Statewide Threat Assessment Update

Outreach & Methodology Update

February 2026

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Village of Atka and the Atka Volcano Complex. Photo Credit: Rowan Kraft

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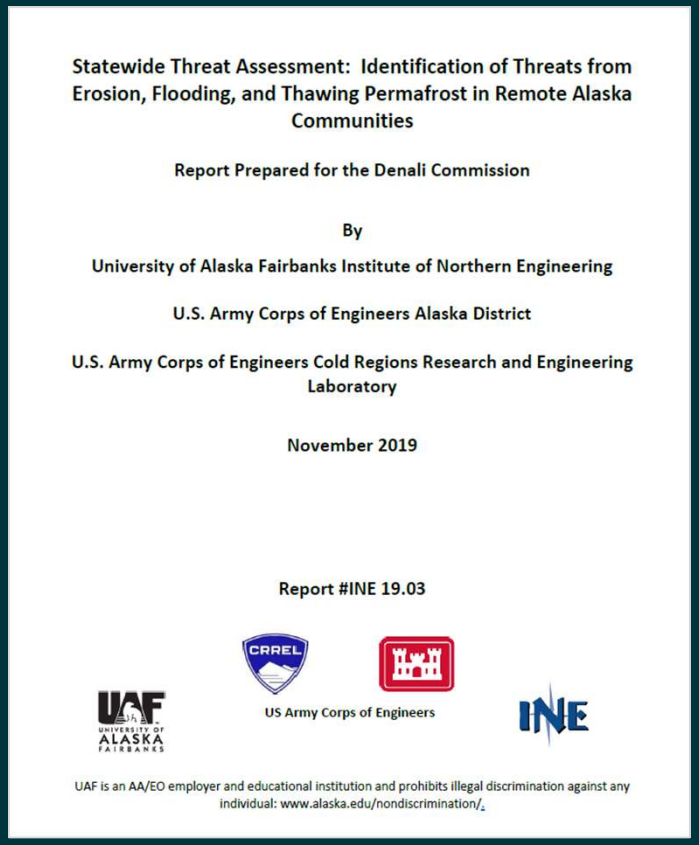
2019 STA Methodology



Statewide Threat Assessment: Identification of Threats from Erosion, Flooding, and Thawing Permafrost in Remote Alaska Communities

Report Prepared for the Denali Commission

By

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US Army Corps of Engineers

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Overview

- Considered ~190 rural communities
  - Larger, more urban communities not included as the study is designed to address data gaps in remote locations with fewer data and limited resources
- For each community, determined best fit **Impact Rating** (0 to 3) for
  - **Permafrost Degradation**
  - **Flooding**
  - **Erosion**

Impact Ratings: 0 (no impact) – 3 (high impact)
Uncertainty Ratings: *** (relative high amounts of high-quality data available) – * (relatively little data available)

2019 STA Methodology

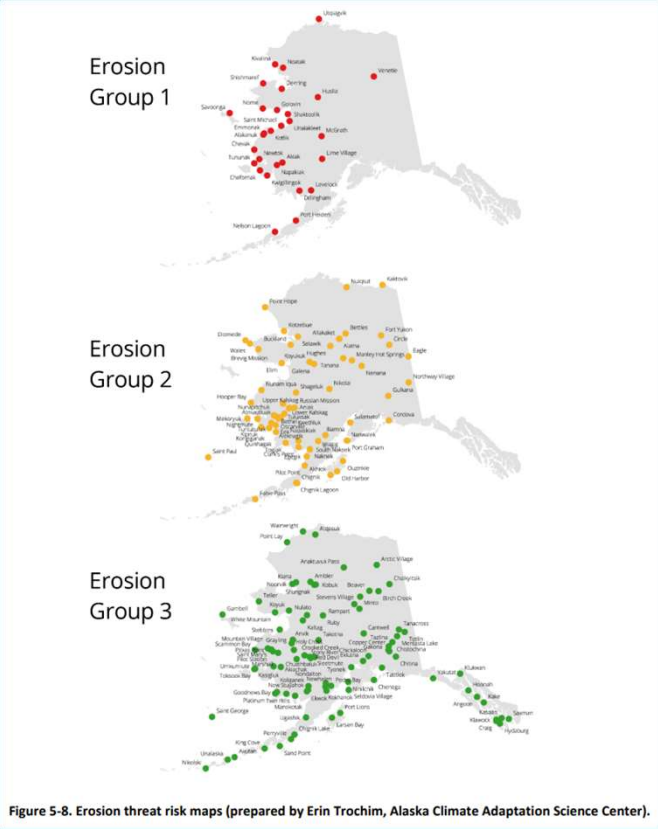


Figure 5-8. Erosion threat risk maps (prepared by Erin Trochim, Alaska Climate Adaptation Science Center).

