

Climate Resilience Forum

November 10, 2021 | 8:30 am – Noon



1

Presenters and panelists

- ❖ **David J. Hayes**, Special Assistant to President Biden for Climate Policy
- ❖ **Rep. Davina Duerr** (D–Bothell) and Councilmember, Bothell
- ❖ **Dr. Meade Krosby**, Senior Scientist with University of Washington Climate Impacts Group and University Deputy Director of the Northwest Climate Adaptation Science Center
- ❖ **Paul Roberts**, Owner, Paul Roberts & Associates
- ❖ **David Forte**, Senior Policy Analyst, Washington State Office of the Insurance Commissioner
- ❖ **Sarah Fox**, Climate Program Manager, Washington State Department of Commerce
- ❖ **Marissa Aho**, AICP, Policy Director and Chief Resilience Officer, Washington State Department of Natural Resources
- ❖ **Bobbak Talebi**, Senior Coastal Planner, Washington State Department of Ecology
- ❖ **Tonya Graham**, Executive Director, GEOS Institute
- ❖ **Richard Martinez**, Senior Vice President, Kitsap Bank
- ❖ **Banu Erdim**, Sustainability Analyst, Kitsap Bank
- ❖ **John Phillips**, Director of Integrated Watershed Management, Parametrix
- ❖ **Lisa Pool**, Public Policy Consultant, Municipal Research and Services Center (MRSC)
- ❖ **Alicia Seegers Martinelli**, Interim CEO, AWC
- ❖ **Carl Schroeder**, Deputy Director of Government Relations, AWC



2

Zoom meeting technical tips

- Please **submit questions for the speaker** via the **Chat feature**
- You can also use the **Chat feature** for any **technical issues** or questions



Select **Chat**, type your question or comment into chat pane, and hit **Enter**.



3

Disclaimer

Disclaimer: The information contained in this presentation is for general educational purposes only and is not intended to be legal advice. Please consult legal counsel for advice about specific questions.



4

Welcome and keynote

Alicia Seegers Martinelli

Interim CEO

Association of Washington Cities

David J. Hayes

Special Assistant to the President
for Climate Policy

White House



5

What's the state legislative landscape on climate?

Rep. Davina Duerr (D-Bothell) and Councilmember, Bothell

Carl Schroeder, Government Relations Deputy Director,
Association of Washington Cities



6



Climate impacts on Washington’s cities and communities: Risks & resilience

Meade Krosby, PhD

Senior Scientist, Climate Impacts Group
Deputy University Director, NW Climate Adaptation Science Center
University of Washington



Image ©CIG; with aerial support from LightHawk

7

CIG.uw.edu

The University of Washington Climate Impacts Group builds climate resilience by advancing awareness of climate risks & enabling science-based action to manage those risks.

8



NORTHWEST Climate Adaptation Science Center

Supporting sound resource management in the face of changing conditions by advancing understanding of the implications of climate change & variability for fish, wildlife, water, land & people.



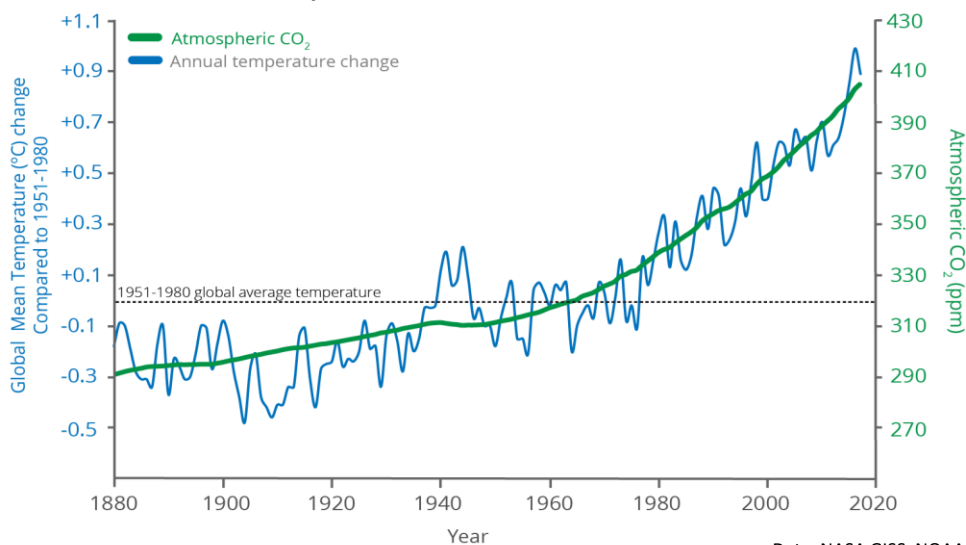
Northwest Climate Resilience Collaborative

Science in service to frontline communities seeking to increase their climate resilience.



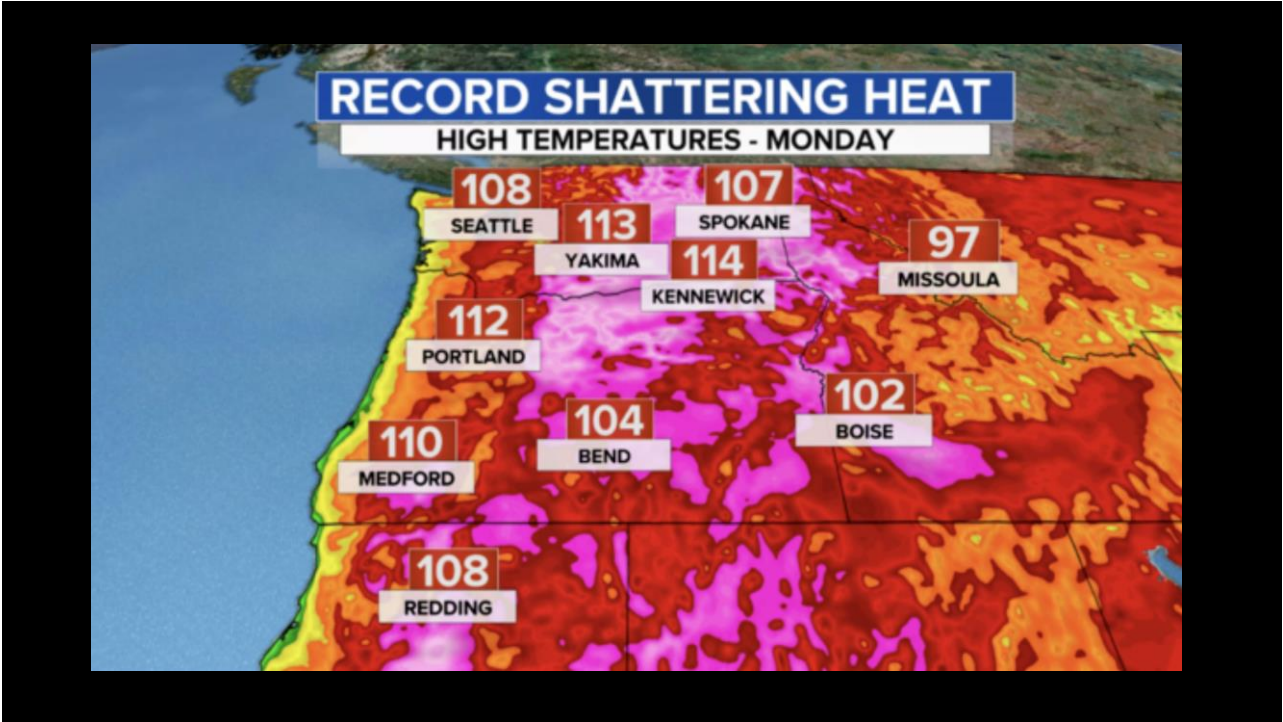
9

Global average temperatures have increased about **1.1°C** since pre-industrial times. Close to 100% of the warming since 1950 is the result of human activity. (IPCC 2018)

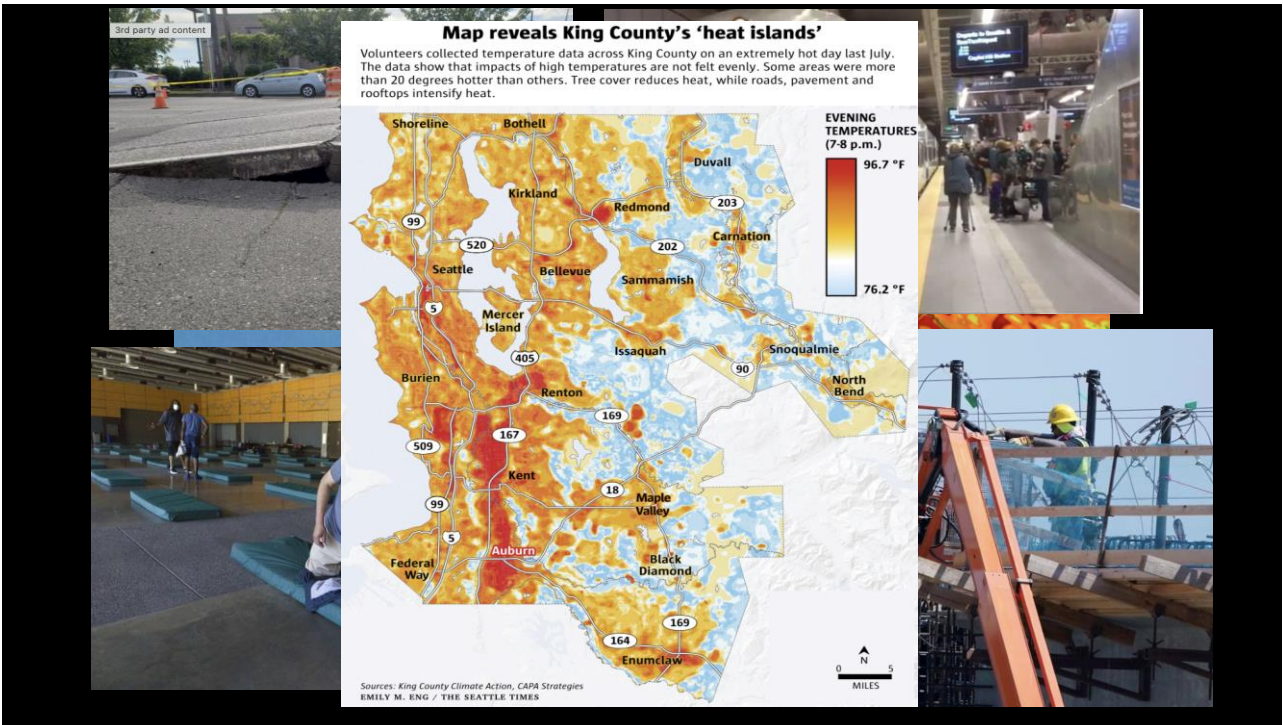


Data: NASA GISS, NOAA ESRL, NOAA NCEI

10



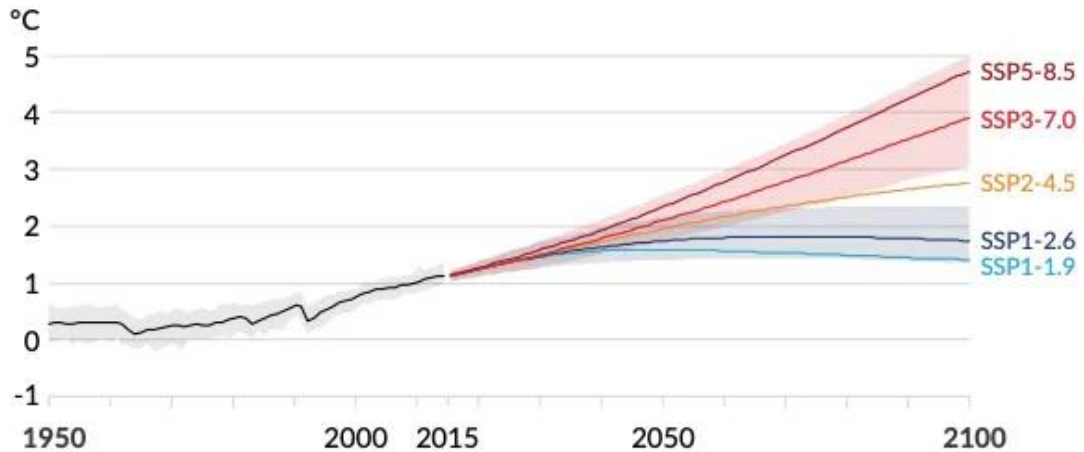
11



12

If current emissions rates continue, global warming could reach 1.5°C as soon as 2030

