

Alaska Center for Climate Assessment and Policy
Project Report

***Alaska Climate Adapters: Update existing review of stakeholder
information needs documents***

Prepared by Casey Brown 6/15/2018

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Introduction:

Previous work analyzing needs document found that stakeholders were wanting more transparency, better collaboration with indigenous communities, and interdisciplinary research that can directly meet community needs (Knapp & Trainor 2013, 2015). Stakeholders suggested changing practices including maintaining accessible data sharing archives, networks for knowledge sharing, and long-term science-community partnerships at a regional scale. Data collection on this project ended in March 2013. This review expanded upon this effort to include updated sources of information (2013-2018) and an analysis that synthesized what stakeholders are saying about what climate adaptation research is needed in their communities.

Methods:

We collected and analyzed stakeholder-generated documents that identified climate change research needs in Alaska (Spring 2013-Spring 2018). The identification and coding of existing climate research needs assessments and documents followed methods outlined in Knapp & Trainor 2013, Knapp & Trainor 2015. Assessments created by research institutions were only included if they conducted the needs assessment to inform practical decision-making and policy. We selected documents based on if: 1) the document was generated by a stakeholder group, 2) related to climate change and 3) identified climate change research needs. We did not include scholarly articles or science plans.

We used qualitative content analysis methods to identify what each document proposed about the type of research that should be conducted and the approach needed to meet stakeholder needs. Content analysis is a methodology that groups sections of text related to similar themes (i.e., coding), to identify thematic patterns across documents (Bernard & Ryan 2009). Following our web search, documents were imported into NVIVO, reviewed, and then coded into themes. Coding followed themes developed by Knapp and Trainor 2013 & 2015. During the review process, we added to the 2013 coding list when new themes were identified. We coded both for research needs and research approach. Once the preliminary rounds of coding were complete, we used word searchers to confirm that we had labeled all the research needs within each document. We used hierarchical coding reports to summarize how often a theme is coded and how many documents included a specific theme. To summarize the information, we present the percentage of total documents that include individual themes. Additionally, we examined what was said by including a few comments to highlight each theme.

Results:

We collected and coded a total of 40 stakeholder documents that identified research needs related to climate change in Alaska (See Appendix 1). The most common type of document was reports (47%), summaries (37%), needs assessments (8%), and strategies (8%). Authors used a diverse set of methods including expert knowledge (28%), workshops (20%), literature reviews

(15%), interviews (15%), surveys (15%), and focus groups (8%). The majority of climate change needs documents came from Western/Southwestern Alaska(33%), Northern Alaska (including the Beaufort and Chukchi (33%), multiple regions (18%), Southcentral Alaska(10%), Southeast Alaska (5%), and Interior Alaska(<5%).

Research Needs:

The majority (85%) of stakeholder-generated needs assessments were associated with socio-economic themes (Figure 1). Over 60% of stakeholder-generated documents wanted a better understanding of how climate change affects subsistence species in Alaska. Subsistence was described within several topics including management, human safety, food security, and management. One document stated, “With changes to subsistence resources, we need new policies to adapt but regulations are very static and difficult to change. We need more research into new emergent species and understanding regulations that need to be changed.” Hazards and safety needs were also mentioned in over half of the needs documents (55%). Hazard and safety needs included those associated with oil spills and marine contaminants, increased risk of disease, exposure to extreme weather and fire events, and travel risk. Additionally, infrastructure, planning, economy, and adaptation were other needs that were commonly identified.

