



## **Alaska Center for Climate Assessment and Policy (ACCAP) Annual Report**

**Award Title:** Alaska Center for Climate Assessment and Policy

**Performance Period:** May 1, 2011 – April 30, 2012

In this performance period ACCAP has been in transition between the wrap-up of our Phase I grant and the initialization the Phase II award.

### **Team Members:**

*Principal Investigators:* Dan White (ACCAP Phase I); Sarah Trainor (ACCAP Phase II)

*Co-Investigators:* Craig Gerlach (Phase I), John Walsh (Phase I and II), Philip Loring (Phase II), Jeremy Mathis (Phase II), and Scott Rupp (Phase II)

*Coastal and Living Marine Research Specialist:* Philip Loring

*Research Associate:* Corrine Knapp

*Program Manager:* Brook Gamble

*Graduate Students:* Hannah Harrison and Eunkyong Hong

**ACCAP Steering Committee:** Ex Officio Members include former ACCAP PI and Director, Institute of Northern Engineering, University of Alaska Fairbanks, Dan White; Director, Alaska Ocean Observing Systems, Molly McCammon; Director, NOAA Alaska Region Climate Service, James Partain; Acting Director, Alaska Region National Weather Service, Aimee Devaris; Coordinator, NOAA Alaska Regional Collaboration Team, Amy Holman. Members-At-Large include Lawson Brigham, Professor of Geography & Arctic Policy, UAF; David Christie, Director, Alaska Sea Grant; Jackie Kramer, Alaska Climate Change Coordinator, EPA; Michael Macrander, Science Lead, Shell Alaska Venture; Vera Metcalf, Director, Alaska Eskimo Walrus Commission, Kawerak Inc.

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### 1. NEW AREAS OF FOCUS AND PARTNERSHIPS

ACCAP has expanded our partnerships in core areas of coastal and living marine resources and native tribal impacts and adaptation. We are expanding decision-support tool development in sea ice information services. New areas of focus and stakeholder partnerships include cryosphere hazards research, international collaboration, meta-analysis of regional climate information needs and National Forest vulnerability assessment.

#### *A. Coastal and Living Marine Resources*

ACCAP’s focus on coastal and living marine resources is deepened and broadened significantly in this reporting period by new research and partnerships. P. Loring conducted coastal community vulnerability research in Bristol Bay, in partnership with **Alaska Native Tribal Health Consortium, Bristol Bay Borough, and Bristol Bay Natives Association** (with leveraged funds from **NOAA CPO/CSI-Coasts**). P. Loring and C. Gerlach initiated food security assessments in Southcentral Alaska. Partners include **NOAA’s Kachemak Bay National Estuarine Research Reserve** and **Sustainable Homer**. P. Loring initiated a citizen science biodiversity monitoring project on the arctic coast of Alaska, in collaboration with **Alaska SeaLife Center** (with leveraged funds from **USFWS Arctic LCC**).

Co-Investigator J. Mathis initiated an ocean acidification (OA) sensitivity index for coastal Alaska to analyze the impacts of OA on Alaskan waters and work with coastal communities to help them better understand and adapt to the resulting ecological and economic implications. This project is in collaboration with the **UAF Ocean Acidification Research Center, NOAA Pacific Marine Environmental Lab** and the **North Pacific Research Board**.

#### *B. Sea Ice and Cryosphere Hazards*

ACCAP is partnering with the **Alaska Ocean Observing System (AOOS)**, the **National Weather Service Anchorage Office Sea Ice Desk**, the **National Snow and Ice Data Center (NSIDC)**, and **NOAA’s Pacific Environmental Marine Laboratory (PMEL)** to produce a Digital Sea Ice Atlas. The atlas consists of digitally-stored sea ice concentration data on a grid covering all Alaska coastal waters to a distance of ~500 km (300 mi) from

shore, with a spatial resolution of 25 km. The time resolution is monthly for the period 1850s-1950s, and weekly for the period from the early 1950s to 2010 with the allowance of subsequent updates. This tool is being produced with leveraged funds from AOOS and the **DOI Climate Science Center**.

This year, ACCAP forged a new partnership with scientists at UAF and the **Alaska Division of Geological and Geophysical Surveys (DGGS)** in Snow, Ice and Permafrost Hazards in Alaska. A research needs and opportunities scoping workshop was held in June 2011. (Workshop report attached, leveraged funds from **UAF Chancellor's Office**). A follow-up stakeholder engagement session was held in February 2012 at the Alaska Forum on the Environment. Key new stakeholder relationships include: **Alaska Department of Environmental Conservation; Water Division; Alaska Department of Natural Resources; Division of Geological & Geophysical Survey; Alaska Department of Natural Resources; Division Oil and Gas ; Alaska State Pipeline Coordinator's Office; Alyeska Pipeline Service Company; ASRC Energy Services Company; Bureau of Ocean Energy Management, Regulation and Enforcement; The Denali Commission; Institute of the North; North Slope Science Initiative; US Army Corps of Engineers; US Coast Guard.**

