



International Community-Based Environmental Observation Alliance for the Arctic Observing Network

Bering Sea Sub-Network

Sharing Knowledge – Improving Understanding

Annual Report 2008

CAFF Technical report No.17



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Bering Sub-Sea Network

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The **Bering Sea Sub-Network: International Community-Based Environmental Observation Alliance for the Arctic Observing Network**, known as BSSN, is a 2008–09 International Polar Year project implemented by the Aleut International Association in collaboration with the University of Alaska, United Nations Environment Programme/GRID-Arendal and Alaska Native Science Commission under the auspices of the Conservation of Arctic Flora and Fauna working group of the Arctic Council. BSSN is funded by the United States National Science Foundation under the Cooperative Agreement ARC – 0634079.



Bering Sea Sub-Network Annual Report 2008

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Executive summary

The Bering Sea Sub-Network: International Community-Based Environmental Observation Alliance for the Arctic Observing Network, known as BSSN, is a 2008-09 International Polar Year project implemented by the Aleut International Association in collaboration with the University of Alaska, United Nations Environment Programme – Global Resource Databank Arendal and the Alaska Native Science Commission under the auspices of the Conservation of Arctic Flora and Fauna working group of the Arctic Council¹. BSSN is funded by the United States National Science Foundation under the Cooperative Agreement ARC – 0634079. The project's pilot stage, which began in June 2007, runs through May 2009. The project is expected to continue, pending further funding.

BSSN is a network of coastal communities. It consists of six villages representing six indigenous cultures: three in the Russian Federation (Kanchalan – Chukchi, Tymlat – Koryak, and Nikolskoye – Western Aleut/Unangas) and three in the United States (Gambell – Siberian Yup'ik, Togiak – Central Yup'ik, and Sand Point – Eastern Aleut/Unangan). This project creates a structured network that provides the means for the systematic collection of information about the environment and lays a foundation for future community-based research. The network also provides for the efficient management of data gathered from community-based environmental observations.

The overall goal of BSSN is to increase our understanding and knowledge of pan-Arctic processes, thereby enhancing the ability of scientists, Arctic communities, and governments to predict, plan, and respond to environmental changes and their subsequent socio-economic effects.

1. The Arctic Council (AC) is an international, intergovernmental circumpolar organization with eight member states (Canada, Denmark, Finland, Iceland, Norway, Russian Federation, Sweden, and the United States) and six Indigenous Peoples' organizations, which are known as Permanent Participants (The Aleut International Association (AIA), The Athabaskan Arctic Council (AAC), the Gwich'in Council International (GCI), the Inuit Circumpolar Council (ICC), the Russian Association of Indigenous Peoples of the North (RAIPON), and the Saami Council (SC)). The Arctic Council provides a mechanism to address common concerns and challenges faced by Arctic residents through scientific research, program implementation, and the development of policy recommendations.

This report provides an overview of the BSSN concept, outlines the project's activities and summarizes its first-year results. The purpose of this report is to inform the broader community of scientists, governments, and Arctic residents about the project's progress, to solicit critiques that may help improve BSSN, and to seek possible partnerships with interested organizations.

The first project year was taken up with an extensive amount of travel, meetings with the individuals and communities involved in BSSN, efforts to establish and formalize international partnerships, and the development of the survey instrument. The survey instrument was designed utilizing sociological methods, drawing in particular on cognitive interviewing techniques. In addition, the BSSN team developed a uniform protocol for interviewing residents in all participating villages about their observations of environmental conditions and marine resources. The BSSN Secretariat in Anchorage, which is processing the data gathered, has already received dozens of completed questionnaires.

Among the most important achievements of this busy year were the establishment of a deeper understanding between the BSSN's participating parties as to how the network functions, the selection of structured interviews as the primary method of gathering information, the design of a uniform questionnaire in English and in Russian, the development of the BSSN Interview Manual for village coordinators, the training of coordinators, and the establishment of a system for data management.

BSSN's achievements during its first year have paved the way for it to move to the next level: the expansion of the geographical area of the BSSN, the refinement of research techniques, the incorporation of questions from various scientific disciplines, and the gaining of broader community support. **The continuation of BSSN's work will leave behind a valuable legacy that can be drawn upon not only by IPY participants, but also by the broader community of Arctic residents. By creating an organized, community-based observation network, BSSN will ultimately serve as a partner in the general effort to develop and expand pan-Arctic observations of environmental change.**

Introduction

“It is important to have an open mind in order to create the kind of world that we want for ourselves and our children. This [project] will allow us to form friendships and working relationships that allow us to learn from one another and gain a better understanding of the environment. Indigenous knowledge is as important as modern science. Now this fact is being recognized on a global scale.”

