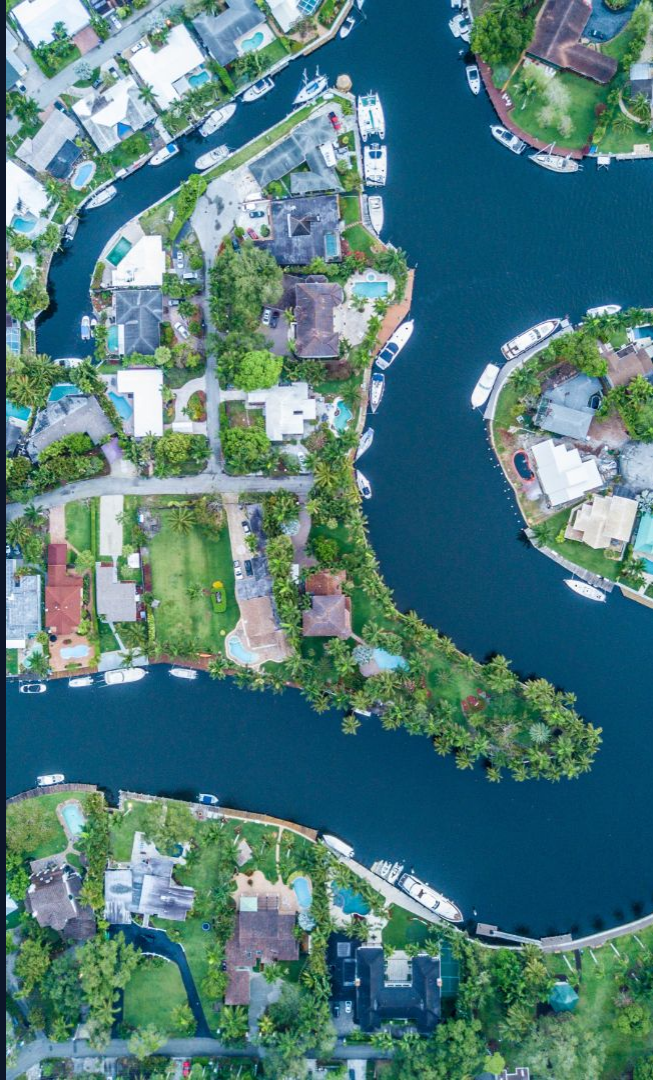
FORERUNNER

Mapping 45 Years of Flood Risk: Insights from Repetitive Loss Patterns across Washington State

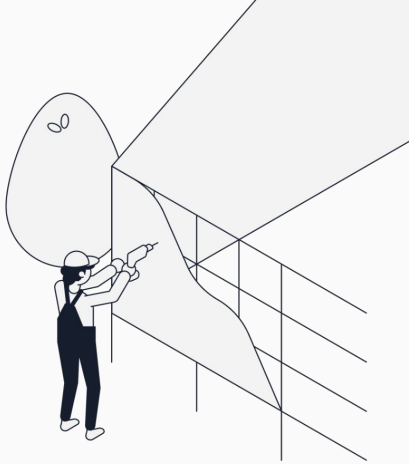
Kevin Zerbe | Hazard Analysis and Resilience Planning Supervisor - Washington Emergency Management Division
Susanna Pho, CFM | Co-Founder and COO - Forerunner

withforerunner.com



Housekeeping

- This presentation is being recorded.
- The recording will be shared via email after the webinar.
- If you have a question, please post it in the chat.
- At the end of the webinar, complete the attendance survey to receive your 1 ASFPM CEC and .10 ICC CEU. The certificates will be sent via email to you, ASFPM, and ICC next week.
- Please reach out after the webinar for additional questions.



Poll

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We work with over 180 of the most at-risk cities, counties, and states throughout the U.S.

