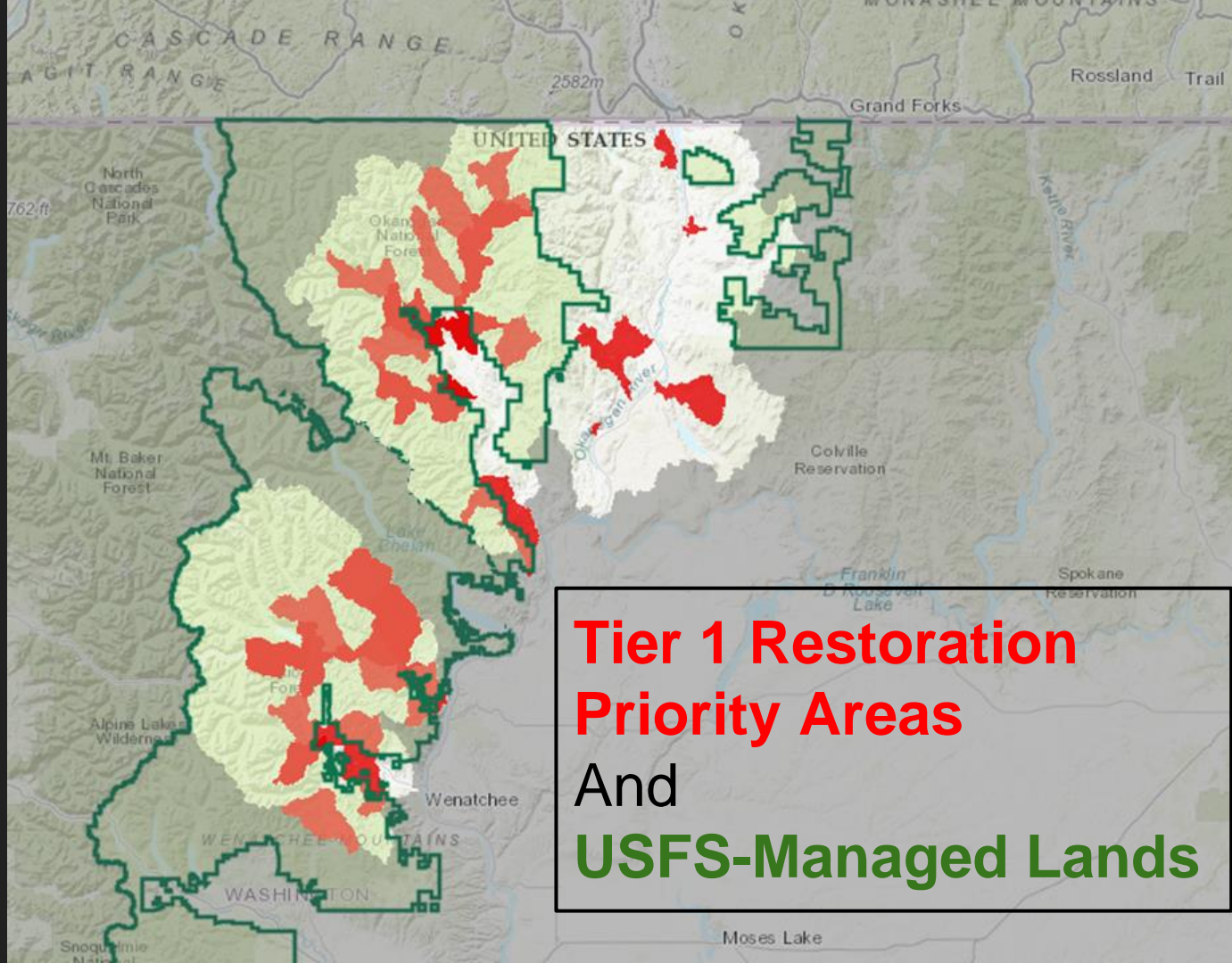




Snow2Flow in the Upper Columbia

**Upper Columbia Salmon Recovery Board
Columbia River Policy Advisory Group (CRPAG)
Quarterly Meeting
December 7, 2021**



**Tier 1 Restoration
Priority Areas
And
USFS-Managed Lands**

A large, textured tree trunk stands on the left side of a river. The river flows through a dense forest of green trees and ferns. The water is turbulent, creating white rapids. The text is overlaid on the right side of the image.

