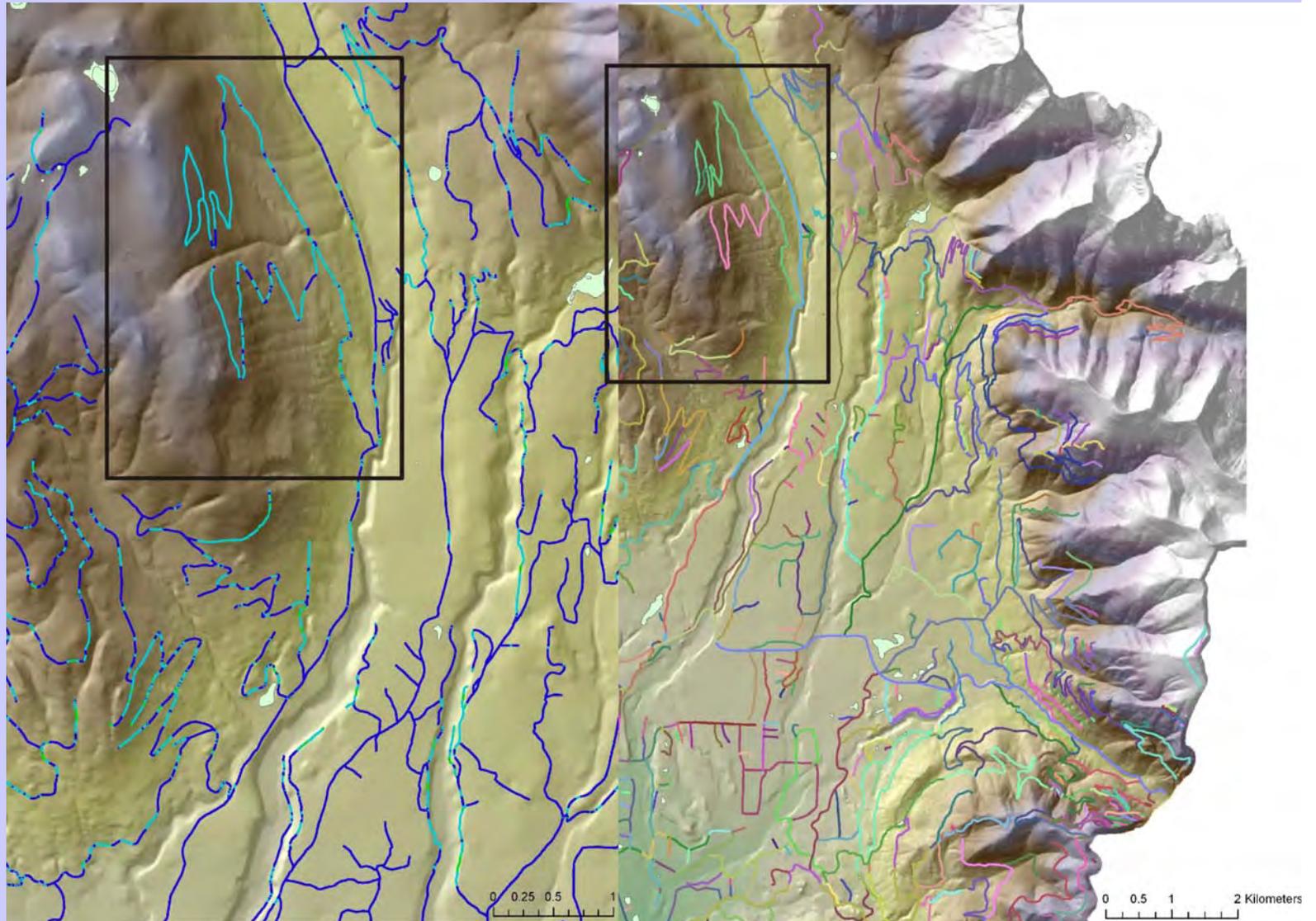
- Description: This tool maps the width of the floodplain (or valley) at a user specified multiple of channel bankfull depth(s) above the stream channel. For valley width specifically at 5X bankfull depth, see the parameter "valley width" in the aquatic habitat map generator. The output of this tool is rendered in both a reach attribute (left and right sides of the channel floodplain width combined) and as a polygon. The polygon of floodplain width shows differences between left and right sides of the channel and this parameter can be used to identify road intersections of floodplains, among other uses. The first time you run this tool it might be time consuming. Later applications of the tool will be faster.
- # of bankfull depths to calculate valley width: 1
- Get Valley Width values as reach attribute (vw2) and import polygons
- Check this box to run initialization again - ONLY if channel depth has changed.
- Roads: Find Roads in Floodplains, (HELP) Roads in Floodplains, Load a previously created valley width polygon
- Limit Scope (optional): Set Minimum Channel Width, Only use selected channel (will go upstream and downstream of a selected reach)
- Get Help For This Tool (with a blue arrow pointing left)

This function can take up to 20 minutes for an average-size NetMap dataset.

*Identify roads in  
floodplains*

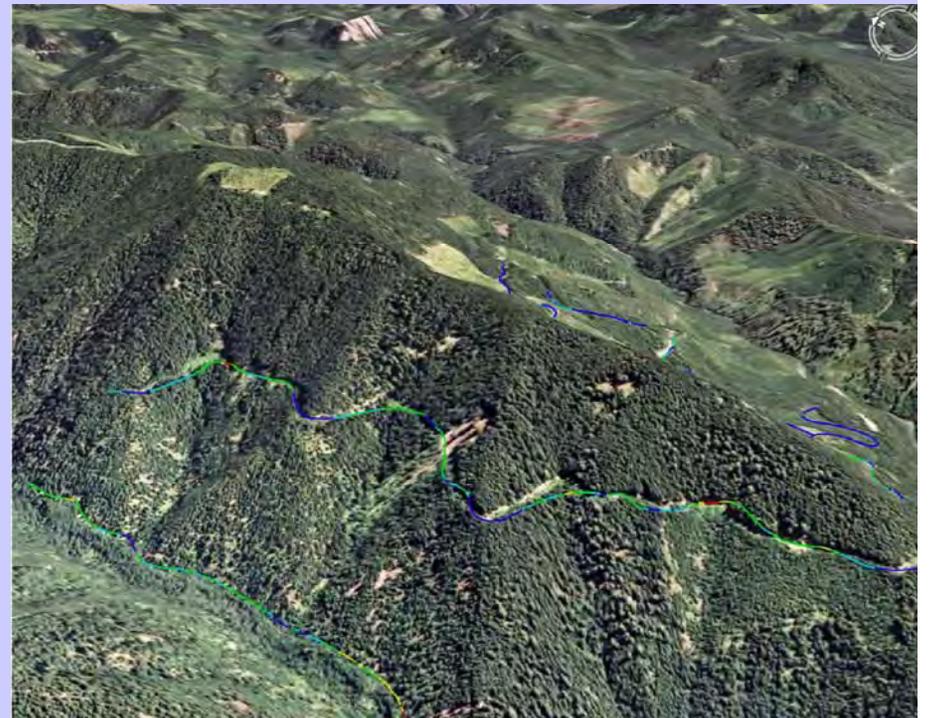


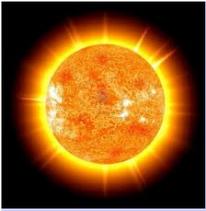
*Example of community tool development; Siuslaw NF supports a road segment aggregation tool*



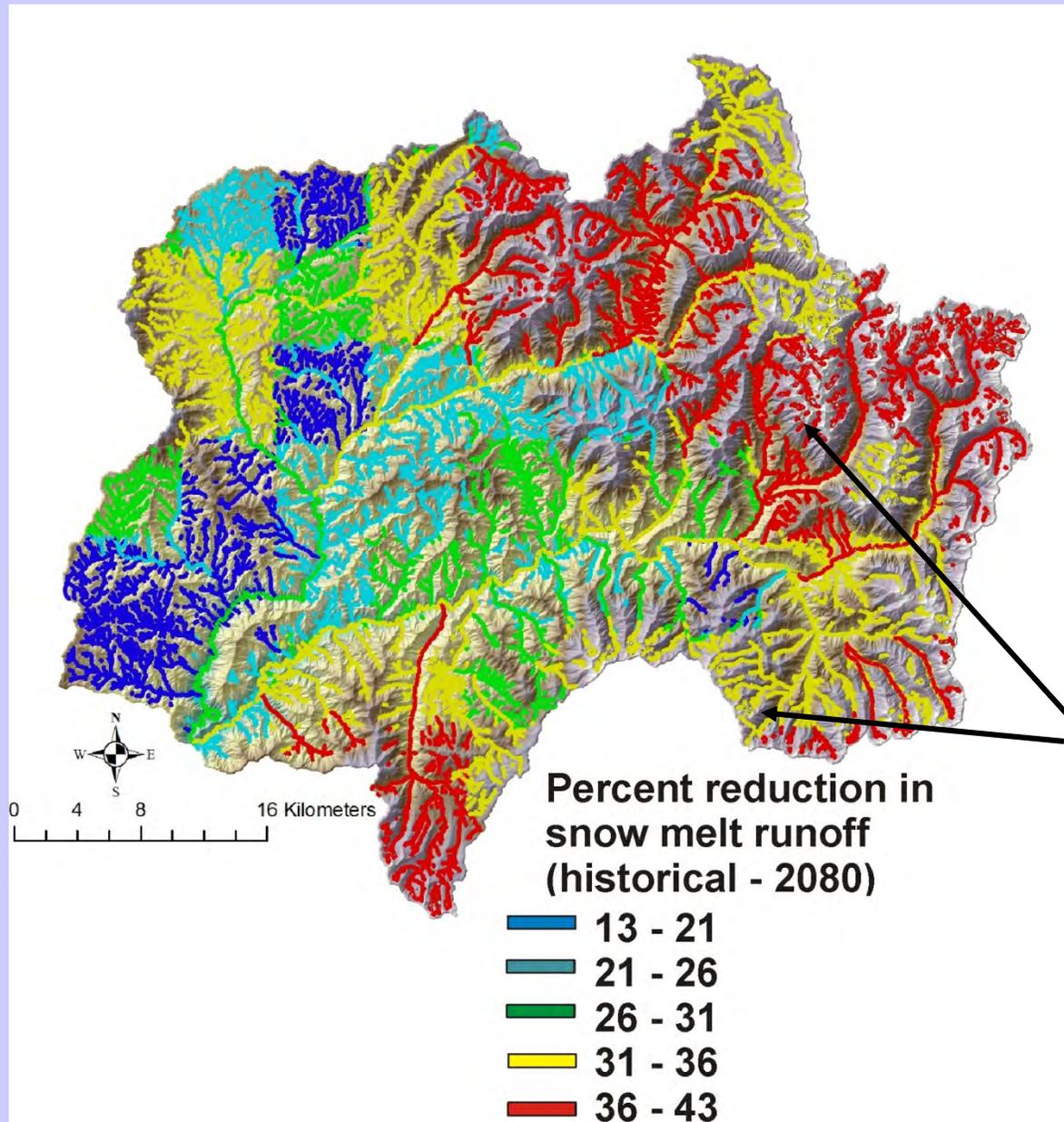
## *How the tools can be used in a roads analysis*

- screening hotspots*
- stratification*
- prioritization*
- monitoring*
- pre fire planning*
- post fire rehab*





*Ex. of climate change application, downscaled Global Climate consider road impacts*

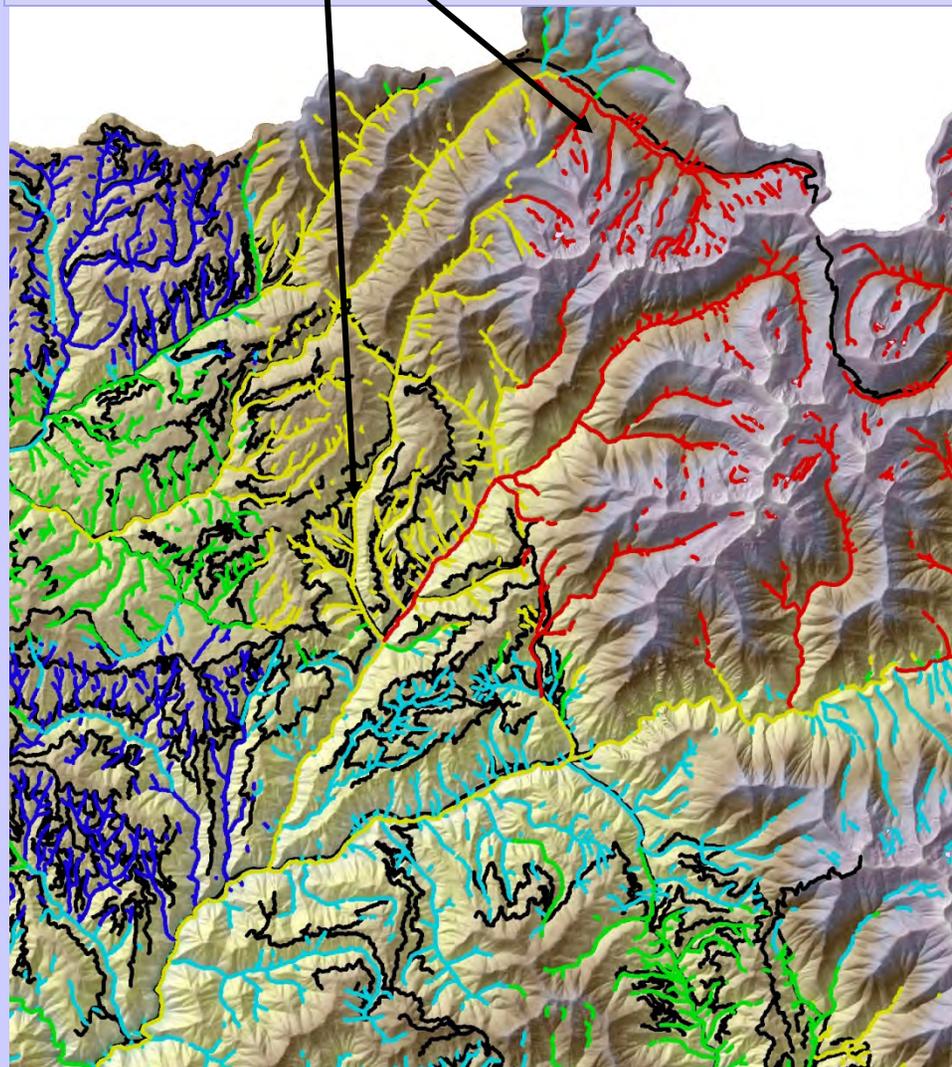
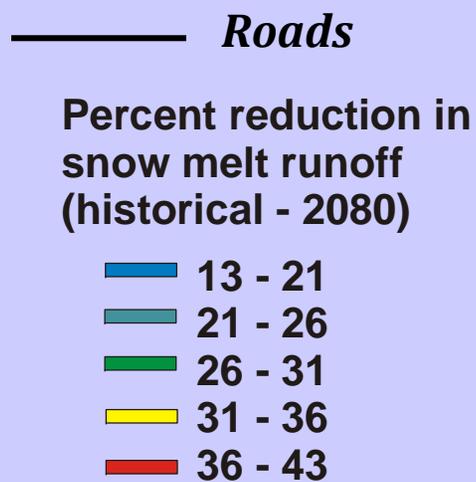


*Increased winter flooding likely*



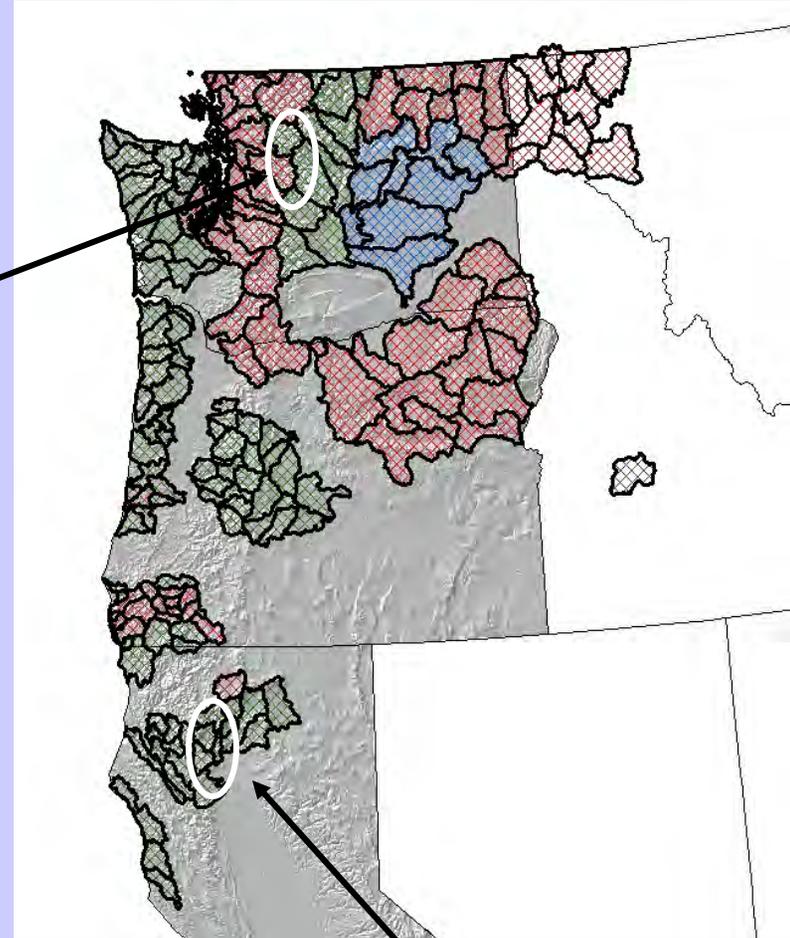
## *Examine roads within GCM predictions*

