TRANSBOUNDARY AGREEMENT:

CASE STUDIES OF MARINE MAMMAL MANAGEMENT IN THE BERING STRAIT

By

Kelsey B. Aho, B.A.

A Thesis Submitted in Partial Fulfillment of the Requirements

for the Degree of

Master of Arts

in

Arctic and Northern Studies

University of Alaska Fairbanks

December 2016

APPROVED:

Dr. Amy Lovecraft, Committee Chair
Dr. Brandon Boylan, Committee Member
Dr. Martin Robards, Committee Member
Dr. Mary Ehrlander, Director of *Arctic and Northern Studies*
Todd Sherman, Dean *College of Liberal Arts*
Dr. Michael Castellini, *Dean of the Graduate School*

Abstract

The effectiveness of a state's natural resource management is rendered meaningless if the particular resource migrates into another state's jurisdiction. In the case of marine mammals, inadequate management of the species anywhere along their annual migration could make food insecure for the regional human populations. My research evaluates to what extent International Environmental Agreements have been able to manage transboundary challenges to food security. Two case studies, the *Polar Bear Agreement* (U.S. Fish and Wildlife Service, 2000) and the *International Convention for the Regulation of Whaling* (International Whaling Commission, 1946), are analyzed quantitatively and qualitatively using Ronald Mitchell's four factors for describing variation of International Environmental Agreements' effectiveness: incentives, capacities, information, and norms. To ensure food security in the Bering Strait, this thesis stresses the importance of local concerns, norms and stakeholders. Transboundary management includes stakeholders at various scales to address a local challenge that is intersected by an international political boundary. The higher values of the Bowhead whale International Environmental Agreement's four factors, in the quantitative analysis, account for the higher level of food security for Bowhead whale. The qualitative analysis makes three recommendations for future International Environmental Agreements, in this case the draft U.S.-Russia agreement on Pacific walrus: 1) conservation of the Pacific walrus, 2) maintenance of Native self-determination and, 3) encouragement the flow of information between the local and federal stakeholders and between the United States and Russia. In order to ensure future food security in the Bering Strait Region, the management of the Pacific walrus depends on an effective International Environmental Agreement.

Table of Contents

List of Figures

Acknowledgements

I want to thank Dr. Amy Lovecraft and Dr. Martin Robards for their years of support of my geographic interest in the Bering Strait. Both assisted me in securing a summer research position with the Shared Beringian Heritage Program. Additionally, this thesis and its analysis would not have been possible without their guidance and insights. Thank you Dr. Brandon Boylan and Dr. Mary Ehrlander for your ongoing persistence to focus my writing, and for the year-long Research Assistant position with Model Arctic Council. Additionally, I would like to thank the Resilience and Adaptation Program and it's fellows for providing support regarding the biology and systems involved in my research. I would also like to thank the Resilience and Adaptation Program and EPSCoR for funding an internship and a significant portion of my coursework. Finally, I would like to express my gratitude to my mom, dad, Matthew Labrenz and Eduard Zdor for their unending willingness to vet my research and support this multi-year project.

Chapter 1: Introduction

Introduction

The boundary lines of states are not representative of ecosystems. Inherently, terrestrial and marine ecosystems often cross these political demarcations. In a time of unprecedented ecological and social change in the Arctic, the rural populations spanning the Bering Strait Region are emphasizing the need for policy that will minimize disturbance to one of the traditional backbones of the region's food security: the Pacific walrus (Metcalf & Robards, 2008; MacCracken, 2012). The insecurity of several marine mammal species has heightened the need for effective management in the Bering Strait Region. One counterexample, the Bowhead whale, is increasing in population size and has set an historical precedent for co-management in the Arctic. Local indigenous stakeholders, key players in the co-management process, depend on these species for ecological and social wellbeing. This regional collaboration addresses both local concerns and the two federal governments' cooperation.

The two countries bordering the Bering Strait, the United States and Russia (previously the U.S.S.R.), are not known to see eye-to-eye politically. However, they do share interests in the Bering Strait Region's natural resources, human populations, and strategic geography. My thesis analyzes the strengths and shortcomings of existing United States-Russia marine mammal policies that aim to ensure individual aspects of food security. With strengths and shortcomings identified, recommendations will be made for the unfinished Pacific walrus agreement. This thesis answers the question: To what extent have International Environmental Agreements been able to manage transboundary challenges to food security? With food security as the dependent variable, this thesis begins by examining whether effective International Environmental Agreements lead to greater food security.

Two marine mammals, in addition to the Pacific walrus, inhabit the transboundary region and are co-managed under United States-Russia International Environmental Agreements. These two species are Bowhead whale and polar bear. All three species were historically and

continue today to be critical to food security. Food security in the Bering Strait Region is as critical for health as it is for the region's cultures (Inuit Circumpolar Council-Alaska, 2015). The Inuit Circumpolar Council defines food security as the "entire Arctic ecosystem …[which] teaches us when, where and how to obtain, process, store and consume, … the importance of dancing and potlucks to share foods, … our rights to govern how we obtain, process, store and consume food, … and how it [indigenous knowledge] will aid in illuminating the changes that are occurring" (Inuit Circumpolar Council- Alaska, 2015).

In this thesis, International Environmental Agreements represent the political capacity of the United States and Russia to manage the region's food security by comparing four factors of the marine mammal agreements. Generally, regions' populations are represented by the international agreements that the individual states sign as the peoples' representatives (Brownlie & Baker, 1973). However, in the Bering Strait Region, the indigenous population has largely influenced and even administered the United States-Russia agreements. Commonly, international agreements are understood through interstate actors. This thesis additionally considers actors at local and regional scales (see Figure 3.8, Figure 4.2). Due to the cross-scale nature of this thesis, attention has focused on providing equal representation to Native,[1] non-Native, Russian and American actors. While most reviewed literature has been in the English language, great effort was taken to represent Native, non-Native, Russian, and American perspectives. Additionally, of the 23 Bering Strait Region experts interviewed, eight were Russian and six were Native.

The two existing International Environmental Agreements, the *United States-Russia Conservation and Management of the Alaska-Chukotka Polar Bear Population* (2000) and the *International Convention for the Regulation of Whaling* (1946), have been executed differently in their respective countries, and the two agreements developed differently. A consequence of this range of effectiveness is the range of food security across the Bering Strait Region. These differences between the two states and the two agreements will provide the basis for policy recommendations drawn for Pacific walrus.

[1] "Native" is used throughout the thesis in lieu of synonymous terms, such as Indigenous, in order to follow legal precedent.

Ronald Mitchell (2006) references International Environmental Agreements in his discussion on the political capacity to handle transboundary management in *Problem structure, institutional design, and the relative effectiveness of international environmental agreements*. Since this thesis focuses on the political capacity of the Bering Strait Region to manage transboundary marine mammals, Ronald Mitchell's four factors for describing variation of International Environmental Agreements' effectiveness: incentives, capacities, information and norms, are used to evaluate the effectiveness of these two existing international agreements (Mitchell 2006). Mitchell's four factors fit the scope of this thesis because they specifically address ecological concerns shared by multiple countries. Mitchell's (2006) four factors assist in identifying the components of an agreement that work well and work poorly in specified conditions. Instead of prescribing conditions based on an outside or ideal example, the four factors compare the three case studies discussed in this paper. The success and shortcomings of the first two case studies guide the three recommendations for the draft United States-Russia policy regarding the Pacific walrus. Regarding this third case study, this research asks: What recommendations can be drawn from the existing International Environmental Agreements for a future Pacific walrus agreement? The following outline provides background, questions and detail on the thesis' process that lead to this aforementioned question.

Chapter 1: "Introduction" provides a brief history of the Bering Strait's marine mammals before turning to the social-ecological system as a framework for subdividing the ecological and social properties of the geographic area into exogenous, slow, and fast properties. The visualization of a social-ecological system of the Bering Strait Region (see Figure 1.1: A Social-ecological system of the Bering Strait Region) is based on Chapin, Kofinas, and Folke's (2009) "Social-ecological System". The social-ecological system shows the interconnectedness of the Bering Strait Region's two (ecological and social) systems. For example, the biophysical change of ice (the slow ecological property) affects marine mammals, specifically ice-obligate species such as polar bears and Pacific walrus. This indirect effect of sea ice change on food security will be demonstrated. The food security (the slow social property) of the Bering Strait Region depends equally on the region's social and ecological components. Following Figure 1.1, the

study's boundaries are explained (see "Geographic Scope" in the top left corner of Figure 1.1), followed by the ecological properties "Climate and Biophysical Change", "Marine Mammals", and "Resource Density". Then the background shifts to focus on the social aspects "Political Alliances" and "International Agreements." Chapter 2 covers "Food Security," the identified slow social property, in depth. "International Agreements," the exogenous social property, begins by addressing a fast growing human threat to the ecology of the Bering Strait Region: shipping. Increased shipping threatens specific marine mammals and it is the biophysical change that makes increased shipping possible. Since the majority of natural resources in the Bering Strait Region are threatened due to their statuses as common-pool resources, one of Elinor Ostrom's (1990) design principles is used to emphasize the importance of cross-scale involvement, emphasizing the importance of local to federal collaboration. Common-pool resource management in the Bering Strait Region requires both stakeholder participation and co-management. Both of these requirements are defined in reference to the Bering Strait Region's International Environmental Agreements. International Environmental Agreements for common-pool natural resources are used to measure the region's food security since, in the Bering Strait Region, International Environmental Agreements incorporate local to federal stakeholders and do so for social and ecological reasons. Chapter 1's "Methodology" outlines how the two International Environmental Agreements were chosen for the comparative case study. Ronald Mitchell's four factors are described as the conceptual framework for analyzing the International Environmental Agreement case studies. The four factors evaluate many overlapping components of the agreements, such as stakeholder participation and co-management. Both of these topics will be given attention since, the future of the Bering Strait Region's marine mammals relies upon international agreements between the United States and Russia.

The status of the political relationship between the United States and Russia is critical for understanding the Bering Strait Region's transboundary policy. This thesis addresses politics and food security together in Chapter 2: "The United States- U.S.S.R./Russia's Transboundary Relations." Political aspects of food security receive lesser attention in academic literature than cultural and ecological aspects. Chapter 2 demonstrates how local and federal bodies are

involved in the region. Chapter 2 begins by reviewing the variety of types of agreements between the United States and U.S.S.R./Russia that have been formalized since the late 1980s, and the goodwill symbolism of the Bering Strait Region that ensued. The chapter addresses the shared goals of United States-U.S.S.R./Russia documents and agreements. Collectively, social and ecological components (Inuit culture, health and wellness, decision making power etc.) of these agreements address the multitude of components within the Inuit Circumpolar Council's interpretation of food security. The national security of both states is discussed in reference to food security and as a driver for further political collaboration in the Bering Strait Region. Chapter 2 understands the "bridge of hope" symbolism as a reference to increased involvement of local participation in United States-Russia collaboration and in concert with national security concerns. As a result of local participation, food security became a goal shared by both states, and is described as a critical contemporary challenge for the populations throughout the region (Inuit Circumpolar Council-Alaska, 2015). The State of Alaska and the Inuit Circumpolar Council's definitions for food security are provided to emphasize the influence of regional norms. International Environmental Agreements provide benefits for both federal and local stakeholders. In the discussion on International Environmental Agreements, Native commissions have a seat at the marine mammal management decision-making table, granting local populations a say in their own food security. Chapter 2 discusses equity concerns and notable outcomes of marine mammal policies' collaborations between local and federal actors. The chapter concludes with the contemporary relations and challenges between the United States and Russia, recognizing that International Environmental Agreements have had both successes and shortcomings.

Chapter 3: "Successes and Shortcomings of Co-management: How International Environmental Agreements Affect Food Security" uses two case studies, the *United States-Russia Conservation and Management of the Alaska-Chukotka Polar Bear Population* and the *International Convention for the Regulation of Whaling* regarding Bowhead whale, to discuss past successes and shortcomings of formalized United States-Russia co-management. While informal co-management is explored in Chapter 2 and can be representative of norms, this thesis

examines formal co-management backed by International Environmental Agreements regarding the Bering Strait Region's marine mammals. The International Environmental Agreements, as the independent variables, are analyzed with regard to their impact on the dependent variable: food security. The entirety of Chapter 3 is built around answering the question: To what extent have International Environmental Agreements been able to manage transboundary challenges to food security? Due to the assumption that policy, as a fast social property (see Figure 1.1), can address these impacts, the *United States-Russia Conservation and Management of the Alaska-Chukotka Polar Bear Population* and the *International Convention for the Regulation of Whaling* are analyzed as two agreements set up to address threats to the Bering Strait's food security. Using Ronald Mitchell's four factors, the International Environmental Agreements will be quantitatively and qualitatively evaluated. For the purpose of this paper, the term International Environmental Agreements (IEAs), will be used from this point as a comprehensive term for international treaties, conventions, protocols, Memorandums of Understanding and other agreements. As mentioned earlier, the four factors being used to evaluate the effectiveness of the transboundary policies include incentives, capacities, information and norms. These four factors differentiate problems and institutional design from one another. The quantitative analysis results in a cumulative value of 9 for the *United States-Russia Conservation and Management of the Alaska-Chukotka Polar Bear Population*, while the combined factors under the *International Convention for the Regulation of Whaling* total 12. These numerical values are based on the agreements' effectiveness in both the United States and Russia. Thus, if Russia is highly successful under one factor but the United States has little to no success, the results will be pooled and the category will be given the average of the two realities. This averaging of the scores is important, because it shows the influence of both states on the effectiveness of an IEA. The higher values of the four factors for the Bowhead whale IEA account for the higher level of food security for Bowhead whale. Accordingly, the lower values of the Polar bear IEAs four factors reflect the lower level of food security based on polar bear. Chapter 3 answers to what extent have International Environmental Agreements been able to manage transboundary challenges to food security, based on *United States-Russia Conservation and Management of the*

Alaska-Chukotka Polar Bear Population and the *International Convention for the Regulation of Whaling*.

Chapter 4: "Analysis of and Recommendations for Transboundary Management: A Case Study on Pacific Walrus" begins with the species' trends since the nineteenth century and the subsequent scientific collaboration between the United States and Russia during the twentieth century. Pacific walrus are bottom-feeders, making the Bering Strait a perfect home since its deepest points are less than 100m (Ray, McCormick-Ray, Berg, & Epstein, 2006). However, according to Jay, Fischbach, and Kochnev (2012) Pacific walrus are moving further North, and according to Kochnev (2016) the gender and mortality rates of haulouts are changing. Both of these trends are associated with changes in sea ice thickness and availability. The 2016 Pacific Walrus Protection and Management in a Changing Climate seminar is incorporated in this chapter as valuable local-federal and United States- Russia dialogue on Pacific walrus. Chapter 4 explains the ongoing need for a Pacific walrus IEA, through the drafted agreement from the 1990s. The discussion on the needs of the Pacific walrus references the successes and short-comings faced by *United States-Russia Conservation and Management of the Alaska-Chukotka Polar Bear Population* and the *International Convention for the Regulation of Whaling*. Chapter 4 then outlines the incentives, capacities, information, and norms of Pacific walrus in 2016. The comparative gaps in the draft Pacific walrus IEA include: 1) the lack of an international organization championing Pacific walrus, 2) the lack of a single historical event that mobilized action and 3) the lack of a current large-scale or commercial harvest threat, even though commercial harvests have been devastating in the past. Chapter 4 concludes with the three following recommendations for the Pacific walrus IEA: 1) conservation of the Pacific walrus, 2) maintenance of Native self-determination and, 3) encouragement of the flow of information between the local and federal stakeholders and between the United States and Russia. In order to ensure the future food security of the Bering Strait Region, the management of the Pacific walrus depends on a highly effective IEA.

The following literature review relies on primary and secondary literatures to discuss the individual properties of the Bering Strait Region. The "Social-Ecological System: The Bering

Strait Region" section affirms the need for a co-management through an IEA. In the Bering Strait, co-management under an IEA involves stakeholders and is an iterative process, due to the speed and scope of the changes experienced by the region.

Literature Review

A Social-Ecological System: The Bering Strait Region

About 200 years before the Pacific walrus IEA was drafted, stakeholders diversified to include non-indigenous individuals. This broadening of stakeholders occurred as marine mammals from the Bering Strait Region made their way into international markets, valued because of their skins and oil, and with the Gold Rush of the nineteenth and twentieth centuries. Before technological advances in Western European exploration and due to the harsh climate, the Bering and Chukchi Seas had remained largely out of reach to the colonizers of the fifteenth, sixteenth, and seventeenth centuries (Ray, 1975). This unsympathetic climate, however, produced a resilient indigenous population and one of the oceans' most productive ecosystems in the world (Mathis et al., 2010; Ray et al. 2006; Wexler et al., 2014). The ecological and social systems were well integrated before the arrival of the Russians and the Americans in the eighteenth century.

Today, the Bering Strait Region has local, regional, and federal stakeholders. The two separate governments have a stake in upholding the functioning ecological and social systems. In order to better understand how the systems are interdependent in the Bering Strait, literature on one of the Bering Strait's social-ecological systems will be reviewed, starting a general background on the concept of social-ecological systems. The "Ecological scope" section will provide geographic bounds to this study. Global climate change's impacts on the Bering Strait Region will be demonstrated through discussion on "Climate and Biophysical Change." The biophysical change, in the form of sea ice, applies to the Bering Strait Region through the changes predicted for marine mammals' migrations. Changes of the migration of species at the highest trophic positions over the next 100 years is expected to cascade impacts down through

the food web. The time-scale then narrows from the long-term predictions, to short-term concerns that occur in a day or a year. One aspect experiencing fast change is "Resource Density." Stampedes cause rapid changes in Pacific walrus' population density. The cause of stampedes is connected to both social and ecological properties. Social properties of the Bering Strait Region correspond with the slow and fast ecological changes. The fast social property, "Political Alliances," shows how sudden changes in U.S.-Russia relations, similar to changes in marine mammal migration, can cause a cascade of changes onto the local human populations. A slower changing social property is food security, which has been shaped over hundreds, sometimes thousands, of years. Summing up this review of the Bering Strait Region's social-

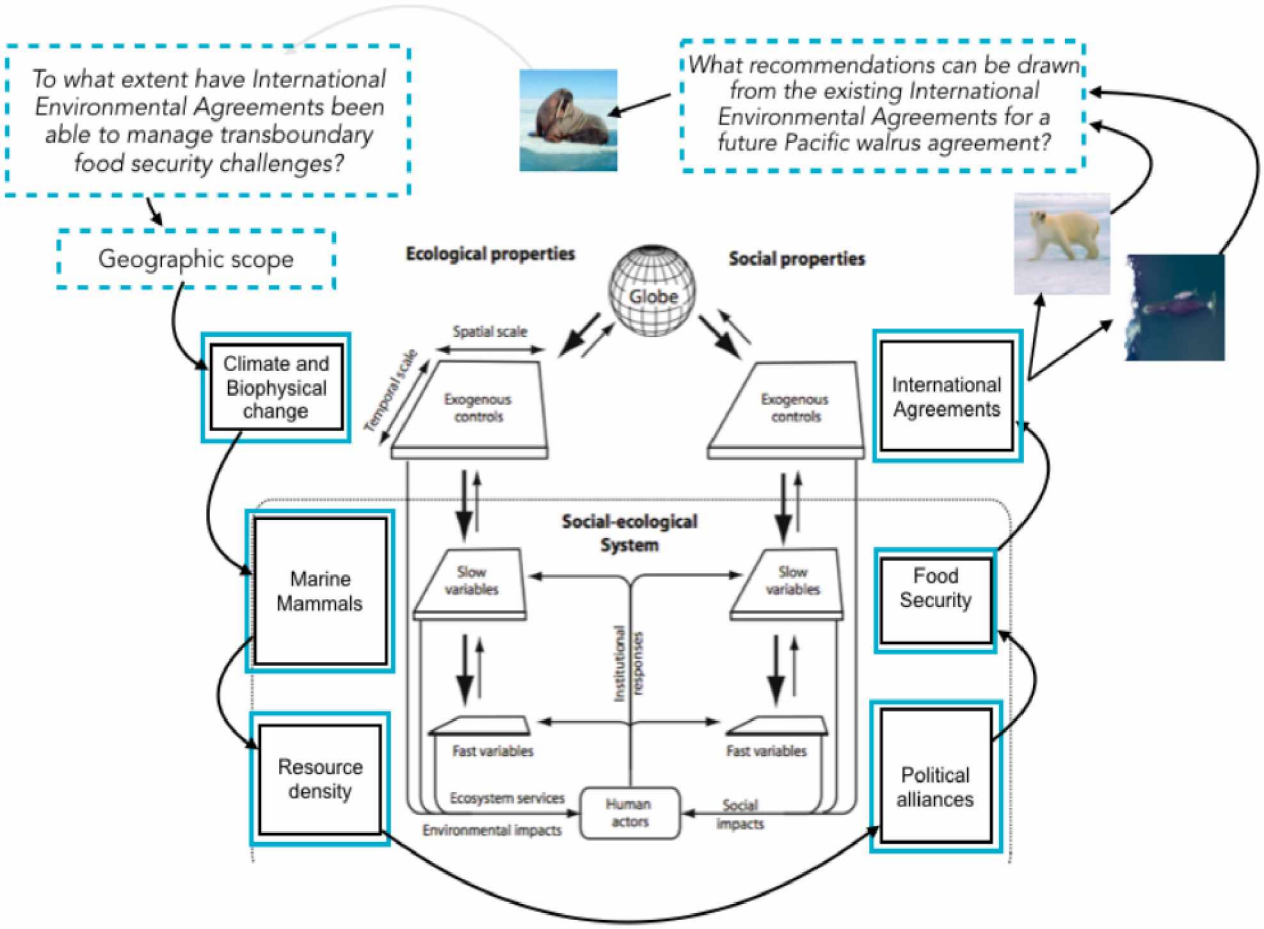

Figure 1.1 A Social-ecological System of the Bering Strait Region
Source: (Chapin, Kofinas, & Folke, 2009)

ecological system, IEAs will be addressed as exogenous social properties. The Bering Strait Region's IEAs' transboundary relevance and connection to Moscow and Washington D.C. puts them at an international scale. This thesis assumes that IEAs have the ability to address both social and ecological changes occurring in the Bering Strait Region.

Due to the inter-tribal collaboration on the transboundary social and ecological needs of the Bering Strait Region, food remained relatively secure over the last several millennia. This thesis will review social-ecological systems (SESs) to explain the interconnections between the individual ecological and social properties. "A Social-Ecological System," in this case, considers both relations between local stakeholders of the Bering Strait Region and the exogenous stakeholders of the United States and the U.S.S.R./Russian federal governments. Through discussing both social and ecological components of the SES and the local and regional actors, the successes and shortcomings from the region's IEAs can be identified.

At the turn of the twenty-first century, SESs rose to the forefront of interdisciplinary human systems and ecology theories. SESs provide a method for coupling social and ecological systems. Today, many of these ecology-social systems are challenged by changes in the local ecosystem. The endangered status of ice-obligate marine mammals, such as polar bear and Pacific walrus, are results at least partially from human behavior. Many of the human threats come from outside of the region or individuals from outside the region. Examples of outside threats include excessive harvests of common-pool resources, climatic change, and the subsequent increase of shipping (Hovelsrud, McKenna, & Huntington, 2008). SESs provide a useful framework for studying human management by exploring the system's complexity through a number of properties. Due to their adaptability, SESs are understood as offshoots of resilience theory, symbols of panarchies of change, and as a model of the cross-scale and social-ecological interactions that exacerbate or lessen change.

In 1973, Crawford Holling developed a theory of "ecological resilience" that combined ecological theory and the behavior of natural systems within a single framework. Holling (1973) defined r*esilience* as "the persistence of relationships within a system and [a] measure of the ability of these systems to absorb changes of state variables, driving variables, and parameters,

and still persist". Notably, Holling emphasized that resilience did not mean strictly stability or equilibrium. In Holling's understanding, fluctuations exist and populations absorb these extremes. For example, in one of Holling's (1973, p. 18) simplified scenarios, species in the Arctic are seen to have more climatic resilience than those in the tropics, due to their ability to persist despite great temperature variation throughout the calendar year.

At the turn of the twenty-first century, Frances Westley, Steven Carpenter, William Brock, Crawford Holling, and Lance Gunderson (2001) used Holling's (1973) resilience theory to examine SESs in *Panarchy: understanding transformations in human and natural systems*. The authors defined SESs as "panarchies of change". Westley et al. (2001) applied Holling's ecological resilience theory to SESs, by additionally focusing on social systems. Using Westley et al.'s definition of SESs, *Navigating Social-Ecological Systems* (Berkes, Colding, & Folke, 2002) adds management recommendation to SESs.

Fikret Berkes, Carl Folke, and Johan Colding (2002) applied Holling's (1973) ecological understandings of resilience to entire social systems in *Navigating Social-Ecological Systems*. Berkes et al. (2002, p. xi) define SESs as, "how human societies deal with change in coupled social-ecological systems and build capacity to adapt to change." Berkes et al. (2002) focus additionally on understanding how to manage change, specifically in the form of cross-scale institutional management. Berkes et al. (2002, p. 356) first method for building resilience is "learning to live with change and uncertainty". Learning only occurs if incorporated with a cross-scale institutional response. Learning must occur at every scale from local to international, or the shortcomings and uncertainties would simply repeat themselves, time and time again. In Berkes et al.'s (2002) conclusion, the authors discuss how cross-scale institutional responses are utilized today in the case of the United States' forestry policy. Looking towards the future, Berkes et al. (2002) claim that capacity will be built through additional knowledge, social and ecological diversity, and change. Ronald Mitchell (2006) uses similar criteria to evaluate the capacity of international agreements.

In *Navigating Social-Ecological Systems,* Berkes et al. (2002) claim that traditional[2] approaches to management take place alongside environmental uncertainty or change. Berkes et al. (2002) say many social groups take part in managing uncertainty, such as scientific, stakeholder, and political communities. While Berkes et al. do not discuss policies' capacities to handle transboundary management, Mitchell (2006) discusses the political capacity. The political capacity of the Bering Strait Region is equally dependent on the resilience of the region's ecological and social properties. For the purpose of this thesis, those properties will be addressed after the geographic scope (as seen in the top left corner of Figure 1.1) is defined.

Geographic scope

Starting with the geographic boundaries, the Bering Strait Region, according to Oceana and Kawerak's co-produced *Bering Strait: Marine Life and Subsistence Use Data Synthesis,* lies just south of the Arctic Circle. As a waterway, the Bering Strait connects the Pacific Ocean to the Arctic Ocean, the Bering Sea to the Chukchi Sea, and the Seward Peninsula to the Chukchi Peninsula (Oceana & Kawerak, 2014). The ecological components of the Bering Strait, as defined by Moore and Stabeno in *Synthesis of Arctic Research (SOAR) in marine ecosystems of the Pacific Arctic* (2015), depend on the shallow, broad continental shelf as the "only gateway for Pacific water to enter the Arctic". Peaking productivity in the summer, the Bering Strait provides heat, nutrients, and plankton to the Chukchi and Beaufort marine ecosystems (Moore & Stabeno, 2015). This seasonality "of both sea-ice cover and transport" supports the ecosystem from primary production to upper trophic levels of the ecosystem (Moore & Stabeno, 2015, p. 1).

These geographic and ecological definitions of the Bering Strait Region provide an understanding of an ecosystem with dramatic annual fluctuations, as well as rapid warming over a longer time period. The geographic demarcations of the region's ecology are likely to change as the Arctic Ocean's ice decreases in the future. According to Moore and Stabeno (2015), changes in the flow of water through the Bering Strait, "can impact the world climate far beyond the

[2] Traditional here refers to, "local, indigenous or traditional knowledge refers to ecological understanding built, not by [scientific] experts, but by people who live and use the resources of a place" (Berkes, Colding & Folke, 2002).

Bering Strait and Arctic region" (p. 2). Moore and Huntington (2008) argue that as the boundaries of the rich sea ice ecological setting that provides food and homes to many marine mammal species change, management must adapt in order to sustain the individual marine mammal populations.

These definitions of the geographic and ecological boundaries integrate opinions of scientists, Native populations, and politicians from the Arctic. This integration of opinions represents Ostrom's (1990) "nested enterprise" theory. Spanning from local to federal, stakeholders' voices are diverse and still recovering from two centuries of exploitation of their local knowledge and natural resources.

Ecological properties

This section address the three ecological properties "Climate and Biophysical Change", "Marine Mammals", and "Resource Density". The social properties "Political Alliances" and "International Agreements" follows.

Climate and biophysical change

"Many marine mammals rely on this ice environment as a platform for resting and foraging, breeding, traveling, birthing, nursing, and mating. Many species also follow the movement of the ice in their migration patterns. However, each species is precisely adapting to different types of ice" (Marz & Medina, 2007, p. 6).

Stacy Marz' and Monica Medina's statement on the dramatic relationships within sea-ice ecosystems, address the multitude of sea ice uses. Individually, Bowhead whale, Polar bear, and Pacific walrus use the sea ice independently, but their uses are each affected by the biophysical changes.

The value of sea ice lies in the great productivity of the Bering Strait Region's continental shelf. Algae blooms occur in the spring, under the ice. Without the ice, the algae bloom would occur later once the water has warmed, and when zooplankton are already abundant. The zooplankton would consume the algae, leaving few nutrients to bottom-feeders such as the Pacific walrus. According to the International Panel on Climate Change, sea ice cover has decreased 15-20 percent in the last 30 years and total sea ice extent is decreasing at an even

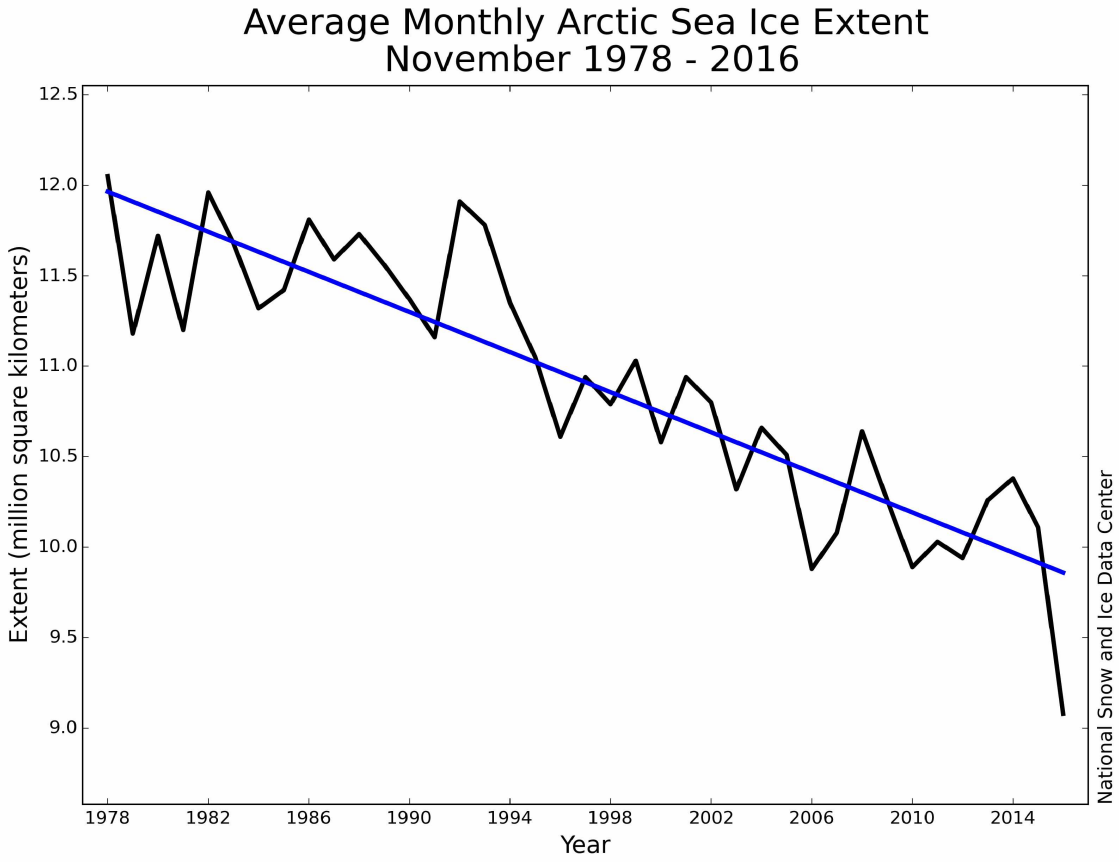

Figure 1.2: Average Monthly Arctic Sea Ice Extent
Source: (National Snow and Ice Data Center, 2016)

faster rate (Intergovernmental Panel On Climate Change, 2007; International Arctic Science Committee, 2010).

Moreover, ocean temperatures are predicted to increase, resulting in lower salinity and changes to the ocean's currents. The National Snow and Ice Data Center charting of sea ice extent shows a decrease from around 15.5 million square kilometers in 1979 to around 13.5 million square kilometers in 2016 (see Figure 1.2: Average Monthly Arctic Sea Ice Extent). Marz and Medina claim in “On Thin Ice” that “for marine mammals adapted to sea-ice, a reduction in ice is likely to be reflected initially by shifts in animals’ range and abundance”

(Marz & Medina, 2007, p. 9). For ice-obligate[3] species such as polar bear and Pacific walrus, anticipated changes include "declines in recruitment and body condition" while the changes for ice-associated marine mammals like Bowhead whale include "migration alteration and occupation of new feeding areas" (Moore & Huntington, 2008, p. 163).

These biophysical changes of the Bering Strait Region directly impact both marine mammals and those subsisting on marine mammals. As a legacy of the excessive harvests in recent history, hunters have already faced difficult seasons (Hovelsrud et al. 2008; Larson, 2013). The capacity of the United States and Russia to address these transboundary marine mammal management challenges depends on social collaboration in the face of rapid ecological changes.

Marine mammals: historic and modern maritime activity

Before Vitus Bering's exploration that brought him to the eponymous Bering Strait, during the first half of the eighteenth century, the region had been fairly untouched by others than the first settlers. Dorothy Ray's *The Eskimos of Bering Strait* (1975) discusses the Bering Strait's transformation from a locally used maritime space into a globally recognized maritime space over the course of the nineteenth and twentieth centuries. Ray (1975) notes that the discovery of Alaska can be traced at two different times to Siberia. The first was the initial migration of individuals over the land bridge during the Pleistocene and the second was a series of Russian explorations that began the an inauguration trade, diffusing nonnative traits across the Strait (Ray, 1975).

Following Vitus Bering's exploration in the Bering Strait Region, other European states sponsored expeditions to the region (Frost, 2003). This rush of states from far away marks the delineation of the Bering Strait Region from being a local maritime area to being a globalized space. Ray (1975) notes that after 1848, the commercial whaling ships brought liquor, guns and

[3] "Ice-obligate", according to Moore and Huntington (2008) refers to species that are "reliant on sea ice as platform for resting, breeding, and/or hunting" while the term "ice associated" is broader and refers to species that are "associated with sea ice and adapted to the marine ecosystem of which ice is a key part" (p. 158).

exploitation of natural resources. Schools, missions, and the Gold Rush followed in "the subsequent rush of 1899-1900 to the Nome area combined with the measles epidemic of 1900 to affect native culture in a way that no event had done before, and at no other time in the historical period could the ending of one era and the beginning of another be seen so clearly" (Ray 1975, p. 9). With this new era came not only goods, but new scientific methods, ways of understanding, and harvesting the region's resources. As a consequence, the St. Lawrence Island famine took place in 1878 alongside Bowhead whale and Pacific walrus population collapses, largely ridding the Bering Strait Region of those industries by the turn the century (Bockstoce and Botkin, 1982; Nuttall, 2012). During the late nineteenth century St. Lawrence Island witnessed a famine in which two-thirds of the population perished and six of the original eight villages were lost (Ray, 1975). Causes included disease, bad weather, and famine due to the depletion of Bering-Chukchi-Beaufort Bowhead whale population and Pacific walrus populations. Experts estimate that from 1840 until the famine, more than half of the Pacific walrus and 90 percent of the Bering-Chukchi-Beaufort Bowhead whale population had been killed by outside whalers (Ray, 1975). In 1879, fleets shifted from whaling to walrusing, and Captain C. F. Nye journaled that whalers had been "destroying them [walruses] by the thousands; about 11,000 having been taken and 30,000 or 40,000 destroyed this year. Another year or perhaps two years will finish them..." (as quoted in Bockstoce and Burns, 1993, p. 575).

Despite the growing need for collaboration between holders of traditional ecological knowledge and western knowledge, both sources of knowledge have rarely been included within single publications. Overall, traditional ecological knowledge was given less legitimacy by twentieth century writers, except for in a certain collection of anthropologically focused literatures (Nelson, 1900; Giddings, 1960; Hopkins, 1967; Ray, 1975). Not until the second half of the twentieth century would the similarities and differences between these two trains of thought be compared. The first incorporation of both into policy would take another 25 years, and today the idea of using both western science and traditional ecological knowledge still only exists within certain geographical areas and subjects of policy.

The Bering Strait Region's local, regional, and federal actors work closest today to protect shared resources. Since the region is largely defined by the maritime area and its productivity, subsequent formal and informal IEAs focus significantly on marine mammals.

The robust ecological maritime production of the Bering Strait Region had led to concentrated human settlements in the Arctic, along the coasts of the Bering Strait, and on the strait-bound St. Lawrence and Diomede Islands (Ray 1975). Marine mammals and humans depend on the rich ecosystem, the sea ice, and on the shallow waters. Local and federal actors are concerned about marine mammals, because they represent the health of the Bering Strait Region's ecosystem. Pacific walrus's benthic bioturbation, for example, positively feeds back into the "productivity and ecological function" of the Bering Strait (Ray et al., 2006, p. 404). Local populations depend on marine mammals as a cornerstone of food security and therefore those governing over the region, at a variety of scales, work to meet human needs that are provided by marine mammals (e.g. tourism, food etc.). Humans depend on the marine mammals to annually migrate from the coast of Alaska to the coast of Chukotka and back again. The shallow water of the Bering Strait Region explains the benthic bioturbation, the high productivity, and the migration patterns of the maritime ecosystem. All of these conditions combined with the biophysical seasonality of the Bering Strait, make this region the world's largest and most productive continental-shelf system (Ray et al., 2006).

