

# Delivering Climate Change Information in the Forest Service



Dr. Cynthia West, Executive Director Office of Sustainability and Climate



Forest Service Washington Office

# Presentation Overview:



- **OSC Digital Strategy**
  - Websites
  - Digital Newsletter and Bulletins
  - Regional Drought Summaries
  - Map Galleries
  - Story Maps
  - Managed Data Services
- **Questions and Answers**

# Digital Strategy

Discoverability and consistency

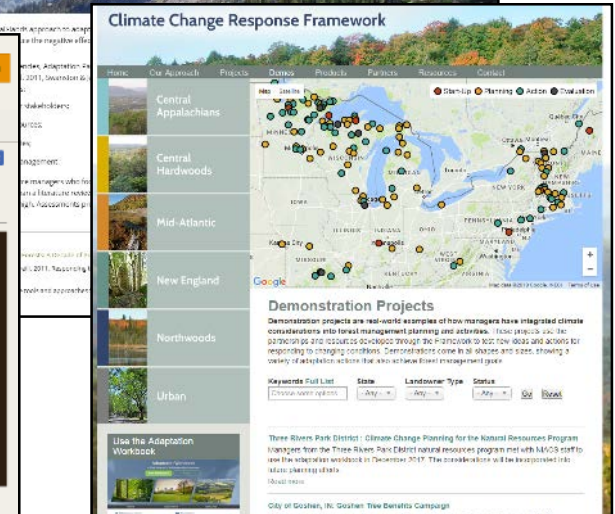
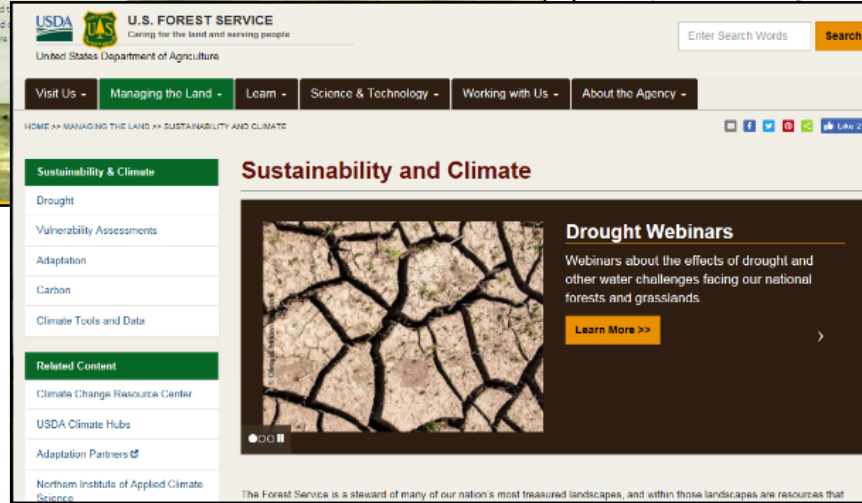
Science-based

Trusted information that is kept current  
and updated



# Communication and Data Products

## Websites





# Communication and Data Products

## Digital Newsletter and Bulletins

- Subscription based electronic newsletter and bulletins.
- Send an email to: [oscc@fs.fed.us](mailto:oscc@fs.fed.us) to be added to the distribution list.



### A Framework for Climate Action

Over the last six years each Forest Service Region has conducted climate vulnerability assessments, in partnership with Forest Service Research and Development. These assessments provide the basis for climate adaptation plans and projects, a sampling of which is featured in this issue of the Office of Sustainability and Climate's newsletter. These stories highlight our science-based framework that help us implement the results of climate vulnerability assessments, guide forest plan revisions, and the ability of our forests to be productive and resilient.

**Monitor and Learn**  
Learn from the monitoring of actions to help guide future assessments, adaptation plans, and tactics.

**Assess**  
Assess vulnerability to changing environmental conditions.

**Implement**  
Develop actions to enhance the ability of forests to adapt to changing conditions.

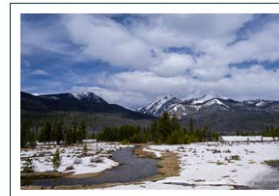


April 2018

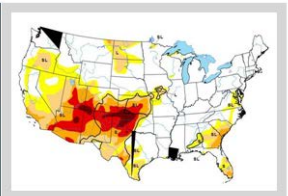
### Water Challenges: Too Much? Too Little?

Although drought is a normal feature of climate, occurrences are projected to increase in frequency, intensity, and duration in some parts of the country. Longer-term droughts severely impact water supplies needed to sustain agriculture, forests, and rangelands, and clean drinking water for municipalities. Conversely, too much water can damage property and infrastructure, cause soil erosion around roads, and lead to sediment pollution and damage to fish habitat.

The Forest Service is actively monitoring temperature and precipitation levels in order to better understand and respond to the challenges that too much or too little water pose to national forests and grasslands.



