

COASTAL VOICES

LESSONS LEARNED AND RECOMMENDATIONS ON REVITALIZING OUR
RELATIONSHIP WITH SEA OTTERS, KELP FORESTS AND COASTAL FISHERIES

"The concept we are trying to spread is the idea of preparing for the arrival of sea otters by protecting and sharing our food sources. Our goal is to figure out what role humans played in the past and what role are we going to play in the future in protecting our coastal ecosystems. How do we adapt to and prepare for the arrival of sea otters?"

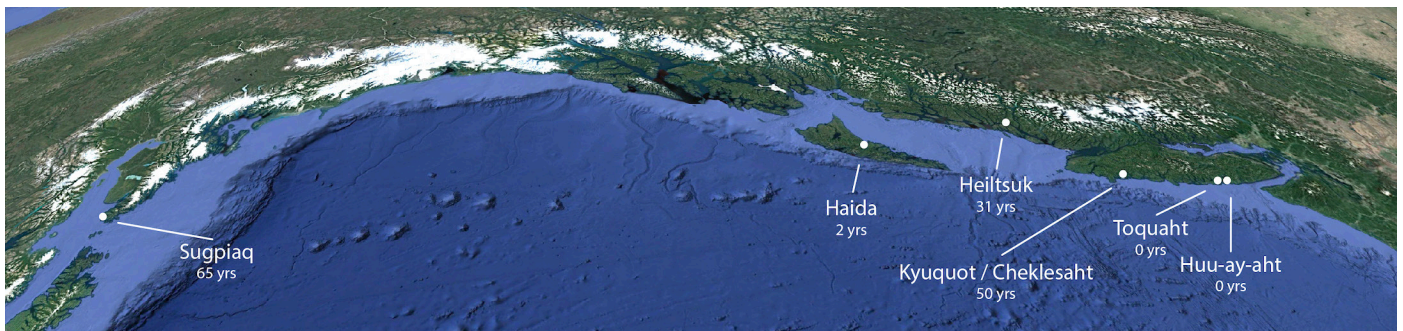
*Hup-in-Yook, Tom Happyhook
Hereditary Chief, Huu-ay-aht Nation*



SHANE STAGNER

WHO ARE WE?

We are a collective of Hereditary Chiefs, Indigenous knowledge holders, elected representatives and university researchers working together to gather traditional knowledge and scientific information on how coastal communities can protect their seafood and support thriving coastal ecosystems with the recovery of sea otters, a well recognized shellfish predator and major architect of marine ecosystem change.



Indigenous communities that we interviewed as part of Coastal Voices and the number of years they have experienced sea otter recovery.

OUR GOALS

1

Collect ancient knowledge and western scientific information about the relationships between sea otters, kelp forests and people;

2

Diversify the sources of evidence and expand the time horizon over which these relationships are examined;

3

Collect information from Indigenous communities and rocky reefs experiencing various stages of sea otter recovery. Contrast these impacts in a 'space-for-time-substitution', allowing communities and scientists to peer into the future, anticipate forthcoming changes, and prepare well informed adaptation strategies;

4

Expand our knowledge of the different worldviews, values and objectives associated with coastal conservation and management broadly, and sea otter recovery more specifically;

5

Share this information between coastal communities, managers and policy makers to inform marine stewardship decisions that are both ecologically sustainable and socially just.

OUR GOVERNANCE

Our research and online learning platform, coastalvoices.net¹, are guided by a steering committee of Hereditary Chiefs representing 19 coastal First Nations and Tribes in British Columbia (BC) and Alaska. We intentionally sought the consent and guidance of Hereditary Chiefs as they are the rights holders and descendants of the original, deep time leaders who were responsible for managing the relationships between people, lands and waters prior to the incursion of settler-colonial laws. By upholding

ancient Indigenous decision-making protocols, this approach models a new way to co-produce policy-relevant science that supports Nation-to-Nation environmental governance and equitable research and knowledge transfer processes that align with the United Nations Declaration on the Rights of Indigenous People (UNDRIP)².



“Our ancestors had a way of managing our relationship with sea otters, they had a place in the ecosystem. With today’s laws there is a delicate balance and Indigenous people need to be a part of the discussion regarding their management.”

