



HILARY S. FRANZ

COMMISSIONER OF PUBLIC LANDS

Washington Geological Survey Spotlight

Alex Steely, PhD, LG,
Assistant State Geologist
Assistant Director of Geologic Hazards and Mapping
and
Tricia Sears
Geologic Planning Liaison

Puget Sound Regional Council, Regional Staff Committee, May 16, 2024



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Washington Geological Survey

MISSION

To collect, develop, use, distribute, and preserve geologic information to promote the safety, health, and welfare of the people of Washington, protect the environment, and support its economy.

VISION

Fostering a safer, more productive and resilient society that incorporates geology into its regular thought and decision-making processes.

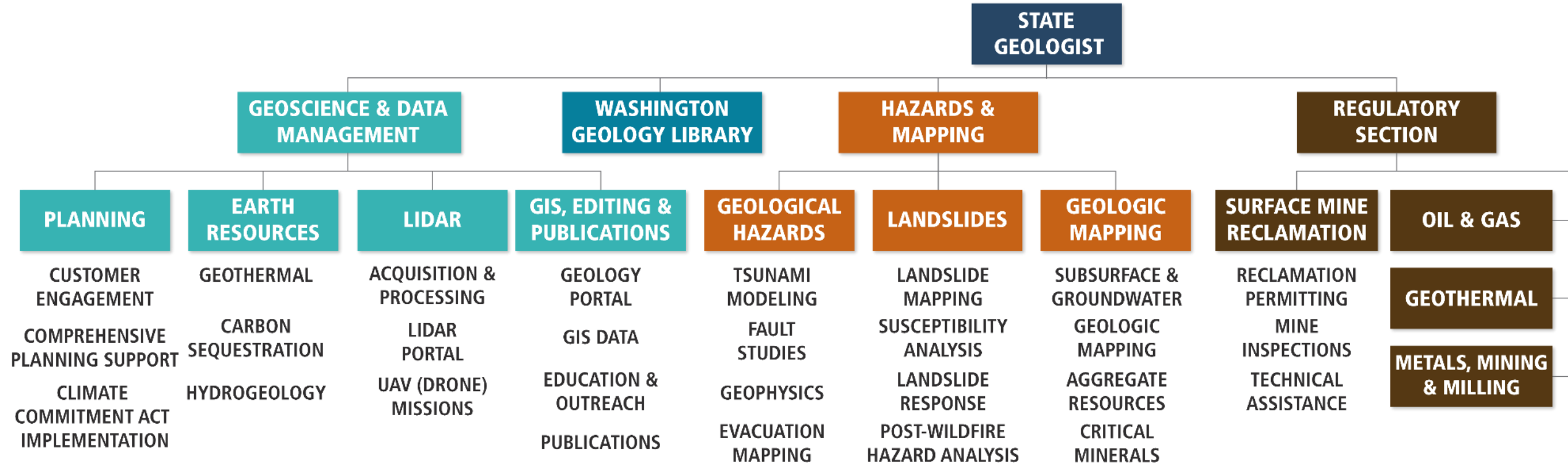


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REGULATORY PROGRAMS

- Oil & Gas Conservation Act (78.52)
- Geothermal Resources Act (78.60)
- Surface Mining Act (RCW 78.44)
- Metals Mining & Milling Operations Act (78.56)



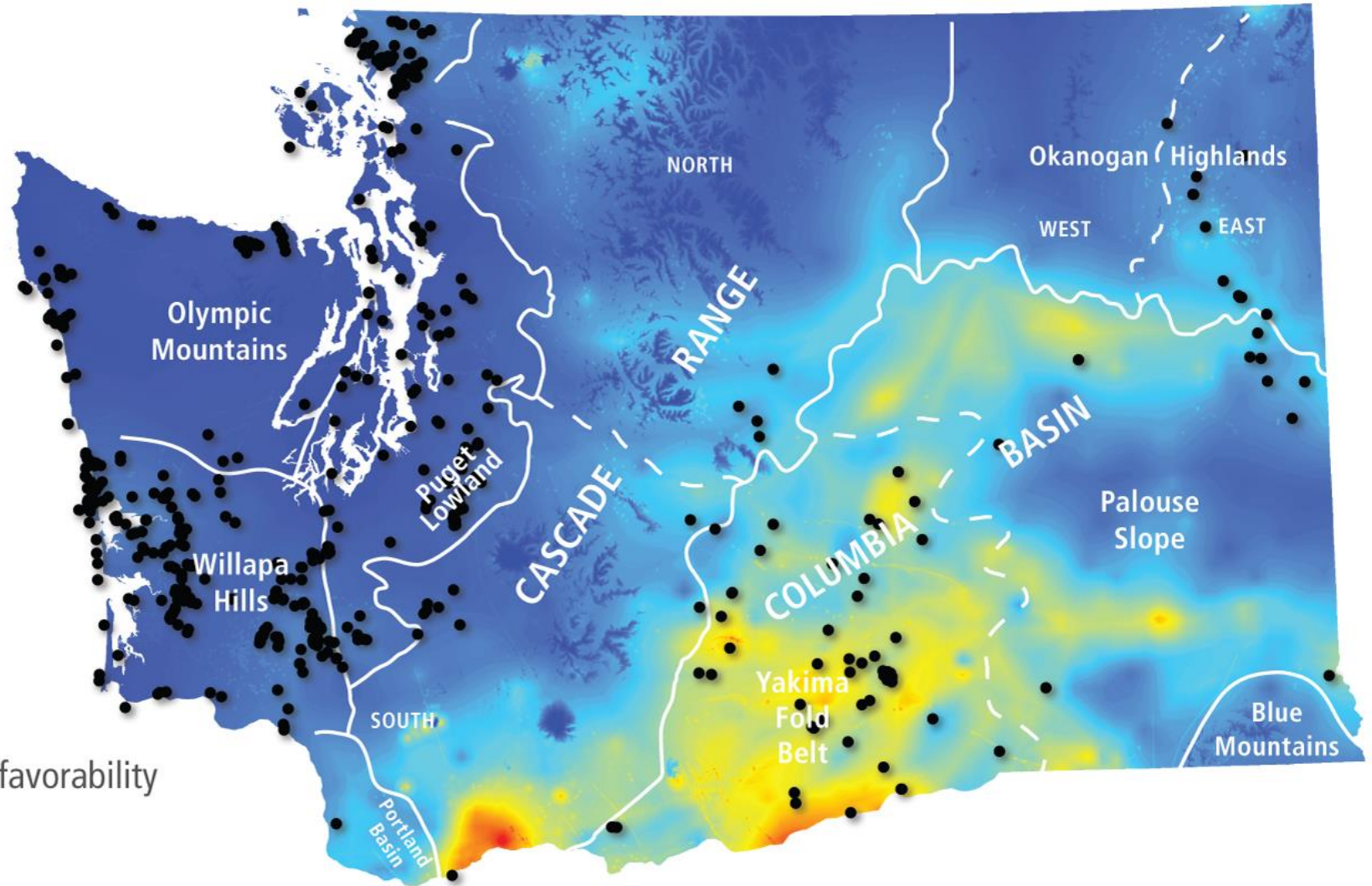
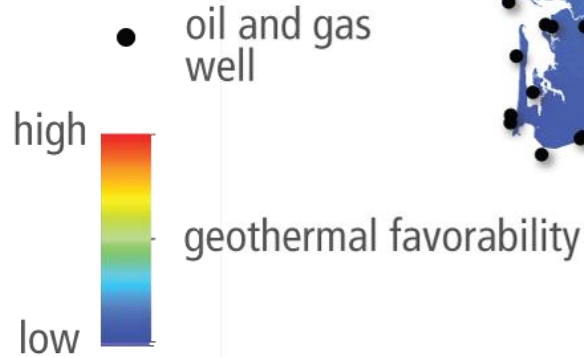
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Oil & Gas and Geothermal Regulation

- Oil and Gas Conservation
- Underground Natural Gas Storage Act
- Geothermal Resources



Surface Mining Act Metals Mining & Milling Operations Act

- Rehabilitate for the appropriate future land use
- Reestablish the vegetative cover, slope stability, and water conditions
- Prevent or mitigate future environmental degradation



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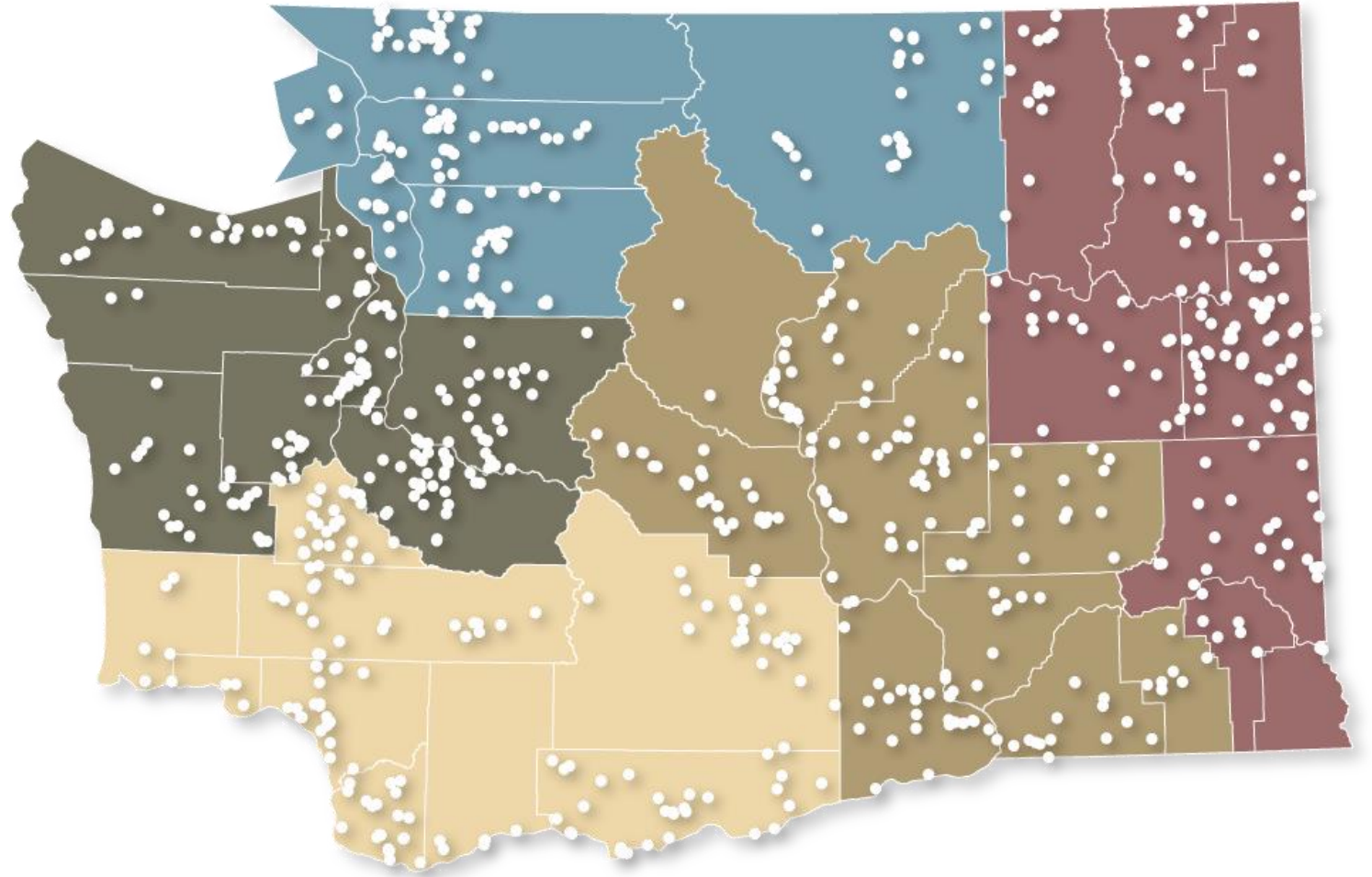
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Surface Mines, Metal Mines, Milling Operations

Permit Application Review
SEPA
Mine Inspections
Technical Assistance
Permit Holder Compliance
Enforcement Actions
Stakeholder Relations