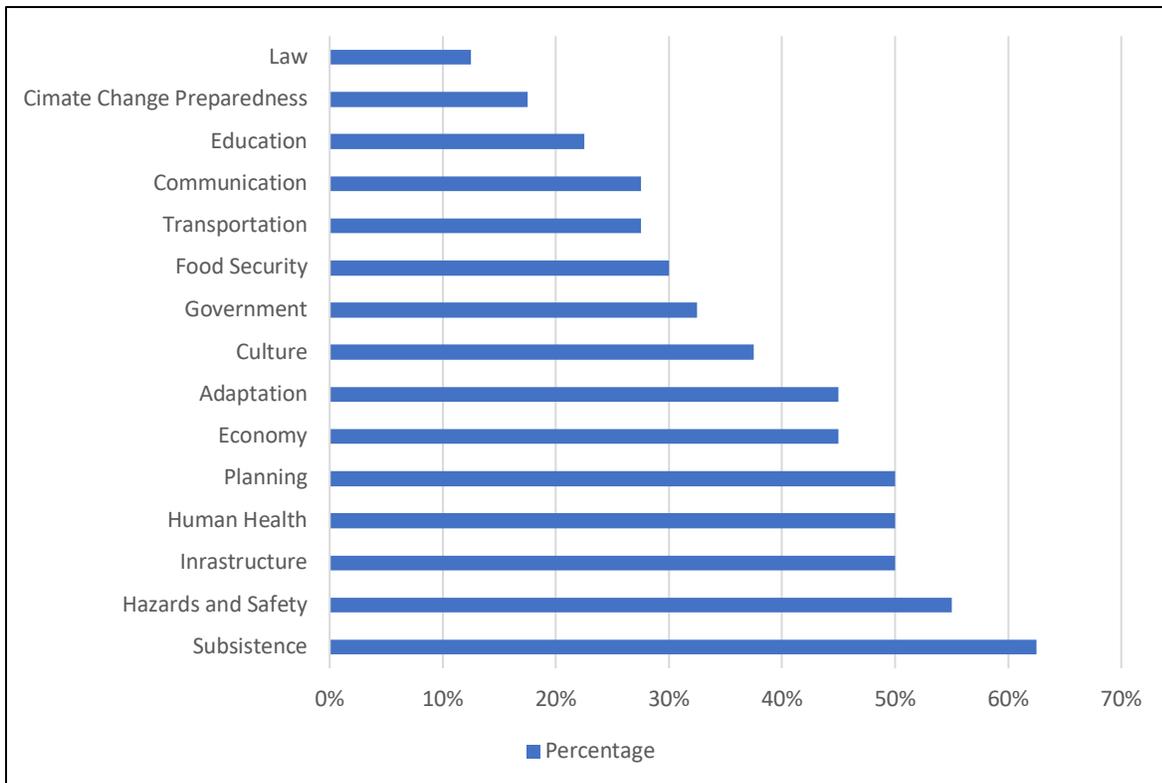


Figure 1. Percentage of documents that identified themes related to the socio-economic system.

Needs related to the ocean (68%) and terrestrial environments (68%) were also frequently stated research themes. In the ocean environment (Figure 2), 65% of stakeholders identified the need for more information on ice conditions. Stakeholders also mentioned needing more information on the marine ecological system (e.g., marine wildlife/fisheries/habitat; 50%) and coastal storm and weather patterns (42%). Coastal storm and weather patterns included information on trends, storms, waves, extreme weather environments, and impacts to human communities. As one document describes, “Site-specific research is needed to gauge impacts on coastal infrastructure. The research should focus on impacts to specific ports and marinas from elements such as sea level rise and storm surge.” In the terrestrial environment (Figure 3), stakeholders highlighted the need for ecological system (e.g., wildlife/fisheries/habitat; 57%) and hydrologic (40%) projects. For example, one document stated, “The top-rated topics in the biological sciences were the development of population trends for specific species. The top species group needing additional research was “subsistence species” followed closely shorebirds, waterfowl, and marine invertebrates.”