The region's marine mammals generate change in the Bering Strait Region's ecosystem, through their own adaptations to the decreasing amount of sea ice. Hovelsrud et al. (2008) predict the migrations of marine mammal from 2008 until the end of the century will extend further North. These predictions pertain to both ice-obligate and ice-associated species, illustrating the importance of ice for the entire ecosystem of the Bering and Chukchi Seas. The resource density of marine mammals is also incurring rapid changes, specifically during the longer open-water season which subsequently leads to greater interaction with humans.

Resource density

Hovelsrud et al. (2008) expect that the changes in marine mammal migration patterns, that they predict, will occur over the next century. However, more rapid changes are ongoing, for instance the sudden depletion in resource density that occurs with stampedes of Pacific walrus. During the twenty-first century, stampedes have been increasing, arguably, due to the changing locations of haulouts and increased human presence which leads to human disturbances (Udevitz, Taylor, Garlich-Miller, Quakenbush, & Snyder, 2013; Fischbach, Kochnev, Garlich-Miller, & Jay, 2016).

In the summer of 2007, an estimated 3000-4000 Pacific walrus were lost due to stampedes during haulouts (Roach, 2007). Roach lists the disturbances to Pacific walrus in 2007 as, "loud boats, low-flying airplanes, or the sight of predators such as polar bears" (p. 1). Researchers associate these disturbances, for the most part, with the increased human activity in the Bering Strait Region. Human activity over the last 50 years has increasingly included shipping, tourism, and resource extraction.

This overlap of the increasing number of stampedes and human disturbances has been a focus of public policy efforts. Changes in the Bering Strait, whether long-term such as changes in migration patterns or short term such as stampede caused deaths, are addressed within U.S.-Russia policy. Societies and governments use policy to address concerns in human behavior and its impact on the ecology. Social properties of the Bering Strait's twenty-first century SES, are addressed below. Food security, a slow social property as seen in Figure 1.1, will be discussed in Chapter 2.

Social properties

Social properties of a system, refer to its human involvement and human interests. Social properties reflect norms, political influence, and ecological ties of humans to their natural world. Some of these social properties, such as food security, take hundreds, sometimes thousands of years to fully develop. Rapidly changing properties (referred to here as "fast properties"), such as political alliances, exist as well. During the twentieth century, the United States and

U.S.S.R./Russia demonstrated how rapid disintegration of political alliances impacts transboundary marine mammals and the food security they provide to human populations.

Political alliances

The Bering Strait represents the on-the-ground political boundary between the United States and Russia. The status of the cooperation between the United States and the U.S.S.R./Russia directly impacts the Bering Strait Region. Cooperation, or lack thereof, correlates with the effectiveness and legitimization of the transboundary management. The political history of the Bering Strait Region addresses regionally based authorities and jurisdictions. Notably in 1989, American and Soviet teams co-published their goal for Beringian heritage and cultural recognition as the *Reconnaissance Study* (Union of Soviet Socialist Republics and United States of America, 1989). In 1990, at a Presidential summit, President Bush and President Gorbachev presented their desire for an international park that would be a "bridge of hope" (National Park Service, 1992). But in 1991, President Gorbachev was forced out of power. U.S. Senate Bill 2088, which had been introduced earlier in the year to establish the Beringian Heritage International Park, was never acted upon. Today, the states within the Bering Strait Region have weak diplomatic relations, which negatively impacts the collaborative management of the shared ecosystem. The insufficient diplomatic relations symbolize broader United States-Russia relations, not necessarily those of the local or regional stakeholders.

Broadly speaking, diplomatic relations between the United States and Russia have waxed and waned, especially as *small-numbered peoples*[4] and the *Arctic*[5] were redefined by the Russian

[4] The Russian Federation legally recognizes 41 small-numbered peoples consisting of altogether 200,000 to 300,000 indigenous persons (Mikkelsen, 2013). As defined by the Russian Federation's constitution, adopted by Yeltsin in December of 1993, a people must be distinct with a population of less than 50,000, indigenous to The North, Siberia or the Far East area, and maintain a traditional way of life (Rohr, 2014). The largest concentration of indigenous peoples live in the Arctic Zone of the Russian Federation.

[5] The Arctic Zone of the Russian Federation includes areas of Murmansk and the Nenets territories and the Chukotka and Yamalo-Nenets Autonomous Regions. Prior to May 2014 the Republic of Sakha (Yakutia), the Arkhangelsk province, and the Krasnoyarsk territory were also included in the Arctic Zone of the Russian Federation (Arctic Info, 2014). Russia has finally identified the land territory of the Arctic.

Federation, following the dissolution of the U.S.S.R. The beginning and end of the U.S.S.R. mark the most collaborative periods between Russia and the United States, as measured by the number of agreements signed between the two states (see Figure 2.1: Treaties between the United States and the U.S.S.R./Russia, 1945-2015). For example, the largest number of agreements between the two states were signed during the era of President George H. W. Bush and President Clinton (U. S. Embassy, 2013). For the United States-Russia relationship, the late 1980s and early 1990s embodied both uncertainty and the "creative destruction"[6] of policy. The documents and agreements outlined in Chapter 2's "The Bering Strait Region as a Symbol in the 20th Century" section emerged during this dynamic and creative era. Following the dissolution of the U.S.S.R., the United States and Russia worked closely. These relations weakened with President Putin's first term in office. By 2015, the cooperation between the the two states in the Bering Strait Region has come to a near standstill. Additionally in 2012, Russia issued a Foreign Agent Law, which requires non-profit organizations to register themselves as foreign agents if they receive a donation from abroad (121-FZ). This law has "marginalized independent groups" especially those geographically located along the periphery of Russia (Klimova, 2012). On the other hand, local authorities of the Bering Strait Region continue with their work according to Roop, Alessa, Kliskey, Fidel & Beaujean's *We Didn't Cross the Border; the Border Crossed Us* (2015). Roop et al. (2015) additionally claim that informal institutions have become stronger since the turn of the century.

Therefore authorities over resources in the Bering Strait Region overlap at different scales. Specific co-management agreements that embody these overlaps are the crux of United States-Russia relationship in the Bering Strait Region. Notably, these co-management agreements have the potential to counter-act outside impacts on the Bering Strait Region's social-ecological system.

[6] Meaning that when one thing fails, a window of opportunity is created for something new (Schumpeter, 1942).

International agreements: transboundary policy

International Environmental Agreements (IEAs) exist in order to lessen threats and impacts of human impacts to ecological systems. In the case of the Bering Strait, IEAs protect marine mammals and support the local traditional cultures that are integrated with the well-being of the ecosystem. IEAs can address a global phenomenon. The Kyoto Protocol, for example, broadly addresses climate change and has been signed by eighty-four states. Transboundary policy, a specific type of IEA, addresses a local or regional environmental concern. While these policies directly focus on a single species, they indirectly bring attention to entire ecosystems.

Max Dunbar (1968), an arctic oceanographer, summarizes the importance of each and every species within an ecosystem as: "we have been looking at evolution in the polar regions as an ecological problem, which indeed it is, and have emphasized the development of the ecosystem as a whole rather than the evolution of individual species within the system". A change amongst one Bering Strait species affects the entire ecosystem. Therefore, by understanding the changes that the Bering Strait Region's ecosystem is undergoing, the respective transboundary IEAs can effectively address a host of threats and implement lessons learned from the documented change of corresponding species in their shared ecosystem.

Transboundary policy[7] depends on institutions and stakeholders. Such institutions include established laws and normative customs. Transboundary policy, as established law, commonly exists as bilateral agreements or multilateral conventions. Norms drive policy of resource co-management, especially in the Bering Strait Region where local stakeholders have several thousand years' experience managing the ecosystem (Armitage, 2008 as cited in Robards & Lovecraft, 2010). Traditional ecological knowledge and management overlap significantly with transboundary norms. However, norms are not legally recognized as management practices; therefore, local transboundary stakeholders depend on bilateral and multilateral policies

[7] I refer to policy that crosses a political boundary line. In this paper, the Baker-Shevardnadze line of the United States-Russia Convention of March 18 1867 demarcates a political boundary being crossed.

(Salomon et al., 2011). Ideal transboundary policies reference local norms to increase their effectiveness (Cortell & Davis, 2000).

The International Arctic Science Committee's "Impacts of a Warming Arctic" states that biophysical change will generate five major impacts on society: loss of hunting culture, declining food security, human health concerns, wildlife herd impacts, and the expansion of marine shipping in the Arctic (International Arctic Science Committee, 2010). Declining food security is intimately tied to each of the other four expected impacts, and changes amongst any of those would directly impact food security. While historically, marine shipping in the Arctic was merely a dream of explorers, today, the threat of "expansion of marine shipping in the Arctic" has garnered substantial attention and led to international agreements. The increase of shipping is known to threaten common-pool resources upon which humans rely for food security. A discussion of international shipping agreements will lay the groundwork for transboundary policies on common-pool resource management in the Bering Strait Region.

The Bering Strait Region depends on the collaboration of more than one nation and more than one state.[8] The effectiveness of the common-pool resource management, under an IEA, depends largely on two conditions: the participation of the individuals managing the resources (stakeholders) and the quality of the management process (co-management). The two common-pool resource management conditions, "Stakeholder Participation" and "Co-Management", conclude this literature review on managing a transboundary social-ecological system.

Shipping

Shipping is increasing in the Bering Strait Region due to a longer ice-free season. The Intergovernmental Panel on Climate Change predicts that by 2050, the Arctic will be ice free for the summer (Intergovernmental Panel on Climate Change, 2013). Side effects of increased shipping include marine mammal strikes, increased pollution, oil and gas spills, an altered soundscape, and a need for regulations that support safe shipping lanes (termed "Port Access" by USCG) according to Reeves et al.'s report (Reeves, Rosa, George, Sheffield & Moore, 2012).

[8] In this thesis, "State" is defined as a politically governed area, while a "nation" is defined as a group of individuals unified by culture, history, religion, and/or a regional ecosystem.

The Age of the Arctic's (Young, 1985) forecast of arctic shipping cooperation needs in 1985, was substantiated by Reeves et al.'s (2012) "Implications of Arctic industrial growth and strategies to mitigate future vessel and fishing gear impacts on bowhead whales" thirty years later.

Several policies on polar shipping exist. *The International Convention for the Prevention of Pollution from Ships*, also known as MARPOL, addresses the side effects of polar shipping. MARPOL came into force in 1983, under the International Maritime Organization, addressing oil, sewage, garbage, noxious liquid, and air toxin discharge (International Maritime Organization, 1978). Both the United States and Russia are parties to MARPOL. In 2010, the U.S. Coast Guard carried out a Port Access Route Study (PARS) to evaluate new vessel routes as traffic increases. The Bering Strait PARS recommended north and southbound shipping lanes. A third regulation, the International Code for Ships Operation in Polar Waters (commonly known as the Polar Code), regulates pollution and shipping codes for activity in the polar waters, under both MARPOL and the International Convention for the Safety of Life at Sea. The International Maritime Organization officially adopted the Polar Code in 2014; it will enter into force in 2017 (International Maritime Organization, 2014). The Polar Code will affect the states party to MARPOL and institutionalizes Young's (1985) words 30 years prior: "a compelling case can be made for establishing cooperative regimes to deal with arctic shipping and for protecting the Far North's marine mammals" (p. 1).

These shipping policies concern local residents. While public comment periods have existed for all three of these regulations, whether the policies will incorporate the local populations' concerns because local residents likely endure the largest impact from the increased shipping, remains uncertain. The Bering Strait Maritime Symposium of 2013 in Nome, Alaska addressed this concern. The symposium, according to an article published in the Nome Nugget by Diane Haecker (2013), addressed issues related to increased shipping due to oil, gas, and mining. Local residents, who depend on the coastal maritime area for subsistence often refer to the area as the local "grocery store". Gay Sheffield, with the Marine Advisory Program in Nome, said the symposium was inspired by frustration expressed by local residents about the lack of information on how to deal with increased activity. [This lack of information will reappear in the

"Information: Rules, Roles, and Scientific Uncertainty" subsection of "Case Study: United States-Russia Conservation and Management of the Alaska-Chukotka Polar Bear Population."] Sheffield went on to say that the number one perceived immediate concern was "harm to essential marine mammal resources" (Haecker, 2013, p. 4). However, in legal terms and regardless of the traditional ecological knowledge of these local populations, historically, coastal Natives have had a small voice. Despite the Native populations' sparse numbers, community members engage through a handful of initiatives. To address increased shipping traffic, local Native populations created the Arctic Marine Mammal Coalition, comprised of five co-management organizations. Speaking on behalf of the Arctic Marine Mammal Coalition at the Bering Strait Maritime Symposium, Vera Metcalf said, "the Alaska Native voice was not fully heard at the national or international level when it comes to the health and safety of our people" (Haecker, 2013, p. 4). Yet these are the voices of the Bering Strait's common-pool resources' in-the-ground managers of the marine mammals and the co-management arrangements.

Common-pool Resource Management

Common-pool resource literature, as a sub-category of "International Agreements", narrows the focus of social exogenous properties to the Bering Strait Region. Common-pool resource management, additionally connects "International Agreements" to each of the aforementioned slow, fast, and exogenous ecological and social properties. Changes in sea ice directly impact the density of marine mammal species, decreasing food security. Political alliances that yield international agreements provide a cross-scale management option for these threatened common-pool resources.

Marine mammals, as common-pool resources, require cooperation and transboundary management, in order to reduce rivalry. Common-pool resource management focuses, according to Ostrom (1990), on the exclusion of rivalrous goods. Common-pool resource management includes natural and human-made resource systems that have lesser ability to exclude users and that face overuse problems. User exclusion occurs if users must pay to use a resource. Use of common-pool resources such as marine mammals is legally restricted, but fees are not applied to

legal users. High subtractability, or overuse, poses a problem if not properly managed by the users. Marine mammals, for example, have high subtractability, since consumption of a marine mammal completely bars another from consuming that marine mammal. Additionally, consumption of marine mammals is driven by the high value of their furs, meat, oil, and ivory. Legal non-monetary exclusion, in theory, stabilizes the subtractability of the resource. Legal methods include IEAs such as the *United States-Russia Conservation and Management of the Alaska-Chukotka Polar Bear Population* (U.S. Fish & Wildlife Service, 2001) and domestic agreements such as the *Marine Mammal Protection Act of 1972* (Marine Mammal Protection Act, 1972).

Elinor Ostrom's (1990) *Governing the Commons* has influenced thought on common-pool resource management. She provided eight design principles for institutions to manage the commons; that is, land or waters connected to everyone in the region's community. One of these principles, "nested enterprises" provides scalar insights to multi-layered monitoring and enforcement of the IEAs regarding common-pool resources of the Bering Strait (Ostrom, 1990). Nested enterprises bring several scales of actors together, such as local stakeholders, federal agencies, and international bodies, to manage a single resource. Nested enterprises are the basis for monitoring and governing transboundary species in the Bering Strait Region. The two legal agreements that endorse nested enterprise principles are the *United States-Russia Conservation and Management of the Alaska-Chukotka Polar Bear Population* and the *International Convention for the Regulation of Whaling*. The polar bears and Bowhead whales in Figure 1.1 exemplify these two case studies. The two marine mammal case studies have been chosen for this research project because they are the only transboundary policies that address migratory marine mammals of the Bering Strait. The category title *International* Environment Agreements emphasizes the transboundary nature of these policies.

Analysis in Chapter 3 of these two IEAs leads to the conclusion that they provide substantial food security. Consequently, Chapter 4 examines the potential for an IEA to provide food security through reliance on the Pacific walrus. Recommendations for this agreement come from the qualitative and quantitative evaluations of the two IEAs in Chapter 3. Figure 1.1 is an

iterative process, following the recommendations for the Pacific walrus with a reevaluation of the status of the Bering Strait's social and ecological properties.

Both local stakeholders and federal entities must participate in the transboundary policy in order to address regional incentives, capacities, information, and norms. Transboundary policy is essential for effective management of transboundary regions such as the Bering Strait. However, due to the surrounding transboundary policy, only 10 percent of the Bering Strait Region's policies are transboundary, meaning they include both the United States and Russia. In the case of separate policies regarding a single, transboundary species, that species can be threatened by the lack of local stakeholder participation or by separate management plans resulting from an inability to co-manage.

Stakeholder Participation

Transboundary institutions depend on successful management of common- pool resources at every scale. Institutions at a smaller scale include local and regional agreements or management bodies. These small scale institutions typically have a higher involvement of local stakeholders than institutions at larger scales. Institutions with a greater number of stakeholder participants generally lead to lesser conflict and better resource management, according to Oliver Hensengerth (2009).

Broadly, participation can also be understood as the involvement of stakeholder entities in maintaining national or stakeholder interest in the transboundary region. Participation may include governments or individuals at small scales, such as a local representative. Public participation can pose problems, according to Hensengerth (2009), even when regional organizations and governments are well developed if the participation is "incipient". For example, if local participation is underdeveloped, then Ostrom's (1990) "nested enterprise" theory could fail, since the high levels of governance in this model depend on the success of the lower levels. In a more general scenario, a lack of participation could dissolve linkages between government branches, lessening the complexity of the system. Participation and complexity, which are both sources of strength for the system, could be transformed into weaknesses, if they

are anemic or underdeveloped. Hensengerth (2009), argues that if participation is not integrated within government programs, then the nature of the intuitions and governance will change immensely. In the Bering Strait Region, a variety of Local-Federal collaborations exist, due to differences between the governance of the United States and Russia.

In order to better integrate local participation, the United States for example, has reviewed and reissued tribal consultation in Executive Order 13175 over the last 20 years (see Chapter 2's "Federal and Local Actors" subsection). Under the *Alaska National Interests Lands Conservation Act's* Section 801 rural stakeholders participating in a "subsistence way of life" who have "personal knowledge of local conditions" are guaranteed to have "a meaningful role in the management of fish and wildlife and of subsistence uses of public lands in Alaska" (16 U.S.C. 3111-3126). Many have argued that tribal consultation under Executive Order 13175 does not fulfill *Alaska National Interests Lands Conservation Act's* Section 801's definition of "meaningful" since often local participants' concerns are generalized by their representative regional corporations and some tribes are not consulted at all (Haecker, 2013; Landreth, 2015).

Stakeholder participation has been increasing within specific federal institutional tasks, such as managing and monitoring. Co-management of migratory species in the Bering Strait Region is an important methodology for bringing local, regional, and federal stakeholders from both sides of the Bering Strait together. That is, ideally, transboundary co-management would be able to extend both horizontally (between Russian and American institutions) and vertically (from local and federal scales). In 1997, for example, Protocol Amendments were implemented to the Migratory Bird Treaty (16 U.S.C. §703-712), due to the fact that the original treaty did not address traditional harvests. Therefore, the amendments accommodated subsistence harvests and management bodies to "ensure an effective and meaningful role of Alaska's indigenous inhabitants in the conservation of migratory birds" (Alaska Migratory Bird Co-Management Council, 2015, p. 1). Today the Migratory Bird Co-management Council body is required to have one state, one federal, and 12 Native representatives.

The involvement of 12 Native representatives, one from each of the 12 regions of Alaska under the *Alaska Native Claims Settlement Act*, is based on their on-the-ground knowledge and

irreplaceable traditional ecological knowledge (Alaska Migratory Bird Co-Management Council, 2015). Traditional ecological knowledge brings generations of oral knowledge and long-term observations to the management of natural resources. In areas like the Bering Strait Region, traditional ecological knowledge is especially valuable due to the population's thousands of years of interaction with the marine ecosystem (Krupnik, 2000). Regarding Pacific walrus, "people and their dogs ate the flesh; tools and weapons were made from ivory and bone; and skins provided covers for boats and dwellings". The knowledge was then passed along as "people spoke of walruses in tales and myths, honored them in ceremonies and prayers, and called children and geographical places by names used to describe them. Thus, indigenous knowledge of walruses springs from millennia of use" (Krupnik & Ray, 2007, p. 2947). Krupnik and Ray (2007) note that biologists from outside the region began learning about the Pacific walrus in the nineteenth century.

Native stakeholder's acute traditional ecological knowledge has the potential, when connected with western sciences' breadth of data and information, to increase the effectiveness of management undertaken by IEAs. One transboundary method for increasing the flow of information and participation of stakeholders at every scale is co-management.

Co-Management

While a variety of definitions for co-management exist, the following definition agreed upon by Alaska Native, State, and Federal representatives at the 2015 Co-Management Symposium in Fairbanks, Alaska will be used: "A fair sharing of the responsibility and authority for managing fish, wildlife, or lands as mutually negotiated, defined and agreed by indigenous peoples and managing agencies" (Department of Tribal Natural Resource Management, 2015, p. 1).

Institutions shape the way in which people interact with their environment, according to Petursson, Vedeld and Kaboggoza (2011). Management is the way people interact with their environment, according to Arild Vatn (2007) as used in *Transboundary Biodiversity Management on Mt. Elgon* (Petursson, Vedeld, & Kaboggoza, 2011). Petursson et al. (2011)

explain that transboundary management faces two large obstacles: acceptance from stakeholders and legitimacy These problems arise due to transboundary managements' often weighted focus on the environment, rather than the local communities. Bringing communities to the decision-making table through co-management agreements has proved to be an effective management process for ensuring subsistence harvests and stable subtractability of the species (Pinkerton, 2011). For example, Milton Freeman in Evelyn Pinkerton's *Co-operative Management of Local Fisheries* (2011) states that:

> Bowhead whale is a key species for illuminating adaptive response by subsistence hunters to the exigencies posed by state-management systems, where the latter systems are often imposed from a distance and reflect values markedly different from those of subsistence users of renewable resources…Insofar as these particular attitudes reflect a profound concern for the future wellbeing of a valued resource, state authorities, conservationists, preservationists, and the Alaskan Eskimo whaling societies have much in common…scientific managers (whether national or international) on the one hand, and the Alaskan North Slope Inupiat and the Bering Sea Yupik whalers on the other, have, despite their cultural differences, formed an effective co-management arrangement during a decade of intense activity in defence of each group's respective culturally-based position (p. 138).

It is clear that stakeholders' rights and responsibilities vary within differing co-management agreements of the Bering Strait Region. It is also apparent that the Bering Strait Region actively integrates traditional ecological knowledge and western scientific forms of knowledge into management plans and practice. For example, Section 119 from the 1994 amendments of the *Marine Mammal Protect Act*, are the basis for the cooperative agreements between NOAA and the Alaska Native organizations such as the Alaska Nanuuq Commission, the Alaska Eskimo Whaling Commission, and the Eskimo Walrus Commission, as discussed in the "Marine Mammal Protection Act of 1972" subsection of Chapter 2 of this thesis. Co-

management of these three species blends traditional ecological knowledge with scientific knowledge.

Local stakeholders and federal entities must both participate on transboundary policies of marine mammals to achieve effective management of the ecosystem. The multiple scales of participation in the Bering Strait Region's policies, reinforces the pertinence of transboundary policy. Collaboration must be ongoing, as the threats to the Bering Strait Region are just as, if not more, numerous and complex than the scales of human interaction. In 2016 alone, the first cruise ship passed through the Bering Strait en route to New York City, and NASA documented the warmest summer and lowest sea ice on record (Fox, 2016; Sevunts, 2016). Populations inhabiting the Bering Strait Region have worked together historically to address challenges. Chapter 2 addresses such collaborations in order to emphasize how food resources have been conserved in the past and to stress the continued need for such cooperation.

Conceptual Framework

In order to understand how the Bering Strait Region's transboundary policies impact food security, this research evaluates the agreements based on the four factors, as used by Ronald Mitchell in *Problem structure, institutional design, and the relative effectiveness of international environmental agreements* (Mitchell, 2006). The four factors include: incentives, capacities, information and norms.

Four Factors of International Environmental Agreements

As the conceptual framework, these four factors are used to analyze IEAs' institutional designs and shortcomings. Mitchell's four factors are a good fit for evaluating these marine mammal agreements, because the factors are to be used for agreements at an international scale. Specifically the four factors supplement the goal "of identifying aspects that influence institutional design and targeted behaviors" (Mitchell, 2006, p. 80). The marine mammal agreements, as institutions, target human behavior. Their variation is disclosed by the four factors.

The first factor, incentives, includes drivers for coordination and collaboration around problems ranging from small to large scale. Mitchell notes that states are more incentivized to carefully monitor when upstream/downstream problems are significant (Mitchell, 2006). The capacities factor often plays a role in compliance failures. For example, Mitchell notes, "developing countries fail to protect the health of their populations adequately because of financial, administrative, and technical incapacities" (Mitchell, 2006, p. 80). The third factor used to evaluate the effectiveness of a transboundary policy is information, which references how well traditional ecological knowledge and western science are communicated. Informational uncertainty can decrease a state's willingness to alter its behavior. Information also addresses scientific and political transparency. The final factor used to evaluate the effectiveness of transboundary policy, norms, can be ahead of or lagging behind policy. Strong norms regarding harmful behavior often guide states to include demanded requirements. In reference to Finnemore and Dessler (1997), Mitchell discourages "behaviors that are supported by countervailing norms" (2006, p. 81). These four factors distinguish IEAs from one another and will be used to quantitatively evaluate their effectiveness. These four factors are ranked 1 if "not present", 2 if "sometimes present", and 3 if "fully present" in order to compare the two case studies. Learning from existing IEAs informs better management of additional marine mammals, such as the Pacific walrus.

Methodology

Using a comparative case study, this research project will analyze food security in the Bering Strait Region. George and Bennett describe structured, focused comparison: "questions are asked of each case under study to guide and standardize data collection, thereby making systematic comparison and cumulation of the findings of the cases possible" (2005, p. 67). The two existing marine mammal International Environmental Agreements (IEAs) between the United States and Russia, the *United States-Russia Conservation and Management of the Alaska-Chukotka Polar Bear Population* and the *International Convention for the Regulation of Whaling,* have been selected as case studies. IEAs are being used because they endorse and rely

on co-management, thus engaging local stakeholders. The comparison of these case studies reflects the assumption that international agreements have a large influence on outside[9] human behavior that affects regional resources. The varying marine mammal species define the differing norms and incentives amongst the marine mammals' stakeholders. A third international agreement that has not yet been formally established applies to the Pacific walrus. This thesis will apply its analysis of the successes and shortcomings of the Bowhead whale and Polar bear agreements to the Pacific walrus.

Food has become more insecure due to Russia's colonization of Alaska after Vitus Bering's exploration in 1741, the growing tension between rural communities and the State of Alaska since statehood, the Alaska Native Claims Settlement Act's extinguishment of Alaska Native hunting and fishing rights in 1971, the growing number of contaminants in protein-rich foods, the changing climate, the decreasing amount of sea ice, and further industrial development (Caulfield, 2002). However, historically local management has taken place despite these hurdles. The *United States-Russia Conservation and Management of the Alaska-Chukotka Polar Bear Population* and the *International Convention for the Regulation of Whaling* are the earliest precedent of marine mammal co-management between the United States and Russia. Therefore, a comparative case study of the polar bear and Bowhead whale IEAs will demonstrate how a more effective IEA leads to higher food security.

While marine mammal management remains critical for the Bering Strait Region today, weak diplomatic relations between the United States and Russia since the early 2000s has greatly decreased the likelihood of bilateral agreements. However, on-the-ground collaboration remains at an all time high during the twenty-first century. Chapter 2 draws upon the Bering Strait Region's symbolism of goodwill between the United States and Russia, unique agreements such as the Bering Strait Regional Commission, the ongoing successes of the Eskimo visa-free area, the Qatnut Fair, the Shared Beringian Heritage Program, and marine mammal observations to illustrate that the will to co-manage migratory marine mammals in the Bering Strait exists today. Moreover, with the knowledge that the United States and Russia have the political capacity to

[9] "Outside" refers to individuals coming into the region purely to extract or harvest the resources.

co-manage Pacific walrus, the two existing IEAs will be analyzed in order to identify gaps and recommendations for the drafted Pacific walrus IEA.

Chapter 2: The United States-U.S.S.R./Russia's Transboundary Relations

Introduction

The governance and management of the Bering Straits Region's resources have a fairly short commercial history, regarding their ties to western markets. Similarly, policy on the region's governance and management has about 150 years of history. In the Bering Strait Region, American, Russian, bilateral, and Native policies can be either formal or informal. The bilateral policies differ from national policies, due to their reliance on collaborative political will and leadership at various scales. Transboundary policies reflect the needs of regional stakeholders. Bilateral policy requires a high level of trust and demand for action (Pinkerton, 2011; Chapin et al., 2009). For this reason, the sub-sections of Chapter 2 outline the need for action and shared goals that made bilateral policy a reality between the United States and the U.S.S.R./Russia in the late twentieth century.

National Security

Despite the tumultuous relations between the United States and the U.S.S.R. during the middle of the twentieth century, by the 1980s, political dialogue was opening. Two examples of this "opening" include the increasing number of economic and political agreements that were made and the easements on travel for local residents.[10] Due to the political disintegration of eastern Europe and the exposure of the dire situation of the U.S.S.R.'s economy, President Reagan, President George H.W. Bush and President Clinton signed 111 Agreements, Memorandums of Understanding, Treaties, Protocols and Conventions with the U.S.S.R. or Russia. Thus, from 1981 to 2001 nearly twice as many agreements were signed as from 1945 to 1981 and from 2001 to 2016 combined (U.S. Department of State, 2013). This rapid increase in political willingness to agree demonstrates that the Cold War would, in time, no longer be the largest national security threat to either state (see Figure 2.1: *Treaties between the United States*

[10] This opening is often referred to as g*lasnost* (openness) and *perestroika* (restructuring).

and the U.S.S.R./Russia, 1945-2015). Not only was the Cold War no longer a threat to national security, but the collaboration between the states slowly displaced the states' animosity. The leadership of the two powerful states had begun to collaborate on political objectives, producing agreements and joint studies.

The political will of the United States and Russia to work collaboratively in the Bering Strait Region is evident by the extensive surveying that was undertaken and the following documents that acted upon the collaborative will between the United States and Russia up through the millennium. A few of those documents include: the 1974 *Joint Committee Meeting: Increased Cooperation in Bering Straits Region* (Train, 1974), *The Reconnaissance Study* released in 1990 (Union of Soviet Socialist Republics and United States of America, 1989), *Presidential Agreement* of 1 June 1990 and the subsequent Senate *Bill 2088* introduced to Congress in October of 1991 ("S. 2088," 1991), the *Beringia Conservation Program* of 1991 (Graham, 1991), the Russian produced *A Feasibility Study for establishing a protected land and*

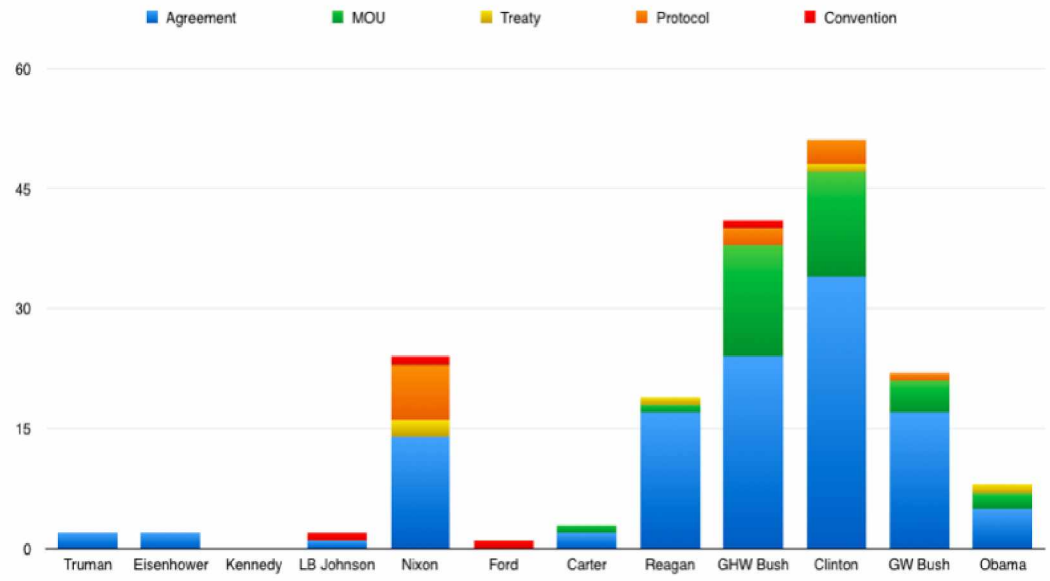

Figure 2.1: Treaties between the United States and the U.S.S.R./Russia, 1945-2015
Source: (Department of State, 2013)

marine territory in the Bering Strait area (Kim et al., 1991), the National Park Service's *Bridge of Friendship* (National Park Service, 1992), President Bush and President Yeltsin's Joint Statement from 1992 (United States of America and Russian Federation, 1992), *Recommendation 2.80 the Ecospace of Beringia* of 2000 (Jones, 2001), and the most recent *US-Russia joint statement of 2012* (U.S. Embassy, 2012). These documentations of collaboration show how the United States and the U.S.S.R./Russia shared the view that national security included environmental considerations in the Bering Strait Region.

The political will driving the environmental security dialogue between the United States and the U.S.S.R/Russia came to fruition through leadership statements on the need for an international park in 1991. President George H. W. Bush claimed, "This park will preserve the unique natural, environmental and cultural heritage of the Bering sea region of Alaska and Siberia. Just as a bridge of land once joined our two continents, so let a bridge of hope now reach across the water to join our two peoples in this spirit of peaceful cooperation." Meanwhile, President Gorbachev claimed that, "The result of our work together represents an event of momentous importance not only for our two countries but for the world…What is very important, I think, is that we do not just declare our commitment to moving towards a healthier international environment, towards better international relations, toward a nonviolent world; we are taking practical steps[11] in that direction" (National Park Service, 1992, p. 1). The practical steps President Gorbachev referenced are the actionable documents mentioned previously. Both Presidential statements describe the leadership's support of establishing an international park that spans the Bering Strait. At the international scale, it is clear that the federal governments of both countries planned to collaborate on a culturally and ecologically rich transboundary park, which subsequently represents their willingness to share sovereignty in order to protect shared resources. Since the agreements and goals required the participation of a large number of actors, the federal governments have largely depended on local actors, organizations, and governments for implementation of the agreement. From the 1990s, these transboundary goals for the Bering

[11] By "practical steps", President Gorbachev is referring to the Bering Strait international park that himself and President Bush signed earlier on 1 June 1990.

Strait Region have emphasized ecology and culture, and to a lesser extent academic research and economics.

Ecological goals focused mostly on marine mammals, the productivity of the waters in the Bering Strait Region, and subsistence. The cultural goals, while focusing on subsistence, additionally stressed subcategories of subsistence such as language, clothing, and traditional practices. Together the ecological and cultural goals had one population in mind, the communities that had inhabited the coastal region of the United States and Russia for more than 10,000 years: Alaska Natives and Russia's small-numbered peoples. The agreement recognizes the dependence of these communities on cultural and ecological components to maintain their traditional way of life. The environmental, social (political) goals of the governments converge in a two-word phrase: *food security*. Co-management ensures this transboundary ecological and cultural goal, is carried out at local to global scales. Co-management acts as a proxy by which

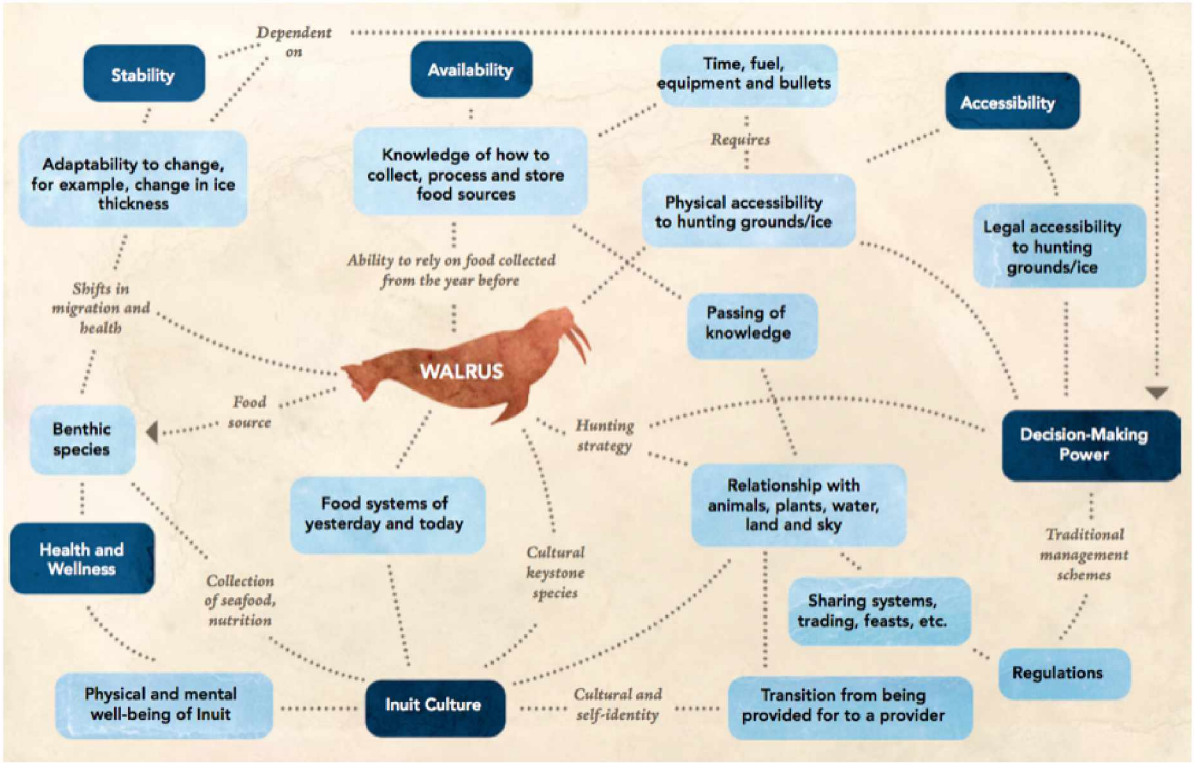

Figure 2.2: Interconnecting drivers surrounding walrus within a given time and space
Source: (Inuit Circumpolar Council- Alaska, 2015)

shared sovereignty in the Bering Strait Region between the United States and Russia, can be examined. The existing IEAs that emerged during this collaborative time period formalized each state's individual responsibilities to increase food security.