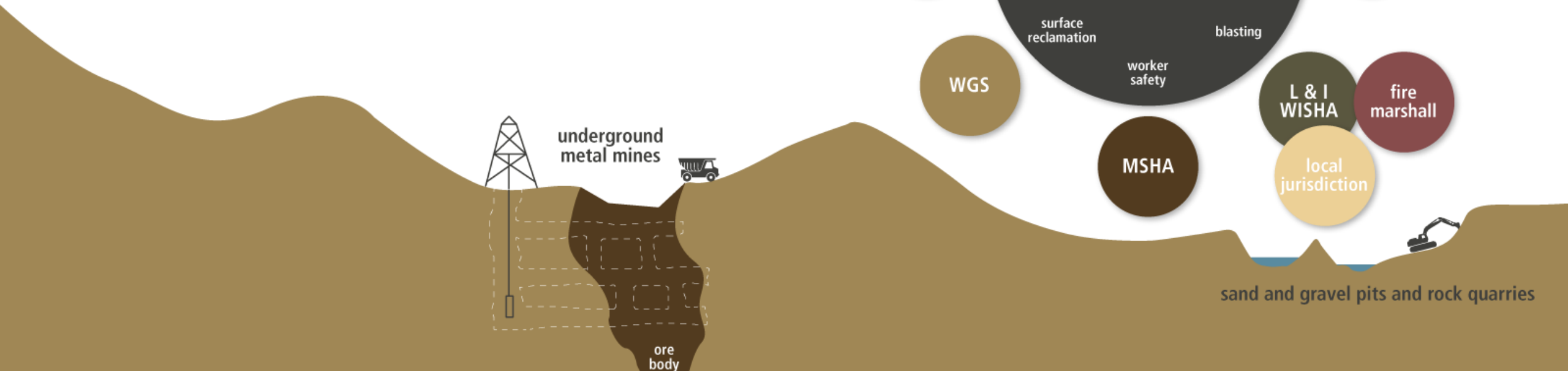
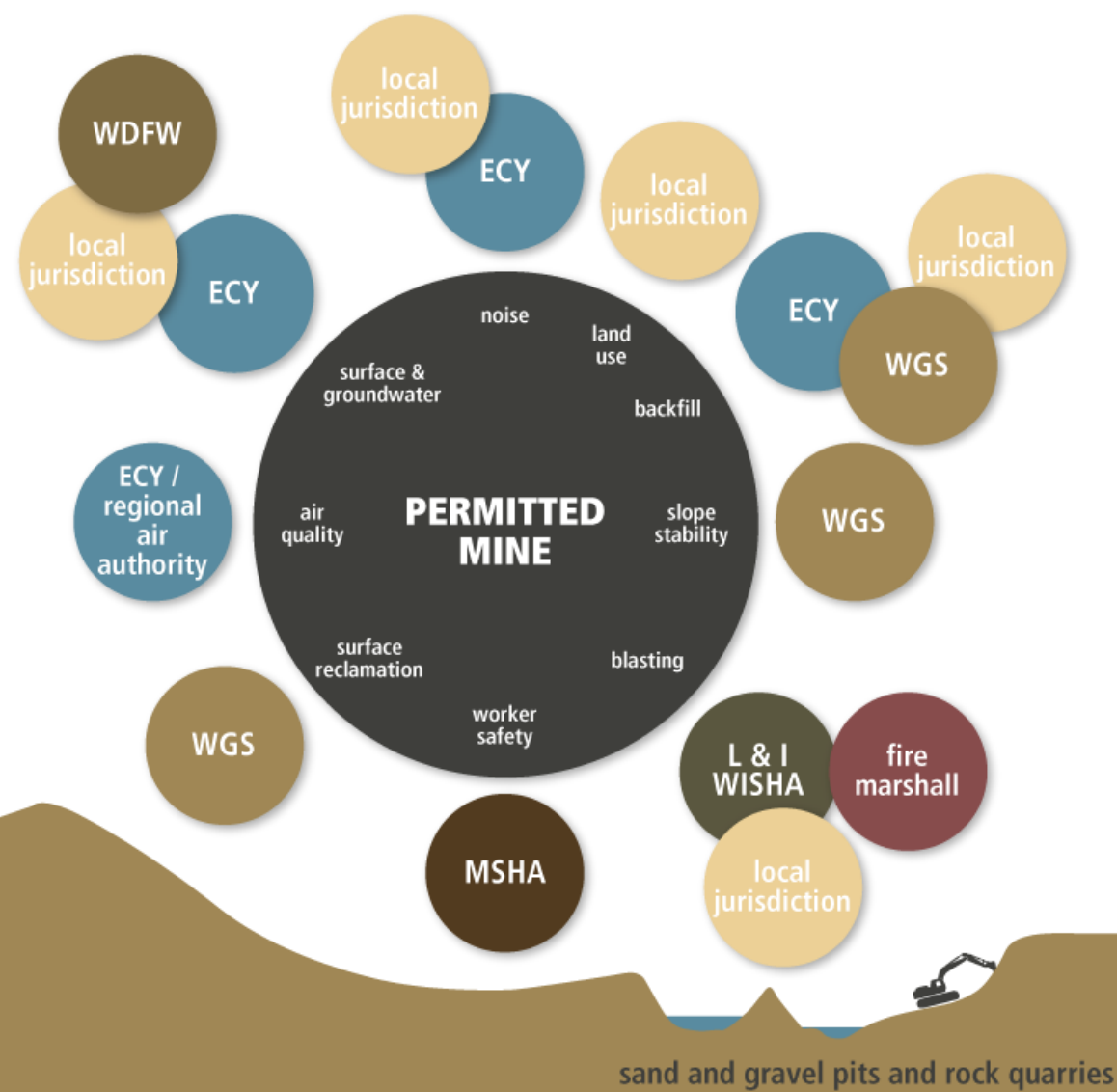
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Mine Regulation in WA

- Metals Mining & Milling Operations Act
- Surface Mining Act



RCW 43.92 Geological Survey

OBJECTS OF SURVEY

.020

"The geological survey shall have for its objects:

1. an examination of the economic products of the state, including: gold, silver, copper, lead, and iron ores, as well as building stones, clays, coal, and all mineral substances of value;
2. an examination and classification of soils, and the study of their adaptability to particular crops;
3. an investigation and report upon the water supplies, artesian wells, and water power of the state, gauging the streams, etc., with reference to its application for irrigation and other purposes;
4. an examination and report upon the occurrence of different road building material;
5. an examination of the physical features of the state with reference to their practical bearing upon the occupation of the people;
6. the preparation of special geological and economic maps to illustrate the resources of the state;
7. the preparation of special reports with necessary illustrations and maps, which shall embrace both the general and detailed description of the geology and natural resources of the state; and
8. the consideration of similar scientific and economic questions that in the judgment of the state geologist, is deemed of value to the people of the state."

STATE GEOLOGIST

.010

"There shall be a geological survey of the state that shall be under the direction of the commissioner of public lands who shall have general charge of or of the survey a geologist of established reputation, to be known as the state geologist."

INTENT

.900

"It is the intent of the legislature that there be an effective state geological survey that can produce essential information that provides for the health, safety, and economic well-being of the citizens."

COOPERATION

.060

"The state geologist may make provisions for topographic, geologic, and hydrographic surveys of the state in cooperation with the United States geological survey in such manner as in the opinion of the state geologist will be of the greatest benefit to the agricultural, industrial, and geological requirements for the state. However, the director of the United States geological survey must first agree to expend on the part of the United States upon such surveys a sum equal to that expended by the state."

TECHNICAL ASSISTANCE

.025

"In addition to the objectives stated above, the geological survey must conduct and maintain an assessment of seismic, landslide, and tsunami hazards in Washington. This assessment must apply the best practicable technology, including light detection and ranging (lidar) mapping, to identify and map volcanic, seismic, landslide, and tsunami hazards, and estimate potential hazard consequences and the likelihood of a hazard occurring.

The survey must:

- a. Coordinate with state and local government agencies to compile existing data, including geological hazard maps and geotechnical reports, tending to inform geological hazard planning decisions;
- b. acquire and process new data or update deficient data using the best practicable technology, including lidar;
- c. create and maintain an efficient, publicly available database of lidar and geological hazard maps and geotechnical reports collected under (a) and (b) of this subsection; and
- d. provide technical assistance to state and local government agencies on the proper interpretation and application of the results of the geological hazard assessment."



HAZARDS AND MAPPING PROGRAMS



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Geologic Mapping Program

Geologic maps are a basic building block to most decision making. Using field work, sampling/analysis, geophysics, and subsurface data, create maps of soil properties, geologic hazards, and provides needed context.

Mapping currently underway in southeast Puget Lowland, Mount Si area, and Ellensburg.






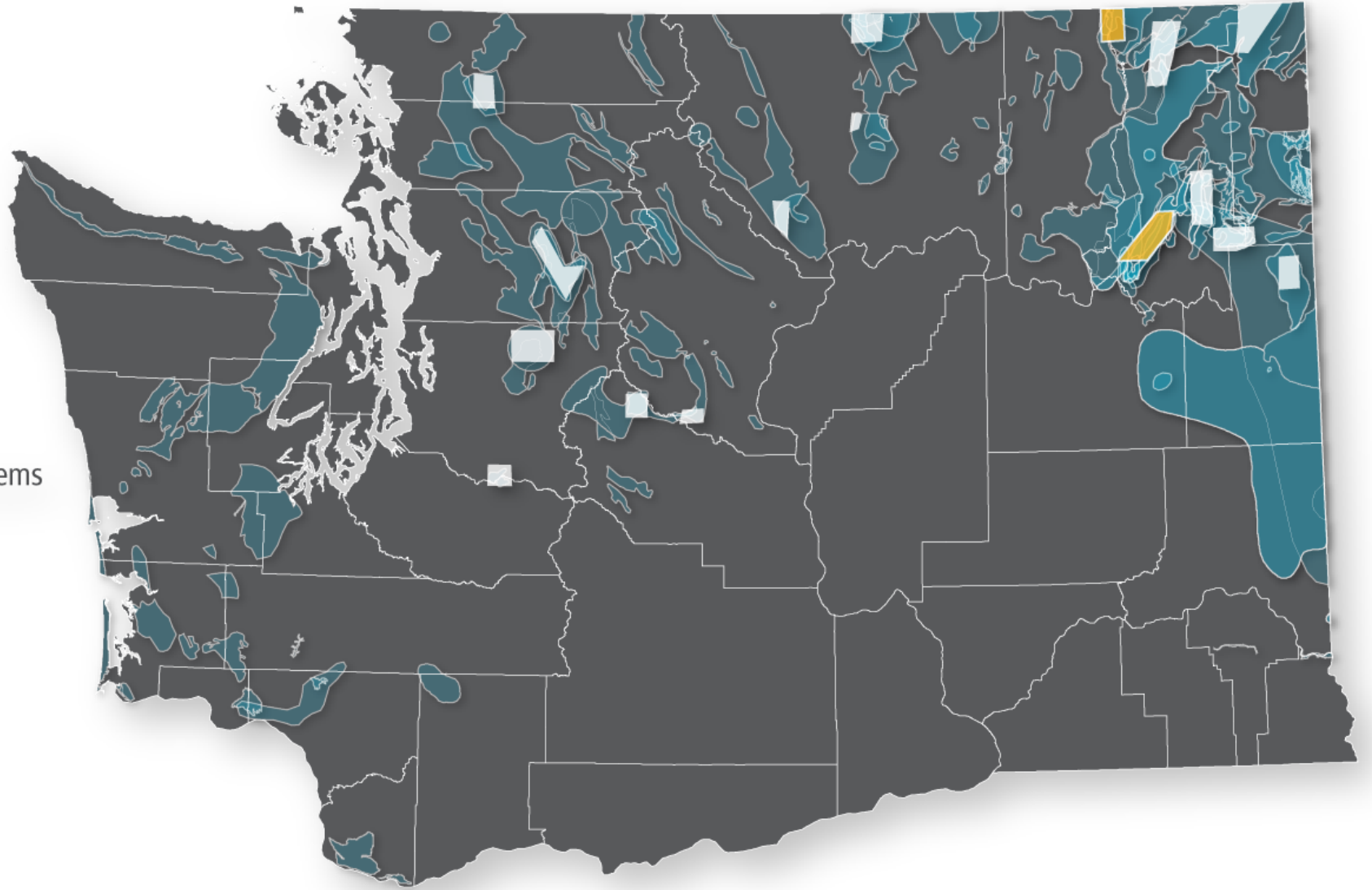
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Geologic Mapping Program

