



Alaska Institute
for Justice



Alaska Native Science Commission
bringing together research and science
in partnership with the Native community



ALASKA NATIVE
TRIBAL HEALTH
CONSORTIUM

TITLE PAGE

Identification of the Competition

COCA: Climate and Societal Interactions: Supporting Resilient Coastal Communities and Ecosystems in a Changing Climate: Understanding climate-related human health risks within the coastal environment.

Funding Opportunity Number: NOAA-OAR-CPO-2015-2004099- CFDA 11.431 Climate and Atmospheric Research

Project Title: Resilient Alaska Native Coastal Communities: Integrated Social-ecological Monitoring and Assessment Supporting Adaptation Decisions

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Year 1: 139,070
Year 2: 160,800

ABSTRACT

Introduction to the Problem: A rapidly changing climate in the Arctic is dramatically impacting the health and well-being of Alaska Native communities. Erosion and repeated extreme weather events damage infrastructure, including health clinics and water and sewage treatment facilities. Saline intrusion and thawing permafrost impact access to potable water. In the most extreme cases, accelerating rates of erosion are life-threatening and are causing Alaska Native communities to choose to relocate their entire community.

Rationale: This research strives to increase the adaptive capacity of Alaska Native communities experiencing the impacts of climate-induced environmental change on their health and well-being. Community engagement and empowerment are critical to any process aiming to improve the adaptive capacity of Alaska Native communities. By developing new and building upon existing trust relationships, learning from, and co-producing knowledge with communities, we seek to develop adaptation strategies to protect their health and well-being, and to articulate their needs to organizations that might be able to provide technical or financial assistance.

Brief Summary of Work: 1. Design a community-based social-ecological monitoring and assessment methodology that will be used and implemented by Alaska Native communities to enable them to perform their own monitoring. Methodology development will be a cooperative effort led by Alaska Native communities and involving university researchers, government representatives, such as the US Army Corps of Engineers, and non-governmental organizations such as the Alaska Institute for Justice, Alaska Native Science Commission and the Alaska Native Tribal Health Consortium; 2. Train local community representatives to implement this methodology in their community and to perform trial data collection throughout the grant period and use these data to improve the methodology; 3. Document the collaborative relationship between these communities, university researchers, non-governmental organizations and government agencies throughout the grant period; 4. Compare and assess the possible differences in implementation of the social-ecological monitoring and assessment methodology between the five communities; and 5. Disseminate the methodology.

Project Title: Resilient Alaska Native Coastal Communities: Integrated Social-ecological Monitoring and Assessment Supporting Adaptation Decisions.

Name of Competition: *Climate and Societal Interactions: Supporting Resilient Coastal Communities and Ecosystems in a Changing Climate: Understanding climate-related human health risks within the coastal environment.* The Alaska Institute for Justice, Alaska Native Science Commission and University of Alaska seek \$299,870 for a two-year project. Additional grant partners include the Alaska Native Tribal Health Consortium and the University of Victoria.

Works Relevance to Competition & NOAA's Next Generation Strategic Plan: This interdisciplinary project seeks to foster adaptation in Alaska Native communities by designing a community-based social-ecological monitoring and assessment methodology so that these communities can better assess their vulnerabilities to a changing climate and make informed adaptation decisions. The goals of this research project fit squarely within the parameters of the NOAA *Supporting Resilient Communities and Ecosystems in a Changing Climate* grant program, and NOAA's *Next-Generation Strategic Plan* because this research is interdisciplinary, innovative and designed to collaborate with Alaska Native coastal communities so that they can maintain or improve their health and vitality over time by anticipating and adapting to change.

RESULTS FROM PRIOR RESEARCH

The prior research of each principal investigator is listed below. The list begins with the previous research conducted jointly between Dr. Chapin, professor emeritus at the University of Alaska Fairbanks, and Patricia Cochran, executive director of the Alaska Native Science Commission. Following the description of this collaborative research project, the previous research projects are listed for the Principal Investigator, Dr. Bronen, and the co-PIs, Dr. Chapin and Patricia Cochran including how and when they have made their data accessible and useable by the community in the past.

Dr. Chapin and Patricia Cochran: Community Partnership for Self-Reliance & Sustainability (CPSS): Dr. Chapin and Patricia Cochran led this collaborative research project and Dr. Bronen participated in as a graduate student. The CPSS research project provides the most direct methodological and informational background for this proposal. The goal of this project was to engage selected Alaska Native communities to implement *their* concept of community self-reliance in the context of the modern world. Twenty research groups at the UAF offered to contribute their expertise to individual communities to develop adaptive solutions. Local coordinators and teams were set up to implement plans. UAF graduate students, faculty, and departments provided technical assistance to the communities and ANSC assisted communities to learn, prioritize, and take action on projects that each community felt were most important to their self-reliance and sustainability. Action Plans for communities included: comprehensive energy planning, water and land rights, strengthening culture and language, flooding assessment, self-sufficient energy use, protecting fish, hunting and trapping on traditional lands, removing barriers to relocation, long-term planning for sustainability, reducing fuel costs, and food security and subsistence. All data and plans were developed, reviewed, coordinated and retained by local communities and leaders with the assistance of UAF and ANSC. CPSS continues with limited university funding.

Dr. Chapin: In addition to CPSS, Dr. Terry Chapin led the following research projects, relevant to this proposed project, during the previous three years. The Resilience and Adaptation Program (RAP) provides a decade of experience in graduate training about social-ecological systems. The goal has been to train interdisciplinary scholars to integrate the ecological, economic, and social dimensions of sustainability in a systems framework. It was initiated as an NSF IGERT grant in 2001, renewed in 2006 and institutionalized with ongoing funding from the Alaska legislature in 2013. This program initiated a tradition of collaboration among natural and social scientists at the University of Alaska Fairbanks. About 70% of the students conducted thesis research in Alaskan indigenous communities, giving the RAP program and these communities a substantial history of collaboration as well as a cadre of students qualified to participate in our proposed research. Dr. Bronen received her PhD from this program in 2012. **IPY: Impacts of High-Latitude Climate Change on Ecosystem Services and Society (2007-2012;** senior investigators Chapin, Brinkman, Kofinas; Bronen participant) is the research grant which had the following research goals: (1) document current status and trends in ecosystem services in the Arctic and Boreal Forest, (2) project future trends in these services; and (3) assess the societal consequences of altered ecosystem services. All data and plans were developed, reviewed, coordinated and retained by local communities and leaders. In addition, a website houses downscaled historical and projected climate (1900-2100) for all Alaskan communities; final reports to our three partner communities (Venetie, Kaktovik, and Wainwright); data

archived with the Bonanza Creek LTER and the two regional tribal research partners (North Slope Borough and the Council of Athabascan Tribal Governments [CATG]). In this research we developed close research collaborations with 8 indigenous communities (participatory co-design and implementation of the research), three regional tribal organizations, and three state and federal agencies that manage subsistence resources.

Dr. Bronen: *Climate Change and Community-Based Relocation: Supporting Adaptation, Protecting Human Rights* (2012). This grant supported collaboration related to climate-driven relocation for indigenous communities in Alaska and Papua, New Guinea and provides an international context for our social/ecological monitoring and assessment methodology which can assist communities strategize about long-term adaptation options. The goal of this research project was to develop models for collaboration between communities faced with climate-induced environmental change which caused each community to choose relocation as the preferred adaptation strategy. All data and plans were developed, reviewed, coordinated and retained by local communities and leaders. Data was also made accessible through community presentations in Newtok, Alaska and Carteret Islands, Papua New Guinea.

Patricia Cochran: Arctic Alliance. The Arctic Alliance was formed to foster circumpolar cooperation between indigenous peoples and environmental organizations, and promote protection of the Arctic environment and sustainable development for Northern communities. ANSC serves as the host of the Arctic Alliance. The Alliance developed Arctic Monitor (www.arcticmonitor.net), a web-based circumpolar communications tool that aggregates and delivers environmental and community-related news on a weekly basis to key Arctic experts and decision makers. The Alliance recently launched Arctic Watch (www.arcticwatch.net), a web platform that for the first time enables Arctic civil society organizations and indigenous peoples to share news and information about issue-specific advocacy and educational initiatives.

STATEMENT OF WORK

Introduction:

The goal of this research project is to collaborate with Alaska Native communities to foster their adaptive capacity to respond to climate-induced environmental change, including accelerating rates of erosion and thawing permafrost. Dr. Robin Bronen, executive director of the Alaska Institute for Justice (AIJ) is the lead Principal Investigator, and Dr. Stuart Chapin, professor emeritus at the University of Alaska Fairbanks (UAF) and Patricia Cochran, executive director of the Alaska Native Science Commission (ANSC) are co-Principal Investigators for this proposal. In addition, researchers from the University of Victoria with expertise on storm surge modeling and representatives from the Alaska Native Tribal Health Consortium with expertise on climate change health impact assessments are included as grant partners in this proposal.

This proposal builds on the research collaboration, *Community Partnership for Self-Reliance and Sustainability* (CPSS), between the University of Alaska Fairbanks and the Alaska Native Science Commission. Dr. Chapin and Ms. Cochran were the principal investigators for this project and Dr. Bronen participated as a graduate student. The goal of the CPSS project was to collaborate with selected Alaska Native communities to implement *their* vision of adaptation to climate change and *their* concept of community self-reliance in the context of the modern world.

The need to build capacity to foster effective adaptation is particularly pronounced at high northern latitudes where climate is warming at twice the global average rate (Chapin et al. 2014;

IPCC 2014), challenging the capacity of people to adapt (Berkes and Jolly 2001; Ford et al. 2010; Hovelsrud and Smit 2010) as well as the capacity of government agencies to provide the necessary funding and technical assistance to adjust nimbly to changing adaptation challenges (Bronen 2011).

To address this issue, this research project seeks to work with Alaska Native communities, and governmental and non-governmental organizations, to design and implement a methodology to allow these communities to assess and monitor environmental impacts on the health and well-being of their community residents in order to foster long-term and sustainable adaptation decisions and to improve bi-directional communication and information exchange between these communities and university researchers, federal and state government representatives and non-governmental organizations. Non-governmental organizations include the Alaska Native Health Consortium, which has conducted climate change health impact assessments and the Alaska Native Science Commission. Governmental organizations invited to participate in this project will include the US Army Corps of Engineers, Alaska Village Safe Water, a state government agency which provides technical assistance on sewage, water and sanitation systems and the Division of Community and Regional Affairs, which administers the Alaska Climate Change Impact Mitigation grant program. Several of these agencies participated in the CPSS project.

The goals of this research project fit squarely within the parameters of the NOAA *Supporting Resilient Communities and Ecosystems in a Changing Climate* grant program, which is designed to provide support for interdisciplinary science, which is innovative and broadly applicable to support decision-making, particularly for better understanding of risks and vulnerabilities, and address adaptation challenges.

Identification of the problem:

A rapidly changing climate in the Arctic is dramatically impacting the health and well-being of Alaska Native communities. Erosion and repeated extreme weather events damage infrastructure, including health clinics and water and sewage treatment facilities. Saline intrusion and thawing permafrost impact access to potable water. In the most extreme cases, accelerating rates of erosion are life-threatening and are causing Alaska Native communities to choose to relocate their entire community.

In the last half-century, Alaska and the Arctic have warmed twice as fast as the global average. This has led to shrinkage of summer sea ice, shortening of the snow-covered season, warming and thawing of permafrost, drier landscapes, and more extensive insect outbreaks and wildfire (Chapin et al. 2014; IPCC 2014). Together these environmental and ecological changes have altered the structure and functioning of arctic and boreal ecosystems. Late-summer sea ice extent has declined by 40% relative to the beginning of the satellite record in 1979, so autumn storms produce larger waves and more coastal erosion. Coastal bluffs that were “cemented” by permafrost are now thawing in response to warmer air and ocean waters and are therefore more vulnerable to erosion (Chapin et al. 2014; IPCC 2014). Standard defensive adaptation strategies to protect coastal communities from erosion such as rock walls, sandbags, and rip-rap have been largely unsuccessful (Bronen and Chapin 2013).