FDEM
Florida

DWR
California

MEMA
Mississippi

Santa Barbara County
California

Concord
California

Maui County
Hawaii

Palm Beach County
Florida

Gila County
Arizona

Raleigh
North Carolina

Cottage Grove
Oregon

Cedar Rapids
Iowa

Las Cruces
New Mexico

Stockton
California

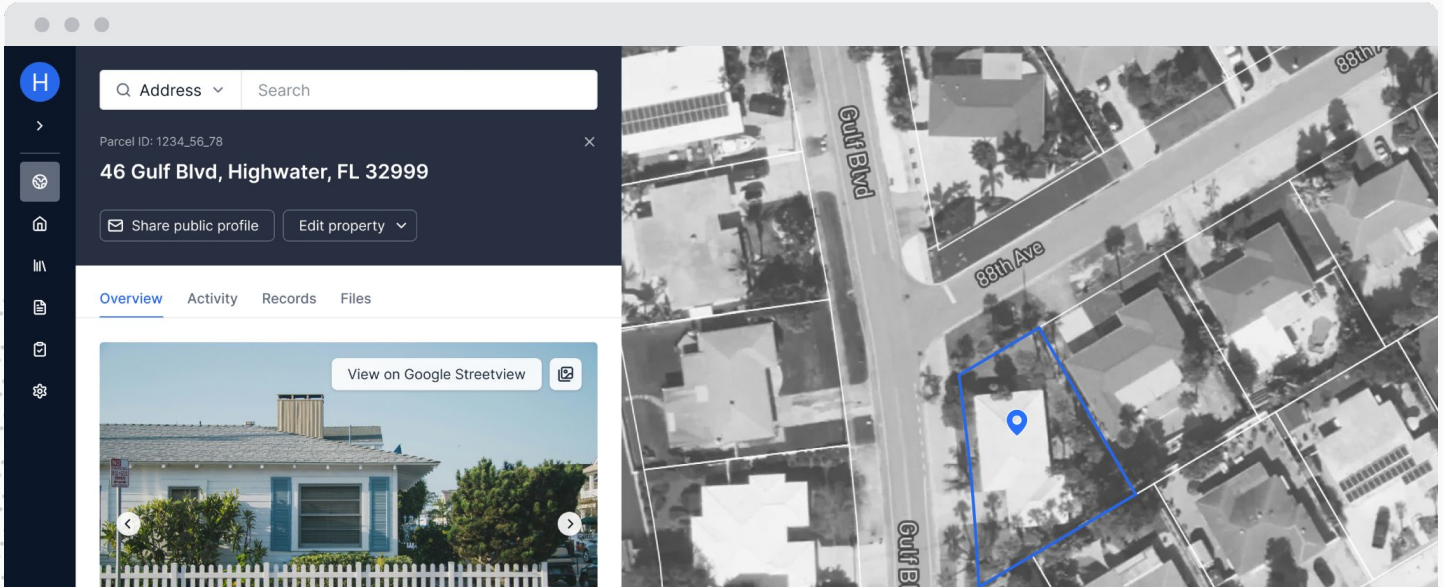
Lincoln
Nebraska

Orting
Washington

Tohono O'odham
Nation

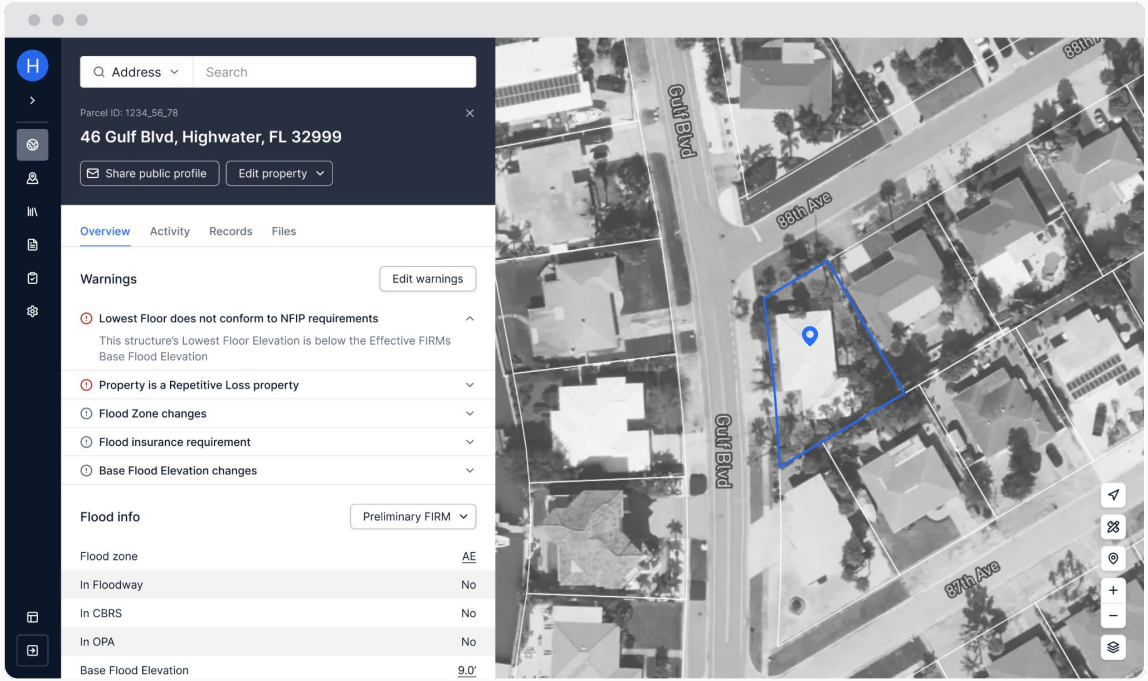
Our solution

Forerunner empowers gov. agencies to do more.

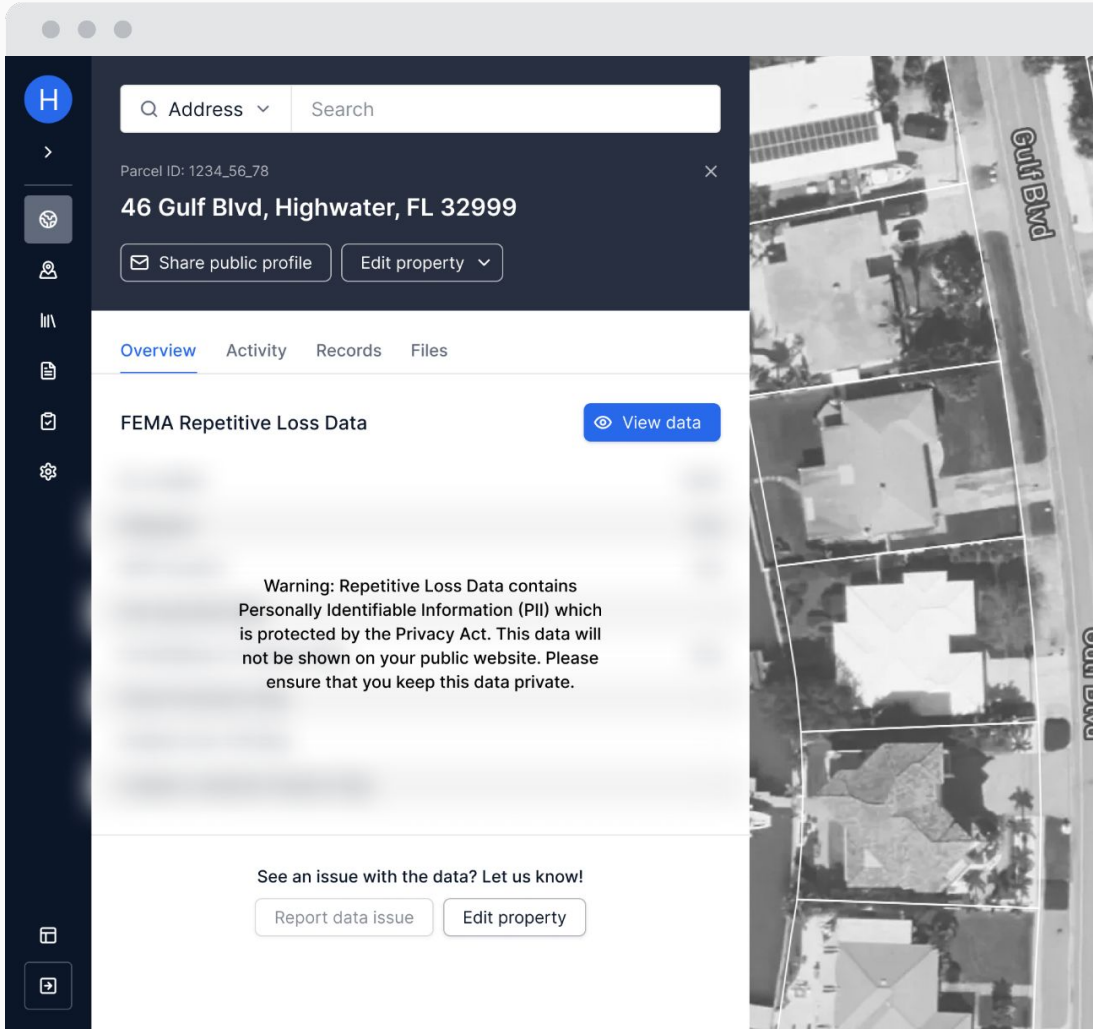


Geospatial dashboard delivers per-property insight.

- Parcel level information
- Property warnings
- FIRM information
- SI / SD tracking



Manage your Repetitive Loss Data.



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Kevin Zerbe

Hazard Analysis and Resilience Planning Supervisor
Washington Emergency Management Division