-  known critical mineral systems
-  WGS project areas
-  WGS priority areas

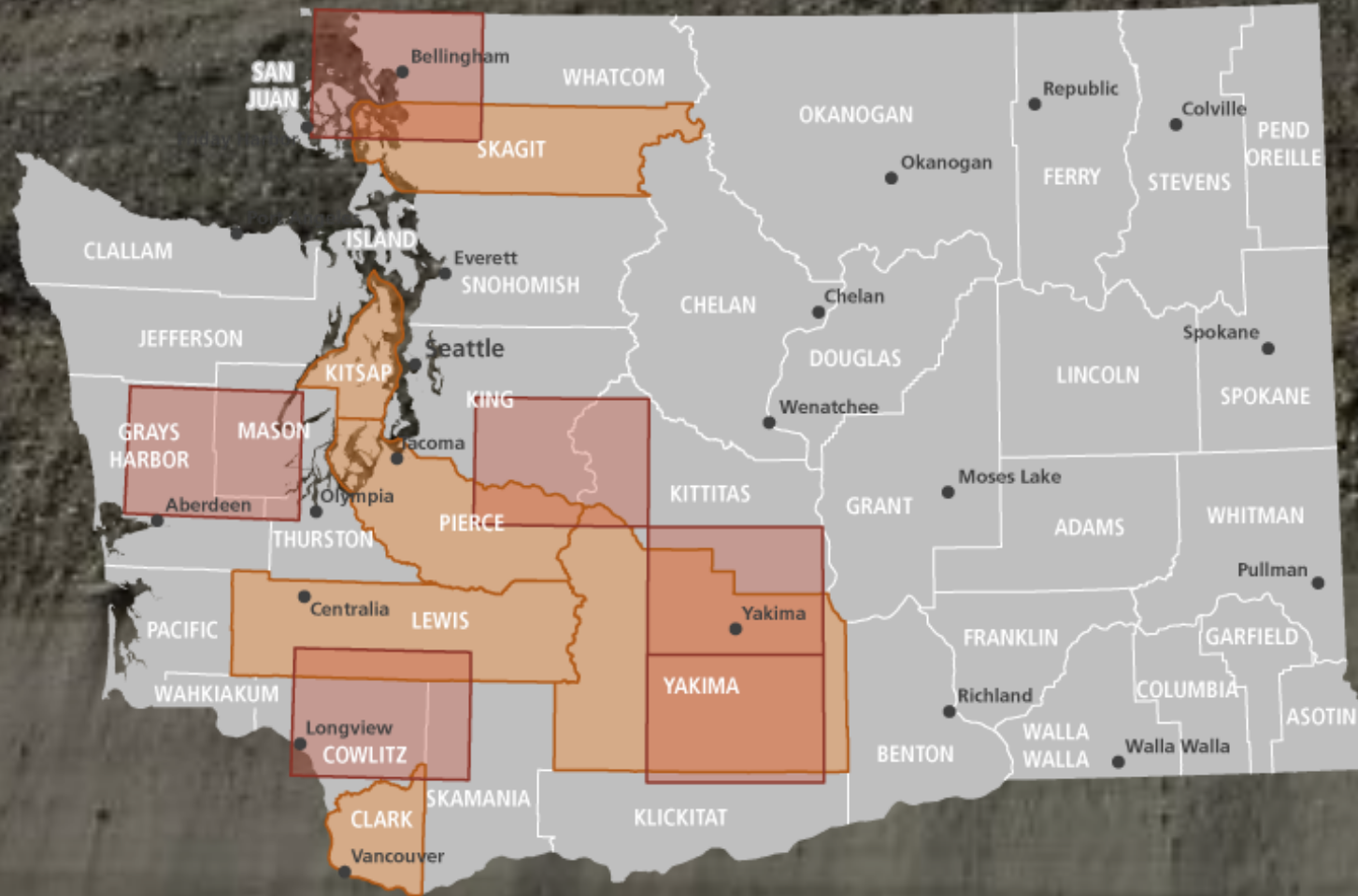


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Geologic Mapping Program



AGGREGATE MAPPING

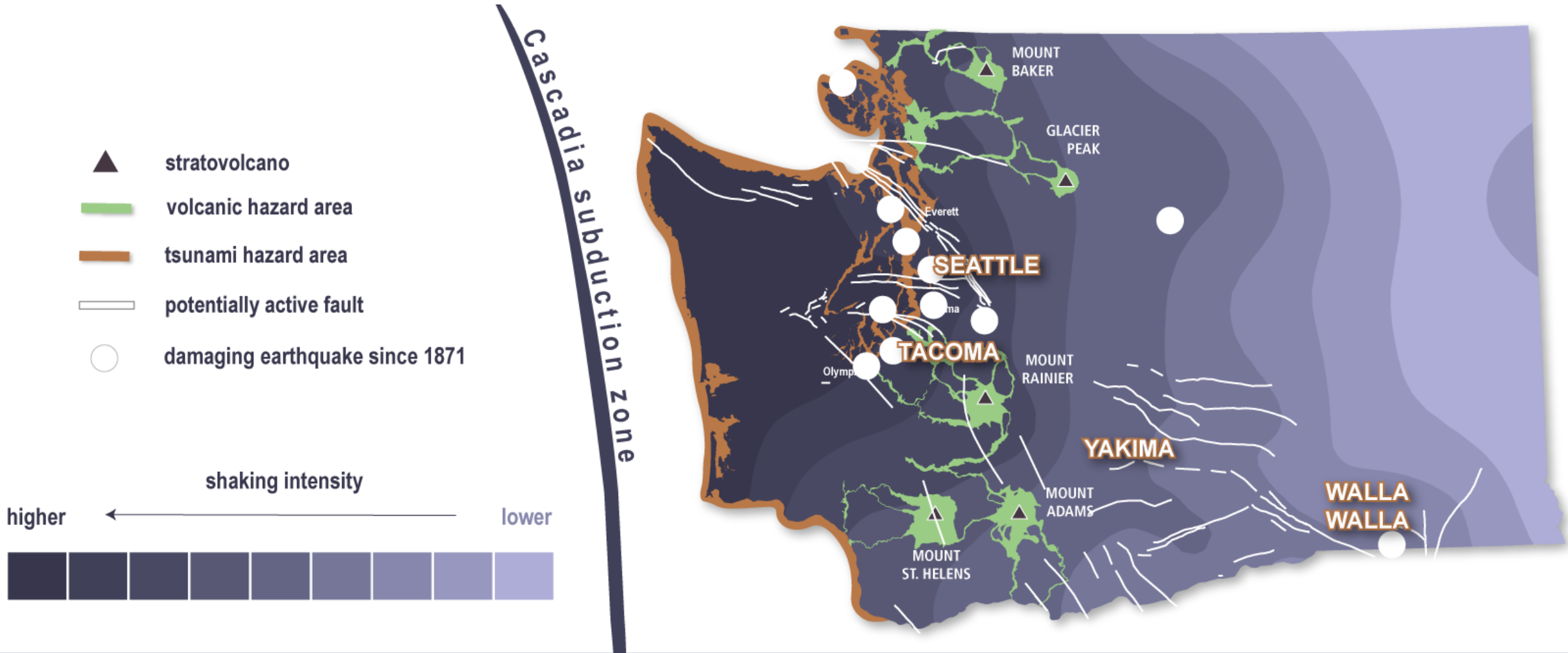
Uses geologic mapping, subsurface data, materials testing, and mine information

Provides estimates location and quality of sand and gravel

Ideally used by local jurisdictions in mineral lands designations

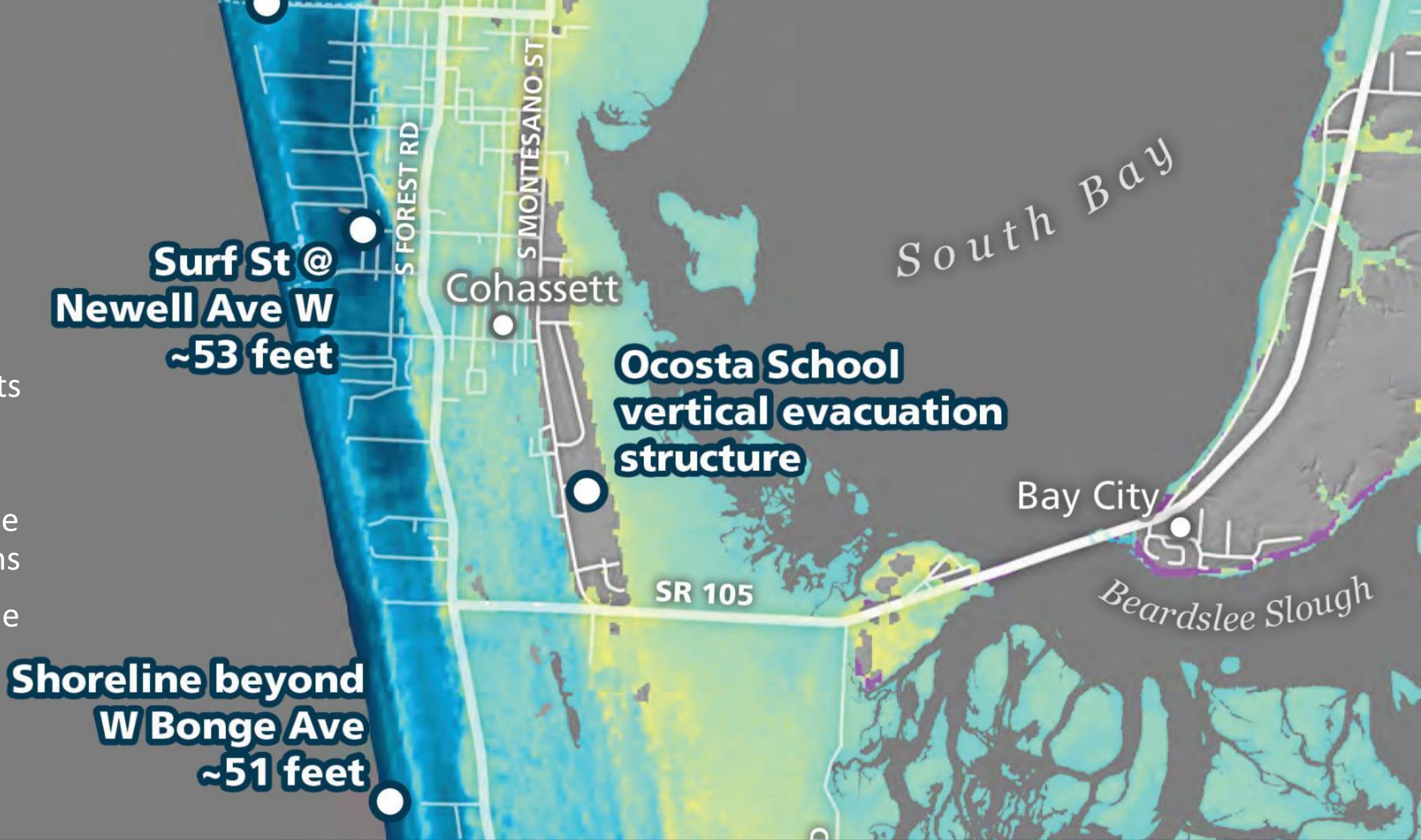


Geologic Hazards Program



Tsunami Hazards

- WGS models tsunami inundation on land and in ports
- Assists emergency managers devise evacuation plans
- Data informs the Washington State Building Code

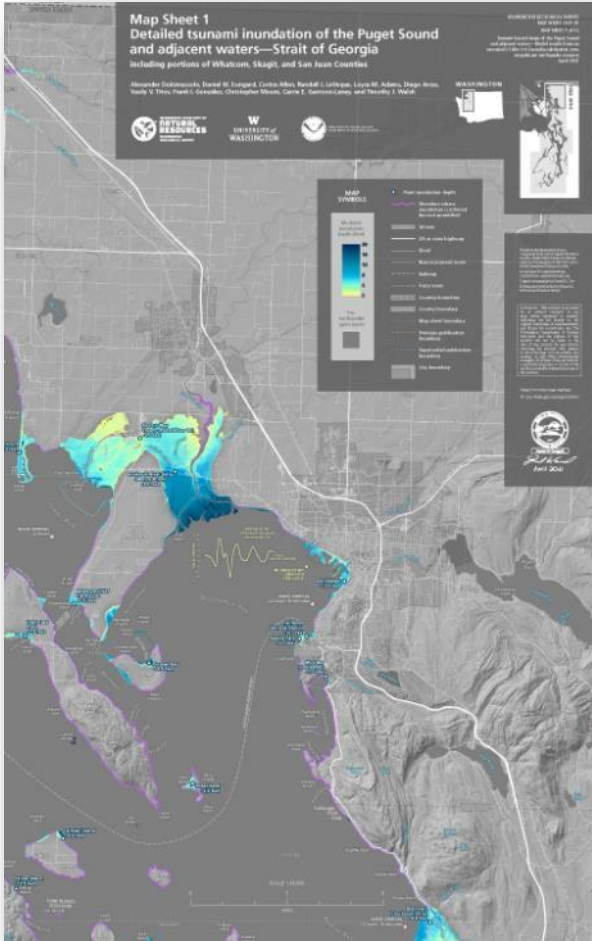


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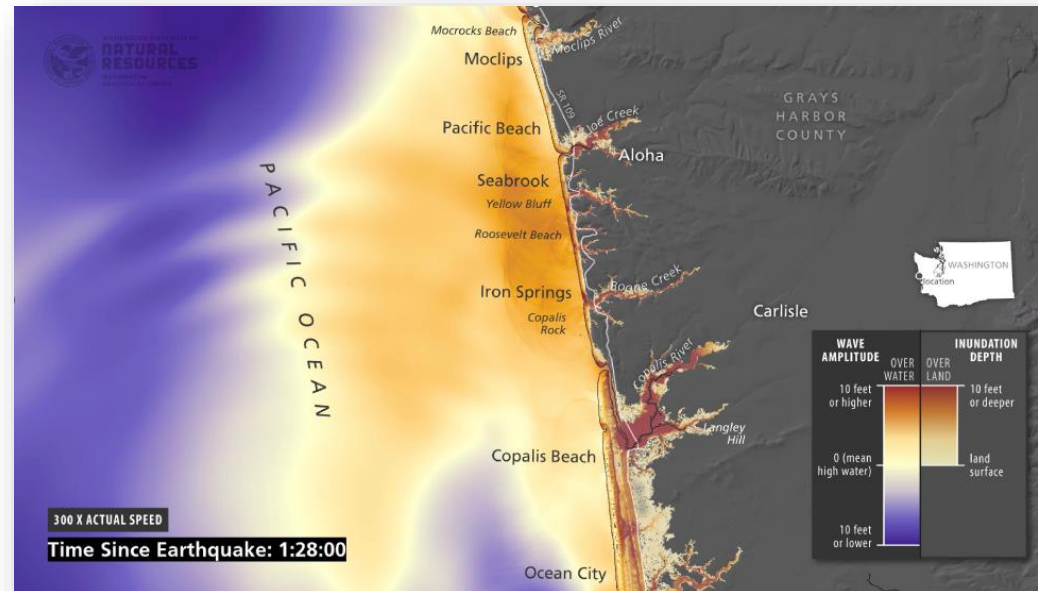
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Tsunami Hazard Assessments