### *C. International Collaborations*

This winter ACCAP hosted a delegation of Canadian visitors from the **U.S. Department of State's** International Visitor Leadership Program: Arctic Development and Security in an Age of Climate Change, A Project for Canada. Among the items of discussion were the parallels & challenges that rural Alaska and Canada share in planning for climate change. Participants included representatives from the **Government of Manitoba, Environment Canada, University of Québec at Montréal, Government of Nunavut, Government of the Northwest Territories, and the Department of Aboriginal Affairs and Intergovernmental Relations.**

### *D. Meta-Analysis of Regional Climate Information Needs*

ACCAP has hired a new **Research Associate, Corrine Knapp**, to review existing climate related information and needs assessments in Alaska. A comprehensive and place-based understanding of needs is requisite to effective collaboration between scientists and stakeholders in coping with and responding to change. The assessment goal is to review identified information needs state-wide and across a range of sectors and stakeholder groups to identify overlapping needs and information gaps. ACCAP will use the needs assessment process as both a collaboration-building activity and a primary tool for identifying and designing future climate information services.

### *E. National Forest Vulnerability Assessment*

ACCAP is partnering with the **USFS Tongass National Forest, Alaska Coastal Rainforest Center, and Scenarios Network for Alaska and Arctic Planning** on a three-phase process to analyze exposure and sensitivity of resources to climate-related changes in and around the Tongass National Forest using the best performing climate models and associated scenarios

for southeast Alaska. A phase-one project workshop will be held in early May 2012, and will inventory and prioritize key resources impacted by climate change.

## **2. RESEARCH FINDINGS**

Our core research findings in this reporting period center around coastal and living marine resources; climate change vulnerability, adaptation and literacy; climate and weather; and sea ice.

### ***A. Coastal and Marine Living Resources:***

- The vulnerability of coastal community infrastructure in Bristol Bay is influenced heavily by seasonal demographic patterns related to fishing and other seasonal employment booms.
- The reputation for sustainability in Alaska fisheries may be counteracting opportunities for meaningful social change (and improvement of quality of life in rural Alaska) as well as continued improvement in the management of Alaska fisheries. The associated outcome is that coastal, fishing-dependent communities remain vulnerable to the challenges of climate change, despite the presence of a commercial industry that appears thriving (Loring and Harrison 2012).
- The ability to fish locally is an important source of food security for low-income households of the Kenai Peninsula. This suggests a related vulnerability of low-income households to disruptions in fisheries/fisheries declines.
- Local opinion and perspectives in the Kenai Peninsula are heavily divided regarding the sustainability of local salmon populations; this feeds into a general distrust of management and contentious relationships between fishing sectors (i.e., commercial, sport, personal use, subsistence).

### ***B. Climate Change Vulnerability, Adaptation and Literacy***

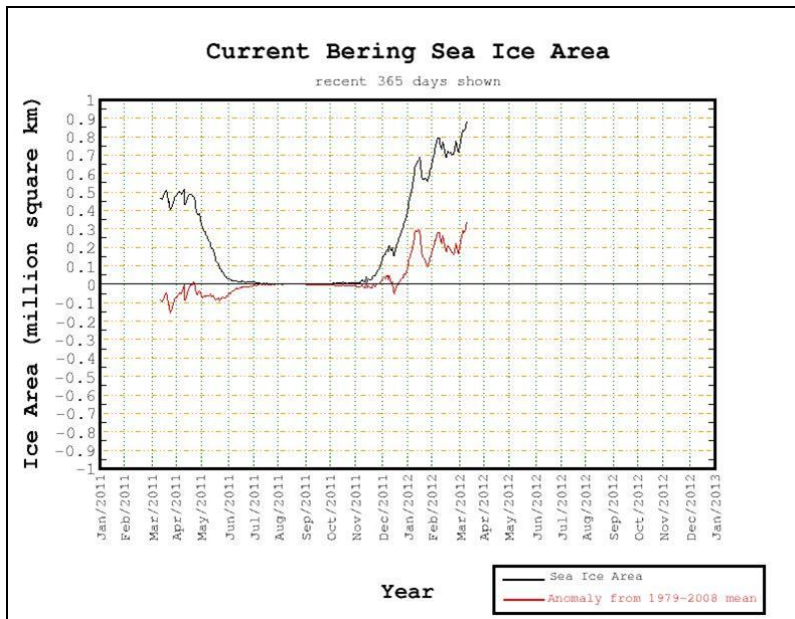
- Extended and extreme events such as fog and high snow years can increase rural community vulnerability to other non-climate related challenges. For example, the costs associated with extensive snow removal can tap community coffers and extended fog that closes airports can interrupt important supply chains in remote rural communities.
- Adaptation to climate change in Alaska is closely linked to other social, economic and environmental drivers. (Trainor, Walsh, Gamble, in prep.)
- Alaskan stakeholders are less familiar with global and national assessment reports than local information on climate change.

**C. Climate and Weather**

- The occurrence of warm extremes is increasing and the occurrence of cold extremes is decreasing in Alaska. Trends of precipitation extremes in Alaska are varied (J. Walsh, NCA Technical Input Report).
- The Arctic’s five warmest years on record were 2005-2010 (Walsh et al. 2011).