In 2003, a congressionally mandated study by the Government Accountability Office (GAO) found that 86% of 213 Alaska Native villages are affected to some extent by flooding and erosion (GAO 2003) and that “while the problems are long standing, various studies indicate that coastal villages are becoming more susceptible to flooding and erosion due in part to rising temperatures.” The GAO later identified 31 communities as facing imminent erosion threats (GAO 2003; GAO 2009), with four requiring immediate relocation. Of these 31 communities, 21 are located along the coasts of Alaska.

The combination of repeated extreme weather events coupled with decreased arctic sea ice and thawing permafrost is threatening the habitability of the places where people live along the western coast of Alaska (Cochran et al. 2013). Dr. David Atkinson, a research partner in this proposal, has focused his research on the environmental forcing of coastal zones and the analysis of weather data for extreme events, specifically storms. His work has focused on the western coast of Alaska, most recently in the communities of Shishmaref and Shaktoolik. When storms drive water toward the shore, if the near shore bottom is not deep, which is the situation for western coastal communities in Alaska, water has nowhere to go and piles up on the coast in a surge. Low-lying coastal communities in Alaska are subject to storms that can generate surges of up to 25 feet, causing flooding and erosion along the coastline, with resulting negative effects on infrastructure and subsistence activities (Mesquita, Atkinson and Hodges 2010).

These environmental changes have had a profound impact on the health and safety of community residents. Social/environmental conditions such as housing quality, employment, education, access to clean water, contamination, and the availability of subsistence resources are central to the health and well-being of Alaska Native communities. More people are getting ill from water-borne diseases, are being stung by insects and have suffered from allergies that result from increases of certain plants (ANTHC 2011). In addition, the changing migration patterns of subsistence food sources may affect diet.

The Alaska Native Tribal Health Consortium (ANTHC) has conducted health impact assessments since 2010. The ANTHC Climate and Health Impact Assessment (HIA) Program aims to document the impact of climate change on the health of Alaska Native community residents (Brubaker 2011). The health impact assessments have been done in 11 communities, provide critical baseline data and have documented a range of health effects including injury related to unusual travel conditions, damage to health infrastructure related to erosion and permafrost thaw and food insecurity related to changes in wildlife health and harvest success (Brubaker 2011).

In Newtok, Alaska the Yukon-Kuskokwim Health Center conducted a public health survey in 2006 and found ‘sanitation conditions in Newtok to be grossly inadequate for public health protection’ (ASCG 2008). Between 1994 and 2004, twenty-nine percent of Newtok infants were hospitalized with lower respiratory tract infections because of high levels of community contamination resulting from the lack of potable water for drinking, hygiene, and sanitation (Bronen 2011). Washing hands regularly is a hardship with limited access to water. The failure to address these issues is due to policies and regulations which prevent the building or repairing of damaged infrastructure in places which cannot be protected from flooding and concerns about the inefficient use of funding to repair or rebuild infrastructure in a community’s original

location because of the community's decision to relocate (Bronen and Chapin 2013; Bronen 2011).

In Kivalina, ANTHC evaluated the climate change impacts on the health of community residents in 2011 and recommended the development of a community monitoring program to better understand the climate change health impacts on community residents (ANTHC 2011). ANTHC is a research partner in this project and will assist with the development of the health component of the monitoring and assessment methodology.

In 2008, the Alaska Legislature established the Alaska Climate Change Impact Mitigation Program (ACCIMP) with funding to address the immediate planning needs of communities imminently threatened by climate-induced environmental change, such as erosion (Bronen and Chapin 2013). Funding from the ACCIMP is limited to two community categories. Non-competitive funding is allocated to six communities designated by name that are currently threatened by climate-induced environmental change. The remaining funds were administered through a competitive grant process to complete hazard impact assessments.

Through the ACCIMP program, Quinhagak is one of the communities which received competitive funding to complete a Hazard Impact Assessment (HIA). Quinhagak is located on the southwest coast of Alaska and is the home to approximately 700 primarily Yup'ik Eskimo residents whose lifestyle revolves around subsistence food gathering (POWTEC 2012). Erosion, river flooding, coastal storm surge, and thawing permafrost threaten residential dwellings, critical community infrastructure and livelihoods. The critical community infrastructure affected by these hazards includes the only functional dock in the community, the health care clinic, and the sewage lagoon (POWTEC 2012).

The community hired an outside consultant to conduct the Hazard Impact Assessment. Although the HIA report made several recommendations to monitor environmental change in order to reduce the cost of repairing and replacing infrastructure and to address the critical need for data to better predict rates of climate-induced environmental change, no mechanism was left in place to facilitate this monitoring and no financial or technical assistance resources were provided to assist community residents with this critical process (POWTEC 2012).

A fundamental limitation of hazard impact assessments is that external evaluators are primarily used to assess hazards in a snapshot of time and then provide potential solutions that may not be closely informed by or linked to processes by which individual communities envision and seek to implement their desired future. It also creates an inevitable tension between top-down government planning for adaptation, which focuses on cost-effective provision of a few broadly applicable solutions, and local empowerment to identify locally appropriate adaptation goals and pathways (Adger et al. 2005; Clark et al. 2011; Nelson et al. 2007).

Top-down planning that lacks bottom-up reciprocity also has potential practical limitations. (1) The heterogeneous needs and goals of local users may be a poor fit to highly specified solutions provided by agencies (Berkes and Jolly 2001). (2) Top-down solutions, including many subsidies, may restrict bottom-up innovation by creating perverse incentives or disincentives for self-sufficiency or counteracting local efforts (Nelson and Finan 2009). (3) The limited inclusion of locally specific values and planning needs may leave communities feeling disenfranchised,

leading to low buy-in and compliance with adaptation plans (Adger et al. 2005). (4) Top-down planning usually addresses incremental adaptation within existing institutional structures but seldom empowers transformative adaptation (Beilin et al. 2012; Clark et al. 2011; Park et al. 2012). These dilemmas suggest a need for community-empowered adaptation planning and more effective integration between bottom-up and top-down planning, monitoring, and assessment (Berkes 2008; Urwin and Jordan 2008).

The Hazard Impact Assessment process also demonstrates the complexity of the issues facing communities threatened by climate-induced environmental change. The combination of antiquated and damaged infrastructure needing replacement or repair coupled with the unknown projected erosion and flooding risk elucidates the need to implement and design a social-ecological monitoring and assessment methodology so that the progressive nature of the environmental changes can be captured and communicated to technical experts who can assist the community in evaluating the best adaptation responses. On-going and systematized monitoring and assessment of the environmental changes and its impacts on the health and well-being of community residents are essential in order to make informed decisions that will address the health impacts of climate-induced environmental change and ensure the long-term resilience of each community.

Scientific objectives of this research:

1. Design a community-based social-ecological monitoring and assessment methodology that will be used and implemented by Alaska Native communities to enable them to perform their own monitoring. Methodology development will be a cooperative effort led by Alaska Native communities and involving university researchers, government representatives, such as the US Army Corps of Engineers, and non-governmental organizations such as the Alaska Institute for Justice, Alaska Native Science Commission and the Alaska Native Tribal Health Consortium;
2. Train local community representatives to implement this methodology in their community and to perform trial data collection throughout the grant period and use these data to improve the methodology;
3. Document the collaborative relationship between these communities, university researchers, non-governmental organizations and government agencies throughout the grant period;
4. Compare and assess the possible differences in implementation of the social-ecological monitoring and assessment methodology between the 5 communities; and,
5. Disseminate the methodology.

These objectives provide a guiding framework that will enable our research to increase the adaptive capacity of Alaska Native communities experiencing the impacts of climate-induced environmental change on their health and well-being. Community engagement and empowerment are non-trivial, multi-dimensional challenges; however they are critical to any process aiming to improve the adaptive capacity of Alaska Native communities. By developing new and building upon existing trust relationships, learning from, and co-producing knowledge with communities, we seek to enhance their capacity to assess needs and develop adaptation strategies to protect their health and well-being, and to articulate their needs to organizations that might be able to provide technical or financial assistance.

The objectives listed above are further guided by three supporting elements and concepts: (1) The capacity of researchers to engage local communities depends on mutual trust built on legacies of previous interactions, mutual respect, genuine interest in learning from one another, and shared commitment to common goals. Existing legacies in the form of previous PI/co-PI interaction with several of the communities on the list, are available to the project. (2) Communities are likely to be more engaged in and benefit from research that empowers them to participate as equal partners in the design and implementation of research that explicitly addresses their needs. (3) At times when communities lack the capacity to meet their needs, projects (like ours) that facilitate information-sharing and collaboration through a sustained building of trust and sharing of power are more likely to foster community-based adaptation to change.

Information and communication for decision-making. An important approach to enhancing adaptive capacity is to foster effective communication and collaboration between entities that are trying to solve a problem and those with the experiential or technical knowledge or financial capacity to contribute to solutions (e.g., community members themselves, agencies, tribal organizations, and researchers). Information about technology or funding is most likely to be used by stakeholders if it is salient (i.e., clearly relevant to users' needs), credible (i.e., scientifically adequate and appropriate), and legitimate (i.e., respectful of divergent values). Stakeholder groups (e.g., researchers, agencies, and communities) often differ in their opinion about salience, credibility and legitimacy of the same information, indicating that the communication *process* is important. It is most likely to be effective when users participate actively and share power in co-producing knowledge and making decisions that affect their future rather than being passive recipients of information. Open, transparent communication, translation (e.g., avoiding jargon), and, where necessary, mediation may all be important in getting different groups "on the same page" with respect to the development and spread of effective adaptations. This proposal will facilitate monitoring and observing of environmental change in order to enhance communication between Alaska Native communities and technical experts that can assist with the design and implementation of adaptation strategies.

Adaptive and collaborative capacity. Effective adaptation requires much more than information exchange. Collaborative governance provides a framework for understanding the links between drivers of change, decision-making processes, actions, and adaptations. Conditions for effective action include internal properties of the community (*adaptive capacity*, e.g., leadership, education, diverse skills and interconnections among groups and individuals) as well as external drivers (e.g., changes in climate, global economy, and other stressors and opportunities) (Emerson, Nabatchi and Balogh 2012). By engaging federal and state government representatives along with university researchers and non-governmental organizations in the design of the interdisciplinary monitoring and assessment of environmental change, this proposal will foster *collaborative capacity*, which is defined by the joint creation or sharing of institutional arrangements, leadership, knowledge, and resources.