2019 STA Chapter 4.0 Risk Evaluation, Criteria, and Methods

– Steps:

1. Gathered all available data
2. Developed evaluation criteria
3. For each criterion, determined best fit **Impact Rating** (0 to 3) and combined into ranked **Aggregate Impact Rating**
4. Estimate the most likely **Time to Damage**
5. Calculate **Risk Rating** based on **Aggregate Impact Rating** and **Time to Damage**
6. Rate the overall level of **Uncertainty** (* to ***)

Additionally, a simple summation for normalized scores performed for a **Combined Threat Ranking**

Impact Ratings: 0 (no impact) – 3 (high impact)
Uncertainty Ratings: *** (relative high amounts of high-quality data available) – * (relatively little data available)

2019 STA Evaluation Criteria

- ✓ Critical Infrastructure
- ✓ Health and Human Safety
- ✓ Subsistence and Shoreline Use
- ✓ Land Use / Geographic Location
- ✓ Percentage of Population Affected
- ✓ Housing Distribution
- ✓ Environmental Threat
- ✓ Cultural Importance
- ✓ Commercial Infrastructure

Derived from the USACE 2009 Baseline Erosion Assessments

2019 STA Methodology Scoring Example

Table 4-4. Erosion scoring example for MyCommunity.

A	B	C	D	E	F	G	H
Evaluation Criterion	Impact Rating	Criterion Relative Weight	Weighted Impact Rating (B*C)	Time to Damage	Risk Rating (D*E)	Normalized Score (100*(F/ Max Possible Score)	Group
Critical Infrastructure	3	3	9				
Health & Human Safety	2	3	6				
Subsistence & Shoreline Use	1	2	2				
Land Use/Geographic Location	1	1	1				
Population Affected	2	2	4				
Housing Distribution	2	2	4				
Environmental Threat	3	3	9				
Cultural Importance	1	1	1				
Commercial Infrastructure	3	2	6				
Aggregate Ratings			**42**	**3**	**126**	**74**	**Group 1**

Group 1 = high relative threat

Group 2 = medium relative threat

Group 3 = low relative threat

2019 Erosion Results

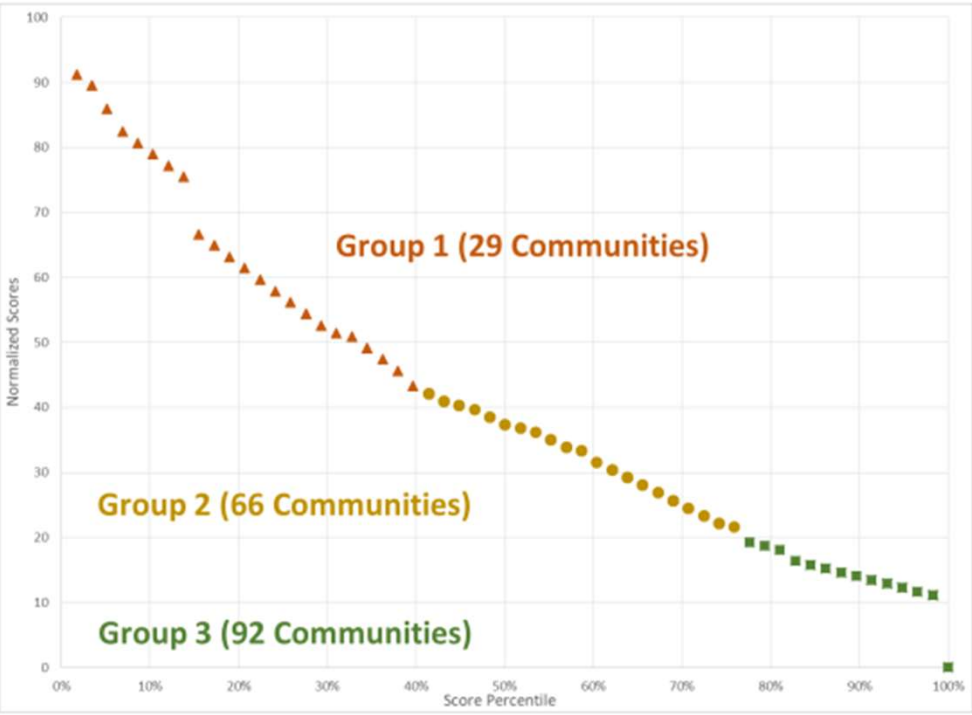


Figure 5-1. Cumulative distribution curve for erosion, illustrating groupings.