Food security, in the Bering Strait Region, encompasses historical and contemporary social (economic, political) and ecological (from Traditional Ecological Knowledge and Western science) aspects. Specific species shape these attributes as much as these attributes impact the species (see Figure 2.2). Due to the complexity and variability of food security from community to community, the rest of this chapter will discuss the following components of food security, according to the Inuit traditional way of life: definitions, the six interconnecting dimensions, United States federal policy and local actors, Russian federal policy and local actors, and influential historical transboundary collaboration.

Food Security

Food security, also known as *subsistence* and the *traditional way of life* within the Bering Strait Region, incorporates the cultural practices of a community to conserve and harvest ecological resources. Food security is addressed at every scale and historically is the basis for festivals and other annual traditions.

Definitions

Beginning with the Bering Strait Region's stakeholders, the Inuit Circumpolar Council-Alaska (2015) defines food security as,

> 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 for; we are talking about 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 [indigenous knowledge] and how it will aid in illuminating the changes that are occurring (p. 4).

Shaped by weather events, demographics, and rapid changes of the twentieth and twenty-first centuries, food security looks different in every village. A multifaceted concept, food security is additionally nuanced by the local cultures and ecology. According to Alaska Natives and Russian small-numbered peoples, food security is more complicated than the federal and state definitions because of the integration of the natural resources into culture and the way of life (Inuit Circumpolar Council- Alaska, 2015).

According to the United States Department of Agriculture, food security has three factors: caloric intake, cost restrictions, and unavailability in areas such as food deserts (Ver Ploeg et al., 2012). Over the years, the State of Alaska's comprehensive definition has been reshaped to include a myriad of attributes to the region's traditional cultures including access to food consumption, shelter, fuel, clothing, tools, transportation, the local economy, and trade.[12] The State of Alaska's definition of food security accounts for values of the Bering Strait Region's Native populations and thus has changed many times in order to account for additional cultures and practices. Myron Naneng, the President of the Association of Village Council Presidents in Alaska, addresses the multitude of definitions for food security when stating, "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" (Naneng et al., 2015, p. 4). Due to the historic and broad use of marine mammals, Naneng explains how food security according to Alaska Natives incorporates harvesting, distribution (eg. sharing systems), health and wellness of the ecosystem, decision-making (eg. hunting strategy), and more.

Food security problems in the State of Alaska have measurable effects at the population scale. For example, the largest driver of migrations from rural to urban areas in Alaska is food insecurity. One cause of migration in rural Alaska, as described by Lee Huskey, Matthew

[12] "The customary and traditional uses by rural Alaska residents of wild, renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools or transportation; for the making and selling of handicraft articles out of nonedible by-products of fish and wildlife resources taken for personal or family consumption; and for the customary trade, barter or sharing for personal or family consumption" ("16 U.S.C. § 3113," 2012).

Berman, and Alexandra Hill (2004, p. 79), is the cost of subsistence. Fuel prices in rural Alaska are two to five times the national average. As the future of marine mammals becomes more unpredictable, the probability of migration to urban areas is likely to increase. At the individual-scale, food security effects can be seen in health issues. Philip Loring and Craig Gerlach (2009) claim that the health of Alaska Natives, in regards to the prevalence of Type II diabetes, obesity, coronary heart disease, and cancer, is worsening. While food security is directly related to social and cultural practices of rural Alaskan communities, there is less research on how policy in the Arctic affects food security. Loring and Gerlach (2009) claim that change in the environment, sociopolitics, culture, and economics decrease food security. Due to the large number of variables affecting food security, evaluating it is a complicated matter. Given the variation in food security among villages, the Inuit Circumpolar Council's "How to Assess Food Security from an Inuit Perspective" will be used to identify regional food security vulnerabilities and the connections between cultural and environmental systems according to local Native stakeholders (Inuit Circumpolar Council- Alaska, 2014).

The Inuit Circumpolar Council's "How to Assess Food Security from an Inuit Perspective" and individual perspectives such as those of Myron Nenang and Carolina Behe represent the local and Native perspectives for communities spanning the Bering Strait Region. Carolina Behe, the Indigenous Knowledge and Science Advisor for the Inuit Circumpolar Council (ICC) spoke at the 2014 ICC General Assembly on "How to Assess Food Security from an Inuit Perspective" (Behe, 2013). She began with a brief description of food security as the interlink of both cultural and environmental systems. Measuring food security depends on identifying food security vulnerabilities, according to Behe (2013). The Inuit Circumpolar Council's (2014) report identified 44 drivers of food security ranging from the transfer of traditional ecological knowledge to the change in ocean currents to tourism to the respect of animals. These drivers will be broken down further in Chapter 3's "Threats" for Bowhead whale, Polar bear, and Pacific walrus respectively. Socially, the Inuit perspective claims, "connections between people are based on traditional foods", and concludes that, "the point here is that all of this is connected. If each one of the drivers describes arctic systems and the connections of those

systems then there is not one piece that is more significant than another" (Inuit Circumpolar Council- Alaska, 2014, p. 11).

The 44 components interact with one another in what the "Alaska Inuit Food Security Conceptual Framework" (2015) calls the six interconnecting dimensions. The dimensions will better define how politics affect food security, in the Bering Strait Region, from a Native perspective.

Ties to Inuit Culture: The Six Dimensions

Local communities, organizations, and the federal governments recognize food security as an ongoing challenge for the communities within the Bering Strait Region. Inuit food security is said to be characterized by environmental health and containing six interconnecting dimensions (Inuit Circumpolar Council- Alaska, 2015).[13] Additionally, the definition of the six interconnecting dimensions holds the assumption that "without food sovereignty, food security will not exist" (Inuit Circumpolar Council- Alaska, 2015, p. 5).

The dimensions represent a conceptual framework used by local stakeholders to express the overlap between environmental health and food security (see Figure 2.3: *Alaskan Inuit Food Security Conceptual Framework*). Two of *Alaskan Inuit Food Security Conceptual Framework's* components, integral to the political system of the Bering Strait Region, are: *Co-management* and *Policy*.

Co-Management and Policy

Formal co-management exists as policy. For example, in the United States the *Marine Mammal Protection Act* of 1974 created "cooperative agreements". Internationally, agreements such as the *United States-Russia Conservation and Management of the Alaska-Chukotka Polar Bear Population* required both Native and non-Native representatives from the United States and Russia, to sign and legitimize the policy. In these examples, co-management requires collaboration between multiple scales. Examples of the different scales involved in co-

[13] The six interconnecting dimensions: 1) Availability, 2) Inuit Culture, 3) Decision-Making Power and Management, 4) Health and Wellness, 5) Stability and 6) Accessibility.

management include: local and federal, Native and non-Native, and American and Russian. All three of these examples will be present within one or more of the policies discussed.

"How to Asses Food Security from an Inuit Perspective" lists policy and co-management as food security tools that need additional action and research. Because no one person is expected to carry all the knowledge, "the knowledge of seasons and how to collect, process, store and consume traditional foods" is taken on by separate individuals and at different times of the year, according to the Inuit Circumpolar Council-Alaska (2015, p. 13). This delineation of experience emphasizes the need of local representation and knowledge to be incorporated into policy, and not just local policy, but the international policy that directly manages the harvest limits of each season. Co-management refers to the integration of traditional ecological

Figure 2.3: Alaskan Inuit Food Security Conceptual Framework
Source: (Inuit Circumpolar Council- Alaska, 2015)

knowledge and western science as a way to "equitably manage human activities" and as a necessary step in order "for Alaskan Inuit to have control over their own fate and to use their cultural value system" (Inuit Circumpolar Council- Alaska, 2015, p. 13). There is a need to: "Investigate co-management structures of other Inuit countries to determine practices that may strengthen co-management" (Inuit Circumpolar Council- Alaska, 2015, p. 24). Russia will serve as the other "Inuit country" and existing co-management policies will be evaluated to determine their strengths and shortcomings with the intent of strengthening future co-management agreements.

The various scales and nations involved with the policy in the Bering Strait Region are discussed in reference to what IEAs provide for local and federal stakeholders.

The Bilateral Politics of Food Security

Policy that engages local communities, organizations, the federal governments, and the interconnecting dimensions of Inuit food security will determine the United States and Russia's political capacity in the Bering Strait Region. The species of the *United States-Russia Conservation and Management of the Alaska-Chukotka Polar Bear Population* and the *International Convention for the Regulation of Whaling* are interrelated in regard to their shared ecosystem, and are related to humans in regards to food security. The lessons gleaned from the two case studies will be applied directly to Pacific walrus. Evaluating and proposing policy to address marine mammals, a key sector of food security, has a transboundary impact and an international audience.

According to the *Bering Strait: Marine Life and Subsistence Use Data Synthesis* (2014) the Bering Strait Region's 2014 harvest included the following marine mammals: walrus, seal, Bowhead and other whales, sea lions, and polar bear. The 2014 *Bering Strait: Marine Life and Subsistence Use Data Synthesis* stresses the relative abundance of marine mammals (Oceana & Kawerak, 2014). Their "Subsistence Analysis: Composite Seasons", shows that the abundance of subsistence resources is high around the entirety of St. Lawrence Island and most of the Seward and Chukchi Peninsulas (see Figure 2.4: *Bering Strait Marine Life and Subsistence Use Data*

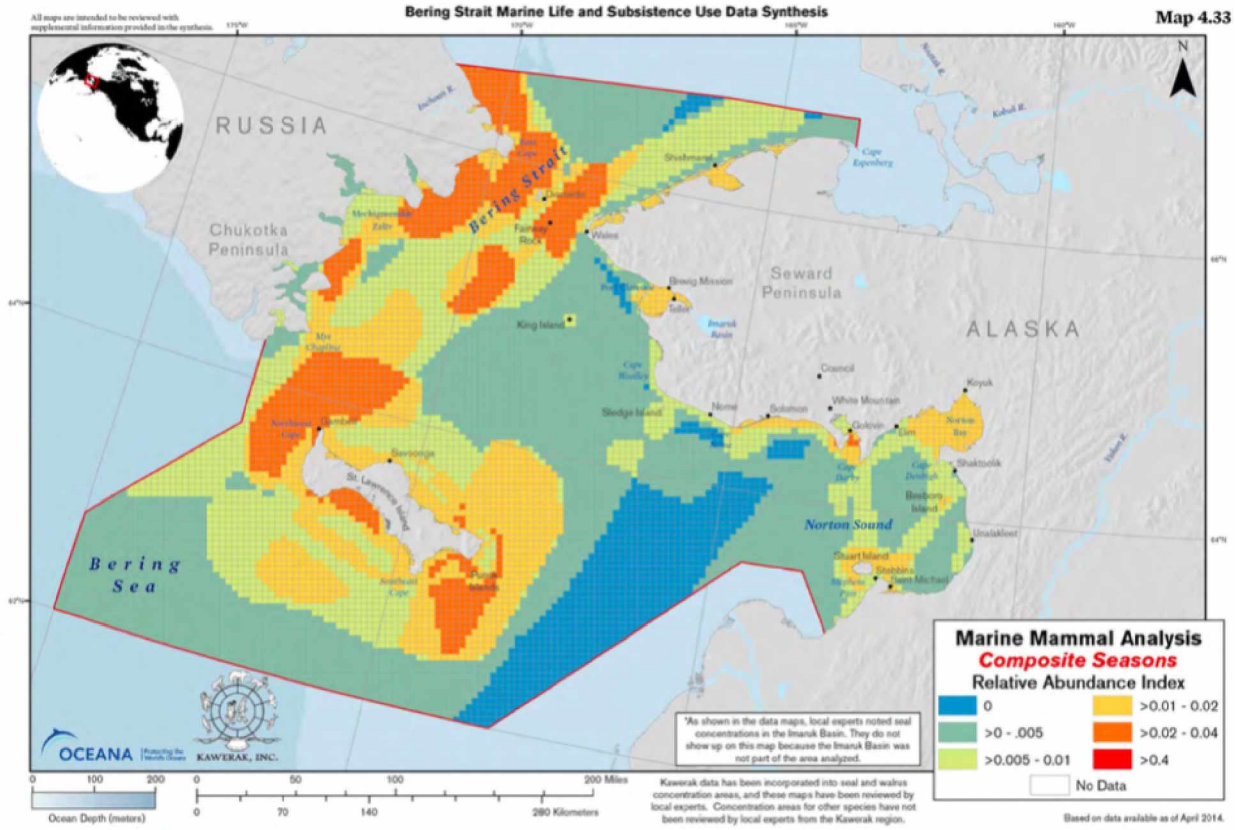

Figure 2.4 Bering Strait Marine Life and Subsistence Use Data Synthesis
Source: (Oceana & Kawerak, 2014)

Synthesis). All of the marine mammals mentioned as part of the 2014 harvest are part of the traditional ways of life in the Bering Strait Region. Without these species, whether due to extinction, commercial over-harvest, or management bans, the traditional way of life would be threatened. Food would be insecure.

The United States and Russia have different histories and contemporary policies regarding the management of both marine mammals and food security. In the United States, the *Marine Mammal Protection Act*, the *Endangered Species Act,* and corresponding federal and local actors have been the basis for marine mammal policy. In Russia, marine mammal policy has made little progress domestically; however, internationally federal and local work is ongoing.

The United States

Marine mammal management in the United States, under the Marine Mammal Protection Act of 1972, utilizes co-management through the U. S. Fish and Wildlife Service and National Marine Fisheries Service in connection with Native commissions, comprising hunters and experts with traditional ecological knowledge. Some marine mammals in the Bering Strait Region, specifically Pacific walrus, are managed mostly by this method since they do not have a bilateral agreement. Accountability measures such as the 2008 *Review of Marine Mammal Co-Management*, government-to-government consultations, and Executive Order 13175, work to overcome challenges faced within federal-local co-management in the United States.

Marine Mammal Protection Act of 1972

The 92nd United States Congress passed the *Marine Mammal Protection Act* (MMPA) in 1972. The United States government's National Marine Fisheries Service (NMFS), United States Fish and Wildlife Service (USFWS), and the Animal and Plan Health Inspection Service administer the MMPA. The MMPA responded to scientific concern that several populations of marine mammals were in danger of extinction. According to the Marine Mammal Commission (2007), the MMPA set forth a policy to prevent the populations from diminishing, or completely losing, their functional role within the ecosystem. The MMPA covers conservation, management, and health of marine mammals in Title I-IV. Title V of the MMPA specifically covers polar bears, due to their unique treaty.

Within Title I, the authority of the federal government is reaffirmed through Section 109's provision that states, such as Alaska, may not enforce any of their own laws or regulations on marine mammals unless the Secretary of the Interior transfers power for a specific species. If power is transferred, the state must develop and implement a program to conserve and manage that species.

Recalling Westley et al.'s *Panarchy* (2001), Chapter 4: "Why systems of people and nature are not just social and ecological systems" focuses on the overlap and differences between ecological and social systems. The comparison identifies elements that are unique to one system

or the other. These elements, the authors conclude, "help to explain the fundamental lack of responsiveness or adaptability to environmental signals that characterize much of natural resource management" (Westley et al., 2001, p. 1). In response to that failing, Chapter 15: "Discoveries for Sustainable Futures" can be used to visualize the Bering Strait Region's ecosystem with differing system types or phases of the adaptive cycle[14]. The conservation phases of the adaptive cycle directly reference the management of marine mammals and their ecosystem under the MMPA. Conservation is defined by Westley et al. (2001, p. 34-36) as both "the sustained plateau or maximum population that is attained" and as a phase where "the system's connectedness increases, eventually to become over connected" which would move the system into the release phase. The conservation phase has been applied by the federal government as the primary method of measuring species' stability; however, this practice has come into conflict with the goals of the Alaska Native Commissions' co-managers.

The MMPA needed changes to account for large commercial takes and their effects on marine mammal population numbers (National Marine Fisheries Service, 2015). For this reason, Congress amended the original MMPA in 1994. Section 119, under the 1994 amendments and unique to Alaska, allows cooperative agreements to be entered by Alaska Native organizations in order to allow co-management of subsistence. Section 119 has resulted in nine cooperative agreements (Marine Mammal Protection Act, 1972). Co-management is meant to create an equal partnership between local and federal bodies. The MMPA provides that marine mammals may only be taken by Alaska Natives. Two noted benefits provided by co-management projects, according to the 2007 Marine Mammal Commission, are environmental education in Native communities and traditional ecological education of people outside of coastal communities. Alaska Natives who live in specific rural locations are legally allowed to hunt the mammals. Their proximity to the marine mammals provides Alaska Natives with a holistic understanding that can complement the understandings of scientists working outside of the region.

[14]Adaptive cycles "provide a framework for describing the role of disturbance in social–ecological systems (Holling, 1986)" and proceed following the disturbance with release, renewal, growth and conservation (Chapin et al., 2009).

The Endangered Species Act of 1973

The *Endangered Species Act* (ESA), an act of the United States Congress, signed into law by President Richard Nixon became effective just one year after the MMPA and carries out provisions of the *Convention on the International Trade of Endangered Species* of 1973. The ESA has had a broader reach than the MMPA, since the ESA conserves species of fish, wildlife, and plants.

The U.S. Fish & Wildlife Service and the National Oceanic and Atmospheric Administration administer the ESA. Under its provisions, species' statuses may be designated as either endangered, threatened, candidate (proposed for listing), or experimental essential/non-essential population. The primary goal of the ESA is to prevent the extinction of both animal and plant life (Fish and Wildlife Service and National Oceanic and Atmospheric Administration, 1973). The secondary goal is to recover populations by lessening threats. Habitat loss is a large threat for many species. Section 3 of the ESA describes "critical habitat" as areas specific to endangered or threatened species that may be set aside for special management considerations or protection. Section 7 emphasizes the importance of protecting not just the species, but also their habitat. The State of Alaska has compiled data on the habitat of candidate, threatened, and endangered species. "Critical habitats" have been identified for Speckled and Steller Eider, and Steller sea lion. States may pass and implement protective laws if they are more restrictive than the federal regulation according to Section 6. Under Section 7 interagency cooperation is allowed.

Alaska Department of Fish and Game has a cooperative agreement with the federal agencies for endangered, threatened and candidate species. According to the ESA, endangered species of the Bering Sea include the short-tailed albatross, western Steller sea lion, Beluga whale, Bowhead whale, Fin whale, Humpback whale, Sperm whale, Blue whale, North Pacific right whale, and the Grey whale (National Oceanic and Atmospheric Administration, 2016). Threatened species include polar bear, spectacled and Steller's eider and eastern Steller sea lion population. As of December 2015, Pacific walrus were listed as "Candidate Species" (U.S. Fish & Wildlife Service, 2014). Part (e) of the ESA's Section 10: "Exceptions", states that the

provisions of the ESA do not apply to Alaska Natives in the case of taking or importing, as long as the practice is not wasteful.

As a regularly reevaluated piece of legislation, the ESA has the potential to impact Alaska's hunting and fishing regulations. Since neither Russian small-numbered peoples nor Alaska Native hunters are restricted by the ESA, the Act plays a lesser role in local than federal affairs. However, the MMPA and the ESA have resulted in significant federal and local collaboration, as well as the creation of acting management bodies. Major actors for carrying out this legislation include the U.S. Fish & Wildlife Service, National Marine Fisheries Service, Alaska Native Commissions, and tribes from the Bering Strait Region.

Federal and Local Actors

The effectiveness of Federal-Tribal co-management regimes in the United States has been improving, due to legislation's increasing inclusions of tribes. Tribal consultation in Executive Order 13175 and cooperative agreements under Marine Mammal Protection Act bring more stakeholders to the decision-making table. In order to understand marine mammal policy and management in the United States, the relations of federal and local tribal actors with each other will be addressed.

The Marine Mammal Protection Act (MMPA) and the subsequent Marine Mammal Commission provide for management in the United States. Efforts to improve co-management between the United States' Federal government and Alaska Native tribes have gained support during the twenty-first century. Initiated by the 1994 Amendments to the MMPA, Section 119 gave way for United States agencies to "enter into cooperative agreements with Alaska Native organizations to conserve marine mammals and provide co-management of subsistence use" (Buck, 1994, p. 252). Coming out of the February 2008 conference in Anchorage, Alaska, the *Review of Marine Mammal Co-Management* by the Marine Mammal Commission shows improvements in these relationships. The Marine Mammal Commission states that "all aspects of co-management have progressed significantly since 1994," illustrating that the Marine Mammal Commission recognized that poor relations existed beforehand. Moreover, these relations are

based on the facts that Alaska Native organizations and United States agencies "have entered into 14 agreements involving 12 species," and that "co-management efforts also have integrated the field skills and knowledge of Alaska Native hunters" (Reynolds, Alexander, & Dayton, 2009, p. iii). The 2008 co-management review looked at the advantages of regionally-based versus species-based co-management, how to modify the Indigenous People's Council for Marine Mammals to further their collective purpose, and funding needs for the necessary capacity building.

Regarding actors, the U.S. Fish & Wildlife Service and the National Marine Fisheries Service represent the federal government within the following cooperative agreements: Alaska Beluga Whale Committee, Alaska Eskimo Whaling Commission, Aleut Marine Mammal Commission (focused on Steller sea lions and harbor seals), Alaska Native Harbor Seal Commission, Cook Inlet Marine Mammal Council (focused on Beluga whale), Ice Seal Committee, Indigenous People's Council for Marine Mammals, Traditional Council of St. George Island (Steller sea lion and Northern fur seal), and Tribal Government of St. Paul (Steller sea lion and Northern fur seal). Each of these co-management commissions has a written agreement under *Section 119 of the Marine Mammal Protection Act Amendments* (Public Law 103-238) that involve at least one of the following sections: development of co-management structures and processes with Federal and State agencies, monitoring the harvest for subsistence use, and/ or participation in research and collecting data on the marine mammal populations (National Marine Fisheries Service, 2015). The co-management agreements with National Marine Fisheries Service each have an additional Memorandum of Understanding. Additionally, the Native commissions monitor and manage aspects of United States-Russia IEAs.

Following the MMPA's 1994 Amendments, President Clinton held a summit on tribal challenges, which included at least one leader from each of the 547 individually recognized tribes. Later that year a document requiring federal-tribal consultation was drafted (Haskew, 1999). In 2000, President Clinton issued Executive Order 13175, which also "directs federal agencies to consult with Indian tribal governments, including Alaska Native communities, when formulating or implementing policies that affect tribal interests. In the Alaskan Arctic, those

interests include subsistence resources…" (Boness, Gulland, & Tillman, 2014, p. 35). In general, Executive Order 13175 has been viewed as supportive of Native self-government, self-determination, and tribal sovereignty. According to Colette Routel and Jeffrey Holth's (2012) *Toward Genuine Tribal Consultation in the 21st Century*, President Clinton's Executive Order has led to "meaningful dialogue between Federal officials and Tribal officials", especially following President Obama's 2009 Memorandum insisting that executive departments and agencies engage in "meaningful consultation and collaboration" (p. 454).

However, the 2008 Marine Mammal Commission report identified none of the co-management regimes as having balanced the management between the federal and tribal governments. This Marine Mammal Commission statement draws attention to shortcomings within governance and management of the Bering Strait Region. Bering Strait Region experts frame the importance of the equitable management and representation for the people and marine mammals of the Bering Strait Region in terms of the following:

> Consider, for example, the changes over time since the 1900s in how voting majorities and public administrators … have responded to the issue of polar bear harvests and the effects of climate change on the polar bear habitat. Shifting policies on animal welfare (from sport hunting to a moratorium in the U.S.…); and the development of rights of indigenous peoples (laws in place to protect Alaska Native subsistence take…) are three key aspects of marine mammal management tied directly to the temporal scale. Simultaneously, activities or actions of management agencies locally, regionally, or nationally, can have direct impacts in other nations and distant locations (Meek, Lovecraft, Varjopuro, Dowsley, & Dale, 2011, p. 468).

This text emphasizes the political and historical inequality in natural resource management in the United States between the federal and local, sometimes tribal, scales. Even with an adaptive co-management system, like the system promoted through the MMPA, inequalities persist. Decision-making power often rests with the federal agencies in these cases of co-management. Due to these unbalanced relationships and as a follow-up in 2014, a government-to-government project was initiated. This project has developed model procedures for government-to-

government[15] consultations with Alaska Native tribes, specifically, on regulations, legislation and policies. These government-to-government consultations are carried out by the Environmental Law Institute, Indigenous People's Council on Marine Mammals (IPCoMM), and Alaska Native communities (Boness et al., 2014). This project builds upon the existing Executive Order 13175.

As mentioned previously, conflicts exist between the co-managing parties of the MMPA. Ostrom (1990) lists "conflict resolution" as one of the requirements for a successful "nested enterprise", especially in cases such as these where the conflict has the potential for a party to completely remove itself from the cooperative agreement. Conflict of interest is unsurprising due to the distinct interests and histories of the bodies that manage and carry out the work in a co-management agreement. For example, at the core of their work the U.S. Fish & Wildlife Service and Eskimo Walrus Commission understand the health of walrus differently. The main goal of the U.S. Fish & Wildlife Service is to maintain or at least determine the population size and health of the Pacific walrus. According to Vera Metcalf and Martin Robards (2008), the Eskimo Walrus Commission, on the other hand, is most interested in the human-walrus relationship. By human-walrus relation, Metcalfe and Robards (2008) refer to the access, harvest, and utilization of walrus by humans. In general, the Eskimo Walrus Commission views walrus from several angles, within food security. The Eskimo Walrus Commission's focus on a complex integration of systems, also relies on ecosystem-wide research, rather than data on the individual species. Since the goals differ, U.S. Fish & Wildlife Service and the Eskimo Walrus Commission understand the funding, research, and public involvement needs of the species differently (Metcalf & Robards, 2008).

This work, undertaken by U.S. Fish & Wildlife Service and Eskimo Walrus Commission, will only be as effective as the co-management is collaborative. Effective co-management, in the form of balanced management responsibility, must also be an outcome of United States-Russia co-management efforts. Next, domestic co-management within Russia will be discussed followed by a look at collaboration and co-management between American and Russian actors.

[15] "Government-to-government" refers to interactions between the United States Federal Government and Alaska Native Tribal Governments

The Russian Federation

Following the dissolution of the U.S.S.R. in 1992, a considerable portion of the Arctic region of the Russian Federation faced divestment followed by famine. These hardships were not felt in Chukotka's parallel American community, Alaska. These challenges were amplified by the shift in the treatment of the Arctic peoples. Under the U.S.S.R., a legal definition of the Arctic was never released, even though substantial stipends were provided to those living in the "Arctic". Civil and environmental programs existed in the Soviet Arctic, such as marine monitoring. However, these programs were classified under the "closed frontier zone", meaning that those records and documentation from the U.S.S.R. are, today, not accessible to the public. Rather, information used here from the U.S.S.R. on Chukotka, a part of the Soviet Arctic, comes from individual scientists who have published their work. Lyudmila Bogoslovskaya, for example, has published research from the 1980s that indicated that fish-eating birds had switched to a zooplankton diet by 1988 (International Arctic Science Committee, 2010).

Chukotka seceded from the Magadan Province in 1953, and the following period underwent a notable demographic shift. In 1959, an estimated 47,000 people lived in Chukotka, in 1989 164,000 people lived there; and then in 2002, the population ebbed to a mere 67,000 people (Round, 2005). These numbers illustrate Chukotka's industrial expansion under the U.S.S.R. and the desperation during the first years of the Russian Federation. Under the U.S.S.R., Native Chukotkans were relocated into permanent settlements, which challenged their traditional way of life and food security (Gray, 2006). The earlier rapid development of oil, gas, and infrastructure left the region largely polluted and unpopulated by the mid-1990s. The wealth of the 1970s and 1980s disappeared almost instantly, and without financial support from the Russian Federation, social and environmental services ceased (International Arctic Science Committee, 2010). The Native population largely reverted to hunting and gathering to ensure a degree of food security. Within ten years local collaboration produced a number of marine mammal groups in Chukotka and international collaboration with Alaska Native organizations and tribal organizations. The U.S.S.R. and Russian domestic actors and marine mammal policies

will be discussed through the international policies agreed to by the federal government and local organizations specific to Chukotka's small-numbered peoples' hunters.

Policy: Domestic and International

As stated previously, little policy regarding the natural environment of the Russian Arctic exists. The International Arctic Science Committee goes as far to claim, that "the Parliament (Federal Assembly) of the Russian Federation has so far enacted no law, amendment, or supplement to the current laws on the protection of the arctic environment" (International Arctic Science Committee, 2010, p. 1). The marine environment and mammals in the Russian region of the Arctic face the same lack of legal representation: "no adequate legal framework exists for management and protection of the marine ecosystems of the Arctic and the associated species, subspecies, and populations of birds and mammals". There are, however, "ratified conventions and agreements on a number of species" and social policies that reserve seats on boards and in courts for Russian small-numbered peoples (International Arctic Science Committee, 2010, p. 1).

Social policy, however, spread with *perestroika*[16] and the opening of the U.S.S.R. The Congress of Indigenous Small-Numbered Peoples of the North, Siberia and the Far East emerged as the highest decision-making body of small-numbered peoples in 1989 (Rohr, 2014). Meeting every four years, the Congress consists of both federal and regional authorities and covers challenges that touch each of the 41 recognized small-numbered peoples. This body works to co-manage social rights of small-numbered peoples. Moreover, the small-numbered peoples have requested a bicameral government, in order to gain a voice in the upper house, as they had during the Soviet times. The reestablishment of village councils, tribal governments, or councils of elders—similar to the way that the Soviet of Nationalities existed in the 1930s—has been suggested as a means of self-determination that would provide small-numbered peoples in autonomous areas with increased representation similar to the way in which the Russian Constitution represents all groups within its borders. Today, co-management, or even

[16]"Restructuring" and the dissolution of the former Soviet Union.

The total allowable catch of marine biological resources (marine mammals) in the inland waters of the Russian Federation, as well as in the territorial sea of the Russian Federation, on the continental shelf of the Russian Federation and in the exclusive economic zone of the Russian Federation, in the Sea of Azov and the Caspian Sea for 2013

(thousands of specimens)

Northern Fishery Area

Aquatic biological resources	Barents Sea	White Sea
Beluga whale	0,2	0,05
Ringed seal	0,5	0,5
Bearded seal	0,15	0,02

Volga-Caspian Fishery Area

Aquatic biological resources	Caspian Sea
Caspian seal	6,44

West-Siberian Fishery Area

Aquatic biological resources	Cara Sea
Beluga whale	0,2
Ringed seal	0,5
Bearded seal	0,15

East-Siberian Fishery Area

Aquatic biological resources	East Siberian Sea
Beluga whale	0,04
Walrus	0,005
Bearded seal	0,15

Far Eastern Fishery Area

Aquatic biological resources	Western Bering Sea zone	*Eastern Kamchatka zone*		North Kuril zone	South Kuril zone
		Karaginskaya subzone	Petropavlovsk-Komandorskaya subzone		
Beluga whale	0,04	-	-	-	-
Walrus	0,25	-	-	-	-
Northern fur seal	-	-	4,86	-	-
Bearded seal	0,4	0,1	-	-	-

Aquatic biological resources	*Okhotsk Sea*			
	Northern Okhotsk subzone	Western Kamchatka subzone	Kamchatka-Kuril subzone	Eastern Sakhalin subzone
Beluga whale	0,36	0,05	-	-
Killer whale	0,006	0,002	-	0,002
Bottlenosed dolphin	-	-	-	0,015
Pilot whale	-	-	-	0,015
Pacific white-sided dolphin	-	-	-	0,02
Northern fur seal	-	-	-	4,483
Bearded seal	1,5	0,5	0,1	0,1

Aquatic biological resources	Chukotka zone	Chukchi sea
Beluga whale	0,06	0,06
Walrus	0,431	0,75
Bearded seal	1,3	1,8

Figure 2.5: Russian total allowable catch of marine mammals
Source: (Russian Orca, 2013)

cooperation, in Russia does not mirror the written social policies. Rather, recognition of collaboration with small-numbered peoples in Russia is far less developed than that under Federal-Tribal policy in the United States.

Even though Russia has no domestic marine mammal policies, Russia does release an annual "Total allowable catch of marine mammals in Russia" (see Figure 2.5: Russian total allowable catch of marine mammals). Additionally, Russia and the U.S.S.R. both "ratified conventions and agreements on a number of species," according to the International Arctic Science Committee (2010, p. 1). A group of these policies includes the *North Pacific Fur Seal Convention of 1911*, the 1946 *International Convention for the Regulation of Whaling*, the 1973 *International Polar Bear Agreement*, and the 2000 *United States-Russia Conservation and Management of the Alaska-Chukotka Polar Bear Population*. The United States also signed each of these agreements. While Russia is party to each of these agreements, little jurisdiction exists to regulate human activity or to promote collaboration between the federal and local stakeholders. The International Arctic Science Committee concludes that:

> The scientific community of Russia, the indigenous minorities of the North, and the non-governmental environmental organizations have been campaigning for a refinement of the legislative framework regarding the Arctic. There are, however, few examples of fruitful cooperation between governmental bodies and indigenous and local organizations for management and protection of the natural environment of the Arctic. One positive example, however, concerns the 25-year monitoring of marine mammals and their harvest by the indigenous Inuit and Chukchi peoples of the Chukchi Peninsula, associated with Russian participation in the International Whaling Commission (International Arctic Science Committee, 2010, p. 1).

Individuals on both sides of the Bering Strait tried to reconnect Alaska Natives and Chukotka's small-numbered peoples through whale monitoring, right before the turn of the century. Work in partnership with the International Whaling Commission will be addressed in the "Federal Collaboration" section. Due to the involvement of local, Native actors in whaling collaboration, local actors began influencing marine mammal cooperation between the United

States and Russia. Subsequent groups emerged following the famine of the 1990s: the Union of Marine Mammal Hunters, the Association of Traditional Marine Mammal Hunters of Chukotka, and the Chukotkan branch of the Russian Association of Indigenous Peoples of North.

Federal and Local Actors

In the mid-1990s leaders from Chukotka came to the North Slope Borough in Alaska to meet with a biologist, Tom Albert, and to observe Bowhead whale. Albert wanted to replicate the Alaska Nanuuq Commission, an Alaska Native organization for Bowhead whale, in Russia, but the individuals from Chukotka were thinking of additional species. For this reason, in 1997, the Union of Marine Mammal Hunters (UMMH) was formed and intended to replicate IPCoMM. Five commissions were created under UMMH: whale, Beluga whale, walrus, polar bear, and seal. A separate Scientific Council also exists under the Union of Marine Mammal umbrella. These commissions have been active. In 2005, the Whaling Commission merged with the Beluga Commission, and the Fish Commission was established due to the need for a fish quota for Chukotka's traditional subsistence. Then, in 2010, the Fish Commission was decommissioned due to species' stability (Zdor, 2015).

Differently than IPCoMM, the five commissions worked closely together. In 1997, UMMH was registered with the Chukotkan authority. The government set up a separate meeting for hunters under the name "Union of Marine Mammal Hunters of Chukotka" (UMMHC). At that point, UMMH also became an official organization. Members of UMMH consisted of hunters and elders. In 2000, UMMH was re-registered in order to carry out the *United States-Russia Conservation and Management of the Alaska-Chukotka Polar Bear Population* (for Russia) as an official representative of Chukotkan small-numbered peoples. In 2001, the Association of Traditional Marine Mammal Hunters of Chukotka (ChAZTO) began acting in UMMH's place, after UMMH ceased to exist. ChAZTO had been founded in 1997 and in 1999 drew up a memorandum with the Eskimo Whaling Commission in Alaska. Since 1999, ChAZTO and the Eskimo Whaling Commission have met annually to self-regulate whaling in the Bering Sea (Zdor, 2015).

Roman Abramovich provided financial support for Chukotka's whalers for several years, and ATTMHC was one of the recipients of this support (Dudarev, Chupakhin, & Odland, 2013). ChAZTO used the money to represent Native peoples on the International Whaling Commission. Abramovich was the Governor of Chukotka from 2000-2008. In 2006, many of ATTMHC's rights and duties were passed on to or shared with the Chukotka branch of the Russian Association of Indigenous Peoples of North (CAIPON). Despite the rise of CAIPON, ChAZTO and the Alaska Nanuuq Commission signed a Native-to-Native agreement in 2008. In 2009, all signing powers, regarding marine mammal documents, were transferred from ATTMHC to CAIPON (Zdor, 2015).

Local representation and assignment of duties within these groups can be complex. While an affiliate of the Russian Association of Indigenous Peoples of the North (RAIPON), CAIPON is a separate group, with interests purely based in Chukotka. The first congress of small-numbered peoples in 1990 established RAIPON. As the only small-numbered peoples organization recognized by the Russian government, initially RAIPON was regarded as a legitimate authority. Other regional small-numbered peoples organizations emerged during the same time period (Rohr, 2014). These regional organizations served as branches of RAIPON, which established an information center, with the idea to create a network of regional centers (Mikkelsen, 2013). On November 1,[8] 2012 the Ministry of Justice suspended RAIPON's activities in response to 1) an independent resolution RAIPON made in 2009, 2) RAIPON's choice to host a congress in 2011 rather than waiting until the time prescribed by Russia, and 3) a new non-governmental organization law that restricted small-numbered peoples organizations from receiving assistance from outside of Russia. The suspension lifted six months later. However, the incident had tarnished RAIPON's credibility amongst both the Native members and the international community. Later, when state-sponsored Grigori Ledkov replaced of the previous President Pavel Sulyandziga, RAIPON's credibility declined yet again (Rohr, 2014).

