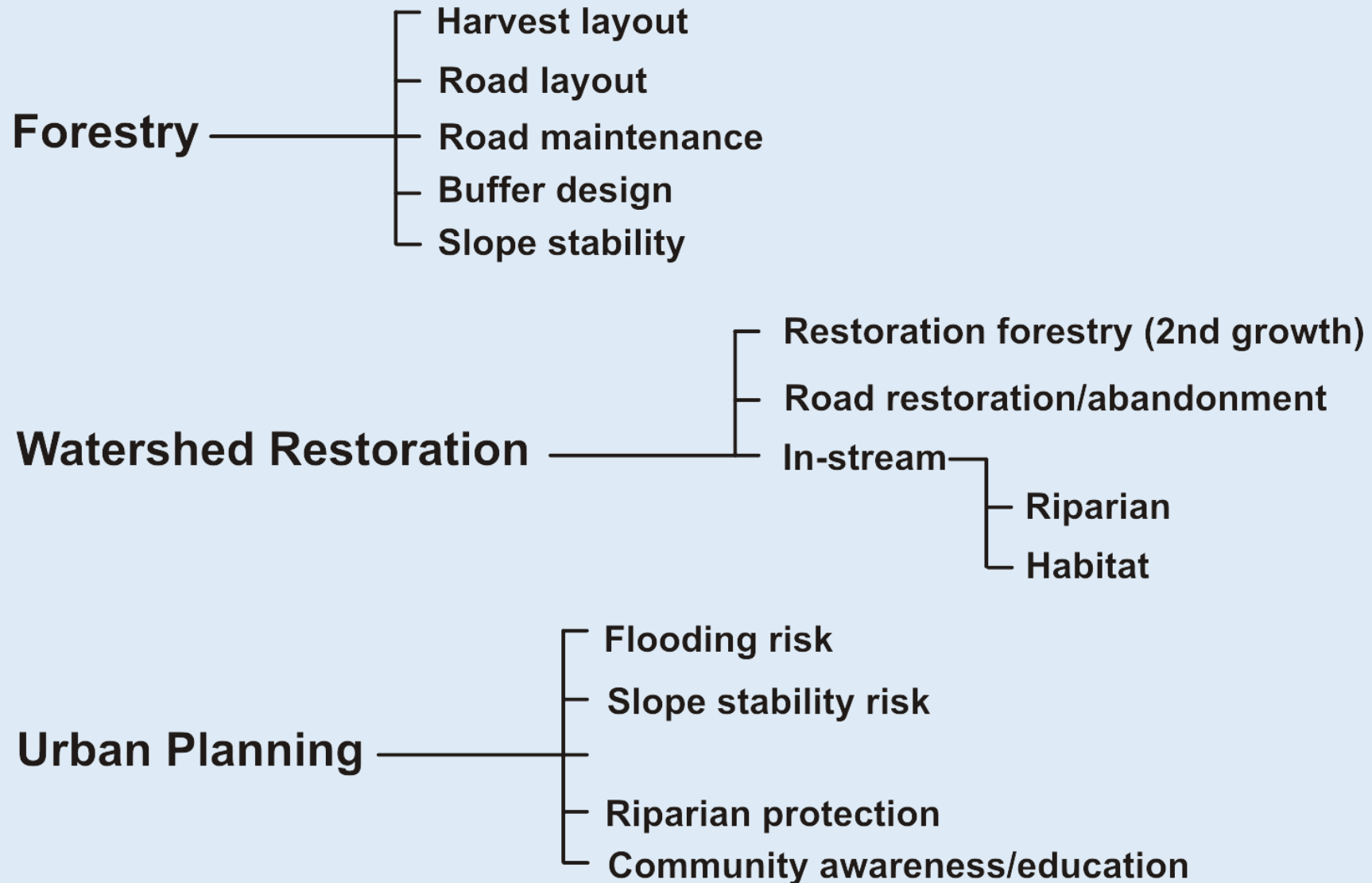


A photograph of a waterfall cascading over rocks into a pool of water, surrounded by lush green trees and foliage.

What Places & Interactions in Your Watersheds Matter Most?

Welcome to NetMap Portal Tutorial |

Potential Applications



What Can you do with the Portal? At least 25 things!

- 1) Locate the best potential fish habitats.
- 2) Identify biological hotspots.
- 3) Map floodplain extent and variation.
- 4) Identify potential landslide prone slopes.
- 5) Examine landslide risk – fish habitat interactions.
- 6) Detect potential debris flow risk areas.
- 7) Examine debris flow risk – fish habitat interactions.
- 8) Examine slope stability proximity to built infrastructure.
- 9) Evaluate forest road erosion and sediment delivery to streams.
- 10) Identify stream reaches that receive road related sediment.
- 11) Determine optimal locations for new road drains to eliminate or reduce sedimentation.
- 12) Evaluate fish habitat amount upstream of road crossings.
- 13) Identify road – landslide/debris flow risk interactions.
- 14) Detect road – floodplain interactions.
- 15) Evaluate thermal sensitivity of streams.

What Can you do with the Portal? At least 25 things!

- 16) Predict current shade and thermal loading conditions in streams.
- 17) Identify where to put new shade for greatest effectiveness.
- 18) Estimate current in-stream wood recruitment potential.
- 19) Map potential thermal refugia – three different types.
- 20) Map potential climate change to stream reaches.
- 21) Evaluate climate change – fish habitat intersections.
- 22) Identify fire risk and severity, and mapped to streams.
- 23) Detect overlaps between fire risk and important resources.
- 24) Obtain information of channel fluvial conditions.
- 25) Identify all streams using shaded relief, including ephemeral reaches.

There are two ways into the Portal

If you have a NetMap analysis in your watershed and or are a subscriber to NetMap tools, use a password to log in

netmap

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What Places & Interactions in Your Watersheds Matter Most?

Supporting Cost Effective Prioritization in Resource Management, Restoration and Conservation

"NetMap Portal is the best way to visualize complex datasets and analysis of the watersheds we care about."

Map Categories

- STREAMS & RIVERS**
Search for critical interactions
Channel types, aquatic habitats, fish-eye view of riparian - erosion - road - fire - climate change conditions.
- RIPARIAN ZONES**
Optimize riparian zones.
Riparian vegetation, shade and thermal energy, best locations to increase shade, in-stream wood recruitment, thermal refugia
- FLOODPLAINS & VALLEY FLOORS**
Locate ecological hotspots.
Floodplains and valley floor landforms, flood hazard zones.
- TOPOGRAPH, EROSION, & ROADS**
Prioritize activities
Landslide, debris flow and gully potential, road erosion, optimize new drains and surfacing, road stability, roads in floodplains, and habitat length above all crossings.
- WILDFIRE & CLIMATE CHANGE**
Identify critical zones
Fire risk and severity, climate change.

Select a region to see what's possible... [Subscribers Login Here](#)

Anyone else can access map data by locating your watershed of interest using the Home Page Web Map

When using a password, you will be automatically flown into the watershed web map to your general geographic area of interest, saving time



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NetMap Portal DEMO - Hoonah LiDAR



For example, we have just landed in the general area of North Chichigof Island in Southeast Alaska, showing four NetMap virtual watershed datasets, built in support of the Hoonah Community Forest Project





Clicking on the watershed of interest allows one to load the watershed map data

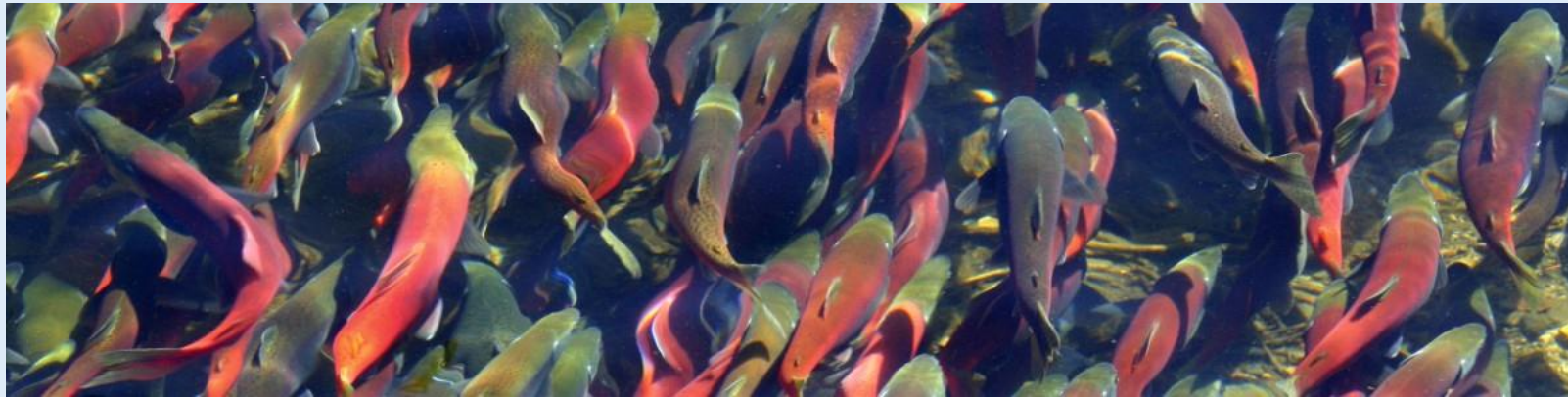


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First things first: In addition to fluvial and aquatic habitat attributes, stream channels also contain hillside attributes, like erosion potential, wildfire, road characteristics.

