



**National Oceanic and
Atmospheric Administration**

March 7, 2023

Climate Resilience Toolkit and Other Tools

FEMA Region X - Mitigation Summit

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NOAA/National Centers for Environmental Information

Overview

- Climate Tools *Do's and Don'ts*
- Climate.gov and the Climate Resilience Toolkit
- Regional resources and tools



Climate Tools – the DO'S

- **DO spend time exploring the universe of tools**

Data visualization, how-to guides, planning examples...they are all out there

- **DO use tools for:**
 - visualizing complex, space-time data
 - building climate literacy and confidence
 - building your network



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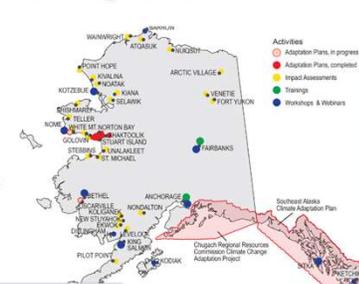
DO – Read your National Climate Assessment Chapter(s)



Figure 24.1: Detroit Lake Reservoir in Oregon at record-low levels in 2015. Photo credit: Dave Reinert, Oregon State University.



Adaptation Planning in Alaska



<https://nca2018.globalchange.gov/>



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Climate Tools – the DON'TS

- **Don't** use them as stand-alone decision-makers...
there is no substitute for local engagement
- **Don't** inventory them
- **Don't** accept indices “as-is”
- **Know the source** – government agencies and universities are often the most transparent



The screenshot displays the NOAA Climate.gov website. At the top, the NOAA logo and "Climate.gov" are visible, along with social media icons and a search bar. The navigation menu includes "News & Features", "Maps & Data", "Teaching Climate", "Resilience Toolkit", and "About". The main content area features a large map of the United States with a color-coded overlay, likely representing temperature anomalies. Below the map, a featured article is titled "Did La Niña drench the Southwest United States in early winter 2022/23?". To the right, a "FEATURED" section lists several news items, including "A look at all 173 of NOAA's new global temperature maps", "Disrupted polar vortex brings sudden stratospheric warming in February 2023", "February 2023 ENSO update: the ENSO Blog investigates, part 3", "Having dodged lava flows, NOAA's Mauna Loa research facility to get upgrades", and "In the face of sea level rise, NOAA helps endangered Hawaiian monk seals find higher ground".



Climate.gov

- Great starting point
- Content is diverse and fresh
- For non-technical audience, but has “on-ramps” to more technical sources/discussions



Climate.gov
SCIENCE & INFORMATION FOR A CLIMATE-SMART NATION

News & Features ▾ Maps & Data ▾ Teaching Climate ▾ **Resilience Toolkit** About ▾

Did La Niña drench the Southwest United States in early winter 2022/23?

FEATURED

A look at all 173 of NOAA's new global temperature maps
NEWS AND FEATURES | FEBRUARY 17, 2023

Disrupted polar vortex brings sudden stratospheric warming in February 2023
NEWS AND FEATURES | FEBRUARY 16, 2023

February 2023 ENSO update: the ENSO Blog investigates, part 3
NEWS AND FEATURES | FEBRUARY 8, 2023

Having dodged lava flows, NOAA's Mauna Loa research facility to get upgrades
NEWS AND FEATURES | MARCH 5, 2023

In the face of sea level rise, NOAA helps endangered Hawaiian monk seals find higher ground
NEWS AND FEATURES | JANUARY 31, 2023

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Climate Resilience Toolkit



<https://toolkit.climate.gov/>

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Climate Resilience Toolkit

- 1) *Steps to Resilience* Guide
- 2) Case studies
- 3) Climate Explorer – data visualization