- Skil-Hiilans Allan Davidson
Hereditary Chief, Haida Nation

SEA OTTER RECOVERY:

THE CHALLENGES & OPPORTUNITIES



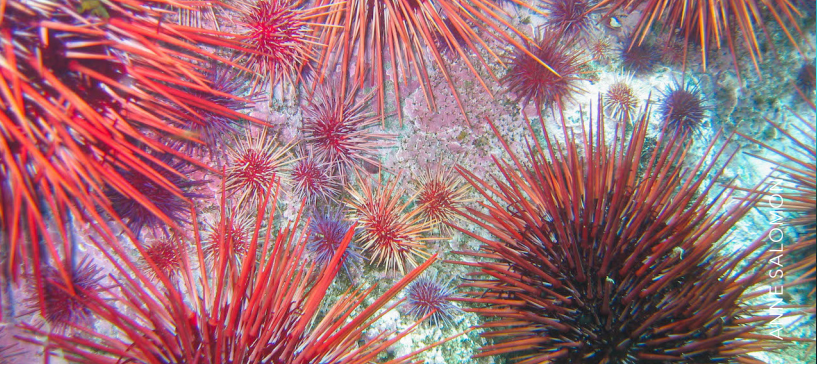
The late Alex Short
Elder, Kyuquot/Cheklesah Nation

“People have to understand how valuable the sea otter is to our people. We have great histories. We have been with them for years and years, thousands of years. Big chiefs use sea otters to recognize a great chief amongst our people. The sea otter can bring back all the histories of people before.”

- Tsah-seets Stanley Sam
Elder, Ahousaht Nation

The Pacific maritime fur trade of the 18th and 19th centuries had profound effects on the ecosystems, social systems and management systems of North America’s northwest coast, leaving a set of interconnected challenges we continue to grapple with today³. The global trade in sea otter pelts starting in the late 1700s not only caused the elimination of sea otters from much of the Northwest Coast, it opened the door to colonial settlement, economies and laws. Colonization of North America, justified by the discredited notion of *terra nullius* and the Doctrine of Discovery, along with disease epidemics which reduced Indigenous populations by 80-90%, led to the dispossession of Indigenous land, stewardship practices and well-established trade networks that had been in place for millennia³. Although Indigenous people valued, hunted, controlled and coexisted with sea otters for well over ten thousand years^{4,5}, by the mid 1800s, sea otters became functionally non-existent due to intense commercial overexploitation driven by markets overseas.

Populations of sea otters began to recover along some stretches of Alaska and BC’s coastlines throughout the mid to late 1900s both naturally, due to government protection measures, and via intentional translocation.



ANNESALOMON



ROWAN TREBILCO

Sea otter recovery causes reefs to flip from being covered by sea urchins to being covered by kelp.

Recovery began along the southcentral coast of Alaska, traditional territory of the Sugpiat, as early as the 1950s via natural range expansion. In BC, sea otters were intentionally translocated from the Aleutian Islands to the west coast of Vancouver Island, traditional territory of the Kyuquot/Cheklesah Nation, without consultation. Through a cascade of effects, recovery of this keystone predator has caused high latitude shallow rocky reefs to tip from being covered by sea urchins to being covered by kelp.

“More otters are good for the herring and for other little fish.”

- Richard Gillette
Kyuquot/Cheklesah Nation

that challenge coastal communities. Where sea otters are absent, their shellfish prey such as sea urchins, abalone, clams and crabs flourish, supporting local food security, food sovereignty and commercial fisheries.

Where otters are present, these shellfish plummet in both numbers and size while kelp forests expand in size and depth. These underwater forests provide habitat, create food, calm seas, catch larval fish and shellfish, reduce coastal erosion, create safe passage, and soak up carbon from our atmosphere. While these indirect ecosystem effects are beneficial, they come at the cost of dramatically reduced numbers of shellfish, a critical source of food for coastal Indigenous communities who are among the poorest and most food insecure in North America.



ILJA HERB

We had big clam beaches in Kyuquot, Actis. We used to just go down the beach, dig what we want to eat. No more clams. That’s when k’wak’wala [sea otter] came around. Ate up all the clams.”

- Saq’wistl Hilda Hanson
Elder, Kyuquot/Cheklesah Nation

Because the effects of recovering sea otter populations are rapid, strong, direct and indirect, their return causes profound social, cultural and ecological trade-offs

Today, sea otter conservation and coastal fisheries management challenges exist in part due to the protected status of sea otters, the inequitable distribution of their ecosystem costs and benefits across society, and the inconsistency and hesitancy of federal governments to uphold the rights of Indigenous people to access, manage and economically



“It’s all about balance. The question is, will the balance return while the growing population of sea otters are still under the Species at Risk Act?”

