INUIT

INUIT CIRCUMPOLAR COUNCIL-ALASKA

ALASKAN INUIT FOOD SECURITY CONCEPTUAL FRAMEWORK:

HOW TO ASSESS THE ARCTIC FROM AN INUIT PERSPECTIVE

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Technical Report

INUIT CIRCUMPOLAR COUNCIL-ALASKA

All information and concepts within this report are a product of a collaborative effort among 146 contributing authors (all Indigenous Knowledge holders), the project Advisory Committee and the Inuit Circumpolar Council-Alaska. This project has been managed and facilitated by the Inuit Circumpolar Council-Alaska's Indigenous Knowledge/Science Advisor Carolina Behe. The final report was prepared by Carolina Behe in collaboration with the project's Food Security Advisory Committee members and contributing authors.

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TABLE OF CONTENTS

Photo courtesy of Jackie Cleveland

Photo courtesy of Mary Sage

LISTS OF BOXES, FIGURES AND TABLES

"Food is a lifeline to the community."

"All of the plants, all of the animals, the water, the air, the land is all of what we are. … It is who we are. This is our understanding. People making decisions have a different understanding."

"It is all connected. … You cannot know what is happening within a community, without knowing what is happening to the seal, or the ice. …"

"The ice connects us all. … Upriver to the coast."

"We have a duty and responsibility to take care of what is around us. When we no longer use these things, they are no longer available."

"If we don't take care of our food to share with widows and Elders that cannot hunt, we will lose it all."

"There are so many regulations up here, and we have our own regulations. To come in here with disregard [to our regulations] is not right. They need to work with us under our laws and our culture. When outside agencies don't work with us, they are breaking our rules/laws. Our knowledge predates them."

"We should have the right to take care of ourselves."

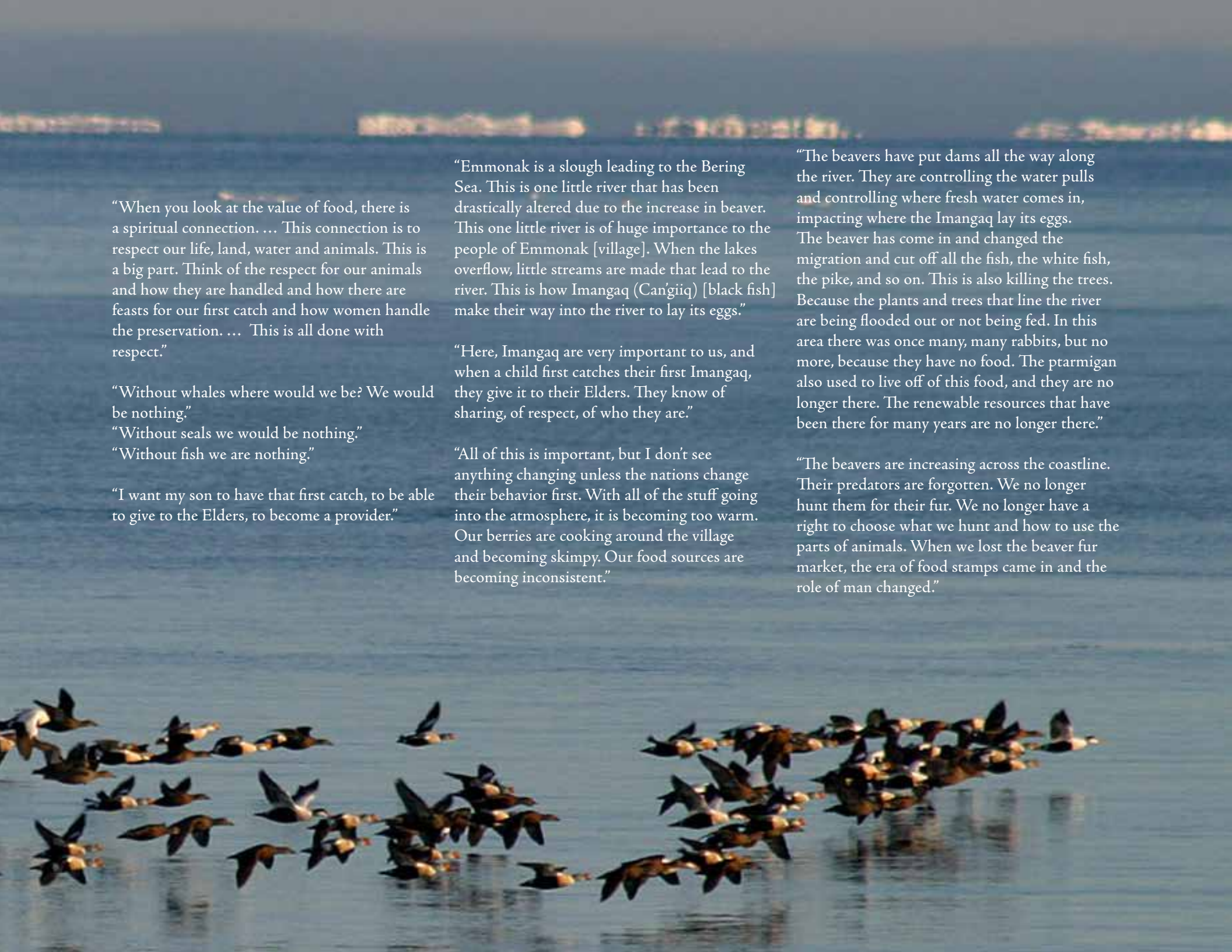
"How can we let the state [Alaska] or feds [federal government] know that we are capable of regulating our food source?"

"The animals are searching for food, just like we are."

"Tradition and culture is important from the very beginning that we come into this world. We start with a month of celebrating. We gather and share. This is part of our religion, our spirituality. It [gathering, processing, storing, sharing, consuming food] is our religion. We have to do it, we must continue. It is a culture we have to pass from generation to generation. We need it without interference from outside."

All quotes provided during semi-directive interviews, community meetings and/or regional food security workshops.

Photo courtesy of North Slope Borough



"When you look at the value of food, there is a spiritual connection. … This connection is to respect our life, land, water and animals. This is a big part. Think of the respect for our animals and how they are handled and how there are feasts for our first catch and how women handle the preservation. … This is all done with respect."

"Without whales where would we be? We would be nothing."
"Without seals we would be nothing."
"Without fish we are nothing."

"I want my son to have that first catch, to be able to give to the Elders, to become a provider."

"Emmonak is a slough leading to the Bering Sea. This is one little river that has been drastically altered due to the increase in beaver. This one little river is of huge importance to the people of Emmonak [village]. When the lakes overflow, little streams are made that lead to the river. This is how Imangaq (Can'giiq) [black fish] make their way into the river to lay its eggs."

"Here, Imangaq are very important to us, and when a child first catches their first Imangaq, they give it to their Elders. They know of sharing, of respect, of who they are."

"All of this is important, but I don't see anything changing unless the nations change their behavior first. With all of the stuff going into the atmosphere, it is becoming too warm. Our berries are cooking around the village and becoming skimpy. Our food sources are becoming inconsistent."

"The beavers have put dams all the way along the river. They are controlling the water pulls and controlling where fresh water comes in, impacting where the Imangaq lay its eggs. The beaver has come in and changed the migration and cut off all the fish, the white fish, the pike, and so on. This is also killing the trees. Because the plants and trees that line the river are being flooded out or not being fed. In this area there was once many, many rabbits, but no more, because they have no food. The ptarmigan also used to live off of this food, and they are no longer there. The renewable resources that have been there for many years are no longer there."

"The beavers are increasing across the coastline. Their predators are forgotten. We no longer hunt them for their fur. We no longer have a right to choose what we hunt and how to use the parts of animals. When we lost the beaver fur market, the era of food stamps came in and the role of man changed."

4 ABOUT INUIT CIRCUMPOLAR COUNCIL-ALASKA AND THE INUIT CIRCUMPOLAR COUNCIL

Inuit Circumpolar Council (ICC) – Alaska is a 501(c)(3) non-profit organization that exists to be the unified voice and collective spirit of Alaskan Inuit, to promote, protect and advance Inuit culture and society. ICC-Alaska membership includes regional organizations that represent the Iñupiat of the North Slope, Northwest and Bering Strait; the St. Lawrence Yupik; and the Central Yup'ik and Cup'ik of the Yukon-Kuskokwim region.

Member organizations include the North Slope Borough, Arctic Slope Regional Corporation, Inupiat Community of the Arctic Slope, NANA Regional Corporation, Northwest Arctic Borough, Maniilaq Association, Bering Straits Native Corporation, Kawerak, Inc., Calista Corporation and Association of Village Council Presidents. Representatives from these membership organizations, along with the President, Vice President and Youth and Elder representatives, compose the ICC-Alaska 14-member Board of Directors.

ICC-Alaska is a national member of ICC International, an international, non-governmental organization founded by Eben Hopson Sr. from Barrow, Alaska, in 1977. Its creation came out of the realization that Inuit need to speak with a united voice on issues of common concern. Today ICC represents approximately 160,000 Inuit in Russia (Chukotka), the United States (Alaska), Canada and Greenland.

ICC holds Consultative Status II with the United Nations Economic and Social Council. ICC is a Permanent Participant of the Arctic Council. ICC strives to strengthen unity among Inuit of the Circumpolar North; promote Inuit rights and interests on an international level; develop and encourage long-term policies that safeguard the Arctic environment; and seek full and active partnership in the political, economic and social development of the Circumpolar North. ICC receives its mandate from Alaska, Canada, Greenland and Chukotka delegates gathered in a General Assembly held every four years. The ICC-Alaska Food Security Project began under the Nuuk Declaration (2010-2014) and continues through the Kitigaaryuit Declaration (2014-2018).

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Alaskan Inuit Arctic Ecosystem

Illustration courtesy of Carolina Behe and Allison Castillo

Photo courtesy of Amos Oxereok

It's my great pleasure to present the Alaskan Inuit Food Security Conceptual Framework: How to Assess the Arctic From an Inuit Perspective. This report is the culmination of the hard work of many people from four regions and 15 villages within Alaska. Regional workshops were also held in Barrow, Kotzebue, Nome and Bethel. My sincere thanks to everyone who contributed so generously to this effort.

The project was controlled from start to finish by Inuit. As Inuit, we believe this was the only logical approach to take. This is an approach to assessing food security from the perspective of the Inuit culture. We think this approach should be utilized more often when assessing topics and issues important to Inuit and the other Arctic Indigenous Peoples. The Inuit worldview is evident throughout this report, as it should be.

To look at environmental health through an Inuit food security lens requires one to undergo a paradigm shift. One must be willing to attempt to understand the Inuit culture to know what Inuit mean when they talk about food security. We have tried to provide examples of the Inuit perspective throughout this report. We did this to illustrate that there are different ways to understand food security. Indeed, there are different ways to understand the world.

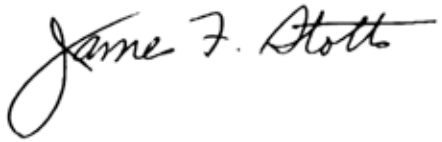
This project started with three objectives: 1) present an understanding of food security from an Inuit perspective; 2) identify the causes of food insecurity; 3) create a framework to assess food security across cultural and environmental systems. We have achieved all of these objectives.

Throughout this report you will find reference to the term Indigenous Knowledge. We didn't use the term traditional knowledge. To me, the term traditional knowledge sounds like something static, something unable to evolve over time, something not relevant. I think the term traditional knowledge is misleading and weak. It's like using the term subsistence to describe food security.

What we are talking about here is culture. The term traditional knowledge does not acknowledge the culture behind the knowledge. This report aims to change that. From now on we will use the term Indigenous Knowledge.

Finally, I want to recognize and thank Carolina Behe for her tireless effort to bring this project to completion. Without her this project would not have been successful. Here's wishing you a pleasant paradigm shift.

Quyanaqpuk…



Drastic changes are occurring within our world. We are on the forefront of these changes. We have lived here for millennia and have grown and changed with all that is around us. All that is around us physically and spiritually nourishes us, and our culture reflects the Arctic because we are part of this ecosystem.

With these rapid changes comes the need for holistic information based on Indigenous Knowledge (IK) and science. With this understanding, we brought our concerns regarding the impact of Arctic changes on our food security to forums throughout the Arctic. Through these conversations, it quickly became evident that we were referring to something different than those we were holding the discussions with.

We have often heard people within academia, policy and management speak to us of nutritional value, calories and money needed to purchase food. All of this is important, but not what we are talking about when we say food security. We are speaking about the entire Arctic ecosystem and the relationships between all components within. We are talking about how our language teaches us when, where and how to obtain, process, store and consume food; the importance of dancing and potlucks to share foods and how our economic system is tied to this. We are talking about our rights to govern how we obtain, process, store and consume food; about our IK and how it will aid in illuminating the changes that are occurring. We are talking about what food security means to us, to our people, to our environment and how we see this environment. We are talking about our culture.

From the realization that we need to fully share what our food security means within the Alaska Arctic, this project was born. There has been a lot of positive work completed and work that is ongoing to increase academic and governmental understanding of food security. The outcomes of this project come directly from us, Alaskan Inuit, to share what our food security is, how to assess changes occurring and how to move forward in a way that will strengthen our food security.

The objectives for the project were clear from the beginning – define food security, identify what the drivers (or causes) of food (in)security are, create a conceptual framework and provide an assessment process to determine Alaskan Inuit food security. What resulted is something much more. As we came together through community meetings, one-on-one and group interviews, regional workshops and numerous conversations, we realized that the drivers of our food security are all the same and that what make up food security within each of our identities, villages and regions is the same.

A Project Led by Alaskan Inuit

Over a three-and-a-half-year period, a group of IK holders, regional youth representatives and two cultural anthropologists acted as the Food Security Advisory Committee. The Committee guided ICC-Alaska through the development, implementation and analysis of information gathered. The final products of the project are the result of 146 Inuit contributing authors – a title fitting for those who provided all concepts, philosophies and recommendations that have come out of this project.

Defining Alaskan Inuit Food Security
Alaskan Inuit food security is the natural right of all Inuit to be part of the ecosystem, to access food and to care-take, protect and respect all of life, land, water and air. It allows for all Inuit to obtain, process, store and consume sufficient amounts of healthy and nutritious preferred food – foods physically and spiritually craved and needed from the land, air and water, which provide for families and future generations through the practice of Inuit customs and spirituality, languages, knowledge, policies, management practices and self-governance. It includes the responsibility and ability to pass on knowledge to younger generations, the taste of traditional foods rooted in place and season, knowledge of how to safely obtain and prepare traditional foods for medicinal use, clothing, housing, nutrients and, overall, how to be within one's environment. It means understanding that food is a lifeline and a connection between the past and today's self and cultural identity. Inuit food security is characterized by environmental health and is made up of six interconnecting dimensions: 1) Availability, 2) Inuit Culture, 3) Decision-Making Power and Management, 4) Health and Wellness, 5) Stability and 6) Accessibility. This definition holds the understanding that without food sovereignty, food security will not exist.

From here on, this is what we are discussing when we say food security.

Summary and Technical Reports
A summary and recommendations report and technical report have been created from this project. The summary report was created for those who are looking for a quick glimpse at what food security means to us, what it means to apply a food security lens to assessments and recommendations for strengthening food security. For a deeper understanding and more in-depth discussion, this technical report is provided. Within both reports you will find: 1) recommendations, 2) key barriers, 3) the food security conceptual framework, and 4) drivers of food security and insecurity.

Technical Report Road Map
This report is broken up into five sections. Throughout the report conceptual maps are provided to aid in the visualization of discussions on different parts of food security. For example, a conceptual map in section four aids in illustrating pieces of our sharing system.

The first section provides a complete listing of key concepts, recommendations and barriers that we have identified throughout the process of this project. The key concepts will be of interest to all seeking a better understanding of IK and food security. These concepts are key to how we view the world through our IK and emphasize that our knowledge system holds methodologies for monitoring and analyzing information gathered.

The recommendations are grouped under dimensions that make up food security. You will see these recommendations again in section four of the report. The recommendations may include components that are familiar – points that we have made for many years. Through this report, we have another opportunity to express the need for particular actions, to define how we are involved in research, management and policymaking and to lay out what is needed to support our culture and overall food security.

This section ends with a list of key barriers that are limiting the understanding of the Arctic ecosystem and addressing food security. Many of these barriers may also be considered gaps in our current knowledge or information sharing. All of them provide us with an opportunity to improve information gathering and decision making.

Section two provides an overview of the project location and methodology. This project engaged all 95 tribal councils located throughout the four regions that ICC-Alaska advocates on behalf of. Throughout the project we aimed to follow our IK methodologies.

This project is providing us with an opportunity to demonstrate IK methodologies scaled up. A more in depth discussion of the project methodology is provided in appendix two.

In section three we define terms and concepts that you will see throughout the report. It was decided to provide this section at the beginning of the report to aid in our description of the Food Security Conceptual Framework, food (in)security drivers and further discussions.

In section four, Understanding Alaskan Inuit Food Security, we begin to provide the meat of this report. In this section we present the Alaskan Inuit food security conceptual framework (shown on opposite page). The framework is the product of semi-directive interviews and analysis of information conducted through community meetings, regional workshops and, at times, with assistance of computer software to pull out themes. These themes were further analyzed and evaluated through regional meetings. During this process, contributing authors and the Food Security Advisory Committee provided continuous guidance, feedback and direct involvement in the development of the conceptual framework.

The framework provides an understanding of all the components that make up our food security and further begins to demonstrate the relationships that exist between all that is in the Arctic. The conceptual framework is provided through an image of a drum. The drum demonstrates that food security is characterized by environmental health, which is achieved through the stability of its six dimensions. Three tools support the stability of the dimensions: policy, knowledge sources and co-management. The drum is held together by the spirit of all (Cillam Cua, Eslam Yuga, Iñua and Ellam Yua). The drum is held up by food sovereignty – a requirement to have food security. The conceptual framework aids us in seeing the underlying issues, described as "drivers," to explain actions, components or causes of food (in) security as they push food security in a particular direction.

Section four also provides a full listing of the 58 drivers that make up food (in)security. Though 58 may seem like a high number of drivers, remember that our food security is complex and multi-faceted with many interlinking parts (Caulfield. 2002). Here we begin to explain how the drivers are interlinked and categorized under the six dimensions that make up food security. These drivers are what is under the surface of the dimensions. Many of the identified drivers also act as indicators of various components of the Arctic environment. This section is followed by an in-depeth discussion and examples of each of the dimensions that make up food security. Boxes holding the associated recommendations follow each discussion. We highly recommend reading this section to gain a fuller understanding of what our food security is, how the dimensions are defined and the context behind the recommendations.

Section five provides an assessment process. This process lays out all of the information and actions needed to conduct an assessment on Alaskan Inuit food security. This type of assessment is holistic and pays close attention to relationships between components and cumulative impacts. Though some may be interested in only the assessment process, we again highly recommend first reviewing section four to gain a fuller understanding of our food security.

We expect the results of this project to be useful to multiple audiences. Audiences will include groups, such as national decision-makers developing policies and programs to ensure community-level food security and the support of ecosystem resiliency through disturbances; local Indigenous organizations in communicating with Outside interests, such as mining companies or environmental organizations; and international institutions, such as the Arctic Council, all of which

hold an interest in understanding the Arctic and the changes that are occurring. Though this report is the product of Alaskan Inuit, it is hoped that Indigenous Peoples from across the Arctic will find it of use.

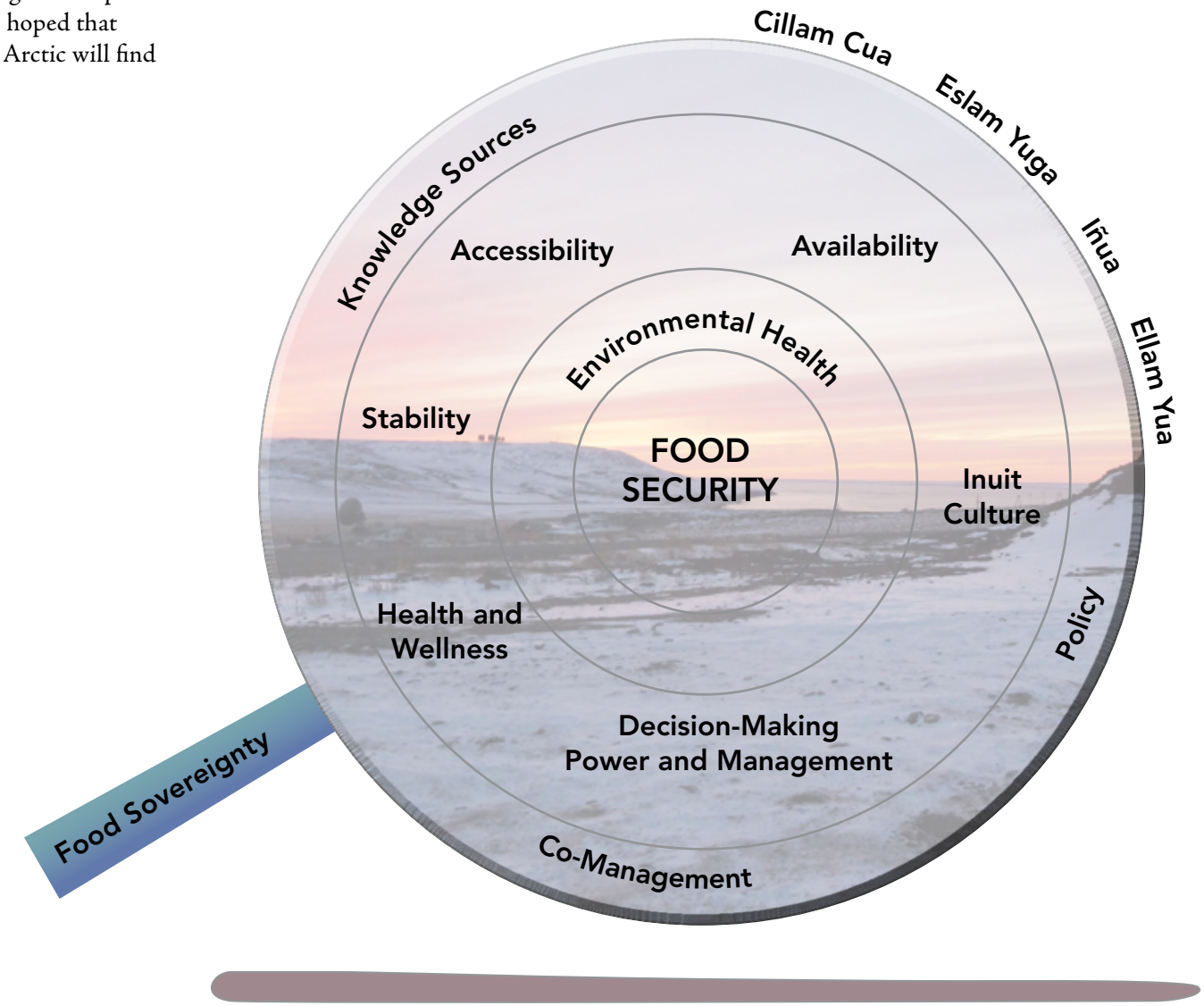


Photo courtesy of L. Whitaker

Food security is a term that is being used more often in research, in politics and in the media to describe the associated consequences of food (in)security and whether a group of people is obtaining enough food. There is a growing appreciation for the complexities of food security, and the hundreds of definitions developed in the last 40 years are beginning to evolve to account for these complexities. Currently, the multiple food security definitions and assessment processes do not necessarily match the Arctic ecosystem or our cultures. For example, many consider food security in terms of purchasing power, nutrients, caloric intake and access to food. A lot of research has concentrated on land use change in agricultural development.[1]

Our food security is dependent on very different factors that lie outside of agriculture. Our purchasing power is concentrated on the ability to afford fuel and bullets to obtain our food. Our nutrients and calories are provided by the plants and animals around us. And our food security includes all of what makes up our way of life, such as our language, social gatherings, education and art.

Here, we suggest that the understanding of food value, the defining of food security components, food security vulnerabilities and the appropriate measurement levels for food (in)security must be place-based and consider the health of the entire Arctic environment.

There is a deep connection between our food systems and understanding the Alaskan Arctic. We (Inuit) have developed a rich culture, shaped by the changing environment in which we live and centered on the obtaining, processing, storing and consumption of Arctic flora and fauna. Traditional foods such as caribou, waterfowl, salmon, seal, salmonberries and sura (diamond-leaf willow) provide spiritual, cultural and traditional values, medicines, energy, identity and more. Through long-held cultural and traditional beliefs and practices, our food security has involved storytelling, dance, drumming, art, education, language, games and rituals. Our traditional foods are much more than calories or nutrients; they are a lifeline throughout our culture and reflect the health of an entire ecosystem.

The Arctic environment is changing at an unprecedented rate. Where ice and cold temperatures once acted as a barrier, today, shifts in sea ice coverage and thickness, increasing temperatures and other factors are issuing a new Arctic, one filled with possibilities. How we react to these changes will influence levels of adaptability, resiliency and health in our communities.

To understand the rapidly occurring changes, there is a need to apply a food security lens. Doing so will provide a deeper understanding of the interconnections and relationships between all within the Arctic ecosystem and reveal the cumulative impacts occurring.

The following technical report focuses on sharing the collective efforts of ICC-Alaska, 146 Inuit contributing authors, a 12-member Food Security Advisory Committee and many other Inuit, who provided input and guidance. The report aspires to strengthen the evidence base of 1) what our food security is, 2) what the drivers of food (in)security

are and 3) identify information needed to conduct an assessment through the development of a conceptual framework. The assessment tool is designed to build the baseline of information needed to understand the Arctic environment and allow a pathway for assessments (food security, ecosystem, political, cultural, etc.) to link eco- and socio- components of sciences and IK. Conducting such an assessment requires a co-production of knowledge, depending on information generated through both IK and sciences.

This project has been ongoing for three-and-a-half years. Since the beginning of the project in 2012, the impacts resulting from rapid changes have escalated. Where before we discussed changes that had never seen, today, these changes are persistent, and inconsistency is becoming a new norm. For example, before people mentioned having less meat to dry, and today some have no meat to dry.

There is no time to waste; we must begin to make changes today, not just for the sake of our culture but also for the sake of the entire Arctic ecosystem. Using a food security lens, the tools provided through this project and applying the recommendations will help us be able to make the changes needed.

[1] Today there is a growing number of initiatives that expand upon previous work. For example, work done by the Council of Canadian Academies, Tebtebba Indigenous Peoples' International Centre for Policy Research and Education, Nunavut Food Security Coalition, Alaska Food Policy Council and academic researchers, such as Michael Carolan and Philip Loring, seeks to expand the understaning or address the complexities of food security. This work is important and has a lot to offer. This project and the following report come directly from us, Alaskan Inuit, to explain and share our own conclusions and our way of knowing. It is important to also acknowledge that our regional organizations, Kawerak, Inc., Bering Straits Native Corporation, Maniilaq Association, NANA Corporation, Northwest Arctic Borough, North Slope Borough, Inupiat Community of the Arctic Slope, Association of Village Council Presidents, Arctic Slope Regional Corporation and Caslista Corporation, have historically addressed food security through various avenues on a daily basis.

