

# Project Showcases



## PROJECT SHOWCASE

**Region 10 CTP Program Overview**

Rynn Lamb *(FEMA Region 10)*

**Risk MAP Coordination Activities, State of Alaska**

Sally Russell Cox *(State of Alaska, DCRA/DCCED)*

**Hazard Mapping & Engagement in Oregon:**

**Post-Wildfire Debris Flows, LIDAR, and More!**

Bill Burns *(State of Oregon, DOGAMI)*

Robert Hairston-Porter *(State of Oregon, DOGAMI)*

**Flood Hazard Mitigation & Resilience Planning in Idaho**

Bradley Peterson *(Madison County, Idaho)*

**New and Cool Efforts from the WA Geological Survey**

Tricia Sears *(Washington Geological Survey)*



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**RiskMAP**  
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## COOPERATING TECHNICAL PARTNERS (CTP) PROGRAM: REGION 10 OVERVIEW

Rynn Lamb  
Risk Analyst, Region 10  
[rynn.lamb@fema.dhs.gov](mailto:rynn.lamb@fema.dhs.gov)

Marshall Rivers  
Risk Analyst, Region 10  
[marshall.rivers@fema.dhs.gov](mailto:marshall.rivers@fema.dhs.gov)

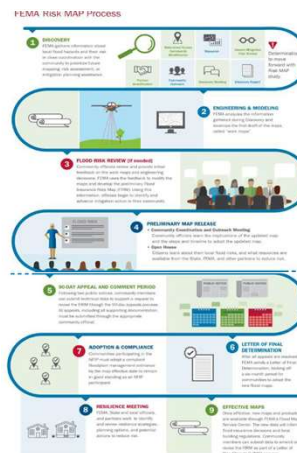
Kara Jacobacci  
Risk Analyst, Region 10  
[kara.jacobacci@fema.dhs.gov](mailto:kara.jacobacci@fema.dhs.gov)



## FEMA Risk MAP Overview



- Risk MAP stands for:
  - Risk Mapping, Assessment, and Planning
- Risk MAP supports community resilience by:
  - Providing high-quality data
  - Building lasting partnerships
  - Supporting long-term hazard mitigation planning
- Outputs to Risk MAP may be:
  - Regulatory and Non-Regulatory products to assess, understand, and communicate natural hazard risk
  - May be Flood-focused or Multi-Hazard focused



## Cooperating Technical Partners (CTP) Overview



### ▶ Cooperating Technical Partners (CTP) Program

#### Overview

- Aims to create partnerships between FEMA and participating NFIP communities, regional and state agencies, tribes, and universities that have interest and capability to become more active participants in the FEMA flood hazard mapping program.
- <https://www.fema.gov/cooperating-technical-partners-program>

#### Mission

- Strengthen the effectiveness of the National Flood Insurance Program (NFIP) and support FEMA's mitigation objectives.
- Leverage partnerships and collaboration to deliver high-quality hazard identification and risk assessment products, provide outreach support, and empower communities to take action to reduce risk based on informed, multi hazard-based data and resources
- Help communities identify hazard risks, reduce losses, and promote resiliency.

#### Eligible Projects

- Activities such as Floodplain Mapping, LiDAR acquisition, Natural Hazard Mapping & Risk Assessments, Training and Outreach, Mitigation Planning, and Technical Assistance
- Emphasis on local partnerships, capabilities, and community relationships



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## Cooperating Technical Partners (CTP) Overview



### ▶ Cooperating Technical Partners (CTP) Program

#### Eligible Applicants

- Communities, state or regional agencies, universities, territories, tribes and nonprofits

#### Potential CTP partners must:

- Have existing systems in place to support data collection and flood hazard mapping.
- Have demonstrated capability to perform, implement, or contract a given activity.
- Ensure your community is in good standing with the NFIP.
- Be able to perform required financial management activities.
- Have in-house staff able to monitor performance and approve projects.

#### Ineligible Activities include (among others):

- Materials, equipment, construction, or renovation
- Update to a mitigation plan
- Website or document maintenance

#### Learn more at:

- <https://www.fema.gov/cooperating-technical-partners-program>



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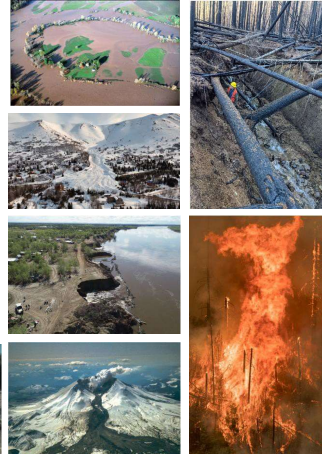
## CTP Overview: Region 10 Focus



### ▸ CTP Focus in Region 10

Our communities face types of hazard concerns

- Flood (obviously) **plus** other flood-related hazards:
  - Post-wildfire flood risk
  - Channel migration, sedimentation, ice jams
  - Permafrost degradation, glacial outburst
  - Erosion and shoreline change
  - Infrastructure (levees, pump stations, dams)
- Avalanche, Landslide, Debris Flow
- Volcano/Lahar, Earthquake, Liquefaction, Tsunami
- Wildfire, Drought, Extreme weather
- Future conditions & climate impacts
  - Sea level rise, drought, wildfire, storms, landslide/avalanche rates



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## Cooperating Technical Partners (CTP) Overview



### ▸ CTP Focus in Region 10

- CTP is a valuable tool in Region 10 to help support identified community hazard needs
  - Integration with ongoing FEMA Risk MAP projects and activities throughout the region
  - Support hazard information and analysis needs not typically delivered through FEMA's regulatory flood mapping processes
  - Allows communities to access and leverage local/state/regional resources & expertise through partnerships
- CTP program priorities for Region 10 include:
  - Actionable mitigation strategies, recommendations, or outcomes for communities
  - Integration with mitigation planning processes
  - Project needs & outcomes must be community-identified and community-driven
  - Emphasis on pilot projects and innovation (not for sustained programs or needs)
  - Projects must include a communications and outreach component
  - Community-focused requirements, engagement, and deliverables
  - Integration with elements of FEMA's Strategic Plan (future conditions and equity)



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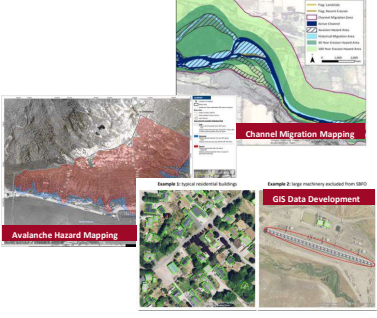
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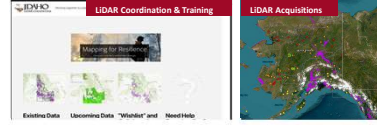
# CTP Overview: Project Categories & Examples



- ▶ Mapping & Analysis
  - Floodplain Mapping & Analysis
  - Risk Assessments
  - GIS & Data Development
  - Landslide and Avalanche Hazard
  - Post-Fire Debris Flow (PFD)
  - Channel Migration Zone Mapping
  - Erosion & Bluff Stability
  - Seismic and Liquefaction Risk
  - Mitigation Alternatives & Technical Analysis



- ▶ LiDAR (Elevation) Data Support
  - LiDAR Acquisitions
  - Collection Management & Coordination
  - User Education and Outreach



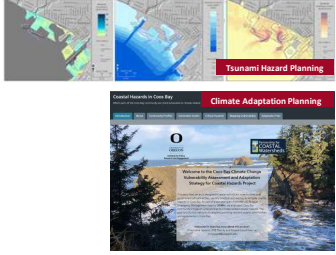
# CTP Project Categories & Examples



- ▶ Communications & Outreach
  - Coastal Hazard 'Best Practices'
  - Tsunami Playbook
  - Natural Hazard Story Maps
  - Resilience Workshops
  - Regional Hazus Training (4 courses)
  - Northwest Hazus User Group



- ▶ Mitigation & Resilience Planning
  - Post-Wildfire Watershed Restoration
  - Erosion Analysis & Mitigation Planning
  - Nature-based Solutions (Resilience Planning)
  - Climate Adaptation Strategy Development
  - Code Review & Model Code Development
  - Mitigation & Resilience Workshops



## CTP Project Categories & Examples



### ▸ State Risk MAP Coordinators

Provide a critical role for Region 10 Risk MAP communications, liaison, community connections, and representation throughout the state. Assist in identification and prioritization of future needs and Risk MAP planning.



#### Risk MAP Coordinators

Alaska: Sally Russell Cox ([sally\\_cox@alaska.gov](mailto:sally_cox@alaska.gov))  
 Idaho: vacant (POC: Becky Rose)  
 Oregon: vacant (POC: Stephen Richardson)  
 Washington: Jerry Franklin ([Jerry.Franklin@ecy.wa.gov](mailto:Jerry.Franklin@ecy.wa.gov))

#### State Risk MAP Portals

Alaska: [Risk MAP, Planning & Land Management, Division of Community and Regional Affairs \(alaska.gov\)](#)  
 Idaho: [Risk MAP | Office of Emergency Management \(idaho.gov\)](#)  
 Oregon: (coming soon!)  
 Washington: [Risk MAP | WA - DNR](#)



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## For More Information



### Contact Us!

Rynn Lamb (AK, OR)  
 Risk Analyst, FEMA Region 10  
[rynn.lamb@fema.dhs.gov](mailto:rynn.lamb@fema.dhs.gov)

Marshall Rivers (ID)  
 Risk Analyst, FEMA Region 10  
[marshall.rivers@fema.dhs.gov](mailto:marshall.rivers@fema.dhs.gov)

Kara Jacobacci (WA)  
 Risk Analyst, FEMA Region 10  
[kara.jacobacci@fema.dhs.gov](mailto:kara.jacobacci@fema.dhs.gov)



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THE STATE  
of ALASKA  
GOVERNOR MICHAEL J. DUNLEAVY

# Risk MAP Coordination Efforts in Alaska

Sally Russell Cox

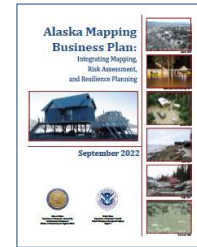
*Presentation to FEMA Region 10 Mitigation Summit*

March 9, 2023



## Role of the Alaska Risk MAP Coordinator

- Serve as primary point of contact for Risk MAP activities
  - Liaison between Alaska local governments (boroughs, cities, Alaska Native villages, other unincorporated communities) and FEMA
- Annually update Alaska's Risk MAP study priorities and Risk MAP strategy
- Plan and implement community outreach and engagement
- Create climate of understanding and ownership of FEMA's mapping process at the state, Tribal, and local levels.
- Leverage Risk MAP data, analyses, products, and/or processes to support communities to advance mitigation actions.



### Data collection, risk and vulnerability assessments



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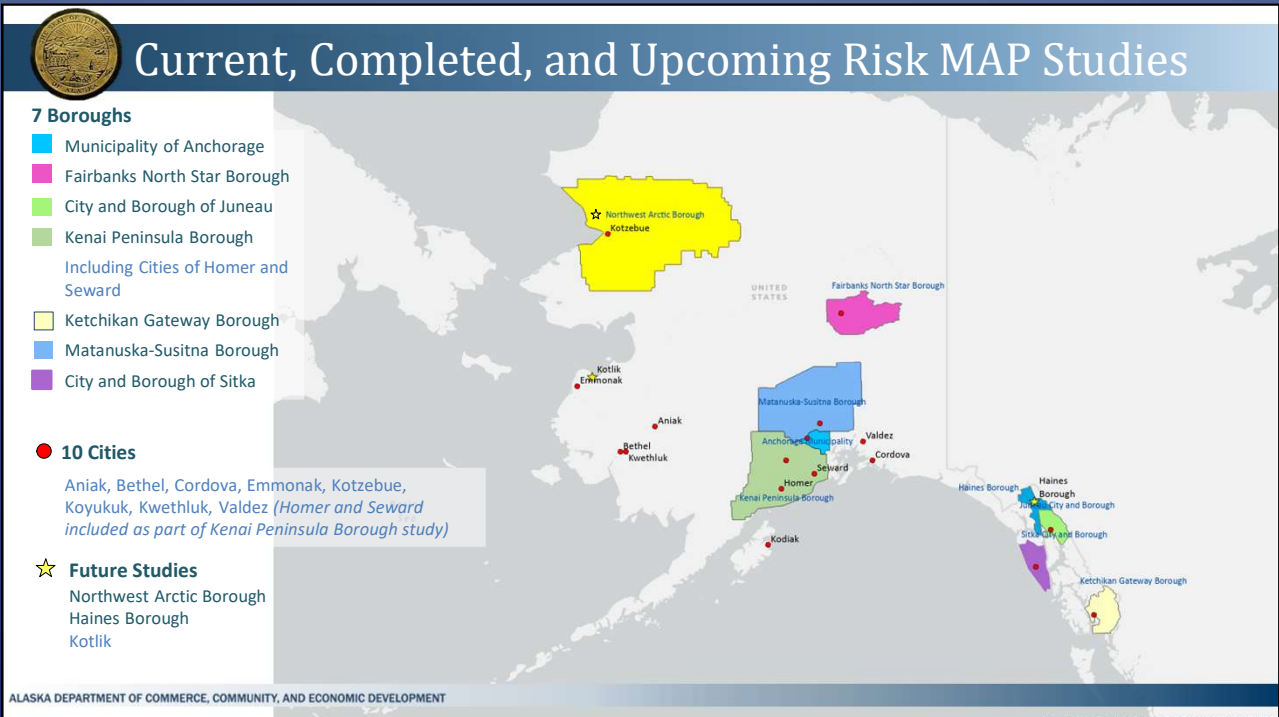
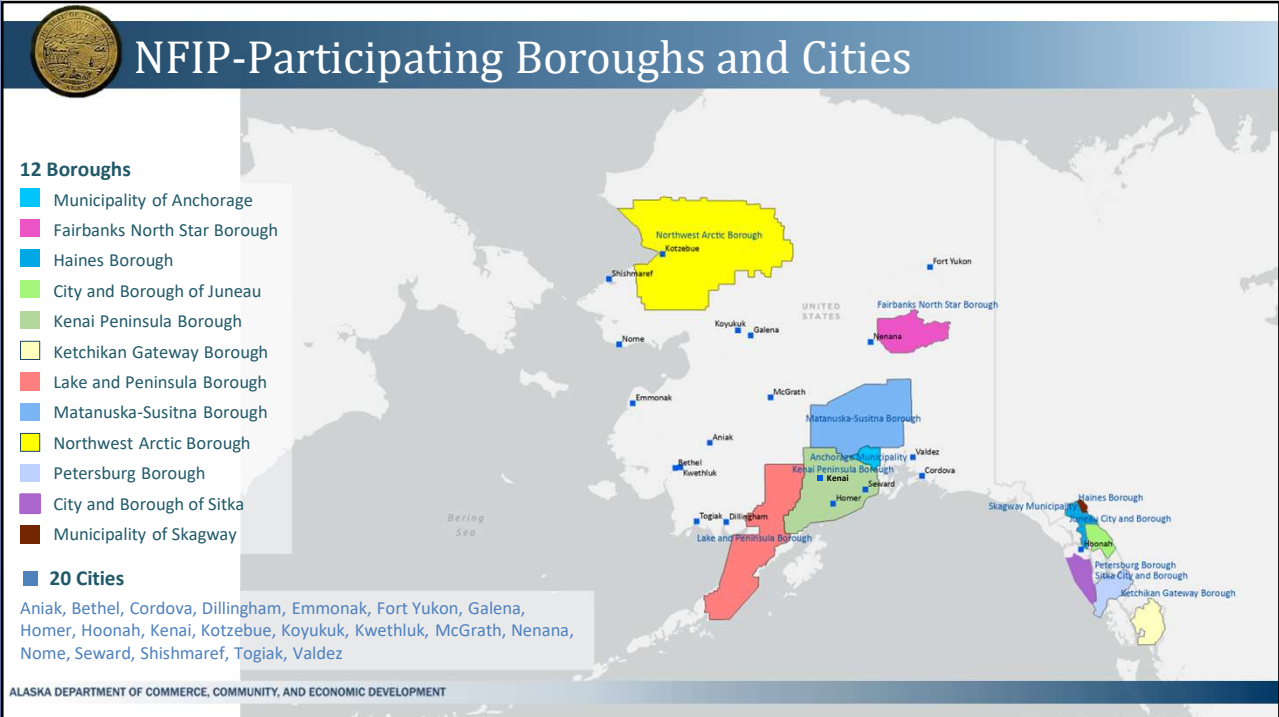
## Role of the Alaska Risk MAP Coordinator

- Develop, promote and deliver resources and products to communities for risk awareness and mitigation action.
- Develop and provide training to state and local officials throughout the course of a flood risk project
- Encourage Hazard Mitigation Plan implementation and advance community hazard mitigation actions through technical assistance that supports the Mitigation Planning Process and Risk MAP projects.
- Share CTP program experience and related information with peer participants regarding best practices and process improvements related to COMS activities.



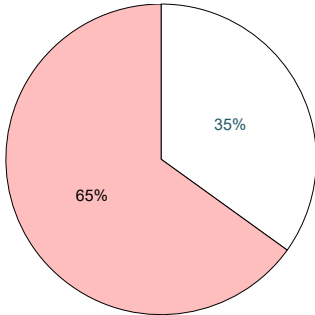
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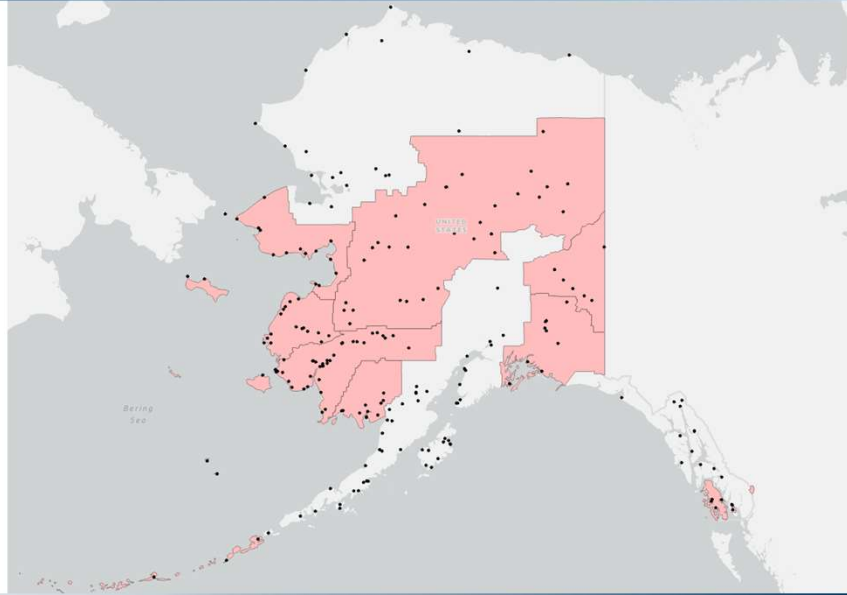




# Federally Recognized Tribes in Alaska



 Tribes in Organized Borough  
 Tribes in Unorganized Borough



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# Some Rural Alaska Statistics...