- Wii-tsts-koom Anne Mack
Hereditary Chief, Toquaht Nation

benefit from marine fisheries more broadly. These challenges, moreover, are playing out amid great uncertainty due to a rapidly changing climate.

Navigating these challenges and devising solutions hinge on our understanding of historic baselines and the vast ripple effects sea otters trigger across coastal

ecosystems, our appreciation of the different worldviews, values and objectives held by all people, and the willingness of decision makers to engage in equitable Nation-to-Nation ocean governance^{3,6-8}. Current sea otter recovery planning, however, is playing out within a political, scientific, and conservation context driven primarily by western worldviews and values, and centralized federal decision-making. Our Coastal Voices collaboration aims to broaden this dialogue and solution space.

The challenges associated with the return of sea otters to the traditional territories of coastal First Nations and Tribes are emblematic of environmental decision-making conflicts occurring across Canada and the United States. However, vast opportunities exist to weave traditional and scientific knowledge into ocean management plans and shift ocean governance arrangements and decision-making authority towards a place that is more ecologically sustainable and socially just.

“I believe there is more than one factor that stops us from coexisting with the otter, and that’s the no-consultation with our people by the federal government and the responsibilities that have been taken from us as a people.”

-The late Hiišiiqwth Natalie Jack
Beach Keeper and Educator
Kyuquot/Cheklesah Nation

WHAT HAVE WE ACCOMPLISHED?

SYNTHESIZED PAST RESEARCH ON SEA OTTER-HUMAN RELATIONSHIPS

To begin our work together and identify research gaps, we co-authored a book chapter³ that synthesized and analyzed previously published Indigenous and scientific knowledge on sea otter-human relationships. This publication summarizes archaeological evidence, historical records, traditional knowledge and contemporary ecological data to illuminate how coastal First Nations used, managed and conserved sea otters.

CONVENED A TRANSDISCIPLINARY WORKSHOP



Hup-in-Yook, Tony Hansen, Tim Tinker, and Anne Salomon discuss how Indigenous sea otter hunting practices could be revitalized today.

In June 2014, we held a 5-day workshop with 41 coastal marine experts, including Indigenous knowledge holders, Hereditary Chiefs, marine resource managers, archaeologists, social scientists, and ecologists from Alaska, through BC, to California, to discuss past, present and future social-ecological trade-offs triggered by the recovery of sea otters. We engaged in dialogue and produced a report documenting traditional and scientific knowledge about ancient use and management of sea otters, and contemporary barriers and opportunities to adapt to this predator's return⁶. Based on this knowledge sharing, we began to envision sustainable, just and equitable ways to coexist with sea otters into the future.

CO-PRODUCED A SHORT DOCUMENTARY FILM

We produced a 10-minute film documenting the social-ecological changes triggered by sea otter recovery. This film showcases the diverse knowledge systems and unique worldviews and values held by Indigenous leaders and knowledge holders and renowned sea otter and resource management scientists.



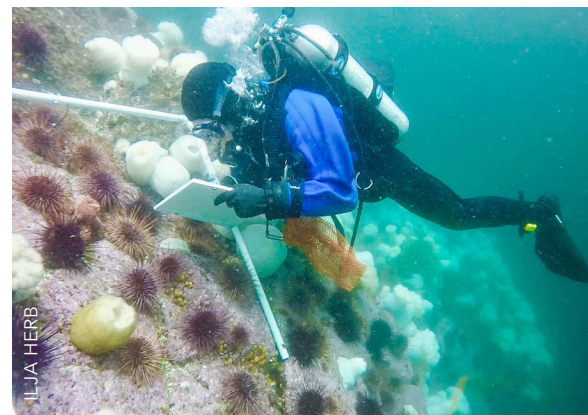
Gitkinjuaas shares his knowledge in the documentary, Coastal Voices; Navigating the Return of Sea Otters.

CREATED AN ONLINE LEARNING PLATFORM

We created coastalvoices.net, an online learning platform and website, to house our documentary film, research products, photo journal, blog and video room, where visitors can listen to a diversity of Indigenous voices and university researchers reflect on ancient use and management of sea otters, contemporary challenges, and the value of bridging Indigenous and scientific knowledge¹.

GENERATED NEW DATA AND KNOWLEDGE BY DIVING INTO BC'S KELP FORESTS

Ten students and our Indigenous research partners completed four field seasons of diving among BC's central coast kelp forests varying in sea otter occupation time. This field work, supported by additional grants, has formed the basis of 6 theses and 8 scientific papers.



