Indigenous diplomats at the IMO: A case study in successful cross-scale governance for international shipping traffic in the Bering Strait.

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Abstract

The Bering Strait, positioned between the maritime borders of the Russian Federation and the United States, has recently seen an increase in commercial shipping and tourism transit due to the rapid warming of the Bering Sea, the loss of Arctic sea ice, and the development of the Northern Sea Route. Although borders and shipping lanes are often seen as the purview of international relations, protecting environmental security and food security in the mixed subsistence-market economy of the Strait's communities is a key collective action problem requiring Indigenous and local knowledges. In this chapter, we develop a policy history through the public record to demonstrate how the networks of the ocean governance policy subsystem enabled collective action that protected Indigenous marine use areas and promoted sustainable development through international institutions. Our analysis indicates that policy networks with significant Indigenous participation help knowledge pertinent to change at these scales travel across borders and levels of governance to better inform regional stewardship and security. Finally, we propose a cross-border effort on scenarios development to explore the region's commitment to a set of unified conservation goals.

I. Introduction

Rapid changes of socio-economic, climatic, and environmental conditions in the Bering Strait region are concurrent to an increase in the participation of multiple actors with diverse and sometimes conflicting priorities. The Bering Strait social-environmental system includes the political jurisdictions of the Chukotka Autonomous Okrug of Russia and the State of Alaska, United States. As a connector between the Arctic Ocean and the Pacific Ocean (and their associated seas), the Bering Strait region is becoming a focal point for activities spanning from the millennial old practices of subsistence, and more recent local-scale livelihood activities, to the global operation of shipping companies and national agendas for the circumpolar north. But, "in the

processes of world markets globalization creates a lot of problems and consequences not only for the Arctic as a whole, but also for the cross-border region - the Pacific Arctic" (Krasnopolski, 2020). Krasnopolski goes on to describe this space as being in "the beginning stage of the formation" of a "new geo-political and geo-economical region" *(ibid*). As the multiple uses of this space increase, corresponding pressures are placed on the institutions that have developed to manage marine traffic, ecological conditions, and other human needs. Of particular importance to all the interests - subsistence to shipping - is the nature of sea ice. This cryospheric feature provides numerous services (Inuit Circumpolar Council-Canada, 2008, Lovecraft *et al.*, 2012, Lovecraft 2013, Falardeau and Bennett 2020) related to subsistence and community well-being but also represents hazards for shipping and other navigations through the strait. This raises the question of how to design effective and equitable rule sets for a region of increasing use that is experiencing rapid environmental and social changes. Generally, scientific research is the foundation of safety, environmental, economic, and other regulations - but there can be gaps between what evidence is available and which questions are most pressing. Falardeau and Bennett's comprehensive overview of the research on Arctic marine system knowledge integration (2020) indicates that while many empirical studies are providing valuable information on changing Arctic marine systems, there are some research gaps: (1) impact studies to Inuit well-being from ecosystem processes to services were only 8% of the total research articles, (2) cumulative impacts studies were only 13%, (3) human dimension studies in Inuit regions rarely examined the future of those systems, and (4) study areas are heterogeneous as there are clusters of studies in "hotspots" such as the Bering Strait. Their overall conclusion is that "truly integrative research on Arctic marine social-ecological systems is rare" (page 14), leading us to argue for far greater inclusiveness of multiple perspectives given the growing pressures on this system.

We argue that integrative and relevant policy research - a system of study that includes traditional, Indigenous, and local knowledges - is necessary for a location like the Bering Strait because the research results should contribute to policy-making in a multiple-use, multiple scale of use, and an increasingly trafficked location. Policy networks can be sites of transformative deliberation, in which integrative research can be taken up on the agenda. This is similar to the explanation by Tengö *et al.* (2014: 580) that "multiple bases of evidence" or "the recognition of complementarities across knowledge systems have advanced the understanding, and in many cases improved management, of ecosystems, critical natural resources, and biodiversity".

