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## Notes on Codes

US AON interviewed a diverse group of people about risk management and hazard mitigation in the Alaskan Arctic, focusing on how observing and data gaps impact risks and hazards. To understand themes and shared concerns, US AON coded the interview notes. The code book was developed dynamically based on the way the interviewees discussed their work and concerns. While the codes may continue to evolve, this glossary explains the codes in use as of Fall 2024. Other people and projects are welcome to make use of this information with permission. For more details or to apply these codes to your work please reach out to Sandy Starkweather: [sandy.starkweather@noaa.gov](mailto:sandy.starkweather@noaa.gov).

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### A. Management and Mitigation Mission Areas

Refer to organizational missions related to risk management and hazard mitigation. This includes clearly defined mission areas (such as those defined for federal agencies) and mission areas that are self-described. It also includes scope of work for an individual or organization.

1.1 Mitigation – refers to the organizations and groups with missions to mitigate certain hazards or risks. Climate risks and adaptation (sub-code) refers to the mitigation of climate hazards and risks. Planning and implementation (sub-code) refers to groups that create and implement mitigation plans. Regulatory (sub-code) refers to mitigation of risk by regulating the activities of other groups or creating regulatory guidelines (including the sub-code of inspection and enforcement). Eligibility for funds (sub-code) refers to mission areas involving soliciting or identifying funding streams to mitigate risks. Change detection (sub-code) refers to identifying climate change through new data analyst forms.

1.2 Resilience – refers to mission areas that seek to promote resilience within communities or observing systems. Sub-codes include tribal (refers to those mission areas that focus on expanding resilience in tribal communities) and infrastructure (refers to those mission areas that focus on supporting the resilience of infrastructure, such as buildings, transportation, etc.).

1.3 Risk Assessments, Analysis – Refers to organizations with mission areas of assessing risk and producing assessments related to key hazards in AK. Sub-codes include Asset, Risk Maps (referring specifically to the production of maps showing risks in the risk assessment).

1.4 Safe Operations — refers to mission areas that ensure the safety of people or groups working across industries (including shipping, transportation, infrastructure, navigation, oil, etc.). Situational Awareness (sub-code) refers to mission areas that produce place-based and usable data on conditions to allow people to make informed decisions about certain operations and activities (e.g, related to subsistence, navigation, etc.).

1.5 Predictions – refers to mission areas where organizations use data to make predictions (e.g., about weather events, about climate, etc.); Sub-codes include Aviation Weather (refers to the production of predictions for aviation); seasonal (refers to the production of seasonal predictions); and Protection of Life, Property (refers to the production of predictions to better protect life and property).

1.6 Preparedness – refers to mission areas where organizations focus on preparing for emergencies (by producing data, by participating directly in preparedness, etc.). Sub-codes include disasters (referring to mission areas that focus on preparing for disasters) and alert on conditions (referring to preparedness mission areas that include sending out alerts).

1.7 Event Response - refer to mission areas that focus on responding to events and emergencies (e.g., weather events, natural hazards, man-made hazards, accidents, etc.). Sub-codes include search and rescue; operational picture; oil spills; interagency (event response coordinated across groups); declaration (authority to declare an emergency declaration); and effectiveness (evaluation of event response).

1.8 Informed Decision Making – refers to mission areas that include collecting and analyzing data to make informed, evidence-based decisions.

1.9 Data Collection – refers to organizations with a mission area of collecting data on any relevant topic (e.g., environmental, social, economic, etc. data) in the Alaskan Arctic.

1.10 Research – refers to mission areas that focus on conducting research on certain risks and hazards in AK. Research includes physical science, community science, natural science, and social science research.

1.11 Tribal Engagement – refers to mission areas that focus on tribal engagement and working with tribal communities

1.12 National Security – refers to mission areas that focus on protecting national security in Alaska/in the Arctic. Often applied to geopolitical concerns and concerns related to transportation and trade.

1.13 Development – Refers to developing certain capacities, including workforce development, infrastructure development, housing development, and technological development.