Jenn Burt surveying a sea urchin barren off BC's central coast.

GENERATED NEW DATA AND KNOWLEDGE BY DIGGING INTO THE PAST



Iain McKechnie (left), Denis St. Claire (top), and their field crew excavating in Tseshaht territory.

We measured the size of ancient mussel shells harvested by people for over 3000 years dug up from shell middens from BC's coast and compared them to the size of mussels found today along shorelines varying in sea otter presence. Because sea otters eat mussels and reduce the number of large mussels remaining on the shore to be harvested by people, we could compare historic and modern mussel sizes to estimate ancient sea otter presence along our coast in deep time. These methods and findings are synthesized in a scientific paper⁹.

COMMUNICATED VIA RESEARCH VIDEOS, PUBLIC NEWSLETTERS AND FACEBOOK POSTS

We created short research videos, made newsletters and wrote Facebook posts to keep Indigenous communities, collaborators and the public abreast of our research activities.

HELD KNOWLEDGE EXCHANGES AMONG INDIGENOUS LEADERS



Hereditary Chief of BC's Toquaht Nation, Wii-tsts-koom, learning from Sugpiaq knowledge holder in Alaska.

To share knowledge of the social-ecological changes caused by sea otters along with the deep time, ancestral strategies for coping with them, we held community exchanges among Indigenous Nations and Tribes who were among the first to experience sea otter recovery and those anticipating sea otter expansion into their territorial waters. Haida and Nuu-chah-nulth Hereditary Chiefs visited the Sugpiaq villages of Port Graham and Nanwalek in Alaska, that have been experiencing unassisted sea otter recovery since the late 1950s, and to the Nuu-chah-nulth village of Kyuquot/Checkleset in BC, that has been experiencing sea otter recovery since the early 1970s.



Left: Conducting surveys in Kyuquot, BC. Centre: Kii'iljuus presenting Coastal Voices research in Sweden. Right: Wickaninnish speaking at the 2019 PEW Fellows meeting in Sooke, BC.

SURVEYED COMMUNITY MEMBERS TO DISCOVER ADAPTATION STRATEGIES

We interviewed residents from Port Graham, Nanwalek and Kyuquot/Checkleset to learn about the social, ecological and regulatory conditions that affect their ability to adapt to sea otter recovery and the rapid system-wide changes they trigger. These survey results were analyzed and published in a scientific paper that summarizes key factors that enable human and sea otter coexistence⁸.

ORGANIZED TWO INTERNATIONAL SYMPOSIA

We organized symposia at the 2017 Resilience conference in Stockholm, Sweden and the 2019 Pew marine fellows meeting in Sooke, BC to exchange knowledge among Coastal Voices affiliates and the broader marine conservation policy and sustainability science community¹⁰.

SPOKE AT INTERNATIONAL AND NATIONAL CONFERENCES AND COMMUNITY MEETINGS

Collectively, our research team has given over 25 talks at international and national conferences, Hereditary Chief councils, and coastal community meetings.

GENERATED MEDIA ATTENTION AND REPORTING

Our research team has helped generate diverse media coverage of sea otter recovery in Science News, The Globe and Mail, Maclean's Magazine, the CBC, Canadian Wildlife, the BBC, National Public Radio in the US, and local community papers and podcasters.

WHAT ARE OUR KEY FINDINGS?

LESSONS PASSED ON FROM THE ANCESTORS:

1. Among coastal Indigenous communities in BC and Alaska, ancestral governance protocols, management practices and social norms guided harvest and stewardship practices of coastal resources to sustain their use and equitable distribution among people. Foremost among these practices was the proprietorship of discrete coastal spaces by Hereditary Chiefs for their clans that was contingent on the sustainable use and management of the lands, waters and all that was encompassed within these seascapes^{1,3,6,11}.



Ancient clam garden on BC's central coast.

2. Archaeological evidence shows that sea otter hunting was widespread and sustained among coastal Indigenous communities in BC throughout the Holocene. Specifically, the ubiquity and chemical signature of sea otter bones found in shell middens provide evidence that humans and sea otters co-existed for at least 10,700 years prior to the 18th and 19th century commercial maritime fur trade^{4,5}.