Global surface temperature change relative to 1850-1900



IPCC 2021

13

Warming of 1.5°C will significantly challenge Washington's communities, economy and ecosystems

Change with 1.5°C

Risks

More very hot days
(above 90°F)



Heat-related illness and deaths
Warmer streams stressing salmon
More frequent harmful algal blooms

Change with 1.5°C

Risks

Lower summer streamflow
(April-September)



Reduced summer hydropower
Conflicts over water resources
Negative effects on salmon populations

Reduced snowpack
(April 1st snow water equivalent)



Reduced water storage
Irrigation shortages
Winter and summer recreation losses

Sea level rise



Coastal flooding and inundation
Damage to coastal infrastructure and communities
Bluff erosion

Higher winter streamflow
(October-March)



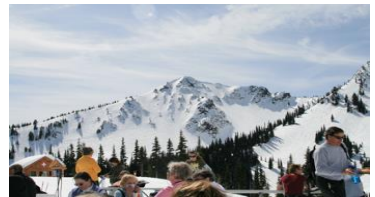
River flooding
Costly stormwater management and flood protection
Negative effects on salmon populations

... but we're on the path to *more* warming

Data: NCA 2018, Climate Impacts Group, Miller et al. 2018
Figure: Climate Impacts Group

14

Climate Matters: Washington's economy, infrastructure and natural systems were built to succeed in the context of the climate of the past.



15

So what can we do?

Address the root cause

Stop emitting greenhouse gases



Prepare for the consequences

Reduce vulnerabilities and build resilience

16

The decisions we make today will shape the risks we face tomorrow

Annual global greenhouse gas emissions
in gigatonnes of carbon dioxide-equivalents
150 Gt

100 Gt

50 Gt

Greenhouse gas emissions
up to the present

1990 2000 2010 2020 2030 2040 2050 2060 2070 2080 2090 2100

Data source: Climate Action Tracker (based on national policies and pledges as of May 2021).
OurWorldinData.org – Research and data to make progress against the world's largest problems.

Last updated: July 2021.
Licensed under C.C-BY by the authors Hannah Ritchie & Max Roser.

Modified from IPCC 2018

No climate policies
4.1 – 4.8 °C

→ expected emissions in a baseline scenario if countries had not implemented climate reduction policies.

Current policies
2.7 – 3.1 °C

→ emissions with current climate policies in place result in warming of 2.7 to 3.1°C by 2100.

Pledges & targets (2.4 °C)
→ emissions if all countries delivered on reduction pledges result in warming of 2.4°C by 2100.

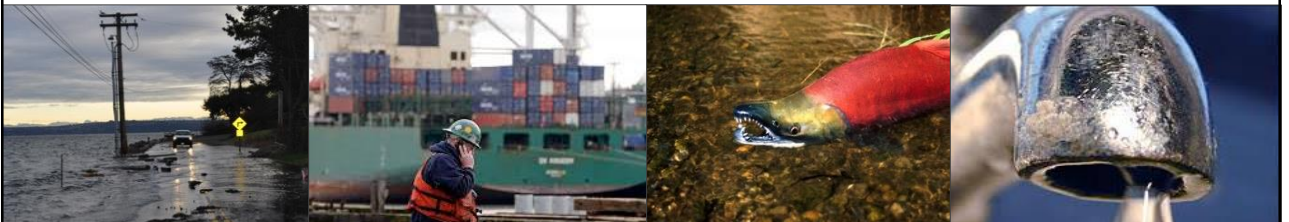
2°C pathways
1.5°C pathways

17



Climate Impacts Group: science, tools and decision-support for climate resilience

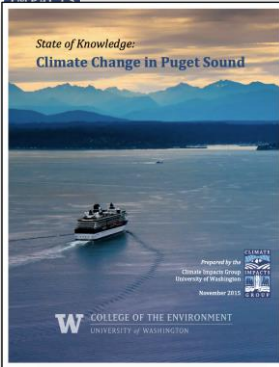
- Science on climate risks and adaptation responses
- Online data & visualization tools
- Technical guidance and support for climate risk assessment and management



18

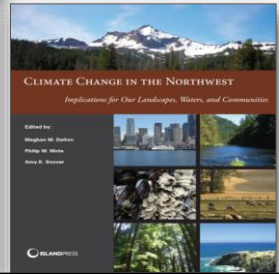
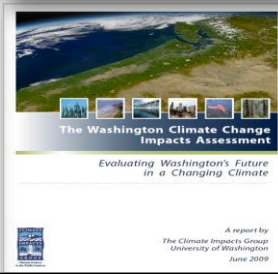


Syntheses, assessments and briefs



“State of Knowledge” series

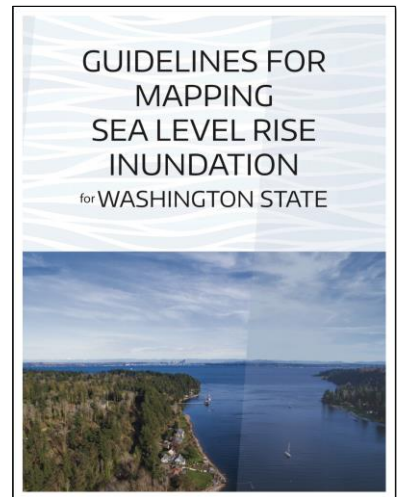
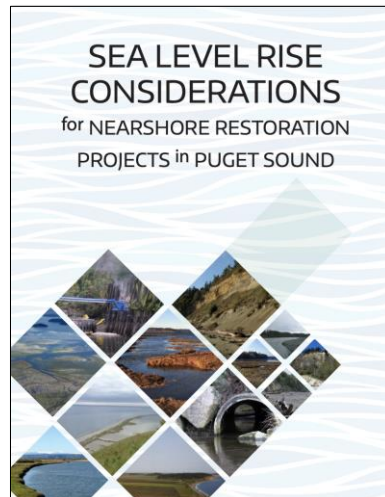
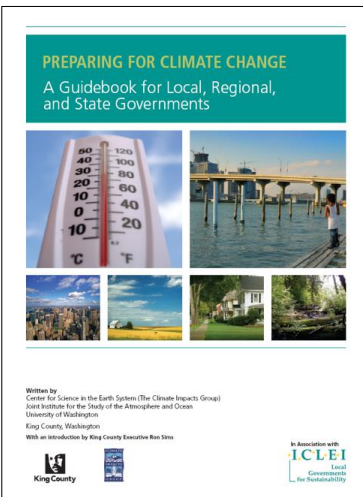
- Comprehensive synthesis reports detail observed and projected changes for Puget Sound & WA.
- Water resources, forests, species and ecosystems, coasts and ocean, infrastructure, agriculture, and human health
- Local climate change risk reduction activities & highlights data resources available to support local climate adaptation efforts.



- Resources for those interested in understanding and preparing for climate change impacts on the PNW.



Technical guidance and support for climate risk assessment and management



Help local, regional, and state governments prepare for climate change by recommending detailed, easy-to-understand processes for climate change preparedness based on familiar resources and tools



Meade Krosby

UW Climate Impacts Group
Northwest Climate Adaptation Science
Center

@CIG_UW cig.uw.edu

@NW_CASC nwcasc.uw.edu

W COLLEGE OF THE ENVIRONMENT
UNIVERSITY of WASHINGTON

21



Climate Resilience Forum

Breakout discussion question
6 minutes



As an elected official, have you had a conversation with your community about the possible impacts of climate change on your city? If so, how did you approach the subject?

Association of Washington Cities



22



Climate Change and Insurance Risk

David Forte
Sr. Property & Casualty Policy Analyst

AWC Climate Resilience Forum

November 12, 2021



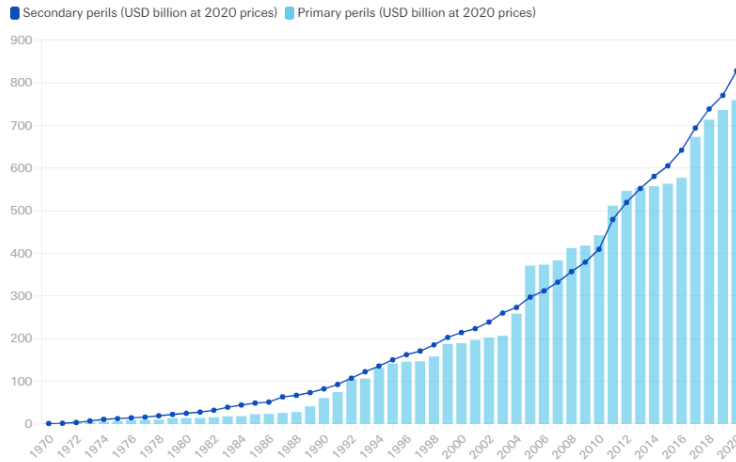
What risk?

- Company solvency.
 - When an insurance company becomes insolvent, the outstanding claim payments are at jeopardy of not being covered.
- Availability of insurance products.
 - Insurance companies will not cover a risk it deems too susceptible to perils.
- Affordability of insurance products.
 - Rising claim costs = rising premium costs.



Rising costs of claims

Cumulative insured losses from secondary and primary perils since 1970, in USD billion at 2020 prices



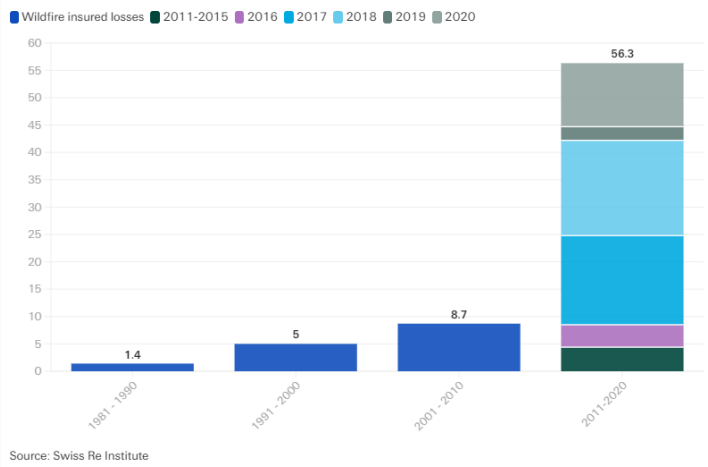
Source: Swiss Re Institute



25

Rising costs of wildfire claims

Global insured losses from wildfires, in USD billion at 2020 prices



Source: Swiss Re Institute



26

How it may affect your constituents and you

Insurance is financial resiliency.

If property insurance becomes unavailable or unaffordable, then your constituents have less financial resiliency when they need it.

If a climate emergency hits, this will put additional strain on your emergency management plans.