*Areas of  
potential concern*



# *Vegetation Management (Fire Planning)*

*PNW – JFS program, coupling aquatics  
w/ pre and post fire planning*



*CA State/Sacramento River Exchange  
Watershed Assessment/USFS-pre  
fire planning*

# *Vegetation/Fuels Management*



# *Vegetation/Fuels Management: in the context of aquatics/water quality*

## Cascading Sequence of Fire Effects in Aquatic Ecosystems

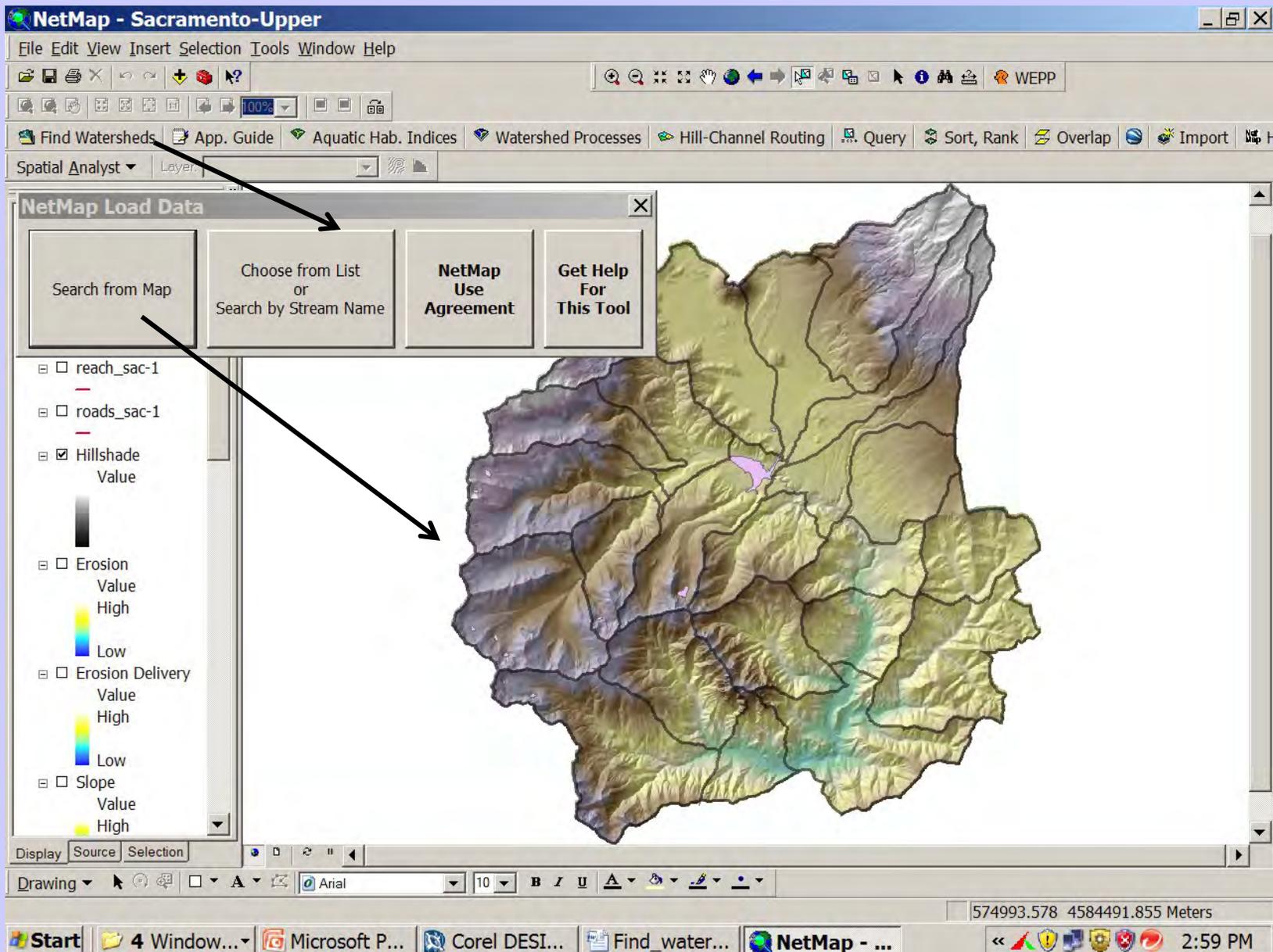
Habitat Impacts ← Downstream Propagation ← Erosion



# *Pre Fire Planning*

- Strategically target fuel reductions to maximize benefits to*
- aquatic ecosystems & water quality*
- (e.g., erosion, LWD recruitment, shade, food)*

# Step 1 – Select a watershed from the NetMap database



*The upper Sacramento watershed in northern California is used in this example*

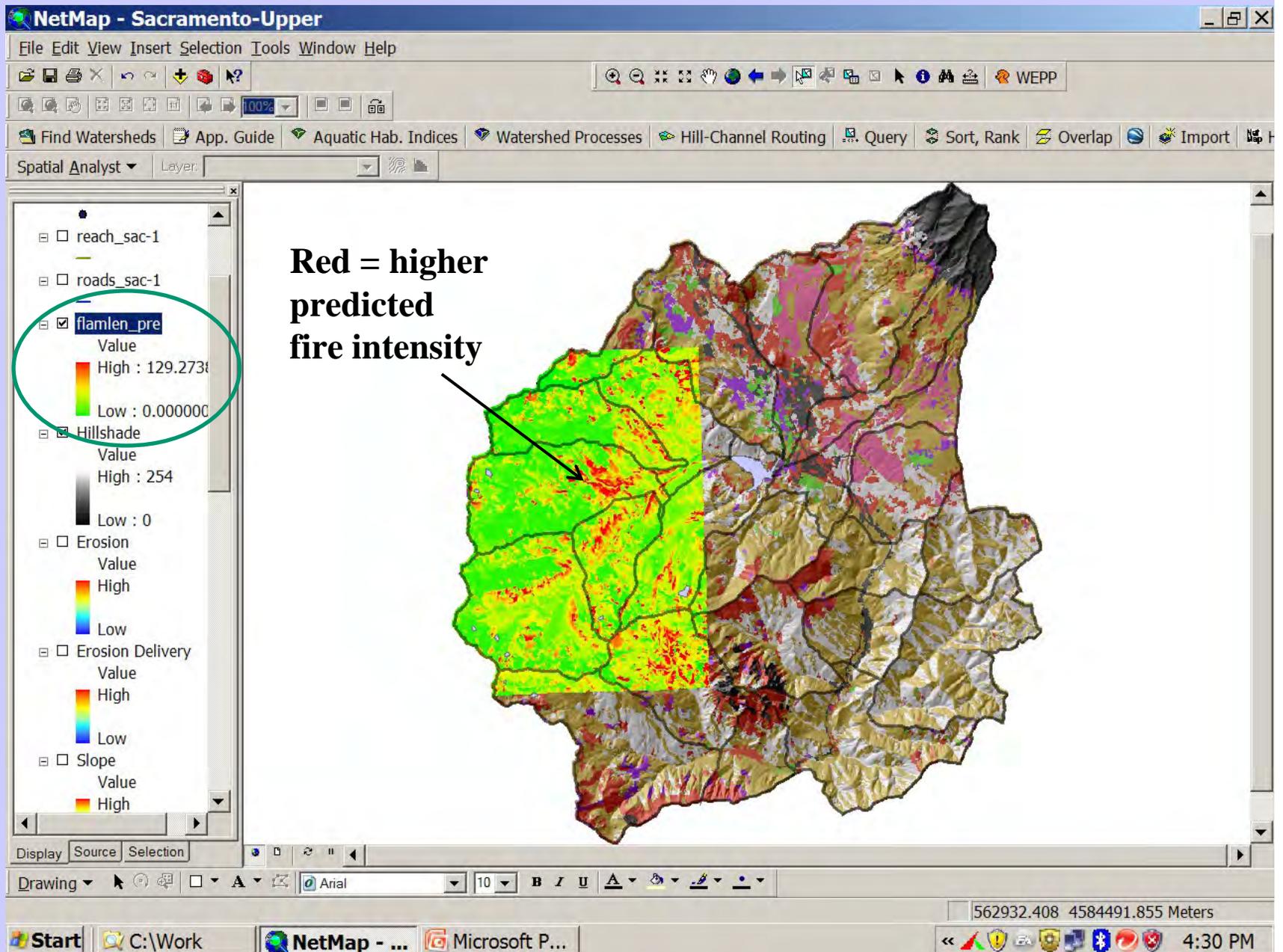
## Step 2 – Determine vegetation types and fuel loads (for fire hazard prediction)

The screenshot displays the NetMap - Sacramento-Upper software interface. The main window shows a map of a watershed with various layers and a legend. The legend is titled "NetMap - Vegetation & Fire" and includes several categories:

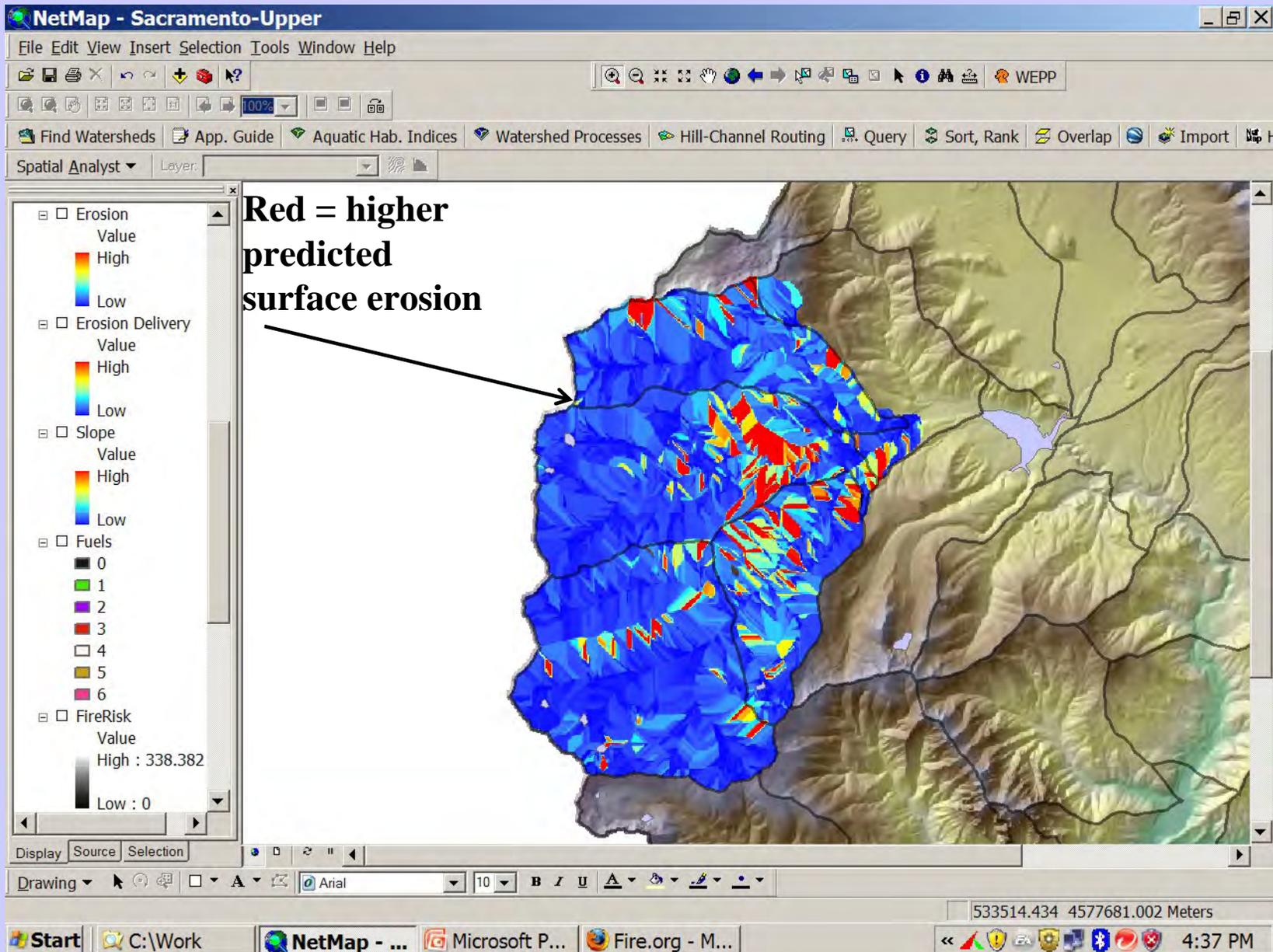
- Forest Age: High (red), Low (blue)
- Slope Value: High (red), Low (blue)
- Fuels: 0 (black), 1 (green), 2 (purple), 3 (red), 4 (white), 5 (yellow), 6 (pink)
- FireRisk Value: High (red), Low (blue)
- Deep-Seated Value: High (red), Low (blue)

The "Fuels" category is circled in green. A blue arrow points to the "Veg & Fire Maps" button in the legend. The map shows a complex terrain with various colors representing different fuel types and fire risk levels. The interface includes a menu bar (File, Edit, View, Insert, Selection, Tools, Window, Help), a toolbar with various icons, and a status bar at the bottom showing coordinates (568259.425 4584843.639 Meters) and the time (4:26 PM).

## Step 3 –Predict fire intensity (flame length) using a fire hazard model (such as Flammap)

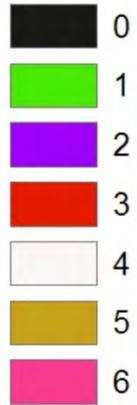


## Step 4 –Using a fire hazard index (flame length), predict surface erosion (using WEPP technology) in NetMap (or use other erosion models)

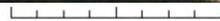
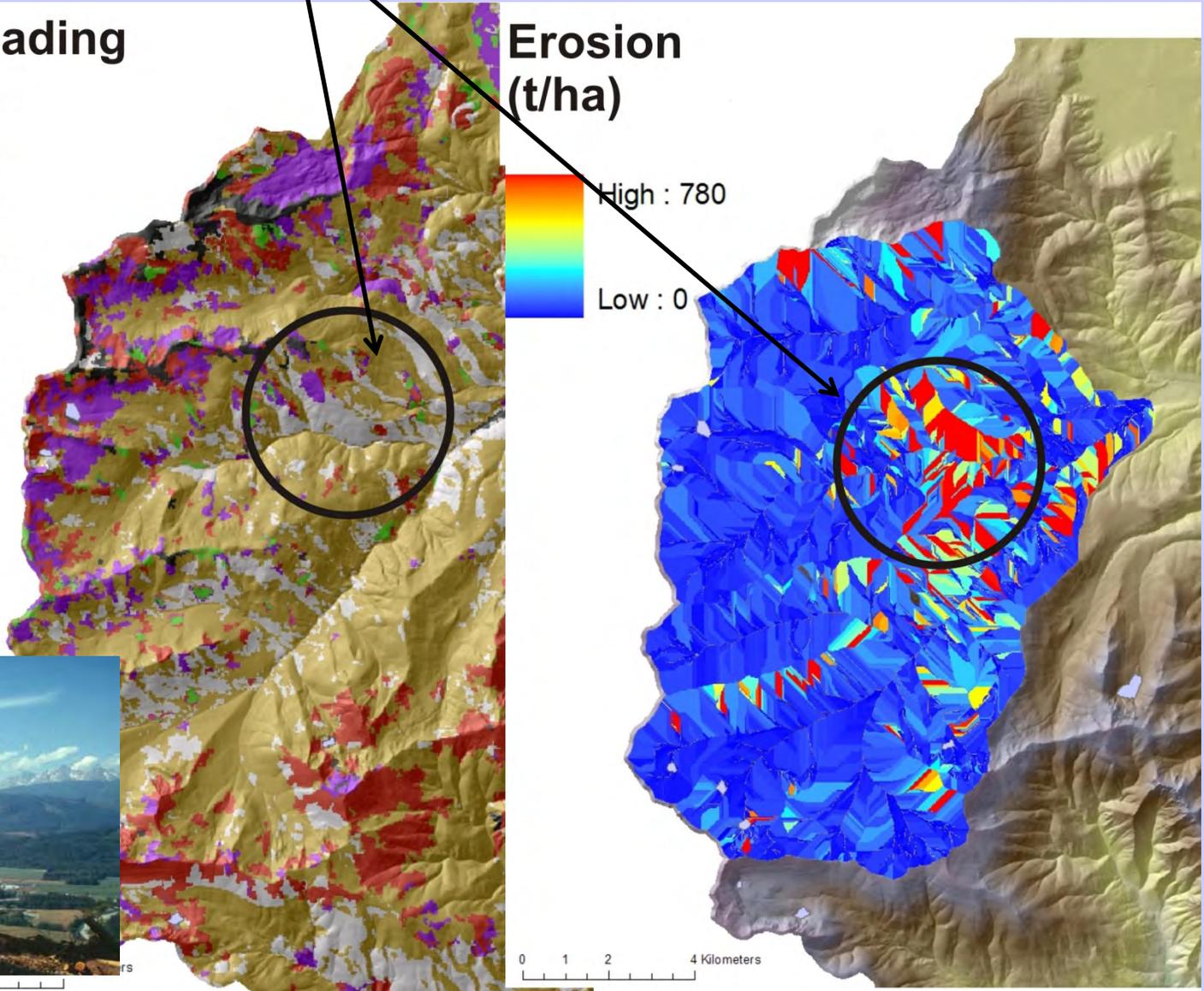
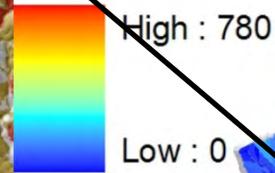