Sally Swetzof (Moonwoman)
Unangas (Western Aleut) of Atka, Alaska
*Opening Remarks at BSSN Workshop
Anchorage, October 2007*



Indigenous peoples around the Bering Sea region have come together for a project that monitors environmental changes in the region. The Bering Sea Sub-Network (BSSN) provides a mechanism for remote indigenous villages to communicate their observations from their own perspective – a viewpoint that is based on indigenous knowledge and a keen understanding of the local environment – in order to improve management of the Bering Sea resources. In addition, BSSN improves our understanding of the social, cultural, and economic impacts of environmental changes on these communities.

The Bering Sea is one of the most productive seas in the world and is of economic importance to both the United States and Russia. But this vast marine ecosystem is experiencing widespread environmental changes – changes that alarm scientists and coastal residents alike. Declines in sea ice extent, the northward movement of southern species, alterations in the distribution and abundance of fish and marine mammals, modified weather patterns, and a myriad of changes to Arctic ecosystems present serious challenges for indigenous peoples.

The health, economic well-being, and ways of life of the indigenous and non-indigenous peoples around the Bering Sea are all inextricably linked to the sea itself and

to the natural resources it provides. The socioeconomic development of coastal villages around the Bering Sea depends on maintaining ecologically sustainable conditions in the region.

The BSSN concept emerged as a response to the findings of the Arctic Climate Impacts Assessment (ACIA), a project of the Arctic Council, which demonstrated a clear need for large-scale networks to record local observations of environmental changes. In 2003, the Aleut International Association (AIA) began exploring the possibility of a network for community-based monitoring in the Arctic, and then narrowed that vision to focus on the Bering Sea region. In 2004, Senior Arctic Officials recommended the project to the Conservation of Arctic Flora and Fauna (CAFF) working group of the Arctic Council. Over the next two years, numerous discussions at workshops, meetings with stakeholders, and consultations with scientists helped shape the current project. AIA submitted a grant proposal to the National Science Foundation's International Polar Year program for Arctic Observing Networks, and received funding for a pilot project.

The project assesses large-scale environmental changes in the Arctic by looking at both the physical and human dimensions of change and its impact.

BSSN member communities



BSSN communities span across the Bering Sea and extend into the upper reaches of the North Pacific.

United States

Gambell – Siberian (St. Laurence Island) Yup'ik

Togiak – Central Yup'ik

Sand Point – Unangan (Eastern Aleut)

Russian Federation

Kanchalan – Chukchi

Tymi lat – Koryak

Nikolskoye – Unangan (Western Aleut)

The project languages are English and Russian. Indigenous languages speakers are accommodated through hiring bilingual local coordinators. Four out of six villages have people speaking indigenous languages on a daily basis.



Photo: AIA

Research team

BSSN research team is comprised of more than 25 people working together to make BSSN a reality.

Principles

Victoria Gofman, Aleut International Association, Anchorage, U.S. (PI)

Lilian Alessa, University of Alaska, Anchorage, U.S. (Co-PI)

Patricia Cochran, Alaska Native Science Commission, Anchorage, U.S. (Co-PI)

Joan Eamer, UNEP/GRID-Arendal, Norway (Co-PI)

Andrea Grant-Friedman, BSSN Secretariat, Aleut International Association, Anchorage, U.S (Data Manager)

Andy Kliskey, University of Alaska, Anchorage, U.S (Senior Researcher)

Local Research Assistants

Iver Cambell, Gambell, Alaska, U.S.

Eileen Dushkin, Connie Kochuten, Sand Point, Alaska, U.S.

Elizabeth Maya, Togiak, Alaska

Olga Gerasimova, Ludmila Kluchitskaya, Valentina Petrova, Kanchalan, Chukotka, Russia

Svetlana Petrosyan, Kamchalan, Koryakia, Russia

Ivan Vozhikov, Natalia Tatarenkova, Nikolskoye, Kamchatka, Russia

Organizational Support

Mariyam Medovaya, BSSN Secretariat, Aleut International Association, Anchorage, U.S (Project Assistant)

Janice Walton, BSSN Secretariat, Aleut International Association, Anchorage, U.S. (Former Project Assistant)

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Tina Kasaeva, Russian-American Center, Petropavlovsk-Kamchatsky, Kamchatka, Russia (Project Coordinator)

Vladimir Devyatkin, Chukotka Business center, Anadyr, Chukotka, Russia (Project Coordinator)

Anne Morris, Qagan Tayagungin Tribe, Sand Point, Alaska, U.S. (Sub-award Manager)

Molly Chythlook, BBNA, Dillingham, Alaska, U.S. (Sub-award Manager)

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Ida Ruchina, Chukotka Business Center, Anadyr, Chukotka, Russia (Sub-award Manager)



Photo: Dmitry Utkin

Development of BSSN: From dream to reality

■ **First International Scoping Workshop Anchorage, Alaska, U.S., 2005**

The Aleut International Association conducted an initial workshop in October 2005 to discuss the creation of a network with regional representatives. The purpose of the meeting was to learn about current and past community-based research projects, and to explore potential funding opportunities. The workshop was timed to coincide with two large meetings in Anchorage, Snowchange 2005 and the Wilderness Congress, to take advantage of the travel funding available for these meetings. Additional financial support was received from the Alaska Conservation Foundation and AIA.