Insurance Commissioner Mike Kreidler

- 10+ years chaired the National Association of Insurance Commissioners' working group on climate risk and resilience.
- 10+ years requiring insurance companies answer the Climate Risk Disclosure Survey.
- In 2015- led a national work group that developed financial examination guidelines for regulators to evaluate insurers climate change risk and investments.
 - Joined the Paris Pledge for Action.
 - the OIC became a supporting institution for the United Nations Environment Programme (UNEP) Finance Initiative for Principle of Sustainable Insurance.
- In 2016 the OIC joined the UNEP Sustainable Insurance Forum.
- Commissioner Kreidler has held 5 Climate Risk and Resiliency Summits bringing together the insurance and financial sectors with climate scientists and resiliency advocates.
- Commissioner Kreidler also participates with the Task Force on Climate Related Financial Disclosure to create the standard of how financial institutions disclose their climate risk.



Recent in-state efforts

SHB 2322 (2018) and codified in RCW 48.18.558, 48.18.559, and 48.19.530.

- This law allows residential property insurers to provide certain goods and/or services to its insured and not be in violation of inducement laws.
- 2018- \$1,500 per 12 months
- 2020- raised to \$7,000 per 12 months
- No limit if property is under immediate threat of damage.

2019-2020 Washington state Disaster Resiliency Work Group- 30 members

- Provided recommendation to the Legislature on how the state can become more resilient.
- Many recommendations became law last session.



Community Risk Mitigation Programs

Wildfire:

International Fire Chiefs Association- Ready, Set, Go

National Fire Protection Association- Firewise USA

Washington Fire Adapted Communities Learning Network

Flood:

NFIP- The Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management practices.

Windstorm:

Insurance Institute for Business & Home Safety- Fortified Homes Program



FEMA – BRIC funding

Building Resilient Infrastructures and Communities (BRIC) grant program for pre loss mitigation programs.

- Eligibility- Local governments, including cities, townships, counties, special district governments, and tribes.
 - All sub-applicants must have a FEMA-approved hazard mitigation plan by the grant application deadline and at the time of award
- Cost sharing- 75% Federal, 25% local
 - “Economically Disadvantaged Rural Communities” 90% federal, 10% local
- Work with the WA Emergency Management Division to process application



Parametric Insurance

Parametric “insurance” is a risk transfer arrangement where a party buys a pre-defined amount of protection which will pay-out based on pre-defined terms.

It does NOT indemnify a loss.

The trigger is measured by an objective and independently verifiable parameter or index.

The payout process is much quicker than typical insurance claims.



Questions?

David Forte

Sr. Property & Casualty Policy Analyst

davidf@oic.wa.gov / 360-725-7042

Connect with us!

- Facebook: <https://www.facebook.com/WSOIC>
- Twitter: https://twitter.com/WA_OIC
- www.insurance.wa.gov



State agency resources on climate change: Departments of Natural Resources, Commerce, and Ecology

Sarah Fox

Climate Program Manager

Washington State Department of Commerce

Marissa Aho, AICP

Policy Director and Chief Resilience Officer

Washington State Department of Natural Resources

Bobbak Talebi

Senior Coastal Planner

Washington State Department of Ecology



Climate Program

Sarah Fox

CLIMATE PROGRAM MANAGER

NOVEMBER 10, 2021



Washington State
Department of
Commerce

35

We strengthen communities



**HOUSING
HOMELESSNESS**



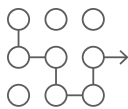
INFRASTRUCTURE



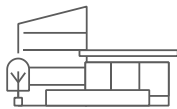
**BUSINESS
ASSISTANCE**



ENERGY



PLANNING



COMMUNITY FACILITIES



**CRIME VICTIMS &
PUBLIC SAFETY**

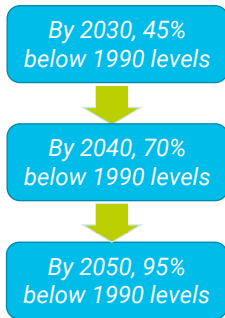


**COMMUNITY
SERVICES**

36

Why now?

Greenhouse gas emission targets: RCW 70A.45.020

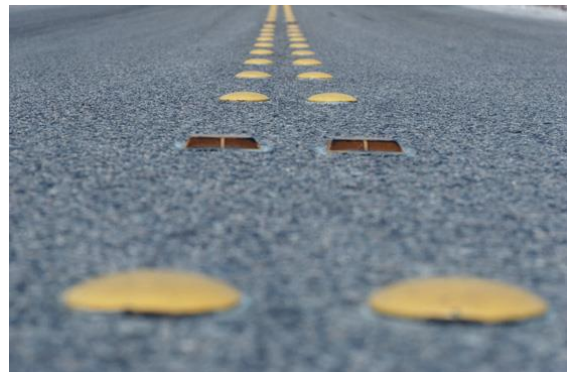


Proposed HB 1099 (2021)

- **New** climate change mitigation goal added to GMA.
- **New** climate change and resiliency element added to comprehensive plans.
- **Identify** GHG and VMT reduction plans from transportation and land use systems.

Deliverable – Model Framework/Element

- **To include measures and actions:**
 - Identify natural hazard areas exacerbated by climate change.
 - Reduce greenhouse gas emissions (GHG).
 - Reduce vehicle miles traveled (VMT).
 - Identify, design, and invest in resilient infrastructure.
 - Prioritize actions to support people disproportionately impacted by climate change.



Model Climate Program

- *Due June 30, 2023*
- *Funding of approx. \$3M*
- *Specific state agency partnerships:*
 - *Ecology (ECY)*
 - *Natural Resources (DNR)*
 - *Health (DOH)*
 - *Fish and Wildlife (WDFW)*
 - *Emergency Management (EMD)*
 - *Transportation (WSDOT)*



Reduce greenhouse gas emissions

“Mitigation” Efforts to reduce or prevent emission of greenhouse gases

- *Identify actions to reduce GHG to achieve statewide goals RCW70A.45.020(1)*
- *Measures to reduce VMT that can be achieved in all cities – no matter the size*



Adapt to climate impacts

- *Adaptation*
- *Identify natural hazards*
- *Invest in resilient infrastructure*
 - *Natural*
 - *Traditional*
 - *Protect natural areas*
 - *Protect vital habitat for species migration*



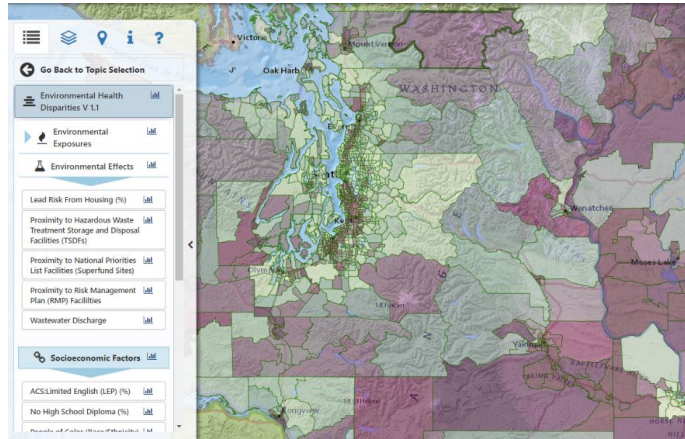
Adapt to climate impacts

- *Identify co-benefits of resilient actions such as:*
 - *salmon recovery,*
 - *ecosystem services, and*
 - *supporting treaty rights.*

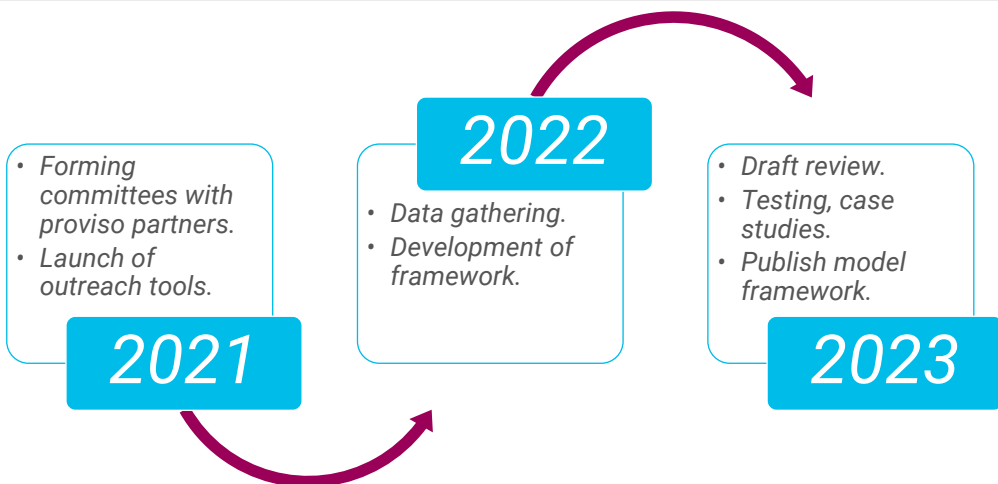


Disproportionate impacts

- *Identify and prioritize actions to uplift communities most impacted by climate change*
- *Environmental Health Disparities Map (DOH)*



Collaborative project schedule



We need your partnership

Forming committees now:

- *Small to mid-size cities*
- *Large cities*
- *Underrepresented communities*

Interested?

Potential pilot program and testing of model framework starting in Fall 2022.



Thank you!

Sarah Fox, AICP
CLIMATE PROGRAM MANAGER
Sarah.fox@commerce.wa.gov
360.725.3114



**SAFEGUARDING OUR LANDS,
WATERS, AND COMMUNITIES:**

FEBRUARY 2020 **DNR'S PLAN FOR
CLIMATE RESILIENCE**

Marissa Aho, AICP
Policy Director/Chief Resilience Officer

WASHINGTON STATE DEPT OF
NATURAL RESOURCES
MILWAUKEE S. PRANGE
COMMISSIONER OF PUBLIC LANDS

- Climate change
- Accelerating wildfire
- Growing wildland-urban interface
- Wildland fire response systems are stretched
- Potential increased damage from insects and pathogens
- Landslides and debris flows
- Water quality/quantity
- Increased precipitation
- Soil erosion
- Coastal flooding
- Inland flooding
- Drought
- Sea level rise
- Ocean acidification
- Declining salmon and orca populations
- Threats to shellfish
- Tsunami inundation
- Inequity
- Supporting multi-lingual communities
- Environmental Injustice
- Air Quality
- Urban Heat Island Effect
- Human Health Disparities
- And more