## Rural Alaska by the Numbers



Alaska is  $\frac{1}{5}$  the size of the Lower 48

**<500**  
The average population of communities in rural Alaska



**60%** of Alaska communities are not connected to the road system

Each year Alaskans in rural communities harvest an average of **295 pounds** of food through subsistence activities.

The cost of living in rural Alaska is **32% higher** than the national average. (January 2022)

Of the 144 environmentally threatened communities facing infrastructure impacts from erosion, flooding and permafrost thaw, **95%** are economically disadvantaged.

Heating oil in Noatak, AK: **\$16/gallon** (May 2022)

Source: ANTHC • DCRA • Unmet Needs Report 2023

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# Reports on Climate-Impacted Alaska Communities

GAO  
United States Government Accountability Office  
Report to Congressional Committees

November 2005

**ALASKA NATIVE VILLAGES**  
Most Are Affected by Flooding and Erosion, but Few Qualify for Federal Assistance

GAO

U.S. Army Corps of Engineers  
Alaska District

Study Findings and Technical Report

Alaska Baseline Erosion Assessment

GAO  
United States Government Accountability Office  
Report to Congressional Requesters

June 2009

**ALASKA NATIVE VILLAGES**  
Limited Progress Has Been Made on Relocating Villages Threatened by Flooding and Erosion

GAO

RECOMMENDATIONS REPORT TO THE GOVERNOR'S SUBCABINET ON CLIMATE CHANGE

FINAL REPORT FROM THE IMMEDIATE ACTION WORKGROUP  
APRIL 17, 2008

IMMEDIATE ACTION WORKGROUP RECOMMENDATIONS TO THE GOVERNOR'S SUBCABINET ON CLIMATE CHANGE

MARCH 2009

Imperiled Community Water Resources Analysis

Prepared for Immediate Action Workgroup Group of the Governor's Climate Change Sub-Cabinet

Prepared by TETRA TECH

June 30, 2010

***IAWG:** Support to climate-impacted Alaska Native communities should be based on level of natural hazard threat and not competitive grants*

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# 2017 Mitigation Summit Break-Out Session

## Improving Alaska Native Village Coordination – February 16, 2017

1. Begin development of new Risk MAP process to support the unique needs of AK Native Villages with the engagement and support of key stakeholders.
2. Discuss need for process to rank Alaska Native communities **based on risk**. Input should be sought from the Tribes regarding factors they would like considered in their ranking.

**Risk Mapping, Assessment and Planning: Assisting Alaska Native Villages**

Over the last several decades, the number of presidentially-declared disasters in Alaska has increased dramatically, as illustrated in Figure 1, below. The majority of these disasters are caused by flooding associated with severe storms. Over the past decade, most of these events have occurred in the Bethel and Yukon-Keeyuk census areas (see Figure 2). Both census areas are comprised of small, remote, predominantly Alaska Native communities. These communities are especially vulnerable because both census areas are part of Alaska's vast unorganized borough where there is no borough form of government to provide services and other resources to address disaster events. Only six of the 68 Alaska Native villages within these two census areas participate in the National Flood Insurance Program (NFIP).<sup>1</sup> Half of the villages within these census areas are ineligible to participate in the NFIP because they are not incorporated municipalities.<sup>2</sup> Storm events are increasingly putting these communities at risk to loss of life and property. Recent studies indicate that the frequency and intensity of these storms is likely to increase, especially in western Alaska.<sup>3</sup>

**Figure 1: Alaska Federally-Declared Disasters, 1953-2016**

Year	Snow or Freezing	Earthquake	Other	Fire	Flood or Tornado Storms
1953-1959	1	0	0	0	0
1960-1966	2	0	0	0	0
1967-1973	3	0	0	0	0
1974-1980	4	0	0	0	0
1981-1987	5	0	0	0	0
1988-1994	6	0	0	0	0
1995-2001	7	0	0	0	0
2002-2008	8	0	0	0	0
2009-2015	9	0	0	0	15
2016	10	0	0	0	20

1 Data acquired from <https://www.fema.gov/disasters/gis/ak-bethel-disasters.cfm>  
2 The six communities are Atkasut, Bethel, Kwethadik, Galena, McGrath and Pitmeag.  
3 To participate in the NFIP, communities agree to certain regulations for land use and new construction in high-risk flood zones. In Alaska, municipal incorporation is required for land use regulations.  
4 Federal law (the Coastal, Seismicity, and Tornado Storms Act) requires that the Yukon-Kuskokwim Delta, Alaska, be added to the list of communities eligible for NFIP coverage. See also: <http://www.federalregister.gov/documents/2015/02/26/2015-04833>

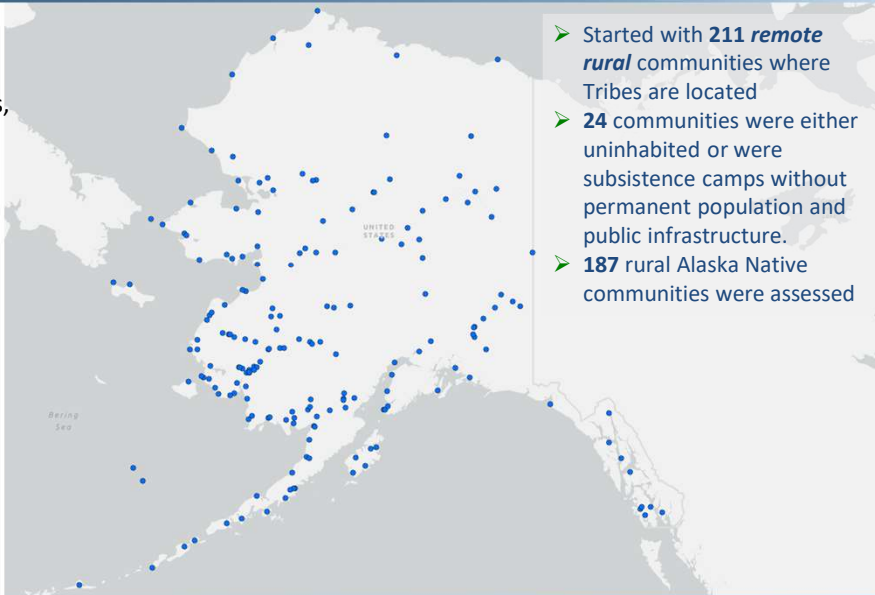
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# Alaska Statewide Threat Assessment

**Focus:** to identify the most vulnerable communities so community members, policy makers, and government agencies can make better-informed decisions.

1. Assess individual threats to public infrastructure associated with erosion, flooding, and thawing permafrost
2. Evaluate combined threat imposed by interactions between erosion, flooding, and thawing permafrost
3. Provide guidance to decision makers regarding technical information required to develop mitigation or adaptation strategies related to those threats



- Started with **211 remote rural** communities where Tribes are located
- **24** communities were either uninhabited or were subsistence camps without permanent population and public infrastructure.
- **187** rural Alaska Native communities were assessed

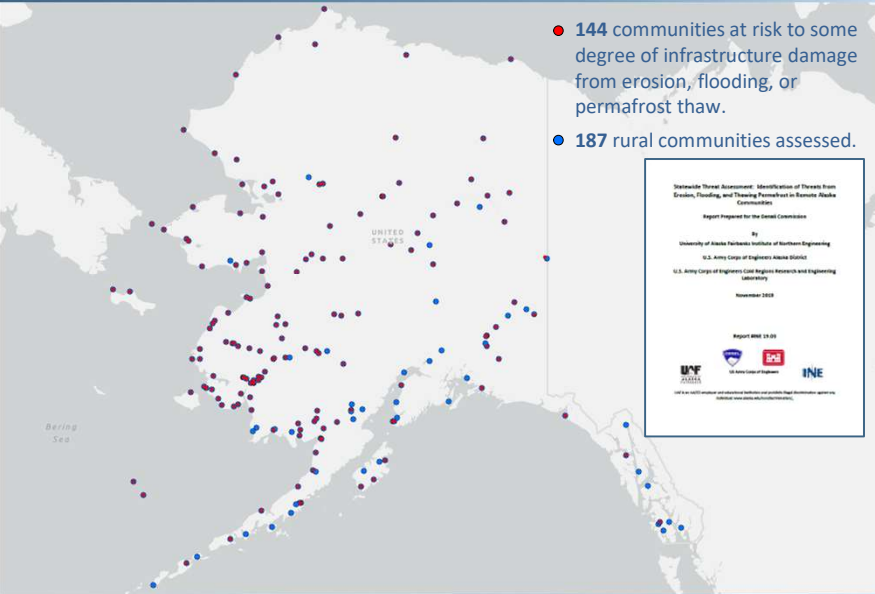
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# 144 Environmentally Threatened Communities

## **Environmentally Threatened Communities:**

The 144 Alaska Native communities identified in the **Statewide Threat Assessment** as highly threatened (in Group 1) or moderately threatened (in Group 2) by infrastructure damage from at least one of the environmental threats assessed: erosion, flooding or thawing permafrost.



- **144** communities at risk to some degree of infrastructure damage from erosion, flooding, or permafrost thaw.
- **187** rural communities assessed.



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# Assistance to Environmentally Threatened Communities

State of Alaska / Commerce / Community & Regional Affairs / Planning & Land Management / EVCs

## ASSISTANCE TO ENVIRONMENTALLY THREATENED COMMUNITIES

Resources for Environmentally Threatened Communities

DCRA staff provides assistance to environmentally threatened communities in partnership with the Alaska Native Tribal Health Consortium **Center for Environmentally Threatened Communities**, the Alaska Division of Geological and Geophysical Surveys **Coastal Hazards Program**, the Denali Commission **Village Infrastructure Protection Program**, and a number of other state and federal agencies and organizations. Currently, the focus is on the communities\* who were ranked highest for flood, erosion, permafrost degradation and combined threats in a **2019 Statewide Threat Assessment**. DCRA staff assists these communities with local planning as well as providing access to the broad range of local government resources DCRA has to offer.



Click to open interactive map of Environment.

<https://www.commerce.alaska.gov/web/dcra/PlanningLandManagement/EVCs.aspx>

### PLANNING & LAND MANAGEMENT LINKS

- Planning & Land Mgmt Home Page
- Alaska Climate Change Impact Mitigation Program
- Alaska Community Coastal Protection Project
- Alaska Risk MAP Program
- Community Coastal Impact Assistance Program
- Community Profile Maps
- Floodplain Management
- Interactive Mapping
- Municipal Land Trustee Program
- Planning & Land Mgmt Publications
- Community Plans Library
- Who's Planning Alaska



# Resources for Environmentally Threatened Communities

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- Who's Planning Alaska

Click on this drop-down to reveal a variety of resources for community-based monitoring, infrastructure protection planning, and scopes of work for erosion, flood, and permafrost assessments.

**Resources for Environmentally Threatened Communities**

State of Alaska / Commerce / Community & Regional Affairs / Planning & Land Management / EVCs

**ASSISTANCE TO ENVIRONMENTALLY THREATENED COMMUNITIES**

**PLANNING & LAND MANAGEMENT LINKS**

- Planning & Land Mgmt Home Page
- Alaska Climate Program
- Alaska Comm Project
- Alaska Risk M
- Community Co Program
- Community Pr
- Planesplan Ma
- Interactive Ma
- Municipal Lan
- Planning & La
- Community Plans Library
- Who's Planning Alaska

**Resources for Environmentally Threatened Communities**

- Community-Based Methods for Monitoring Erosion, Flooding, and Permafrost Thaw**
  - Community-Based Erosion Monitoring**
    - Understanding and Evaluating Erosion Programs by the Alaska Division of Community and Regional Affairs
    - Community-Based Methods for Monitoring Coastal Erosion by the Alaska Division of Geological and Geophysical Surveys
  - Community-Based Flood Monitoring**
    - High Water Mark Project Toolkit by the Federal Emergency Management Agency
    - High Water Mark Sign Guide by the National Weather Service
  - Community-Based Permafrost Monitoring**
- Prototypical Scopes of Work for Erosion, Flood and Permafrost Studies**
  - Prototype Scope of Work: Rural Alaska Coastal Erosion and Storm Surge Flood Assessment from Denali Commission Statewide Threat Assessment (Appendix B)
  - Prototype Scope of Work: Rural Alaska Riverine Erosion Assessment from Denali Commission Statewide Threat Assessment (Appendix C)
  - Prototype Scope of Work: Rural Alaska Permafrost Vulnerability Assessment from Denali Commission Statewide Threat Assessment (Appendix D)
- Infrastructure Protection Planning**
  - Template for Near-Term Infrastructure Protection Plan (Microsoft Word)
  - Template for Near-Term Infrastructure Protection Plan (Adobe PDF)

**Handbooks and guides for community-based methods for monitoring erosion, flooding, and permafrost thaw, infrastructure protection planning, and scopes of work for erosion, flood, and permafrost studies.**

**Assistance to Environmentally Threatened Communities**

**The Communities**


For information on community history, culture, economy, governance, critical infrastructure, natural hazard threats and current/proposed efforts to address each the natural hazards impacting each community, please explore the drop-down menu below.

- Akiak
- Alakanuk
- Allakaket
- Bethel
- Chefornak
- Circle
- Deering
- Diomedea
- Eagle
- Emmonak
- Fort Yukon
- Galena
- Golovin
- Hughes
- Huslia
- Kivalina
- Kotlik
- McGrath
- Napakiak
- Napaskiak
- Newtok

**Drop-down menus with information on community history, culture, economy, governance, critical infrastructure, environmental threats, and current/proposed projects**



# Assistance to Environmentally Threatened Communities



▼ Akiak

Akiak experiences severe riverine erosion, flooding, severe weather events, subsidence due to permafrost degradation, and wildland fire. Riverine erosion is Akiak's greatest natural hazard threat. In May 2019, more than 75 feet of riverbank was lost in a single event along a mile-long stretch of the Kuskokwim River, resulting in the loss of several smokehouses and endangering residences. In 2012, flooding eroded more than 150 feet of the community's riverbank, resulting in the loss of the community's original cemetery, fuel header protective embankment, and a house. As a result of this event, Akiak's tribal and city governments jointly submitted a disaster declaration to the Governor of Alaska requesting disaster relief.


In 2009, the US Army Corps of Engineers (USACE) Alaska Baseline Erosion Assessment identified Akiak as a **Priority Action Community** in which erosion is threatening the viability of the community. Significant resources are being expended to minimize such threats, or both conditions are present, and the community should be considered for immediate action in either initiating an investigation or continuing with ongoing efforts to manage erosion. The USACE also selected Akiak for a **Detailed Erosion Assessment**. The assessment determined that Akiak was losing 31,900 square feet of land per year (73 acres). The assessment projected that Akiak would lose an additional 37.33 acres of land with property damages totaling \$373,000 and building damages totaling \$4.5 million over a 50-year period of analysis. The **2009 Government Accountability Office Report on Flooding and Erosion in Alaska Native Villages** identified Akiak as one of 31 Alaska Native Villages facing imminent flooding and erosion threats. At the community's request, Akiak will be prioritized for a new Risk MAP project in 2020.

- ▶ Alaska Community Database Online Story Map for Akiak
- ▶ **Akiak Interagency Planning Meeting Agendas, Notes and Meeting Materials**
- ▶ Akiak Low Earth Orbit Broadband Project
- ▶ Akiak Home Relocation and Managed Retreat Project
- ▶ Akiak Community Plans
- ▶ Akiak Community Profile Maps
- ▶ Akiak Reports and Studies
- ▶ Akiak in the News

Summary of environmental threats, meeting documents, reports, studies, plans

# Assistance to Environmentally Threatened Communities

## Interactive Map of Environmentally Threatened Communities


Alaska Division of Community and Regional

### Environmentally Threatened Communities

This interactive map shows the location of communities\* identified as most threatened by erosion, flooding, permafrost degradation and combined threats in the **2019 Statewide Threat Assessment**. Funded by the Denali Commission and conducted by the US Army Corps of Engineers and the University of Alaska Fairbanks. For more information on these communities, please also visit DCR's webpage on [Environmentally Threatened Communities](#).

\*Diomedea was added by DCR.