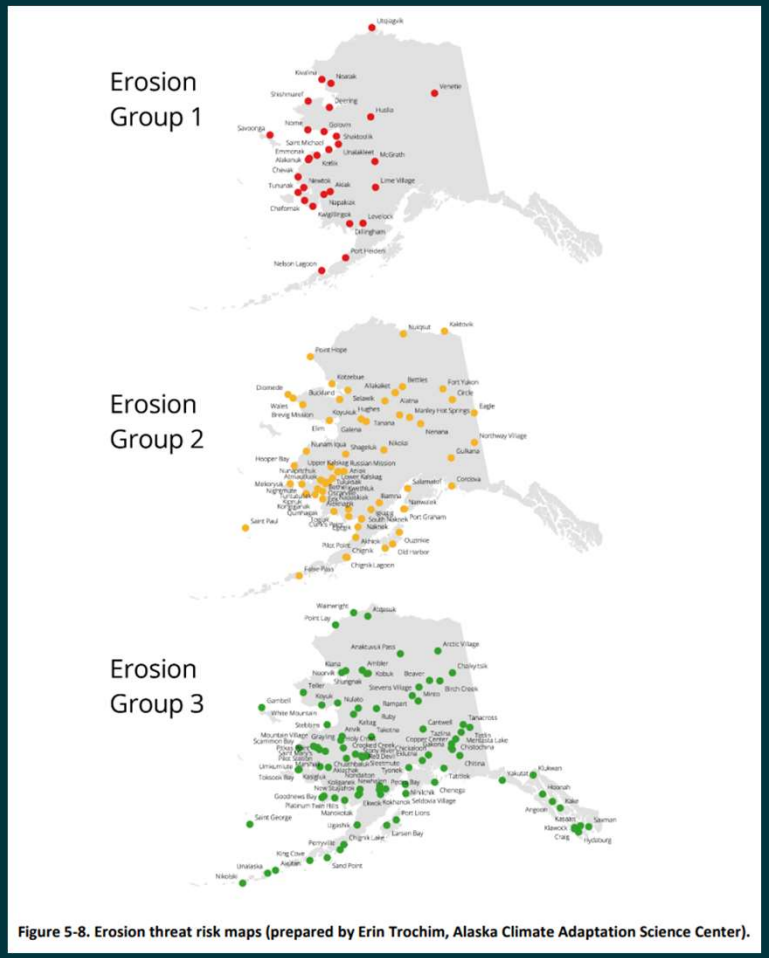


Figure 5-8. Erosion threat risk maps (prepared by Erin Trochim, Alaska Climate Adaptation Science Center).

Top 5 Ranked in Group 1:
Newtok, Kivalina, Napakiak, Shaktoolik, Shishmaref

2019 Flood Results

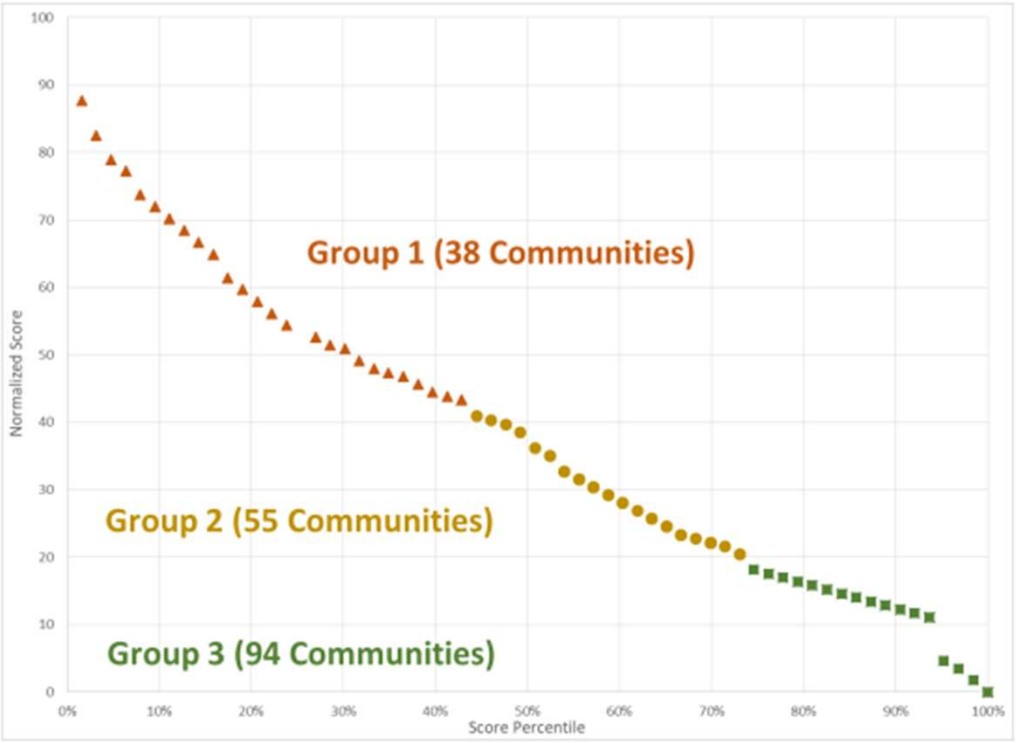


Figure 5-2. Cumulative distribution curve for flooding, illustrating groupings.