As a step in this direction, the U.S. National Oceanic and Atmospheric Administration (NOAA) has begun to include Indigenous voices in its Arctic Report Card as a stand-alone chapter. In 2019, Indigenous co-authors gave multiple indicators of negative impacts from environmental change. For example, Ugruk(s) are negatively impacted; they are bearded seal(s) in Inuit (although the spelling changes depending on the language group). As the report explained,

> The media and scientific coverage of massive seal die-offs in Alaskan waters is confirmed by what we too observe. At Wales, we counted 20 dead young *ugruks* from this past [S]pring that had presumably not had enough food. Similarly, on St. Lawrence Island, we observed 50 dead spotted seals and young *ugruks* along a 15-20 mile stretch of beach. In recent years, near Chevak, various species of seals with bald patches have been found floating dead on our rivers. While the messages we receive from biologists point to starvation, as opposed to disease, these observations are nonetheless alarming and cause worry regarding the security and safety of our food sources. With sea ice diminishing, our walruses, *ugruks*, whales, and polar bears are in danger. Our whole marine ecosystem is in danger, threatening our traditional way of life (NOAA, 2019: 92)

Although borders and shipping lanes are often seen as the purview of international relations, protecting environmental security and food security (i.e. marine mammals and other Indigenous foods) in the mixed subsistence-market economy of the Strait's communities is a policy challenge

requiring Indigenous and local knowledges to avert environmental disasters and protect food resources. In this chapter, we build a policy history through the public record to demonstrate how diverse venues of deliberation in the ocean governance policy subsystem enabled collective action that protected Indigenous marine use areas and promoted sustainable development through international institutions. Our analysis indicates that venues with significant Indigenous participation help knowledge pertinent to change at these scales travel across borders and levels of governance to better inform regional stewardship and security.

The article proceeds this way: section II introduces our theoretical touchstones, including policy subsystems and cross-scale governance for the more formal interactions between policy actors. The section concludes with a discussion of the concept of paradiplomacy, as introduced in the present edited volume. Section III weaves together a narrative of environmental and global change drivers and situates community-based resistance to the loss of social-ecological richness as a response to these drivers. Section IV introduces a case study of the US and Russian proposal to the International Maritime Organization (IMO) and argues for Indigenous paradiplomacy as a key linkage for cross-scale governance between the IMO and local resilience. Section V concludes our analysis and presents the next steps necessary to maintain the Bering Strait's richness in relation to its social and ecological systems.

II. **Theoretical touchstones**

a) Policy subsystems

Within theories of the policy process, the Advocacy Coalition Theory describes the ways in which advocates shape policy ideas through coalition-building with other policy actors (Baumgartner and Jones, 1993; Sabatier and Jenkins-Smith, 1993) in particular issue areas. These

areas, or policy subsystems, have been described as "...semiautonomous decision-making networks of policy participants that focus on a particular policy issue usually within a geographic boundary" (Sabatier, 1987). We further define our study as a transnational advocacy network which has "issue areas characterized by high value content and informational uncertainty, although the value-content of an issue is both a prerequisite and a result of network activity…". What is significant about these networks "is the ability of non-traditional international actors to mobilize information strategically to help create new issues and categories, and to persuade, pressurize, and gain leverage over much more powerful organizations and governments" (Keck and Sikkink 1999: 89). In Arctic marine policy and transnational policy, regional or topical policy subsystems are nested in a superstructure-like network supporting ocean governance at the United Nations.

[FIGURE 1 HERE]

Within the United Nations' institutions relating to oceans governance and the Law of the Sea, our case study takes place within the policy subsystem shaping shipping law: the International Maritime Organization. Numerous studies have demonstrated that public policy is not made in an orderly analytical "stages heuristic" but through a process, sometimes decades long, of convergence among purported problems and proposed solutions. In other words, among the democratic governments and societies of the United Nations there is a generally accepted understanding that policies are formed because people bring issues to the attention of government and then a linear sort of process follows that sets an agenda, formulates policy, seeks support (legitimation) for the policy, implements it, then evaluates it and considers changes (Kraft and Furlong, 2018). However, this "black box" of public input, government operations, and policy output does not contain a linear process, or even, at times, a rational process. At any time, each of these stages noted above is introduced or manipulated by actors with competing ideas and belief

systems that vie for public attention. Each nation has its own variant of democratic practice that contains various forms or units of collective action (e.g. community activist groups, political coalitions, specialized interest groups) that seek to convince the existing government or social coalitions to push for stability or to promote change in a given issue arena (Keck and Sikkink, 2014; Kingdon, 2003; Baumgartner and Jones, 1993; Sabatier and Jenkins-Smith, 1993).