The workshop participants from Alaska and Russia identified common areas of concern for coastal communities. The most important outcome of this workshop was the decision as to what observations the BSSN survey should capture. It came as no surprise that the availability and abundance of fish and marine mammals emerged as the most pressing issue for communities.

Learning and sharing experience from other relevant projects was another important outcome of the 2005 workshop. The list of reviewed projects included:

IGAP (Indian General Assistance Program) of U.S. EPA

The IGAP program funds tribal governments and intertribal consortia in Alaska to perform capacity building and planning for environmental programs. Examples of some of the work that tribes focus on include: education and outreach, training, local assessment and monitoring. The EPA does not set the priorities for the tribes in their environmental programs; each tribe sets their own local priorities for program development. Some of the projects that have been developed include local plans for subsistence resources, GIS mapping, traditional place names, beach monitoring and video development.

Native Village of Belkofski Environmental Office Project

The Belkofski Tribal Council has obtained grants to work on numerous solid waste issues, such as educating people on how to separate garbage before it goes to the dump. Although the program currently focuses only on local projects, they look forward to the possibility of developing interest in a broader spectrum of issues affecting their community, as well as other neighboring communities.

Snowchange

Snowchange is a Finland-based international collaborative effort to collect local observations in Scandinavia, Russia, and Alaska. In 2000, seal hunters began exchanging observations on the changes in ice and water that were of great concern for indigenous harvesters. Snowchange researchers asked the seal hunters to create maps of their seal hunting trips, which usually lasted four to six weeks. The first round of studies involved mapping and semi-structured interviews to determine where the hunts took place and what types of changes were being observed. The researchers revisited the community and families several times. Snowchange has developed large archives of seal hunting information from the communities.

Over time, the hunters also shared information on the spiritual connection between seal and hunter, among other things. This exchange proved to be a turning point for the young Finnish students who were conducting the work, providing them with the opportunity to learn new things about their own culture. During the mapping and interview process, researchers established that over 120 different terms exist for wind, weather, and ice in local languages. The local language, changes in weather and environment, and the people themselves are all interrelated. The hunters' maps were used to compare ice data with scientific data, with some correlations being found between the two. This project has helped communities to address spirituality, trust, and language; to support local dialects; and to contribute to broader scientific research on climate change in the Baltic. Similar methods were used in Alaska and other parts of the Arctic.

Alaska-Chukotka Development Program

The Alaska Chukotka Development Program highlighted two projects: a polar bear project and a whale hunting project, which were respectively conducted in collaboration with the Polar Bear Commission and Chukotka Traditional Marine Mammal Hunters. Funds were received from the U.S. National Park Services' Beringia Program. Research, including interviews with local residents, was carried out to determine the amount of each marine mammal that was used as indigenous food. The purpose of the project was to improve indigenous participation in marine mammal management.



Chukotka Native Information Center

The Chukotka Native Information Center was created in 2003 to provide information to Chukotka indigenous peoples about events that are happening in central Russia and around the world, about their rights, and to offer suggestions on how they might solve issues and problems affecting them.

Commander Islands

The representatives from the Commander Islands informed that while they did not have any relevant projects there was a need and desire to develop community-driven projects addressing local problems. The Commander Islands is the westernmost group of islands in the Aleutians and home to the only Aleut village in Russia. The residents use sea lion, ring seal and harbor seals as traditional foods. There is no commercial hunting, only subsistence. However, there were numerous issues with resource-use regulations. There was a need to communicate with the scientific community and the local government to better manage the resources essential for the continuation of the indigenous way of life.

Pribilof Islands Stewardship Program

This program obtained a grant from the U.S. National Park Service to develop a pilot project for community-based monitoring. Data, which were collected in the community, would be managed by and housed in the community. Through IGAP, St. Paul and St. George developed GIS data management. The Island Sentinel Program had a person monitoring anything and everything that goes on the island, physically walking the shores and observing what was happening.

Aleutian Pribilof Traditional Food Safety Program

This four-year project on Dietary Benefits and Risks in Alaskan Villages emerged from concerns about contaminants in traditional foods. Traditional foods within each community were tested for contaminants and nutrients. Through the investigation, it was determined that traditional foods are not the only foods that present potential health threats. There were more problems in the region with people become ill or dying from diabetes, caused by the consumption of soda pop, than from eating traditional foods. The study found that there needed to be a balanced view of the risks and benefits. The project developed a curriculum to share the investigation proc-

ess with other communities through films, workshops and workbooks. There was continuing desire in St. Paul for additional monitoring.