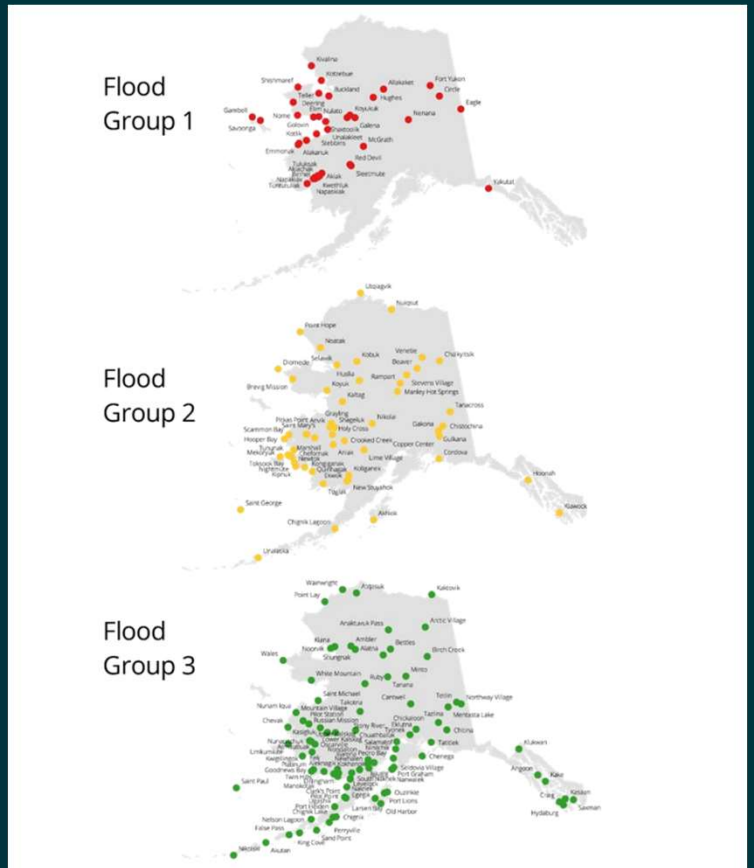


Figure 5-9. Flooding threat risk maps (prepared by Erin Trochim, Alaska Climate Adaptation Science Center).

Top 5 Ranked in Group 1:
Akiachak, Akiak, Allakaket, Alakanuk, Bethel

2019 Thawing Permafrost Results

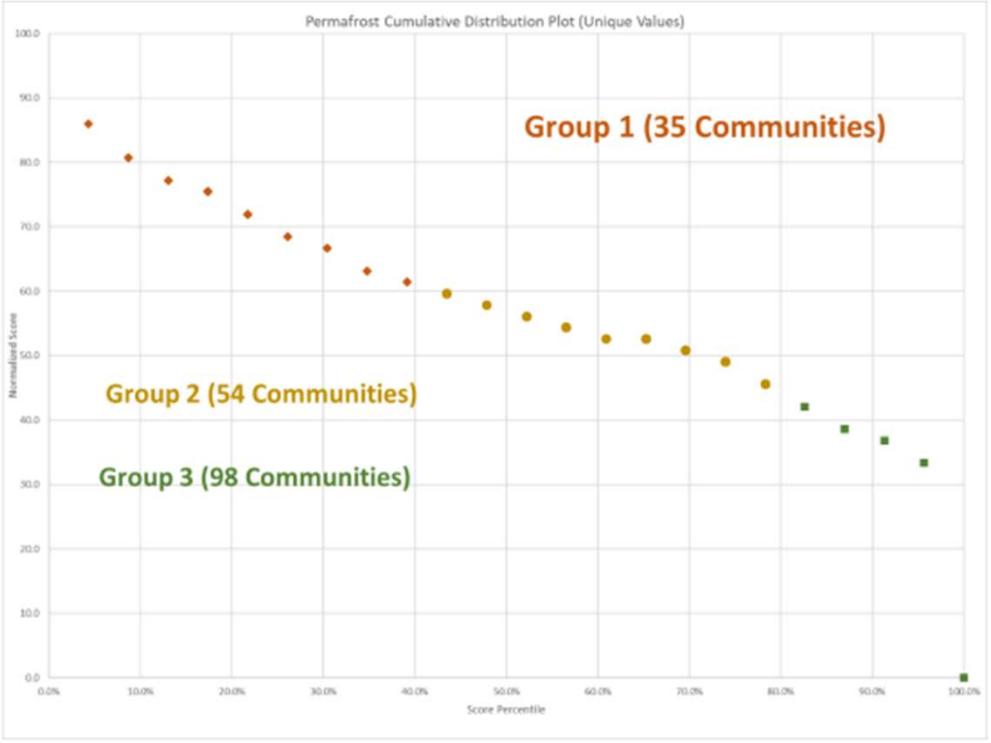


Figure 5-3. Cumulative distribution curve for thawing permafrost, illustrating ratings.