Additional resources

Links for funding opportunities
 Thematic Storymaps
 Expert contact list



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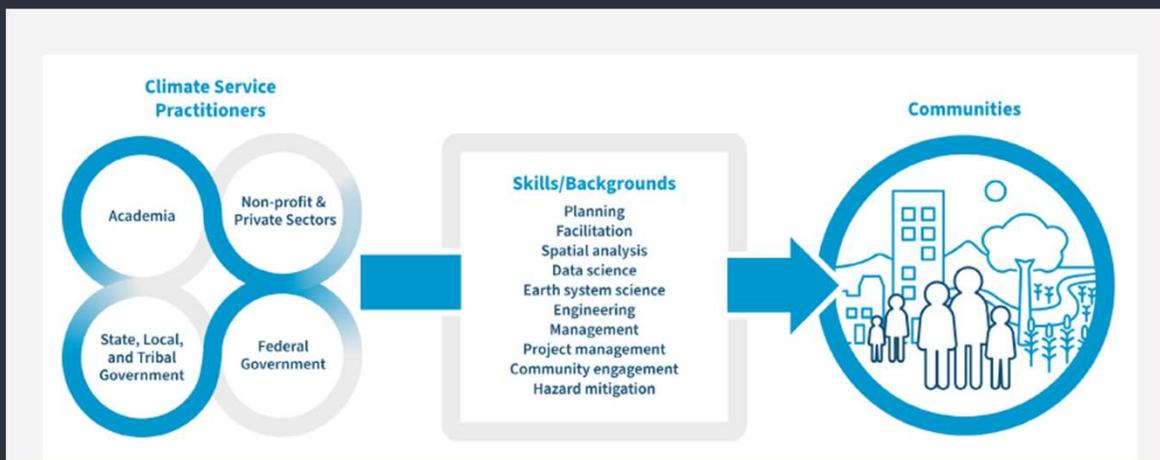
Steps to Resilience



<https://toolkit.climate.gov/steps-to-resilience/steps-resilience-overview>



StR Practitioner's Guide Context – The Climate Services Value Chain



Gardiner, Ned, ed., Matt Hutchins, Jim Fox, Aashka Patel, and Kim Rhodes. *Implementing the Steps to Resilience: a Practitioner's Guide*. Climate-Smart Communities Series, Vol. 6. NOAA Climate Program Office, 2022. 10.25923/9hnx-2m82 **The Climate Services Value Chain**



StR Practitioner's Guide How to – “Getting Started”

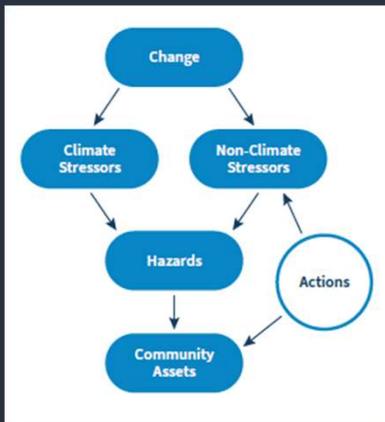


- OBJECTIVES**
- 0.1 Assemble a planning team
 - 0.2 Community participation
 - 0.3 Understand community history
 - 0.4 Consult pre-existing plans and resilience efforts
 - 0.5 Define equity-centered goals
 - 0.6 Project kickoff



Gardiner, at al 2022

StR Practitioner's Guide Conceptual frameworks for impacts, vulnerability, and risk



(b) Vulnerability classification into three groups.

Sensitivity	HIGH	Medium Vulnerability	High Vulnerability	High Vulnerability
	MED	Low Vulnerability	Medium Vulnerability	High Vulnerability
	LOW	Low Vulnerability	Low Vulnerability	Medium Vulnerability
		HIGH	MED	LOW
		Adaptive Capacity		



Gardiner, at al 2022

StR Practitioner's Guide

Moving toward implementation

Table 13. Example traffic light evaluation of strategies. Source: Fernleaf.

ID	STRATEGY	CRITERIA <i>(examples shown below)</i>				
		Benefits		Feasibility		
		Co-benefits?	Does it meet social equity goals?	Is there staff capacity?	Is there political will?	Is funding available (now or future)?
ST-001	Incentivize private property owners to implement green infrastructure through zoning	Yellow	Green	Green	Yellow	Green
ST-002	Implement the stormwater response plan to clear inlets and outlets, including teams on stand-by, before & during events	Green	Green	Red	Green	Yellow
ST-003	Evaluate streets for accessibility for various levels of service given SLR to promote best routes	Yellow	Yellow	Yellow	Green	Green
ST-004	Evaluate and implement tree planting recommendations in public areas	Green	Yellow	Red	Yellow	Yellow