APRIL SPOTLIGHT

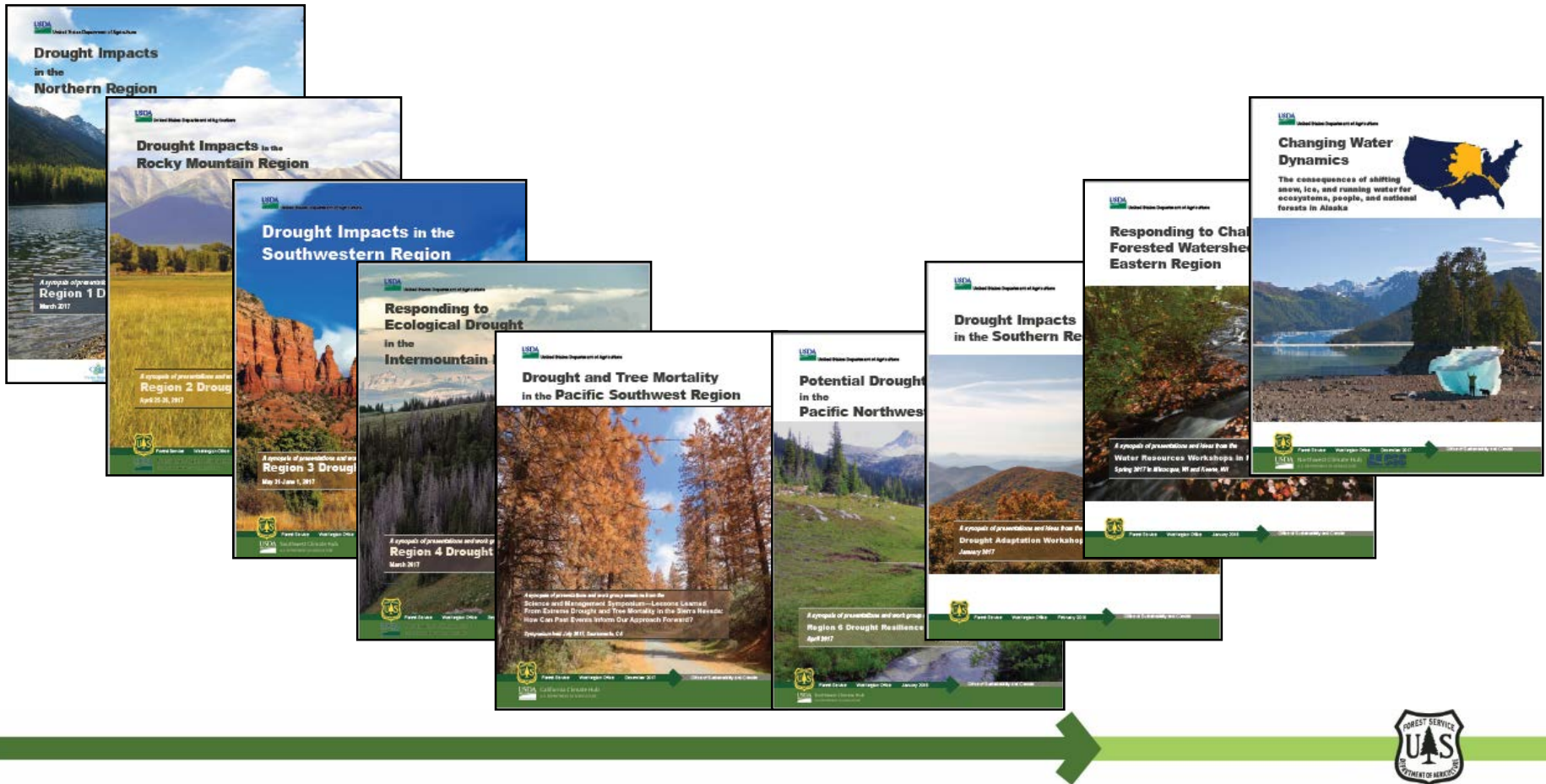


US Drought Monitor



# Communication and Data Products

## Regional Drought Summaries



# Communication and Data Products

## Map Galleries

The screenshot shows the 'Climate Gallery' page of the U.S. Forest Service website. The header features the USDA and U.S. Forest Service logos with the tagline 'Caring for the land and serving the people'. Below the header, the page title 'Climate Gallery' is followed by the subtitle 'A collection of maps, apps, and resources'. A search bar is present. The main content area lists several resources: 'A Gallery of Drought Data and Resources' (a web mapping application), 'App: Changes in Temperature and Precipitation' (a web mapping application), 'App: Climate Change Vulnerability Assessments Across the Nation' (a web mapping application), and 'App: Snow Drought in the 21st Century' (a web mapping application). Each resource includes a small thumbnail image and a brief description.

The screenshot shows the 'Drought Gallery' page of the U.S. Forest Service website. The header features the USDA and U.S. Forest Service logos with the tagline 'Caring for the land and serving the people'. Below the header, the page title 'Drought Gallery' is followed by the subtitle 'A collection of maps, apps, and resources'. A search bar is present. The main content area lists several resources: 'A Gallery of Climate Data and Resources' (a web mapping application), 'App: Drought Over Time' (a web mapping application), and 'App: Forest Disturbances and Drought' (a web mapping application). Each resource includes a small thumbnail image and a brief description. To the right of the gallery, there is a sidebar with the text 'The US Forest Service - Office of Sustainability and Climate' and a paragraph explaining the Forest Service's role as a steward of landscapes and its commitment to sustainability.





# Communication and Data Products

## Story Maps

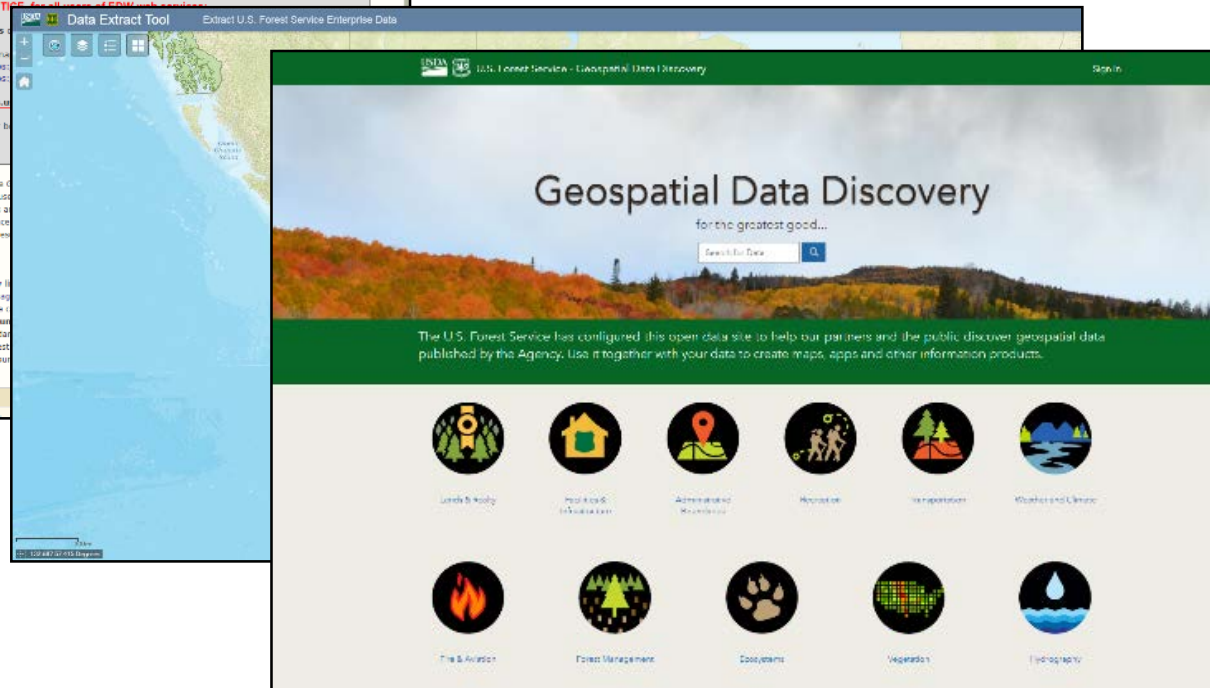
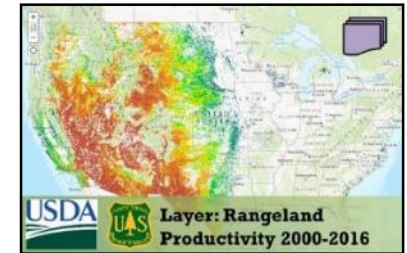
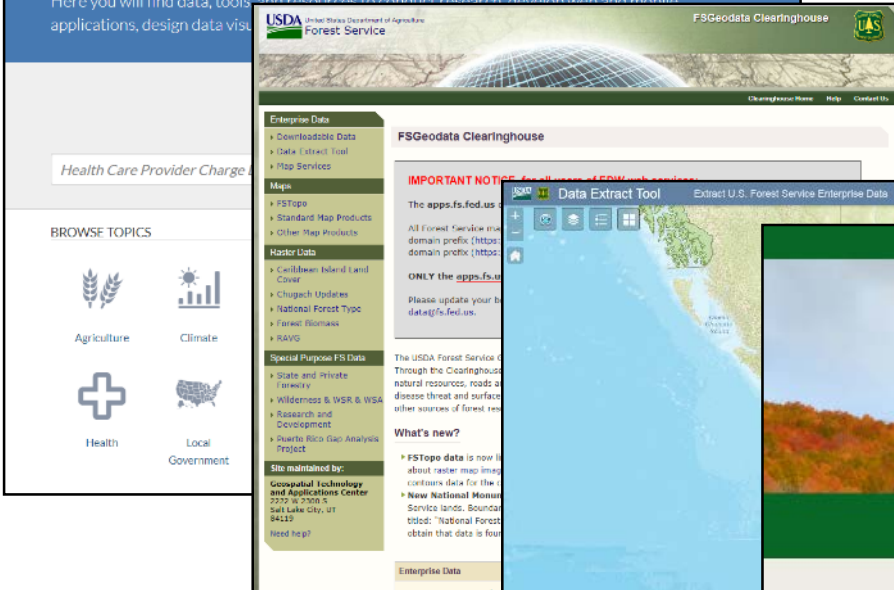
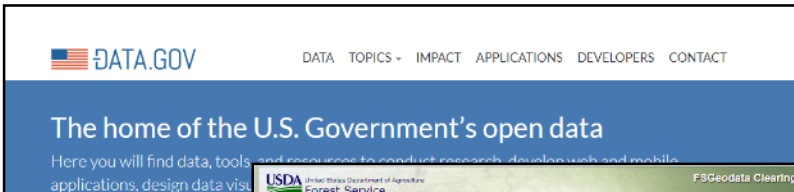
The collage displays a variety of communication and data products from the USDA Forest Service. The products are organized into a grid-like structure, with each item featuring a title, a brief description, and a visual element (map, chart, or photo). The products are:

- Stream Temperature and Native Trout**: A map showing stream temperature and native trout distribution.
- Good News and Bad News**: A text-based product discussing climate change impacts.
- Changes in Temperature and Precipitation**: A map showing changes in temperature and precipitation over time.
- Access to Good Information Drive**: A text-based product discussing information access.
- Snow Drought in the 21st Century**: A map showing snow drought trends.
- Yellow-cedar Decline in Southeast Alaska**: A map showing the decline of yellow-cedar trees.
- Rangelands and Drought**: A map showing rangeland conditions and drought impacts.
- Forest Disturbances and Drought**: A map showing forest disturbances and drought impacts.
- Mapping Yellow-cedar Decline**: A map showing the decline of yellow-cedar trees.
- Rangelands in the United States**: A map showing rangeland distribution.
- Rangeland Productivity 2000-2016**: A map showing rangeland productivity trends.
- Drought, Rangeland Variability**: A map showing drought and rangeland variability.
- Future Insect and Disease Risk to Forests**: A map showing future insect and disease risk.
- Wildfire Locations 2000-2015**: A map showing wildfire locations.





# Managed Data Services



# Questions and Answers



Drought gallery: <https://tinyurl.com/y973s6rn>

Climate gallery: <https://tinyurl.com/y7makrbm>



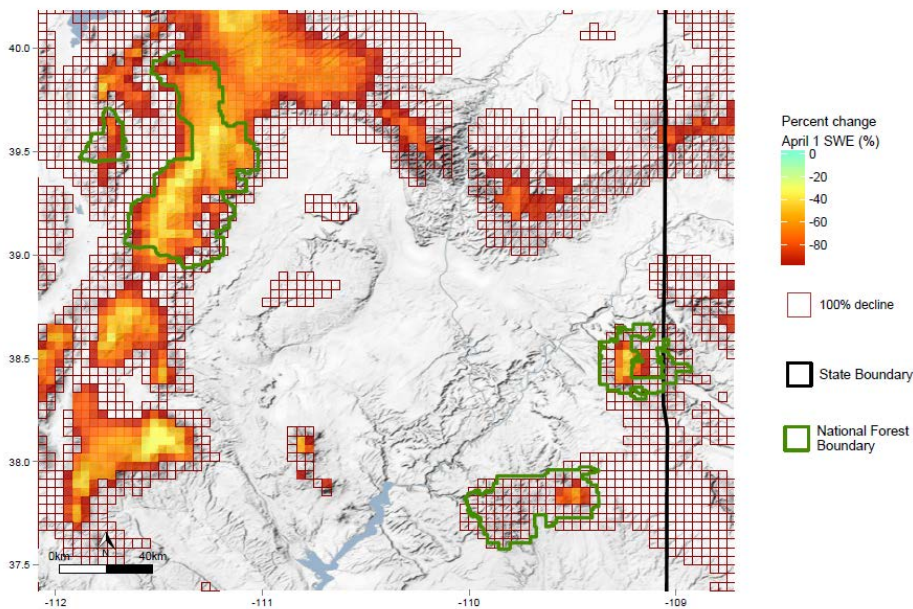
# Climate Change Maps Project

## Intermountain Region – Climate Assessment Workshop

May 23, 2018

### Manti-La Sal National Forest

Percent Change in April 1 SWE, historical to 2080s RCP8.5



**Charles Luce, PhD**  
Research Hydrologist  
US Forest Service Research



**NATIONAL FOREST CLIMATE CHANGE MAPS:**  
**YOUR GUIDE TO THE FUTURE**

<https://www.fs.fed.us/rm/boise/AWAE/projects/national-forest-climate-change-maps.html>