47

Climate Resilience

Reducing Carbon Emissions and Carbon Sequestration Opportunities

Urban Forestry, Tree Canopy and Evergreen Communities

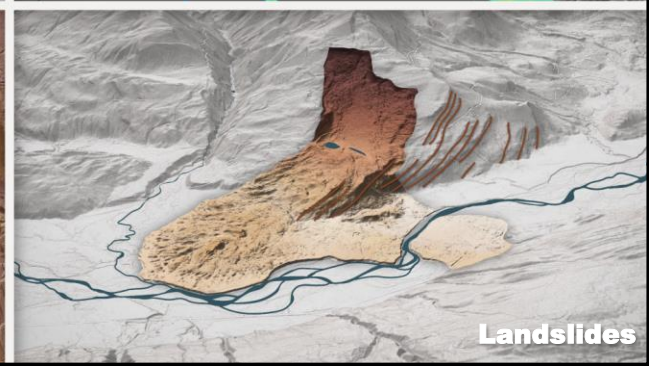
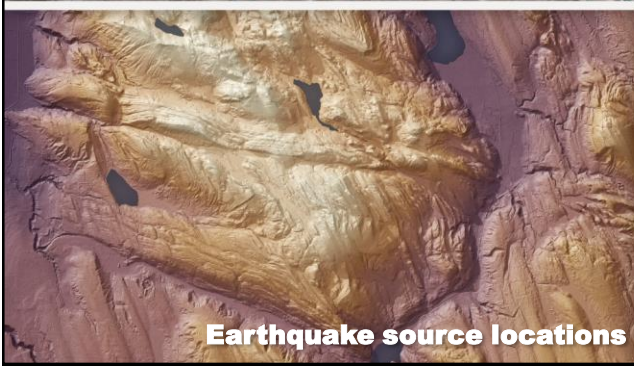
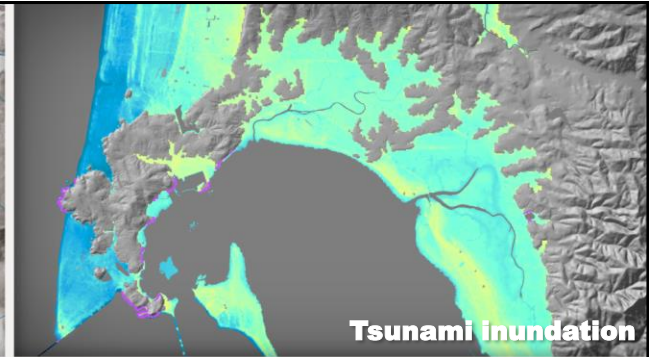
Ecosystem Conservation, Natural Areas, Natural Heritage Programs and Recreation

Aquatic Resources and Coastal Management

48

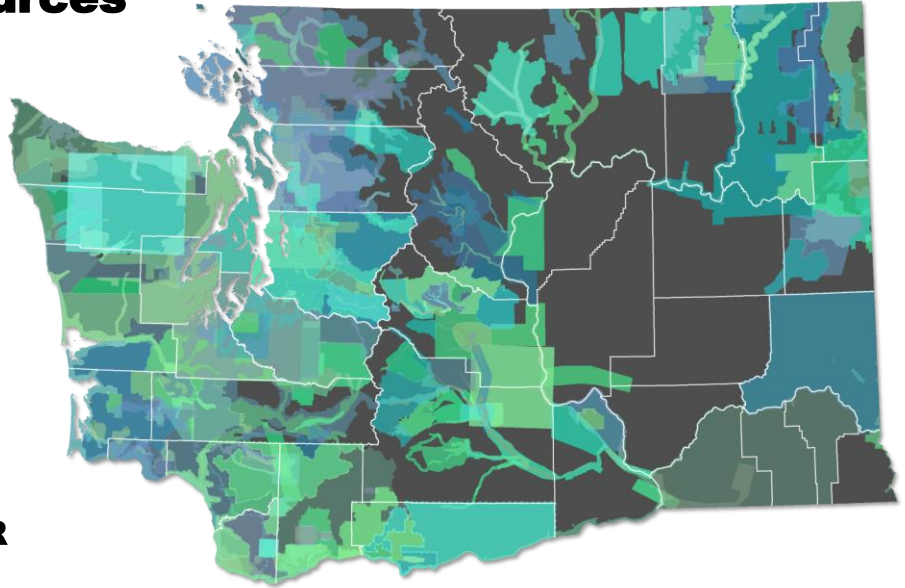


49



50

LiDAR Resources



- Existing LiDAR landscape

51



Spokane, 2007

52



53

Proposed Resource

- **In 2022 seeking a statewide collection on a predictable ten-year cycle**
- **Partner with others to achieve a faster refresh rate (goal 6 years)**
- **Streamlines collection**

54

Additional DNR Resilience Resources

- DNR Plan for Climate Resilience <https://www.dnr.wa.gov/climate-change>
- DNR LiDAR Resources <http://dnr.wa.gov/lidar>
- DNR Geology GIS Database <https://www.dnr.wa.gov/programs-and-services/geology/publications-and-data/gis-data-and-databases>
- DNR Geologic Portal <https://www.dnr.wa.gov/geologyportal>
- DNR Urban Forestry <https://www.dnr.wa.gov/urbanforestry>
- DNR Wildfire Ready Neighbors <https://wildfireready.dnr.wa.gov/>
- DNR Aquatics Research and Monitoring <https://www.dnr.wa.gov/programs-and-services/aquatics/aquatic-science/aquatic-assessment-and-monitoring-team/adaptive>
- DNR Species Vulnerability to Climate Change <https://www.dnr.wa.gov/NHPclimatespecies>
- Forest Health Assistance for Small Forest Land Owners <https://www.dnr.wa.gov/cost-share>

55

Additional Select Resilience Resources

- Resilient Cities Network <https://resilientcitiesnetwork.org/>
- National League of Cities Resilience <https://www.nlc.org/initiative/sustainability-and-resilience/>
- Climate Mayors <https://climatemayors.org/>
- USDN <https://www.usdn.org/products-climate/html>
- Federal Climate Adaptation Plans <https://www.sustainability.gov/adaptation/>
- National Integrated Heat Health Information System <https://nihhis.cpo.noaa.gov/>
- FEMA Resilience Analysis & Planning Tool <https://www.fema.gov/emergency-managers/practitioners/resilience-analysis-and-planning-tool>

56



Marissa Aho, AICP
Policy Director/Chief Resilience Officer
Office of the Commissioner of Public Lands
Department of Natural Resources
Mobile: (360) 515-8087
Marissa.Aho@dnr.wa.gov

57



THE WASHINGTON COASTAL HAZARDS RESILIENCE NETWORK (CHRN)

Bobbak Talebi
Senior Coastal Planner
Washington State Department of
Ecology



58

Our vision

Our innovative partnerships protect and sustain healthy land, air, and water in harmony with a strong economy.

Our mission

To protect, preserve, and enhance Washington's environment for current and future generations.

Goal 2: Reduce and prepare for climate impacts

Ecology is preparing for the future by understanding and reducing the effects of climate change on our communities, environment, and economy. We will reduce greenhouse gas emissions, promote community resilience, and prevent and remediate negative impacts with an emphasis on historically underserved and overburdened communities.



59

- [Air Quality](#) – We partner with local clean air agencies to ensure communities have healthy air to breathe.
- [Environmental Assessment](#) – We assess and monitor the environment, collect and share data, and assure that our science meets the highest standards.
- [Hazardous Waste and Toxics Reduction](#) – We provide assistance to manage dangerous waste, prevent pollution, and foster sustainability.
- [Nuclear Waste](#) – We oversee cleanup of the toxic legacy of plutonium production at Hanford, and help keep people and the environment safe from dangerous radioactive and chemical hazards.
- [Office of Chehalis Basin](#) – We are working to reduce flood-related damages while restoring aquatic species habitat in the Chehalis – River basin in Southwest Washington, the state's second largest river drainage system.
- [Office of Columbia River](#) – We are working to meet current and future water needs for Eastern Washington, in the Columbia River basin, and its tributaries.
- [Shorelands and Environmental Assistance](#) – We support community conservation efforts for shorelands, wetlands, and floodplains.
- [Solid Waste Management](#) – We coordinate solid waste management and recycling programs for public safety and resource efficiency.
- [Spill Prevention, Preparedness, and Response](#) – We prevent, prepare for, and respond to oil and hazardous materials spills.
- [Toxics Cleanup](#) – We work to clean up accidental spills of dangerous materials and past contamination of land and water.
- [Water Quality](#) – We protect Washington's waters for recreation, drinking, public health, business activities, and fish and wildlife.
- [Water Resources](#) – We manage water to sustainably meet the current and future needs of people, farms, and fish.



60

Shorelands and Environmental Assistance Program

- Our team is made up of floodplain, coastal, shoreline, and wetland planning staff.
- We administer state and federal grants to improve and protect the environment.
- We oversee the rules and guidance for the State Environmental Policy Act (SEPA).
- From ocean beaches to the banks of streams, we provide guidance for best management, technical assistance, and regulate land use along state shorelines.

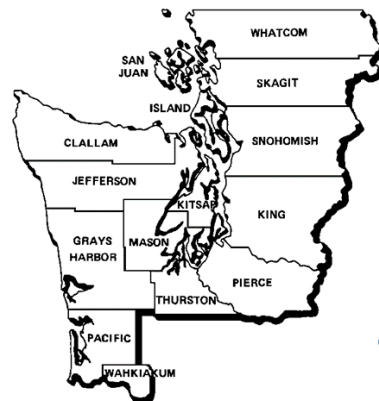


61




WASHINGTON COASTAL HAZARDS RESILIENCE NETWORK


The Washington Coastal Hazards Resilience Network is dedicated to increasing the resilience of Washington's coastal communities to existing and future natural hazards through coordination, collaboration, education, and knowledge exchange.




62




WASHINGTON COASTAL HAZARDS RESILIENCE NETWORK




Understand
Hazards Basics



Explore
Research and Tools





Identify
Resources for
Project Support




Connect with
the Network

- Be an information-sharing platform: resources, best available science, tools, practices, lessons learned
- Identify subject area experts
- Share ongoing projects, upcoming events, & opportunities for learning and skill development
- Provide recommendations on how to address specific technical, management, or policy issues


63



WASHINGTON COASTAL HAZARDS RESILIENCE NETWORK

A community of practice of coastal hazards and climate resiliency practitioners from Federal, local, and state government agencies, tribes, academic institutions, consulting firms, and nonprofits

80 members in the CHRN directory, 150 on the CHRN Listserv



Kaminsky, George
Environmental/Coastal Engineer, Washington Department of Ecology

George Kaminsky is a Coastal Engineer with the Washington State Department of Ecology with 25 years of applied research experience in coastal engineering and morphodynamics. Georg...

✉ gkarn461@ECY.WA.GOV

[VIEW MORE](#)

ALL

ALL HAZARDS

CLIMATE CHANGE

SEA LEVEL RISE

FLOODING

EROSION

LANDSLIDE

TSUNAMI

EARTHQUAKE

PERMITTING

PLANNING

SCIENTIFIC ASSISTANCE

TECHNICAL ASSISTANCE

ACADEMIA

CONSULTANT



NONPROFIT

LOCAL GOVERNMENT

STATE AGENCY

FEDERAL AGENCY

TRIBAL GOVERNMENT

64

Home Hazards Basics Research and Tools Project Support The Network

Let's Get Started!

Understand Hazards Basics

Explore Research and Tools

Identify Resources for Project Support

Connect with the Network

Featured

New Sea Level Rise Risk Reduction Case Studies

by admin | Jan 14, 2021

Six new sea level rise-focused risk reduction project case studies have been added to the Coastal Hazards Risk Reduction Project Mapper. Although we still continue to feature new projects that address erosion, flooding, tsunamis, and other coastal hazards in Washington...

[read more](#)

Risk Reduction Project Mapper

Sea Level Rise Projections

TUE 20	North Pacific Coast Marine Resource Committee meeting April 20 @ 4:00 pm - 6:00 pm
MON 26	Wahkiakum County Marine Resources Committee meeting April 26 @ 5:30 pm - 6:30 pm
MAY 11	Grays Harbor Marine Resource Committee Meeting May 11 @ 3:30 pm - 5:30 pm

65

Home Hazards Basics Research and Tools Project Support The Network

Let's Get Started!

Understand Hazards Basics

Explore Research and Tools

Identify Resources for Project Support

Connect with the Network

Featured

New Sea Level Rise Risk Reduction Case Studies

by admin | Jan 14, 2021

Six new sea level rise-focused risk reduction project case studies have been added to the Coastal Hazards Risk Reduction Project Mapper. Although we still continue to feature new projects that address erosion, flooding, tsunamis, and other coastal hazards in Washington...