**Step 5: Identify coupled high fuel loading – intense erosion zones;  
then prioritize areas for fuel treatments.**

**Fuel Loading**



**Erosion  
(t/ha)**



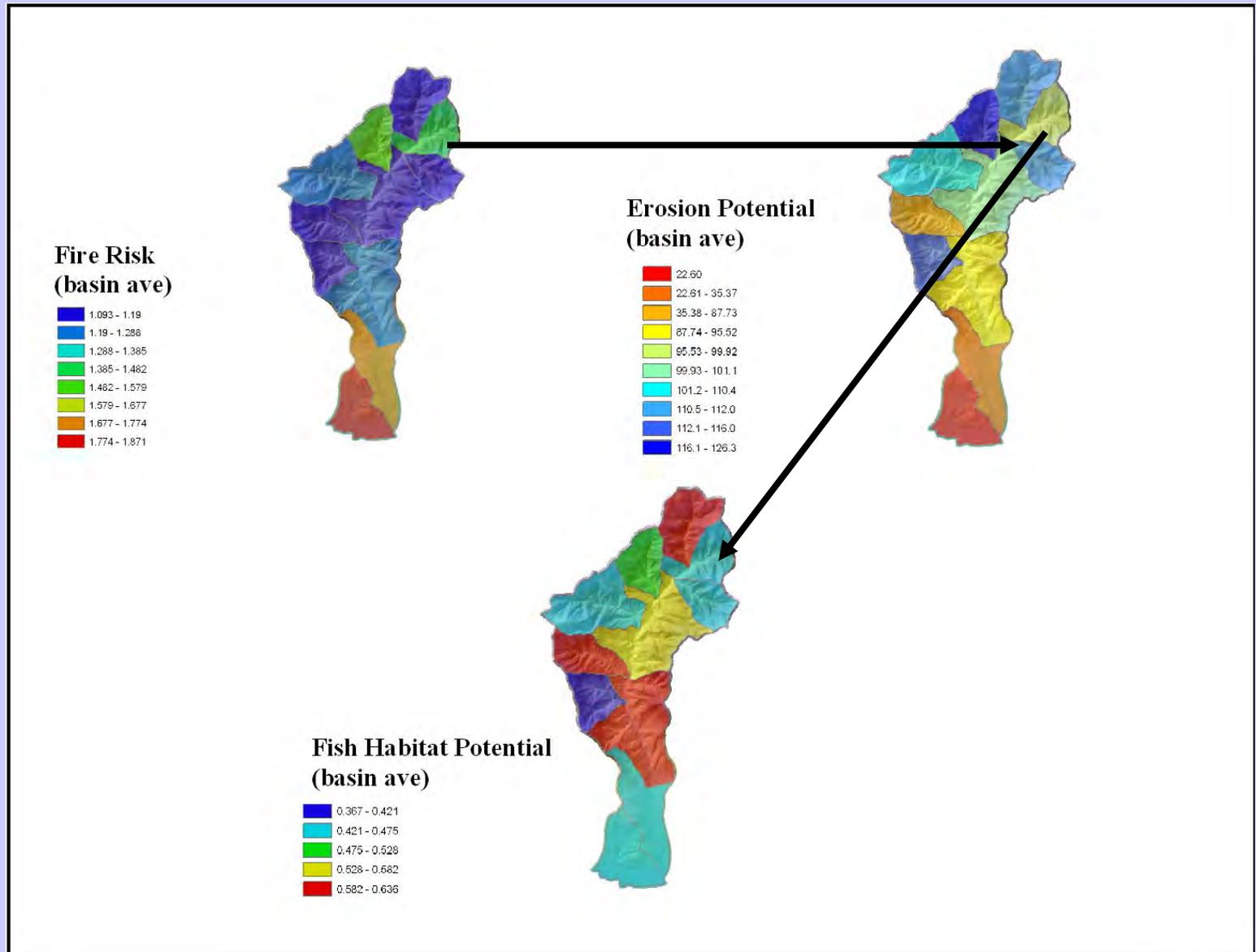
**Search for overlaps of potential concern among 1) forest age (timber harvest) or fire risk & burn severity, 2) erosion potential, and 3) sensitive habitats**

The screenshot displays the ArcGIS interface with a watershed analysis tool. The main map shows a watershed with various colored lines representing different attributes. A dialog box titled "Select attributes for hillslope:" is open, showing the following configuration:

Select attributes for hillslope:	Range:	Input Threshold:
(1) Fire Risk / Segment	0 to 3	2 (3)
(2) Local Sed. Supply / Cont. Area (GBP)	0 to 6612.3	2000
(4) Habitat Intrinsic Potential-Coho	0 to 1	0.5

The dialog box also includes a "Go" button and a "Done!" button. A "Tips" section provides instructions on viewing parameter maps. The map shows two circular areas of concern, with arrows pointing from the text "(5) Sensitive areas of concern (and biological hotspots)" to these areas. The Layers panel on the left shows various layers, including "reach\_tr25" and "roads\_tr25". The status bar at the bottom indicates the current location and time.

# *Do the same at the scale of subbasins*

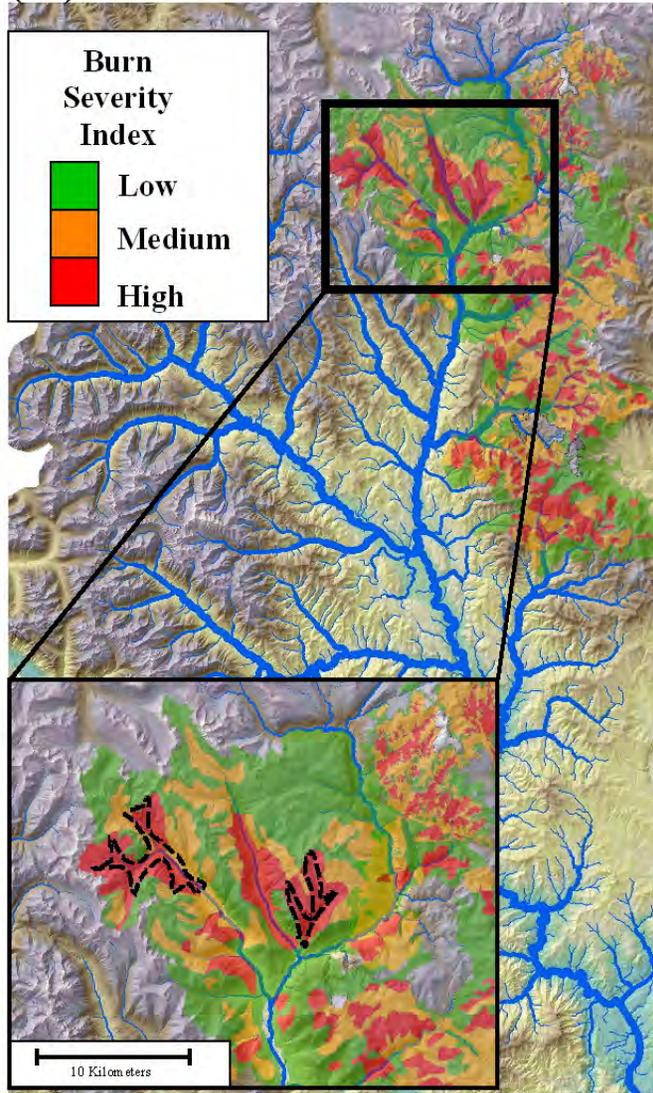


# *Post Fire Planning*

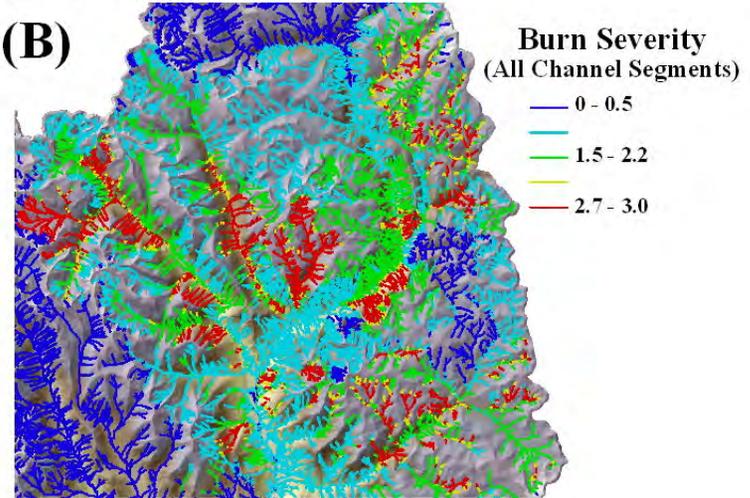
- Inform salvage logging issues*
- Erosion control*
- Habitat restoration*
- Road issues (restoration, abandonment etc.)*



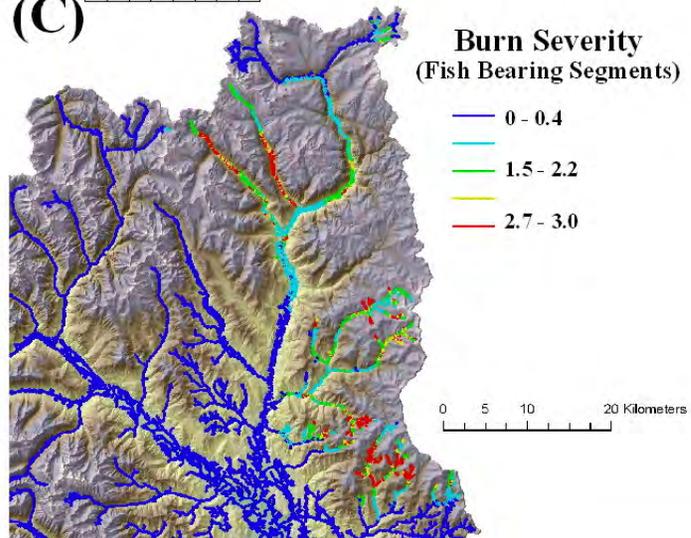
### (A) Recent Fires in the Methow Basin (2000-2006)



### (B)

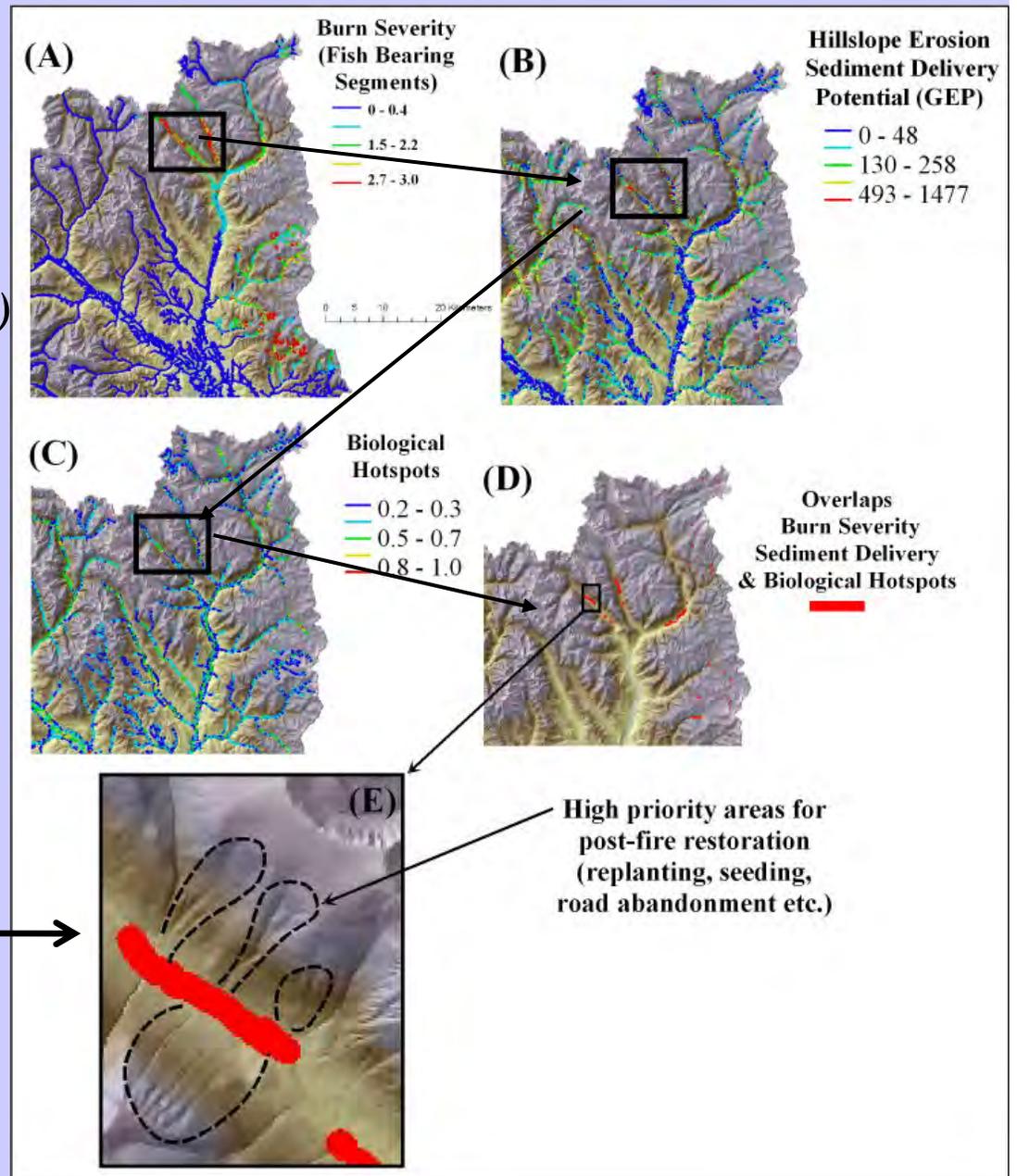


### (C)



*Such information can be used to prioritize restoration (BAER) in context of water quality & fisheries*

*Identify those areas in need of restoration (vegetative cover, road maintenance and abandonment etc.)*



*Methow Example*

Google Earth

File Edit View Tools Add Help

Search

Fly To Find Businesses Directions

Fly to e.g., 1600 Pennsylvania Ave, 20006

Places Add Content

- Community BBS layer in Reichstag, Berlin, Germany
- Enable the Keyhole Imperial Palace, Tokyo, Japan
- Enable the Keyhole Community BBS layer in Canadian Supreme Court
- Enable the Keyhole Community BBS layer in
- Temporary Places
  - reach\_met-2\_P\_DF\_AVE.k
    - 0.001 - 0.015
    - 0.015 - 0.045
    - 0.045 - 0.095
    - 0.095 - 0.186
    - 0.186 - 0.492

Layers

View: Core

- Primary Database
  - Terrain
  - Geographic Web
  - roads
  - Traffic
  - Weather
  - 3D Buildings
  - Borders and Labels
  - Gallery
  - Global Awareness
  - Places of Interest
  - More