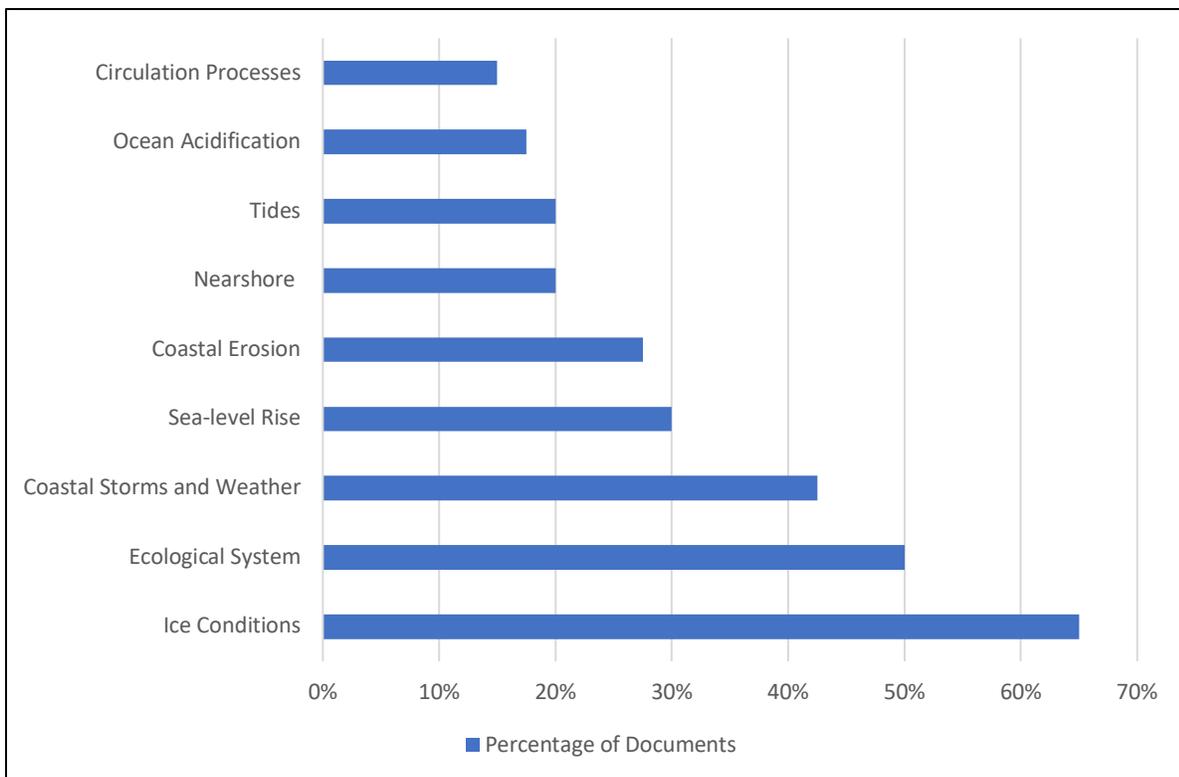


Figure 2. Percentage of documents that identified themes related to the ocean environment.