Figure 1. Six dimensions of Alaskan Inuit food security

Photo courtesy of Robert Tokeinna

Photo courtesy of Jacki Cleveland

Box 1. What is Indigenous Knowledge?
The ICC offers the following definition:

Indigenous Knowledge is a systematic way of thinking applied to phenomena across biological, physical, cultural and spiritual systems. It includes insights based on evidence acquired through direct and long-term experiences and extensive and multigenerational observations, lessons and skills. It has developed over millennia and is still developing in a living process, including knowledge acquired today and in the future, and it is passed on from generation to generation.

Under this definition, IK goes beyond observations and ecological knowledge, offering a unique "way of knowing." This knowledge can identify research needs and be applied to them, which will ultimately inform decision-makers. There is a need to utilize both, Indigenous and scientific Knowledge. Both ways of knowing will benefit the people, land, water, air and animals within the Arctic.

*Note: Inuit at times may refer to their knowledge as Indigenous Knowledge, Inuit Knowledge or Traditional Knowledge. The definition provided above is understood by ICC to apply to all three terms.

This report focuses on the overall concepts needed to understand Alaskan Inuit food security and identifies what information is required to conduct an assessment. This section provides a list of **key concepts, recommendations** and **barriers** to understanding and supporting food security.

Key Concepts

The following key concepts should be of interest to all seeking a better understanding of IK and food security. These concepts are key to how we view the world through our IK and emphasize that our knowledge system holds methodologies to monitoring and analyzing information gathered.

- There are six dimensions of Alaskan Inuit food security: 1) Availability, 2) Inuit Culture, 3) Decision-Making Power and Management, 4) Health and Wellness, 5) Stability and 6)Accessibility.
- The decision-making power and management dimension strongly influences all other dimensions of food security and the ability of Inuit to adjust to stressors and disturbances. A lack of decision-making power greatly influences the integrity of the connection between Inuit culture and the rest of the ecosystem. The decreased strength (or integrity) of one dimension will drive a decrease in strength of all other systems.
- Fifty-eight drivers of food (in)security have been identified, 37 drivers are linked to food security; 11 drivers are linked to food insecurity; and 10 drivers are linked to either food security or food insecurity. The drivers are categorized under the six dimensions of food security.
- Food sovereignty is required to have food security.
- An accumulation of drivers and stressors are increasing levels of food insecurity within the Alaskan Arctic.
- IK is a knowledge system. Information generated from this knowledge source can be documented and shared but cannot be forced into a two-dimensional form and be considered complete. Information generated from IK and put into a two-dimensional form, such as reports or maps, is useful, but the fourth dimension, the IK holders, are required to complete the picture and provide context, even analytical review.
- For successful adaptive management, resiliency across scales and the support of food security, IK is needed to enhance understanding of changes occurring within the Arctic and to inform decision-making.This includes meaningful engagement of IK holders and inclusion of information generated through IK in state and national review processes, such as environmental impact assessments. IK methodologies for ecosystem monitoring are centered on monitoring connections, or relationships, between components, as opposed to individual components.
- IK teaches us that the greatest points of vulnerability lie at the interface of where components connect (components may be the dimensions of food security, the drivers of food (in)security, the Arctic systems, etc.).
- An increase in competition will increase user conflict, which creates a stronger dichotomy between value systems that inform decisions being made.

Photo courtesy of Jenny Irene Miller

Overall Recommendations

Recommendations generated from this project are meant to inform possible actions that should be taken by Inuit organizations, state and federal agencies, environmental non-governmental organizations, policymakers, resource managers and all others who engage in the Alaska Arctic. Some recommendations address large-scale changes needed in decision-making processes or information needed to build baseline data, while others address issues of inequality. Each recommendation is categorized under baseline data and research needs or under the dimensions and tools that make up the food security conceptual framework.

There are many positive examples throughout Alaska in which IK holders are engaged in a respectful and positive way; where equitable relationships lie between Inuit and those working with them to better understand the Arctic and address challenges faced today. With these recommendations we support such relationships and actions and aim to make them the norm as opposed to the exception. All recommendations aim to strengthen food security.

Suggested Actions to Support Assessments, Creation of Baseline Data and Research

- Utilize the Alaskan Inuit food security conceptual framework to guide development of research questions and projects. Collection of needed baseline data should be generated through scientific and/or IK questions and methodologies.
- Establish a virtual clearinghouse to allow for easy access to previous and current work conducted within a given area. Utilize interoperability

tools to establish such a virtual clearinghouse. Close attention will be necessary to review how IK is categorized and accessed to ensure that information is viewed and used under IK philosophies (e.g., avoiding cause and effect singular rationalizations).

- Develop regional research protocols. Protocols may include pathways to generate community-driven research, engagement of Inuit, involvement of Inuit in research activities, such as collection and analysis of information generated, and the development of a regional and/or Alaskan Inuit review board. Through the review board proposed research is reviewed, commented on and approved by Alaskan Inuit.
- Increase understanding of food security through the identification of combined variables. Allow for community-level identification of interconnecting stressors and drivers to identify level of vulnerability.
- Document IK methodologies and evaluation processes, key questions that drive IK decisions and IK monitoring methodologies throughout all six dimensions of food security.
- Document health and wellness indicators based on IK (flora, fauna and social) across scales (those addressing ecosystem, national, regional and community scales).
- Establish ecological baseline data rooted in IK. For example, there is a need to identify highly sensitive ecological areas through IK. Additionally, close attention needs to be given to how such information is categorized and shared.
- Move toward a co-production of knowledge approach, based on the use of both IK and science. Through this approach, IK and science are not translated into each other.
- Develop indicators through a co-production of knowledge approach, based on both IK and science, that cross over both natural and physical phenomena (e.g., identify keystone species important to both cultural and ecological processes).
- Enhance monitoring of pollutants throughout habitats.
- Enhance monitoring programs throughout all Alaskan Inuit communities; enhance monitoring programs based on both IK and scientific methodologies; enhance monitoring programs through the use of modern technology (e.g., recorders, cameras, etc.).

Suggested Actions Listed Under the Inuit Culture Dimension of Food Security

Education System/Passage of Knowledge

- Give equal weight to IK within the formal education system.
- Fund Elders to continuously provide IK education within the formal education system.
- Provide traditional foods within formal education institutions.
- Promote the indigenization of education frameworks to more clearly align with Inuit ideologies (ICC-Alaska 2015).
- Research, advocate for and promote the development, implementation and sharing of culture-based curriculum that focuses on students' identities as Inuit.
- Promote education of Inuit languages.

Sharing Systems

- Support the current Inuit sharing system through subsidizing the transport of traditional foods and medicines between villages, regions and across the state.
- Adopt and support regulations that reflect and account for the sharing of traditional foods and medicines across space.
- Develop community freezers to store traditional foods and medicines. It is suggested that such a program should provide youth with the responsibility of obtaining foods and medicines.

Cultural Activities

- Continue support of cultural activities, such as celebrations, feasts, dancing, drumming, singing and the creation of art through funding of programs that provide a platform for Elders and Youth,

and for Inuit of differing regions to come together.

- Encourage all within a given area to participate in cultural activities (including non-Inuit).

Suggested Actions Listed Under the Availability Dimension of Food Security

The focus of the following recommendations are on obtaining, processing, storing and consumption.

- Support documentation of traditional recipes and preparation processes. Note: such documentation cannot replace being taught by an IK holder and/or actively "doing" to learn but could be used as a tool.
- Support learning how to make tools and utilize flora and fauna to create clothing.
- Aggregate documentation of ways and methods for obtaining, processing and storing all food sources throughout the four Alaskan Inuit regions. Establish community programs for passing on knowledge and encourage use of knowledge.
- Aggregate documentation of medicinal plants and foods throughout the four Alaskan Inuit regions. Establish community programs for passing on this knowledge and encourage use of knowledge.
- Encourage understanding of Inuit calendars (seasonality) within a given area and associated activities for the obtaining, processing, storing and consumption of traditional foods.
- Adopt and support regulations that reflect and account for the consumption of traditional foods and medicines within education institutions and hospitals.

Suggested Actions Listed Under the Accessibility Dimension of Food Security

- Provide culturally appropriate subsidies that support environmental health (e.g., providing bullets or fuel).
- Increase understanding of change in use patterns and ensure priority of access to traditional areas is maintained.
- Increase communication on potential disturbances, quick shifts in weather and information generated from scientific research within a given area and between scientists, decision-makers and IK holders.
- Document all that impedes accessibility (e.g., policies, limited access to traditional lands and waters, loss of knowledge, lack of economic resources, regulations, etc.).

Photos courtesy of Minnie Naylor (top) and Heather Dingman (bottom)

Photo courtesy of Jackie Cleveland

Photo courtesy of Maija Lukin

Suggested Actions Listed Under Health and Wellness Dimension of Food Security

- Develop housing architecture in collaboration with IK holders and focus on cultural and village needs, energy efficiency and ventilation. For example, the University of Alaska Fairbanks Cold Climate Housing Research Center has developed a strong process for working with Alaskan Inuit communities through a participatory approach.
- Determine the location of sanitation systems and landfills in collaboration with IK holders.
- Continue to monitor contaminants associated with sanitation and landfill systems.
- Monitor flora and fauna using both IK and scientific methodologies.
- Implement an active communication of pollutants system.
- Mitigate persistent organic pollutants (POPs) and other contaminants generated from outside the Arctic but that have an impact on Arctic ecosystems.
- Develop indicators of health and wellness throughout an entire ecosystem as defined by IK holders.

Suggested Actions Listed Under Stability Dimension of Food Security

- Use the food security conceptual framework as a guide to document current and future impacts of increasing ship traffic in the Arctic.
- Support research focused on gaining a stronger understanding of the changes occurring within the physical elements of the ocean in association with changes in food web dynamics.
- Allow for flexible policies. There is a need for ecosystem-based policies and IK management utilization to support adaptability and the health of the ecosystem.
- Support and encourage an increased understanding of socio-ecological systems to provide a greater understanding of how to support the health of all within the Alaska Arctic.

Suggested Actions Listed Under the Decision-Making Power and Management Dimension of Food Security

- Document Alaskan Inuit traditional management practices across space and time. The following are two examples of Inuit traditional management practices that may be documented. In one region, five villages within a given area meet once a year to develop maps of the area and discuss potential safety needs and changes in hunting strategies. In

Photo courtesy of Carolina Behe

another region, Elders from three villages come together to discuss and analyze information and decide on beluga hunting strategies for a given year.

- Create an Inuit food security board to address vulnerabilities identified through the drivers of food (in)security.
- In collaboration with Inuit, develop federal and state flexible regulations that are able to account for shifts in the environment, such as a shift in animal distribution or early ice break-up.

Suggested Actions Listed Under Tools That Support the Six Dimensions of Food Security

Policy

- Adopt policies that recognize the connective nature of the Arctic and cumulative impacts within the Arctic.
- Involve IK holders directly in the interpretation of current policies.
- Review types of protected areas utilized by Indigenous Peoples to safeguard their food sovereignty and identify what practices may be utilized within Alaska air, waters and land.
- Uphold state and federal regulations that identify subsistence activities as a top priority. For example, obtaining salmon for food is a top priority, second only to escapement goals. Adopt policies and practices for the avoidance of expropriating Inuit food sources.
- Adopt policies and practices for the avoidance of expropriating Inuit food sources.

Co-Management

- Investigate co-management structures of other Inuit countries to determine practices that may strengthen co-management.
- Increase IK holder input to decide what information is needed to make management decisions.

- Increase equality of IK within co-management bodies through the increased involvement of IK holders throughout all processes.
- Support the building of Inuit capacity to demonstrate the applicability of IK allowing for equal footing in managing and developing policies for Arctic resources.
- Integrate strategic planning based on information generated through IK and science.

Knowledge Sources

- Recognize IK as a systematic way of knowing with multiple methodologies.
- Base decisions on the best available information generated from both IK and science.
- Involve IK holders in the identification of questions, research methods and analysis of information.
- Adopt a coproduction of knowledge approach in gathering information through research.
- Develop protocols for the storage and ethical use of information derived from IK holders to ensure that intellectual and cultural property rights are maintained.
- Increase networking capability across Inuit organizations to allow for information to be easily shared and used.

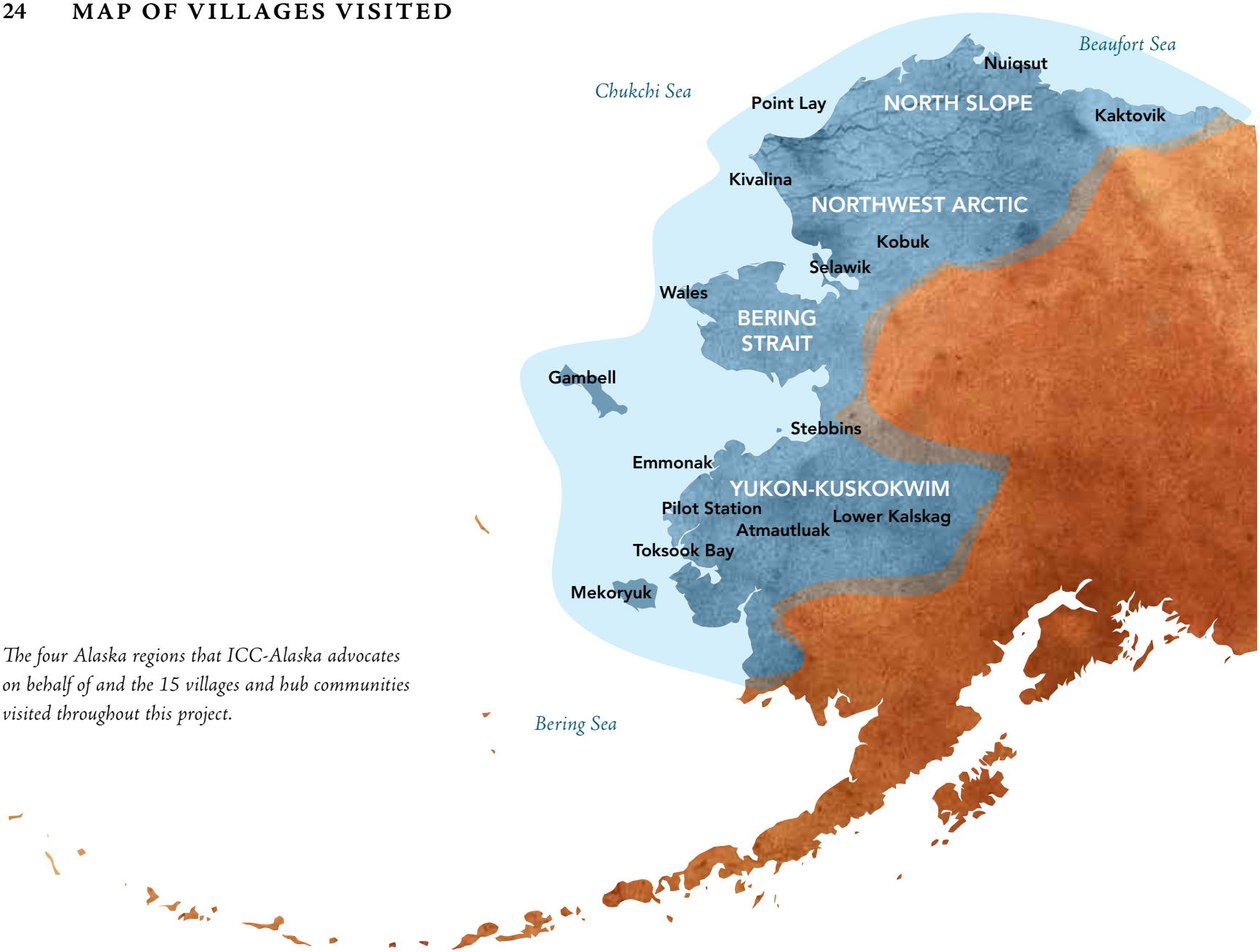
Barriers

Key barriers limiting the understanding of the Arctic ecosystem and addressing food security were identified. Many of these barriers may also be considered gaps in our current knowledge or information sharing. For example, there is a need to increase collaboration between social and physical scientists and IK holders. We share these identified barriers to inspire a focus on filling gaps and in building a stronger understanding of the Alaska Arctic.

- Little synergy of information generated from natural and social sciences and Inuit IK.
- Limited sharing of available scientific data with Inuit communities.
- Need for community-managed and accessible information from IK holders and/or scientific data.
- There is a lack of infrastructure and tools that allow for the sharing and analysis of information derived from community monitoring (based on IK and/or science) between Inuit organizations across villages, regions and the other Inuit countries.
- Need for a methodology and/or process to assess Alaskan Inuit food security.
- There is little attention given to connectivity and cumulative impacts in current assessment processes.
- There is little use or understanding of IK methodologies and evaluation processes outside of Indigenous communities.
- Current scientific research demonstrates limited understanding of socio-ecological systems.
- Research that only takes a scientific approach. Such research is commonly focused on the identification of singular attributes based on specific hypotheses and vulnerabilities and/or is centered on cause and effect correlation.
- There is little documentation of indicators of health and wellness throughout an entire ecosystem as defined by IK holders.
- There is a lack of Inuit-initiated and -defined research protocols, Inuit research approval processes and Inuit guidelines to ethics in research.
- There is a lack of tools that support the ethical use of information derived from IK holders to ensure that intellectual and cultural property rights are maintained.
- There is a lack of tools to ensure that information generated from IK is appropriately categorized.
- There is a lack of biological and ecological significant areas defined by IK.

- There is a need to increase meaningful engagement with IK holders within national environmental reviews, such as environmental impact assessments, allowing for the time and resources needed to collect information through IK processes.

Photo courtesy of Maija Lukin



The four Alaska regions that ICC-Alaska advocates on behalf of and the 15 villages and hub communities visited throughout this project.

SECTION 2: PROJECT LOCATION AND METHODOLOGY

Location

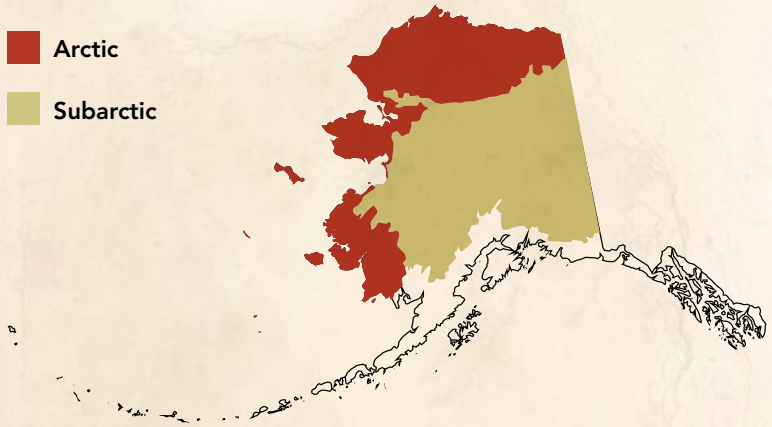
The project takes place within four Alaska regions that ICC-Alaska advocates on behalf of and are home to the Inupiat, St. Lawrence Island Yupik, Central Yup'ik and Cup'ik (collectively referred to as Inuit within this report). The following ecoregions characterize these regions: Arctic Tundra (Brooks Foothills, Brooks Range Tundra-Polar Desert, Beaufort Coastal Plain), Intermontane Boreal (Kobuk Ridges and Valleys, Kuskokwim Mountains, Yukon River Lowlands), Bering Tundra (Seward Peninsula, Kotzebue Sound Lowlands, Bering Sea Islands), and Bering Taiga (Nulato Hills, Yukon-Kuskokwim Delta, Ahklun Mountains Tundra-Meadow) (Gallant et al., 1995). Within this report the entire area is referred to as the Arctic. The Beaufort Sea, Chukchi Sea, Bering Sea and Arctic Ocean compose the marine environment throughout the four regions that will be covered in this project. The project engages 95 federally recognized Tribes located throughout 81 villages with fieldwork taking place within 15 of the 81 villages.

All communities rely on a mixed-cash economy. A mixed-cash economy means that we are reliant on a mix of cash (from various sources) as well as our traditional Inuit economy. An industrial economy, with large-scale resource extraction, is found throughout the four regions. In some cases local governments are dependent on annual transfers from the regional industrial activity.

Though the Arctic is often thought of as barren and not having many species of flora and fauna, it is in fact home to numerous species of birds, fish, marine and terrestrial animals, vegetation and other forms of life. The Arctic environment hosts a variety of food webs developed through an interlinking of biotic and abiotic systems that support unique biogeochemical and physical processes (Aagard et al. 1999, Gregory, Ingram and Brklacich, 2005). The diversity of the eco-zones and our cultures within the Alaska Arctic allowed for this project to identify similarities in food systems, understandings of food security and

Photo courtesy of Jackie Cleveland

Box 2. Arctic boundaries



Box 3.

Arctic boundaries cont.

ICC-Alaska uses the same definition of the Arctic as the Arctic Council. This is a geo-political boundary and is indicated on this map by the black line. Each respective Arctic country is also indicated on the map.

drivers across the four regions. Through this report and conceptual framework, we have identified community and regional similarities in our understanding of food security and drivers to food (in)security. However, additional variables need to be considered uniquely within each community and/or region when assessments take place.

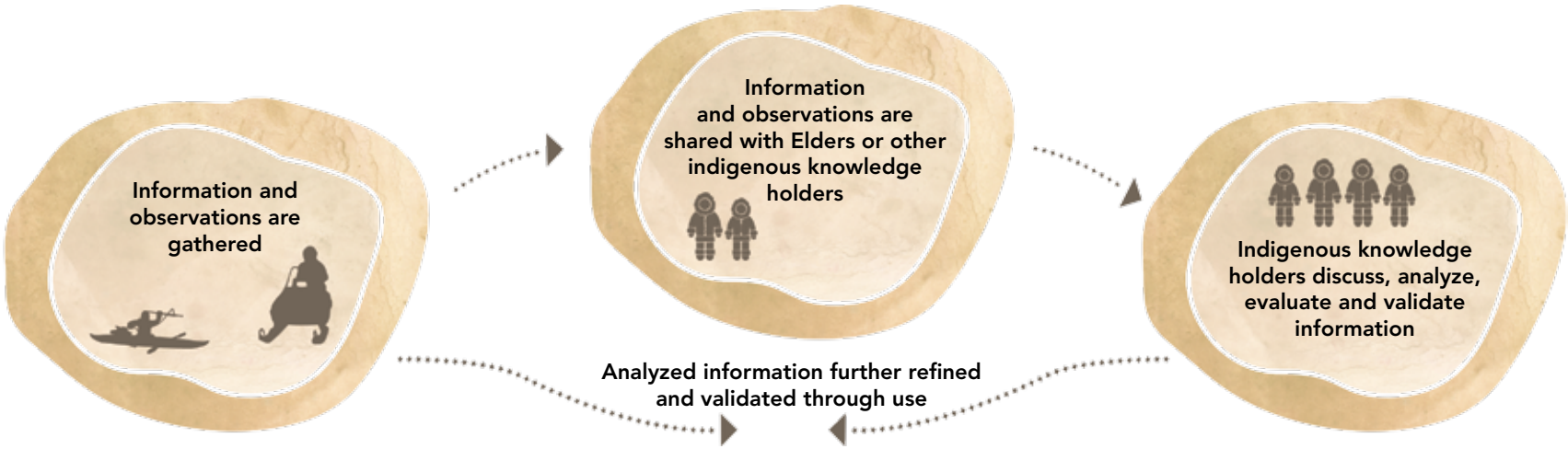
Methodology

The methodology used in this project comes from our IK. The methodology used for gathering information and in evaluating and validating information is seen daily within our communities. Social science techniques and tools that align with IK supplement the process. The social science techniques work in a manner that allows IK to stand on its own and does not dilute this knowledge source by attempts to translate it into other formats, such as Western science.

It is common practice within our communities for observations and information of any kind to be discussed with Elders and those determined by their peers to be the most knowledgeable. Those people speak with their peers to bring further context to the information based on their wealth of knowledge and experience and to provide analysis of the information. This process is an evaluation and validation process.

As stated above, the methodology for this project was developed with the intention of mirroring the above process. The project methodology was laid out and further developed throughout the first year of the project in collaboration with the project's Food Security Advisory Committee and feedback from Tribal Councils.

Since July 2012, ICC-Alaska has visited 15 villages within the four regions for which ICC-Alaska advocates. In each village visited, we worked closely with the Tribal Councils to collect information from IK holders on the topic of food security, through semi-directive interviews and community meetings. The information gathered was aggregated and analyzed to obtain a greater understanding of what defines food



security and to identify drivers (causes) of food security and insecurity. Preliminary findings and themes have been pulled from expert interviews held within each region.

The preliminary findings of themes, drivers and understanding of food security found within each region were presented at regional workshops. Through this method, IK holders at the village level and community meeting participants determined what was discussed at regional food security workshops. Each workshop allowed for greater engagement of villages throughout the four regions and a preliminary evaluation and validation process. For each workshop IK holders were identified by their respective Tribal Councils and peers to evaluate and validate the preliminary findings, gained through analysis of information documented through expert interviews, and to offer further insight on drivers of food security and insecurity. See appendix 2 for more detail on project methodology.

Photo courtesy of Sam Towarak

Box 4. Villages visited throughout the project

The communities visited are located in diverse environments, such as along coastlines, rivers and on islands.

Kaktovik
Selawik
Stebbins
Mekoryuk
Nuiqsut
Kobuk
Emmonak
Atmautluak
Point Lay
Wales
Pilot Station
Lower Kalskag
Kivalina
Gambell
Toksook Bay

Photo courtesy of Jackie Cleveland

Photo courtesy of Amos Oxereok

To understand food security it is important to understand the terms used in discussing the topic and points that will have to be explored and defined throughout an assessment process. This section provides such definitions and begins to explain the conceptual relationships that lie between the components that make up our food security. While these are general terms, they may be interpreted differently within the context of different cultures. Here we recognize that culture defines terms as much as language does. We begin this section with the food security definition we developed through this project.

Our Definition: Alaskan Inuit food security is the natural right of all Inuit to be part of the ecosystem, to access food and to care-take, protect and respect all of life, land, water and air. It allows for all Inuit to obtain, process, store and consume sufficient amounts of healthy and nutritious preferred food – foods physically and spiritually craved and needed from the land, air and water, which provide for families and future generations through the practice of Inuit customs and spirituality, languages, knowledge, policies, management practices and self-governance. It includes the responsibility and ability to pass on knowledge to younger generations, the taste of traditional foods rooted in place and season, knowledge of how to safely obtain and prepare traditional foods for medicinal use, clothing, housing, nutrients and, overall, how to be within one's environment. It means understanding that food is a lifeline and a connection between the past and today's self and cultural identity. Inuit food security is characterized by environmental health and is made up of six interconnecting dimensions: 1) Availability, 2) Inuit Culture, 3) Decision-Making Power and Management, 4) Health and Wellness, 5) Stability and 6) Accessibility. This definition holds the understanding that without food sovereignty, food security will not exist.