Within nations and their subnational governments, as well as across the Arctic and the globe, there are different networks of public and private organizations and individuals who are concerned with policy outcomes related to a specific issue. In policy jargon, these form "policy subsystems." For example, the collection of actors, rule-sets, and information related to shipping, animal conservation, or Indigenous rights form such manifestations. Such subsystems of policy development, implementation, and evaluation often have overlapping concerns and actors. For example, consider the conservation of marine mammals in relation to subsistence hunting in the Bering Straits as more ships use the narrow passage.

Milward and Provan (2006) attribute the rise of societal and policy networks to the hollowing-out of the state and the weakening capacity of governments to address complex social, political, and economic issues. On many emerging policy issues in the Arctic, however, strong capacity by central authorities were not needed before rapid sea ice decline because thick sea ice and cold weather prevented large-scale industrialization. Instead, what we are now seeing is the emergence of multi-scalar networks that recognize Indigenous sea uses as well as the traditional state framing of "security".

Minassians and Roy (2020) argue that policy networks are most effective when their members work together in the pursuit of common outcomes. However, they note that participant

may also want to further additional agendas, or pursue divergent policies and strategies, leading to overlapping networks of influence. The authors also review how network structure tends to allow particular levels of participant engagement. The structure of each type of network is distinct and tends to support particular levels of participant engagement, "...some network structures tend to be more open and encourage broad participation of state and societal actors operating at multiple levels. Others, however, tend to restrict participation to formal actors and limit the amount of citizen engagement." Horizontal and vertical networks tend to correspond to the formality of the governance bodies involved, with vertical networks supporting more hierarchical forms, such as international relations.

Proponents of more horizontal networks argue that agents self-organize in order to circumvent bureaucratic rules and slow governmental processes in order to influence policy from outside of government. Our case study illustrates both types of networks and the ways in which horizontal networks can facilitate Indigenous diplomacy.

b) Cross-scale governance

Cross-scale governance is defined in our chapter as a way that governments, groups, coalitions, and individuals at one geographical and jurisdictional scale interact with others at adjacent scales (i.e. more local organizations linking to regional, Indigenous, and state systems) help to steer governance of an issue area. Because of the increasingly fragmented and complex nature of policy issue areas, the knowledges and capacities of one scale can be complemented by those from another. We agree with Robichau (2011) that these efforts should be guided by a focus on democracy and a re-envisioned art of "statecraft." Stivers (2008) calls for a "governance of the common ground" that results from consistent application of democratic practices over time

involving “many small steps—discussions, actions, stories, practices, shared understandings—in the direction of democracy” (pages 117–20).

c) Paradiplomacy

In his chapter on the origins and politics of regional or sub-governmental efforts to achieve diplomatic goals, Kuznetsov (2015) defines paradiplomacy as, “...a form of political communication for reaching economic, cultural, political, or any other types of benefits, the core of which consists in self-sustained actions of regional governments with foreign governmental and non-governmental actors (31).” Based on the introduction to this volume, we find that our case of Indigenous paradiplomacy (i.e., Indigenous diplomacy) would fall into the category of identity-based paradiplomacy, albeit in a broader sense that includes the social-environmental system of the region.

III. **Narrative of environmental and global change drivers and solutions**

a) Environmental

The Bering Strait is a 53-mile wide stretch of water that connects the Pacific and Arctic Oceans (figure 2). Due to its strategic location and biologically rich heritage, the strait has been a focus of geophysical, biological, and social investigations since early Russian voyages in the 17th century. In 2019, Indigenous Elders from Bering Sea communities noted that "[i]n a warming Arctic, access to our subsistence foods is shrinking and becoming more hazardous to hunt and fish. At the same time, thawing permafrost and more frequent and higher storm surges increasingly threaten our homes, schools, airports, and utilities" (NOAA, 2019).