Analyzing repetitive flood losses in Washington State

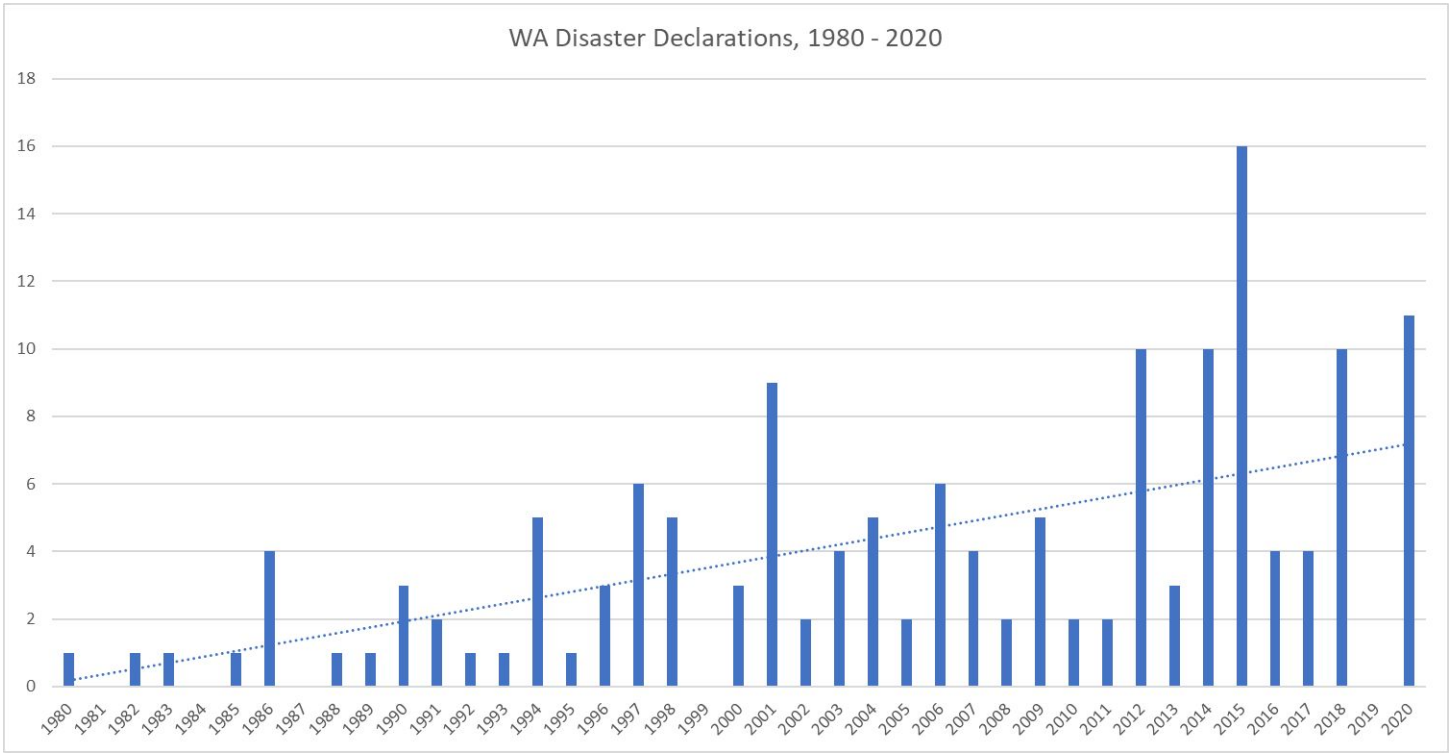
A spatiotemporal look at flood damage in Washington since 1977

Kevin Zerbe
Hazard Analysis & Resilience Planning
Washington Emergency Management Division

Hazard Analysis & Resilience Planning at EMD

- Understanding disaster risk is a **priority** for WA (RCW 38.52.590, EMAP)
- HARP's goal: provide a **scientific basis** for effective and data-driven decisions for **disaster resilience** in WA
- Our approach: develop and apply "**hazard indifferent**" risk assessment methodologies that improve our understanding of disaster risk – *where it is, what drives it, what reduces it*

Flooding is WA's most common natural hazard



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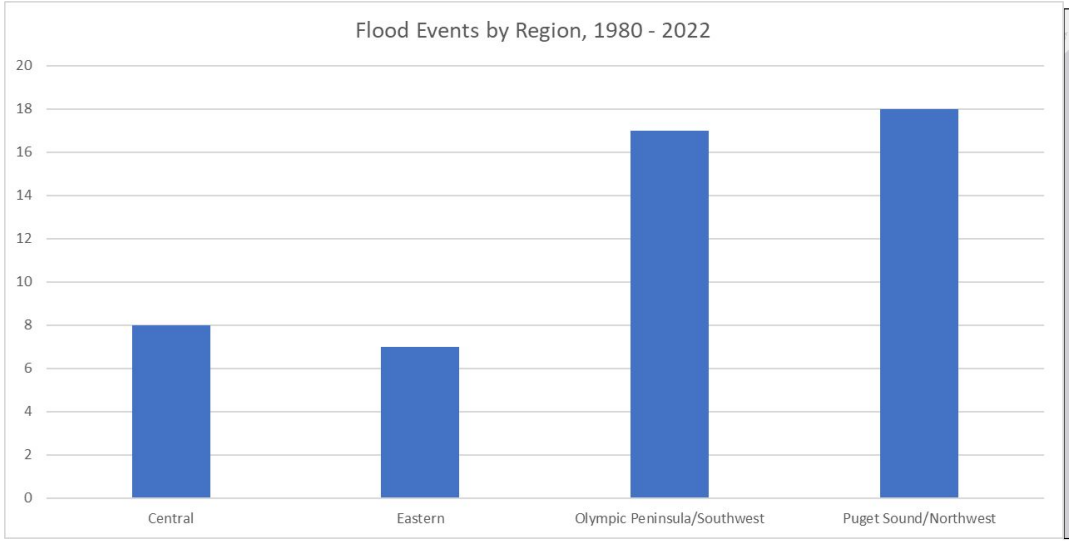