Why? Because it offers a channel- or fish-eye view of hillside conditions that are relevant to stream conditions and aquatic habitats. For example, in the Portal's 'Watershed Analyst' module, you can search for and identify locations in the channel network where the highest potential for increased shade overlaps spatially with the most sensitive fish habitats. Or, where the highest erosion potential overlaps with the best quality habitats.



How? Each 100 m stream segment in NetMap's Virtual Watershed has its local drainage area on both sides of the channel delineated (up to ridge tops); we refer to these as "drainage wings". Any spatial data located within the local drainage areas can be summarized and reported to the stream channel, creating a fish-eye view of terrestrial attributes. Please see next page for an illustrative sketch.

Learn more about ["virtual watersheds"](#).

Reporting terrestrial attributes to stream channels

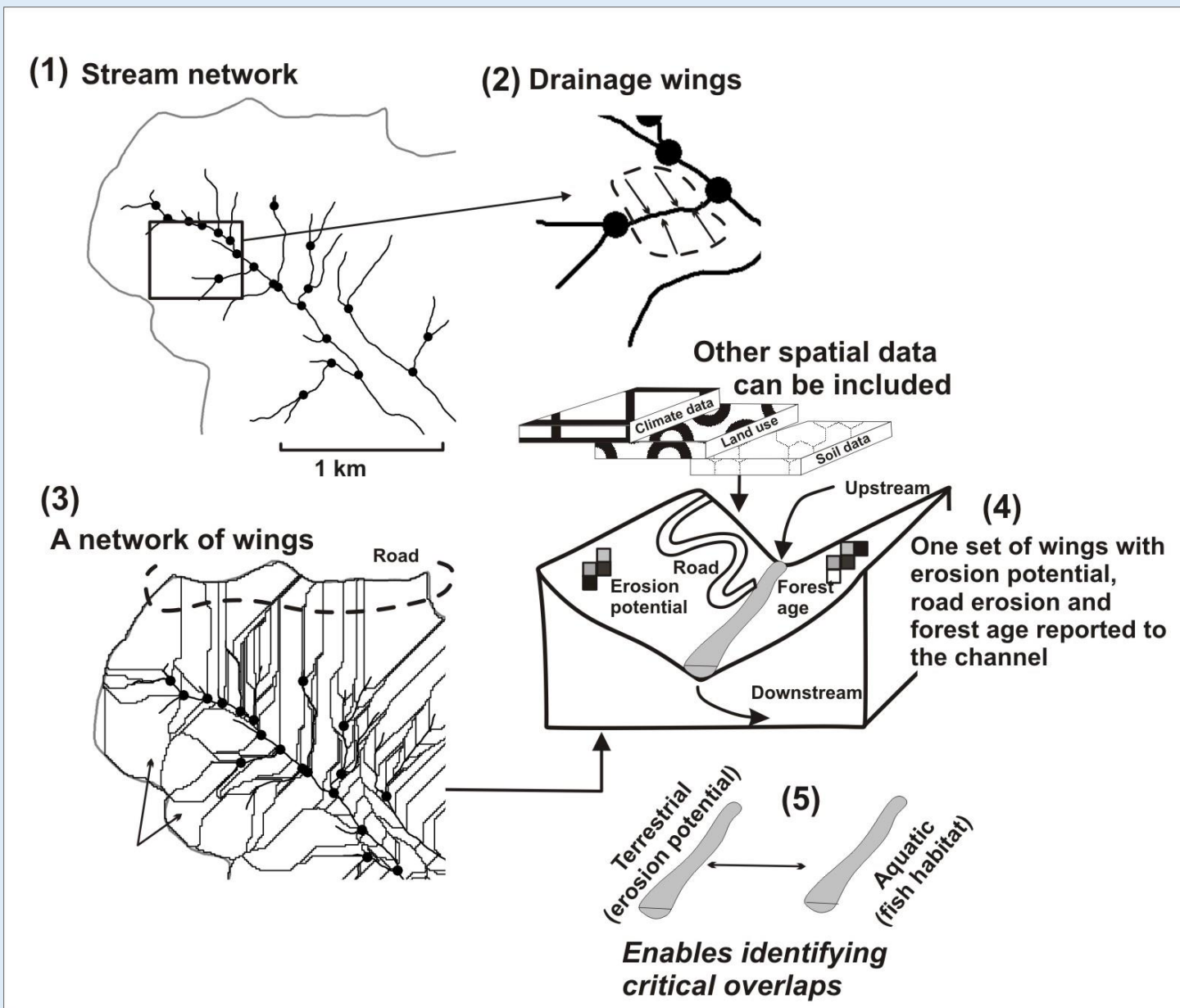
(1) First, the digital stream network is created.

(2) Next, the stream's local contributing drainage areas on both sides are delineated ("drainage wings").

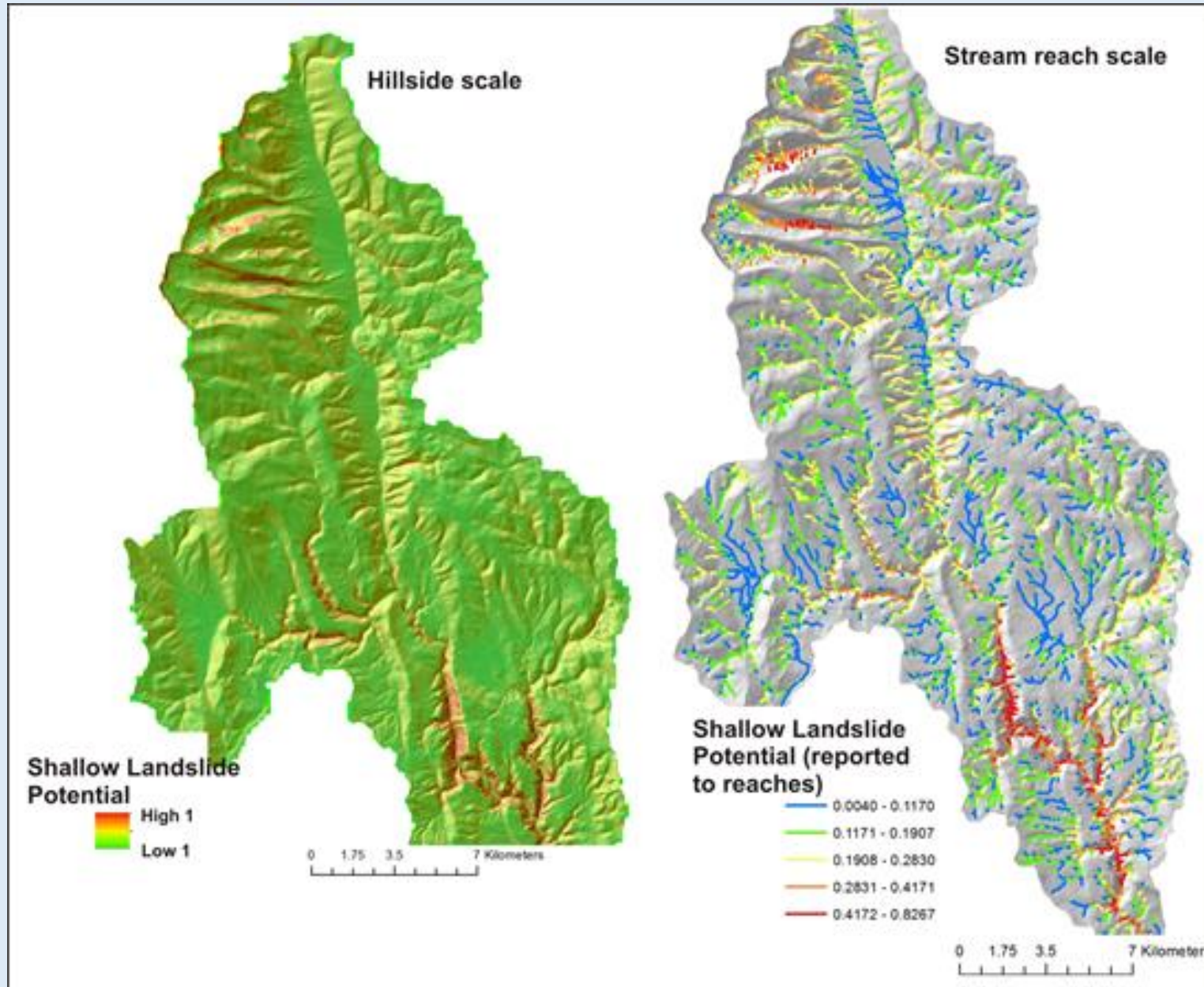
(3) A stream network contains a network of drainage wings.

(4) Then, any terrestrial information of interest in the wings is summarized and reported to channel segments.

(5) This enables one of the Portal's key functions: to identify what places & interactions in your watershed matter most.