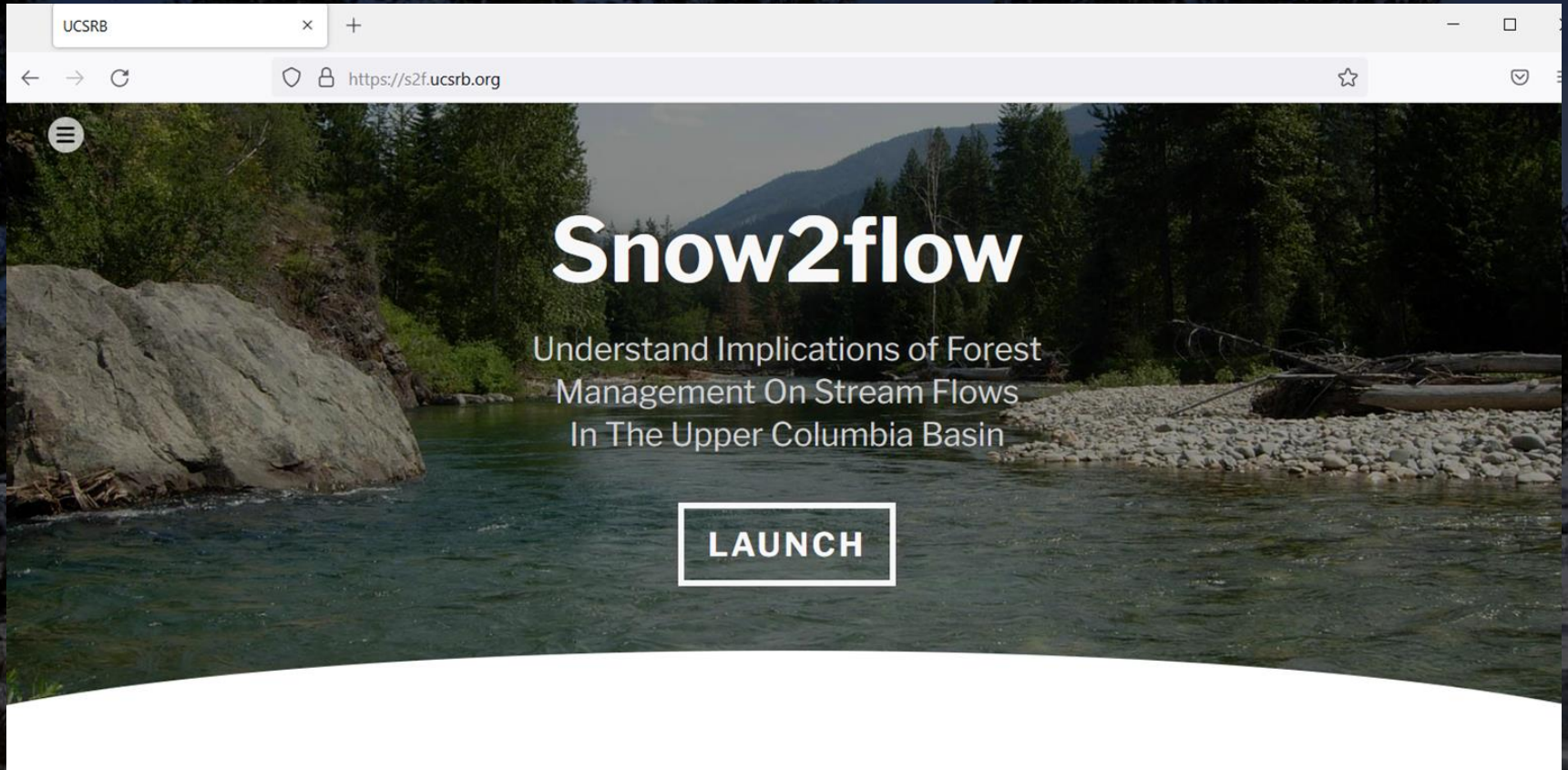
Upper Columbia Salmon Prioritization

- 191 priority reaches
- 85% reaches limited by streamflow
- 75% reaches limited by temperature

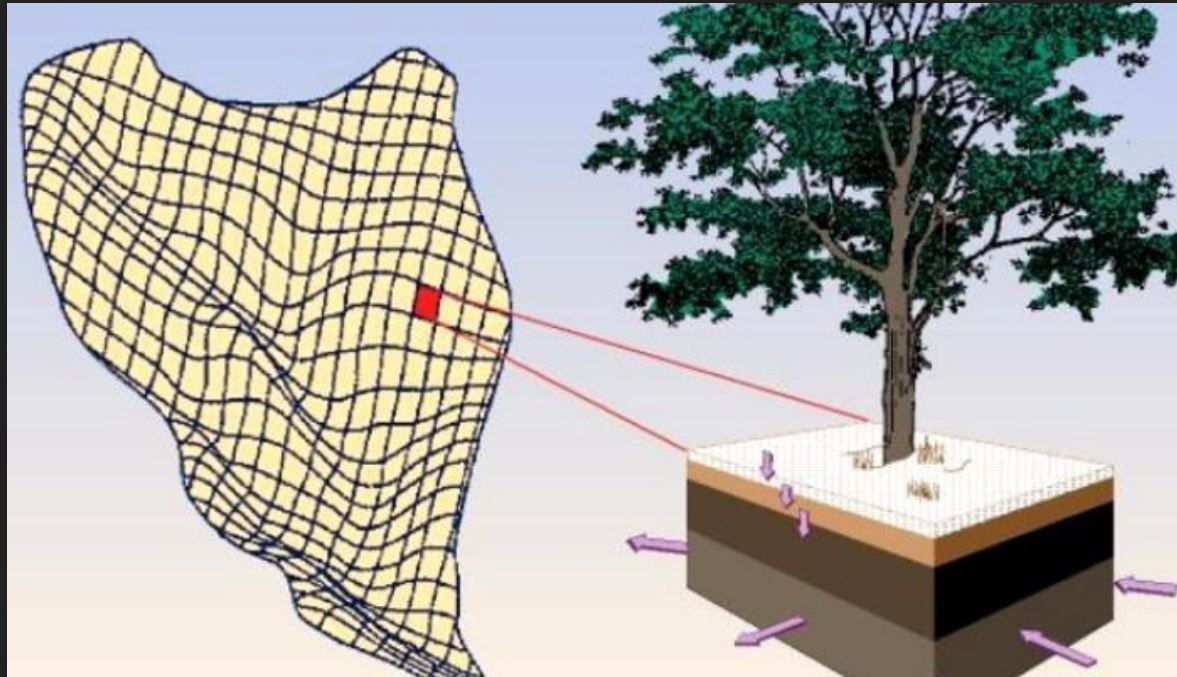
Goal for Snow2Flow

Tool for partners to explore how forest management can enhance streamflow in the Upper Columbia

What is Snow2Flow?



Distributed Hydrology Soil and Vegetation Model (DHSVM)