Research & Development







UNITED STATES DEPARTMENT OF AGRICULTURE

U.S. FOREST SERVICE



# Rocky Mountain Research Station

## Air, Water, & Aquatic Environments Program

[ABOUT AWAE](#)[RESEARCH ▾](#)[PROJECTS, TOOLS, & DATA ▾](#)[PUBLICATIONS ▾](#)[CONTACT US ▾](#)[GO](#)☒ search only: AWAE[HOME](#) ▶ [PROJECTS](#) ▶ NATIONAL FOREST CLIMATE CHANGE MAPS: YOUR GUIDE TO THE FUTURE

## NATIONAL FOREST CLIMATE CHANGE MAPS: YOUR GUIDE TO THE FUTURE

The National Forest Climate Change Maps project was developed to meet the need of National Forest managers for information on projected climate changes at a scale relevant to decision making processes, including Forest Plans. The maps use state-of-the-art science and are available for every National Forest in the contiguous United States with relevant data coverage. Currently, the map sets include variables related to precipitation, air temperature, snow (including April 1 snow water equivalent (SWE), and snow residence time), and stream flow. More maps will continue to be added so be sure to check back! Contact Charles Luce at [cluce@fs.fed.us](mailto:cluce@fs.fed.us) for more information.

### Climate Change Maps by National Forest

[Northern Region \(Region 1\)](#)[Rocky Mountain Region \(Region 2\)](#)[Southwest Region \(Region 3\)](#)[Intermountain Region \(Region 4\)](#)[Pacific Southwest Region \(Region 5\)](#)[Pacific Northwest Region \(Region 6\)](#)[Southern Region \(Region 7\)](#)



# Ready-to-Go PDF Files by Forest

## Metrics Available

- Temperature
- Precipitation
- Snow Water Equivalent
- Snow Residence Time
- Streamflow
  - Mean annual
  - Floods
  - Center of timing
  - More
- Metadata

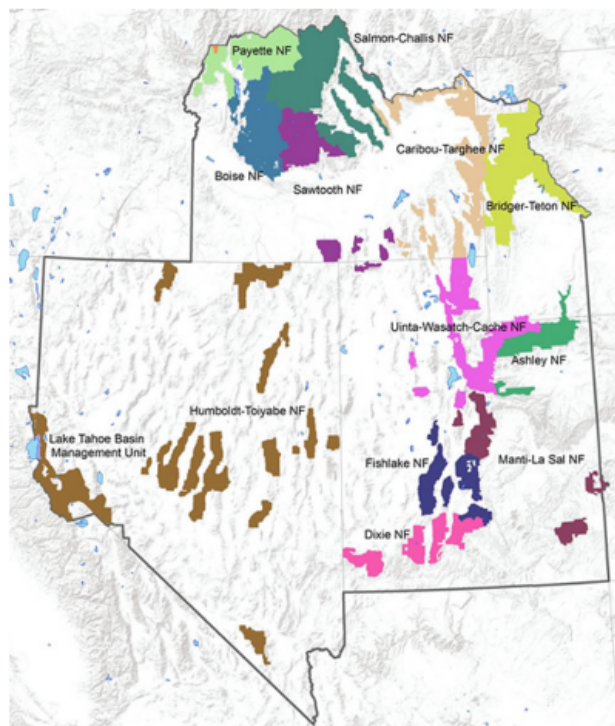
## Maps & Data

- Historical
- 2080s (some to 2040s, too)
- Absolute Change
- Percent Change
- Also as 4-km raster data over CONUS for T, P, Snow
- Streamflow available as .dbf to link with NHDPlus V2

<https://www.fs.fed.us/rm/boise/AWAE/projects/national-forest-climate-change-maps.html>



# NATIONAL FOREST CLIMATE CHANGE MAPS: YOUR GUIDE TO THE FUTURE



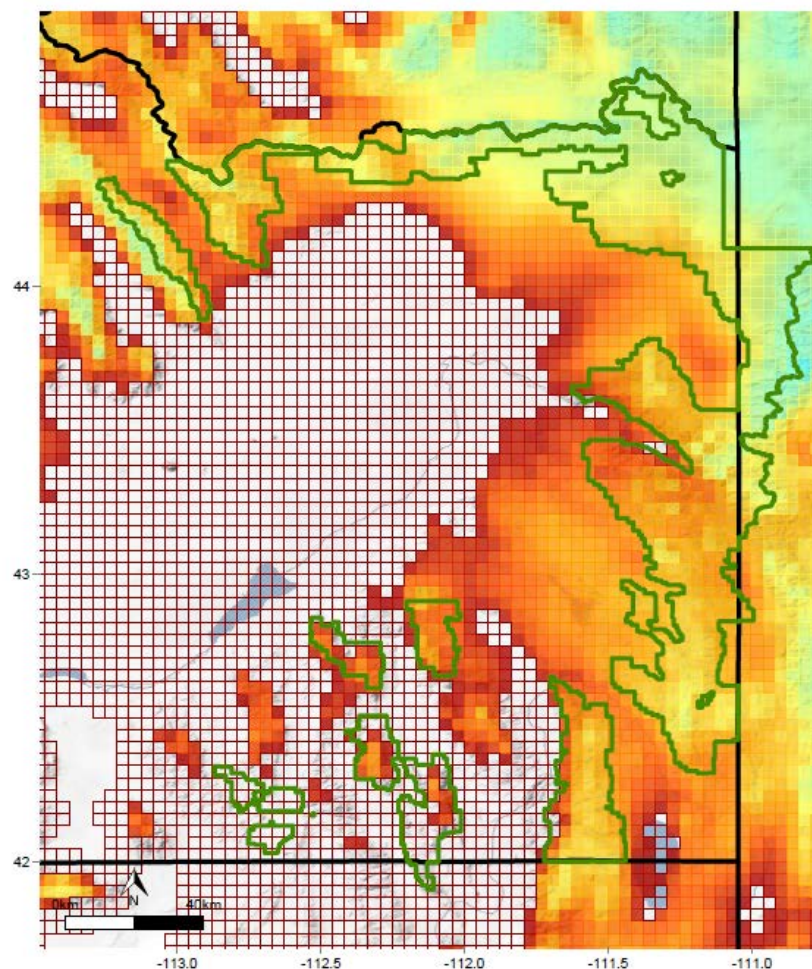
Region 4 Forests	Downloads - Which maps are available to download?
Ashley National Forest	<a href="#">Precipitation</a>   <a href="#">Trout</a>   <a href="#">Snow</a>   <a href="#">Streamflow Metrics</a>   <a href="#">Air Temperature</a>   <a href="#">Stream Temperature</a>
Boise National Forest	<a href="#">Precipitation</a>   <a href="#">Trout</a>   <a href="#">Snow</a>   <a href="#">Streamflow Metrics</a>   <a href="#">Air Temperature</a>   <a href="#">Stream Temperature</a>
Bridger-Teton National Forest	<a href="#">Precipitation</a>   <a href="#">Trout</a>   <a href="#">Snow</a>   <a href="#">Streamflow Metrics</a>   <a href="#">Air Temperature</a>   <a href="#">Stream Temperature</a>
Caribou-Targhee National Forest	<a href="#">Precipitation</a>   <a href="#">Trout</a>   <a href="#">Snow</a>   <a href="#">Streamflow Metrics</a>   <a href="#">Air Temperature</a>   <a href="#">Stream Temperature</a>
Dixie National Forest	<a href="#">Precipitation</a>   <a href="#">Trout</a>   <a href="#">Snow</a>   <a href="#">Streamflow Metrics</a>   <a href="#">Air Temperature</a>   <a href="#">Stream Temperature</a>
Fishlake National Forest	<a href="#">Precipitation</a>   <a href="#">Trout</a>   <a href="#">Snow</a>   <a href="#">Streamflow Metrics</a>   <a href="#">Air Temperature</a>   <a href="#">Stream Temperature</a>
Humboldt-Toiyabe National Forest	<a href="#">Precipitation</a>   <a href="#">Trout</a>   <a href="#">Snow</a>   <a href="#">Streamflow Metrics</a>   <a href="#">Air Temperature</a>   <a href="#">Stream Temperature</a>





