Arctic Vessel Traffic and Indigenous Communities in the Bering Strait Region of Alaska

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Contents

Abstract The Bering Strait region of Alaska is home to three different groups of indigenous people and 20 federally-recognized Tribes. Indigenous communities in the Bering Strait have both a right and a strong desire to be included in discussions about the future of vessel traffic in the region, to have their Traditional Knowledge and expertise about the marine environment considered and utilized, and to have meaningful involvement in decision making about activities taking place in their homeland and with the potential to impact their lives. This chapter outlines some of the concerns that Tribes and Tribal organizations have regarding current and projected vessel traffic in the region. It also discusses recent research conducted by Kawerak and Tribes that can contribute to discussions about the future of arctic shipping, including GIS mapping, Traditional Knowledge documentation projects, and regional meetings that have focused on shipping.

Keywords Bering Strait · Vessel traffic · Indigenous · Subsistence · Traditional Knowledge · Food security

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1 Introduction

The Bering Strait region of Alaska (Fig. 1) is the homeland of Inupiaq, Yup'ik and St. Lawrence Island Yupik people. The members of 20 federally recognized Tribes currently live in Nome, the "hub" city for the region, and 15 surrounding villages. Kawerak, Incorporated is the Alaska Native nonprofit tribal consortium for this region, based out of Nome. Kawerak provides services and programs to Tribes and region residents, which includes conducting social science research in the region through our Social Science Program. Kawerak also has a Marine Program and administers the Eskimo Walrus Commission, both of which also focus on marine and vessel traffic-related issues.

The Social Science Program conducts collaborative, community-based research. Our methods are grounded in the tradition of anthropology and include interviews, focus groups, workshops, mapping, community meetings and participant observation. Much of the research we conduct addresses Tribal needs, or information gaps, many of which are relevant to vessel traffic. We work with Traditional Knowledge holders—individuals who are recognized as subject matter experts by their Tribal

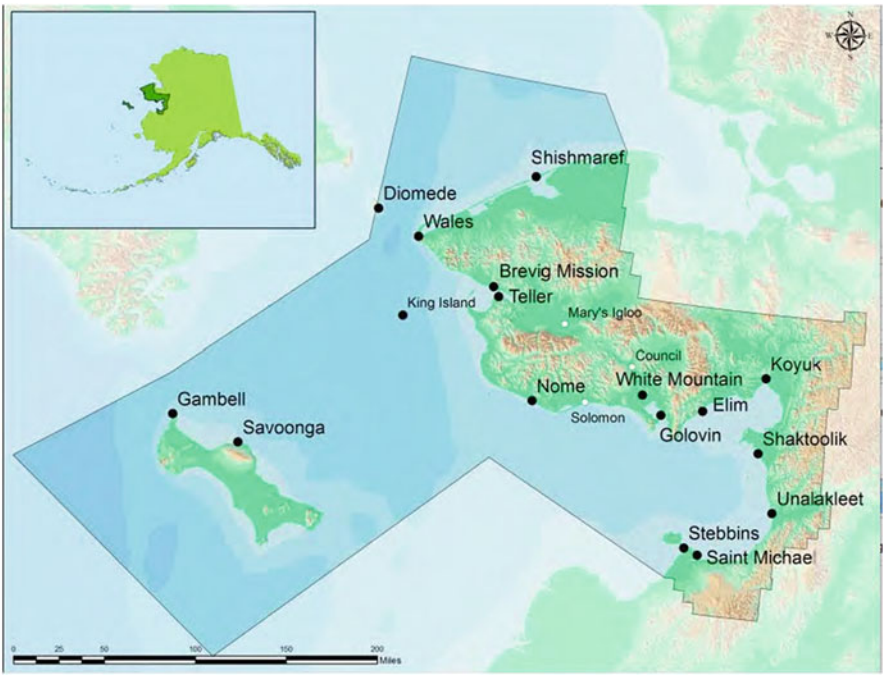

Fig. 1 The Bering Strait region of Alaska

leadership and peers—to document Traditional Knowledge[1] and community perspectives on a variety of topics. Our Social Science Program also partners with other indigenous organizations, with conservation groups, and other researchers. The results of our work are used by Kawerak, Tribes and others for a variety of purposes.

This chapter describes some of the concerns that Tribes and Tribal organizations have regarding current and projected vessel traffic in the Bering Strait region. It also discusses recent research conducted by Kawerak and Tribes that can contribute to discussions about the future of arctic shipping, including GIS mapping, Traditional Knowledge documentation projects, and regional meetings that have focused on shipping.

Bering Strait communities are remote and difficult to access. Most communities in the region are only accessible by small airplane, boat or snowmobile. The community of Diomede, for example, is only accessible by helicopter for most of the year. Region villages range in size from approximately 115 people to almost 700, and in most villages around 90% of residents are Alaska Native or American Indian (ADCCED 2017). The city of Nome, the largest community in the region, has a population of 3598 residents, of which approximately 55% are Alaska Native or American Indian (*ibid.*). The Nome Census Area has a population of approximately 9900 people, 75% of whom are Alaska Native or American Indian (US Census Bureau 2016).

Traditional cultural practices, including intensive use of the marine environment for subsistence activities and travel, remain critically important in region residents' lives today. Subsistence can be described as "hunting and gathering related activities which have a deep connection to history, culture, and tradition, and which are primarily understood to be separate from commercial activities" (Raymond-Yakoubian et al. 2017, p. 133). Communities in the region depend on marine species such as bowhead whales, beluga whales, walruses, ice seals, various birds and fish, and benthic fauna such as clams, sea peaches (Halocynthia aurantium) and other animals.

Marine subsistence activities take place primarily from small boats (e.g. 18 foot aluminum skiffs) with outboard motors, on the sea ice, and in the intertidal zone (e.g. collection of clams and driftwood). The safe and successful conduct of marine subsistence activities requires extensive knowledge of the local environment and

[1]Traditional Knowledge can be defined as: "a living body of knowledge which pertains to explaining and understanding the universe, and living and acting within it. It is acquired and utilized by indigenous communities and individuals in and through long-term sociocultural, spiritual and environmental engagement. TK is an integral part of the broader knowledge system of indigenous communities, is transmitted intergenerationally, is practically and widely applicable, and integrates personal experience with oral traditions. It provides perspectives applicable to an array of human and non-human phenomena. It is deeply rooted in history, time, and place, while also being rich, adaptable, and dynamic, all of which keep it relevant and useful in contemporary life. This knowledge is part of, and used in, everyday life, and is inextricably intertwined with peoples' identity, cosmology, values, and way of life. Tradition – and TK – does not preclude change, nor does it equal only 'the past'; in fact, it inherently entails change" (Raymond-Yakoubian et al. 2017, p. 133).

broader ecosystem, including information from both personal experiences and that which has been passed down through generations. The indigenous residents of the Bering Strait region rely upon the marine environment for their cultural, nutritional, economic and spiritual needs, and take very seriously their role as caretakers of their marine and terrestrial surroundings.