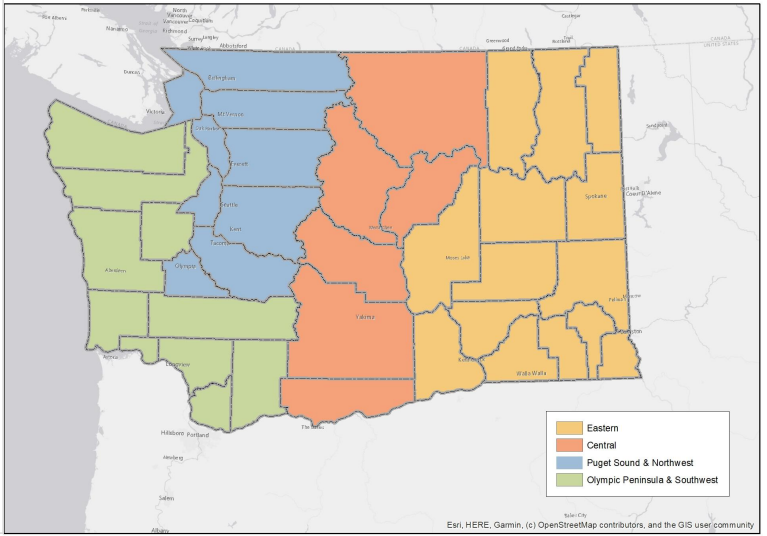

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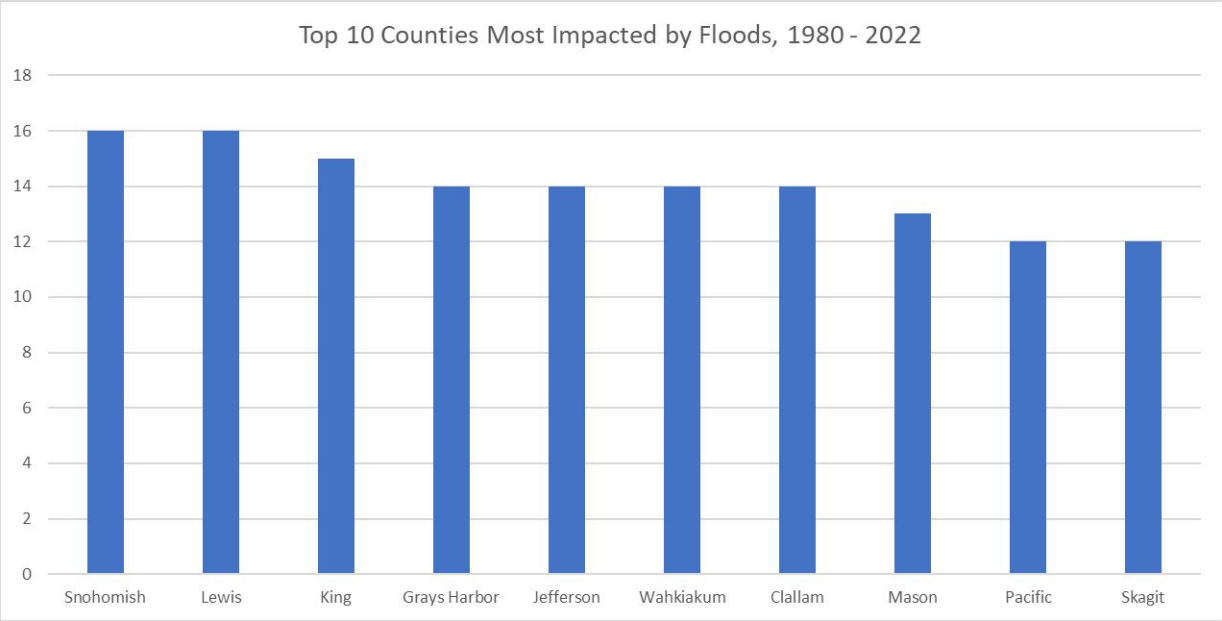
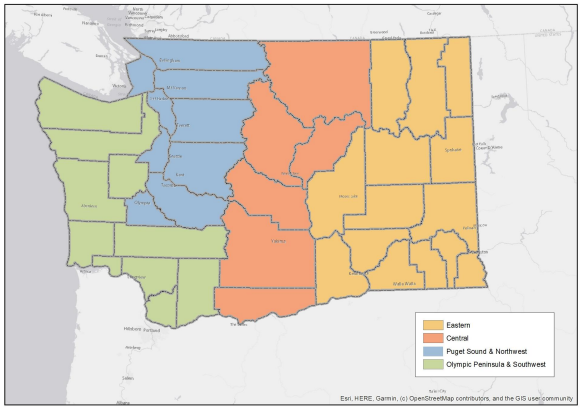
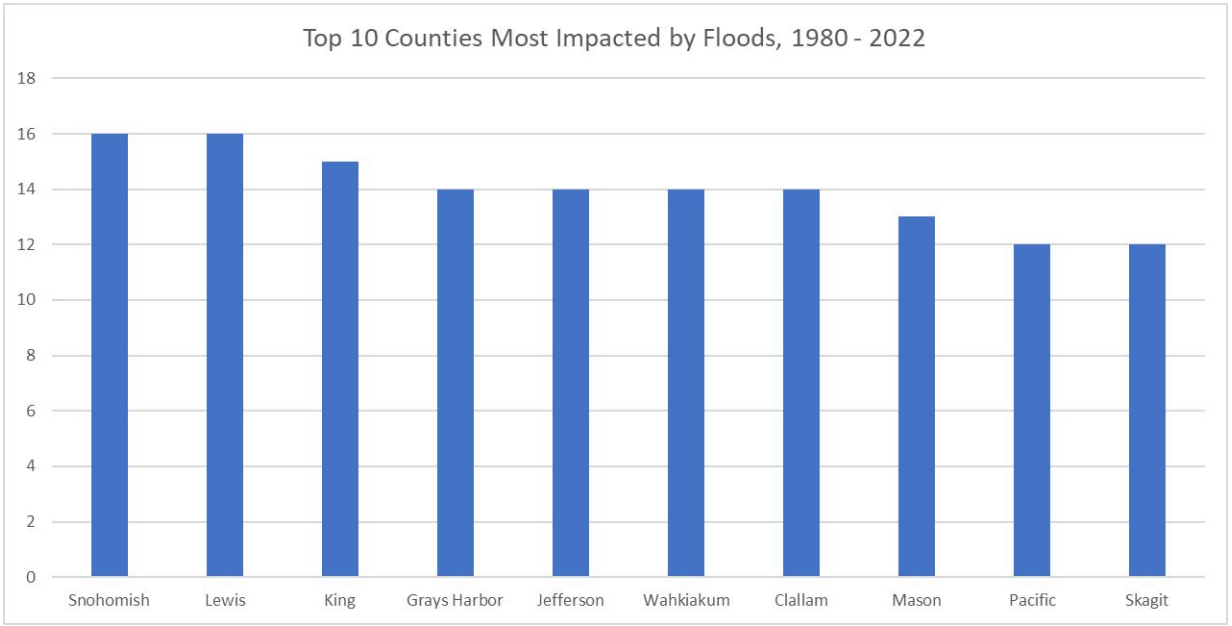
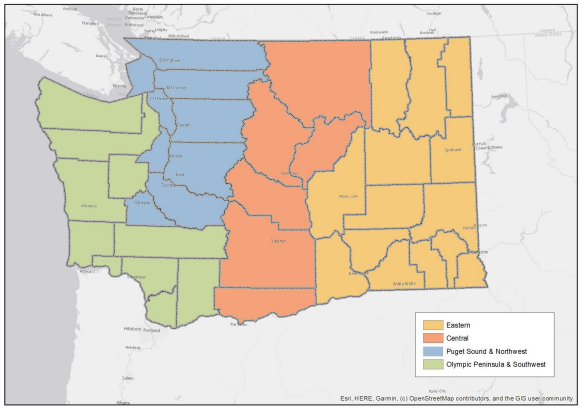




Flooding is western WA's most common natural hazard



Disaster declarations = federal damage thresholds surpassed



Past is prologue?

- Climatic changes and extreme events, along with increasing population growth and development in the state, are expected to exacerbate Washington's flood dynamics and lead to increasingly destructive floods that impact people, property, and critical infrastructure

November 2021 floods in Whatcom County, when a month's worth of rain fell in 24 hours

What can be done?

- Risk identification
- Project planning
- Access to mitigation dollars (FMA)

In this era of fewer resources for risk reduction, how do we know we'll get the biggest bang for our resilience buck?

EMD role: Develop and implement a “repetitive loss strategy”

- Where should we be directing our flood risk reduction efforts?
- How can we use the FMA program to achieve our goals?

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EMD role: Develop and implement a “repetitive loss strategy”