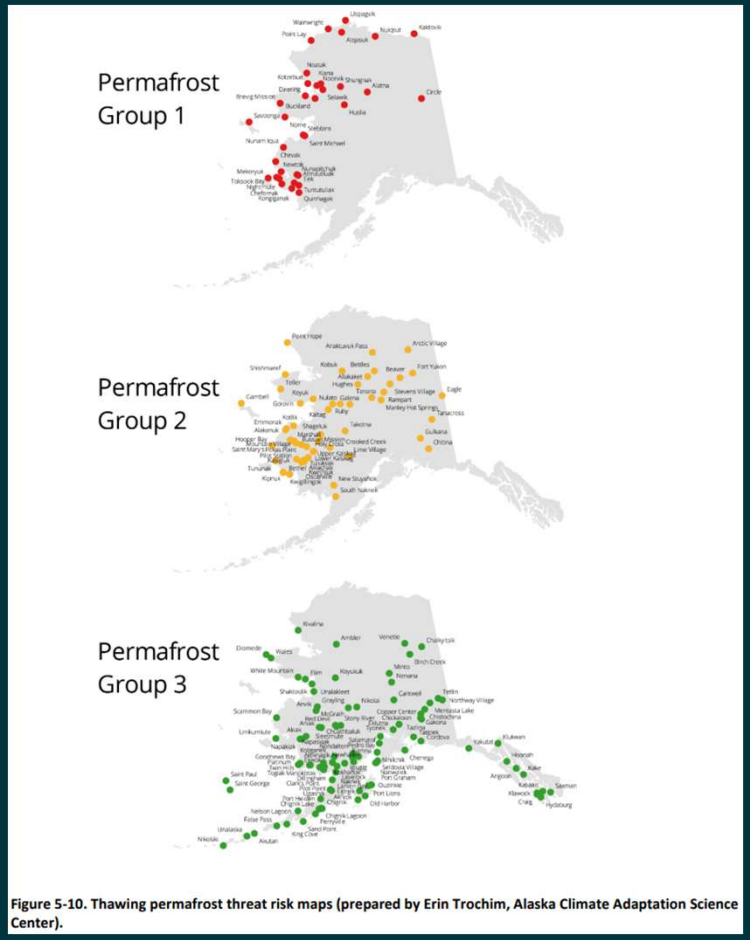


Figure 5-10. Thawing permafrost threat risk maps (prepared by Erin Trochim, Alaska Climate Adaptation Science Center).

Top 5 Ranked in Group 1:
Newtok, Utqiagvik, Point Lay, Tuntutuliak, Kongiganak

2019 Combined Threat

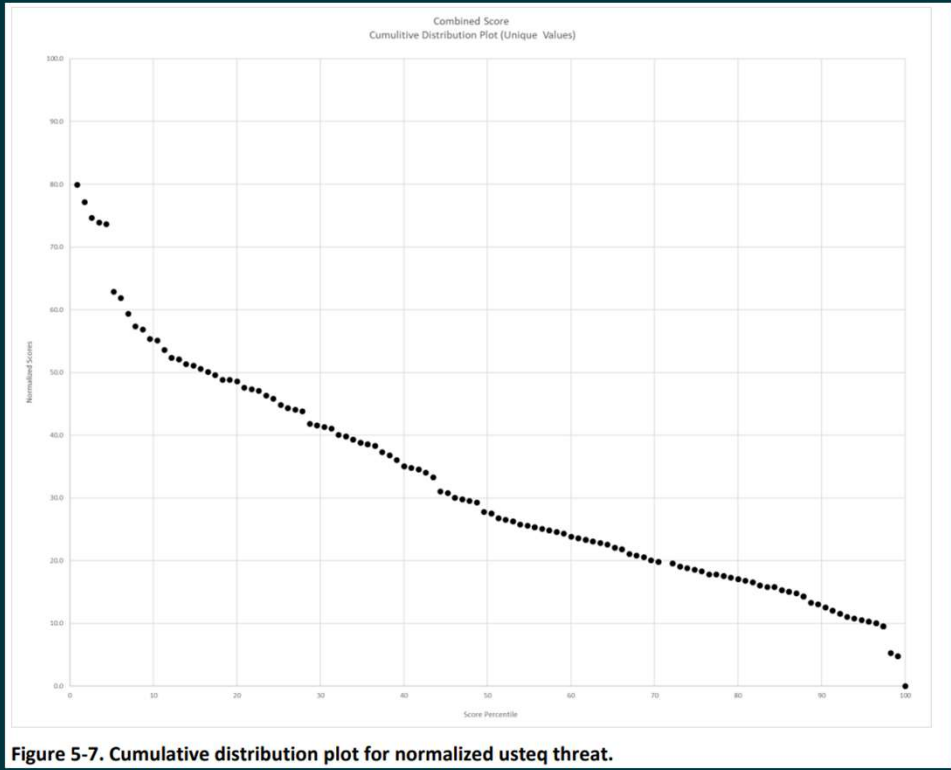


Figure 5-7. Cumulative distribution plot for normalized usteq threat.