1.14 Climate Change – Refers to mission areas that include identifying climate change and climatological effects through data collection and analysis; informing policy and decision-making around climate change; and monitoring climate trends. This code is distinguished from the climate change sub-code in mitigation because this code includes other work related to researching and assessing climate change. Related to the climate risks and adaptation sub-code.

1.15 Recovery – refers to work that is done by an organization following an event (e.g., an environmental event, a natural disaster, etc). The sub-code Clean Up refers to remediation following such an event (e.g., environmental remediation).

1.16 Resource Management – refers to groups with missions related to the management of natural resources (including fisheries, ecosystem resources, etc.).

1.17 Environmental Conservation, Protection – refers to groups with missions related to the protection and conservation of Alaskan environments and ecosystems.

1.18 Upholding sovereignty – refers to mission areas that uphold the sovereignty of Indigenous governance.

1.19 Integration, Coordination – refers to organizations with mission areas that include helping coordinate and integrate data and services for the benefit of the organization and other groups.

1.20 Service Equity, Justice – refers to mission areas that center serving disadvantaged communities. This includes climate and environmental justice and is related to upholding sovereignty and tribal engagement.

1.21 Communication – refers to mission areas that include communicating with the public or other stakeholder groups to inform them of data and information related to risks and hazards. Sub-codes include education and outreach (refers to educational and outreach campaigns about a topic) and work with communities (refers to working with community members to explain data and to coordinate work relevant to the community).

1.22 Preserving Culture – refers to mission areas focused on protecting and conserving cultural resources. This includes those resources directly related to cultural activities (e.g., subsistence and land resources when linked to culture)

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## **B. Management and Mitigation Effectiveness Factors**

Refers to anything described as impacting a group's ability to achieve a stated mission.  
Can contribute to or constrain effectiveness of operations.

2.1 Understanding, Engaging Community Needs – when agencies can't be as effective because they don't have ways to understand needs, especially important in underserved communities (sub-code).

2.2 Data Gaps – agencies can't be effective due to gaps in data collection and tools to analyze data. Sub-codes include terminology (gap in the uniform definition of a term); latency (temporal limitation in data collection and reporting that produces data too late to be effective); not sustained (data observations are not collected regularly enough); and sparse data (lack of data both spatially and temporally across AK)

2.3 Prediction Gaps – agencies can't effectively predict a certain event or occurrence, sometimes related to data gaps. Sub-codes include uncertainty (data precision is poor, producing uncertainty in prediction); seasonal (gaps in seasonal predictions); and local scale (lack of predictive capacity at the local scale).

2.4 Climate Change – when the changing climate itself, both the unpredictability and relationship with emerging phenomena (sub-code), make the past a poor guide for the future. Extremes is the second sub-code and refers to extreme phenomena related to climate change.

2.5 Planning, Assessment – speaks to issues that are constraining effectiveness like a lack of methods or capacities to do the work well. Some effectiveness factors specifically relate to the emerging and urgent needs of climate adaptation planning (sub-code).

2.6 Innovative Technology – Technology that is emerging and supporting greater effectiveness or that needs fostering/investment. Sub-code includes Machine Learning and AI which refers to machine learning and AI tech.

2.7 Capacity – refers to the human capacity to effectively meet challenges/the lack of people or skills to do work or provide input. Relates to Code: Understanding, Engaging. Sub-codes include Organizational networks and scientific literacy/accessibility.

2.8 Indigenous-led – Efforts that are led by Tribes or Tribal entities have been identified as critical capacities for fostering mission effectiveness. The absence of them constrains effectiveness. The sub-code Local Knowledge, Observations refers to knowledge generated by tribes.

2.9 Research gaps - persistent gaps in research can reduce effectiveness of an agency to perform management and mitigation work. Applied science (sub-code) refers to gaps in applied applications of research.

2.10 Scale and scope – AK is large with different location specific needs, etc. and this can impact effectiveness.

2.11 Complex, coupled systems – refers to the interrelation between different systems and events that can often constrain effectiveness. The sub-code cascading, compounding effects refers to interrelated impacts that can stem from one particular event or system or a series of events/systems.

2.12 Alaskan context – Alaska values/context differs from other locations and this can alter effectiveness factors

2.13 Policy – policies and regulation can impact the effectiveness of an agency. Authorities gap (which refers to a lack of clarity in who is in charge of regulating a certain activity) is a sub-code of policy.