Delegates to CAIPON represent villages, rather than individual hunters, and its top interests are language and culture, not marine mammal management. The Chukotkan government gave CAIPON the ability to manage marine mammals in 2009, but since the

members do not include hunters, CAIPON chooses to focus on other cultural needs. UMMH on-the-other-hand has 15 main members, one from each of Chukotka's coastal villages. These members of UMMH work with the *United States-Russia Conservation and Management of the Alaska-Chukotka Polar Bear Population* and are similar to ATTMHC's 15 village representatives. As of 2016, ATTMHC members meet annually to represent interests, prepare documents and letters for the Russian government, and work closely with foreign scientists in order to influence marine mammal management, even though CAIPON retains official signing powers (Zdor, 2015).

Local actors on the United States and Russian sides of the Bering Strait have management and monitoring powers, of varying degrees, as delegates of their Native organizations. These Native organizations provide protections for subsistence and the traditional way of life throughout the region. While local communities throughout the Bering Strait Region have been collaborating for millennia, during the last few centuries, American and Russian federal entities have assumed a major role in management. Historical and contemporary examples of Federal-to-Federal, Federal-to-Local, and Local-to-Local collaboration provide the complex backgrounds from which a future IEA would be based.

Federal Collaboration: *Convention on the International Trades of Endangered Species* and *Cooperation in Environmental Protection*

Together the *Convention on the International Trade of Endangered Species* and *Cooperation in Environmental Protection* policies, both signed by the United States and Russia, have been able to advance collaborative work in the Bering Strait Region between federal entities. These two agreements set a precedent for today's formal co-management of polar bear and Bowhead whale.

Convention on the International Trade of Endangered Species

The *Convention on the International Trade of Endangered Species* (CITES), a multilateral treaty, was drafted first in 1963 and entered into force in 1975. CITES addresses marine mammal species within the Bering Strait Region. during its existence. CITES' goal is to

control trade to reduce threats to endangered species. The United States and the U.S.S.R./Russia are parties to CITES. CITES regulates more than 35,000 species across the globe. Species are placed on one of three appendices: only those on Appendix I are threatened to such an extent that CITES prohibits their trade; however, the Convention provides exceptions for science and traditional use (United Nations Environmental Program, 1975). No species from the Bering Strait Region are currently listed in Appendix I. However, if species from the region were listed, then their trade would be curtailed amongst commercial interests and would likely impact Native traditional practices.

CITES states, in reference to the 1973 *Agreement on the Conservation of Polar Bears*, that "climate change impacts might exacerbate existing stressors or modify existing complex environmental, ecological and physiological processes" (Scanlon, 2013, p. 1). Recognizing these uncertainties, CITES regularly reevaluates the criteria that would put Polar Bears in Appendix 1. Similarly, since the Pacific walrus is listed as a "candidate" on the United States' *Endangered Species Act,* they also are reevaluated for listing in Appendix I of CITES. Moreover, the "global trade in walrus ivory is restricted according to a CITES Appendix III listing" (Garlich-Miller et al., 2011). While more than 98 percent of traded walrus ivory originates in the United States, the majority of the ivory is from historical middens, predating the CITES and the MMPA. However, if the trade were to involve a greater amount of ivory from post-MMPA or post-CITES, the trade and hunting likely would be greatly restricted, changing the Appendix listing of the Pacific walrus to I or II (Garlich-Miller et al., 2011).

Cooperation in Environmental Protection

The United States and Russia collaborate infrequently through multilateral treaties such as CITES, but, IEAs addressing resources along a shared political boundary require active collaboration from both parties. The two countries have signed agreements with an ecological focus to manage the shared space; these have both ecological and social implications. An influential agreement, the *Cooperation in Environmental Protection*, signed by the United States and the U.S.S.R. In 1972, led to a similar agreement between the two countries, the *Cooperation*

in the Field of Protection of the Environment and Natural Resources (the *Agreement*) in 1994. Article 3 of the 1972 *Agreement* stated that cooperative activities would take place in the form of exchanges for scientists and scholars, bilateral conferences, and joint development of projects. Article 5 established a joint committee that has met annually, alternating between Washington and Moscow (Train, 1974). In 1986, the *Agreement* established a "Conservation and Management of Natural and Cultural Heritage" working group. One of the themes identified by the working group was the "Research, Conservation, and Management of the Beringian Heritage". Through further development, by 1990 this theme had gained momentum as the Bering Strait International Park that both President Bush and President Gorbachev boosted, according to the Shared Beringian Heritage Program (National Park Service, 2015). The U. S. Environmental Protection Agency and the Russian the Ministry of Natural Resources and Environment oversee the implementation of the 1994 *Agreement*. In 2012, the joint committee concluded with, "we also seek to deepen our cooperation in the Bering Strait region in close participation with Alaska Natives and the indigenous peoples of Chukotka, local agencies, non-governmental organizations, and university researchers" (Bureau of European and Eurasian Affairs, 2012, p. 1). This comment supports Roop et al.'s *We Didn't Cross the Border, the Border Crossed Us,* and the claim made earlier that the federal governments increasingly rely on local actors to carry out agreements. If the United States and Russia adopt a comprehensive bilateral agreement, it will be based on the precedent set by the ecological and cultural components of the 1994 *Agreement*.

These ecologically-based agreements and acts have relied on the Bering Strait Region's Native population, whether for observations or to procure scientific samples. Each of these policies addresses potentially endangered species, and Alaska Natives and Russian small-numbered peoples have been consistently exempted from restrictions. With the turning of the twenty-first century, these international agreements offer potential for increased engagement of the local population in the management of the Bering Strait Region's resources. While the federal entities led the MMPA, CITES, and the ESA processes, species-related policies have engaged the Bering Strait Region's local population as traditional ecological knowledge holders. The

Bering Strait Region's specific cultural and ecological characteristics have been guided by thousands of years of adaptation, hardship, and change. Today, the ecologically based cultures of the Bering Strait Region continue traditional practices such as the Qatnut Fair. These traditions exist with a degree of support from both federal governments, whether legal, financial, or logistical.

Local Collaboration: Eskimo Visa-free Area, Bering Straits Regional Commission, Qatnut Fair, Shared Beringia Heritage Program, Marine Mammal Observations

The weak diplomatic relations between the United States and the U.S.S.R./Russia during the twentieth century reflect wider geo-politics, rather than the local populations' historical relations. As Roop et al. note in *We Didn't Cross the Border; The Border Crossed Us,* the Bering Strait populations are: "a group of people who have existed in the Arctic outside of modern political and legal systems and were enveloped within those systems without a choice" (2015, p.71). The authors also observe that at the turn of the millennium momentum shifted from federal to independent efforts. Following the dissolution of the U.S.S.R., the treaty free area in the Bering Strait Region reopened and marine mammal practices and observations resumed. Today, the Qatnut Fair and the Shared Beringian Heritage Program symbolize the historical relations of the Native populations within the Bering Strait Region.

The Visa-free Area and the Bering Strait Regional Commission

The first legal document to recognize the transboundary relationships of the Bering Strait Region's peoples was *Visits to Siberia by American Eskimos.* In February 1938, the American and Soviet governments recognized the shared culture on either side of the Bering Strait by signing the first visa-free memorandum, known as *Visits to Siberia by American Eskimos* (Bevins, 1974). Under the *Visits* treaty individuals were allowed to travel to meet with relatives. The *Visits* treaty entered into force on the April 18, 1938 and was terminated ten years later on the May 29, 1948. Beforehand the Native populations had been moving back and forth between the United States and the U.S.S.R. freely. The treaty aimed to track this interstate travel. The *Visits Treaty* allowed up to 100 Alaska Natives annually, with a form of identification, to enter

the U.S.S.R. for up to three months (U.S. Department of State, 1938). After World War II, relations changed dramatically and in 1946 the last recorded boat traveled from the United States to the U.S.S.R. Michael Krauss (1994) comments that, "during the spring of 1948, at exactly the same time as the Berlin blockade and airlift were beginning, a State Department file shows considerable activity concerning the termination of these Eskimo visits" (p. 369). For the next 40 years, the Bering Strait would be effectively closed.

Meanwhile, during the 1950s mass evacuations took place in the U.S.S.R., in order to limit contact between the Russian and American Native communities. During the 1970s interests in kin on both sides of the Bering Strait were renewed as academics, linguists specifically, began making contact with their counterparts on the other side of the Bering Strait (Krauss, 1994). In May of 1988, President Reagan and General Secretary of the Communist Party of the Soviet Union Gorbachev expressed support for the expansion of contacts between Native peoples of the Soviet North and Alaska. One month later in June 1988, the Nome-to-Provideniya Friendship Flight carried 70 passengers across the Bering Strait (Krauss, 1994).

In 1989, the United States and the U.S.S.R. Signed the *Intergovernmental Agreement Concerning Mutual Visits by Inhabitants of the Bering Straits Region and concerning the Bering Straits Regional Commission (9.10.11448)* at Jackson Hole, Wyoming. The Bering Straits Regional Commission's consists of three American and three Russian members, with one from each country named Chief Commissioner (Chukotka Okrug, 2015). the Bering Straits Regional Commission is the only Regional Commission of which the United States is a party. In 1991, the Bering Strait Regional Commission held its first official meeting in which it finalized the procedures needed for visa-free travel. By August of 1991, 6,000 people had crossed the Bering Strait (Krauss, 1994). In 1992, the first Chukchi representatives traveled to Alaska using the visa-free arrangement. This number expanded, and in 1994, 355 Chukotkan small-numbered peoples visited Alaska. In 1996 due to the success of the Regional Commission and movement across the visa-free area, the visa-free application fee was abolished.

According to Charles Bevins (1974), the present-day visa-free area, rooted in the *Visits to Siberia by American Eskimos*, is one of the few examples of local power on par with a federal

power. As a formal institution, the visa-free area is unique in that it has been run entirely by Native leaders such as Alaskans Charlie Johnson, Vera Metcalf, Caleb Pungowiyi, Jack Omelak, and Russian Leonid Gorenshtein. The visa-free area was a popular topic within United States-Russia literature of the 1990s (Stephan, 1993; Johnson, 1997; Gray & Schweitzer, 2000). In 2001, cooperation was reaffirmed at the Alaska-Chukotka Summit, with an emphasis on "visa-free travels under the joint economic, cultural, educational and tourism programs" according to the Chukotka Okrug (2015, p.1). Control of the visa-free area, was put in the hands of the Bering Strait Region's Native leaders, and not just symbolically by the federal governments, but to recognize their representation of the local populations in the visa-free area.

Russia's annexation of Crimea in 2014 directly impacted the visa-free area. Numerous accounts document the increasing difficulties experienced by both the United States and Russian borders. For instance, an entire group traveling from Nome who was refused entry into Russia in 2014. The Bering Strait Messenger Network's "From Russian to American Alaska: What Happened in the past 150 year?" discussed this event, which illustrates how the Russian and American federal governments' discord has infiltrated relations at lower scales (Institute of the North, 2014). Local authority has been taken away from the Native communities, likely until trust is restored between the United States and Russia. Karthika Sasikumar, an international security specialist at Stanford University, claims that "easing mobility restrictions is a way to promote stability and integration in the region." However, negative political will of the adversarial states has historically outweighed regional, Native assets (Sasikumar, 2013, p.1). From this point of view, travel in the visa-free area will likely slow to a stand-still and its viability will entirely depend on the federal governments' wills. However, while native individuals have claimed increasing difficulties with the visa-free travel in the area, commercial travel between the two states is growing. In 2012, Yakutia Airlines began flying from Anchorage to Petropavlovsk-Kamchatsky and Yakutsk again. During the summer of 2015, the United States agreed to issue special passport inserts to Alaska Natives traveling to Chukotka, making travel one direction easier. In 2016, Yakutia Airlines set a record for the most flight options between the Far East and Alaska (Yakutia Airlines, 2015).

The return of the visa-free area to public attention during 2015, stood in contrast to the current United States-Russia tension, as a notable transboundary institution that relies on local, Native collaboration. The Qatnut Trade Fair is an historical event for which local populations travel between Russia and the United States, often using the visa-free area as a form of travel assistance.

The Qatnut Trade Fair

The Qatnut Trade Fair in Kotzebue is one of the oldest known celebrations and the largest gathering of Iñupiaq in the Bering Strait Region. Revived in 1996, after the Cold War no longer barred the participants from meeting together, the trade fair continues to live up to its name. Qatnut means "bring people together", as published by the National Park Service (National Park Service, 2013). Nobuhiro Kishigami (2007) writes that the trade fair is documented as early as the fifteenth century. Despite formalized connections between mainland Russia and Siberia in the mid-seventeenth century, trade continued across the Bering Strait in the form of skins, tusks, ivory, boots, tobacco, tea, sweets and more (Schweitzer & Golovko, 1997). Even after Alaska came under American jurisdiction in 1867, the trade between Iñupiaq in Alaska and the Siberian Yupik and Chukchi in Siberia continued. Kishigami (2007) notes the ban of American traders in Chukotka at the turn of the twentieth century, which was intensified during the Cold War, when "the governments of the USA and Soviet Union prohibited any inter-continental native trade" (p. 45).

While access to goods decreased in the U.S.S.R. during the twentieth century, access to goods increased throughout the Bering Strait Region. With the increase, the need to resume historical trade practices declined. In reference to the trade ban between the United States and the U.S.S.R., Michael Krauss (1994) describes that era as "the 'bad old days' of American Chukotka", noting that, "[they] are not forgotten" (p. 366). However, these claims made by Krauss in 1994, were surprisingly overturned by Native initiative in 1996, when the centuries-old Qatnut trade fair resumed.

Since 1996, the Qatnut Trade fair has occurred every other year, through rotating organizational sponsorship. For example, NANA Regional Corporation hosted the 2009 trade fair, the 2011 trade fair was hosted by the Kikitagruk Inupiat Corporation, and the 2013 trade fair was hosted by the Northwest Arctic Borough (Kikitagruk Inupiat Corporation, 2011). Inter-institutional and inter-cultural collaboration allows for the return of what was historically described by the National Park Service as "a few boatloads…from the Bering Strait Islands and the Russian Far East". Later in the late nineteenth century "Koyukon Athabaskan participated in Qatnut as well" (National Park Service, 2013, p. 1). The Qatnut Trade fair represents more than economic trade. The Qatnut Trade Fair represents the historic collaboration between the Native populations living along the coasts of the Bering Strait in order to maintain traditional practices, socialization, competition, and celebration.

Marine Mammal Observations

The visa-free area has been a modern solution for retaining traditions, such as the Qatnut Fair, where food, goods, and news were shared and traditions were built. Events such as the Qatnut Fair rely heavily on marine mammals, which form the bulk of most traded goods. For this reason, observing marine mammals to implement responsible harvesting practices furthers conservation of the species. As noted above, outsiders entered the Bering Strait Region in the nineteenth century and took unsustainable harvests of walrus, whale, seal, otter and other marine mammals. While separate efforts tracked these species during the Cold War, the reopening of the communication has allowed scientists and local, traditional ecological knowledge holders to compare observations from individual locations throughout the Bering Strait's social-ecological system.

Collaborative observation of whales started before the fall of the U.S.S.R., due initially to a whaling ban by the International Whaling Commission in the 1970s and later to the famine in Chukotka in the 1990s. In 1972, species quotas were enacted due to the near extinction of several whale species around Antarctica according to *Understanding the Revised Management Procedure* (Young & International Whaling Commission, 1992). Governments that were party to

the International Whaling Commission proposed a resolution that would impose a 10-year moratorium on whaling. While not approved, in 1975/6 the New Management Procedure was signed, which imposed a "selective moratorium". The U.S.S.R. immediately objected the moratorium and shortly thereafter the United States followed suit. Other member states' doubts in the scientific committee were expressed as, "the degree of scientific uncertainty is so widespread…the only appropriate way to assure stocks are not over-exploited is through a moratorium" (Young & International Whaling Commission, 1992, p. 104). Native whaling populations along the Bering Strait disagreed with the estimated Bowhead whale populations, however, in 1977, they formed the Alaska Eskimo Whaling Commission in response to the IWC's ban on whaling. Due to the Alaska Eskimo Whaling Commission's own data collection, the Alaska Eskimo Whaling Commission later resolved many of the concerns that were preventing whaling under the International Whaling Commission. In 1979, the International Whaling Commission recommended bilateral agreements for several types of whales, including Bowhead, and the inclusion of "Inuit observers" in the observation process (Young & International Whaling Commission, 1992). Beginning in 1981, the Alaska Eskimo Whaling Commission has managed Bowhead whale hunts under a cooperative agreement with National Oceanic and Atmospheric Administration. Local collaboration between the whalers in Alaska and Chukotka followed, due to food security concerns in Chukotka.

Beginning in 1992, a joint Russian-American project began studying the migration patterns of Bowhead whales. Building on the four-year project, in 1999, shore-based counts began in order to confirm observations that an alternative migration occurs along the western edge of the Bering Strait (Melnikov, Litovka, Zagrebin, Zelensky, & Ainana, 2004). Ten years later, Vladimir Melnikov of the Russian Academy of Sciences, Eduard Zdor of Association of Traditional Marine Mammal Hunters of Chukotka, Gennady Zelensky of Chukotka Science Support Group, and Denis Litovka of Chukotka TINRO collaborated with the North Slope Borough on the Bowhead Coastal Observation Project. According to Mark Nuttall, the Borough, under Mayor George Ahmaogoak, worked in partnership with the American-Russian Centre to assist Chukchi who had "appealed to Alaska whalers for assistance in obtaining appropriate

whaling technology and training in how to go whaling" (Nuttall, 1998). According to an annually published report, the same group of individuals also collaborated from 2003-2006 on a bio-sampling project of both Gray and Bowhead whales (George & Hanns, 2011). Due to changes in the ecosystem, the United States-Russia joint Bowhead whale project concludes that the series of endeavors during the last 20 years has been highly important in understanding whale population numbers, and migration patterns. These shore-based counts by experienced hunters supported the previous discrepancy between traditional ecological knowledge and the State of Alaska and National Oceanic and Atmospheric Administration-produced data that underestimated the number of Bowhead whale (Melnikov et al., 2004). By enlisting the hunters in the observation process, researchers detected feeding patterns that scientists had previously been aware of. By incorporating management experts and scientific suggestions the funding was made possible. Together, these collaborative observations have made the continuation of subsistence whaling possible.

Conclusion

The bilateral agreements between the federal governments and the historical local collaboration, has increased food security. The *Cooperation in Environmental Protection* started as a federal government to federal government agreement, but today involves more local actors than federal actors. Each discussed initiative, whether led by federal or local entities, was co-managed. Through co-management, the shared sovereignty in the Bering Strait Region between the United States and Russia can be maintained. The willingness to co-manage a resource illustrates the recognition on both sides of the Bering Strait of the importance of the resource, given that all parties must relinquish a degree of their sovereignty or control over the resource. Moreover, when the North Slope Borough worked with Chukotka, the borough donated funds to Chukotka to support its participation in co-management. In the visa-free area, the federal governments have decreased their visibility, as Native individuals have directed the program.

When co-management occurs, the separate parties participate due to the benefits brought forward by their respective co-managers. In most Native-federal co-management agreements, the

federal parties bring financial support, while the Native parties provide local, traditional ecological knowledge or observations based on transfers of knowledge passed down from generation to generation, knowledge that the federal entities would otherwise not be able to access. Polar bear and Bowhead whale, two species of great traditional importance to the Bering Strait Region, are co-managed by local and federal actors in the United States and Russia.

In Chapter 3, the success and shortcomings of *United States-Russia Conservation and Management of the Alaska-Chukotka Polar Bear Population* and the *International Convention for the Regulation of Whaling* will be examined in order to answer the research question: To what extent have International Environmental Agreements been able to manage transboundary challenges to food security?

Chapter 3: Successes and Shortcomings of Transboundary Co-management: How International Environmental Agreements Affect Food Security

Introduction

Marine mammals in the Bering Strait Region increasingly face uncertainty due to shipping (Arctic Marine Shipping Assessment, 2009; Haecker, 2013), inadequate management that results in excessive natural resource extraction (Ray, 1975), and biophysical change of ice (National Snow and Ice Data Center, 2016). Shipping, excessive extraction or harvest, and biophysical change increasingly affect the Bering Strait Region because of its geographical position along what Uspenski (cited Stirling, 2012, p.163) describes as the "Arctic Ring of Life."

Mostly parallel to the coastline, the "Arctic Ring of Life" corresponds with areas of open water surrounded by ice during the winter, specifically known as polynyas. Such polynyas have been known to exist from year to year in the same location. They are home to the Arctic's greatest algae production and consequently are home to algae-feeding species and their predators such as walrus, polar bears, and Bowhead whales (Stirling, 2012). Arctic species demonstrate seasonal migrations, known as *seasonal fidelity* for polar bears, meaning the species annually frequent the same areas, remaining dependent on each others' roles in the food web (see Figure 3.1: Marine Arctic Food Web).

Bowhead whale, polar bear, and Pacific walrus are not only connected ecologically, but also historically through industry. Bowhead whale were the initial target of the three species as whale oil was a major fuel source in high demand within European markets. Commercial whalers entered the Bering Strait Region in the 18th and 19th centuries, and as Bowhead whale populations declined, they turned their attention to polar bear. In Ian Stirling's (2012) words, "whenever bowheads were not captured in sufficiently large numbers, the whalers shifted much of their attention to seals, belugas, walruses and polar bears". Thus the initial demand for whales extended to other species, with cascading consequences on the food web. The St. Lawrence Island famine of 1878 resulted initially from the depleted sources of Bering-Chukchi-Beaufort Bowhead whale, followed by the depletion of Pacific walrus. Polar bear harvests increased

rapidly during the first half of the twentieth century in correspondence with the increasing value of their hides and hunters' increased access to high-powered rifles and later snow machines. From 1950 until the passing of the MMPA, trophy hunters accounted for 85-90 percent of the kill in Alaska (Stirling, 2012).

Building upon their historical interconnections, today polar bear, Bowhead whale, and Pacific walrus are intricately linked by their individual responses to the melting of sea ice. The melting sea ice threatens the species not only because of the increase in shipping that will be prompted by the opening sea lanes, but because of the effects on the diets of these ice-obligate and ice-associated species. Experts predict that previously narrow areas of open water will become vast. They anticipate that polar bears will increasingly drown when navigating those areas (Stirling, 2012). Similarly, Pacific walrus that are unable to swim the increased distance are likely to resort to haulouts. As the productive areas of water spread out, Bowhead whale foraging efficiency may decrease, leading Bowhead whales to begin competing for foraging areas with Gray whales. As Bowhead whales change their foraging locations, traditional whaling will also be threatened (Marz & Medina, 2007).

These contemporary threats, without adequate transboundary management, directly decrease the region's food security. However, IEAs have the potential to increase food security, as seen in the case study comparison of the *United States-Russia Conservation and Management of the Alaska-Chukotka Polar Bear Population* and the *International Convention for the Regulation of Whaling*. Evaluation of these IEAs demonstrates that the higher values of the Bowhead whale IEAs' four factors reflect for the higher level of food security for Bowhead whale. Accordingly, the lower values of the polar bear IEAs' four factors result in a lower level of food security based on polar bear. Many social and biological trends support these conclusions. This thesis finds that the effectiveness of an IEA, regarding marine mammals in the Bering Strait Region, as measured by Mitchell's four factors: incentives, capacities, information and norms, is a function of food security regarding that marine mammal species.

Four Factors as the Framework for Analyzing International Environmental Agreements

Food security, as the dependent variable, represents the impact IEAs have or have not had in the Bering Strait Region. Food security includes species conservation, habitat restoration, and representation of stakeholders in co-management. Ronald Mitchell's four factors, incentives, capacities, information and norms, will be used to determine: To what extent have International Environmental Agreements been able to manage transboundary challenges to food security? Two existing IEAs will be evaluated, and the findings will guide policy recommendations for a Pacific walrus bilateral treaty. Mitchell states that relative effectiveness can not come from qualitative case studies alone and that comparing several agreements "can clarify the average effect of particular features across a range of contexts" (Mitchell, 2006, p.74). The foremost purpose of bilateral environmental agreements, according to Mitchell, is to have "influence on human behaviors that harm the environment" (Mitchell, 2003, p. 444).

In the marine mammal cases examined, norms such as a subsistence-based cultural identity are built upon thousands of years of observing and living in close relation to those species. These cases assume the former definition of norms, since in a cyclical manner the norms are arguably a large impetus behind the incentives.

Case Study: United States-Russia Conservation and Management of the Alaska-Chukotka Polar Bear Population

Before the signing of the *United States-Russia Conservation and Management of the Alaska-Chukotka Polar Bear Population* (from here referred to as the *Polar Bear Agreement*) in 2000, the five arctic states had addressed polar bears management through the International Union for Conservation of Natures's Polar Bear Specialist Group. In 1956, the U.S.S.R. banned all polar bear hunting and in 1971 Alaska reduced unlimited polar bear hunts to an annual limit of three per person. A year later, the MMPA would ban all polar bear hunting in the United States, except for that done by Alaska Natives. The 1973 *Agreement on the Conservation of Polar Bears* banned the killing of polar bears, except for scientific pursuits and for local Native populations' needs, reflecting the concerns of the international community.

Incentives: The 1973 Agreement, Inuvialuit-Iñupiaq Agreement, Politics of the 1990s

Before the 1973 Agreement, poaching and sport hunting greatly reduced the number of polar bears across the Arctic. This rapid decline led the U.S. Secretary of the Interior Stewart Udall to call for an international conference, which resulted in what is today known as the "First Scientific Meeting on the Polar Bear" in 1965. Each Arctic state was represented by a scientific specialist, and these specialists continued to meet every two years thereafter. In 1973, the Arctic Five[17] signed the "Agreement on the Conservation of Polar Bears" in Oslo. Politically, the 1973 Agreement incentivized polar bear conservation since it was the Arctic Five's first successfully

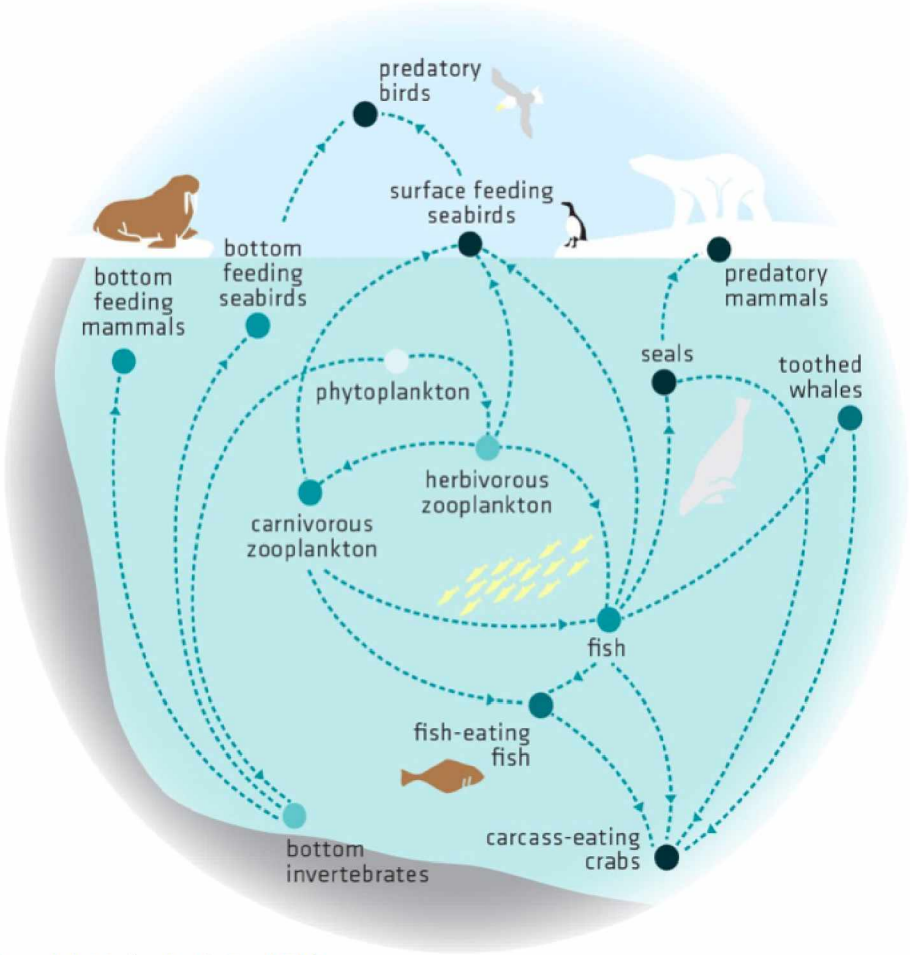

Figure 3.1: Marine Arctic Food Web
Source: (World Wildlife Fund & Groc, I., 2014)

[17] Canada, Denmark (by way of Greenland), Norway, Russian Federation, United States

negotiated framework that addressed a circumpolar concern (Stirling, 2012). According to Ian Stirling, concerns for polar bears were rooted in two main topics, biophysical change of the Arctic landscape and change in human behavior. Human behavior, regarding hunting, has changed due to the growing access to small aircraft which can search vast areas, that were previously inaccessible to the local Native hunters (Stirling, 2012).

Problems for polar bears stem from biophysical changes and are geographically focused on polynyas. Polar bears' largest food sources are based in polynyas and the populations of polar bears are congruent with polynyas. Polynyas in the Bering Strait occur between shore-fast ice and the consolidated pack ice that stays in motion through much of the winter (Stirling, 2012). While pack ice is the main summer habitat for polar bears, they use shore-fast ice in the spring and for feeding. Lesser permanent ice cover in the Chukchi Sea means lesser opportunity for the Alaska-Chukotka polar bear population to live on the ice in the Bering Strait Region. Most of Alaska-Chukotka polar bear population summers on the Arctic Ocean.

Traditionally, around 120 polar bears were taken annually from the Beaufort Sea and the Alaska-Chukotka polar bear populations, as recorded from 1925-1953. Chanda Meek discusses the rapid changes in human behavior in the 1950's as sport hunters began using aircraft, noting that between 1960-1972, 260 polar bears were annually taken (Meek, 2009). With the passing of the MMPA and the end to commercial and sport hunting, the harvest rate by Alaska Natives returned to around 100 polar bears a year. While it is thought that the Alaska-Chukotka polar bear population rebounded during the following 20 years following the 1973 Agreement, during the 1990s gaps in the size of the population and the non-enforceable character of the 1973 Agreement posed concerns. Scientists and local hunters considered the Alaska-Chukotka population threatened, but to what extent was uncertain. Therefore, with the U.S.S.R./Russia and the United States' increasing will to collaborate during the 1990s, they consulted the U.S. Fish & Wildlife Service (USFWS) and the Alaska Nanuuq Commission. Collaboration on research projects as well as a Treaty proposal ensued. The proposal would in time become the *Polar Bear Agreement*.

A strong regional example, the 1988 Inuvialuit – Iñupiaq Agreement on Beluga Whales and Polar Bears, gave Alaska Natives and their counterparts in Chukotka a successful polar bear management model to follow. In the hopes of managing the partially overlapping Alaska-Chukotka and Beaufort polar bear populations (see Figure 3.6: *Chukchi and Beaufort Polar Bear Populations*), the 1988 Inuvialuit – Iñupiaq Agreement provided a level of local empowerment. Local involvement and interest in polar bear management grew during the 1990s, a direct result of the Inuvialuit – Iñupiaq Agreement. The Inuvialuit – Iñupiaq Agreement also incentivized the Bering Strait Region to support a voluntary quota, since on average, annual harvests were kept below the set quotas (Meek et al., 2011).

The political uncertainty and later economic turmoil in the U.S.S.R and Russia during the 1990s provided high incentive to return to traditional food resources. Residents of Chukotka used polar bears for food, clothing, and trade. The harvest rates remained largely unknown in Chukotka, in contrast to he presumably accurate reporting in Alaska. Observers and scientists suspect that significant poaching occurred in the 1990s and after the turn of the millennium (Marz & Medina, 2007). Leading up to the *Polar Bear Agreement* in 2000, evidence emerged that the Alaska-Chukotka polar bear population was increasingly facing deaths from "drowning, starvation, and cannibalism" (Marz & Medina, 2007). Despite the establishment of the Alaska Nanuuq Commission, scientists with the U.S. Geological Survey predicted that in 50 years no polar bears would remain in Alaska, which provided additional support for an iterative management process in the co-management of the Alaska-Chukotka polar bear population (U.S. Geological Survey, 2007).

Due to the precedent set by the 1973 Agreement and the Inuvialuit – Iñupiaq Agreement, and the support the *Polar Bear Agreement* received from the United States and Russian federal governments, the incentive factors ranks a 3 – fully present – for its influence on political leadership to conserve polar bear and reserve harvests for Native populations only.

Capacities: Federal actors, Regional and Native cooperation, and Non-governmental Organizations

The United States-Russia bilateral *Polar Bear Agreement* followed in the formation of the International Union for Conservation of Nature's Polar Bear Specialist group, which established the original 1973 Agreement. The Arctic Five signed the *Polar Bear Agreement* with four goals in mind. The *U.S. Russia Polar Bear Treaty: Implications for Harvest* stated that the first goal was to meet the subsistence needs of Native peoples on both sides of the Bering Strait Region. The second goal was to include Native input on the four-member commission[18] when making management decisions. The third goal was to identify and apply a shared sustainable harvest. And the fourth goal was for both scientific data and traditional ecological knowledge to be integrated into polar bear management appropriately (U.S. Department of the Interior & U.S. Fish & Wildlife Service, 2011). According to the written agreement, the four-member commission includes the Alaska Nanuuq Commission and their two Russian counterparts the Association of Traditional Marine Mammal Hunters of Chukotka (ChAZTO) and the Chukotka branch of Russian Association of Indigenous Peoples of the North (CAIPON). Together, this body, the U.S.-Russia Bilateral Polar Bear Commission, decide the voluntary harvest quota for subsistence every three years (U.S. Department of the Interior & U.S. Fish & Wildlife Service, 2011). Administrative and financial capacity of polar bear research is rooted in the World Wildlife Fund which provided support in the early 1970s to the IUCN and developed the 1973 Agreement and, as recently as May 2016, supported the Arctic Wanderer project (Procter, 1973; Payne, 2016). At a smaller scale, the capacity of the Bering Strait Region to meet these goals largely depends on the incorporation and competencies of federal, regional, non-governmental, and Native entities.

After the signing of the *Polar Bear Treaty* in 2000, the Russian and United States' bilateral communication continued but, domestically inaction prevailed. By 2006, the implementing legislation of the *Polar Bear Treaty* still awaited ratification by the United States

[18] One Alaska Native, one United States federal government representative, one Chukotka Native, along with one Russian federal government representative.

Senate. In 2008, the U.S. Department of the Interior listed the polar bear as a threatened species under the Endangered Species Act, meaning importing polar bear trophies was banned since the taking of polar bear was banned under the MMPA. The National Park Service (NPS) has worked throughout Alaska with polar bears. For example, in 1997-2000, the NPS worked with the Alaska Nanuuq Commission to document traditional ecological knowledge on polar bear habitat in Alaska and Chukotka (Lunn, Schliebe, & Born, 2002). Another regional entity, the Alaska Science Center, researches polar bear-sea ice relations and population dynamics, and it forecasts the future status of polar bears. Run by the U.S. Geological Survey, the Alaska Science Center qualifies as both a regional and national research entity (Rode, Robbins, Nelson, & Amstrup, 2015). In Russia, polar bear research focuses geographically on the coast of Chukotka and Wrangel Island. The research is conducted by the Chukotka Autonomous Region government. The *Polar Bear Agreement* also produced a Scientific Working Group. In 2012, under the leadership of Terry DeBruyn and Stanislav Belikov, "the cochair recognized the need for research collaboration between the U.S. and Russia" (Haskett, Brower, Amirkhanov & Kavry, 2012). The 2015-2016 Scientific Working Group consists of representatives from the U.S. Fish & Wildlife Service, the U.S. Geological Survey, the Alaska Department of Fish and Game, the North Slope Borough, and the Alaska Nanuuq Commission. Russian members represent the All-Russian Research Institute of Nature Protection, the Marine Mammal Council of Russia, the Russian Academy of Sciences, the Russian Association of Indigenous Peoples of the North, the Chukotka Federal Fisheries Research Institute, the Chukotka Autonomous Okrug, and the Union of Marine Mammal Hunters (U.S. Fish & Wildlife Service, 2015). As seen in the given examples, active work has been occurring largely at a regional scale by governmental, non-governmental and Native organizations.

Earlier in 1996, the Nanuuq Commission carried out village consultations in Alaska and the same was done later by the Polar Bear Commission of the Union of Marine Mammal Hunters (UMMH) later did the same in Chukotka. However, the Nanuuq Commission developed a transboundary agreement with ChAZTO, a different organization from Chukotka. The State of Alaska and the Chukotka Okrug managed the agreement (Meek, Lovecraft, Robards, & Kofinas,

2008). This agreement includes local, Native representatives in the management of the consensus process. Regarding Native involvement in the United States, the MMPA's 1994 Amendments established the Alaska Nanuuq Commission, in which Charlie Johnson advocated for Alaska Native people to be able to have "an active and meaningful role in conservation and management of Alaska's two polar bear populations" (Haecker, 2013, p.4). The *Polar Bear Agreement* still "calls for the active involvement of natives and their organizations" (U.S. Fish & Wildlife Service, 2001, p. 1) on paper, but in reality the Russian Native representatives have changed hands and have yet to prove to be consistent partners (Meek et. al, 2008). The USFWS and the Alaska Nanuuq Commission co-manage polar bears in the United States while the Russian federal government and ChAZTO manage polar bears in Russia. While the *Polar Bear Agreement* is a unique international agreement due to its placement of the majority of power in the hands of the local Native population, those within the representative Native bodies voice different opinions. Eduard Zdor (2015) the Director of ChAZTO, claims that the federal government of Russia has complete control over polar bear management, resigning ChAZTO to a figurehead position since 2006. Additionally, Zdor (2015) claims that the signing powers of ChAZTO were transferred to a third group, CAIPON in 2009 after ChAZTO and the Nanuuq Commission signed a Native-to-Native agreement in 2008. The Native-to-Native agreement develops harvest limits and conservation measures (Meek et al., 2008).