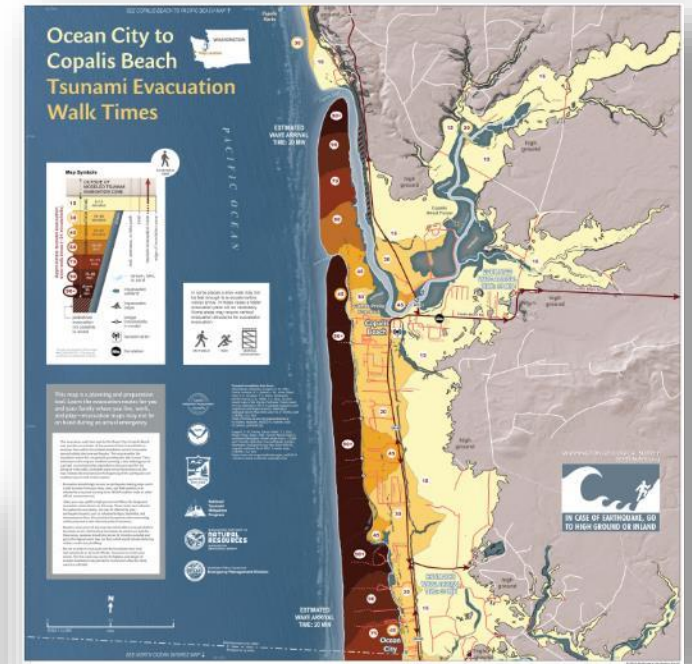


Tsunami Products

Tsunami Simulations



Tsunami Walk Maps



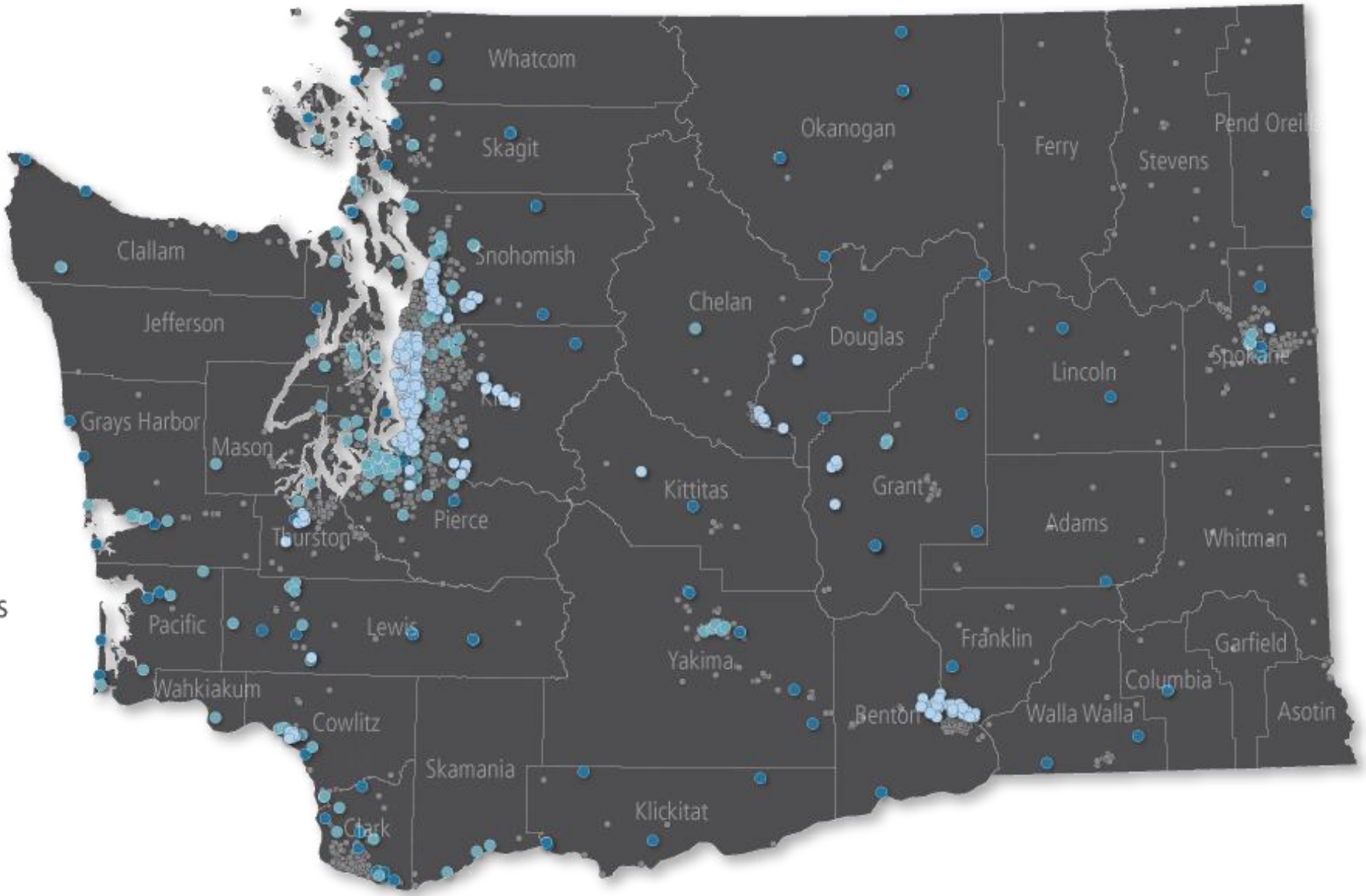
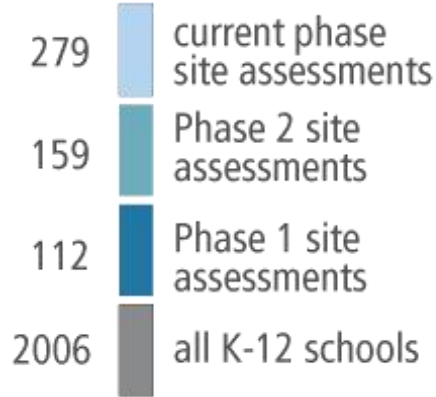
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School Seismic Safety Project



Landslide Hazards Program

- Landslides are the most frequent geologic hazard in Washington
- Largely driven by steep slopes and high precipitation

- Program focused on inventorying and mapping landslides
 - Provides emergency response
 - Additional attention on wildfire-affected communities

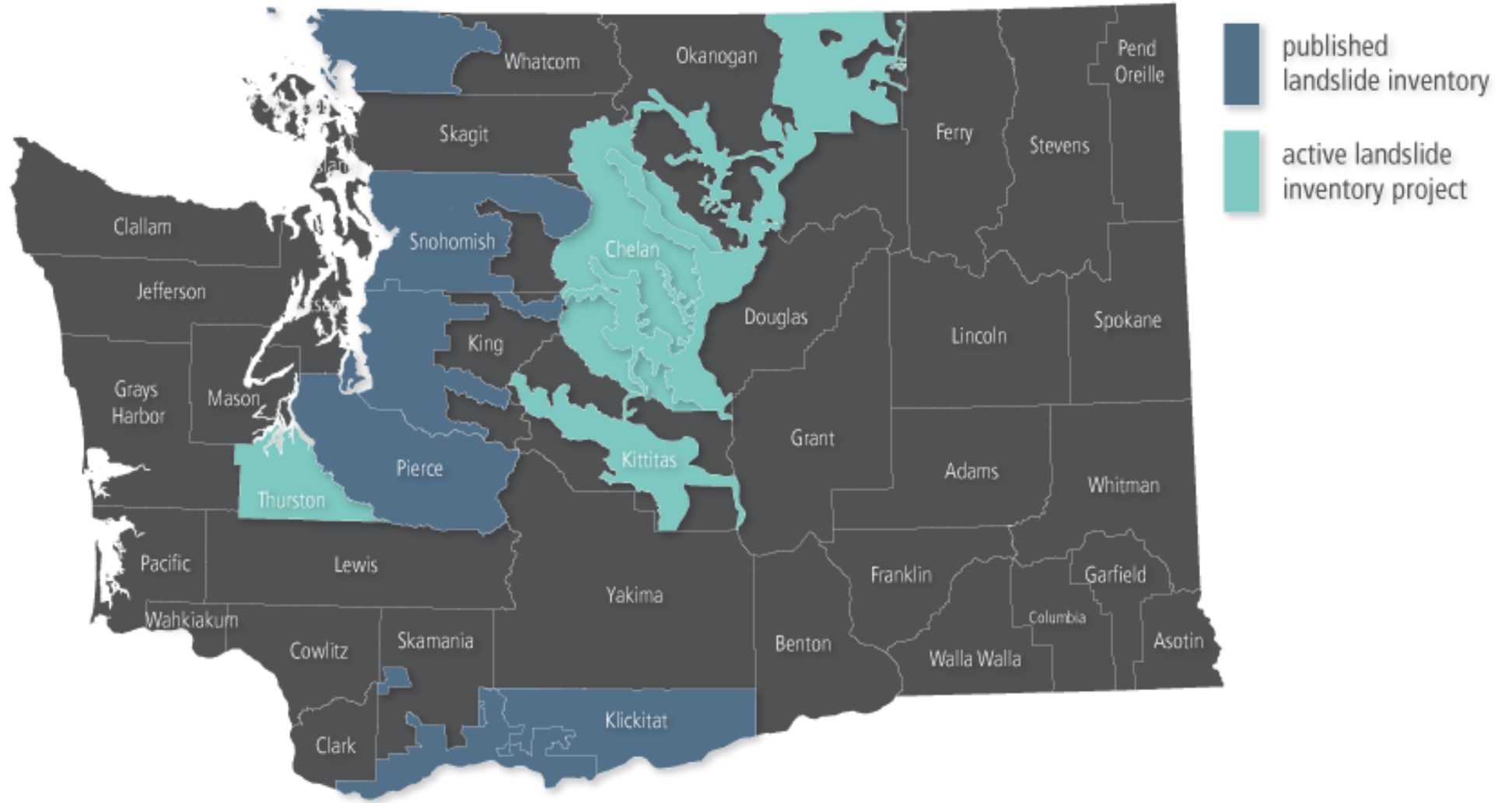


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Landslide Hazard Group Projects

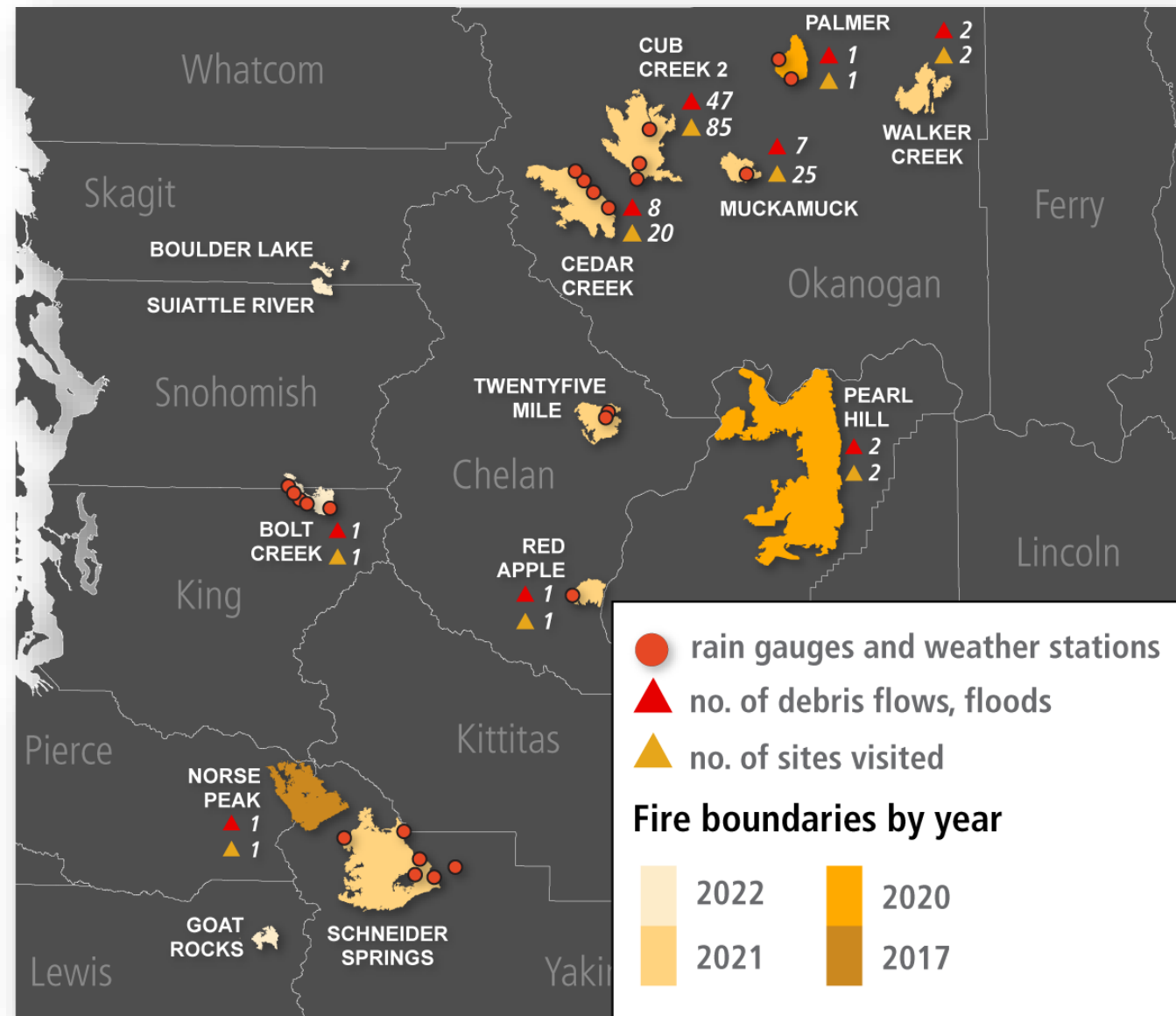


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Post-Fire Debris Flow Hazards