**D. Sea Ice**

- Bering Sea ice cover reached a record maximum in March 2012 (Figure 1, Alaska Climate Dispatch Spring 2012).



**Figure 1.** Ice-covered area (millions of km<sup>2</sup>) in the Bering Sea from March 2011 through early March 2012. The black line is the actual ice covered-area, the red line is the departure from normal (1979-2008 average). Figure courtesy of The Cryosphere Today (<http://arctic.atmos.uiuc.edu/cryosphere/>).

- Study of storm frequency and intensity in Alaskan waters showed increasing frequency of storms affecting northern and western coasts when sea ice is absence. Study used NCEP storm track database (Jon Gottschalk, CPC); (leveraged via collaboration with W, Chapman, University of Illinois.)

**3. ACCOMPLISHMENTS**

ACCAP’s accomplishments in this reporting period focus on stakeholder outreach, serving information needs of Native stakeholders, and contributions to the National Climate Assessment.

### ***A. Stakeholder Outreach***

**Monthly Webinars** – ACCAP webinars continue to promote dialogue between scientists, planners, state and local government, land and resource managers, industry, the news media, and others who need information specific to climate change in Alaska to make informed decisions. More than 1080 people participated in ACCAP webinars during this reporting period. The average number of participants per webinar has increased from 31 in 2007, the program’s inaugural year, to over 100 during this reporting period, and our webinars continue to draw an increasingly diverse audience including representatives from a range of federal and state agencies, industry and tribal groups. Webinar topics in this reporting period include:

- Climate change in Alaska: From weather to whether
- Salmon stream temperatures: Past, present and future
- Integrated ecosystem research in the Bering Sea
- Alaska and the National Climate Assessment: Who what where when why and how you can be involved
- BIOMAP Alaska: Citizen science for Alaska’s oceans
- Updated precipitation frequency atlas for Alaska
- Interagency science in the Arctic

Additionally, ACCAP has established itself as a trusted facilitator for stakeholder outreach, with organizations such as the U.S. Arctic Research Commission and the National Science Foundation’s Interagency Arctic Research Policy Committee and Office of Polar programs seeking opportunities to participate in our program and diversify their own outreach efforts in Alaska. Archived webinar videos, podcasts, presentation slides, and associated media coverage from 2007 to present are available on the ACCAP website.

### ***B. Serving Information Needs of Native Stakeholders***

P. Loring contributed curriculum regarding climate change scenarios and basic concepts regarding vulnerability assessment and adaptation planning to a day-long Climate Change Adaptation Planning training workshop organized by the Institute for Tribal Environmental Professionals (ITEP) and delivered concurrent with the 2011 meeting of the Alaska Council of Tribal Environmental Professionals (Figure 2).

In addition, P. Loring, in cooperation with the Alaska Native Tribal Health Consortium, is working with tribal environmental professionals in the Bristol Bay region of Alaska to understand ongoing and future impacts of climate change to community infrastructure. In early 2011, he provided a climate change short course, offered as a continuing education module through UAF’s Bristol Bay Campus. This training was a three-day intensive, providing both background material on the biophysical and socioeconomic dimensions of climate change, and concluding with examples of adaptation planning approaches as well as exposure to how tribal environmental professionals can contribute through citizen-science to our understanding of climate change impacts in Alaska’s coastal zone.



Currently, P. Loring has identified and begun site visits to communities in the region for which assessments will be completed in 2012 of both climate change impacts on human health and on local civic infrastructure such as water/wastewater facilities.



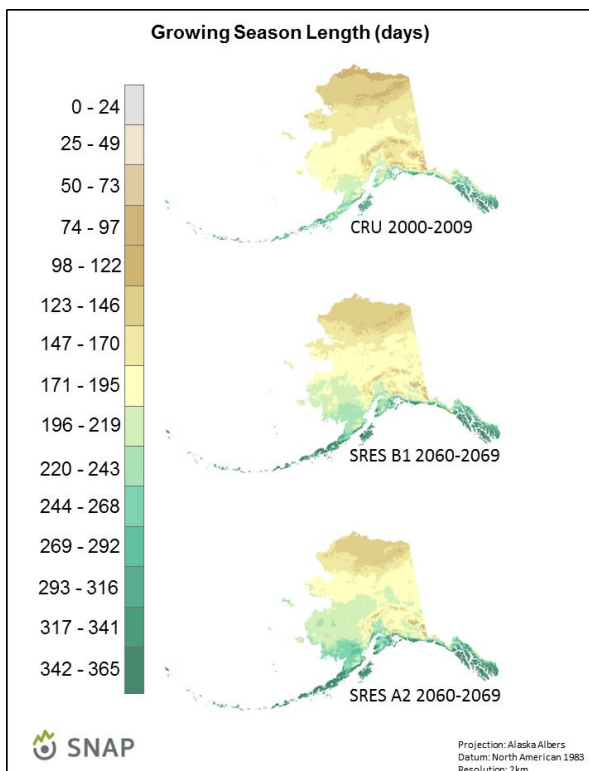
**Figure 2.** Tribal environmental professionals participating in ACCAP Co-Investigator Philip Loring’s May, 2011 climate change training workshop.