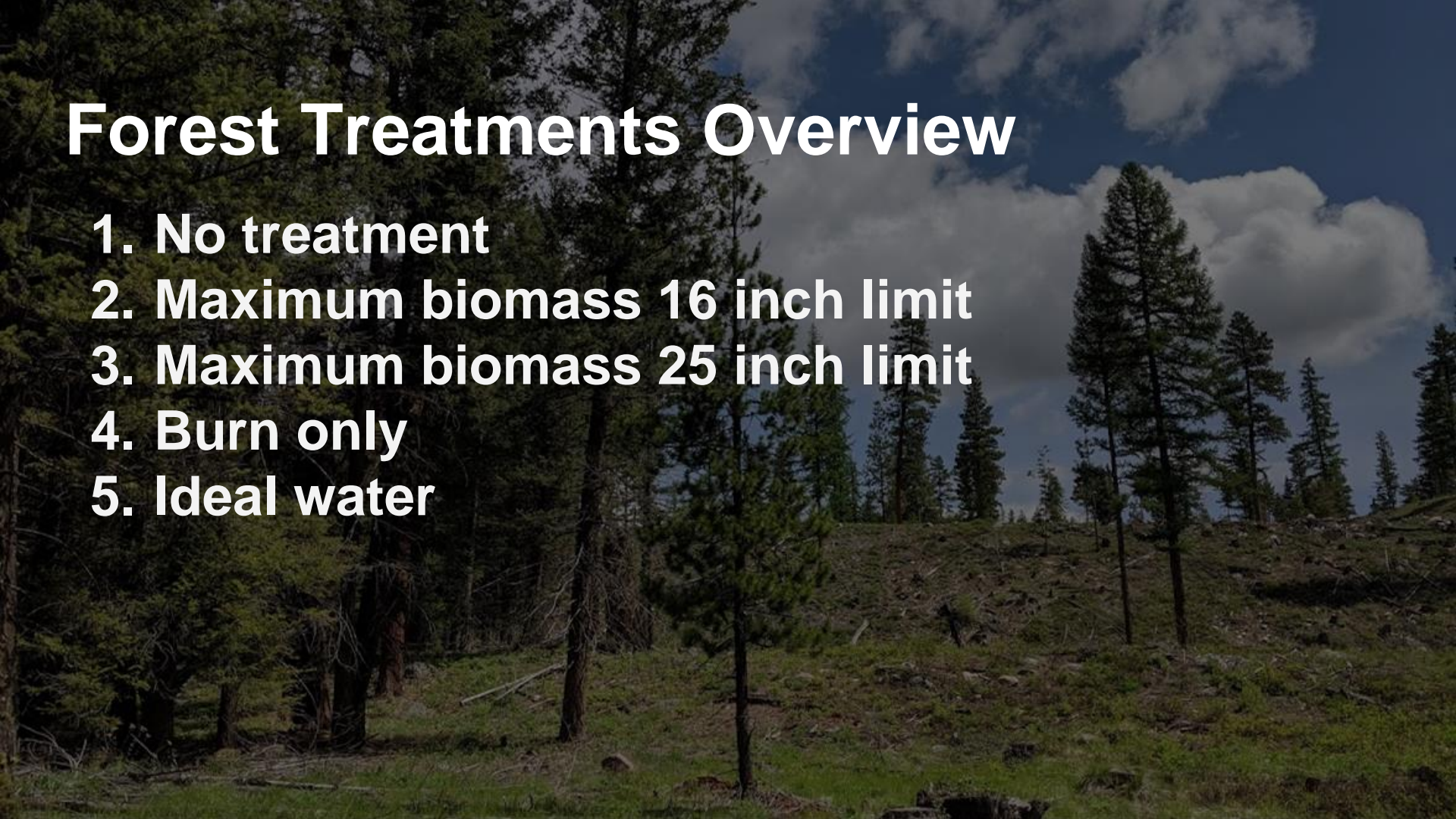


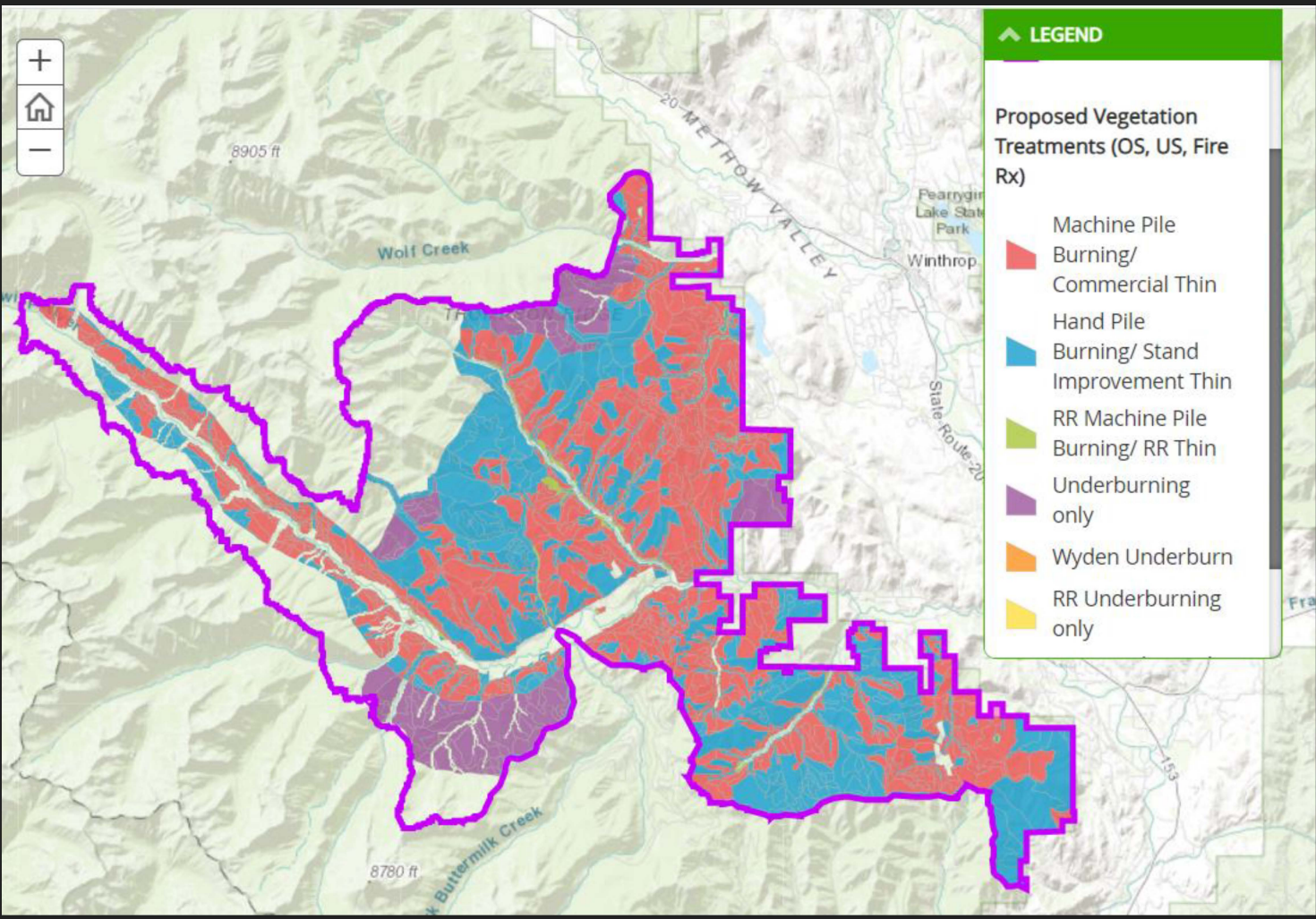
DHSVM benefits:

1. Incorporates different sub-daily weather, aspect, etc.
2. Simulates sub-daily flow
3. Dry, average, and wet year simulation