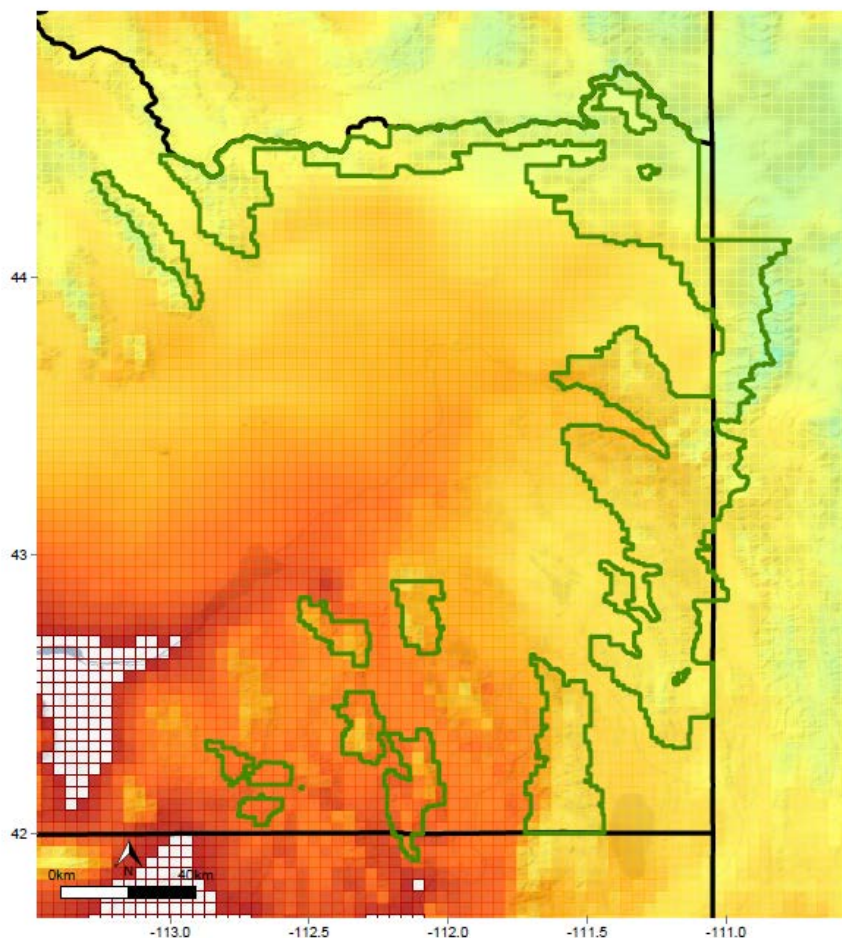
## Caribou-Targhee National Forest

Percent Change in April 1 SWE, historical to 2080s RCP8.5

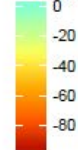


## Caribou-Targhee National Forest

Percent Change in Snow Residence Time, historical to 2080s RCP8.5



Percent change  
Snow Residence  
Time (%)