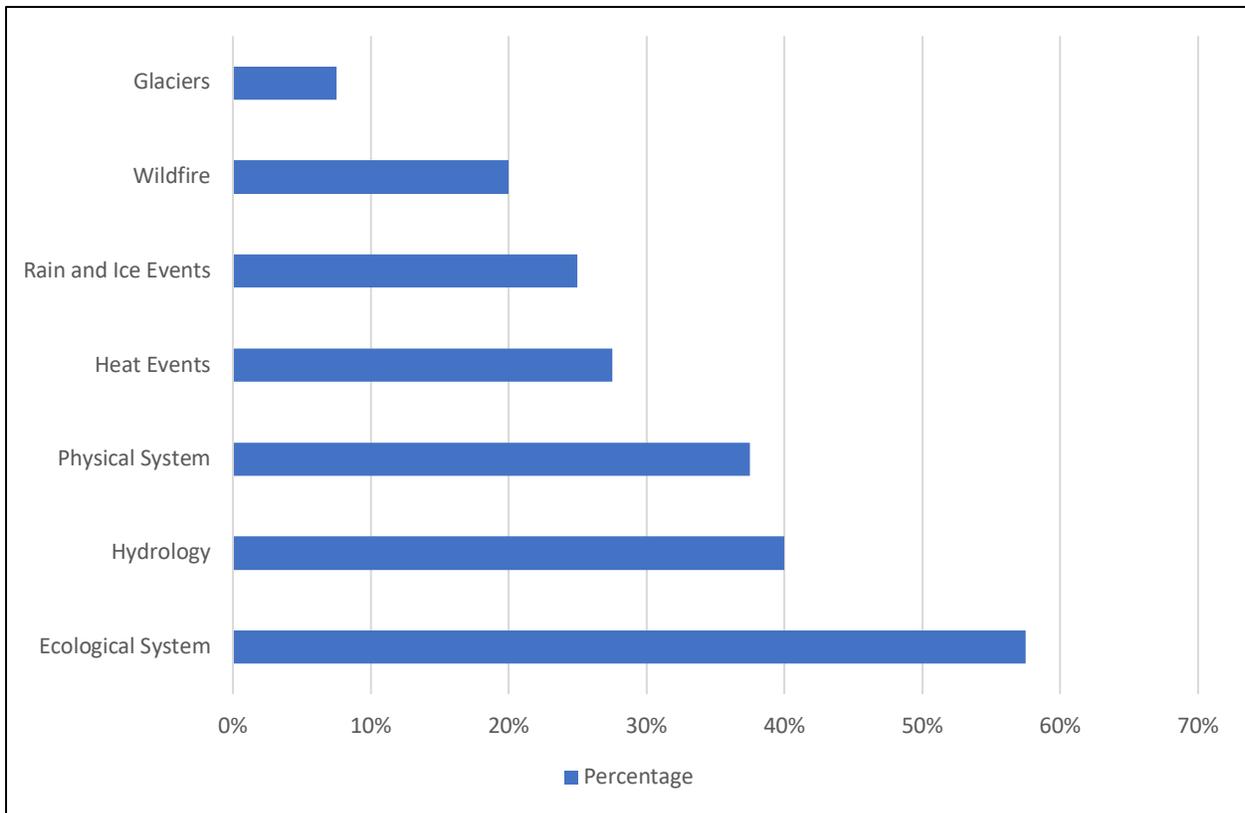


Figure 3. Percentage of documents that identified themes related to the terrestrial environment.

Research Approach

Along with specific research needs, 78% of the documents described a data and monitoring need (Figure 4). According to stakeholders, new monitoring (52%) and data collection (45%) projects were needed. Many documents highlighted the need for community involvement in citizen-based monitoring projects (40%). Additionally, baseline data was absent from many documents including information on ecological, bio-chemical, physical and social-economic variables. Assessments also identified the need for spatially-explicit data (25%) including maps of wildlife habitat, bathymetry, flood and erosion risk and sea ice.

Three-quarters of Alaskan needs documents mentioned the importance of utilizing new approaches to climate change research (see Figure 5). The key change highlighted across documents was the need for better coordination (47%). One document affirmed that, “coordination with the borough, academic institutions and government agencies is recommended to understand sea level, permafrost thaw, erosion and other relevant coastal measures and to provide city and borough planners with the best available information.”

Many of the needs assessments communicated the importance of integrating local knowledge into climate change research (32%). Additionally, better communication was described in almost half of the needs documents (48%). More specifically, improved science communication to the public was stated as a research need in 30% of the documents.

The needs documents also described several important products and tools that should be developed to meet climate change needs (Figure 6). Half of the documents discussed the importance of developing tools for decision-makers. Stakeholders also stated that researchers should focus on information that was relevant to native Alaskan communities (40%). Several documents wanted research to inform standards (38%) that could be used in climate change planning.

Over one-third of the documents (See Figure 7) stated that scientists should develop models including improved weather forecasts (28%), integrated models (23%), and higher-resolution climate models (20%). To reduce uncertainty around extreme weather events, stakeholders made both broad and specific recommendations for new weather forecasting tools. For example, one stakeholder mentioned, “Due to increasing uncertainty, efforts to enhance weather monitoring and forecast systems is encouraged.” Whereas another stakeholder gave more specific recommendations: “The NWS can provide information about wind strength velocity, direction, etc. to help prepare for storms.” Many assessments suggested a new ‘communication infrastructure’ between forecasters and the public on topics including: improved weather forecasts, marine forecasts, flooding forecasts, aviation, fire, high surf advisories, sea ice forecasts (e.g., ice lead time) and weather warnings.