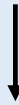
Reporting terrestrial attributes to stream channels – example



In this example, the terrestrial attribute of landslide potential (left image) is reported to stream channels, providing a fish-eye view of landslide potential.

Now, landslide risk can be overlaid with fish habitat quality to identify critical locations where they overlap.

NetMap Portal watershed map data are split among three data types



Streams Viewer: A list of stream attributes focused on fluvial and aquatic conditions

Valley/Hillside: Includes map data on valley floor topography, including floodplains; also erosion attributes, such as landslide potential

Road Viewer: Includes available NetMap roads analyses

netmap portal

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Stream Viewer Valley Hillside Viewer Road Viewer

Watershed: Hoonah LiDAR (hnl2) [change](#)

Valley/Hillside includes grid (raster) and polygon data on several hillside erosion attributes and valley floors and floodplains. Erosion attributes can include shallow landslide potential, debris flow potential and gully erosion. Floodplains are mapped at several levels above the channel.

View in 3D

Shaded relief opacity: 0.5

Select Layer: Landslide Potential ?

Dimensionless index of erosion potential. Based on slope and contour curvature.

100 - high risk
0 - low risk

Landslide Potential Opacity: 0.9

Show Streams & Roads
 Enable Tooltips

source: 2m LiDAR
Project Funded By:
[Natural Resource Conservation Service](#)

Chitka Creek
Chatham Strait
North Fork Freshwater Creek
SONYAKAY RIVER
netmap

2 mi

"Stream Viewer" Map Navigation Panel (part 1)

The screenshot shows the NetMap portal interface. At the top left is the NetMap logo. To the right are navigation links: "log in", "home", "maps", "about", "services", "contact", and "help". Below the logo are three tabs: "Stream Viewer", "Valley Hillside Viewer", and "Road Viewer". The "Stream Viewer" tab is active. The main map area displays a 3D shaded relief map of a river basin with stream lines overlaid in various colors (red, yellow, green, blue). A legend for "Pink Intrinsic Potential" is visible in the bottom left of the map area, showing a color scale from red (> 1) to blue (< 0). A scale bar indicates 2 miles. On the right side, a "Map background selector" panel is open, showing a grid of map styles including Imagery, Topographic, National Geographic, etc. A box highlights the "Background" button in the top right corner of the map area.

Load a new dataset

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Map background selector

River basin name

ershed: Hoonah LiDAR (hnl2) [change](#)

NetMap's watershed code

Watershed Analyst includes a complete list of stream tributates that contain numerous riparian, erosion, road, wildfire and climate change attributes, reported to the stream from adjacent hillsides. [More...](#)

Change shaded relief opacity

Shaded relief opacity: 0.75

Select stream data category

Category: Aquatic

All tools have pop up tips!

Display: Pink Intrinsic Potential
? Pink salmon fish habitat quality; values range from 0 to 1; with one being the best fish habitat; based on Romey 2017

Drainage Area
>= than 5

VAL

Bankfull Channel Width
>= than 0



“Stream Viewer” Map Navigation Panel (part 2)

The screenshot shows the netmap portal interface. At the top left is the netmap portal logo. Below it is a 'More...' link. The main panel contains several sections:

- View in 3D:** A green button and a slider for 'Shaded relief opacity: 0.75'.
- Select data category:** A dropdown menu set to 'Aquatic'.
- Display attribute:** A dropdown menu set to 'Pink Intrinsic Potential'. Below it is a help icon and text: 'Pink salmon fish habitat quality; values range from 0 to 1; with one being the best fish habitat; based on Romey 2017'. There are 'Re-Draw' and 'Help' buttons.
- Drainage Area:** A dropdown menu set to '>= than 5' and a slider.
- Bankfull Channel Width:** A dropdown menu set to '>= than 0' and a slider.
- Summary:** A box showing 'AREA_SQKM >= 5 AND WIDTH_M >= 0' and '199.70 km of streams.'

Annotations on the left side:

- 'Select data category' points to the 'Aquatic' dropdown.
- 'Display attribute' points to the 'Pink Intrinsic Potential' dropdown.
- 'Slider bar is used to limit display to specified attribute threshold values' points to the 'Drainage Area' slider.
- 'To increase the speed of map drawing in large watersheds, the steam orders displayed vary with zoom level' points to the 'Bankfull Channel Width' slider.

Annotations on the right side:

- 'Attribute mapped' points to a stream line on the map.
- 'Dynamic legend – legend is based on the visible map and can change with zoom level' points to the legend box.

The map shows a 3D terrain view with stream lines colored according to the 'Pink Intrinsic Potential' attribute. A legend box titled 'Pink Intrinsic Potential' shows a color scale from blue (< 0) to red (> 1). A scale bar indicates 2 miles. The footer text reads 'Bureau of Land Management, Esri, © OpenStreetMap'.

Use NetMap Portal to search and for prioritization

Watershed: Game / SeaGull (hnl2b) [change](#)

This interface helps you search for places and interactions in your watershed that matter most. To begin, select a category and attribute for display. Then, the two sliders allow you to select any attribute and search for a threshold value, either an absolute value or as a percentile of the distribution. [More....](#)

 View in 3D

Shaded relief opacity: 0.75



Category:

Display: ?

Drainage Area

VAL



Bankfull Channel Width

VAL

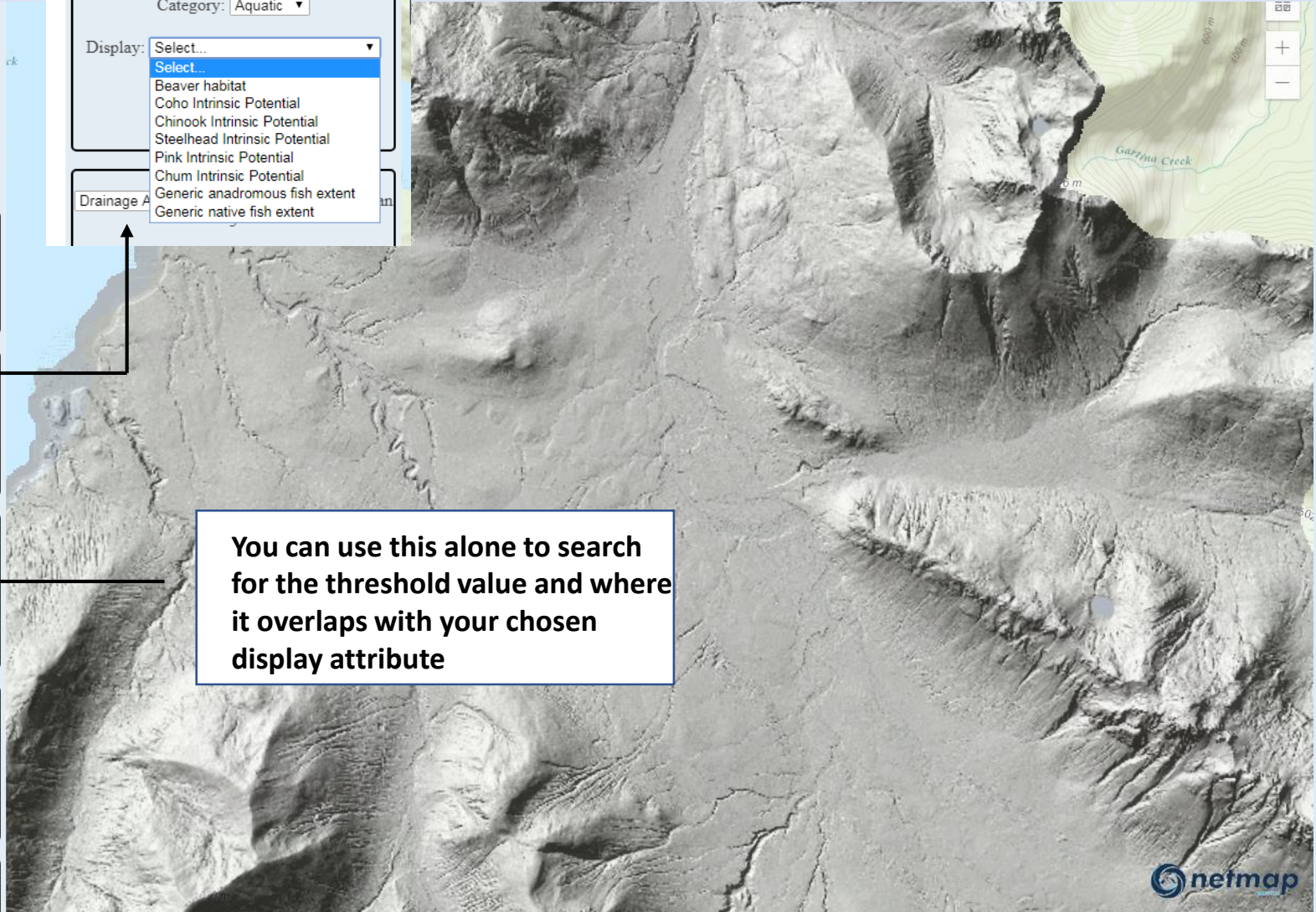


AREA_SQKM >= 5 AND WIDTH_M > 0

Category:

Display:

- Select...
- Beaver habitat
- Coho Intrinsic Potential
- Chinook Intrinsic Potential
- Steelhead Intrinsic Potential
- Pink Intrinsic Potential
- Chum Intrinsic Potential
- Generic anadromous fish extent
- Generic native fish extent



First, select a data category and attribute for display

The first slider allows you to select any attribute and search for a threshold value in absolute value or in percentile of the distribution

The second slider is used to select a second attribute with another threshold value

You can use this alone to search for the threshold value and where it overlaps with your chosen display attribute

Locations in the network where one or both thresholds overlap are identified – see example, next slide

Example Application:

Question, where does the highest road erosion potential overlap with the best fish habitats?