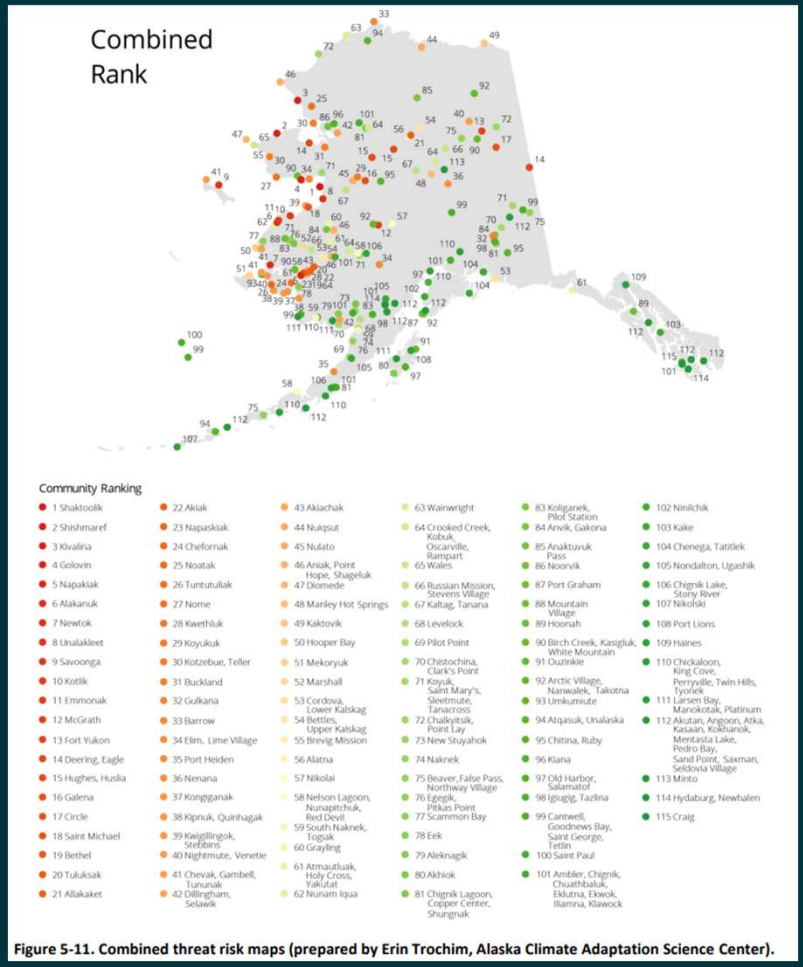
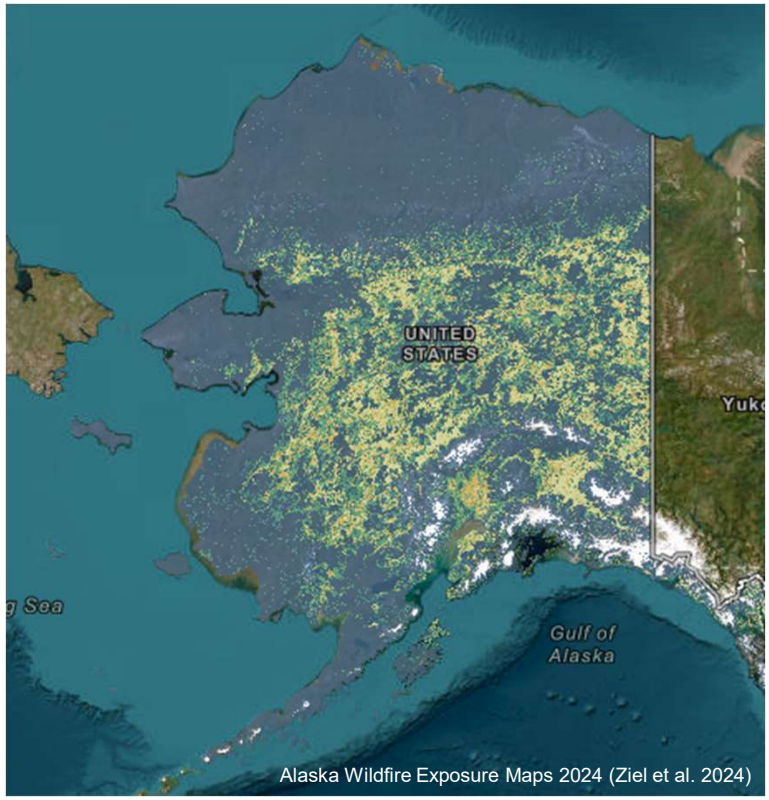


Figure 5-11. Combined threat risk maps (prepared by Erin Trochim, Alaska Climate Adaptation Science Center).

Top 5 Ranked for Combined Rankings:
Shaktoolik, Shishmaref, Kivalina, Golovin, Napakiak

Proposed Changes

1. Include five additional hazards



Alaska Wildfire Exposure Maps 2024 (Ziel et al. 2024)

- ✓ Flood
- ✓ Erosion
- ✓ Permafrost Degradation
- ✓ Earthquake
- ✓ Landslide
- ✓ Tsunami
- ✓ Volcano
- ✓ Wildfire

Proposed Changes

2. Modify Evaluation Criteria

- Add two new evaluation criteria
- Remove one evaluation criteria
- Rename Commercial Infrastructure to include Economic Impact
- Minor edits proposed in justification for remaining 8 to align across all hazards
  - Removed quantitative measures – could not be determined equally across hazards
  - Included determination of “local” versus “regional” impacts

✓ Past Impacts
✓ Critical Infrastructure
✓ Health and Human Safety
✓ Subsistence and Shoreline Use
✓ Land Use / Geographic Location
~~✓ Percentage of Population Affected~~
✓ Housing Distribution
✓ Environmental Threat
✓ Cultural Importance
✓ Commercial Infrastructure / Economic Impact
✓ Changing Conditions