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GEOSCIENCE & DATA MANAGEMENT PROGRAMS



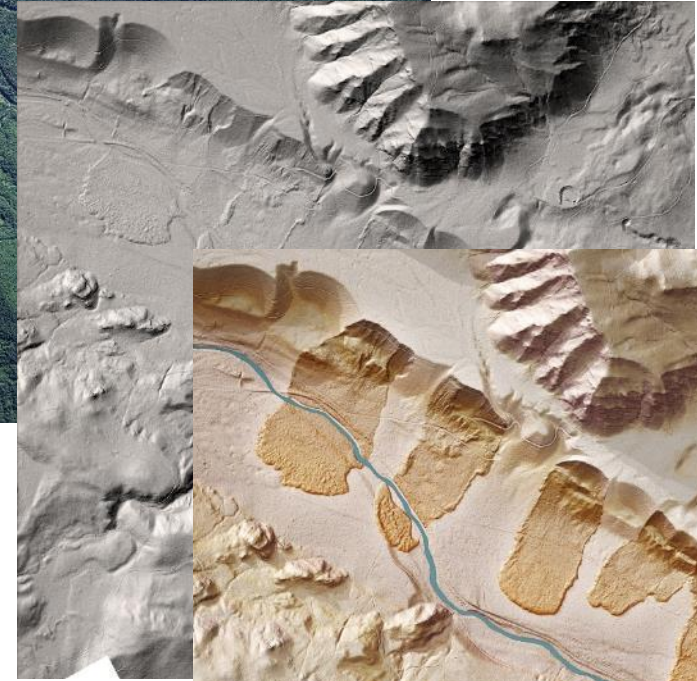
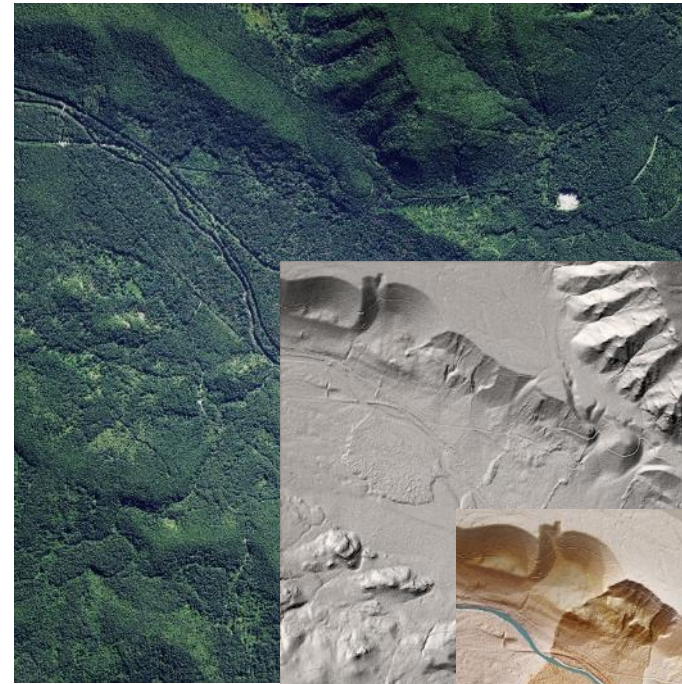
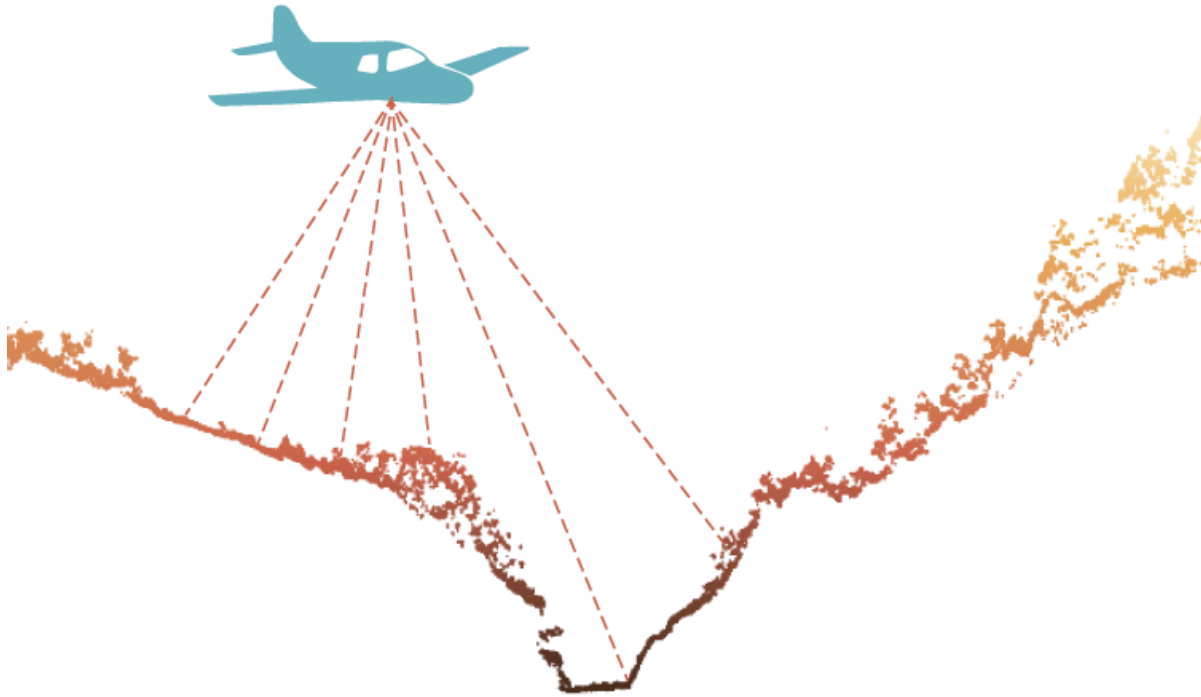
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Lidar Program

Lidar is a technology that collects high-resolution topographic information of the Earth's surface, and can see through Washington's dense vegetation to the bare earth.



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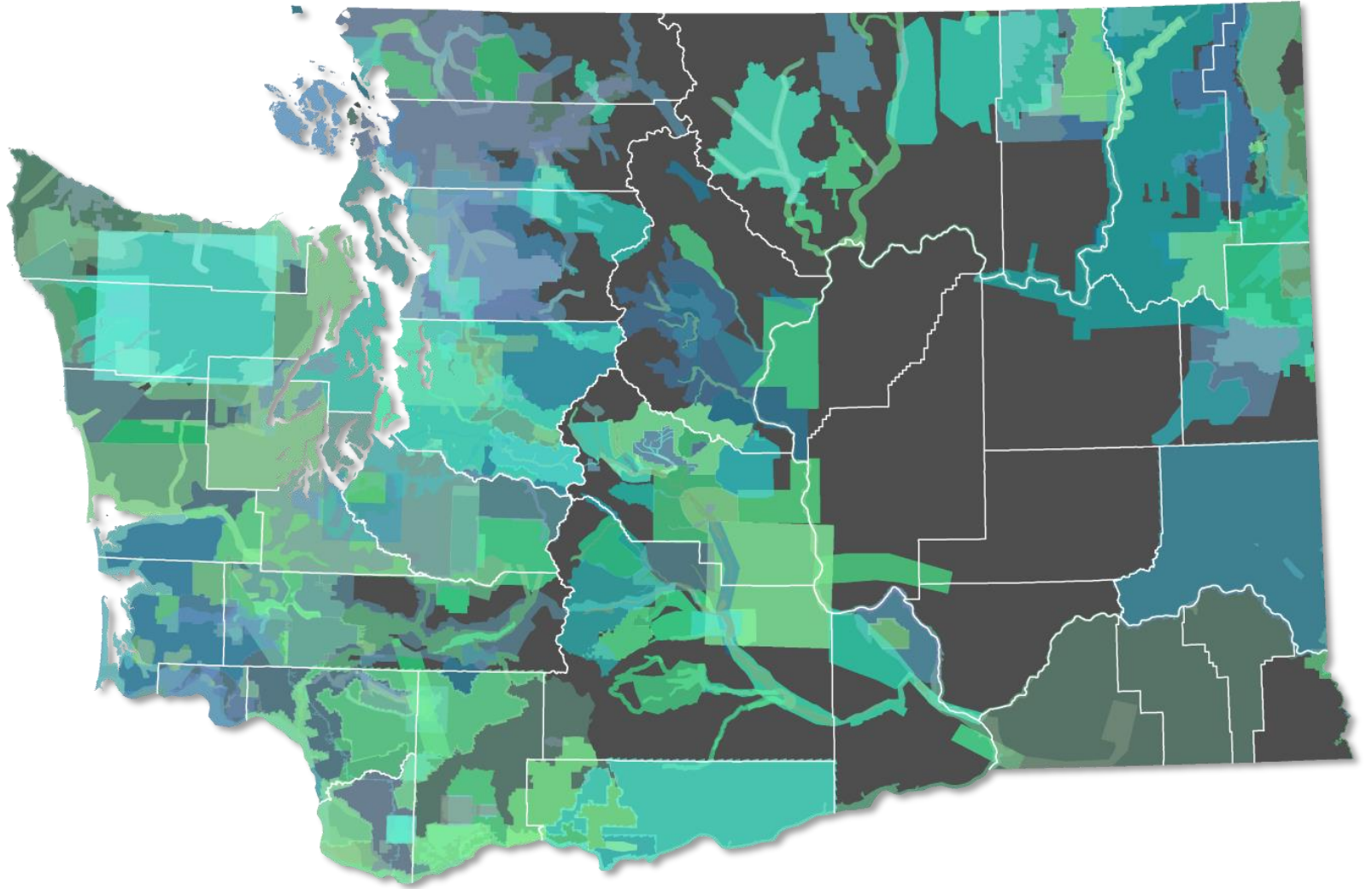
Lidar Program

Used for:

- All geologic hazard mapping
- Forest health
- Flood mapping
- Shoreline mapping
- Agriculture
- Etc.