Select map attribute to display

Select road sediment delivery to streams – threshold (top 50% of quality)

Select pink salmon habitat quality threshold (top 50%)

Indicates if any areas in the watershed met your criteria

View in 3D
Shaded relief opacity: 0.75

Category: Aquatic

Display: Pink Intrinsic Potential

? Pink salmon fish habitat quality; values range from 0 to 1; with one being the best fish habitat; based on Romey

Re-Draw Help

Road Sediment Delivery

>= than 50%: 51.127

%

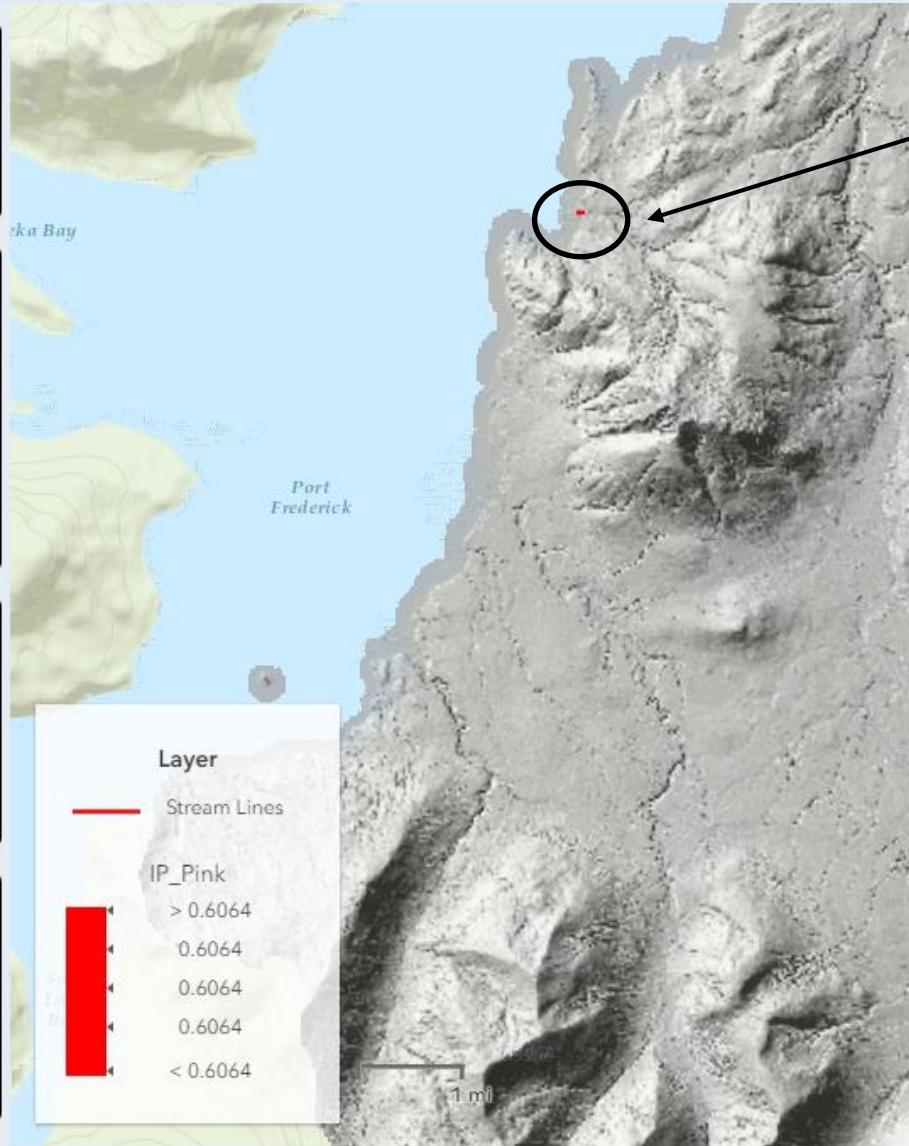
Pink Intrinsic Potential

>= than 49%: 0.598

%

READI >= 51.127 AND IP_Pink >= 0.598

0.18 km of streams.



One stream segment met the search criteria

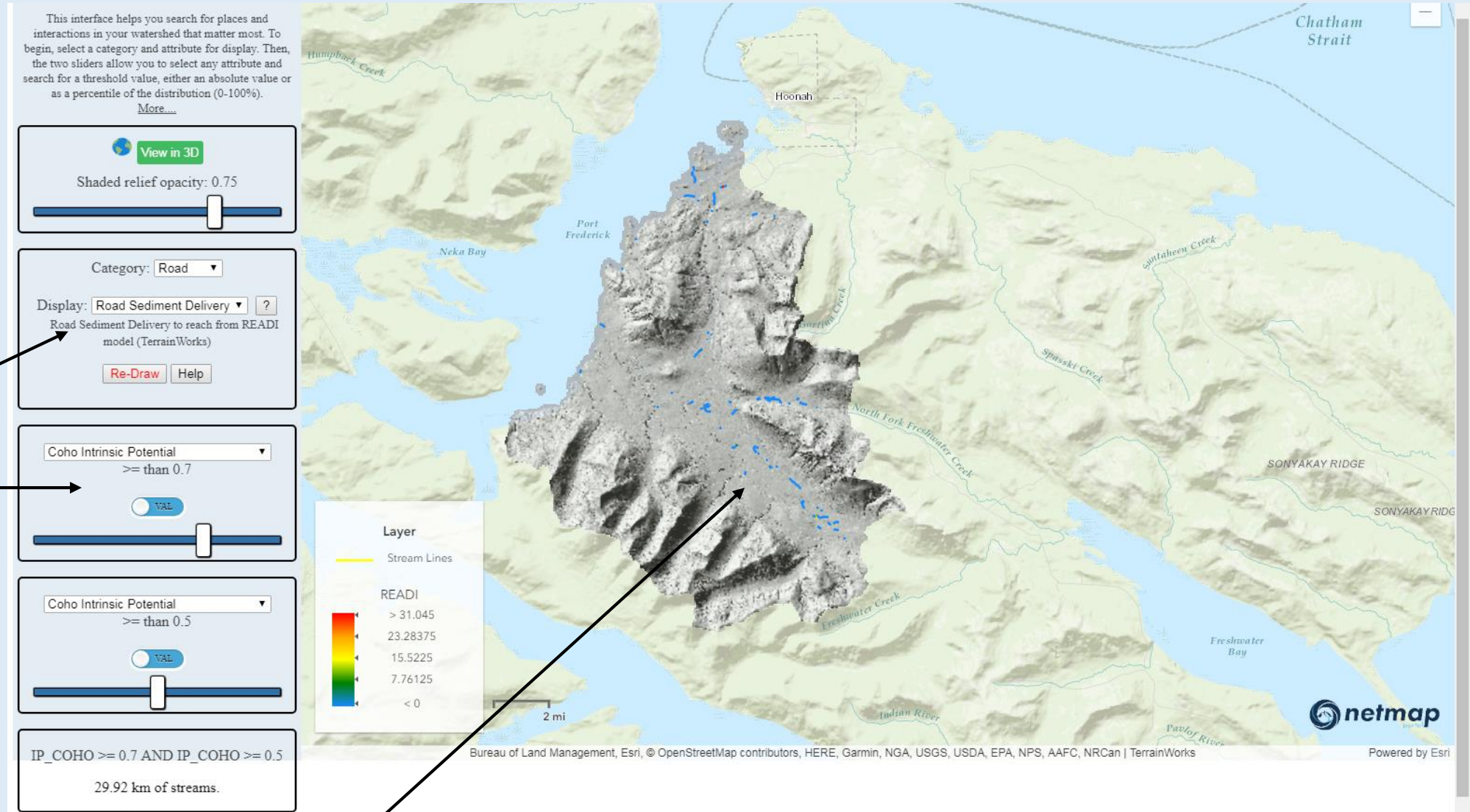
Specifies search criteria

Specifies stream length meeting criteria but only in map view

Another way to use the interface is to determine where a potential stressor – like forest road sediment delivery – interacts with a sensitive fish habitat

Map the stressor

Then map the habitat



Examine how the stressor is distributed according to sensitive fish habitats

Stream Viewer Valley Hillside Viewer Road Viewer

Watershed: Hoonah LiDAR (hnl2) [change](#)

Watershed Analyst includes a complete list of stream attributes that contain numerous riparian, erosion, road, wildfire and climate change attributes, reported to the stream from adjacent hillsides.
[More...](#)