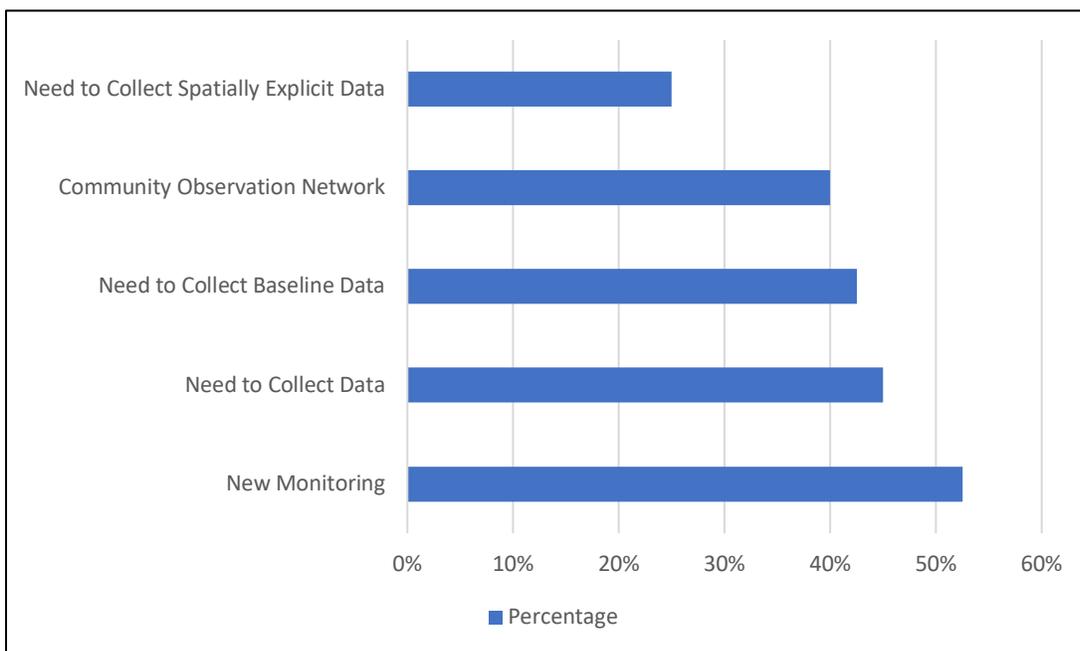


Figure 4. Percentage of documents that identified themes related to data monitoring need.