Another project worth mentioning was on oil spills monitoring. Recently there was a tanker spill in the region. It was determined that there was not an adequate amount of response equipment or training. The long-term concern was that small amounts of oil could hurt traditional foods.

What emerged from the discussion at this workshop were the common concerns of Alaskan and Russian Bering Sea villages: the availability and safety of traditional foods, local capacity building for monitoring projects' implementation, and the existence of an intricate connection between biological resources and the continuity of cultures. The outcome of this meeting was of significance for the work of BSSN, as it established the fact that the state of biological resources in the Bering Sea is important for evaluating the well-being of coastal communities.

AIA appreciates all participants who contributed their time and expertise at the workshop:

George Pletnikoff, Unalaska Native Fisherman's Association, U.S.

Larry Mercurieff, Alaska Native Science Commission, U.S.

Karen Pletnikoff, Aleutian Pribilof Islands Association, U.S.

Olga Gogoleva, Alaska Chukotka Development Program, Russian Federation

Vera Tymneraskova, Chukotka Native Information Center, Russian Federation

Karin Holser, Pribilof Islands Stewardship Program, U.S.

Ivan Vozhikov, AIA, Russian Federation

Gennady Yakovlev, ANSARKO, Russian Federation

Santina Gay, United States Environmental Protection Agency

Tatiana Samuelson, Native Village of Belkofski (E.P. Dept), U.S.

Tero Mustonen, Snowchange, Finland

Second International Scoping Workshop Anchorage, Alaska, U.S., 2006

In 2006, the International Polar Year (IPY) Joint Committee endorsed the concept of the Bering Sea Sub-Network. The cumulative result of the efforts of all participants was a proposal submitted to the National Science Foundation (NSF) in May 2006 under the title: Bering Sea Sub-Network, International Community-Based Observation Alliance for Arctic Observing Network (BSSN). The proposal responded to the needs of the Arctic Observing Network (AON) on both scientific and indigenous knowledge issues, and demonstrated the existence of strong community and regional-level support. NSF proposed funding a pilot project.

In October 2006, with the generous support of the U.S. State Department and Environment Canada, the second international scoping workshop was convened to obtain recommendations for a scaled-down project and develop an implementation plan including objectives for the pilot project, the number of villages, and criteria for participating communities. The originally proposed villages are shown on the map below.

The BSSN science plan and data management for the project were presented and discussed. The key points were:

- Indigenous peoples of the Arctic have been refining knowledge of the environment through their observations for thousands of years.
- Humans are sophisticated sensors of environmental change, possessing the ability to provide the sort of high-resolution imagery that no remote sensor can ever produce.
- The challenge is to learn how to read these fine human instruments. The BSSN project will do this by using innovative methods of surveying and collecting environmental information.

The objectives of the BSSN pilot were proposed as:

- Establishing the BSSN infrastructure and policies.
- Designing and implementing a pilot project to collect data on selected key variables and indicators across the network.



- Establishing collaboration with SEARCH (Study of Environmental Arctic Change) and other International Polar Year (IPY) science projects on community-based research components.
- Developing a mentorship program for younger people.
- Planning for a final workshop to discuss optimal practices, lessons learned, the strengths of the project, and areas of improvement.
- Publishing a paper on the pilot results.

Representatives from Alaska and Russia agreed to limit the number of BSSN villages for the pilot project to six: three in the Russian Federation and three in the United States. Reaching an understanding on the management and ownership of data was discussed in great detail. The participants wanted assurance that villages would have a say in how the data would be used and that the sensitive data would be safeguarded. Workshop participants provided valuable recommendations on how to ensure the success of the pilot project in order to increase the likelihood of obtaining future funding to sustain the network. The project budget underwent revisions to reflect these recommendations. It was approved by the NSF in May, 2007.

Villages were to be selected by respective local organizations and governments based on the following selection criteria developed at the 2007 Workshop:

- *Geographic location* – Village locations would cover North, Central, South Bering Sea ecosystem. Important factors to consider: sea ice, migration routes, breeding colonies/grounds.
- *Capacities* – A community would have the technological infrastructure and individuals qualified to work on the project.
- *Community interest* – A community would be able to engage interested individuals in the village to participate in the project.
- *Needs* – A community may have immediate ecological concerns regarding subsistence species.
- *Previous experience* – A community, where possible, would build on existing experience, knowledge, capacity and activities already ongoing in the community.
- *Potential project contribution to the community* – The project would benefit the community's existing programs and enhance indigenous knowledge.

It was decided that a Steering Committee consisting of representatives from all BSSN villages would be formed to address data ownership.

