JUNE 1, 2018 – MAY 31, 2019

*This performance period covers year 3 of Award NA16OAR4310162
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TEAM MEMBERS
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John Walsh, CO-Director
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Rick Thoman, AK Climate Specialist
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Kristin Timm, PhD Student
Dina Abdel-Fattah, PhD Student
Lindsey Heaney, Masters Student
Sherri Wall, PhD Student
Rick Lader, PhD Student

NEW TEAM MEMBER
Rick Thoman joined the ACCAP team in October 2018 after retiring from the National Weather Service with 31 years of service. As our new Alaska Climate Specialist, Rick brings to the team a unique combination of subject matter expertise, long-standing relationships in communities, and a strong desire to serve ACCAP's mission. We are proud of the continued NWS collaboration that he supports as well as the extensive community outreach and media services that he has added to our portfolio.

WNS COLLABORATIONS
Rick has continued many of the activities and services that he previously provided as NWS collaborator, including presenting monthly climate outlook webinars, creating content for the ACCAP Climate and Weather Highlights Tool, and providing both content and graphical contributions to our quarterly Alaska Climate Dispatch newsletter. Rick also continues to collaborate with NWS Alaska Region to help sustain the ACCAP/NWS partnership through activities such as briefings for the NWS Alaska Region River Forecast Center, and joint webinars.

The seamlessness of the transition and the value of Rick to ACCAP and the role he continues to play for the NWS can best be summed up in a note received by ACCAP from Scott Lindsey (Hydrologist-in-Charge at the Alaska-Pacific River Forecast Center): "I continue to get valuable input from Rick and I think it is great to have someone with so much experience and knowledge continuing to be a part of our team." This cooperative strategy helps to leverage our river and breakup expertise with the unique climate outlook expertise that Rick provided. The end result is better service for our customers throughout Alaska. Internally, it allows our staff to focus on the near-term weather forecasts knowing that Rick and ACCAP are able to provide insight into the standard 2 week to 3 months out climate products available through national centers. Maintaining local climate experts is important to our quarterly Alaska Climate Dispatch newsletters. Rick has also been instrumental in providing support for ACCAP's ongoing, collaborative research with NWS. As discussed further in the Next Steps Section he is integral in the design and implementation of a NWS LCAT distance training module, the need for which was identified in a previous ACCAP project assessing stakeholder information needs for the NWS Alaska Region.

Rick has become the go-to expert for media outlets looking to understand what is happening in Alaska and its impact on weather and climate around the US and the globe. He has received 431 media mentions since joining us, ranging from local news outlets such as the Nome Nugget and the Anchorage Daily News to national and international outlets such as the Washington Post, the New York Times, and CBS News.
BUILDING TRIBAL RELATIONSHIPS

Project Personnel: Kettle, Malinda Chase (ACCAP Partner)

Key Audience and Stakeholders:
- Alaska Native Tribal Health Consortium (ANTHC)
- Institute for Tribal Environmental Professionals (ITEP)

ACCAP is building on and expanding established relationships with key trusted tribal organizations who are supporting tribal climate adaptation planning in Alaska. These organizations include the Alaska Native Tribal Health Consortium (ANTHC) and the Institute for Tribal Environmental Professionals (ITEP), an organization that serves tribes throughout the country.

In collaboration with the Alaska Tribal Resilience Liaison housed within the USGS Alaska Climate Adaptation Science Center (AK CASC), ACCAP approached ITEP and ANTHC to evaluate a series of recent tribal climate adaptation planning trainings. In the Alaskan context, ACCAP was interested in understanding the status of tribal climate adaptation planning, ongoing tribal adaptation planning needs, and potential barriers and opportunities to planning. ITEP and ANTHC were interested in how their ongoing trainings could be improved to meet tribal needs in Alaska. In this reporting period, individuals within ACCAP, ANTHC, and ITEP worked together to develop trust and gain a better understanding of each other’s goals. The Alaska tribal resilience liaison played a central role in navigating this new relationship.

Key findings from the evaluation:
1. Climate change is being incorporated into several planning documents;
2. One of the most helpful aspects of training for participants was learning what changes are occurring in other communities and how they are adapting to these changes;
3. Lack of local level tribal leadership may be a barrier to climate adaptation planning. For example, over 95% of participants viewed support from local tribal leadership as at least very important to planning. However, of these participants, 29% believed they didn’t have full or moderate support.
4. On-going training is desired by participants to meet continually emerging needs.