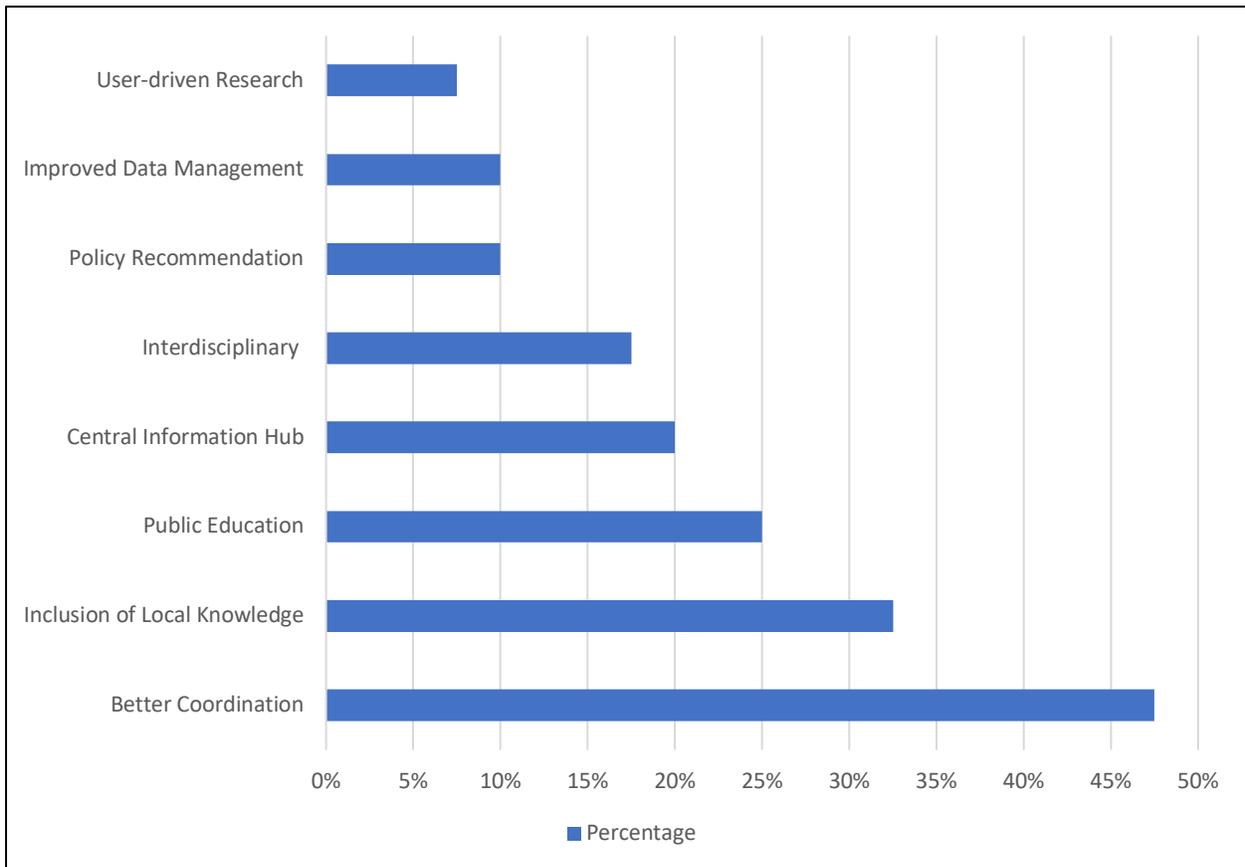


Figure 5. Percentage of documents that identified themes related to new approaches needed for climate change research.

Discussion:

Stakeholders in Alaska have identified several key research needs including more information on subsistence species, human safety, infrastructure, and sea ice conditions. In addition, stakeholders would like to see new monitoring efforts with an emphasis on better coordination and inclusion of local knowledge. Stakeholders would like to see more decision-making tools resulting from climate change projects. Our findings matched several key results that were identified by Knapp and Trainor 2013 & 2015. A key match included the need for increased collaboration and the integration of local knowledge in climate change research. However, we found some difference between the 2013 and 2018 results. Knapp and Trainor found that ‘better understanding of uncertainty’ was the most important theme related to research outcomes. We found that uncertainty was the least important theme and that the production

of decision-making tools was a more important research outcome. This could suggest that contemporary Alaskan climate change research has been more effective communicating uncertainty to the public. Or, that stakeholders have become more concerned about how climate change research can be used in planning efforts. Future researchers should make an effort to apply key results towards products that could aid regional decision-making and planning efforts.

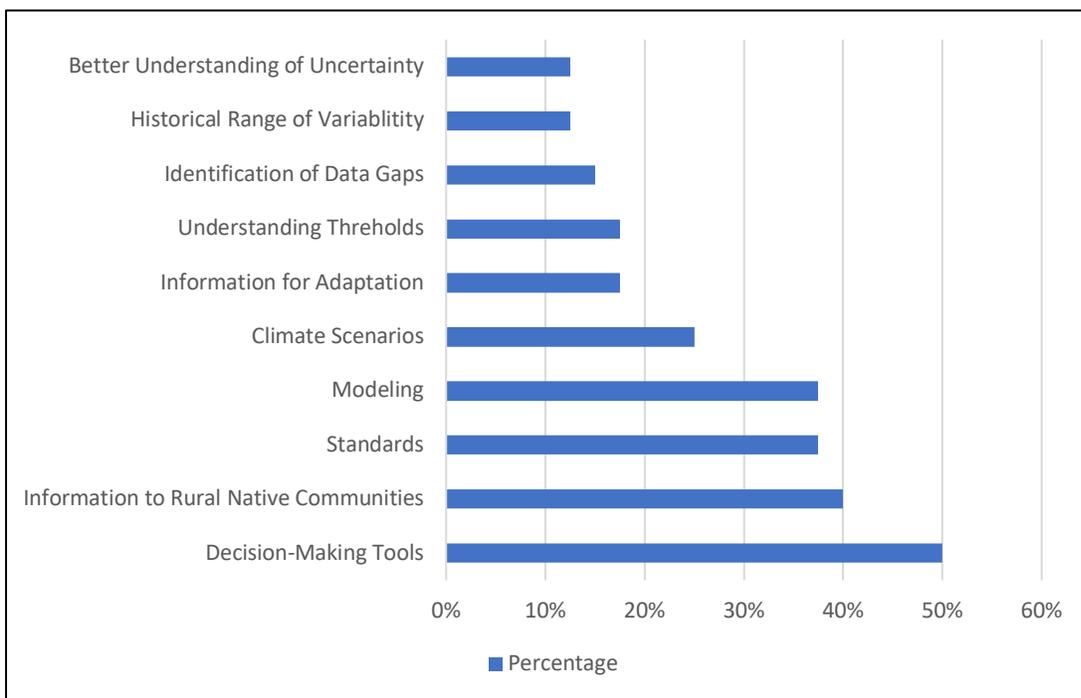


Figure 6. Percentage of documents that identified themes related to new tools needed for climate change research.