[read more](#)

Risk Reduction Project Mapper

Sea Level Rise Projections

TUE 20	North Pacific Coast Marine Resource Committee meeting April 20 @ 4:00 pm - 6:00 pm
MON 26	Wahkiakum County Marine Resources Committee meeting April 26 @ 5:30 pm - 6:30 pm
MAY 11	Grays Harbor Marine Resource Committee Meeting May 11 @ 3:30 pm - 5:30 pm

66

67

68

Home
Hazards Basics
Research and Tools
Project Support
The Network

Sea Level Rise Visualization Tools

Sea Level Rise

- Overview
- About Sea Level Rise
- Sea Level Rise Projections
- Use the Visualization Tools
- Visualization Tutorials
- Sea Level Rise Resources
- Case Studies

ABOUT THE SEA LEVEL RISE DATA VISUALIZATION TOOLS

The data visualizations allow users to view localized relative sea level rise (RSLR) projections along the Washington coast. Visualizations occur at different locations that the user selects. Visualizations change over time.

VISUALIZATION #1: Projected sea level change by year

Select a location to view localized relative sea level rise (RSLR) projections.

Select County (optional)

King

Select WRIA (optional)

(All)

Select likelihood(s)

0.1%

1%

5%

10%

17%

50%

83%

90%

99%

Select greenhouse gas scenario(s)

High (RCP 8.5)

Low (RCP 4.5)

[Click for Full SLR report.](#)

Data Estimated for 47.6°N, -122.4°W
County: King
WRIA: 8, Cedar - Sammamish

Vertical land movement estimate and uncertainty (1 standard deviation) for this location: **-0.3 to 0.2 feet/century** (negative values represent land level fall, or subsidence). This number is factored into these RSLR projections.

If there is a subduction zone earthquake this area may be subject to an additional level level change of **0.0 feet to 0.2 feet** which is NOT factored into these RSLR projections. Coastal subsidence during a subduction zone earthquake would have the effect of RAISING local relative sea level.

RSLR for Selected Location

Projected changes relative to the average sea level over 1991-2009.

Hover for details.

Scenario, Likelihood

- High (RCP 8.5), 1%
- High (RCP 8.5), 50%
- Low (RCP 4.5), 1%
- Low (RCP 4.5), 99%

Select projections end year: 2150

Year	High (RCP 8.5)			Low (RCP 4.5)		
	1%	50%	99%	1%	50%	99%
2020	0.0	0.0	0.0	0.0	0.0	0.0
2030	0.0	0.4	0.1	0.0	0.4	0.1
2040	1.0	0.6	0.2	1.0	0.6	0.2
2050	1.5	0.8	0.3	1.4	0.8	0.3
2060	2.0	1.1	0.4	1.9	1.0	0.3
2070	2.4	1.4	0.6	2.4	1.2	0.4
2080	2.9	1.7	0.7	3.0	1.4	0.5
2090	3.2	2.0	0.8	3.7	1.6	0.5
2100	3.5	2.3	0.9	4.4	1.9	0.5
2110	3.8	2.5	1.1	5.2	2.1	0.6
2120	4.0	2.9	1.2	6.0	2.3	0.6
2130	4.2	3.2	1.3	6.9	2.5	0.6
2140	4.4	3.5	1.4	8.0	2.7	0.5
2150	4.6	3.8	1.5	9.2	2.9	0.5

[Click here to download the full Excel data tables for this location or select "Coastal" in the download menu below to export only the values shown here see p. xvii.](#)

69

PROJECTED SEA LEVEL RISE for WASHINGTON STATE

A 2018 ASSESSMENT

HOW TO CHOOSE A PRIMER FOR SELECTING SEA LEVEL RISE PROJECTIONS FOR WASHINGTON STATE

GUIDELINES FOR MAPPING SEA LEVEL RISE INUNDATION for WASHINGTON STATE

SEA LEVEL RISE CONSIDERATIONS for NEARSHORE RESTORATION PROJECTS in PUGET SOUND

Extreme Coastal Water Level in Washington State

Guidelines to Support Sea Level Rise Planning

Sea Grant Community-Based Coastal Resilience Planning Guidebook

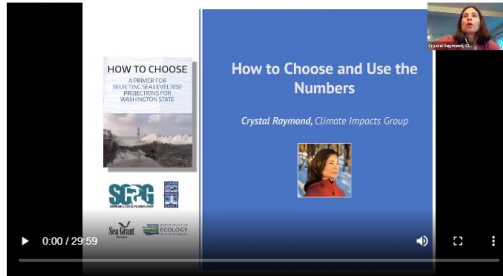
Sea Level Rise Considerations in Washington State Capital Grant Programs

Inventory and Lessons Learned

November 2020
Publication 20-06-015

70

1. "How to Choose and Use the Numbers," provides instructions for using the projections. Presented by Crystal Raymond of UW Climate Impacts Group.



2. "Visualizing Washington's Sea Level Rise Projections" describes how to use the Tableau data visualizations (below). Presented by Harriet Morgan of UW Climate Impacts Group.



71

Home Hazards Basics Research & Tools Project Support Case Study Mapper About	
Washington State Department of Archaeology and Historic Preservation	⊖
Washington State Conservation Commission and Conservation Districts	⊖
Washington State Department of Commerce	⊖
Washington State Department of Ecology The Department of Ecology works to protect, preserve and enhance the environment for current and future generations. The Department of Ecology primarily provides grants to local governments, municipalities and public entities towards environmental efforts such as clean water, stormwater, relief, floods and more. Types of projects funded: Stormwater, floodplain management, watersheds & flow, toxic clean-ups, clean water and more. Example projects: Washington Coastal Hazards Risk Reduction Project Mapper Funding available: Funding availability varies on grant and grant cycle. More information: <ul style="list-style-type: none"> • Department of Ecology Find a Grant & Loan Site • Department of Ecology Water Quality Grants & Loan Site • Department of Ecology Watershed Planning Grants Site • Department of Ecology Flood Control Grants Site 	
Washington State Department of Fish and Wildlife	⊖
Washington State Department of Natural Resources	⊖
Washington State Department of Social and Health Services	⊖
Washington State Department of Transportation	⊖

72



Thank You

Bobbak Talebi

Bobbak.Talebi@ecy.wa.gov

360-819-3014

73



Climate Resilience Forum

Breakout discussion question
6 minutes



What technical or planning resources would help you the most in preparing your community for a changing climate and environment?



74

Private sector resources panel

Tonya Graham
Executive Director
GEOS Institute

Richard Martinez
Senior Vice President
Kitsap Bank

Banu Erdim
Sustainability and ESG Analyst
Kitsap Bank

John Phillips
Director of Integrated Watershed Management
Parametrix

Moderator - Paul Roberts
Everett City Councilmember



75



Climate Ready Communities

Climate resilience support for small to mid-sized communities

Tonya Graham, Executive Director

Association of Washington Cities – November 10, 2021

76

GEOS INSTITUTE

*Mission: To keep human and natural communities whole
in the face of climate change.*



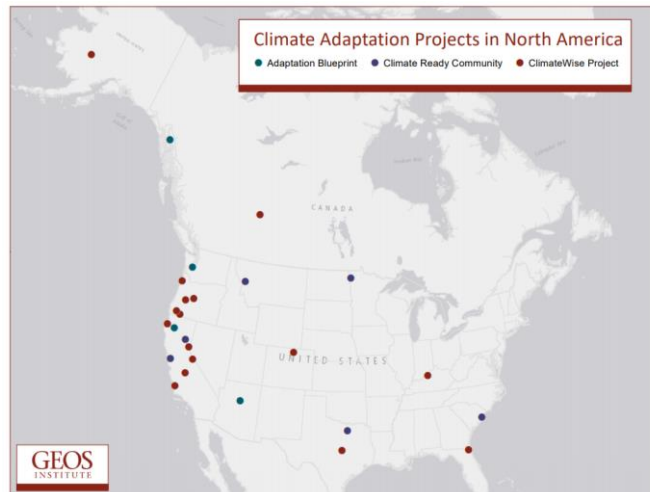
CLIMATE
WISE®



WORKING
WATERS

77

CLIMATE WISE®



78



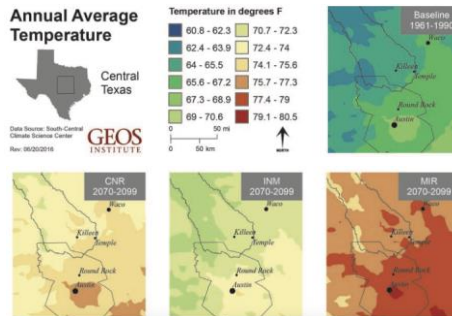
What do you love about where you live?



CLIMATE READY COMMUNITIES

Whole Community Resilience

- Science-based
- Socially equitable
- Ecologically sound
- Supports mitigation



CLIMATE READY COMMUNITIES

81

Whole Community Resilience



CLIMATE READY COMMUNITIES

82



CLIMATE READY COMMUNITIES

83

Resilience Services

- Every community needs a climate resilience plan
- Most communities need help
- Many communities cannot afford to hire a consultant
- Mainstreaming alone does not lead to holistic solutions
- Especially true for small to mid-sized and under-resourced communities

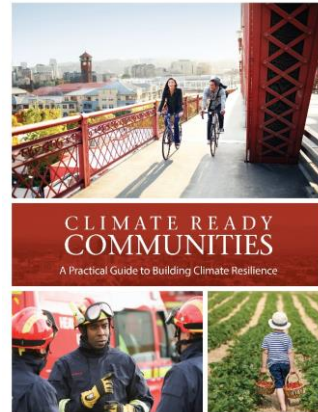


CLIMATE READY COMMUNITIES

84

Climate Ready Communities

- Step-by-step guide available for download at no cost



CLIMATE READY
COMMUNITIES

85

Climate Ready Communities

- Support Package
 - 29 downloadable templates
 - 9 video tutorials
 - Library of webinars on resilience topics
 - One-hour introduction call
 - Access to web portal to track progress
 - Cost: \$500 for 2 years of access

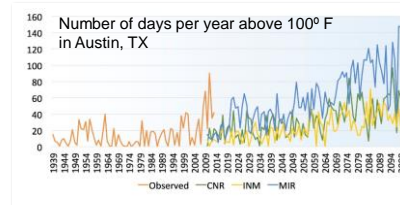


CLIMATE READY
COMMUNITIES

86

Climate Ready Communities

- Other Services
 - Local climate projections
 - Workshop facilitation
 - Report writing
 - Webinars on resilience-related topics
 - Consulting hours



CLIMATE READY
COMMUNITIES

87

Climate Ready Communities

- Consulting Network
 - Engagement
 - Social Equity
 - Climate Science
 - Finance
 - Integration into existing plans
 - Implementation



CLIMATE READY
COMMUNITIES

88

Cohorts

- Multiple cities, towns, or counties in a region or state
- Move through the process together
- Leverage resources



CLIMATE READY COMMUNITIES

Climate Ready Communities



“The Climate Ready Communities program has been an excellent tool for Corinth. It provides clear steps and expert guidance. The backing of the Geos Institute provides credibility and helps to build momentum for our resilience planning.”

Patrick Hubbard, City of Corinth, TX



“We find these tools to be effective and designed with a community user’s perspective in mind. We appreciate the step-by-step approach as well as the fact that the program is flexible, allowing us to make modifications as needed to fit our specific circumstances.”