100% decline

State Boundary

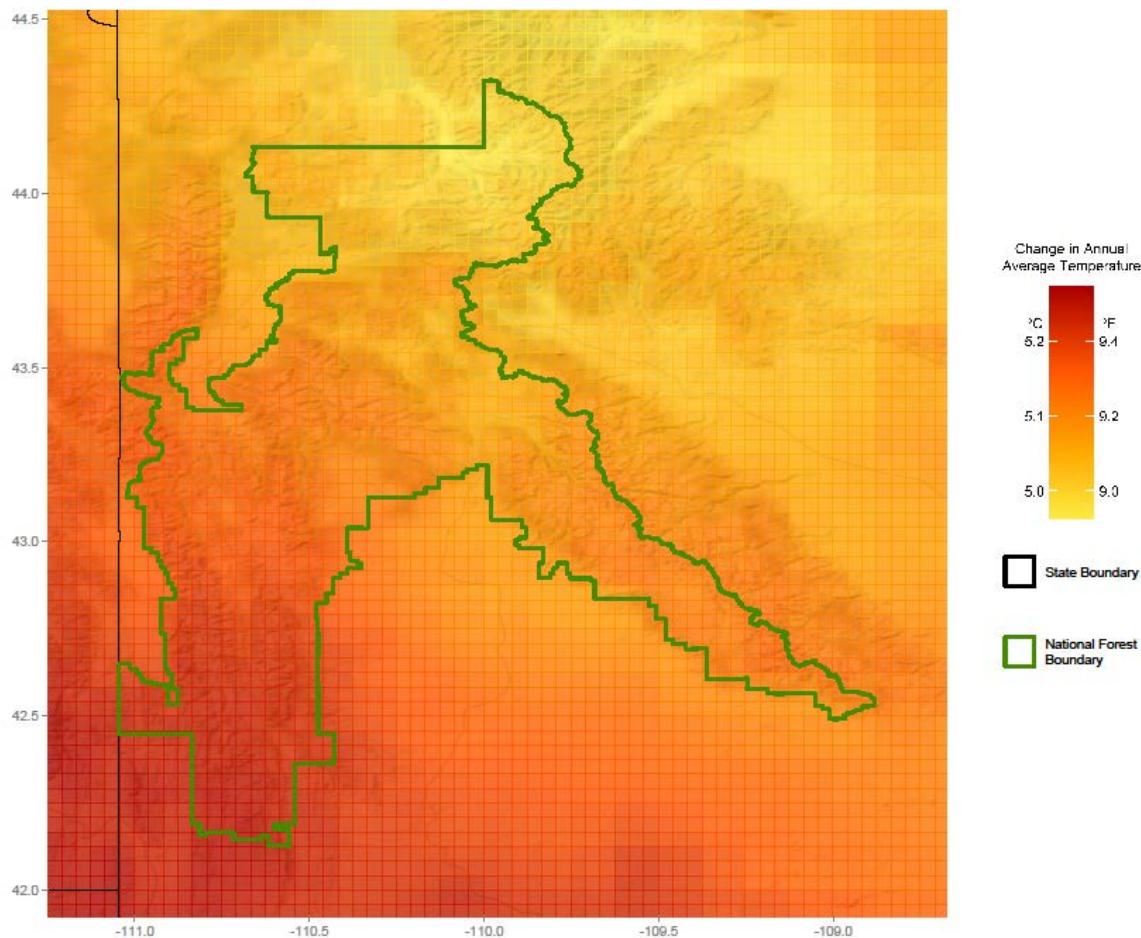
National Forest  
Boundary





## Bridger-Teton National Forest

*Change in Annual Average Temperature, historical to 2080s RCP8.5*



**NATIONAL FOREST CLIMATE CHANGE MAPS:**  
**YOUR GUIDE TO THE FUTURE**

<https://www.fs.fed.us/rm/boise/AWAE/projects/national-forest-climate-change-maps.html>