- Where should we be directing our flood risk reduction efforts?
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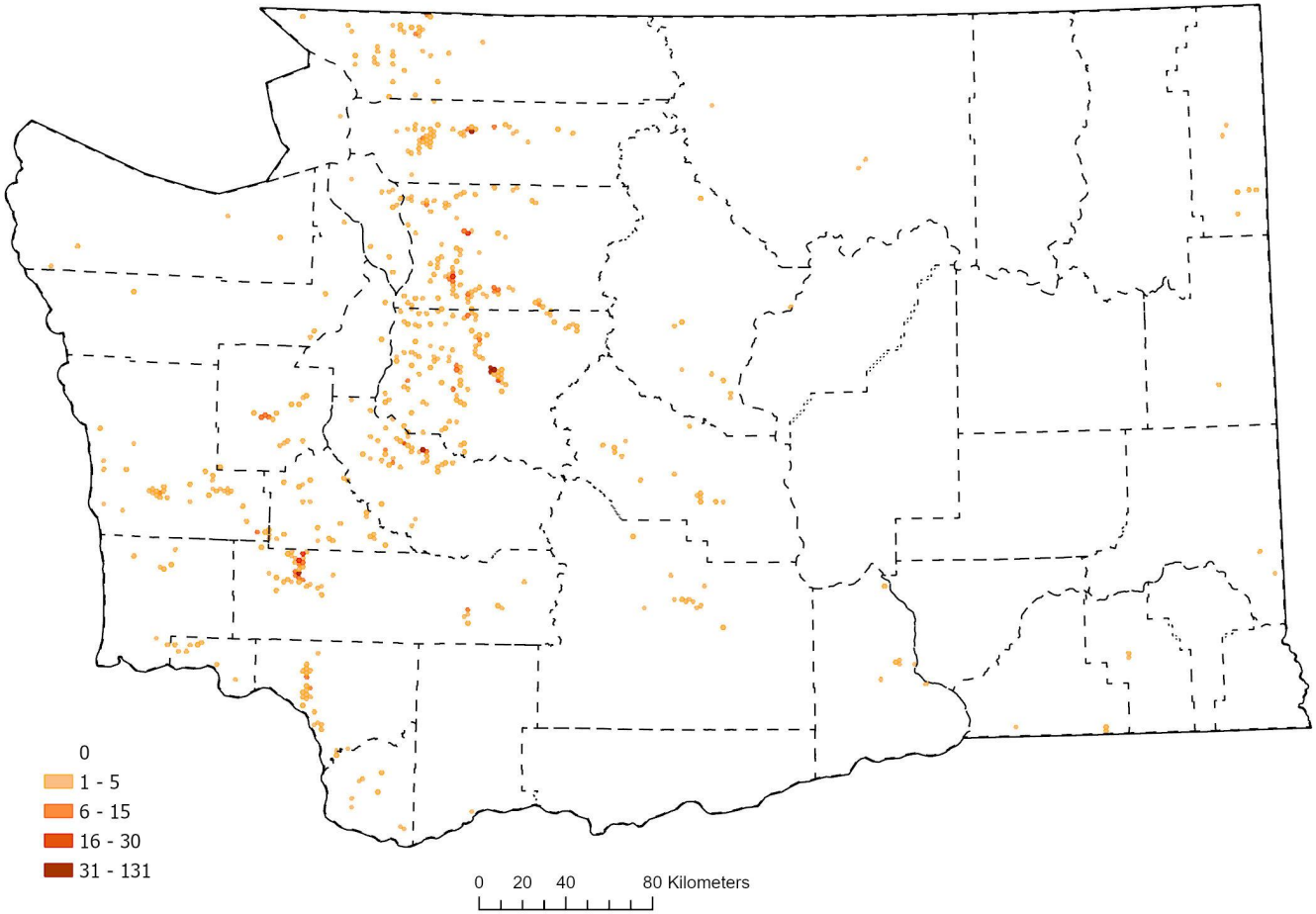
*How can we contribute to **permanently reducing** the number of repetitively flooded structures in WA?*

- *How many?*
- *Where are they?*
- *Are they concentrated or dispersed?*
- *Have their locations changed over time?*

- *Can this tell us anything about flood risk over all?*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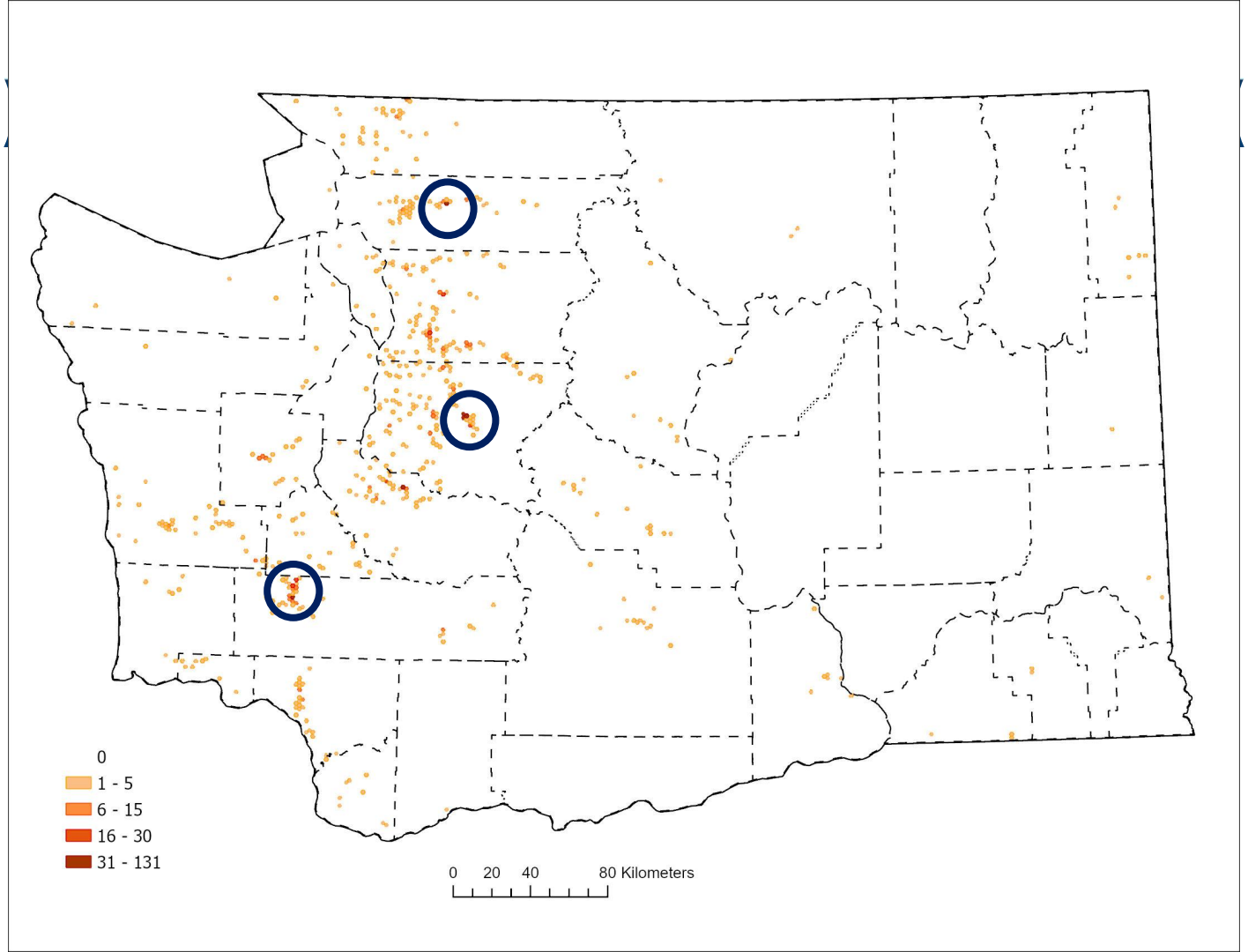
6 - 15
16 - 30
31 - 131
0 20 40 80 Kilometers