Gardiner, et al 2022



Case studies

Case Studies

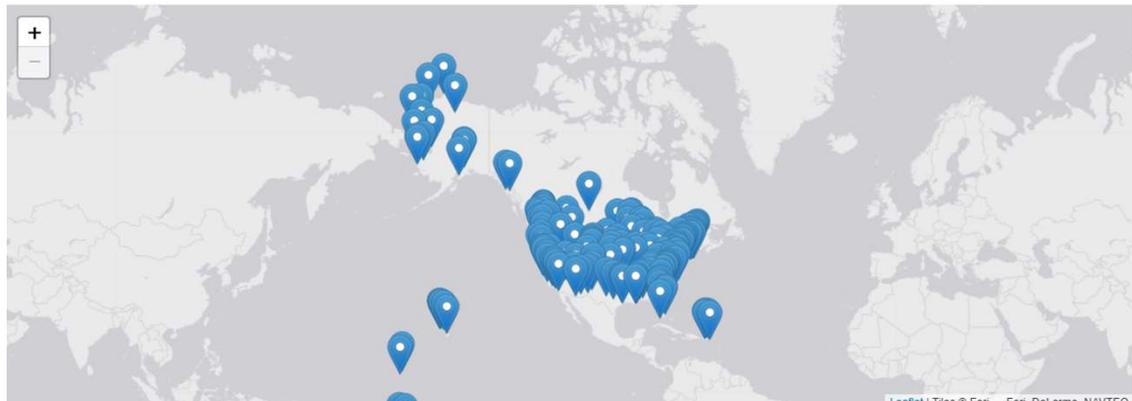
Filter by climate threat/stressor: ▼

Filter by topic: ▼

Filter by steps to resilience: ▼

Filter by region: ▼

Communities, businesses, and individuals are taking action to document their vulnerabilities and build resilience to climate-related impacts. Click dots on the map to preview case studies, or browse stories below the map. Use the drop-down menus above to find stories of interest. To expand your results, click the Clear Filters link.



Example Case Study – Portland, OR

Throw Away Your Crystal Ball: A Stress Testing Approach to Infrastructure Planning Under Climate Change Uncertainty

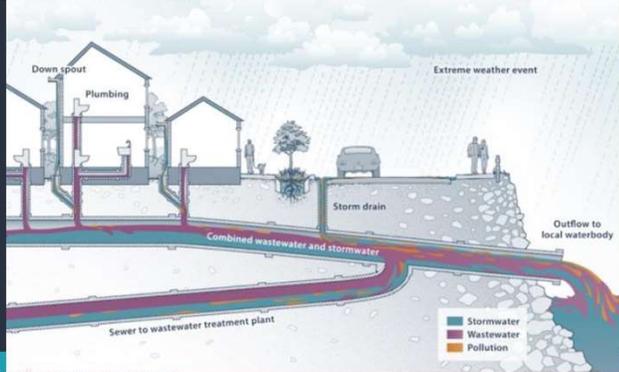
Civil Engineers in the City of Portland, Oregon relate how they used data and customized design storms to stress-test the city's stormwater sewer system.

<https://toolkit.climate.gov/case-studies/throw-away-your-crystal-ball-stress-testing-approach-infrastructure-planning-under>



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Combined Sewer Overflow



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Climate Explorer

- Provides local depiction of past and future climate change
- Can be a data firehose



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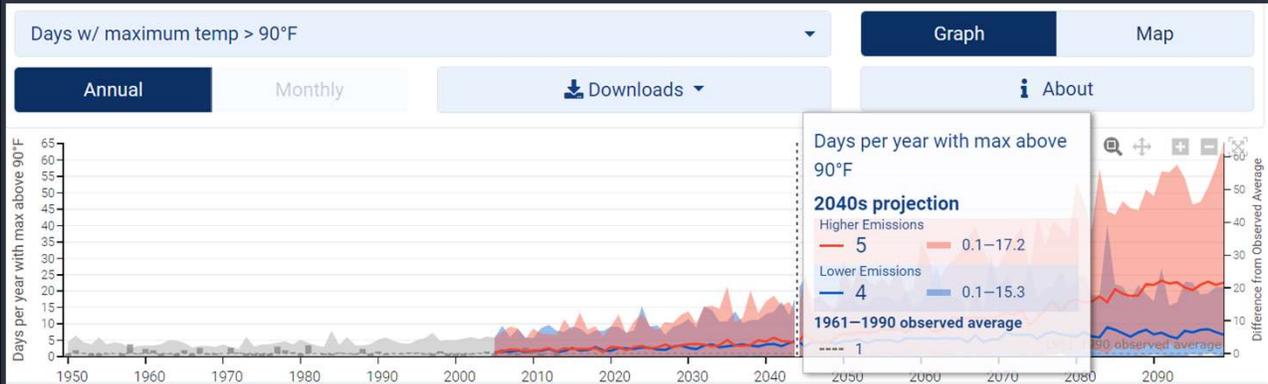
Climate Explorer – example of days >90 F in late 21st century