Proposed Changes

2. Modify Evaluation Criteria – Example Justification Changes (Flooding)

Evaluation Factor	Definition	Rating	Old Justification	New Justification	Data Sources
Critical Infrastructure	[Same as 2019]	0	No evidence of likelihood of impact to critical infrastructure due to threat	Flooding not expected to impact critical infrastructure in the community and no services loss is anticipated	HMPs, Community Survey, Coastal Flood Impact Assessments, WEAR Project Site
		1	One item of critical infrastructure at risk from threat. Loss of Infrastructure would not result in loss of community sustainability. Damage could be repaired, or alternative service restored in less than 1 month.	Flooding impacts to critical infrastructure is likely limited and may result in only short-term service loss	
		2	More than one item of a critical infrastructure at risk from threat. Loss of infrastructure would not result in loss of community sustainability. Damage could be repaired, or alternative service restored between 1 and 6 months.	Flooding has or is likely to impact numerous critical infrastructure locations and result in long-term service loss	
		3	More than one item of a critical infrastructure at risk from threat. Loss would impact community sustainability. Repairs or establishing alternative service would take more than 6 months.	Flooding has or is likely to impact numerous critical infrastructure locations that are regionally significant and result in long-term service loss	

Proposed Changes

3. Remove **weights** in Impact Rating

4. Replace **Time to Damage** multiplier with **Changing Conditions** evaluation criteria

   – Changing conditions addresses conditions either worsening or improving impacts to the community during the threat, and new or emerging threats experienced by a community.

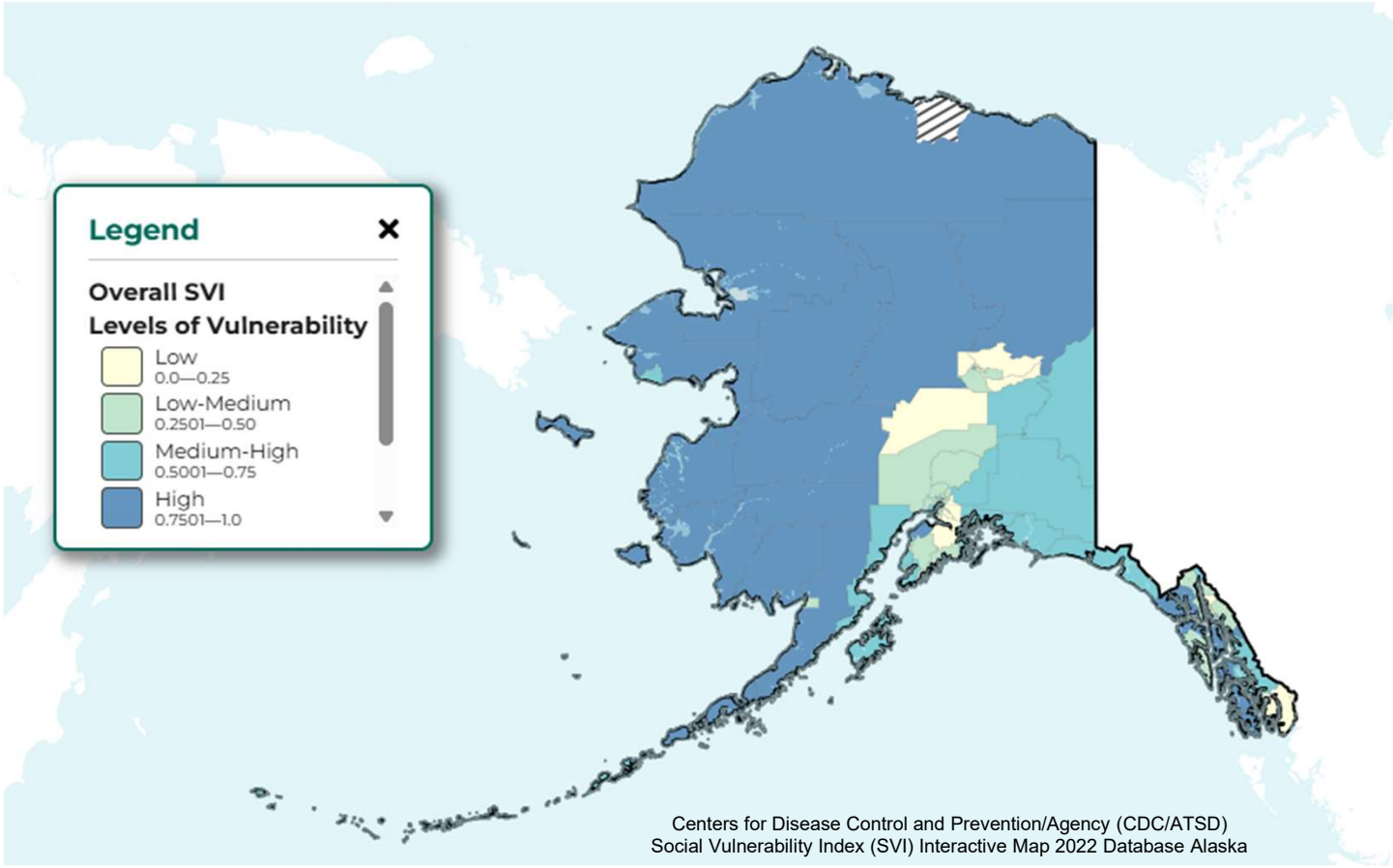
Table 4-3. Evaluation factors and relative weights.