The Bering Sea Sub-Network introduced an important collaborator: the Circumpolar Biodiversity Monitoring Program (CBMP). A CBMP overview was offered at the workshop by Mike Gill, Environment Canada.

- CBMP is an international network and coordinating entity for existing Arctic biodiversity monitoring pro-

grams, for initiating new programs to address gaps, for data gathering and data analyses, and for the coordination and communication of research results. It is a program meant to harmonize efforts across the Arctic to improve detection and reporting of important trends in biodiversity.

- CBMP is a CAFF (Conservation of Arctic Flora and Fauna) program. CAFF is a working group of the Arctic Council. A key partner in the CBMP is the United Nations Environment Programme (UNEP), both UNEP-WCMP (World Conservation Monitoring Center) and UNEP-GRID (Global Resource Information Database). Canada is the lead country for the CBMP.
- CBMP's goal is to strive for conservation of biological diversity, to halt or significantly reduce its loss, and provide information for the sustainable use of the Arctic's living resources for the Indigenous Peoples of the Arctic, other Arctic residents, and stakeholders inside and outside the Arctic.

BSSN and CBMP announced plans for developing further cooperation when both projects were at a more advanced stage.

Following workshop recommendations, AIA proceeded and the project officially commenced on June 1, 2007.

AIA is grateful to contributions from all project participants:

- Lillian Alessa**, University of Alaska Anchorage
- David Atkinson**, International Arctic Research Center, University of Alaska Fairbanks
- Alexy Drozdov**, Tribal organization "Kam-Avva", Kamchatka
- Rose Fosdick**, Kawerak, Inc.
- Andy Kliskey**, University of Alaska Anchorage
- Mike Gill**, Environment Canada
- Victoria Gofman**, Aleut International Association
- Maria Gunnarsdottir**, CAFF, Executive Secretary
- Ivan Gutorov**, Kamchatka Regional Association of the Tribes of the Indigenous Peoples, Chair
- Karen Holser**, St. George Island Stewardship Program
- Naomi Kashevarof**, St. George Island Traditional Council, IGAP coordinator
- Clara Martin**
- Larry Mercurieff**, Seven Generations Consulting, meeting facilitator, Alaska Native Science Commission, Deputy Director
- Kaisu Mustonen**, Snowchange
- Peggy Osterback**, Aleut Marine Mammal Commission, Executive Director
- Tatiana Vlasova**, Russian Academy of Science
- Bruce Wright**, Aleutian Pribilof Islands Association/AIA, Science Advisor
- Eduard Zdor**, Chukotka Association of Marine Hunters, Executive Director
- Gennady Zelensky**, Chukotka Science Support Group, Executive Director

Pilot project overview

Project synopsis

Description

BSSN is a formalized network devised to gather and record observations regarding Bering Sea marine resources and environmental changes in and around the Bering Sea. The network provides the means for the Bering Sea coastal communities to participate in discussions on issues of common concern. Six communities – three in the Russian Federation and three in the United States – are engaged in gathering environmental observations on the primary subsistence and commercial species of the Bering Sea, such as a variety of salmon species, Arctic char, halibut, walrus and seal, just to name a few. Over the course of a year, more than a thousand interviews are being conducted by trained local project coordinators. The BSSN Steering Committee (made up of members from each community) oversees access to sensitive data. The BSSN secretariat provides a central location for the development of data management protocols, management of data, internal and external communication, and helps link BSSN with the Arctic Observing Network (AON) and other Arctic research.

Goals and Objectives

BSSN aims to increase scientific knowledge that is of significance for the understanding of pan-Arctic processes and to enhance the ability of scientists, Arctic communities, and governments to predict, plan, and respond to environmental changes.

Methodology

Semi-structured interviews utilize questionnaires with open-ended, close-ended, and multiple choice questions. Whenever permission is granted, the interviews are recorded using a digital voice recorder. Questionnaires are filled out by local interviewers capturing exact

answers. An electronic version of each interview is sent to the Data Manager at the BSSN Secretariat, who enters information in the original language and in translation into the data management programs. Monthly teleconferences with local interviewers are used to provide feed back and to address any problems to assure quality control.

Targeted Information

The survey instrument is designed to capture:

- Changes in climate and environmental conditions
- The abundance and quality of the resource
- Changes in migration patterns and habitat
- The effect of changes on the availability of resources, on food supply, and on the livelihood of communities
- The indigenous knowledge base associated with marine resources

Scientific Questions

BSSN addresses:

- The historical and current distribution and properties of economic and subsistence species, as derived from collective indigenous and traditional knowledge.
- Types of major variables and indicators that can be correlated with western science to develop predictable models based on indigenous and traditional knowledge
- Spatial and temporal convergence and divergence of community-derived and western science data.