Forest Treatments Overview

1. No treatment
2. Maximum biomass 16 inch limit
3. Maximum biomass 25 inch limit
4. Burn only
5. Ideal water



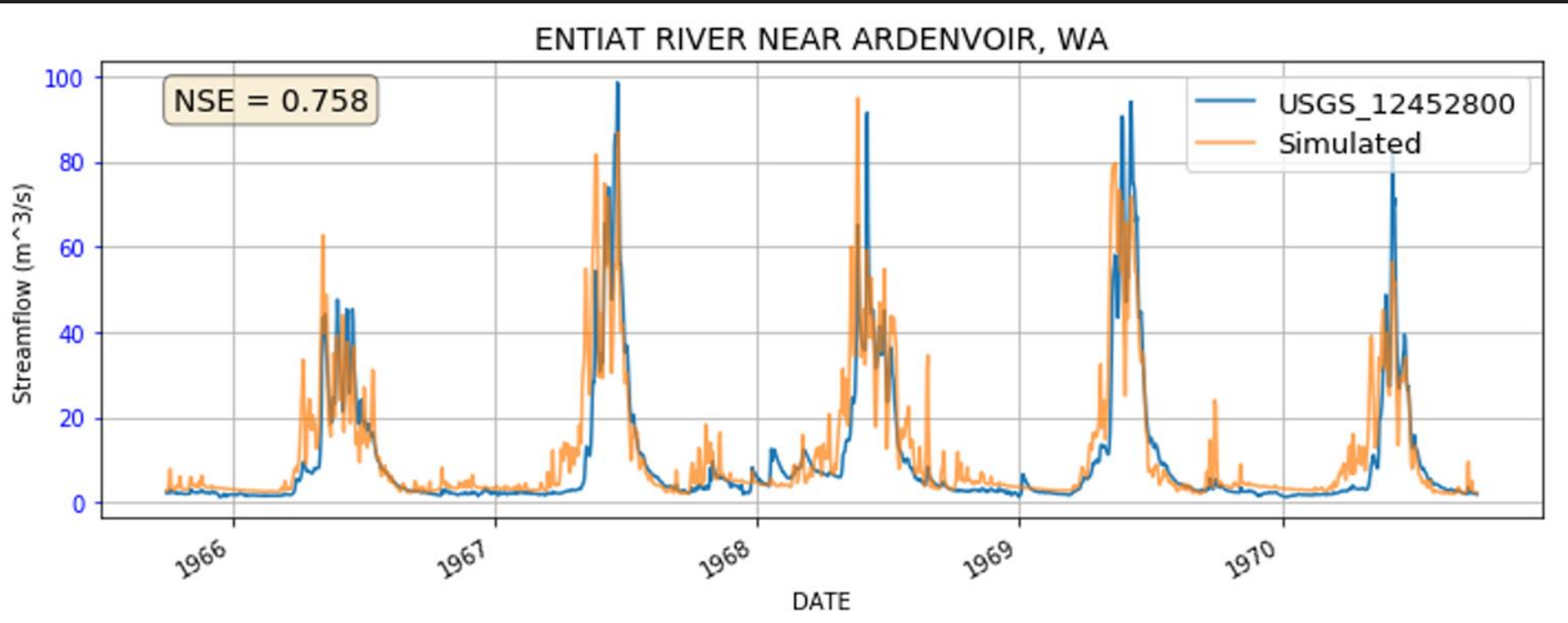


▲ LEGEND

Proposed Vegetation Treatments (OS, US, Fire Rx)

- Machine Pile
- Burning/ Commercial Thin
- Hand Pile
- Burning/ Stand Improvement Thin
- RR Machine Pile
- Burning/ RR Thin
- Underburning only
- Wyden Underburn
- RR Underburning only