0
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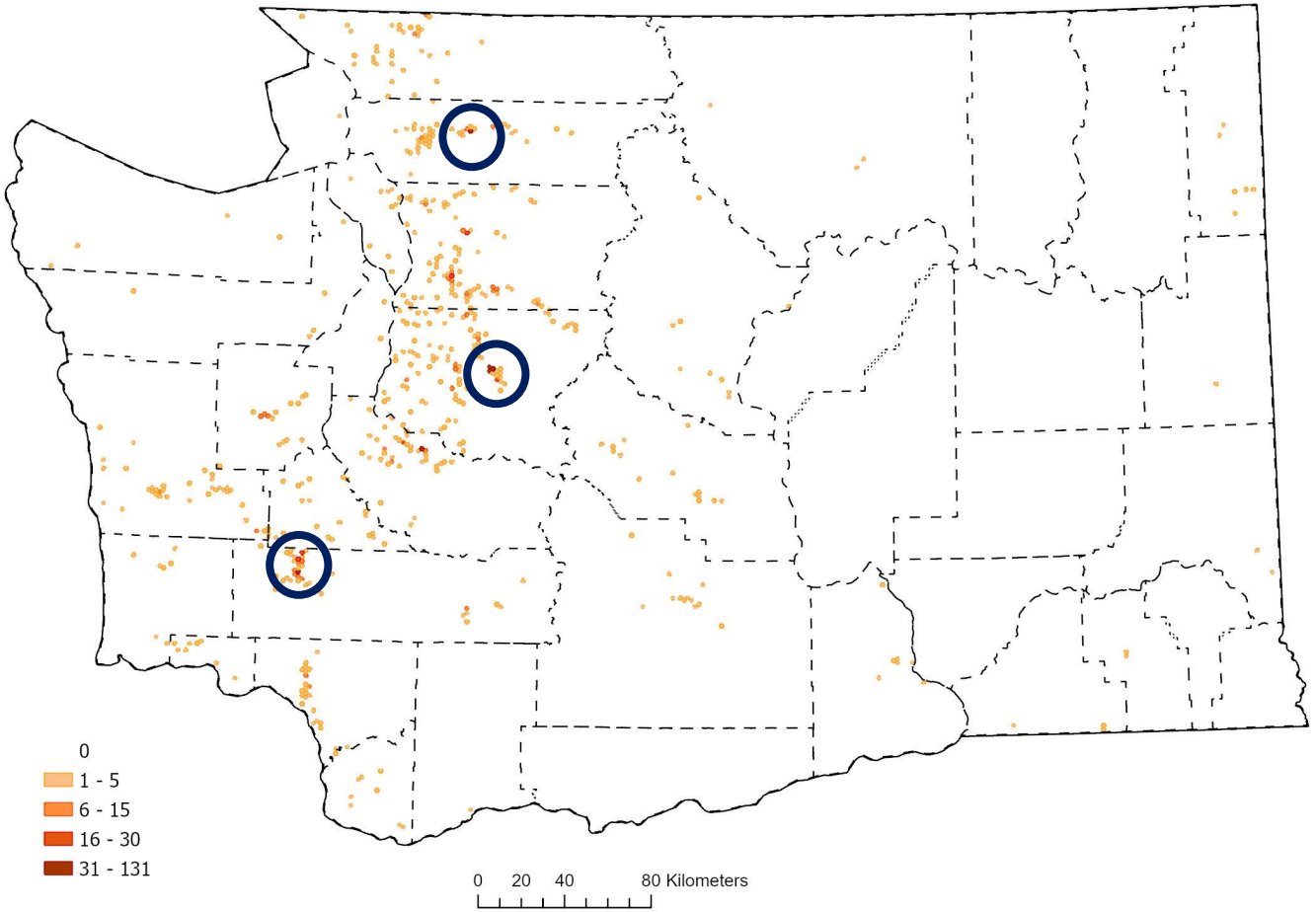
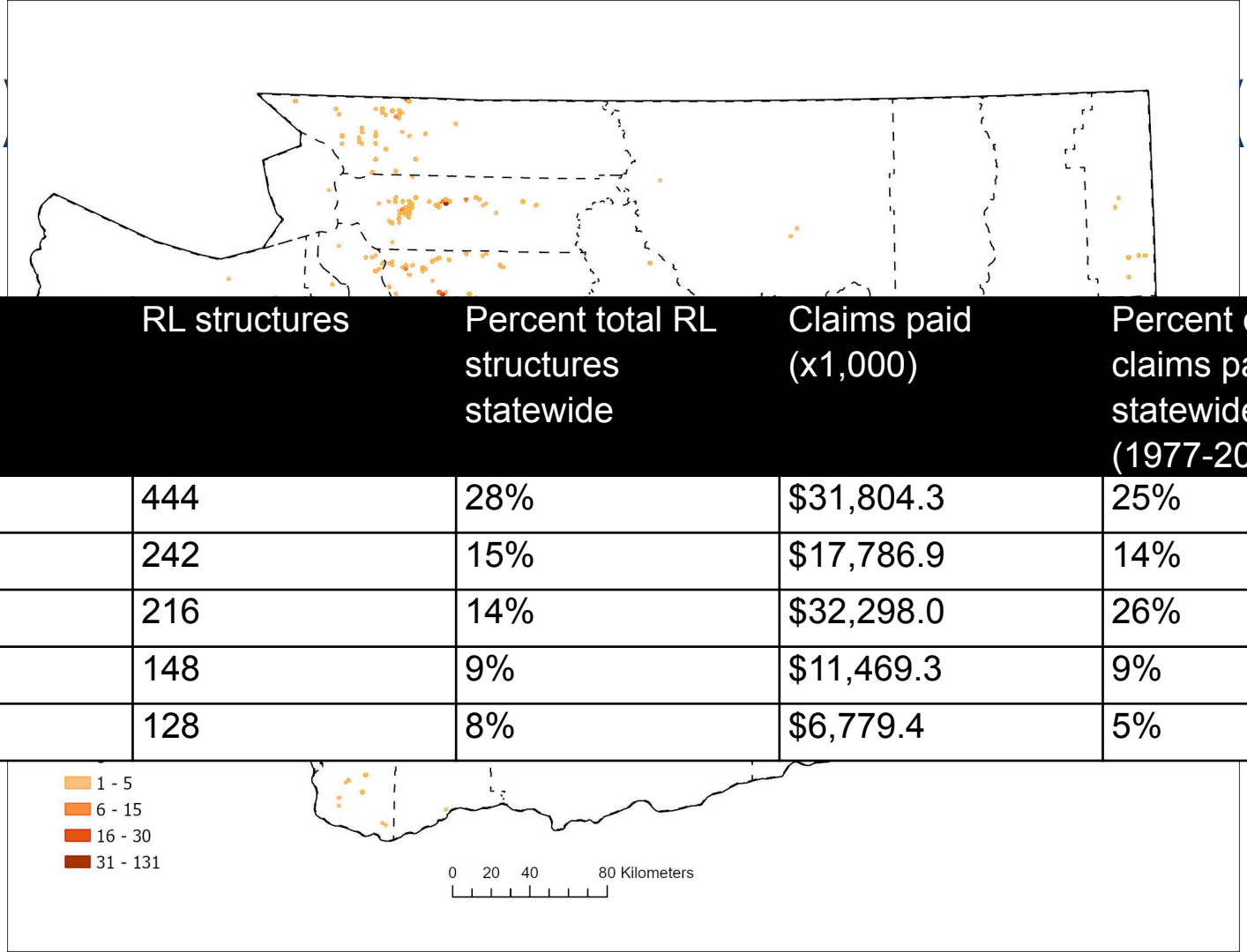
16 - 30
31 - 131
0 20 40 80 Kilometers

Coastal flooding ?