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### **C. Hazard Topics**

Describe any condition or situation with the potential for harm in terms of human/animal injury or health, damage to property, damage to the environment, or a combination.

3.1 Human-Animal Encounters - refers to encounters that may introduce harm between humans and animals.

3.2 Natural Hazards - broadly defined; includes all hazards caused by or related to natural environments. Sub-codes include climate threats (natural hazards related to climate change); permafrost thaw; weather events and conditions; floods; sea ice conditions; Ecosystem shifts (hazards that are occurring due to changes in the natural environment); avalanches; landslides; land ice change; tsunamis; heat waves; underwater terrain; wildfires; hydrology; volcanic eruption; earthquakes; and disease.

Many sub-codes are further segmented into sub-codes.

The sub-codes for permafrost thaw include pathogens (hazards related to release or growth of pathogens due to permafrost thaw); ice degradation; expansion of lakes; form of landslide (landslides resulting from permafrost thaw); riverine (hazards related to permafrost thaw in riverine environments - related to erosion and flooding); coastal (hazard related to permafrost thaw in coastal environments – related to erosion and flooding); and alpine (hazards related to permafrost thaw in alpine environments)

The sub-codes for Weather Events and Conditions include river ice; rain on snow; ice fog; snow; sea spray, icing; waves and wind.

The sub-codes for Flood include rainfall; glacial outburst floods; ice jams; and erosion

The sub-code for Ecosystem Shifts include population shifts, migration; disturbance (disturbance of ecosystems causing hazards); unusual mortality events (die-offs of animals); invasive species; and HABs.

The sub-code for land ice change is sea level rise.

The sub-code for wildfires is smoke and ash

The sub-code for hydrology is lake drainages

The sub-code for volcanic eruptions is ash.

The sub-code for disease is zoonotic disease.

3.3 Human Made, Technological – refers to hazards that are caused by human or man-made sources. Sub-codes include transportation, travel accidents; pollution; marine debris; human migration; solid waste management; and political conflict.

Transportation, Travel Accidents include the sub-codes of river (accidents occurring in rivers); aviation (accidents related to aviation travel); and marine transportation (inclusive of hazards related to shipping and vessel traffic)

Pollution includes the sub-codes of noise; PFAS; mining; and oil and gas development (hazards related to the industry, with a sub-code for specifically oil spills)

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## **D. Risk Topics**

Describes anything that was indicated as a likelihood and/or consequence of harm occurring

4.1 Air Quality – refers to risks and consequences associated with changes in air quality

4.2 Water Quality – refers to risks and consequences associated with changes in water quality. There is a sub-code for ocean acidification (the decrease of the pH of the earth's ocean).

4.3 People – refers to risks and consequences that are likely to cause harm to people. Sub-codes include health; research; sanitation; economy; housing; subsistence; travel; tribal communities; disruption in services; stratospheric ozone depletion; reduced military readiness; and human trafficking.

4.4 Animals – refers to risks and consequences that are likely to cause harm to animals. Sub-codes include animal strikes (collisions with animals and vessels) and animal health (risks that affect animal health)

4.5 Natural Environment – refers to risks and consequences that impact the natural environment of the Arctic. Sub-codes include pollution (e.g., fuel pollution); hydrology; land ice buttressing; and erosion.

4.6 Infrastructure – refers to risks and consequences that affect built infrastructure. Sub-codes include roadways (with a sub-code for washed out roadways); energy systems (e.g., wind development, oil and gas, electrical); ice cellars; defense critical infrastructure sites; and buildings

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## **E. Region, Location Specific**

Applies to only those regions and places discussed in dialogs.

5.1 SE Alaska

5.2 Interior

5.3 Dillingham Region

5.4 Bering Sea

5.5 Kotzebue, NW Region

5.6 Aleutians

5.7 State-wide

5.8 North Slope

5.9 Nome Region

5.10 Y-K Delta

5.11 Barry Arm

5.12 Merbok

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**F. Highlighted Efforts, Cases**

Applied to any product or effort that is mentioned in discussions. There are no sub-codes in this code.