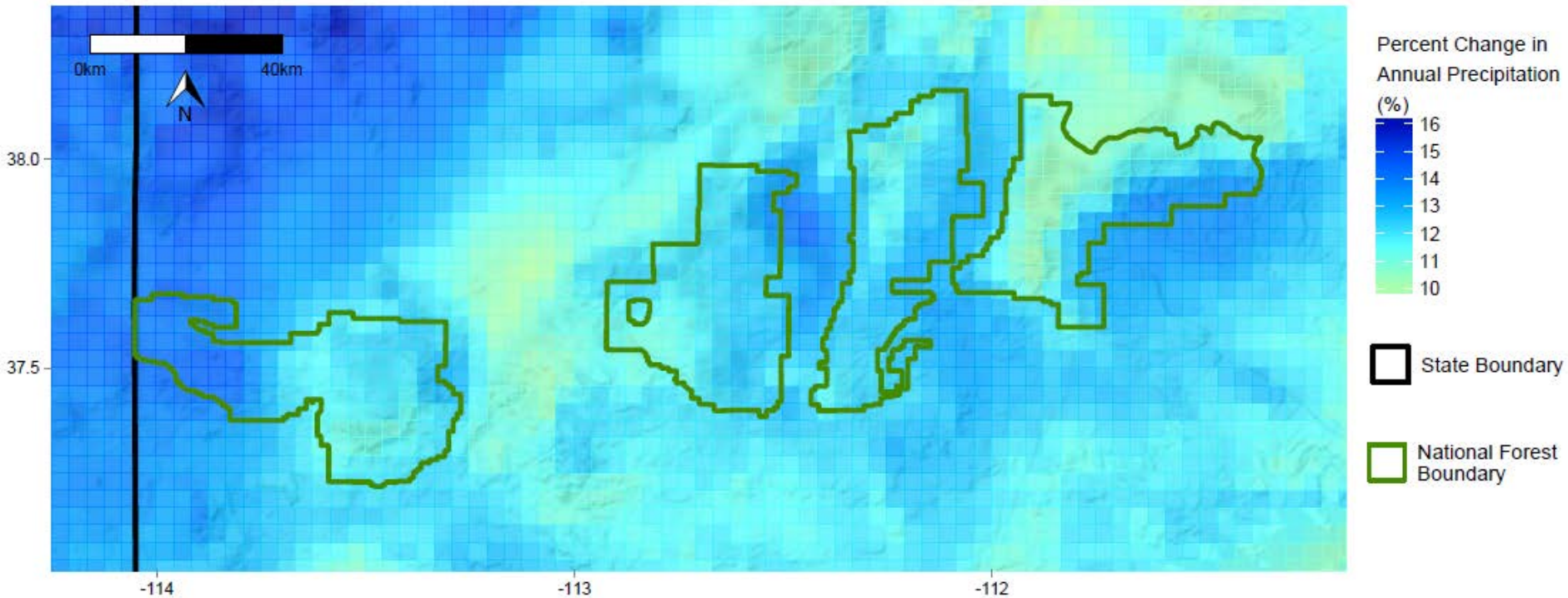


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## Dixie National Forest

*Percent Change in Annual Precipitation, historical to 2080s RCP8.5*



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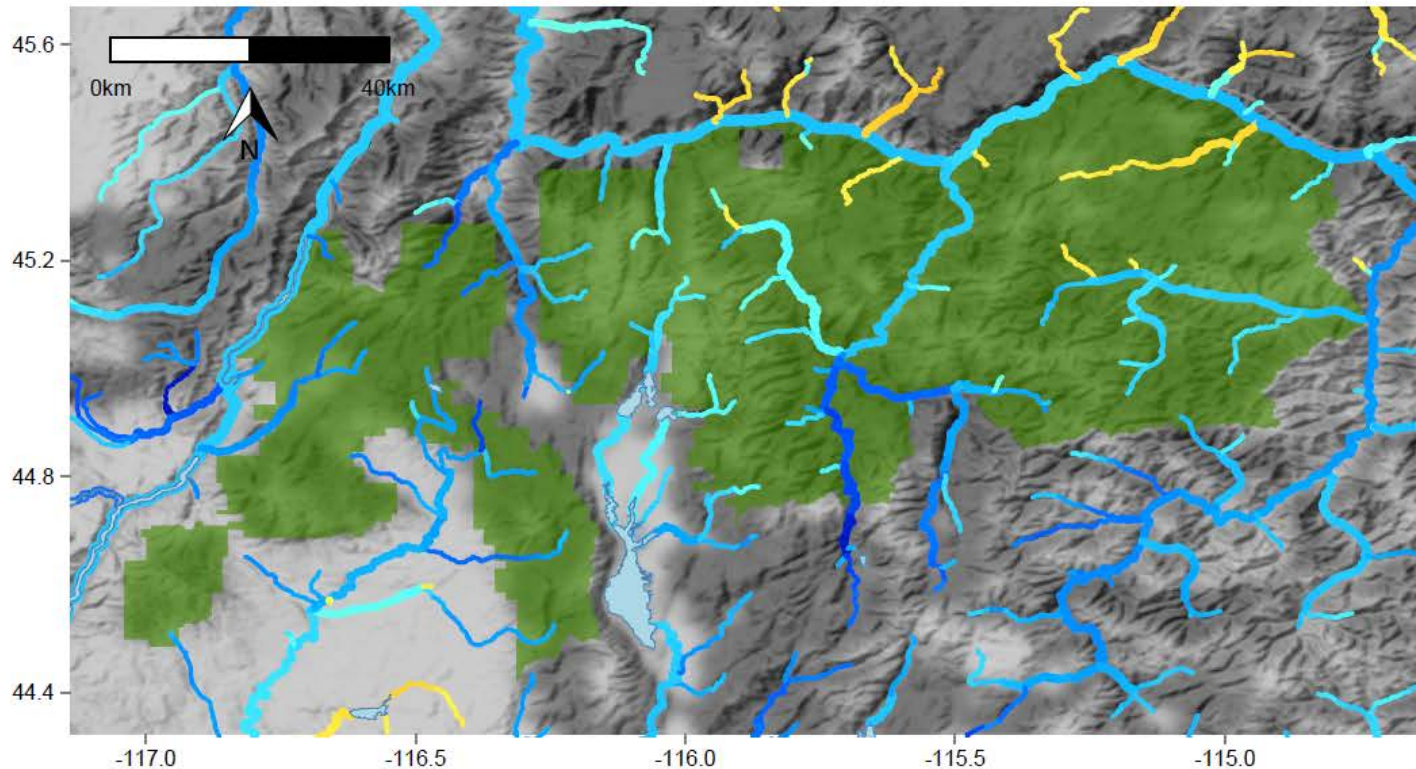
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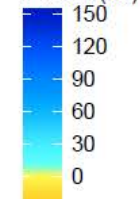


## Payette National Forest

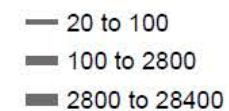
*Percent Change in 1.5 Year Flood, historical to 2080s A1B*



Percent Change  
1.5 Year  
Flood (%)



Historical Mean  
Annual Flow (cfs)



Waterbody

National Forest

State Boundary



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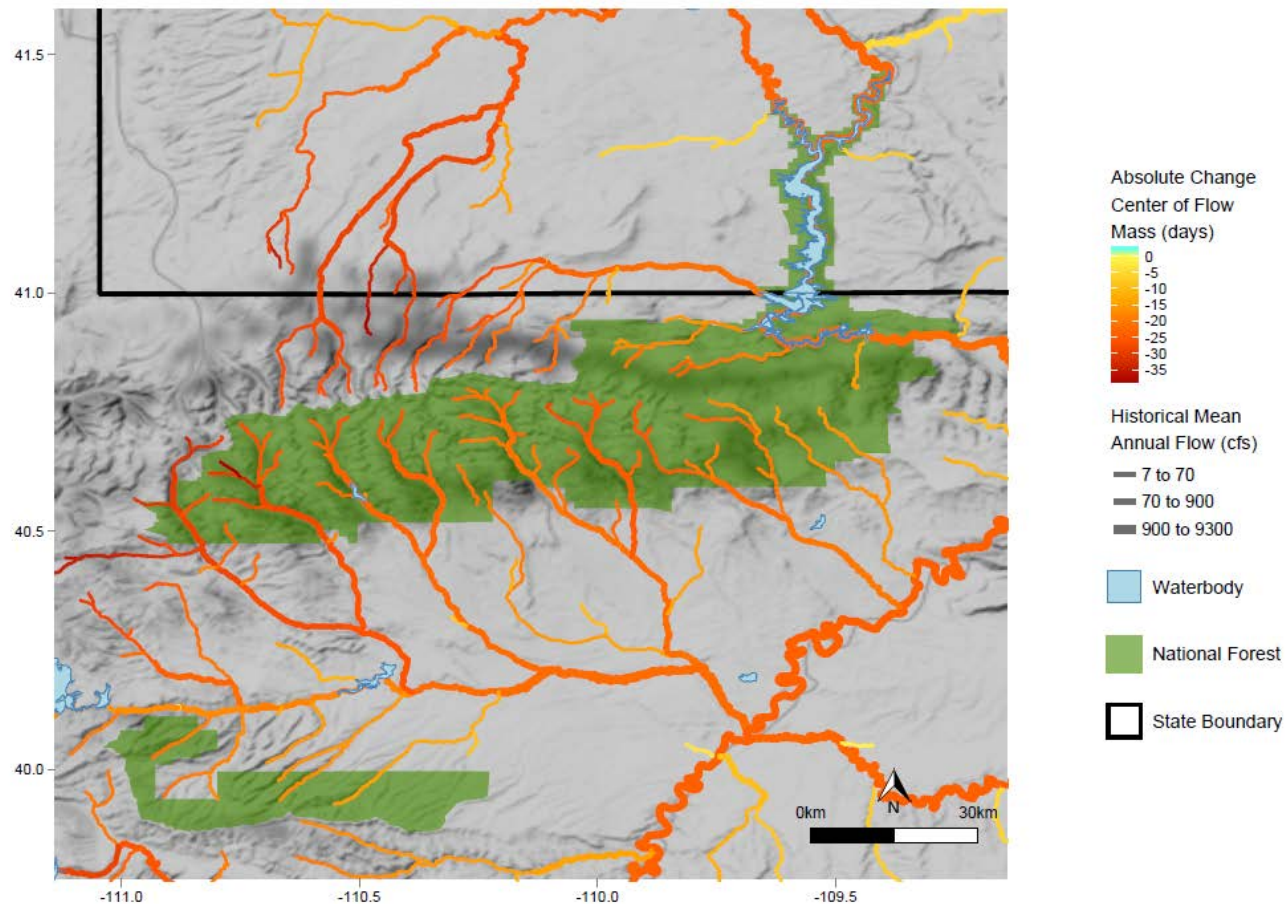
Research & Development





## Ashley National Forest

*Absolute Change in Center of Flow Mass, historical to 2080s A1B*



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<https://www.fs.fed.us/rm/boise/AWAE/projects/national-forest-climate-change-maps.html>