Both the U.S. and Russia maintain active research on environmental conditions of the Bering Sea and Bering Strait Region. According to the U.S. National Oceanic and Atmospheric

Administration's 2019 *Arctic Report Card* (NOAA, 2019), the region is experiencing significant changes: winter sea ice extent in 2019 was near the record low set in 2018, leading to the warmest recorded ocean temperatures on the Southern Bering Sea shelf. Moreover, bottom temperatures on the Northern Bering shelf exceeded 4°C for the first time in November 2018. Regional subarctic and Arctic species fisheries have shifted northward; these changes are linked to the loss of sea ice and changes to bottom water temperature, similar to the Barents Sea in Northern Europe and Russia.

Currently, the location has been directly affected by changing climatic conditions in the Arctic that are diminishing the seasonal sea ice cover (figure 3), changing the nature of the water column and sediment production, and altering the patterns of fish, marine mammals, and other species (McFarland *et al.*, 2020; Grebmeier et al 2006). In addition, changes in the weather and climate regimes of the Bering Strait region itself have impacted environments outside of the Arctic as sea ice loss in the Bering Sea has been linked to the recent severe cold winter in North America (Iida, Sugimoto, and Suga 2020).

[INSERT FIG 2, 3]

For the focus of this chapter, it is the feature of sea ice that matters most because it provides numerous services to society such as a platform for hunting, travel, and industry as well as resting and denning sites for marine mammals; the ice also creates hazards to marine traffic and industrial infrastructure (Lovecraft *et al.*, 2013, Eicken *et al*., 2009). The overall diminishment of the size, extent and age of Arctic sea ice is due to multiple factors including warming seawater temperatures in the Arctic forced by a global mean surface temperature rise and anthropogenic CO2 emissions (Barnes and Polvani, 2015; Dai *et al*., 2019).

In brief, the Bering Strait region has experienced a decline in sea ice extent that enhances surface warming across the Arctic and contributes to the Arctic amplification of global warming (Screen and Simmonds 2010). The effects of these changes in the Bering Strait ecosystem are the northward shifts in high benthic biomass, changes in macrofaunal composition, and over time, a possible shift from a benthic-dominated system to a pelagic one (Grebmeier *et al.*, 2018, Afflerbach *et al.*, 2017). Each of these changes directly impacts people who rely on the ecosystem for food at the local scale (i.e. mixed-subsistence livelihoods) as well as globally for industries whose needs for biomass are linked to the Bering Sea, its strait, and the Arctic Ocean. During the winter season 2020, sea ice extent "plummeted, faster than ever before in the 42 years of satellite data" (McFarland *et al.*, 2020). Average ice extent for the first half of April was the third lowest from all other years, 2018 and 2019 being the lowest years on record.

b) Globalization

Key drivers of an industrialized shipping seaway through the Bering Strait depend on several sets of factors tied to both social and environmental developments that are themselves intertwined. Because the region of the strait itself is not a major producer of goods for export or significant purchaser of goods that would be imported, offloading at one of Alaska's deep-water ports further south, the bulk of the traffic, in particular larger vessels, are passing through without stopping. Most shipping traffic occurs prior to winter (January), although the shoulder seasons are very important for the subsistence species and their ice refugia. In coming decades, the winter season is likely to see more traffic and be managed in similar ways to the current open water management regime. What we decide on now as governance matters to future winter governance. The governance of the region is mitigating free passage under the United Nations Convention on the

Law of the Sea (UNCLOS), which could be all year round; it is the sea ice conditions that will determine how shipping operators make decisions on hazards.

Additionally, shipping trends into the future will also depend on the market dynamics related to goods that might be shipped via the Northern Sea Route, controlled in near entirety by Russia, or the Northwest Passage, the international status of which remains disputed between the U.S. and Canada. The Transpolar route is unlikely to be safely navigable as a shipping route through the end of the century (Boylan and Elsberry, 2019). The two increasingly used routes both pass through the Bering Strait that has extensive maritime traffic from local community fishing boats to massive international sea going vessels. An analysis of U.S. seasonal traffic indicates a high concentration of tugs and barges which resupply Alaska coastal communities and the North Slope during summer months. There are a small number of bulk cargo carriers (near 30 on average) that carry zinc ore out from the Red Dog Mine complex at Kivalina to global markets. Data also indicate a small number of coastal tankers in U.S. waters. On the Russian side of the strait, the Marine Exchange data indicate passage of tankers, bulk carriers, liquefied natural gas (LNG) carriers from Russia's Kara and Barents Sea ports, icebreakers, and support vessels into and out of the Northern Sea Route (Brigham, 2015, World Wildlife Fund, 2019). The Marine Exchange of Alaska uses the Automatic Identification System (AIS) required by the IMO for large commercial ships to track transit via the Bering Strait. In a review of this data, Brigham (2015) found that the AIS data indicate that ship transits in the U.S. maritime Arctic are almost entirely concentrated in the roughly six-month ice-free season from June to November. Further, the data shows ship traffic begins to appear in late May, peaks in July and August and ends by November in the strait. The same data source indicates that the summer (June through October) is also the peak season on the Russian side.