**Information Provided by this Interactive Map**

Click on the **dot** where a community is located and a **pop-up** will appear providing information specific to that community. The arrow at the top of the pop-up allows you to scroll through the following information for each community:

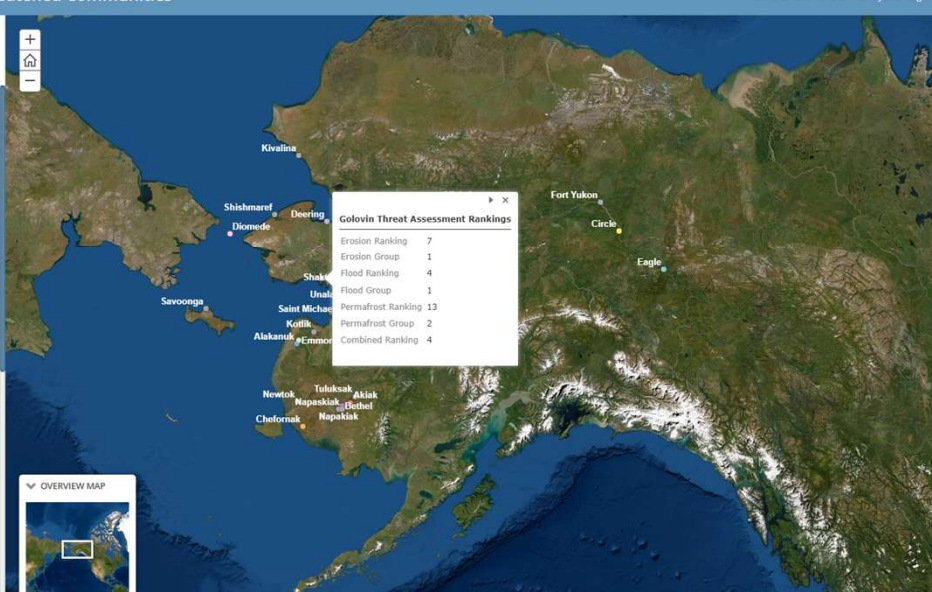
**Hazard Summary:** this layer provides information on the key hazard threats to the community and provides a summary of the impact of these threats.

**Threat Assessment Ranking:** this layer provides information on the rank the community received for erosion, flooding, permafrost degradation and combined threats from the **2019 Statewide Threat Assessment** and identifies the group the community was placed in for each of these threats (group 1 being the most threatened communities).

**Hazard Study History:** this layer provides information on the community's inclusion in the key hazard studies and efforts carried out over the past three decades (excluding the 2019 Statewide Threat Assessment).

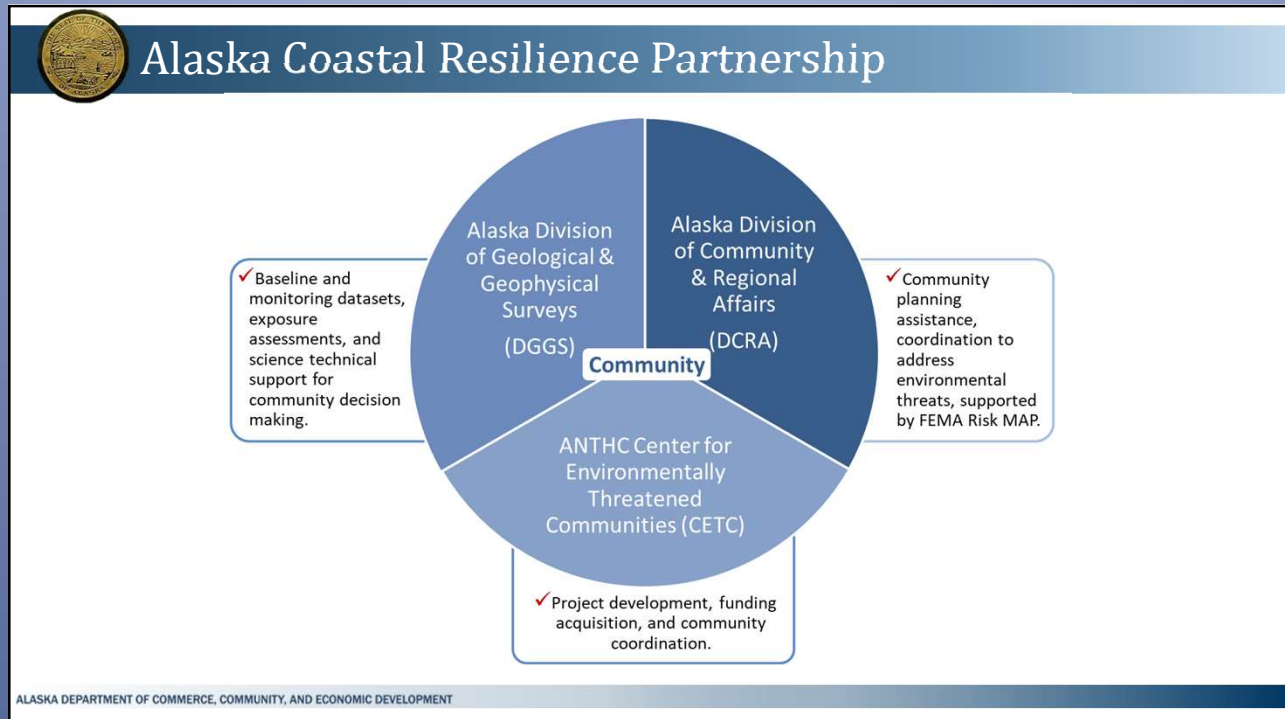
These studies and efforts include:

1. 2009 Baseline Erosion Assessment (US Army Corps of Engineers)
2. 2009 Alaska Native Villages: Limited Progress Has Been Made on Relocating Villages Threatened by Flooding and Erosion (US Government Accountability Office)
3. 2008 Immediate Action Work Group (State of Alaska Climate Change Sub-Cabinet)



**Golovin Threat Assessment Rankings**

Erosion Ranking	7
Erosion Group	1
Flood Ranking	4
Flood Group	1
Permafrost Ranking	13
Permafrost Group	2
Combined Ranking	4



## Alaska Coastal Resilience Partnership

- Environmentally threatened communities face an estimated \$4.3 billion in costs to infrastructure from environmental threats over the next 50 years.
- Most environmentally threatened communities do not have access to baseline risk assessments to quantify the magnitude or severity of threats.

Photo: Shishmaref by Twyla Thurmond

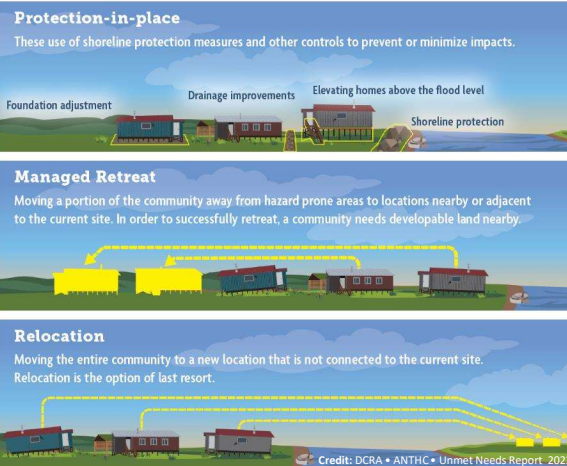




## Alaska Coastal Resilience Partnership

### *Building Capacity and Conducting Coastal Risk Assessments in Remote Alaska Native Communities (National Coastal Resilience Fund)*

1. Quantify and assess vulnerability
2. Develop resilience strategies with mitigation solutions (*protect-in place, managed retreat, relocation*)
3. Obtain funding and implement actions to reduce risk
4. Monitor effectiveness



ALASKA DEPARTMENT OF COMMERCE, COMMUNITY, AND ECONOMIC DEVELOPMENT



## The Three Phases of Adaptation

### RISK ASSESSMENT



- Collect baseline data on erosion, flood, and permafrost thaw using community-based observations and scientific data
- Erosion, flood, and permafrost modeling and engineering analyses
- Data compiled into risk assessment report for review by community members and leaders

#### RESULT

Community understanding of risk

### PLANNING



- Community solutions to mitigate risk are developed based on technical feasibility, and benefits and costs of actions
- Community decides to protect-in-place, retreat or relocate, and prioritizes related actions, resources, and timelines
- Community develops Hazard Mitigation Plan (HMP) and resilience/adaptation plan with prioritization of fundable projects

#### RESULT

Written plan summarizing hazards and priority projects to reduce risk

### IMPLEMENTATION



- Community drives project design
- Community acquires and manages project funding
- Community manages construction project implementation by working with local or outside project management contractors
- Construction using local workforce

#### RESULT

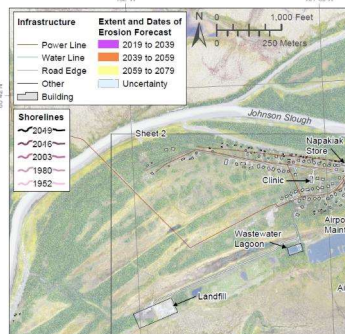
Reduced risk to environmental threats

Credit: DCRA • ANTHC • Unmet Needs Report 2023



# Risk Assessment and Planning Deliverables

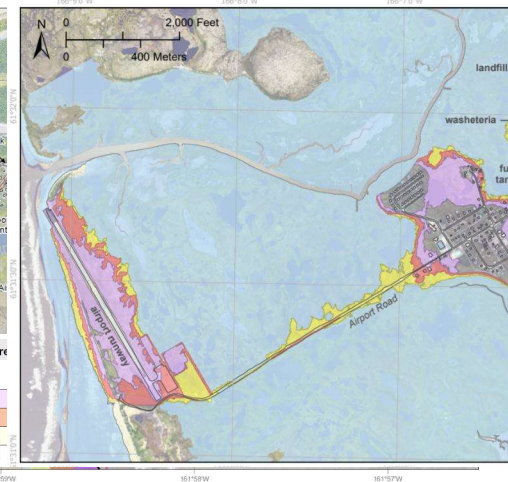
## Erosion Forecast Napakiak, Alaska



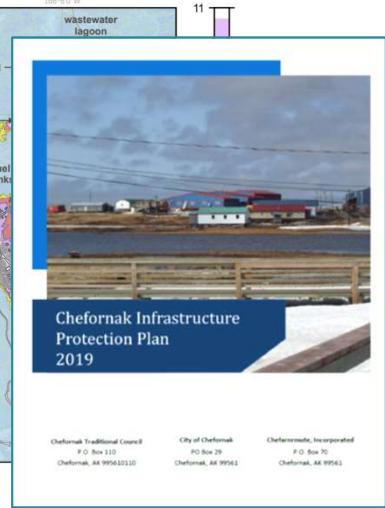
**Cost to Replace Exposed Infrastructure**

Erosion Forecast Date Range	Buildings & Tank Facilities	Power Lines	Water Lines	Roads
2019 to 2039	\$41,525,900	\$196,500	\$239,100	\$836,400
2039 to 2059	\$13,050,000	\$223,400	\$115,000	\$1,235,000
2059 to 2079	\$8,450,000	\$244,400	\$0	\$951,000
<b>Combined Total</b>	<b>\$63,025,900</b>	<b>\$664,300</b>	<b>\$354,100</b>	<b>\$3,022,400</b>

## Coastal Flood Impact Map Hooper Bay, Alaska



REPORT OF INVESTIGATION 2021-1  
Buzard and others, 2021  
HOOPER BAY



ALASKA DEPARTMENT OF COMMERCE, COMMUNITY, AND ECONOMIC DEVELOPMENT



# Monitoring Progress & Coordinating Efforts

Conducting work and tracking progress with 144 communities requires a consistent and continuously updated catalog.

Resource for agencies and other organizations to understand ongoing activities and remaining gaps.

Data and assessment tracking catalog created in ArcGIS Online database, allows for sharing across organizations and with the public.  
<https://dgs.alaska.gov/hazards/coastal/>

Community flooding, erosion, and permafrost risk assessment status

Type or Select Community: Shishmaref

**Shishmaref**

General Information

Population: 542

Geographic Setting: coastal

---

Statewide Threat Assessment

Community: Shishmaref

Flood Group: 1

Erosion Group: 1

Permafrost Group: 2

---

Map for Search Results

This map only flashes the result of the search in the top right. You must select a community using the search in the top right.

**Baseline Data**

Time Period: 1950, 1985, 2003, 2016

Date Completed: 2018

Source: USGS

Link:

Modern Imagery: Complete

Date: 2016, 2021

Note: fixed-wing

Source: USGS, USACE

Link: Ortho

Topography: Complete

Date: 2004, 2021

Note: 2004-ldar, 2021-pending topobathy lidar

Source: USACE

Link: lidar

Bathymetry: Complete

Date: 2012, 2021

Source: DGS, USACE

Note: single-beam, topobathy lidar

Link: bathymetry

First Floor: In progress

Elevation Survey:

Date: 2021

Source: Denali Commission

Link:

**Monitoring**

Coastal Elevation: In progress

Profile Status:

Date: 2012, 2017

Source: Alaska Institute for Justice

Link: ACFT

Community Based Erosion or Flood Monitoring:

Date: 2017

Source: Alaska Institute for Justice, AOS

Link: Monitoring Site

---

**Water Level Data**

More information at Alaska Water Level Watch

NOAA: None

RealTime Water Level ID

Alternative GNSS-R Water Level Activity Status: Recommended

Date: 2021

Source: NOAA- 946954

**Risk Assessment**

Historical Shoreline Change Rate:

Date: 2019

Source: USGS

Link: Shoreline Change Report

Historical Flood Assessment:

Date: 2023

Source: NCRF

Link:

Baseline Erosion Forecast:

Date: 2021

Source: Denali Commission

Link: <https://dgs.alaska.gov/pub/id/20672>

Hydrodynamic Flood Model:

---

**Engineering Assessment**

Engineering Analysis: Recommended

Date:

Source:

Engineering Report: Recommended

Date:

Source:

ALASKA DEPARTMENT OF COMMERCE, COMMUNITY, AND ECONOMIC DEVELOPMENT





## Project Phases, Key Partners, Deliverables, Desired Results

### RISK ASSESSMENT

Primary Partner with Community: *DGGS*  
Supported by *DCRA + ANTHC*

- Baseline Data Collection to support Flood Modeling (*DGGS*)
- Community surveys of local knowledge of hazard impacts (*DCRA*)
- Coastal Erosion and Flood Risk Assessments (*DGGS*)
- Coastal Flood Modeling (*DGGS*)
- Assistance to community to understand risk assessments (*DCRA + ANTHC*)

**Deliverables:**

- Erosion Forecast Map
- Coastal Flood Impact Map

**RESULT:**

Community understanding of risk

### PLANNING

Primary Partner with Community: *DCRA*  
Supported by *ANTHC + DGGS*

- Community assesses technical feasibility, benefits and costs of solutions and makes a decision to protect-in-place, retreat or relocate (*DCRA + ANTHC*)
- Community identifies and prioritizes actions, resources and timeline
- Develops strategic actions and sequencing of tasks (*DCRA*)
- Develops funding strategy (*ANTHC*)

**Deliverables:**

- Infrastructure Protection Plan

**RESULT:**

Community decisions to reduce risk

### IMPLEMENTATION

Primary Partner with Community (*ANTHC*)  
Supported by *DCRA + DGGS*

- Community manages construction project implementation by working with local or outside project management contractors (*ANTHC*)
- Community acquires and manages project funding (*ANTHC*)
- Community drives project design
- Construction using local workforce

**Deliverables:**

- A pipeline of fundable projects

**RESULT**

Reduced risk to environmental threats



## Contact:

Sally Russell Cox

State of Alaska Risk MAP Coordinator

Alaska Department of Commerce, Community, and Economic Development  
Division of Community and Regional Affairs

[sally.cox@alaska.gov](mailto:sally.cox@alaska.gov)

(907) 269-2588

<https://www.commerce.alaska.gov/web/dcra/CommunityResilienceandClimateAdaptationPrograms.aspx>



## PROJECT SHOWCASE

Region 10 CTP Program Overview	Rynn Lamb <i>(FEMA Region 10)</i>
Risk MAP Coordination Activities, State of Alaska	Sally Russell Cox <i>(State of Alaska, DCRA/DCCED)</i>
<b>Hazard Mapping &amp; Engagement in Oregon: Post-Wildfire Debris Flows, LiDAR, and More!</b>	Bill Burns <i>(State of Oregon, DOGAMI)</i> Robert Hairston-Porter <i>(State of Oregon, DOGAMI)</i>
Flood Hazard Mitigation & Resilience Planning in Idaho	Bradley Peterson <i>(Madison County, Idaho)</i>
New and Cool Efforts from the WA Geological Survey	Tricia Sears <i>(Washington Geological Survey)</i>



FEMA

**RiskMAP**  
Increasing Resilience Together

2020 Labor Day Megafires!  
Riverside  
Beachie  
Lionshead  
Holiday Farm  
Archie

~11% of the Cascades Burned in the 2020 Labor Day Fires (Abatzoglou and others, 2021)

Need to understand and reduce post-fire debris flow risk in these fire-affected regions

4 months Later

January 12-13, 2021  
Fatal Debris Flow, Interstate 84  
Eagle Creek Fire (2017), Columbia River Gorge, OR



Photo from ODOT, January 2021

Image from Oregon Department of Forestry Story Map

Burns, 2023



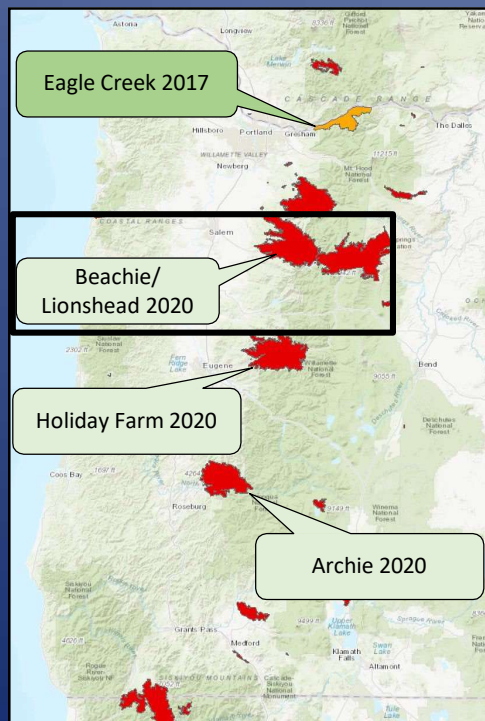


# Proposals Funded!

- The first thing DOGAMI did after the 2020 Labor Day megafires & fatality in Eagle Creek was propose projects to FEMA to further assess PFD hazard & risk, and develop a road map to risk reduction
- Thank you to FEMA Cooperating Technical Partners (CTP) Program!
  - Especially Rynn Lamb, FEMA Region 10
- Thank you to all who supported the proposals



Burns, 2023



# Post-Fire Debris Flow Projects

- DOGAMI Proposal Lead + DLCDD & LCOG and Local Support
- FEMA (CTP) funded 4 projects to further assess PFD risk and work on risk reduction
- Started with Beachie/Lionshead because of concern in Detroit

Local advocates (letters of support):

Multnomah County Emergency Management  
 Hood River County Emergency Management  
 USFS Columbia River Gorge National Scenic Area  
 City of Cascade Locks  
 Columbia River Gorge Commission  
 The McKenzie Watershed Recovery Team  
 McKenzie River Trust  
 Eugene Water and Electric Board  
 Lane County Emergency Management  
 Lane Council of Governments (LCOG)  
 North Santiam Watershed Council  
 Linn County Planning & Building Department  
 Marion County Emergency Management  
 Linn County Emergency Management  
 Linn County Road Department

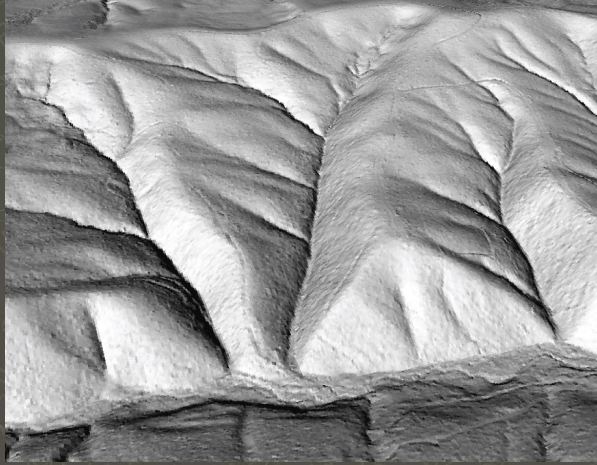
State and federal advocates (letters of support):

Oregon Department of Transportation  
 Oregon Department of Forestry  
 Oregon Emergency Management  
 Oregon Department of Land Conservation and Development  
 U.S. Forest Service  
 Bureau of Land Management  
 NOAA National Weather Service  
 U.S. Geological Survey  
 Oregon Regional Solutions (Governor's Office)



Burns, 2023

## What is a Debris Flow?



Debris flows are fast-moving landslides that are particularly dangerous to life and property because they move quickly, destroy objects in their paths, and often strike without warning.