Evaluation Factor	Relative Weight
Critical Infrastructure	3
Health & Human Safety	3
Subsistence & Shoreline Use	2
Land Use/Geographic Location	1
% Population Affected	2
Housing Distribution	2
Environmental Threat	3
Cultural Importance	1
Commercial Infrastructure	2

2019 STA

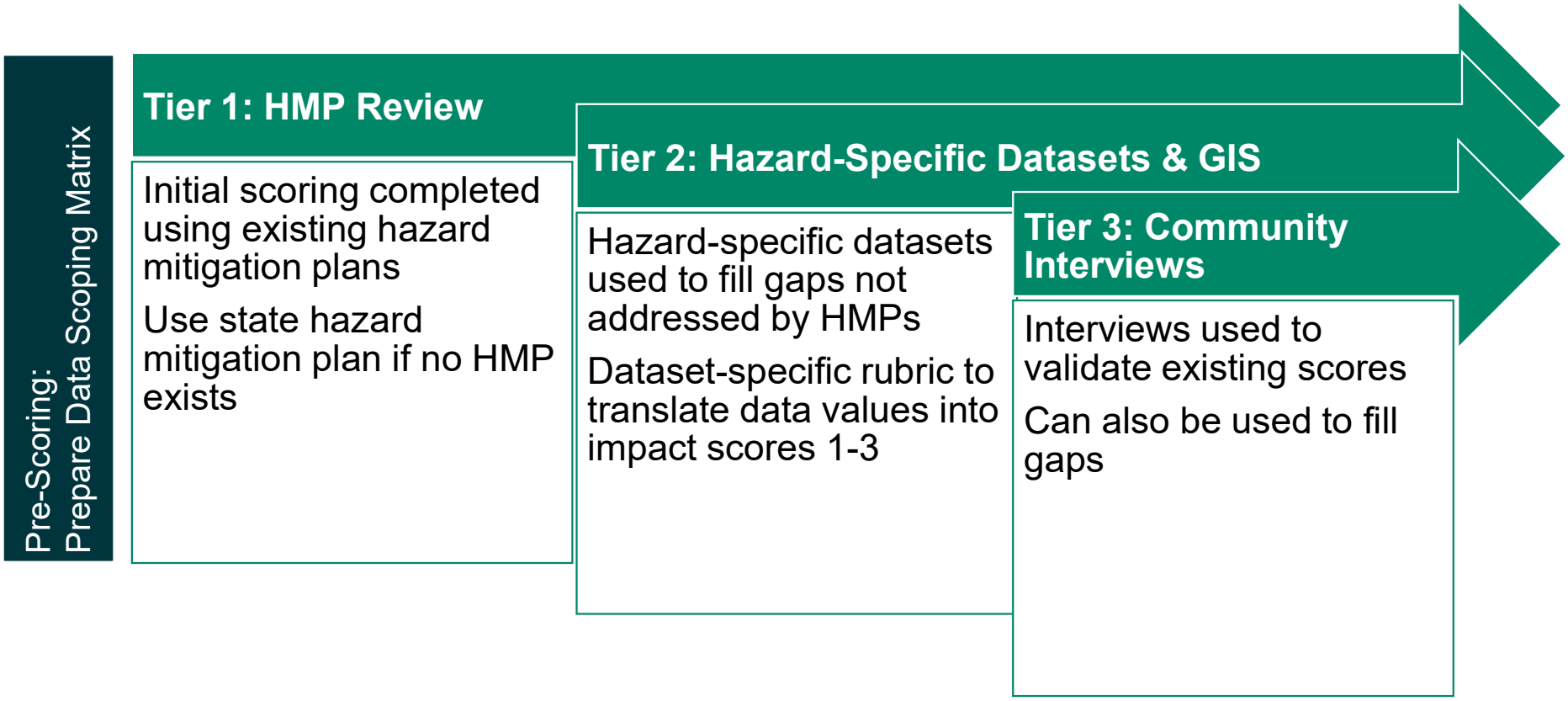
Proposed Changes

5. Added a multiplier for **Social Vulnerability**



Centers for Disease Control and Prevention/Agency (CDC/ATSD)
Social Vulnerability Index (SVI) Interactive Map 2022 Database Alaska

Three-Tiered Approach



Recap – Proposed Changes

- ✓ New hazards added
- ✓ Evaluation criteria consistent across all hazards (except where N/A)
- ✓ Incorporated past events and worsening / changing conditions
- ✓ Regional hubs integrated more consistently in scoring
- ✓ Social Vulnerability incorporated into scoring
- ✓ 3-tiered process for layering sources used for scoring

Next Steps

1. Modify methodology based on feedback received
2. Complete **impact rating scores**
3. Rate the overall level of **Uncertainty** (* to ***)
4. Determine which hazards to **aggregate**
5. Develop **draft** report with results (summer 2026)
6. Collect public/stakeholder **feedback** (fall 2026)
7. Release **final** document (end of 2026)

Feedback

1. **Bethel (Jan. 27) and Anchorage (Feb.6) and Juneau (Feb 10):** Met with Stakeholders
2. **Fairbanks:** Available to chat in Zach's at Sophie Station. Thursday, February 26, 1:00-5:00pm
3. **Questionnaire:** Connect with us

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