### ***C. Contributions to the National Climate Assessment:***

ACCAP is providing substantial contributions to both the Alaska Regional Technical Report and the Alaska and Arctic Chapter of the USGCRP National Climate Assessment (NCA). We are also making solid progress on regional climate adaptation and vulnerability research funded by the NCA.

1. ACCAP scientists and affiliates were core contributors to the Alaska Regional Technical Report for the National Climate Assessment. S. Trainor was one of the lead editors of this report in collaboration with C. Markon at the USGS and F.S. Chapin at UAF. J. Walsh co-authored the section “Climate of Alaska” together with four scientists at NOAA’s National Climatic Data Center (B. Stewart, K. Kunkel, L. Stevens, and S. Stevens). P. Loring and graduate student H. Harrison contributed on vulnerability of Alaska’s fisheries. T. Brinkman wrote a section on wildfire in Alaska. J. Wolken and T. Hollingsworth contributed on climate impacts on Alaska’s forested ecosystems. D. White and L. Hinzman contributed on water resources in Alaska. D. Atkinson contributed on coastal erosion and storms. ACCAP affiliated technicians from the Scenarios Network for Alaska and Arctic Planning (SNAP), provided downscaled climate graphics for this report (Figure 3) (Leveraged funding from the USGS).
2. S. Trainor is serving as Coordinating Lead Author (CLA) for the Alaska and Arctic Regional Chapter of the NCA. J. Walsh is serving as a CLA for the Climate Science chapter. Both have attended several NCA meetings and submitted zero-order chapter drafts.

3. P. Loring has served as a contributing author to the Marine chapter of the NCA and as a member of the technical working group for the Rural Communities chapter of the NCA. Both chapters are in prep. Loring contributed information regarding the impacts of climate change on rural and coastal Alaska communities to the NCA technical report on marine/ocean services. This also included information related to the impacts of climate on Alaska's commercial fisheries. Loring also served as a friendly reviewer for the entire technical report. For the rural communities report, Loring participated in a three day workshop with report authors to identify priority areas, themes, and key research findings related to the impacts of climate change on rural America.
4. We have completed key informant interviews and preliminary analysis for National Assessment project, "Assessing Stakeholder Capacity for Adaptation in Alaska" (S. Trainor, J. Walsh, B. Gamble). Peer review publication in preparation, (Funding from USGCRP/NCA).
5. We are conducting a vulnerability assessment of Alaska fisheries to projected climate change. Based on a survey of Kenai Peninsula residents we are evaluating the vulnerability of local communities to projected climate-driven changes in salmon streams (P. Loring). This analysis is underway in cooperation with Cook Inletkeeper (Funding from USGCRP/NCA).



**Figure 3.** Downscaled distribution of length of growing season (days). Top panel shows observationally-derived growing season lengths for 2000-2009. Projections are shown for 2060-2069 under B1 scenario (middle panel) and A2 scenario (lower panel). ACCAP affiliated technicians from the Scenarios Network for Alaska and Arctic Planning (SNAP), provided downscaled climate graphics for the Alaska Regional Technical Report and the Alaska and Arctic Chapter of the USGCRP National Climate Assessment (NCA).



#### 4. PUBLICATIONS, WHITE PAPERS & REPORTS

\* Information has been communicated to decision makers and stakeholders.

##### Peer-Reviewed Publications

- Bieniek, P. A., U. S. Bhatt, R. L. Thoman, H. Angeloff, J. Partain, J. Paipneau, F. Fritsch, E. Holloway, **J. E. Walsh**, C. Daly, M. Shulski, G. Hufford, D. Hi., S. Calos and R. Gens. 2012. On revising the climate divisions for Alaska, *Journal of Applied Meteorology and Climatology*, in press.
- Díaz, S., F. Quétier, D. M. Cáceres, **S. F. Trainor**, N. Pérez-Harguindeguy, M. S. Bret-Harte, M. Peña-Claros, L. Poorter & B. Finnegan. 2011. Linking functional diversity and social-actor strategies: a framework and tool for interdisciplinary analysis of ecosystem services. *Proceedings of the National Academy of Sciences*. Vol. 108: No. 3, pp. 895-902. (With leveraged funds from the Inter America Institute)
- Gamble, J.B, S. Trainor**, N. Fresco. 2011. Assisting Arctic Inhabitants in Responding to a Changing Climate. *Rural Connections*. Vo. 5, Issue 2, pp.40-44. ([www.accap.uaf.edu//documents/RCJUN11accap.pdf](http://www.accap.uaf.edu//documents/RCJUN11accap.pdf))
- \***Gerlach, S. C., P. A. Loring**, and A. M. Turner. 2011. Food Systems, Climate Change, and Community Needs. H. Eicken and A. L. Lovecraft, editors. *North by 2020*. Fairbanks, AK: University of Alaska Press. (Findings presented in an ongoing series of public evening engagements arranged by the UAF Chancellor.)
- Hamilton, L.C., **D.M. White**, R.B. Lammers, and G. Myerchin. 2011. Population, climate, and electricity use in the Arctic integrated analysis of Alaska community data. *Population & Environment* DOI: 10.1007/s11111-011-0145-1
- Loring, P. A.**, and H.L. Harrison. 2012. “Fisheries and Food Security in Alaska.” *Agroborealis* 42 (1): 45–48. ([http://www.uaf.edu/files/snras/agro\\_42\\_1.pdf](http://www.uaf.edu/files/snras/agro_42_1.pdf))
- \***Loring, P. A., S. C. Gerlach**, D. E. Atkinson, and M. S. Murray. 2011. Ways to Help and Ways to Hinder: Governance for Successful Livelihoods in a Changing Climate. *Arctic* 64:73–88. (Analysis presented at the 2012 Climate Prediction Application Science Workshop in Miami, FL and at the ACCAP Alaska Climate webinar series)
- \***Loring, P. A.**, and L. K. Duffy. 2011. Managing environmental risks: the benefits of a place-based approach. *Remote and Rural Health* 11:1800. (Findings shared with the Alaska Native Tribal Health Consortium and with participants at the 2011 American Association for the Advancement of Science (AAAS) Arctic Division meeting in Dillingham, AK)
- MacNeil, M. A., N. A. J. Graham, J. E. Cinner, N. K. Dulvy, **P. A. Loring**, S. Jennings, N. V. C. Polunin, A. T. Fisk, and T. R. McClanahan. 2010. Transitional states in marine fisheries: adapting to predicted global change. *Philosophical Transactions of the Royal Society B: Biological Sciences* 365:3753 –3763.
- Overland, J. E., M. Wang, V. M. Kattsov, J. H. Christensen, W. L. Chapman and **J. E. Walsh**. 2012. Climate model projections for the Arctic. *Snow, Water, Ice and*