Photo from ODOT,  
January 2021

January 2021 Post-Fire Debris Flow, HWY 30 and Interstate 84  
Eagle Creek Fire (2017), Columbia River Gorge, OR

Burns, 2023



## Post-Fire Debris Flows Background

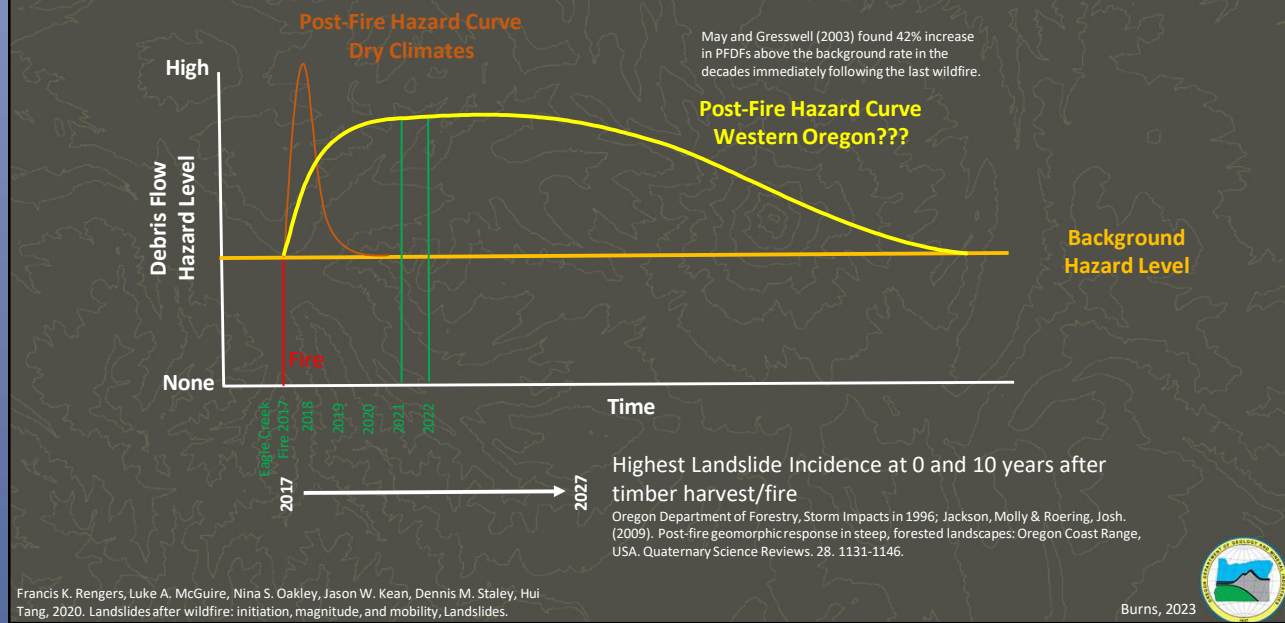
- Post-fire debris flow (PFDF) hazard is poorly understood in western Oregon
- Most research on PFDF in dry climate regions of the US
  - Do not have dense vegetation like western Oregon
  - Different geology and climate (weather patterns)
- USGS PFDF emergency assessments calibrated on data from these dry climate regions
- USGS ran models. Much better than having nothing, but...
  - Exact numbers (ex. probabilities) are probably incorrect
  - Maybe relatively ok
  - Need PFDF research in western Oregon

Burns, 2023





## Most of the DFs in the Eagle Creek Fire 2017. Also, 3 ARs over Eagle Creek Fire



## Post-Fire Debris Flow (PFDF) Research

- GEER Team (Geotechnical Extreme Events Reconnaissance)
  - Professor Josh Roering @ U of O
  - Many scientists collecting data
- USGS Landslide Program – PFDF team
  - Jason Kean, Francis Rengers, USGS
  - DOGAMI collects field data when PFDFs happen
- PFDF Research Project
  - Professor Ben Leshchinsky @ OSU
  - Funded by ODOT research
- US Army Corps of Engineers
  - Paul Sclafani
  - Hyperconcentrated flow modeling



Burns, 2023

## Scope of Work

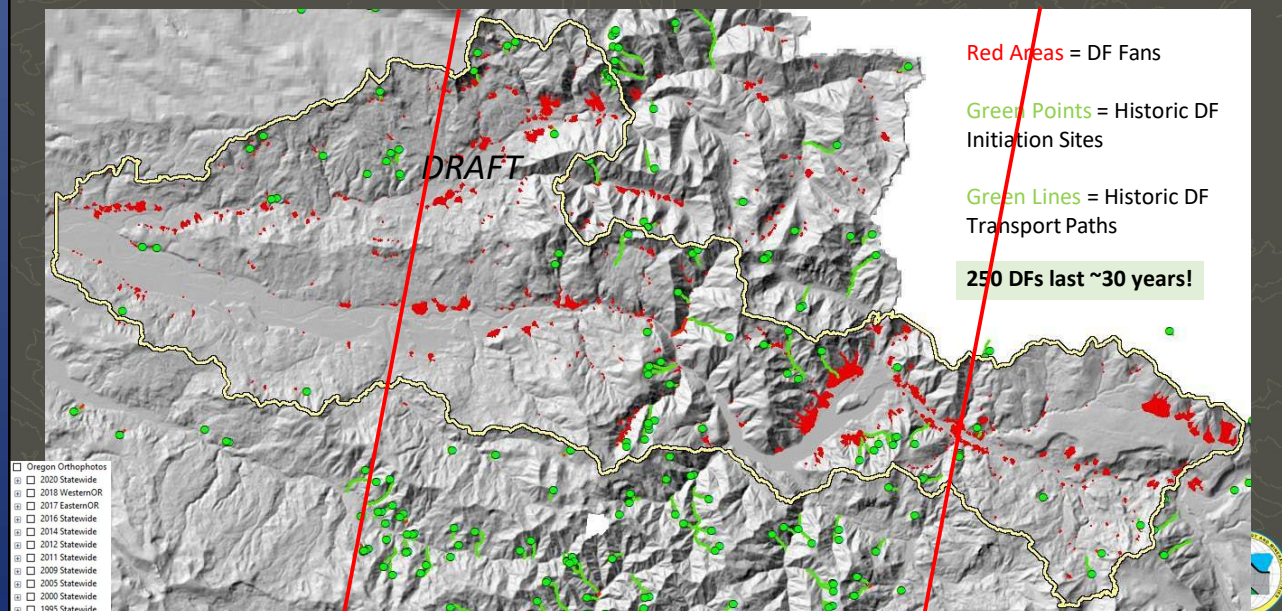
1. Map past events and deposition areas (landslide inventory)
2. Model the future susceptibility – SP-53 Protocol for channelized debris flow susceptibility mapping (Burns and others, 2022)
3. Analyze the risk – Are there buildings with people living in them in the hazard zones?
4. Risk Reduction – DLCD, LCOG, and the communities

<https://www.oregongeology.org/Landslide/PostFireDebrisFlow.htm>



Burns, 2023

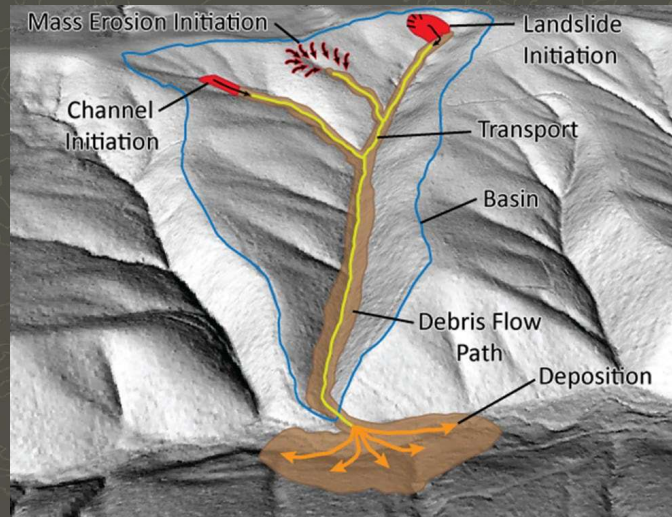
## Scope: Task 1 - Map Fans and Historic Events



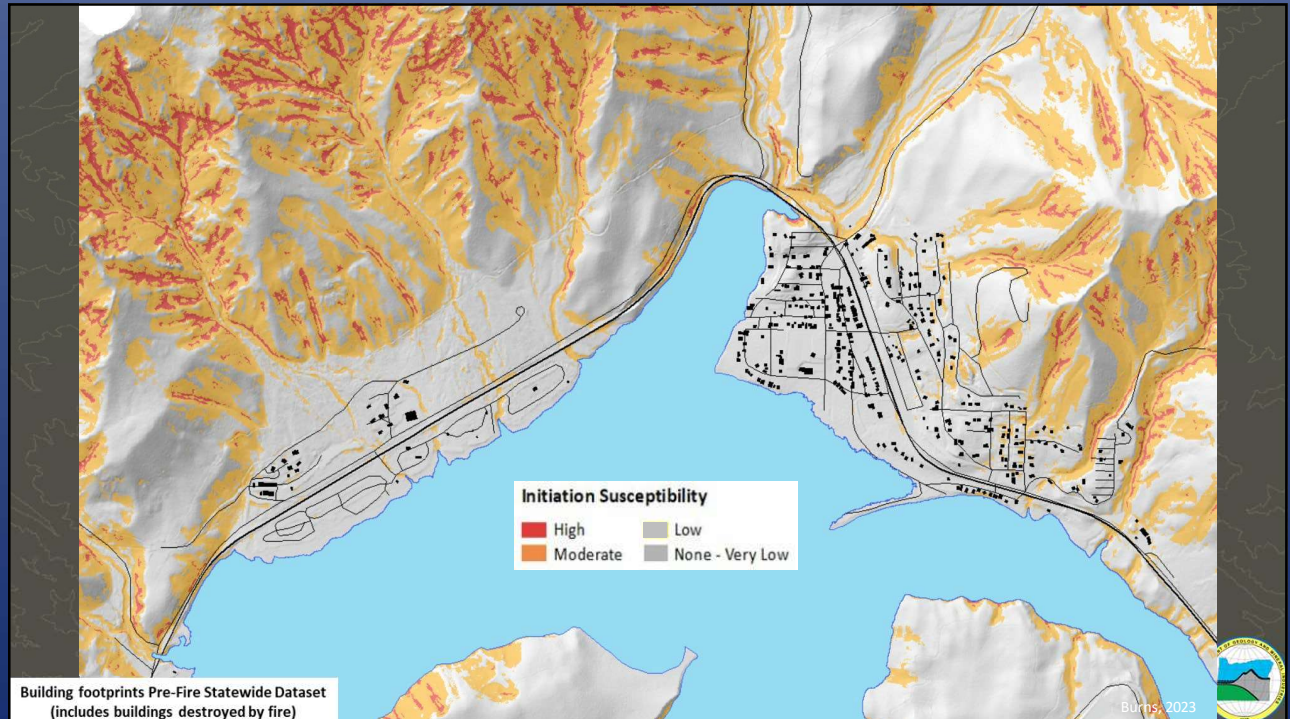


## Task 2 - Model Future Susceptibility

- Initiation
- Transport
- Basin Susceptibility
  - Initiation + Transport
- Inundation/Runout



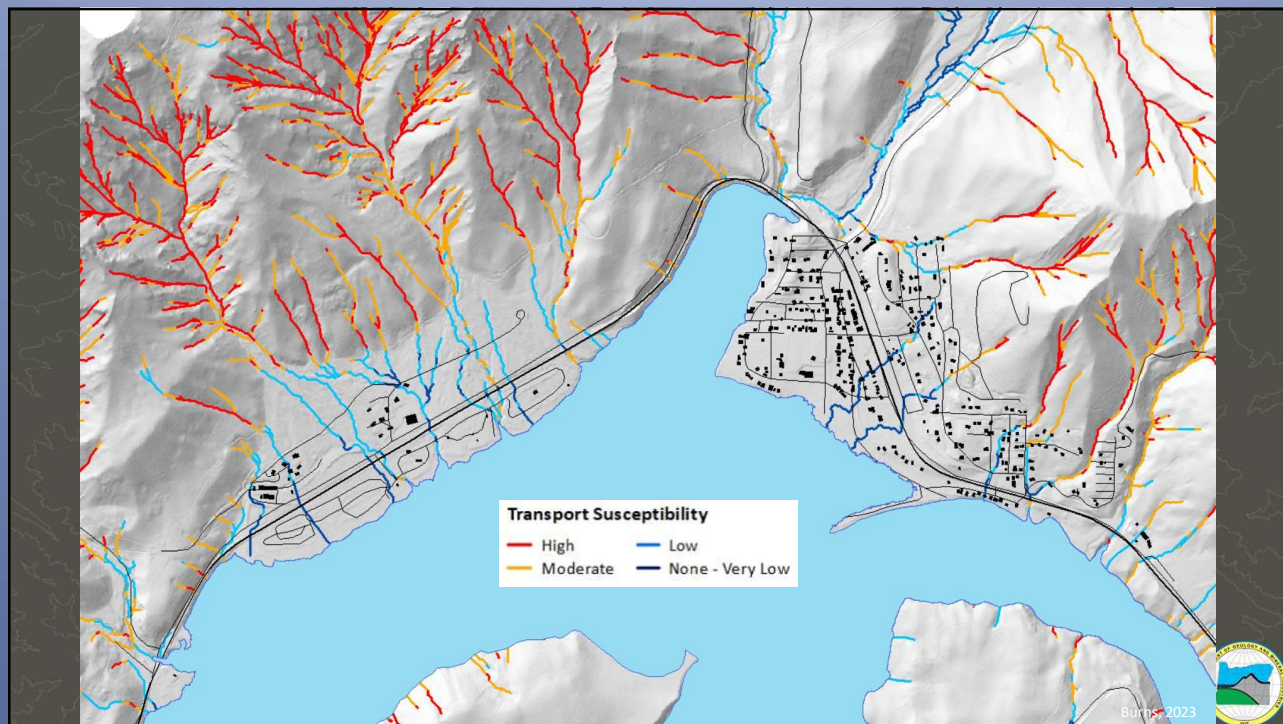
Burns, 2023



Building footprints Pre-Fire Statewide Dataset  
(includes buildings destroyed by fire)