<https://crt-climate-explorer.nemac.org/>



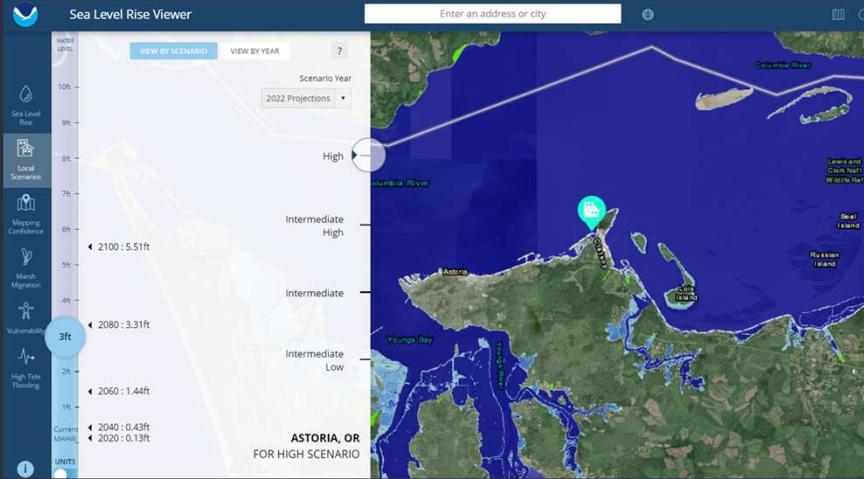
Climate Explorer – example of days >90 F in Seattle



<https://crt-climate-explorer.nemac.org/>



There are LOTS of other resources out there!

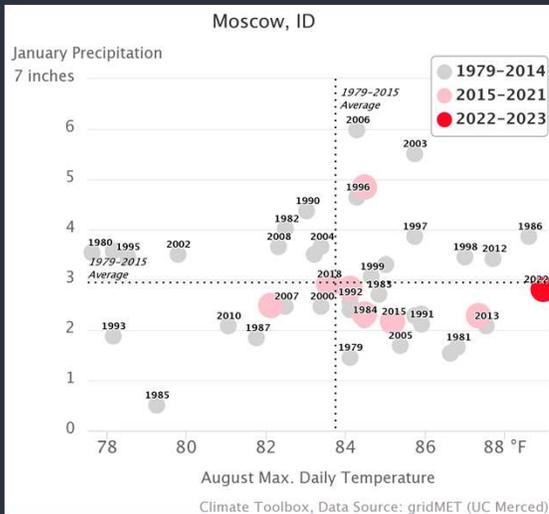


<https://coast.noaa.gov/slr/>



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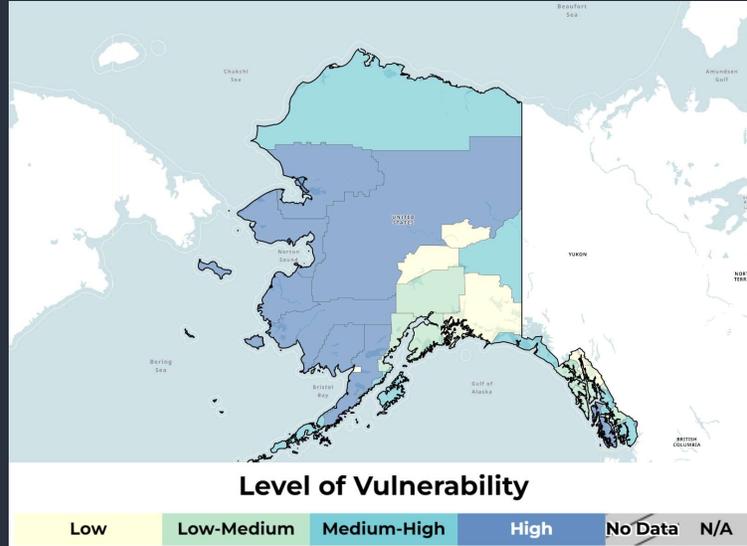
'How to Use the Toolbox' for Grassland Managers

<https://climatetoolbox.org/>



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CDC/ATSDR Social Vulnerability Index



<https://www.atsdr.cdc.gov/placeandhealth/svi/index.html>



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Regional resources and tools