2 Recent Kawerak Work Related to Vessel Traffic

Much of the recent work of the Kawerak Social Science Program has involved mapping activities, such as the mapping of subsistence use areas and animal habitat. Through a variety of projects we have documented spatial information regarding fish, ice seals, walruses, indigenous place names and ocean currents. These projects have recorded information relevant in many ways to the issue of vessel traffic. In addition to and in conjunction with the mapping, we also document Traditional Knowledge related to harvest and processing of subsistence foods, climate changes, social relationships, cultural values and practices, and other information relevant to each particular project foci. Below we review some of this recent work and their connections to vessel traffic and vessel traffic related concerns of indigenous communities in the region.

For example, we collaborated with eleven Tribes in the region to document fish habitat and harvest areas spatially, in map format (see Fig. 2), as well as through interviews and workshops (Raymond-Yakoubian 2013; Raymond-Yakoubian and Raymond-Yakoubian 2015). Two of the communities involved in that work, Brevig Mission and Teller, sit on the north and south shores of Port Clarence, respectively. Port Clarence has also been under consideration as the location for the development of a deep-water port facility and has been used as a 'port of refuge' for over a century for vessels in need of safe harbor (USACE 2013). Brevig Mission and Teller residents, as well as people from other communities, are concerned about vessel traffic and pollution because they harvest fish and seals in the waters of Port Clarence, as well as various berries and plants along the shores. They also travel out into the waters of the northern Bering Sea and Bering Strait to hunt marine mammals.

Another recent project has involved documenting (spatially and through narratives) ice seal and walrus habitat and subsistence harvest areas in collaboration with nine Tribes (Figs. 3 and 4) (Gadamus and Raymond-Yakoubian 2015a, b; Gadamus et al. 2015). Figures 3 and 4 are part of a larger map atlas that includes information about ice seal and walrus subsistence use areas and habitat and Traditional Knowledge (Kawerak 2013a).

Figure 3 illustrates areas where King Island hunters may travel to harvest seals and walrus during the spring time (i.e. March through May). Proposed vessel traffic routes travel directly through these harvest areas, including close to King Island itself, which King Island Tribal members consider to be a particularly significant and sensitive area. Kawerak has recommended that the vessel route proposed in the Port Access Route Study be moved further to the west of King Island (Kawerak 2015b).

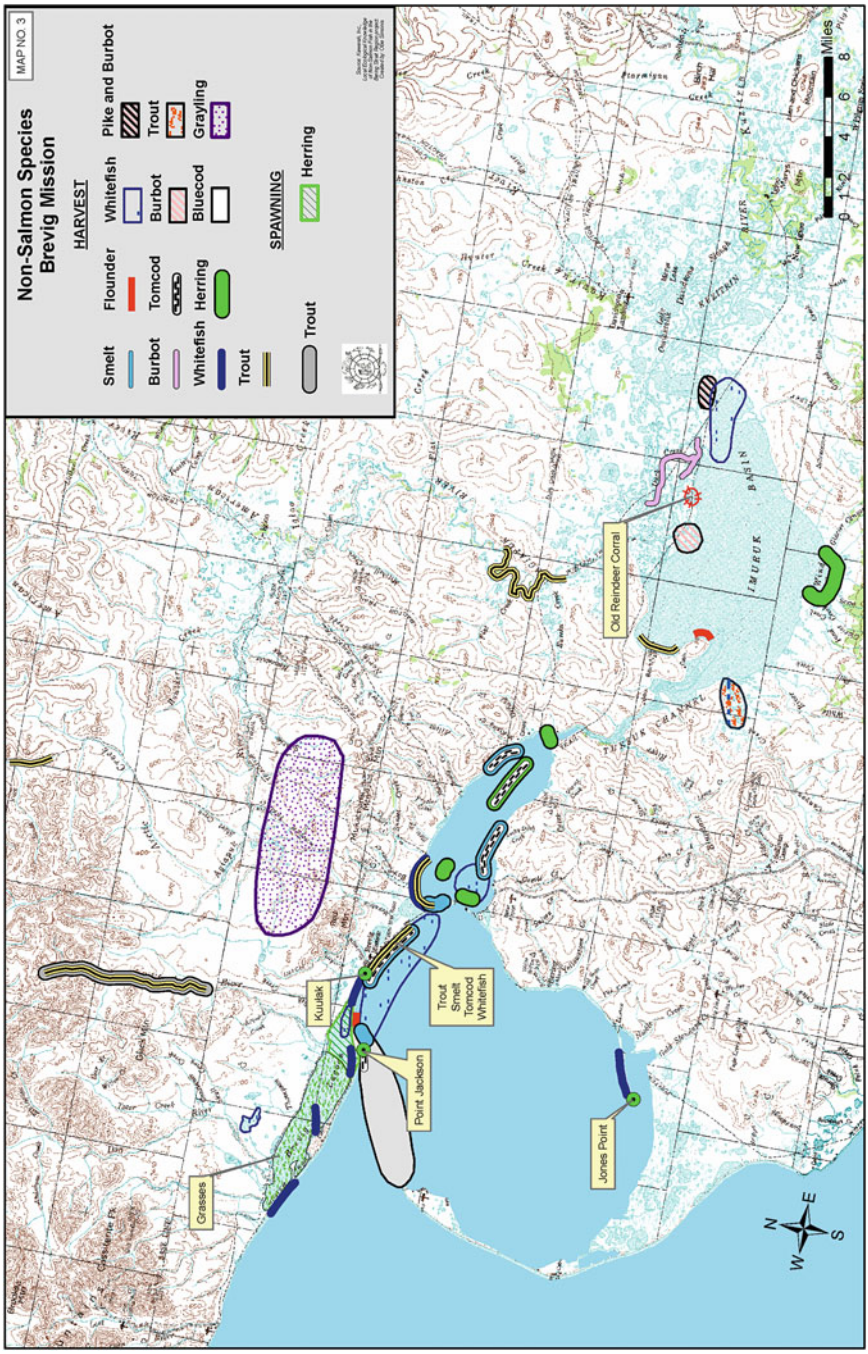

Fig. 2 Brevig Mission subsistence harvest areas for various fish species (originally published by Raymond-Yakoubian 2013; published with permission of Kawerak, Inc. All Rights Reserved)