View in 2D or 3D

View in 2D
Shaded relief opacity: 0.75

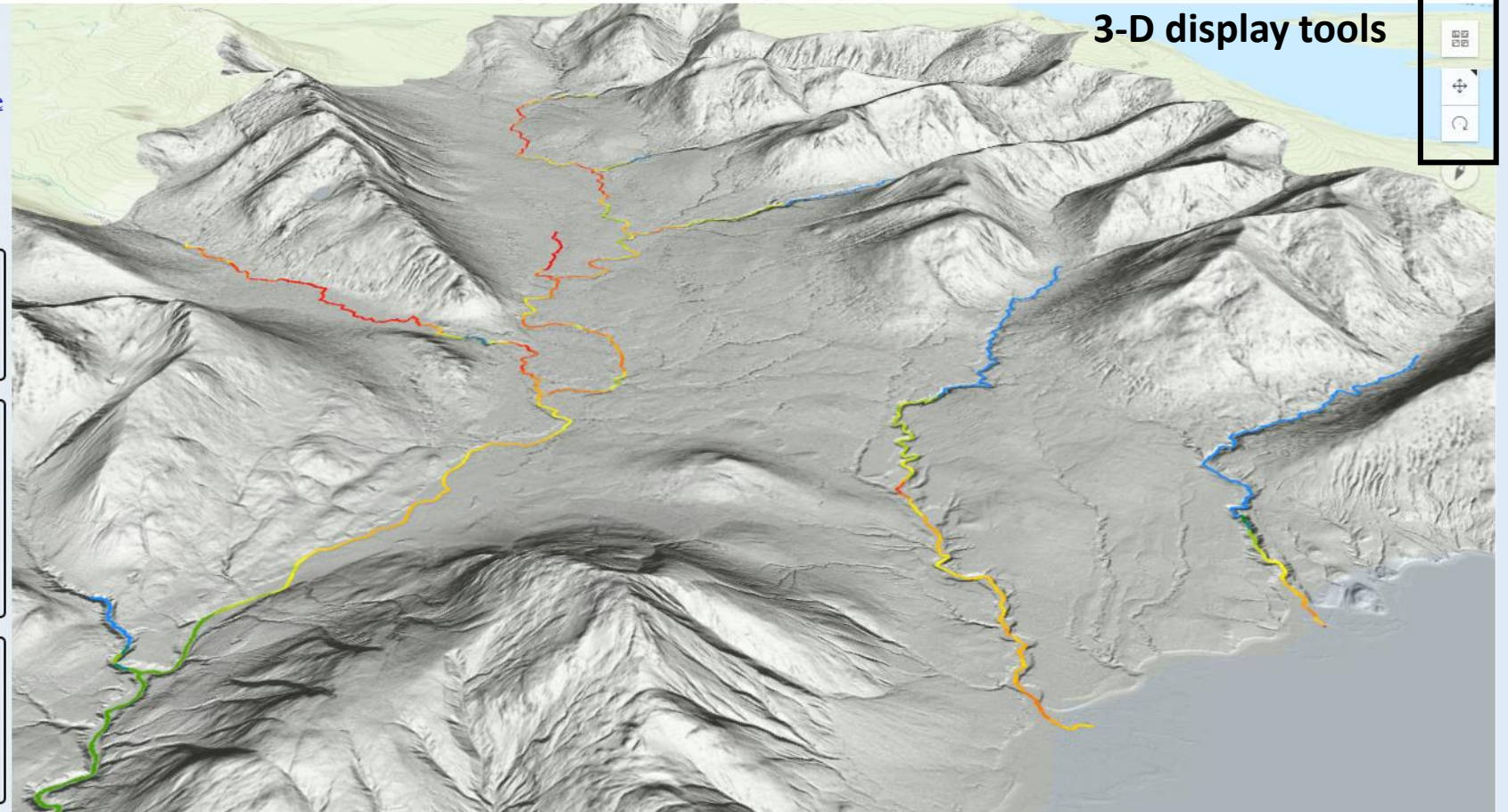
Category: Aquatic ▾

Display: Pink Intrinsic Potential ▾
? Pink salmon fish habitat quality; values range from 0 to 1; with one being the best fish habitat; based on Romey 2017

[Re-Draw](#) [Help](#)

Drainage Area ▾
>= than 5

VAL



3-D display tools

In "Stream Viewer" one can 'click' on a reach and see all reach attribute values

The screenshot displays the NetMap Stream Viewer interface. On the left, there are navigation tabs for 'Stream Viewer', 'Watershed Analyst', 'Valley Hillside', and 'Road Viewer'. The current view is 'Stream Viewer' for the 'Game / SeaGull (hnl2b)' watershed. Below this, there is a 'View in 3D' button and a slider for 'Shaded relief opacity: 0.75'. Further down, a 'Category' dropdown is set to 'Aquatic', and a 'Display' dropdown is set to 'Coho Intrinsic Potential'. A descriptive text explains that Coho salmon habitat quality values range from 0 to 1, with 1 being the best habitat. There are 'Re-Draw' and 'Help' buttons at the bottom of this section.

The main map area shows a topographic view of a watershed with a stream network highlighted in yellow. A black arrow points to a specific reach on the stream. A data table is overlaid on the right side of the map, titled 'Stream name:'. The table contains the following attributes and values:

Attribute	Value
OBJECTID	5329
AREA_SQKM	15.28
ELEV_M	93.897
GRADIENT	0.011
STRM_ORDER	5
MEANANNCMS	1.4182
WIDTH_M	12.5677
DEPTH_M	0.3971
FP_WIDTH	104.04
StrmPow	981.886
BeavHab	1
IP_COHO	0.8847
IP_Chinook	0.7965
IP_Steelhd	0.6433

“Valley/Hillside” Map Navigation Panel



Stream Viewer Valley Hillside Viewer Road Viewer

Watershed: Hoonah LiDAR (hnl2) [change](#)

Valley/Hillside includes grid (raster) and polygon data on several hillside erosion attributes and valley floors and floodplains. Erosion attributes can include shallow landslide potential, debris flow potential and gully erosion. Floodplains are mapped at several levels above the channel.



Shaded relief opacity: 0.5



Select Layer

Landslide Potential

Landslide Potential: Dimensionless index of erosion potential

100 - high risk



0 - low risk

Landslide Potential Opacity: 0.9

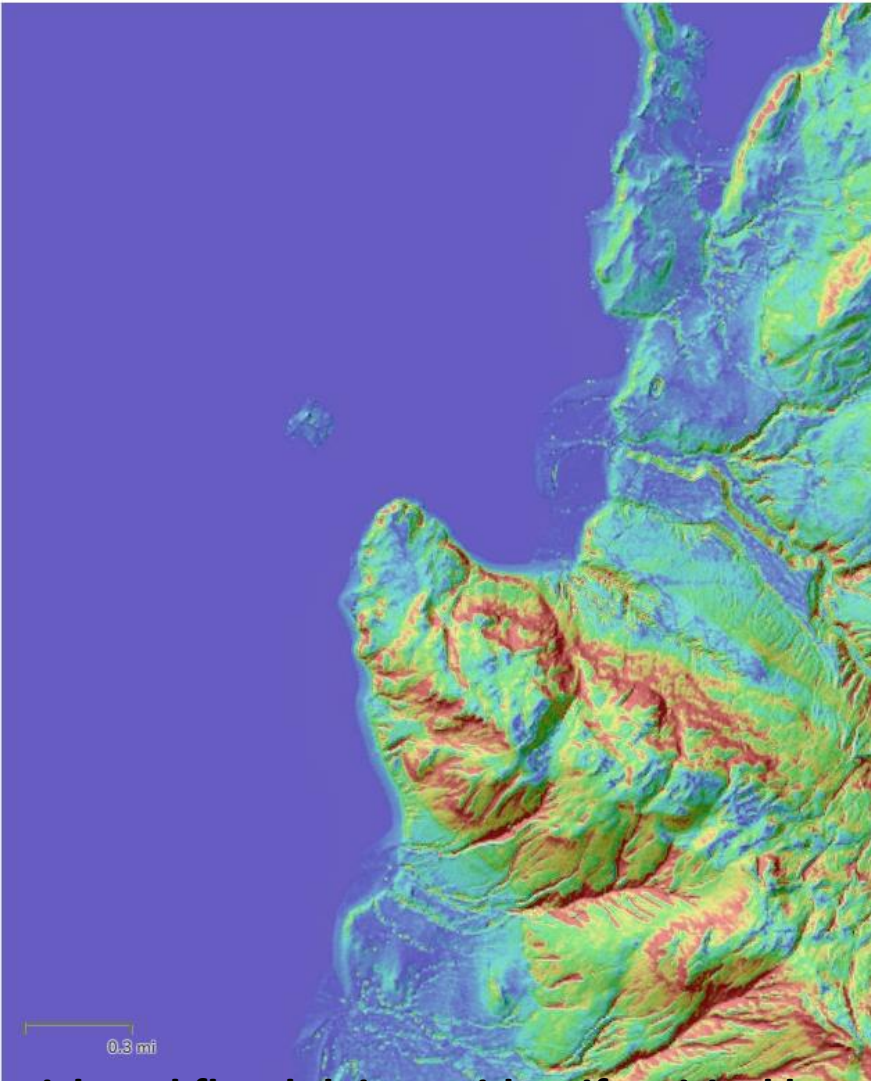


Show Streams & Roads

Enable Tooltips

source: 2m LiDAR
Project Funded By:

[Natural Resource Conservation Service](#)

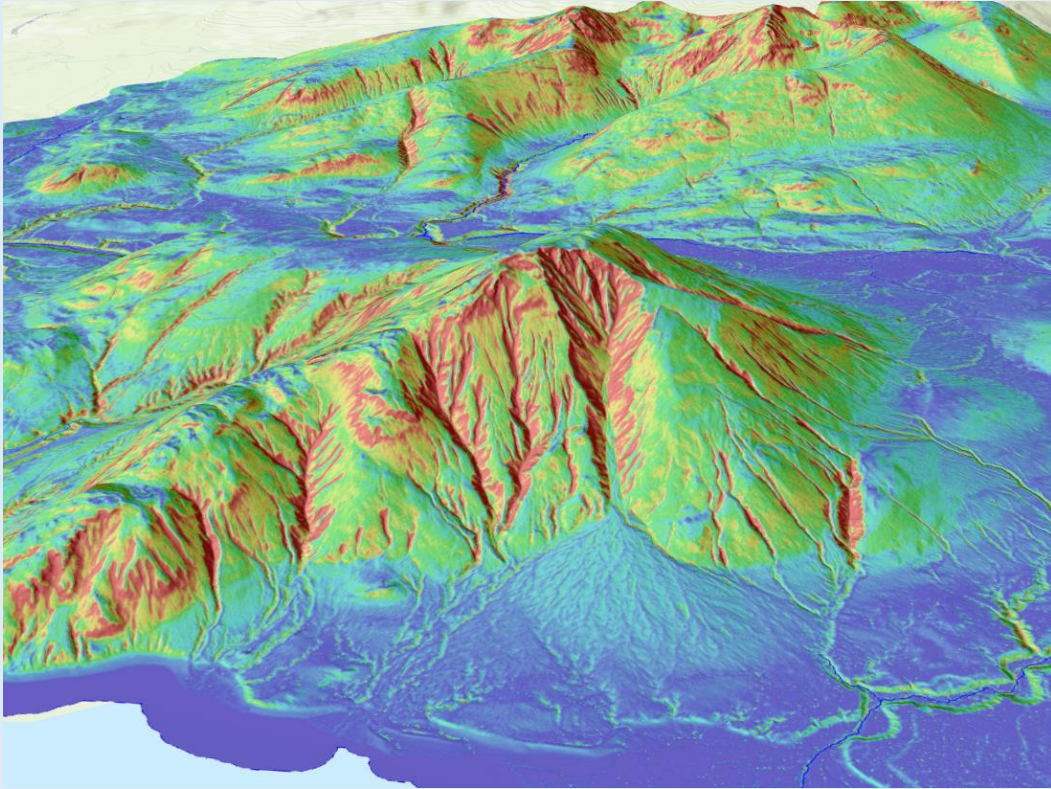


This map interface displays several different kinds of data including slope stability, valley floors and floodplains

Note – for debris flow or flash flood predictions (available in some datasets) refer to the ‘Stream Viewer’ and choose the ‘Erosion’ data category.

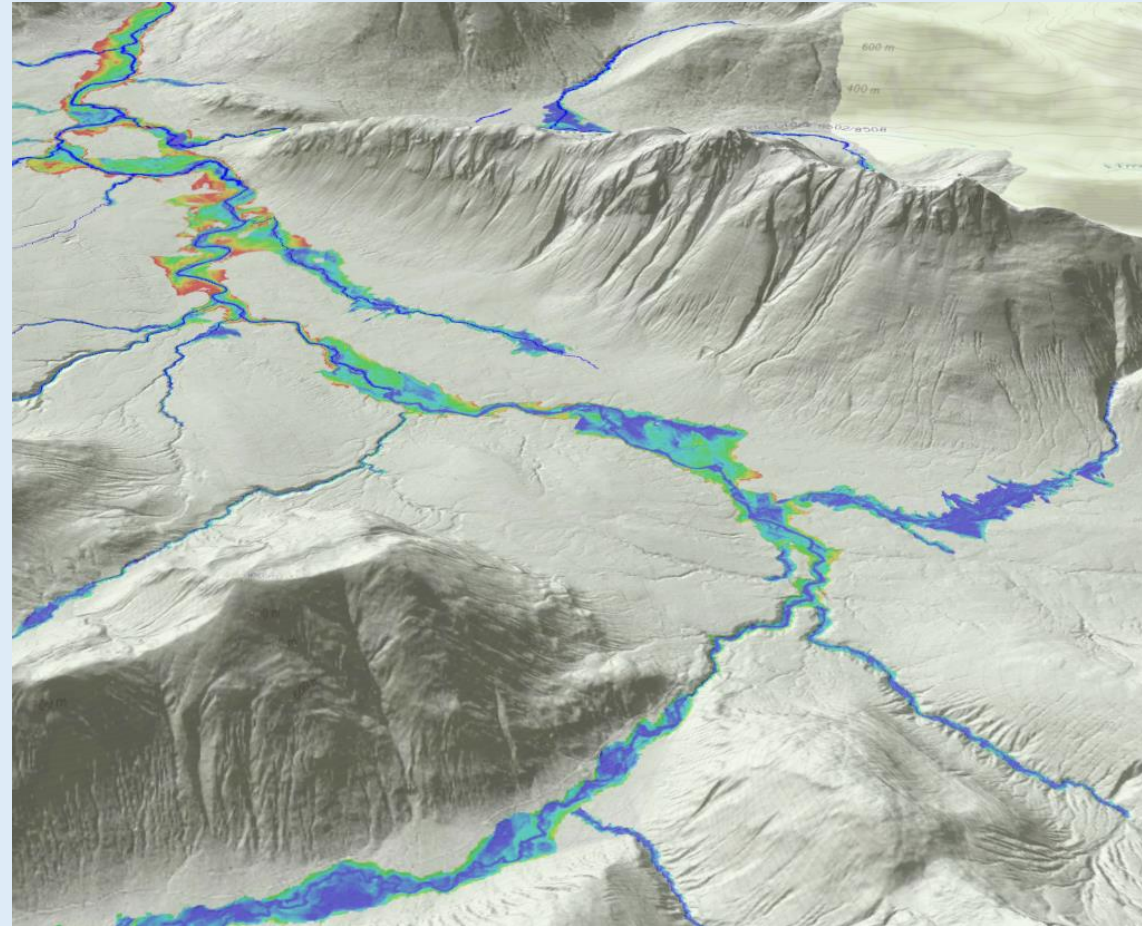
Overlay roads onto landslide risk and floodplains to identify critical locations

“Valley/Hillside” Map Navigation Panel – see Landslide Potential and Valley Floor/Floodplains in 3-D