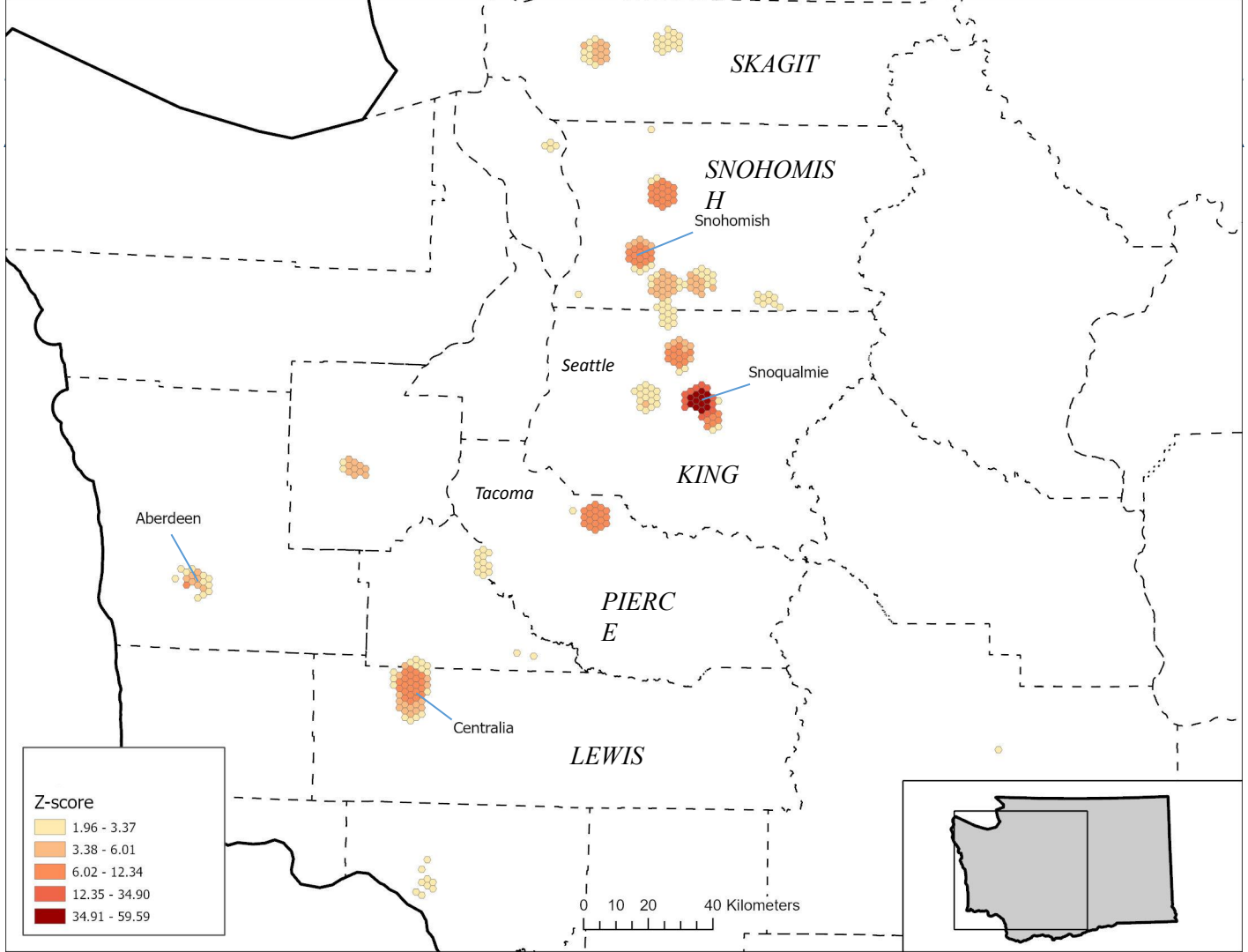




County	RL structures	Percent total RL structures statewide	Claims paid (x1,000)	Percent of total claims paid statewide (1977-2022)
King	444	28%	$31,804.3	25%
Snohomish	242	15%	$17,786.9	14%
Lewis	216	14%	$32,298.0	26%
Pierce	148	9%	$11,469.3	9%
Skagit	128	8%	$6,779.4	5%

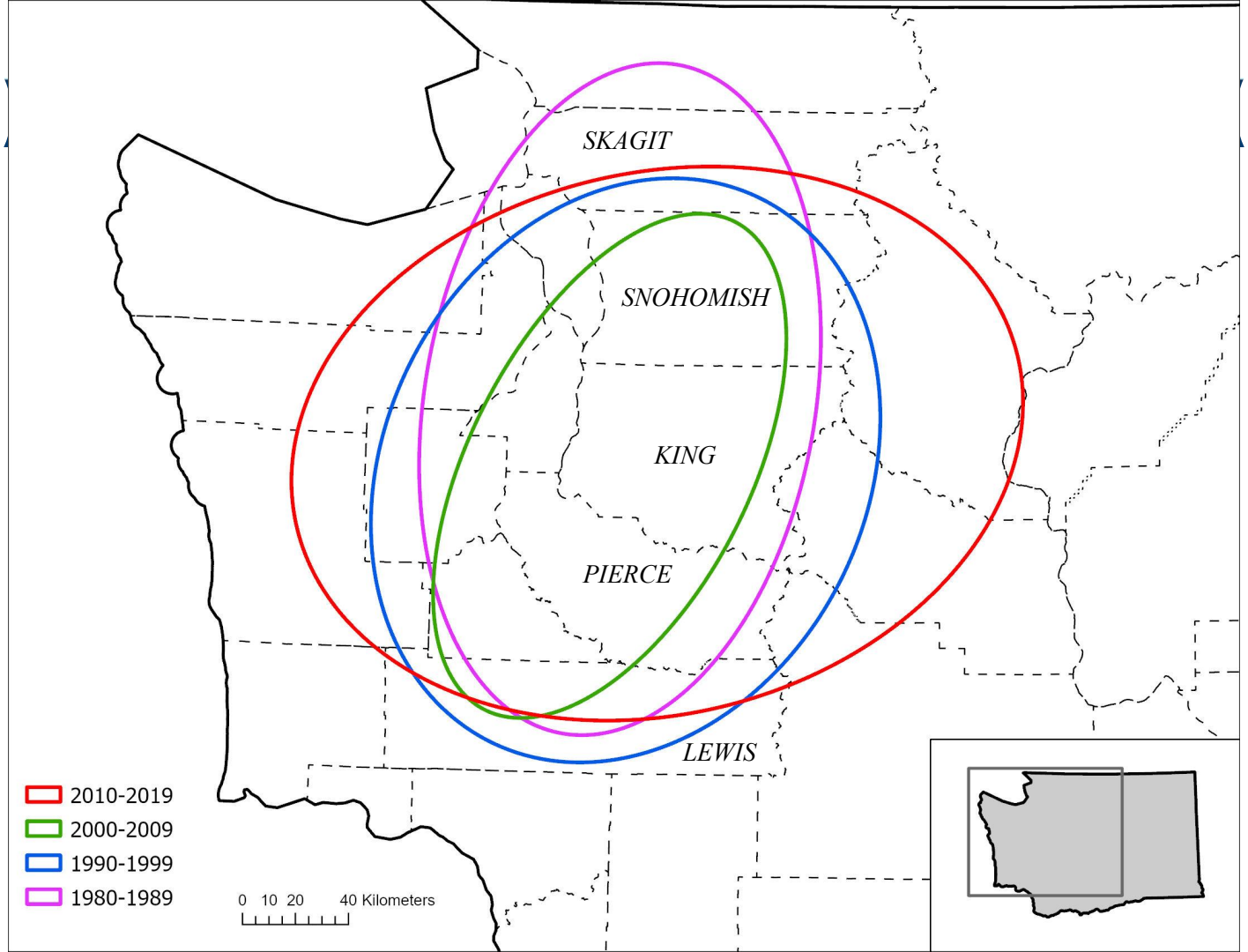
Hot spot analysis

Where are the most significant clusters of RL structures?