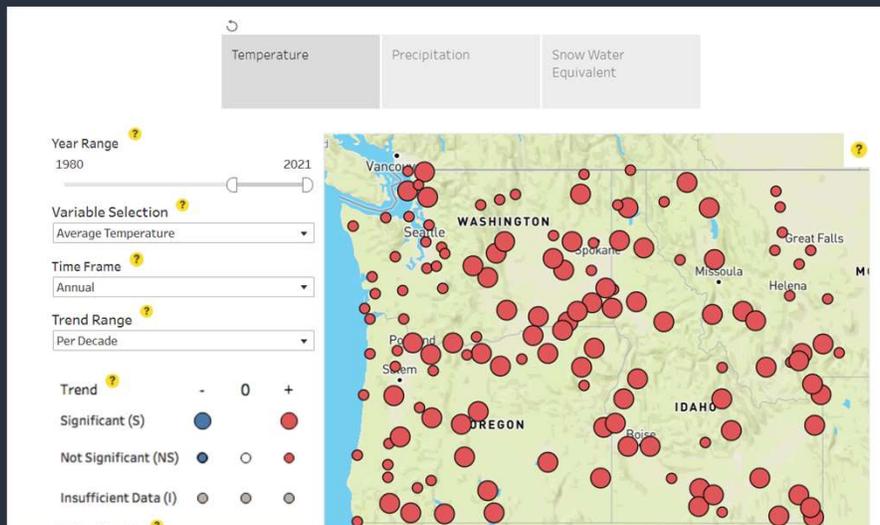
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PNW and Alaska have many Climate Service Providers



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PNW Temperature, Precipitation, and SWE Trend Analysis Tool

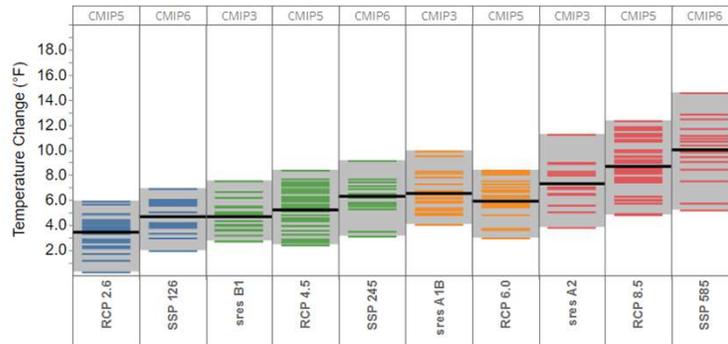


<https://climate.washington.edu/climate-data/trendanalysisapp/>

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PACIFIC NORTHWEST CLIMATE PROJECTION TOOL

Projected change in average annual Temperature (°F) for the Pacific Northwest in the 2080s relative to 1950-1999



Warming is projected for all scenarios. Differences among the scenarios are greatest at the end of the century, and the warming will be greatest during summer months.

GHG Scenario
 Very Low
 Low
 Medium
 High

Location
 Global
 Pacific Northwest
 West of the Cascades
 East of the Cascades

Year
 2050s
 2080s

Season
 Annual
 Winter
 Spring
 Summer
 Fall

<https://ciq.uw.edu/resources/analysis-tools/pacific-northwest-climate-projection-tool/>



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CLIMATE MAPPING FOR A RESILIENT WASHINGTON

Select Visualization

View maps of climate data at the resolution of the data. View county-level climate data on graphs and tables.

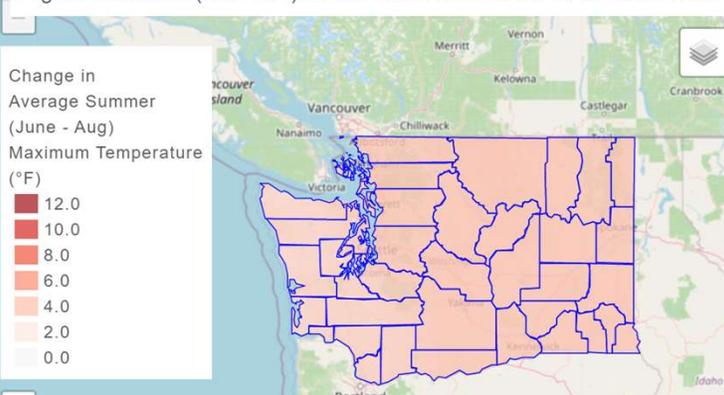
STATE MAP
 COUNTY GRAPH
 COUNTY TABLE

Select County

Select a Washington County here or by clicking on map.