Broader issues

BSSN contributes to:

- Social awareness in the broader community around the Bering Sea
- Investments in community-based research and observations
- Communities' resilience and adaptation to change
- A more prominent role for indigenous and traditional knowledge in modern science

BSSN Organizational Structure



Project progress

October 2007 Workshop

In October of 2007, AIA launched the Bering Sea Sub-Network at a workshop that established the overall goals and structure of the network, began designing a draft questionnaire for the initial survey, and developed the procedural guidelines for the governance of the network.

Project Development

One of the primary goals for the October 2007 BSSN workshop was the writing of a first draft of the survey instrument. Scientists and community representatives worked cooperatively to develop the survey content.

A significant portion of the workshop was devoted to discussions between representatives from each community and the Project Leaders on how to produce a questionnaire that collects specific information essential to the goals of this project while still responding to the specific needs of each village. It was decided that local fishermen and hunters would be interviewed before and after harvesting events. The pre-event draft questionnaire was developed at this workshop. A first draft consisting of sample questions prepared by the Project Leaders was presented as a starting point for discussion and editing. It is important to note that while presentations and discussions were translated consecutively, a portion of the questionnaire editing was done in separate, simultaneous sessions for English and Russian speakers. Afterwards, the questions were correlated and merged into one version, respectively produced in English and Russian.

Workshop participants decided that the survey would cover only marine harvesting activities, specifically fishing and marine mammals hunting. Local Coordinators would conduct two interviews per individual respondent: pre-harvest and post-harvest. The pre-harvest questionnaire would establish expectations based on previous hunting or fishing trips, while the post-harvest questionnaire would record specific information about current conditions and the actual catch.

The workshop discussion focused on many issues affecting survey quality, such as the survey title, a realistic time frame with consideration for remote locations of the villages, appropriate community approval processes, coordinator training, the number of surveys to be conducted, survey length, public relations and promotional materials, and other anticipated challenges. The following recommendations were made:

- Survey Title: “The Bering Sea Coastal Community Observations of Traditional Harvest”
- The survey would cover a twelve month period, if possible.

- Local approval would be gained for every community prior to the beginning of interviews.
- Village research assistants would receive training in methodology, conflict resolution, and the translation of technical terms.
- Questionnaires would be in English and Russian. However, when necessary, the survey instrument would be translated into the local language by bilingual assistants
- The target sample size would be 100 households per community.
- Target participants would be high harvesters.
- Respondents would be offered a monetary reward or a gift for their time, as decided by each community.
- Each interview would take no longer than one hour.
- The survey process would be minimally disruptive to hunting/fishing events.
- The survey questions would capture:
 - Resource availability
 - Quality of the catch
 - Quality at the time of preparation
 - Quality at the time of consumption
 - Environmental change
 - Shifts or changes in harvesting locations
 - Comparisons between past and present conditions
 - Any other observations of unusual occurrences
- Publicity is important and various media would be utilized to advertise BSSN:
 - Newspaper
 - Radio
 - Quarterly newsletter
 - Posters/displays in public places
 - Promotional items with the BSSN logo (pens, caps, hats, jackets, backpacks)
- Proactively address challenges that have already been identified, such as:
 - Many communities in Alaska are inundated with surveys.
 - May be difficult to complete both the pre and post-event questionnaires.
 - Hunters and fishermen are very busy.
- Elders and experienced harvesters would receive special consideration:
 - Design a short questionnaire specifically for Elders
 - Identify key respondents

Data Management

Data management is a key component of this project. Participants established the procedural standards for the management of the data and decided that access to specific data would be granted by consensus-based collaborative agreement.

- The data would be physically entered and stored at the BSSN Secretariat until the time when communities have the capacity to manage and distribute the database.
- A portion of the data would likely be disseminated via the Internet.

- A management team would organize the data for a diverse group of users
- A Data Manager would handle requests for access to the data, the granting of permission to interested users, and the organization of the data based on the policies adopted by the steering committee.
- Confidentiality is a key concern
- Sensitive data, such as exact locations of hunting and fishing sites, would be safeguarded.
- Tracking sheets would be utilized to disassociate names from surveys.
- Completed surveys would be maintained under lock and key.
- All data and survey results would be the property of BSSN member communities.
- BSSN would maintain full control of the data to the extent permissible by law.

The workshop was attended by Project Principles (Gofman, Alessa, Cochran, Kliskey), Village Coordinators (Tatarenkova, Vozhikov, Petrosyan, Kluchitskaya, Cambell), community representatives (M. Chythlook, H. Chithlook, Gundersen) and BSSN staff (Gamble, Waters, Walton). The workshop participants gave special thanks to Sally Swetzof of Atka for her opening remarks, which set the tone of the meeting.

Survey Instrument Development

The final survey instrument consists of pre-event questionnaire, post-event questionnaire, and a Manual for Village Coordinators.