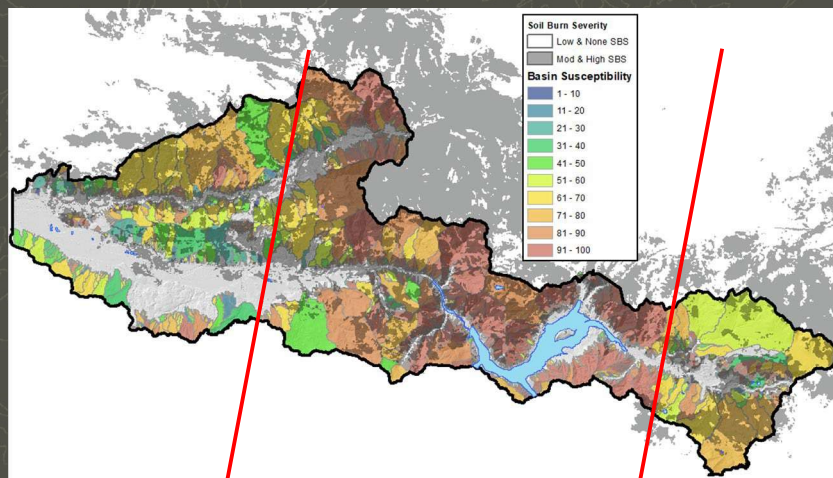
Burns, 2023



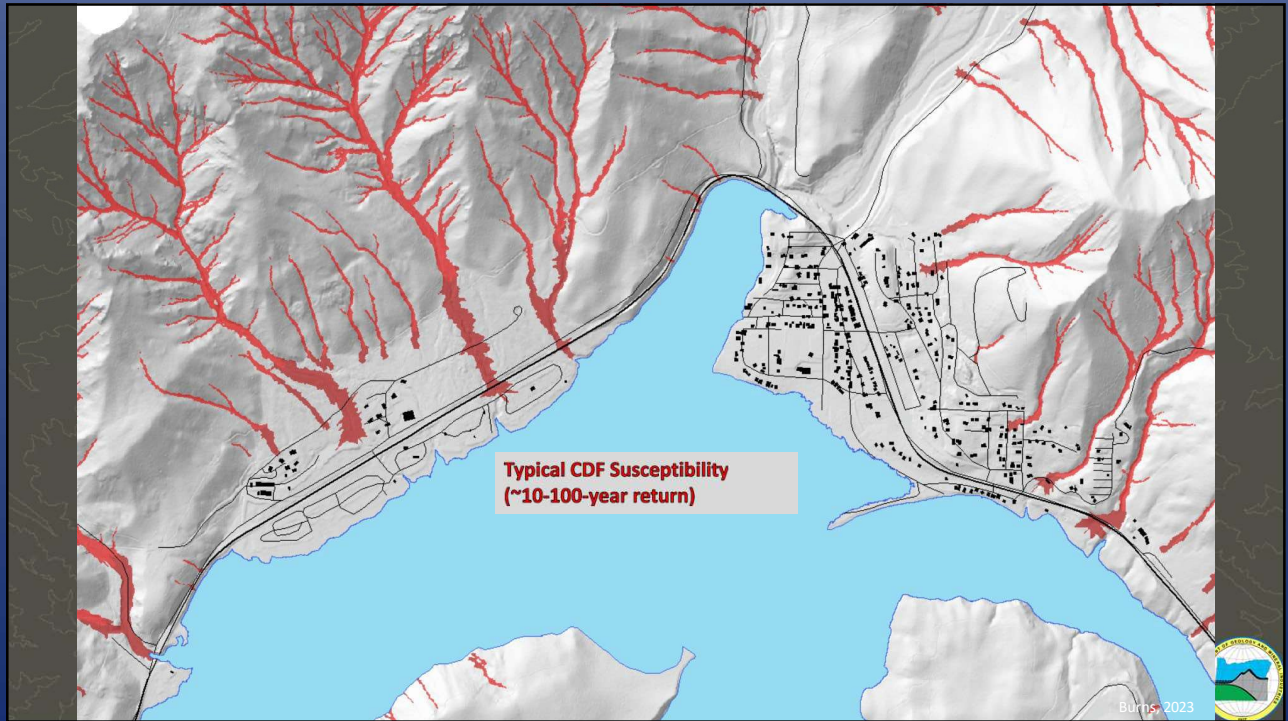
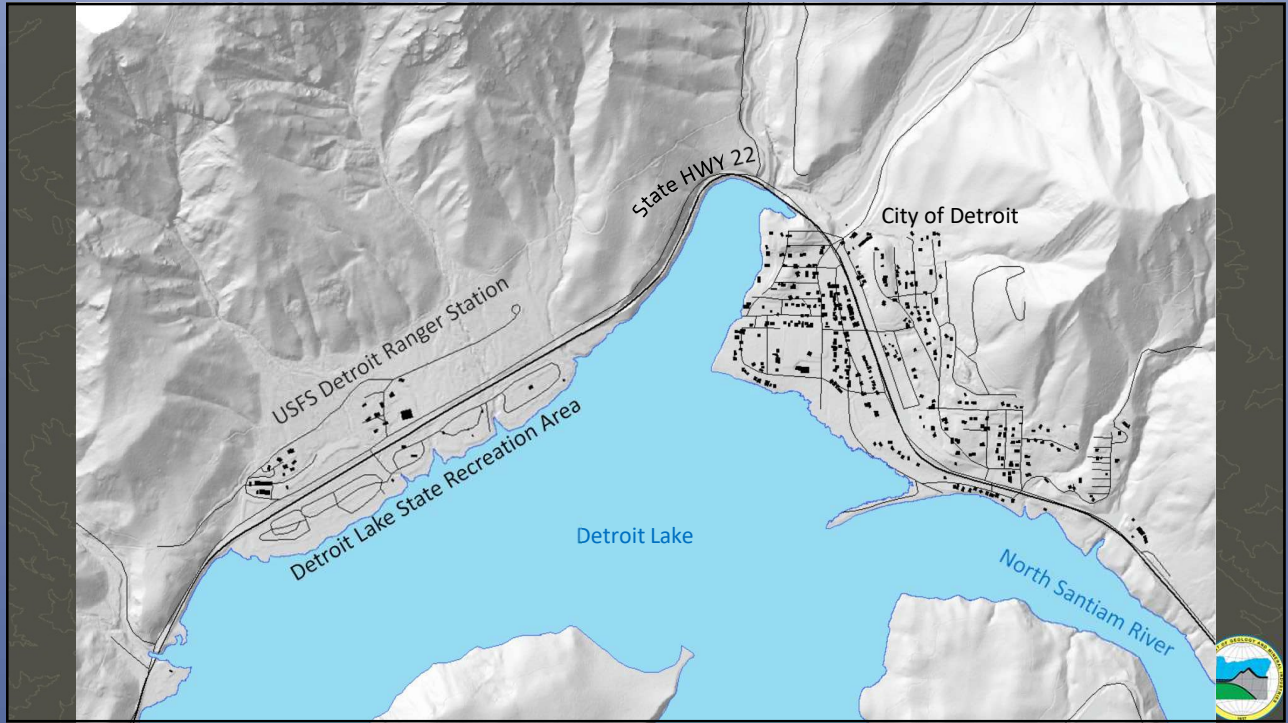


## Basin Susceptibility

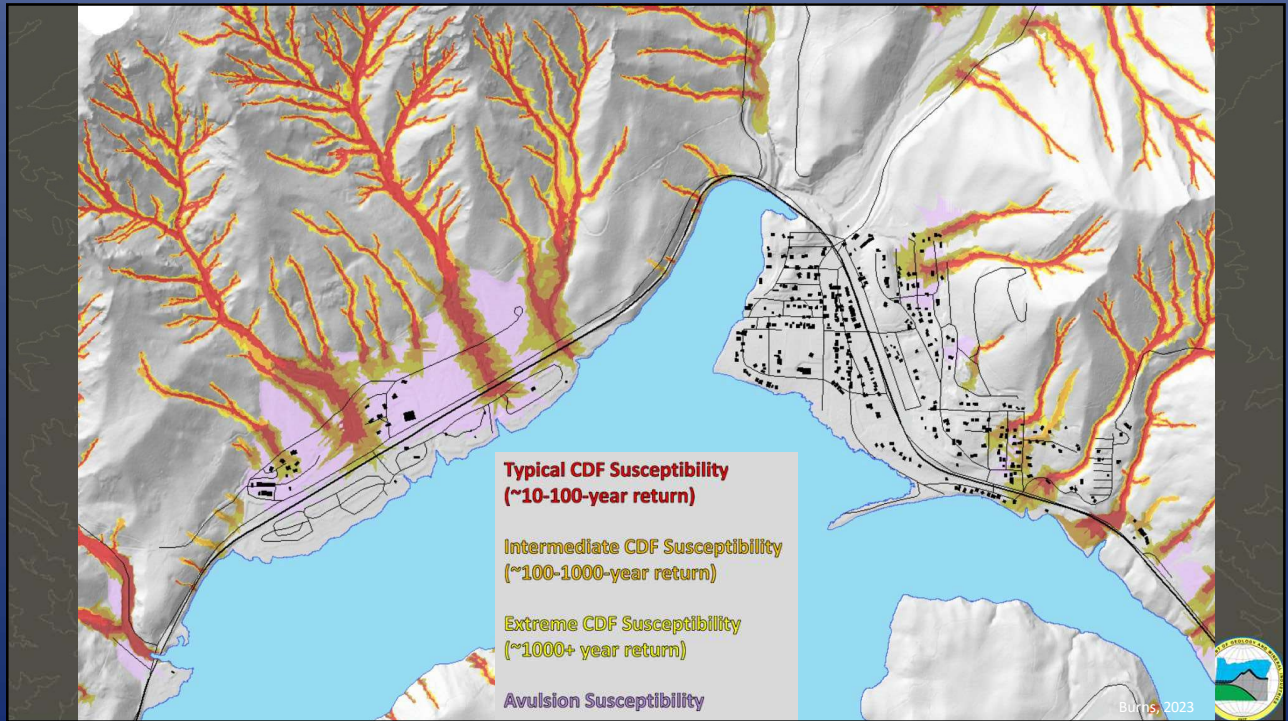
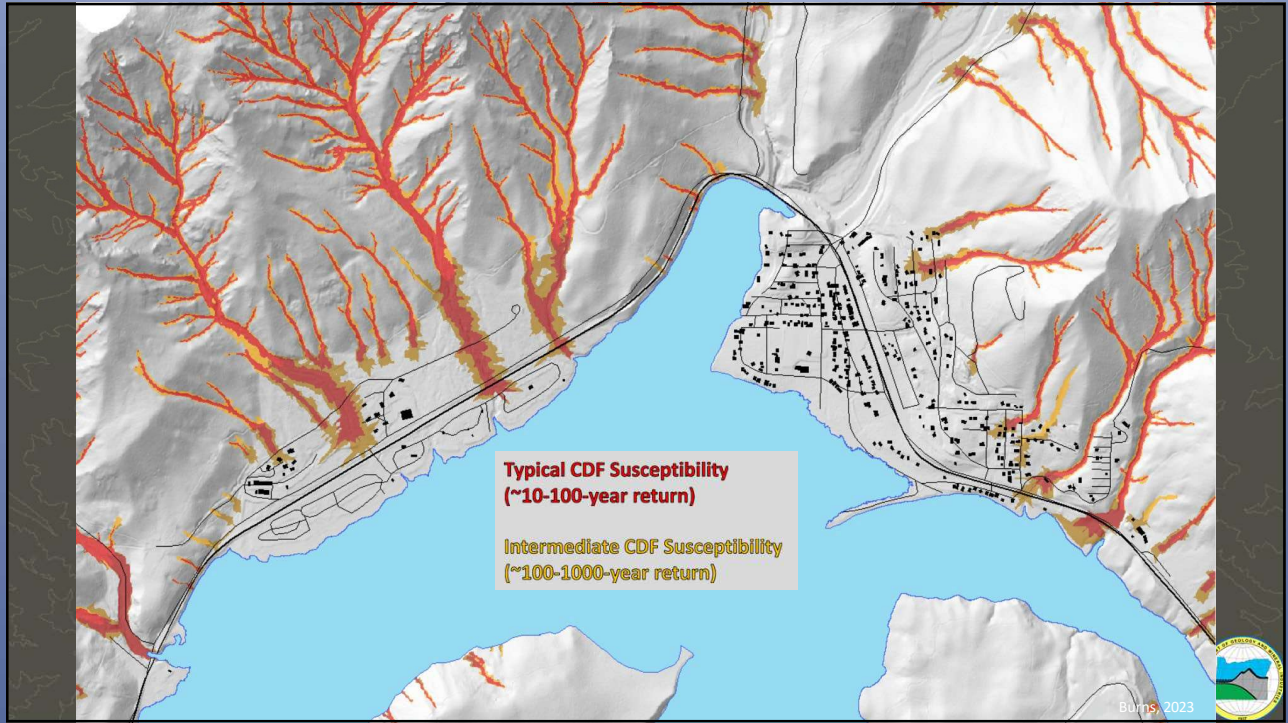
- Initiation + transport = overall basin susceptibility, compare to inventory
- Use basin susceptibility to select basins to model inundation and runoff
- Add post-fire affects to basins
- Inundation delineation based on Laharz (Iverson and others, 1998) "Objective delineation of lahar-inundation hazard zones," LAHARZ
- Reid and others (2016) modified ability for volumes to grow down channel





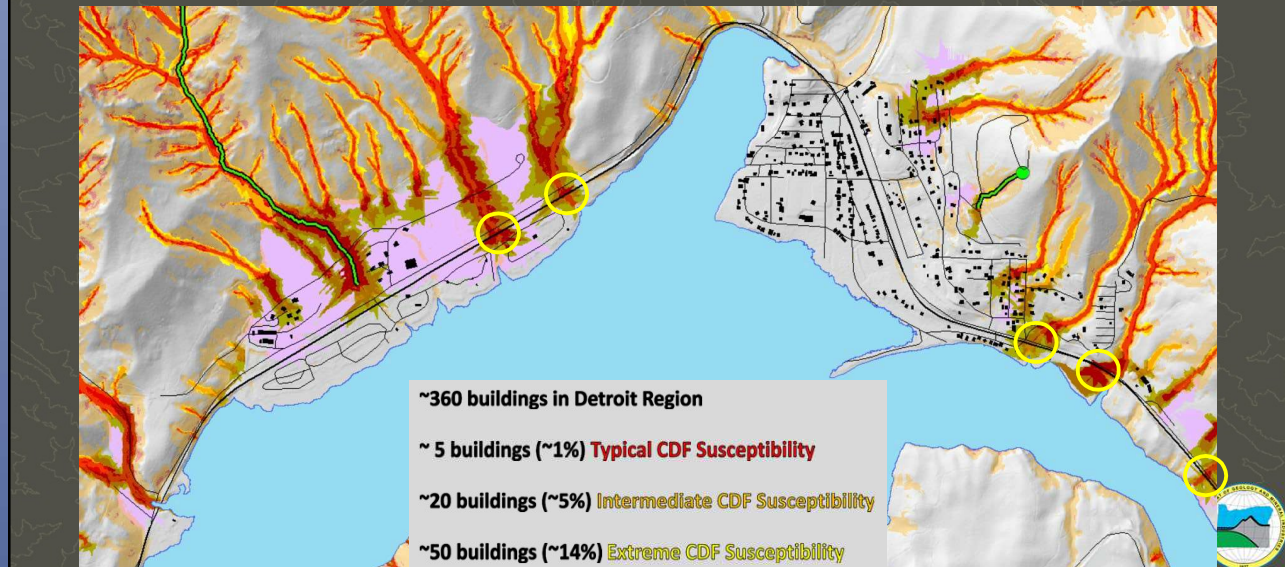




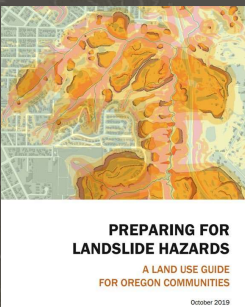
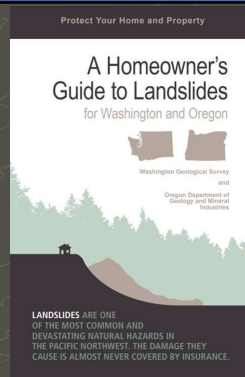




## Task 3 - Analyze Risk: Buildings with people? Sections of HWY?



## Scope of Work Task 4: Risk Reduction

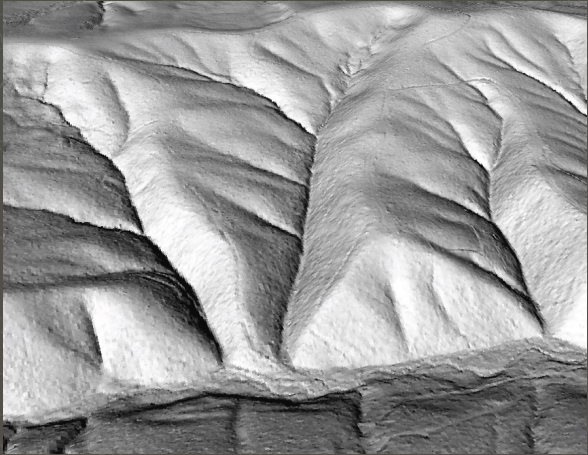


- Awareness/Education
  - Everyone part of the solution
  - Share maps and risk reduction actions
  - Web, fact sheets, story maps
- Planning
  - Comprehensive Plan – Municipalities Long-term plan
  - Regulations/zoning
- Warnings – Emergency Management
  - Partnership with NWS. Thank U NWS!
- Insurance – NFIP
  - Mudflows



Burns, 2023

# Questions/Discussion



[Bill.Burns@dogami.Oregon.gov](mailto:Bill.Burns@dogami.Oregon.gov)



Burns, 2023



## FEMA SUMMIT 2023 Current DOGAMI Oregon Lidar Consortium FEMA CTP Funded Projects

Robert Hairston-Porter  
Oregon Department of Geology and Mineral Industries



## Risk reduction process



Modified After Burns, W.J., 2015. Landslide Risk Reduction Projects in Oregon. AEG Landslide Forum, Time to Face the Landslide Hazard Dilemma: Bridging Science, Policy, Public Safety, and Potential Loss, Seattle, WA <http://c.ycomdn.com/sites/www.aegweb.org/resource/resmgr/Events2015/aeg-ls-forum-program-abstract.pdf>

## DOGAMI OLC Lidar Data Products

Points	LAS v 1.4 tiled by 3,000 foot DPA tiles <ul style="list-style-type: none"> <li>Classified Points: default (1), bare earth (2), low noise (7), water (9), bridge decks (17), high noise (18), ignored ground (20)</li> <li>Intensities</li> </ul>
Rasters	3 foot resolution GeoTIFFs tiled by 3,000 foot DPA tiles <ul style="list-style-type: none"> <li>Bare earth model</li> <li>Highest hit model</li> </ul> 1.5 foot GeoTIFFs tiled by 3,000 foot DPA tiles <ul style="list-style-type: none"> <li>Intensity images</li> </ul>
Vectors	Shapefiles (*.shp) <ul style="list-style-type: none"> <li>Defined project area (DPA)</li> <li>3,000 ft DPA tile index</li> <li>Flightlines</li> <li>Ground control points (GCPs) used for LiDAR calibration</li> <li>Vegetated ground survey points (GSPs)</li> <li>Non-Vegetated GSPs</li> <li>Project survey monuments</li> </ul>
Metadata	<ul style="list-style-type: none"> <li>FGDC compliant metadata for all data products</li> </ul>