While a large and compelling array of capacities has been involved over time, the decreasing Native representation and utilization of traditional ecological knowledge directly reduce the "customary and traditional uses" of polar bear in Russia. Due to these impacts of capacities on food security, the factor ranks 2 – sometimes present. The communication and information sharing of the capacities will be examined first in the United States and then in Russia.

Information: Rules, Roles, and Scientific Uncertainty

"At the present time, however, the status of the Russian- American Polar Bear Commission is unclear, as it has not been appropriated funding and its power to regulate resources now listed as threatened under the Endangered Species Act is in question" (Meek, 2009).

Under the *Polar Bear Agreement*, a Native-to-Native agreement calls for two positions on the Commission for each of the two Native representative bodies. The *Polar Bear Agreement* splits the harvest equally between the two states' Native populations. The recent annual limit for the taking of polar bears was 58 total, according to Karyn Rode with U.S. Fish & Wildlife Service (U.S. Department of the Interior & U.S. Fish & Wildlife Service, 2011). The decision-making powers regarding harvest limits and conservation measures should rest with the Alaska Native Commission and ChAZTO, instead lie mostly with the Alaska Nanuuq Commission. To add to this imbalance between Russian and American Native entities, the management of the Alaska-Chukotka polar bear population rests largely in federal hands, since the Alaska-Chukotka polar bear population is international. These imbalances result in poor communication of the rules of the *Polar Bear Agreement*.

In response to challenges in interpreting the rules, roles have also been asymmetrical, with the Nanuuq Commission working extensively with their Russian counterparts in order to develop a strong person-to-person relationship where formal relations are lacking (Meek et al., 2011). Native entities remain uncertain about population trends and threats to habitat. The effects of the *Polar Bear Agreement* on individual hunters is even more disconcerting. According to a polar bear hunter interviewed by Chanda Meek, "... these rules come down on us" (Meek, 2009, p.147). The hunter expressed his uncertainty about his own fate and his frustration at the limited influence of his participation in polar bear management or rule making. Borough Mayor Edward Itta later attributed the limited influence of hunters on "automobile drivers in Los Angeles, California" (Meek, 2009, p. 147) stating:

> The real tragedy would be if people in the lower 48 hear that the polar bear is now being protected and they...they feel good and they feel reassured while they're listening to their radio sitting in traffic. And they don't have any idea that they're letting the Iñupiaq Eskimos take the heat while nothing changes down there where the problem comes from."

The differing impact of the roles played by the National Marine Fisheries Service (NMFS), on behalf of the U.S. government, and of the Nanuuq Commission are apparent. The NMFS concerns itself with implementing specific rules, especially harvest assessments. The Nanuuq Commission, on the other hand, has spent the majority of its time building relationships based on the Alaska-Chukotka agreement. Accordingly, Native Commissioners expressed their frustrations, in 2006, at of the inconsistent financial security of the co-management board and at the priorities supported by these finances (Meek, 2009).

With uncertainty as to the rules and roles of the *Polar Bear Agreement,* it should come as no surprise that scientific uncertainty contributes to further ambiguity. The voice of the international scientific committee comes through the Convention on International Trade in Endangered Species' (CITES), which has declined to move the polar bear to Appendix I, where it would receive greater protection. While the 1973 Agreement documents the concerns for polar bears throughout the circumpolar North, CITES remains vague claiming that "climate change impacts might exacerbate existing stressors or modify existing complex environmental, ecological and physical local processes" (Scanlon, 2013, p. 3). Meanwhile the United States designated polar bears as "threatened" under the Endangered Species Act in 2008 (Southern, 2008). Uncertainty was high in the United States during the first six years of the twenty-first century, as the domestic and international community awaited Congress' ratification of the *Polar Bear Agreement*. Meanwhile in Russia, where hunting polar bears has been banned since 1956, the state was considering lifting the ban. Despite the poor condition of the species in Russia, the state reasoned that: "In Chukchi culture, the polar bear has been a source of reverence as well as a source of food. Officials believe that restoring cultural values that were suppressed due to the 1956 ban will help revive a sense of stewardship toward the bears and reduce incidences of rampant poaching (Worldwatch Institute, 2007). In 2011, Chukotka's Governor Roman Kopin legalized the indigenous hunt of polar bear, adding legitimacy to Russia's seat in the *Polar Bear Agreement* (Osborn, 2011). Legalization in Russia comes at a time when scientific uncertainty remains high, and the international community pauses once more before acting.

In an effort to ameliorate some of these difficulties, Jack Omelak, the Executive Director of the Alaska Nanuuq Commission, says that the coalition aims to speak in one voice to the multitude of agencies that manage Alaska marine mammals. "The agencies managing them aren't [connected]" said Omelak, "we aim to make the Arctic Marine Mammal Coalition a one-stop shopping place and we try to do away with the many funding restrictions we encounter with multiple agencies involved" (Haecker, 2013, p. 4). By the end of 2016, the USFWS will establish the reporting and management regime for the Alaska-Chukotka polar bear population. This outcome has the opportunity to allay concerns about the imbalance of Native to non-Native and American to Russian power within the *Polar Bear Agreement* (Department of the Interior, 2016). In April and May of 2016, scientists conducted aerial research under a project titled "Arctic Wanderer". The project included individuals from the World Wild Fund for Nature (WWF Russia), the Russian Marine Mammals Council, the Russian Arctic National Park, the Severtsov Institute of Ecology and Evolution, the Joint Directorate of Taimyr Nature Reserves, and the Wrangel Island Nature Reserve, to develop the first reliable population estimate for the region (Melnikov, 2016).

The clarity and decisiveness of information forthcoming on the rules, roles, and scientific findings under the *Polar Bear Agreement* have varied immensely between the United States and Russia; and due to the impact that the Russian-American Polar Bear Commission's questionable status is having on secondary components of food security, such as trade, barter, and sharing, the Information factor ranks 2– sometimes present.

Norms: Native, Global, and Interdependent

"The commercial moratorium for polar bear sport hunting was successful, largely because it was a blunt policy instrument and effective social norms and legal enforcement were brought to bear on a small population of resource users" (Lentfer, 1980).

Like the commercial moratorium on polar bear referred to in the quotation above, the *Polar Bear Agreement* between the United States and Russia can be viewed as successful. In the Russian Arctic, the killing or hunting of polar bears has traditionally taken place when polar bears have ventured too close to villages. The fifty year ban on hunting did not reverse this norm,

but rather, Russia's political and economic woes have further incentivized what was considered poaching until 2011. As Chukotkans killed polar bears in self-defense or for subsistence, they did so illegally. In the meanwhile, global concerns for polar bears have also shaped the norms that have furthered action on the *Polar Bear Agreement*. Outside of the traditional cultures of the Bering Strait Region, polar bears have come to symbolize climate change in the Arctic.

Native and popular norms have kept polar bears relevant on the international stage, but so have polar bears' interactions with other species for which the public is concerned. Bowhead whales, for example, attract polar bears and often result in the killing of polar bear. A whaler recounted an example of the integration of polar bear within the traditional hunting cultures of Alaska to Chanda Meek (2009): "One of our whaling captains came…and told us that polar bears are stalking us,…and [on] our captains' instructions, we went to find the largest polar bear-…and in my captain's reasoning was that if we catch the largest one, and then the smaller polar bears are watching this one being killed, that they will go away, and that's exactly what happened". Polar bears, Bowhead whales and Pacific walrus are interdependent, especially as sea ice increasingly faces biophysical changes. Polar bear are attracted to polynyas because of the robust number of other marine mammals that also depend on the polynyas.

Traditional hunting and cultures provide norms that have maintained the *Polar Bear Agreement's* relevance in the twenty-first century. While the global symbolism of polar bears attracts more media time than traditional norms, culturally relevant norms have additionally produced the Native-to-Native agreement and the strong cooperation between the Native polar bear hunters in Alaska and Chukotka, even when the rules, roles, and science within the *Polar Bear Agreement* were uncertain.

Norms, at a global scale, reflect the public's concern about climate change's impacts on the Arctic. However, local norms have had less impact on the federal governments' involvement with the IEA. As the federal governments engaged less actively with the *Polar Bear Agreement* in recent years, local action has been unable to bring concerns to the forefront of policy, as general global concern for polar bears had done previously. Therefore, the norm factor ranks 2 – sometimes present.

Case Study: International Convention for the Regulation of Whaling

For thousands of years, Bowhead whales have been the center of food security for Native populations along the Bering Strait. Bowhead whales provide a significant portion of the fats consumed in the Arctic since they are "the only baleen whales that spend their entire lives in waters near sea-ice and do not migrate to temperate or tropical waters to calve. They have the thickest blubber of any marine mammal" (Marz & Medina, 2007, p. 26). Due to the size of Bowhead whales and the need for human coordination for a successful harvest, Bowhead whales have shaped the Iñupiaq and Chukotkan cultures that remain vibrant in the twenty-first century.

When the International Whaling Commission deleted the Native exception for the subsistence harvest of Bowhead whale in 1977 (U.S. Department of Commerce, 1977), local communities in the Bering Strait Region entered the international political arena for the first time. Providing their own research and establishing the Alaska Eskimo Whaling Commission (AEWC), by 1981, the AEWC managed Bowhead whale hunts under a cooperative agreement with the U.S. government (Alexander, 2013). In Chukotka, co-management of whaling began after the Association of Traditional Marine Mammal Hunters of Chukotka (ChAZTO) was established. According to David Case and David Voluck (2012) the AEWC "represent[s] the first time since before the American Revolution that Indigenous Peoples in the Americas have participated in international treaty negotiations directly affecting their rights" (p. 278) . Bowhead whale in the Bering Strait Region provide more than a political reason for local involvement, by incentivizing the use of traditional ecological knowledge in management. Ecologically, the region's Native populations knew that Bowhead whale population estimates by western scientists were inaccurate. Knowing that: "the main ecological roles of bowheads appear to be… consuming plankton and vertically mixing nutrients, keeping ice open for other species,… providing a source of energy for scavengers and predators (polar bears, killed whales, arctic fox, humans)" (Moshenko, Thomas, & Eastern Arctic Bowhead Advisory Committee, 2003), Native populations' cultural incentive to preserve whaling was additionally coupled with ecological reasons.

Incentives: Whaling Moratorium, International Decision-Making, Cultural Impacts

"With whalers and their wives declaring their intentions to go to jail rather than follow what they considered to be an unreasonable federal quota for whales, the federal government eventually invited AEWC officers to Washington D.C. to discuss a cooperative agreement to regulate whaling and the grand jury investigation was dropped" (Meek, 2009).

Similar to polar bears, Bowhead whales migrate between wintering areas in the Bering Sea to the Chukchi and Beaufort Seas for the summer. Traditional ecological knowledge and western science corroborate that "the spring migration follows fractures in the sea-ice [polynyas] around the coast of Alaska, generally in the shear zone between the shore fast ice and the mobile polar pack ice. [Bowhead] depend on a system of open-water leads to provide a migratory route between wintering and summering grounds" (Marz & Medina, 2007, p. 26). Local traditional ecological knowledge first verified these understandings after an international decision-making body, the International Whaling Commission (IWC), proposed an unfounded whaling moratorium. After forty years of work, the IWC, the United States and Russia, the North Slope Borough and Chukotka Okrug, and the AEWC and ChAZTO have formed an effective IEA that engages scientific, cultural, political and Native experts.

Beginning in the early 1970s, the IWC published Bowhead whale population predictions that contradicted with the traditional ecological knowledge of Native communities. Based on the IWC's population estimates, the commission proposed, but did not approve a whaling moratorium. In 1976, the New Management Procedure was signed, imposing a "selective moratorium" that deleted the Native exception for subsistence harvest of Bowhead whale in Alaska. Nationally, the U.S.S.R. immediately opposed the moratorium, and shortly thereafter the United States followed suit. Other member states' concerns led them to favor a whaling ban, however; scientific committee members reasoned: "the degree of scientific uncertainty is so widespread…the only appropriate way to assure stocks are not over-exploited is through a moratorium" (Young & International Whaling Commission, 1992, p. 104). Native whaling populations along the Bering Strait began documenting their own understandings of the Bering-Chukchi-Beaufort Bowhead whale population, and in 1977 they formed the AEWC in response to the IWC's whaling ban. By this point, the AEWC, which was comprised of Iñupiaq and Yupik

whaling captains, had their own data to make a case for the continuation of Bowhead whaling. Beginning in 1981, the AEWC managed Bowhead whale hunts under a cooperative agreement with the U.S. government (Quakenbush, 2008).

Regarding whaling and quotas, the IWC represents an international voice in the management process of a species that migrates only regionally. Signed in 1946, the *International Convention for the Regulation of Whaling* later led to the development of the IWC. However, in those early years, the IWC did not undertake rule-making or enforcement, due to what they claimed was a lack of scientific data. In 1972, species quotas were enacted due to the near extinction of several whale species around Antarctica according to *Understanding the Revised Management Procedure* (Young & International Whaling Commission, 1992). The AEWC as mentioned earlier, had the incentive to publish their traditional ecological knowledge and undertake further research on population numbers, after a foundation in their traditional culture was challenged.

For the Bering Strait Region's populations, Bowhead whaling is a significant component of food security. Annually, the edge of the shore-fast ice is used as a platform for hunting Bowhead whale. The hunt depends on an understanding of the ice. As ice changes, not only do the routes of Bowhead whales change, the efficacy of the hunt is affected (Hovelsrud et al., 2008). By weight, the Bering-Chukchi-Beaufort Bowhead whale population is the largest contributor to food security. The threat of a moratorium by a international decision-making body mobilized the creation of the AEWC, and through the AEWC the United States-Russia IEA emerged. This incentive promoted by the moratorium and led by the AEWC, ensured the Bering Strait Region's food security, in regard to Bowhead whale. Therefore, the incentive factor ranks 3 – fully present.

Capacities: International, Federal Agencies, Regional Governments, and Native Organizations

The United States-Russia IEA integrates the international IWC and the Inuit Circumpolar Council, the federal agencies of both the United States and Russia, and four regional entities including the Chukotka Autonomous Okrug, the North Slope Borough, AEWC, and ChAZTO.

The diverse group of actors involved in managing Bowhead whale depends on the traditional ecological knowledge of the local populations in the Bering Strait Region. Through the processes of establishing harvest quotas, attending international meetings, and producing quality research, the capacities demonstrate not only their own importance but the value of transboundary cooperation.

The international capacity derives mainly from two bodies: the IWC and the Inuit Circumpolar Council (ICC). The ICC, during the IWC, represents Alaskan and Chukotkan whalers. Kristina Alexander (2013), the legislative attorney for the Congressional Research Service Report on Whaling, frames whaling as it exists under the IWC by emphasizing each state's independent quotas for various species. However, in regards to the United States and Russia, "[they] share the aboriginal quotas for these whales, with U.S. Native groups taking almost all of the Bowhead whales and the Russian groups taking almost all of the gray whales" (p. 12). This means that the quotas depend on transboundary cooperation between the two nationalities of the Bering Strait Region. The research that produced these prescribed catch figures addressed at the end of this section involves the IWC and the Native commissions. This IEA is considered "successful in regulating harvests", due to the active role that whalers take in defending their subsistence rights at every renewal of the multi-year quota by the IWC (Meek, 2009). International capacity, we see, is largely dependent on the localized actors. The 2008-2012 aboriginal subsistence quota was nearly defeated by legislators from outside of the Arctic. Alexander (2013) claims that whaling was only to be rescued at the last minute by the United States' diplomatic action. In addition to the IWC, both the United States and Russian national governments regulate whaling alongside the Native organizations.

In 1979, the IEAs were recommended for several types of whales, including Bowhead, and the inclusion of "Inuit observers" was encouraged (Young & International Whaling Commission, 1992). Beginning in 1981, the AEWC managed Bowhead whale hunts under a cooperative agreement with the National Oceanic and Atmospheric Administration, an agency of the National Marine Fisheries Service (NMFS). Under the 1986 terms, whaling on a subsistence basis was approved, even though quotas were still being determined. According to the IWC, each

state must advocate for and submit the needs of its own people (Young & International Whaling Commission, 1992). As mentioned previously, the national bodies' capacities to defend their Native communities has been strong in recent years. Prior to 1996, Russia was the only state to be granted a quota for gray whale for its aboriginal people. Met with considerable controversy around the globe, the United States and Russia submitted a joint request in 1997. The collaboration was successful and in 2002, the two states chose to trade existing quotas rather than requesting increases from the IWC (Jeffery, Firestone & Bubna-Litic, 2008). This exchange was later formalized in the 2004 IWC meeting (Gillespie, 2005). When the IWC issues a new harvest assessment and quota, the United States publishes it in the federal register. In Russia the quota is adopted into their national law. Today the quotas are still shared between the Native populations in the United States and Russia. In part due to the action taken by both federal governments, the five year quota for 2008-2012 allowed for the taking of 280 Bowhead whales and 620 Gray whales (Alexander, 2013). The report published by the IWC is largely based on quotas and ice conditions gathered from American and Russian whaling captains.

The two prominent Native organizations, the AEWC of the U.S. and the ChAZTO of Russia, work directly with the international and national agencies discussed previously. Lori Quakenbush (2008) explains that the conditions of AEWC, ChAZTO, and IWC's collaboration through the agreement lend themselves to a quota of "up to 67 strikes per year to be divided among the 10 Alaska whaling villages along with a comparative agreement with Russia" (p. 2). Whales use small boats and handheld weapons during the spring and fall. The AEWC has also assisted with the development of the harvest assessment, "a compromise with NMFS after the IWC asserted its authority over the bowhead whale hunt in 1977" while additionally providing harvest reports and ice conditions collected from whaling captains (Meek, 2009). The AEWC and North Slope Borough created the Alaska-Chukotka "Program for Encouragement of Native Involvement in Policy and Decision Processes" in the mid-1990s for three reasons: to strengthen Native organizations in Chukotka, to engage Native hunters' participation in wildlife management, and to document traditional ecological knowledge on marine mammals (Nuttall, 1998). In Russia, ChAZTO works mostly on Bowhead whale research. Since the early 1990s,

ChAZTO has partnered with the Chukotka Science Support Group and scientists from ChukotTINRO on the *Bowhead Coastal Observation Project*. In the project's first years, ChAZTO partnered with the North Slope Borough (George & Hanns, 2011). Informally and before AEWC or ChAZTO formed, whaling research collaboration began between individuals in Chukotka and Alaska.

While the North Slope Borough has contributed to political collaboration in the Bering Strait Region, it has also been a catalyst for collaborative research. The involvement of the North Slope Borough's Department of Wildlife Management relied on the belief that by providing correct population numbers to the IWC, whaling would resume for the borough's Native communities. Five of six coastal communities in the North Slope Borough depend on whaling. According to Mark Nuttall (1998), the North Slope Borough, under Mayor George Ahmaogoak, worked in partnership with the American-Russian Centre to assist the Chukchi who had "appealed to Alaska whalers for assistance in obtaining appropriate whaling technology and training in how to go whaling" (p. 105). Victor Fischer explains that the compensation the Russian whalers received for their work helped them organize ChAZTO before the end of the century (Fischer & Wohlforth, 2012). In the twenty-first century, the North Slope Borough attends the IWC with whaling leaders, as non-profit delegates, which allows them to lobby for their rights and the persistence of whaling in the Bering Strait Region (Meek, 2009). The Far East Branch of the Russian Academy of Sciences has worked on the "Bowhead Coastal Observation Project" with the Chukotka Autonomous Okrug, providing most final reports and analyses (George & Hanns, 2011).

Research and cultural collaboration continue to take place, with contributions from each of the discussed capacities, but with reliance always on the local populations. The "U.S.-Russia Coastal Observation for Bowhead Whale Project" undertook shore based counts by experienced hunters. The project's outcomes and analysis have supported traditional ecological knowledge, which disagreed with the IWC's Bering-Chukchi-Beaufort Bowhead whale population estimate (Melnikov et al., 2004). Local and regional participants, such as hunters, provided understandings on feeding patterns which improved observations and data collection. National

and international participation improved funding, which has come from the National Park Service, National Marine Fisheries Service, and the North Slope Borough's Department of Wildlife Management. Through improvement over the last 40 years, including the more recent adoption of Conflict Avoidance Agreements, to improve information sharing, the Capacity factor ranks 3 – fully present.

Information: IWC-AEWC and ChAZTO Relations, Integrated Research Collaboration, Annual Industry-Native Agreement

Despite the lack of a comprehensive plan, management activities and, until recently, low levels of development in its habitat have been successful in recovering bowhead whales to the point at which senior NMFS biologists have suggested de-listing the species from the Endangered Species Act (Shelden, Rugh, DeMaster, & Gerber, 2003) as cited in (Meek, 2009, p. 123).

Using its traditional ecological knowledge, the AEWC gathered sufficient data on Bowhead whale migration and population size to resolve the Western scientific uncertainties and concerns that the species was endangered. Direct communication between the IWC, the federal governments, and the AEWC and ChAZTO resulted in what Evelyn Pinkerton, a maritime anthropologist, deems a highly "effective co-management arrangement" (Pinkerton, 2011, p. 138). While the effectiveness of the IEAs are not a function of population trends, the number of Bowhead whale have been increasing continuously since the IWC recognized traditional ecological knowledge from the Bering Strait Region and began working with the AEWC and ChAZTO (see Figure 3.2: Bowhead Whale Population Estimate 1975-2011). In 1975, the IWC estimated that around 1000 Bowhead whales existed, while the AEWC estimated around 5,000 individuals. As can be seen in Figure 3.4, the figure from 1978 doubled from 5,000 to around 10,000 by 2000, with a 95 percent confidence interval. In 2011, the North Slope Borough, the AEWC, and the NMFS together estimated the Bowhead population at 16,892 individuals (Givens et al., 2013). Population estimates have been taken in intervals of about 10 years, using visual observations of open leads and acoustic surveillance (Clark, Ellison, & Beeman, 1986; Zeh et al., 1993). Due to active management of the habitat and harvest, the Bering-Chukchi-

Beaufort Bowhead whale population has recovered to some extent from the excessive commercial whaling of the nineteenth century.

After 40 years of work, the information provided by research, observations, and studies on the Bering-Chukchi-Beaufort Bowhead whale population produces a positive trend of this Bowhead population. Traditional ecological knowledge and western science have been integrated within research projects and American industry and whalers have been producing Conflict Avoidance Agreements annually. Both of these outputs are clear and consistent. In general, Rod Hobbs of the Marine Mammal Working Group, claims that shared whale research includes: aerial surveys, health assessment, harvest monitoring, audiograms, tagging and satellites (U.S.-Russia Marine Mammal Working Group, 2013). Beginning in 1992, the joint Russian-American project, mentioned earlier, studied the migration patterns of Bowhead whales for four years. Building on the four-year project, in 1999, the researchers began shore-based counts to confirm that an alternative migration occurs along the western edge of the Bering Strait (Melnikov et al., 2004). Ten years later, Vladimir Melnikov of the Russian Academy of Sciences, Eduard Zdor of Association of Marine Mammal Hunters of Chukotka, Gennady Zelensky of Chukotka Science Support Group, and Denis Litovka of Chukotka TINRO collaborated with the North Slope Borough on the Bowhead Coastal Observation Project. According to an annually published report, the same group of individuals also collaborated from 2003-2006 on a bio-sampling project of both Gray and Bowhead whales (George & Hanns, 2011). Due to the changing marine ecosystem, the United States-Russia joint Bowhead whale project concludes that the series of endeavors during the last 20 years has advanced understanding of whale population numbers, and migration patterns significantly. Overall, this research has provided data needed by the IWC in order to allow the continuation of whaling, a substantial component of food security in the Bering Strait Region.

In the United States, an annual and preventative Conflict Avoidance Agreement (CAA) has ensured information and collaboration on the Bering-Chukchi-Beaufort Bowhead whale population and its habitat. The U.S. Fish & Wildlife Service with ten Arctic villages and five tribal governments annually publishes a CAA with the AEWC. They developed the first CAA in

1985 to balance economic development with subsistence needs. The oil and gas industry represents the federal government on the CAAs. Decision-making under CAA's co-management system depends on seasonality. During the "Open Water Season" the CAAs allow industry to carry out work, while requiring industry to respect area closures for whaling (Lefevre, 2013). During whaling season subsistence hunters are the primary decision-makers while industry assumes those decision-making powers during the remainder of the year (Lefevre, 2013). Collaboration through CAAs not only represents collaboration between separate entities but recognizes local norms of Native organizations such as the AEWC.

The capacity of regional entities to confirm positive scientific estimates regarding Bowhead whale population numbers, their ability to allow Bowhead to return to their historic role in the region's food security (see Figure 3.3: Bowhead Whales Landed by Alaska Natives 1974-2010), and their ability to ensure Bowhead as a food source as well as for secondary uses, results in an Information factor ranking of 3 – fully present.

Norms: Cultural Components of the AEWC and ChAZTO

"Bowhead whaling strengthens family and community ties, adds to the sense of a common Inupiat heritage, culture, and way of life, and provides strength, purpose, and unity in the face of rapid change" (Bureau of Land Management, 2005).

Over the last millennium at least, local populations on both sides of the Bering Strait have been hunting the Bering-Chukchi-Beaufort Bowhead whale population (Stoker & Krupnik, 1993). These Bowhead whale hunts have shaped the norms that incentivized the creation of the AEWC and ChAZTO. This section discusses norms as subsistence, the harvest of those resources, and the valuable structure of inter-generational and inter-community relations that surrounds these hunts.

According to Sam Stoker, Bowhead whale are the preferred subsistence resource in northern coastal communities due to the powerful cultural basis for sharing and community cooperation (Stoker, 1983). The Bureau of Land Management's (BLM's) 2005 Subsistence Report acknowledges that "whaling continues to be the most valued activity in the subsistence economy of the communities, even in the light of harvest constraints imposed by the

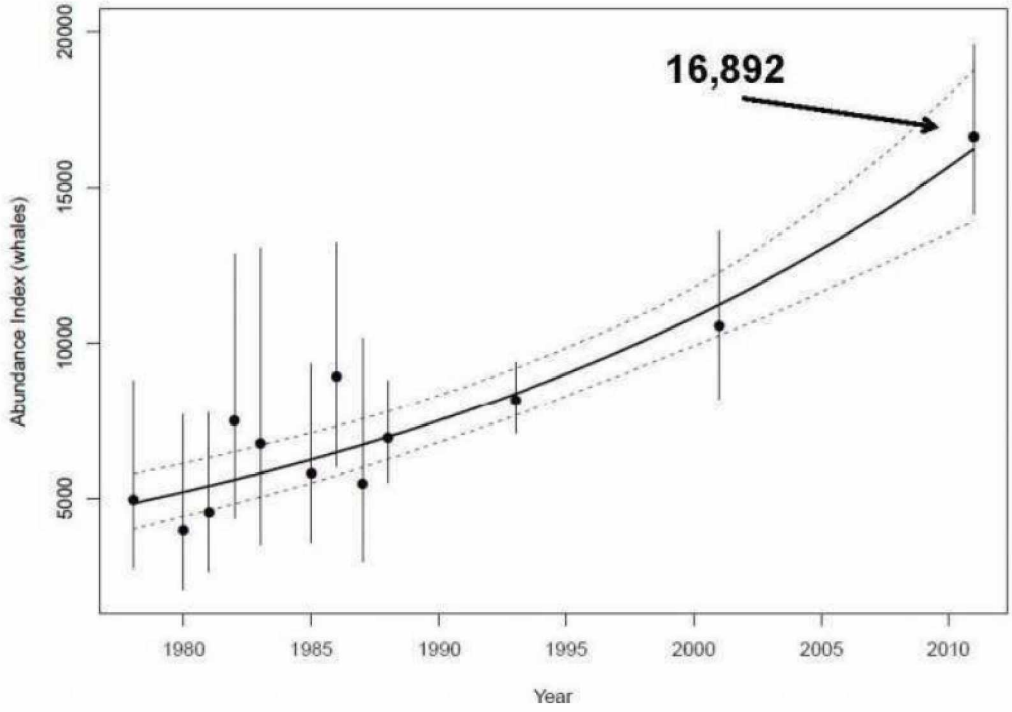

Figure 3.2: Bowhead Whale Population Estimate 1975-2011
Source: (Givens, G. et al., 2013)

International Whaling Commission quotas" (Bureau of Land Management, 2005, p. J-6). According to the Subsistence Report, in Barrow 21 percent of wild food harvested is Bowhead whale (Bureau of Land Management, 2005). Whaling provides variable percentages of the Bering Strait Region communities' diets. Surveys by the Alaska Department of Fish and Game (ADF&G) report subsistence for whales ranging from 175 lbs./person in Wales, Alaska in 1993, to 560 lbs./person in Kaktovik in 1992, to170 lbs./person in Point Lay in 2012 (Alaska Department of Fish & Game, 2016). What is known, is that reported harvests of wild resources, in kg per person, have decreased. James Fall, of the ADF&G, reports that between 1986 and 2012 harvests decreased from 318.5 kg per person to 198.7 kg for the Arctic region of Alaska. In 2012, marine mammals averaged 78.6 kg of those 198.7 kg (Fall, 2016). In Russia, whale provides more than half of subsistence meat taken from marine mammals. In 2000, it was

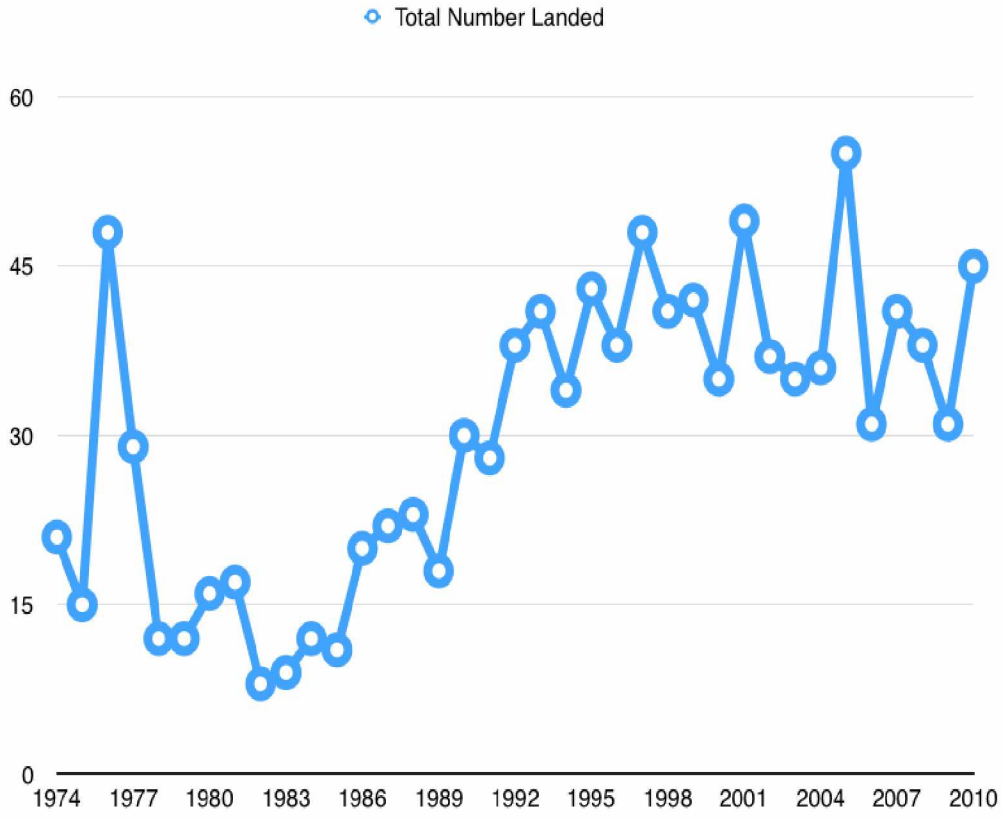

Figure 3.3: Bowhead Whales Landed by Alaska Natives 1974-2010
Source: (Suydam, R.S. & George, J.C., 2004; Suydam, R.S. & George, J.C., 2005; Suydam, R.S. & George, J.C., 2006; Suydam, R.S. & George, J.C., 2007; Suydam, R.S. & George, J.C., 2008; Suydam, R.S. & George, J.C., 2009; Suydam, R.S. & George, J.C., 2010; Suydam, R.S. & George, J.C., 2011)

reported by the Chukotka Autonomous Okrug that about 14 of the 21 kilos of reported subsistence meats per person were from whale (Сайдаль & Ministry of Fisheries, 2000). While Bowhead whale harvests have recently decreased, the management of Bowhead whale at local, regional, national and international scales have been largely shaped by norms that emanate through the AEWC and ChAZTO.

Not only historical bowhead whaling practices, but current Bowhead whaling norms in Bering Strait Region communities have shaped management policies, as Chanda Meek writes,

due to the fact that Bowhead whales' "relationship with people [that] continues to structure community life and cultural identity" (Meek, 2009). Bowhead whale have shaped preservation efforts amongst coastal communities, through the generation-to-generation transference of traditional ecological knowledge and adaptation to change. The observation and harvest of Bowhead whales over thousands of years has led to the establishment of several seasonal coastal villages, where the Iñupiaq originally moved to exclusively hunt Bering-Chukchi-Beaufort Bowhead whale. The size and number of harvested Bowhead whale have largely influenced sharing features of Iñupiaq culture. Whaling preparations occur year-round, culminating with the spring harvest (Bureau of Land Management, 2005).

This thorough integration of whaling with the traditional way of life in the Bering Strait Region produced the transboundary and informal values that, as norms, arguably have had the greatest affect on international and federal attitudes toward whaling. While the international community voiced the intention to ban whaling, whalers and their wives, for example, declared they would rather go to jail than abide by what they deemed the inaccurate population based moratorium in the 1970s (Meek, 2009). The U.S. federal government responded by inviting the AEWC to Washington D.C. to discuss a cooperative agreement. As seen in the capacity section, all entities have worked closely with the AEWC and whaling captains in research projects, and domestic and intentional policy creation. Stephen R. Braund of the Institute of Social and Economic Research in Anchorage, writes that owing to the normative values of whaling, in the Bering Strait Region, "bowhead whale hunting is the key activity in the organization of social relations in the community and one of the greatest concentrations of effort, time, money, group symbolism, and significance" (Braund & the Institute of Social and Economic Research, 1993, p. 26). BurnSilver, Magdanz, Stotts, Berman, and Kofinas (2016) discuss this persistence of subsistence over the last several centuries despite the interference of Yankee whalers, gold miners, epidemic diseases and multinational oil companies. Subsistence as a crucial component of the Bering Strait's mixed economics has not been traded for pure market engagement. The persistence of whaling-based norms based in shaping culture and providing food security have

been amplified by local norms' abilities to influence international politics and cooperation. Therefore, the Norms factor ranks 3 – fully present.

The incentives, capacities, information and norms shaping the Bowhead whale and polar bear IEAs exhibit temporal and spatial trends. The preservation of the populations of these two species that reside in the Bering Strait Region relies on the effectiveness of these agreements. The following conclusion compares the success and shortcomings of the *Polar Bear Agreement* and the *International Convention for the Regulation of Whaling*.

Discussion and Conclusion

"The differences in the bowhead whale and polar bear regimes – the use of hard quotas versus voluntary measures, histories of state-community relations, and different levels of power sharing offer a unique opportunity to study public policy from a comparative standpoint" (Meek, 2009, p. 5).

The U.S.-Russia *Polar Bear Agreement* and the U.S.-Russia agreement under the *International Convention for the Regulation of Whaling* were both built upon a variety of incentives. Today the two IEAs are carried out by different capacities, have produced information of varying certainty, and exhibit norms that come from different localities throughout the Bering Strait Region. Figure 3.4 visualizes and quantifies a comparison of the discussion and the IEA's trends (see Figure 3.4: Polar Bear and Bowhead Whale Four Factor Comparison). For the purpose of this thesis, the factors considered are given a value of 1 to represent "not present", 2 to represent "sometimes present", and 3 to represent "fully present".

Strong incentives exist for establishing and implementing bilateral management of polar bear and Bowhead whale. For the *Polar Bear Agreement*, incentives included protecting a species critical to the ecosystem and culture, the need for a better understanding of the Alaska-Chukotka polar bear population size, the success of the 1988 Inuvialuit – Iñupiaq Agreement, and combating the threat of increased poaching. Incentives for a bilateral agreement on the management of Bowhead whales were largely based on the fundamental role the Bowhead whale assumes within the Native cultures, as well as being the largest subsistence source for these

coastal communities. An additional incentive included the recent establishment of the Alaska Eskimo Whaling Commission, which overturned inaccurate population estimates from the IWC and became a benchmark for future co-management cooperative agreements under the MMPA's 1994 amendments. Incentives for the *Polar Bear Agreement* were largely top-down orientated, with little involvement or even compliance at the local level, especially in Russia. While the incentives address different ecological and cultural impetuses for both of these agreements, the incentives were fully present for establishing and continuing to enforce the *Polar Bear Agreement* and the *International Convention for the Regulation of Whaling.*

The capacities of the bilateral U.S.-Russia management and local-national co-management of the Bering-Chukchi-Beaufort Bowhead whale population have improved over the last 40 years. In contrast, owing to poor communication and poor delineation of authority, the co-management of the Alaska-Chukotka polar bear population, specifically between the United States and Russia, has not improved. In the case of the Bering-Chukchi-Beaufort Bowhead whale, a "nested enterprise" exists according to Ostrom's (1990) analysis. However, "monitoring" and "enforcement," two components of Ostrom's (1990) nested enterprise's are weaknesses in the management of the Alaska-Chukotka polar bear population. The regime for managing Bowhead whale harvests remains the most active at the local level, because of the immense roles that whaling captains and the AEWC have in reporting harvests and weather conditions (Meek, 2009). Local managers of Bowhead whale enjoy strong linkages to their federal partners, due to collaborative biological research, annual negotiations with industry in "Open Water Season" Conflict Avoidance Agreements, and through the updating of quotas every five years. On the other hand, the *Polar Bear Agreement* depends on voluntary measures rather than quotas, and additional stakeholders, such as industry, are not consulted with the same formality as the annual Conflict Avoidance Agreements. The initial impetus, or capacity, to address polar bear was the Marine Mammal Protection Act, followed by the 1973 Agreement. These top-down efforts contrast sharply with the trajectory that Bowhead whale management has taken. The AEWC proposed the original management plan; not until later would the National Marine Fisheries Service become involved. Over the subsequent 30 years, Chanda Meek writes,

"trust built between the whalers, the biologists and NMFS… the intense international scrutiny of native whaling has created the foundation for highly effective, coordinated management" (Meek, 2009, p. 150).