3. Indigenous knowledge from BC and Alaska reveals that Chiefs managed the relationships between people, sea otters and coastal fisheries, with advice from knowledge holders. Sea otter hunting was strictly controlled by Chiefs with the dual goals of protecting shellfish harvesting areas and sea otters themselves. Spatially-explicit sea otter hunting protocols, monitoring, active sea otter deterrents, negotiations with neighboring Chiefs,

habitat enhancements like clam gardens, and trade of shellfish, finfish, and seaweed between communities were some of the ways by which Chiefs intentionally regulated sea otter impacts to ensure access to food, medicine and materials for the people of their villages. Sea otters were deliberately excluded by humans from areas protected for shellfish harvest and cultivation by people^{1,3,6,12}.

4. Archaeological evidence retrieved from shell middens from BC's coast containing 3,000 years of mussel harvests, shows that Indigenous communities in the past maintained access to significantly larger mussels than those found at shorelines with high sea otter numbers today. This provides evidence that sea otters and their predatory impacts on shellfish were minimized in some coastal areas and maintained below carrying capacity, the maximum number that the environment could have sustained, especially near shellfish harvesting areas⁹.

5. Taken together, our archaeological research and the traditional knowledge we collected provide strong evidence for the hypothesis of a spatial mosaic of sea otter populations along the Northwest Coast in deep time. Close to human settlements, sea otters would have been kept away via hunting and fear itself, whereas viable sea otter populations would have persisted

far from villages. Over a region, this would have led to persistent populations of sea otters but at overall lower densities and more patchily distributed than we see today. This is consistent with evidence from Alaska¹³ and elsewhere in BC^{4,5}. A patchy distribution in sea otters would have led to a spatial mosaic of both productive kelp forests and shellfish beds. Thus, traditional sea otter hunting practices provide insight into ways we can manage the trade-offs associated with sea otter recovery today^{3,6,7}.



“The way our people did in the past, is that they kept [sea otters] away from where we were, close by, like all around the islands out here. They hunted them there and kept them off the sea urchin beds so they didn’t take everything. It could be done again.”

- Waakitaam Peter Hanson
Chief, Kyuquot/Cheklesah Nation

LESSONS FROM SEA OTTERS AND KELP FORESTS TODAY:



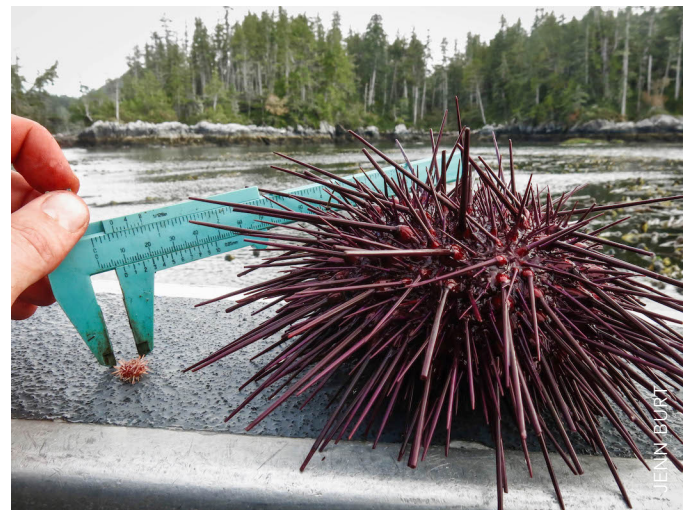
“You can’t manage out of ignorance. You have to know what species do, whom they eat, what role these prey species play. When you know that, you can begin to make some intelligent decisions.”

-The late Robert T. Paine
Professor Emeritus, University of Washington

1. Sea otters target increasingly diverse and smaller shellfish prey the longer they have occupied a stretch of coast¹⁴. By reducing both the number and size of sea urchins, sea otters decrease the rate at which urchins eat kelp¹⁵.

2. The return of sea otters to rocky reefs along the central coast of BC caused a 89-98% drop in the number of large sea urchins, converting sea urchin-dominated reefs to kelp-dominated reefs within 1 year¹⁶. Sea otters are however, not the only sea urchin predator. Sunflower sea stars eat small and mid-sized urchins. Consequently, sea star wasting disease associated with the 2015 marine heat

wave reduced sunflower sea stars by 90% along BC’s central coast which contributed to a 300% increase in medium-sized urchins and a 30% decline in kelp¹⁶.



Measuring the size of sea urchins is as important as counting their numbers.