WGS has its own master contract for lidar

All of the data is publicly available on WGS's Lidar Portal



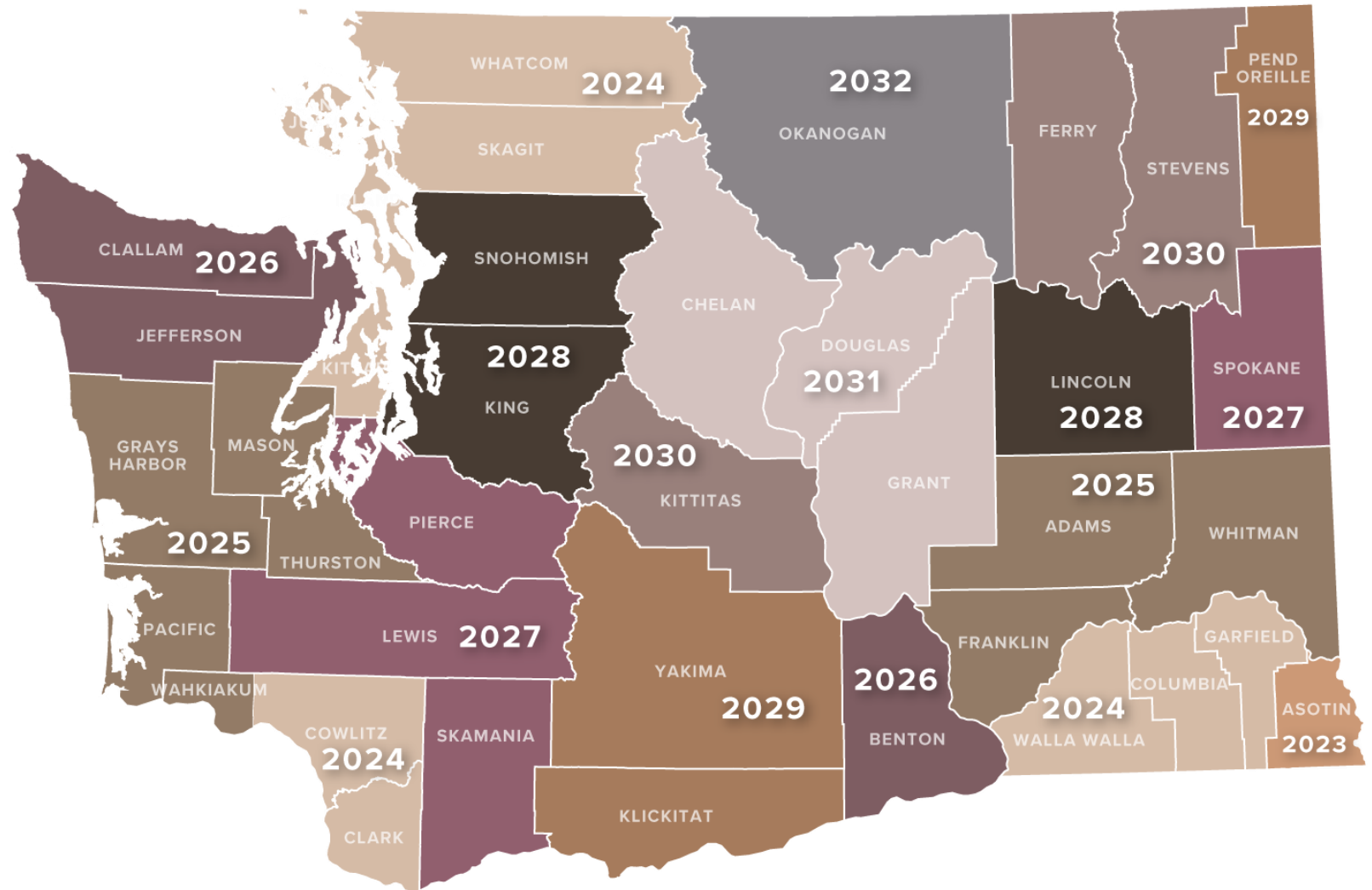
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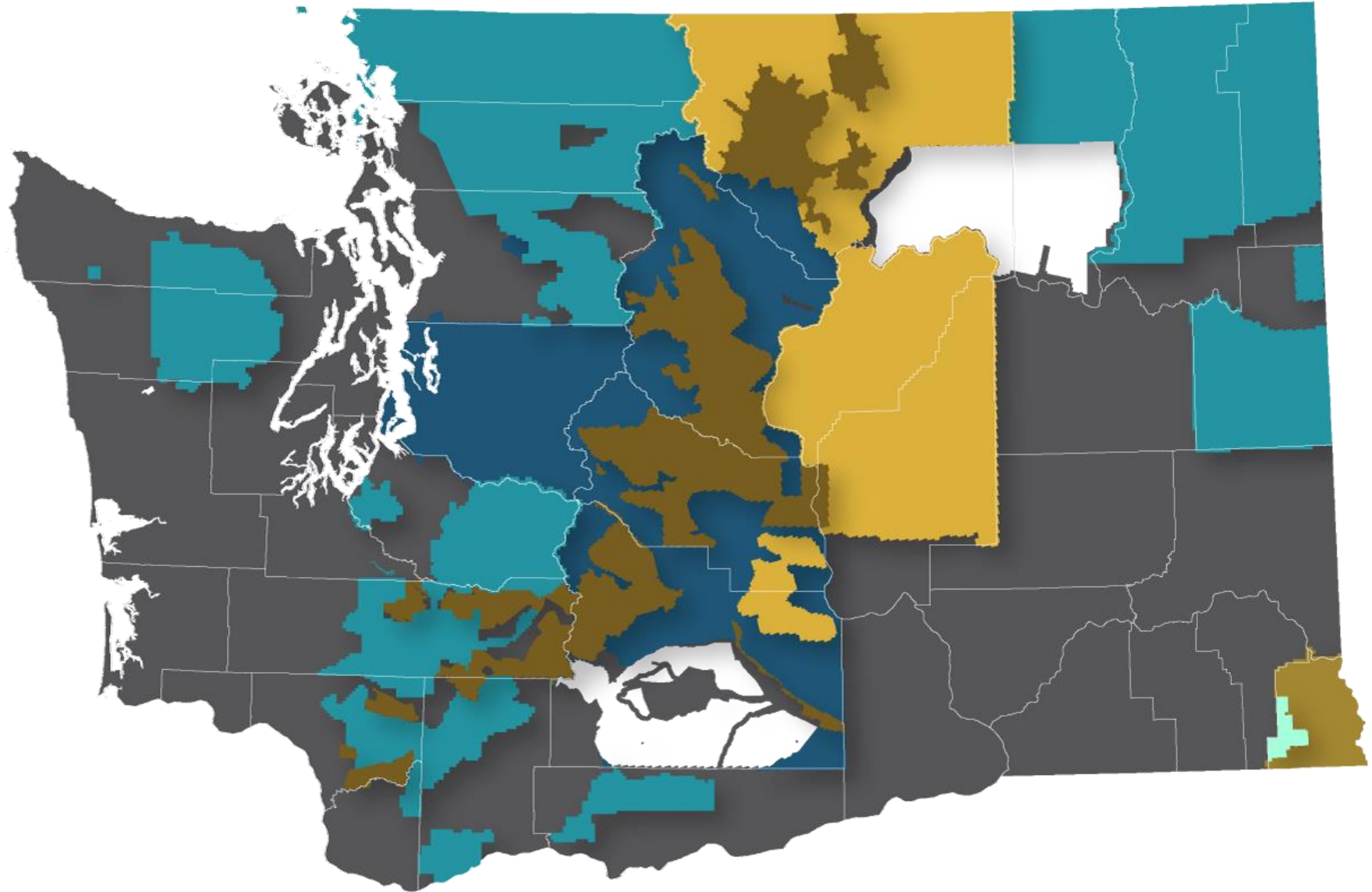
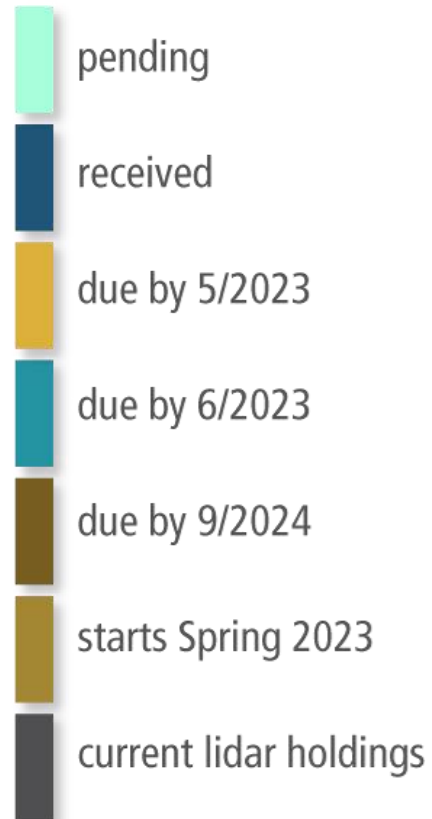
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The Future of Lidar Refresh in Washington

- 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

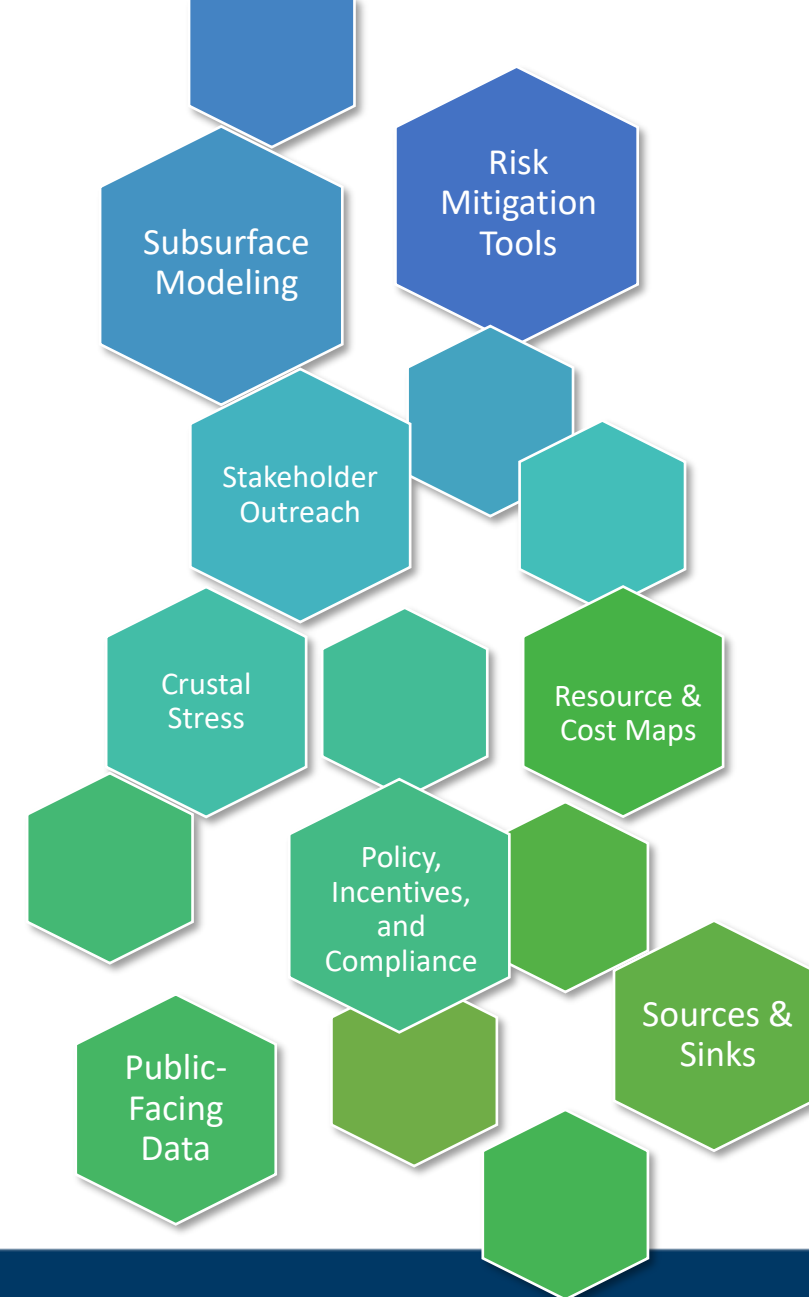
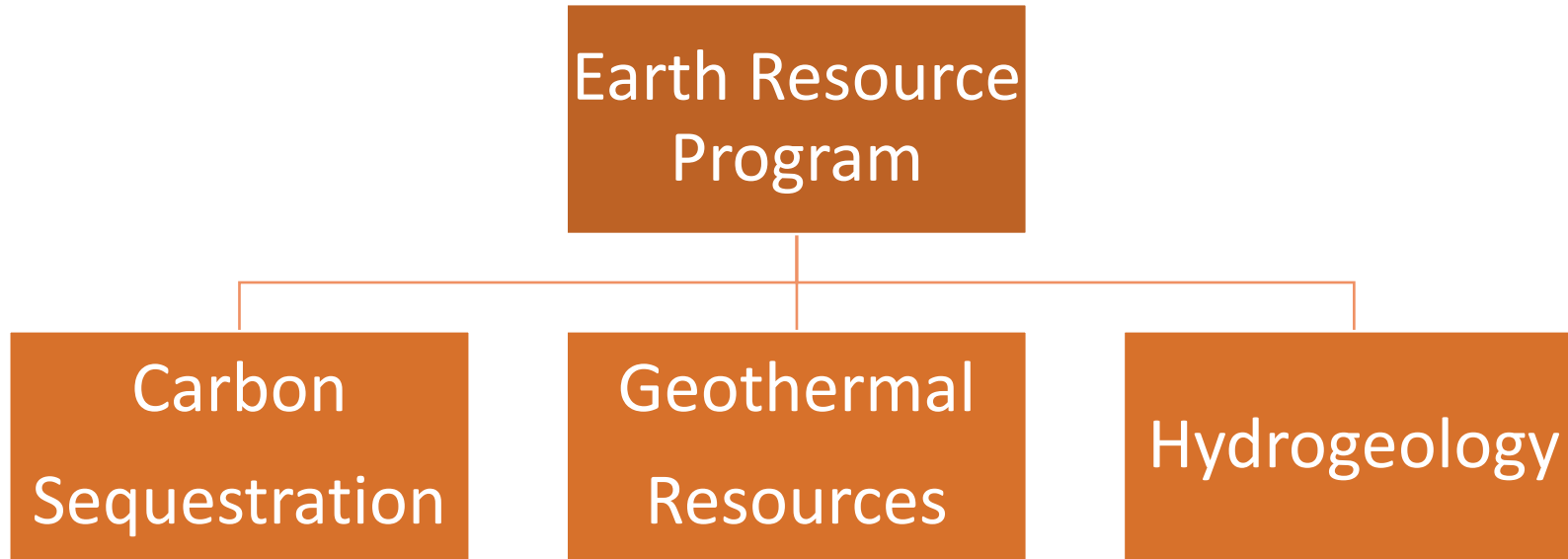