Capacity regards not only how individual entities work together, but how well the bilateral managements can be enforced. Bodenhorn (2000) contributes to the knowledge on the AEWC's success of regulating harvests, by highlighting the success of reducing the take of old whales and punishing the take of calves. Enforcement has been highly effective and thought to have also influenced the efficiency of hunts. Meek (2009) proposes that enforcement, effective reporting, and policy implementation of polar bear and Bowhead whale have differed due to the varying levels of cultural, subsistence, and seasonal dependence on the marine mammals by the respective communities.

Information on the Alaska-Chukotka polar bear population and harvest numbers, and the management structure itself, remain opaque and difficult to access, for those hunting. Additionally, the local population still perceive high poaching numbers. As for Bowhead whaling, population and harvest numbers are regularly documented. Bowhead whale hunts have improved from a 50 percent efficiency rate in the 1970s to 78 percent by 2007 (National Marine Fisheries Service, 1977; Alaska Eskimo Whaling Commission, 2012). Reporting for polar bears is inconsistent between the United States and Russia, resulting in the assumption that poaching numbers of polar bears in Russia are high. Since the beginning of the twenty-first century, Bowhead whales harvests boast near perfect reporting with rates between 98-100 percent (Alaska Eskimo Whaling Commission, 2012). The degree to which local actors can use information also impacts fate-control and the level of efficacy in information transfer. Meek claims that:

> [Whaling Captains' Associations] are important in creating sustained collective action… [which] provides whalers a sense of control over their own fates, at least as far as harvesting rules go. Polar bear hunters in Barrow seek information through local organizations, but have little influence over many policy initiatives relating to polar bear conservation. Responsibility for harvest assessment is fragmented along many levels of social organization (Meek, 2009).

1: not present, 2: sometimes present, 3: fully present

	Polar bear (2000-2016)			**Bowhead whale (1990s-2016)**		
	United States	Russian Federation	Trend	United States	Russian Federation	Trend
Incentives	• Success of Inuvialuit-Iñupiaq Agreement	• Increased poaching • Success of Inuvialuit-Iñupiaq Agreement	3	• 1977 Deletion of Subsistence Harvest • Traditional ecological knowledge on population data, made available to IWC	• 1977 Deletion of Subsistence Harvest • Traditional ecological knowledge on population data, made available to IWC	3
Capacities	International: World Wildlife Fund, International Union for Conservation of Nature, US-Russia Bilateral Polar Bear Commission, International Union for Conservation of Nature (IUCN) Polar Bear Specialist Group National: U.S. Fish & Wildlife Service (USFWS), National Park Service (NPS), U.S. Geological Survey Regional: North Slope Borough (NSB), Alaska Nanuuq Commission, Alaska Dept. of Fish and Game (ADF&G)	International: World Wildlife Fund, International Union for Conservation of Nature, US-Russia Bilateral Polar Bear Commission, IUCN Polar Bear Specialist Group National: Russian Academy of Sciences, Marine Mammal Council of Russia, All-Russian Research Institute of Nature Protection, Russian Association of Indigenous Peoples of the North (RAIPON) Regional: Chukotka Autonomous Okrug, Association of Traditional Marine Mammal Hunters in Chukotka (ChAZTO), RAIPON-Chuktoka (CAIPON), Polar Bear Commission of the Union of Marine Mammal Hunters (UMMH), Chukotka Federal Fisheries Research Institute	2	International: International Whaling Commission, Inuit Circumpolar Council, U.S.-Russia Marine Mammal Working Group National: NPS, National Marine Fisheries Service (NMFS), USFWS Regional: Alaska Eskimo Whaling Commission, NSB, NSB's Department of Wildlife Management, Alaska Fisheries Science Center, ADF&G Local: Whaling Captains Associations in Gambell, Savoonga, Wales, Little Diomede, Kivalina, Point Hope, Point Lay, Wainwright, Barrow, Nuiqsut, Kaktovik	International: International Whaling Commission, Inuit Circumpolar Council, U.S.-Russia Marine Mammal Working Group National: Russian Academy of the Sciences, Russian Federal Research Institute of Fisheries and Oceanography Regional: ChukTINRO, ChATZO, Chukotka Science Support Group, Chukotka Autonomous Okrug	3
Information	• Scientific uncertainty on population numbers	• Unclear communication between national and Native actors in Russia	2	• Clear communication of duties with IWC • Positive scientific certainty on population numbers	• Clear communication of duties with IWC • Positive scientific certainty on population numbers	3
Norms	• Polar bear integrated into ecosystem-based traditional values • Global icon of climate change concern	• Polar bear integrated into ecosystem-based traditional values • Global icon of climate change concern	2	• Traditional values and culture (e.g. language) • Post-MMPA general concern	• Traditional values and culture (e.g. language)	3
Total			9			12

Figure 3.4: Polar Bear and Bowhead Whale Four Factor Comparison

Scientific uncertainty surrounding polar bear population numbers and harvests remains a frustration for local actors, as well as governments at every scale. Without collaboration between traditional ecological knowledge and western science, the *Polar Bear Treaty* has a lesser ability to drive further policy implementation and a lesser ability to further develop capacities.

While all four factors are interdependent, norms informally represent the will of those on the ground and in the cases of both polar bears and Bowhead whales, are influential. The reasons for harvesting polar bears and Bowhead whales differ historically, and yet both species are integral to traditional ecological knowledge and norms of the peoples of the Bering Strait Region. The importance of whales to not only the culture but to a holistic definition of food security has been amplified by local norms' abilities to influence international politics and cooperation. The attention that polar bears have attracted from within the general populations of Arctic and non-Arctic states, owing to their symbolism of the Arctic itself and the region's fragility, adds driven action on the *Polar Bear Agreement* informally. This public support, outside of the Arctic, is not found readily in the defense of Native harvest of Bowhead whale.

As seen in Figure 3.4, not only does the presence of the four factors differ, but the trends of the capacities and information sharing differed following the implementation of these IEAs. The Information differences are most noticeable. Information on polar bear populations and harvests has not been gathered or shared freely, and what information exists lacks clarity, especially on the Russian side of the Strait, since 2006. Meanwhile, information generated on the Bering-Chukchi-Beaufort Bowhead whale population through both traditional ecological knowledge and western scientific methods has increasingly been shared, with positive results. Norms, differ for both species and often from village to village, and nation to nation. Incentives have been fully present the entire time for conserving polar bear and Bowhead whale.

As seen in Figure 3.4 the cumulative value of the *Polar Bear Agreement*'s factors is 9, while the factors under the *International Convention for the Regulation of Whaling* equal 12. These values demonstrate that a higher level of food security exists due to the effectiveness of the Bowhead whale IEA. The increasing take and population numbers of Bowhead whale, the near perfect reporting of Bowhead whale takes compared to the poaching of polar bear, and the

Bowhead whale IEAs resolution of each of the original incentives all support these quantitative values as well. This research leads to the conclusion that the effectiveness of an IEA regarding marine mammals in the Bering Strait Region relates directly to the security of that natural resource.

Pacific walrus, similar to polar bear and Bowhead whale, are culturally significant in the Bering Strait Region. The representative Alaska Native organization, the Eskimo Walrus Commission (EWC), was modeled on the AEWC and established only one year later. Pacific walrus, unlike polar bear or Bowhead whale received considerably lesser attention outside the Arctic during the twentieth century. However, the Pacific walrus faces similar threats from biophysical changes of ice and increased shipping. Therefore a Native agreement has been drafted for Pacific walrus and a series of bilateral meetings have been called to discuss the biggest challenges and propose solutions. Chapter 4 reviews the historical background, contemporary status, and political action surrounding Pacific walrus. In conclusion, the strengths and shortcomings of the *Polar Bear Agreement* and the *International Convention for the Regulation of Whaling* will inform policy recommendations for a future U.S.-Russia Pacific walrus IEA.

Chapter 4: Analysis of and Recommendations for Transboundary Management: A Case Study on Pacific Walrus

Introduction

The political capacity of the Bering Strait Region to manage transboundary ecological challenges depends on international organizations, the federal governments, and the local stakeholders as demonstrated by both the *Polar Bear Agreement* and the *International Convention for the Regulation of Whaling*. Findings from the four-factor comparison of these two IEAs include: strong incentives must be regionally pertinent, capacities' powers on the other hand must be clearly delineated between the actors (ranging from local to national scales), information hinges upon the clear communication of each capacity's role; and collaboration between traditional ecological knowledge and western science, and actors at each scale; and norms , which, despite their informality, influence policy as the will of the region's stakeholders. This chapter finds that a Pacific walrus IEA is possible with further attention to three identified gaps that will be identified and three recommendations: 1) conservation of the Pacific walrus, 2) maintenance of Native self-determination and, 3) encouragement of the flow of information between the local and federal stakeholders and between the United States and Russia.

Historical Importance

Local stakeholders, the key actors related to the factors used to evaluate the polar bear and Bowhead whale IEAs, have voiced a need for a Pacific walrus IEA, largely owing to the significant role the Pacific walrus plays in the cultures of the Native peoples living along the Bering Strait. Dorothy Ray (1975) relays that the cultures of the nineteenth century peoples of the Bering Strait Region are "whaling-walrus" due to their known traditions, foods, tools, and festivals based on whales and walrus. Residents of the Bering Strait affirmed their reliance on the walrus by establishing the Eskimo Walrus commission in 1974, one year after the establishment of the Alaska Eskimo Whaling Commission. The 11 other Alaska Native Commissions under the Marine Mammal Commission would not be established until the passage of the Marine Mammal

Protection Act's 1994 amendments, 20 years later (Marine Mammal Commission, 2007). The unknown status of Pacific walrus remains disconcerting to the Native peoples of the Bering Strait Region due to interactions between the human population and the Pacific walrus for over a millennium. According to Native hunters from Chukotka "the Pacific walrus has served as a very basis of existence for the indigenous peoples of Chukotka and Alaska since time immemorial" (Kochnev, 2016).

In 1820, Karl Hillsen wrote that he had seen on ice floes along the coast of St. Lawrence Island, an island nearly equidistant from the United States and Russia, "hundreds of thousands of walrus" (Hillsen, 1849 cited in Ray, 1975, p. 200). However half a century later and concurrent with the St. Lawrence Island famine and the rapid decrease of Bowhead whale, the numbers of Pacific walrus had decreased dramatically. Sheldon Jackson articulated in an 1894 report the devastating decrease of whale and walrus population numbers in the Bering Strait (Jackson, 1894). With the turn of the century, exploration accounts began being replaced by scientific and anthropological accounts that incorporated traditional ecological knowledge on the Pacific walrus. Within fifty years the Marine Mammal Protection Act of 1972 would mark the final push to shift marine mammal management from a traditional ecological ideology to a system based on western science (Meek et al., 2008). An early example of western science's involvement with the Pacific walrus comes from 1937, when two Russian scientists conducted five months of walrus data collection while aboard the ships of Russian small-numbered peoples who were hunting walrus (Freiman, 1941). This scientific journey, sponsored by the Russian Pacific Research Fisheries Center, added significantly to the western scientific knowledge of the biological explanation of the migration and sex structure of the walrus herds. In the meanwhile, the United States banned commercial harvests of walrus in 1941 under the *Protection of Walrus in the Territory of Alaska Act* (55 Stat. 632, 48 U.S.C. § 248).

In the following years in Russia, hunting walrus remained legal, but the concerns about walrus mounted rapidly within the scientific community (Fay, Eberhardt, Kelly, Burns, & Quakenbush, 1997; Nikulin, 1941). In 1971, V. I. Krylov stated that the literature on the biology and haulouts of walrus was extensive but that the Pacific walrus' position in the food chain was

not. Krylov, following the work of Nikulin (1941), found that mollusks (as we know today) were the most frequently eaten food item of the Pacific walrus, followed by worms, ascidians, crustaceans, fishes, and marine mammals (Krylov, 1971). Krylov claimed that walrus ate the latter four food items as substitutes for basic foods, such as mollusks, when they were unavailable. While Krylov acknowledged marine mammals in his table of food contents, he did not mention them in his writing. However, Arseniev (1927) touched upon the subject stating that the Chukchi had a rarely used alternative name for walrus (*ryrka*) that described a carnivorous walrus (*klyooch*). Scientific understanding of the Pacific walrus advanced substantially in the twentieth century. While the research and concerns surrounding Pacific walrus differ between the United States and Russia, both states' scientists and Native peoples agree upon the migration, biology, and interaction within the Bering Strait Region ecosystem of the Pacific walrus.

Critical locations, or habitats, include breeding areas, feeding areas and other areas needed for the biological well-being of the Pacific walrus. The identified areas are chosen for their physical or biological features according to the National Ocean and Atmospheric Administration (NOAA) (2016). Garlich-Miller et al. mapped the Pacific walrus' use of the entire Bering Strait Region's maritime area based on a NOAA report from 2011 (see Figure 4.1: Pacific Walrus Haul-outs by Season).

In the mid-1990s, concurrent with the efforts to create the *Polar Bear Agreement*, a *Bilateral Agreement for the Conservation of Pacific Walrus* was drafted. However, this agreement was not signed or ratified by the United States or Russia. The Marine Mammal Protection Act's Annual Review of 1996 discusses the needs for a Pacific walrus IEA as:

> A single stock of walrus occurs in the waters off Alaska and eastern Russia. Both nations share common interests with respect to the conservation and management of this walrus population. The need to address international conservation issues such as assessing the status and trend of the Pacific walrus population as well as Native subsistence needs and impacts resulting from oil and gas exploration and development, shipping, commercial fishing, and other activities are recognized priorities for Government officials and Native

> leaders from both countries. In 1995, meetings were held in Petropavlovsk, Kamchatka, Russia to discuss possible bilateral agreements for walrus conservation and management, and a protocol of intent was signed. The protocol acknowledged the mutual interest in developing bilateral government-to-government and Native-to-Native agreements to provide for the conservation, research, habitat conservation, and Native subsistence use of the Pacific walrus population. It was agreed to continue discussions on developing government and Native agreements in the future. Progress continued in 1996. Russian biologists provided the Service with a draft government-to-government agreement for review, and a draft Native-to-Native agreement was presented for review to the Eskimo Walrus Commission by its counterpart Russian Native organization (Department of the Interior, 1998, p. 23).

The government-to-government and Native-to-Native agreements "to conserve the Pacific walrus stock" began with a meeting in Nome, Alaska in September of 1994 (Marine Mammal Commission, 1996). The meeting produced a protocol signed by officials from both states, who agreed to hold a technical meeting in 1995. One year later that meeting was held in Petropavlovsk, Russia with individuals from the Fish and Wildlife Service, the Alaska Native community, the Marine Mammal Commission, the State of Alaska, and the Russian Federation Ministry of Protection of the Environment and Natural Resources. Representatives of some of these organizations signed the new protocol. The protocol discussed "conservation, research, habitat protection, and Native subsistence use of the Pacific walrus stock" (Marine Mammal Commission, 1996, p. 152). The Marine Mammal Commission noted the resumption of the five-year population surveys in its report. The Commission wrote the Fish and Wildlife Service (USFWS) about the value of the 1994 and 1995 meetings and their intent to continue such discussions. While the USFWS did not respond to that opening, a USFWS representative later indicated that "the status of talks on the walrus agreements were a year or more behind those for polar bear agreements" and that "formal negotiation of the walrus agreements would not be initiated until 1998 (Marine Mammal Commission, 1997).

In 1997, another meeting occurred with American and Russian representatives, ending with the expectation that the working group would meet at least once in the coming years (Marine Mammal Commission, 1998). As of 1998, the development of the bilateral agreement had been deferred due to to focused efforts on the *Polar Bear Agreement*. While the government-to-government agreement had been stalled, the Eskimo Walrus Commission continued work with their Russian counterparts on the Native-to-Native agreement (Marine Mammal Commission, 1999). With work on the *Polar Bear Agreement* still incomplete in 1999, work on the bilateral Pacific walrus agreement was deferred for another year. In 2000, a Pacific Walrus Survey Workshop took place with participants largely from the United States. The only recorded Russian collaborations took place through the Beringia Program with the National Park Service (Marine Mammal Commission, 2001). With the signing of the *Polar Bear Agreement*, according to the Marine Mammal Commission's report of 2001, "no plans had been made to begin work on a walrus agreement." Such work was "delayed until funding for walrus research and management in Russia improve[d]" (2001, p. 87). In 2002 and for the first time, the Marine Mammal Commission's dialogue began the shift from discussing a bilateral agreement to discussing cooperation in the form of harvest monitoring (Marine Mammal Commission, 2002; Marine Mammal Commission, 2003).

While the Pacific walrus is socially and culturally ingrained within the day-to-day lives of the populations lining the Bering Strait, the comparatively fewer political incentive to focus on Pacific walrus have kept Pacific walrus, for the most part, as a local and secondary interest at national and international scales. As seen in Figure 4.1, most of this region's communities exist adjacent to previous haulouts, and those further North have the potential to interact with Pacific walrus during any season of the year. The presence of ice determines the seasonality of Pacific walrus migration (Fedoseev, 1990). Additionally, as sea ice decreases in the open waters of the Bering Sea and Chukchi Sea, Pacific walrus are spending more time on the coasts of both the United States and Russia (Oozeva, Noongwook, Noongwook, Alowa, & Krupnik, 2004). Regarding seasonality, MacCracken (2012) claims that "many hunters in Alaska indicate that the spring migration occurs about a month earlier than in past decades, is more rapid, and routes may

have changed". This outcome of decreased sea ice will bring walruses closer to human communities and force the species to adapt its biological practices that typically take place on ice, such as giving birth and resting, to land (Kochnev, 2004).

The Contemporary Concerns: Geographic and Species-Based Changes

"Thus, the present data show that ice changeability is one of the main factors affecting walruses numbers dynamics and their distribution. Those factors seem to have influence on changeability in intrapopulation processes, including growth, maturity, survival of young animals, and increasing of population" (Fedoseev, 1990, p. 2).

As changes occur to the natural environment in which Pacific walrus live, concern grows. Observed changes of the Pacific walrus are occurring at both the population and individual scale. First, at the population scale, changes in the Pacific walrus' movements includes their migration patterns and haulouts sizes and locations (Jay et al., 2012). Haulouts have been a long-term focus of research, with records of haulouts on Cape Serdtse-Kamen, Russia dating back 60 years (Ristroph, 2016). Today's concerns about haulouts stem from the decreased sea ice which most experts agree is leading to greater numbers of walrus in the haulouts occurring both on lands of previous haulouts and those without such a history (Jay et al., 2012). Jay et al. (2012) confidently state that due to the recent (2007 to 2011) changes in Arctic sea ice, the patterns of walrus migration have changed. Moreover, Jay et al.'s (2012) research attributes "a more northerly extension in the range of [Pacific] walrus" due to loss of sea ice and subsequent increases in open water (p. 1). While population numbers are unknown, scientists assume that the population is still fairly stable (Gilbert, 1992; Robards & Garlich-Miller, 2012; Speckman et al., 2011).

At the individual scale, changes have been observed in diet contents, the gender of individuals involved in haulouts, and the age of death (Eskimo Walrus Commission, 2003; Grebmeier et al., 2006). The gender of individuals hauling out on land is shifting to larger numbers of adult female and young Pacific walrus for the first times according to Henry Huntington, Mark Nelson and Lori Quakenbush (2012). The number of Pacific walrus deaths during haulouts has also increased, according to Kochnev, likely in connection to the differing

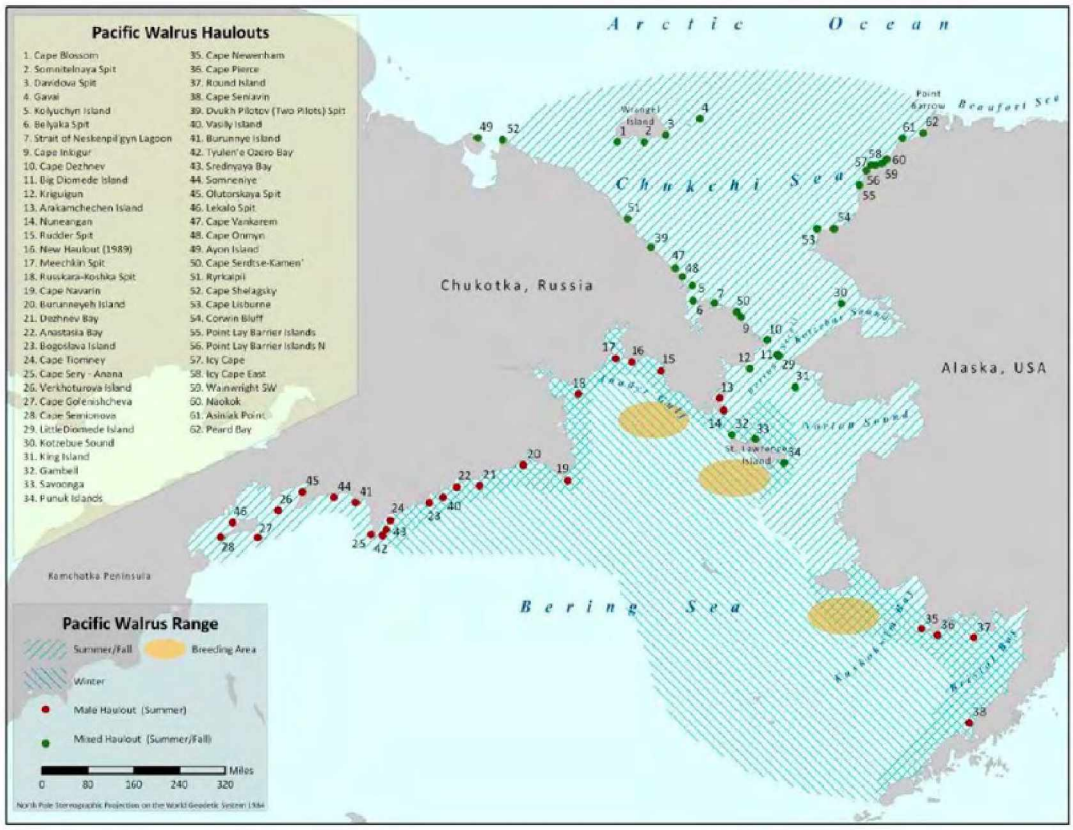

Figure 4.1: Pacific Walrus Haul-outs by Season
Source: (Garlich-Miller et al., 2011)

genders and ages of walruses partaking in haulouts (Kochnev, 2016). Additionally, Kochnev noted that 30 percent of the pregnant female Pacific walrus he observed in Russia had experienced spontaneous abortions due to the stress of stampedes occurring during haulouts (Kochnev, 2016 cited in Ristroph, 2016). These observations of changes amongst individual walrus, have supported similar claims made on the corresponding, American, side of the Bering Strait.

Due to these observed population and individual changes amongst the Pacific walrus, some scientists predict a split of the population, similar to the split in the the Atlantic walrus population. This hypothesis rests on the expectation of continued decrease of ice between the United States and Russia from now into the future, which would geographically separate the

population into separate groups (Ristroph, 2016). Other hypotheses include the increase of negative human-walrus interactions, due to increased haulout sizes as a result of decreased ice and the decreased food supply for Pacific walrus (Kochnev, 2016). This latter hypothesis rests on the assumption that increased Pacific walrus density will not correlate with locations of greater food density.

Human impacts on walrus populations are also expected to be harmful. With the subsequent decrease in food, space, and increase in mortality of Pacific walrus, due to the changes in sea ice, human impacts are of large concern. In 2015, the Eskimo Walrus Commission identified the Arctic Waterways Safety Committee, the tribal monitoring program, increased arctic shipping, oiled wildlife, and unusual mortality events, as "significant [human] impacts to the region".

Food security and each of its corresponding attributes within the Bering Strait Region's cultures, such as sharing with elders, the health and wellness of the ecosystem, and decision-making, depend on the availability of the Pacific walrus and the ability to hunt the species while it is in proximity to the hunters.

Case Study Comparison of Bowhead Whale and Polar Bear with Pacific Walrus

The evaluation of the potential for a Pacific walrus IEA will follow the same approach used for the evaluation of the other two IEAs focused on migratory marine mammals in the Bering Strait Region. The four factors used to evaluate the viability of the IEAs are critical to making policy recommendations for Pacific walrus, due to their usefulness in assessing the existing capabilities surrounding Pacific walrus and those capabilities' needs. The need for integrating a social-ecological system with western science and traditional ecological knowledge is the basis from which recommendations will be drawn.

Incentives: Ecological Impacts of Sea Ice Changes and Loss of Cultural Values of Pacific Walrus

"Researchers with USGS, NOAA, and USFWS, and the residents of Point Lay stressed that they don't know if and when a haulout may occur, but since 2007 a consistent pattern of response to

the loss of ice in the Chukchi Sea has emerged: walrus females and calves are coming ashore in the late summer/early fall in large numbers near the community" (U.S. Fish & Wildlife Service et al., 2015, p. 1).

Incentives for establishing an IEA between the United States and Russia are largely ecological and social. The political incentives for bilateral collaboration are the same for Pacific walrus as those stated for polar bear and Bowhead whale including the economic advantages that come from co-management. Ristroph observes: "Aside from all the current agreements and working relationships, there are historical connections between the two sides that remain in place," (2016, p. 36) referring to the centuries of collaboration between the Native populations, of modern-day Alaska and Chukotka. Today, scientists and policy makers also recognize incentives for continuing collaboration in the Bering Strait Region.

Ecologically, the Bering Strait Region's stakeholders are concerned about the changing sea ice and weather. Changing weather carries implications for the entire ecosystem including increased erosion of coasts and the size and length of the seasons for storms (Marz & Medina, 2007). This increase in storms, related to the decreasing amount of sea ice, is shown to increase the rate at which mothers are losing pups; the growing rate of pup mortality is hypothesized to be linked to weather (Kochnev, 2004). As the ice recedes into the Arctic Ocean and away from the continental shelf, Pacific walrus are unable to dive deep enough to reach their bottom-dwelling prey (Marz & Medina, 2007). Calves also depend on the sea ice, for rest. Jay et al. (2012) discuss how decreased sea ice results in the increased size of haulouts and Pacific walrus' movement further North, which in many situations has placed Pacific walrus closer to human populations. Increased proximity to human populations increases the risk of disturbance and increases the likelihood of stampedes caused by human activity such as air and water traffic (Crawford, Neakok, Nelson, Garlich-Miller, & Quakenbush, 2011; Jay, Marcot, & Douglas, 2011). Stampedes increased, reduced quality of sea ice, increased rates of stress, spontaneous abortions, and higher death rates serve as indicators of ecological changes (Kochnev, 2004).

Media and public concern about climate change's effects on the Arctic may be exacerbating the impacts on the ecological system including the well-being of animals. In 2015,

the USFWS, the Native Village of Point Lay, the U.S. Geological Service and NOAA issued a joint statement that read: "The Native Village of Point Lay does not have the capacity to answer media requests, and we respectfully ask members of the media, tourists and other organizations to refrain from visiting our community to film the animals or sightsee." Additionally, the Point Lay Tribal Council President Leo Ferreira III claimed, "we do not believe that these sorts of visits are in the best interest of the walruses and they do not align with the haulout protection role we have developed and measures we set in place to prevent disturbances" (U.S. Fish & Wildlife Service et al., 2015). Changes with Pacific walrus, have ecosystem-wide effects, including changes to the food web (Ray et al., 2006).

Local populations suffer the largest impacts from Pacific walrus' changes and adaptations. Loss of culture and language are two major social impacts (Inuit Circumpolar Council- Alaska, 2014). *How to Assess Food Security from an Inuit Perspective* (2014) describes the value of language as a tool that embodies culture as a toll that embodies culture; language "teaches us when, where and how to obtain, process, store and consume food...all of these components play a part in defining our food security" (p. 4). Fast-paced social impacts are thought to be greatest in Russia, due to the lack of a food safety net provided by the government or an organization. In Alaska, food safety nets in the situation of an emergency can be provided by the government and by Native organizations such as Kawerak, the Native non-profit organization dedicated to the well-being of the peoples of the Bering Strait Region. In Russia, a basic food safety net has not existed following the disintegration of the U.S.S.R. and the ensuing crises of the 1990s (Kozlov, 2004).

These ecological, social , and food security incentives for implementing a regional IEA are also driven by the observed increases in commercial shipping (largely tied to the increase in tourism), oil and gas development, and excessive renewable resource extraction such as fishing (Robards, Burns, Meek & Watson, 2009). Local stakeholders are supportive of establishing an IEA due to the "importance of having working agreements or understandings between the United States and Russian agencies, even if these are not binding agreements" according to Ristroph (2016, p. 35). An IEA would support the Bering Strait's capacity to establish proximity

regulations for haulouts, and to increase collaboration and understandings between traditional ecological knowledge bearers and scientists.

Capacities: International, Legal Options for Federal Agencies, Regional Organizations and Governments

The needs of the Pacific walrus and the Pacific walrus' stakeholders have been addressed through a handful of entities such as international organizations that have encouraged exchanges between local stakeholders from the United States and Russia. Pacific Environment, alongside Trust for Mutual Understanding hosted the 2016 Pacific Walrus Protection and Management in a Changing Climate seminar in Fairbanks in March of 2016 (Ristroph, 2016). In 2012, the U. S. Fish and Wildlife Service, Wildlife Conservation Society, Trust of Mutual understanding and the National Park Service hosted "A Workshop On Assessing Pacific Walrus Population Attributes from Coastal Haulouts" in Anchorage (Robards & Garlich-Miller, 2012). Each of these exchanges has engaged representatives from the two regional bodies: the United States' Eskimo Walrus Commission (EWC) and Russia's Association of Traditional Marine Mammal Hunters of Chukotka (ChAZTO). International organizations such as the International Maritime Organization have also impacted international policy that concerns the Bering Strait Region, by producing the Polar Code which will enter into force in 2017 (International Maritime Organization, 2014). Number seven of the nine requirements for routes through polar waters, under the Polar Code, includes considering "speed recommendations and vessel traffic services relating to known areas with densities of marine mammals, including seasonal migration areas" (International Maritime Organization, 2014, p. 27). While international organizations have largely supported the transboundary concerns regarding Pacific walrus, national policies have contributed substantially to scientific research on the Pacific walrus' status and trends, and to regulation through a series of recommendations.

In the United States, federal agencies such as the USFWS and the Bureau of Energy Management regulate disturbances to Pacific walrus and their haulouts. The USFWS prohibits harassment of marine mammals by aircraft flying in and above national refuges (50 CFR 27.34). The *Marine Mammal Protection Act* § 216.3 defines two levels of harassment, providing for

penalities under the MMPA for Level A harassment (50 CFR § 216.3). A cooperative agreement under the USFWS with the Eskimo Walrus Commission (EWC), similar to the Alaska Eskimo Whaling Commission's (AEWC's) cooperative agreement with NMFS, represents 19 communities from the North Slope, Northwest Arctic, and Nome Boroughs. The Eskimo Walrus Commission signed a Memorandum of Understanding with Alaska Department of Fish & Game (ADF&G) and USFWS in 1998, to improve joint management of the Pacific Walrus Conservation Fund. The main funding source for funding for conservation and research comes from the United States. The EWC is considered a national organization due to their agreement with USFWS and subsequent cooperative projects that include monitoring, data collection, and assistance with an international agreement (Kawerak, 2012). The EWC signed an additional agreement with the USFWS in 1997 to increase "hunters' participation in conserving and managing walrus stocks in the coastal communities" (Kawerak, 2012).

Connecting the United States and Russia, the Pacific Walrus International Database is run by both the United States Geological Service and the Russian Academy of Sciences. The Pacific Walrus International Database contains data on "land and ice haulout counts, sex/age composition, reproduction, mortality, harvest statistics, and morphometry" (Jay & Fischbach, 2015, p. 1). The Russia Pacific Science Research Fisheries Center (TINRO) and the Alaska Science Center maintain local databases. Participating organizations include regional entities such as the Wrangel Island National Nature Reserve and the University of Alaska Fairbanks (Jay & Fischbach, 2015). An additional Bilateral Walrus Harvest Monitoring Program was established in 1999 due to political and economic crisis that had faced Russia and had led to the disintegration of monitoring programs for marine mammals (Garlich-Miller & Pungowiyi, 1999). The Bilateral Walrus Harvest Monitoring program was a partnership between agencies including the United States' Shared Beringian Heritage Program and Russia's ChAZTO (Eskimo Walrus Commission, 2012). Russia's Federal law regulates "hunting for the purpose of ensuring maintaining the traditional conduct of life and implementation of traditional economic activity" (209-FZ Sec. 2, Art. 19, p.1). While contemporary enforcement of Russian law varies greatly, precedent for Russian law and enforcement was set in 1986's "Law on Marine Mammal

Protection and Harvest" (N 349) which identified the regulations and consequences for non-abiding users for individual regions. Under Russian law, the individual okrugs are allowed to implement their own regulations, as long as they follow federal law. Article 72 under the Russian Constitution: "Protection of the traditional living habitat and of the traditional way of life of the small ethnic communities" applies to both the Russian Federation and the individual Okrugs (North Atlantic Marine Mammal Commission, 2004; Protsyk & Harzl, 2013). Each of these American and Russian national policies addresses a regional concern. Therefore, many of these national capacities also work at a regional scale as seen in committees, information providers, and researchers.

Local and regional populations contribute to the U.S. Coast Guard's weekly bulletin the *Local Notice to Mariners* which disseminates information on the areas' obstructions or dangers (Ristroph, 2014). While the use of the *Local Notice to Mariners* to report on marine mammals is not consistent, the *Local Notice to Mariners* does publish requests from federal agencies, such as the USFWS, which in LNM: 48/06 asked for "cooperation in minimizing disturbances to walrus resting at Cape Seniavin. Mariners are asked to stay 1000 yards from shore..." (United States Coast Guard, 2006, p. 7). Regional bodies such as Native marine mammal commissions, regional Native Corporations, and industry representatives have been collaborating through the Arctic Waterways Safety Committee, which identifies itself as "a self-governing multi-stakeholder group focused on creating or documenting best practices to ensure a safe, efficient, and predictable operating environment for all users of the arctic waterways" (Arctic Waterways Safety Committee, 2016). The Arctic Waterways Safety Committee comprises all the previous members of the Alaska Marine Mammal Commission, meeting twice annually (Arctic Waterways Safety Committee, 2016). In 2014, the Eskimo Walrus Commission became a member of the Arctic Waterways Safety Committee. In March 2015, the Arctic Waterways Safety Committee's (2016) bylaws, which identify the two fundamental purposes as "identifying, assessing, planning, communicating, and implementing those operational and environmental best practices" and endeavoring to "ensure the long-term health of the arctic ecosystem and marine mammals", were adopted by the committee.

In Russia, regional bodies such as ChAZTO and Chukot-TINRO, as well as the international groups Pacific Environment and the Eskimo Walrus Commission, jointly carry out the projects. The Haul-out Keeper Project was promoted by the mass mortality of Pacific walrus near Chukotka in 2007 (Zdor, 2013). Monitoring haulouts and developing protocols for surveying walrus are its main goal. This Russian project has found aircrafts to be the main disturbance, with lesser concern regarding hunting, fishing trawlers, and military activities (Zdor, 2013). Another Russian joint project "Walrus" is administered by the Russian Geographical Society and the National Park "Russian Arctic". Geographically "Walrus" covers sites from Franz Josef Land to Chukotka in the Far East (Russian Geographical Society, 2014). While monitoring is the main focus of this project, biopsies are also being taken in order to better understand the genetic diversity of the populations. Russian organizations take part in a large number of other projects, most of which have American or international partners.

International organizations' funding, federal agencies' legal contributions, and regional organizations' on-the-ground work with Pacific walrus have contributed significantly to the Bering Strait Region's capacity to manage Pacific walrus over the past several decades. The information produced and communicated with the public and between the United States and Russia has primarily drawn from western science, with recently increased attention to traditional ecological knowledge. However, information communication still leaves little room for public feedback.

Information: Scientific Communication on Population Uncertainty and Communication with the Public

"The reaction of walruses to the pollution and increasing human activities in a large portion of their habitat is impossible to predict" (Kochnev, 2016, p.1).

The vast number of individuals, organizations and governmental agencies contributing to knowledge on the Pacific walrus has led to the formation of two co-management commissions in the United States, a haulout monitoring group in Russia and hundreds of scientific studies on the biology and behavior of, and human connections to, Pacific walrus over the last century.

Information communicated to the public has been a secondary goal to communication between scientists in the United States and Russia.

Between 1975 and 1990, scientists from the two states attempted to understand the Pacific walrus population number and those numbers' trends through aerial surveys. However, the project had many flaws. Scientists during and afterward complained of their inability to observe walruses that were under water, which was compounded by the inconsistencies of other variables. In 1990, the two states carried out their final of four international surveys (Department of the Interior, 1998). In 2006, the United States and Russia joined efforts in the U.S.-Russia Aerial Abundance Survey using thermal airborne imagery with results showing a population of 129,000 Pacific walrus with a 95 percent confidence interval (Burn, Webber, & Udevitz, 2006; Speckman et al., 2011). In 2016, efforts began once more to capture the true population size of the Pacific walrus through a two year survey by the joint committee established under the *Cooperation in Environmental Protection Agreement* in 1972 (Russell, 2016). Attempts to gather population data have been undertaken beyond the United States-Soviet Union Aerial Survey of Pacific walrus, including a Russian scientific survey in 1958-1960 (Fedoseev, 1962), an American led survey in 1976 (Braham, Burns, Fedoseev, & Krogman, 1984), and a scientific survey of ice habitats in 1987 (Fedoseev, Razlivalov, & Boborova, 1988). Small-scale Pacific walrus population surveys have taken place across most of the Bering Strait Region, with concentrations of activity on Wrangel Island off the northern coast of Chukotka and the Walrus Islands off the south west coast of Alaska (Kochnev, 1999; Okonek, Sell, & Weiss, 2010).