3. The response of reef fish to sea otter recovery varies by species. The amount of copper rockfish caught by hook and line was 3 times higher on rocky reefs occupied by sea otters for over 17 years where kelp habitat was greater, compared with shorter occupied and sea otter absent reefs where kelp habitat was smaller. In contrast, the catch of kelp greenling was not affected by sea otter occupation time¹⁷.

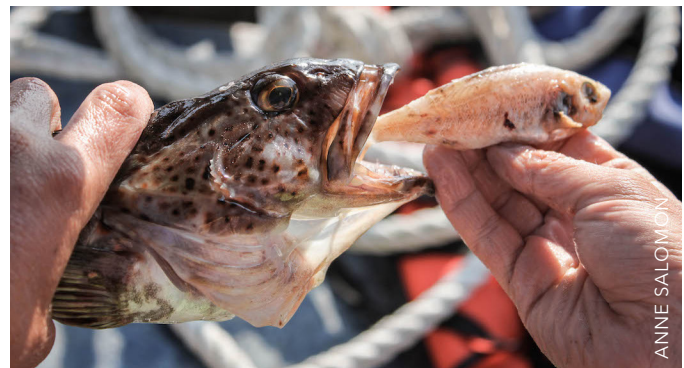


Black rockfish hover over a rocky reef off BC's central coast where sea otters are absent.

4. The number of abalone found openly exposed on rocky reefs occupied by sea otters for over 30 years was 16 times lower compared to sites where sea otters have yet to recover. In contrast, the number of abalone hiding in crevices almost doubled at these long sea otter occupied reefs¹⁸. Moreover, these endangered marine snails were found at deeper depths and were smaller at reefs exposed to long sea otter occupation times compared to reefs without sea otters. While sea otters directly reduce the number and size of abalone, they also

indirectly benefit abalone by reducing predation by sunflower sea stars and by increasing the amount and depth at which kelp provides food and habitat for this culturally important snail.

5. The longer sea otters occupy a stretch of coast line, the greater the number of feeding links occur in kelp forest food chains¹⁹ and the greater the diversity of coralline algal species - the pink crust often found on rocky reefs²⁰. Coralline algae are known to provide important settlement cues for the 'seed' (larva) of shellfish such as abalone. Food webs that are more biologically diverse in their number of species and feeding links have been found to be more resilient to disturbances, such as climate change and commercial harvest.



Near the top of marine food chains, lingcod will eat any fish they can squeeze into their mouth.

6. Warmer ocean temperatures slow kelp recovery rates following harvest, suggesting future increases in ocean temperature threaten kelp forest resilience to harvest by humans and grazing by sea urchins²¹.

LESSONS FROM INDIGENOUS COMMUNITIES EXPERIENCING SEA OTTER RECOVERY:

Food Security and Collaborative Management are Priorities

“If we could have a little bit of control and have a little bit of say in how we utilize and live with the sea otters in our backyard. I just really hope for a better future for both sides - the sea otters and us- cu’ahs people”

-Naasq^{wa} Daisy Hanson
Language & Cultural Worker
Kyuquot/Cheklesah Nation



Hup-in-Yook and Violet Yeaton harvest a black leather chiton, a source of food for Indigenous people along the Northwest Coast.

1. While sea otter populations have been expanding their range through Indigenous territories, most of which are unceded in British Columbia, the outstanding issues of food security, co-management, and traditional sea otter hunting and stewardship have been largely neglected from research, management and policy conversations^{3,6-8}.

2. Ecosystem-wide shifts triggered by sea otters disproportionately impact coastal Indigenous communities that are reliant on seafood, constrained in economic opportunities, experience high rates of food insecurity and are frequently marginalized in natural resource decision-making⁸.

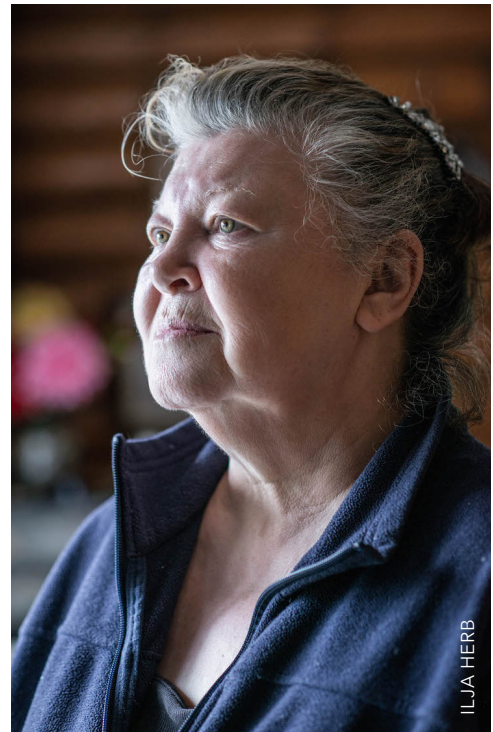
3. Access to locally-obtained shellfish are critical to Indigenous peoples’ diets and health, local food security and sovereignty, social bonding within and between communities and cultural continuity across generations⁸.