New and In-Progress



Earth Resource Program

- Science to support decision making
- Technical assistance



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Geothermal Resources

FOUR THINGS ARE NEEDED FOR GEOTHERMAL HEAT TO BE USEFUL TO HUMANS:

1. It must be hot enough to do the needed task

2. The heat must be able to move through fractures or other passageways

3. There must be fluid present, usually water, to conduct the heat

4. The heat must be accessible (shallow and safe to access)

HEAT SOURCE

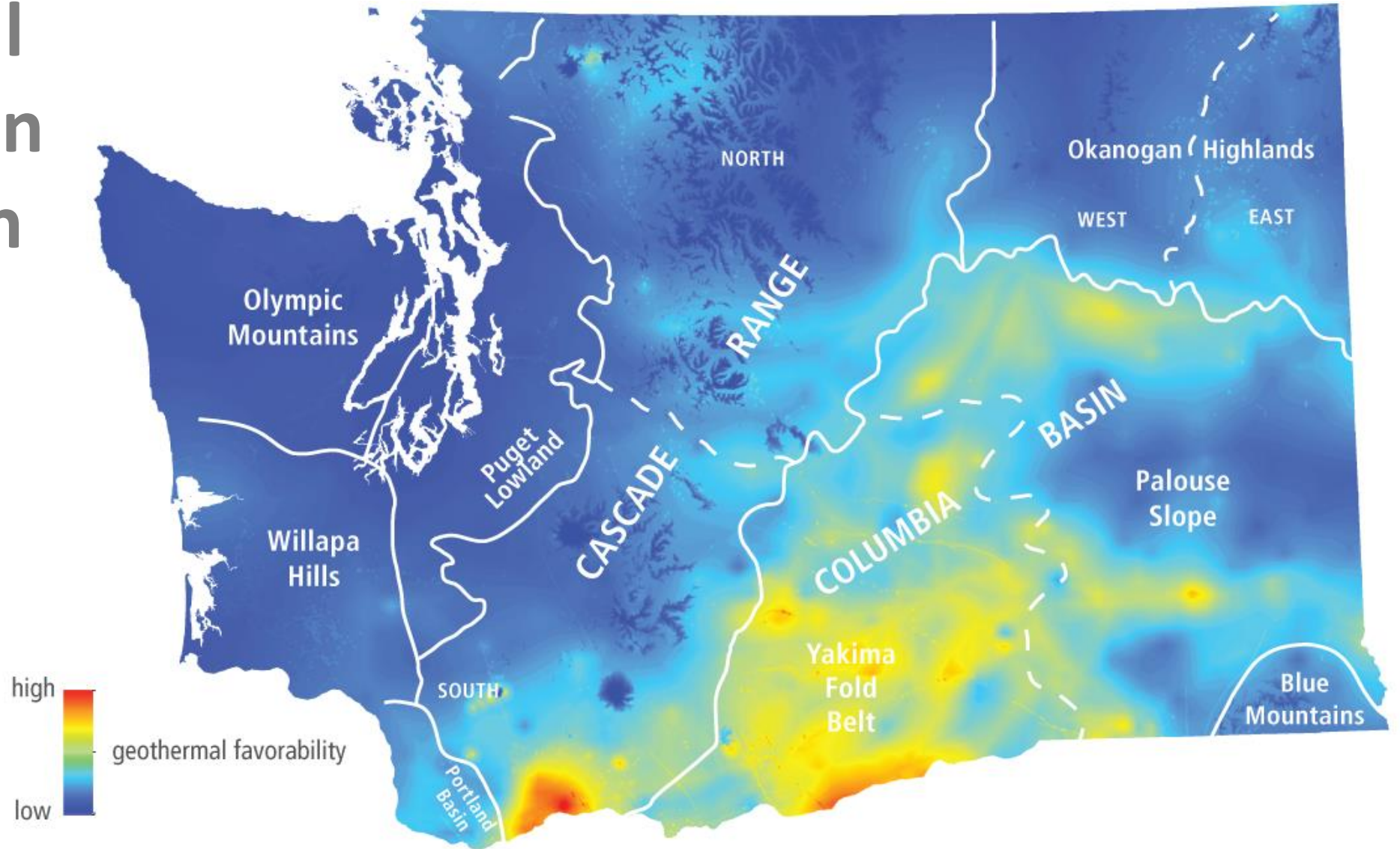


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Geothermal Resources In Washington

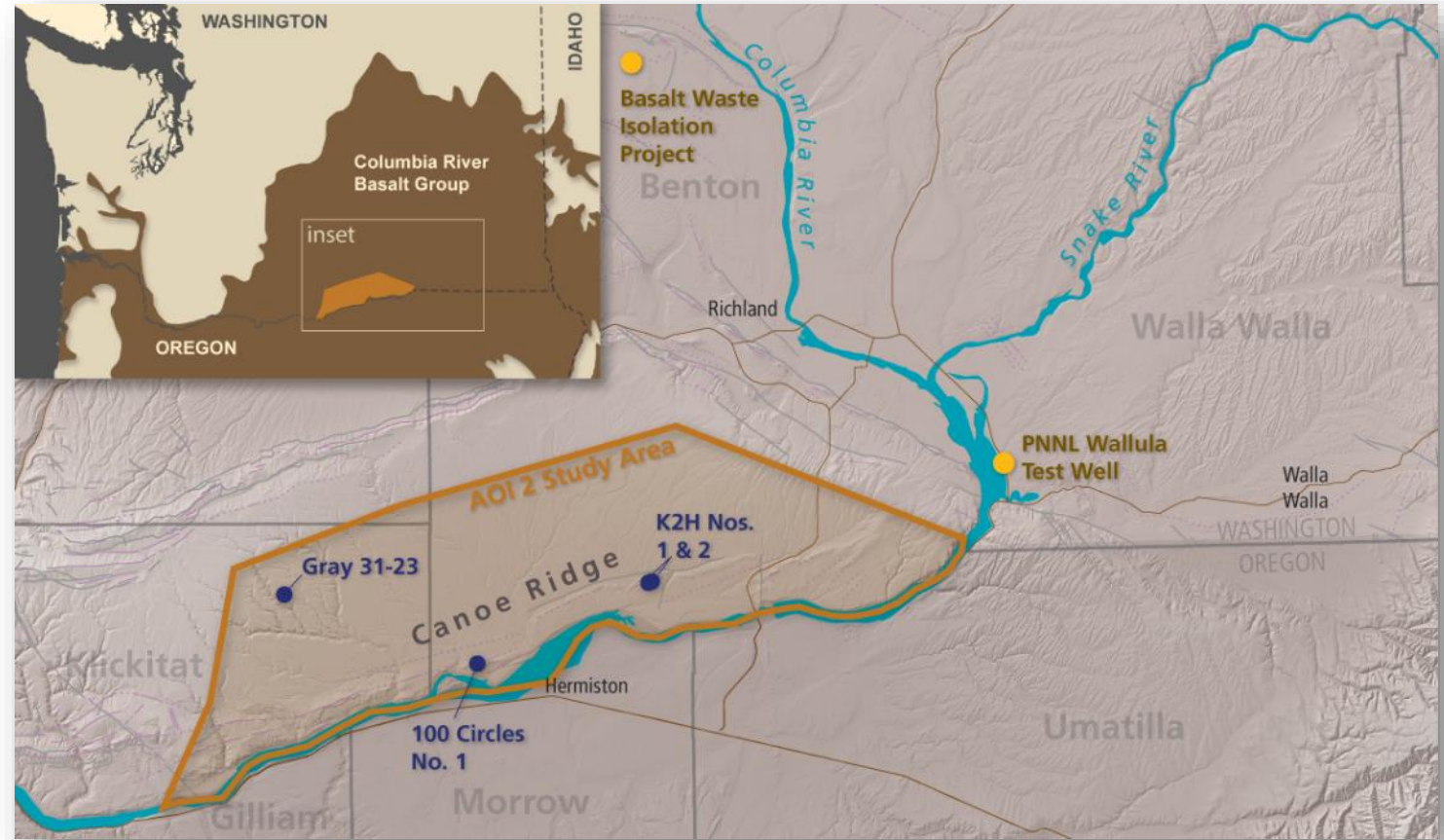
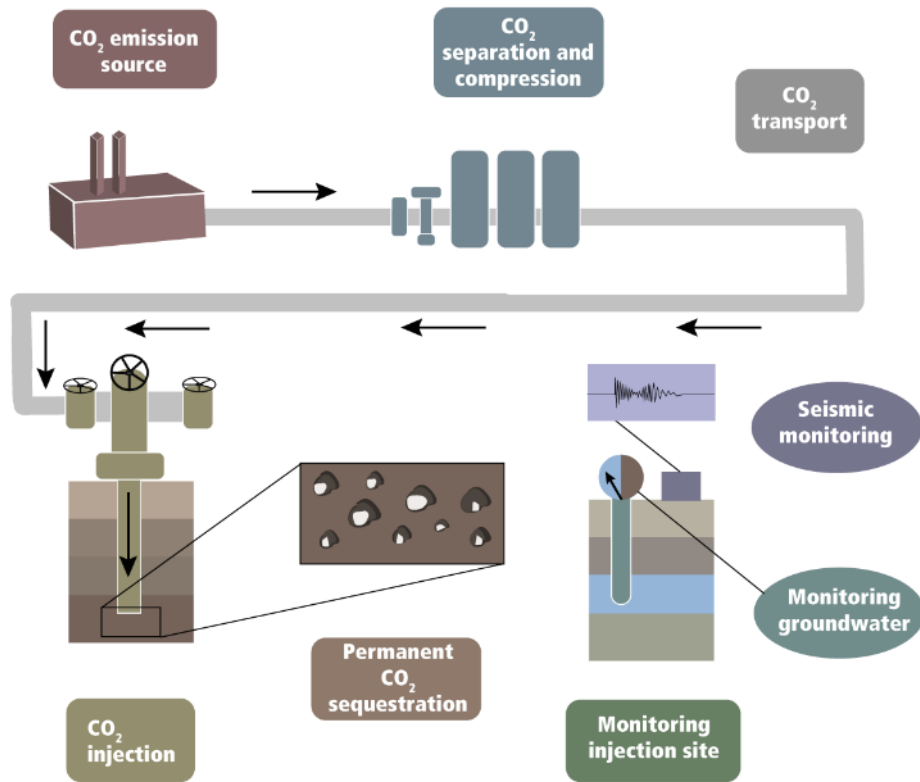


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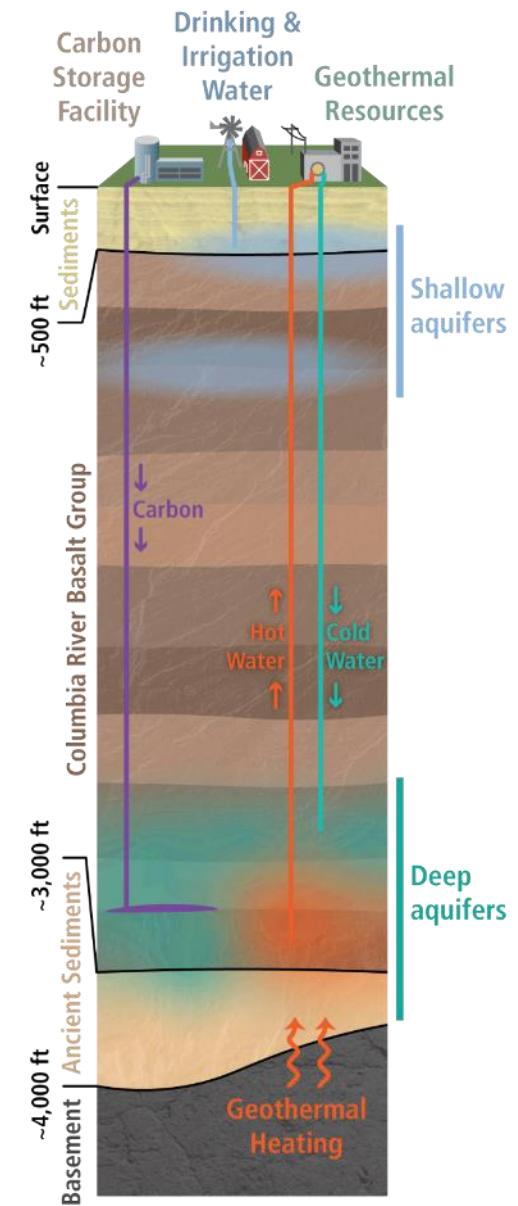
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Geologic Carbon Sequestration