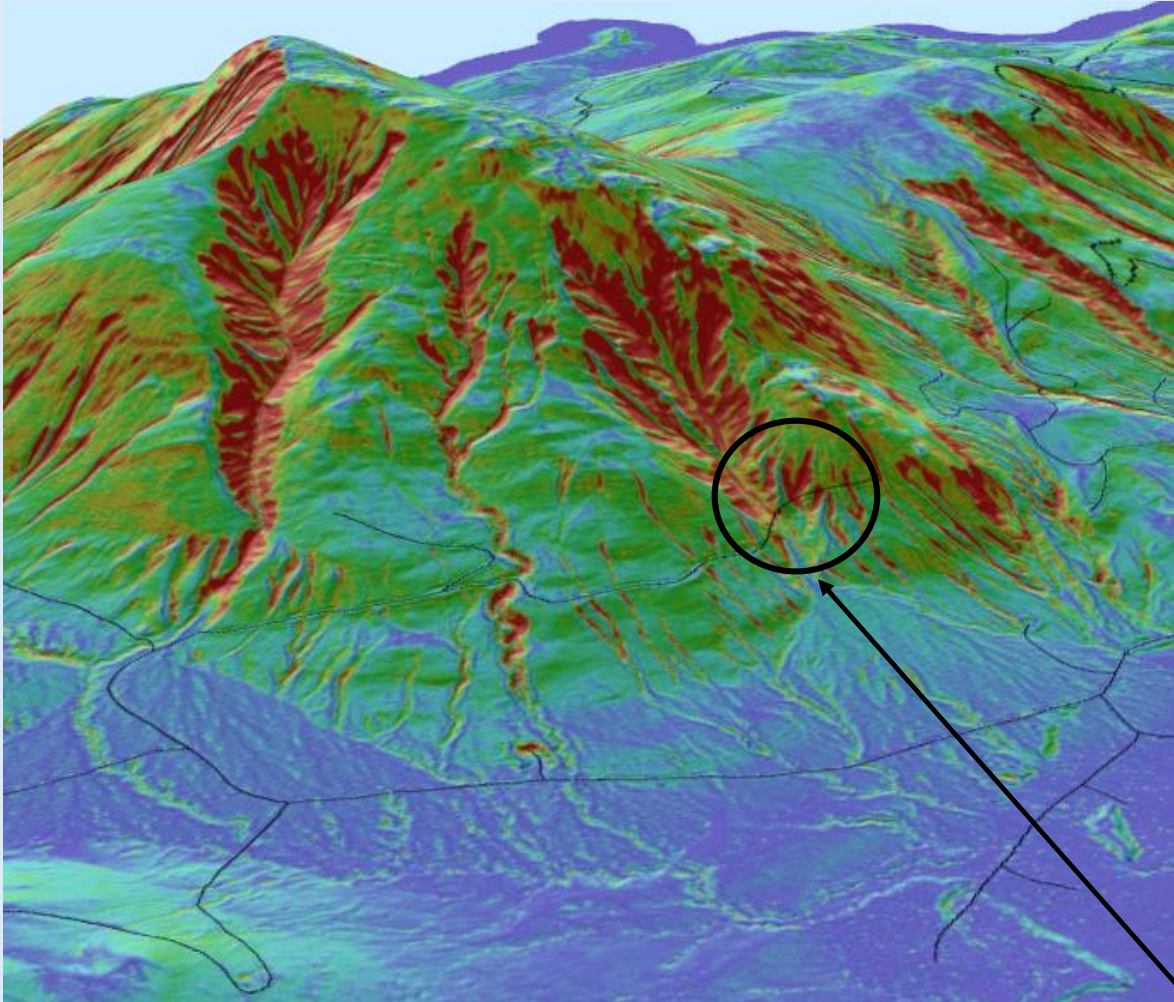
Landslide Potential

Floodplains

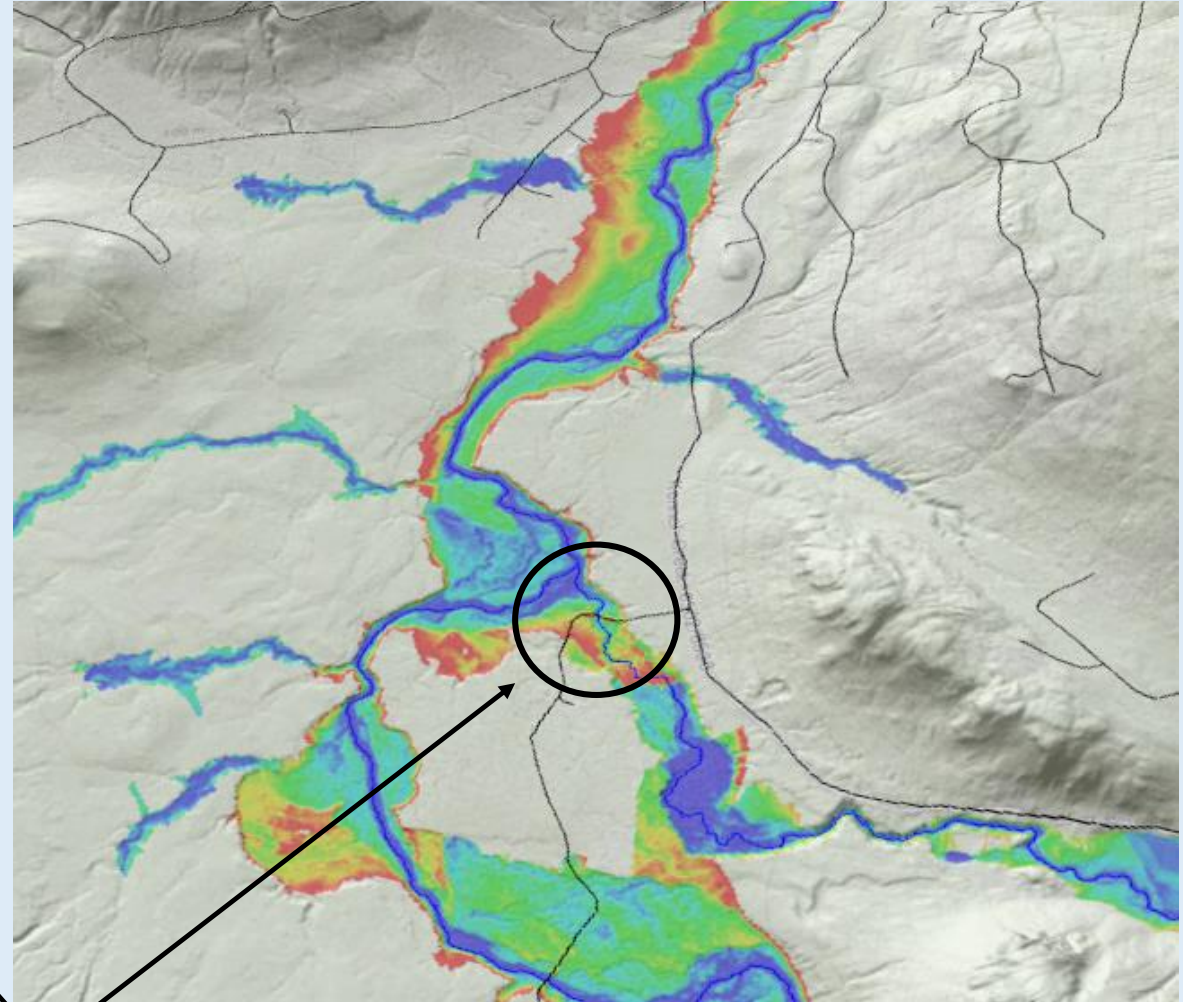


“Valley/Hillside” Map Navigation Panel Locate road – landscape interactions

Landslide Risk



Flood Risk



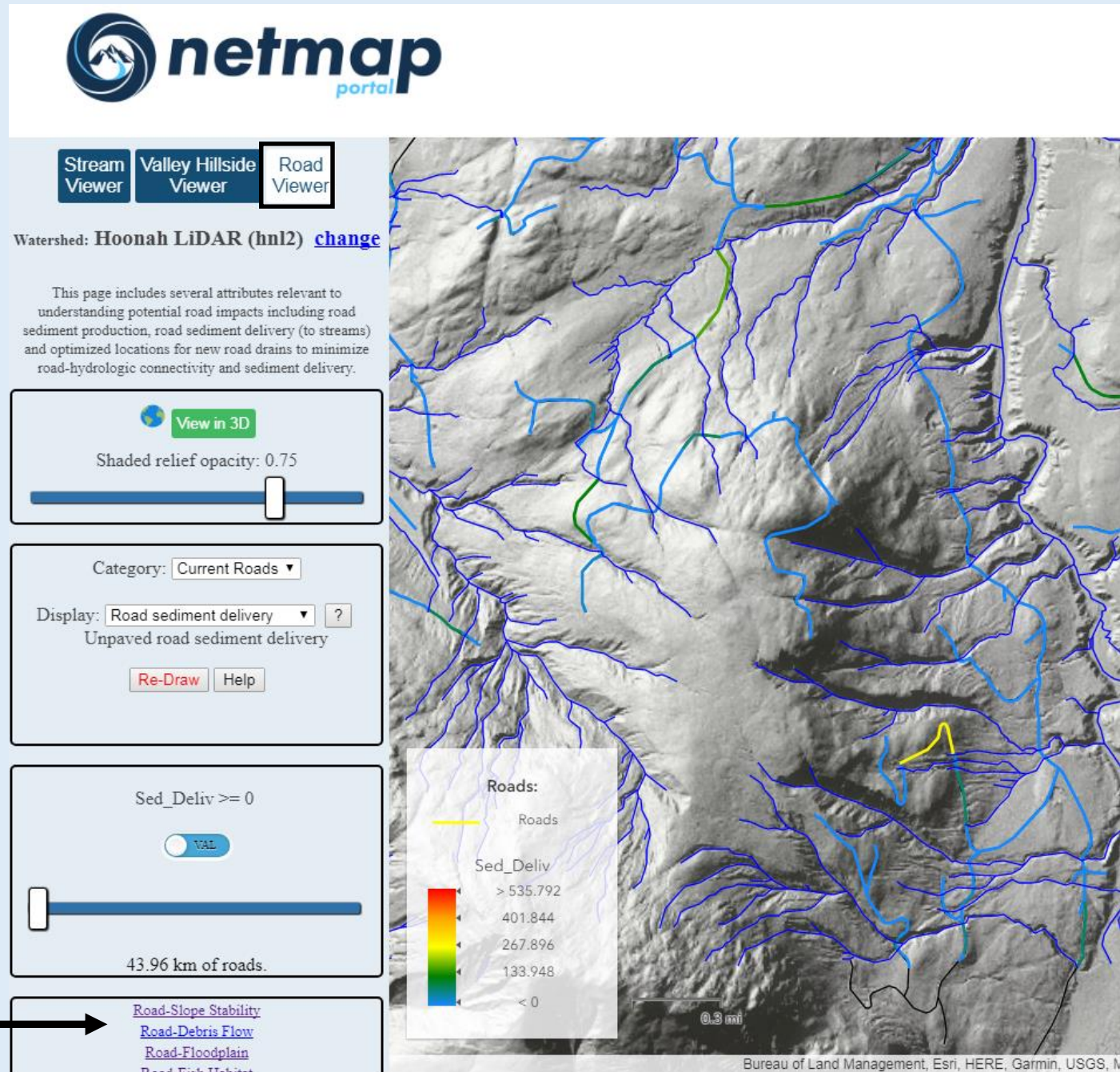
Potentially sensitive road locations

“Road Viewer” Map Navigation Panel

This map interface contains predictions for forest road runoff and sediment delivery to stream channels.