4. Sea otter recovery exposes injustices in sea otter management, and coastal fisheries more broadly. It highlights the inequities in who benefits from endangered species recovery and the ecosystem changes these predators trigger, and who bears the cost of reduced food and nutritional security^{3,6-8}.

5. In the Indigenous communities we surveyed, people prioritized access to local seafood over revenue and jobs from tourism or other forms of employment⁸. Compared to the importance of food security for themselves and their children, having more livelihood options and greater financial security were not considered as helpful by Indigenous community members in improving their coexistence with sea otters.

6. In both the US and Canada, Indigenous communities see their current authority in marine resource management to be relatively low. They stated that adapting to sea otter recovery would be improved if they had increased participation and authority in decision-making⁸.

7. A lack of trust between Indigenous communities and state/provincial and federal management agencies exists. Some people stated that traditional knowledge is not always used or respected, and that there remains a general lack of consultation, information sharing, and open communication^{6,8}.



“Jobs do not make a difference because we’ve still got to eat off the land. It’s not about jobs, it’s about our way of life”

- Nina Kvasnikoff
Elder, Sugpiaq Tribe, Nanwalek, Alaska

Sea Otter Hunting Supports Coexistence

1. Key elements that influenced the ability of the Kyuquot/Cheklesah Nation and Sugpiaq Tribes of Port Graham and Nanwalek to adapt to sea otter recovery include; an ability to hunt sea otters, the length of time their communities have been exposed to sea otter recovery, and their degree of authority in marine management decisions⁸.



“Hunting is keeping our traditions alive. That’s what’s important, that’s what we survived on, it’s how we adapted.”

- Tim Malchoff
Hunter and Education Coordinator
Sugpiaq Tribe, Port Graham, Alaska

2. In Alaska, Tribes have federally granted access rights to hunt marine mammals. Indigenous-led organizations, such as The Alaska Sea Otter and Steller Sea Lion Commission, have promoted Tribal involvement in marine mammal policy decisions, monitoring, and research. However, some of their programs have ceased due to insufficient funding and political conflicts⁸.

3. Sugpiaq community members engage in limited and non-wasteful hunting of sea otters (mostly adult males). They tag and monitor their harvest, do hunter-implemented bio-sampling, and use sea otter pelts for cultural handicrafts that provide economic benefits to the community^{1,8}.



Lydia McMullen holding up a tagged sea otter hide in Port Graham, Alaska.

4. Only a few community members of the Sugpiaq Tribes of Port Graham and Nanwalek actively hunt sea otters because pelt processing and tanning costs are prohibitive. Furthermore, federal rules constrain the sale of pelts, and severe consequences exist for overharvest. Many Sugpiaq community members feel that hunting large numbers of sea otters is unnecessary and inappropriate⁸.



Telescope used for watching sea otters forage.

5. Some Alaskan tribes have worked with local sea otter hunters to direct their subsistence hunting spatially to locally protect shellfish fisheries. Challenges exist with regards to processing pelts and finding a market. The Sitka tribe started a tannery that worked on a barter system^{6,10}.

6. First Nations in Canada are interested in revitalizing traditional hunting of sea otters as a key component of active sea otter co-management. An example of how this could work exists in the Nuuchahnulth Tribal Council draft co-management plan for kʷakʷatɫ (sea otter) in Nuuchahnulth ha'houlthee, (traditional territories)^{1,6-8}.

“Hunting provides an opportunity for people to make money. It’s a very positive thing for Native people to be able to use otter skin for arts and crafts.”

- Nancy Yeaton
Language Education Coordinator
Sugpiaq Tribe, Nanwalek, Alaska



Peoples' Environmental Values and Attitudes About Sea Otters are Diverse



Sea otter and seal fur pouch hand made by Sugpiaq subsistence expert, Lydia McMullen, Port Graham, Alaska.