Image Courtesy of NVS



**Eagle Creek 2022**  
**105 Square Miles**

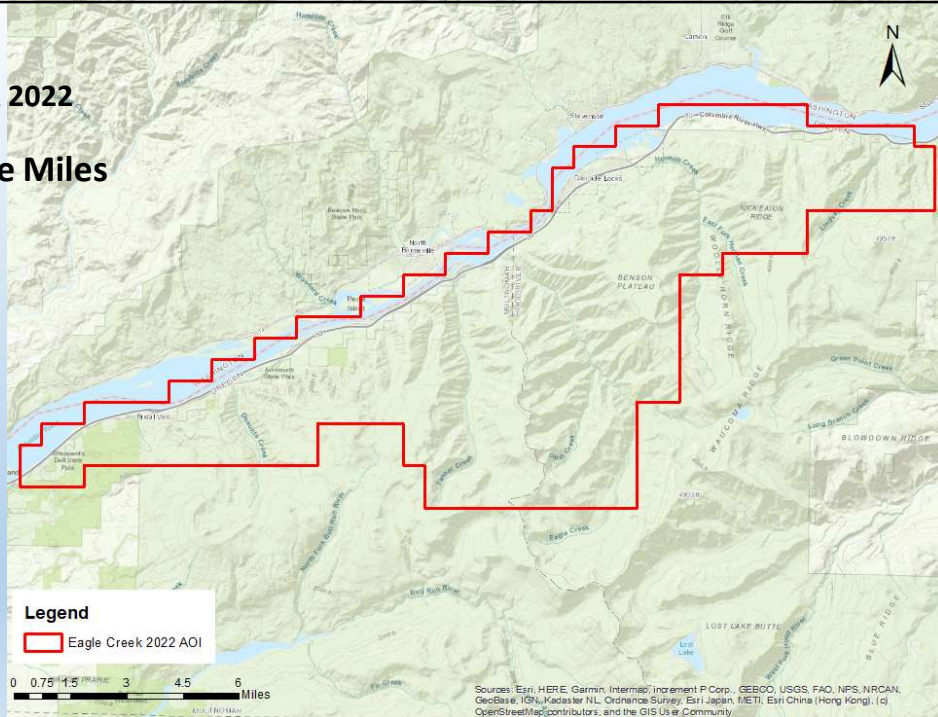
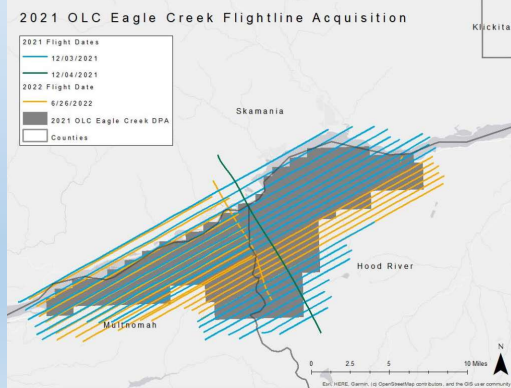


Image Courtesy of RHP

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

OLC Eagle Creek 3DEP	
Acquisition Dates	December 3-4, 2021 June 26, 2022
Study Area	67,149 acres
Projection	OGIC Lambert
Datum: horizontal & vertical	NAD83 (2011) NAVD88 (Geoid 18)
Units	International Feet



Images Courtesy of NVS

OLC Eagle Creek 3DEP	
Quality Level	QL1
Acquisition Dates	December 3-4, 2021 June 26, 2022
Aircraft Used	Cessna 208B Caravan
Sensor	Riegl VQ 1560ii
Maximum Returns	unlimited
Resolution/Density	Average 8 pulses/m <sup>2</sup>
Aggregate Nominal Pulse Spacing	0.35
Survey Altitude (AGL)	2,500 m
Survey Speed	145 kts
Field of View	58.5°
Mirror Scan Rate	160 LPS
Target Pulse Rate	1,514 kHz
Pulse Length	3 ns
Central Wavelength	1064 nm
Pulse Mode	Multi (MPIA)
Beam Divergence	0.18 mrad
Planned Swath Width	2,801 m
Swath Overlap	55% sidalap
Intensity	16-bit
	NVA (95% Confidence Level) ≤ 19.6 cm
Accuracy	VVA (95th Percentile) ≤ 30 cm
	Relative < 8cm between swaths





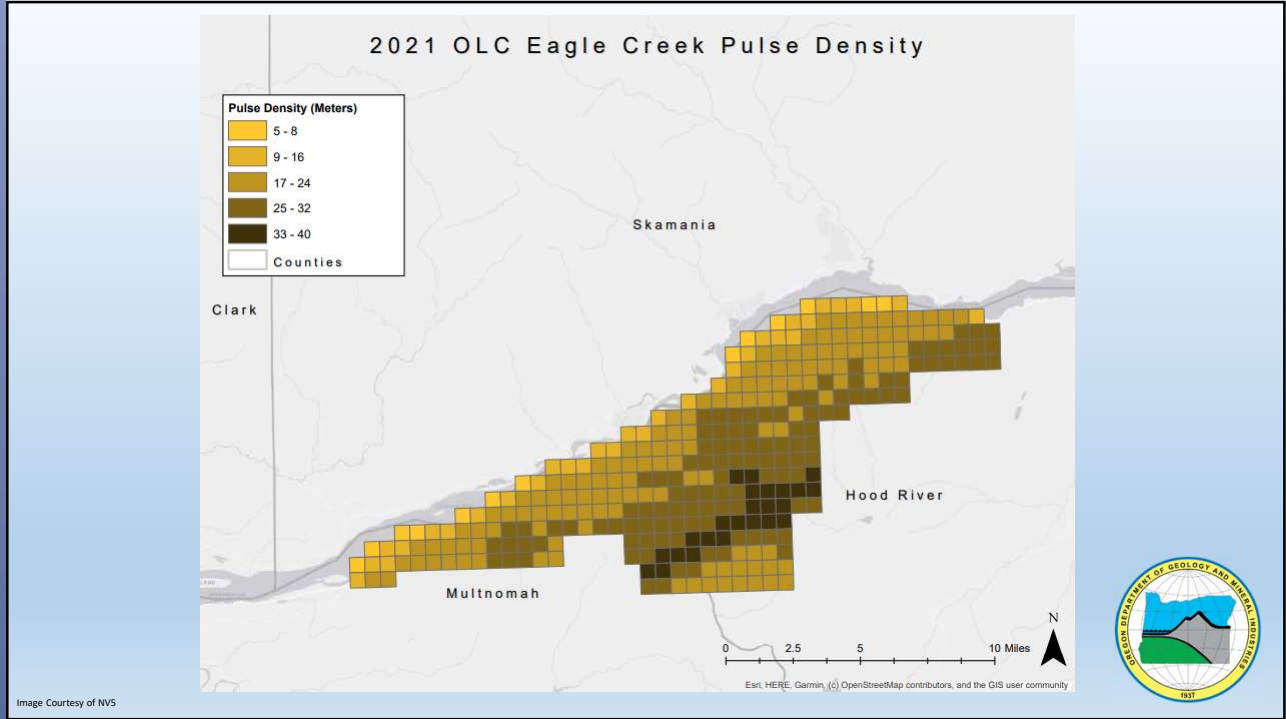


Image Courtesy of NVS

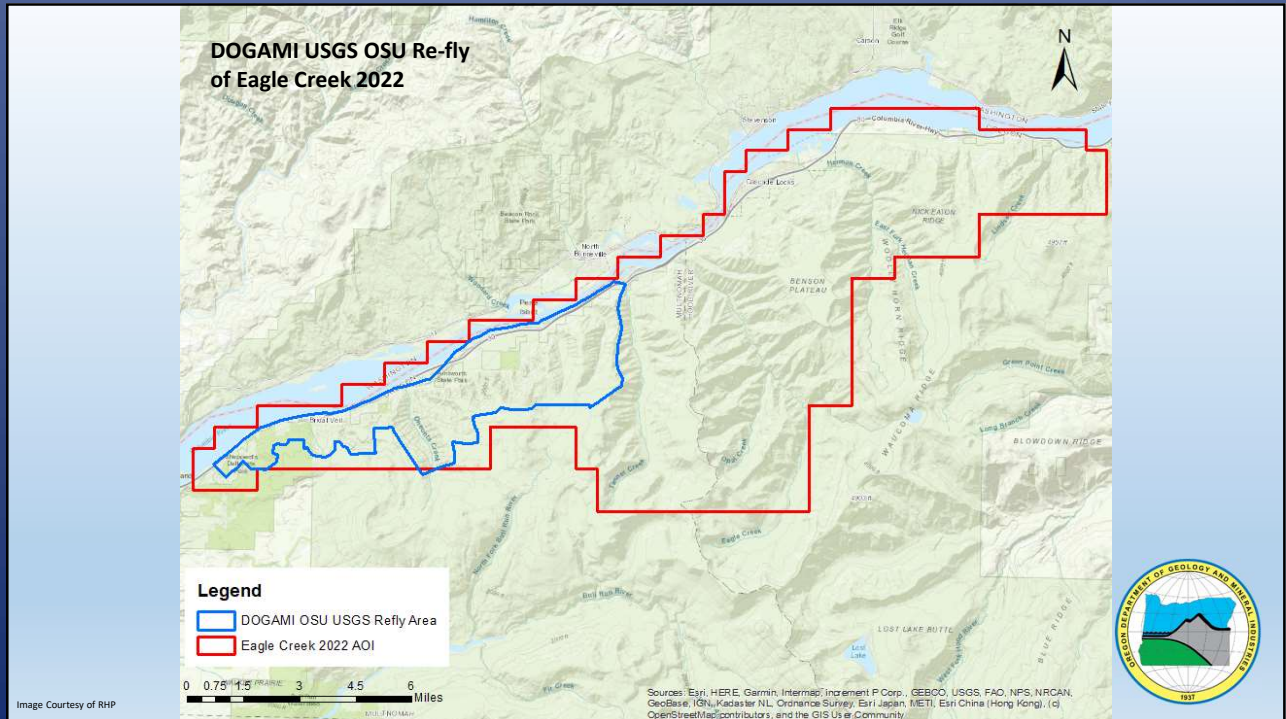
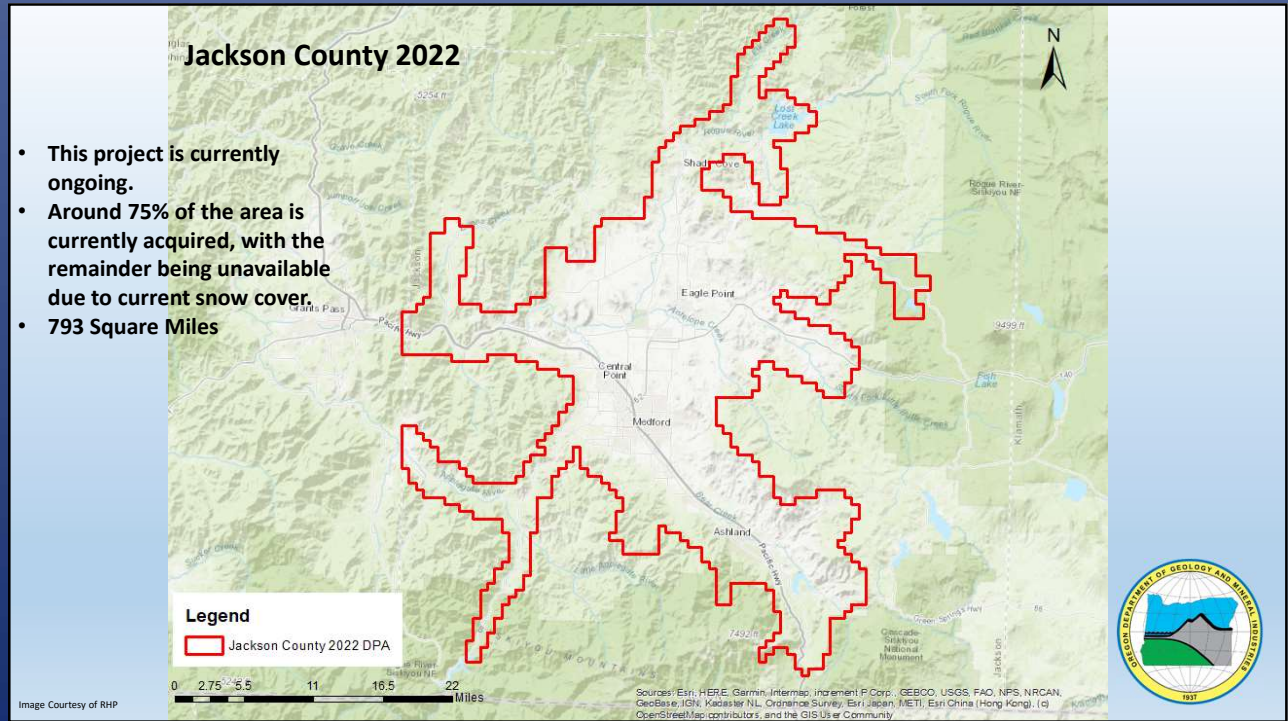
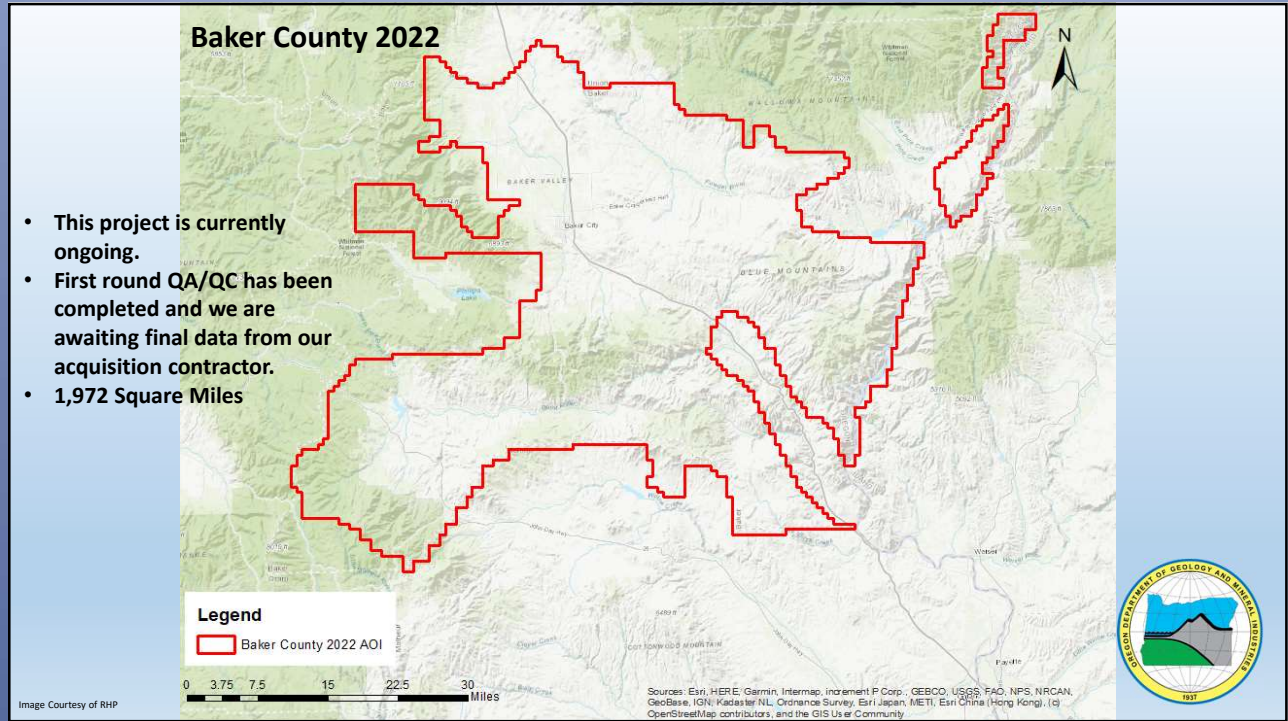
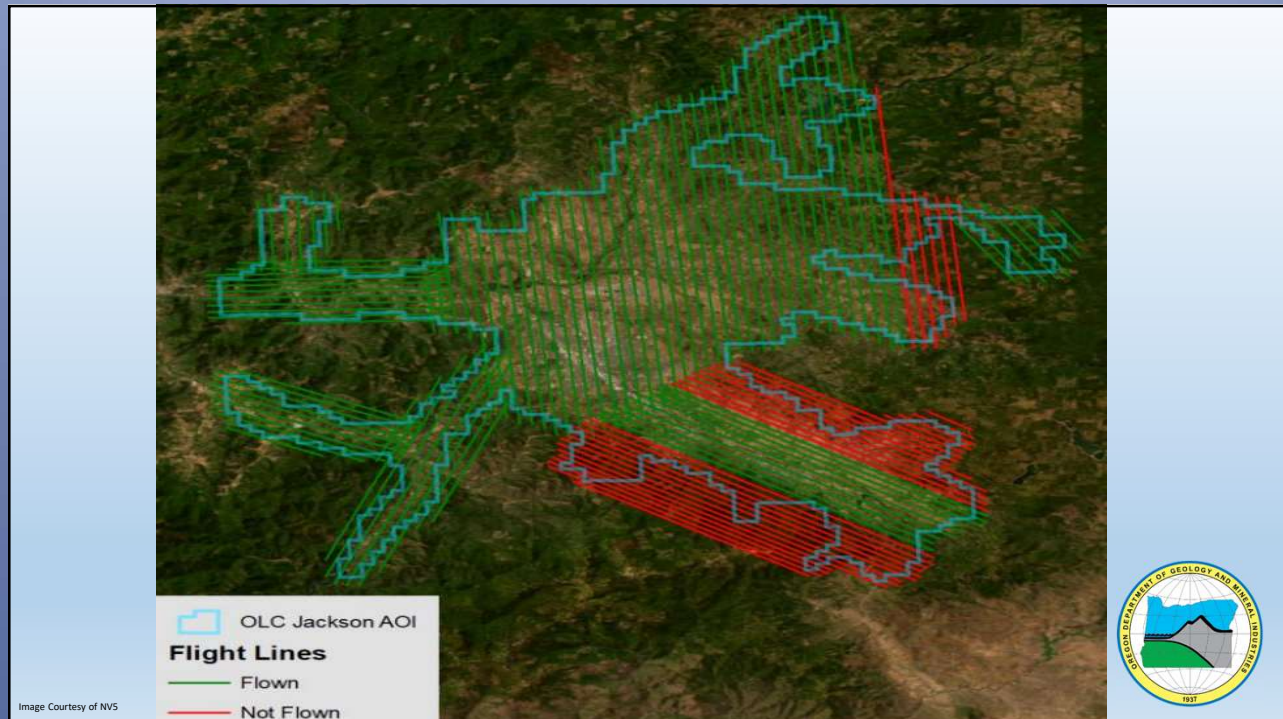