According to an array of accounts, maritime traffic is increasing in the Northwest Passage, the Northern Sea Route, and the Bering Sea and Strait (Boylan and Elderberry 2019). For example, "in 2014-2015, the Bering Sea and Strait saw a total of 60,925 transit segments by fishing vessels (many of which support the seafood industry) and 51,142 segments by non-fishing vessels. The most common type of non-fishing vessels were bulk carriers (20,120) and container ships (15,228), numbers unparalleled in the Arctic Ocean itself" (International Maritime Organization, 2017a). The former refers to ships that carry their load in large quantities while the latter are ships that carry their cargo in intermodal containers. Moreover, "transit through this channel has seen an increase of 250 percent between 2008 and 2015 - from 220 to 540 transits annually. This increase is largely due to destinational shipping for the Yamal liquefied natural gas (LNG) project, in which Russia and China have partnered to extract natural gas from the Russian Arctic" (Humpert, 2018). In 2019, the AIS recorded 494 ship transits, compared to 262 in 2009 (World Wildlife Fund, 2020). Of course, 2020 has seen a significant dip in transits, as the COVID-19 contributed to a global depression.

IV. Case study of the US and Russian proposal to the IMO for routing measures and Areas to be Avoided

a) The proposal

Per UNCLOS Article 41, a coastal state can "designate sea lanes and prescribe traffic separation schemes ... where necessary to promote the safe passage of ships," but to do so, the state must develop a regulatory proposal for IMO approval, in cooperation with other states bordering the strait. For the Bering Strait, this means that the United States is limited in its ability to unilaterally adopt additional traffic regulations. Any marine traffic regulation proposed by the United States and Russia needs to be approved by the IMO in order to be enforceable by the coastal

states on foreign-flagged vessels in transit passage. In 2017, the Russian Federation and the United States proposed six two-way routes and six precautionary areas in the Bering Sea and Bering Strait off the coast of Chukotskiy Peninsula and Alaska where increased shipping traffic has been documented since 2010 and is projected to rise due to economic activity. Use of the routes is voluntary for all ships of 400 gross tonnage and above (International Maritime Organization, 2017a).

As noted in the proposal, the co-sponsoring states conducted analyses of shipping traffic, risks to safety and navigation, and the marine environment. The states also discussed the proposal with "users" of the Bering Sea and Bering Strait to include the maritime community, environmental groups and "other interested stakeholders" (International Maritime Organization, 2017b:). For its part, the U.S. Coast Guard also coordinated the proposal with regional subnational governments such as the state of Alaska, but also the city of Nome (Alaska), and Indigenous governments such as "federally recognized tribes and tribal organizations." These Indigenous governmental organizations in Alaska are recognized under various federal authorities, akin to Graham White's "treaty federalism" and so, while they do not have international standing to attend the IMO as a nation-state, they also should not be considered a sub-unit of the state. In the legal parlance of Indigenous rights law in the United State, they are considered to be "domestic dependent nations".