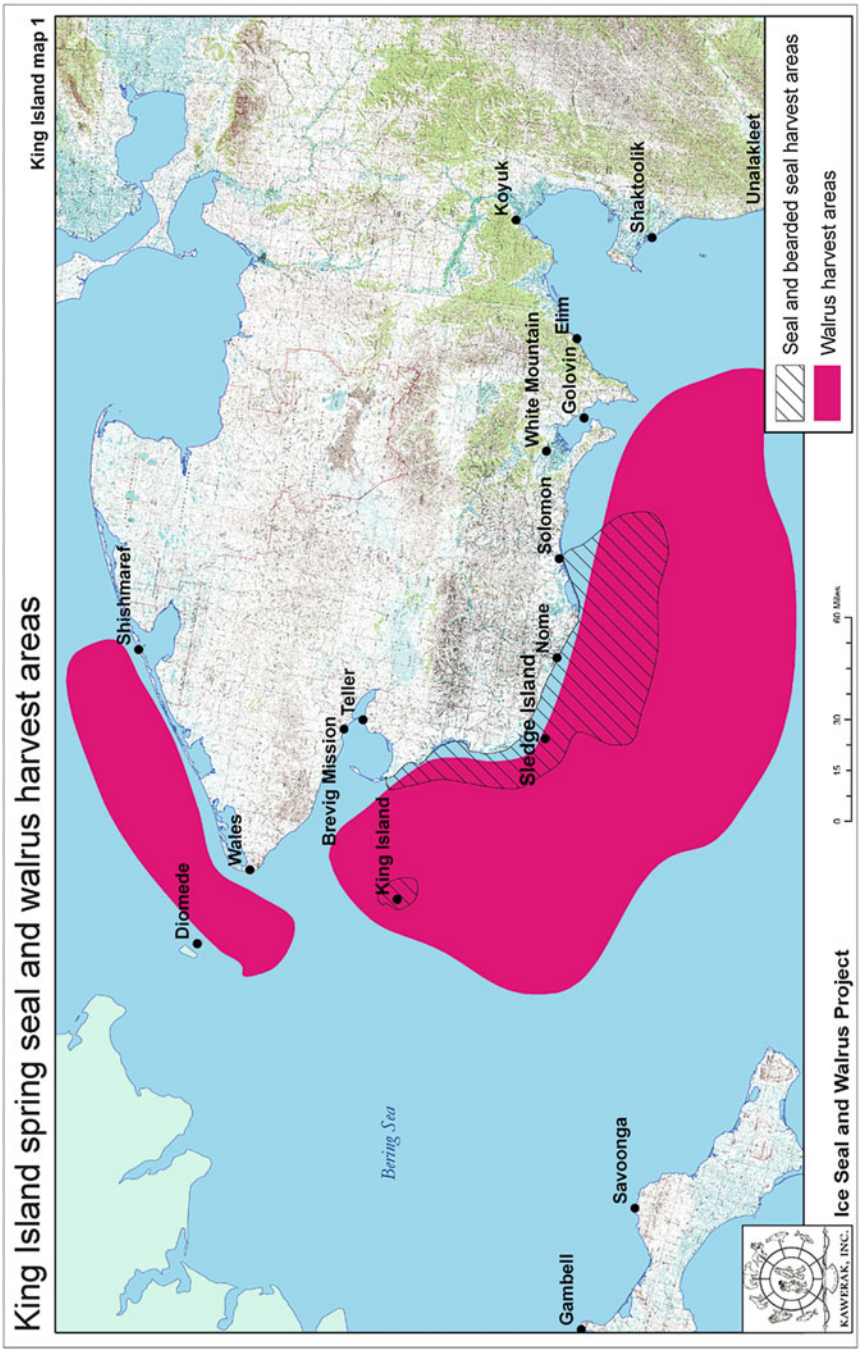

Fig. 3 Seal and walrus harvest and habitat information documented in collaboration with King Island experts (originally published by Kawerak 2013a; published with permission of Kawerak, Inc. All Rights Reserved)