DHSVM Results

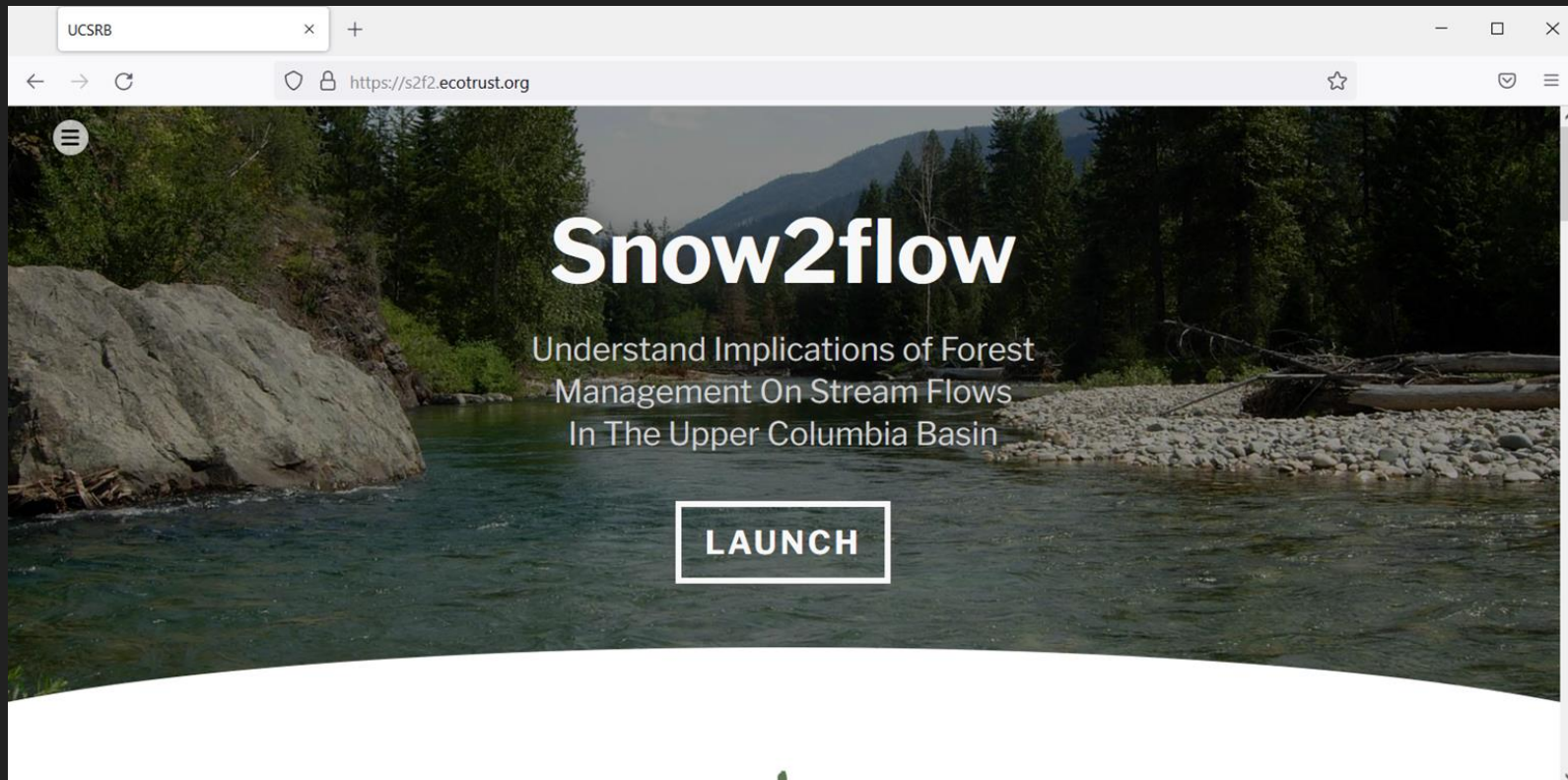


DHSVM Results

Nash Sutcliffe Efficiency:

1. Wenatchee: 0.796
2. Entiat: 0.758
3. Methow: 0.630,
 - a. 0.879 (monthly)
4. Okanogan: lacked continuous observations

Snow2Flow Interface

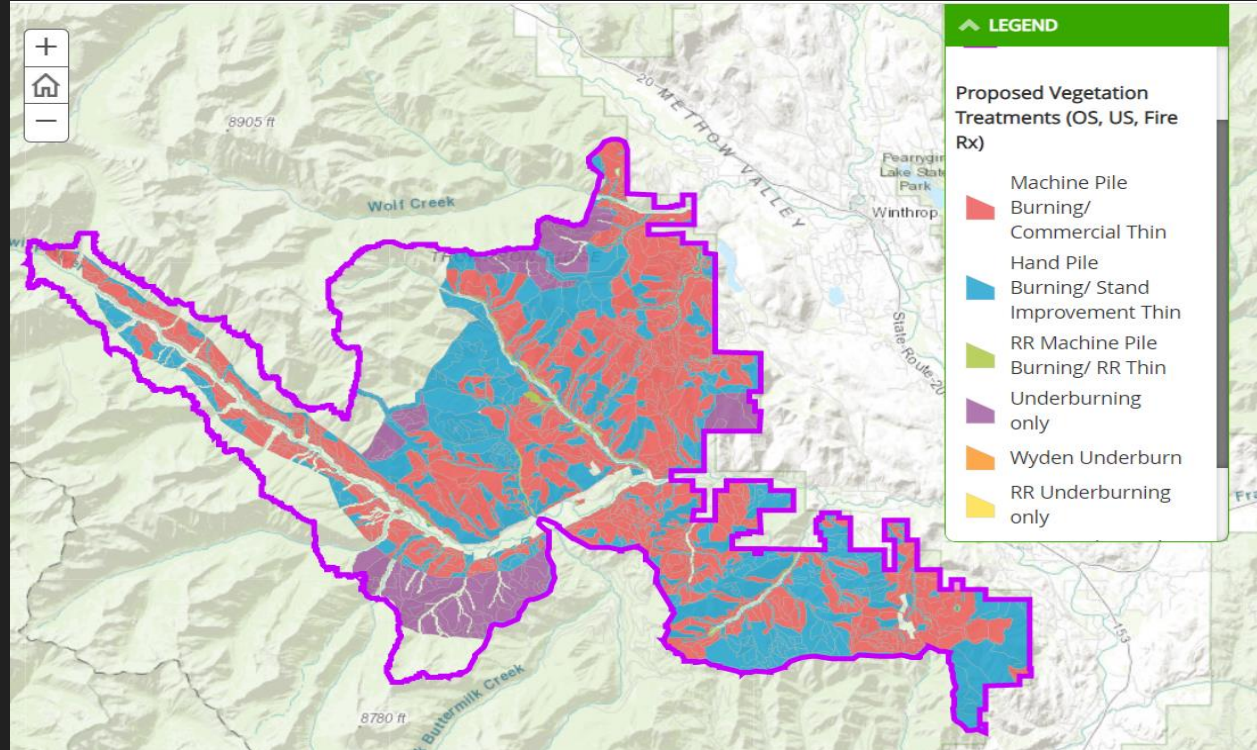


Snow2Flow Interface

Two Primary Pathways:

- 1. Draw treatments**
- 2. Upload treatments**

Example: Twisp River Restoration Project



Snow2Flow Moving Forward

- 1. Outreach to partners**
- 2. Watershed Program**

A dark, atmospheric landscape photograph of a mountain valley. In the foreground, a river flows through a valley floor covered in snow or light-colored earth. The middle ground is filled with a dense forest of evergreen trees. In the background, rugged mountains with snow-capped peaks rise against a cloudy sky. The overall tone is dark and moody, with the text 'Feedback and Questions?' overlaid in the center in a bright white font.

Feedback and Questions?

Updates Walk Through: Screen shots



Snow2flow

Understand Implications of Forest
Management On Stream Flows
In The Upper Columbia Basin

LAUNCH



Direct Forest Restoration Activities to



Filter forest regions



Define treatments

load saved

Start by deciding how you want to interact with the map.

Can't decide?





Draw or Upload?