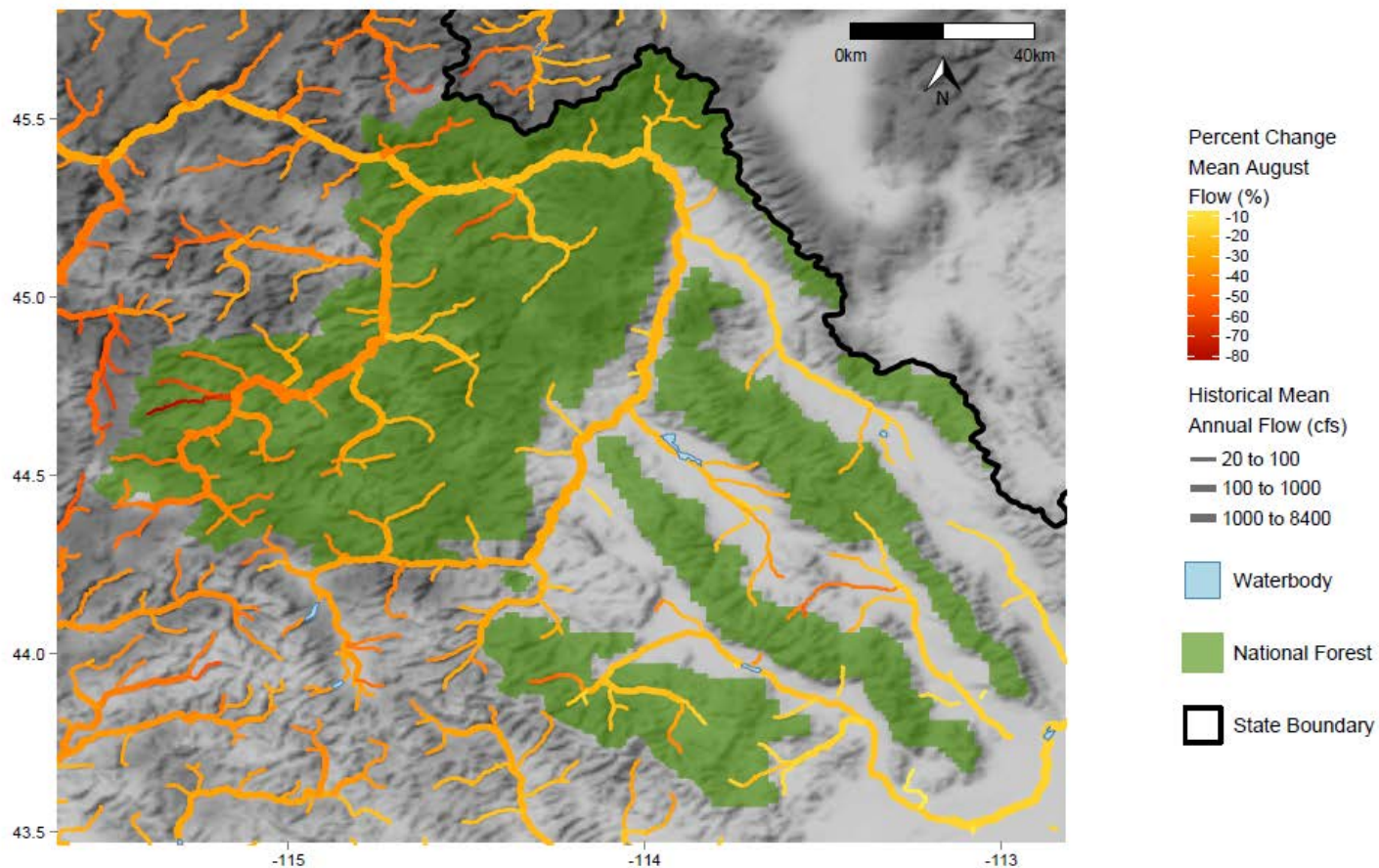
Research & Development





## Salmon-Challis National Forest

*Percent Change in Mean August Flow, historical to 2080s A1B*



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<https://www.fs.fed.us/rm/boise/AWAE/projects/national-forest-climate-change-maps.html>



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# Purposes

- Speed
- Simplicity
- Support of Forest Plan Revision
  - Assessment Phase



**Charles Luce**  
Research Hydrologist  
Boise, Idaho  
cluce@fs.fed.us

Project Design and Implementation Supported by:  
Tiffany Cummins, Natalie Little, & Abigail Lute

<https://www.fs.fed.us/rm/boise/AWAE/projects/national-forest-climate-change-maps.html>



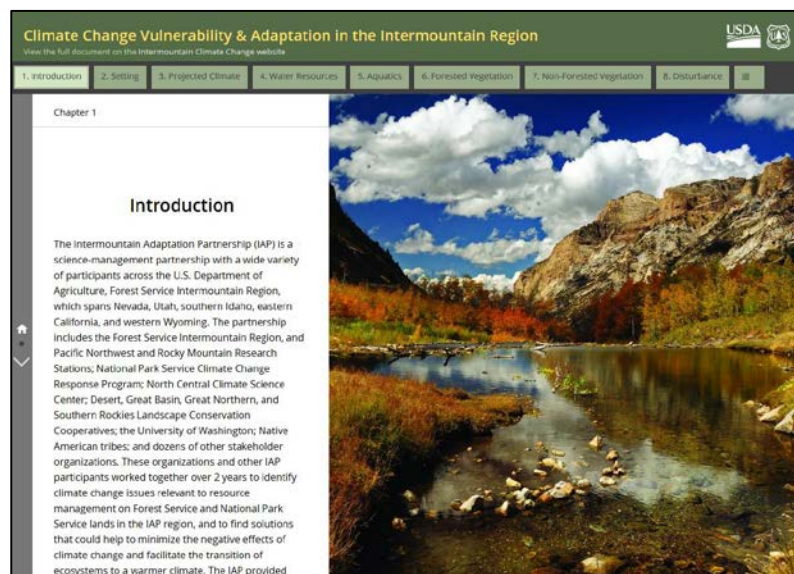






# Using Web-based GIS to Provide an Overview of the Climate Assessment

Intermountain Region – Climate Assessment Workshop  
May 23, 2018



**Natalie Little & Greg McNamee**  
Intermountain Region– USDA Forest Service



## Objectives:

- Reach a broader audience using technology
- Create an appealing interactive story map
- Allow users to interact with information in a new way
- Summarize the info in GTR



## Current Status:

- Available to the public at: [www.fs.usda.gov/goto/cc](http://www.fs.usda.gov/goto/cc)
- Initial Version Complete
- Work in progress
  - Add Additional Data Interactions
  - Data Updates





# Demo



## DIALOGUE AND Q&A





# Intermountain Climate Assessment Workshop

May 22-24, 2018

Have a nice evening ... see you tomorrow.





# **Intermountain Climate Assessment Workshop**

May 22-24, 2018

Dinner at 6pm

Location TBA