Food Insecurity – The Food and Agriculture Organization of the United Nations defines food insecurity as the opposite of food security (Clay, 2002). This is also true for Alaskan Inuit food security. Food insecurity will occur when instability to any of the six dimensions or a combination of drivers results in an accumulation of disturbances. This instability and food insecurity may take many different forms. For example, in one region this could mean a combination of declines in lichen growth, a shift in caribou migration patterns and less income used to provide tools and resources, such as the fuel needed to support obtaining food. For another region it may mean a loss of the transfer of knowledge and lack of skills needed to prepare and store foods, in addition to a shift in food web dynamics and/or introduced species.

Food Security Assessment – A tool to identify the areas faced with the greatest vulnerabilities and measure a level of food security. Traditionally food security measurements have been based on ordinal scales, such as those to gauge the level of hunger as severe or less severe (FAO, 2003). Within this report, contributing authors discuss what is needed in a food security assessment process that gauges level of strength across an entire ecosystem.

Conceptual Framework – A tool used for organizing and representing knowledge (Flavel, Miller and Miller, 2002) and allows for a mental

grouping of different entities into a single category (a concept) on the basis of some underlying similarity – some way in which all the entities are alike, some common core that makes them all, in some sense, the same thing.

Drivers of Alaskan Inuit Food (In)Security – Concepts that cause food security or insecurity leading to the stability or instability of the six food security dimensions. The drivers are underlying issues that explain actions, components or causes of food (in)security.

Food Systems – Describes all that goes into the production, processing, distribution and consumption of traditional foods. In the Alaska Arctic this definition breaks down to all steps and components needed to feed our people. These steps include storing, sharing, trading, feasts, distribution and management of foods, and education/transfer of knowledge, language, etc. Also included in a food system is learning how to be within the environment through traditional and cultural knowledge transmitted over multiple generations, how to remain safe and how to respect life and take care of the environment.

Food Chain – All the parts of a food system (Dictionary.com, 2015). A food chain may be short or very complex and will include the collection, processing and storage of food, in addition to the connection of any given food source to its own food. For example, while in its ocean life phase, a sockeye salmon will eat bright orange phytoplankton. This is the first step in the food chain that we are discussing. Figure 2 shows a sockeye salmon eating phytoplankton, then an adult and youth catching the sockeye. During this process the youth is learning about the fish

Figure 2. Depiction of two food chains

and all that is connected to it. The youth also learns cultural point values, such as respect. The fish is then processed to be stored for winter. Here we see many connections between the culture and biophysical process in the food chain described. Another possible food chain will begin again with the sockeye eating bright orange phytoplankton. As part of the animal's lifecycle, it swims upriver to spawn. Following spawning, the salmon dies, its body decays and adds important nutrients to the riparian ecosystem. Vegetation and other life have come to depend on these nutrients. We also depend on the vegetation and animals that use the nutrients from the decaying salmon as it passes through the food chain. The Alaskan Inuit food systems comprise multiple food chains operating at the global, national and local levels.

Food Cycle – Describes the relationship between food chains and/or key elements of a food system. In recognizing a food cycle, it is crucial to consider cascading effects and feedback loops (International Institute for Sustainable Development, 2013).

Food Webs – Allow for the connection of food chains and/or elements, such as food security dimensions or individual drivers (International Institute for Sustainable Development, 2013). Understanding the food web will allow us to better understand the impacts of potential disturbances or cumulative changes, such as impacts of regulations on environmental integrity or passage of knowledge.

Disturbances – A large force upon a given area, such as the food security system of the Arctic. Such forces may be large-scale changes within the system of a given area that result in impacts across scales and time. For example, an increase in the price of gasoline or a sport hunting activity within a remote area utilized by Inuit hunters may result in a large disturbance to the Inuit hunters' abilities to access animals.

Within all cultures, within all ecosystems, there are food cycles, food webs, food systems and food chains. These systems and chains alter, change and adjust to disturbances (large changes, such as shifts in sea ice thickness and coverage) within the environment and change across space and time. Disturbances may result in positive or negative outcomes. Disturbance do not always result in negative impacts. Sometimes disturbances result in perceived benefits or may build up over time to act cumulatively in small doses.

Photo courtesy of Jenny Irene Miller

Resilience – The ability of a system and its component parts to anticipate, absorb, accommodate or recover from the effects of a disturbance in a timely and efficient manner (IPCC, 2012). Resilience is largely based on the ability of various systems, inclusive of the Inuit culture, to adapt and adjust to disturbances as they occur.

Availability – The ability of the Arctic ecosystem to maintain a high variety of life (biodiversity), allowing adequate transfer of nutrients and energy. It is the knowledge of seasons and how to collect, process, store and consume traditional foods, allowing for Inuit to eat what has been gathered from the previous season and harvest a variety of medicines.

Inuit Culture – Food is the cornerstone of our culture and self- and shared identity. Harvesting traditional foods is how cultural values, skills and spirituality are learned – this is how all learn to be within their environments and to be part of the ecosystem. The relationship between Inuit and all else that makes up the Arctic environment aids in the maintenance of cultural and environmental integrity.

Decision-Making Power and Management – The Alaskan Inuit ability to use and value IK to manage daily activities; to build and rely on self-governance across space and time; for Alaskan Inuit to use their knowledge system in synergy with other knowledge systems, such as Western science, to equitably manage human activities within the Arctic environment and to better understand changes occurring; to apply holistic knowledge to understanding the Arctic environment through IK philosophies and methodologies; the ability to manage activities within the Arctic in a way that ensures younger generations will have healthy and nutritious foods to harvest; for Alaskan Inuit to have control over their own fate and to use their cultural value system.

Health and Wellness – Physical health of all life within the Arctic and of the land, water and air; adequate passage and absorption of nutrients throughout the Arctic ecosystem; mental health related to community and household relations and self- and cultural identity; environmental integrity and productivity to withstand pollution, habitat destruction and other disturbances.

Photo courtesy of Maija Lukin

Stability – The ability of the puzzle pieces (systems) to adjust to each other as shifts within the ecosystem occur. The ability to maintain sustainability through the management of human actions that support and ensure younger generations will have sufficient healthy food to harvest and that all the pieces of the puzzle maintain connected. Stability is obtained through a level of Alaskan Inuit mental security and is in reference to the legal protections for the environment against harm caused by pollutants. Mental security is also in reference to legal protection against forced assimilation, which allow for the maintenance of a level of cultural confidence and hope.

Accessibility – The ability to live off the land, ocean and air and to obtain sufficient access to a diverse source of healthy food, water, animals, plants, fish, ice, etc. The ability to maintain Inuit traditional economic practices, such as trading, sharing and providing foods and medicines. It is the ability to access and maintain an economic system based on cash in connection to an Inuit traditional economic system. It is the ability to obtain skills, tools and technologies needed to collect, process and store traditional foods.

Food Sovereignty – The right of Alaskan Inuit to define their own hunting, gathering, fishing, land and water policies; the right to define what is sustainably, socially, economically and culturally appropriate for the distribution of food and to maintain ecological health; the right to obtain and maintain practices that ensure access to tools needed to obtain, process, store and consume traditional foods. Within the Alaskan Inuit food security conceptual framework, food sovereignty is a necessity to supporting and maintaining the six dimensions of food security. Without food sovereignty, food security is not possible (Bell-Sheeter, 2004; Nyeleni, 2007).[2]

Photos courtesy of Maija Lukin (left) and Amos Oxereok (right)

[2] The food sovereignty definition presented here accounts for all points identified by Alaskan Inuit and has been adapted from the definition written by Hamm and Bellows in First Nations Development Institute's Food Sovereignty Assessment Tool, 2004 and in addition to the definition provided in the Declaration of Nyéléni (2007).

SECTION 4: UNDERSTANDING ALASKAN INUIT FOOD SECURITY

This section will cover four topics: The 1) Food Security Conceptual Framework 2) connectivity and cumulative impacts 3) food (in)security drivers and 4) understanding the dimensions of food (in)security and drivers.

Alaskan Inuit food security is characterized by environmental health (Loring and Gerlach, 2009), as stated in our definition (see page 31). An environment is considered healthy when all parts are functioning in a stable and productive way. As one Elder explains, the Arctic environment is like a puzzle, with all pieces having a place and all pieces needed to make up the entire puzzle; this includes our languages, retention of IK, animal health, oceans and rivers, etc. This description of the environment helps explain how the Arctic ecosystem is made up of multiple parts. Scientists may also understand this explanation in terms of system science. Each puzzle piece can be envisioned as a system that together makes up the entire ecosystem. Our culture is a system within this larger ecosystem. Just as the hydrologic system is part of the Arctic ecosystem. Our cultural system is interconnected with all aspects of the larger ecosystem.

Within this understanding, there is an emphasis that the Arctic is continuously changing. Pieces of a puzzle move and adjust to each other as change occurs. Figure 3 shows an image of the Arctic environment made up of multiple puzzle pieces (systems). With each piece there may be multiple additional pieces (systems) nested within it and they all demonstrate an interlinking between natural and social phenomena. In order to understand the Arctic environment, it is necessary to see the entire puzzle, to see where the pieces connect to each other. This holistic philosophy of how to see the world is one of the foundations of our IK. The philosophy informs the gathering and harvesting of traditional foods and our entire food system.

Photo courtesy of Mary Sage

Figure 3. Image of Arctic interlinking puzzle pieces (systems)

Note that the puzzle pieces may have multiple systems nested within one piece and that all demonstrate an interlinking between social and natural phenomena.

Alaskan Inuit Food Security Conceptual Framework
The development of a conceptual framework provides a platform for understanding what all of food security's facets are. The framework aids us in seeing the interconnections between the many pieces that make up food security. It provides direction for what information is needed and how to interpret that information in order to assess food security.

Figure 2 provides an outline view of the Alaskan Inuit food Security Conceptual Framework, illustrated as an Inuit drum. In the center of the drum is food security and surrounding the inner circle is what characterizes food security. Surrounding this characterization are the six dimensions that make up food security. Surrounding the dimensions are the tools required to obtain food security. Along the outside of the drum is the spirituality of all within the Arctic. The handle of the drum holds all of these pieces together. To assess food security, we can move from the outside toward the center of the drum or from the center out.

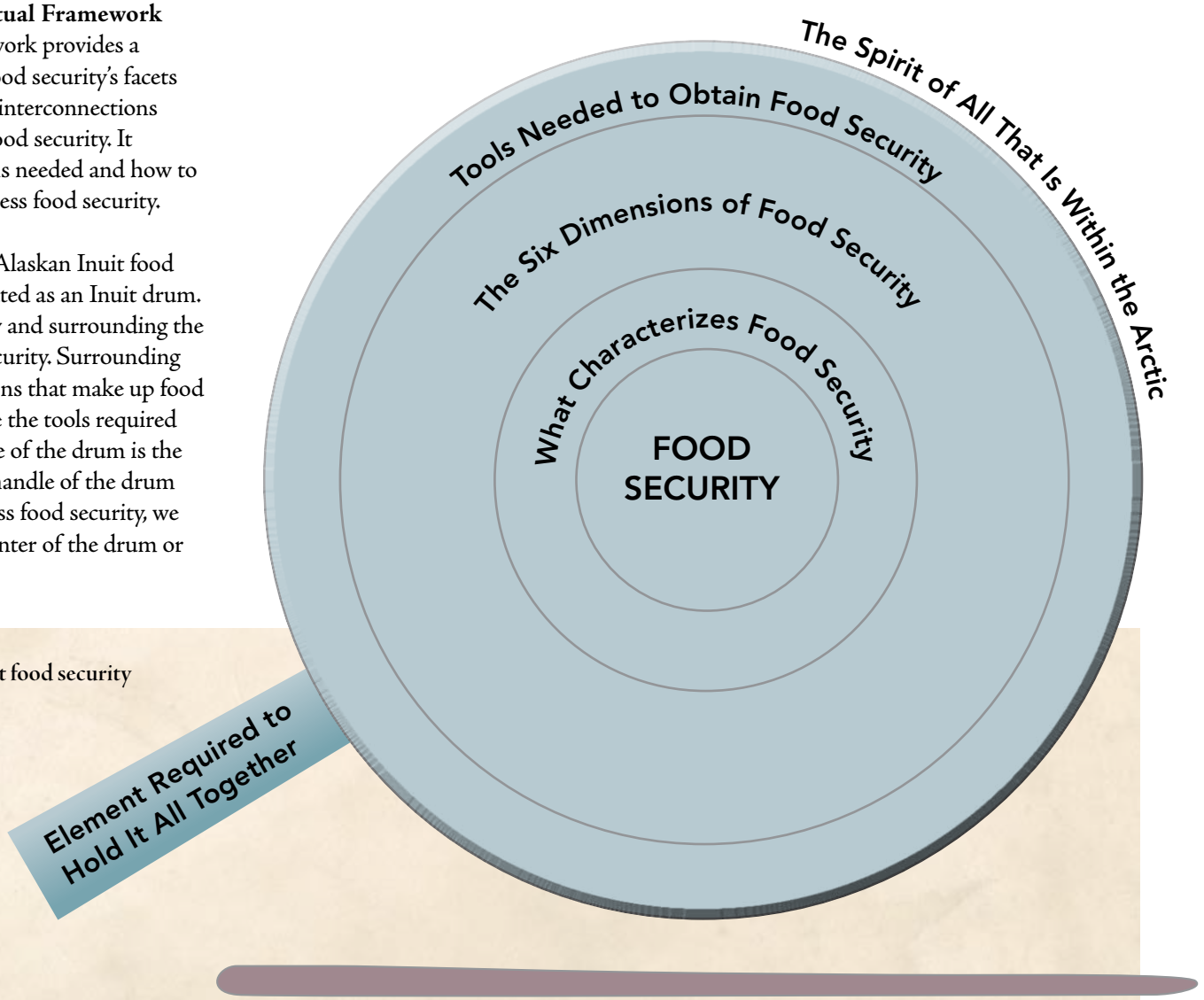
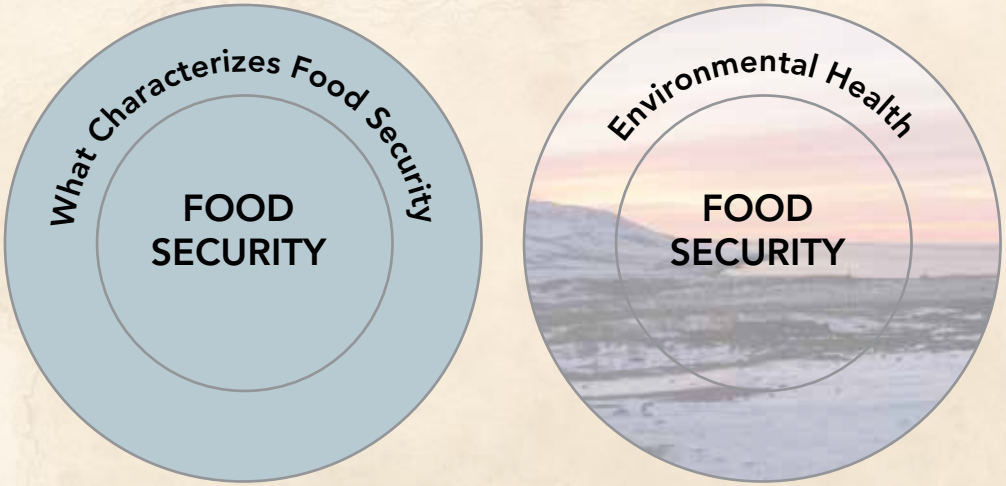


Figure 4. Conceptualizing Alaskan Inuit food security

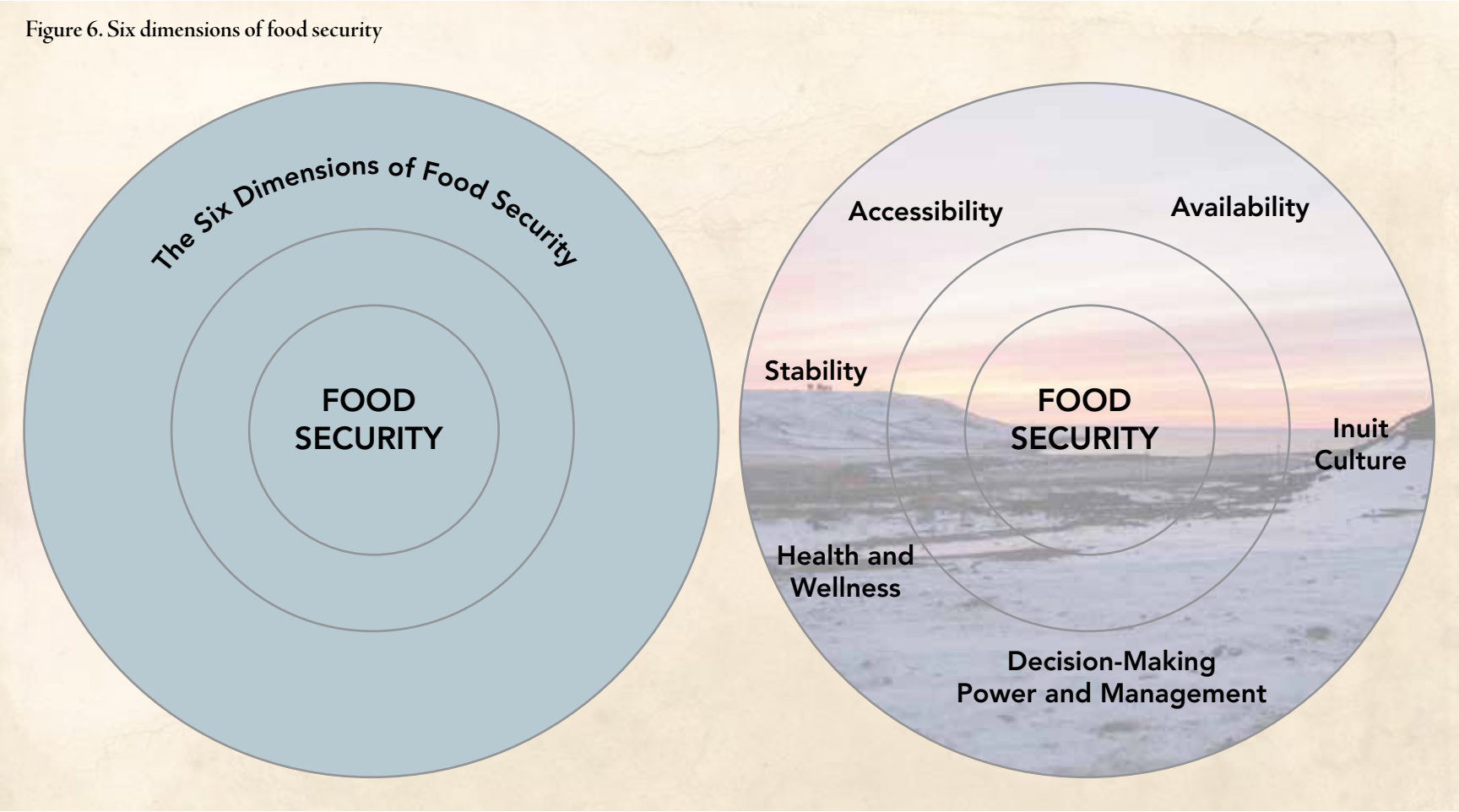
The Alaskan Inuit Food Security Conceptual Framework in figure 5 shows that food security is characterized by environmental health. An environment is considered healthy when all pieces of the puzzle are connected and able to adjust to account for disturbances and rapid changes.

Figure 5. What characterizes food security



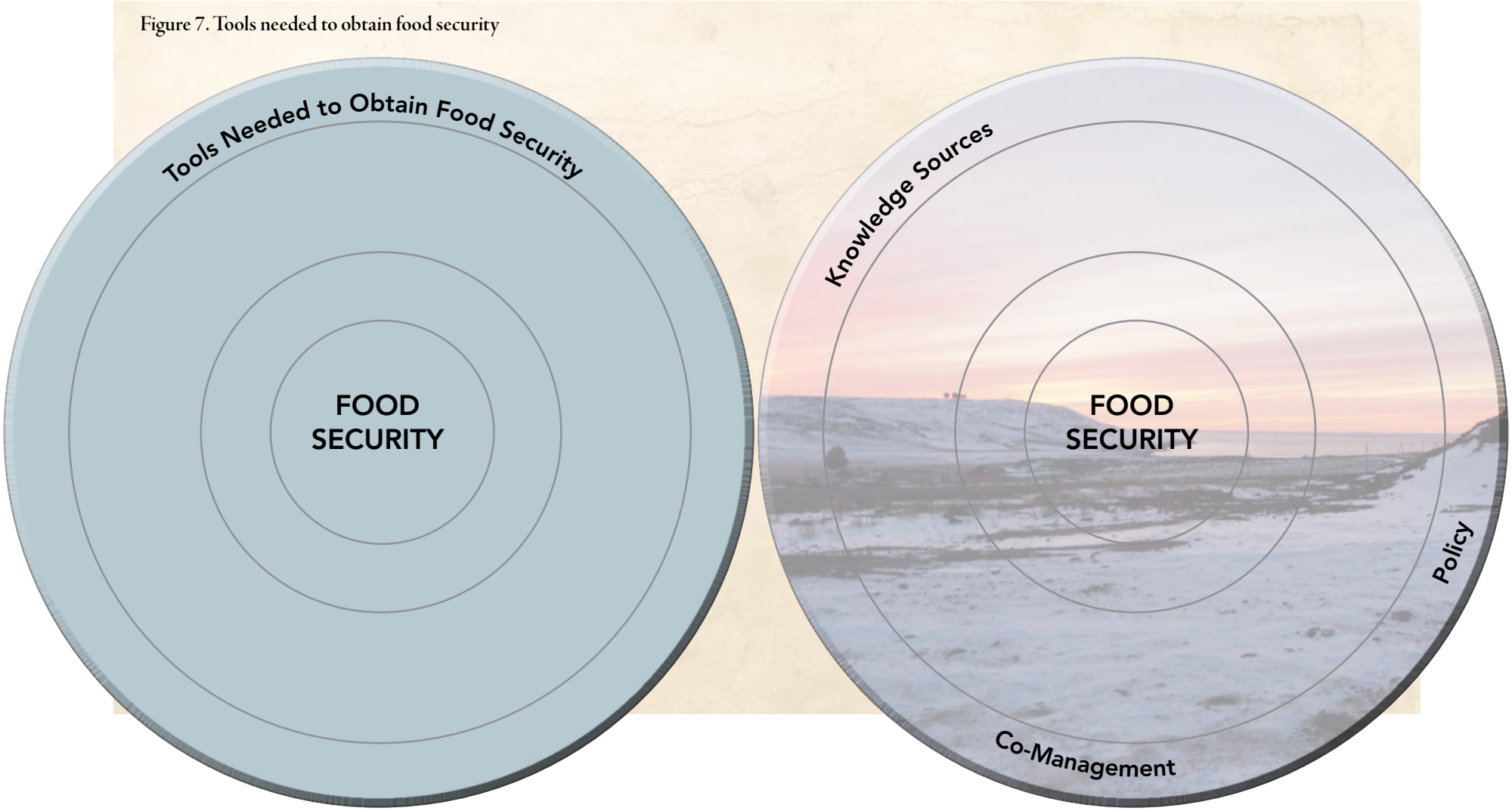
Surrounding the characterization of food security are the six dimensions that make up food security: *Availability, Inuit Culture, Decision-Making Power and Management, Health and Wellness, Stability and Accessibility*. These dimensions are constituted by drivers of food (in)security.

Figure 6. Six dimensions of food security



The outer ring of the drum shows the tools required to obtain and maintain food security, (policy, co-management and knowledge sources). Surrounding the drum is the spirit of all, written in Iñupiaq, Yup'ik, Cup'ik and St. Lawrence Island Yupik. The drum handle is food sovereignty. Food sovereignty is required to hold the drum together. If any piece of the framework is missing or lacks strength, resiliency will decrease and food security will decrease.

Figure 7. Tools needed to obtain food security



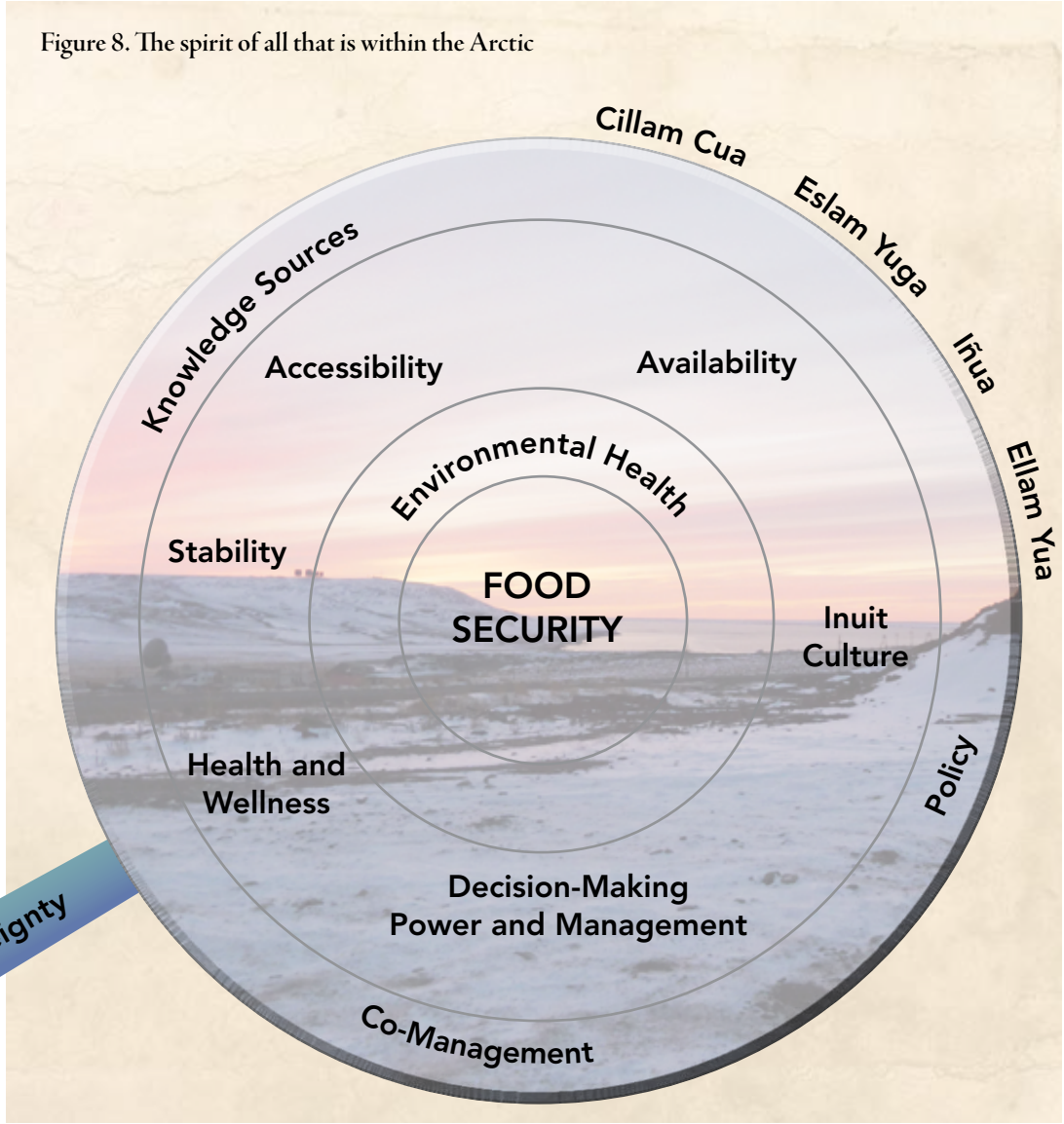
The four words surrounding the drum, Cillam Cua (Cup'ik), Eslam Yuga (St. Lawrence Island Yupik), Iñua (Iñupiaq) and Ellam Yua (Yup'ik) can be roughly translated as "the spirit of all" – of animals, people, air, land, water, of the universe. Within the Arctic, all is alive.