Image © 2008 DigitalGlobe

Image © 2008 TerraMetrics  
© 2008 Europa Technologies

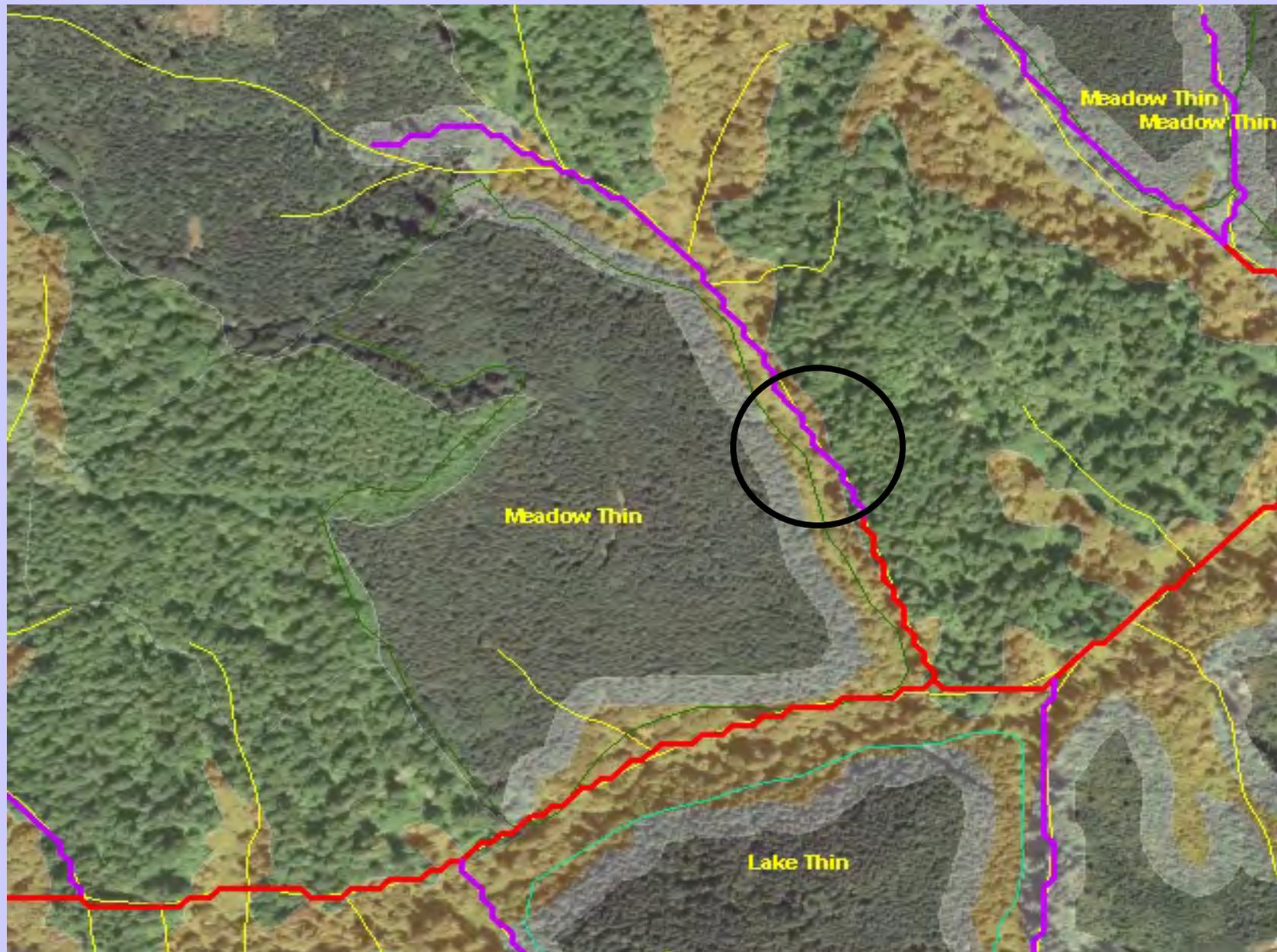
Streaming 100%

Eye alt 9929 ft

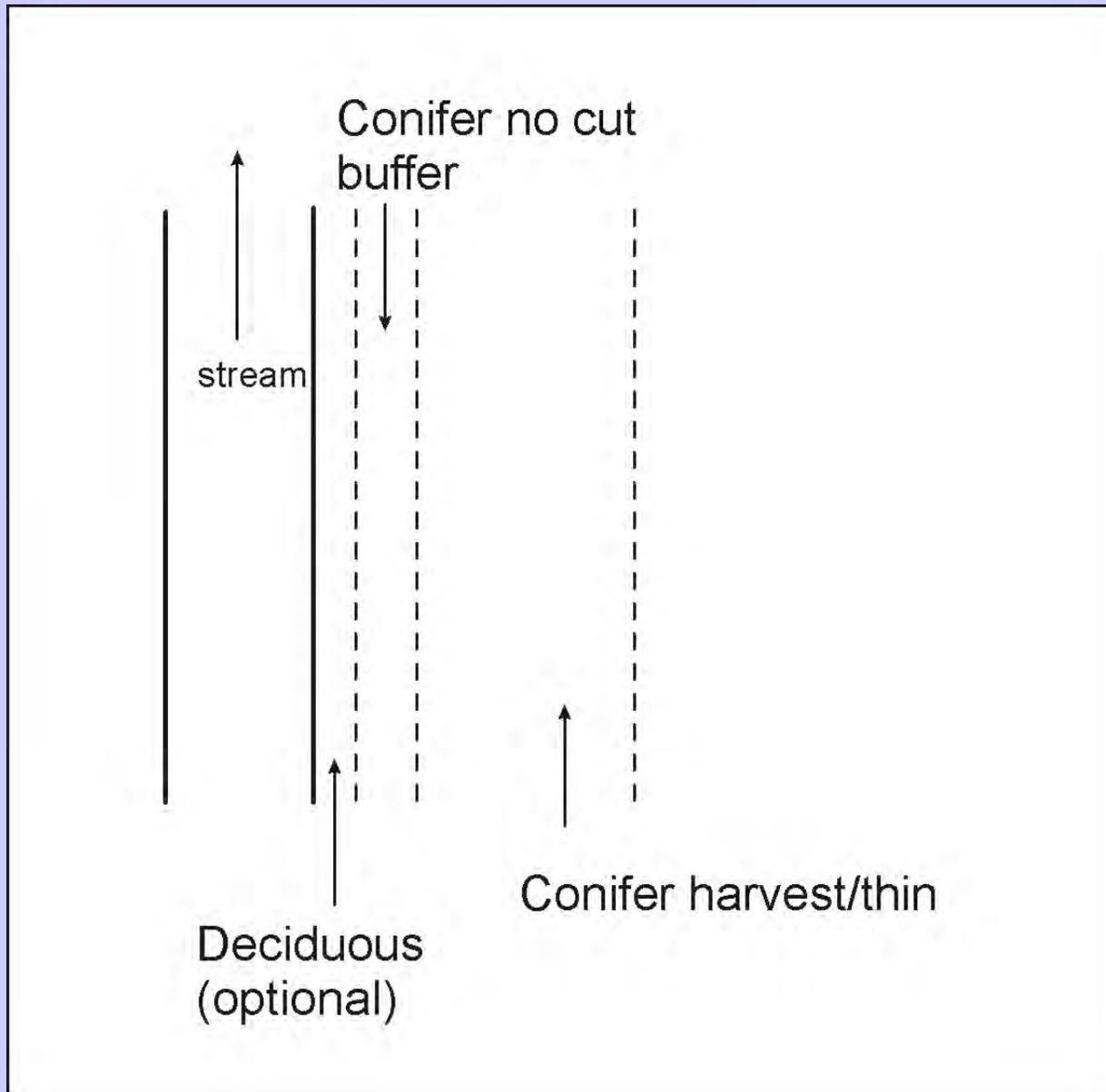
Pointer 48°47'41.96" N 120°06'47.35" W elev 4088 ft

Start Retrospect Exp... 3 Microsoft P... Corel DESIGN... Calculator Slope\_Stability... Google Earth NetMap\_v3\_01... 9:45 PM

# *Thinning in riparian reserves-NW Forest Plan*



# *Thinning in riparian reserves-NW Forest Plan*



# Reach scale conditions

- **Examine the effects of 10m, 20m, and 30m uncut buffers (2<sup>nd</sup> growth) on one side of the stream (no harvest on opposite side);**
- **Clear cut harvest;**
- **Mortality predicted by FVS;**
- **Bank erosion of 5 mm was applied to both sides;**
- **One year analysis**

# Wood recruitment model interface

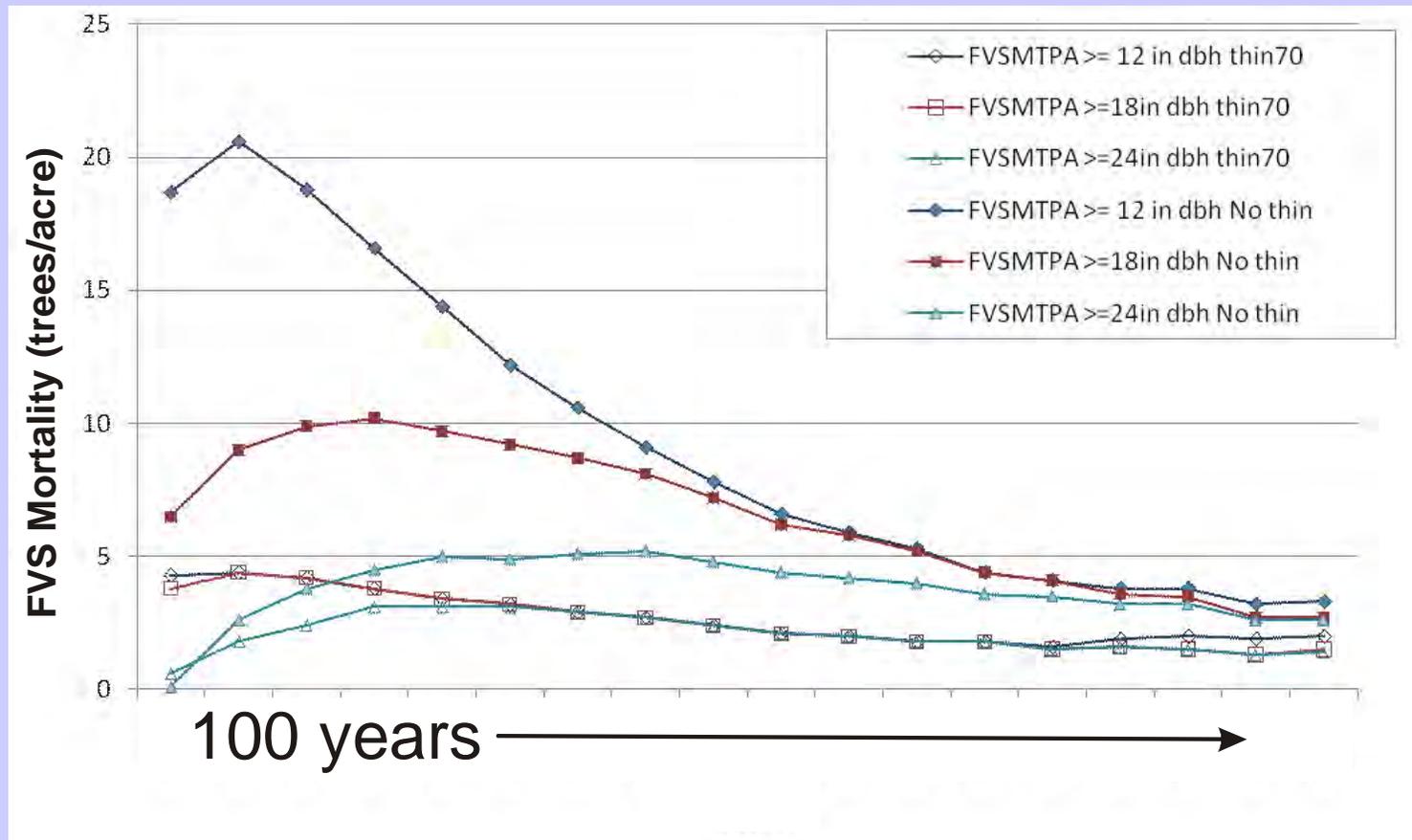
The screenshot shows the 'Reach scale wood recruitment model' dialog box within the NetMap software. The dialog is organized into several sections:

- Buttons:** 'Add stand table', 'Remove stand table', 'Open reach file', 'Save reach file', 'Save as reach file', and 'Download demo data'.
- Table:** A table with 8 columns: 'Stand table', 'Left Stand 3', 'Left Stand 2', 'Left Stand 1', 'Reach', 'Right Stand 1', 'Right Stand 2', and 'Right Stand 3'. The rows are:
 

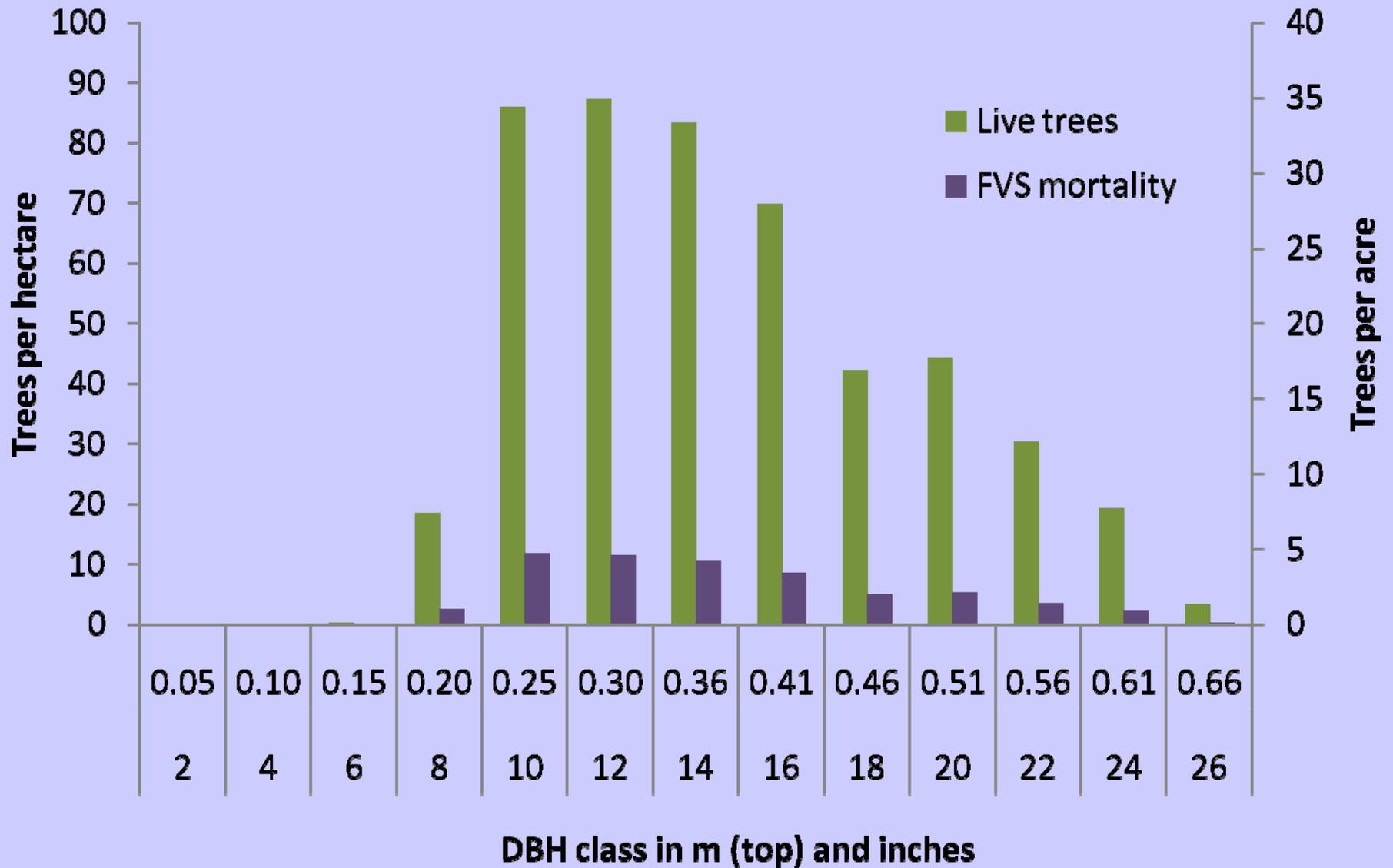
	Left Stand 3	Left Stand 2	Left Stand 1	Reach	Right Stand 1	Right Stand 2	Right Stand 3
Stand table	0	0	0	---	0	0	0
Stand ID	0	0	0	---	0	0	0
Average width (m)	0	0	0	0	0	0	0
Average valley side slope (%)	0	0	0	---	0	0	0
- Minimum diameter of piece sizes (m):** A list box containing '0.1', '0.35', and '0.6', with an 'Add' button and a 'Remove' button. A note says 'Maximum 10 sizes'.
- Taper equation:** Radio buttons for 'Kozak taper equation (1988)', 'Waddell taper equation (1987)', 'Select USFS NVEL', and 'Conical taper'. 'Kozak taper equation (1988)' is selected.
- Tree fall direction:** Radio buttons for 'Sobota directional bias downslope (2006)' and 'Random tree fall for slope < 40%'. 'Sobota directional bias downslope (2006)' is selected.
- Bank erosion rate (m yr-1):** A text input field containing '0.005' with a note: 'will be applied to both banks.' A 'Calculate' button is located to the right.
- Plotting options:** A section titled 'Select a plot for number of pieces or volume:' with two columns: 'Number of pieces' and 'Volume'.
  - Number of pieces:**
    - By distance to stream for each piece size. Select a year.
    - Cumulative source distance by year. Select a year.
    - By year for each piece size.
  - Volume:**
    - By distance to stream for each piece size. Select a year.
    - Cumulative source distance by year. Select a year.
    - By year for each piece size.
- Buttons:** 'Draw plot', 'Help', and 'Close'.