- Permafrost in the Arctic, Chapter 3 in Scientific Report, *Arctic Monitoring and Assessment Program*, in press.
- Polyakov, I. V., **J. E. Walsh** and R. Kwok. 2012. Recent changes of Arctic multiyear sea-ice coverage and their likely causes. *Bulletin of American Meteorological Society*, 93, 145-151.
- Polyakov, I. V., U. S. Bhatt, **J. E. Walsh** and A. P. Abrahamsen. 2012. Recent Arctic Ocean changes in the context of longer term observations. *Ecological Applications*, accepted pending revision.
- \*Pundsack, J., **D. White**, J. Cherry, and A. Tidwell. 2011. The state of water science. H. Eicken and A. L. Lovecraft, editors. *North by 2020*. Fairbanks, AK: University of Alaska Press. (Findings presented in an ongoing series of public evening engagements arranged by the UAF Chancellor.)
- \*Stewart, B. C., **J. E. Walsh**, K. E. Kunkel, L. E. Stevens and S. E. Stevens. 2012. Climate of Alaska. *Technical input report for U. S. National Climate Assessment, U.S. Global Change Research Program*, 43 pp. (Information presented in National Climate Assessment (NCA) Alaska Region public engagement webinar Nov. 2011 and in NCA public engagement session at the Alaska Forum on the Environment, Feb. 2012).
- \*Tidwell, A., **D. White**, and A. Kliskey. 2011. Planning for change. H. Eicken and A. L. Lovecraft, editors. *North by 2020*. Fairbanks, AK: University of Alaska Press. (Findings presented in an ongoing series of public evening engagements arranged by the UAF Chancellor.)
- Walsh, J. E.**, J. E. Overland, P. V. Groisman and B. Rudolf. 2011. Ongoing climate change in the Arctic. *Ambio*, 40, 6-16.
- Walsh, J. E.**, J. E. Overland, P. Groisman, B. Rudolf. 2012. Arctic climate: Past and Present. Snow, Water, Ice and Permafrost in the Arctic, Chapter 2 in *Scientific Report, Arctic Monitoring and Assessment Program*, in press.
- Wolken, J., **T. S. Rupp**, T. Hollingsworth, **S. F. Trainor**, et. al. 2011. Evidence and implications of recent and projected climate change on Alaska's forest ecosystems. *Ecosphere*. Vol. 2, Issue 11, art124. (<http://www.esajournals.org/toc/ecsp/2/11>) (With leveraged funds from the US Forest Service Pacific Northwest Laboratory)

### **White Papers & Reports**

- \* Andreassen, N., K. Itchoak, L. Krutikov, and **S. Trainor**. 2011. Snow, Ice and Permafrost Hazards: Research Needs and Opportunities. Report from June 2011 workshop. Anchorage, AK: Cryosphere Hazards in Alaska. ([www.accap.uaf.edu/documents/AlaskaCryosphereHazardFinal.pdf](http://www.accap.uaf.edu/documents/AlaskaCryosphereHazardFinal.pdf))
- \*Oceans and Marine Resources in a Changing Climate: Technical Input to the 2013 National Climate Assessment. Griffiths, R. and J. Howard. Eds. (**P. Loring** contributing author). Submitted as technical input for the NCA; peer review and publication pending.

\*The United States National Climate Assessment – Alaska Technical Regional Report, 2012. Markon, C.J., **S.F. Trainor**, and F. S. Chapin, III. Eds. Submitted as technical input for the NCA; peer review and publication pending.