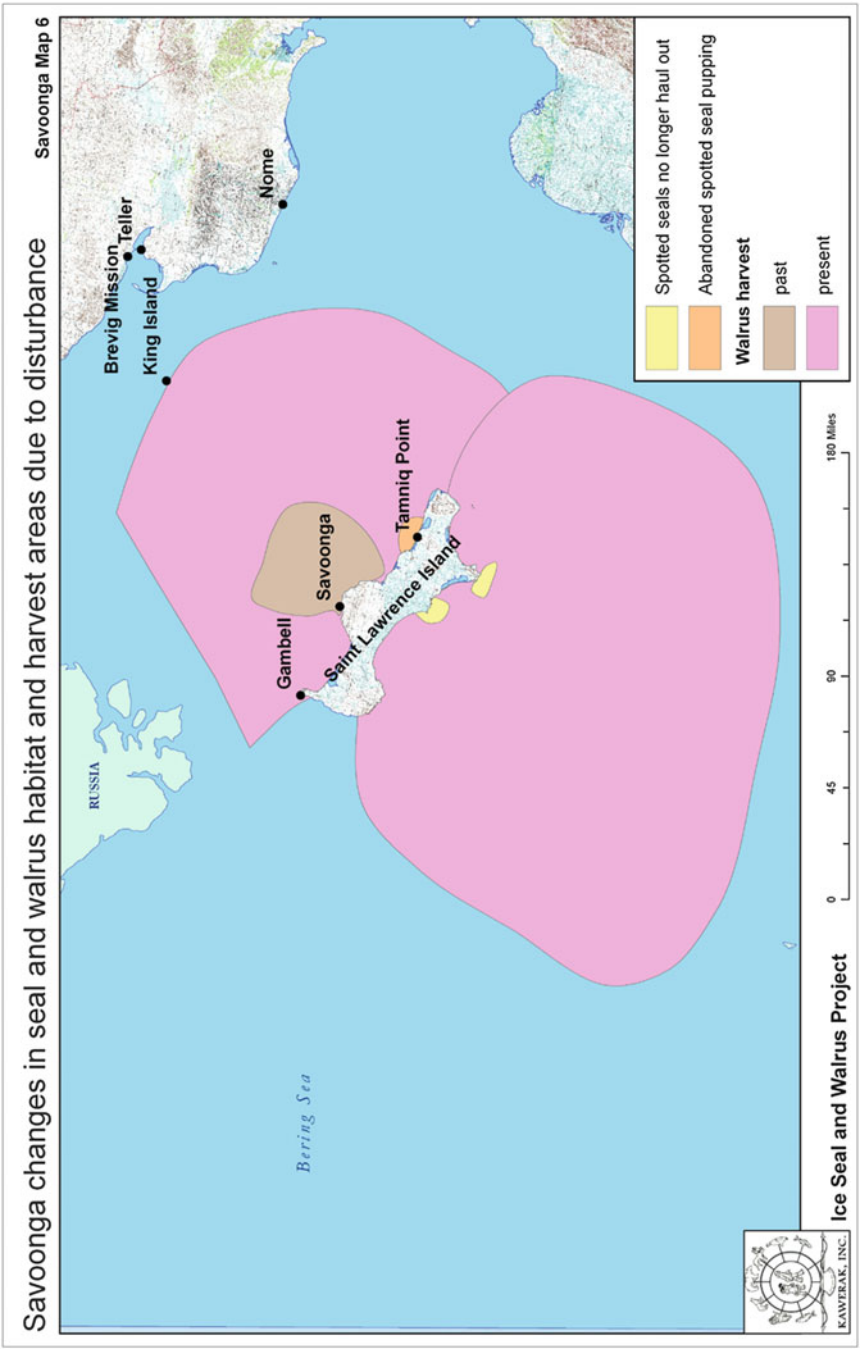

Fig. 4 Seal and walrus harvest and habitat information documented in collaboration with Savoonga experts (originally published by Kawerak 2013a; published with permission of Kawerak, Inc. All Rights Reserved)

Figure 4 shows both habitat and harvest information documented in collaboration with the Tribe in Savoonga, on St. Lawrence Island. This map shows changes in habitat and harvest areas due to disturbance (e.g. noise from human activities such as air traffic, vessel traffic, and other sources). Savoonga and other region communities are concerned about potential additional changes to animal distribution and behavior that may result from increased traffic, noise, or from any spills or accidents. Noise from vessel traffic is one of the major concerns of indigenous communities in the region. Some animals are particularly sensitive to noise and may change their behavior because of noise. Marine mammal hunters worry that animals may become more difficult to harvest, or may move further away from communities. Traditional Knowledge instructs hunters to avoid all unnecessary noise or movement (e.g. Kawerak 2013c) and hunters know to make noise in order to scare dangerous or unwanted animals away (e.g. Kawerak 2013d).

Figure 5 is a map that was created during a collaboration between Kawerak and the conservation group Oceana (Oceana and Kawerak 2014). This collaboration resulted in a document called the *Bering Strait Marine Life and Subsistence Use Data Synthesis* which combined documented Traditional Knowledge and western science about various marine species and habitat components into comprehensive maps of the Bering Strait (as well as a vast amount of textual information about species and habitat). The map in Fig. 5 shows the distribution of walruses during the fall (i.e. September through October). During this time of year walrus are very widely distributed across the entire region, and are densely concentrated in the Diomede Islands. Vessel traffic routes directly intersect with important marine mammal habitat areas shown on this map. For Bering Strait communities, it is important to recognize that marine species are highly mobile and utilize the entire region. Communities are concerned about walrus concentration areas, as well as subsistence use areas, and areas of the marine environment that animals may only travel through during their annual migration. It is difficult, if not impossible, to designate one area as more important than another because the entire region is used by animals at different times of the year, for different reasons.

Kawerak also recently partnered with Audubon Alaska and several other conservation organizations to do a vessel traffic routing analysis showing how the U.S. Coast Guard (USCG) proposed vessel traffic route overlaps with various habitat and physical features of the Bering Strait area, as well as with areas used by subsistence harvesters (Audubon Alaska et al. 2015). Figure 6, one map created as part of the analysis, helps to illustrate the origin of many concerns shared by indigenous communities in the region. The map shows documented information about marine subsistence use areas, in comparison to the vessel traffic route. While there are gaps in our documentation of marine subsistence use areas,[2] this map

[2]While there has been a large amount of work done to document subsistence use areas, there are still significant gaps. For example, Kawerak's recent research on seals and walrus was with 9 tribes of the 20 in the region. So while that work was comprehensive in each of the nine participating communities, it was not comprehensive for the region. This particular map also does not include any information from the Russian Federation, and does not illustrate habitat use by animals—only subsistence use areas.