Angayuqaq Oscar Kawagley has provided an insight into the Yup'ik word Ellam Yua through his description of the Yup'ik culture. His words are true for all Alaskan Inuit.

"The Yupiaq [all Inuit] people[s] live in an aware world. Their sense of sacredness is of a practical nature, not given to abstract deities and theological rationalization. Because nature is their metaphysic, Yupiaq [all Inuit] people[s] are concerned with maintaining harmony in their own environment" (Kawagley, 1999).

Angayuqaq's words begin to explain the cosmology of Alaskan Inuit and the importance of maintaining the health of the environment. Though Cillam Cua, Eslam Yuga, Iñua and Ellam Yua cannot be measured to determine levels of food security, it is important to understand and consider the socio-ecological relationship shaped through these words and their cultural importance. Scientific assessments often hold a bias determined by a different way of knowing (epistemology) (Corntassel, 2008) that inadvertently discounts Inuit cultural values, needs, IK and overall understanding of the world.

Figure 8. The spirit of all that is within the Arctic



The connectivity of all food security dimensions, and subsequently all drivers, are key to understanding the Arctic ecosystems. Within our IK, the strength of the interconnections of these systems are an indication of resilience to disturbances. While it is important to understand the components and resiliency of each dimension, IK guides us to look closely at the interface between the dimensions and drivers. This IK methodology allows for a greater understanding of cumulative impacts.

Our IK teaches us to pay close attention to the connections between systems and between components within an ecosystem. For example, a walrus hunter understands the connection between sea ice thickness and walrus, the connection between benthic animals and walrus, the connection between benthic animals and currents, etc. The monitoring of these connections helps inform an understanding of the environment, changes that are occurring through cumulative impacts, and decision-making. Throughout the rest of the report these points will be demonstrated, as they relate to all that is within the drum of food security.

Photo courtesy of Amos Oxereok

DRIVERS OF FOOD (IN)SECURITY

Throughout this project, contributing authors have identified drivers of food (in)security. The conceptual framework aids us in seeing the underlying issues. We describe these issues as drivers. The term driver is used to communicate actions, components or causes of food (in)security because they are pushing food security in a particular direction. Though every village and every region is different, the drivers of each appear to be the same.

Below each driver is categorized under the dimension that it is most closely linked to. The six dimensions of food security are made up of a total of 58 drivers [Behe, 2013., Inuit Circumpolar Council-Alaska. 2014, Bering Strait and Inuit Circumpolar Council-Alaska. 2014 Northwest Arctic.] In the list below it is indicated if the driver is an indication for either food security (FS), food insecurity (FI), or both (FS and FI).

Availability

1. Variety – number of different animals and plants in the area (may also be referred to as biodiversity) (FS)
2. Knowledge of how to obtain, process, store and consume traditional foods (FS)
3. Knowledge of seasonality – Inuit calendars (FS)
4. Being able to eat what has been gathered from last season (FS)

Inuit Culture

1. Value of food (FS)
2. Spirituality (FS)
3. Language and terminology (FS)
4. Education and transfer of knowledge (FS)
5. Sharing systems (FS)
6. Respect (FS)
7. Celebration, games and feasts (FS)

Photos courtesy of Carolina Behe

8. Social interaction (FS)
9. Dance, art and music (FS)
10. Self- and cultural identity (FS)
11. Clothing, tools (FS)
12. Maintaining Inuit leadership and knowledge holders (FS)
13. How to be within the environment (cosmology) (FS)
14. Time constraints (FI)
15. Gathering, processing, storing and consuming traditional foods (FS)
16. Physical safety (e.g., navigation skills) (FS)
17. Knowledge of food systems of yesterday and today (FS)
18. Relationship with animals (socio-ecological system) (FS)

Decision-Making Power and Management

1. Ability to manage lands, waters and resources (FS)
2. Power dynamics – self regulation (FS)
3. Perceived and actual reality of control over fate (FS)
4. Strength of co-management structures (FS and FI)
5. Loss of resource benefits and income (FI)
6. Federal and state regulations/jurisdiction (FS and FI)
7. User conflict (FI)
8. Burden of conservation (FI)
9. Increase in competition (FI)
10. Taxation without representation and representation with low understanding of Inuit culture and Inuit ecological regions (FI)
11. Respect for and equality of knowledge systems (IK and science) (FS)
12. Preparedness for large disturbances, such as preparedness for oil and emergency response (FS)
13. Meaningful, equitable involvement in research (FS)
14. Institutional racism (FI)

Health and Wellness

1. Environmental integrity and productivity to withstand pollution (noise and light pollution, garbage, contaminants, wastewater, etc.) erosion, habitat destruction, etc. (FS)
2. Increased vulnerability throughout the food chain (FI)
3. Degradation of healthy food systems and overall health (e.g., increases in chronic diseases such as cancer) (FI)
4. Nutrition – ability to access and absorb (FS)
5. Accessibility to traditional medicines and healers (FS)
6. Accessibility to Western medicine and healthcare professionals (FS)
7. Landfill system (FS and FI)
8. Sanitation system (FS and FI)
9. Mental health (FS and FI)
10. Housing structures (FS and FI)
11. Mixed diet of traditional and non-traditional foods (FI and FS)

Stability

1. Adapt to changes (FS)
2. Rapid speed of change (FI)
3. Inuit mental security – confidence in the legal protections for the environment from harmful actions, such as those that result from pollution, among other things. Legal protection for the Inuit culture against forced assimilation. (FS)
4. Integrity of interconnection systems – marine, terrestrial, cultural, etc. (FS and FI)
5. Change in sea ice thickness, timing of formation and break-up (FI)
6. Hope (FS)

Accessibility

1. Access to traditional territories (FS)
2. Ability to live off the resources of the land, water and air (FS)
3. Econmics – Inuit economy, cash [market] economy, government subsidies (FS and FI)
4. Water sources (e.g., multi-year ice, river ice, etc.) (FS and FI)
5. Access to tools and possessing the ability to access healthy animals, plants, fish, ice, water, etc. (FS)

Food Sovereignty – Drivers that directly support food sovereignty are as follows: the type of management used, legal structures to support decision-making power, power dynamics, federal and state jurisdictions, equality of knowledge systems, the generation of information to inform decisions through co-production of knowledge and community-driven research.

There are 37 drivers linked to food security; 11 drivers are linked to food insecurity; 10 drivers are linked to either food security or food insecurity. Drivers of food security may quickly become drivers of food insecurity when not not adequately supported. For example, access to traditional territories is a driver of food security. Lack of access to traditional territories is a driver of food insecurity.

Many drivers may support both food security and insecurity by directly impacting the dimension of its own category or by indirectly impacting other dimensions. The cumulative impact of multiple drivers results in a decreased resiliency to food security. For example, loss of language is listed as driver of FI. When this driver is combined with a loss of respect and celebrations, the impact is seen throughout the six dimensions of food security.

Many concerns and disturbances today are linked to one or more driver. For example, rapid development in some areas is resulting in negative impacts to animal and plant health and change in migration patterns. In some of these situations, the lack of meaningful involvement of IK holders, lack of decision-making power and the loss of rights to manage areas where development may take place, leads to the negative impacts.

Photo courtesy of Carolina Behe

The integrity of the dimension determines a community's ability to withstand disturbances, such as rapid change. Without food sovereignty or with a decrease in the strength of any dimension, the result is food insecurity.

The six dimensions of food (in)security are interlinked and support the stability of each other or further exacerbate cumulative impacts. For example, decision-making power is strongly linked to the integrity or ability of the other dimensions to absorb disturbances and stresses without resulting in a decrease in food security or degradation of t he environment.

A loss of resilience occurs when the connections are broken. To further illustrate this point, one may consider what impedes accessibility. Accessibility to the environment may be impeded by multiple factors that inadvertently degrade social integrity, causing a shift in defining terms and value of food. For example, as animals move farther away from villages, hunters are required to utilize more fuel and time to hunt. If time and fuel are not available, accessibility is decreased. This coupled with additional drivers that decrease accessibility, such as regulations that may further impede accessibility to animals through restrictive harvest windows, rapid changes in the environment due to climate change (shifts in sandbars and erosion), and an education system that is perceived to place higher value on a Western education philosophies, all drive food insecurity, decrease the transfer of knowledge and lead to a change in how terms are defined.

Inuit Culture – *Food is the cornerstone of our culture and self- and shared identity. Harvesting of traditional foods is how cultural values, skills and spirituality are learned–this is all learn to be within their environments and to be part of the ecosystem. The relationship between Inuit and all else that makes up the Arctic environment aids in the maintenance of cultural and environmental integrity.*

Where other food security definitions focus strongly on nutrients, caloric intake and purchasing power, our understanding of food security is characterized by environmental health and focuses on the relationships held between components of that environment. Within our culture, food holds a deep physical and spiritual meaning. We have shared time and time again "food is priceless." There is no trade-off that will provide compensation for what is lost when food security is compromised. Traditional foods are a part of our heart and an inseparable part of what being Inuit means – this is how we understand the value of food. The value of food directs how to gather and handle food, guides traditional management decisions of how to engage within the environment and informs a cultural responsibility to take care of the environment.

Rooted within the understanding of the value of food are the concepts of Inuit responsibility and "natural rights." We have a responsibility and natural right to take care of and protect the land, sea, air, animals and plants. We have a responsibility and a right to educate younger generations, to transfer knowledge of respect, how to be within the environment, the inter-connections within the food web and our Inuit languages.

Photo courtesy of Mary Sage

The value of traditional food is listed as a driver of food security, as it speaks to the many cultural principles of how to be within and care for this environment. However, when this relationship is severed or damaged, there is a concern about how the value of traditional foods may be lost. If this occurs it becomes a driver of food insecurity as it often leads to a decline in self- and cultural identity and self-esteem. This process is held within a positive feedback loop. In this positive feedback loop the drivers of food insecurity build-up, resulting in drivers magnifying the impact of other drivers, leading to disturbances within the environment.

At times, our value of traditional food is easily marginalized in comparison to the values of other cultures in determining management practices and use of the Arctic. For example, we consider it wasteful and disrespectful to the overall ecosystem when regulatory decisions allow sports hunters to leave behind parts of killed animals. On the other hand, our practices may appear wasteful to other cultures. For example, when encountering a sick or injured caribou, it is a hunter's responsibility to decrease the animal's suffering by killing it. This practice also decreases the possible passage of sickness to other caribou and/or animals. A misunderstanding of these situations often leads to user conflict (a driver). Examples of the marginalization of Inuit traditional food values are found throughout wildlife management regimes and in some situations, how and what research is conducted.

Language is another a driver of food security found within this dimension. The loss of language, in combination with other drivers, increases the chances of food insecurity. Like any language, each word within our Inuit languages hold context that is partly or fully lost when translated. Today there is a concern for the loss of our language and the associated loss of the transfer of knowledge. There is a need to aid youth in learning Inuit languages and understanding why learning them is important.

With the loss of language comes the loss of a way of interpreting the world around us and communication between generations. Language is used to communicate where food is located, weather conditions, age of animals, processing, respect, etc. For example, the word Imangaq in Yup'ik is translated into English as "black fish," a fish found within a particular body of water. The word Imangaq speaks to the education youth gain when taught how to obtain this fish, it speaks to the type and growth of vegetation within and around the waters and the connections that are held throughout the environment surrounding the Imangaq. When Imangaq is translated to English, it simply means black fish and the other information is lost. Another example comes from the Inupiaq language. In Inupiaq there are many ways to describe snow, one word to describe wet, another to describe sticky snow and others to describe the many other variations of snow. With each word, hunters, gatherers and travelers know when to go out and what locations are more favorable for travelers and hunting. English descriptions of snow are not as nuanced, and someone may just say, "It's snowing."

Further, language teaches us crucial concepts for maintaining food security. For example, Inataqtuaqunilluna savaaniqiqunniluna (do not hunt in excess; do not take more than you need) encompasses concepts of conservation, self- and cultural identity, responsibility, sharing and the importance of not wasting food.

Inuit **celebrations, feasts and games** support social, physical and mental health, self- and cultural identity, teamwork and additional drivers of food security. They provide a platform for other drivers of food security, such as drumming, dancing and singing. As people come together, food is shared, and life is celebrated. For example, recently during whaling season there was a limited number of open leads, leaving whalers waiting for days to go out and hunt. This created a lot of frustration among people, and so they held a dance to help set things right, to help everyone remember what they were doing and why they were doing it.

The consumption of food may occur among a small group of people or as a large feast. Such activities engage people in the environment around them and shape their understanding. These activities build patience, provide an educational platform for passing knowledge between generations, encourage respect for life and the environment, teach youth how to be within their environment, traditional management practices, the importance and practices of safeguarding the ecosystem, and the interconnections that lie between all parts of an ecosystem. Additionally we learn of the methodologies found within our IK, such as how to monitor and observe, what questions to ask of the environment, how to be safe and so on.

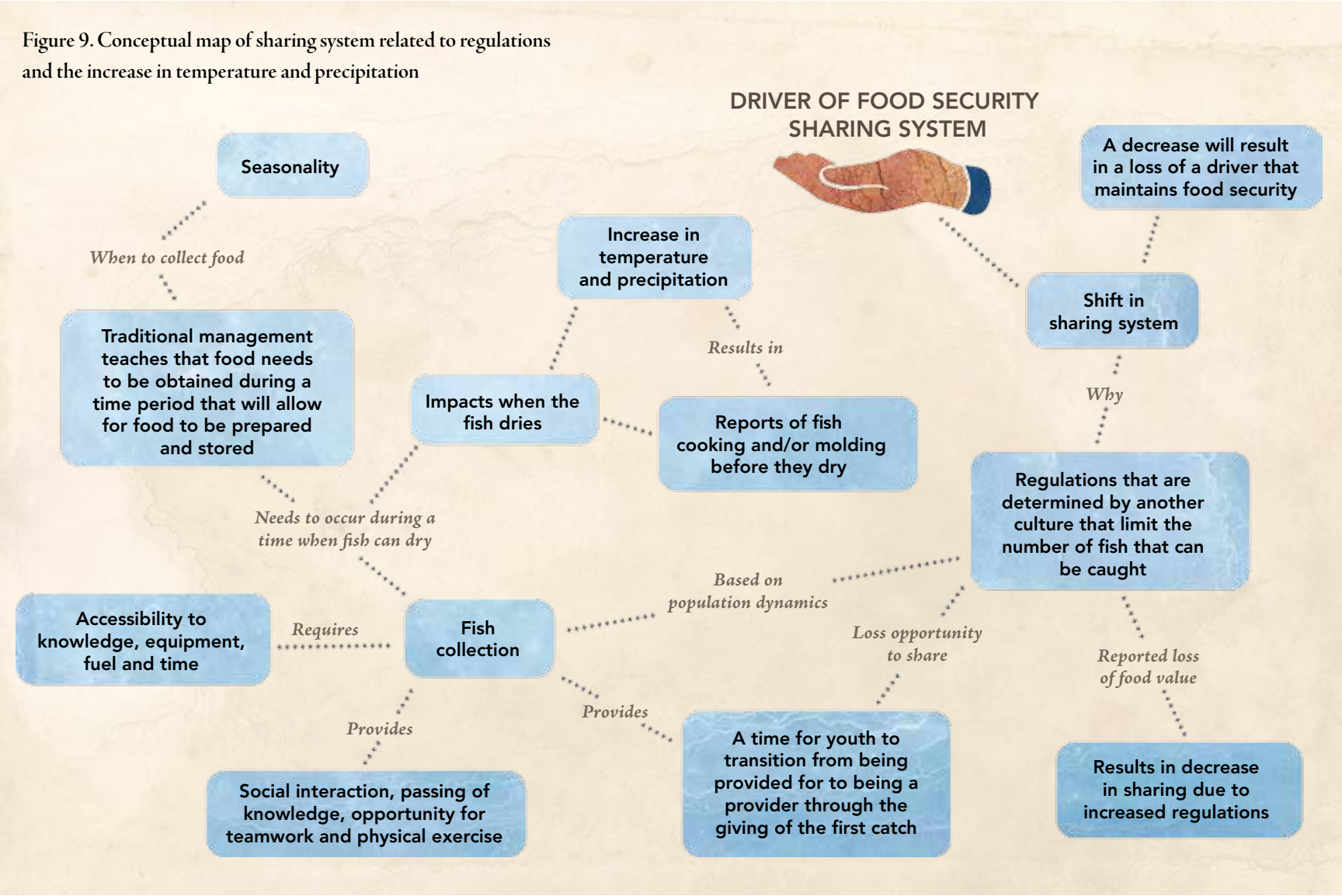
Given the spiritual and physical connection to traditional foods, it is easy to understand how Inuit self-esteem and cultural identity are tied to the entire ecosystem. This is seen in the practice of children being taught that the first animal they catch must be given to an Elder. An act that connects concepts of self-identity, education, language, knowledge of the environment, respect for animals, etc. A child's first catch is rooted in self-identity and serves as an activity that defines a new chapter in their life as the child moves from being a receiver to becoming a provider. Such activities initiate learning of multiple Inuit values, such as one's responsibility to care and have respect for the world around them and their community.

Social stability is maintained through knowledge transfer and food gathering practices. For example, during whaling season, the whaling crew comes together, then all the crews come together and then the entire village comes together to obtain the whale and to process the whale. Children are there to learn at every point. Many whaling captains will share that teamwork is the first thing to learn for whaling. Children begin to learn this when they are around five years old. They begin going out on the boat, watching the teamwork and preparing and putting away the whale with everyone to witness the food being shared throughout the region.

Inuit **sharing systems** are one of the strongest drivers for food security and are a part of our survival. Food collected and prepared is shared readily with neighboring villages, hub communities, other regions and with relatives who have relocated to urban areas. When a relative or friend expresses a craving for a taste of a type of food, it is important that they are provided with that food. A craving for traditional foods is both physical and spiritual. Sharing traditional foods keeps people grounded within their cultural identity and provides

Photos courtesy of Ronald Brower (top) and Jackie Cleveland (bottom)

Figure 9. Conceptual map of sharing system related to regulations and the increase in temperature and precipitation



access to healthy foods.

Today, sharing systems include activities of assisting others with acquiring their own food. This may be done through sharing of fuel or equipment. The sharing and trading systems allow for a variety of foods to be utilized across varying landscapes. For example, it is common for ugruk (bearded seal) oil collected from coastal villages to be sent to villages upriver.

A decrease in sharing systems is considered a driver of food insecurity when associated with a loss of value for traditional foods. An immense amount of time and energy is put into the obtaining of niqipiaq/neqpik (Iñupiaq word for traditional foods/the words for traditional foods in Yupiaq). Putting in this effort and level of care to obtain food is part of what is being shared when presenting traditional foods to others. For example, the sharing of one's first catch with Elders and widows demonstrates an understanding of the importance of the food being shared, the need to be part of a team and to care for all. Under this practice it is important to give the best of what you have and not to expect anything in return.

When this practice decreases, due to various reasons, the result is a loss of teamwork, a possible decrease in self- and cultural identity, a loss of nutrient-rich food for some and a shift in how the environment is viewed by those no longer sharing traditional foods. It is important to question how and why a decrease in sharing systems occurs. Some of our Elders have expressed a concern for the connection seen between a decrease in sharing systems and increasing regulations resulting from rapid changes occurring within the Arctic. Some of our communities are seeing people change in how and who they share with in reaction to tightening regulations created from outside our culture. For example, at times some community members are moving from providing for each other to sharing only with immediate family or requiring an exchange of cash for traditional food sources as opposed to sharing or trading.

The overall result of tightening regulations at times results in a cumulation of drivers, such as a decrease in the types and amounts of foods that may be provided for relatives and friends living within cities or to Elders and widows, burdens of conservation and pollution and shifts in animal migrations. Cumulations of drivers often result in a decrease of food insecurity. Figure five demonstrates the interlinking of drivers of food (in)security in relation to sharing systems.

The **transfer of IK** is a driver of food security. Food security and overall survival is attributed to what has been learned from our Elders through generations. Our ancestors knew everything around them – the land, the people, animals, water, wind, etc.

The transfer of IK begins in the womb and is stressed throughout all Inuit ages. Transfer of knowledge between generations may occur as early as birth, when a child is given their name. When a baby is named after someone, they take on the traits and behaviors of the person they are named after. Youth are often kept with adults through all activities associated with our food systems. For example, a toddler will accompany adults and Elders in setting a net for fish, in pulling up fish, in processing, storing, sharing and consuming the fish. The transfer of knowledge through such practices maintains food security and emphasizes the importance of continuing to educate our youth through watching and doing, by being with many adults as food is gathered, processed and stored. It also allows youth an opportunity to gain confidence in learning through other means beyond textbooks or laptops. This addresses concerns that youth are losing necessary skills, such as patience and listening, when they only learn from books.

A decrease in the transfer of knowledge leads to food insecurity with the loss of how to hunt, what hunting means, how to gather foods

and process and store them, of weather, ocean currents, and so on. For example, fewer people rely on and have lost a taste for fermented foods today because they have lost the knowledge of how to prepare it.

The transfer of knowledge is part of our education system. The transformation within the Inuit education systems began long ago with colonialism, forced boarding schools and in forced change in languages spoken from Inuit languages to English. Our traditional education practices, such as drawing, music, art, dance and the entire food system (gathering, processing storing and consuming traditional foods), have taken a backseat to the current formalized education systems of today. Additionally there is much more focus on the restriction of natural intelligence due, in part, to the impact of assimilation through education systems, neglecting to place high value on Inuit education.

As one of the contributing authors to this report, an Elder pointed out that the No Child Left Behind Act inadvertently left behind our children. As the U.S. endeavored to improve student preparedness across the U.S., some villages marked a decrease in the amount of days that youth were excused from school to hunt, pick berries or prepare food. This further marginalizes traditional educational practices and Inuit values. The participant went on to explain that this marginalization of Inuit values and education practices leads to further loss of self-identity and poor performance within the Western education system, resulting in the limited number of children graduating from high school and an even fewer number of students going onto college. The end results are youth unprepared for either environment.

Today there is an appreciation for both education systems to obtain and support food security. There is a need to create a balance in the current education systems and for youth today to have skills to make money while still being able to obtain traditional food sources. Here we stress the importance of obtaining both an Inuit and Westernized education. It is not necessary for children to have to choose between knowledge systems but instead harness what is needed from both. Though we recognize the need for both knowledge systems, there is concern for the lack of priority given to providing an Inuit education within the formalized education systems.

Photo courtesy of North Slope Borough

Availability – The ability of the Arctic ecosystems to maintain a high variety of life (biodiversity), allowing adequate transfer of nutrients and energy. It is the knowledge of seasons and how to collect, process, store and consume traditional foods, allowing for Inuit to eat what has been gathered from the previous season and harvest a variety of medicines.

Variety, commonly referred to as biodiversity among scientists, is a driver of food security. Variety maintains the strength of interconnecting ecosystems through the transfer of energy. Today there is a shift in the variety and abundance of animals and plants. Some areas are seeing an increase in types of animals, while others experience a decrease.

The diversity of species throughout the Arctic varies. Some areas host at least 102 species relied upon for the gathering, processing and/or storing of traditional food sources, while others have at least 82 species (Jones, A., 2006; Magdanz et al., 2010). In areas with less variety, the sources of food hold a higher cultural and ecological importance. For example, the village of Anaktuvuk Pass is highly dependent upon

Box 5. Actions to sustain and/or increase food security associated with Inuit culture

Education System/Passage of Knowledge

1. *Give equal weight to IK within the formal education system.*
2. *Fund Elders to continuously provide IK education within the formal education system.*
3. *Provide traditional foods within the formal education institutions.*
4. *Promote the indigenization of education frameworks to more clearly align with Inuit ideologies (ICC-Alaska, 2015).*
5. *Research, advocate for and promote the development, implementation and sharing of culture-based curriculum that focuses on students' identities as Inuit.*
6. *Promote education of Inuit languages.*

Sharing Systems

1. *Support the current Inuit sharing system through subsidizing the transport of traditional foods and medicines between villages, regions and across the state.*
2. *Adopt and support regulations that reflect and account for the sharing of traditional foods and medicines across space.*
3. *Develop community freezers to store traditional foods and medicines. It is suggested that such a program should provide youth with the responsibility of obtaining foods and medicines.*

Cultural Activities

1. *Continue support of cultural activities such as celebrations, feasts, dancing, drumming, singing and the creation of art through funding of programs that provide a platform for Elders and youth and for Inuit of differing regions to come together.*
2. *Encourage all within a given area to participate in cultural activities (including non-Inuit).*

caribou. IK within this area teaches that caribou is a key species to all other life around the area. If a decline in caribou occurs, there is a decline in animals throughout the trophic levels and overall health and well-being throughout the environment.

When the caribou migration is disrupted due to a combination of drivers, there is a large impact on the village. In 2013 the caribou herd stayed further north for a longer period than normal. Hunters were unable to travel north due to cost and accessibility. The result was no caribou for the drying season, fewer opportunities to share knowledge, language and nutrients, and a lack of social gatherings and sewing materials (sinew).

The obtaining, processing, storing and consumption of traditional foods brings people together, creating a strong social system and emphasizing family-oriented activities. This view constructs the value of food within each individual Inuit, each Inuit community and within each Inuit region over large events seen through a history of survival, multiple changes within the environment, famines and colonialism.

Before obtaining traditional foods, preparations must occur for travel and camping. Before processing food, items need to be collected and prepared. For example, in many areas driftwood is collected to create structures for food to dry on. In storing food, many steps have to be taken to ensure the proper storage of food sources (e.g., ice cellars must be continuously cared for throughout the year, rotting ice has to be cleared out and food being stored has to be turned). Some food sources are only stored after another food source is processed. For example, some greens are often stored in seal oil.

This type of knowledge must be learned through action and is required to learn how to adjust to any given situation. Consider food that is prepared and stored though aging, drying, brining and storing in seal oil, all of which occurs when temperatures are conducive to the process. Another example is the drying of fish. It is important to gather fish during a time of year that the air temperature will allow for the proper processing and storage of the fish in order to avoid any waste.

These examples emphasize a need to understand the calendar (seasonality) of a given area. Success in gathering, processing, storing and consumption of food requires a great understanding of variable weather systems. Knowledge of the calendar of a given area aids in adaptation to shifts within seasons. Figure nine provides a simplified example of a seasonal calendar for a village within the North Slope region of Alaska.

The North Slope Department of Wildlife Management's website lists approximately 84 different species of flora and fauna relied upon within the food systems of that region (Bird Identification, 2015; Common

Figure 10. Simplified seasonal calendar for a village

Species	June	July	August
Fish	X	X	X
Birds	X	X	X
Berries			X
Furbearers			
Caribou	X	X	X
Polar Bears	X		
Seals	X	X	
Walrus	X	X	X
Bowhead Whales	X	X	X
Benthic Animals	X	X	X

Plants of the North Slope, 2014; Alaska Wildlife Notebook Series, 2014). In documenting a seasonal calendar, all species within a food system should be included. While the table in figure nine demonstrates seasons when food is collected, it would be advisable to also include the season in which tools are collected that are necessary to process and store food.