OUTREACH & MEDIA SERVICES

In addition to maintaining a strong connection with NWS Alaska Region, Rick has significantly expanded ACCAP’s outreach capacity, especially in traditional and social media. His expertise in reaching geographically dispersed audiences helps him serve rural Alaskan needs. Since joining the ACCAP team, Rick’s outreach activities include:

- **Print and reports**
  - Nome Nugget • Weekly ocean conditions (sea ice, sea surface temps, etc.) and outlooks with a focus on Western Alaska
  - Alaska Climate Dispatch • Seasonal climate reviews and focused articles
  - 4th National Climate Assessment • Alaska chapter co-author, media contact

- **Radio**
  - Beyond the Weather • KUAC (Fairbanks, AK) - Weekly 90 second interview on Interior Alaska climate related topics (historical events to climate models)
  - Recurring segments • Regional focus, emphasis on serving rural Alaska
  - Climate highlights • KNOM (Nome Alaska), KDLG (Dillingham, AK), KYUK (Bethel, AK) - 70 second climate highlights on a climate topics (including sea ice) relevant to western Alaska, tailored for the different communities
  - Iditarod weather forecasts • KNOM (Nome, AK) to supplement KNOM’s 40+ years of Iditarod Race Coverage

- **Social media**
  - Twitter • 5,000 followers on @AlaskaWx: Alaska climate (including sea ice) and impacts focused, reaching many in the news media, local to national
  - Facebook • pages (administrator and contributor):
    - SNAP and ACCAP merged with International Arctic Research Center (IARC)
    - Seward Peninsula/Bering Strait Weather and Climate Info

- **Presentations to community groups**
  - ANTHC/Arctic OneHealth • Seasonal climate presentation (quarterly)
  - U.S. Department of Defense, Arctic Domain Security Orientation • Alaska climate and environmental change presentation (several times/year)
  - Glen Gerberg Weather & Climate Summit • Invited presentation (January, 2019)
  - Alaska Marine Science Symposium • Keynote address (January, 2019)
  - One Tree Alaska • Green-up forecast (yearly, ongoing)
  - Bethel Search & Rescue • Kuskokwim River freeze-up outlook (yearly, ongoing)
  - Alaska Institute for Justice • Bering Sea storm outlooks and subject matter expert for imminently threatened communities project (weekly in autumn)
  - Sea Grant/UAF NW Campus • Climate and sea ice presentations and community briefings (periodic)
  - US Arctic Research Commission meeting • Presentation (May 8, 2019)
NEW FOCUS & PARTNERSHIP

CROSS-RISA COLLABORATION
Cross-RISA collaboration between ACCAP and SCIPP, leveraged with funding from CPO Sectoral Applications of Research Program (SARP).

Building resilience to extreme events and water hazard planning in rural communities

Project Personnel: Trainor, Walsh, Holen (AK Sea Grant), Thoman

Key Audience and Stakeholders:
- Water managers in Bethel and Nome, Alaska
- Water managers in Terrebonne Parish, Louisiana

In September of 2018, ACCAP initiated a new research collaboration with the Southern Climate Impacts Planning Program (SCIPP) comparing the information needs of water managers in remote rural communities in both regions with existing available weather and climate information, in a project funded by the NOAA Climate Program Office, Sectoral Applications of Research Program (SARP).

Small, rural coastal communities are similarly exposed to extreme precipitation and flood events as larger, urban centers, yet they often face added vulnerability due to lack of capacity, resources, and expertise. Research indicates that creating and maintaining robust networks can reduce risk to extreme events.

Objectives:
1. Compare water and wastewater manager information needs related to extreme precipitation and flooding events at sub-seasonal, seasonal, and annual time scales to available model outputs.
2. Identify key elements of regional networking, communication, and collaboration for small rural communities that can reduce risk and increase regional resilience to extreme events.