Proposed Methodology:

Outline of Research Design. We will collaborate with Alaska Native communities to study the impact of climate-induced environmental change, including flooding and accelerated rates of

erosion, on the public health of 27 communities in rural Alaska. The Government Accountability Office identified 31 communities imminently threatened by flooding and erosion. Of these 31 communities, 21 are located along the coast of Alaska. We will first work with the 21 Alaskan coastal communities that the U.S. Government Accounting Office [GAO] identified as most threatened by erosion (GAO 2003, 2009) (Fig. 1) and the six additional communities which have completed Hazard Impact Assessments through the Alaska Climate Change Impact Mitigation Grant (ACCIMP) program. We engage with these communities in five phases that we describe broadly in this section (Table 1), with details presented later. In *phase 1*, we will document for the coastal communities the current climate-change impacts on public health and the adaptive responses to these impacts. In *phase 2*, we will invite 5 communities experiencing a range of climate change impacts to public health to collaborate with university researchers and governmental and non-governmental agency representatives in the first Anchorage adaptation workshop. At this workshop, the participants will work together to develop an integrated social-ecological assessment and monitoring methodology that can be used to inform community residents as well as governmental and non-governmental agencies, of the on-going health impacts of climate change and guide adaptation responses. We will select the 5 communities based on their level of exposure to climate change impacts so that we have a continuum represented from those communities which have chosen to relocate as an adaptation strategy and those which have chosen to protect in place. In *phase 3*, we will travel to the 5 communities to facilitate the implementation of the methodology. In *phase 4*, we will bring the 5 community representatives, university researchers and governmental and non-governmental organizations together a second time to assess the design of the social-ecological monitoring and assessment methodology and its implementation and make a preliminary assessment of whether the methodology has improved climate-change adaptation. In *phase 5*, we will make the generic assessment methodology openly available, with community review and approval, on the internet to all 184 Alaskan indigenous communities currently threatened by erosion as well as to erosion-threatened communities globally, knowing that each community is individual and as such requires tailoring of a generic methodology to best suit their own needs. However, other communities should benefit at the very least by examining the process espoused in this research.

Table 1. Research phases, with their objectives, methods, and sample population.

Phase	Objective	Methods	Sample
1: Baseline April – December 2015	Document existing climate impacts on health and well-being of coastal communities	a) Data synthesis from documents and internet; b) Surveys by internet and phone	GAO and ACCIMP 27 coastal communities
2: Participatory design of model assessment and monitoring methodology. January 2016	Design social-ecological monitoring methodology to assist adaptation responses, from protection in place to community relocation	Participatory action research with communities, governmental and non-governmental agencies, and university researchers. a) Qualitative interviews and surveys with workshop participants.	5 communities, spanning the continuum of protection in place to community relocation

3: Pilot test monitoring and assessment methodology. February 2016-February 2017	Determine how communities have used the methodology.	Travel to each community to assist with implementation.	5 communities
4: Compare and assess implementation of monitoring and assessment methodology. March 2017	Compare and assess implementation of social-ecological monitoring results and methodology and its ability to facilitate adaptation.	Participatory action research with communities, governmental and non-governmental agencies, and university researchers. a) Qualitative interviews and surveys with workshop participants.	5 communities
5: Make the monitoring and assessment methodology openly available on the internet April 2017	Facilitate widespread access to monitoring and assessment methodology.	Work with UAF and ANSC to post the methodology on the internet and work with ANTHC to host a webinar to discuss the monitoring and assessment methodology.	184 communities

Methods:

Our project will accomplish the following activities during the grant period:

- Review of all literature related to erosion and flooding, including hazard impact assessments and studies conducted by the US Army Corps of Engineers, related to the 27 Alaskan coastal communities;
- Invitation to 5 communities to participate in this research project. Additional communities will be invited, if some communities decline.
- Three meetings involving the 5 communities and government and non-governmental representatives and university researchers who can provide technical and funding assistance. The first meeting (phase 2) will focus on the design of a methodology to monitor and assess environmental and ecological change and its impact on the health and well-being of communities. The second meeting (phase 3) will occur in each community to work with community residents on the application of the methodology to their specific local environment. The final meeting (phase 4) will bring all participants together to share the work performed in each community, lessons learned and evaluate dissemination to other communities affected by climate-induced environmental change.
- Methodology design process will follow these approximate steps, depending on community desires (these bullets are broken out in detail in the following sections):
 - Work with communities to have them self-identify priority concerns. Examples can include: fresh water supply, landfill, health, hunting and gathering concerns, weather

- issues that impact activities, storm surge that impact infrastructure, short-term hazards to health and safety such as small boats/large waves.
- Establish appropriate indicators or observation protocols along with the means by which the community can monitor elements they have identified as being of concern.
 - Engage external agencies appropriate to the expressed needs and act as facilitator to open up lines of communication between communities and the agencies. Examples may include, NOAA for anything related to storm forcing, EPA for water quality issues, USACE for erosion mitigation, etc. This does two things: 1) it puts the agency “on alert”, that there is a particular problem in a given community, and 2) it initiates the flow of information that will furnish the agency with the raw material to determine the right course of action.
 - Assess the level of collaboration by gathering data about the levels of collaboration between Alaska Native communities, the university researchers and the governmental and non-governmental representatives who participate in the design of the monitoring and assessment methodology at the beginning of the project and at the conclusion of the project. Data will be gathered by conducting surveys and interviews of representatives from the Alaska Native communities, the university researchers and the governmental and non-governmental agency representatives who participate in the project.

Structure and approach of our research group. Most of the hands-on research will be conducted by a *networking team* of individuals that has worked extensively with Alaskan communities, agencies, and university researchers and is committed to regular ongoing interactions with these groups.

Phase 1: Determine the baseline. The first phase of this research project involves learning about the climate change health impacts of the 27 Alaska Native communities, that are immediately threatened by erosion and flooding. We will document for all 27 communities the current climate-change health impacts and adaptive responses they have attempted. We will inform the tribal administrator of each community about our research program and invite them to participate in phases 1 and 5. For all 27 communities, we will synthesize information from published and gray-literature reports, such as hazard assessments, and internet sources. This will document the degree of exposure of each community to flooding and erosion, the impacts on health and their past and planned responses. We include all 27 communities in this analysis to ensure a consistent methodology and opportunity across all communities.

We will follow up with surveys (by internet and phone) of tribal leaders (village council that manages tribal affairs) and municipal leaders (city government that manages physical infrastructure) in each community to confirm patterns described in documentary sources and to learn of health impacts and adaptation efforts not described in written and internet sources.

Where possible, we will initiate contacts with each community through a member of the networking team that has worked with that community. When we don't know community leaders, communities will be contacted by Patricia Cochran of the Alaska Native Science Commission who is widely recognized in rural Alaska. The purpose of these initial contacts is to inform communities of the overall research goals, invite them to participate, confirm the accuracy of our phase 1 results, and invite a subset of communities to apply to participate in phase 2.

Below is a sample of research questions we will ask to tribal administrators and municipal leaders related to this component of the research:

Table 2. Questions related to climate-change health impacts and adaptive capacity:

Assessing response and adaptive capacity:

- 1) What are the environmental factors that are of greatest concern for the health and well-being of the residents in your community and how have these changed?
- 2) How has your community responded to changes in these factors?
- 3) Have responses been effective (i.e., increased resilience of village infrastructure)?
- 4) What factors (e.g., fuel costs, regulations, lack of funding) have facilitated or acted as barriers to adaptation to climate change?

Build the capacity of Alaska Native communities to respond to climate change impacts:

- 1) What resources does your community need to decide on an appropriate response to erosion and flooding?
- 2) What do you think are the best methods to use to monitor and assess the climate change impacts on the health and well-being of your community? What factors should be considered when assessing these impacts?

At the end of phase 1 we will write to the tribal administrator of the 27 communities. In our letter to each community, we will describe the phase-2 research and invite them to apply to participate in this more intensive phase of the research program, following up with phone calls to communities that do not respond. From those communities that apply to collaborate, we will select 5 communities for intensive collaboration. The selection process will be based on the level of impact of climate-induced environmental change on the infrastructure and health and well-being of community residents and the adaptation strategies chosen to respond. Our goal is to invite communities that have experienced a range of climate-induced threats from imminent to longer-term and those which have chosen adaptation strategies that reflect the spectrum from protection in place to community relocation. With community review and approval, the University of Alaska will be responsible for making widely available via the internet the assessment methodology and adaptation solutions that communities identify for addressing climate-induced erosion and flooding.

Phase 2: Co-design the social-ecological monitoring and assessment methodology. Phase 2 involves a more intensive engagement with communities to build their adaptive capacity to respond to the climate-induced environmental changes documented in phase 1. During the second phase of this research, we will select 5 communities and work with community-resident liaisons who will work with graduate students and project staff.

The goal of phase 2 of the research project is to design a social-ecological monitoring and assessment methodology that can be used by community members to monitor local observations of environmental change and the impact on the health and well-being of community residents. At the beginning of phase 2, we plan an adaptation workshop on erosion and flooding issues to foster effective communication among community representatives, university researchers and agency representatives. We will invite the community liaison, funded through this grant, and one community leader from each participating community. At the adaptation workshop, community leaders and liaisons will share their experiences about flooding/erosion impacts on the health and

well-being of community residents and adaptation responses with one another and university researchers and agency representatives that have potential to make scientific or funding contributions to address these issues.

An important approach to building multi-level adaptive capacity is to foster effective communication between entities that are trying to solve a problem (i.e., users) and those with the technical or financial capacity to contribute to solutions (e.g., community members themselves, as well as agencies and researchers). Information about technology or funding is most likely to be used by stakeholders if it is salient (i.e., clearly relevant to users' needs), credible (i.e., scientifically adequate and appropriate), and legitimate (i.e., respectful of divergent values) (Cash et al. 2003). The *process* by which information is communicated is also important. Communication is most effective and trust is more likely to develop when users participate actively and share power in co-producing knowledge and making decisions that affect their future rather than when information or solutions are “delivered” to them (i.e., the loading dock model of information transfer) (Cash et al. 2003).

Community leaders frequently comment that they have insufficient or inappropriate information with which to make well-informed adaptation choices. Analogously, many researchers lack contacts in rural communities to know what information would be most useful and how it is best communicated, and governmental and non-governmental agencies are often unaware of specific needs and desires of each community they serve. If differing perceptions emerge at the workshop about opportunities and barriers for adaptation, we will discuss why this might be, how barriers could be overcome, and how opportunities might be more effectively utilized.

We will use these conversations to design a social-ecological monitoring and assessment methodology jointly with the community liaisons, researchers, and agency representatives. During the adaptation workshop we will invite agency representatives responsible for community planning, climate change health impact assessments, water treatment, solid waste facilities and agency representatives and researchers knowledgeable about erosion and flooding to participate in discussions with community representatives to discuss the ways that local community representatives can monitor the climate change impacts in their community and how information from researchers and agency representatives can be integrated into the information being gathered by community residents. Although the methodology cannot be fully described prior to the workshop, it will likely include measures of erosion, flood height, storm severity and frequency, infrastructure damage, frequency and cause of damage to water, sewage, and solid waste systems, water-borne disease incidence. Dr. Atkinson will assist with the development of this environmental component of the community-based assessment and monitoring methodology. The methodology will be similar to a hazard impact assessment, which examines hazards within a community and impact on infrastructure. Dr. Chapin will assist with the development of the ecological assessment (e.g. permafrost degradation, changes in the production of berries and medicinal plants and in wildlife habitat). This methodology would add an examination of the health impacts, which include social, economic, subsistence and cultural impacts, of the hazards, and give community residents the ability to monitor the changes as they occur. The Alaska Native Tribal Health Consortium will help design the health monitoring component of the monitoring and assessment methodology. Government representatives, such as from the US Army Corps of Engineers, will be invited to participate in the development of this methodology.

These government agencies participated in the CPSS project and also work with the research partners in this grant. Together, we will facilitate the development of a social-ecological monitoring methodology that can be used by community residents and a process to include agency representatives and researchers in the monitoring process. Monitoring these types of changes greatly improves a community's chances of getting funding to address the challenges that they identify.

At the workshop, we will also conduct separate interviews and disseminate surveys to workshop participants to document baseline data about past collaboration among workshop participants.

Phase 3: Implementation and Assessment of the social-ecological monitoring methodology. In *phase 3* of this component of the research, we will work with the 5 communities to implement the social-ecological monitoring and assessment methodology developed at the adaptation workshop. It is likely that each community will monitor additional processes that they consider important, providing a mechanism for the monitoring methodology to evolve, improve, and meet community-specific needs. We will facilitate bi-monthly teleconferences and/or webinars with the community liaisons, researchers and agency representatives to assess the usefulness of the social-ecological monitoring methodology.