Diana Maneta, Missoula County, MT

“The Climate Ready Communities program has been extremely relevant and useful for Sierra CAMP as a regional collaborative. The comprehensive guide with its step-by-step organization helps us and our member communities break the climate resilience planning process into manageable steps and build our internal technical expertise.

Nikki Caravelli, Sierra Business Council, CA

CLIMATE READY COMMUNITIES



Contact Us

TONYA GRAHAM – TONYA@GEOSINSTITUTE.ORG

GEOFF WEAVER – GEOFF@GEOSINSTITUTE.ORG

CLIMATE READY
COMMUNITIES

91

Kitsap
Bank

AWC Climate Forum

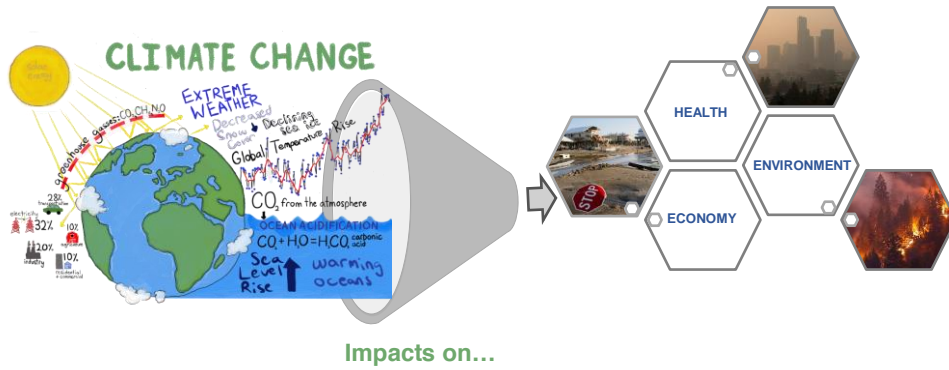
RICHARD MARTINEZ, SVP, Director Municipal & Specialty Banking

BANU ERDIM, Sustainability & ESG Analyst

November 10, 2021

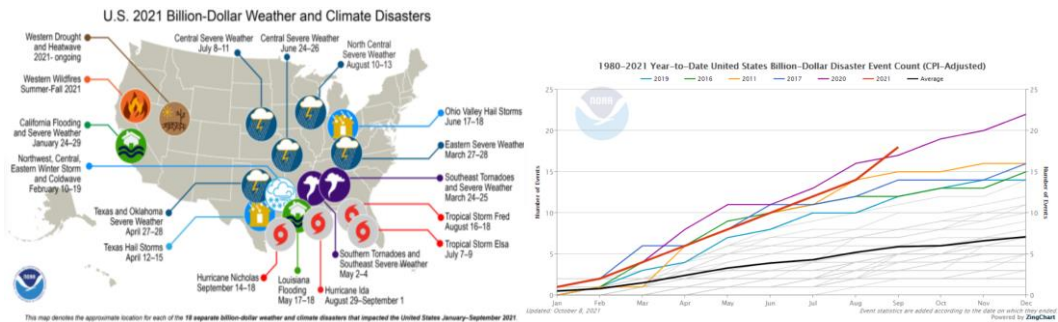
92

Confronting Climate Change



Confronting Climate Change

- In 2021, the U.S. has endured 18 separate weather and climate disasters that have cost at least \$1 billion.
- While 2021's 18 events trail 2020's count, 2021's disasters have been more costly. They are estimated to have resulted in \$104.8 billion in damages, surpassing last year's estimated \$100.4 billion.



The Risks for Our Region

Change with 1.5°C	Risks
<p>More Very Hot Days (Above 90° F)</p> <p>↑ 67%</p>	<p>Heat-related illness and deaths</p> <p>Warmer streams stressing salmon</p> <p>More frequent harmful algal blooms</p>
<p>Reduced Snowpack (April 1st snow water equivalent)</p> <p>↓ 38%</p>	<p>Reduced water storage</p> <p>Irrigation shortages</p> <p>Winter and summer recreation losses</p>
<p>Higher Winter Streamflow (October-March)</p> <p>↑ 16%</p>	<p>River flooding</p> <p>Costly stormwater management and flood protection</p> <p>Negative effects on salmon populations</p>
<p>Lower Summer Streamflow (April-September)</p> <p>↓ 23%</p>	<p>Reduced summer hydropower</p> <p>Conflicts over water resources</p> <p>Negative effects on salmon populations</p>
<p>Sea Level Rise (at 2100)</p> <p>↑ 1.4 feet</p>	<p>Coastal flooding and inundation</p> <p>Damage to coastal infrastructure and communities</p> <p>Buff erosion</p>



Increased summer drought stress



Marine-based economies suffer



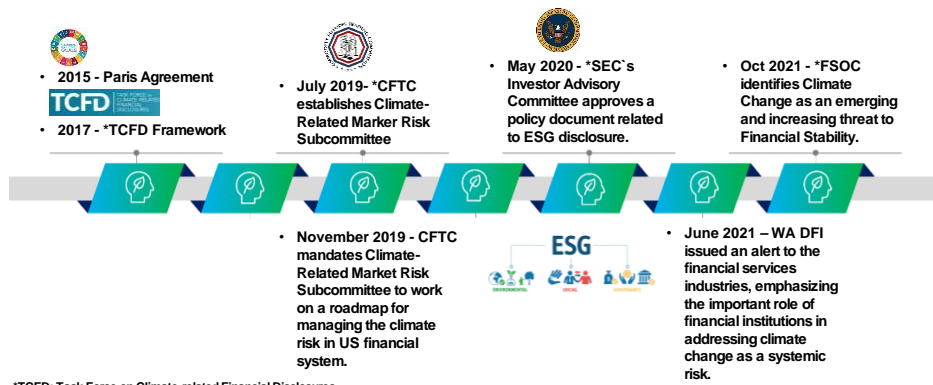
Greater risks to homes, businesses, and infrastructure from increased coastal & river flooding and extreme weather events.



Resource: WA Dep of Natural Resource's Plan for Climate Resilience, Feb 2020.

A View of Key Efforts

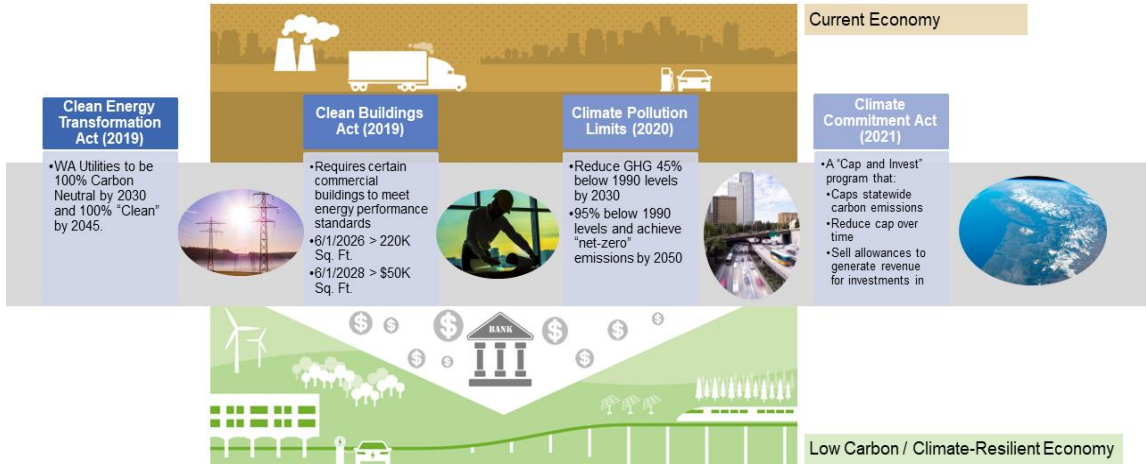
It might have been in the background before, but now—and with increasing frequency—signs point to the necessity of climate risk preparedness:



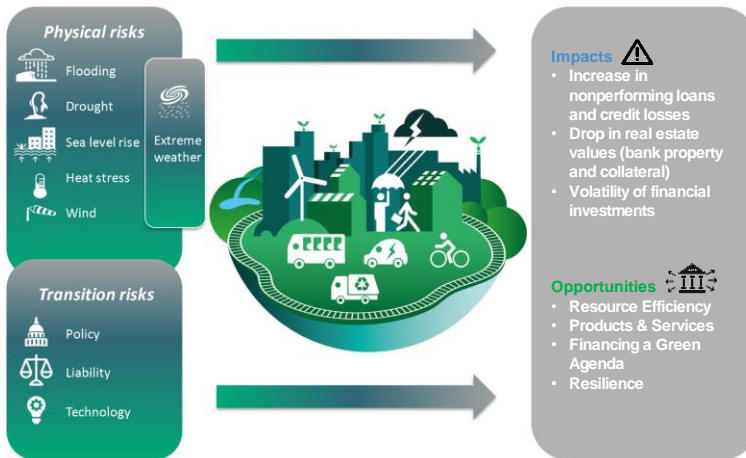
*TCFD: Task Force on Climate-related Financial Disclosures
 *CFTC: Commodity Futures Trading Commissioner
 *SEC: Securities and Exchange Commission
 *FSOC: Financial Stability Oversight Council
 *WADFI: Washington State Department of Financial Institutions

Legislation in WA

WA is shaping the transition from Brown to Green.



Climate Change and the Banks



What is Kitsap Bank doing?

C-PACER Implementation in WA

- Lighting
- Solar Panels
- Fire Suppression
- Heating & Cooling
- Windows
- Flood Protection
- Seismic Upgrades
- Insulation
- Pumps & Motors
- Electric Vehicle Charging
- Smart Metering
- Stormwater Control

Solar Financing Portfolio

- East Brunswick Branch 2016
- West Brunswick Branch 2016
- 1000 Vermont County 2016
- 2016 Las Vegas Valley Water Services
- 2016 James W. Moore Electric CO-OP
- 2016 Jacksonville Energy Authority

ESG Framework Development including Carbon Foot Print Calculation

Year	2016	2017	2018	% Change
Total MFCOs	1,716	2,176	2,311	36%
Milestones	240	282	298	25%
Essential/Imp	15.0	10.9	11.2	3%

Municipal Market Expectations

- Financial institutions can support local government entities and public sector clients in their climate resiliency efforts.
- Financial institutions understand the unique challenges that local governments face navigating climate concerns, with budgeting challenges and the overall needs of their communities. Consequently, they will be looking for greater transparency and due diligence in line with their climate change related initiatives, activities and exposures.





800.283.5537 | kitsapbank.com

101

Climate Change and Resiliency

Association of Washington Cities
Climate Resilience Forum

November 10, 2021

John Phillips

Director of Integrated Watershed Management

Parametrix

102

100% Employee-owned firm

Over 300 employees in Washington State with Offices in Puyallup, Seattle, Camas, Bremerton and Mukilteo

Services include transportation, water, environmental sciences, compliance, long-range planning, survey, construction management and utility management

Parametrix

103



Climate Change and Resiliency at Parametrix

Our vision brings value to our clients by being regional leaders in climate change and resiliency in our geographies.

Help our clients and partners create vibrant, sustainable communities and restore the health of the planet for future generations.

Climate change and resiliency is increasingly impacting communities throughout the West and affecting everything our clients do.

We offer best available science and regionally specific information to address the impacts of climate change along with the ability to bring national expertise to a local level.

Parametrix

104

Questions?