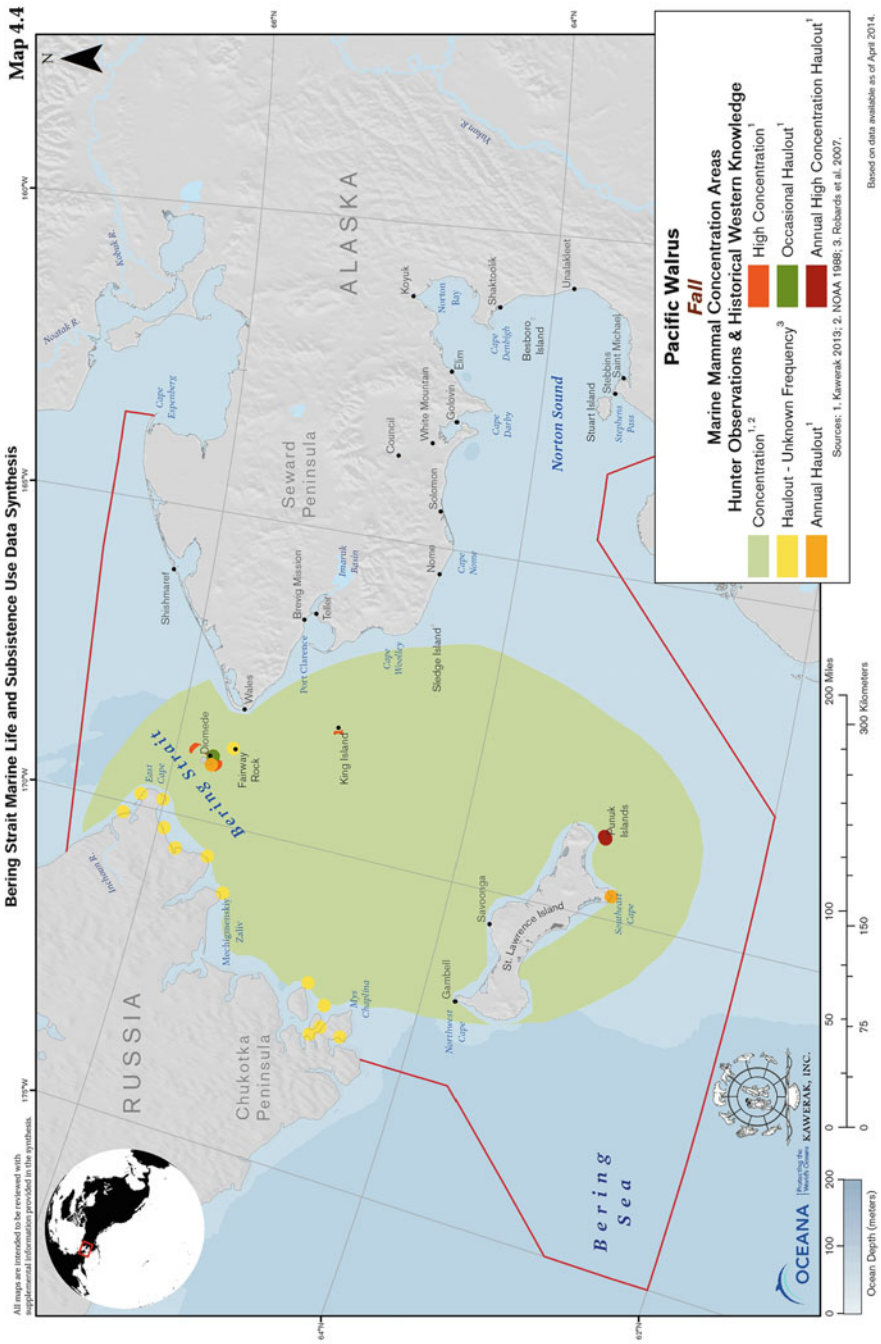

Fig. 5 Pacific walrus concentration areas during the fall (originally published by Oceana and Kawerak 2014; published with permission of Oceana and Kawerak. All Rights Reserved)

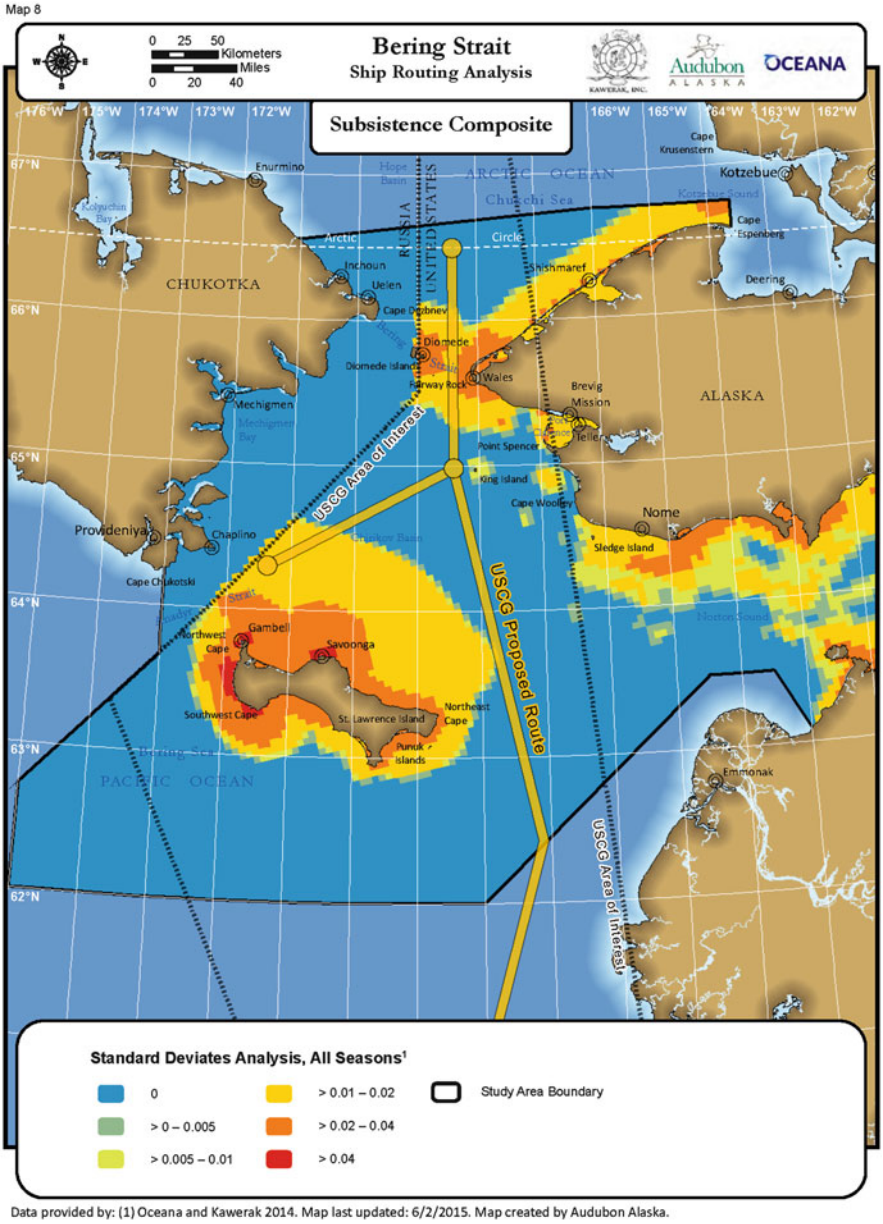

Fig. 6 Composite map of documented subsistence activity areas in the Bering Strait region (originally published by Audubon Alaska et al. 2015; courtesy of Melanie Smith of Audubon Alaska. All Rights Reserved)

illustrates how vessel traffic is and likely will continue to take place in highly sensitive marine areas. These areas are used by hunters in small boats (typically small, open, aluminum skiffs around 18 feet in length) carrying out subsistence activities and are also the main migration routes used by various marine mammals in their annual migrations. Any increases in traffic or associated noise, pollution or other disturbance in the region is of great concern, as is discussed further, spatial information from the region, such as was documented by Kawerak and in Kawerak and Oceana's Synthesis, has also recently been reviewed and updated when Kawerak and region Tribes cooperated with Audubon Alaska (Smith et al. 2017; Oceana and Kawerak 2014; Kawerak 2013a).