The working draft of the survey questionnaire, after gaining approval from network members at the October 2007 workshop, underwent extensive expert review by consultants at Westat, Maryland, U.S., and the Project Leaders. Cognitive tests were conducted in all villages. Three test interviews per village, eighteen total, were analyzed for comprehensibility of the questions. The final version of the Questionnaire in English and Russian was completed and sent to villages in April, 2008.

Survey Administration

Survey interviews take place before and after each hunting/fishing season/event. Trained local coordinators administer individual interviews at a location and time convenient for respondents. Interviews are recorded (with respondent approval) using digital voice recorders, while coordinators record answers in writing.

Coordinators then enter written responses into electronic survey forms which are sent, along with the electronic voice recording files, to the BSSN Secretariat office in Anchorage, Alaska. Hard-copy survey originals are mailed to the BSSN office for secure storage. A BSSN

Data Manager receives all survey materials, and then enters all information into an electronic database. At the conclusion of the one-year survey period, all results will be compiled for statistical analysis. The resulting data will be both qualitative (narratives) and quantitative (graphs, charts, maps).

Survey Progress

In May 2008, BSSN began collecting the first surveys from participating villages in western Alaska. In July of this year, surveying commenced in the BSSN communities located in northeast Russia. Over the course of the summer, BSSN coordinators gathered dozens of interviews with local residents, in which respondents speak about their recent experiences harvesting fish and marine mammals during the summer fishing and hunting season. By the late fall of 2008, BSSN will have collected between 50 to 100 surveys from each of the participating villages, depending on the type of harvesting that local residents engage in. Surveys coming from areas where people hunt marine mammals unfold over a longer stretch of time than those where the bulk of fishing happens in the summer because of the timing of fish runs.

As of end of August, 2008, the surveys collected by the BSSN team covered respondents' experiences harvesting several species of salmon in the fishing communities of Sand Point, Alaska and Nikolskoye, Tymlat, and Kanchalan, Russia. In addition, surveys gathered from the village of Gambell, Alaska addressed the harvest of walrus and seals. The surveys provide valuable information about the harvesting activities and environmental conditions in these areas, including the quantity and quality of salmon and marine mammals caught, the impact of hunting and fishing regulations on the ability of indigenous communities to harvest, and the environmental changes observed by native populations – such as, fluctuating air and water temperatures, disappearing ice, shifts in wind direction and velocity, and the appearance of previously unseen animal species. In addition, the surveys also yield valuable information about individuals' perception of the intensity and speed of changing environmental conditions and how their own sense of well-being is affected by them.

BSSN Project Leaders continue to work to increase the quality of the information gathered by training the surveyors in the different communities on their interview techniques. By encouraging the coordinators who conduct the interviews to ask respondents follow-up questions and prompt interviewees for further explanations of their answers, the Project Leaders anticipate that over the course of the coming months the surveys will provide even greater insights into indigenous communities' experience and knowledge of harvesting and climactic change in the Arctic.

Data collection and analysis

The Bering Sea Sub-Network Data Manager oversees the organization of the survey data coming in from the participating villages and prepares it for analysis. Because the surveys contain both closed and open-ended questions, the data is managed using research software designed to handle both quantitative and qualitative information.

The answers to the closed-ended questions are entered into an SPSS database, a statistical package widely used in the social sciences and business for managing quantitative data. For the analysis and coding of open-ended questions, the popular qualitative research software NVIVO is utilized. Respondents' open-ended answers are coded by using a version of the Delphi method. Drawing on the expertise of the project Leaders, the knowledge of other researchers involved in the project, and the input of outside experts on socio-environmental research, BSSN has developed a protocol for how to categorize and code the qualitative information contained in the surveys. In this work, particular attention is paid to instances in which the respondents' answers yield information about socio-cultural phenomena such as:

- Expectations about what should exist in the natural environment
- The populations' ability to adapt to changing harvesting conditions and develop flexible responses
- Individuals' sensitivity to climate shifts and general feelings of anxiety and/or alarm about environmental conditions
- The sources of information that people rely on – for instance, personal observations, radio and television news, community elders – for their knowledge of environmental conditions
- The impact of present-day realities – for example, rising fuel prices – on harvesters' ability to reach the locations where they hunt or fish, in an effort to assess the effect of resources pressures on sedentary communities.