John Phillips

Director of Integrated Watershed Management

jmphilips@parametrix.com

206.940.8769

Parametrix

105

MRSC's Local Climate Response Project

AWC Climate Resilience Forum | November 10, 2021

Lisa Pool, AICP, Public Policy Consultant
Municipal Resources and Services Center



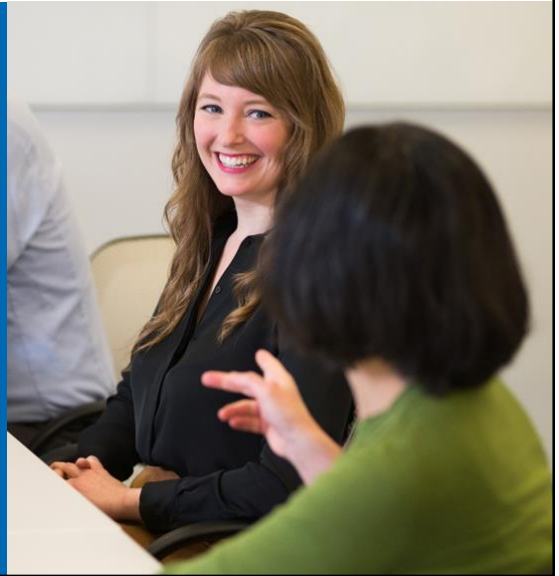
106

About MRSC



MRSC's Mission:

Empowering local governments to better serve their communities



107

About MRSC



- Guidance (“Ask MRSC”)
- Webinars and trainings
- Topic pages
- Blog posts
- E-newsletters
- Databases with city profiles and more



108

MRSC's Climate Project



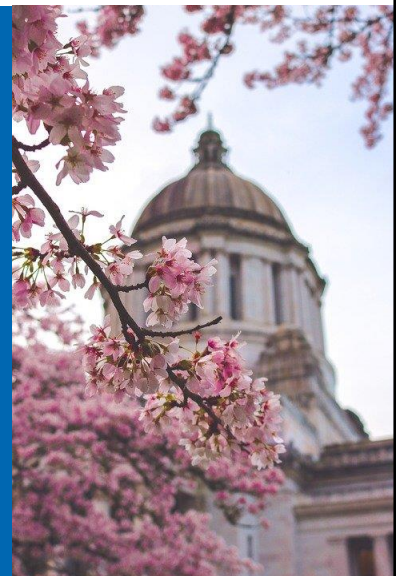
- Resources to help local governments develop and implement effective climate action plans and policies
- Three key climate areas:
 - ✓ Climate equity
 - ✓ Greenhouse gas emissions reduction strategies
 - ✓ Adaptation and resiliency

109

MRSC's Climate Project Partners



- Association of Washington Cities
- WA Department of Health
- WA Department of Commerce
- WA Department of Transportation
- Jurisdictions, including Olympia
- Nonprofits, including Shift Zero



110

MRSC's Climate Project Survey

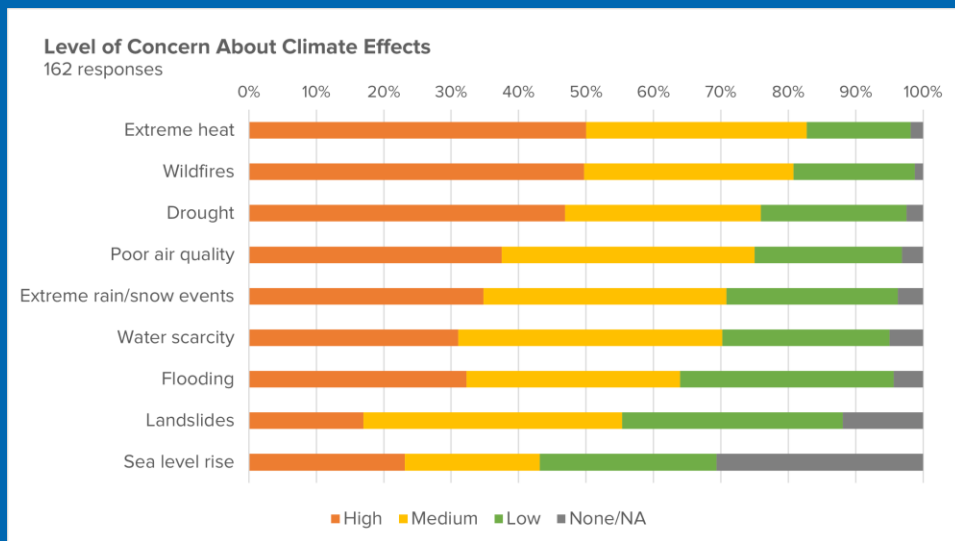
Responses from 164 people from across state
(not all responded to each question)

Number of survey respondents by jurisdiction type and region

Jurisdiction Type	Eastern WA	Central Puget Sound	Western WA	TOTAL
City	31	29	16	76
County	9	5	15	29
Other	10	16	20	46
TOTAL	50	50	51	151

111

MRSC's Climate Survey: Concerns



112

MRSC's Climate Survey: Concerns

Average Level of Concern About Climate Effects by Region

(3 = high concern, 0 = none/NA)

	Eastern WA	Central Puget Sound	Western WA
Extreme heat	2.40	2.26	2.31
Wildfires	2.76	1.74	2.38
Drought	2.52	1.78	2.33
Poor air quality	2.18	2.10	1.96
Extreme rain/snow events	1.72	2.27	2.06
Water scarcity	2.18	1.54	2.16
Flooding	1.52	2.04	2.22
Landslides	1.20	1.88	1.71
Sea level rise	0.45	1.52	1.96

Key

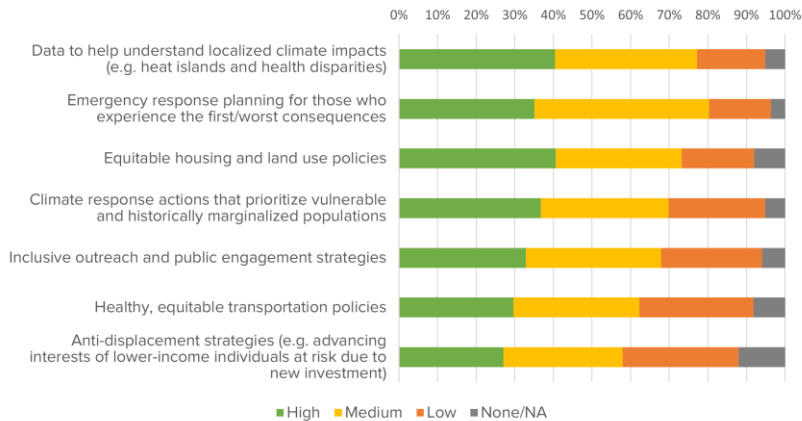


113

MRSC's Climate Survey: Equity

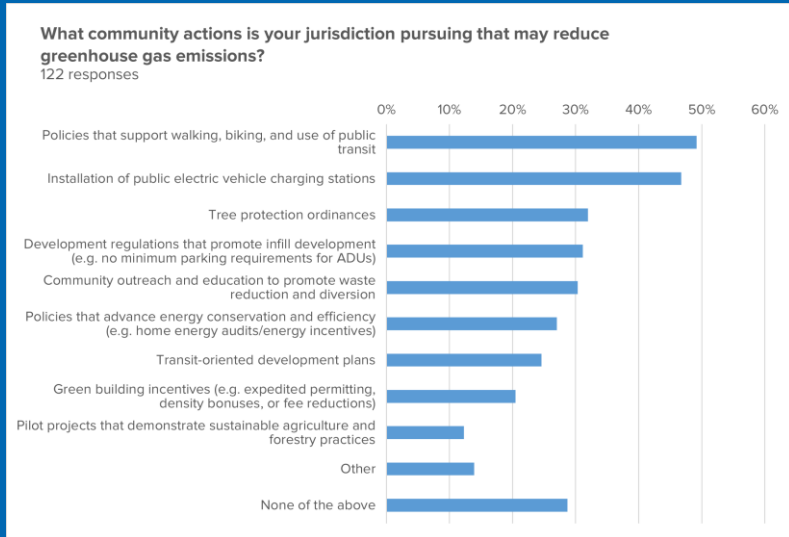
What level of interest do you have in learning more about the following strategies for assisting people hardest hit?