Geologic Carbon Sequestration



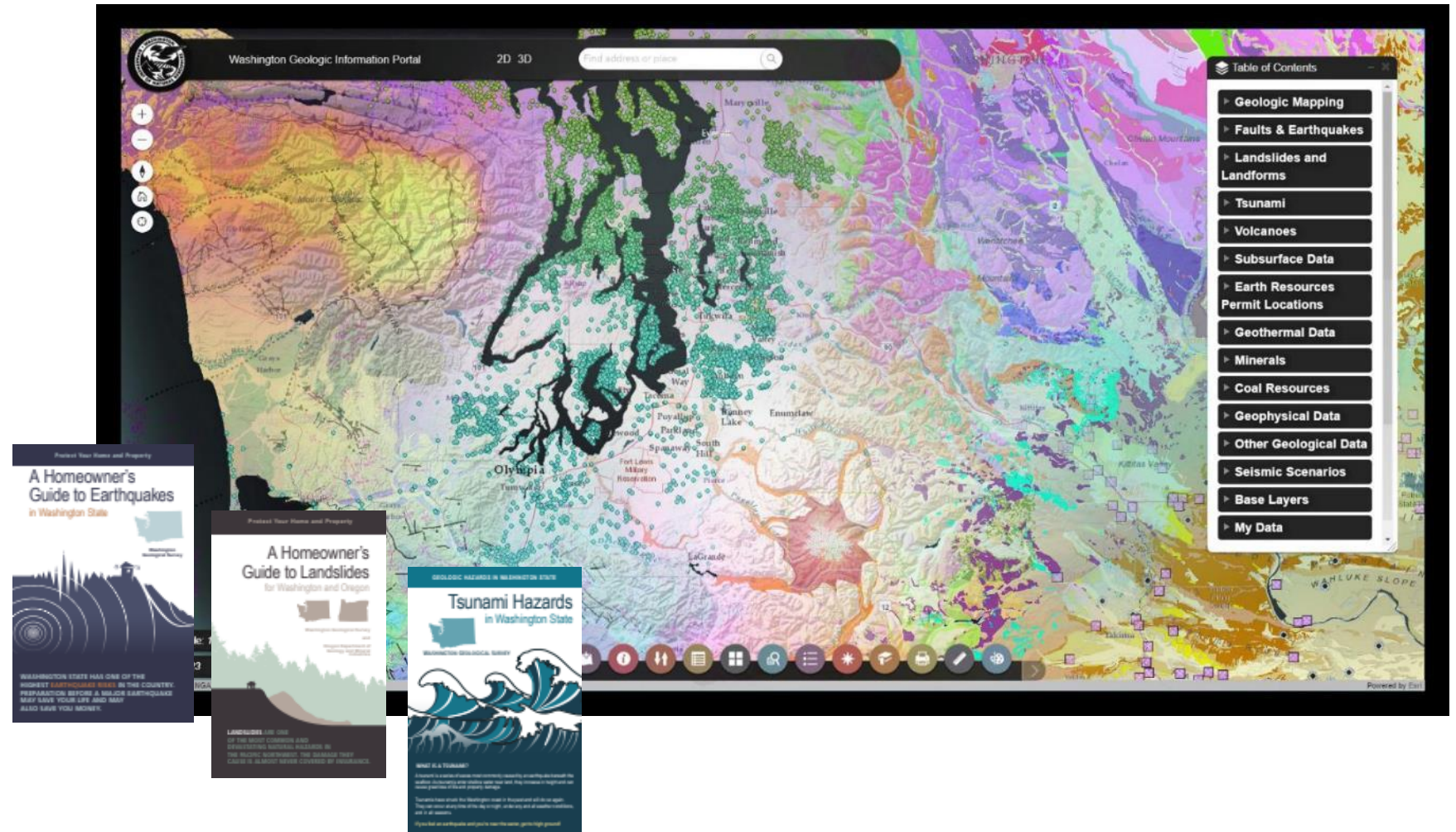
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GIS, Editing & Publications

- Publications that distribute science to the public
- ~30 GIS datasets
- Geologic Information Portal
- Outreach materials
- ~60 webpages



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Geologic Planning

Engagement with cities, counties, other state agencies, and tribes to exchange information, to gather feedback and to aid in understanding of our products

Guidance on

- Critical Areas: geologically hazardous areas
- Comprehensive plan and development regulations
- Mineral Resource Land designations

Assistance in statewide climate resilience efforts



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Where Does WGS Contribute?

Critical Areas and Land Use:

- **Geologically Hazardous Areas (WAC 365.190.120)**
 - Erosion
 - Landslide Hazards
 - Seismic Hazards (includes tsunamis)
 - Areas subject to other geological events such as coal mine hazards and volcanic hazards including: mass wasting, debris flows, rock falls, and differential settlement.
- **Mineral Resource Lands (WAC 365.190.070)**
 - Sand, gravel, and metallic mineral resources

Climate Commitment Act Implementation



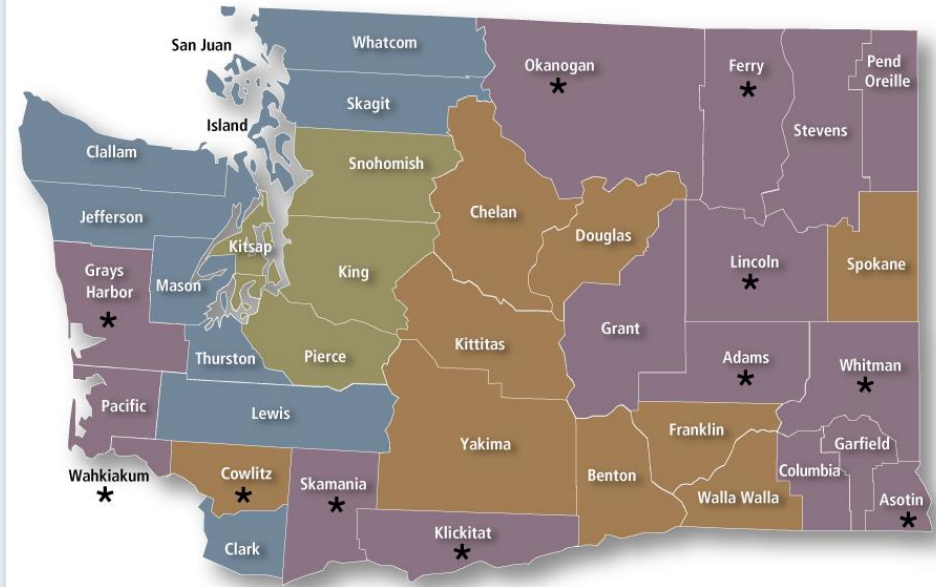
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Critical Areas and Land Use:

WAC 365-196-830 Protection of critical areas, states the GMA “requires the designation of critical areas and the adoption of regulations for the protection of such areas by all counties and cities, including those that do not plan under RCW 36.70A.040.”

The map shows the current comprehensive plan periodic update schedule for the counties and cities.

Growth Management Services Periodic Update Schedule - RCW 36.70A.130



Periodic Update Schedule

| | | | |
|---------------|-----------|-----------|-----------|
| December 2024 | June 2025 | June 2026 | June 2027 |
|---------------|-----------|-----------|-----------|

* Starred counties are partially planning under the Growth Management Act



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Critical Areas and Land Use:

GMA requires all critical areas be designated, and their functions and values protected using the best available scientific information—aka best available science (WAC 365-195).

WAC 365-190-120(4) states counties and cities should assess the risks and classify geologically hazardous areas as either:

- (a) Known or suspected risk;
- (b) No known risk; or
- (c) Risk unknown - data are not available to determine the presence or absence of risk.



Geologic Planning

Mineral Resource Lands and Climate Commitment Act Implementation

Mineral Resource Lands (WAC 365.190.070)

- Sand, gravel, and metallic mineral resources

Climate Commitment Act Implementation

- Caps and reduces greenhouse gas emissions
- Puts environmental justice and equity at the center of climate policy
- Assistance to local jurisdictions on integrating climate change information



DID YOU KNOW?

The 2021 Climate Commitment Act requires that Washington reduce its carbon emissions by 95% by 2050.



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Geologic Planning

How Can We Help You?

- Provide the best available science for geologic hazards.
- Discuss the appropriate uses of our data and maps.
- Provide communication tools for local outreach about WGS science.
- Provide examples of codes and tools used by other jurisdictions.
- Review land-use codes related to geologic hazards.
- Assist with GMA periodic updates.
- Give us feedback on your needs and concerns



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Geologic Planning

A Sample of Active Projects

- Aggregate resource mapping for Spokane County
- Landslide inventory of Thurston County
- Climate guidance and rulemaking

Resources

- Geologic Planning page [Geologic Planning | WA - DNR](#)
- Fact sheets: Aggregate Resources Mapping, Landslide Hazards Mapping, Geologic Planning
- Geologic Information Portal [Geologic Information Portal | WA - DNR](#)

Aggregate Resource Mapping in Washington

WHAT IS CONSTRUCTION AGGREGATE?
Aggregate is a sand, gravel, or crushed stone. It is important to know where it is located and how much is available. It is used for roads, bridges, and other infrastructure.

AGGREGATE RESOURCE PLANNING
Planning for aggregate needs and use is required under Revised Code of Washington (RCW) 26.03A.020 and Washington Administrative Code (WAC) 26.03A.020. These RCW and WAC were established as part of the Growth Management Act (GMA). The GMA requires each county and city of the state periodically update its comprehensive plan and development regulations. The aggregate resource planning is a key component of this process.

How can our aggregate resource mapping help your jurisdiction's land-use planning?
The Washington Geological Survey (WGS) and DNR are leading the way in mapping aggregate resources in Washington. This information can help you understand the location and quantity of aggregate resources in your area. It can also help you identify areas where aggregate resources are scarce and where you may need to consider alternative sources.

What does aggregate resource mapping NOT do?
The aggregate resource mapping does not determine the location and quantity of aggregate resources in your area. It only provides information on the location and quantity of aggregate resources in the state.

OUR AGGREGATE MAPPING PROCESS
Using several input datasets, we identify aggregate resource areas as either "concentrated" or "disseminated". These designations help you understand the location and quantity of aggregate resources in your area. It can also help you identify areas where aggregate resources are scarce and where you may need to consider alternative sources.

Input Data: mapping data, materials listing of samples, existing geologic mapping, surface data

Aggregate Resource Map: Inferred Resource, Active Resource, Dispersed Resource

Analysis Result

Landslide Hazard Mapping in Washington

WHAT IS A LANDSLIDE?
A landslide is a sudden movement of soil, rock, or debris down a slope. It can be caused by natural factors like heavy rain or snowmelt, or by human activities like construction or deforestation.

Why is a landslide hazard map important?
A landslide hazard map shows areas that are at risk of landslides. This information is important for planning and development. It can help you identify areas where landslides are likely to occur and where you may need to take precautions.

How are landslide hazard maps created?
Landslide hazard maps are created by analyzing data on landslides, geology, and other factors. This information is used to identify areas that are at risk of landslides and to assign hazard levels to those areas.

How are landslide hazard maps used?
Landslide hazard maps are used for a variety of purposes, including planning and development, emergency response, and public education. They can help you understand the location and extent of landslide hazards in your area.

Geologic Planning in Washington

WHAT IS GEOLOGIC PLANNING?
Geologic planning is the process of identifying and evaluating geologic hazards and resources. It is an important part of land-use planning and development. It helps you understand the location and extent of geologic hazards and resources in your area.

Why is geologic planning important?
Geologic planning is important because it helps you understand the location and extent of geologic hazards and resources in your area. This information is important for planning and development. It can help you identify areas where geologic hazards are likely to occur and where you may need to take precautions.

How is geologic planning done?
Geologic planning is done by analyzing data on geologic hazards and resources. This information is used to identify areas that are at risk of geologic hazards and to assign hazard levels to those areas.

What are the most significant geologic hazards?
The most significant geologic hazards in Washington are landslides, earthquakes, and volcanic activity. These hazards can cause significant damage and loss of life. It is important to understand the location and extent of these hazards in your area.



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CONTACTS

Alexander N. Steely, PhD, LG (he/him)

Assistant State Geologist

Assistant Director of Geologic Hazards and Mapping

Washington Geological Survey

Cell: 360-999-0115

alex.steely@dnr.wa.gov

Tricia R. Sears (she/her/hers)

Geologic Planning Liaison

Washington Geological Survey (WGS)

Cell: 360-628-2867

tricia.sears@dnr.wa.gov

Thank you!



QUESTIONS?

OTHER STAFF CONTACTS

Jessica Czajkowski, Assistant State Geologist, and Assistant Director of Science and Research – jessica.czajkowski@dnr.wa.gov

Rian Skov, Surface Mine Reclamation Program—rian.skov@dnr.wa.gov

Corina Allen, Geologic Hazards—corina.allen@dnr.wa.gov

Kate Mickelson, Landslide Hazards—kate.mickelson.@dnr.wa.gov

Abby Gleason, Lidar Program—abigail.gleason@dnr.wa.gov

Susan Schnur, GIS, Editing, and Publications—susan.schnur@dnr.wa.gov

Lee Florea, Earth Resources Program—lee.florea@dnr.wa.gov