Photo: N. Tatarenkova



Photo: Dmitry Utkin

Outreach and public relations



Photo: AIA



Photo: Dmitry Utkin



Photo: Dmitry Utkin



Photo: AIA

Presentations outlining developments in the BSSN project and its overall progress were made at the following events:

- Arctic Council Meeting, Selfoss, Iceland, May 2004
- Arctic Council Meeting, Syktyvkar, Russia, April 2006
- Arctic Observing Network (AON), Boulder, CO USA, March 2007
- Arctic Observing Network (AON) Meeting, New York, NY, USA, March 2008
- Berengia Days, Anadyr, Russia, September 2007
- PAME I, St. Johns, Newfoundland, Canada, June 2008
- SCAR/IASC Open Science Conference, St Petersburg, Russia, July 2008

Conclusions

The Bering Sea Sub-Network is community-based. At the very core of BSSN is the idea that the participating communities should be involved at every level of planning and development of the network and the BSSN project. The development of the survey instrument, entitled “The Bering Sea Coastal Community Observations of Traditional Hunting and Fishing”, was a collaborative effort between community representatives and scientists. The resulting survey is an instrument that reflects and addresses the concerns of member communities. Local coordinators in each village administer the BSSN surveys, while member communities provide oversight for the project.

Although BSSN is still in the early stages of gathering and processing the surveys, a preliminary examination of the material received from four out of the six villages – two in Russia (Nikolskoye and Kanchalan) and two in Alaska (Sand Point and Gambell) – suggests that the study may reveal useful findings about environmental changes occurring in both areas. By looking at the answers that respondents have already given to both the closed and open-ended questions on the survey, it appears that the BSSN study will allow researchers to draw important conclusions about the similarities and differences in the environmental conditions and harvesting experiences of native populations’ on both sides of the Bering Sea.

For example, one of the most striking trends that appears to be emerging from the data gathered thus far is the frequency with which Alaskan and Russian harvesters are encountering animal species with evidence of disease or poor health. Forty percent of respondents from the surveys analyzed to date have indicated that they have caught fish or marine mammals with signs of illness. However, this percentage varies noticeably based on where a respondent resides – only 14% of those who live in Alaskan villages have indicated that they have caught such animals, compared to 75% of those who live in Russia. Respondents in Nikolskoye and Kanchalan describe a range of illnesses in the fish they have encountered, including lesions and sores, skin infected with parasites, and underdeveloped sperm sacks. Those interviewed have given a high degree of detail in their descriptions of these phenomena; if this continues in the surveys BSSN will be receiving in the coming months, such information could be very useful for scientists seeking to understand the specific impact of environmental conditions on the animals that indigenous peoples use to survive. The BSSN team will continue paying close attention to this trend to see if the differences between Russia and Alaska continue or if they change as the study sample size increases.

Another interesting difference that the data analyzed thus far appear to indicate is variation in the ability of Alaskan and Russian villagers to travel significant distances to hunt and/or fish. Sixty-three percent of survey respondents living in Nikolskoye and Kanchalan do not travel more than 10 miles or 15 kilometers in order to reach their fishing

locations. In respondents’ comments to the interviewers, many indicate that they fish within a mile or less of their villages, citing poor roads, lack of means of transport (in particular boats), unavailability of fuel, or greater ease of access to nearby locations for reasons why they do not go farther. In contrast, only 44% of Alaskan respondents have indicated that they remain within the same 10 mile or 15 kilometer range, while 19% said they go more than 40 miles or 60 kilometers. No Russian interviewees have indicated they go such distances in order to fish. While the BSSN team must await the receipt of further surveys in the coming months before being able to confirm this finding, this apparent trend is of interest because the relative ability of harvesters to travel significant distances will likely affect individuals’ ability to adapt and respond to environmental change occurring nearby where they live. Therefore, the BSSN study may provide researchers with insights into the general study of adaptability and resilience within indigenous communities.

The information garnered by this survey will be presented in a final report that will be a valuable tool in the hands of communities as they seek to improve resource management in order to preserve and continue their indigenous way of life. The information contained in the report may contribute to local decisions regarding resource management and will enhance communities’ understanding of what is happening in and around the whole of the Bering Sea.

As a network, BSSN encourages cultural connections and communication between groups of people who have diverse cultures, but who share similar concerns. As a project, BSSN empowers communities in their resource management endeavors and contributes to their ability to plan for and adapt to environmental change.

Climate change will continue to be a significant issue in the Arctic for the foreseeable future, with Bering Sea communities continuing to experience its effects for many decades to come. Climate change is making Arctic waters and resources more accessible. An increase in human activities in the Arctic, driven by the greater accessibility of resources and the emergence of more economical shipping routes, will present new challenges and, hopefully, more opportunities for the Bering Sea coastal communities. BSSN will increase a community’s ability to convey their observations and concerns to scientists, policy makers, and the public. It will also help them better prepare and plan for the changes taking place.

In the future, BSSN can be expanded to include other communities. The established network may become a springboard for many other research activities in the region, and may provide a model for other regional networks. Developing collaborative relationships with other projects is vital to the future sustainability of BSSN. These partnerships will also increase opportunities for local communities to meet their research needs.

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- The Government of Chukotka Region
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Photo: Dmitry Utkin