Phase 4: Compare and assess implementation of social-ecological monitoring and assessment methodology. In the last year of the study we will facilitate a second adaptation workshop so that the community liaisons, agency representatives and researchers can share the lessons learned from use of the assessment methodology they developed. We will compare implementation of the methodology to learn challenges and successes. Through this work, we will create a framework to assess the effectiveness of the monitoring and assessment methodology, which can be useful to other communities impacted by climate change. At the conclusion of phase 4, the research team will bring the research findings back to each of the 5 communities to ensure accuracy and validate results as well as give communities control of the research findings.

At this workshop, we will also administer surveys and conduct separate interviews with workshop participants to see if there has been a change in the collaboration among workshop participants.

Phase 5: Share the assessment methodology with all communities threatened by climate change. In *phase 5*, we will make the assessment methodology openly available on the internet to all 184 Alaskan indigenous communities currently threatened by erosion as well as to erosion-threatened communities globally. We will disseminate the assessment methodology with the Alaska Native Knowledge Network (ANKN) and Arctic Alliance, which are trusted sources of culturally appropriate information for Alaska Natives throughout the state and with the Alaska Center for Climate Assessment and Policy (ACCAP; <http://ine.uaf.edu/accap/>; a NOAA RISA program), whose mission is to help Alaskans respond to a changing climate. ACCAP works closely with climate-change scientists and management agencies as well as provides information to communities.

In addition, the University of Alaska Fairbanks Community Partnership for Self-Reliance and Sustainability (CPSS) is currently developing an adaptation catalogue that lists a wide variety of

adaptation solutions that communities in rural Alaska have implemented to reduce their vulnerability to climatic, economic, and social stresses. The role of CPSS in the proposed research will be to add to this adaptation catalogue the assessment methodology and adaptation solutions that communities identify for addressing climate-induced erosion and flooding and to make these tools widely available via a web-based knowledge-sharing hub.

During year one, when the research program is working with communities to develop the assessment methodology and identify adaptation solutions, CPSS will develop the internet architecture that can host this information. In the second year, this information will be incorporated into the website and made publicly available. CPSS will assist the research team in contacting erosion-prone communities to inform them of the availability of the assessment methodology to assist them in adapting to coastal erosion and other climate-change phenomena.

Finally, the Alaska Native Tribal Health Consortium, which facilitates a local environmental monitoring program in 140 communities and hosts a webinar each month to discuss these observations, will also assist with the dissemination of the methodology.

Expected Results, Successes, Outputs and Outcomes: Community engagement and empowerment are the primary goals of this research proposal. To develop trust with, learn from, and co-produce knowledge with communities, the major products of this research will be:

- *A climate impact monitoring and assessment methodology co-designed by community leaders, with input from researchers and agency representatives with relevant expertise.* This methodology will be used, tested, and improved by communities. This methodology will be shared publically over the internet with other communities seeking to monitor health impacts and adapt to climate-induced flooding and erosion.
- *General documentation of climate-change impacts and attempted adaptation responses of the 27 Alaskan coastal communities most strongly threatened by flooding and erosion, as well as documentation by each phase-2 community of changes through time in social-ecological impacts of climate change on their community.* This documentation greatly increases the credibility of community proposals that seek government or private funding to address these climate impacts.
- *Documentation of correlations and interactions among climate impacts (e.g., disruption of water supply and incidence of water-borne diseases) and health both within communities through time and among communities.* This information will be valuable to communities and agencies in identifying the most promising interventions to reduce climate vulnerability.
- *Reports to each community of that community's assessment of its climate vulnerability and options for reducing risks.* Both a community-specific report and a general report summarizing the results for all communities will be sent to each participating community. After editing and acceptance by these communities, this report will be circulated among relevant agencies, research groups and will be publicly available through websites of the Alaska Native Knowledge Network, the Alaska Center for Climate Assessment and Policy and CPSS.
- *Following community review, major lessons learned will be published in the peer-reviewed literature jointly authored by community liaisons, participating graduate students and grant partners.*

The ultimate outcome of this research project is to enhance the long-term resilience of Alaska Native coastal communities threatened by climate change impacts, such as unsafe drinking water, damaged solid waste facilities and contaminated subsistence river resources. This will occur through community-led documentation and assessment of their vulnerability (i.e., exposure and sensitivity) to climate risks and their capacity to reduce this vulnerability through community discussion and strategies that enable them to cope, learn, adapt, and in some cases transform in culturally appropriate ways that reduce their vulnerability.

Through the design and implementation of an integrated social-ecological monitoring and assessment methodology, Alaska Native communities will be able to assess on an on-going basis the climate-change impacts in their community and use this information to guide adaptation strategies and seek funding to address underlying causes of vulnerability. Including agency representatives with expertise in community planning, erosion and flood control, health, and solid waste and water infrastructure in the design of this assessment methodology will provide an opportunity for these agencies to mainstream climate-change policies with other agency mandates, provide funding and technical assistance and ensure that information collected by communities is adequate for them to make wise decisions that address community challenges. Perhaps the most important contribution to resilience is the development of a community-based monitoring and assessment methodology which can be used by communities to further their vision of resilience which is culturally appropriate and aligned with community values and vision.

Roles and Responsibilities: Dr. Bronen is the executive director of the Alaska Institute for Justice and a senior research scientist at the University of Alaska Institute of Arctic Biology. Dr. Bronen's research focuses on community-based adaptation and specifically climate-induced community relocations. Dr. Chapin is a professor emeritus of ecology at the University of Alaska. Previous to his emeritus status, he worked as a professor of Ecology, University of Alaska between 1984-89 and 1996-2011. Patricia Cochran is executive director of the Alaska Native Science Commission, which focuses on creating partnerships between science, research and Alaska Native communities. Ms. Cochran previously served as Administrator of the Institute for Circumpolar Health Studies at the University of Alaska Anchorage.

Dr. Bronen, Dr. Chapin and Patricia Cochran have previously worked together on the Community Partnership for Self-Reliance project. They will oversee all aspects of the research planning and implementation of this project to provide quality assurance in data collection, data analysis and that grant funds are expended in a timely and efficient manner. They will work in coordination with each community liaison as part of the research team to monitor progress towards project objectives, develop standard research procedures for gathering, analyzing and storing data from each participating community. The Alaska Native Science Commission will organize both of the meetings in Anchorage as well as the meetings which occur in each of the 5 intensively engaged communities.

Grant partner, Alaska Native Tribal Health Consortium (ANTHC), will work with the 5 intensively engaged communities in phase 2, 3 and 4 of this project to co-design a social-ecological monitoring and assessment methodology that will specifically address climate change health impacts. To accomplish this component of the project, ANTHC will attend both

adaptation workshops in Anchorage and visit each of the 5 villages to assist with implementation. ANTHC will also assist with the dissemination of the methodology after the 5 communities have reviewed and approved the results from this project.

Grant partner, David E Atkinson, has been an Associate Professor at University of Victoria since 2010; before that, he was a Research Scientist with International Arctic Research Center and Assistant Professor at University of Alaska Fairbanks. He has worked for many years on northern coastal forcing issues, mostly from a physical perspective (i.e., storm characteristics and winds driving waves and storm surge), but also from an “end-user” perspective – what specifically constitutes “bad weather” for communities and industry. This work he currently performs in communities in western Alaska. Atkinson sits on the Science Steering Committee for the International Study of Arctic Change. For this project he will assist with facilitation and methodology design meetings held in Anchorage, including guiding residents on the preparation of environmental monitoring protocols. He will help identify and open up communications with agencies relevant to areas of his expertise, e.g. NOAA or USACE. He will aid all aspects of physical forcing of the coastal environment by weather, and any community-identified issue that arises from weather (this includes sea-ice). He will perform weather analyses in response to community identification of problematic weather episodes. Laura Eerkes-Medrano is Dr. Atkinson’s PhD student. Her PhD is focused on the intersection of community security issues (especially food security), environmental forcing (especially sea-ice), and the role that existing policies play in supporting (or hindering) resilience building of western Alaskan communities to adapt. For this project she will assist in all aspects related to facilitation of community meeting and methodology development. She will help identify relevant agencies. She will assist Dr. Atkinson with weather analyses.

Relevance to the NOAA competition and NOAA’s long-term climate goal:

This proposal fits squarely within NOAA’s long-term Next Generation Strategic Plan and within the parameters of NOAA’s *Supporting Resilient Coastal Communities and Ecosystems in a Changing Climate: Understanding climate-related human health risks within the coastal environment* grant competition because the research seeks to improve the ability of Alaska Native communities, which are experiencing dramatic health impacts from climate change, to anticipate and respond to these impacts and make informed adaptation decisions. This project will fund the design and implementation of a community-based interdisciplinary methodology to monitor and assess environmental change and its impacts on the health and well-being on coastal community residents in Alaska. In this way, coastal communities in Alaska will develop a collaborative monitoring and assessment methodology with university researchers and government and non-governmental agency representatives who can provide technical and financial support in order to make informed adaptation decisions to foster their resilience and reduce their vulnerability to climate change. The results of this project comport with NOAA’s long-term adaptation goal to create an informed society anticipating and responding to climate and its impacts. Specifically this project will foster resilient coastal communities that can adapt to the impacts of hazards and climate change.

Benefits of the proposed project to the general public and the scientific community.

The findings from this research will benefit the general public and the scientific community because we anticipate that the design and implementation of a community-based social-

ecological monitoring and assessment methodology will be replicable and assist other coastal communities faced with climate-change impacts on health.

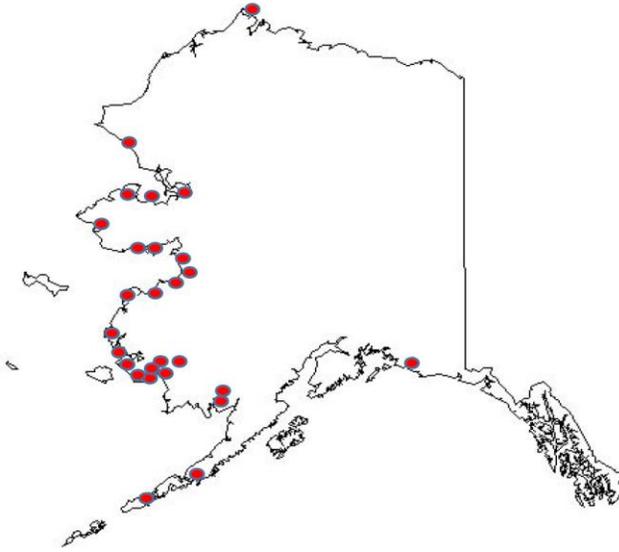


Figure 1: 27 Alaska Coastal Communities identified by GAO and ACCIMP
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DATA/INFORMATION SHARING PLAN:

Environmental data and information collected and/or created under this grant will be made visible, accessible and independently understandable to general users, free of charge and in a timely manner. Data management and sharing of research products are central features of our research program because one of the major goals of this research is to facilitate improved information exchange among communities, agencies, and researchers. The University of Alaska Fairbanks will be responsible for archiving the data and primarily responsible for making the assessment methodology widely available via the internet following community review and approval. As in our previous research, we plan to archive all data in three places: (1) with partner communities in forms that are useful to them, (2) on the knowledge-sharing network in forms that are useful for communicating about climate-change adaptation, and as databases archived and distributed by the Bonanza Creek Long Term Ecological Research Program.

Description of the types of environmental data and information created during project:

Four types of data will be collected during this research project: publicly available data; quantitative environmental data; community adaptation data and survey and interview data.