*For multi year, requires forest growth prediction*

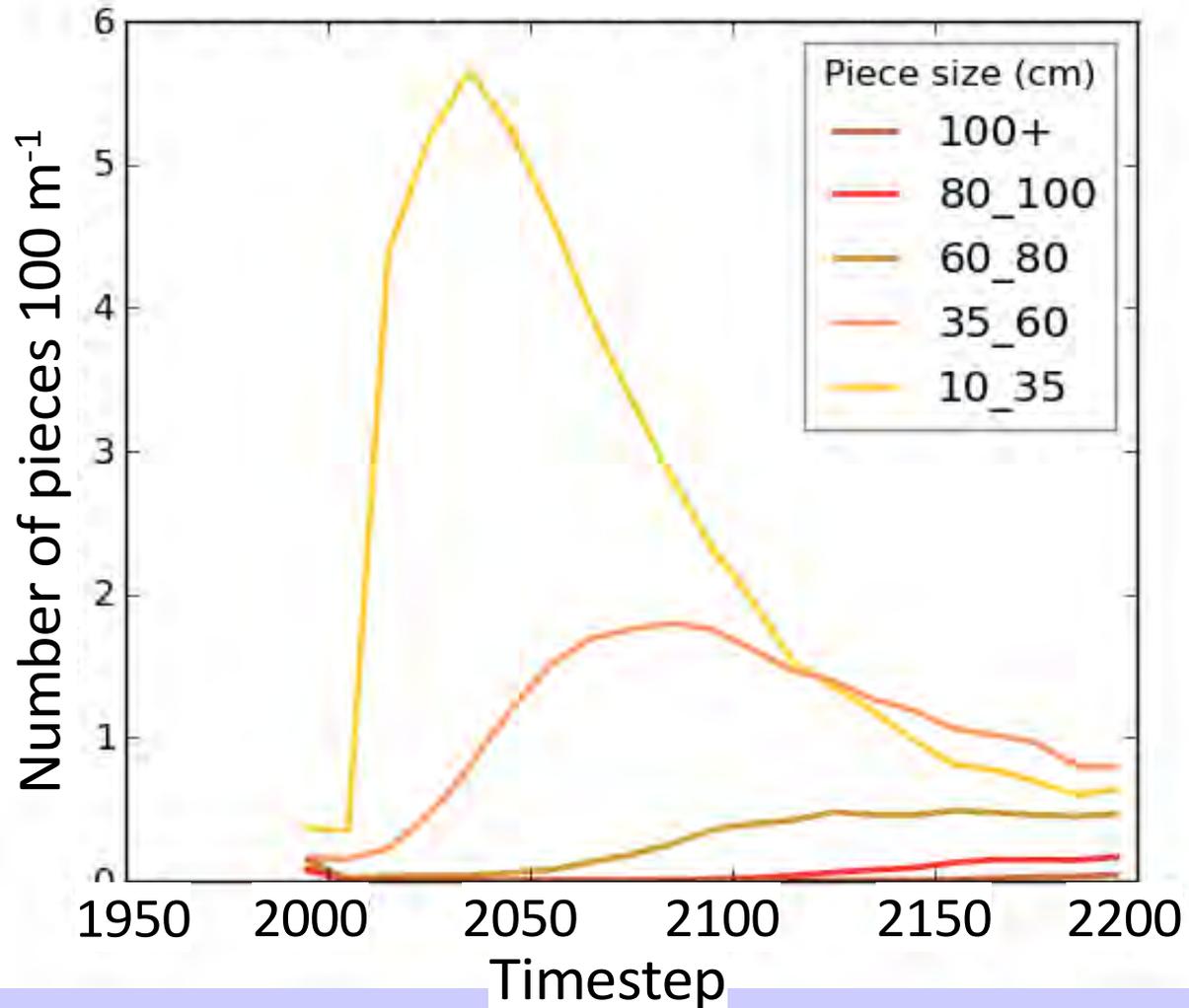
*FVS mortality trees per acre for thin and no thin scenarios for Size classes > 12 in, > 18 in, and > 24 in.*

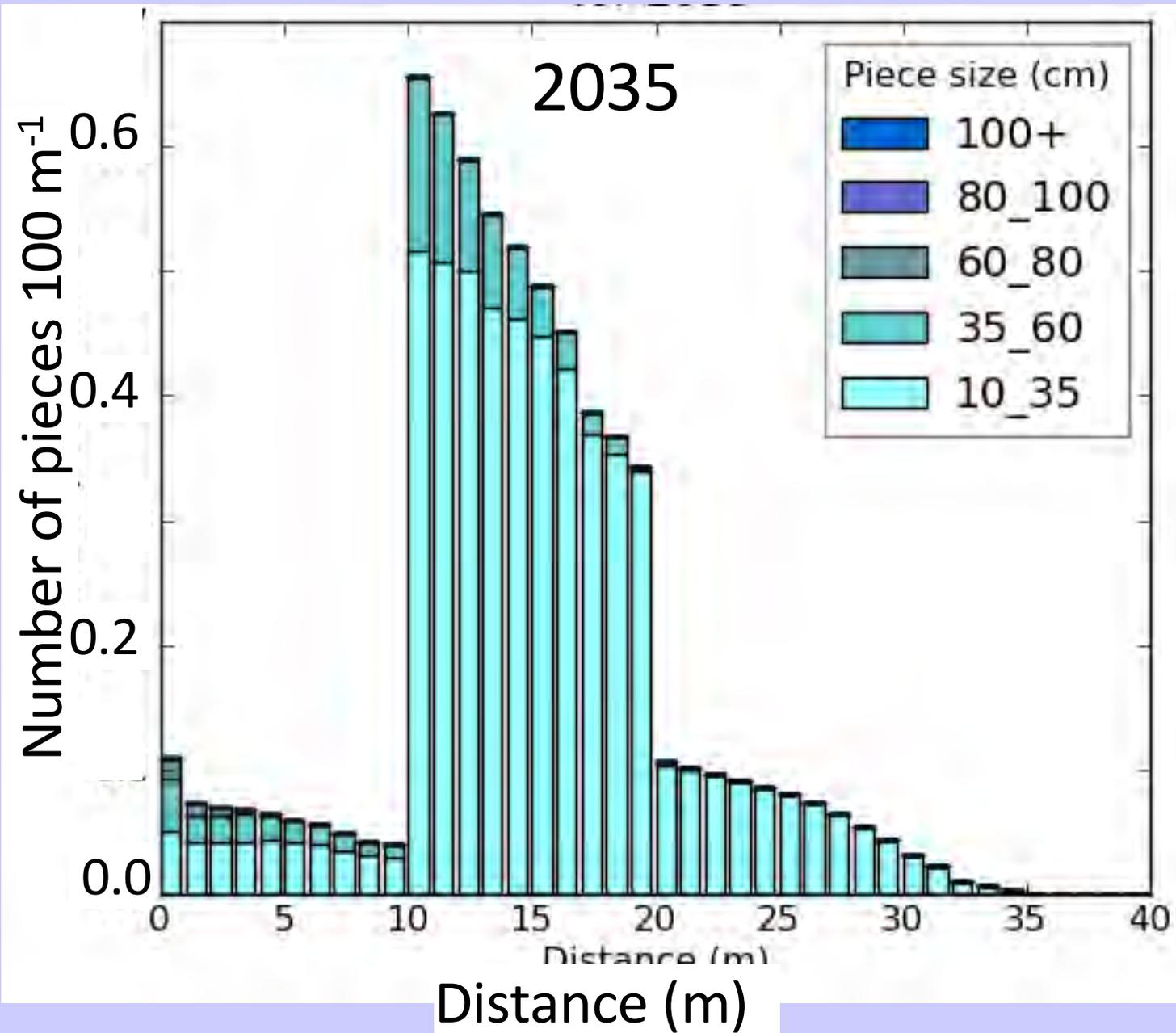


## Stand 504373 NoThin: live and dead trees by DBH for 2025

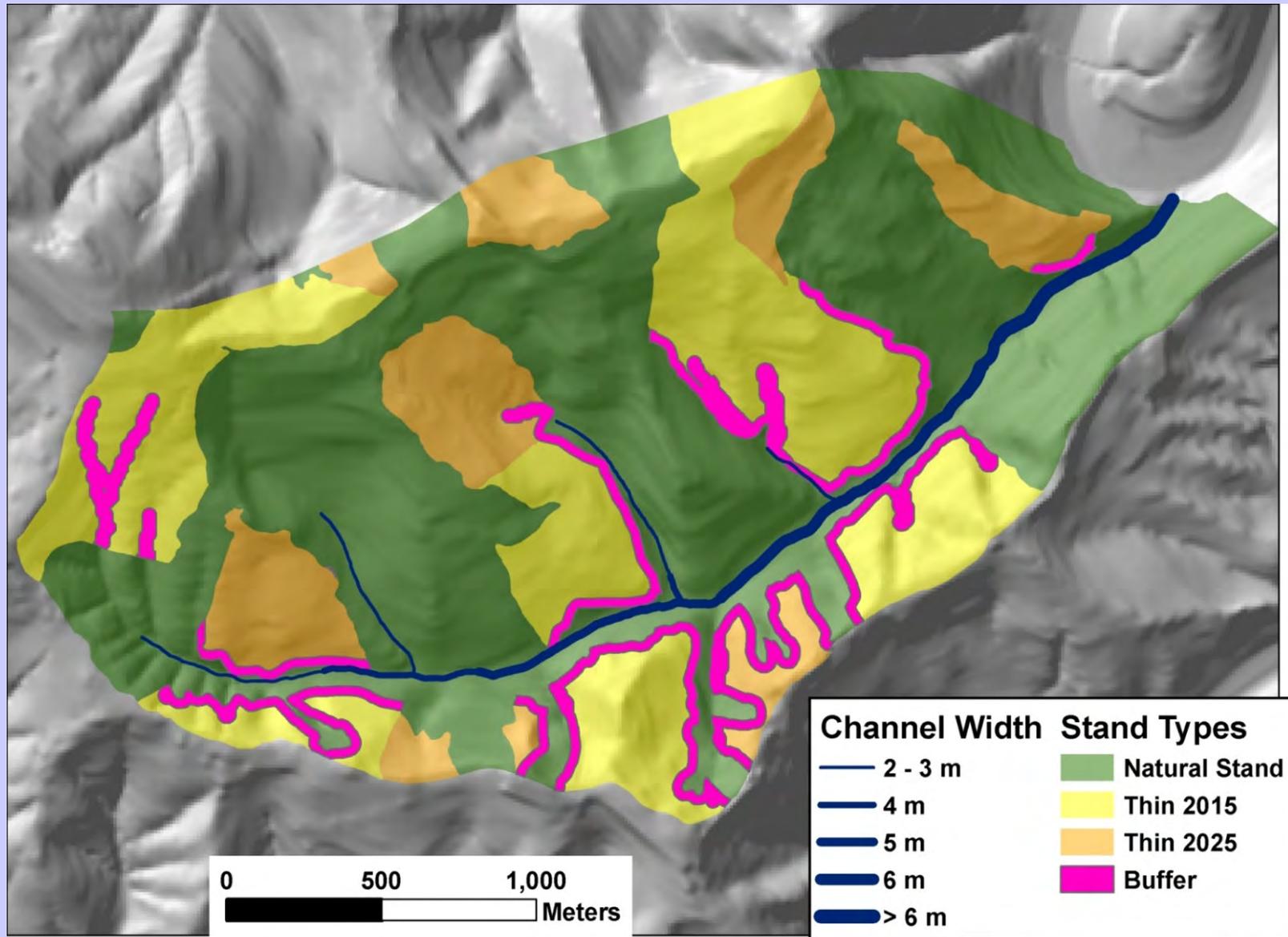


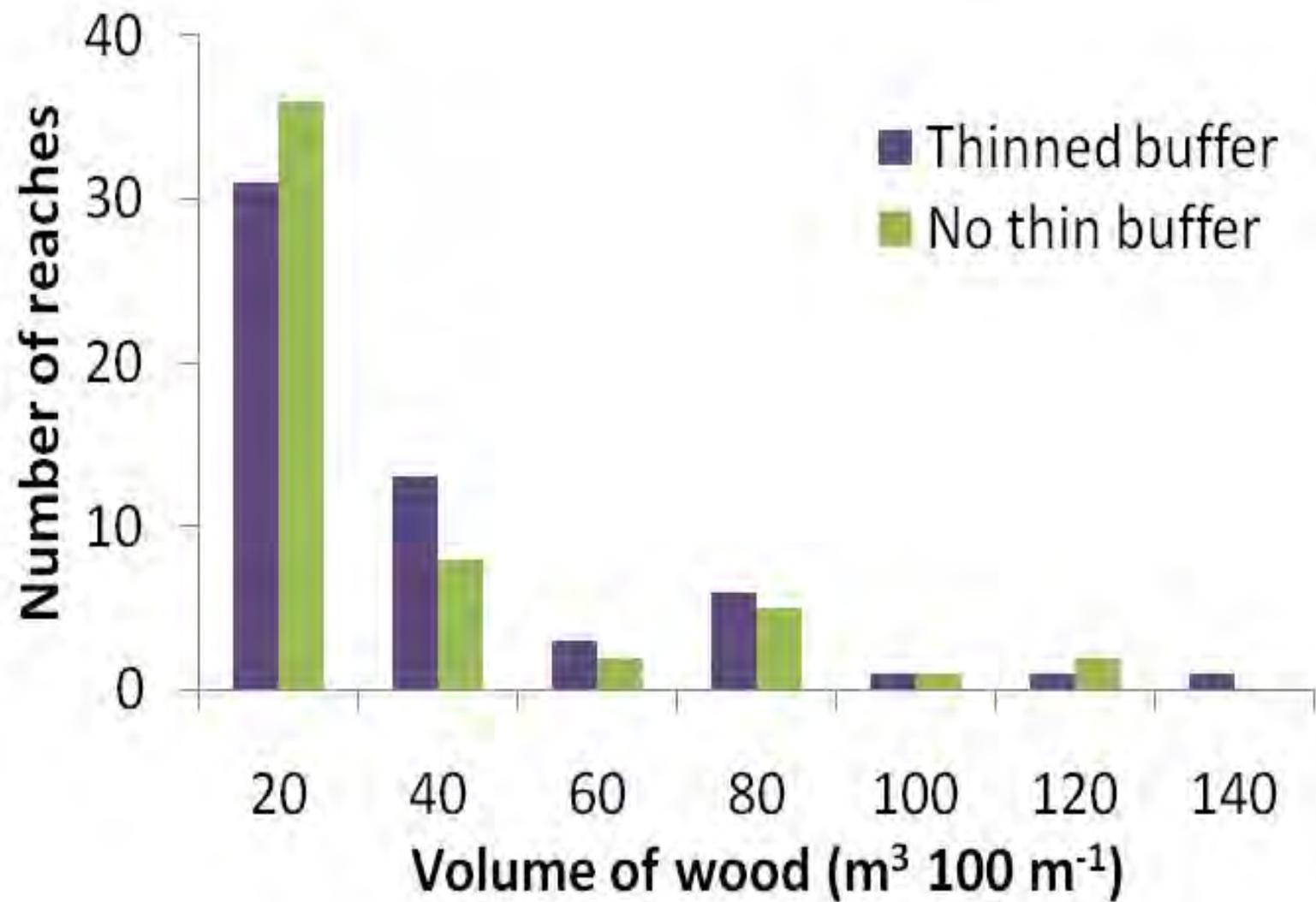
## Number of pieces by time and diameter