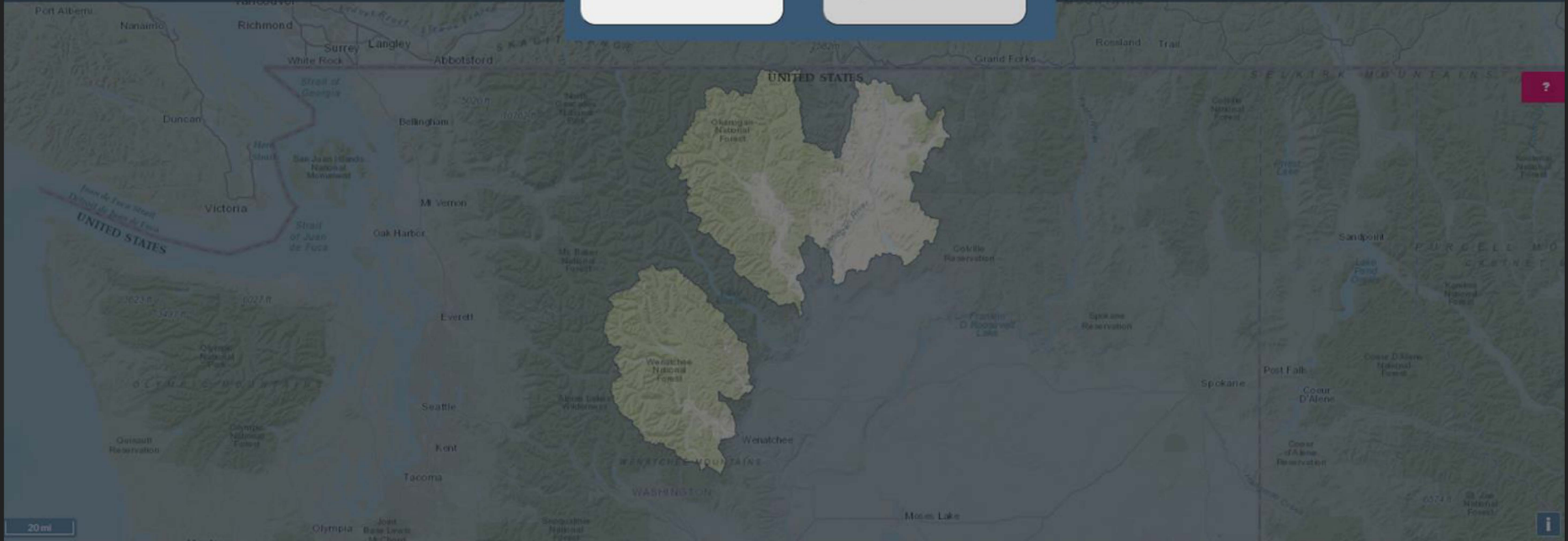
Draw treatments



Upload treatments

load saved

start over



20 mi





Upload Your Treatment



Zipped Shapefile: No file chosen

Treatment Name:

Treatment Description:

Shapefile Projection (Optional):

Select a default treatment prescription:

- No Treatment ?
- Maximum Biomass 16 Inch Limit ?
- Maximum Biomass 25 Inch Limit ?
- Burn Only ?
- Ideal Water ?

You will be able to assign different treatment prescriptions to each treatment area later

load saved

start over

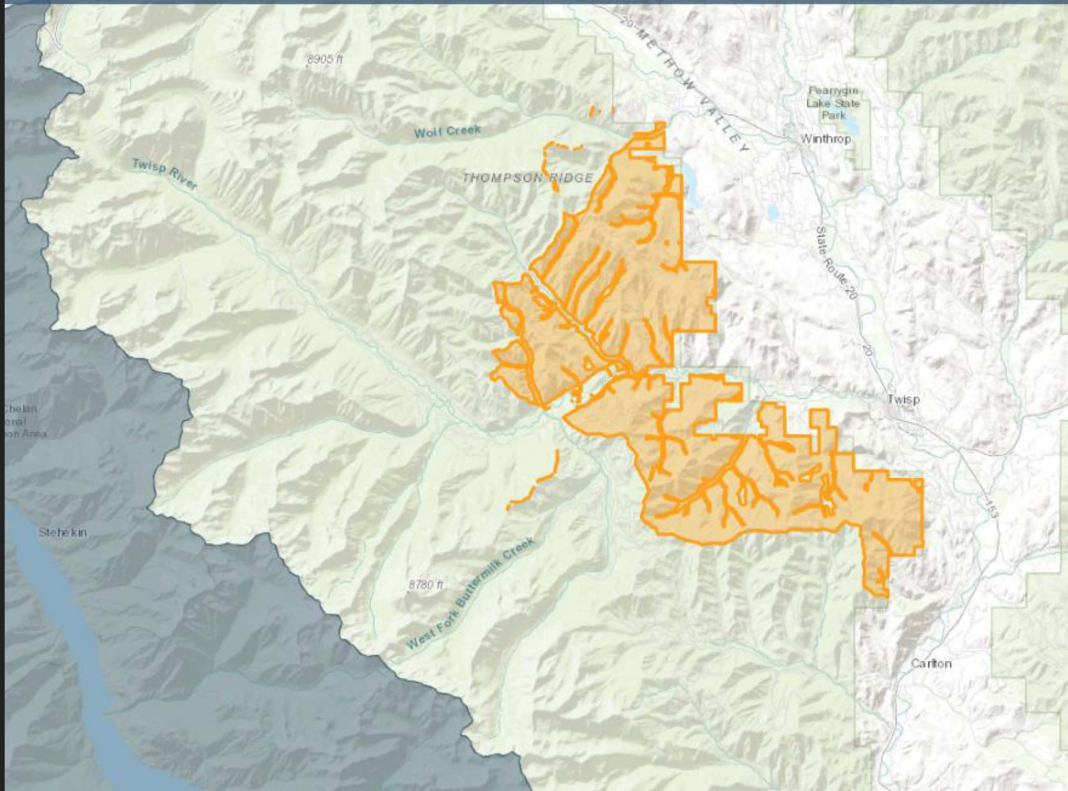




load saved

start over

Select which areas you wish to change treatment prescriptions for.



Assign Prescriptions

Click to select one or more treatment areas then apply your desired prescription.

0 treatments selected.