138 responses



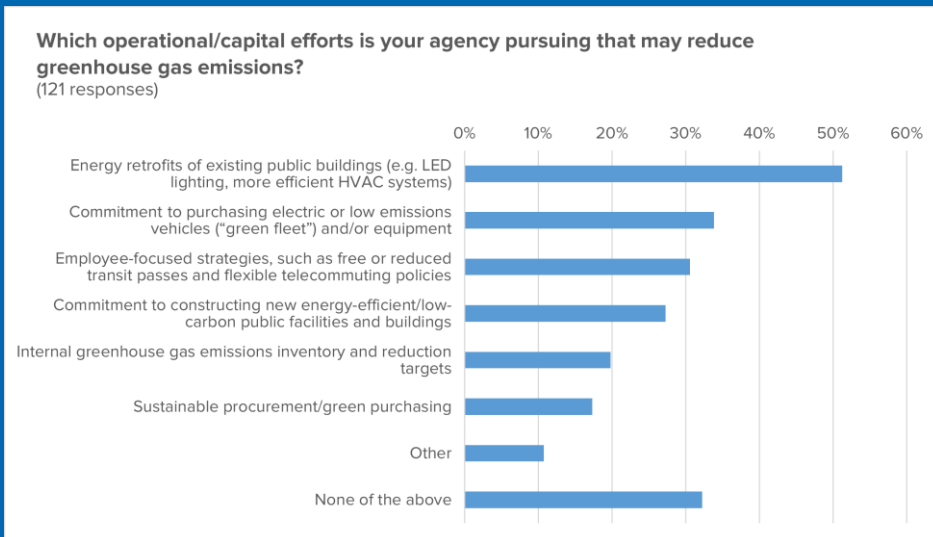
114

MRSC's Climate Survey: Community Actions



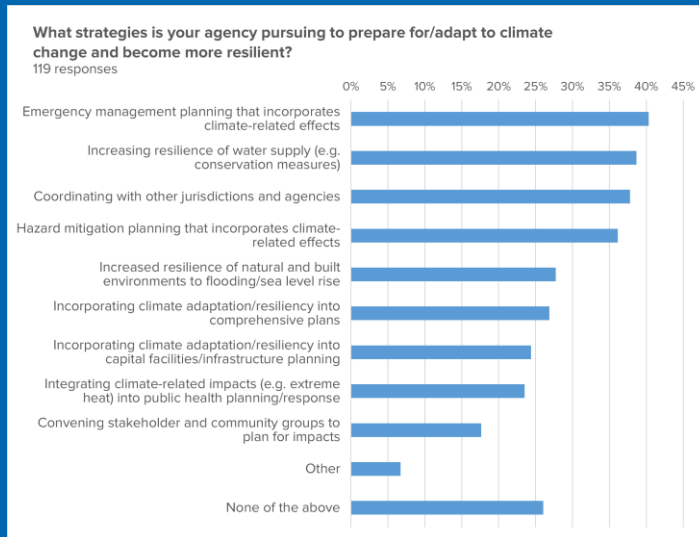
115

MRSC's Climate Survey: Jurisdictional Efforts



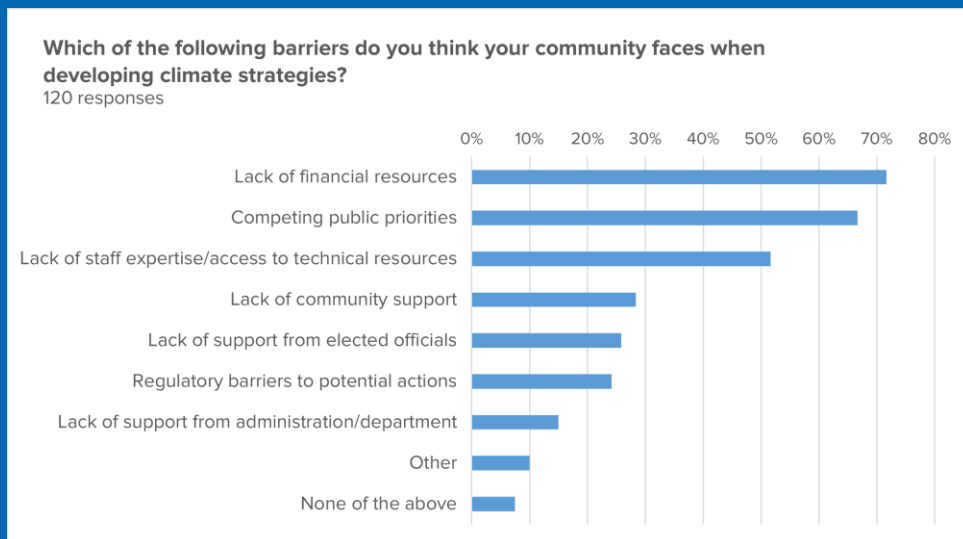
116

MRSC's Climate Survey: Adaptation



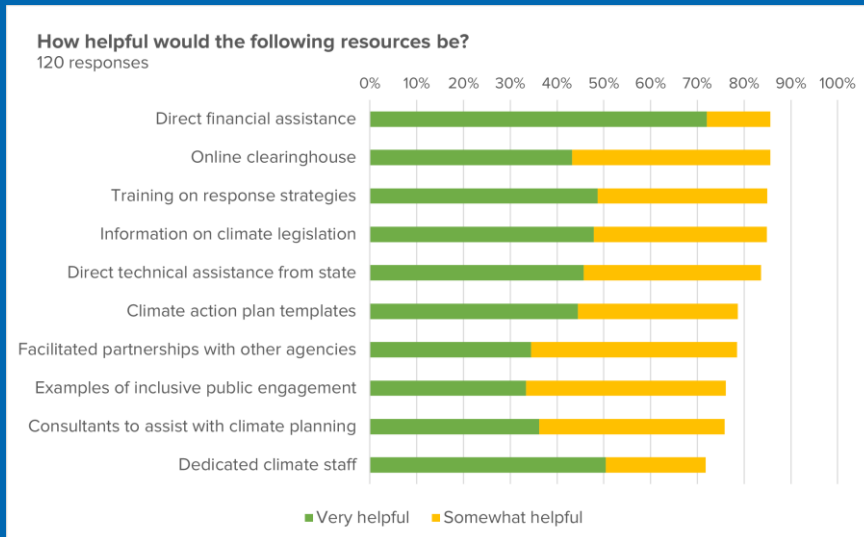
117

MRSC's Climate Survey: Barriers



118

MRSC's Climate Survey: Resources



119

MRSC's Climate Survey: Wish List



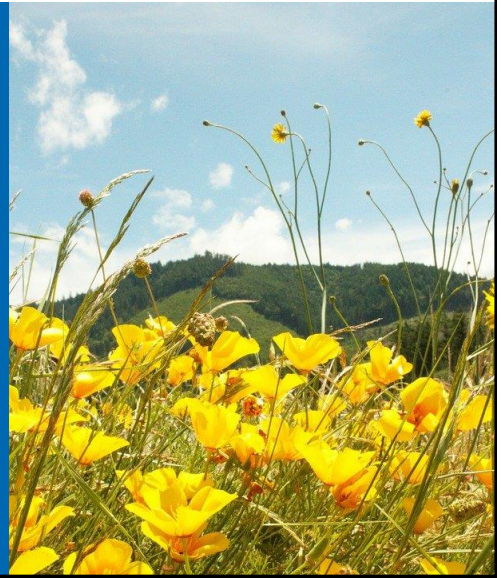
- Preparing for climate impacts
- Centering equity for vulnerable populations
- Public transit, walking, and biking
- Electric and low emissions vehicles
- Compact neighborhoods with mixed uses
- Retrofits for energy efficiency and renewable energy

120

MRSC's Climate Project Blog Posts



- Project introduction
- Climate legislation
- Survey results
- Coming up from partners:
 - Electric vehicles (fleets)
 - Building decarbonization



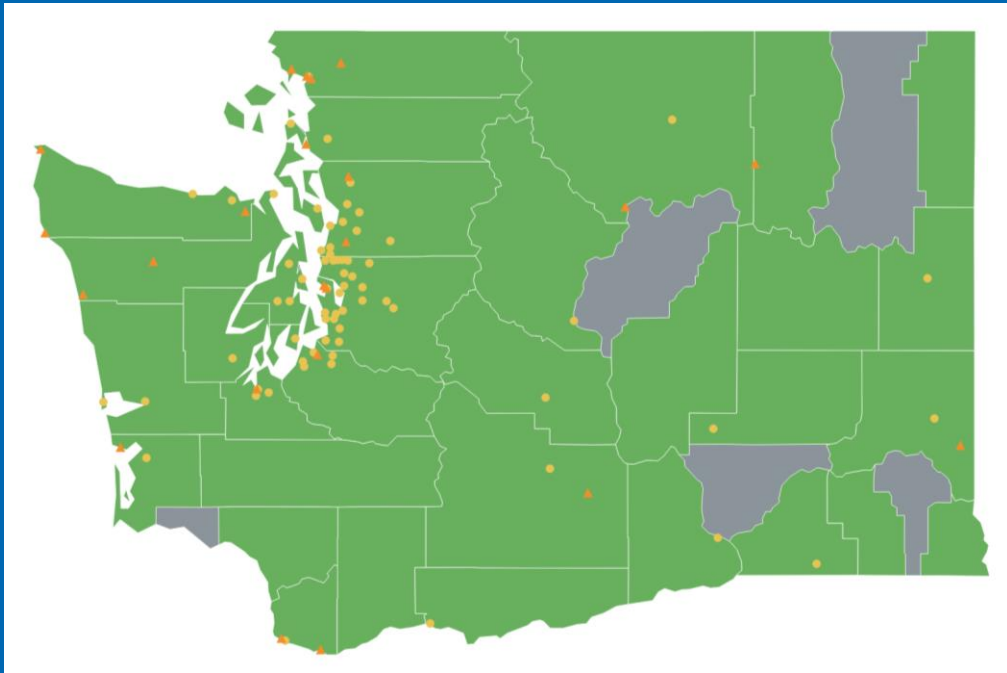
121

MRSC's Climate Project Webpages



- New climate webpages
 - Overhaul of existing climate page
 - New pages on climate equity, greenhouse gas reduction strategies, and adaptation and resiliency
 - Financial and technical resources, best practices, and more
 - Interactive map of climate plans in WA

122



123

MRSC's Climate Project Webinars



- Developing a Local Climate Action Strategy: Approaches for Washington Local Governments
 - November 15, Noon – 1:30 PM
- Equity and Inclusion in Climate Action Planning
 - December 7, 11 – 12:30 PM
- Adaptation and Resiliency
 - January (TBD)

124

What's Next?



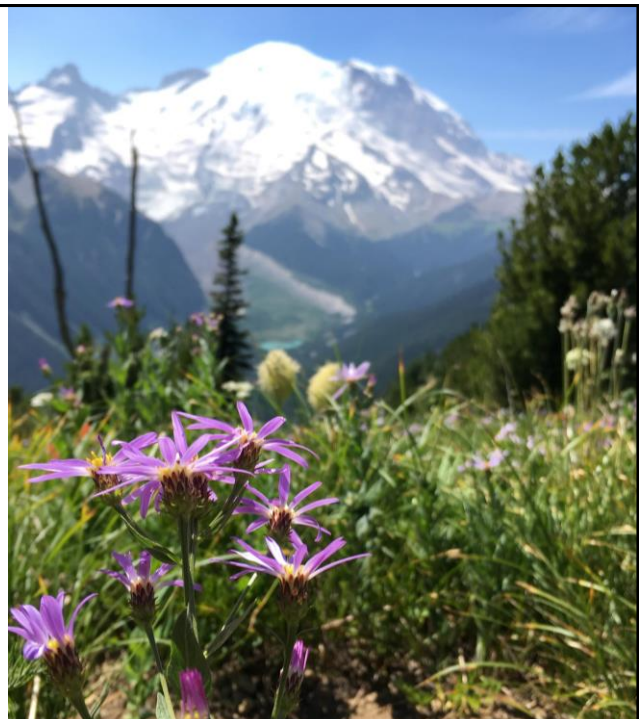
Check our website, mrsc.org, for updated climate content, more information on the next webinar, and more blog posts

- [Climate Change Topic Page](#)
- [Upcoming Webinars](#)
- [MRSC Insight Blog](#)

125

Questions?

Lisa Pool, AICP
Public Policy Consultant
lpool@mrsc.org



126



Resources



AWC Center for Quality Communities

www.CFQC.org



[Growing the Green Economy Study](#)

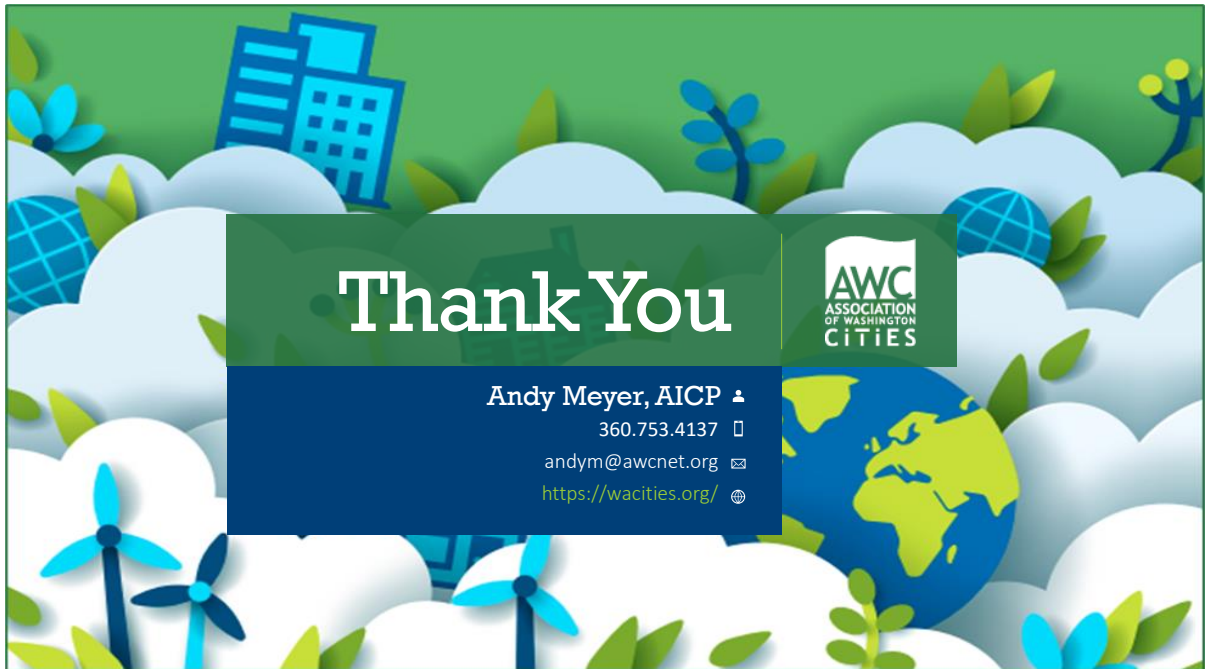
Published in 2019



[Climate Resilience Handbook](#)

Published June 2021

127



128