\*Alaska Climate Dispatch Quarterly Newsletter. **Gamble, J.B., J. Walsh, and S. F. Trainor**. Eds. ([www.accap.uaf.edu//dispatch.htm](http://www.accap.uaf.edu//dispatch.htm))

## 5. NOAA REGIONAL PARTNERSHIPS

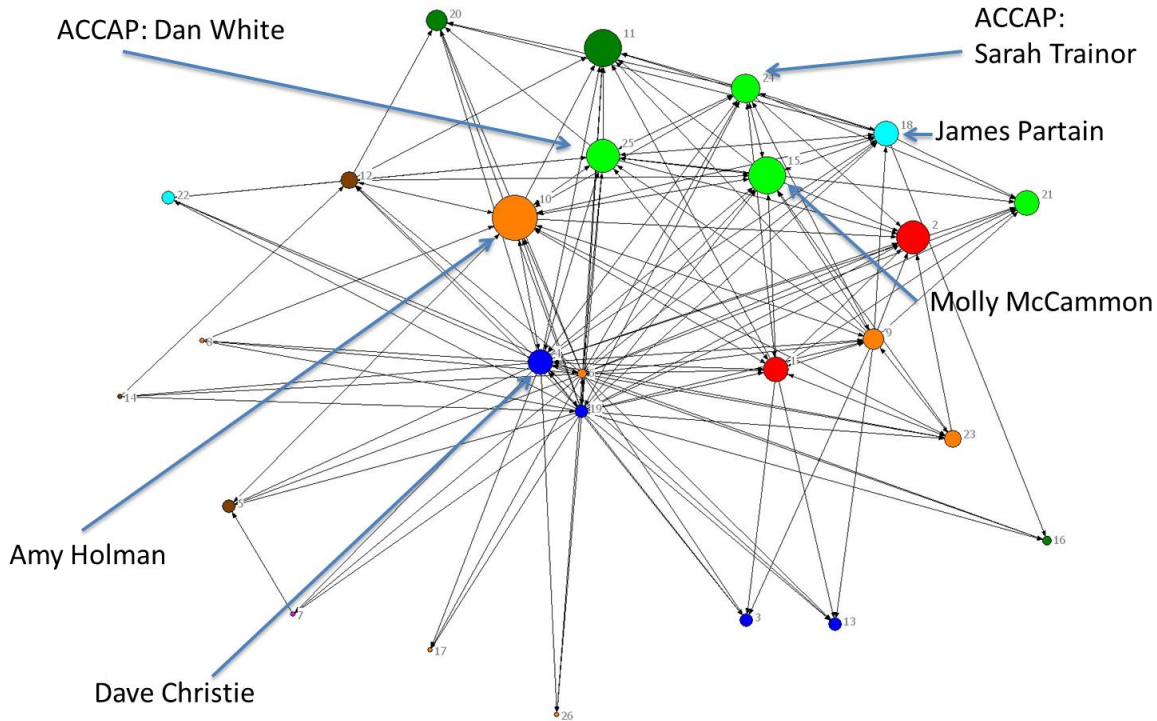
In addition to being regular, contributing participants in monthly meetings of the NOAA **Arctic Regional Collaboration Team (ARCTic)**, we have assisted team member and Regional NOAA Climate Director James Partain with the climate adaptation section for **Interagency Arctic Research Policy Committee (IARPC)** 5-year plan and ACCAP has been asked to help engage stakeholders in the public comment period for IARPC.

Additionally, ACCAP participated in a **social network analysis to help characterize the work of the NOAA regional collaboration teams** and map the networks associated with NOAA's strategic goals (Figure 4). Overall results showed that ACCAP scientists are well connected and highly sought among regional NOAA teams, divisions, and non-NOAA collaborators. Our partnership with NOAA was further strengthened by an autumn site visit from Kelly Redmond, Deputy Director and Regional Climatologist, Western Regional Climate Center.

**Cross RISA collaborations** were strengthened on several fronts this year. S. Trainor has served as a consultant to Western Water Assessment and Southeast Climate Consortium on vulnerability assessments and adaptation planning for native lands. Additionally we have focused on building collaborations with Pacific RISA, visiting in July 2011 to explore synergies between programs and regions and explore future research collaboration (with leveraged funding from the Pacific Land Grant Alliance).

ACCAP engages hydrologists and meteorologists with **National Weather Service Fairbanks Forecast Office** and the **Pacific River Forecast Center** to make key quarterly contributions to Alaska Climate Dispatch articles ([www.accap.uaf.edu//dispatch.htm](http://www.accap.uaf.edu//dispatch.htm)).

## NOAA Regional Team Social Network Analysis Findings



**Figure 4.** Map result from a NOAA social network analysis of regional collaboration teams. ACCAP scientists are well connected and highly sought among regional NOAA teams, divisions, and non-NOAA collaborators. A. Holman, ARCTic Coordinator, and M. McCammon, D. Christie and J. Partain all serve on the ACCAP Steering Committee (see above for their affiliations).