Select All

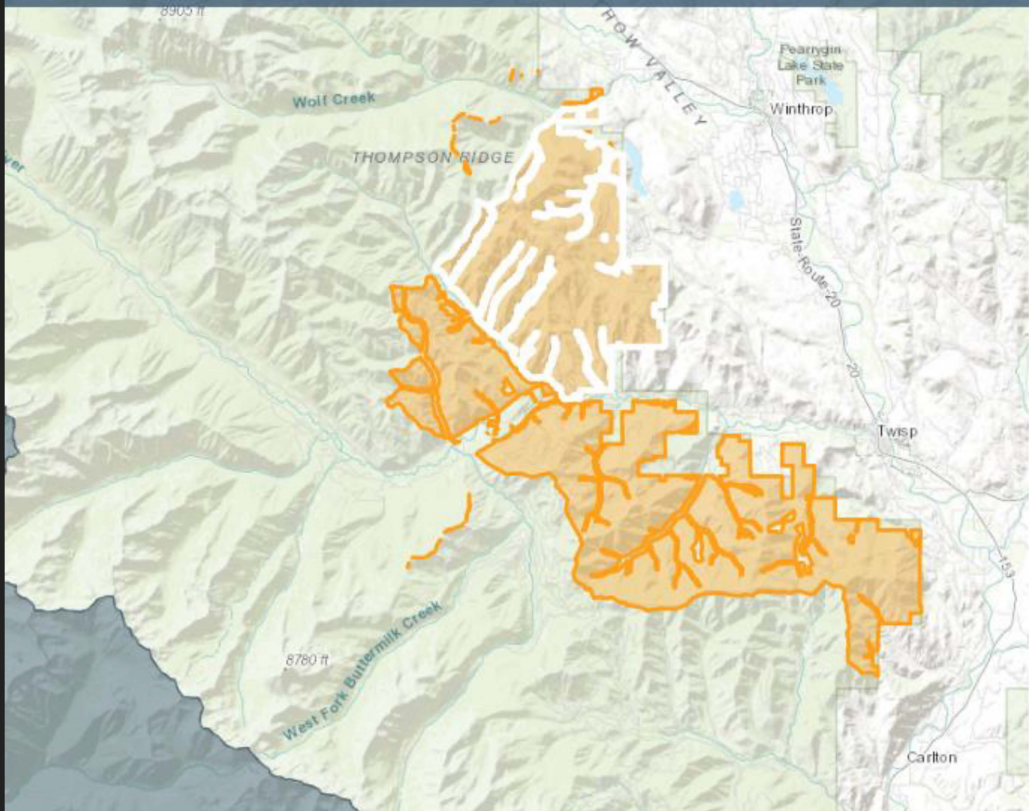
Clear Selection

- Apply No Treatment ⓘ
- Apply Maximum Biomass 16-inch ⓘ
- Apply Maximum Biomass 25-inch ⓘ
- Apply Burn Only ⓘ
- Apply Ideal Water Flow ⓘ

Save And Report



Select which areas you wish to change treatment prescriptions for.



Assign Prescriptions

Click to select one or more treatment areas then apply your desired prescription.

1 treatments selected.

Select All

Clear Selection

Apply

No Treatment



Apply

Maximum Biomass 16-inch



Apply

Maximum Biomass 25-inch

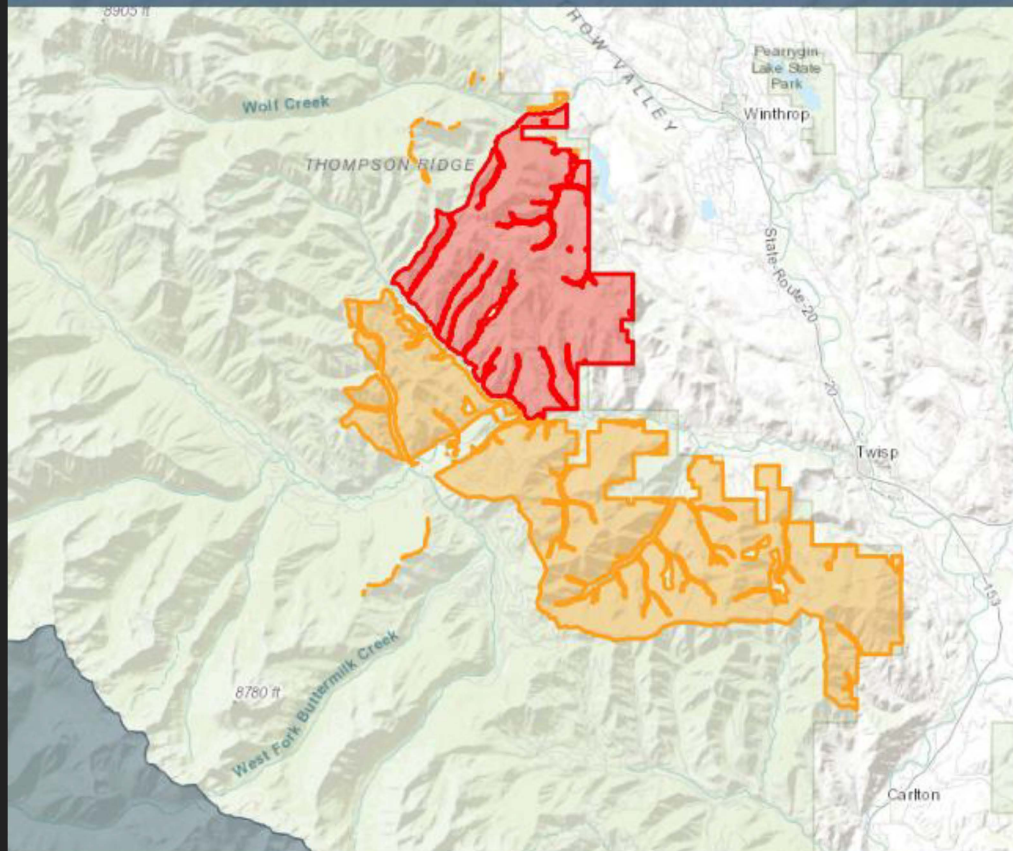


Apply

Burn Only



Select which areas you wish to change treatment prescriptions for.



Assign Prescriptions

Click to select one or more treatment areas then apply your desired prescription.

0 treatments selected.