Image Courtesy of RHP





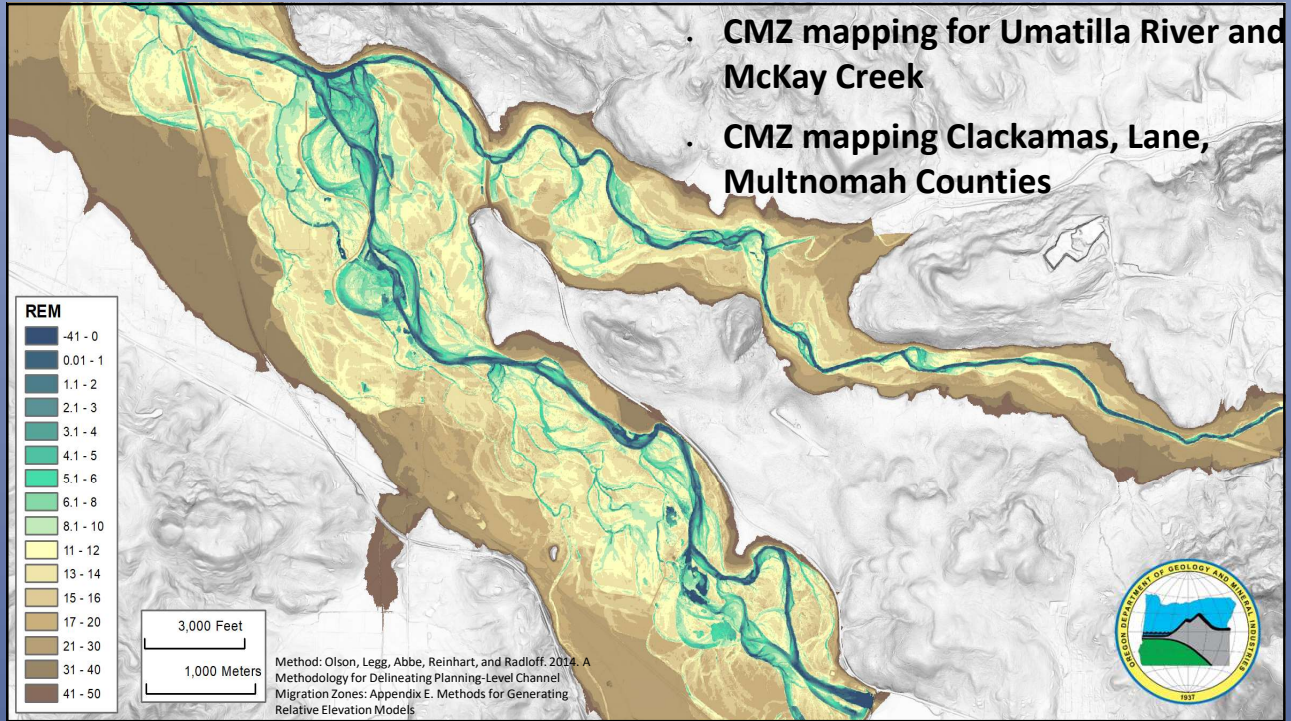


## Multi-Hazard Risk Assessments

- Benton, Marion, Morrow Multi-Hazard Risk Assessments
- Marion County Publication:  
<https://www.oregongeology.org/pubs/ofr/O-22-05/p-O-22-05.htm>
- Multi-hazard Risk Assessment Washington County
- Washington County Publication  
<https://www.oregongeology.org/pubs/ofr/O-22-04/p-O-22-04.htm>
- Multi-Hazard Risk Assessments Crook, Harney, Klamath, Yamhill.  
Currently in-progress.
- Geohazard Mapping & Risk Reduction in South-Central Lane County  
(Cottage Grove, Creswell). Currently in progress.
- Earthquake Hazard Risk Assessment, Lane County, Oregon







**Thank You!**

**Robert Hairston-Porter**

[robert.hairston-porter@dogami.oregon.gov](mailto:robert.hairston-porter@dogami.oregon.gov)





## PROJECT SHOWCASE

Region 10 CTP Program Overview

Rynn Lamb *(FEMA Region 10)*

Risk MAP Coordination Activities, State of Alaska

Sally Russell Cox *(State of Alaska, DCRA/DCCED)*

Hazard Mapping & Engagement in Oregon:

Bill Burns *(State of Oregon, DOGAMI)*

Post-Wildfire Debris Flows, LiDAR, and More!

Robert Hairston-Porter *(State of Oregon, DOGAMI)*

**Flood Hazard Mitigation & Resilience Planning in Idaho**

Bradley Peterson *(Madison County, Idaho)*

New and Cool Efforts from the WA Geological Survey

Tricia Sears *(Washington Geological Survey)*



FEMA

**RiskMAP**  
Increasing Resilience Together

# Flood Hazard Mitigation and Resilience Planning in Idaho

MADISON COUNTY  
PRESENTED BY:  
BRADLEY PETERSEN

## Background – History Madison County



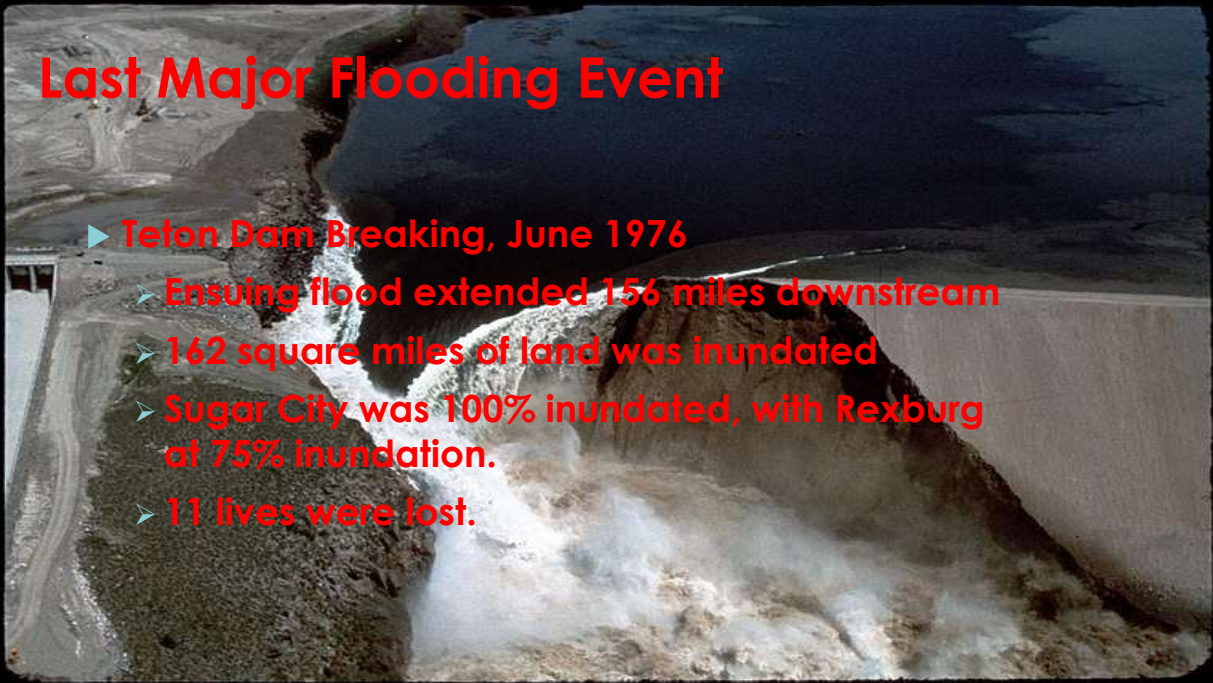
- ▶ Third smallest county in Idaho (Total Land Mass)
- ▶ Population 2020 Census: 52,913

	County's Avg.	State Avg.
▶ Median Household Income (Lowest in State)	\$39,160	\$62,803
▶ Poverty Rate (Highest in State)	32%	11%
▶ Median Age (2 <sup>nd</sup> lowest in the Nation)	23.5	40.3
▶ Growth Rate (2020 Census) (Highest in State)	41%	17%



## Last Major Flooding Event

- ▶ Teton Dam Breaking, June 1976
  - Ensuing flood extended 156 miles downstream
  - 162 square miles of land was inundated
  - Sugar City was 100% inundated, with Rexburg at 75% inundation.
  - 11 lives were lost.

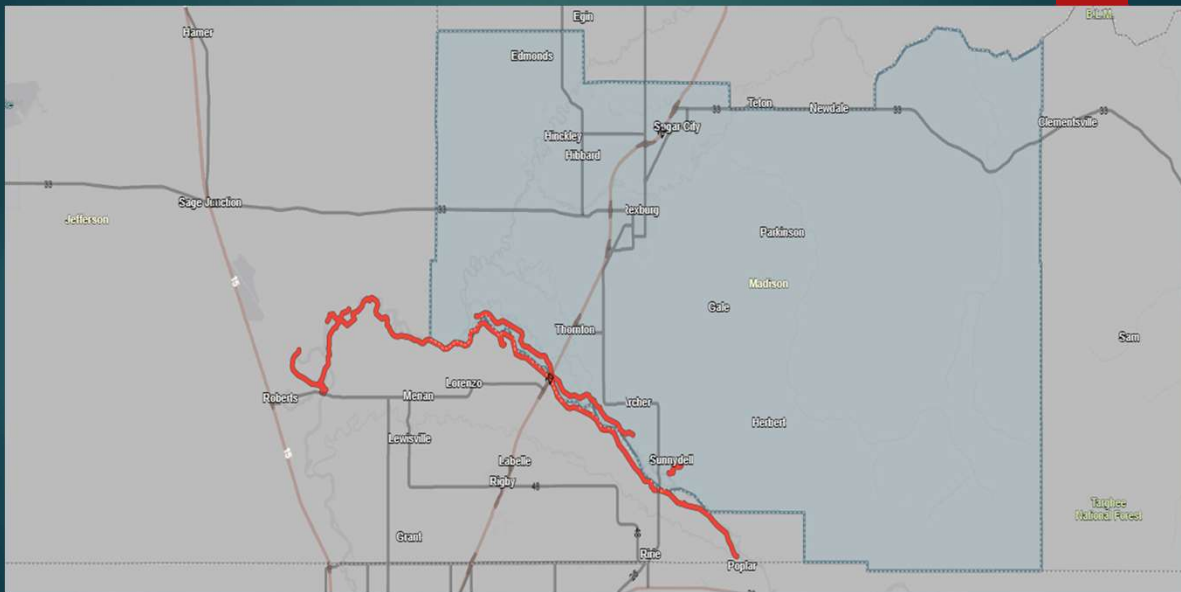




# Current FIRM – June 3, 1991



# Levees

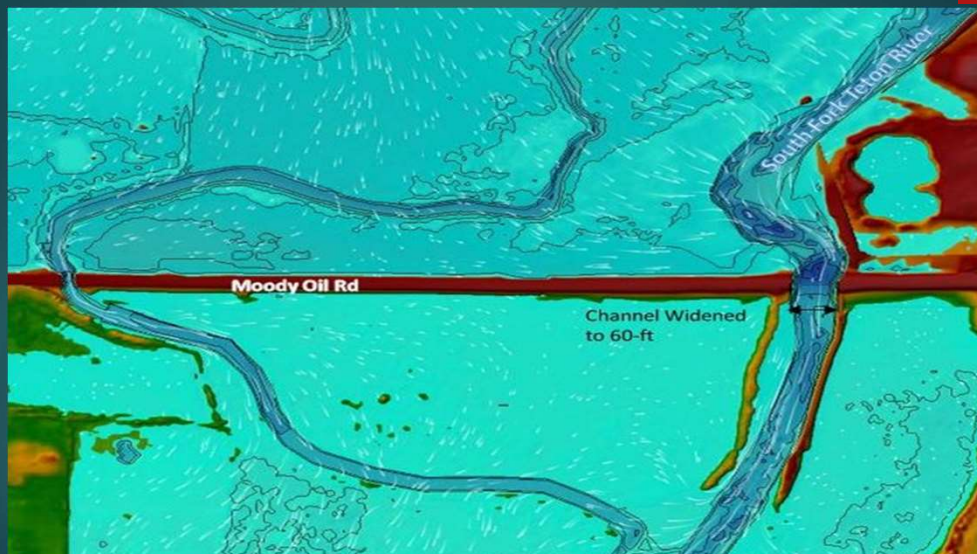


# Partnership with FEMA Region 10

## Cooperative Technical Partnership Grants (CTP)

- ▶ 2019
  - ❖ Teton River Flood Mitigation Study
  - ❖ Model Forest Policy Program (Partnership)
- ▶ 2020
  - ❖ Analyses to Reaccredit of the Lyman Creek Levee System
- ▶ 2022
  - ❖ Characterization of Teton River Peak Discharge Mitigation Through Temporary Storage/Infiltration and Predicted Floodplain Benefits

## “Choke Points”



# Infiltration Sites

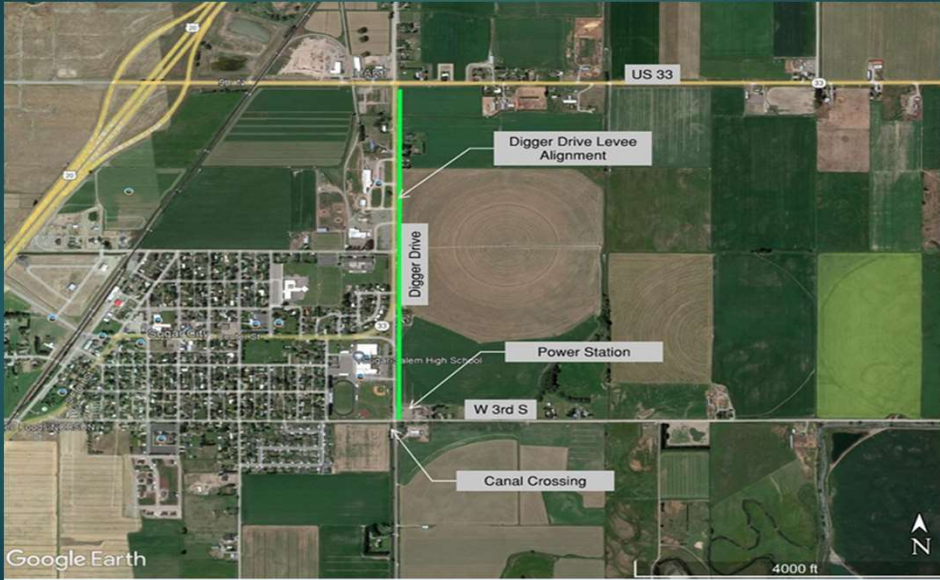


# Levee





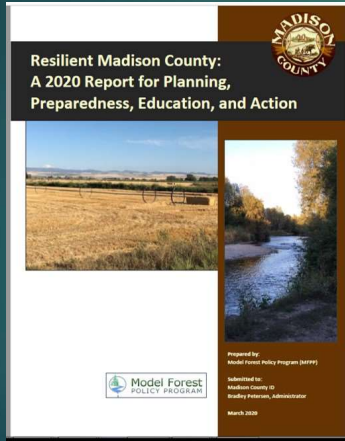
# Potential setback Levee/Spillway



# Levee



# Model Forest Policy Program



10

# Economic Development

To fully invite and or grow these industries within the county, our first priority was to focus on critical infrastructure issues;

- ▶ **Talent:**
  - Where will new employees come from to work for these new or existing companies?
- ▶ **Management:**
  - Waste-water control
  - Fire-surpression system
- ▶ **Power:**
  - Do we have adequate power supports to handle future demands? (electricity, natural gas, solar, etc.)
- ▶ **Broadband/Fiber:**
  - Internet speed and reliability.
- ▶ **Supply Chain:**
  - Sources to bring in supplies for manufacturing at production
- ▶ **Distribution:**
  - Sources to send products out
- ▶ **Quality of Life Issues (Regionally and Locally):**
  - Recreational opportunities: greenspace, pathways, parks, etc.