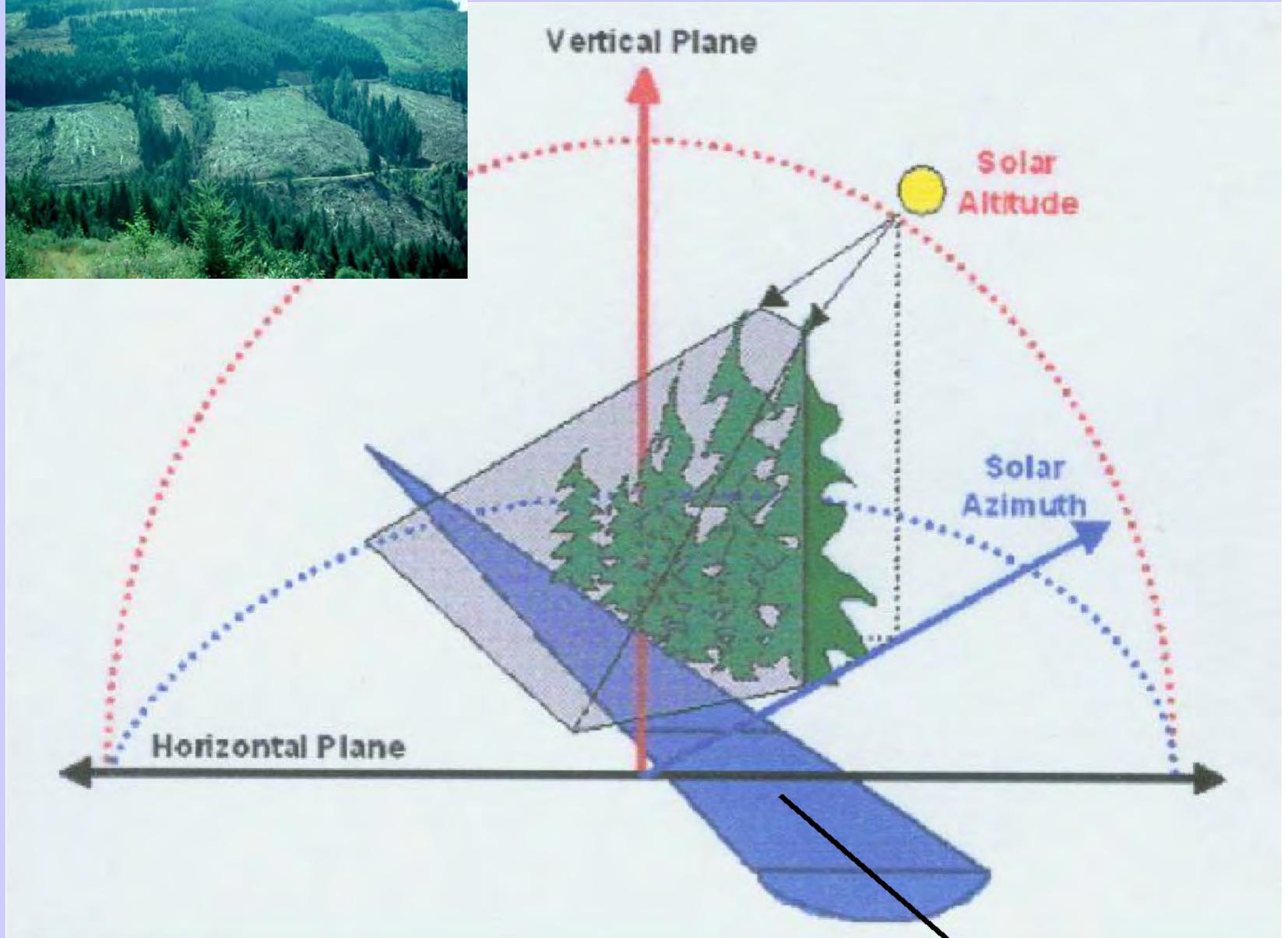


# *NetMap's watershed scale wood recruitment tool*



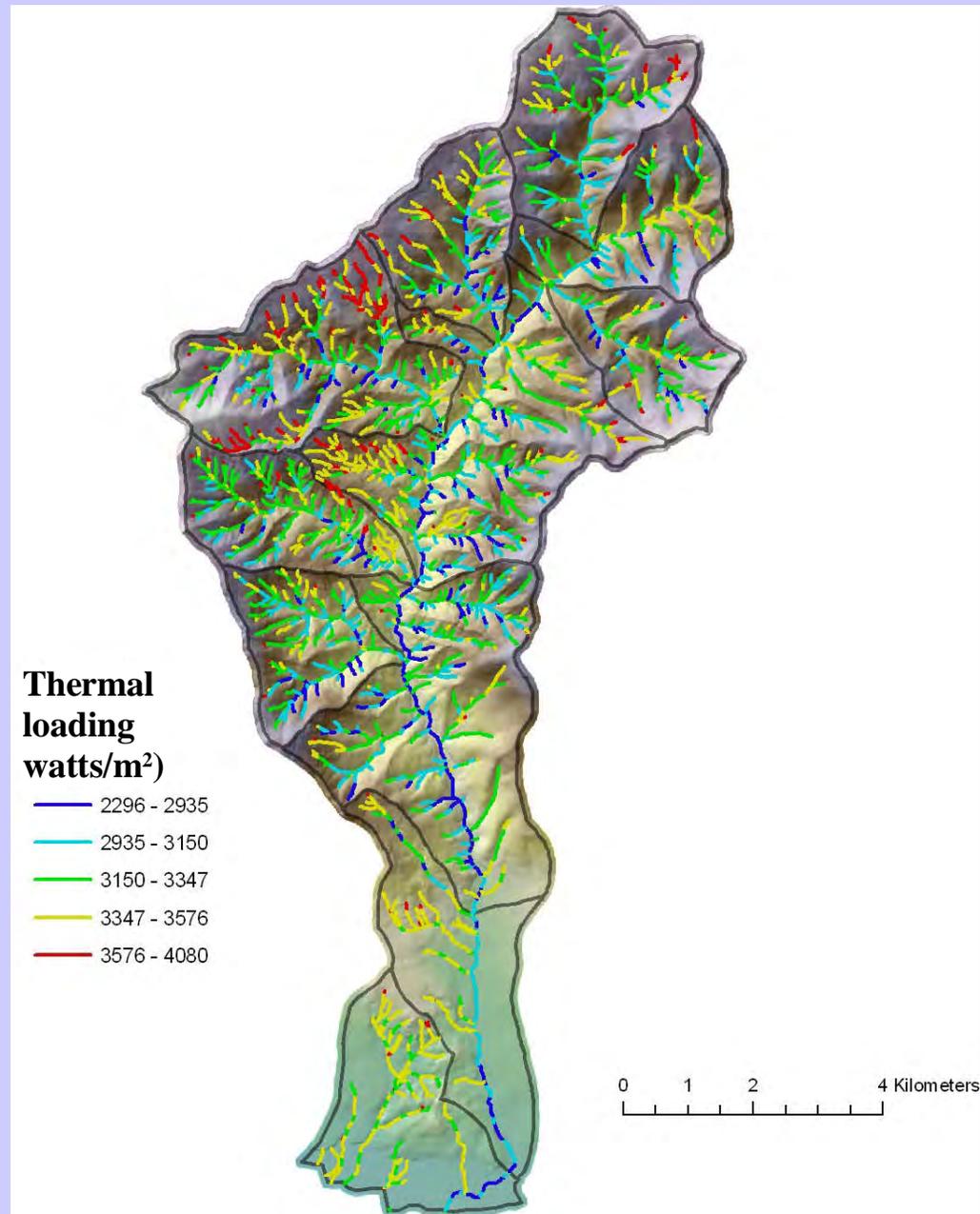


# *NetMap's thermal load tool*



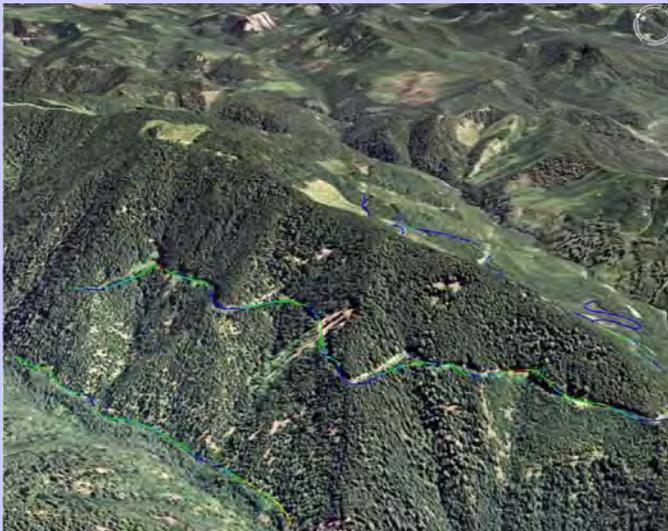
Stream azimuth

*Sensitivity analysis:  
which channels  
are most  
sensitive to changes  
in  
thermal loading?*



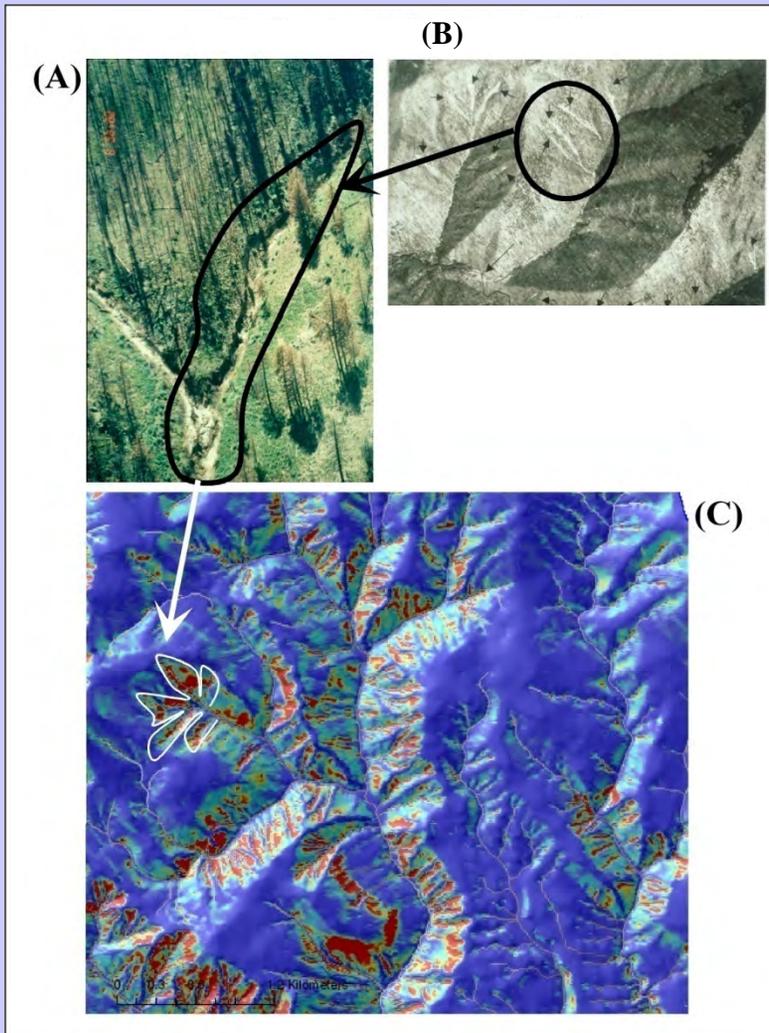
*Fully forested versus no vegetation (bare)*

*Where are the most erosion prone areas located?  
Which areas are most sensitive to land uses?  
What are the best buffer designs to mitigate erosion?*



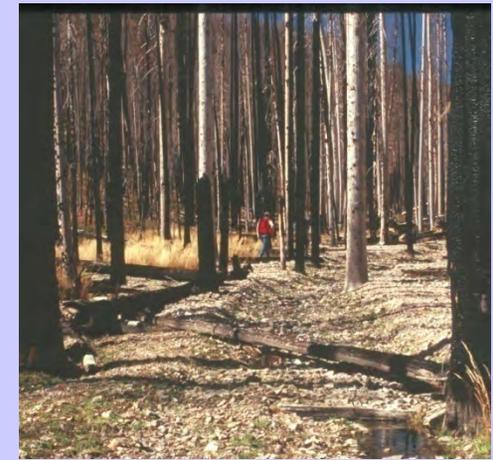
# NetMap erosion indices

Generic erosion potential  
Shallow landslide potential

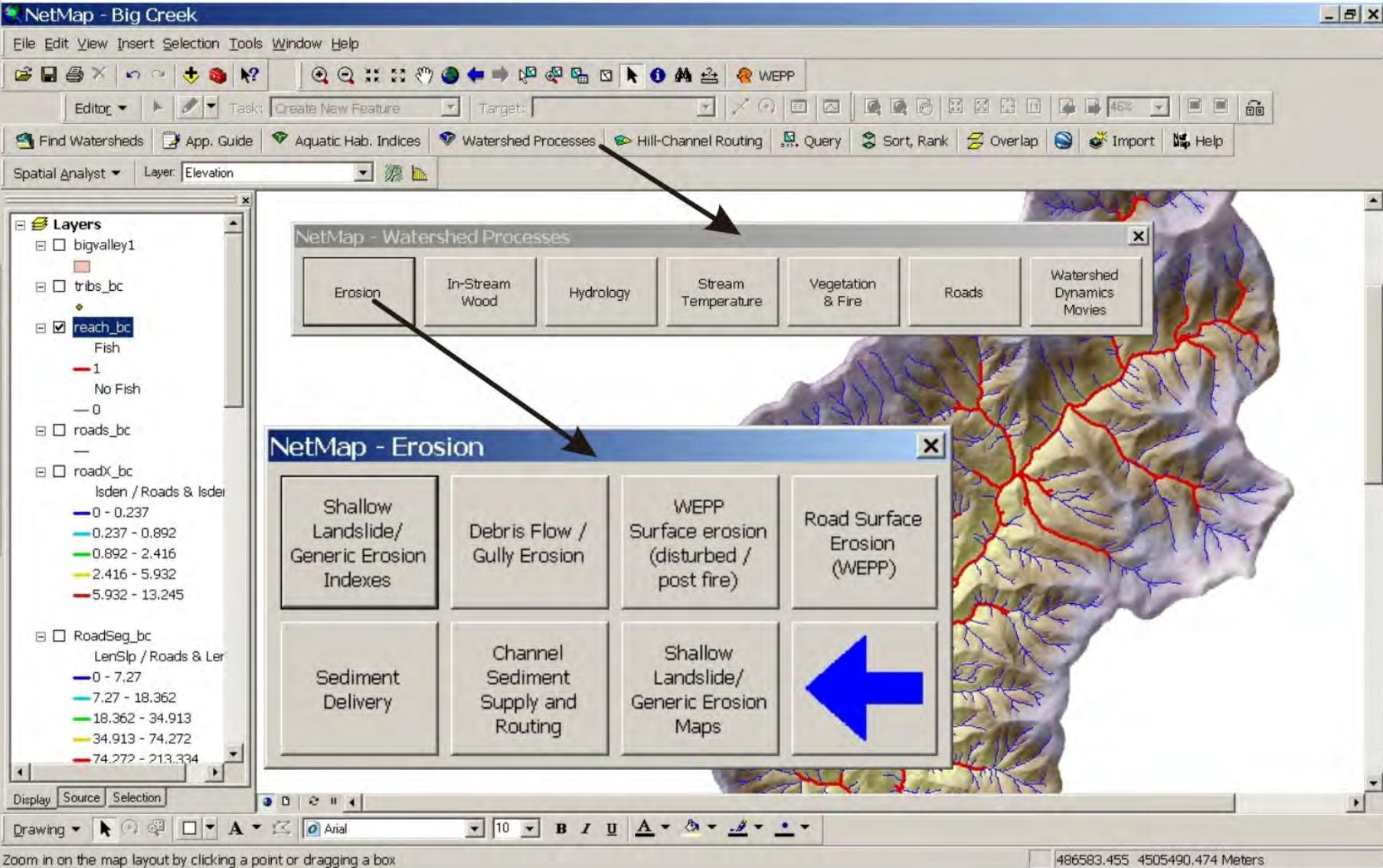


Debris flows (&LWD del)  
Gully erosion

WEPP\_surface erosion (& post fire), basin scale  
WEPP\_roads (road erosion and screening tool)



# NetMap's Erosion Tools



# Export predictions (maps) to Google Earth

**Search**

Fly To Find Businesses Directions

Fly to e.g., New York, NY

**Places** Add Content

- Landslide
- Layers
  - [no name]
- NetMap current location
- Nile tour.kmz
- Temporary Places
- reach\_hoh\_IP\_COHO.kml
  - 0.001 - 0.174
  - 0.174 - 0.437
  - 0.437 - 0.649
  - 0.649 - 0.844
  - 0.844 - 1
- Landslide

**Layers**

- Primary Database
- Geographic Web
- Roads
- 3D Buildings
- Street View
- Borders and Labels
- Traffic
- Weather
- Gallery
- Ocean
- Global Awareness
- Places of Interest
- More
- Terrain

Red=higher risk  
Blue = lower risk

Less concern

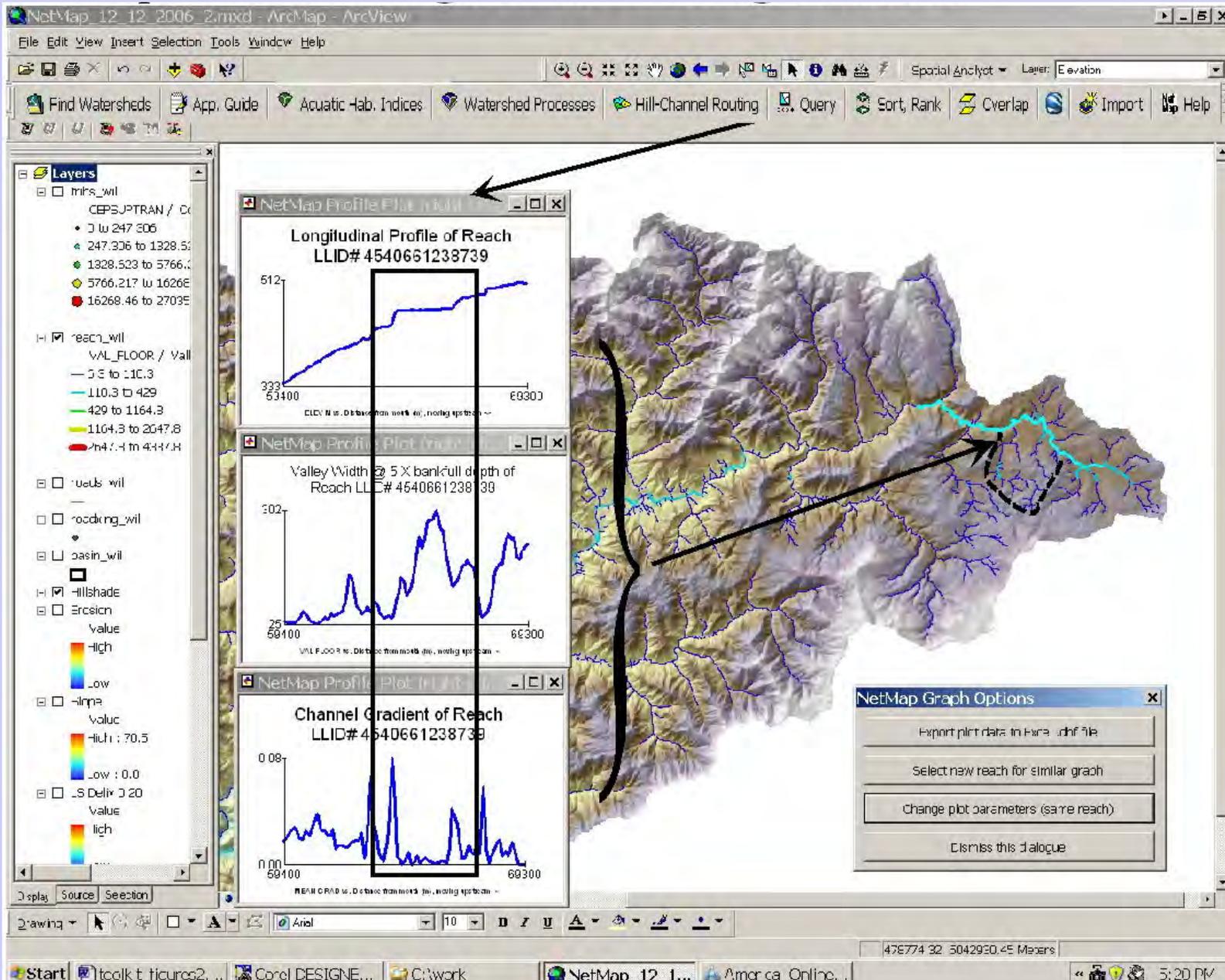
More concern

Image U.S. Geological Survey  
Image © 2009 DigitalGlobe  
Data SIO, NOAA, U.S. Navy, NGA, GEBCO