One final map that illustrates some of our recent research relevant to vessel traffic is of Bering Strait ocean currents (Fig. 7). This map includes information from experts from three Tribes and illustrates Bering Strait area ocean currents, as well as other marine features, such as areas where pressure ridges typically form. Marine animals also follow these currents throughout the year. There is a guide that goes along with this map that explains each of the features on it (see Raymond-Yakoubian et al. 2014). The project that this map is derived from highlighted Tribal concerns about hazardous materials spills, ship discharges, ships not under control and other situations where vessels or materials may be transported by currents to particularly sensitive places where people do not want them to go. Tribes wanted their knowledge about currents documented for accident and spill planning and response purposes.

Kawerak partners and collaborates with various organizations, agencies, bodies and researchers when we believe such relationships will benefit our Tribes. The determination of who to partner with and when is a decision made by Kawerak Administration and staff and is carefully considered and discussed. Inappropriate use or misuse of data (be it in spatial, numerical, narrative, photographic or other formats) is always Kawerak's major concern. Decisions are made based on a variety of considerations including availability of funding, shared values and goals, Tribal interest, Kawerak's own institutional capacity to partner, and other factors. Relationship building can be complicated and difficult at times, and it is crucial to have the terms of the collaboration clearly laid out ahead of time, to revisit them periodically, and to have an open dialogue throughout.

3 Indigenous Community Concerns

Many indigenous community concerns regarding arctic vessel traffic were noted above in relation to work recently completed by Kawerak and illustrated in the maps from that work. Those concerns are discussed below in additional detail.

Indigenous concerns primarily, but not exclusively, relate to the health of the marine environment and the health of marine resources that people harvest for subsistence. Marine resources are critical to Bering Strait region indigenous

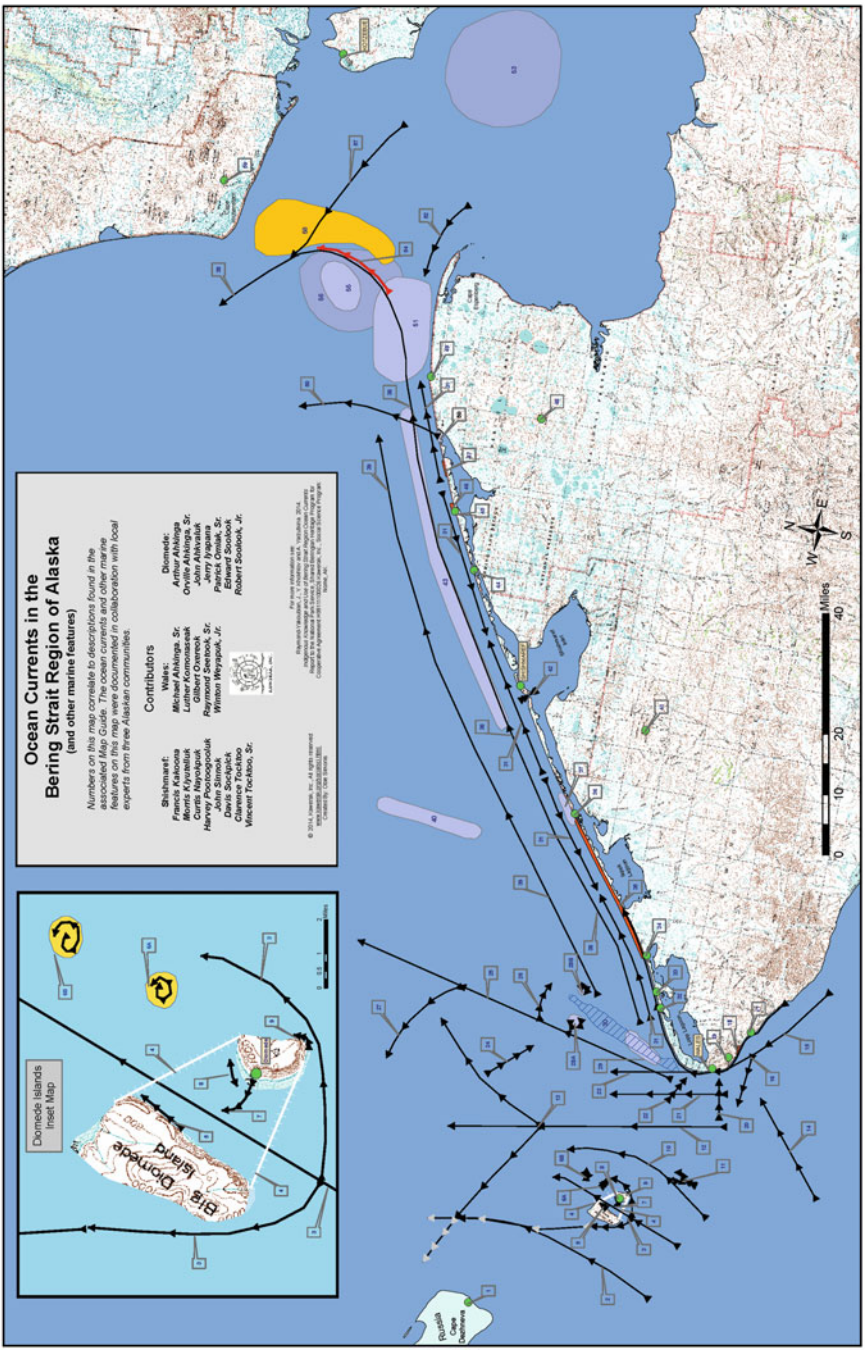

Fig. 7 Map of Bering Strait ocean currents (originally published by Raymond-Yakoubian et al. 2014; published with permission of Kawerak, Inc. All Rights Reserved)

communities for a variety of reasons,[3] as outlined below (see also, e.g. Gadamus 2013; Raymond-Yakoubian et al. 2014; Raymond-Yakoubian and Raymond-Yakoubian 2015; Raymond-Yakoubian 2013, 2015).