The proposal does not include any additional details on Russia's process for consulting stakeholders, but the 2015 Maritime Doctrine of the Russian Federation includes a principle (section F) related to governance allowing for the cooperation and coordination of efforts between state organizations, governments of the constituents such as Chukotskiy Autonomous Oblast, and

public interest groups in the development and implementation of the National Maritime Policy (Russia Maritime Studies Institute, 2015).

b) Policy networks and Indigenous diplomats

There are three significant policy networks on the American/Alaskan side of the Strait relating to ocean governance and touching on shipping policy: 1) the Arctic and Western Alaska Area Committee (AWA-AC), 2) the Arctic Marine Mammal coalition and 3) the Arctic Waterways Safety Committee. The first network was created to provide for coordinated emergency oil spill or disaster response through the development and maintenance of a Strategic Plan under the authority of the (U.S.) federal Clean Water Act, and is co-chaired by federal and state on-site coordinators with coordination of Indigenous and non-Indigenous local governments. Its structure is hierarchical, with limited opportunities for deliberation based on local concerns. However, the Committee does have policy guidance related to Indigenous consultation (Arctic and Western Alaska Area Committee, 2018).

The second network, the Arctic Marine Mammal Coalition is a group of marine mammal co-management organizations that joined together with assistance from a non-governmental organisation to advocate for improved marine conservation and policy discussions with the U.S. Coast Guard. The network was structured to be a horizontal network and to facilitate educating the U.S. Coast Guard on regional hazards and food security issues from an Indigenous perspective. The Coalition and the Coast Guard then were able to facilitate structuring a third formal network, the Arctic Waterways Safety Committee (AWSC), that could push forward Indigenous issues into a new federal forum for conflict resolution among user groups (Robards *et al.*, 2018). Through its unique make-up, the AWSC has been able to bring together a self-governing group of maritime users, including Indigenous hunters' organizations, industry, and regional governments (including

Indigenous governments). Although this network is also an authorized entity under the federal Clean Water Act, its decisions are advisory. This network is largely horizontal.

Across the Strait, Indigenous leaders in Chukotka have been able to join some of their American counterparts in these initiatives and in similar efforts through international wildlife management grants and research plans. But the centralized approach of the Russian government has limited local participation. Several NGOs, such as World Wildlife Fund-US (WWF-US) and Pacific Environment, have specialized in helping Chukchi leaders such as Nikolay Ettyne and Eduard Zdor to participate in international fora such as the International Whaling Commission and the U.S.-Russia Polar Bear Commission.

During the debate over the Bering Strait routing measures proposal, NGOs facilitated travel of six Indigenous experts from Alaska, Russia and Canada to lead a diplomatic push to highlight the importance of social and environmental equity, with a focus on food security, animal health, and community well-being. Additionally, the six experts discussed the idea of a permanent seat within the IMO for Arctic Indigenous Peoples to participate in deliberations (Barents Observer, 2016). Alaska-based Kawerak, Inc. representative and hunter Austin Ahmasuk reported that the IMO Secretary-General Kitack Lim was very receptive to the overall diplomatic presentation: "I believe that I was able to clearly present to this body that never heard from Arctic Indigenous people the importance of our lives, our environment and I think we were able to convince the Secretary General that Arctic Indigenous perspectives are very important…" (Nome Nugget, 2016). Following these efforts, Secretary-General Lim spoke about the U.N.'s commitment to the International Declaration on the Rights of Indigenous Peoples and appeared to be moved by the presentations. The US delegation lead also promised Alaskan Indigenous diplomats the ability to

be part of the official delegation in the future. The IMO Bering Strait proposal was the first internationally recognized ship routing measures adopted for polar waters. It was approved and entered into force in December 1, 2018. We consider not only this intervention but also the building upon both hierarchical and horizontal networks to be critical to the successful introduction of planning and inclusive decision-making in the Bering Strait.

One persistent gap in the ability to manage multiple human uses in the Bering Strait is the reticence of the Russian Federation and the State of Alaska to engage in ocean planning and habitat conservation. On the Chukotskiy Peninsula side, Russia has engaged with environmental NGOs in marine pollution issues and has legacy policies protecting Arctic marine animals. On the Alaskan side of the Bering Strait, the U.S. Coast Guard and the National Oceanic and Atmospheric Administrationwork with marine mammal hunters and NGOs to conserve selective habitats and protect subsistence hunting from hazards. Existing agreements, such as the US-Russia Polar Bear Agreement, the countries' joint quota for Bowhead whales and the coordinating network relating to Pacific walrus management, provide additional venues to discuss threats to and resilience of animal and human populations. However, the fragmentation of these networks has limited transitions towards a holistic vision of marine conservation in the Bering Strait.