When considering the dimension of availability, it is important to pay attention to connectivity and cumulative impacts from combined drivers. For example, availability is inhibited by environmental contaminates, the impact of global climate change on ecosystems (Power, 2008) and other drivers identified under stability. We are experiencing changes in weather and many areas are experiencing an increase in climatic variability (e.g., increase in storm surges). Most of our activities are controlled by the weather.

For example, increasing air temperatures are making it difficult to dry fish. Sometimes the fish cooks before it can dry (cooked fish cannot be stored as long as dried fish). With rising temperatures, loss of ice cellars and permafrost, new ways of storing food have to continue to be explored, such as drying fish within homes. However, the knowledge of some alternative practices is not being relied upon as heavily. For example, fermenting meat and fish is a good way to store food (it is also highly nutritious). This example demonstrates the importance of documenting our practices and continuing to teach our youth through doing so that they will also be able to explore new ways of storing food in the future.

Accessibility – *The ability to live off the land, ocean and air and to obtain sufficient access to a diverse source of healthy food, water, animals, plants, fish, ice, etc. The ability to maintain Inuit traditional economic practices, such as trading, sharing and providing foods and medicines. It is the ability to access and maintain an economic system based on cash in connection to an Inuit traditional economic system. It is the ability to obtain skills, tools and technologies needed to collect, process and store traditional foods.*

On the surface, **Inuit traditional economy** includes trading, bartering and sharing. Underneath the surface our traditional economy includes the giving of a first catch to Elders, providing for those who are unable to provide for themselves and management strategies – linking economics firmly to the Inuit culture dimension of food security.

Box 6. Actions to sustain and/or increase food security associated with availability

1. *Support documentation of traditional recipes and preparation processes. Note: such documentation cannot replace being taught by an IK holder and/or actively "doing" to learn but could be used as a tool.*
2. *Support learning how to make tools and utilize flora and fauna to create clothing.*
3. *Aggregate documentation of ways and methods for obtaining, processing and storing all food sources throughout the four Alaskan Inuit regions. Establish community programs for passing on this knowledge and encourage use of knowledge.*
4. *Aggregate documentation of medicinal plants and foods throughout the four Alaskan Inuit regions. Establish community programs for passing on this knowledge and encourage use of knowledge.*
5. *Encourage understanding of Inuit calendars (seasonality) within a given area and associated activities for the obtaining, processing, storing and consumption of traditional foods.*
6. *Adopt and support regulations that reflect and account for the consumption of traditional foods and medicines within education institutions and hospitals.*

Many of these systems, such as sharing systems, have assisted in maintaining food security throughout our history. Today it is commonly understood that we use both traditional economic and cash economic systems. However, there is less understanding of the connectivity between these two systems and the need for both. Cash is needed to purchase equipment for transportation and to pay for high fuel costs and household bills, such as electricity. There is a need for boats, motors, snow machines, guns, bullets and other materials for the gathering, processing and storage of traditional foods.

The combination of these two economic systems support food security. These tools and resources are becoming increasingly important. We are having to travel further distances to gather food due to shifts in animal migrations. As ice cellars become less reliable, there is an increased need to depend on freezers, etc. Utility costs, such as electricity and fuel for heat, require cash.

However, we continue to rely on sharing, barter and trade to decrease the stress of not being able to obtain food. Yet, a combination of drivers, primarily resulting from shifts in the stability and decision-making dimensions of food security, is resulting in economics acting as a driver of food insecurity. Today, we are often faced with difficult choices in determining what food to provide for our families. For example, it is not uncommon to have to make a decision between hunting for food, which may result in nothing, or buying food from the store (regulations on timing exacerbate the difficulty of making such decisions).

Ways of obtaining cash within rural areas is interconnected with drivers within the Inuit culture dimension of food security. The transfer of knowledge and art is an important component to being able to use both a traditional and cash economy. Many people rely on different vegetation and parts of animals to create art. This expression of culture is important to our culture. The selling of art provides the cash needed

Photos courtesy of Mary Sage (left) and Jacki Cleveland (right)

to obtain resources to collect food.

The practice of creating and selling art is becoming challenging within some areas of Alaska. Not long ago more people utilized carving and sewing skills to create art and goods that could be sold for cash. Today, there is a decrease in the transfer of knowledge to build skills. This is, in part, attributed to the education system and contemporary regulations that may impede the sale of materials used. For example, Inuit artists once used owl feathers for making dance fans and headdresses. Current regulations and statutory bans on the use of owl feathers require alternative resources to be used, such as turkey feathers. This results in a decrease in knowledge of how to respectfully obtain and use owl feathers.

In considering both Inuit traditional economics and a cash economy, one has to consider economic practices through regional, national and global practices. For example, consider what food is available to eat within a given area and consider the cost of that food throughout an entire ecosystem (through all food security dimensions). What does it cost for a hot dog to be sold at a store in a rural village, what are the associated long-term costs associated with the transportation of that hot dog and what are the trade-offs in relying on that hot dog for nutrients and calories as opposed to traditional food sources (Carolan, 2012).

Such questions require a deeper look into federal and global subsidy programs that inadvertently create large imprints on global and regional ecosystems. Alternatively, subsidies could support culturally appropriate, regional, traditional food sources – programs that provide subsidies for fuel, bullets or other resources needed to gather, process and store traditional foods.

Accessibility is closely interlinked with availability and decision-making power. High expenses associated with hunting coupled with regulations often results in a decrease in accessing animals. Hunting is often regulated by government agencies through timing windows and areas where hunting may take place. These regulations may conflict with our IK and/or require hunters to travel farther from a village to obtain food.

Oftentimes sports hunters have greater access to animals through the use of helicopters and other equipment to access remote areas – a luxury that many of us are unable to afford. The non-local sports hunters further decrease our hunting success through lack of knowledge. For example, non-local hunters will often hunt north of Anaktuvuk Pass, scattering the caribou herd and causing a change in their distribution pattern. The caribou are then diverted from traditional migration paths located near the village, creating increased difficulty for local hunters to harvest.

Current regulations often result in a hardship on our culture by inadvertently or intentionally decreasing our accessibility to food sources. Regulations developed by federal and/or the State of Alaska do not reflect the flexibility and the shift of food source availability in times of need. For example, for the past few years a community had limited to no access to marine mammals due to unfavorable ice conditions. Hunters were unable to hunt animals at the time of migration. It is crucial for the hunters, for the village, to then depend on other food sources.

Overall, accessibility to traditional food sources may be impeded by multiple drivers and additional stressors, such as a decrease in transfer of knowledge, lack of fuel, access to transportation, time constraints, loss of language, change in animal distribution caused by research activities, sport hunters and /or industrial activity, regulations that conflict with traditional practices, limited access to traditional lands, extinction and decreased density of plant and animal species, changes

in animal migratory patterns, lack of money for expenses related to hunting and fishing, not having someone in the family to harvest, and/or disincentives (factors, particularly financial disadvantages, that may discourage) to harvest the are built into social assistance programs (Power, 2008).

Box 7. Actions to sustain and/or increase food security associated with accessibility

1. *Provide culturally appropriate subsidies that support environmental health. (e.g., bullets or fuel).*
2. *Increase understanding of change in use patterns and ensure priority of access to traditional areas is maintained.*
3. *Increase communication on potential shocks, quick shifts in weather, information generated from scientific research conducted within a given area and between scientists, decision-makers and IK holders.*
4. *Document all that may impede accessibility (e.g., policies, limited access to traditional lands and waters, loss of knowledge, lack of economic resources, regulations, etc.).*

Health and Wellness – *Physical health of all life within the Arctic and of the land, water and air; adequate passage and absorption of nutrients throughout the Arctic ecosystem; mental health related to community and household relations and self- and cultural identity; environmental integrity and productivity to withstand pollution, habitat destruction and other disturbances.*

Drivers listed under the **health and wellness** dimension are drivers of both food security and insecurity. As discussed under the previous drivers, an accumulation of disturbances and/or drivers of food insecurity may result quickly in creating or exacerbating one of the drivers of food security to one of food insecurity.

Mental health is a driver of food security. The practices of obtaining, processing, storing and consumption of food, celebrations, feasts and games, sharing systems and providing for others all support both physical and mental health. These activities also strengthen any drivers listed under the Inuit culture dimension of food security. One of the largest potential threats to mental health comes from the severing of an individual or group from the environment around them or from key cultural practices that self- and community identities are based upon, in addition to a loss of control over ones own fate.

When such relationships are severed, our IK, worldviews, values and practices related to these relationships and other aspects of the food systems erode over time. Severing us from the environment that we live in began long ago through forced assimilation policies, such as sending children to boarding schools, changing children's names, not allowing us to speak our languages, condemning dancing and drumming and the discouragement of other cultural activities. The historical traumas forced upon our ancestors have been passed down through generations and continue to impact us today.

The connection between access and self-identity are so closely intertwined that when that connection is severed, it is understood to weaken the individual and family, resulting in boredom, alcoholism, welfare, crime and suicide. This is explained by our Elders through an understanding of self-worth and overall identity to be part of the environment in which you live through a relationship with all of life, land, air and water and to provide for those around you.

The erosion of healthy food systems and overall health is a driver of food insecurity and may further exacerbate the mental health as a driver of food insecurity. The erosion of healthy food systems and physical and mental health may be caused by numerous stressors and is multiplied by cumulative impacts. Today there is a high concern for growing cancer rates, diabetes and other chronic diseases that are understood to be a result of multiple stressors, such as pollutants, decreased access to traditional foods and decrease in physical activity associated with obtaining, processing and storing food, mixed diets, etc.

When addressing Inuit physical and mental health, it is important to discuss accessibility to traditional and non-traditional medicines and care providers. The importance of maintaining knowledge of traditional medicines and access to healers cannot be overstressed. Of equal importance is access to non-traditional medicines and care providers. Ideally the two would work together to address physical and mental needs within a given area.

Today, there are concerns related to when and where we have access to either sources of medicines and/or care providers. Here, it is important to remember that traditional foods are our medicine. For this reason, it is important to maintain access to traditional foods when receiving medical care outside a community.

Health is further supported and maintained through the passage of knowledge. For example, knowledge of how to correctly process and store food throughout our food systems is crucial to maintaining physical health. Culturally appropriate housing structures are understood to aid in the passage of knowledge and correct processing and storage of some foods. Consider that a good housing structure will have appropriate room for drying food and good ventilation. Housing structures may be a driver of food security when designed with IK and science to be energy efficient, account for cultural activities and support the overall Inuit food systems.

Photo courtesy of Jackie Cleveland

Photo courtesy of Jenny Irene Miller

Additional impacts on physical health include mixed diets of traditional and non-traditional foods that leave out important attributes such as nutrients and/or roughage. For example, there is a decrease in the consumption of caribou intestines. Caribou intestines act as important roughage that assists in maintaining health of the colon. Greens from a given area additionally maintain health of colons. Non-traditional foods that may be purchased from the store will also maintain the health of colons, such as fresh vegetables.

It is important to note that such examples will only occur through a combination of food (in)security drivers, such as loss of knowledge and decreased access to food sources. Additionally, it is important to note that there are many other factors that are believed to result in chronic diseases impacting colons and overall physical health, such as contaminants.

Nutrition, nutritional values and the ability to absorb nutrients are drivers of food security. Traditional foods are nutrient dense and support physical health. Within the topic of nutrients, we may also consider overall hunger and what hunger means. Traditional foods are understood to provide more energy over a longer period of time than non-traditional foods. This needs to be considered when assessing levels of hunger through questions regarding the frequency in which people eat.

Many of our Elders have experienced some level of famine and the associated pain within living memory. For some, it is believed that they have a responsibility to the Arctic environment because our culture has survived these famines. This demonstrates an interconnection between hunger, nutrients, the value of food, self-identity and responsibility.

The environmental strength and productivity to withstand pollution is a key driver of food security. Pollution comes in many forms and may be generated from within a region, nationally or globally. Key pollutant concerns today include contaminants to the air, water and land resulting in an increase in vulnerability to disease and viruses throughout the Arctic ecosystem.

Over the past few years, there have been many discussions regarding abnormalities in animals and sick animals. Throughout all our villages there are increasing reports of animals with sores, changes in meat texture and color, increased vulnerabilities to parasites and deformities, changes in the texture and color of animal livers and

Photo courtesy of Amos Oxereok

people becoming ill after consuming the livers. There are reports of drops in population, incidences of large numbers of animals found dead due to various reasons, whales beaching themselves, and marine mammals entangled in ghost gear (gear left behind in the ocean waters). The pollutants briefly discussed here are interconnected with the stability dimension of food security.

At times the lack of information or limited information shared has impacted village decisions in ways that affect food security. For example, upon pulling up many fish with sores and parasites and seals with hair loss and sores, some people within a village opted not to obtain fish and/or a seal for that season. Though our IK informs us of when to discard food, limited information at times may cause uncertainty. By not depending on their own IK and with the limited sharing of information, the result was less nutritious food for those families. This also led to fewer opportunities for youth to learn how to obtain and process those food sources.

Additional concern is in the increase of noise and light pollution within the Arctic, such as increasing shipping activity. Based on our IK, we have explained that a great deal of reported changes in animal behavior toward each other (with other animals and with humans) are, in part, a result of noise and light pollution.

Some pollutants are being generated within the regions and may be worsened through poor sanitation and waste systems. Sanitation and waste systems (such as landfills) are understood to often be a driver of food insecurity. Many sanitation and waste systems have been placed in locations that lead to the contamination of freshwater resources and/or a contamination of the food chain. Additionally, concerns arise when particles from these systems are blown throughout a village, which oftentimes results in more effects in villages where introduced roads are resulting in large amounts of dust being blown throughout the air.

Incidences of sanitation systems discharging waste and chemicals used processing water systems have resulted in a decrease in life (fish and vegetation) within the direct area. Similar concerns lie with possibly faulty landfill technology that is resulting in links of contaminants into the environment.

Box 8. Actions to sustain and/or increase food security associated with Health and Wellness

1. *Provide culturally appropriate subsidies.*
2. *Develop housing architecture in collaboration with IK holders and focus on cultural and village needs, energy efficiency and ventilation. For example, the University of Alaska Fairbanks Cold Climate Housing Research Center has developed a strong process for working with Alaskan Inuit communities through a participatory approach.*
3. *Determine the location of sanitation systems and landfills in collaboration with IK holders.*
4. *Continue the monitoring of contaminants associated with sanitation and landfill systems.*
5. *Monitor flora and fauna using both IK and scientific methodologies.*
6. *Implement an active communication of pollutants system.*
7. *Mitigate persistent organic pollutants (POPs) and other contaminants generated from outside the Arctic but that have an impact on Arctic ecosystems.*

Photo courtesy of Julie Raymond-Yakoubian

Stability – *The ability of the puzzle pieces (systems) to adjust to each other as shifts within the ecosystem occur. The ability to maintain sustainability through the management o human actions that support and ensure younger generations will have sufficient healthy food to harvest and that all the pieces of the puzzle maintain connected. Stability is obtained through a level of Alaskan Inuit mental security and is in reference to the legal protections for the environment against harm caused by pollutants. Mental security is also in reference to legal protection against forced assimilation, which allow for the maintenance of a level of cultural confidence and hope.*

Stability directly relates to the rapid speed of change and cumulative impacts. The discussion of this dimension is centered on the changes driving food insecurity the occur within flora and fauna, biogeophysical processes, changes resulting from climate change and those resulting from industrialization. Again, the attributes of these changes are considered drivers of food insecurity when combined with multiple other drivers. For example, industrial activity within the Arctic is not listed as a driver of food insecurity. However, when coupled with lack of decision-making power, disregard for our values, lack of use of information generated through IK and lack of involvement of IK holders in the development, activities lead to negative impacts on food systems.

In considering this dimension, it is important to remember that IK teaches us that this environment is continuously changing and we are well-adapted to adjusting to changes as they occur. Today's concerns are not central to the idea of change but to the rapid speed of change and/or the cumulative impacts driving the changes. The key to adaptating to rapid change is decision-making power.

Ecosystem stability speaks directly to the resiliency of interconnecting systems. The **integrity of interacting systems (marine, terrestrial, cultural and social-ecological, etc.)** is a driver of food security. IK teaches us that the greatest points of vulnerability lie at the interface of these interconnecting systems (these puzzle pieces). Given the connective nature of the Arctic ecosystems, if the connections between systems weaken beyond a point that adaptation may occur, food security will be threatened.

Consider the rapid changes resulting from climate change: changes in sea ice coverage, thickness and timing of formation, decrease in multi-year ice, melting permafrost, increase in erosion, freshwater lakes and ponds drying up, change in water and atmospheric mean temperatures, changes in hydro-systems (shallowing of waterways, narrowing and widening of streams, etc.), change in precipitation rates, increase in storm surges, increase in flooding, ocean acidification, change in salinity levels of ocean and brackish waters, shifts in saltwater lines, increase in freshwater flooding, change in ocean micro-current, increase of vertical stratification occurring in near-shore ocean waters, and shifts in sandbars. Many of these changes are interlinked with each other.

These changes in land, air and water characteristics (abiotic features) contribute to changes in all life found within the Arctic. For example, shifts in animal migration patterns and shifts in vegetation are occurring as a result of changes in temperatures, salinity levels, precipitation rates, snow coverage, soil integrity (erosion), ice coverage, etc. Such changes require adjustments in gathering, hunting and fishing strategies. Additionally, we face new dangers as we attempt to navigate

Photo courtesy of Julie Raymond-Yakoubian

through storms with increased intensity, rotting ice, timing of sea and/or river ice formation and change in ice thickness.

In some locations ice used to freeze up to 10-feet thick, but today it is only five-feet thick; where once freeze-up occurred by October, it is now occurring around November, limiting transportation, fishing and hunting. Another example is the melting of permafrost linked to increased erosion and the drying of lakes and ponds. Many of these changes began to occur between 15 and 20 years ago. However, the rate and intensity of these changes has increased in more recent years.

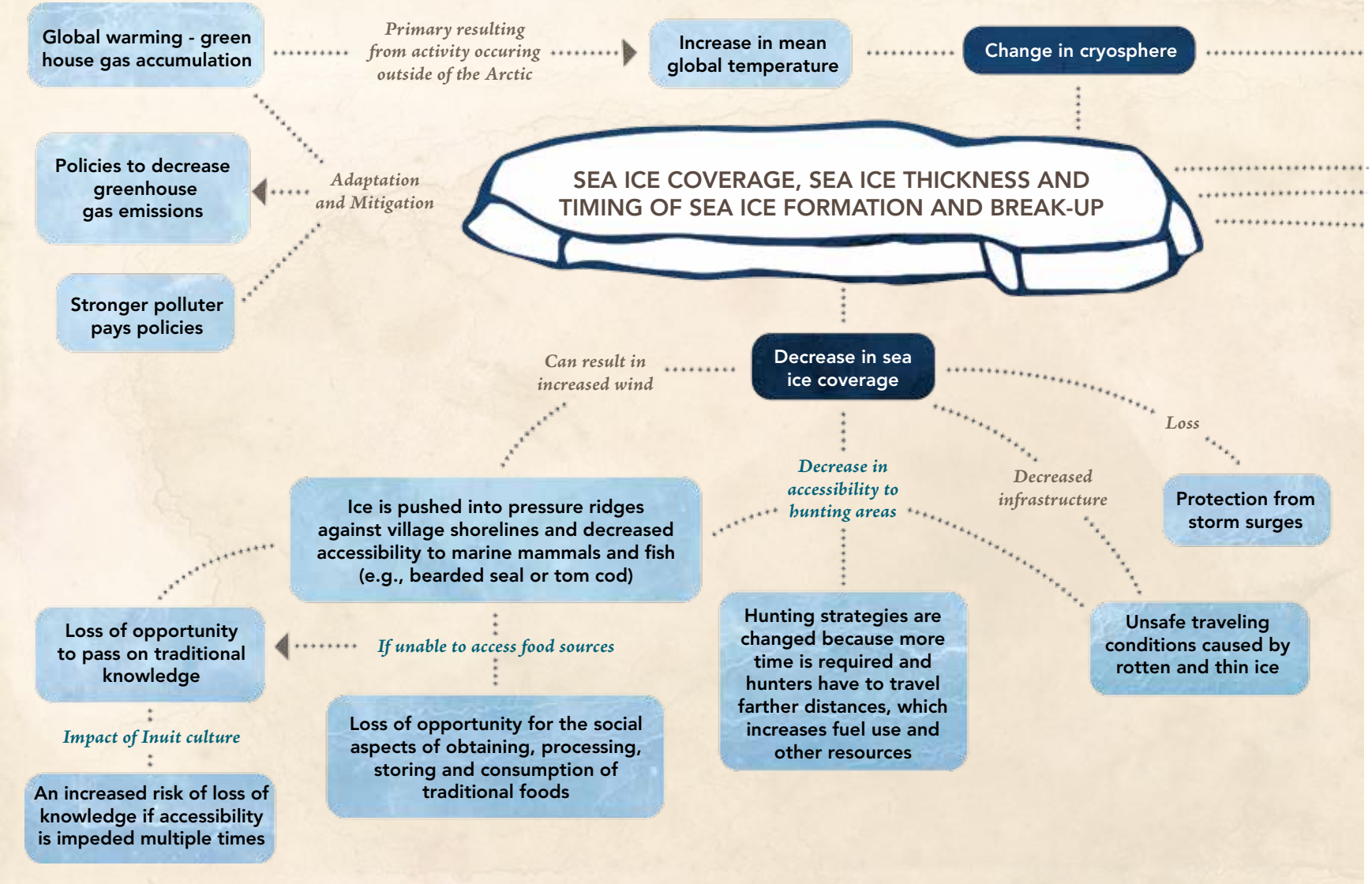
There is an understanding that there is a link between these changes, species distribution and well-being. As indicated before, our IK concentrates on the interconnections within the environment. With this in mind, IK stresses the need to consider how changes within one system will impact another. For example, changes in sea ice coverage, thickness and timing of formation cause changes in ocean currents, intensity of storms, increase storm surges, distribution of marine flora and fauna, prey dynamics (shifts in food web dynamics), accessibility to hunting locations, and traveling and hunting safety, all of which require adjustments in hunting and processing strategies. This chain reaction also occurs within the terrestrial environment.

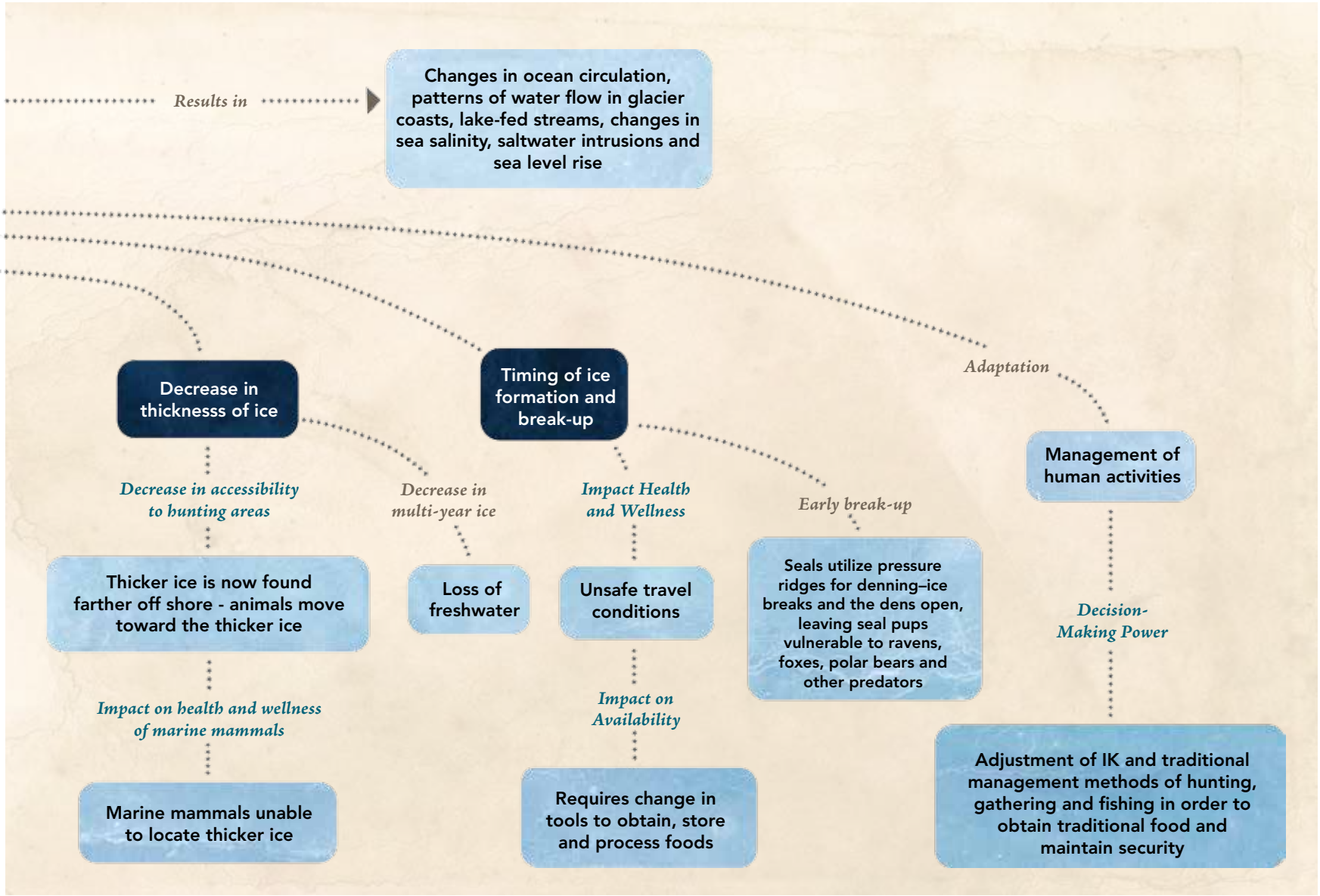
To understand the impacts of physical changes on the dimensions of food security, it is necessary to identify interlinking components. Figure 11 shows the cumulative impacts of changes in sea ice coverage, thickness and time of formation on the interconnected dimensions of food security. The figure demonstrates a simplified example of the relationship between a driver of food security listed under Stability and the other dimensions. In reviewing the conceptual map, it is important to ask where points of lost resilience may lie. Remember, IK teaches us that the points of vulnerability will be within the relationships between and at the interface of the connecting points.