### 6. NATIONAL CLIMATE ASSESSMENT ACTIVITIES BEYOND JUNE 1, 2012

S. Trainor is CLA for the Alaska and Arctic Chapter of the National Climate Assessment (NCA). J. Walsh is CLA for Climate Science Chapter of the NCA. As such they will be participating in CLA meetings and workshops as convened by the NCA (for example a workshop planned for June 12-14, 2012 in Washington, D.C.) and working with the NCA editorial team to address public input and revise the chapters for full report publication.

S. Trainor will be working with the NCA and the Alaska and Arctic Chapter lead author team to coordinate with other chapter authors (i.e. Adaptation, International, Forestry, Marine, Coastal, etc.) to revise the Alaska regional chapter and coordinate the full report.

S. Trainor is also editor of the Alaska Technical Report for the NCA. Final text editing for this report is likely to extend beyond June 1, 2012. If it is decided to proceed with report



publication at Island Press, ACCAP will be managing graphics and layout for this report, which will also extend beyond June 1, 2012.

ACCAP expects to play a key role in on-going and continued assessment activities. However, the amount of time and effort dedicated will depend on additional funding available from the NCA for these activities. Finally, we will be completing and submitting publications from previously awarded NCA funds.

## 7. ACCAP PROJECTS TABLE

PI	Title	End Date	Deliverables	Abstract/Description	Partners	A=RISA-led project B=RISA contributes	If B, primary lead
Loring	Food security in the Kenai Peninsula	2013	Technical report (in process). Presentation to local communities (planned). Two papers in review to peer-review journals.	This project is assessing the current state of food insecurity in communities of the Kenai Peninsula, with specific focus on access and availability of locally-caught seafood to the local food system. Climate change impacts on salmon populations are projected with significant relevance to community stability and vulnerability.	Kachemak Bay Research Reserve, Sustainable Homer	A	
Loring	Marine Range Extensions and Invasives in the Arctic (MARINA)	2013	This project resulted in a successfully funded proposal to the USFWS Arctic Landscape Conservation Cooperative to build a fully-functioning citizen science website and outreach program for North Slope communities	This project seeks to deploy a community-based monitoring effort in Alaska/Arctic communities for the ongoing evaluation of range extensions of key marine species, as are projected/anticipated as a result of climatic change.	Mari Beth Murray, UAF, Alaska Sea Life Center (funded by USFWS Arctic LCC)	A	
Loring	The vulnerability of Alaska Fisheries to projected climate change	2012	Planned peer-review articles	This is a piece of work initiated in response to the publication by Alison et al (2009), "Vulnerability of national economies to the impacts of climate change on fisheries." Fish and Fisheries 10(2): 173-196. This project seeks specifically to add resolution to the Alaska region, as this is bundled in with the rest of the US in the aforementioned report. A state-level assessment with one regional case study (Kenai Peninsula) will be made.		A	



<b>PI</b>	<b>Title</b>	<b>End Date</b>	<b>Deliverables</b>	<b>Abstract/Description</b>	<b>Partners</b>	<b>A=RISA-led project B=RISA contributes</b>	<b>If B, primary lead</b>
<b>Loring</b>	The vulnerability of water security to climate change in Bristol Bay	2013	Ongoing; planned articles and a book project	This project will provide a spatial analysis, testing an adaptive capacity/assets framework for evaluating water/wastewater resources and infrastructure among communities of the Bristol Bay region.	Alaska Native Tribal Health Consortium, Bristol Bay Borough, and Bristol Bay Natives Association (Funded by NOAA CPO/CSI-Coasts)	A	
<b>Mathis</b>	Ocean acidification sensitivity index for coastal Alaska	2013	Ocean acidification sensitivity index	Ocean acidification sensitivity index for coastal Alaska to analyze the impacts of OA on Alaskan waters and work with coastal communities to help them better understand and adapt to the resulting ecological and economic implications.	Ocean Acidification Research Center, NOAA Pacific Marine Environmental Lab, North Pacific Research Board	A	

PI	Title	End Date	Deliverables	Abstract/Description	Partners	A=RISA-led project B=RISA contributes	If B, primary lead
<b>Trainer/ Walsh</b>	Assessing Stakeholder Capacity for Adaptation in Alaska	2012	Peer review publication. Presentations at professional meetings such as Adaptation Futures, May 2012	This project is a multi-sectoral synthesis of climate adaptation in Alaska. We engaged semi-structured interviews with key informants in conjunction with document analysis and literature review. Our investigation reveals three major categories of response to environmental change in Alaska. These are 1) community and institutional strategic planning and related funding mechanisms, 2) research and monitoring of environmental variables and 3) actual on-the-ground actions such as community re-location. This synthesis reveals that adaptive actions and activities are often initiated and motivated in response to immediate environmental conditions rather than as implementation of pre-meditated, deliberate or planned adaptations to climate change per se. In addition, people, communities, and governments are responding to climate impacts as part of a constellation of many different environmental and social changes, which may or may not be definitively linked to climate change. Finally, this work reveals that, while planning and monitoring can occur at the state-wide or regional level, adaptation actions occur most notably at the local scale.		A	
<b>Trainer</b>	NCA Alaska Chapter	2013	NCA Alaska Chapter	Regional Alaska and the Arctic Chapter for the NCA		A	