Capacities engaged with the Pacific walrus have tended to focus directly or indirectly on seeking population size information. Communication concerns have garnered less attention. The Pacific Walrus International Database, established in the late 1990s concurrent with the drafting of the *Bilateral Agreement for the Conservation of Pacific Walrus*, brings research from different agencies into a single database (Jay & Fischbach, 2015). Currently, the Pacific Walrus International Database is only accessible through the Internet translations are not provided for the projects or datasets (Jay & Fischbach, 2015). Other exchanges of scientists and local representatives have worked to bridge the gap between the scientific community and on-the-

ground observers and stakeholders. In 1998, building on of the 1997 EWC and USFWS agreement to increase local involvement in management, a draft Native-to-Native Agreement was signed by EWC and ChAZTO (Meek et al., 2008). One year later, the Bilateral Walrus Harvest Monitoring Program began. The monitoring program's five years of funding and coordination came to an end in 2004. Subsequently another Bilateral Walrus Summit took place in order to plan for future collaboration, due to increasing concerns about the Pacific walrus population's health and environmental changes (Eskimo Walrus Commission, 2016). Meanwhile, the EWC hosted bilateral biomonitoring workshops in 2003 and 2005 (Eskimo Walrus Commission, 2012). In 2012, the first comprehensive exchange in eight years, the Workshop on Assessing Pacific Walrus Population Attributes from Coastal Haul-Outs took place in Alaska (Robards & Garlich-Miller, 2013). Successes of updated bylaws, the EWC's membership in the Arctic Marine Mammal Coalition and Arctic Waterways Safety Committee, and the Shared Beringian Heritage Program's projects such as the "Health Evaluation of Walrus" and the "Bilateral Walrus Monitoring", are each directly connected to the bilateral exchanges and transference of information between scientific and Native knowledge holders (Eskimo Walrus Commission, 2016; Shared Beringian Heritage Program, 2014).

The informational exchange successes within the scientific community are countered by communication needs voiced by local communities. First, a need for better communication with off-shore vessels and on-shore observers would provide more immediate information about marine mammals, compared to the information provided in the weekly *Local Notice to Mariners* (Ristroph, 2014). The current method of this form of communication, in Alaska, is the Automatic Identification System (AIS), which distributes information through the Marine Exchange of Alaska's receivers in each of the coastal communities in the Bering Strait Region (Ristroph, 2014). In Chukotka, however, the coastal communities do not have receivers and have little ability to communicate with ships near haulouts, as reported by individuals at the 2016 Pacific Walrus Protection and Management in a Changing Climate seminar in Fairbanks (Ristroph, 2016). Noise disturbance from aircraft, ships, and individual humans, especially that generated by the increase in tourism, is a concern. As stated previously, the United States has generated

recommendations to address this concern (50 CFR 27.34; 50 CFR § 216.3). But the United States has no legally enforceable regulation of walrus disturbances. In Russia a 12 mile buffer for vessels exists but little enforcement occurs (N 349 Art 11.4, 1986; Ristroph, 2016). These communication shortcomings between stakeholders and outsiders, during a time of increasing numbers of haulouts, allow disturbances to the Pacific walrus population to persist. Consequences include decreased hunting opportunity and increased food insecurity.

Communication difficulties have raised few concerns, in comparison to the food and economic crisis that faced Chukotka in the 1990s. The economic collapse of the infrastructure led to a substantial return to the traditional subsistence economy in Chukotka (Kozlov, 2004). Norms, with assistance from neighboring Native populations, guided the Native people in Chukotka, during a time of starvation, to develop capacities to manage marine mammal food sources. These norms led to the formation of the Native commissions that are concerned with food security today, as well as drawing attention to Native cultural features including language (Kozlov, 2004).

Norms: Chukotka's Crises that drove a return to traditional practices during the 1990s

The cultural importance of Pacific walrus to the coastal communities of the Bering Strait Region is well recognized. How these traditions influenced the reshuffling in Russia, during and following the economic and political crises during the 1990s, illustrates how norms drove United States-Russia collaboration further to the establishment of Native marine mammal commissions in both states.

The population number of Chukotka halved from 1989 to 2000, and meanwhile the monthly income (when converted to US dollars) declined from $169.4 to $64.8 (Federal State Statistics Service, 2000). The effects of these dramatic changes on cultural features of the traditional Chukchi way of life, such as food consumption and Chukchi language, were immense (Kozlov & Zdor, 2003). In Chukotka between 1985 and 2000, consumption in grams per capita per day of market meats decreased by 193 grams while meat from marine mammals increased by 115 grams. Consumption of market fats and oils also decreased, while consumption of marine

mammal fats increased proportionally (Kozlov, 2004). Regarding traditional practices in the 1980s, a majority of the Native population under the age of 30 preferred a European ("Russian") diet, while by 2002, 76 percent of that same age group preferred Native foods (Ainana et al., 2002; Fomenko, 1990). At a narrower scale, the Chukchi language, which was banned from educational institutions during the Soviet period, was reintroduced along with Eskimo language, to high school programs throughout Chukotka and to primary school programs in villages. Moreover, Chukchi language is increasingly used in mass media, political literature and art (Morgounova, 2007). Cultural norms, dating back hundreds even thousands of years in some places within Chukotka, have appeared within Russian politics and as a method to improve the standard of life, specifically in reference to food security.

While Chukotka suffered economic and social set-backs due to the Russian Great Depression during the 1990s, international assistance, from the North Slope Borough and the University of Alaska assisted Chukotka with developing capacities to address the ongoing challenges. While the North Slope Borough initially focused on whaling, the Borough gave $18,000 in 1999 to renew walrus monitoring in Russia after the Russian government claimed that no funds were available (Marine Mammal Commission, 2000). The "Alaska-Chukotka Program for Encouragement of Native Involvement in Policy and Decision Processes" was established in order to strengthen Native organizations in Chukotka by increasing representation of hunters, documenting traditional ecological knowledge, and improving the success of whaling (Nuttall, 1998). From this program, all of the previously discussed Native organizations such as the Association of Traditional Marine Mammal Hunters of Chukotka (ChAZTO), the Union of Marine Mammal Hunters and its five mammal sub-commissions were established before the turn of the century, through local initiative. These entities not only improved life for the Native populations living in Chukotka, but through collaboration with Alaska Native organizations, national agencies, and international organizations, those such as ChAZTO have improved the status and support of traditional harvests and the incorporation of traditional ecological knowledge into the scientific understandings of marine mammals.

Variations in the drafting of the Pacific walrus IEA

In Alaska and Chukotka, similar efforts occurred concurrently throughout the last forty years to protect the Pacific walrus population and thereby protect the cultures and food security of the region. Following the opening of the relations between the United States and the U.S.S.R. during the 1980s, when twice as many agreements were signed as from 1945 to 1981 and 2001 to 2016 combined, political will has lent support to a flurry of other collaborative projects and agreements (see Figure 4.2: Polar Bear, Bowhead Whale, and Pacific Walrus Four Factor Comparison). The incentives, capacities, information and norms surrounding Pacific walrus, as an invaluable feature of traditional diets and cultures, did not lead to a formal agreement, however. As seen in Figure 4.2, capacities and information compare strongly between the IEAs of polar bear, Bowhead whale, and the Pacific walrus. Comparison of the histories of the three species in Figure 4.2 reveals distinct differences that explain the inaction behind the Pacific walrus IEA, including: 1) the lack of an international organization championing Pacific walrus as their cause (see Polar Bear "Norms": "Global icon of climate change concern"); 2) the lack of a single historical event that mobilized action (see Bowhead whale "Incentives": "1977 Deletion of Subsistence Harvest"); and 3) the absence of a large-scale or commercial harvest threat to the species, although commercial harvests have been devastating in the past (see Polar bear "Incentives": "Increased poaching").

These significant distinctions in the recent histories of the species, not only reduce the effectiveness of an eventual Pacific walrus IEAs, but have kept an IEA from being established as confirmed by Meek et al. (2008):

> International and interlocal discussions were initially held in 1994, in conjunction with the bilateral polar bear agreement. However, these discussions lacked the momentum of the polar bear treaty discussions and never assumed formal legal status. Because of this lack of formality, the interlocal relationship has persisted as the primary locus for Bering Strait SES walrus management coordination...international and interlocal discussions were initially held in 1994, in conjunction with the bilateral polar bear agreement (p. 7).

As discussed throughout this paper, a Pacific walrus IEA would increase food security, benefitting Alaska Natives and Russian small-numbered peoples, as well as stakeholders at other scales. Establishment of such an IEA may lag until incentives that drove the formation of the Bowhead whale and polar bear agreements develop, such as an immediate physical, legal or environmental threat to the survival of the species or to local people's right to harvest them.

Recommendations for a Pacific Walrus International Environmental Agreement

Based on the three differences in the histories of the three species examined here and on the finding that higher values related to Mitchell's four factor analysis account for a higher level of food security, I have three recommendations for the Pacific walrus IEA: 1) conservation of the Pacific walrus, 2) maintenance of Native self-determination and, 3) encouragement of the flow of information between the local and federal stakeholders and between the United States and Russia. The flow of information makes the first and second recommendations possible. The intention behind these three recommendations is to increase the value of the IEAs four factors, which currently total 8 out of 12.

First, conservation of the Pacific walrus species is central to the IEA. Without conservation, the IEA will be unable to promote Native self-determination or to support the flow of information. Conservation, regarding Pacific walrus, refers to human monitoring and protection to maintain an specified population level and aspects of the species' integrity. The level of the conservation of the Pacific walrus cannot be measured by the population's numbers alone.

Second, maintaining Native self-determination requires the federal governments to acknowledge that the local actors have a substantial role in the management of the species. The norms of the Pacific walrus IEA largely rely on local action. This local action has the capacity to mobilize the incentives behind establishment of the Pacific walrus IEA, similar to the Alaska Eskimo Whaling Commission's role in the establishment of the Bowhead whale IEA.

Third, maintaining the flow of information must occur between both the United States and Russia and between the local and federal scales of actors. This flow of information is the

first step in avoiding miscommunication, in collaborating toward an IEA, and in upholding an IEA. This flow of information must continue bi-directionally between the four aforementioned groups of stakeholders.

Addressing these three recommendations pertains to the effort to improve the status of each of the four factors used to evaluate the IEA. The formal policy recommendations are based on both the quantitative and qualitative evaluations of *Polar Bear Agreement,* the *International Convention for the Regulation of Whaling,* and the drafted Pacific Walrus IEA.

The context in which the Pacific walrus IEA was drafted resembles the context for polar bear and Bowhead whale management under their respective *Polar Bear Agreement* and *International Convention for the Regulation of Whaling* agreements. Pacific walrus' lack of a global audience differs from the global public concern expressed for the polar bear, the imminent threat from the 1977 Deletion of the Subsistence Harvest to the Iñupiaq and Chukchi's ability to hunt whales. Without strong international concern, outside of the Bering Strait Region, the plight of the Pacific walrus lacks the urgency that would produce an IEA. Despite the failure to form a Pacific walrus IEA until this point, Pacific walrus retains strong local significance, and it has generated concern and awareness within the Bering Strait Region. Recommendations to strengthen the four factors surrounding the Pacific walrus IEA will assist with the future development of such an IEA.

Strong incentives for maintaining transboundary management of Pacific walrus existed long before the twentieth century, when Soviet and American scientists first studied the outcomes from the excessive harvesting during the nineteenth century. While these scientists would be unable to gather precise population statistics, they did greatly improve western science's understanding of the migrations, biology, and ecosystem function of the Pacific walrus. Meanwhile, during the twentieth-century, social scientists produced literature on the human connections to Pacific walrus in the Bering Strait Region. Together these research endeavors have contributed to today's scientific understanding of the Pacific walrus and of human roles within the region's social-ecological-system. The incentive to protect the Pacific walrus, also contributes to the maintenance of the flow of information among all stakeholders.

Regarding public policy that has affected the Pacific walrus, walrus hunting was temporarily banned in Russia, while in the United States walrus hunting was only banned commercially. Lesser incentive, and capacity, exists for Native stakeholders to produce highly accurate population numbers of Pacific walrus than for Bowhead whale, which during the 1970s were legally protected, owing to what was later understood to be faulty western science. While the international community has been interested in the increasing size of Pacific walrus haulouts in the United States, the scale of this concern does not compare to the public's emotional support for polar bears on melting ice. As noted above, in 2015, the community of Point Lay co-published an appeal to the public to stay away from haulouts, due to the fear that a large disturbance would cause great Pacific walrus mortality (U.S. Fish & Wildlife Service et al., 2015). Three years prior, a coalition of environmental groups sued the USFWS, due to the USFWS' approval to Arctic oil exploration, which the groups feared could "cause deadly stampedes" in situations similar to a haulout that September where "an estimated 35,000 walruses crowded on a beach near the Northwest Alaska village of Point Lay" (Demer, 2014, p. 1). Local and federal groups are concerned with the effects of disturbances on haulouts. This interest in to co-managing the Pacific walrus supports the third recommendation: to further the flow of information among stakeholders. With greater financial capacity, Native stakeholders will have greater ability to act upon incentives to produce and share the information needed for greater protection of the Pacific walrus. Following inactivity since 1990, the upcoming walrus survey project shows strong incentive by the American and Russian agencies to revive of their previous spirit of collaboration illustrated in the *Polar Bear Agreement* and as a symbol of collaboration as a "bridge of hope". Moreover, as long as the American and Russian agencies continue their collaboration under the 1994 *Cooperation in the Field of Protection of the Environment and Natural Resources*, there is incentive and capacity for a United States-Russia Pacific walrus IEA.

Capacities of the entities affiliated with Pacific walrus apply to both sides of the Bering Strait and both governmental and non-governmental entities. Both ChAZTO and EWC have worked with their respective federal agencies and the opposite states. Similar to the Alaska

Nanuuq Commission's work with the International Union for Conservation of Nature's Polar Bear Specialist Group, ChAZTO's efforts are based on data gathering and observations of Pacific walrus. While ChAZTO has historically been involved with a number of international exchanges, most held in the United States, they have a significantly smaller role at the decision-making table than the Eskimo Walrus Commission. Improvements to this imbalance between the two Native organizations' capacities, could potentially improve the Capacities ranking from 2 to 3 for the Pacific walrus IEA. The regional and local stakeholders of Bowhead whale in Alaska, typically whaling captains with strong connections to their federal partners, have significant management roles. At the turn of the twenty-first century, under the United States-Russia Bilateral Walrus Monitoring project, local stakeholders throughout the Bering Strait Region monitored harvests and the natural environment. This harvest monitoring program produced maps of harvests, haulouts and migrations for the entire Bering Strait Region and was renewed under the Shared Beringian Heritage Program for 2007-2009 (Shared Beringian Heritage Program, 2014). This harvest monitoring program demonstrates Ostrom's (1990) "nested enterprises" through the number of stages involved and the collective spirit of bringing several scales of actors together to manage a single common-pool resource. However, today the monitoring program, that brought a large number of the capacities to a single table during its annual bilateral workshop no longer takes place. Federal agencies working with Pacific walrus would benefit from a larger incorporation of local stakeholders' knowledge and abilities, while stakeholders would ideally gain equitable control over the species (Robards & Lovecraft, 2010). Traditional ecological knowledge would provide additional best practices that serve the region. Moreover, by incorporating these assets into the draft government-to-government IEA, shortcomings regarding local participation in the Polar Bear Agreement would be avoided.

Information on Pacific walrus' population numbers remains a contentious point, especially owing to the large amount of resources that have been expended in the numerous population surveys conducted over the past fifty years. Poor communication and lack of transparency has hindered the free exchange of information among the various stakeholders in Pacific walrus management. As stated earlier, population trends do not reflect the value of the

	Polar bear (2000-2016)		Bowhead whale (1990s-2016)		Pacific walrus	
	United States	Russian Federation	United States	Russian Federation	United States	Russian Federation
Incentives	• Success of Inuvialuit-Iñupiaq Agreement	• Increased poaching • Success of Inuvialuit-Iñupiaq Agreement	• 1977 Deletion of Subsistence Harvest • Traditional ecological knowledge on population data, made available to IWC	• 1977 Deletion of Subsistence Harvest • Traditional ecological knowledge on population data, made available to IWC	• Change in sea ice and weather events • Increased size of haul outs and stampedes	• Change in sea ice and weather events • Increased size of haul outs and stampedes • Food insecurity of the 1990s
Capacities	International: World Wildlife Fund, International Union for Conservation of Nature, US-Russia Bilateral Polar Bear Commission, International Union for Conservation of Nature (IUCN) Polar Bear Specialist Group National: U.S. Fish & Wildlife Service (USFWS), National Park Service (NPS), U.S. Geological Survey Regional: North Slope Borough (NSB), Alaska Nanuuq Commission, Alaska Dept. of Fish and Game (ADF&G)	International: World Wildlife Fund, International Union for Conservation of Nature, US-Russia Bilateral Polar Bear Commission, IUCN Polar Bear Specialist Group National: Russian Academy of Sciences (RAS), Marine Mammal Council of Russia, All-Russian Research Institute of Nature Protection, Russian Association of Indigenous Peoples of the North (RAIPON) Regional: Chukotka Autonomous Okrug, Association of Traditional Marine Mammal Hunters in Chukotka (ChAZTO), RAIPON-Chuktoka (CAIPON), Polar Bear Commission of the Union of Marine Mammal Hunters (UMMH), Chukotka Federal Fisheries Research Institute	International: International Whaling Commission, Inuit Circumpolar Council, U.S.-Russia Marine Mammal Working Group National: NPS, National Marine Fisheries Service (NMFS), USFWS Regional: Alaska Eskimo Whaling Commission, NSB, NSB's Department of Wildlife Management, Alaska Fisheries Science Center, ADF&G Local: Whaling Captains Associations in Gambell, Savoonga, Wales, Little Diomede, Kivalina, Point Hope, Point Lay, Wainwright, Barrow, Nuiqsut, Kaktovik	International: International Whaling Commission, Inuit Circumpolar Council, U.S.-Russia Marine Mammal Working Group National: RAS, Russian Federal Research Institute of Fisheries and Oceanography Regional: ChukTINRO, ChATZO, Chukotka Science Support Group, Chukotka Autonomous Okrug	International: Wildlife Conservation Society, Pacific Environment, WWF, International Maritime Organization National: USGS, USFWS, NPS, Trust for Mutual Understanding Regional: ADF&G, University of Alaska Fairbanks, Kawerak Inc., Eskimo Walrus Commission, Qayassiq Walrus Commission	International: Wildlife Conservation Society, Pacific Environment, WWF, International Maritime Organization National: Russian Ministry of Natural Resources and Environment, RAS, Russian Pacific Science Research Fisheries Center Regional: ChAZTO, ChukTINRO, The Ecological Society of Chukotka "Kaira Club"
Information	• Scientific uncertainty on population numbers	• Unclear communication between national and Native actors in Russia	• Clear communication of duties with IWC • Positive scientific certainty on population numbers	• Clear communication of duties with IWC • Positive scientific certainty on population numbers	• Low scientific certainty on population numbers despite strong international collaboration	• Low scientific certainty on population numbers despite strong international collaboration
Norms	• Polar bear integrated into ecosystem-based traditional values • Global icon of climate change concern	• Polar bear integrated into ecosystem-based traditional values • Global icon of climate change concern	• Traditional values and culture (e.g. language) • Post-MMPA general concern	• Traditional values and culture (e.g. language)	• Cultural resurgence	• Traditional hunting as solution to Russian crises

Figure 4.2: Polar Bear, Bowhead Whale, Pacific Walrus Four Factor Comparison

information factor in this analysis. Yet referencing the third recommendation, communication needs of local communities also stand out in comparison to Bowhead whale stakeholders and polar bear stakeholders in the United States. Russia's lack of transparency with local stakeholders on polar bear poaching compares to recent claims by Russian communities that tourism and business interests have nullified the right to prevent walrus haulout disturbances. The capacities have already demonstrated the ability of stakeholder management of Pacific walrus. However to keep management consistent, managerial rights must be codified in law. The respective roles of stakeholders must be discussed among each group of stakeholders and then delineated in the IEA. Effective bilateral collaboration will yield stronger domestic management of Pacific walrus. Therefore, local entities should first work to acquire a management role under their regional Chukotkan government, similar to the co-management rights of EWC and Qayassiq Walrus Commission in Alaska. Without addressing these capacity needs first, the IEA will likely exhibit communication weaknesses similar to those of the *Polar Bear Agreement*.

Norms relate directly to the first and second recommendations. Norms drove the establishment of local bodies that would be able to collaborate with federal agencies. These local organizations manage Pacific walrus, according to traditional practices and traditional ecological knowledge. The norms related to Pacific walrus are as strong as the norms that guided the AEWC to disprove the scientific data published by the International Whaling Commission. While twenty-first century norms are based on traditional ecological knowledge, they differ from the norms of the twentieth century. Due to the biophysical change of sea ice, uncertainties throughout the Bering Strait ecosystem are growing for both those with traditional ecological knowledge and western science backgrounds. Kochnev, a Russian Pacific walrus biologist, provides an example of uncertainties resulting from changes in sea ice: "the reaction of walruses to the pollution and increasing human activities in a large portion of their habitat is impossible to predict" (Kochnev, 2016, p. 1). This uncertainty calls for improved communication, the third recommendation arising from this thesis research. These immense changes are destabilizing to the norms of the local population and likely to increase the speed at which norms alter, considering that current conditions contradict generations of observations and oral transmission

of traditional ecological knowledge. The uncertain future of polar bears has enhanced for local stakeholders,' efficacy by catching the attention of the international community. The Bowhead whale has, so far, defied ecological threats and rebounded in number. The addition of the Pacific walrus species to the *Endangered Species Act* as a "candidate" (for further listing at "threatened" or "endangered" by 2017) in 2015 reflects the growing uncertainty regarding the species resilience within federal agencies in the United States. The Russian Native commissions that emerged from the cultural resurgence of the 1990s have substantially addressed these uncertainties through population surveys and biological testing. In Russia, norms have evolved not only through a return to a traditional diet but also through increased the emphasis on aspects of Native Chukchi culture that are connected to language. This action related to Recommendation 1 – conservation – and use of traditional ecological knowledge as a method of understanding Pacific walrus illustrate the value of local populations' contributions to the management and monitoring of Pacific walrus. In addition to norms' indirect contributions to the IEA, in the case of the Pacific walrus, norms drive regional domestic policy in addition to being known to reform federal policy.

The four factor evaluation of Pacific walrus management shows that incentives in the United States and Russia are sometimes present, giving the incentives a value of 2. There are incentives to continue transboundary collaboration on Pacific walrus through future projects such as the 2017-19 surveying project. The regional capacities' need for better integration into the management by national and international entities makes the capacity ranking the same as the *Polar Bear Agreement's,* a 2 – sometimes present. By gaining roles alongside national and international entities (similar to AEWC's collaboration with the International Whaling Commission during the 1970s and 1980s), the EWC and ChAZTO will be able to contribute their unique traditional ecological knowledge and address their own information concerns, which accords information a ranking of 2 – sometimes present. Finally, while norms are strong they are not driving action, in the way that norms mobilized whaling communities in the 1970s. Due to the inherent link between norms and incentives, norms rank a 2 – sometimes present, until they

noticeably drive incentives. Thus, the drafted United States-Russia Pacific walrus IEA ranks a total of 8 out of 12.

Discussion

Given the recent Bowhead whale and polar bear IEAs' legitimization, as well as the Bering Strait's symbolism for the goodwill between the United States and Russia, the political capacity for a Pacific walrus IEA exists. A Pacific walrus IEA has the potential to function adequately, based on the comparison between the other two existing IEAs regarding marine mammals in the Bering Strait Region. Each of the four factors used to evaluate the IEAs effectiveness are present sometimes for the drafted Pacific walrus IEA. While these middle-of-the-road rankings of the four factors are influenced by the political discord between the United States and Russia, the rapid change incurred by the local communities during the twenty-first century, has the potential to drive and fill the gap of political will at the higher federal scale. The polar bear IEA was established due to national importance that the species garnered within the United States, during a time when Russia was at an all time low as a national security threat. Today, that political openness has passed leaving Pacific walrus advocates with additional challenges.

Historical and modern-day tension between the United States and Russia, most recently heightened by events in Crimea and Syria, has hindered co-management and cooperative policy between the two states. These barriers are demonstrated in the cultural and traditional ecological knowledge loss incurred due to the forced migration and closed borders of the Cold War. However, with the cessation of the Cold War and with increased shipping on the horizon, the United States and Russia have great incentive to co-manage their shared resources, in order to avoid threats and substantial economic loss.

Both American and Russian stakeholders, ranging from local to federal, gain from IEAs and co-management. Local stakeholders' food security is improved and achieves recognition at an international scale. As a side-effect, cultural components, such as language and traditional ecological knowledge, are retained in some places revived. Federal stakeholders increase the

security of their common-pool resources and ensure greater economic returns due to the monitoring and conservation of the resource(s). Additional economic benefits for both local and federal stakeholders include an increase in tourism and business development for the Bering Strait Region, as well as potential savings on having locally-harvested food resources. Ecologically, the species benefits from conservation along their entire migration routes.

Cooperation between the United States and Russia ensures that resources are protected. Such cooperation affirms the United States' commitment to the Arctic, and is endorsed and restores the Soviet/Russian commitment towards the Arctic's communities. A Pacific walrus IEA would be the second ever species-related agreement to include both a Native-to-Native and government-to-government agreement between the United States and Russian stakeholders (as Bowhead whale are managed by an amendment to the *International Convention for the Regulation of Whaling* which addresses many whale species). In addition to the political benefits of such an agreement, the food security of local populations would be addressed comprehensively. Considering the preliminary status of the Pacific walrus IEA, the shortcomings of the separate Native-to-Native and government-to-government agreements can be ameliorated. By including the Inuit Circumpolar Council's holistic understanding of food security within the United States-Russia Pacific walrus International Environmental Agreement, information will move between international local and federal stakeholders, and the Pacific walrus will be conserved, while maintaining Native self-determination and food security.

Chapter 5: Conclusion

Pacific walrus increasingly face threats tied to the biophysical changes of sea ice. Threats include a decrease in the quality of ice used for resting and giving birth and an increasing number of human disturbances to haulouts of Pacific walrus. These causes and effects are exacerbated by weak management by the American stakeholders or by the Russian stakeholders. The United States and Russia capitalized on the dissolution of the Soviet Union, as a springboard for collaboration on the Bowhead whale and polar bear IEAs during the the 1990s. A similar increase of institutional support for collaborative management is imperative for Pacific walrus.

The United States and Russia began working towards collaboration in the 1970s, as demonstrated by their signing the *Cooperation in Environmental Protection Agreement*, in the 1980s with the Nome-to-Provideniya Friendship Flight and *Reconnaissance Study* (1989) of the heritage and culture of the Bering Strait Region, and especially in the 1990s when the states signed a large number of Agreements, with a handful focused specifically on the Bering Strait Region. The United Nations Development Program, the International Union for Conservation of Nature, the World Wildlife Fund, and the Nature Conservancy (2016) acknowledges the benefits of bilateral agreements, especially IEAs: "a written government commitment to achieve the goals of protected area integration will inspire confidence in the process, and will demonstrate governmental commitment to follow through with the results".

These political agreements and gestures of goodwill in the late twentieth century led the way in the 1990s to the establishment of the two IEAs and other marine mammal collaborations. The two states collaborated on the Shared Beringian Heritage Program, and other protections of the ecologically robust region. This collaboration brought scientists, politicians and Native representatives together to discuss the most pertinent challenges being faced by stakeholders.

Both Russia and the United States perceived the well-being of the Pacific walrus as a germane challenge. The Pacific walrus IEA was drafted in the 1994 to co-manage a number of the species' threats. While both governments and local populations deemed the drafted Pacific walrus IEA a priority, other concerns at the turn of the twenty-first century took precedence. The

polar bear IEA maintained enough support to be formalized in 2000, while the Pacific walrus IEA was sidelined.

In reference to the Bering Strait's ecological pertinence, three of the thirteen ecological and biological sensitive areas as designated by the International Union for Conservation of Nature (IUCN), lie within the Bering Strait Region (International Union for Conservation of Nature & Natural Resource Defense Council, 2010). This action by the IUCN relays the Bering Strait's ecological significance not only to the Arctic, but to the globe. The Bering Strait Region's value incentivizes the co-management of specific species through an IEA, especially those of extensive large ecological and social importance.

This research evaluated the strengths and shortcomings of the existing IEAs in the Bering Strait Region, finding through the four factor evaluation proposed by Mitchell that the effectiveness of an IEA, in the Bering Strait relates directly related to food security in regard to that species. Answering the research questions posed in this thesis: to what extent have International Environmental Agreements been able to manage transboundary challenges to food security, Chapter 3 demonstrates that the IEAs not only promote the conservation of single species, but increase food security and the wellbeing of an entire social-ecological system. IEAs engage a range of stakeholders from local to federal statuses and are shown to additionally provide greater connection to the species for local populations and those further away, by increasing access to traditional ecological knowledge.

Despite increased public and government concern for the Pacific walrus, the Pacific walrus IEA has been no further action. The the lack of international level championship, of historical mobilization, and of an immediate, modern threat have allowed the Pacific walrus IEA to languish. Today, the threats to the Pacific walrus are not being adequately addressed.

IEAs are relevant for Arctic ecosystems, other than the Bering Strait Region, that include Native and non-Native stakeholders whose food security depends on the ecosystem. IEAs can conserve Arctic ecosystems that depend on migratory marine species, terrestrial species or transboundary waters. Outside of the Arctic, IEAs provide an ecological framework for international cooperation, even when the states agree on little else. Due to the successes of the

existing United States-Russia IEAs, these agreements are likely to be replicated in other transboundary regions, between states of lesser historical and contemporary conflict.

Today the use of formal IEAs is increasing, often with a focus on water-based resources shared by states. While IEAs regularly address marine-based resources, they often fail to gain legitimacy due to their attention to topics that are not socially relevant at a national scale, even if they are ecologically valuable. Additionally, these marine-based resources often lack historical relevance or an immediate modern threat. Without thoroughly addressing these challenges through the four factors identified by Ronald Mitchell, an IEA is likely to stall, potentially resulting in the gradual loss of local or regional support.

Food security around the globe is supported and threatened by the transboundary nature of our biosphere. The air, water, climate, pollination, and migration that food resources depend on are inherently transboundary. Local ecosystems and individual species alike depend on the cooperative nature of IEAs.

By returning to the Pacific walrus IEA, the United States would enhance its role in the Arctic and Russia would have the opportunity to improve its relations between Moscow and Chukotka. Both the states and the Native populations would benefit socially, economically, and ecologically from greater food security, while also ensuring greater resilience in a marine environment facing inevitable change.

References Cited

Ainana, A., Blokin, S., Borodin, R., Yetylin, V., Yetylina, O., Zdor, E., Zelensky, G., Litovka D., Melnikov, V., Solovenshuk, L., & Shevchenko, N. *A feasibility study for the harvest of gray and bowhead whales to meet the cultural, traditional and nutritional requirements of the indigenous peoples of Chukotka for the years 2003-2007* (2002). Anadyr, Chukchi Autonomous Region: Department of Agriculture, Food and Trade, 1-32.

Aircraft, 50 CFR 27.34 (2016).

Alaska Department of Fish & Game. (2016). Community Subsistence Information System: Resource by Region. Juneau, Alaska: State of Alaska.

Alaska Eskimo Whaling Commission. (2012). "About Us." Retrieved 22 November 2015, from http://www.aewc-alaska.com/About_Us.html.

Alaska Migratory Bird Co-Management Council. (2015). Common Questions about the Alaska Migratory Bird Co- Management Council. Retrieved 22 November 2015, from http://www.fws.gov/alaska/ambcc/About%20Us_files/Question%20and%20Answers%20for%20AMBCC%20members.pdf.

Alaska National Interests Land Conservation Act, 16 U.S.C. 3111-3126 §801 (1980).

Alexander, K. (2013). The International Whaling Convention (IWC) and Legal Issues Related to Aboriginal Rights. Washington D.C.: Congressional Research Service.

Amendments to Legislative Acts of the Russian Federation regard ing the Regulation of the Activities of Non-profit Organizations Performing the Functions of a Foreign Agent, 121-FZ (2012).

Arctic Info. (May 15, 2014). Russia has finally identified the land territory of the Arctic. Arctic Info: Moscow, Russia.

Arctic Marine Shipping Assessment (2009). Scenarios, Futures and Regional Futures to 2020. Tromso: Arctic Council, PAME: 92-120.

Arctic Waterways Safety Committee. (2016). Our Work. Retrieved May 29, 2016, from http://www.arcticwaterways.org/attorneys-1.html.

Armitage, D. (2008). "Governance and the Commons in a Multi-Level World." International Journal of the Commons 2 (1): 7–32.

Arseniev, V. K. (1927). Pacific walrus. Khabarovsk, Vladivostok. Knizhnoe delo.

Behe, C. (2013). Arctic Food Security: How to Assess Food Security from an Inuit Perspective. W. I. Network, Inuit Circumpolar Council- Alaska.

Berkes, F., Colding, K. & Folke, C. (2002). Navigating social-ecological systems: building resilience for complexity and change. United Kingdom: Cambridge University Press

Bevins, C. (1974). Treaties and Other International Agreements of the United States of America 1887-1949. Washington D.C.: Department of State.

Bockstoce, J. R., & Botkin, D. B. (1982). The harvest of Pacific walruses by the pelagic whaling industry, 1848 to 1914. Arctic and Alpine Research, 183-188.

Bockstoce, J. R., & Burns, J. J. (1993). Commercial whaling in the North Pacific sector. The bowhead whale, 2, 563-577.

Bodenhorn, B. (2000). "It's traditional to change: A case study of strategic decision-making." Cambridge Anthropology: 24-51.

Boness, D., Gulland, F., & Tillman, M. (2014). Performance and Accountability Report. Fiscal Year 2014. Bethesda, MD: Marine Mammal Commission.

Braham, H., Burns, J., Fedoseev, G., & Krogman, B. (1984). Habitat partitioning by ice-associated pinnipeds: distribution and density of seals and walruses in the Bering Sea. In F. Fay & G. Fedoseev (Eds.), Russian-American cooperative studies on marine mammals (pp. 25-47): NOAA.

Braund, S. & the Institute of Social and Economic Research (1993). "North Slope subsistence study Barrow, 1987, 1988 and 1989." Institute of Social and Economic Research at the University of Alaska Anchorage. Minerals Management Service report MMS: 91-0086.

Brownlie, I., & Baker, K. (1973). Principles of public international law (Vol. 1, pp. 26-27). Oxford: Clarendon Press.

Buck, E. H. (1994). Marine Mammal Protection Act Amendments of 1994, Congressional Research Service, Library of Congress.

Bureau of European and Eurasian Affairs. (2012, 18 June). U.S.-Russia Cooperation on the Environment. Retrieved 7 December 2015, from http://www.state.gov/p/eur/rls/fs/193106.htm.

Bureau of Land Management. (2005). Appendix J: Subsistence. National Petroleum Researve-Alaska: Bureau of Land Management: 1-49.

Burn, D. M., Webber, M. A., & Udevitz, M. S. (2006). Application of airborne thermal imagery to surveys of Pacific walrus. Wildlife Society Bulletin, 34(1), 51-58.

BurnSilver, S., Magdanz, J., Stotts, R., Berman, M., & Kofinas, G. (2016). Are Mixed Economies Persistent or Transitional? Evidence Using Social Networks from Arctic Alaska. American Anthropologist.

Case, D. S. & Voluck, D. A. (2012). Alaska Natives and American Laws. University of Alaska Press.

Caulfield, R. (2002). "Food security in Arctic Alaska: a preliminary assessment." Sustainable food security in the Arctic: State of knowledge. Occasional Publication (52): 75-92.

Chapin III, F. S., Folke, C., & Kofinas, G. P. (2009). Principles of Ecosystem Stewardship: Resilience-Based Natural Resource Management in a Changing World. New York: Springer.

Chukotka Okrug. (2015). "Chukotka and Alaska: Visa-free Travels." Retrieved 1 November 2015, from http://www.chukotka.org/en/authorities/visa-registration/.

Clark, C. W., Ellison, W. T., & Beeman, K.. (1986). "A preliminary account of the acoustic study conducted during the 1985 spring bowhead whale, Balaena mysticetus, migration off Point Barrow, Alaska." Report of the International Whaling Commission, 36: 311-316.

Cortell, A. P., & Davis Jr, J. W. (2000). Understanding the domestic impact of international norms: A research agenda. International Studies Review, 2(1), 65-87.

Crawford, J., Neakok, W., Nelson, M., Garlich-Miller, J., & Quakenbush, L. (2011). Results from village-based walrus studies in Alaska, 2011. Fairbanks, AK: Alaska Department of Fish and Game, Eskimo Walrus Commission, U.S. Fish & Wildlife Service.

Definitions, 50 CFR § 216.3 (2016).

Demer, L. (2014, November 10). Environmentalists sue feds to protect Pacific walruses from oil drilling. Anchorage, Alaska: Alaska Dispatch News.

Department of the Interior. (1998). Administration of the Marine Mammal Protection Act of 1972 Annual Report January 1, 1996 to December 31, 1996 (pp. 1-40). Washington D.C.: U.S. Department of the Interior, U.S. Fish & Wildlife Service, U.S. Geological Survey/ Biological Resources Division.

Department of the Interior. (2016). U.S.-Russia Polar Bear Commission; Maintenance of Annual Taking Limit for the Alaska-Chukotka Polar Bear Population. Washington D.C.: Fish and Wildlife Service, Federal Register. 81.