1) Publicly Available Community Data and Data Which it will be Shared: In year 1 from publicly available databases and reports, we will document for 27 coastal Alaska communities the recent flood and erosion risk; the impacts of these stressors on each community; and the adaptive responses that each community has undertaken in response to these impacts; the parameters are described in the text of the proposed research. We will also assemble publicly available socio-economic data that may correlate with the capacity of a community to respond to change (e.g., household income, percentage employment, health and crime statistics). This information will be collected from publicly available sources; *2) Standards for Data Format and Content-*Quantitative environmental data will be archived in their original units, and qualitative environmental data (e.g., flood risk and information quality) will be archived both as descriptive text and as indices (0-1) where possible. The descriptive text becomes part of the metadata for the indices. The spreadsheet and associated metadata will identify the source and time period of all data. Data will be entered in spreadsheets for archival and for use in the project. Following community review and approval, these databases and narratives will be posted on the Alaska Native Knowledge Network and archived in the Bonanza Creek LTER database with appropriate metadata; *3)Policies Addressing Data Stewardship & Preservation-Community Adaptation Data.* Information about the adaptation efforts of each community will be summarized as narratives and databases. These will be presented to the village council for review and approval prior to sharing of the data. The UAF Community Partnership for Self-Reliance and Sustainability (CPSS) within the Scenarios Network for Alaska and Arctic Planning (SNAP) is currently developing an adaptation catalogue that lists a wide variety of adaptation solutions that communities in rural Alaska have implemented to reduce their vulnerability to climatic, economic, and social stresses. The role of CPSS in the proposed research will be to add to this adaptation catalogue the assessment methodology and adaptation solutions that communities identify for addressing climate-induced erosion and flooding and to make this widely available via the internet, after community review and approval. During the time the research team is working with communities to develop the assessment methodology and identify adaptation solutions, CPSS will develop the internet architecture that can host this data. The vetted data will be made available on the knowledge-sharing hub and archived in the Bonanza Creek LTER database, as allowed under Tribal law. We anticipate that these adaptation responses will be posted on the CPSS website (knowledge-sharing hub) within one month of

their approval by communities; and 4) *Survey and Interview Data*. All survey and interview questions will be reviewed by the UAF Institutional Review Board and by our regional tribal partners before being pretested and implemented. Informed consent will be obtained for any interview, and interview files will be stored in a secure location. Interviews will be transcribed, and the interview text and survey responses will be analyzed using qualitative software (atlas.ti). Raw data (hand-written notes, digital data [text, video, audio] files) will be stored in lockable cabinets within the offices and on password protected computers of the Co-Is until permanent storage on a secure server. Raw data will only be accessible by Co-Is and graduate students approved by the UAF Institution Review Board. Summaries of the results for a given community will be reported to that community, reviewed and approved by the individuals interviewed and by the village council before being archived in the Bonanza Creek LTER database, as we have done for earlier community research. The public use of these data, for example in the knowledge-sharing network, will be decided together with communities, agency representatives, and researchers in phase 3 as part of the design of the knowledge-sharing network. We therefore cannot specify the details of public use of these data. We will encourage and assist tribal organizations with existing database structures to catalogue and store survey and interview data that they have collected for the communities they oversee.

Procedures for Providing Access, Sharing, Security and Prior Experience in Publishing Data. During the previous *Chapin* and *Brinkman* (PI and Co-I) NSF-supported project (IPY: Impacts of High-Latitude Climate Change on Ecosystem Services and Society”, we launched a community-managed database for local research products. Datasets in the BNZ LTER database are available to other scientists in as timely a manner as possible on the LTER website, where there are detailed data, EML metadata, and publication lists. In general, datasets are made publicly available as soon as they are archived. At the end of each month, the database backups are consolidated into two backups and burned to CD for storage off site. The servers are backed up off-site to the University of Alaska Fairbanks Arctic Region Supercomputing Center. The servers are protected from unauthorized intrusion by hardware and software firewalls, limited remote accessibility, a minimum number of user accounts, and password requirements.

CURRENT AND PENDING SUPPORT

None of the investigators have current or pending federal support.

Dr. Robin Bronen

PROFESSIONAL PREPARATION

Tufts University	Political Science	B.A. 1981
University of California Davis	Law	JD 1987
University of Alaska Fairbanks	INDS	PhD 2012

APPOINTMENTS

Feb. 2013 – Present	Senior Research Scientist University of Alaska Fairbanks Institute of Arctic Biology
September 2005 – Present	Executive Director Alaska Institute for Justice Anchorage, Alaska

PUBLICATIONS

Most Closely Related to Proposed Project

- Bronen, R. 2014. Community Relocations: The Arctic and South Pacific in Martin, S., Weerasinghe, S. and Taylor, A (editors) *Humanitarian Crises and Migration* Routledge: New York
- Bronen, R. and F. Stuart Chapin III. 2013. Adaptive governance and institutional strategies for climate-induced community relocations in Alaska. Proceedings of the National Academy of Sciences: Washington DC
- Bronen, R. 2013. Climate-Induced Displacement of Alaska Native Communities. Brookings Institution: Washington DC.
- Bronen, R. 2013. Statutory limits prevent effective response to communities at climate risk. The Guardian, May 16, 2013.
- Bronen, R. 2011. Climate-induced community relocations: Creating An Adaptive Governance Framework Based In Human Rights Doctrine. New York University Review of Law and Social Change Volume 35 no. 2.
- Bronen R., 2010. Forced Migration of Alaskan Indigenous Communities Due to Climate Change, T. Afifi and J. Jager (editors) Environment Forced Migration and Social Vulnerability, International Organization of Migration.

SYNERGISTIC ACTIVITIES

- Nansen Initiative, Advisory Board: International consultation to develop guidelines for population climate-induced displacement:2012 - present
- US Civil Rights Commission Alaska Sub-Committee 2011 - present
- National Immigration Project Board Member, 2005-2014
- National Trafficking Advisory Board, Department of Justice, Office of Violence Against Women, 2003-2004.
- Accredited Delegate, U.N. World Conference Against Racism 2001
- Equal Access To Justice, Alaska Supreme Court Committee, 1997-1998
- Implementation Committee of the Equal Access To Justice Task Force, Alaska Supreme Court 1999

COLLABORATORS AND OTHER AFFILIATIONS

Dr. F. Stuart Chapin III, <i>Collaborator</i>	Dr. Elizabeth Ferris
University of Alaska Fairbanks	Co-director Project on Internal Displacement Brookings Institution

F. Stuart Chapin, III

Education

Swarthmore College	Biology	BA	1966
Stanford University	Biology	PhD	1973

Professional appointments

Professor of Ecology, University of Alaska 1984-89 and 1996-2011; now emeritus
Professor of Integrative Biology, University of California Berkeley 1989-1998
Asst and Assoc. Professor, University of Alaska 1973-1984

Publications

- Bronen, R. and F.S. Chapin, III. 2013. Adaptive governance and institutional strategies for climate-induced community relocations in Alaska. *PNAS* 110(23): 9320-9325.
- Cochran, P., O. H. Huntington, C. Pungowiyi, S. Tom, F. S. Chapin, III, H. P. Huntington, N. G. Maynard, and S. F. Trainor. 2013. Indigenous frameworks for observing and responding to climate change in Alaska. *Climatic Change* 120(3):157-167.
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Synergistic activities

Participant in international assessments: Arctic Climate Impact Assessment, Global Change in Terrestrial Ecosystems, Intergovernmental Panel on Climate Change, Millennium Ecosystem Assessment, GEO-4 [UNEP], US National Climate Assessment;

Participant in climate-change adaptation planning: NRC Climate-Change Adaptation Panel (America's Climate Choices) and Alaska Governor's Task Force on Climate Change Adaptation;

Director, Resilience and Adaptation Program (IGERT, 2001-2011);

President, Ecological Society of America (2010-11);

University lead, Community Partnership for Self-Reliance (with Alaska Native Science Commission) Collaborators (2009-2013) [not including former grad students]: W.N. Adger, Univ. Southampton; Lilian Alessa, Univ. AK Anchorage; Rosina Bierbaum, Univ. Michigan; Marion Bret-Harte, UAF; Stephen Carpenter, Univ. Wisconsin; Graeme Cumming, Univ. Capetown; Ruth DeFries, Univ. Maryland; K. Dickenson, Univ. Otago; Charles Driscoll, Cornell; Erle Ellis, U. Md; Eugenie Euskirchen, UAF; Zhilan Feng, Purdue; Carl Folke, Stockholm Univ.; Craig Gerlach, Univ. Calgary; Joshua Greenberg, UAF; Nancy Grimm, Arizona State; Ben Halpern, UCSB; Richard Hobbs, U W Australia; Henry Huntington, Eagle River; Rob Jackson, Duke; Ann Kinzig, Arizona State; Gary Kofinas, UAF; Phil Loring, UAF; David McGuire, UAF; Michelle Mack, Univ. Florida; Dawn Magnass, USFWS; Alan Mark, Univ. Otago; Pam Matson, Stanford; Thad Miller, Portland State U; Christer Nilsson, Umea; Charles Perrings, Arizona State; Deb Peters, U. New Mexico; STA Pickett, Cary Inst.; Mary Power, UC Berkeley; Jim Randerson, Univ. Calif Irvine; Johann Rockstrom, U. Stockholm; Roger Ruess, UAF; Nathan Sayre, UC Berkeley; Marten Scheffer, Wageningen; Edward Schuur, Univ. Florida; Peter Schweitzer, UAF; Gaius Shaver, Marine Biological Lab; Mark Stafford Smith, Australia; Pam Templer; B.L. Turner, Arizona State Univ; Sara Vicca, Univ. Antwerp; Peter Vitousek, Stanford; Brian Walker, CSIRO; Laurie Yung, Univ. Montana; Erica Zavaleta, UCSC; Sergei Zimov, Pacific Ins. Geography

Patricia A. L. Cochran
Executive Director
Alaska Native Science Commission

An Inupiat Eskimo born and raised in Nome, Alaska, Ms. Cochran serves as Executive Director of the Alaska Native Science Commission (ANSC), a non-profit organization created to bring together research and science in partnership with Alaska Native communities. Ms. Cochran brings over thirty years of experience and expertise in organizational development and management, community development, use and application of traditional knowledge, cross cultural communication and diversity training, program and business development, and intimate knowledge and contacts in Alaska Native, the Arctic and worldwide Indigenous communities.