Adams

Higher Scenario (RCP 8.5) Model Median 2020-2049 vs 1980-2009



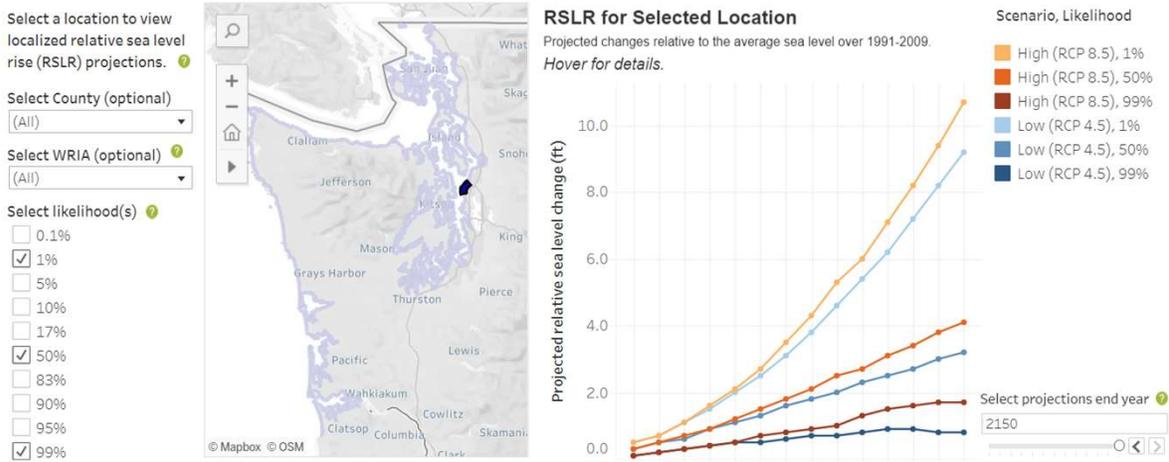
<https://ciq.uw.edu/resources/analysis-tools/climate-mapping-for-a-resilient-washington/>



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Interactive sea level rise data visualizations

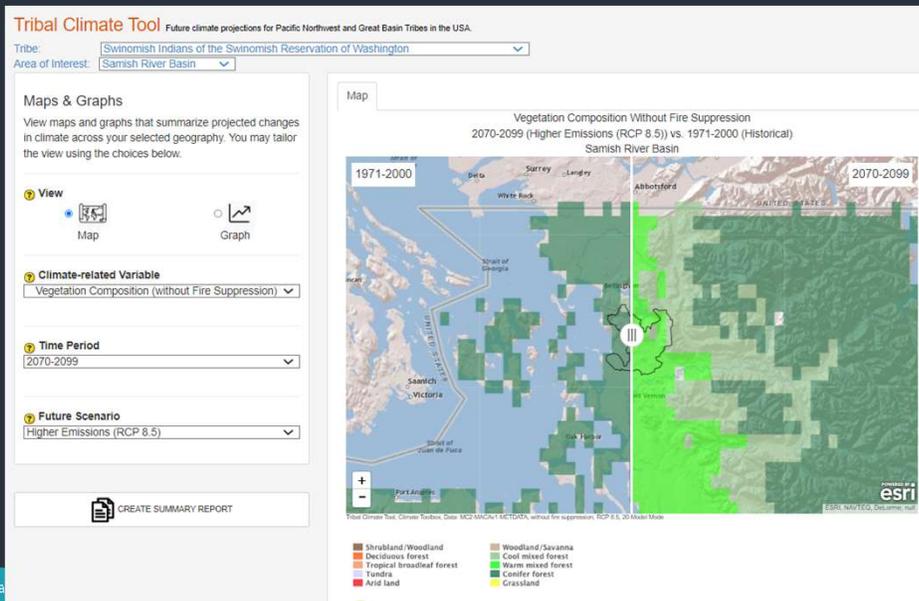
VISUALIZATION #1: Projected sea level change by year



<https://ciq.uw.edu/projects/interactive-sea-level-rise-data-visualizations/>

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Tribal Climate Tool (PNW and Great Basin)



<https://climate.northwestknowledge.net/NWTOOLBOX/tribalProjections.php>



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Key points

- There are MANY resources available to support adaptation planning
- It's critical to understand what's important in the communities in which you are working
- Connecting with climate service providers will maximize your time and effort



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Lunch

Tuesday March 7 | noon-130pm