It also contains predictions about the most optimum locations to place new drains to maximize reductions in sediment delivery.

See other ways to compare roads to watershed features



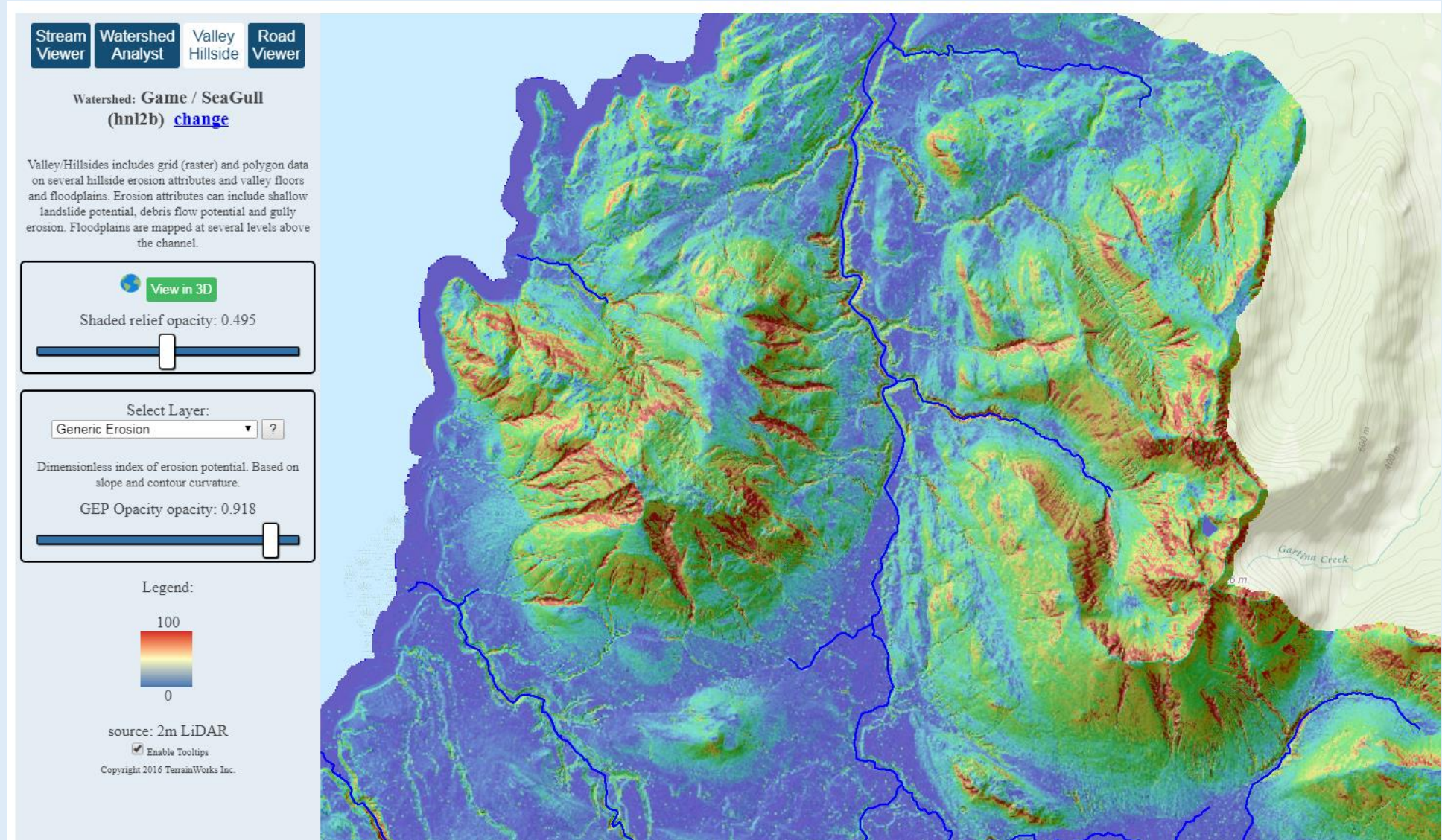
- [Road-Slope Stability](#)
- [Road-Debris Flow](#)
- [Road-Floodplain](#)
- [Road Fish Habitat](#)

Printing a Map

Just use a screen shot to capture the image and the legend. For many purposes this should be suitable.

People with NetMap analyses in their watersheds and or have a subscription to NetMap tools have access to all map GIS shapefiles and can use those to create custom, high resolution images.

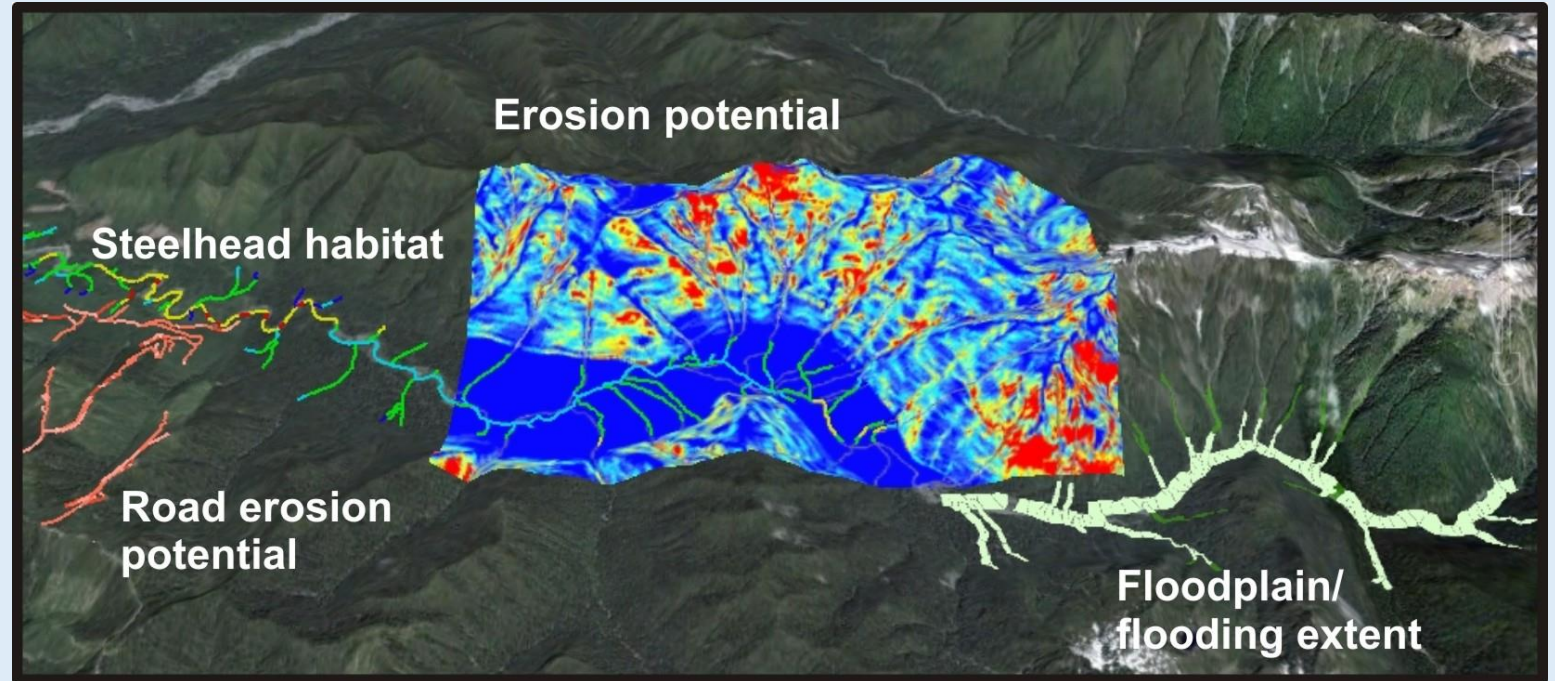
If you would like to access the shapefiles for your watershed to create higher resolution or custom maps, please [contact us](#).



Upgrade Your Watershed using the Highest Resolution Digital Elevation Model and More Advanced Analyses

Note – many NetMap datasets across the western US are based on 10 m DEMs and do not contain many of the latest analyses including:

- use of 1 m LiDAR
- detailed valley and floodplain mapping
- riparian processes (shade-thermal energy, new shade effectiveness, in-stream wood recruitment and thermal refugia)
- forest road analyses



These upgrades can be made in your watershed for very reasonable cost, please [contact us](#).

See the difference between LiDAR and 10 m DEMs in NetMap's watershed attributes [here](#)

With the latest DEMs and the most advanced analyses using NetMap and NetMap Portal, you become the watershed expert!

To learn more about virtual watersheds and NetMap, go www.terrainworks.com