<b>PI</b>	<b>Title</b>	<b>End Date</b>	<b>Deliverables</b>	<b>Abstract/Description</b>	<b>Partners</b>	<b>A=RISA-led project B=RISA contributes</b>	<b>If B, primary lead</b>
<b>Trainor</b>	NCA Alaska Technical Report	2013	NCA Alaska Technical Report	Technical report for the Alaska Region for the NCA		B	USGS
<b>Trainor</b>		2012	Peer review publications – in progress	. This paper reports results from interviews with scientists at one of these RISA centers, the Alaska Center for Climate Assessment and Policy (ACCAP). Average annual temperatures in Alaska have increased by over 3°F since 1949, with resulting impacts including reduction in sea ice extent, shifts from benthic to pelagic marine ecosystems, increasing incidence of wildfire, draining and drying of surface lakes, and observation of new insects. Changes have implications for transportation, marine shipping, safety, health and Native subsistence foods. Using methods in information science, we explore knowledge exchange between scientists and stakeholders in the co-production of knowledge for response to climate impacts in Alaska. Key themes that emerge include the process of knowledge communication and transfer between scientists and stakeholders, knowledge quality and accessibility, and the relationship between scientists and stakeholders.	S. Paquette, University of Maryland	A	

PI	Title	End Date	Deliverables	Abstract/Description	Partners	A=RISA-led project B=RISA contributes	If B, primary lead
Trainor/ Walsh	Alaska Sea Ice Atlas	2013	Digital sea ice atlas for Alaskan seas, monthly, 1850-present	The proposed atlas will consist of digitally stored sea ice concentration data on a grid covering all Alaskan coastal waters to a distance of approximately 500 n mi from shore. The spatial resolution will be ~25 km, and the time-resolution will be monthly, spanning the period from the 1850s through 2010 with the allowance for subsequent updates. The accompanying statistical software will enable probabilistic depictions of ice coverage of various concentrations on specific calendar dates at user-specified locations. Mapping software will be included with the digital database. The software will include the capability for computation of areal totals of ice coverage, opening and closing dates for various shipping corridors, seasonal severity indices, and other measures of ice coverage to be determined through discussions with potential users. Software will also be included to interface the sea ice database with other datasets in the AOOS data archive.	Alaska Ocean Observing Systems (AOOS), National Snow and Ice Data Center, NSIDC (University of Colorado), NOAA's Pacific Environmental Marine Laboratory, University of Illinois	A	
Trainor/ Walsh	Downscaling of projections of extreme events for Alaska	2014	Projections of changes in Alaskan extreme events (temperature, precipitation, storms/winds)	An evaluation of CMIP5 model simulations for Alaska has led to the selection of an optimal subset of models for use in downscaling extreme events (in historical simulations and future projections) for Alaska. Daily output from observing stations, re-analyses and climate models are the primary inputs. Emphasis is on extremes of temperature, heavy precipitation and drought, and high-wind events in Alaska. Complementary activity for Alaskan offshore region is supported by AOOS (STAMP).	Scenarios Network for Alaska and Arctic Planning (SNAP), University of Alaska, AOOS	A	

PI	Title	End Date	Deliverables	Abstract/Description	Partners	A=RISA-led project B=RISA contributes	If B, primary lead
Trainer	Meta-analysis of Climate Related Needs Assessments in Alaska	2/15/13	White paper/ Project Report; Webinar presentation; Peer-review journal article	<p>A comprehensive and place-based understanding of needs is requisite to effective collaboration between scientists and stakeholders in coping with and responding to change. This meta-analysis will review existing information needs assessments state-wide and across a range of sectors and stakeholder groups to identify overlapping needs and information gaps. ACCAP will use the needs assessment process as both a collaboration-building activity and a primary tool for identifying and designing future climate information services.</p> <p>The landscape of climate science and service organizations and entities in Alaska has expanded rapidly over the past three years and continues to dynamically evolve. This social network analysis will map the relationships, communication channels and information exchange between federal, state, tribal, industry and non-profit entities engaged in climate science and services in Alaska in order to provide an informed context for identifying and planning future ACCAP research and outreach. A detailed, nested analysis of the networks of science and stakeholders specific to the DOI Alaska Climate Science Center (CSC) and FWS Landscape Conservation Cooperatives in Alaska will inform Alaska CSC activities and planning.</p>		A	
Trainer/ Loring	Social Network Analysis of Climate Science and Service Organizations in Alaska	8/31/14	White paper/ Project Report; Webinar presentation; Peer-review journal article		DOI Climate Science Center	A	

## **8. ATTACHMENTS/APPENDIX**

(All attachments have been optimized and placed in one PDF for digital delivery. Please request higher resolution files for print)

1. ACCAP Gatefold Flier
2. Alaska Climate Change Adaptation Series Fact Sheets:
  - Alaska Statewide Projections
  - Online Climate Scenario Tools
  - Regional Climate Projections
  - Sea Ice & Marine Resources: Research & Tools
  - SNAP Climate Projections: tools for planners
  - Wildfire
3. Alaska Climate Data Downscaling Workshop DRAFT report
4. Snow, Ice, and Permafrost Hazards in Alaska: Research needs and opportunities Workshop report
5. Alaska Climate Dispatch Spring 2012