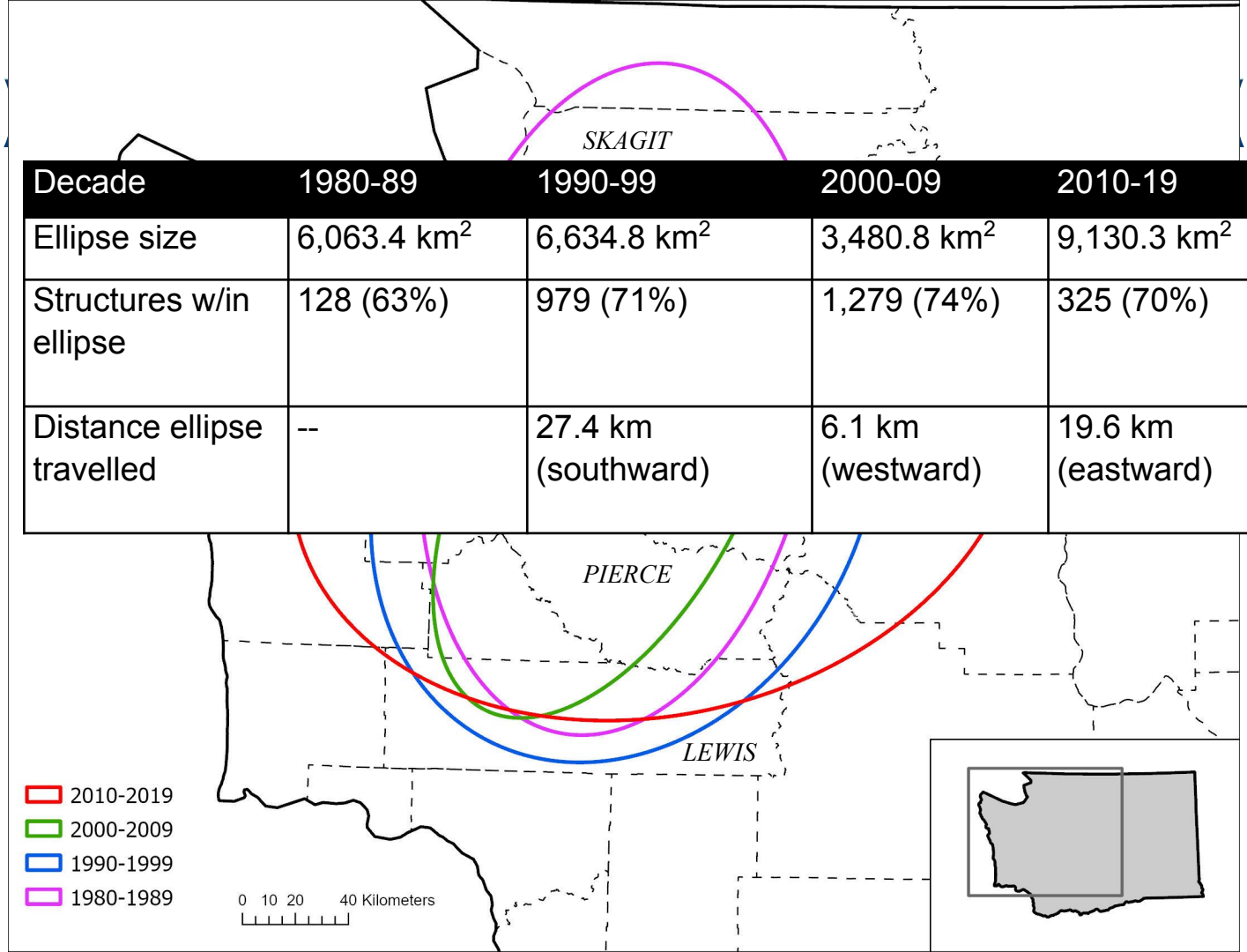


Directional distribution

Have RL locations changed over time?



Decade	1980-89	1990-99	2000-09	2010-19
Ellipse size	6,063.4 km^2	6,634.8 km^2	3,480.8 km^2	9,130.3 km^2
Structures w/in ellipse	128 (63%)	979 (71%)	1,279 (74%)	325 (70%)
Distance ellipse travelled	--	27.4 km (southward)	6.1 km (westward)	19.6 km (eastward)



What did we learn?

- *How many?*
- *Where are they?*
- *Are they concentrated or dispersed?*
- *Have their locations changed over time?*

- *Can this tell us anything about flood risk over all?*

- 1000+ RL structures, primarily in western WA
  - Snoqualmie, Centralia extreme clusters
- RL locations have remained centered around the Seattle metro over the past 40+ years
  - Some small shifts over time
  - Concentration of flood losses in the 2000s
- Flood-population relationship needs more examining
  - Lewis vs. King example
- RL clusters indicate high flood risk, but may not be the only places with high flood risk

What will we do with this information?

- Incorporate into statewide flood risk assessment (state HMP effort for 2028)
  - Next step: understand geographic distribution of clusters via spatial regression modeling, use this to create effective mitigation measures
    - Re-do with a full NFIP claims dataset?
  - Draft manuscript, publish results
- Guide our use of FMA program and other flood risk reduction efforts
  - Establish/build partnerships with most impacted jurisdictions, look for ways to target multiple RL structures at a time (*more bang for the buck*)

Team:

- Kevin Zerbe – HARP Program Supervisor
- Ella Liddicoat – Hazard Mitigation Coordinator, GIS analysis
- Ellen Chappelka, CFM – Coastal Resilience Specialist, analysis and interpretation
- Anne-marie Marshall-Dody, CFM – AD for Disaster Resilience, project oversight

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Accelerating Housing Supply: Practical Strategies for Every Community

Jennifer Raitt

Executive Director
Northern Middlesex Council of Governments

Tuesday, December 9 @ 12 pm ET
.10 ICC CEU

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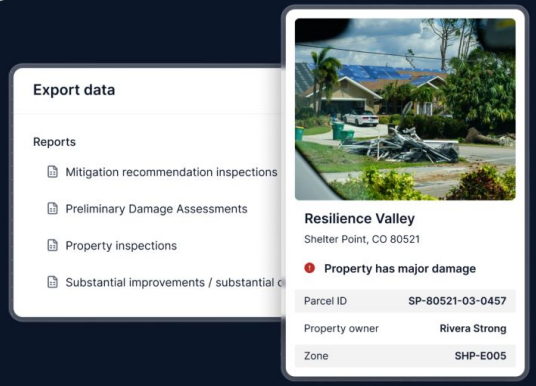
December Product Webinar: Top 3 Features of 2025

Thursday, December 11
12:00 pm ET



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Thank you!

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