Academic Preparation

Alaska Methodist University	1967-68	Specialized Training:	
University of Alaska Anchorage	1977-1979	The Grantsmanship Center	1976
University of Washington	1989	Harvard University -	1980
		Financing Community Development	

Appointments

Executive Director, Alaska Native Science Commission
International Chair, Inuit Circumpolar Council
Administrator, Institute for Circumpolar Health Studies, University of Alaska Anchorage
Executive Director, Alaska Community Development Corporation
Local Government Program Director, University of Alaska Fairbanks
Director of Employment and Training, Chugachmiut Native Corporation

Related Publications

Cochran, Patricia et al. Indigenous frameworks for observing and responding to climate change in Alaska, *Climatic Change Journal*, 26 March 2013, DOI 10.1007/s10584-013-0735-2
Cochran, Patricia. The Arctic: Indicator of Global Change, *SGI Quarterly*, April 2009
Cochran, Patricia A.L., Marshall C., Garcia-Downing C., Kendall E., Cook D., McCubbin L., Gover R. Indigenous Ways of Knowing: Implications for Participatory Research and Community, *American Journal of Public Health*, Volume 98, No. 1, January 2008

Synergistic Activities

- Developed and chaired the Indigenous Peoples' Global Summit on Climate Change with over 80 countries participating.
- Coordinated activities of the Inuit Circumpolar Council representing 160,000 Inuit in Alaska, Canada, Russia and Greenland.
- Head of Delegation to the Arctic Council; Arctic Representative to the United Nations Permanent Forum on Indigenous Issues and representative of indigenous communities at UN Secretary General's High Level Sessions on Climate Change.
- Developed traditional Alaska Native methods and database as a key component in scientific data gathering for Traditional Knowledge and contaminants project.
- Assisted Alaska Native communities and researchers to develop partnership plans for research and developing common research agendas.
- Served as Alaska/Arctic & Tribal Chapter Author for 2014 National Climate Assessment

Collaborators and Other Affiliations

Victor Fischer, University of Alaska Anchorage
Ray Barnhardt, University of Alaska Fairbanks
F. Stuart Chapin, University of Alaska Fairbanks
Glen Schuster, US Satellite, NASA Endeavor
Dan Wildcat, Haskell Institute



**ALASKA NATIVE
TRIBAL HEALTH
CONSORTIUM**

ALASKA NATIVE TRIBAL HEALTH CONSORTIUM
Division of Community Health Services
3900 Ambassador Drive, Suite 401
Anchorage, Alaska 99508
P. 907-729-2464 F. 907-729-3652

October 15, 2014

Adrienne Antoine
Program Manager
Coastal and Ocean Climate Applications (COCA)
Climate and Societal Interactions (CSI)
NOAA Climate Program Office

RE: Letter of Support – UAF / AIJ / ANSC Proposal

Dear Ms. Antoine:

The Alaska Native Tribal Health Consortium (ANTHC) would like to express our support for the proposal by the University Of Alaska Fairbanks, Alaska Institute for Justice, and Alaska Native Science Commission proposal for the solicitation, Climate and Societal Interactions: Supporting Resilient Coastal Communities and Ecosystems in a Changing Climate: Understanding climate-related health risks within the coastal environment. ANTHC supports this project and would collaborate as a partner thorough our Center for Climate and Health.

As the statewide arm of the tribal health system in Alaska, ANTHC recognizes the importance, of understanding environmental change so we can effectively respond to health effects and encourage community wellness. Our organization performs health impact assessment on climate change for communities across Alaska. Developing appropriate social and ecological systems is important as climate change is affecting harvest of subsistence resources and presenting new risks for those who travel, work, and live on the land and sea.

This new proposal will provide opportunity for participating communities to enhance understanding and local capacity for adaptation. It will also develop new knowledge that can benefit communities across Alaska.

Sincerely,

A handwritten signature in black ink, appearing to read "M. Y. Brubaker".

Mike Brubaker
Director, Center for Climate and Health
Alaska Native Tribal Health Consortium



UNIVERSITY OF ALASKA FAIRBANKS

INSTITUTE OF ARCTIC BIOLOGY

P.O. Box 757000

Fairbanks, Alaska 99775-7000 U.S.A.

907 474-7640

FAX 907 474-6967

October 13, 2014

Robin Bronen
Alaska Institute of Justice

Robin,

I'm looking forward to participating in the research described in your proposal to the NOAA program on "Supporting resilient communities and ecosystems in a changing climate." If your proposal is funded, I will participate for one month per year without compensation. I have retired from the University of Alaska Fairbanks, and my retirement benefits are enough that I am happy to contribute my time without compensation.

As co-PI, I plan to assist in the preparation on both of the adaptation workshops, assist with the design and implementation of the monitoring and assessment methodology, travel to at least 2 of the villages with which we will work intensively and work with the UAF graduate student.

In addition, I will work with the coordinator of the Community Partnership for Self-Reliance and Sustainability (CPSS) to implement phase 5 of the proposed research, i.e., to make widely available via the internet the assessment tools and adaptation solutions that communities identify for addressing climate-induced erosion and flooding, as described in the proposal.

Finally, I will coordinate the archival of project data with the Bonanza Creek Long-Term Ecological Research Program (which I formerly directed), as described in the data management plan.

Best wishes,

F Stuart Chapin III



Department of Geography

PO Box 3060 STN CSC
Victoria British Columbia V8W 3R4 Canada
Tel (250) 721-7327 Fax (250) 721-6216
Email geoinfo@uvic.ca Web www.geography.uvic.ca

**University
of Victoria**

Adrienne Antoine
Program Manager
Coastal and Ocean Climate Applications (COCA)
Climate and Societal Interactions (CSI)
NOAA Climate Program Office

October 15, 2014

Dear Ms. Antoine,

I am writing this letter of commitment for the proposal submitted by the Alaska Institute for Justice for the solicitation titled, 'Climate and Societal Interactions: Supporting Resilient Coastal Communities and Ecosystems in a Changing Climate: Understanding climate-related health risks within the coastal environment'.

My name is David Atkinson; I currently work as an Associate Professor of Geography at the University of Victoria. Before that, from 2004 until August 2010, I was a Research Scientist at the International Arctic Research Center with a cross-appointment as an Assistant Professor of Atmospheric Sciences in the College of Natural Sciences and Mathematics at the University of Alaska Fairbanks. My research focuses on Arctic and Northern climate issues centering around storms and the weather and how these impact the coastal zone. This is conducted in two ways, one by performing classic physical analyses of weather and marine parameters (e.g. waves, surge), and the other, by going to end-users (communities, industry, operations) and asking them what types of weather are problematic and then linking these observations to the large scale synoptic weather patterns causing them. Since 2004 I have been to many communities in coastal western Alaska and northern Canada; for my most recent projects, my students and I are working in the Alaska communities of Shaktoolik, Gambell, and Shishmaref, as well as five more communities on the Canadian side.

For this proposal, I plan to assist in the preparation of both of the adaptation workshops and assist with the design and implementation of the monitoring and assessment methodology, specifically those aspects relating to environmental forcing of weather-related hazards. Laura Eerkes-Medrano is a PhD student who I supervise and who will work with me on this proposal. She will assist with the workshops, assessment methodology development, and visits to the final communities selected. Laura has extensive experience in native communities gained from a previous, 19-year career as a treaty negotiator and facilitator for the British Columbia Provincial Government, and before that, in Mexico; she has also been to a number of Alaska communities in the last two years, working under my other projects, and is very familiar with the Alaska context.

I was very enthusiastic about this project when Robin approached me because I firmly believe that the only way efforts to assist in adaptation are going to work is to allow the communities to guide the process. That is how I have styled my projects, to great effect, and that is how Robin is positioning this effort.

Sincerely,

David E. Atkinson, PhD.
Associate Professor of Geography
University of Victoria
+1.250.721.7332
datkinso@uvic.ca

Indirect Cost Rate Agreement for University of Fairbanks



DEPARTMENT OF THE NAVY

OFFICE OF NAVAL RESEARCH
875 NORTH RANDOLPH STREET
SUITE 1425
ARLINGTON, VA 22203-1995

IN REPLY REFER TO:

Agreement Date: May 28, 2014
Supersedes Agreement dated: June 24, 2013

NEGOTIATION AGREEMENT

**INSTITUTION: UNIVERSITY OF ALASKA
FAIRBANKS, ALASKA 99775**

The Facilities and Administrative (F&A) rates contained herein are for use on grants, contracts and/or other agreements issued or awarded to The University of Alaska (UA) by all Federal Agencies of the United States of America, in accordance with the cost principles mandated by 2 CFR 220. These rates shall be used for forward pricing and billing purposes for UA's Fiscal Year 2014 through 2016. This rate agreement supersedes all previous rate agreements/determinations for Fiscal Year 2014 through 2016.

Section I: RATES - TYPE: PREDETERMINED (PRED)

Indirect Cost Rates (F&A):

<u>TYPE</u>	<u>FROM</u>	<u>TO</u>	<u>RATE</u>	<u>BASE</u>	<u>LOCATION</u>	<u>APPLICABLE TO</u>
<u>University of Alaska Fairbanks (UAF)</u>						
Pred	7/1/2013	6/30/2016	50.5%	(a)	On-Campus	Organized Research (1)
Pred	7/1/2013	6/30/2016	59.5%	(a)	On-Campus	Organized Research (2)
Pred	7/1/2013	6/30/2016	26.0%	(a)	Off-Campus	Organized Research (1)
Pred	7/1/2013	6/30/2016	35.0%	(a)	Off-Campus	Organized Research (2)
Pred	7/1/2013	6/30/2016	37.2%	(a)	On-Campus	Other Sponsored Activities
Pred	7/1/2013	6/30/2016	26.0%	(a)	Off-Campus	Other Sponsored Activities
Pred	7/1/2013	6/30/2016	26.7%	(a)	All	Poker Flat
Pred	7/1/2013	6/30/2016	35.0%	(a)	All	Ship
<u>University of Alaska Anchorage (UAA)</u>						
Pred	7/1/2013	6/30/2016	51.2%	(a)	On-Campus	Organized Research
Pred	7/1/2013	6/30/2016	26.0%	(a)	Off-Campus	Organized Research
Pred	7/1/2013	6/30/2016	33.0%	(a)	On-Campus	Other Sponsored Activities
Pred	7/1/2013	6/30/2016	26.0%	(a)	Off-Campus	Other Sponsored Activities
<u>University of Alaska Southeast (UAS)</u>						
Pred	7/1/2013	6/30/2016	59.0%	(a)	On-Campus	Organized Research
Pred	7/1/2013	6/30/2016	26.0%	(a)	Off-Campus	Organized Research
Pred	7/1/2013	6/30/2016	30.2%	(a)	On-Campus	Other Sponsored Activities
Pred	7/1/2013	6/30/2016	26.0%	(a)	Off-Campus	Other Sponsored Activities

<u>TYPE</u>	<u>FROM</u>	<u>TO</u>	<u>RATE</u>	<u>BASE</u>	<u>LOCATION</u>	<u>APPLICABLE TO</u>
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Systemwide (Applies to all Campuses)

Pred	7/1/2013	6/30/2016	50.0%	(a)	On-Campus	Sponsored Training
Pred	7/1/2013	6/30/2016	26.0%	(a)	Off-Campus	Sponsored Training

DISTRIBUTION BASES

- (a) Modified Total Direct Costs (MTDC), as defined in 2 CFR 220, consisting of all salaries and wages, fringe benefits, materials and supplies, services, travel, and subgrants and subcontracts up to the first \$25,000 of each subgrant or subcontract (regardless of the period covered by the subgrant or subcontract). Equipment, capital expenditures, charges for patient care and tuition remission, long term space rental costs, scholarships, and fellowships as well as the portion of each subgrant and subcontract in excess of \$25,000 shall be excluded from Modified Total Direct Costs.

APPLICABLE TO:

(1) Applies to DOD contracts awarded before November 30, 1993, all Non-DOD Instruments, and all DOD grants (See Section II, paragraph E). (Capped)

(2) Applies to only DOD contracts awarded on or after November 30, 1993 in accordance with and under the authority of DFARS 231.303(1) (See Section II, paragraph F). (Uncapped)

SECTION II - GENERAL TERMS AND CONDITIONS

A. LIMITATIONS: Use of the rates set forth under Section I is subject to any statutory or administrative limitations and is applicable to a given grant, contract or other agreement only to the extent that funds are available and consistent with any and all limitations of cost clauses or provisions, if any, contained therein. Acceptance of the rates agreed to herein is predicated upon all of the following conditions: (1) that no costs other than those incurred by the grantee/contractor were included in this indirect cost pool as finally accepted and that such costs are legal obligations of the grantee/contractor and allowable under governing cost principles; (2) that the same costs that have been treated as indirect costs are not claimed as direct costs; (3) that similar types of costs have been accorded consistent accounting treatment; and (4) that the information provided by the grantee/contractor, which was used as the basis for acceptance of the rates agreed to herein and expressly relied upon by the Government in negotiating and accepting the said rates, is not subsequently found to be materially incomplete or inaccurate.