Additional drivers of food (in)security listed under stability may exacerbate the impacts, or disturbances, resulting from changes in sea ice coverage, thickness and timing of formation and break-up. For example, sea ice has been an eco-barrier to the Arctic for thousands of years. The decrease of this natural barrier is resulting in many opportunities and potentially

Photo courtesy of Amos Oxereok

Figure 11. Changes in sea ice coverage, thickness and formation: cumulative impacts on interconnected dimensions of food security




Results in
Changes in ocean circulation, patterns of water flow in glacier coasts, lake-fed streams, changes in sea salinity, saltwater intrusions and sea level rise
Decrease in thicknesss of ice
Timing of ice formation and break-up
Adaptation
Management of human activities
Decrease in accessibility to hunting areas
Decrease in multi-year ice
Impact Health and Wellness
Early break-up
Thicker ice is now found farther off shore - animals move toward the thicker ice
Loss of freshwater
Unsafe travel conditions
Seals utilize pressure ridges for denning–ice breaks and the dens open, leaving seal pups vulnerable to ravens, foxes, polar bears and other predators
Decision-Making Power
Impact on health and wellness of marine mammals
Impact on Availability
Marine mammals unable to locate thicker ice
Requires change in tools to obtain, store and process foods
Adjustment of IK and traditional management methods of hunting, gathering and fishing in order to obtain traditional food and maintain security

negative impacts, particularly when connected with lack of decision-making power. Consider that a decrease in ice coverage allows for an increase in extractive industry, shipping and tourist activities. These three activities are not immediately considered a disturbance to the Arctic ecosystem and food security, except when conducted with a low understanding of Arctic interconnecting systems, Inuit food security and a lack of involvement of IK holders informing how and when activities should take place. An associated decrease of involvement and a perceived decrease in fate control leads to a loss of Inuit mental security.

Mental security, under the stability dimension, stems from our confidence in the respect and priority given to our value system. The number of policies that support our food sovereignty and decisions made by or with us within a given area are often a strong indication of our involvement in how development and new activities occur. Additionally, the number of policies that aim to safeguard the Arctic from pollutants and/or activities that result in forced assimilation must be considered.

A cumulation of changes and the rapid speed at which they are occurring are resulting in a decrease in stability and overall resiliency. For example, melting permafrost is resulting in a loss of transportation infrastructure, loss of summer camps used for collecting, processing and storing traditional foods, loss of sources of freshwater as lakes and ponds dry up, increased sedimentation in waterways and instability of housing structures and gravesites. Also consider that these stressors are resulting in changes in animal behavior and migration patterns; animals' increased vulnerability to parasites, viruses and infectious diseases; drastic drops in some species populations; decreases in vegetation and/or physical loss of accessibility to vegetation; a decrease in sources of nutrients as some animals become inaccessible; increases in climatic variability with more storm surges, shifts in water lines and increased incidents of flooding; and increases in dust blowing throughout villages with the associated impacts of spreading contaminants throughout villages and onto food being processed. As mentioned frequently throughout this section, all of these changes are intensified by a decrease or lack of decision-making power.

Box 9. Actions to sustain and/or increase food security associated with Stability.

- *Use the food security conceptual framework as a guide to document current and future impacts of increasing ship traffic in the Arctic.*
- *Support research focused on gaining a stronger understanding of the changes occurring within the physical elements of the ocean in association with changes in food web dynamics.*
- *Allow for flexible policies. There is a need for ecosystem-based policies and IK management utilization to support adaptability and the health of the ecosystem.*
- *Support and encourage an increased understanding of socio-ecological systems to provide a greater understanding of how to support the health of all within the Alaska Arctic.*

Decision-making Power and Management – *The Alaskan Inuit ability to use and value IK to manage daily activities; to build and rely on self-governance across space and time; for Alaskan Inuit to use their knowledge system in synergy with other knowledge systems, such as Western science, to equitably manage human activities within the Arctic environment and to better understand changes occurring; to apply holistic knowledge to understanding the Arctic environment through Inuit IK philosophies and methodologies; to manage activities within the Arctic in a way that ensures younger generations will have healthy and nutritious foods to harvest; for Alaskan Inuit to have control over their own fate and to use their cultural value system.*

The ways in which traditional food sources are obtained and managed is a driver of food (in)security through both direct and cumulative impacts. We have had our own management systems for thousands of years. There is a need for Outside cultures and government agencies to work with us through recognition and respect of our IK, and traditional management systems and to recognize the importance of self-governance.

The combination of food security dimensions is what is used to determine if food security exists. In this respect there is frustration over the lack of authority that we hold to address the many drivers of food insecurity. In some cases, the need to make decisions is at a local level, such as being able to use traditional management practices for hunting walrus or deciding what children are to learn daily (hunting and education are drivers of food security). In other cases, the food security driver is on a global scale, such as the distribution of pollutants. At all scales, it is important to consider what it means to not have decision-making power.

There are multiple reasons for and a long history of decreasing decision-making power due to colonialism. Today we face uncertainty in a management system that is fragmented among the Alaska state, U.S. federal government and international agreements. This fragmentation occurs across multiple agencies and, at times, within one governing system. We are left with decisions and policies made outside of our culture and oftentimes outside of Alaska. These decisions are often based solely in Western science ideology and are not place-based. This top-down, fragmented approach to management forces us to use another culture's standards to live within the Arctic and dismisses our IK and our way of living. These frameworks within which decisions are made are not transparent, and traditional ways of managing are not usually considered. Current policies and decisions often leave us and the entire ecosystem forced into a box that does not belong here.

Decision-making power allows us to determine the best courses of action under any given circumstance using our IK and value system. These decisions may be as simple as what to buy from the store or as complex as determining the amount of fish to harvest. The lack of decision-making power holds a deep psychological impact on individuals and our culture as a whole. Consider the following statement:

"During the 4th of July celebration in the city of Bethel, in any given year, you'll see food vendors from various cultures selling their food to a large Alaska Native base of customers. Meanwhile, Alaska Native people selling fry bread, agutaq or any other cultural food are on the outskirts due to the colonial regulatory system that bars healthy, wholesome food from being sold in a legitimate cultural setting. We are strangers in our own homeland!" – (Food Security Advisory Committee member, 2015.)

The impact of the inability to decide what food will be sold or what food options we are able to buy adds to a long list of ways that our decision-making power and fate control are impeded. The importance

of understanding the connection that lies between cultural value systems, the development of policies and decision-making cannot be understated. Cultural value systems inform how we view the world and what type of information we require to make decisions in managing human activities.

Drivers found under a lack of decision-making power are **burdens of conservation and pollution,** increases in competition and **user conflict**, taxation without representation, representation with minimal understanding of Inuit culture and Arctic ecosystems, lack of respect for and equality of knowledge systems (IK and science) and meaningful, equitable involvement in research.

As previously stated, we have always had self-management mechanisms. This is most noted in the common statement, "We don't take more then we need." Within this statement is the understanding that people take only what they can process, store and consume, always leaving enough for the continued respect for the rest of the environment around them.

Consider that during whaling, multiple crews will go out together; once a whale is struck by one crew, all other crews will assist in bringing the whale to shore. A cease-fire is called once the number of whales that can be processed within a given time have been obtained. Within the Barrow area it has been determined that three whales is the maximum that can be processed and stored within a given time period. This example demonstrates that the phrase "don't take more than what is needed" is not based on arbitrary numbers and is aligned with conservation, respect and socio-ecological beliefs within the Inuit culture.

This management practice is used in the collection of all food sources and must consider not only how many people are required and available for the processing and storing of food but also the environmental conditions required for these steps. When collecting salmon, no more is taken than what can be consumed immediately, dried, salted or stored through other practices. Given the increase in weather variability (many activities are driven by weather), storm surges and precipitation, it is important to obtain the fish during a time that no waste will occur during the processing and storing activities. Other aspects that must be considered are when cash is available for fuel; the time available; opportunities to gather additional foods at the same time to decrease efforts; and the most appropriate time for the fish to be

caught based on its health and nutritional value. All of these factors must be considered and often require quick, adaptive decisions. If we are not allowed to make these decisions due to enforced regulations based on a combination of differing factors, the result is food insecurity.

For example, IK teaches that seasons are determined by weather, animal migrations, changing plants and activities to gather food. Harvest windows for species like salmon are regulated by resource management agency calendars. Today, the timing of when to obtain food is more complex. As explained above, gathering fish should occur during a time that weather ideally allows for drying. For example, in the Yukon-Kuskokwim Delta, the best drying cycle for salmon is during the latter part of May to early July. During this time, the temperature is warm enough to dry fish without cooking it. Later in the summer (late July and August), fly infestations begin to occur and will lay larvae in drying fish, spoiling the harvest.

Additionally, traditional management teaches us to obtain some animals during times of the least stress. For example, it is best to obtain an animal after it has been feeding, not while it is feeding. Timing set by

Photo courtesy of Amos Oxereok

our IK is systematic. Applying a food security lens to the environment allows for quick, adaptive management with an inherent ecosystem approach to management.

There are many examples of Inuit traditional management practices: when an animal is unhealthy, the hunter must let the animal sink so that its body will feed back through the food web; when one fish species is low or an animal population is low, it is important to not add more stress to the animal and to seek different food sources; the seas and waters must be protected and in good health to protect the animals so that they will come back; we must protect important areas such as haul out areas, breeding grounds and animal food sources; we must teach children from a young age how to be within their environment and how to respect it; and we must not harvest birds while they're young or while nesting.

Concerns today regarding lack of decision-making power extend beyond direct impacts to us and include concerns for decisions made based on missing information, wrong information and/or other value systems that result in harm to all Arctic life. Consider regulatory decisions that provide sports hunters with more permits to obtain muskoxen than Inuit within a nearby village; consider regulatory decisions to decrease Inuit take of salmon while allowing large by-catch numbers within the Alaska pollock industry; consider funded research initiatives concentrated on economically viable species as opposed to entire habitats. Such decisions also result in **user conflict,** a driver of food insecurity.

User conflict is a growing concern when non-Inuit activities result in stressing animals, shift in animal migration patterns, disrespectful waste of flora or fauna, and trade-off decisions made by non-Inuit (such as federal or state governments, tourism organizations, scientists or environmental organizations) that support non-Inuit values at the cost of our values. Such conflicts may also stem from **representation with minimal understanding of Inuit culture and overall Arctic ecology,** a driver of food insecurity. **Respect for and equality of knowledge systems (IK and science) and meaningful, equitable involvement in research** is a driver of food security. A clear understanding of the Arctic ecosystems, inclusive of our culture, is necessary, as well as understanding the need for information from IK and the involvement of IK holders to inform decisions made across scales (global, national and regional). With the use of both IK and Western science, we will gain a stronger understanding of rapid changes occurring within the Arctic and ways of mitigating negative impacts.

The **burden of conservation** is being created as the activities of those outside of the Arctic cause negative impacts to animals, plants, water, air, land, etc., and we are expected to adjust our actions, ways of engaging within our environment and food sources. Decisions that favor other cultural value systems[4] often lead to regulations that result in the burden of conservation imposed upon us.

Here again, one may consider the regulations imposed upon the gathering of salmon versus the amount of salmon by-catch allowed within large-scale industry activities. An additional example is seen in the response to a decrease in sea ice and the potential threat that this holds for some species of marine mammals, such as walrus. If walrus hunters are limited in their hunting activities or required to stop hunting, as opposed to working to eliminate the cause of decreasing ice,

[4] Consider the "Malawi principle" of the Convention on Biological Diversity: "The objectives of management of land, water and living resources are a matter of societal choice." This relates to how cautious we like to be or how much risk we are willing to take when it comes to use and management of living resources and nature in a fluctuating and changing climate and environment. The choices we make are in the end value-based and reflect our basic attitudes to Nature, God and the big existential question of "the meaning of life."

we will be left holding the burden of conservation.

Similar situations are seen within the **burden of pollution.** There are many negative impacts of pollution generated outside the Arctic. This is witnessed as debris is carried through currents up to the Arctic. Or more seriously, as contaminants such as mercury are carried throughout the Arctic food web.

The cause of decreasing ice coverage, increasing erosion (leading to a loss of summer and winter camps and decreased accessibility to food sources such as berries,) changes in prevailing winds from west to southwest, soot accumulation on snow and glaciers, rising waters and shifts in sandbars, etc. are all attributed to actions occurring outside the Arctic. Areas where pollution is being generated are home to cultures whose values are determining what is to occur within the Arctic. There are many who are frustrated with the limited, secure avenues to address these threats, and there are grave concerns that we are being left with few options to prevent becoming refugees in our own homes.

Tools Needed to Obtain and Sustain Food Security

Policy, Co-management and Knowledge Sources

Policy

Regional, national and international policies that support the protection of our rights, give priority to our traditional territories, and adopt IK philosophies into the interpretation of current and new policies that support food security. Such policies may include legal protections from pollutants, stronger polluter-pays policies and polices that support and encourage the use of our languages and guard against forced assimilation.

Many of our concerns today revolve around current regulations that have resulted from the mismanagement of human activities and a desire to over-control and alter the environment. The impacts of creating laws and regulations without including IK are decreases in animal health, an oversimplified understanding of system interconnections and cumulative impacts and a decrease in social cohesion through the interruption of practices that bring villages together.

Box 10. Actions to sustain and/or increase food security associated with Decision-Making Power and Management

1. *Document Alaskan Inuit traditional management practices across space and time. The following are two examples of Inuit traditional managment practices that may be documented. In one region, five villages within a given area meet once a year to develop maps of the area and discuss potential safety needs and changes in hunting strategies. In another region, Elders from three villages come together to discuss analyze information and decide on beluga hunting strategies for a given year.*
2. *Create an Inuit food security board to address vulnerabilities indentified through the drivers of food (in)security.*
3. *In collaboration with Inuit, develop federal and state flexible regulations that are able to account for shifts in the environment, such as a shift in animal distribution or early ice break-up.*

Photo courtesy of Kelly Eningowuk

Co-Management
Co-management of human activities and use of resources within the Arctic between Alaskan Inuit bodies and regional/national government agencies supports the interconnections of the six dimensions of food security.

There is a great concern for changing power dynamics that occur within co-management bodies as a result of increasing users, conflicts of use and increasing value systems to account for decisions being made. At the same time, there is a need for stronger co-management structures that allow for the use of our traditional management practices and IK methodologies in the monitoring and generating of information used to inform decisions. The end desired result is equal say, equal veto power equal decision-making at the table.

Knowledge Sources
The knowledge source, or sources, that informs decisions will support or negatively impact the six dimensions of food security. To discuss knowledge sources as a tool of food security, it is important to recognize the ability to set equality or inequality through the use or disregard of a knowledge source. It is also important to recognize that our IK is a different knowledge system than science.

IK and science tend to ask different questions and may use different information to inform decisions. Consider an IK holder obtaining salmon. Multiple relationships between the salmon, the rest of the environment and among the dimensions of food security must be considered to understand changes that are occurring or may occur. It is important to understand the salmon's health, the texture of the salmon meat, color of the meat and scales, interaction between the salmon and its environment, changes in salinity of the water and temperatures in the water and air. It is important to understand changes in riparian vegetation, shifts in growth of plants and seasonality. All of this information is needed to inform decision-making.

On the other hand, scientists often base an understanding of salmon health on population dynamics and similar variables. Here we see that science is very good at eliminating variables to address singular questions. IK, on the other hand, is very successful in identifying connections between variables in order to address multi-dimensional questions. Both approaches are often needed to better understand the Arctic environment and rapidly occurring changes.

Whether based on science or the use of both IK and science, information gathered, questions that are asked, methodologies that are used and the analyses of information collected needs to include IK holders. This requires the respect of IK holders and respect for the philosophies, cosmology and methodologies found within our IK. It also demands a move away from using science to validate IK or viewing IK only as a knowledge source to support science. The equitable use of both knowledge sources together requires a co-production-of-knowledge approach.

A co-production of knowledge approach allows for the use of both IK and science, respecting both knowledge sources equitably and avoiding the translation of one knowledge source into the other. Oftentimes a co-production-of-knowledge approach has the potential to lead to a third entity of information generated through the analysis of information from both IK holders and scientists together.

There is concern that information generated from IK is being used against us through inappropriate practices. Practices such as cherry-picking data or choosing information shared by IK holders to support one's own arguments and agenda should be considered unethical use of information. These practices commonly utilize a small piece of information without offering the entire context and meaning behind

the information that has been shared. This raises the need to establish strong methods for securing and sharing information and intellectual property rights.

Box 11. Actions to sustain and/or increase food security associated with tools that support food security.

Policy

1. *Adopt policies that recognize the connective and cumulative impacts within the Arctic.*
2. *Involve Inuit IK holders directly in the interpretation of current policies.*
3. *Review types of protected areas utilized by indigenous peoples to safeguard their food sovereignty and identify what practices may be utilized within Alaska air, waters and land.*
4. *Uphold state and federal regulations that identify subsistence activities as a top priority. For example, obtaining salmon for food is a top priority, second only to escapement goals.*
5. *Adopt policies and practices for the avoidance of expropriating Inuit food sources.*

Co-Management

6. *Investigate co-management structures of other Inuit countries to determine practices that may strengthen co-management.*
7. *Increase IK holder input to decide what information is needed to make management decisions.*
8. *Increase equality of Inuit IK and science within co-management bodies through the increased involvement of IK holders throughout all processes.*
9. *Support the building of Inuit capacity to demonstrate the applicability of IK and allowing for equal footing in managing and developing policies for Arctic resources.*
10. *Integrate strategic planning based on information generated through Inuit IK and science.*

Knowledge Sources

11. *Recognize IK as a systematic way of knowing with multiple methodologies.*
12. *Base decisions on the best available information generated from both IK and science.*
13. *Involve IK holders in the indentification of questions, research methods and analysis of information.*
14. *Adopt a co-production-of-knowledge approach to gathering information through research.*
15. *Develop protocols for the storage and ethical use of information derived from IK holders to ensure that intellectual and cultural property rights are maintained.*
16. *Increase networking capability across Inuit organizations to allow for information to be easily shared and used.*

Photo courtesy of Amos Oxereok

Alaskan Inuit Food Security Assessment Guide

The Alaskan Inuit Food Security Conceptual Framework indicates what information is needed to determine a level of food security and to assist in the identification of cumulative impacts and where the greatest vulnerabilities may lie at a given time. The information needed to inform each dimension includes both physical and social attributes, with a focus on the relationship between them and overall biotic and abiotic features throughout an entire ecosystem. To conduct an assessment, the framework may inform a pathway moving from the outward in or from inward out. For example, the first steps of an assessment may be the collection and analysis of information on the tools needed to acquire and maintain food security or the dimensions of food security.

We propose that food insecurity be determined by looking at a combination of vulnerabilities or drivers. These combinations have to be determined within a given time and space. However, an immediate indication of food insecurity, as stated before, is if any piece of the food security drum is displaced.

Conducting an assessment through a food security lens requires the aggregation of information, accessibility to information and in many cases, a co-production-of-knowledge approach to build a third base of information and a holistic understanding. Throughout an assessment process, it is suggested to rely on the configuring of conceptual models to aid in understanding relationships between drivers. The following steps may be taken to conduct such an analysis:

1. Aggregation of information previously generated within a given area
2. Aggregation of all attributes associated with each driver, dimension and tool
3. Identification of all needed indicators to inform levels of health within an ecosystem of a given time and space
4. Identification of connections between each food security dimension and relevant drivers to increase understanding of connectivity and cumulative impacts within a given time and space
5. Examine the drivers in more depth to identify how they interconnect and how and why they contribute to food (in)security (direct and indirect causes)

An assessment should conclude with an analysis of what steps may be taken to address areas of vulnerability. This may require immediate action at a community level or multiple steps across scales (community, regional, national and/or international).

Assessment Steps: 1) Identifying Baselines

As with any assessment, the first step is compiling information to identify baselines. Through this project the need for baseline data rooted in science and rooted in IK was noted. Much of the needed information is held by our IK holders. However, a great deal of information exists within research previously conducted and the documentation of information from IK holders. The same is true for scientific data. The aggregation of baseline data assists in creating a

reference point to identify large adverse impacts from a combination of drivers. As indicated above, some information may be collected through previous research projects and/or documentation. For example, the occurrence of suicides within a given area, the amount of decision-making power afforded and the strength of co-management structures will aid in informing levels of mental health, self-identity and community identity. The information gathered through this process provides a point of reference. Such information needs to be readily accessible by indigenous organizations and individuals in any given area.

Assessment Steps: 2) Description of Drivers/Dimensions
Once data is aggregated and organized, each driver and associated dimension needs to be described within a given area. Additionally, components of the tools used to achieve food security (knowledge source, co-management structure and policy) have to be evaluated within a given area. The following list indicates what information is needed to inform each dimension, driver and tool. The information should be compiled using both IK and scientific methodologies through a co-production-of-knowledge approach, where appropriate. For example, IK teaches us the importance of continuously looking back at the interface between food security dimensions, between the drivers and the relationships between components.

Photo courtesy of Carolina Behe

Table 1. What information is needed to inform each dimension, driver and tool
Inuit Culture

Driver	Identification/Question
Food Systems of Yesterday and Today	• ID all foods eaten and used for medicinal purposes and changes • List all natural resources used to collect and process foods, e.g., driftwood • List all processes involved in obtaining, processing and storage of food processes and changes; this list should include all requirements and tools required, such as housing structures, freezers, temperatures, wood, seal oil, etc. • ID seasonality associated with the foods, medicines and connected relationships • ID use patterns, change in use patterns and reason for changes • Is the connection between the Inuit culture and all other systems within the environment strong to the satisfaction of Inuit within a given area • ID the interface between the cultural system and all other systems • ID all languages spoken in a given area • Is the speaking of Inuit languages encouraged and taught • ID the cause for the retention of language, loss of language, presence or lack of language programs
Value of Food	• Are Inuit values associated with food used in development of decision-making processes to the satisfaction of Inuit within a given area • Is the Inuit value of food considered and given priority in determining trade-offs inside and outside of a given area to the satisfaction of Inuit within a given area • Is the Inuit value of food being transferred between generations to the satisfaction of Inuit within a given area
Passage of Knowledge	• Is the passage of knowledge between Elders and younger generations supported throughout a given area to the satisfaction of Inuit within a given area • Is the passage of knowledge between Elders and younger generations supported within the education system to the satisfaction of Inuit within a given area
Relationship With Animals, Plants and Environment (Socio-Ecological System)	• Is the Inuit cultural connection to their environment supported through decisions made and the education system to the satisfaction of Inuit within a given area

Inuit Culture, continued

Driver	Identification/Question
Education System	• Does the education system assist in the sharing of IK and the passage of knowledge between Elders and younger generations to the satisfaction of Inuit within a given area • Are Inuit values and indigenous knowledge given high importance within a given area to the satisfaction of Inuit within a given area
Sharing Systems	• Identify past and current sharing systems • Is the sharing system supported within regulations to the satisfaction of Inuit within a given area • How is food distributed within the village, regionally, in-state and nationally
Respect	• Do Outside interests respect flora and fauna of a given area • Is research conducted in a respectful way (including prior consultation) to the satisfaction of Inuit within a given area • Are use activities, such a tourism and sport hunting, conducted in a respectful way to the satisfaction of Inuit within a given area
Celebration, Feasts and Dances	• Are celebrations and feasts supported to the satisfaction of Inuit within a given area • Is knowledge of dancing and drumming passed between generations (if applicable) to the satisfaction of Inuit within a given area
Social Systems	• Are social interactions supported to the satisfaction of Inuit within a given area. For example, are Elders and youth encouraged to spend time together to allow for the transfer knowledge • Are youth taught and provided opportunities to be part of a community to the satisfaction of Inuit within a given area
Physical Safety	• Are navigation skills passed between generations • Are navigation skills adequate to support safety • Are processing and storing processes to ensure physical safety passed between generations • What are food safety procedures

Inuit Culture, continued

Driver	Identification/Question
How to Be Within an Environment	• Are youth afforded the time needed to be within their environment to the satisfaction of Inuit within a given area • Is the passage of knowledge and education of an Inuit way to be within an environment supported to the satisfaction of Inuit within a given area
Time Constraints	• Do people have adequate time to gather, process and store food to the satisfaction of Inuit within a given area • Do people have adequate time for the passing of knowledge and social gatherings to the satisfaction of Inuit within a given area

Availability

Driver	Identification/Question
Variety (Biodiversity) - Number of Different Animals and Plants in the Area	• Is diversity and variety maintained within a given area • Do activities inside and outside of a given area support the maintenance of diversity and variety within a given area • How does change in variety of food affect hunting strategies
Knowledge of How to Collect, Process and Store Foods for the Winter	• Is knowledge transferred of how to collect, process and store food to the satisfaction of Inuit within a given area • Do Inuit of a given area have the ability to obtain knowledge of how to collect, process and store food to the satisfaction of Inuit within a given area
Being Able to Eat What Has Been Gathered From Last Season	• Do activities support the gathering and storing of food to the satisfaction of Inuit within a given area

Availability, continued

Driver	Identification/Question
Seasonality	• Identify the calendar of a given area • Identify changes within the calendar of a given area • Are decisions made based on the calendar of a given area

Decision-making Power and Management

Driver	Identification/Question
Loss of Resources, Benefits and Income	• Is there effective consultation for planning, implementation and evaluation
Burden of Conservation	• Are activities impacting flora and fauna occurring from outside of the given area • Are activities impacting flora and fauna a result of non-Inuit activities • Are Inuit in the given area involved in determining needed management action to protect flora and fauna impacted by activities occurring outside of the Arctic • Are the producers of pollution and activities harming Arctic flora and fauna held responsible and are their activities managed as a result • Are traditional management schemes utilized to protect impacted flora and fauna
Burden of Pollution	• Is there a strong polluter-pays policy • Are those responsible for the generation of pollution expected to change their behavior
Increase in Competition	• Increasing rates of commercialization of the environment through tourism, sports hunters, extractive industry activity, shipping, etc.