The project is being conducted in partnership with Alaska Sea Grant and in close collaboration with a team of project advisors, including representatives from the Water Environment and Re-use Foundation, the EPA Climate Ready Water Communities program, and regionally relevant scientists and stakeholder groups such as the Denali Commission and the US Arctic Research Commission. We are examining three case study communities: Nome, Alaska, Bethel, Alaska, and Terrebonne Parish, Louisiana, to learn about water manager information needs in extreme event preparedness and response and compare these with existing climate model outputs. Then, building on existing, available products and tools, we are creating practical project outputs that are designed with the guidance of our advisory team to be useful and relevant to rural water managers. We focus on end-to-end research with direct relevance and application to reducing risk to extreme events by water and wastewater systems in rural, coastal communities.

Project phases and methodologies:
1. Water manager information needs & networks – data collection and analysis via on-line survey, semi-structured interviews, and focus groups.
2. Sub-seasonal to seasonal climate model output synthesis – Available forecast products will be synthesized and compared to rural water manager information needs as identified in activity 1. We will work with USGCRP CRT to ensure integration and reduce duplication with the existing dashboard.
3. Bridging scientific and water/wastewater management communities – A series of webinars will be scheduled and hosted by ACCAP to facilitate dialog between climate modelers and the hazard/risk management community within and across regions.
4. Dissemination of expected outputs & deliverables –
   - Comparison of rural water manager information needs with available forecast products on the sub-seasonal, seasonal, and annual time frames.
   - Guide for communication, collaboration, and network building to increase local and regional capacity and resilience to extreme events, aimed for rural water manager audience.

5. Evaluation/assessment of outputs – With assistance from project advisors, we will evaluate the other project outputs through user feedback surveys and questionnaires.

Thus far an online survey has been designed with the input from stakeholders in both Louisiana and Alaska. Water managers in both Alaska and Louisiana have been identified and the survey has been deployed. Data is currently being gathered and analyzed. Additionally, key water managers will be identified and, if willing, they will be interviewed in the fall of 2019. This project will be completed in the Fall of 2020.

NEW USDA PARTNERSHIP
New partnership with the US Department of Agriculture (USDA).

Research, capacity building, and training for meeting the climate change challenges in Indigenous communities in Alaska

Project Personnel: Trainor, new Post-Doctoral Fellow in recruitment

Key Audience and Stakeholders:
- UAF College of Rural and Community Development students
- UAF Climate Scientists

ACCAP Co-Lead Sarah Trainor is receiving leveraged funds from the US Department of Agriculture (USDA) Hatch program. The project emphasizes climate impacts on ecosystems and community development and has three key elements.

1. Conduct research to advance the theoretical and practical knowledge of sustainability science, use-inspired research, and stakeholder engagement.
A key milestone to date is the formation and regular meetings of a core partnership group including ACCAP PI Sarah Trainor and Program Manager Tina Buxbaum, the BIA Tribal Liaison in Alaska and the community outreach specialist with the Community Partnership for Self-Reliance group at UAF. The group is focused on climate adaptation capacity building in rural Indigenous communities. One of its goals is to create research and education partnerships across campus at UAF between the climate science and related research and the College of Rural and Community Development, and Indigenous studies academic programs in order to train Indigenous students in climate adaptation planning as well as train climate science students in working in rural, Indigenous communities.

OUTPUTS

VISUALIZATION TOOLS
Pan-Arctic sea ice atlas
Project Personnel: Walsh
Key Audience and Stakeholders:
- Climate Researchers

Through a partnership with the National Snow and Ice Data Center, we have developed a visualization tool by which users can view coverage of Arctic sea ice for any month from 1850 onward. The visualization draws upon the dataset “Sea Ice Back to 1850 (SIBT1850)”, developed under prior ACCAP funding as an extension of the Historical Sea Ice Atlas for Alaska Waters. The visualization tool also enables users to examine the contribution from each of approximately 20 data sources to the gridded field for a particular month and year.

The visualization tool includes a matrix for selection of a decade of interest; the selection then provides users with clickable icons for each month and year within the decade. The decadal selection matrix can also be used to show the coverage of each source in the dataset, with a display consistent with the decadal selection matrix. Each pixel of the coverage matrix contains 10 rows (years in the decade) and 12 columns (calendar months). Figure 1 provides examples of the coverage of data from the Danish Meteorological Institute and the NASA passive microwave data. We expect the tool to go live in the fall of 2019.

Figure 1. Decade selection matrix (top) and examples of displays of the coverage of different data sources (bottom) from the SIBT1850 visualization package.