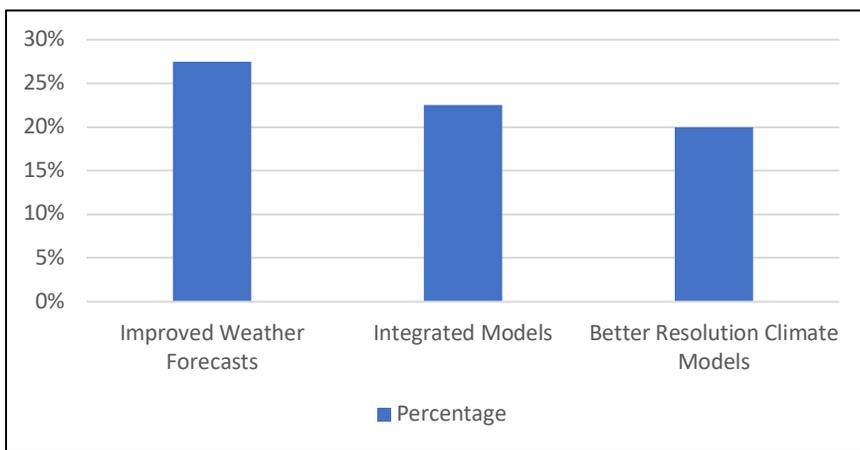


Figure 7. Percentage of documents that identified themes related to new models needed for climate change research.

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Knapp, C.N. and Trainor, S.F., 2013. Adapting science to a warming world. *Global environmental change*, 23(5), pp.1296-1306.

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Appendix 1: Needs documents included in review.

Name of Document	Year	Temporal Scale	Entity Conducted	Primary Sector Served	Method	Region	Eco-region	Type of Document
USFWS Climate Change Adaptation	2015	Short term (2018-2025)	Agency (National)	Climate change science	Interview	South Central	Coastal Rainforest	Report
Stakeholder Based Regional Marine Research Plan for the Aleutian Islands	2016	Not Applicable	Research Institution	Ocean/marine ecology	Expert Knowledge	SW AK	Marine	Report
Alaska State Climate Change Policy	2017	Short term (2018-2025)	Agency (State)	Government (state)	Focus Group	North AK (Arctic)	Several	Summary
Northwest Alaska Research Workshop Summary	2013	Short term (2018-2025)	Research Institution	Climate change science	Workshop	North AK (Arctic)	Tundra	Summary
Adapt Alaska Work Session Summary	2017	Short term (2018-2025)	Research Institution	Coastal systems	Focus Group	Multiple sub-regions	Marine	Report
Alaska Wildland Fire Coordinating Group Needs	2017	Short term (2018-2025)	Agency (National)	Fire	Expert Knowledge	Multiple sub-regions	Several	Summary
Arctic Observing Summit	2016	Short term (2018-2025)	Working Group	Sea Ice	Interview	North AK (Arctic)	Marine	Summary
Current Coastal Change Research Management Needs in SE Alaska	2016	Short term (2018-2025)	Research Institution	Multiple	Literature Review	SE AK	Marine	Report
Climate Change in Bristol Bay	2014	Short term (2018-2025)	Tribal (government or non-profit organization)	Health	Survey	SW AK	Several	Summary
Upper Yukon River Climate Assessment	2016	Short term (2018-2025)	Tribal (government or non-profit organization)	Health	Survey	Multiple sub-regions	Boreal Forest	Summary
Current Coastal Change Projects and Priority Information Needs	2015	Not Applicable	Research Institution	Coastal systems	Literature Review	Western AK	Coast	Needs Assessment