# How to Make it Work? We Need Partners...

- ▶ Look for multiple resources
- ▶ Combine needs
  - Flood Control: (Examples):
    - ❖ Levees into bike paths/trails
    - ❖ Building retrofits for potential earthquakes
    - ❖ Natural solutions (also recreational)
      - ❖ Gravel Pits into Aquafer Recharge Opportunities
      - ❖ Combined with Recreational Opportunities
    - ❖ New road construction
    - ❖ Etc...
- ▶ Need to dream





## PROJECT SHOWCASE

Region 10 CTP Program Overview	Rynn Lamb <i>(FEMA Region 10)</i>
Risk MAP Coordination Activities, State of Alaska	Sally Russell Cox <i>(State of Alaska, DCRA/DCCED)</i>
Hazard Mapping & Engagement in Oregon: Post-Wildfire Debris Flows, LiDAR, and More!	Bill Burns <i>(State of Oregon, DOGAMI)</i> Robert Hairston-Porter <i>(State of Oregon, DOGAMI)</i>
Flood Hazard Mitigation & Resilience Planning in Idaho	Bradley Peterson <i>(Madison County, Idaho)</i>
<a href="#">New and Cool Efforts from the WA Geological Survey</a>	Tricia Sears <i>(Washington Geological Survey)</i>



FEMA

**RiskMAP**  
Increasing Resilience Together



**HILARY S. FRANZ**  
COMMISSIONER OF PUBLIC LANDS

# Washington Geological Survey Update

**TRICIA R. SEARS**  
Geologic Planning Liaison

FEMA Summit  
March 9, 2023



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## Geologic Hazards Program



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# 2022–2023 Tsunami Projects

## Tsunami Hazard Assessments

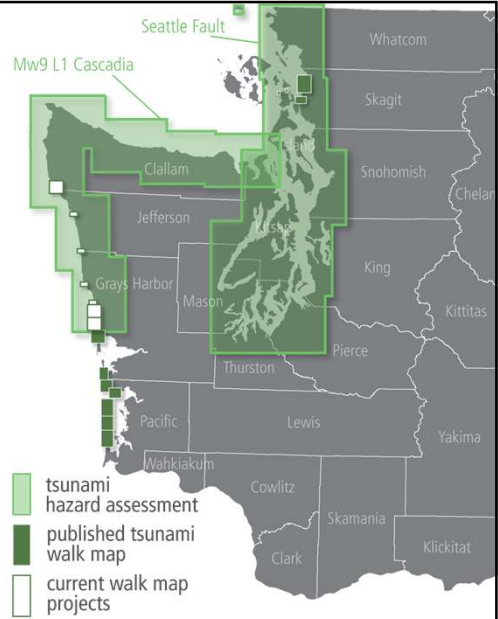
- Mw9.0 L1 Cascadia scenario on northern outer coast and Strait of Juan de Fuca
- Large Seattle Fault earthquake scenario for Puget Sound

## Tsunami Walk Maps

- Long Beach, North Cove, Tokeland, Ocean Shores, and Grayland

## Tsunami Simulations

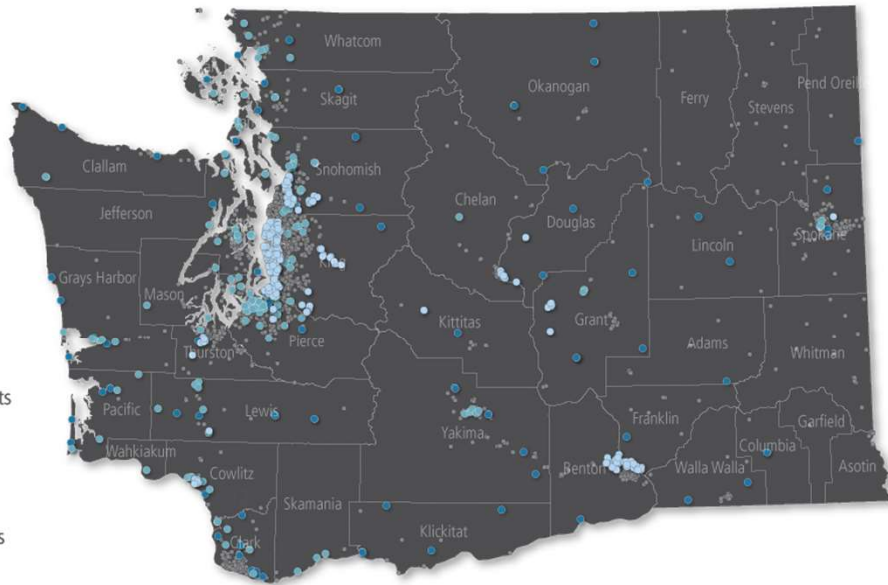
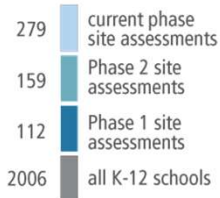
- Bainbridge Island and central Puget Sound
- Tribes and communities on the central and northern outer coast



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# School Seismic Safety Project



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# Landslide Hazard Program

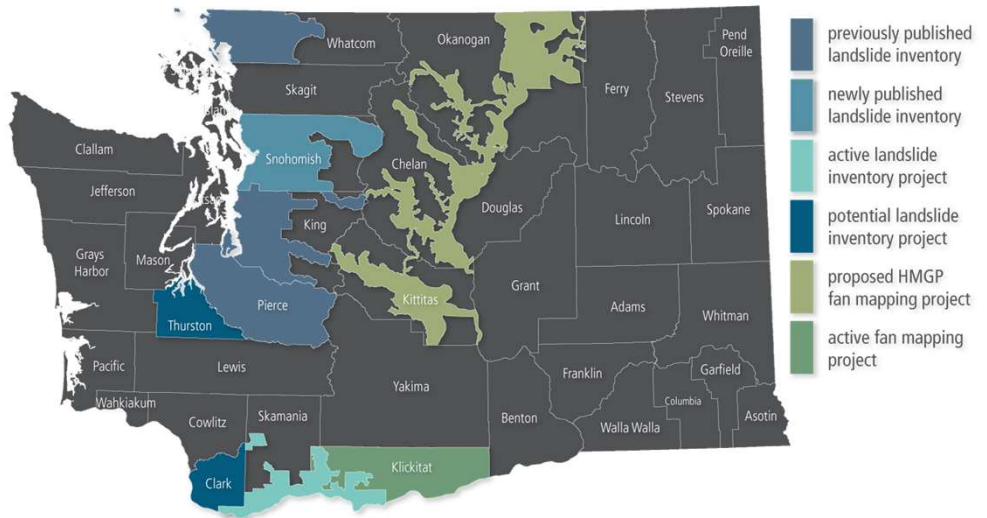


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## Landslide Hazard Group Projects



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# 2022–2023 WALERT Activities

### WALERT monitoring equipment

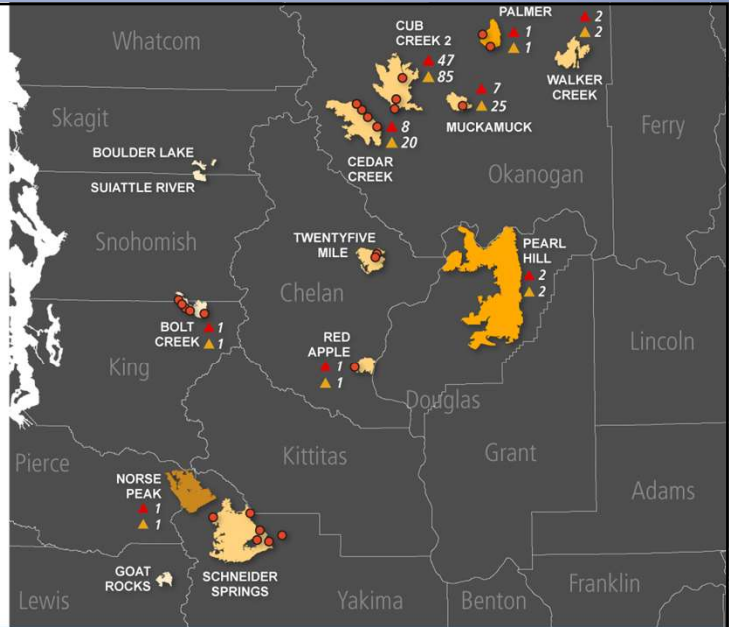
● rain gauges and weather stations

### WALERT observations

▲ no. of debris flows, floods

▲ no. of sites visited

### Fire boundaries by year



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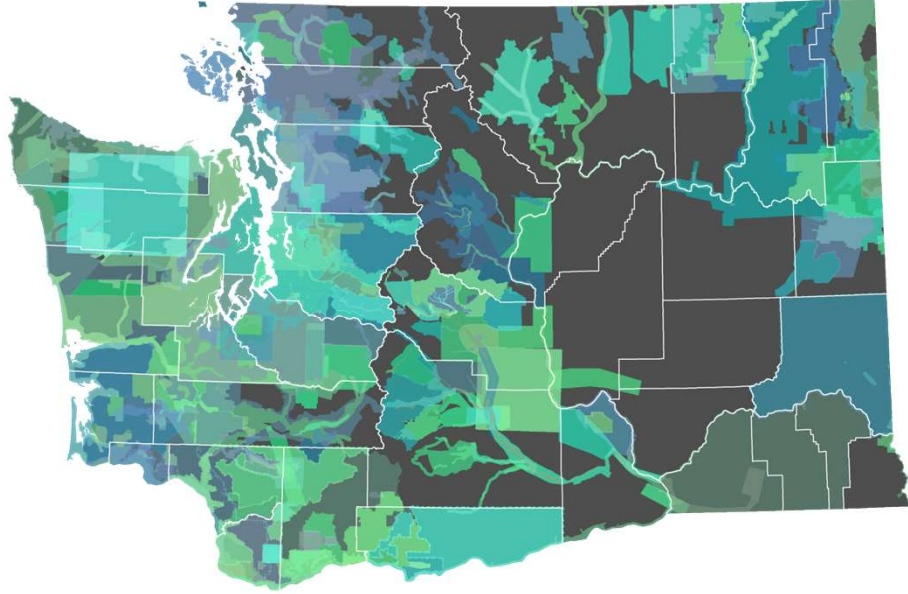
# Lidar Program



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# Lidar Holdings as of Early 2022



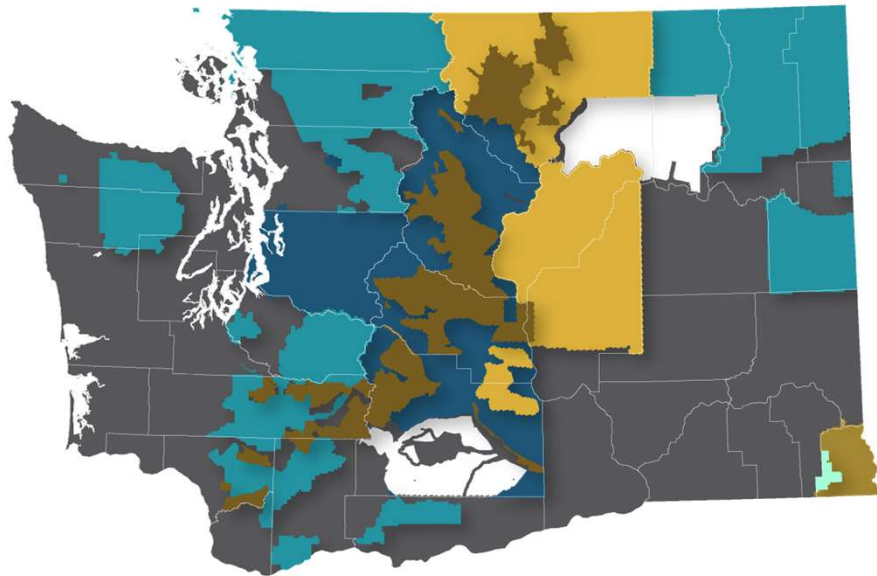
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# New and In-Progress

- pending
- received
- due by 5/2023
- due by 6/2023
- due by 9/2024
- starts Spring 2023
- current lidar holdings



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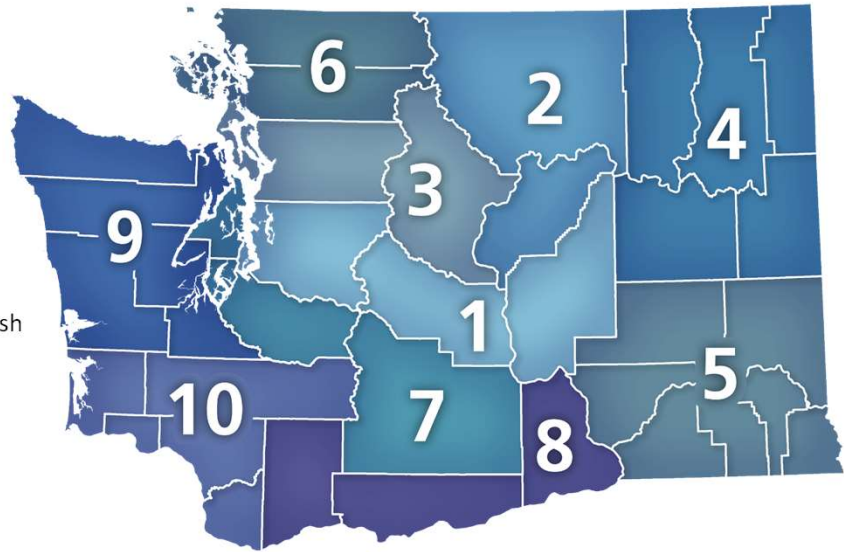
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## The Future of Lidar Refresh in Washington

- Target of 10-year statewide refresh of high-quality lidar with additional state funding.
- Aiming to leverage existing and new partnerships to speed it up even more, to a 6-year refresh



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## WGS 23–25 Legislative Priorities

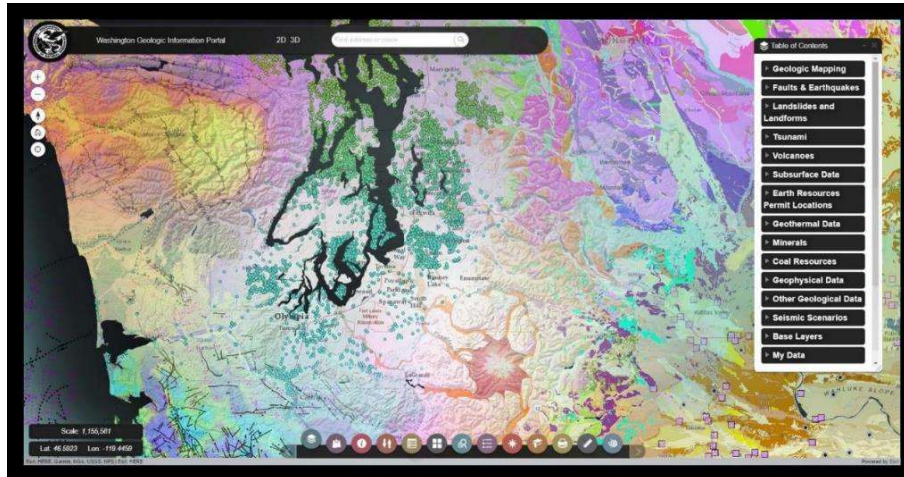
- 1 WGS Operating Request: Statewide Lidar Refresh**
  - Ensuring a minimum of a 10-year statewide lidar refresh for Washington
- 2 WGS Capital Request: School Seismic Safety Site Class Assessments**
  - Continuing to perform site class assessments for OSPI's Study and Survey to assess all WA K-12 schools by 2028
- 3 HB 1578: Cascading Impacts of Wildfire Act**
  - Adding capacity to conduct pre-fire alluvial fan mapping, develop models for early warning, and conduct post-fire assessments



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# Washington Geologic Information Portal



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# THANK YOU! 😊

**TRICIA R. SEARS**

Geologic Planning Liaison

[tricia.sears@dnr.wa.gov](mailto:tricia.sears@dnr.wa.gov)

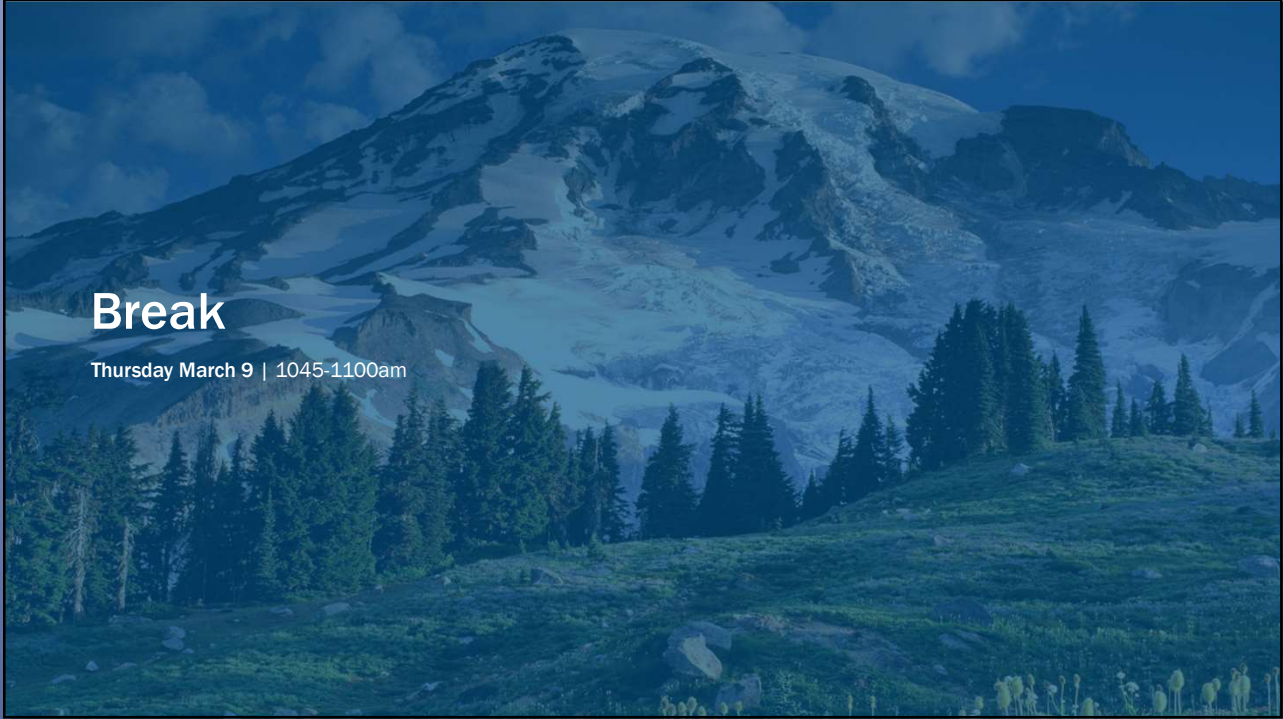
360-628-2867

Corina Allen, Geologic Hazards Program, [corina.allen@dnr.wa.gov](mailto:corina.allen@dnr.wa.gov) and 360-791-0647  
Kate Mickelson, Landslide Hazards Program, [kate.mickelson@dnr.wa.gov](mailto:kate.mickelson@dnr.wa.gov) and 360-810-0006  
Abby Gleason, Lidar Program, [abigail.gleason@dnr.wa.gov](mailto:abigail.gleason@dnr.wa.gov) and 360-902-1560  
Susan Schnur, Publications, [susan.schnur@dnr.wa.gov](mailto:susan.schnur@dnr.wa.gov) and 360-701-6122



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# Break

Thursday March 9 | 1045-1100am