Decision-making Power and Management, continued

Driver	Identification/Question
User Conflict	• Are Inuit values marginalized through the increased user influence on decision-making through their value system • Are Inuit adequately involved in making trade-off decisions associated with development within a given area
Taxation Without Representation	• Do political leaders representing Alaskan Inuit hold adequate understanding of Inuit culture and overall Arctic ecology
Respect for and Equality of Knowledge Systems	• Is there an equitable distribution of monetary resources to ensure capacity in Inuit communities to provide distinction and application of indigenous knowledge systems and methods
Input Into How and What Research Occurs	• Are research projects community driven
Meaningful, Equitable Involvement in Research	• Are Inuit involved in the development of research questions, collection of information and analysis of information
Institutional Racism	• Do current interpretations of policies and implementation of regulations reflect any level of institutional racism according to Inuit of a given area
Preparedness for Large Shocks Associated With Water Vessel Accidents	• Are Inuit involved in the planning and preparations for potential accidents, such as shipwrecks, oil spills, etc.
Environmental Integrity and Productivity to Withstand Shocks	• Identify eco-zones within a given area and how they interconnect • Identify changes of concern within the eco-zones of a given area

Health and Wellness

Driver	Identification/Question
Air, Land and Water Pollution	• Identify key contaminant pathways within a given area • What are possible impacts of contaminants within a given area, e.g., what are the life cycles within a given area • Is communication of contaminants enacted to the satisfaction of Inuit within a given area • Is contaminant information shared with a given area in a way that they will be able to utilize the information to the satisfaction of Inuit
Integrity Throughout the Food Chain	• Identify food systems of yesterday and today • Are there shifts in food web dynamics • Number of species/parts consumed • Documentation of flora and fauna • Identify cultural and ecological keystone species • Identify food web pathway between trophic levels
Mental Wellness	• Is it recognized that Inuit self-identity is rooted in the connection to the environment and in the ability to provide to the satisfaction of Inuit within a given area • Do regulations support cultural and self-identity practices to the satisfaction of Inuit within a given area • Are cultural activities supported to the satisfaction of Inuit within a given area, e.g., games, dancing, etc. • What are the suicide rates of a given area • To what degree do self-destructive behaviors impact a given area, such as drug and alcohol addiction; to be determined by Inuit of a given area • Are people allowed to consume key traditional foods during times of decreased food source abundance to the satisfaction of Inuit within a given area (e.g., it may be important for an Elder to have small amounts of king salmon during a time of low abundance) • Are people provided the necessary harvest and gathering opportunity for traditional foods during times of decreased food sources to the satisfaction of Inuit within a given area

Health and Wellness, continued

Driver	Identification/Question
Erosion of Healthy Food Systems	• Does knowledge transfer occur to the satisfaction of Inuit within a given area • Is there access to equipment needed to gather, process and store food to the satisfaction of Inuit within a given area • Are there providers (hunters, fishers, gatherers) to the satisfaction of Inuit within a given area • Are there knowledge holders of processing and storing food to the satisfaction of Inuit within a given area • Is there a community system for providing and sharing food gathered to the satisfaction of Inuit within a given area • Are the Inuit forced to substitute traditional food sources with Western, commercially processed food sources
Erosion of Health	• Is there an increase in chronic diseases, such as cancer, diabetes, heart diseases, strokes and hypertension • Incidence of diet-related illnesses and resulting mortality and costs • Are pollutants within food sources impacting the physical health of Inuit, flora and fauna
Nutrition	• Is the variety of food within a given area adequate to support nutritional needs • Are there food and nutrition services • Knowledge about healthy eating and traditional foods
Mixed Diet	• Is there an impact of mixed diet, such as eating food that was not accessible before; elimination of important food sources, such as organ meat or animal parts that provide roughage • Is the variety of food within a given area adequate to support nutritional needs • Is there knowledge of how to prepare and store the food
Landfill System	• What is the landfill system • Were Elders and their knowledge used to inform placement and technical environmental processes • Is the technology and material used to create the landfill robust
Sanitation System	• What is the sanitation system of a given area • Were Elders and their knowledge involved in the development of a sanitation system

Health and Wellness, continued

Driver	Identification/Question
Housing Structures	• Were Elders and their knowledge used to inform placement and technical environmental processes in designing and constructing housing structures of a given area • Do housing structures support cultural activities related to food security, such as drying food to the satisfaction of Inuit within a given area • Do housing structures provide adequate ventilation systems and are they energy efficient
Flora and Fauna Physical Health	• Number of reports of ill physical health • Number of large population die-offs • Is there change in animal behavior indicating stress • Is there a decrease or loss in vegetation and/or discoloration of vegetation • Is there an increase in competition for flora or fauna due to new species
Access to Traditional Medicines and Healers	• What health services are there (traditional services)
Access to Western Medicine and Medical Providers	• What health services are there (Western-based services)

Stability

Driver	Identification/Question
Ecological Stability	• *Addressing Environmental Change* - Indentify change resulting from climate change (change in ice; increase in erosion; stability of ground; new species; change in temperature; change in ocean currents; change in weather; storm surges; change in hydro-system e.g., shallowing waterways, narrowing streams, widening streams; change in precipitation; increase in storm surges; increase flooding; ocean acidification) • Identify change resulting from industrialization (increase extractive industry activities, increase in tourism) • Identify change in flora and fauna (animal migration change; shift in food web dynamics; decrease in benthic species; decrease in benthic species abundance; shifts in vegetation placement; decrease in key vegetation species) • Change in bio-geophysical and chemical exchanges (e.g., transport of fixed nitrogen between marine and terrestrial environments). Is there a change in the taste of food • Are current management practices used to ensure future generation and overall ecosystem health (connected to nutritional well-being) • Legal protections for the environment from pollutants (policies to minimize pollutants within the air, land and water) • Legal protections to discourage assimilation of the Inuit culture • Legal protection from the expropriation of Inuit food and medicinal and cultural resources • Legal protection to apply priority of Inuit value system • Do management practices and policies support the mitigation causes of large changes, such as climate change • Are current management practices used to ensure future generation and overall ecosystem health (connected to nutritional well-being) • Is there a sense of fate control
Inuit Mental Security	• Identify availability and temporal changes in availability as a result to rapid change and cumulative impacts • How many weather-related disasters occurred within a given period (disasters are defined as events that caused unexpected harm and are difficult to recover from) • Those already vulnerable will be more vulnerable as changes occur
Rapid Change and/or Cumulative Impacts	• What are the cumulative impacts across interconnecting drivers resulting from rate of change

Accessibility

Driver	Identification/Question
Access to Traditional Territories	• Is there adequate access to traditional food-gathering areas • Is there adequate access to traditional areas used to transfer knowledge • Is there adequate access to traditional sacred areas
Ability to Live Off the Land, Ocean and Air	• Are people afforded the ability to live off the land, ocean and air to the satisfaction of Inuit within a given area
Economics (Cash Economy)	• What government subsidies are provided in a given area • What government subsidies are provided throughout the entire food system (inside and outside of a given area) • What is the environmental impact on the Arctic of government subsidies outside of a given area • Are the government subsidies provided culturally appropriate • Do current subsidies support self-sufficiency • Is there adequate cash to obtain equipment, bullets, fuel, etc. to obtain food • Are people able to afford to stay within their villages (is there a high drop in population) • Is there adequate cash to obtain equipment and tools required for the processing and storing of food • Labor statistics (unemployment and under-employment, wage-levels, types of jobs) • Community resources and assets (e.g., community freezers); how many programs support supply of fuel, bullets, parts, etc.
Economics (Inuit Economy)	• Is trading, sharing and giving supported within a given area to the satisfaction of Inuit within a given area • Community and household demographics; how many people in the community, how many homes, how many households provide for others (super households) • Community resources and assets (e.g., community freezers); how many programs support the collection of traditional foods • How is food distributed within the village, regionally and nationally

Accessibility, continued

Driver	Identification/Question
Water Sources	• Is there multi-year ice to the satisfaction of Inuit within a given area (where applicable) Is there river or lake ice to the satisfaction of Inuit within a given area (where applicable) • Are water sources clean and uncontaminated • Have water sources dried up • Are the tools and knowledge needed to obtain safe water satisfaction maintained, transferred between generations and held to the satisfaction of Inuit within a given area
Ability to Access Healthy Animals, Plants, Fish, Ice, Water, etc.	• Is the knowledge needed available to the satisfaction of Inuit within a given area • Are outside activities impacting accessibility • Are non-Inuit cultural activities and development impacting accessibility • Are there regulatory, statutory or constitutional barriers to the access and utilization of traditional Inuit resources

Tools Needed to Obtain and Sustain Food Security

Tool	Identification/Question
Knowledge Source	• Is IK respected and utilized to inform decision-making to the satisfaction of Inuit within a given area • Is the continued growth and advancement of Inuit IK supported • Are research projects rooted within IK supported by funders • Are co-production of knowledge practices supported by research funders • Are co-production of knowledge practices supported by government entities • Is information obtained from IK or co-production of knowledge processes used to inform decision-making to the satisfaction of Inuit within a given area

Tools Needed to Obtain and Sustain Food Security, continued

Tool	Identification/Question
Co-Management	• Are traditional management practices used within a given co-management structure to the satisfaction of Inuit within a given area • Is Inuit IK given equal value to science in decision-making • Is IK used within a given co-management structure to inform management decisions and identify needed research activity to the satisfaction of Inuit within a given area • Are Inuit traditional management practices respected and utilized to manage relationships within the ecosystem • Is Inuit involvement within co-management structures adequately supported to the satisfaction of Inuit within a given area
Policies (Indicators of Access, Allocation, etc.)	• Legal protections for the environment from pollutants (policies to minimize pollutants within the air, land and water) • Legal protections to discourage assimilation of the Inuit culture • Legal protection to apply priority of Inuit value system • Local policies related to food issues (policies are indicators of access)

Food Sovereignty

Tool	Identification/Question
Management	• What are the government policies as they pertain to the support and sustainability of Inuit food sovereignty • Do Inuit hold the ability to manage lands, waters and resources to the satisfaction of Inuit within a given area
Power Dynamics	• Is self-regulation supported by Outside institutions and government entities to the satisfaction of Inuit within a given area • Is there a sense of fate control
Federal and State Regulations/Jurisdiction	• Do federal and state regulations/jurisdictions support the resiliency of Inuit food security

Assessment Step: 3) Identification of Indicators
Food (in)security drivers may be considered indicators of overall food security. This is particularly relevant when two or more drivers occur concurrently and result in cumulative impacts. The identification of additional indicators through IK is needed to address some of the attributes of individual drivers. For example, in order to understand the level of health of a keystone species, IK holders and scientists may ask different questions, requiring different indicators of the health of that species. A hunter determining potential health of a caribou herd will evaluate the health and growth of lichen. In considering the health of salmon, IK teaches us to consider the texture of the salmon meat, the scales, water temperature, riparian vegetation, behavior of the fish, among other factors. All of these combined will inform and become a gauge of salmon health. Additional indicators will be based on human behavior, such as how much energy, time and resources are being required to obtain a species.

On the other hand, scientists may rely on population dynamics as an indicator of salmon and caribou health. While all indicators discussed here are of great value, they inform different questions about the environment and are both of high importance. For this reason, the next step in an assessment process is to identify all necessary drivers to inform levels of health within an ecosystem of a given time and space. This will require a co-production-of-knowledge approach.

Photo courtesy of Jenny Irene Miller

Assessment Step: 4) Identifying Connections Between Dimensions
Identify connections between each food security dimension and relevant drivers to increase understanding of connectivity and cumulative impacts within a given time and space.

Within each given area, the connection that lies between each driver may vary. However, within the four Inuit regions in Alaska, many of the connections are the same. For example, when we consider all of the components associated with obtaining walrus, the connections between all six dimensions of food security and the possible connections between the identified drivers we begin to see a holistic picture. The picture shows us that there is a strong link between sea ice thickness, walrus location and health, ocean currents, benthic species distribution and health, benthic species washed on shore and collected as food, a young person being taken out to learn how to hunt for walrus, being taught their language, accessing knowledge from older generations, providing a first catch to an Elder and becoming a provider as opposed to being provided for. The connection continues between the self- and cultural identity rooted in these practices and sea ice thickness (Behe, 2013) and through the processing of the caught walrus. Community members come together to assist in the processing and storing of the food. Here again, education and language are passed to younger generations, extending through to the creation of clothes and art and holding feasts, celebrations and games. The connections run through

Figure 12. Interconnecting drivers surounding walrus within a given time and space

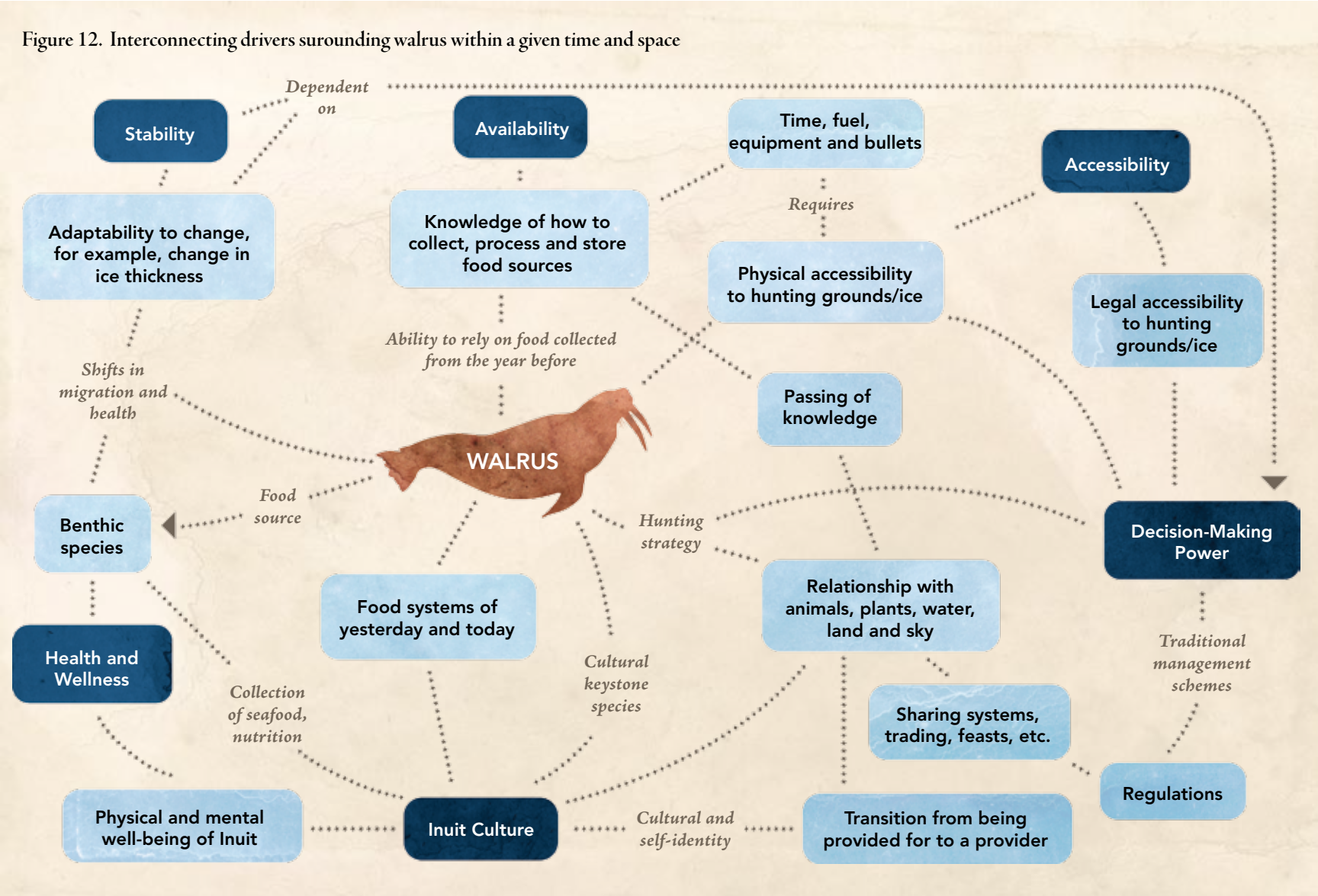
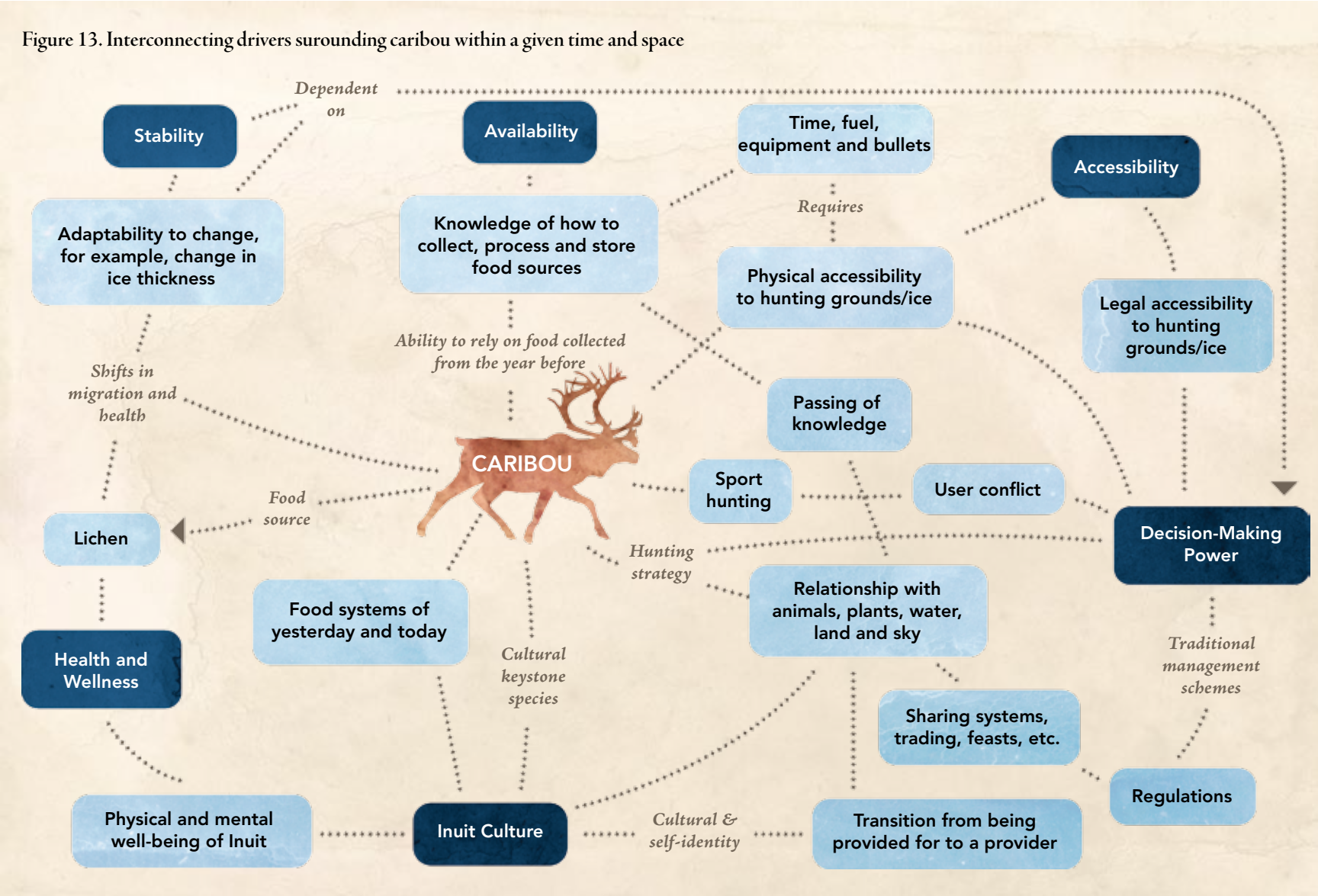


Figure 13. Interconnecting drivers surounding caribou within a given time and space



our economic system and back to our ability to hunt. We rely on parts of this animal to make art. The art created is often sold, and the cash received supports the obtaining, processing and storing of foods through the purchase of items such as, fuel, tools and bullets.

The described connections include the nutritional and overall physical health of people within the community, how decisions are made and the regulations that will determine how and when hunters will gather walrus or other food sources.

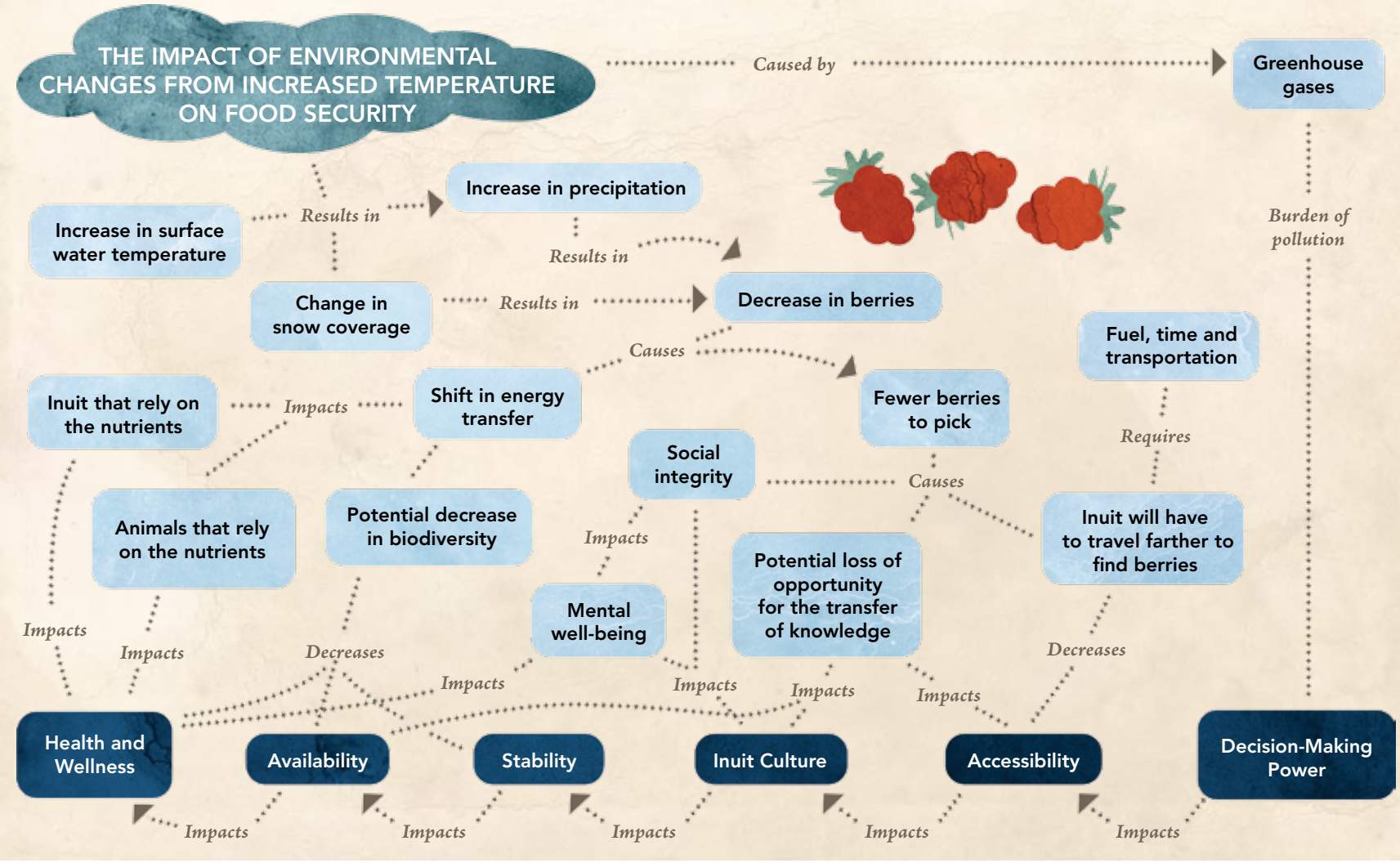
Each of these is part of a food chain and has to be identified to determine the overall food system. Throughout this report we have stressed that the greatest points of vulnerability are at these interfaces or connections. For example, a caribou will only be healthy if able to access healthy lichen. This is the relationship between flora and fauna.

Assessment Step: 5) Detailed Examination of Drivers
Examine the drivers in more depth to identify how they interconnect and how and why they contribute to food (in)security (direct and indirect causes) – ask why.

With each indication of decreasing food security, identify the drivers linked to the possible source of the threat along the connections. This step allows us to unite information across scales through the linking of drivers at a community level to those at a regional, national and/or global scale. The conceptual model in figure 14 shows connections between drivers of food (in)security at a community level to those at a national and global scale by looking at the correlation between increasing mean global temperatures to berries.

Photo courtesy of Amos Oxereok

Figure 14. Connections between drivers of food (in)security at a community level to those at a national and global scale by looking at the correlation between increasing global temperatures to berries



CONCLUSION

In this report we have stressed the importance of connectivity, cumulative impacts and the need for culturally based food security definitions and assessment tools. We are providing a conceptual framework using our drum to show the interconnecting components of food security. The drum guides us through what information is needed to conduct an assessment and a greater understanding of how components are connected.

Our IK teaches us that the greatest points of vulnerability will be where components meet, such as the point at which the dimensions of Inuit Culture and Stability meet. Along this same philosophy, our IK encourages attention be paid to the relationships between components, such as between sea ice thickness, walrus and self-identity.

As noted throughout this report, we face many challenges that require adapting. The rapid changes occurring require our knowledge and expertise to account for short-term and long-term disturbances to the Alaska Arctic. For example, as ice moves out quickly we need to be able to adjust our hunting practices in order to increase our ability to obtain food, maintain safety of our communities and to safeguard this environment. However policies, regulations and other intervening facotrs often decrease our ability to adjust with the rest of the environment.

Though there are many points of vulnerability, there are also drivers that continue to support food security. Many of these are found within our culture. Consider, the large focus placed on the use and preservation of our languages. Our sharing systems are evolving to account for new tools needed to acquire traditional foods. Ways of obtaining, processing, storing and consuming traditional foods, feasts, games, celebrations and dances continue on. The recommendations provided in this report will support food security drivers and strengthen the tools needed to support the dimensions of food security.

In next steps, we want to encourage the use of this framework and assessment process. Conducting a food security assessment will require engagement of IK holders, scientists of multiple disciplines and a need to employ tools and methodologies from IK and natural/social sciences collaboratively. By applying a food security lens to understanding the Alaskan Arctic, we will all be able to work toward safeguarding this environment.

In taking the lead in defining our food security, identifying the drivers of food (in)security, creating a conceptual framework and outlining a food security assessment process, we are taking a step toward food sovereignty. The Alaska Arctic is our home. Our food defines who we are. We need to make the commitment collectively to fight for food security.

On Development – Throughout this project, many of us have discussed concern over the impact of development activities (such as oil and gas exploration, industrial fishing, etc.) on food security and the impact of not involving our knowledge in the various processes related to initiating development, such as environmental impact assessments. For example, there is great concern about the development of roads and the disruption they have to caribou migration patterns. There is a need to view such a change holistically and to understand the connectivity between all of the drivers identified. Some contributing authors expressed the large impact such development could have on villages such as Anaktuvuk Pass. Currently, haul roads to transport resources are being developed and/or proposed. The proposed haul road near Anaktuvuk Pass will pass through caribou migration routes. The proposed road is part of the "Roads to Resources" program geared to increase infrastructure and economic growth. As one contributing author expressed, Anaktuvuk Pass depends highly on caribou, and the way to maintain food security is to not have a road. Some voiced similar concerns of development activities surrounding the village of Nuiqsut. Hunters in Nuiqsut are traveling farther and farther from their village to find caribou that have changed migration patterns. The changes in caribou migrations are attributed to the annual installation of iceroads used to haul resources. In addition, development activities, such as seismic exploration, are also thought to be causing a change in animal migration patterns. In relation to concerns of development is a need for policies and regulations to include information generated from IK and IK holders.

Shipping – Increasing vessel traffic is of high concern for multiple reasons and listed at times as a driver of food insecurity. This driver is largely linked to other drivers and lack of decision-making power. There is a concern that decisions being made are based solely on information generated through science and may be missing a lot of information. There is a need to include information from IK in making decisions. Many uncertainties and concerns regarding increased vessel traffic, tourist activities and mineral extraction and exploration are heard throughout our communities. There is a concern that the ships are and will bring chemical, noise and light pollution, cause a disruption to animal migration patterns and to the animals dependent on the early formation of ice, provide pathways for new species.

IK has a wealth of information and assessment capabilities to better understand the connections throughout the Arctic. For example, outside of one village is a large area of clams. IK holders of this village stress that this area has to be protected first if oil spills occur. This area is a crucial part of the food web.

A holistic view will be gained in using the food security conceptual framework to address questions and potential impacts of increasing shipping activities.