Cultural Marine-based subsistence activities encompass important cultural traditions related to language, dance, spirituality, eating, food preservation, cultural values, and individual and group senses of identity. This includes indigenous languages used during the harvest and processing of foods, the practice of cultural values such as sharing and not wasting, and a sense of identity and belonging derived from participating in traditions that have been passed down for millennia.

Social Marine foods play an important role in intergenerational relationship-building, knowledge transfer, and in the maintenance of ties between communities and within communities. Foods are often processed by groups of people of varying ages. For example, elders may supervise the butchering and distribution of a whale by younger adult community members. The distributed meat and blubber may then be processed by adults with young children observing or participating. These types of interactions not only pass on Traditional Knowledge and skills about food processing, preparation and other topics, but also foster relationships between generations. The sharing and exchange of foods also supports the maintenance of relationships between households within a community and between communities by promoting social interactions and communication.

Nutrition and Well-Being Marine foods harvested by Bering Strait indigenous residents are healthy and nutritious, and are also culturally preferred foods. The activities associated with harvesting and processing marine foods are important for both physical and mental health. Being physically active in the conduct of subsistence activities promotes physical health and many individuals report that such activities also increase positive feelings of mental well-being.

Economics Marine foods play a large role in household and community economies, as well as regional economies. Marine subsistence foods are consumed in large amounts by some individuals and households and are widely exchanged between households (e.g. Ahmasuk et al. 2008; Magdanz et al. 2007). Additionally, the more marine or other subsistence foods a community has, the less store-bought food is needed. Store-bought food is very expensive in rural Alaska and can be a significant household expense.

Kawerak's Marine Program has convened several gatherings with representatives from region Tribes and city governments to discuss vessel traffic-related issues. These gatherings and their associated reports (Kawerak 2015a, 2016, 2017) identified a variety of concerns shared by regional representatives. Additional concerns have been identified through further discussions with Tribes regarding specific

[3] Some of the below was presented at the Bering Strait Voices on Arctic Shipping workshop held in Nome, Alaska September 14–15, 2014 and was included in the workshop report (Kawerak 2015a).

actions or development activities or actions, such as the creation of a vessel traffic routing system by the USCG. Some of these concerns are outlined below:

- Spills and pollution (air pollution and water pollution, including the discharge of ballast water or other materials): because of their impact on the health of the marine environment and species harvested for subsistence.
- Vessel groundings: because of their potential for spilling hazardous materials which would then impact the health of the marine environment and species harvested for subsistence.
- A lack of true accident/spill response capability located in the Bering Strait region: because of the possibility of emergencies escalating due to the current long response times and the lack of response materials (e.g. boom, etc.) located along the northern Bering and southern Chukchi Sea coastlines.
- Vessel interactions with marine mammals (ship strikes or other interactions): because of the possibility of negative impacts to individual marine mammals or their broader populations.
- Increase in noise: because it may cause changes to animal behavior, including migration patterns, which may make it more difficult for communities to harvest animals.
- The possibility of large vessel interactions with small boats (boats with hunters, fishers, or travelers): because of safety concerns for the small boats, including vessel collisions and disturbances to subsistence activities (e.g. interference with hunts).
- The proximity of the USCG proposed vessel traffic route to King Island: because of the possibility of spills or other accidents that may negatively impact the environment around the Island, the animals that use that area, and the subsistence and cultural activities that take place there.
- The proximity of the USCG proposed vessel traffic route to Northeast Cape (on St. Lawrence Island): because of possible interference with bowhead whale migration routes and bowhead whale hunts.
- Communications between vessels and coastal communities: communities are concerned that they will have difficulty contacting large, transiting vessels if needed (e.g. to alert them to the locations of small boats).
- Communications between vessel regulatory or monitoring bodies and communities: communities would like a system to be in place for two-way communication to ensure that they are aware of what is happening in waters adjacent to them.
- The capacity for region residents to participate meaningfully in important venues related to vessel traffic management, monitoring and regulation: Tribes and communities feel as though it is difficult to have their voices and concerns heard and would like more mechanisms through which they can meaningfully engage with the various entities involved with vessel traffic management, monitoring and regulation.
- Cumulative threats and pressures (from vessel traffic and other sources): The cumulative impacts of the above noted concerns, and others, have the potential to greatly impact Tribes and the marine environment.

Fig. 8 The village of Wales, Alaska, located at Cape Prince of Wales on the Bering Strait, approximately 50 miles from Russia (copyright Vernae Angnaboogok, published with permission. All Rights Reserved)

These concerns are serious and of great importance to indigenous communities in the Bering Strait. There are, however, many other developments related to increasing vessel traffic that are currently impacting or have the potential to impact indigenous communities in the region. These other, cumulative impacts include: offshore oil and gas exploration and development; the potential for large commercial fisheries to move northward; salmon bycatch by the Pollock fishing industry; seal and walrus Endangered Species Act issues; offshore gold mining; research activities; climate change and its various impacts (see also, Kawerak 2013b; Raymond-Yakoubian and Raymond-Yakoubian 2017; Raymond-Yakoubian 2015). The cumulative impacts of all of these pressures and threats can be difficult to deal with and strain the capacity of Tribes, Tribal organizations, and communities as a whole. Taken in conjunction with increasing vessel traffic, and risks that such traffic poses, communities are faced with potentially serious challenges to their food security and cultural traditions (Fig. 8).

One of the main reasons these activities are all considered threats and pressures is because they are, or have the potential to, impact the food security of Bering Strait indigenous communities. Food security encompasses all aspects of Inuit culture and tradition and is synonymous with "environmental health" (ICC-Alaska 2014, 2015). Any one of the concerns noted above, or combinations of such concerns, have the potential to impact food security by limiting access to healthy, uncontaminated,

Fig. 9 The village of Diomede, located on Little Diomede Island, as seen from the helicopter landing pad during winter (copyright Meghan Topkok, published with permission. All Rights Reserved)

traditional foods and the distinct cultural traditions and practices associated with them.