Select All

Clear Selection

Apply No Treatment



Apply Maximum Biomass 16-inch



Apply Maximum Biomass 25-inch



Apply Burn Only





Flow Results



Forest Management Summary

load saved

start over



Your hydrologic results



Twisp_Mgmt



Summary

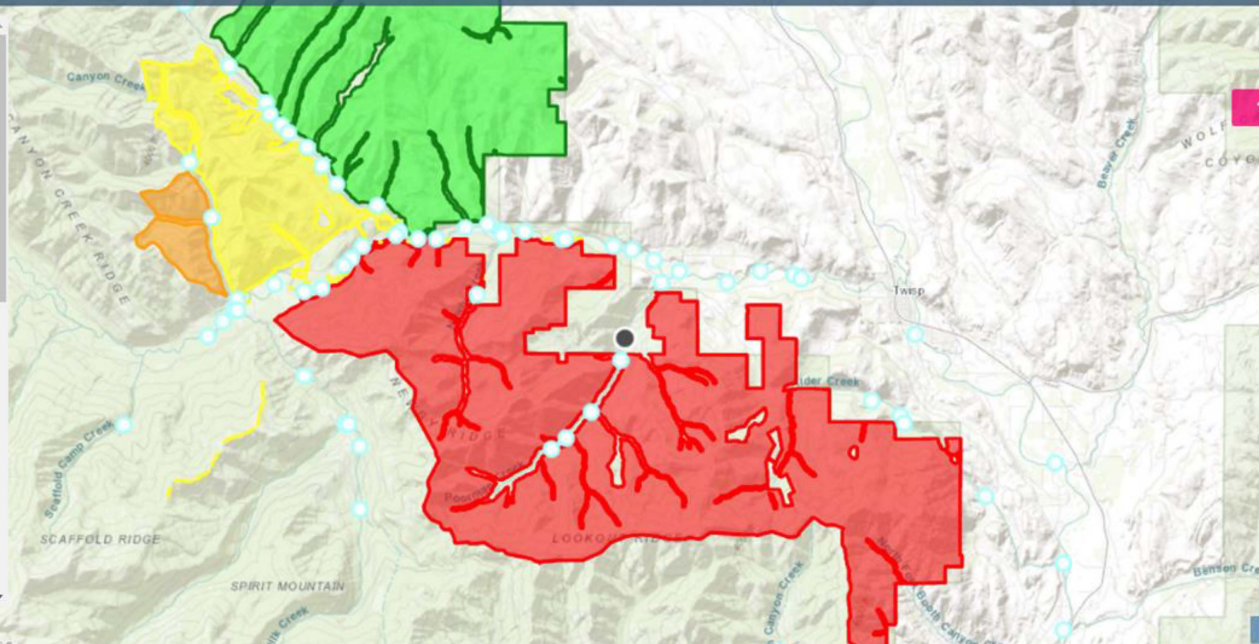
Summary Report

Basin Characteristics

Total area upslope of this gauging station	6146.27 acres
Total forested area upslope	4375 acres
Baseline water yield	0.21 inches/year
Baseline average annual flow	0.15 CFS
Baseline September mean flow	0.08 CFS
Baseline September median 7 day avg low flow	0.08 CFS

Hydrologic Characteristics

Change in average annual flow from proposed management



2mi

baseline September median 7 day avg low flow

0.06

CFS

Hydrologic Characteristics

Change in average annual flow from proposed management

- dry	+0.01	CFS
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- normal	+0.04	CFS
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- wet	+0.06	CFS
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Change in average September flow from proposed management

- dry	+0.01	CFS
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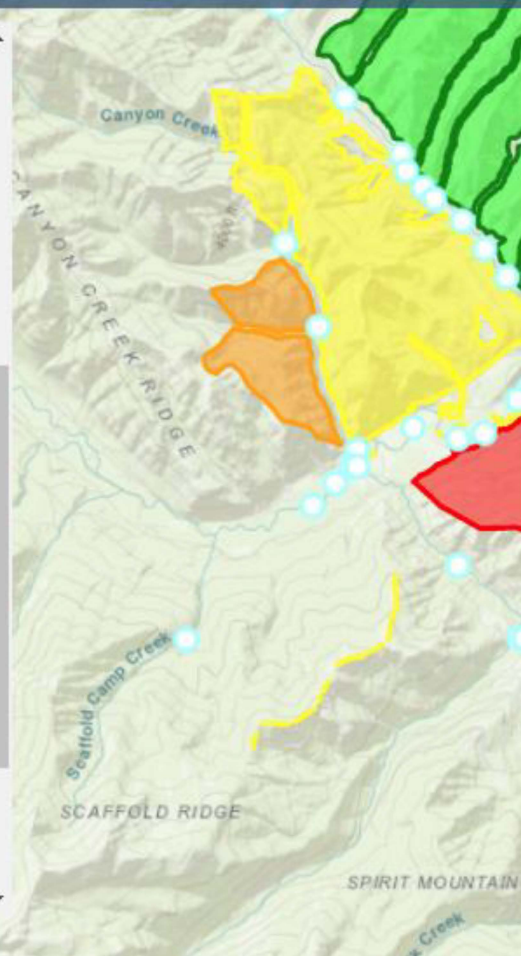
- normal	+0.02	CFS
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- wet	+0.04	CFS
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Change in Sept. 7-day low flow from proposed management

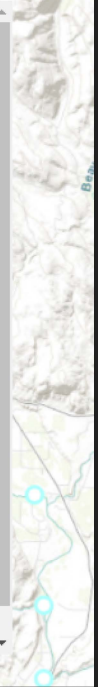
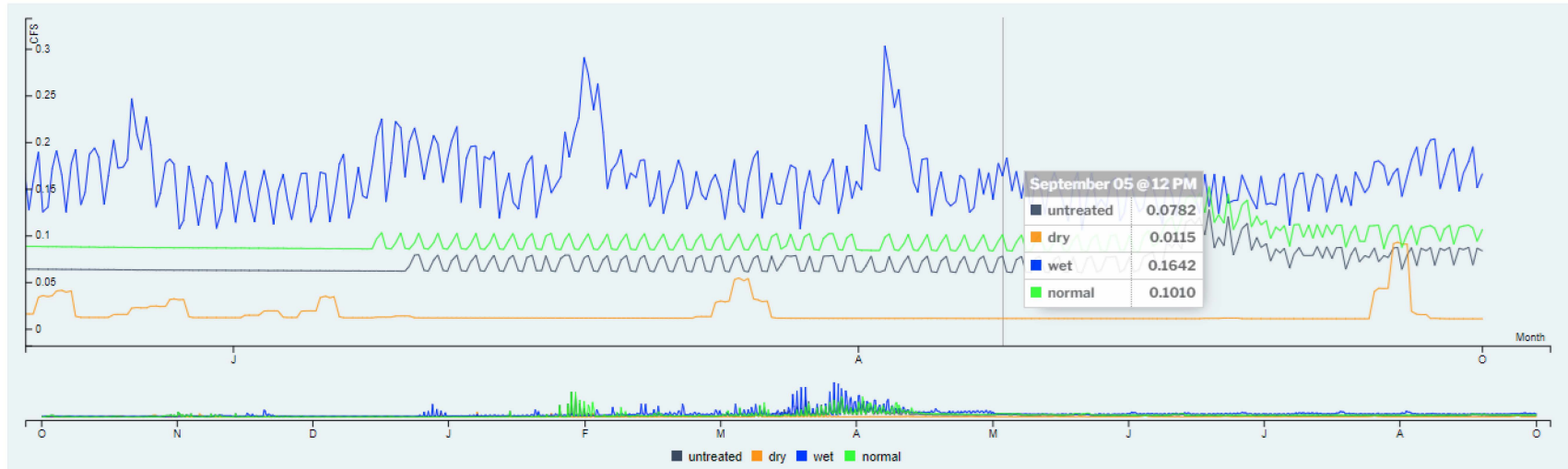
- dry	+0.01	CFS
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- normal	+0.02	CFS
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Absolute Flow Rate





Change in 7 Day Mean Flow Rate