Pollution – There is a high concern regarding contaminants and overall pollution within the Arctic. The concern is not just for people, but for animals and plants. We are most affected by the pollutants on the land, sea and air. Over the past few years, there have been many

discussions regarding abnormalities in animals and sick animals. There are many accounts of animals with sores, parasites and changes in appearances (smaller, loss of hair, etc.). Whether it is from an increase in temperatures resulting from atmospheric pollutants or an increase of contaminants within the water, it is understood that pollutants are playing a role in how life is changing within the Arctic. The changes are seen throughout the food web. For example some are seeing walrus skinnier then ever; changes in the stomach contents of some animals, and some animals with only sand in their stomachs. The livers of animals are a strong indication of health. There are many reports of discolored and abnormal livers of all types of animals. Additionally, in some areas there is concern for the reproduction of animals. For example, the shells of some bird eggs are thinner than they should be, and there are fewer of them.

Pollution is connected to all of this.

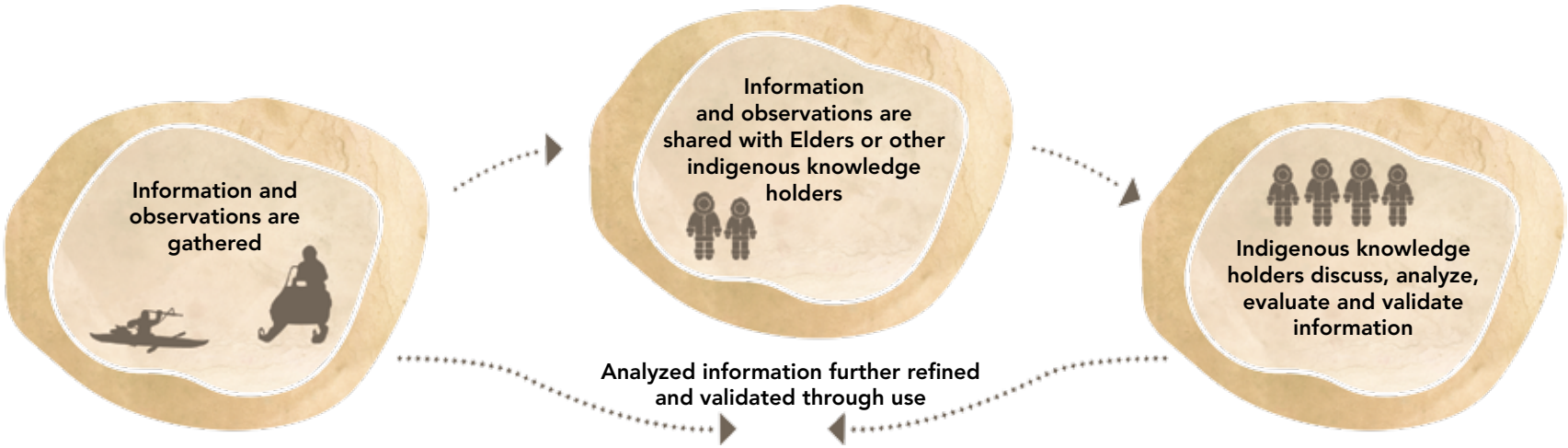
Photo courtesy of Jenny Irene Miller

The project methodology is modeled on Alaskan Inuit methodologies for gathering, evaluating and validating information at a community level. The process is supplemented using social science techniques and tools that allow for IK to stand on its own, avoiding the dilution of this knowledge source by translating it into another knowledge source, such as Western science.

It is common practice within our communities for observations and information of any kind to be discussed with Elders and those determined by their peers to be most knowledgeable. Those people consult with their peers to bring further context to the information based on their wealth of knowledge and expertise and to provide analysis of the information. This is an evaluation and validation process.

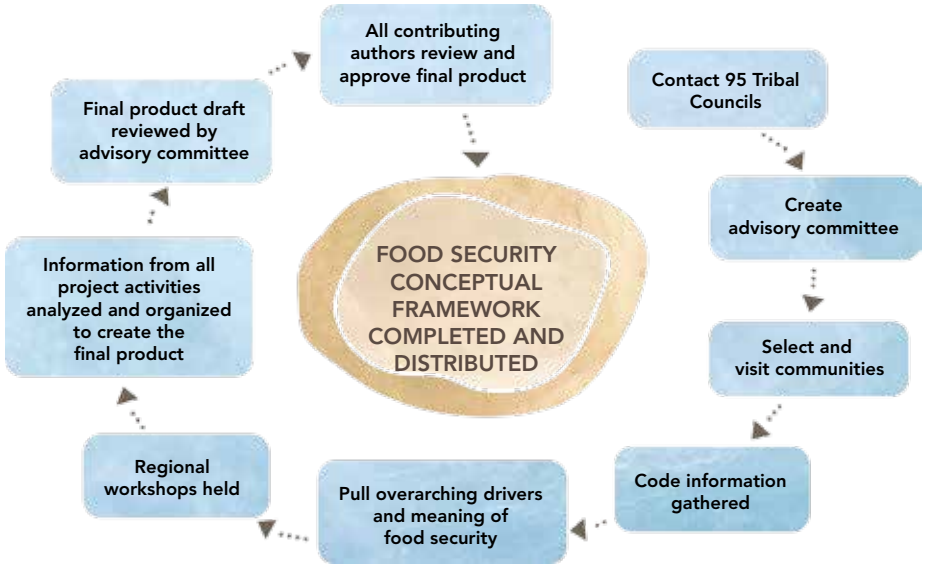
As noted, the methodology for this project was developed with the intention of mirroring this process through discussion, analysis, evaluation and validation. The project methodology was laid out and further developed during the course of the first year of the project in collaboration with the project's Food Security Advisory Committee and feedback from Tribal Councils.

The Food Security Advisory Committee provided guidance and



feedback throughout the process. The committee is made up of knowledge holders nominated by ICC-Alaska membership organizations and consists of six IK holders, four youth representatives and two cultural anthropologists. Within the first year of the work, project information was sent to all 95 village Tribal Councils, followed by phone conversations to discuss the project and solicit feedback.

IK interviews and regional workshops were the primary means of collecting information, in addition to participant observations and literature reviews. Initial unstructured interviews and communications with Tribal Councils confirmed to the ICC-Alaska Board that there was a need to develop a food security conceptual framework to aid in illuminating our understanding of food security. And to provide a tool that will allow for greater understanding of the multiple changes occurring within the Arctic. Initial conversations stressed that our food security is grounded in the interconnections of cultural and environmental systems and is closely linked to self-identity. It was also stressed that "food" extends beyond simply eating and nutrition. We know that our food security is greatly influenced by a variety of complex socio-cultural and socio-ecological factors. This information was used to create the three objectives of the project: 1) provide an understanding of Arctic food (in)security from an Inuit perspective; 2) identify the drivers of food (in)security, and 3) create a conceptual framework on how to assess food (in)security across both cultural and environmental systems.



To fulfill these objectives the project principle investigator (PI) visited 15 communities within the Yukon-Kuskokwim, Bering Strait, Northwest Arctic and North Slope regions. Communities were chosen based on three criteria: 1) community interest, 2) ecosystem type, and 3) engagement in traditional food use and practices. Between August 2012 and March 2014, the project PI visited all villages. All research done by ICC-Alaska was carried out with the informed consent of, and in partnership with, local regional Tribal Councils and individual participants. Within each village we worked closely with the Tribal Councils to collect information from IK holders on the topic of food security through semi-directive interviews and community meetings.

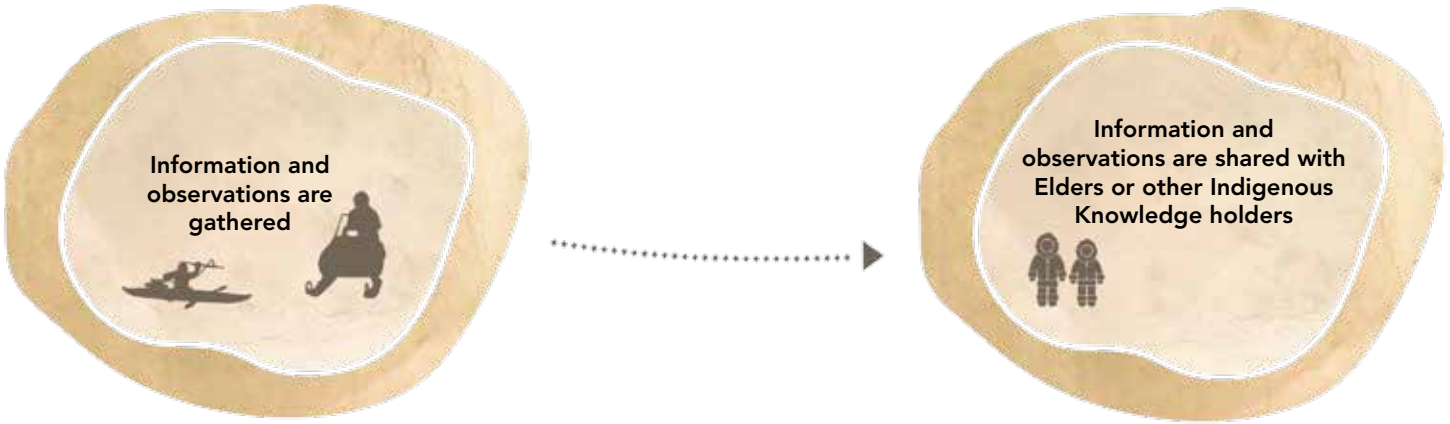
Upon ICC-Alaska's arrival in a community, a community meeting was held. Prior to our arrival to the community, the meeting was organized and fliers advertising the time and place of the meeting were placed around the community by Tribal Council staff. The community meeting provided a platform to discuss the project and to hear from the community on food security-related topics. During this time, meeting participants provided input on the project methodology and adjustments were made accordingly.

The Tribal Councils and Elders councils (where applicable) were asked

to nominate individual experts to speak on behalf of their communities. Council members were asked to nominate both men and women considered to hold high knowledge of the surrounding environment and the collection and/or processing of food sources, and are actively involved in obtaining and/or processing traditional food sources or have been in the past. IK holders were also recommended based on their ability to explain and discuss cultural norms and variations of those norms. The objective was to obtain quality information from respected and trusted IK holders. In addition to the council recommendations, a snowball technique was used to identify IK holders. The project obtained more information from recommended experts and a snowball sampling, then a pre-conceived sample number (Marshall, 1996). In the case of this project, as with many other IK-related projects, it is the quality of information that is most important, not the number of people that are interviewed or participate. For example, a good researcher would not necessarily ask a 20-year-old seal hunter about changes in seal abundance through time, just so the researcher could say that they talked to 10 people instead of nine. It is more important to speak with individuals identified by the community to hold the highest IK on the topic. Other non-experts (younger hunters, other community members) were able to contribute important information also and were important to include (e.g., at community meetings to get a broad sense of community concerns and observations, etc.).

Each interviewee received an honorarium of $50 an hour for the sharing of his/her expertise and time. Interviews lasted between 40 minutes and 120 minutes. All interviewees signed a written consent form prior to participating in the project and were provided the opportunity to stop the interview at any time.

IK holders and community meeting participants throughout the project indicated the importance of receiving credit for sharing their information. ICC-Alaska agrees with the importance of recognition. In response to this, all interviewees were asked if they would like to be listed as a contributing author to this final report. Interviewees were informed that they could change their mind to add or remove



their name at any time throughout the project until the final draft was completed and approved. All concepts, information and most language within this report comes directly from the contributing authors.

ICC-Alaska's IK holder/science advisor and the PI for this project conducted semi-directive interviews with the IK holders. Semi-structured interviews involve a series of questions and topics that are used to guide interviews, as opposed to dominating them. They typically take place more as a conversation than a formal interview. The interviewee is allowed latitude to take the conversation in any direction they deem as relevant to the topics at hand. The interviewer guides and participates by asking follow-up questions and introducing topics for discussion (Bernard, 2006). This method was chosen in an attempt to eliminate bias created from pre-conceived ideas of the researcher (Strauss & Corbin, 1990).

During the semi-directive interviews, participants were asked to discuss their IK as it related to traditional food sources within their area of expertise. For example, a female Elder may share her knowledge of local vegetation and the processing and storing of meats and fish. Throughout the interview the interviewee was asked to expand on knowledge regarding Inuit food systems, the meaning of food, how food security is maintained, what causes a lack of food security and the shifts in hunting, fishing and gathering strategies.

Flexibility was allowed in how interviews were conducted. While many of the interviews were one-on-one, some interviews were conducted with a small group. Small group interviews are more comfortable for some interviewees and can provide knowledge from multiple sources on different topics and allow for interconnections between topics or bodies of experience to be explored by both the interviewees and interviewer. For example, as an Elder discusses the processing of beluga in the past, an active hunter is able to offer comparative information on what is currently being seen and done. Additionally, as one person comments on a topic, other participants may be reminded of memories and events they may not have recalled on their own, resulting in a more comprehensive identification of important information.

Interviews were recorded or handwritten, depending on the permission and preference of the interviewee. The majority of the interviews were recorded. Community meetings were also recorded or handwritten notes were taken. A professional transcription company, Accu-Type Depositions, Inc., transcribed all digital recordings. Interview transcripts and notes, phone conversation notes, meeting transcripts and notes, and any other texts collected were analyzed using the qualitative software program ATLAS.ti.

Within ATLAS.ti information from the interviews was coded and then grouped into families, such as by region and by village. Codes were created through an inductive and deductive process. Through the deductive process, some codes were identified prior to conducting interviews. For example, the project objectives indicated that data should be analyzed and coded for the meaning of food and causes of food (in)security. Through an inductive process many more codes were developed as concepts surfaced throughout the analysis, such as education, language, wellness, or accumulative impacts, and concepts of interconnectedness. Additionally, inductive reasoning was used to explore new concepts, which were not necessarily immediately apparent, such as spiritual connection to food sources or the importance of language in obtaining food security.

Throughout the course of the project, Food Security Advisory Committee members and interviewees were contacted to provide further contextualization of information. This allowed for the identification of metaphors and categories that were then identified as themes and patterns in the data related to food security and assessment

techniques that may be used in assessing identified drivers of food security. Cultural themes, patterns and concepts were identified from the coded information. Concepts that spoke to the meaning of food security and drivers of food (in)security were grouped for each region into families.

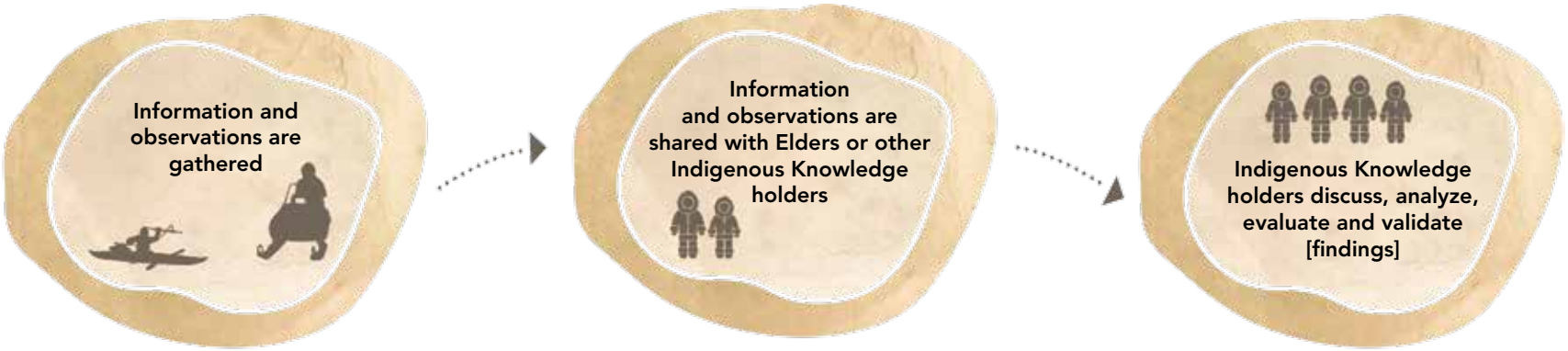
Through this process, preliminary findings of the meaning of food security, drivers of food (in)security and concepts within IK were identified. This information was then evaluated and validated through regional workshops. IK holders at the village level and community-meeting participants determined what was discussed at regional food security workshops.

Between November 2013 and November 2014 a regional workshop was held within the hub community of each of the four regions. The workshops brought together IK holder delegates elected by each of the village Tribal Councils within a region and IK delegates nominated by ICC-Alaska membership organizations and key co-management bodies within the region, such as the Eskimo Walrus Commission. The elected delegates came together over the course of two-day workshops to evaluate and validate information that was previously documented through expert interviews and to offer further insight on drivers of food security and insecurity.

Workshops Goals

1. Discuss the preliminary findings of the project
2. Provide a consensus on food security definitions
3. Identify what drivers of food security and insecurity may be missing
4. Determine methodologies found within IK to be used for the assessment and analysis of the identified drivers

The workshops were audio recorded and notes were taken by the PI, Food Security Advisory Committee members from their respective regions and volunteers from ICC-Alaska membership organizations. The recording and documentation of the discussion throughout the workshop was done with approval and consent of workshop participants. Delegates received a $300 honorarium for the sharing of their expertise and time. All individuals attending the meeting signed consent forms and understood they could withdraw from participating



in the workshop at any time.

Written notes of the workshops were entered into ATLAS.ti and coded through the same process as described above for the interview transcripts. All information, recordings and notes gathered from the workshop were reviewed in light of codes and themes in the data.

Information generated through the project analysis has been used to develop the Alaskan Inuit Food Security Conceptual Framework and this report. The report has been reviewed and approved by the Food Security Advisory Committee and all contributing authors to the project.

Abiotic – Not associated with or derived from living organisms. Abiotic factors in an environment include such items as sunlight, temperature, wind patterns and precipitation (Dictionary.com, 2015).

Baseline – Reference for measurable quantities from which an alternative outcome can be measured, e.g., a non-intervention scenario used as a reference in the analysis of intervention scenarios (IPCC, 2007).

Biodiversity – The total diversity of all organisms and ecosystems at various spatial scales (from genes to entire biomes) (IPCC, 2007).

Biogeochemical – Of or relating to the partitioning and cycling of chemical elements and compounds between the living and nonliving parts of an ecosystem (Merriam-Webster, 2015).

Biotic – Of, relating to, or caused by living organisms (Merriam-Webster, 2015).

Co-Production of Knowledge – The collaborative process of bringing a plurality of knowledge sources and types together to address a defined problem and build an integrated or systems-oriented understanding of that problem (Armitage et al., 2011).

Cosmology – The branch of philosophy dealing with the origin and general structure of the universe with its parts, elements and laws, and especially with such of its characteristics as space, time, causality and freedom (Dictionary.com, 2015).

Ecosystem – A system of living organisms interacting with each other and their physical environment. The boundaries of what could be called an ecosystem are somewhat arbitrary, depending on the focus of interest or study. Thus, the extent of an ecosystem may range from very small spatial scales to, ultimately, the entire Earth (IPCC, 2007).

Epistemological – The study or a theory of the nature and grounds of knowledge, especially with reference to its limits and validity (Merriam-Webster, 2015).

Erosion –The process of removal and transport of soil and rock by weathering, mass wasting and the action of streams, glaciers, waves, winds and underground water (IPCC, 2007).

Fauna – All the animals that live in a particular area, time period or environment (Merriam-Webster, 2015).

Flora – All the plants that live in a particular area, time, period or environment (Merriam-Webster, 2015).

Positive Feedback Loop – Occurs when the output of a process influences the input of the same process in a way that amplifies the process, often in a destabilizing manner (Bennett et al., 2005).

Riparian – Relating to or living or located on the bank of a natural watercourse (as a river) or sometimes of a lake or a tidewater (Merriam-Webster, 2015).

Vulnerability – The degree to which a system is susceptible to, or unable to cope with, the adverse effects of change. Vulnerability in regards to climate change is a function of the character, magnitude and rate of climate variation to which a system is exposed, its sensitivity and its adaptive capacity (IPCC, 2007). The IPCC (2012) has since changed the definition of vulnerability to the propensity or predisposition to be adversely affected.

The Term Subsistence

With the understanding that the term "subsistence" is widely used across the world today, ICC-Alaska appreciates that some may view this report as a description of subsistence. We propose that Alaskan Inuit food security encompasses much more than subsistence as legally defined within Alaska. Within Alaska, the term subsistence has legal connotations that do not reflect all that is encompassed within the obtaining, processing, storage and consumption of food. Consider, for example, the sharing of knowledge, learning about respect, the various meanings of food, etc. Further, many of our people have expressed discomfort regarding the word subsistence, as it can be assigned whatever definition is most convenient for the reader, which may lead to incorrect or inaccurate interpretations. As one contributing author noted, the term subsistence is a word that amplifies the "sub," which connotes something subpar, subjective or of lower meaning and interpretation.

"The weather switches really quick when we are out whaling and we had to go slow because it is glassy and we didn't want to get wet. We can't depend on their [state and federal regulations] time frame for moose and fish with the weather changing so quickly."

" What is happening to our animals is alarming. A walrus found earlier this year was skinnier then ever seen and the heart was hard. The liver was discolored. We see the livers of animals discolored more often. The stomach contents of walrus are an indication of other things going on. People eat the contents of the stomach. The stomachs have been empty. This is a concern of the walrus, the clams, the ecosystem, and a loss food source."

"Here in Alaska, we have sports hunter groups who want to take away our rights. With the high cost of store bough foods, high cost fuel for heating, high cost of gasoline, high cost of electricity, even [lack of] sewer and water contribute to the poor state of mind for the people that live in the Arctic."

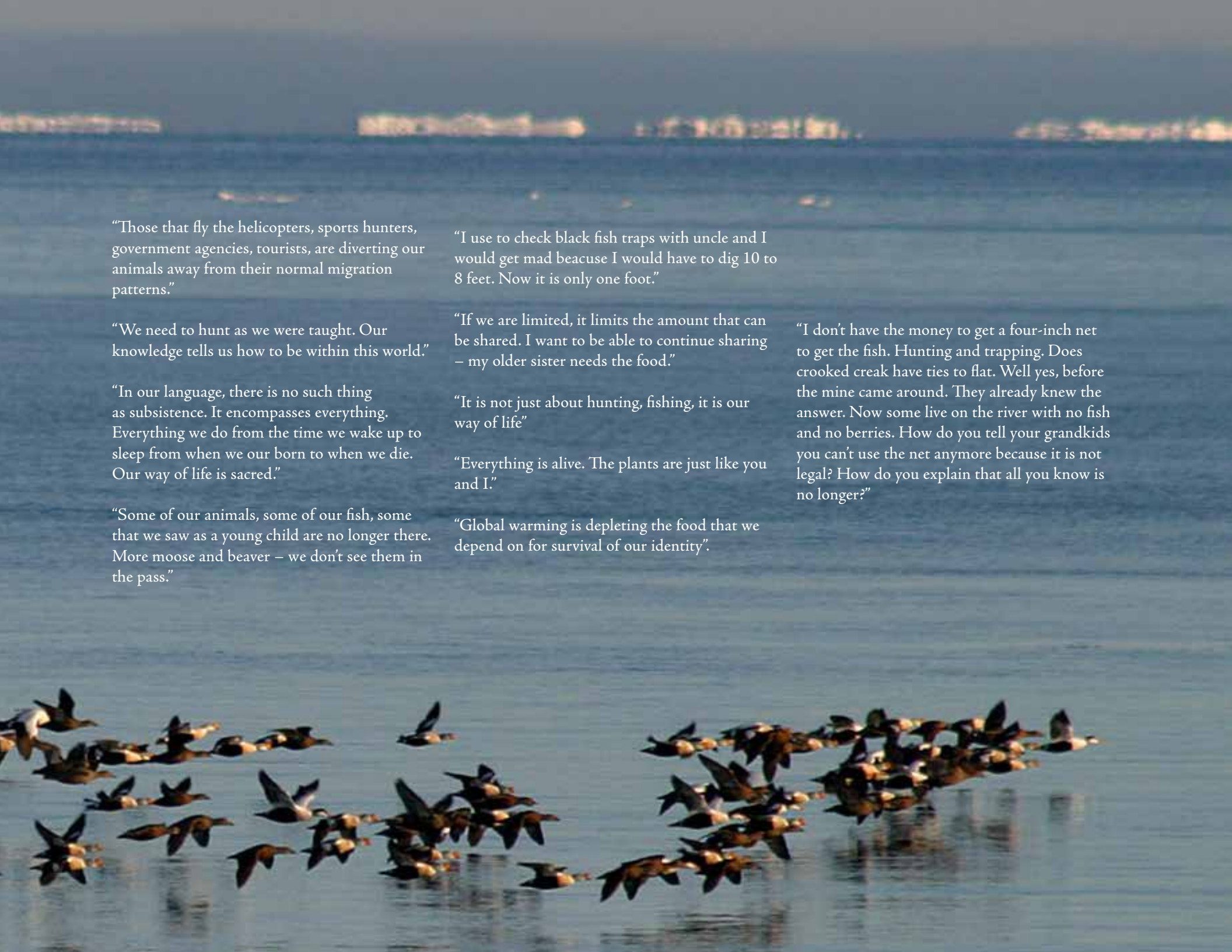
"Global warming/climate change are impacting us and causing shortages of some foods, like salmon berries. Salmonberries have always been abundant here. We are always known to have lots of berries, where lots of people can come to visit and enjoy picking berries."

"We use everything that we harvest. There are undeniable parts of every animal, even farmed animals. Those parts we put back in the ocean for recycling purposes. Crabs, birds, and others eat them. Walrus eat those animals and it comes back to us. All parts of the animal that is sent out, we know is going to come back to us, like the bones and tusk that wash up on shore. We use this to make art. We receive cash to pay for out utilities that keep with lights and freezers and we pay for fuel to gather food. We use all from what we catch so everything is part of us."

"The warming temperatures are really impacting our hunting practices. From what we see, the wrong weather patterns are occurring and pushing the ice. We keep getting the south wind. It is normally the North wind that prevails and this wind keeps the leads open. The South winds pack the ice in and then we have poor hunting. For the first time in my life all of the meat racks are empty [in the village]. The global change is really hurting us."

All quotes provided during semi-directive interviews, community meetings, and/or regional food security workshops

Photo courtesy of North Slope Borough



"Those that fly the helicopters, sports hunters, government agencies, tourists, are diverting our animals away from their normal migration patterns."

"We need to hunt as we were taught. Our knowledge tells us how to be within this world."

"In our language, there is no such thing as subsistence. It encompasses everything. Everything we do from the time we wake up to sleep from when we our born to when we die. Our way of life is sacred."

"Some of our animals, some of our fish, some that we saw as a young child are no longer there. More moose and beaver – we don't see them in the pass."

"I use to check black fish traps with uncle and I would get mad beacuse I would have to dig 10 to 8 feet. Now it is only one foot."

"If we are limited, it limits the amount that can be shared. I want to be able to continue sharing – my older sister needs the food."

"It is not just about hunting, fishing, it is our way of life"

"Everything is alive. The plants are just like you and I."

"Global warming is depleting the food that we depend on for survival of our identity".

"I don't have the money to get a four-inch net to get the fish. Hunting and trapping. Does crooked creak have ties to flat. Well yes, before the mine came around. They already knew the answer. Now some live on the river with no fish and no berries. How do you tell your grandkids you can't use the net anymore because it is not legal? How do you explain that all you know is no longer?"

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