For the residents of the region, even a small accident could have large-scale, long-term, intergenerational consequences. For example, even a small oil spill near a seal haul out could lead to the death of adult seals and pups, and could lead to the abandonment of the haul out, which could mean a community no longer has access to that food source. The cumulative effects of pressures on communities must be taken into account, and when they are it will become very clear that a precautionary approach to the Bering Strait region is needed (Fig. 9).

4 Measures to Address Indigenous Concerns

Many of the concerns noted above can be addressed by various means. On a broad scale, the Polar Code is, of course, a very positive step towards addressing these concerns, though additional measures have been proposed by Bering Strait region Tribes (and others). Other measures that could be taken include but are not limited to the following (see also Audubon Alaska et al. 2015; Kawerak 2015a, b).

Consultation: Consultation with indigenous peoples needs to be increased and formalized across the Arctic. Bering Strait Tribes and other Tribes in the U.S. Arctic have both a right and a strong desire to be consulted on a government-to-government basis (as provided by federal regulation, e.g. Federal Register 2000) about vessel

traffic as well as other activities (e.g. Raymond-Yakoubian 2012; Raymond-Yakoubian et al. 2017), in addition to being consulted and having decision-making power at an international level. Consultation is just the first step in creating truly productive relationships and effective decision-making; we must go beyond consultation to have true equity.

Discharge: Indigenous communities in the Bering Strait want the entire Bering Strait region (which has not been formally defined by Tribes or internationally) to be a zero discharge zone. This would apply to ballast water, organic materials, oily water discharges, black and grey water, trash, and any other materials. Eliminating discharge in the region would help address concerns about pollution; specifically about marine animals becoming contaminated and people consuming them, but also in general for the health of the environment. This would also include strict standards on black carbon emissions.

Vessel Routing: Based on information from region Tribes, Kawerak and others have recommended that the USCG proposed vessel traffic route be moved further west and away from King Island because of its importance as a marine mammal hunting and haul out area and its cultural significance for King Island Tribal members. We have also recommended that the proposed route be moved slightly east in the vicinity of Northeast Cape on St. Lawrence Island because of that area's importance for subsistence activities.

Response capacity: Indigenous communities are likely to be first responders to any accident in the Bering Strait. The lack of response-oriented facilities and the small amount of response equipment currently in the region is inadequate for any major spill response. The nearest U.S. Coast Guard base is also located thousands of miles from the Bering Strait. Communities would like additional response equipment to be placed throughout the region and they would also like to receive training in the use of such equipment. The lack of infrastructure to address vessel-related concerns, such as waste disposal facilities, also needs to be addressed.

Speed limits: Indigenous communities are also concerned about marine mammal interactions with vessels, which could be catastrophic for animals. Speed limits should be created to offer some protection against vessel strikes for whales and walruses with calves, in particular. Speed limits may also reduce the amount of noise produced by vessels, creating less disturbance for marine animals.

Areas to be avoided (ATBA) and Protected Areas: Kawerak and Tribes have requested ATBAs in the waters around King, St. Lawrence Island, and in the Bering Strait proper. ATBAs should be located such that they do not impair the passage of transiting ships, but do protect the important characteristics of each area. Some of these ATBAs have been designated and others are likely to be in future.

Bering Strait Tribes have recognized the unique and globally important characteristics of the region. Protected areas have been discussed and proposed by region residents and others for many decades (e.g. Raymond-Yakoubian 2015). Some 'protected areas' have existed for some time, such as the Arctic Management Area (which currently prohibits commercial fisheries within the management area), for example (NMFS 2009; NPFMC 2009). In December 2016 President Obama, via Executive Order 13754, established the Northern Bering Sea Climate Resilience

Area (NBSCRA) (Federal Register 2016). The NBSCRA was supported by over 70 federally recognized Tribes (including Kawerak region Tribes), created a Federal Task Force and Tribal Advisory Council, and specifically directed Federal agencies to "consider traditional knowledge in decisions affecting the Northern Bering Sea Climate Resilience Area" (ibid.). This action was revoked by President Trump in April 2017 (Federal Register 2017). Re-implementing a similar Area and process, through consultation and equitable collaboration with Tribes, would be an important step towards giving Tribes authority and control over their maritime homelands.

Communications: A communication system should be established under which traffic in the Bering Strait is monitored in real-time. This system should also allow for weather and other information to be transmitted easily between ships, communities, and the shore. A communication system which includes vessel monitoring would help in preventing ship groundings, responding to vessels not under command, and in response to accidents, spills or other events. Communities also need free and unlimited access to Automatic Identification System information. This will allow hunters, fishers and travelers to better plan ocean travel and avoid large vessels that may be transiting offshore from their communities.

Traditional Knowledge: The use of Bering Strait communities' Traditional Knowledge (such as that documented by Kawerak and other entities) to address their concerns, as well as concerns of the shipping community is vital. Indigenous residents of the Bering Strait region have built (and continue to build) a body of detailed knowledge relating to the marine environment, based on first-hand experience, for many generations. If indigenous communities are consulted and included in decision-making this vast body of Traditional Knowledge will be accessible and can be used to formulate effective monitoring and management of vessel traffic and other activities in the region. Indigenous communities must be meaningfully and equitably involved in order for this to be successful.

5 Conclusion

This chapter reviewed some of the recent work carried out by Kawerak in collaboration with Bering Strait region Tribal communities and non-tribal partners. Much of this work, through its documentation of Traditional Knowledge, Tribal concerns, and suggested paths forward, is of direct relevance to vessel traffic activities. Indigenous residents of the region have millennia long connections to the marine environment, and a vast and important body of knowledge and experiences from those connections. This experience and knowledge can directly contribute to discussions about vessel traffic.

While Tribal communities in the region have many and serious concerns related to shipping activities, some of which are shared by others outside the region, they also have many valuable recommendations for addressing these matters.

Indigenous residents of the Bering Strait region are at ground zero for vessel traffic activity, climate changes, and a myriad of other developments. These

communities bear the burden of risk (Kawerak 2015a) associated with these changes, developments and activities, and are in jeopardy of having important cultural traditions and practices negatively impacted or destroyed if the global community does not tread carefully and thoughtfully. Indigenous concerns and solutions must be considered at all points along our collective effort towards safe Arctic shipping.

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