COASTAL COMMUNITY VULNERABILITY INDEX
Visualizations of change in Cook Inlet
Project Personnel: Holen (AK Sea Grant)
Key Audience and Stakeholders:
- Cook Inlet tribes and resource developer

The Cook Inlet Response Tool is a data integration and visualization tool designed to for oil and gas extraction planning and to assist in the event of a technological disaster in Cook Inlet. This project integrates a human dimensions or socio-economic layer into the Cook Inlet Response Tool called the Wild Resource Harvest and Use by Cook Inlet Communities. Methods for this project include a project partner, Axiom Data Science, which is overlaying the data sets to create maps and visualizations. To ground-truth the harvest and use data, as well as to get a better understanding of coastal change and resource abundance and harvesting activities, meetings were held with environmental managers at three Cook Inlet tribes in Seldovia, Nanwalek, and Tyonek. These communities represent a spread geographically with Tyonek in Northern Cook Inlet, Seldovia in Kachemak Bay, and Nanwalek at the outlet of Cook Inlet. Based on discussions with participants in the three communities, potential layers to include in the Cook Inlet Response Tool that could be overlaid on the harvest and use layers include contaminants, vessel traffic, harmful algae blooms, ocean acidification, and sea bird distribution.

This project was a test case to see whether a human dimensions or socio-economic layer would be useful for environmental planning at the local level as well as planning and response at the regional level. There was active interest in this project by the three communities where meetings were held, Seldovia, Nanwalek, and Tyonek. Holen is currently working with Axiom Data Sciences on another project under Adapt Alaska (adaptaakla.org) to build a similar tool for the Bering Sea Region that includes 29 communities spanning from Unalaska to Kivalina. This is in response to community concerns in the region from increased ship traffic and potential for vessel drift and fuel spills. The North Pacific Fisheries Management Council is interested in having spatial subsistence data for the Bering Sea and this next tool should be useful for both the Bering Sea Fisheries Ecosystem Plan as well as council decision making.

COLLABORATIVE LEARNING
Adapt Alaska + website
Project Personnel: Holen (AK Sea Grant)
Key Audience and Stakeholders:
- Rural communities, tribes, agencies, and nonprofits

Adapt Alaska is a resource for communities, tribes, agencies, and nonprofits to enable individuals, communities, and regions in Alaska to learn how to monitor changes, mitigate impacts, build resilience and ultimately adapt to rapidly changing ocean and climatic conditions from Southeast Alaska to the Arctic. The website is a tool to expand existing collaboration to support ongoing networking and collaboration, supplementing and strengthening the benefits of face-to-face meetings and helping to link people facing shared challenges. Alaska Sea Grant and ACCAP collaborate closely on research and projects that help further Alaska’s understanding of and resilience to a rapidly changing environment. Adapt Alaska is the coastal resilience website for both Alaska Sea Grant and ACCAP. Other partners who helped with the vision of Adapt Alaska include the National Oceanic and Atmospheric Administration, Aleutian and Bering Sea Islands Landscape Conservation Cooperative, Southeast Alaska Tribal Ocean Research, Sitka Tribe of Alaska, and Central Council of Tlingit and Haida Indian Tribes of Alaska.

The website is undergoing a redesign to make it more accessible and easier to edit and maintain. Alaska Sea Grant hosts the website adaptaakla.org. More detailed are provided in the Impacts and Narrative section.
PROOF OF CONCEPT
Sea ice hazard tool
Project Personnel: Kettle, Abdel-Fattah
Key Audience and Stakeholders
• National Weather Service
• Search and Rescue teams
• Coastal indigenous communities in Alaska
• Other marine operators

Improving situational awareness and decision support are critical in supporting planning and emergency response to sea ice hazards in the Arctic. Using a model of knowledge co-production, ACCAP developed prototype sea ice hazard tools for maritime operators in the Arctic based on the analysis of historical data. A video demonstration of the process can be found online. Our process included assessing the decision context of operators and responders (US Coast Guard, subsistence hunters, and local search and rescue), identifying three types of sea ice hazards from historical radar data (convergence, breakout, and high speed), identifying and testing hazard notification formats and procedures among our project partners (NOAA’s Arctic ERMA and National Weather Service Alaska Sea Ice Program) for the early warning system, optimizing the tool based on stakeholder feedback, and evaluation. This research was situated in Utqiagvik (Barrow), Alaska. Funding was leveraged from the Arctic Domain Awareness Center – a Department of Homeland Security Science and Technology Center for Excellence. This research has broader implications for understanding how university-based Arctic system science observations, which are of disproportionate importance in the Arctic, may be used in decision support. As stated by a sea ice analyst for the NWS Alaska Sea Ice Program:

Sea ice hazard tools such as these could help bridge the gap between the big picture expertise of the National Weather Service and the local expertise of those in coastal indigenous communities in Alaska. We are excited about the possibility of being able to enhance our decision support service to remote and tribal communities by providing a more detailed and practical sea ice-related hazard information to those operating on and near the sea ice within Alaska and believe these tools will be helpful in addressing this need.

Next steps in support of tool development includes securing funds to support near real time observations, as the radar is currently non-operational, and obtaining evaluation feedback from service providers and decision makers.

ARCTIC CRISIS RESPONSE
TOOL DEVELOPMENT

DATA PROCESSING & ARCHIVAL

ICE NOTIFICATIONS

PROCESSING
• Image annotation
• Ice velocity & divergence calculation
• Ice threshold detection

PRODUCTS
• Annotated and animated imagery (web-ready)
• Raster imagery (GIS-ready)
• Velocity vectors (GIS-ready)

COASTAL RADAR

PROCESSING
• Georeferencing

Radar snapshot every 4-5 minutes

NATIONAL LEVEL REPORTS
Fourth National Climate Assessment: NCA4, completed in November 2018, is a comprehensive and authoritative report on climate change and its impacts in the United States.

ACCAP Authors:
• Sarah Trainor – Alaska Chapter co-author
• Rick Thoman – Alaska Chapter co-author and media contact
• Nathan Kettle – contributor to Alaska Chapter

REGIONAL ALASKA PRODUCTS
Quarterly Climate Outlooks: Developed in partnership with ACCAP and Environment & Climate Change Canada, contains a snapshot of recent weather and climate events and anomalies; regional weather impacts on the local ecosystems and economy; and a climate forecast for the coming 3 months.

Bering Sea Ice Conditions: Winter 2019: This summary of record-breaking sea ice loss in the Bering Sea is the second in a series of yearly summaries started in 2018. It is compiled by the International Arctic Research Center, Alaska Center for Climate Assessment and Policy, and Alaska Sea Grant. Content is based on requests from the Bering Sea communities relayed via the local Alaska Sea Grant Marine Advisory Program agent for information to help them make sense of the unprecedented sea ice loss in the area.

Alaska Climate Dispatch: Published biannually and written for a non-technical audience. Features seasonal weather and climate summaries and Alaska weather, wildfire, and sea ice outlooks and focused articles.

LOCAL OUTREACH
Radio
Beyond the Weather (KUAC) - Weekly 90 second interview on a range of climate related topics (historical events to climate drivers to climate models) with a focus on the Interior

Climate Highlights (KNOM) - 70 second spots on a range of climate related topics that are relevant to western Alaska, including sea ice

Translating weather for Alaska’s Iditarod sled dog race - Iditarod weather forecasts for KNOM to supplement KNOM’s 40+ years of race coverage

Print media
Nome Nugget - Weekly sea ice conditions and outlooks with a focus on Western Alaska stakeholders

CORE OUTREACH ACTIVITIES
ACCAP webinar series
Alaska Climate Webinar Series (monthly since 2007)
National Weather Service Alaska Climate Outlook Briefings (monthly since 2014)
Virtual Alaska Weather Symposium in partnership with the Geographic Information Network for Alaska-GINA (monthly since 2017)
Building Research Capacity

We are working to build our research capacity and are currently in the recruitment phase of hiring two new post-doctoral fellows in two areas: the economics of climate change in Alaska and knowledge co-production among scientists and Indigenous communities.