V. **Conclusion**

We argue in this chapter that inclusive networks and Indigenous diplomacy (para or otherwise) have been critical at reducing hazards in the Bering Strait. However, there is still time to gain a fuller appreciation of the values of resident coastal communities in a project of joint learning. Recently, as scholars and communities work towards an equitable balance of knowledge gathering, management practices, and research protocols, the concept of "co-production of

knowledge" has come to the forefront of discussions in the Arctic with a natural focus on Indigenous Knowledge (Latulippe and Klenk 2020, Robards *et al.*, 2018; Hegger and Dieperink 2014; Armitage *et al.*, 2011). There are several different definitions for this concept. For the purposes of our case study, we use a general action-oriented approach amalgamated from the four texts above and from the recent Inuit Circumpolar Council (ICC) publication on food sovereignty and self-governance that states, "co-production of knowledge, in which IK and science are brought together, is essential to understanding the Arctic as well as for adaptive, holistic decision-making" (Inuit Circumpolar Council-Alaska, 2020: 27). In brief, it is a direct and equitable cooperation of two or more different knowledge systems to learn and create new information. As such, co-production is necessary to the governance of the Bering Strait region because the multiple actors across scales of different activities cannot shape the region effectively to support equitable multiple uses without learning from one another. No single source of knowledge can inform the management needed today and into the future, and, as noted earlier, there is a paucity of research of human, societal, and Indigenous information needed to shape policy decisions.

What next steps can be employed to create a unified set of goals, or at least visions for this location? The first step has been taken by the tribal governments of the Bering Strait region in Alaska. In 2017, after a series of meetings, the Yup'ik and Inupiaq of Alaska produced a *Vision for Action* report explaining their perspectives and interests in cooperation and coordination for ocean planning (Raymond-Yakoubian and Daniel, 2018). This effort could be replicated for the Indigenous people of the Chukotka region in the Russian Federation in a manner appropriate to their own multi-scalar needs and governance capabilities. In a more far reaching vision of how the existing networks could prompt future planning, a scenarios process could bring together all major stakeholders in order to consider plausible outcomes related to different planning strategies and,

ultimately, national regulations and international agreements. Scenarios are stories about possible futures. We all use them in our daily lives, and they have long been used by businesses, for example the oil company Shell, as a more formal planning tool. Considering multiple possible futures allows individuals, companies, governments, or communities to think ahead in rapidly changing complex environments, and to make crucial decisions in the absence of complete information about the future. From our use of futures concepts in planning, scenario exercises do not produce forecasts of what is to come nor are they visions of what participants would like to happen. Instead, they address questions of, "What would happen if…" As such, they create opportunities for strategic decision-making to reduce risk and promote community-level, local-scale resilience. Scenarios are useful for decision makers when uncertainty is high (Cavana, 2010), and when there are strong differences among multiple justifiable opinions, which is exactly the current context in the Bering Strait region. Bringing together decision-makers from the public and private sectors in the region by asking, for example, "What is required for equitable multiple uses across scales of activity in the Bering Strait region by 2050?" creates an environment open to brainstorming and a realization of the diverse knowledge held by different actors. Scenario processes rely on the expertise of participants - without regard to education, status, political office or wealth - to talk about the scope of all possible future events and risks, and to help prepare for them. Engaging in scenario-planning changes the way we think about the future (Wollenberg *et al*., 2000, Lebel *et al.*, 2006, Bohensky *et al.*, 2011). Rather than being a location of fear, the future becomes a suite of possibilities that a community or individual works towards through joint efforts to address needs, possible perturbations, and outcomes. Considering the plausible futures of the region and the different social and environmental activities that press in one direction or the other can create the institutions and rules needed in this complex system.

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FIGURE LABELS

FIGURE 1. Ocean governance policy system figure. Creative Commons Copyright by SA PetraboeEckmann.de based on a figure developed by the Global Ocean Commission.

FIGURE 2. Proposed and adopted ship routing proposals in the Bering Strait. Copyright Marine Policy, as published in Huntington et. al. (2019).

FIGURE 3. Bering Sea Daily Ice Extent 1978-1979 to 2018-2019.

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