Department of Tribal Natural Resource Management. (2015). Co-Management Definition. Co-Management Symposium: Weaving Together Two Worlds. Fairbanks, AK: University of Alaska Fairbanks.

Dudarev, A. A., Chupakhin, V. S., & Odland, J. Ø. (2013). Health and society in Chukotka: an overview. International Journal of Circumpolar Health, 72.

Dunbar, M. (1968). Ecological Development in Polar Regions: A Study in Evolution. Englewood Cliffs, NJ: Prentice-Hall Inc.

Eskimo Walrus Commission. (2003). Conserving our culture through traditional management. Nome, AK: Kawerak Inc.

Eskimo Walrus Commission. (2012). Final Report to National Park Service Shared Beringian Heritage Program for Cooperative Agreement #H9807070009, 6. Nome, AK: Kawerak, Inc.

Eskimo Walrus Commission. (2015). Quarterly Report- 1/1/15-3/1/15. Nome, AK: Kawerak, Inc.

Eskimo Walrus Commission. (2016). EWC Major Milestones & Accomplishments, 1-3. Nome, AK: Kawerak, Inc.

Fall, J. A. (2016). "Regional Patterns of Fish and Wildlife Harvests in Contemporary Alaska." ARCTIC 69(1): 47-64.

Fay, F., Eberhardt, L., Kelly, B., Burns, J., & Quakenbush, L. (1997). Status of the Pacific walrus population, 1950–19891. Marine Mammal Science, 13(4), 537-565.

Federal State Statistics Service. (2000). Russian Statistical Yearbook. Moscow: Goskomstat Rossii.

Fedoseev, G. (1962). On the state of the stocks and the distribution of the Pacific walrus. Zool, 41, 1083-1089.

Fedoseev, G. A. (1990). The Role of Ice in Changes of Pacific Walrus Distribution and their Numbers. Paper presented at the International Meeting on Population Ecology and Management of Walruses, Seattle, WA.

Fedoseev, G., Razlivalov, E., & Borbrova, G. (1988). Distribution and abundance of pinnipeds on the ice in the Bering Sea in April and May, 1987 Scientific investigational work on marine mammals in the northern part of the Pacific Ocean in 1986-1987 (pp. 44-70). Moscow: TINRO.

Finnemore, M. & Dessler, D. (1997). "National interests in international society." International Studies Quarterly, 41: 275-275.

Fischbach, A. S., Kochnev, A. A., Garlich-Miller, J. L., & Jay, C. V. (2016). Pacific walrus coastal haulout database, 1852-2016—Background report: U.S. Geological Survey.

Fischer, V. & Wohlforth, C. (2012). To Russia with Love: An Alaskan's Journey, University of Alaska Press.

Fish & Wildlife Service & National Oceanic and Atmospheric Administration. (1973). "Endangered Species Act of 1973." 16: 1531-1544.

Fomenko, A. (1990). Some features in the nutrition of the indigenous population of the coastal regions of Chukotka. Peculiarities of Therapeutic Disease Incidence and their Prevention in Residents of Chukotka. Anadyr, 62-63.

Fox, J. (2016). Northwest Passage luxury cruise promises adventure, risk. The Washington Times. Retrieved 1 September 2016 from http://www.washingtontimes.com/news/2016/jul/24/crystal-cruises-northwest-passage-luxury-voyage-pr/.

Freiman, S. (1941). Biology of the Chukchi walrus. Izvestiia TINRO 20:3-20 (Translated by Deena Wakhroucheff, 1954).

Frost, O. W. (2003). Bering: The Russian Discovery of America. New Haven, CT: Yale University Press.

Garlich-Miller, J., MacCracken, J., Synder, J., Meehan, R., Myers, M., Wilder, J., Lance, E., & Matz, A. (2011). Status review of the Pacific walrus (Odobenus rosmarus divergens). Anchorage, Alaska: U.S. Fish & Wildlife Service.

Garlich-Miller, J. & Pungowiyi, C. (1999). Proceedings of a workshop concerning walrus harvest monitoring in Alaska and Chukotka. Fish & Wildlife Service Technical Report MMM 99-1; 1- 59.

George, A. L., & Bennett, A. (2005). Case studies and theory development in the social sciences. Cambridge, MA: MIT Press.

George, J. & Hanns, C. (2011). Bowhead Coastal Observation Project- Chukotka. Annual Field Report- 2010, 2011. E. Zdor. Barrow, Alaska: North Slope Borough. 1-14.

Giddings, J. L. (1960). The Archeology of Bering Strait. Current Anthropology, 1(2), 121-138.

Gilbert, J. R. (1992). Aerial census of Pacific walrus, 1990: Marine Mammals Management, U.S. Fish & Wildlife Service, Region 7.

Gillespie, A. (2005). Whaling Diplomacy: Defining Issues in International Environmental Law, Edward Elgar Publishing, Incorporated.

Givens, G., Edmondson, S., George, J., Suydam, R., Charif, R., Rahaman, A., Hawthorne, D., Tudor, B., DeLong, R., & Clark, C. (2013). "Estimate of 2011 abundance of the Bering-Chukchi-Beaufort Seas bowhead whale population." Paper SC/65a/BRG01 (Scientific Committee of the International Whaling Commission 65a, Jeju Island, Korea).

Graham, F. (1991). U.S. And Soviet Environmentalists Join Forces Across the Bering Strait. Audubon, 93(4), 42-61.

Gray, P. A. (2006). "'The Last Kulak and Other Stories of Post-Privatisation Life in Chukotka's Tundra." Nomadic Peoples: 50-67.

Gray, P. A. & Schweitzer, P.P. (2000). "The Chukchis and Siberian Yupiks of the Russian Far East." Endangered Peoples of the Arctic: Struggles to Survive and Thrive. Westport, CT: Greenwood Press.

Grebmeier, J. M., Overland, J.E., Moore, S. E., Farley, E.V., Carmack, E. C., Cooper, L. W., Frey, K. E., Helle, J. H., McLaughlin, F.A., & McNutt, S.L. (2006). A major ecosystem shift in the northern Bering Sea. Science 311:1461–1464.

Haecker, D. (2013). Maritime Symposium addresses increased Bering Strait ship traffic. Nome, AK: The Nome Nugget. CXIII: 1-4.

Haskett, G., Brower, C., Amirkhanov, A., & Kavry, S. (2012). Report of the Fourth Meeting of the U.S.-Russia Polar Bear Commission. Anchorage, AK: U.S. Fish & Wildlife Service: 1-10.

Haskew, D. (1999). Federal Consultation with Indian Tribes: The Foundation of Enlightened Policy Decisions, or Another Badge of Shame? *American Indian Law Review, 24*(1), 21-74.

Hensengerth, O. (2009). Transboundary River Cooperation and the Regional Public Good: The case of the Mekong River. Contemporary Southeast Asia: A Journal of International & Strategic Affairs.

Hillsen, K. (1849). Puteshestvie na sliupe 'Blagonamerennyi' dlia izsledovaniia beregov Azii i Ameriki za Peringovym provlivom s 1819 po 1822 god [Voyage of the sloop Good Intent to explore the Asiatic and American shores of Bering Strait] (Vol. 55). St. Petersburg: Otechetvennye Zapiski.

Holling, C. S. (1973). Resilience and stability of ecological systems. *Annual review of ecology and systematics*, 1-23.

Hopkins, D. M. (1967). The Bering land bridge (Vol. 3). Palo Alto, CA: Stanford University Press.

Hovelsrud, G., McKenna, M. & Huntington, H. (2008). "Marine mammal harvests and other interactions with humans." Ecological Applications. 18(sp2): S135-S147.

Huntington, H., Nelson, M., & Quakenbush, L. (2012). "Traditional Knowledge Regarding Walrus near Point Lay and Wainwright, Alaska, Report to the Eskimo Walrus Commission and Bureau of Ocean Energy Management," 5.

Huskey, L., Berman, M., & Hill, A. (2004). Leaving home, returning home: Migration as a labor market choice for Alaska Natives. *The Annals of Regional Science, 38*(1), 75-92.

Institute of the North. (2014). From Russian to American Alaska: What Happened in the past 150 year Bering Strait Messenger Network, Phone, Institute of the North.

Intergovernmental Panel On Climate Change. (2007). "Climate change 2007: the physical science basis." Agenda 6(07): 333.

Intergovernmental Panel on Climate Change. (2013). Climate Change 2013. The Physical Science Basis, World Health Organization, United Nations Environmental Program, 1535.

International Arctic Science Committee. (2010). Arctic Climate Impact Assessment. Management and conservation of marine mammals and seabirds in the Arctic. S. Draggan, International Arctic Science Committee.

International Maritime Organization. (1978). Protocol of 1978 Relating to the International Convention for the Prevention of Pollution from Ships. 1340 UNTS 61; 17 ILM 546 (1978). International Maritime Organization.

International Maritime Organization. (2014). International Code for Ships Operating in Polar Waters (Polar Code), MEPC 68/21/Add. 1 C.F.R.

International Whaling Commission. (1946). International Convention for the Regulation of Whaling. Washington, DC: United Nations.

Inuit Circumpolar Council- Alaska. (2014). How to Assess Food Security from an Inuit Perspective: Building a Conceptual Framework on How to Assess Food Security in the Alaskan Arctic. Inuit Circumpolar Council. ICC General Assembly, Inuit Circumpolar Council: 1-13.

Inuit Circumpolar Council- Alaska. (2015). Alaskan Inuit Foods Security Conceptual Framework: How to Assess the Arctic from an Inuit Perspective. Summary Report and Recommendations Report. Anchorage, AK: Inuit Circumpolar Council, 1-34.

International Union for Conservation of Nature & Natural Resource Defense Council. (2010). IUCN/NRDC Workshop to Identify Areas of Ecological and Biological Significance or Vulnerability in the Arctic Marine Environment. In Lisa Speer and T. Laughlin (Eds.). La Jolla, CA: Scripps Institution of Oceanography.

Jackson, S. (1894). Report on Introduction of Domesticated Reindeer Into Alaska with Maps and Illustrations: U.S. Government Printing Office.

Jay, C., Marcot, B.G., & Douglas, D.C. (2011). Projected status of the Pacific walrus (Odobenus rosmarus divergens) in the twenty-first century. Polar Biology 34:1065–1084.

Jay, C. & Fischbach, T. (2015, July 27, 2015). PWID Manual. Retrieved May 28 2016, from http://alaska.usgs.gov/science/biology/walrus/pwid/manual/index.html .

Jay, C., Fischbach, A. S., & Kochnev, A. A. (2012). Walrus areas of use in the Chukchi Sea during sparse sea ice cover. Marine Ecology Progress Series, 468(14), 1-13.

Jeffery, M. I., Firestone, J., & Bubna-Litic, K. (2008). Biodiversity Conservation, Law and Livelihoods: Bridging the North-South Divide: IUCN Academy of Environmental Law Research Studies, Cambridge, UK: Cambridge University Press.

Johnson, C. (1997). "The Role of Indigenous Peoples in Forming Environmental Policies." Contested Arctic: 1-12.

Jones, T. (2001). Proceedings. World Conservation Congress Amman, Jordan 4-11 October 2000. Gland, Switzerland and Cambridge, UK: IUCN.

Kawerak. (2012). Eskimo Walrus Commission. Retrieved May 28, 2016, from http://www.kawerak.org/ewc.html.

Kim, V., Shchitinsky, V., Polishchuk, V., Trugman, B., Vdovin, B., & Feulova, Z. (1991). A feasibility study for establishing a protected land and marine territory in the Bering Strait area. Vol. II Basic Provisions. St. Petersburg: State Committee for Architecture and Construction Leningrad State Institute of Urban Planning (translated by Natalia Strelkova and Sergei Chulaki in August 1992).

Kishigami, N. and ג . (2007). "Indigenous Trade and Social Change of the Siberian Yupik Eskimos in the Bering Strait Region during the 18–20th Centuries." The Journal of Liberal Arts, 76: 39-57.

Klimova, Y. (2012). Russia: Government Against Rights Groups. Human Rights Watch. Retrieved from https://www.hrw.org/russia-government-against-rights-groups-battle-chronicle.

Kochnev, A. (2004). Warming of eastern Arctic and present status of the Pacific walrus (Odobenus rosmarus divergens) population. P.284-288 in: Belkovich V.M., ed. Marine Mammals of the Holarctic. Papers of the Third International Conference. Moscow: Marine Mammal Council.

Kochnev, A. (1999). Pacific Walrus in Coastal Waters of Wrangell Island (1991-1994). In T. b. M. Bell (Ed.), News of the Pacific Fisheries Research Center (Vol. 126). Anadyr, Russia: Chukotka Division of TINRO-Center and Wrangell-Island State Reserve.

Kochnev, A. (2016). Pacific Walrus. Retrieved on August 31, 2016 from Pacificwalrus.ru.

Kozlov, A. (2004). Impact of economic changes on the diet of Chukotka natives. International Journal of Circumpolar Health, 63(3).

Kozlov, A., & Zdor, E. (2003). Whaling products as an element of indigenous diet in Chukotka. Anthropology of East Europe Review, 21(1), 127-138.

Krauss, M. (1994). Crossroads? A Twentieth-Century History of Contacts across the Bering Strait, Washington, DC: Smithsonian Institution Press, 365-379.

Krupnik, I. (2000). Humans in the Bering Strait region: responses to environmental change and implications for the future. In: Huntington, H.P. (Ed.), Impacts of Changes in Sea Ice and Other Environmental Parameters in the Arctic. Bethesda, MD: Marine Mammal Commission Workshop Report, Marine Mammal Commission, 48–60.

Krupnik, I., & Ray, G. C. (2007). Pacific walruses, indigenous hunters, and climate change: bridging scientific and indigenous knowledge. Deep Sea Research Part II: Topical Studies in Oceanography, 54(23), 2946-2957.

Krylov, V. I. (1971). On the food of the Pacific walrus (Odobenus rosmarus divergens Ill.). Investigations on Marine Mammals. Trudy AtlantNIRO, 39:110-116.

Landreth, N. (2015, September 1). If you're going to talk about arctic shipping, talk to Alaska's tribes. Alaska Dispatch News. Anchorage, AK.

Larson, M. (2013). Poor Walrus Hunting Leaves Alaskan Village Hurting. New York: New York Times.

Lefevre, J. (2013). "A pioneering effort in the design of process and law supporting integrated Arctic Ocean management." Environmental Law Reporter, News and Analysis, 43.

Lentfer, J. (1980). "Polar Bear Management and Research in Alaska 1974-76.". Proceedings of the Sixth and Seventh Working Meetings of the IUCN Polar Bear Specialist Group 1976 and 1979. Gland, Switzerland: International Union for Conservation of Nature and Natural Resource Defense Council.

Loring, P. A., & Gerlach, S. C. (2009). Food, culture, and human health in Alaska: an integrative health approach to food security. *Environmental Science & Policy, 12*(4), 466-478.

Lunn, N. J., Schliebe, S., & Born, E.W. (2002). Polar Bears: Proceedings of the 13th Working Meeting of the IUCN/SSC Polar Bear Specialist Group, 23-28 June 2001, Nuuk, Greenland: International Union for Conservation of Nature.

MacCracken, J. G. (2012). Pacific Walrus and climate change: observations and predictions. Ecology and evolution, 2(8), 2072-2090.

Marine Mammal Commission. (1996). Annual report to Congress: 1995. Marine Mammal Commission, Washington, DC, 1-254.

Marine Mammal Commission. (1997). Annual report to Congress: 1996. Marine Mammal Commission, Washington, DC, 1-266.

Marine Mammal Commission. (1998). Annual report to Congress: 1997. Marine Mammal Commission, Washington, DC, 1-260.

Marine Mammal Commission. (1999). Annual report to Congress: 1998. Marine Mammal Commission, Washington, DC, 1-252.

Marine Mammal Commission. (2000). Annual report to Congress: 1999. Marine Mammal Commission, Washington, DC, 1-264.

Marine Mammal Commission. (2001). Annual Report to Congress: 2000. Marine Mammal Commission, Washington, DC, 1-264.

Marine Mammal Commission. (2002). Annual Report to Congress: 2001. Marine Mammal Commission, Washington, DC, 1-260.

Marine Mammal Commission. (2003). Annual Report to Congress: 2002. Marine Mammal Commission, Washington, DC, 1-175.

Marine Mammal Commission. (2007). The Marine Mammal Protection Act of 1972 as Amended. 92-522. U. S. Congress. Silver Spring, MD.

Marine Mammal Commission. (2009). Annual Report to Congress: 2008. Marine Mammal Commission, Washington, DC, 1-282.

Marine Mammal Protection Act. (1972). "US Code. vol. 16, sections 1361–1407." Public Law: 92-522.

Marz, S. & Medina, M. (2007). On Thin Ice: The Precarious State of Arctic Marine Mammals in the United States Due to Global Warming. Yarmouth Port, MA: 1- 39.

Mathis, J., Cross, J., Bates, N., Bradley, S. , Lomas, M., Mordy, C. & Stabeno, P. (2010). "Seasonal distribution of dissolved inorganic carbon and net community production on the Bering Sea shelf." Biogeosciences 7(5): 1769-1787.

Meek, C., Lovecraft, A. L., Robards, M. & Kofinas, G. (2008). "Building resilience through interlocal relations: Case studies of polar bear and walrus management in the Bering Strait." Marine Policy 32: 1080-1089.

Meek, C., Lovecraft, A.L., Varjopuro, R. Dowsley, M. & Dale, A. (2011). "Adaptive governance and the human dimensions of marine mammal management: Implications for policy in a changing North." Marine Policy, 35(4): 466-476.

Meek, C. (2009). Comparing marine mammal co-management regimes in Alaska: Three aspects of institutional performance. Fairbanks, AK: University of Alaska Fairbanks.

Melnikov, V. (2016). Russian and American scientists count Chukotka polar bears. The Arctic. Russian Geographical Society.

Melnikov, V., Litovka, D., Zagrebin, I., Zelensky, G. & Ainana, L. (2004). "Shore-based counts of bowhead whales along the Chukotka Peninsula in May and June 1999-2001." Arctic: 290-298.

Metcalf, V., & Robards, M. (2008). Sustaining a healthy human–walrus relationship in a dynamic environment: challenges for comanagement. *Ecological Applications*, *18* (2).

Mikkelsen, C. (2013). "The Indigenous World". Copenhagen, Denmark: International Work Group for Indigenous Affairs.

Mitchell, R. B. (2006). "Problem structure, institutional design, and the relative effectiveness of international environmental agreements." Global Environmental Politics 6(3): 72-89.

Moore, S. E., & Huntington, H. P. (2008). Arctic marine mammals and climate change: impacts and resilience. Ecological Applications, 18(2).

Moore, S. E., & Stabeno, P. J. (2015). Synthesis of Arctic Research (SOAR) in marine ecosystems of the Pacific Arctic. Progress in Oceanography (136), 1-11.

Morgounova, D. (2007). Language, identities and ideologies of the past and present Chukotka. Études/Inuit/Studies, 183-200.

Moshenko, S., Thomas, T. & Eastern Arctic Bowhead Advisory Committee. (2003). Conservation strategy for bowhead whales (Balaena mysticetus) in the eastern Canadian Arctic. Canadian Wildlife Service.

Naneng, M., Andrew, T., Korthuis, V., Heckman, S., Raymond- Yakoubian, J., Johnson, M., Ballot, P., Goodwin Sr., J., Swan Sr., A., Whiting, D., Harcharek, W., & Kanayurak, N. (2015). Alaskan Inuit Foods Security Conceptual Framework. How to Assess the Arctic from an Inuit Perspective. Anchorage, AK: Inuit Circumpolar Council: 1-34.

National Oceanic and Atmospheric Administration. (2016). "Endangered and Threatened Marine Species under NMFS' Jurisdiction." Marine Mammals Retrieved 1.22.2016, 2016, from http://www.nmfs.noaa.gov/pr/species/esa/listed.htm.

National Marine Fisheries Service. (1977). International Whaling Commission's Deletion of Native Exemption for the Subsistence Harvest of Bowhead Whales: Final Environmental Impact Statement. Washington, D.C.: United States Department of Commerce, National Oceanic and Atmospheric Administration.

National Marine Fisheries Service. (2015). "Co-Management of Marine Mammals in Alaska." Co-Management Agreements. National Marine Fisheries Service.

National Oceanic and Atmospheric Administration. (2016, February 23). Critical Habitat. Retrieved on May 26 2016, from http://www.nmfs.noaa.gov/pr/species/criti calhabitat.htm.

National Park Service. (1992). The Bridge of Friendship. A Progress Report on the Establishment of the Beringian International Park. Denver, CO: Branch of Publications and Graphic Design of the Denver Service Center.

National Park Service. (2013). "Uelen Chukotka Dance Group During Qatnut 2013." 2013: 8.

National Park Service. (2015). “History of the Program”. Retrieved on September 16, 2015 from https://www.nps.gov/akso/beringia/about/programhistory.cfm .

National Snow and Ice Data Center. (2016). Average Monthly Arctic Sea Ice Extent: January 1979-2016. Boulder, CO: Arctic Sea Ice News & Analysis.

Nelson, E. W. (1900). The Eskimo about Bering Strait:.U.S. Government Printing Office.

Nikulin, P. G. (1941). The Chukchi walrus. Izvestiia TINRO, 20.

North Atlantic Marine Mammal Commission. (2004). Report of the NAMMCO Workshop on Hunting Methods for Seals and Walrus (pp. 1-60). Copenhagen, Denmark: North Atlantic Marine Mammal Commission.

Nuttall, M. (1998). Protecting the Arctic: Indigenous peoples and cultural survival. Taylor & Francis.

Nuttall, M. (2012). Encyclopedia of the Arctic. New York: Routledge.

Oceana & Kawerak. (2014). Bering Strait Marine Life and Subsistence Use Data Synthesis. Oceana.

Okonek, D. C., Sell, S. K., & Weiss, E. W. (2010). Walrus Islands State Game Sanctuary Annual Management Report 2009 (pp. 1-77). Anchorage, AK: Alaska Department of Fish and Game.

Oozeva, C., Noongwook, C., Noongwook, G., Alowa, C., & Krupnik, I. (2004). Watching ice and weather our way. Washington, D.C.: Smithsonian Institution Press.

Osborn, A. (2011). Russia lifts ban on polar bear hunting. Telegraph. Moscow: The Telegraph.

Ostrom, E. (1990). Governing the commons: The evolution of institutions for collective action. Cambridge, UK: Cambridge University Press.

Payne, A. (2016). Collaborating to Count Arctic Seals and Polar Bears. American and Russian scientists team up in Alaska's remote Chukchi Sea. Washington, D.C.: World Wildlife Fund.

Petursson, J., Vedeld, P., & Kaboggoza, J. (2011). Transboundary Biodiversity Management: Institutions, Local Stakeholders, and Protected Areas: A Case Study from Mt. Elgon, Uganda and Kenya. Society and Natural Resources, 241, 304-1321.

Pinkerton, E. (2011). Co-operative Management of Local Fisheries: New Directions for Improved Management and Community Development, Vancouver: UBC Press.

Procter, J. (1973). "National parks in the Seychelles." Biological Conservation 5(2): 153-155.

Protsyk, O., & Harzl, B. (2013). Managing ethnic diversity in Russia. New York: Routledge.

Quakenbush, L. (2008). Bowhead Whale. Anchorage, Alaska: Alaska Department of Fish & Game.

Ray, G. C., McCormick-Ray, J., Berg, P., & Epstein, H. E. (2006). Pacific walrus: benthic bioturbator of Beringia. Journal of Experimental Marine Biology and Ecology, 330(1), 403-419.

Ray, D. J. (1975). The Eskimos of Bering Strait, 1650-1898. Seattle, WA: University of Washington Press.

Reeves, R., Rosa, C., George, J., Sheffield, G., & Moore, M. (2012). "Implications of Arctic industrial growth and strategies to mitigate future vessel and fishing gear impacts on bowhead whales." Marine policy. 36(2): 454-462.

Reynolds, J., Alexander, V. & Dayton, P. (2009). Annual Report to Congress 2008. Bethesda, Maryland: Marine Mammal Commission.

Ristroph, E. (2014). Loosening Lips to Avoid Sinking Ships: Designing a Ship Communications System for the Bering Strait Region. Indiana International & Comparative Law Review, 24(3), 581-664.

Ristroph, E. (2016). Pacific Walrus Protection and Management in a Changing Climate. Paper presented at the Arctic Science Summit's Community Priorities for Walrus Research Workshop, Fairbanks, AK.

Roach, J. (2007). Young Walruses Trampled by Stampedes in Warming Arctic. National Geographic News, National Geographic. Retrieved from http://news.national geographic.com/news/2007/12/071226-walrus-stampede.html

Robards, M. D., Burns, J. J., Meek, C. L., & Watson, A. (2009). Limitations of an optimum sustainable population or potential biological removal approach for conserving marine mammals: Pacific walrus case study. Journal of Environmental Management, 91(1), 57-66.

Robards, M., & Garlich-Miller, J. (2012, March 19-22). *A Workshop on Assessing Pacific Walrus Population Attributes from Coastal Haulouts*, Anchorage, AK.

Robards, M. D., & Lovecraft, A. L. (2010). Evaluating Comanagement for Social- Ecological Fit: Indigenous Priorities and Agency Mandates for Pacific Walrus. Policy Studies Journal, 38(2), 257-279.

Rode, K. D., Robbins, C.T., Nelson, L. & Amstrup, S.C. (2015). "Can polar bears use terrestrial foods to offset lost ice- based hunting opportunities?" Frontiers in Ecology and the Environment 13(3): 138-145.

Rohr, J. (2014). Indigenous Peoples in the Russian Federation. Copenhagen: Indigenous Work Group for Indigenous Affairs. Copenhagen: 9-13.

Roop, S., Alessa, L., Kliskey, A., Fidel, M. & Beaujean, G. (2015). "'We Didn't Cross the Border; the Border Crossed Us': Informal Social Adaptions to Formal Governance and Policies by Communities across the Bering Sea Region in the Russian Far East and United States." Washington Journal of Environmental Law & Policy, (5) 1.

Round, J. (2005). "Rescaling Russia's geography: The challenges of depopulating the northern periphery." Europe-Asia Studies 57(5): 705-727.

Routel, C., & Holth, J. (2012). Toward genuine tribal consultation in the 21st century. University of Michigan. *JL Reform, 46*, 417.

Russell, E. (2016). Russian and American officials sign wildlife management agreement. Alaska Public Media. Nome, AK: Alaska Public Media.

Russian Geographical Society. (2014). Protection of Endangered Species: The Walrus. Projects. Retrieved April 1 2016, 2016, from https://www.rgo.ru/en/projects/protection-endangered-species-walrus.

Russian Orca. (2013). Russian total allowable catch of marine mammals. Retrieved on 1 April 2016 from http://www.russianorca.com/Doc/ODU2013eng.pdf.

Сайдаль, В. М. & Ministry of Fisheries. (2000). Food, Trade and Fisheries. Chukotka Okrug: Director General of МУП СХТП and Department of Agriculture.

Salomon, A. K., Gaichas, S. K., Jensen, O. P., Agostini, V. N., Sloan, N. A., Rice, J., McClanahan, T., Ruckelshau, M., Levin, P., & Dulvy, N. (2011). Bridging the divide between fisheries and marine conservation science. Bulletin of Marine Science, 87(2), 251-274.

Sasikumar, K. (2013). "Serbia 'Enters' Europe: International Mobility and the Redrawing of State Boundaries." Mediterranean Quarterly, 24(2): 59-80.

Scanlon, J. (2013). International Forum on Conservation of Polar Bears and Jubilee Meeting of the Parties to the 1973 Agreement on the Conservation of Polar Bears. International Forum on Conservation of Polar Bears and Jubilee Meeting of the Parties to the 1973 Agreement on the Conservation of Polar Bears. Moscow, Russian Federation: Convention on International Trade in Endangered Species of Wild Fauna and Flora.

Schumpeter, J. (1942). Creative destruction. *Capitalism, socialism and democracy*, New York: Harper, 82-5.

Schweitzer, P. & Golovko, E. (1997). "Local identities and traveling names: Interethnic aspects of personal naming in the Bering Strait area." Arctic Anthropology: 167-180.

Sevunts, L. (2016, 22 July 2016). First half of 2016 breaks heat records, Arctic sea ice reaches lowest levels: NASA. Radio Canada International. Retrieved from http://www.rcinet.ca/en/2016/07/22/first-half-of-2016-breaks-heat-records-arctic- sea-ice-reaches-lowest-levels-nasa/.

Shared Beringian Heritage Program. (2014, 11 March). Wildlife Projects. Projects & Research. Retrieved on May 28, 2016, from https://www.nps.gov/akso/beringia/projects/wildlife-projects.cfm.

Shelden, K., Rugh, D.J., DeMaster, D.P. & Gerber, L.R. (2003). "Evaluation of bowhead whale status: Reply to Taylor." Conservation Biology, 17(3): 918-920.

Speckman, S.G., Chernook, V.I., Burn, D.M., Udevitz, M.S., Kochnev, A.A., Vasilev, A., Jay, C., Lisovsky, A., Fischbach, A., & Benter, B. (2011). Results and evaluation of a survey to estimate Pacific walrus population size, 2006. Marine Mammal Science, 27(3), 514-553.

Southern, J. (2008). Polar Bear Officially a 'Threatened' Species. Anchorage, AK: Alaska News Nightly.

Stephan, J. J. (1993). "The Russian far east." Current History, 92(576): 331.

Stirling, I. (2012). Polar bears: the natural history of a threatened species. Toronto, Ontario: Bloomsbury.

Stoker, S. (1983). "Subsistence Harvest Estimates and Faunal Potential at Whaling Villages in Northwestern Alaska, Appendix A." Subsistence Study of Alaska Eskimo Whaling Villages. Washington, DC: U.S. Department of the Interior, MMS, 1-82.

Stoker, S.W. & Krupnik, I.I. (1993). "Subsistence whaling." The bowhead whale, 579: 629.

Suydam, R. S., & George, J. C. (2004). Subsistence harvest of bowhead whales (Balaena mysticetus) by Alaskan Eskimos, 1974 to 2003. Unpublished Report SC/56/BRG12. Cambridge, UK: International Whaling Commission.

Suydam, R. S., & George, J. C. (2005). Subsistence harvest of bowhead whales (Balaena mysticetus) by Alaskan Eskimos, during 2004. Unpublished Report SC/56/BRG15. Cambridge, UK: International Whaling Commission. .

Suydam, R. S., & George, J. C. (2006). Subsistence harvest of bowhead whales (Balaena mysticetus) by Alaskan Eskimos, during 2005. Unpublished Report SC/56/BRG21. Cambridge, UK: International Whaling Commission. .

Suydam, R. S., & George, J. C. (2007). Subsistence harvest of bowhead whales (Balaena mysticetus) by Alaskan Eskimos, during 2006. Unpublished Report SC/56/BRG4. Cambridge, UK: International Whaling Commission. .

Suydam, R. S., & George, J. C. (2008). Subsistence harvest of bowhead whales (Balaena mysticetus) by Alaskan Eskimos, during 2007. Unpublished Report SC/56/BRG10. Cambridge, UK: International Whaling Commission. .

Suydam, R. S., & George, J. C. (2009). Subsistence harvest of bowhead whales (Balaena mysticetus) by Alaskan Eskimos, during 2008. Unpublished Report SC/56/BRG6. Cambridge, UK: International Whaling Commission. .

Suydam, R. S., & George, J. C. (2010). Subsistence harvest of bowhead whales (Balaena mysticetus) by Alaskan Eskimos, during 2009. Unpublished Report SC/56/BRG18. Cambridge, UK: International Whaling Commission. .

Suydam, R. S., & George, J. C. (2011). Subsistence harvest of bowhead whales (Balaena mysticetus) by Alaskan Eskimos, during 2010. Unpublished Report SC/56/BRG2. Cambridge, UK: International Whaling Commission. .

Traditional Hunting, 209-FZ Sec. 2, Art. 19 (2014).

Train, R. (1974). US-USSR Environmental Agreement: Joint committee Meeting: Increased Cooperation in Bering Straits Region. Washington, D.C.: Department of States and Environmental Protection Agency.

U.S. Department of Commerce. (1977). Final Environmental Impact Statement: International Whaling Commission's Deletion of Native Exemption for the Subsistence Harvest of Bowhead Whale. In NOAA & NMFS (Eds.): U.S. Department of Commerce.

U.S. Department of the Interior & U.S. Fish & Wildlife Service. (2011). U.S. Russia Polar Bear Treaty. Implications for harvest. K. Rode. Anchorage, AK: U.S. Fish & Wildlife Service.

U.S. Department of State. (1938). Visits to Siberia by American Eskimos. Department of State. Washington, DC: Department of State, 1277.

U.S. Department of State. (2013). "Treaties in Force: A List of Treaties and Other International Agreements of the United States in Force on January 1, 2013."

U.S. Embassy. (2012). "Clinton, Russia's Lavrov on US-Russia Cooperation Agreements." Washington, DC: Department of States.

U.S. Embassy. (2013). "US Treaties in Force." Washington, DC: Department of State.

U.S. Fish & Wildlife Service. (2000). U.S.-Russia Polar Bear Agreement. U.S. Department of the Interior. Arlington, VA: U.S. Fish & Wildlife Service.

U.S. Fish & Wildlife Service. (2014). Walrus and the Endangered Species Act. Department of the Interior. Retrieved November 2015 from https://www.fws.gov/alaska/fisheries/mmm/walrus/esa.htm.

U.S. Fish & Wildlife Service. (2015). Polar Bear: Scientific Working Group of the U.S.-Russia Bilateral Agreement. Anchorage, AK: Department of the Interior. November 2015 https://www.fws.gov/alaska/fisheries/mmm/polarbear/swg.htm .

U.S. Fish & Wildlife Service, National Oceanic and Atmospheric Administration, U.S. Geological Service, Native Village of Point Lay. (2015). If walruses haul-out, eliminating disturbance is essential: U.S. Fish & Wildlife Service.

U.S. Geological Survey. (2007). Future Retreat of Arctic Sea Ice Will Lower Polar Bear Populations and Limit Their Distribution. U.S. Geological Survey.

U.S.-Canada Migratory Bird Treaty, 16 U.S.C. §703-712 (1918).

U.S.-Russia Marine Mammal Working Group. (2013). *Protocol of the Twenty-Second Working Group Meeting under Project 02.05-61, "Marine Mammals".* Paper presented at the U.S.-Russia Agreement on Cooperation in the Field of Environmental Protection and Natural Resources, Seattle, USA.

Udevitz, M. S., Taylor, R. L., Garlich-Miller, J. L., Quakenbush, L. T., & Snyder, J. A. (2013). Potential population-level effects of increased haulout-related mortality of Pacific walrus calves. Polar Biology, 36(2), 291-298.

Union of Soviet Socialist Republics & United States of America. (1989). Beringian Heritage Reconnaissance Study. National Park Service. Denver, CO: Denver Service Center.

United Nations Environmental Program. (1975). Convention on International Trade in Endangered Species of Wild Fauna and Flora (27 UST 1087). Washington DC: United Nations Environmental Program.

United Nations Development Program, the International Union for Conservation of Nature, the World Wildlife Fund, & The Nature Conservancy. (2016, June 8). Sectoral and landscape/seascape Integration. Paper presented at the Protected Area Systems.

United States of America & Russian Federation. (1992). U.S.-Russian Summit Documents: Economic and Trade Issues. U.S. Department of State. Washington, DC: Department of State, 3.

United States Coast Guard. (2006). Local Notice to Mariners District: 17, Week: 48/06. Washington, DC: U.S. Department of Homeland Security.

Vatn, A. (2007). Institutions and the Environment. Norway: Edward Elgar Publishing.

Ver Ploeg, M., Breneman, V., Dutko, P., Williams, R., Snyder, S., Dicken, C., & Kaufman, P. (2012). Access to Affordable and Nutritious Food. *Economic Research Report, 143*, 1-39.

Walrus Protection Act, 55 Stat. 632, 48 U.S.C. § 248 (1941).

Westley, F., Carpenter, S.R., Brock, W.A., Holling, C.S. & Gunderson, L.H. (2001). "Why systems of people and nature are not just social and ecological systems." Panarchy: understanding transformations in human and natural systems. Washington, DC: Island Press, 103-119.

Wexler, L., Jernigan, K., Mazzotti, J., Baldwin, E., Griffin, M., Joule, L., & Garoutte, J. (2014). "Lived Challenges and Getting Through Them Alaska Native Youth Narratives as a Way to Understand Resilience." Health promotion practice 15.1, 10-17.

Worldwatch Institute. (2007). Russia to Resume Limited Hunting of Polar Bears. Encyclopedia of the Earth & Worldwatch Institute.

World Wildlife Fund & Groc, I. (2014). Marine Arctic Food Web. Sea Ice: What Lies Beneath. Retrieved on April 1, 2016 from https://www.worldwildlife.org/magazine/issues/winter2014/articles/sea-ice-what-lies-beneath-.

Yakutia Airlines. (2015). "Alaska-Russian Far East Flights." US: AirRussia. Retrieved November 1, 2015.

Young, N. M. and International Whaling Commission. (1992). Understanding the Revised Management Procedure: Where We are Now, and what We Still Need to Do Before We Can Use the RMP. Center for Marine Conservation.

Young, O. (1985). "The Age of the Arctic." Foreign Policy: (61)160-179.

Zdor, E. (2013). The Haul-out Keepers project in Chukotka. In Robards, M. & Garlich-Miller, J. (Eds.), A Workshop on Assessing Pacific Walrus (pp. 80). Anchorage, AK: National Park Service.

Zdor, E. (2015). Personal communication on the Bering Straits Region. Interviews with Experts related to the Shared Beringian Heritage Program. K. Aho.

Zeh, J. E., C. W. Clark, J. C. George, D. Withrow, G. M. Carroll & Koski, W.R. (1993). "Current population size and dynamics." The bowhead whale, 2: 409-489.