Imagery Date: Sep 12, 2006 47°54'03.69" N 123°43'59.39" W elev 3988 ft

©2009 Google Eye alt 25694 ft

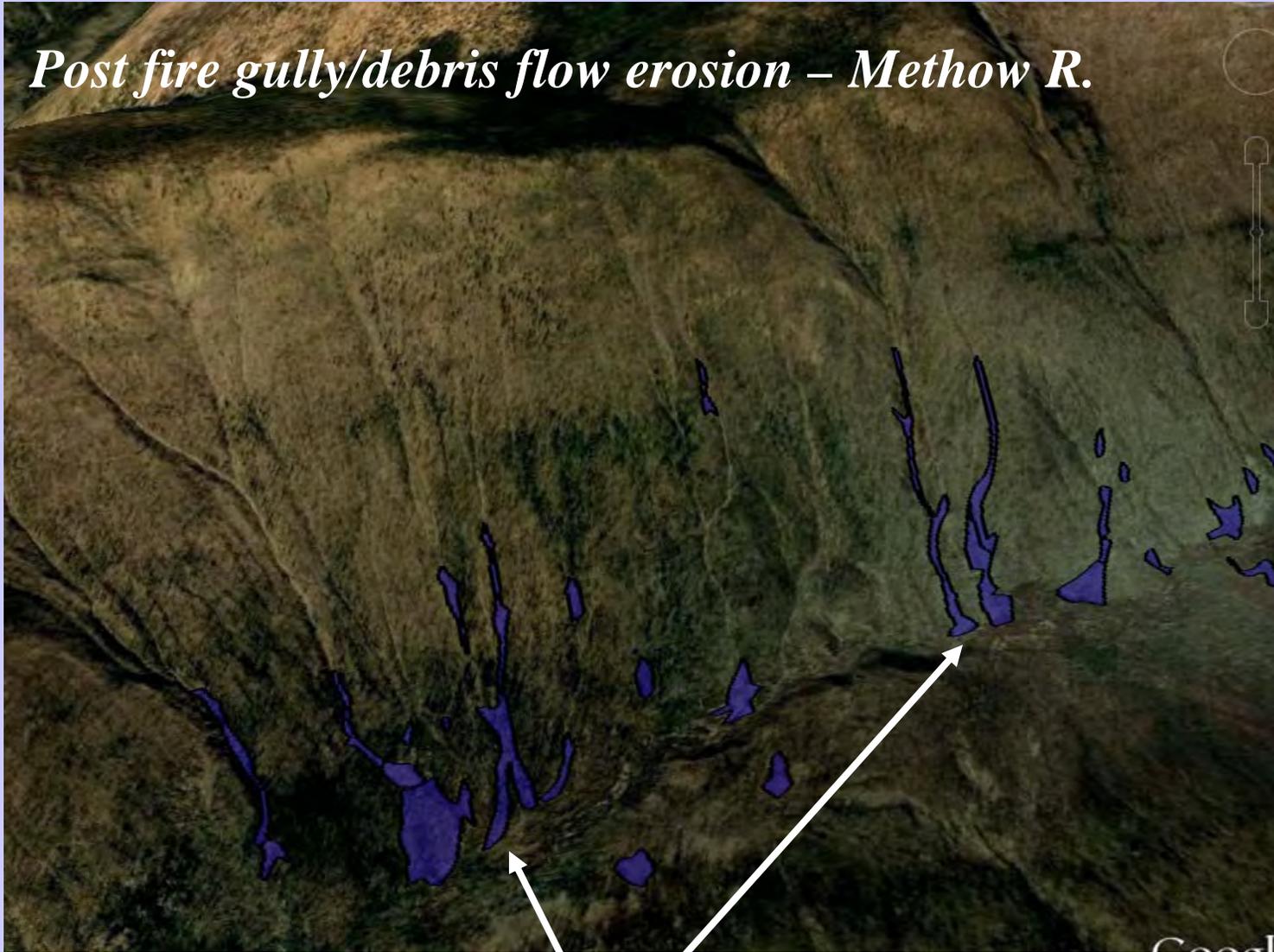
# Search river elevation profiles for large landslides



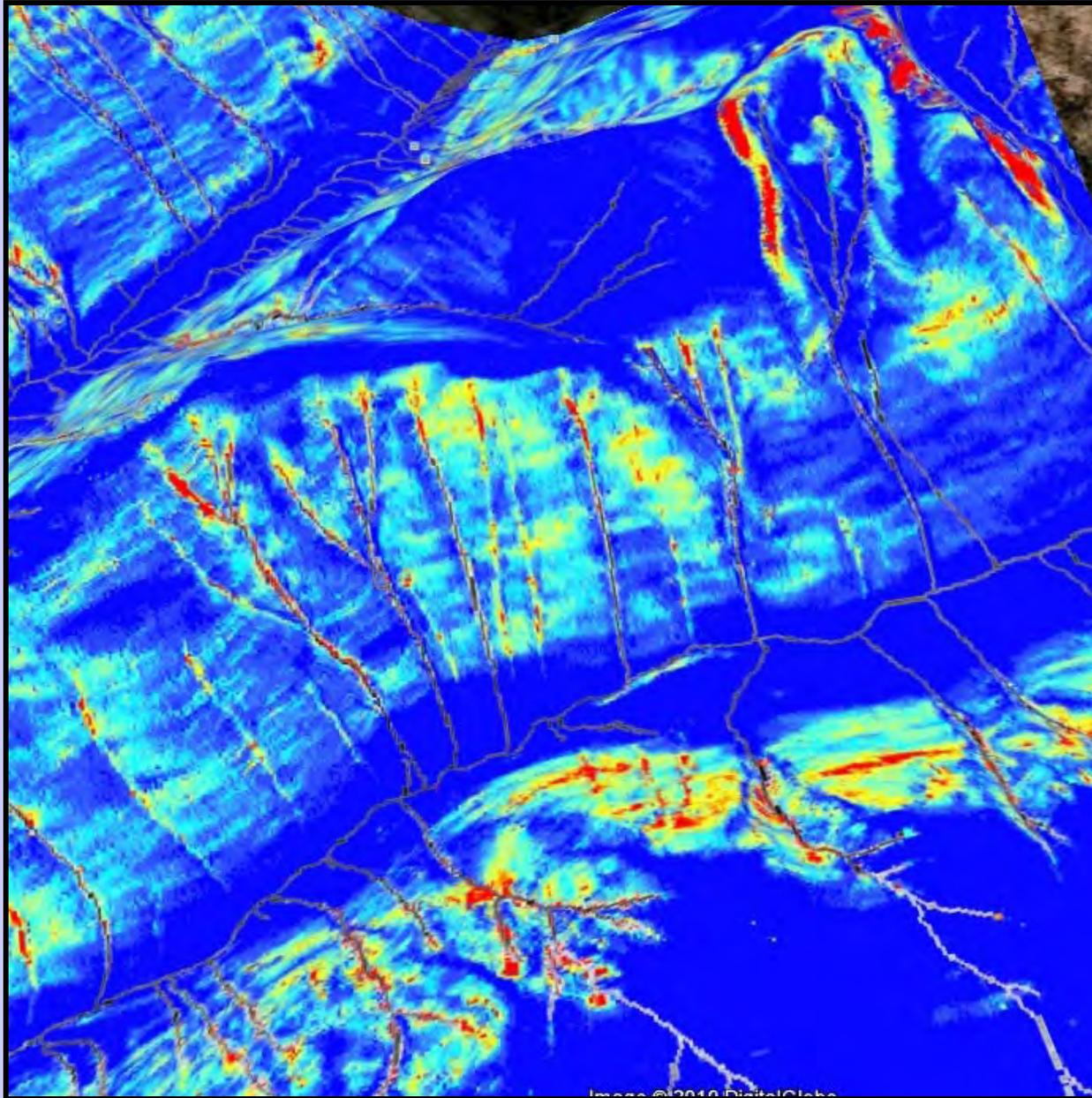
*Post fire gully/debris flow erosion – Methow R.*



*Post fire gully/debris flow erosion – Methow R.*



*Mapped slides (post fire)*

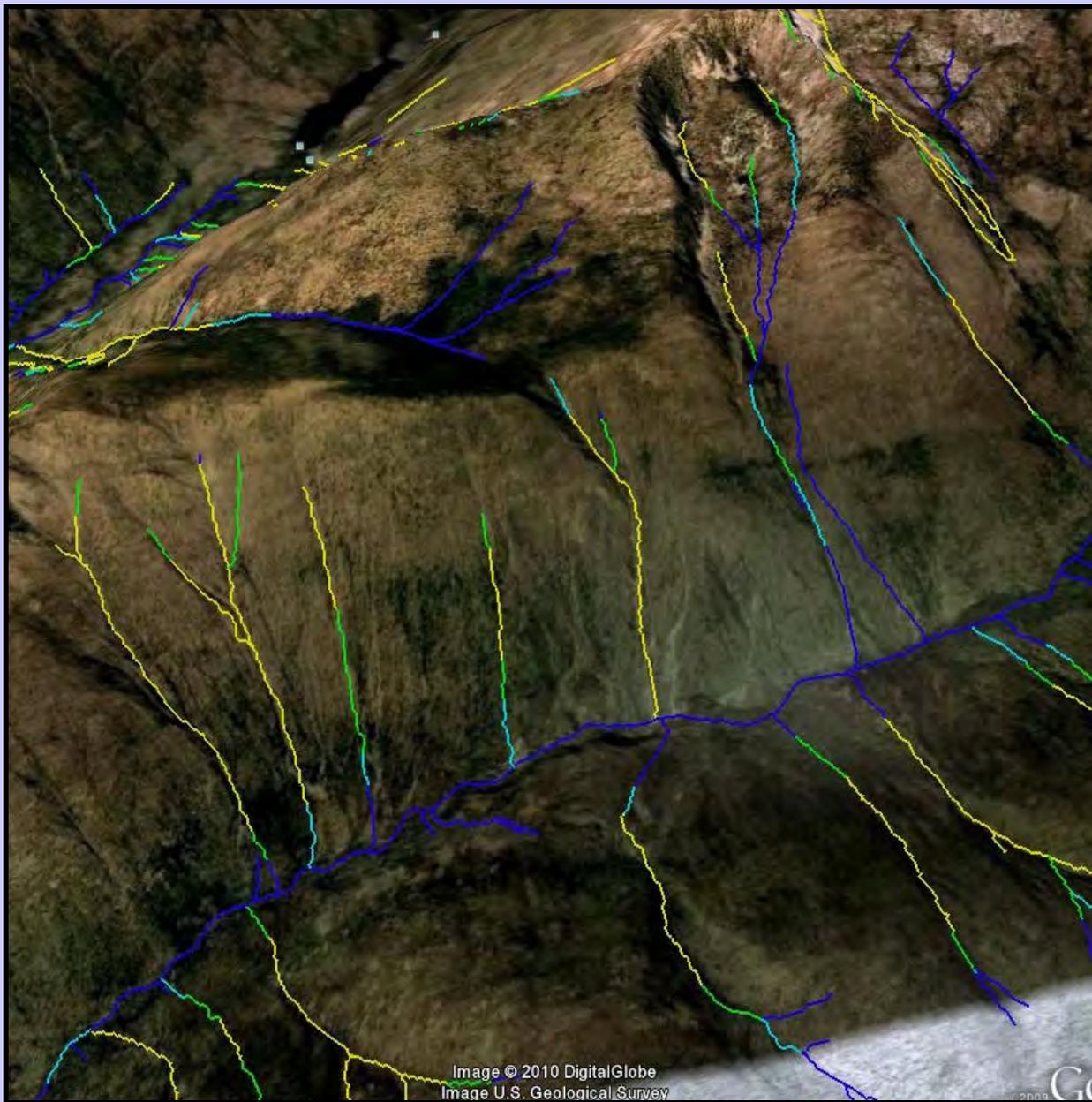


*Landslide-  
Gully potential*



*Post fire gully/debris flow erosion – Methow R.*

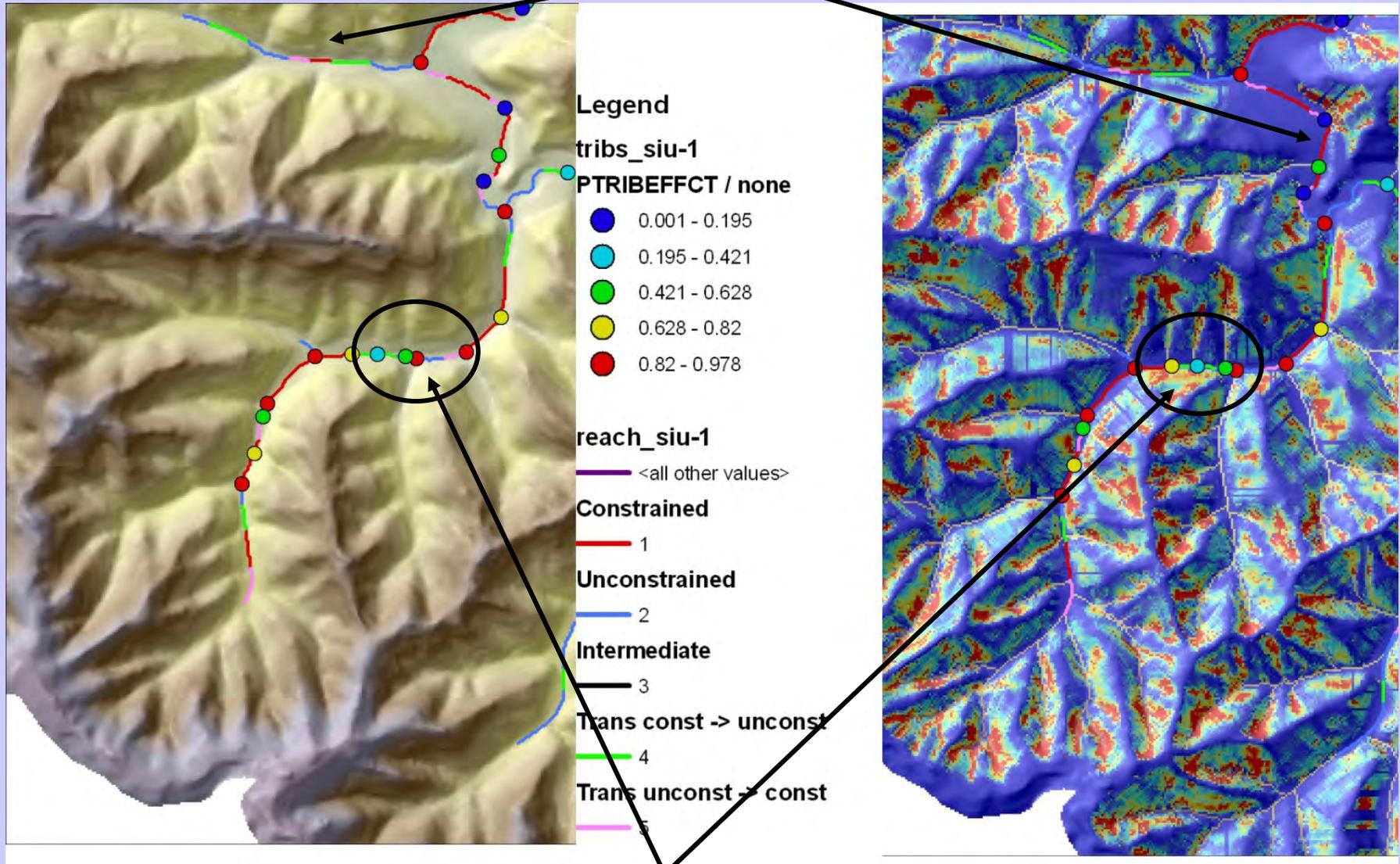




*Debris flow  
potential*



# *More stable monitoring sites*



# *Less stable monitoring sites*

# NetMap: Stream Segment Attribute Information Tool

NetMap Attribute Display

Attributes for Reach ID # 12026

Stream Name =

ID	12026
LLID	4556681235196
Area (km <sup>2</sup> )	3.0108
Length (m)	180.9
DistUS (m)	970
Elev (m)	471.9
Gradient (m/m)	0.0502
Chan Width (m)	7.5
Roughness	0.5097
val. width (m)	25
Val Wid/Chan Wid	3.35
Channel Containment	1
MeanAnnFlow (CFS)	17.305
Stream Power	C.181250154030
Chan. Disturbance Pot.	0