Economics of a Changing Alaska

Project Personnel: Trainor, Meeker, new Post-Doctoral Fellow in recruitment

While much research measures and projects physical and ecological effects of climate change in Alaska and their consequences for communities, relatively little research addresses the economic impacts and opportunities of climate change in Alaska. Little work assess the economic costs and benefits of Arctic change, especially impacts in Alaska, or the value of existing federal and state services and products. ACCAP has a goal to develop research capacity in the relevant work of the NOAA North Pacific Fisheries Laboratory. On advice from economists in the region, we also plan to host a workshop on data availability and limitations as a step zero for conducting future research. To move these efforts forward, ACCAP is recruiting a post-doctoral fellow to conduct interdisciplinary analyses of economic impacts of climate change in various sectors in Alaska and to assist in assessing the economic impact of ACCAP’s scientific and stakeholder engagement activities.

Assessing Climate Change Knowledge Co-production & Boundary Spanning

Project Personnel: Trainor, Timm, Malinda Chase, new Post-Doctoral Fellow in recruitment

Climate change impacts are being felt by Indigenous peoples as well as throughout a range of societal sectors, including wildfire management. Recent scholarship suggests that boundary spanning, translational ecology, and the process of knowledge co-production are effective in bridging the gap between science and decision-making. Currently, many people who work in this field learn from first-hand experience. There is a growing need and call for an expedited process for gaining boundary spanning skills and for building capacity by developing processes for effective evaluation and for training boundary spanning professionals. With this in mind and building on our work in the realm of building capacity for actionable climate science in Alaska as well as assessment of the application of climate information in wildfire management and decision making in Alaska, ACCAP is leveraging its new partnership with the USDA detailed in an earlier section to build our capacity in research and application in assessment and training in knowledge co-production. We are actively recruiting for a post-doctoral fellow to explore one or more of the following, actions, processes, and mechanisms for use-inspired science; metrics of success in knowledge co-production; scientist and practitioner training in knowledge co-production and boundary spanning.

NWS distance training modules

Project Personnel: Kettle, Thoman

Key Audience and Stakeholders:

- National Weather Service Forecasters

ACCAP is collaborating with the NWS to develop distance training modules for the Arctic Local Climate Analysis Tool (LCAT). LCAT is a tool developed, designed, and housed by the NWS to understand local climate variability and impacts, local climate trends in the context of global change, and link weather and water events to climate signals. LCAT may be used by anyone, including NOAA personnel and the general public. This work was motivated based on findings from a needs assessment of climate service needs for the Alaska Region National Weather Service that was conducted by ACCAP. A web-based questionnaire was sent to 21 Alaska Region NWS Staff in May 2018, which identified factors complicating the analysis and prediction of weather, climate, and related phenomena in Alaska (data access, availability, format), use of existing climate tools, and stakeholder engagement. This assessment also revealed a need by NWS Alaska Region Climate Service providers to have training on variables within LCAT that are Arctic specific (e.g., sea ice). Findings were shared with NWS Climate Service Branch, who recommended that ACCAP begin developing this distance training module that provides an overview of the web-based interface and a discussion of how to interpret data queries. Funding for the needs assessment and distance training module were leveraged from the Climate Program Office.

External Program Evaluation

In the fall of 2018 ACCAP contracted with Susi Moser to conduct a programmatic evaluation of ACCAP with two key areas of interest:

1. better understand the impact of past and ongoing work
2. identify areas of improvement and innovative directions for future work.

Based on background information on past evaluative efforts, including an existing logic model, as well as discussion between Susi and the ACCAP team, the following questions emerged as desirable foci for this round of external, programmatic evaluation:

Looking back:

- How do stakeholders become aware of ACCAP?
- How do stakeholders perceive ACCAP’s work?
- How do stakeholders actually use ACCAP’s information? And what is achieved as a result?

Looking ahead to future opportunities:

- What opportunities and avenues might there be to value ACCAP’s impact in economic terms?
- More specifically, what tools, information and other needs to stakeholders have that ACCAP might develop and deliver?
- Considering opportunities and capacity constraints, should ACCAP expand its existing stakeholder base (e.g., additional sectors currently not represented) or deepen the stakeholder relationships and partnerships it currently has (e.g., engage with existing stakeholders in new or different ways)?
- What is unique about what ACCAP offers in the larger landscape of Alaskan boundary organizations, many of whom are ACCAP partners, as well as within the RISA family? How can ACCAP activities be shaped to constitute a coherent research-and-service package?