ABSI LCC Strategic Science Plan Workshop Report	2013	Yearly	Agency (National)	Climate change science	Workshop	SW AK	Marine	Report
Kenai Peninsula Health Summary	2014	Short term (2018-2025)	Agency (State)	Health	Survey	South Central	Several	Summary
Promoting Resilience Adaptation Arctic Workshop	2017	Short term (2018-2025)	Agency (National)	Adaptation	Workshop	Western AK	Coast	Summary
Climate Change and Indigenous Peoples- A Synthesis of Current Impacts and Experiences	2015	Short term (2018-2025)	Agency (National)	Tribes	Literature Review	Multiple sub-regions	Several	Report
Exploring Stakeholder Needs for Coastal Research (U of Maine)	2018	Short term (2018-2025)	Research Institution	Climate change science	Interview	North AK (Arctic)	Several	Summary
Climate Change in Levelock	2013	Short term (2018-2025)	Tribal (government or non-profit organization)	Health	Expert Knowledge	Western AK	Coast	Report
Infrastructure Needs in the US Arctic	2016	Every 10 years	Working Group	Multiple	Expert Knowledge	North AK (Arctic)	Marine	Strategy
Climate change in the Bering Strait Region	2015	Short term (2018-2025)	Tribal (government or non-profit organization)	Health	Interview	Western AK	Several	Report
Climate Change in Pilot Point	2015	Short term (2018-2025)	Tribal (government or non-profit organization)	Health	Expert Knowledge	Western AK	Coast	Report
Climate Change in Wainwright	2015	Short term (2018-2025)	Tribal (government or non-profit organization)	Infrastructure	Expert Knowledge	North AK (Arctic)	Coast	Report
International Ice Charting Working Group	2016	Short term (2018-2025)	International Group	Sea Ice	Survey	North AK (Arctic)	Marine	Summary
Experts Workshops to evaluate	2014	Short term	Research Institution	Sea Ice	Workshop	North AK	Marine	Report

coastal current and ice		(2018-2025)				(Arctic)		
NPS Climate Change Scenario Planning Report-Central	2014	Medium term (2025-2050)	Research Institution	Agency (National)	Workshop	Interior	Boreal Forest	Report
Climate Change in Selawik	2016	Short term (2018-2025)	Tribal (government or non-profit organization)	Health	Expert Knowledge	SW AK	Tundra	Report
Nome Tribal Climate Adaptation Plan	Unassigned	Unassigned	Research Institution	Multiple	Interview	SW AK	Coast	Unassigned
Community Observations on Climate Change	2014	Not Applicable	Tribal (government or non-profit organization)	Adaptation	Expert Knowledge	Western AK	Several	Summary
Climate Change in Nondalton	2015	Short term (2018-2025)	Tribal (government or non-profit organization)	Health	Expert Knowledge	Western AK	Coast	Report
Arctic LCC Future Needs Assessment	2013	Short term (2018-2025)	Agency (National)	Community	Survey	North AK (Arctic)	Tundra	Needs Assessment
SE Climate Adaptation Summit Final Report	2016	Short term (2018-2025)	Tribal (government or non-profit organization)	Subsistence	Workshop	SE AK	Coastal Forest	Report
Climate Change in Atqasuk	2015	Short term (2018-2025)	Tribal (government or non-profit organization)	Health	Expert Knowledge	North AK (Arctic)	Tundra	Report
RESILIENCE WHITE PAPER	2017	Short term (2018-2025)	Unassigned	Tribes	Literature Review	Not Applicable	NA	Article
Meeker and Kettle 2017	2017	Short term (2018-2025)	Research Institution	Multiple	Literature Review	Not Applicable	Several	Report
Climate change impact assessment for surface transportation	2013	Short term (2018-2025)	Research Institution	Infrastructure	Literature Review	Multiple sub-regions	Several	Report
Promoting Resilience and Adaptation in Coastal Arctic Alaska	2016	Short term (2018-2025)	Tribal (government or non-profit)	Government (state)	Workshop	Western AK	Coast	Summary

			organization)					
CRRRC Climate Change Workshop Summary	2016	Short term (2018-2025)	Agency (Local)	Adaptation	Workshop	South Central	Coastal Forest	Summary
ALCC Strategic Science Plan draft Feb2013	2015	Every 10 years	Agency (National)	Climate change science	Not Applicable	North AK (Arctic)	Tundra	Strategy
Climate Change in Nuiqsut	2014	Short term (2018-2025)	Agency (State)	Health	Expert Knowledge	North AK (Arctic)	Tundra	Report
Homer Climate Action Plan Analysis-10 year review	2016	Every 10 years	Research Institution	Government (local)	Interview	South Central	Coastal Forest	Summary
Tour Operators Sea Ice Information Needs	2017	Short term (2018-2025)	International Group	Transportation	Survey	North AK (Arctic)	Marine	Summary