Change Attribute List

Click to recover tool

Get Help For This Tool

Layers

- tribs\_wri
- reach\_wri
  - MEAN\_GRAD / C.000000000 - C.01001 - 0.02
  - C.01001 - 0.02
  - C.02001 - 0.04
  - C.03001 - 0.04
  - C.04001 - 0.05
  - C.05001 - 0.06
  - C.06001 - 0.08
  - C.08001 - 0.08
  - C.00201 - 0.00
  - C.08301 - 0.08
- roads\_wri
- roadX\_wri
- basin\_wri
- P\_SSS
- CHH\_ownership
- Hillshade Value
- Frnsinn Value
- Frnsinn Every Value

Display Source Selection

4556681235196 5148748.425 Meters

Start Retrospect Exam... Corel DESIGN... AOL 9.1 - Conn... Google Earth Untitled - ArcMa... 11:21 AM

# NetMap: Field Link Tool

NetMap Field Link

Watershed: 1103    IUC ID: 13    Stream ID: 8592    User ID: **(2)** cemo    Area (km<sup>2</sup>): 53.952    Length (m): 54.7    Elev (m): 1172.8

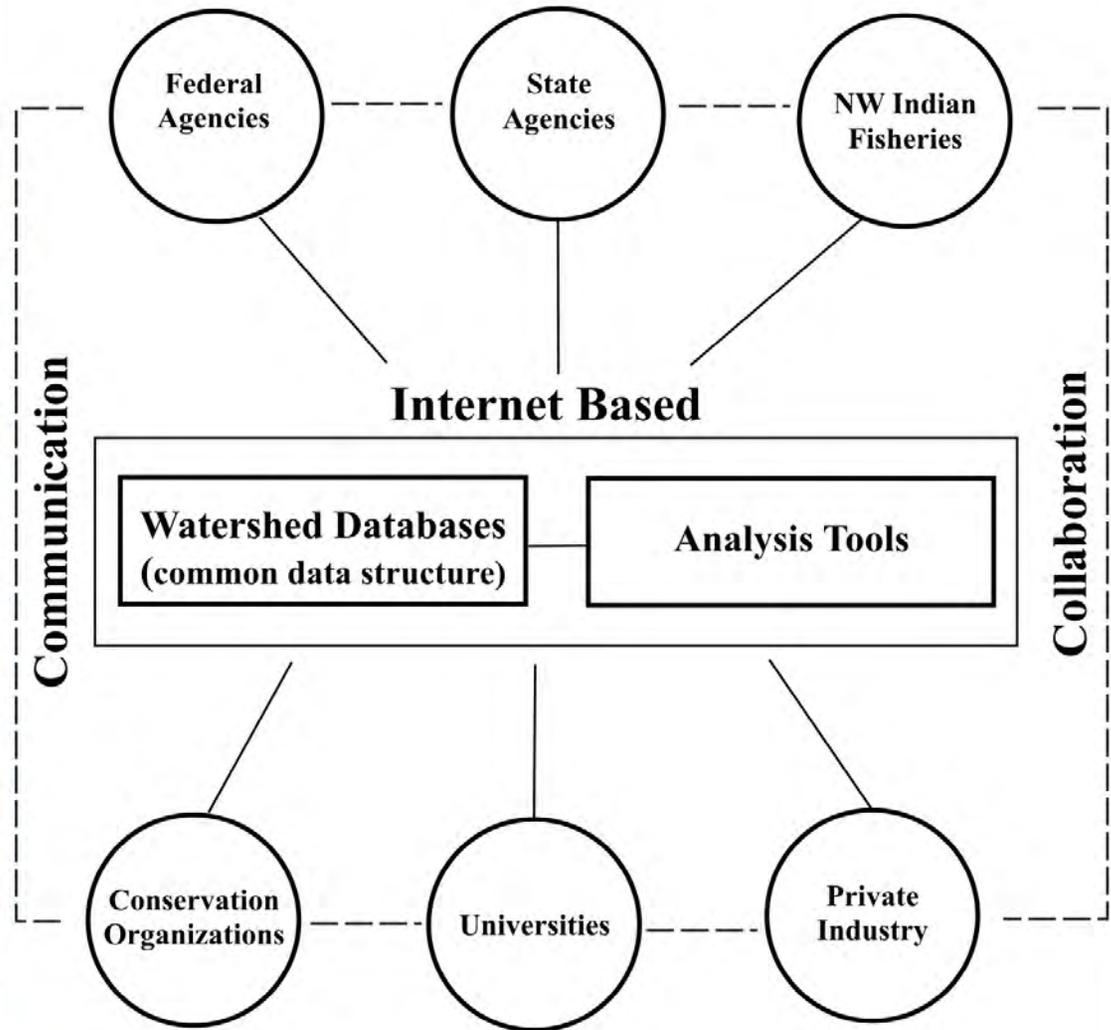
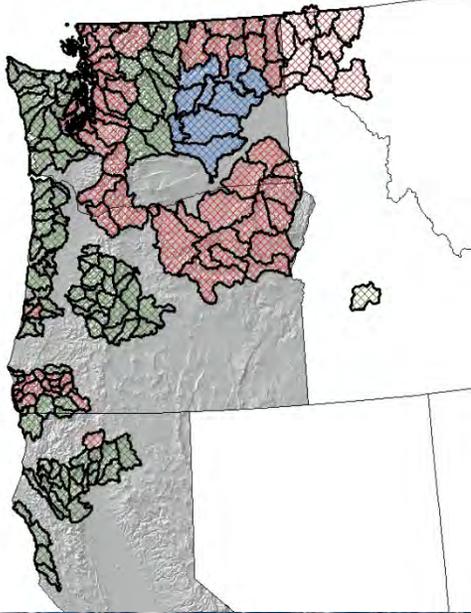
Stream Name: South Fork Sacra

Parameter (*=click)	NetMap Value	Field Value	Comments (max 200 char)
Crociocent	0.0121	0.035 <b>(3)</b>	File Code #: Upper Sacrame <b>(4)</b>
Bankfull Ch.Width	13	12.5	
Valley Width "	53.3		Photo ID 212 <b>(5)</b>
Val Width / Chan Width	4.11	3.2	
Nearstream Roughness *	0.4334		Print Form <b>(6)</b>
Bedrock Outcrop "			
Wood Acc. Type *	2	2	Help
Constrained*	2		
Confluence Effects "	0.54273		Save <b>(7)</b>
Riparian Treeheight *	40		
Riparian Forest Comp. *			Get Help For This Tool
Avg. Bankfull Depth			
Coho IP *	0		
Steelhead IP *	0		
Chinook IP *	0		
General Hab Quality *	0.7489		
Gen Lab Sensitivity *	0		
Fluvial Hotspots "			
Channel Type *			
Generic Erosion Potential			

549651.310 4560059.552 Meters

Start Retrospect Expr... Coral DESIGNE... ACL 9.1 - Com... Google Earth Untitled - Arc... Microsoft Excel ... 2:54 PM

# NetMap Concept



*Enhance wise resource use,  
restoration & conservation*

# NetMap Tool kit: Longitudinal Plotting Function

The screenshot displays the NetMap software interface. The main window shows a 3D terrain map with a river reach highlighted in cyan. Three longitudinal plots are overlaid on the map, each showing data for reach LLID# 4540661238739. The plots are:

- Longitudinal Profile of Reach:** Shows elevation (Y-axis, 512 to 933) versus distance (X-axis, 69400 to 69300).
- Valley Width:** Shows valley width (Y-axis, 25 to 502) versus distance (X-axis, 69400 to 69300).
- Channel Gradient:** Shows channel gradient (Y-axis, 0.00 to 0.08) versus distance (X-axis, 69400 to 69300).

The 'NetMap Graph Options' dialog box is open in the bottom right corner, with the following options:

- Export plot data to Excel (.xls) file
- Select new reach for similar graph
- Change plot parameters (same reach)
- Dismiss this dialogue

The software interface includes a menu bar (File, Edit, View, Insert, Selection, Tools, Window, Help), a toolbar, and a Layers panel on the left. The Layers panel shows various data layers, including 'reach\_will' and 'hillshade'. The status bar at the bottom indicates the current location (478774 32 5042950.45 Meters) and the time (5:20 PM).

# NetMap: Create Cumulative Distributions (CDFs)

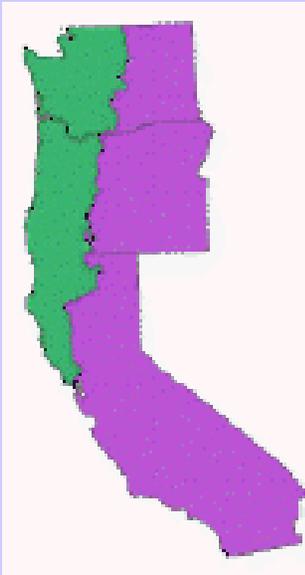
The screenshot displays the ArcMap interface with the following components:

- NetMap Single CDF Dialog Box:** A dialog box with the title "NetMap Single CDF". It contains the text "Select the watersheds you want to calculate CDFs for. (Select multiple watersheds by holding down the shift key.)". Under "Select attribute:", the dropdown menu is set to "Habitat Intrinsic Potential-Coho" with a circled "2". There are two checkboxes: "Only analyze fish-bearing portion of network" (checked) and "Only analyze road crossings" with a circled "3". Buttons include "Go", "Get Help For This Tool" (with a blue arrow pointing left), and "Time Requirements" (This function can take up to 1 minute. Exporting data ...).
- Map View:** A 3D terrain map showing subbasins outlined in red and a river network in cyan. A black arrow points to the subbasins with the label "(1) Subbasins and associated river network analyzed".
- Layers Panel:** A list of layers on the left side of the interface, including "reach\_wl", "roads\_wl", "roadX\_wl", "reach\_n\_wl", "P\_SS", "CDF ownership", "Hillshade Value", "Friction Value", and "Erosion Delivery Value".
- CDF Plots:** Two "NetMap CDF Plot" windows are overlaid. The top plot is titled "CDF of Habitat Intrinsic Potential-Steelhead" and the bottom plot is titled "CDF of Habitat Intrinsic Potential-Coho". Both plots show "Cumulative Proportion" on the y-axis and "Value" on the x-axis. The top plot has a total length of 732.7158 km and a total area of 535.59909327874 km<sup>2</sup>. The bottom plot has a total length of 702.7150 km and a total area of 565.59939327074 km<sup>2</sup>. A black arrow points from the text "Compare multiple plots" to both plots.

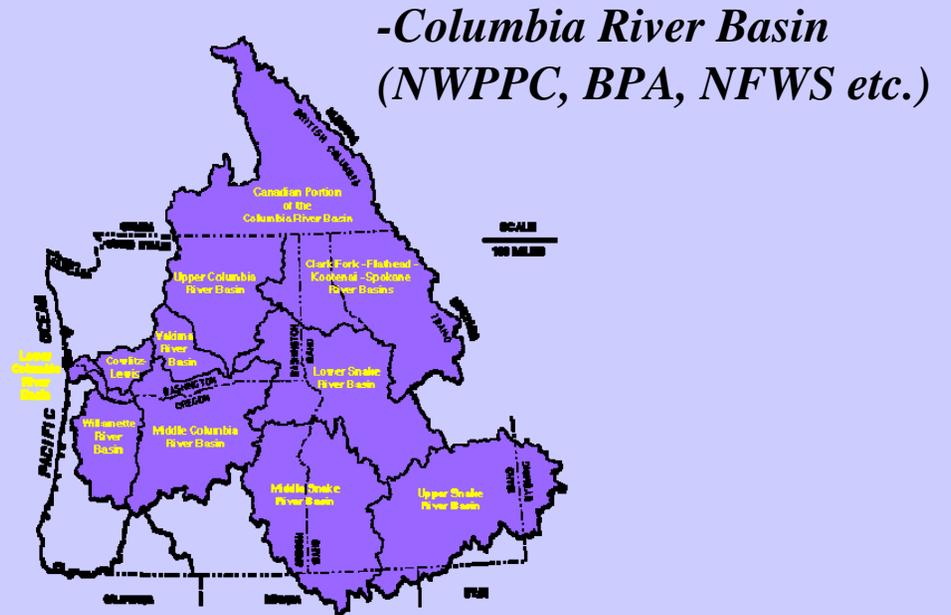
(1) Subbasins and associated river network analyzed

Compare multiple plots

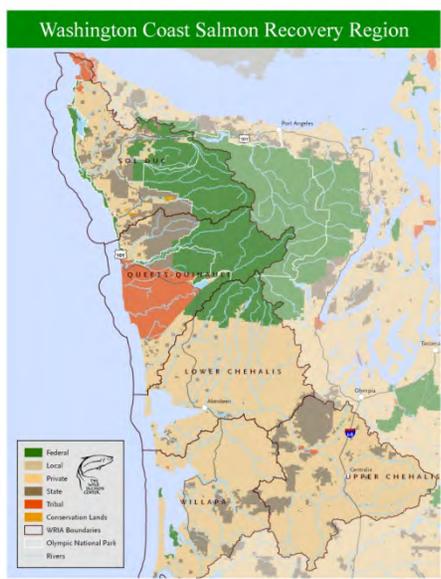
# Increasing Scale in Natural Resource/Environmental Policy



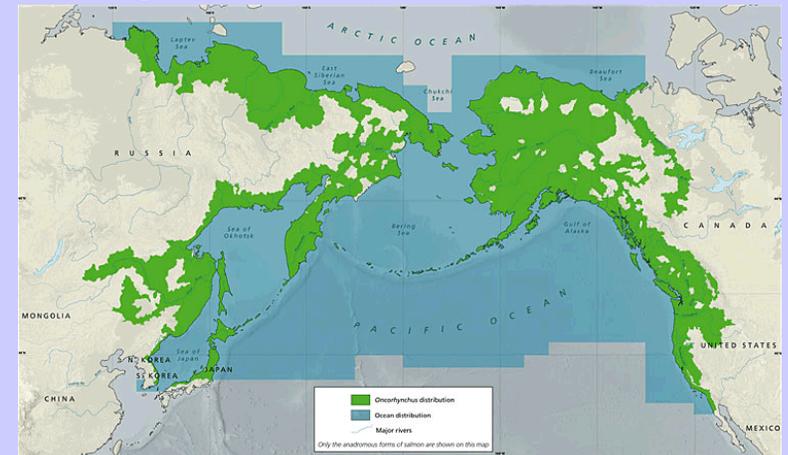
*-Northwest Forest Plan  
(USFS, BLM, NFWS)*



*-Columbia River Basin  
(NWPPC, BPA, NFWS etc.)*



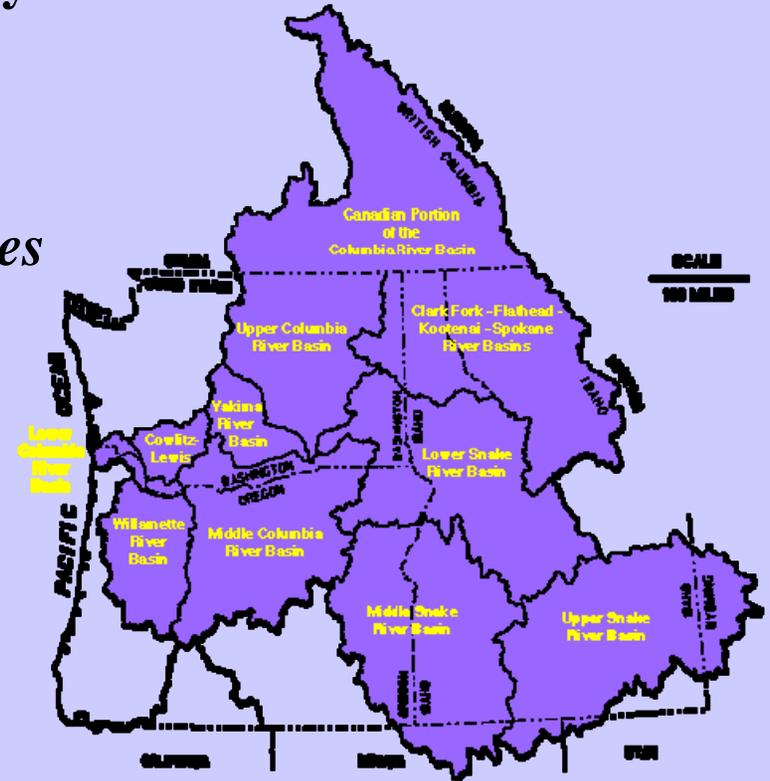
*-Watershed Councils  
-Tribal Nations*



*-Wild Salmon, Ecotrust  
...Save the Salmon NGOs,*

# Land Management & Environmental Policy Features

- 1) *Very large administrative areas,*
- 2) *Common resource management objectives*
- 3) *Overlapping agencies & organizations*
- 4) *Similar questions, data & tool needs*



- USFS
- ODF
- EPA
- NOAA
- WDF&W/ODF&W/CDF&G
- NGOs
- Watershed Councils