Thus far as part of this evaluation effort Susi has conducted a site visit in Fairbanks, in which she met with the core ACCAP team both as a group and individually as well as with locally based representatives of core partners. This has allowed her to get a better understanding of the work ACCAP does and how the team works together.
Cameron Carlson, LTC (Ret.), PhD and Chair of the US Arctic Research Commission: May 8, 2019 Thoman presented at the 111th US Arctic Research Commission meeting in Anchorage, in response ACCAP received a letter of appreciation from Fran Ulmer, Chair of the US Arctic Research Commission:

On behalf of the members of the US Arctic Research Commission, I want to thank you for your information presented at our 111th USARC meeting, May 8th, 2019 in Anchorage. With conditions in the Arctic changing as such a rapid pace, we appreciate receiving the timely and relevant information that you presented to the Commissioners so that we may better understand the region’s many challenges.

May 23, 2019 Cameron Carlson, LTC (Ret.), PhD and Principle Investigator for the Center for the Study of Security, Cyber, Hazards, Response and Preparedness at the UAF School of Management, wrote:

Rick is a key presenter during the course. The course provides a comprehensive introduction on many topics concerning the Circumpolar North. One of the critical modules is Mr. Thoman’s presentation on “The Climate, the Change and Alaska.” It is the second module presented at each delivery in order to baseline participant knowledge concerning relevant climate sciences... His professionalism and extensive knowledge of the complex climate sciences are greatly appreciated by all participants as being particularly understandable and meaningful. Mr. Thoman’s expertise has helped ensure that the collective product and delivery of our program remains world class as well as the continued lead in Arctic scholarly and applied sciences authority.

In the next year, several efforts are underway including a vulnerability assessment for the Chilkat Valley with Chilkat Indian Village and potentially Chilkoot Indian Association. In May we hosted the second Southeast Alaska Climate Adaptation Workshop (Adapt SE AK) to implement the regional adaptation plan where each tribe tailors this plan, drafted by Central Council Tlingit Haida, to their own individual needs. The Adapt Y-K (Yukon Kuskokwim) project is coming to an end this year which will involve mitigation strategies focused on drying fish, infrastructure, and trails. In March we started Adapt Kodiak by forming the first steering committee to initiate conversation on resilience planning for Kodiak’s unique environment. This year the adaptalaska.org website will be redesigned with an adaptation planning tool for communities. Adapt Alaska and adapting communities is an ever-evolving process that itself is adapting to a changing Alaska and will continue to change and adapt moving forward.

Abdel-Fattah’s work is an example of applied and co-produced science. Her research was developed in collaboration with the aforementioned partners, to help them better understand the impact and value of their science products. She also works closely with the City and Borough of Juneau to ensure the GLOF-related information needs of emergency responders are met. Abdel-Fattah's work could provide economic return by improving understanding of how science products are used by stakeholders. This will allow GLOF information providers such as the National Weather Service and the US Geological Survey to focus on high value products with the broadest audience. This work supports the Alaska Climate Adaptation Science Center's website development for monitoring the GLOFs in Juneau. Abdel-Fattah may continue her collaboration with the National Weather Service upon completion of her PhD.

Alaska is often identified as being on the front lines of climate change since it is warming faster than any other state and faces a myriad of associated issues. The cost of infrastructure damage is projected to range from $110 to $270 million per year, assuming timely repair and maintenance. Although climate change does and will continue to dramatically transform the climate and environment of the Arctic, proactive adaptation in Alaska can reduce costs associated with these impacts. This includes the dissemination of tools, such as guidebooks to support adaptation planning, some of which focus on Indigenous communities. While many opportunities exist with a changing climate, economic prospects are not well captured in the literature at this time.


Describes the construction of an outreach project in which downscaled climate model projections were made available to more than 1000 communities in Alaska and northwestern Canada. Key steps in the product development were climate model selection based on historical performance over Alaska, bias-correction based on observational data, and synthesis of the projected changes of temperature and precipitation for each community for each decade through 2100. All projections are accompanied by ranges of uncertainty.


Synthesizes a diverse suite of Arctic indicators to present a coherent system-wide depiction of Arctic change over the past 4-to-5 decades. The changes included fundamental climate variables (e.g., temperature) as well as climate-impacted quantities such as wildfire burn area, river discharge, and glacial melt. Correlations between temperature and changes over land, ocean and the cryosphere pointed to a role of thermodynamic drivers of the changes that pervade the Arctic system.