B. ACCOUNTING CHANGES: The rates contained in Section I of this agreement are based on the accounting system in effect at the time the agreement was negotiated. Changes to the method(s) of accounting for costs which affect the amount of reimbursement resulting from the use of these rates require the written approval of the authorized representative of the cognizant negotiating agency for the Government prior to implementation of any such changes. Such changes include but are not limited to changes in the charging of a particular type of costs from indirect to direct. Failure to obtain such approval may result in subsequent cost disallowances.

C. PREDETERMINED RATES: The predetermined rates contained in this agreement are not subject to adjustment in accordance with the provisions of 2 CFR 220, subject to the limitations contained in Part A of this section.

D. USE BY OTHER FEDERAL AGENCIES: The rates set forth in Section I hereof were negotiated in accordance with and under the authority set forth in 2 CFR 220. Accordingly, such rates shall be applied to the extent provided in such regulations to grants, contracts and other transactions to which 2 CFR 220 is applicable, subject to any limitations in part A of this section. Copies of this document may be provided by either party to other Federal agencies which have or intend to issue or award grants and contracts using these rates or to otherwise provide such agencies with documentary notice of this agreement and its terms and conditions.

E. DFARS WAIVER: Signature of this agreement by the authorized representative of the University of Alaska and the Government acknowledges and affirms the University's request to waive the prohibition contained in DFARS 231.303(1) and the Government's exercise of its discretion contained in DFARS 231.303(2) to waive the prohibition in DFARS 231.303(1) with the exception of the University of Alaska Fairbanks Organized Research. The waiver request by the University of Alaska is made to simplify the University's overall management of DOD cost reimbursements under DOD contracts.

F. APPLICATION OF INDIRECT COST RATES TO DOD CONTRACTS/SUBCONTRACTS: In accordance with DFARS 231.303, for the University of Alaska Fairbanks Organized Research, no limitation (unless waived by the institution) may be placed on the reimbursement of otherwise allowable indirect costs incurred by an institution of higher education under a DOD contract awarded on or after November 30, 1993, unless the same limitation is applied uniformly to all other organizations performing similar work. It has been determined by the Department of Defense that such limitation is not being uniformly applied. Accordingly, the rates cited (2) of Section I, as explained under the title, "APPLICABLE TO" do not reflect the application of the 26% limitation on administrative indirect costs imposed by 2 CFR 220, whereas (1) does so.

G. SPECIAL REMARKS:

- (1) The Government's agreement with the rates set forth in Section I is not an acceptance of University of Alaska (UA)'s accounting practices or methodologies. Any reliance by the Government on cost data or methodologies submitted by UA is on a non-precedence-setting basis and does not imply Government acceptance.
- (2) Off-Campus rates apply to sponsored projects where more than 50% of the university effort is conducted off-campus. Off-Campus is defined as a facility which is not owned or leased by the institution, a facility leased by the institution where the lease costs are charged as direct costs to the award, or a temporary worksite (i.e. field location).

Accepted:

FOR UNIVERSITY OF ALASKA:

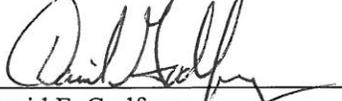


Ashok Roy
Chief Financial Officer

Date

5/28/14

FOR THE U.S. GOVERNMENT:



David F. Godfrey
Contracting Officer

Date

5/28/14

For information concerning this agreement contact:

DAVID F. GODFREY, Contracting Officer

Office of Naval Research

875 North Randolph Street, Rm. 373

Arlington, VA 22203-1995

Phone: (703) 696-2586

E-mail: david.f.godfrey@navy.mil

INDIVIDUAL RATE COMPONENTS

Institution: University of Alaska

FY Covered by Rate: 2014-2016

Location Rate is Applicable to: **University of Alaska Fairbanks -- SHIP**

Type of Rate: Predetermined

Negotiation Base:

Distribution Base (MTDC):	FY 2014	FY 2015	FY 2016
	\$514,000	\$6,117,000	\$6,325,000

RATE COMPONENTS:

	All	All	All
1. ADMINISTRATIVE:			
Gen Admin	12.06%	12.06%	12.06%
Dept Admin	32.06%	32.06%	32.06%
Spon Proj Admin	1.87%	1.87%	1.87%
Student Services	0.00%	0.00%	0.00%
Subtotal	<u>45.99%</u>	<u>45.99%</u>	<u>45.99%</u>
Administrative Cap Adjustment	<u>(19.99%)</u>	<u>(19.99%)</u>	<u>(19.99%)</u>
Subtotal	<u>26.00%</u>	<u>26.00%</u>	<u>26.00%</u>
2. FACILITIES:			
Bld Depr	0.99%	0.99%	0.99%
Equip Depr	0.00%	0.00%	0.00%
Interest	0.00%	0.00%	0.00%
O & M	7.97%	7.97%	7.97%
Library	0.00%	0.00%	0.00%
Subtotal	<u>8.96%</u>	<u>8.96%</u>	<u>8.96%</u>
Rounding	0.04%	0.04%	0.04%
Capped Rate	<u>35.00%</u>	<u>35.00%</u>	<u>35.00%</u>

RATE ROUNDED

FOR UNIVERSITY OF ALASKA:



Ashok Roy
Chief Financial Officer

5/28/14
Date

FOR THE U.S. GOVERNMENT:



David F. Godfrey
Contracting Officer

5/28/14
Date

INDIVIDUAL RATE COMPONENTS

Institution: University of Alaska

FY Covered by Rate: 2014-2016

Location Rate is Applicable to: **University of Alaska Fairbanks -- PokerFlat**

Type of Rate: Predetermined

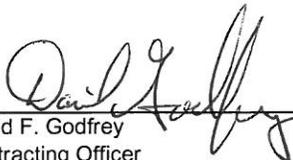
Negotiation Base:

	FY 2014	FY 2015	FY 2016
Distribution Base (MTDC):	\$2,670,000	\$2,697,000	\$2,751,000
RATE COMPONENTS:	All	All	All
1. ADMINISTRATIVE:			
Gen Admin	12.11%	12.11%	12.11%
Dept Admin	18.45%	18.45%	18.45%
Spon Proj Admin	1.87%	1.87%	1.87%
Student Services	0.00%	0.00%	0.00%
Subtotal	32.43%	32.43%	32.43%
Administrative Cap Adjustment	(6.43%)	(6.43%)	(6.43%)
Subtotal	26.00%	26.00%	26.00%
2. FACILITIES:			
Bld Depr	0.74%	0.74%	0.74%
Equip Depr	0.00%	0.00%	0.00%
Interest	0.00%	0.00%	0.00%
O & M	0.00%	0.00%	0.00%
Library	0.00%	0.00%	0.00%
Subtotal	0.74%	0.74%	0.74%
Rounding	-0.04%	-0.04%	-0.04%
Capped Rate	26.70%	26.70%	26.70%

FOR UNIVERSITY OF ALASKA:

FOR THE U.S. GOVERNMENT:


 Ashok Roy
 Chief Financial Officer


 David F. Godfrey
 Contracting Officer

5/28/14
 Date

5/28/14
 Date

INDIVIDUAL RATE COMPONENTS

Institution: University of Alaska FY Covered by Rate: 2014-2016

Location Rate is Applicable to: **University of Alaska Fairbanks -- On Campus Organized Research**

Type of Rate: Predetermined

Negotiation Base:

Distribution Base (MTDC):	FY 2014		FY 2015		FY 2016	
	\$83,700,000		\$83,700,000		\$83,700,000	
RATE COMPONENTS:	On Campus	Off Campus	On Campus	Off Campus	On Campus	Off Campus
1. ADMINISTRATIVE:						
Gen Admin	11.98%	11.98%	11.98%	11.98%	11.98%	11.98%
Dept Admin	21.44%	21.44%	21.44%	21.44%	21.44%	21.44%
Spon Proj Admin	1.60%	1.60%	1.60%	1.60%	1.60%	1.60%
Student Services	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Subtotal	35.02%	35.02%	35.02%	35.02%	35.02%	35.02%
Administrative Cap Adjustment	(9.02%)	(9.02%)	(9.02%)	(9.02%)	(9.02%)	(9.02%)
Subtotal	26.00%	26.00%	26.00%	26.00%	26.00%	26.00%
2. FACILITIES:						
Bld Depr	6.19%	0.00%	6.19%	0.00%	6.19%	0.00%
Equip Depr	1.35%	0.00%	1.35%	0.00%	1.35%	0.00%
Interest	2.05%	0.00%	2.05%	0.00%	2.05%	0.00%
O & M	13.55%	0.00%	13.55%	0.00%	13.55%	0.00%
Library	1.32%	0.00%	1.32%	0.00%	1.32%	0.00%
Subtotal	24.46%	0.00%	24.46%	0.00%	24.46%	0.00%
Rounding	0.04%	0.00%	0.04%	0.00%	0.04%	0.00%
Capped Rate	50.50%	26.00%	50.50%	26.00%	50.50%	26.00%
Rounding	0.02%	-0.02%	0.02%	-0.02%	0.02%	-0.02%
Uncapped Rate	59.50%	35.00%	59.50%	35.00%	59.50%	35.00%

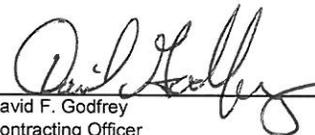
FOR UNIVERSITY OF ALASKA:



Ashok Roy
Chief Financial Officer

Date 5/28/14

FOR THE U.S. GOVERNMENT:



David F. Godfrey
Contracting Officer

Date 5/28/14

INDIVIDUAL RATE COMPONENTS

Institution: University of Alaska

FY Covered by Rate: 2014-2016

Location Rate is Applicable to: **University of Alaska Fairbanks -- Other Sponsored Activities**

Type of Rate: Predetermined

Negotiation Base:

Distribution Base (MTDC):	FY 2014	FY 2015	FY 2016
	\$24,437,000	\$24,768,000	\$25,105,000

RATE COMPONENTS:

	On Campus	Off Campus	On Campus	Off Campus	On Campus	Off Campus
1. ADMINISTRATIVE:						
Gen Admin	11.11%	11.11%	11.11%	11.11%	11.11%	11.11%
Dept Admin	19.15%	19.15%	19.15%	19.15%	19.15%	19.15%
Spon Proj Admin	1.87%	1.87%	1.87%	1.87%	1.87%	1.87%
Student Services	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Subtotal	32.13%	32.13%	32.13%	32.13%	32.13%	32.13%
Administrative Cap Adjustment	(6.13%)	(6.13%)	(6.13%)	(6.13%)	(6.13%)	(6.13%)
Subtotal	26.00%	26.00%	26.00%	26.00%	26.00%	26.00%
2. FACILITIES:						
Bld Depr	2.97%	0.00%	2.97%	0.00%	2.97%	0.00%
Equip Depr	0.51%	0.00%	0.51%	0.00%	0.51%	0.00%
Interest	0.23%	0.00%	0.23%	0.00%	0.23%	0.00%
O & M	6.72%	0.00%	6.72%	0.00%	6.72%	0.00%
Library	0.82%	0.00%	0.82%	0.00%	0.82%	0.00%
Subtotal	11.25%	0.00%	11.25%	0.00%	11.25%	0.00%
Rounding	-0.05%	0.00%	-0.05%	0.00%	-0.05%	0.00%
Capped Rate	37.20%	26.00%	37.20%	26.00%	37.20%	26.00%

FOR UNIVERSITY OF ALASKA:

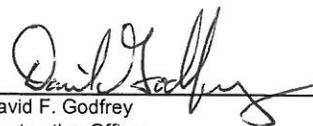


Ashok Roy
Chief Financial Officer

5/28/14

Date

FOR THE U.S. GOVERNMENT:



David F. Godfrey
Contracting Officer

5/28/14

Date

INDIVIDUAL RATE COMPONENTS

Institution: University of Alaska FY Covered by Rate: 2014-2016

Location Rate is Applicable to: **University of Alaska Anchorage -- On Campus Organized Research**

Type of Rate: Predetermined

Negotiation Base:

Distribution Base (MTDC):	FY 2014	FY 2015	FY 2016
	\$12,243,000	\$12,366,000	\$12,552,000

RATE COMPONENTS:	FY 2014		FY 2015		FY 2016	
	On Campus	Off Campus	On Campus	Off Campus	On Campus	Off Campus
1. ADMINISTRATIVE:						
Gen Admin	14.57%	14.57%	14.57%	14.57%	14.57%	14.57%
Dept Admin	37.88%	37.88%	37.88%	37.88%	37.88%	37.88%
Spon Proj Admin	1.87%	1.87%	1.87%	1.87%	1.87%	1.87%
Student Services	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Subtotal	54.32%	54.32%	54.32%	54.32%	54.32%	54.32%
Administrative Cap Adjustment	(28.32%)	(28.32%)	(28.32%)	(28.32%)	(28.32%)	(28.32%)
Subtotal	26.00%	26.00%	26.00%	26.00%	26.00%	26.00%
2. FACILITIES:						
Bld Depr	11.14%	0.00%	11.14%	0.00%	11.14%	0.00%
Equip Depr	0.77%	0.00%	0.77%	0.00%	0.77%	0.00%
Interest	0.33%	0.00%	0.33%	0.00%	0.33%	0.00%
O & M	12.16%	0.00%	12.16%	0.00%	12.16%	0.00%
Library	0.79%	0.00%	0.79%	0.00%	0.79%	0.00%
Subtotal	25.19%	0.00%	25.19%	0.00%	25.19%	0.00%
Rounding	0.01%	0.00%	0.01%	0.00%	0.01%	0.00%
Capped Rate	51.20%	26.00%	51.20%	26.00%	51.20%	26.00%

FOR UNIVERSITY OF ALASKA:

FOR THE U.S. GOVERNMENT:


 Ashok Roy
 Chief Financial Officer


 David F. Godfrey
 Contracting Officer

5/28/14
 Date

5/28/14
 Date

INDIVIDUAL RATE COMPONENTS

Institution: University of Alaska FY Covered by Rate: 2014-2016

Location Rate is Applicable to: **University of Alaska Anchorage -- Other Sponsored Activities**

Type of Rate: Predetermined

Negotiation Base:

Distribution Base (MTDC):	FY 2014	FY 2015	FY 2016
	\$13,648,000	\$13,781,000	\$13,915,000

RATE COMPONENTS:	FY 2014		FY 2015		FY 2016	
	On Campus	Off Campus	On Campus	Off Campus	On Campus	Off Campus
1. ADMINISTRATIVE:						
Gen Admin	14.23%	14.23%	14.23%	14.23%	14.23%	14.23%
Dept Admin	30.94%	30.94%	30.94%	30.94%	30.94%	30.94%
Spon Proj Admin	1.87%	1.87%	1.87%	1.87%	1.87%	1.87%
Student Services	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Subtotal	47.04%	47.04%	47.04%	47.04%	47.04%	47.04%
Administrative Cap Adjustment	(21.04%)	(21.04%)	(21.04%)	(21.04%)	(21.04%)	(21.04%)
Subtotal	26.00%	26.00%	26.00%	26.00%	26.00%	26.00%
2. FACILITIES:						
Bld Depr	2.10%	0.00%	2.10%	0.00%	2.10%	0.00%
Equip Depr	0.09%	0.00%	0.09%	0.00%	0.09%	0.00%
Interest	0.05%	0.00%	0.05%	0.00%	0.05%	0.00%
O & M	4.20%	0.00%	4.20%	0.00%	4.20%	0.00%
Library	0.52%	0.00%	0.52%	0.00%	0.52%	0.00%
Subtotal	6.96%	0.00%	6.96%	0.00%	6.96%	0.00%
Rounding	0.04%	0.00%	0.04%	0.00%	0.04%	0.00%
Capped Rate	33.00%	26.00%	33.00%	26.00%	33.00%	26.00%

FOR UNIVERSITY OF ALASKA:


 Ashok Roy
 Chief Financial Officer

Date 5/28/14

FOR THE U.S. GOVERNMENT:


 David F. Godfrey
 Contracting Officer

Date 5/28/14

INDIVIDUAL RATE COMPONENTS

Institution: University of Alaska FY Covered by Rate: 2014-2016

Location Rate is Applicable to: University of Alaska Southeast -- On Campus Organized Research

Type of Rate: Predetermined

Negotiation Base: _____

Distribution Base (MTDC):	FY 2014	FY 2015	FY 2016
	\$656,000	\$663,000	\$670,000

RATE COMPONENTS:	FY 2014		FY 2015		FY 2016	
	On Campus	Off Campus	On Campus	Off Campus	On Campus	Off Campus
1. ADMINISTRATIVE:						
Gen Admin	21.72%	21.72%	21.72%	21.72%	21.72%	21.72%
Dept Admin	29.26%	29.26%	29.26%	29.26%	29.26%	29.26%
Spon Proj Admin	1.87%	1.87%	1.87%	1.87%	1.87%	1.87%
Student Services	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Subtotal	52.85%	52.85%	52.85%	52.85%	52.85%	52.85%
Administrative Cap Adjustment	(26.85%)	(26.85%)	(26.85%)	(26.85%)	(26.85%)	(26.85%)
Subtotal	26.00%	26.00%	26.00%	26.00%	26.00%	26.00%
2. FACILITIES:						
Bld Depr	13.57%	0.00%	13.57%	0.00%	13.57%	0.00%
Equip Depr	0.75%	0.00%	0.75%	0.00%	0.75%	0.00%
Interest	7.39%	0.00%	7.39%	0.00%	7.39%	0.00%
O & M	16.14%	0.00%	16.14%	0.00%	16.14%	0.00%
Library	3.27%	0.00%	3.27%	0.00%	3.27%	0.00%
Subtotal	41.12%	0.00%	41.12%	0.00%	41.12%	0.00%
Rounding	(8.12%)	0.00%	(8.12%)	0.00%	(8.12%)	0.00%
Capped Rate	59.00%	26.00%	59.00%	26.00%	59.00%	26.00%

FOR UNIVERSITY OF ALASKA:

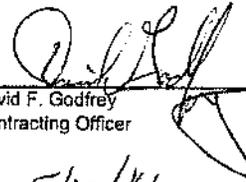


Ashok Roy
Chief Financial Officer

Date

5/28/14

FOR THE U.S. GOVERNMENT:



David F. Godfrey
Contracting Officer

Date

5/28/14

INDIVIDUAL RATE COMPONENTS

Institution: University of Alaska FY Covered by Rate: 2014-2016

Location Rate is Applicable to: **University of Alaska Southeast -- Other Sponsored Activities**

Type of Rate: Predetermined

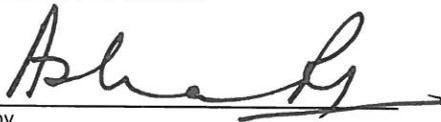
Negotiation Base:

Distribution Base (MTDC):	FY 2014 \$506,000	FY 2015 \$511,000	FY 2016 \$516,000
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RATE COMPONENTS:	On Campus	Off Campus	On Campus	Off Campus	On Campus	Off Campus
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1. ADMINISTRATIVE:						
Gen Admin	21.79%	21.79%	21.79%	21.79%	21.79%	21.79%
Dept Admin	35.94%	35.94%	35.94%	35.94%	35.94%	35.94%
Spon Proj Admin	1.87%	1.87%	1.87%	1.87%	1.87%	1.87%
Student Services	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Subtotal	59.60%	59.60%	59.60%	59.60%	59.60%	59.60%
Administrative Cap Adjustment	(33.60%)	(33.60%)	(33.60%)	(33.60%)	(33.60%)	(33.60%)
Subtotal	26.00%	26.00%	26.00%	26.00%	26.00%	26.00%
2. FACILITIES:						
Bld Depr	0.59%	0.00%	0.59%	0.00%	0.59%	0.00%
Equip Depr	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Interest	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
O & M	1.37%	0.00%	1.37%	0.00%	1.37%	0.00%
Library	2.15%	0.00%	2.15%	0.00%	2.15%	0.00%
Subtotal	4.11%	0.00%	4.11%	0.00%	4.11%	0.00%
Rounding	0.09%	0.00%	0.09%	0.00%	0.09%	0.00%
Capped Rate	30.20%	26.00%	30.20%	26.00%	30.20%	26.00%

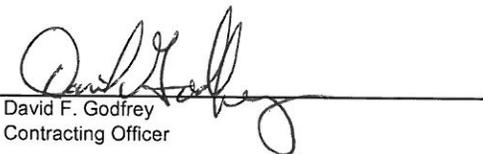
FOR UNIVERSITY OF ALASKA:



Ashok Roy
Chief Financial Officer

5/28/14
Date

FOR THE U.S. GOVERNMENT:



David F. Godfrey
Contracting Officer

5/28/14
Date

INDIVIDUAL RATE COMPONENTS

Institution: University of Alaska FY Covered by Rate: 2014-2016

Location Rate is Applicable to: University of Alaska Systemwide -- Sponsored Training

Type of Rate: Predetermined

Negotiation Base:

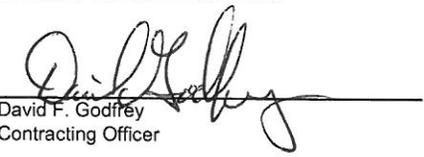
Distribution Base (MTDC):	FY 2014 \$143,909,000	FY 2015 \$145,375,000	FY 2016 \$146,854,000
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RATE COMPONENTS:	FY 2014		FY 2015		FY 2016	
	On Campus	Off Campus	On Campus	Off Campus	On Campus	Off Campus
1. ADMINISTRATIVE:						
Gen Admin	26.35%	26.35%	26.35%	26.35%	26.35%	26.35%
Dept Admin	39.64%	39.64%	39.64%	39.64%	39.64%	39.64%
Spon Proj Admin	1.87%	1.87%	1.87%	1.87%	1.87%	1.87%
Student Services	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Subtotal	67.86%	67.86%	67.86%	67.86%	67.86%	67.86%
Administrative Cap Adjustment	(41.86%)	(41.86%)	(41.86%)	(41.86%)	(41.86%)	(41.86%)
Subtotal	26.00%	26.00%	26.00%	26.00%	26.00%	26.00%
2. FACILITIES:						
Bld Depr	10.85%	0.00%	10.85%	0.00%	10.85%	0.00%
Equip Depr	0.95%	0.00%	0.95%	0.00%	0.95%	0.00%
Interest	1.65%	0.00%	1.65%	0.00%	1.65%	0.00%
O & M	19.60%	0.00%	19.60%	0.00%	19.60%	0.00%
Library	11.68%	0.00%	11.68%	0.00%	11.68%	0.00%
Subtotal	44.73%	0.00%	44.73%	0.00%	44.73%	0.00%
Rounding	(20.73%)	0.00%	(20.73%)	0.00%	(20.73%)	0.00%
Capped Rate	50.00%	26.00%	50.00%	26.00%	50.00%	26.00%
RATE ROUNDED	50.0%	26.0%	50.0%	26.0%	50.0%	26.0%

FOR UNIVERSITY OF ALASKA:


 Ashok Roy
 Chief Financial Officer
 5/28/14
 Date

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 David F. Godfrey
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