1. Differences exist among Indigenous peoples' attitudes toward sea otters in part due to divergent learned values, when in their lifetime they first began experiencing sea otters, perceptions of risk, social-cultural norms and the influence of federal laws⁸.



"You just have to introduce people to what they [sea otters] are and why they were here. I keep telling them the creator put them here. And these guys keep saying "Oh no, he made a mistake". Well, you tell that to the creator!"

- Danny Short
Fisheries Technician
Kyuquot/Cheklesah Nation



“There are different viewpoints on sea otter recovery and it depends on how you’re raised and what your current ecological timeline in the reintroduction of the sea otters is.”

- Josh Anahonak
Photographer
Sugpiaq Tribe, Port Graham, Alaska

2. Community members within Indigenous villages experiencing sea otter recovery were polarized in their perspectives on sea otter-based tourism⁸. While the cost to enter the tourism industry is more than most Indigenous community members can afford, some saw tourism as a potential financial benefit. In Canada, the inability to own land and secure mortgages at equitable rates on Indian reserves are additional barriers to entering the tourism industry.

3. Diverse perspectives on sea otter recovery are not always visible at community meetings which tend to be dominated by extreme views that do not always represent the majority^{8,22}. This is often due to power imbalances among people with opposite views. Furthermore, federal acts, like the Indian Act in Canada, can create power imbalances that undermine traditional governance systems.

4. While there is agreement among Indigenous and non-Indigenous peoples that sea otters should be allowed to recover, there are divergent views and levels of acceptability around hunting as a means to reduce sea otter effects on shellfish and enable coexistence between people and sea otters⁶⁻⁸.



Sea otter and kelp paddle necklaces carved and painted by Jessie Gillette in Kyuquot.

Federal Laws & Policies Need to Uphold Indigenous Rights



“[The government] has taken away our people’s ability to manage this resource. Our hereditary chiefs had a management plan in their governing system. I think it would have helped a lot if we had been allowed to somehow hunt [sea otters] out of some areas.”

- Hupalhwatu Therese Smith,
Nuu-chah-nulth Tribal Council
Kyuquot/Cheklesah Nation

1. Relationships between coastal Indigenous people and sea otters are currently limited by the existence and discretion of federal laws. In Canada, the federal government currently maintains exclusive responsibility over sea otter management and monitoring through the Species at Risk Act (SARA) and Fisheries Act. In the US, Alaskan natives can harvest sea otters and other marine mammals for subsistence purposes and for making and selling handicrafts and clothing through a waiver to the Marine Mammal Protection Act. There is no limit to harvesting sea otters by Alaska Natives if populations are not considered depleted. The US Endangered Species Act (ESA) currently only applies to sea otter populations in southwest Alaska.

2. In Canada, sea otters were listed as ‘Endangered’ in 1978 by the Committee on the Status of Endangered Wildlife in Canada and later legally listed in 2003 as ‘Threatened’ under SARA, which protected sea otters from being captured, killed or disturbed and prohibited anyone from possessing a sea otter pelt. As the annual population growth rate slowed to 8.4% from 1996 to 2008

and 7.1% from 2009 to 2013, sea otters were downlisted in 2009 to a species of 'Special Concern' under SARA. This designation enables First Nations to apply for a license to hunt sea otters for food, social or ceremonial use through the Aboriginal Communal Fishing License Regulations, under the Fisheries Act.

3. Currently, there is no policy tool in the US or Canada that would enable the harvest of sea otters for the purpose of reducing their negative effect on shellfish¹⁰.

4. In Canada, sea otter conservation status is determined by their population trend over three generations, which is approximately 24 yrs²³. Their recovery is defined as occurring when their "long term persistence in the wild is secured". Unlike species recovery plans in the US under the ESA, recovery objectives under SARA do not include numerical population targets. In the US, sea otter recovery targets are set based on an estimated optimal sustainable population size which is scaled to a conceptual population carrying capacity, the maximum number of sea otters that can be sustained in a specific ecosystem. Both policies implicitly assume recovery targets devoid of any functional interaction with humans¹⁰. Consequently, these policies do not consider humans as components of a functioning ecosystem.



"Before the federal government and state, traditional Chiefs had the authority to send people out for anything that the village needed. But what about in the middle of the winter when you've already caught your two or one moose under the state regulations and I know there's a need for meat for our people? My traditional authority to say 'Yeah, go and get one' bumps up against 'What is the fine if we get caught?' And what's the legal ramification for exerting that traditional authority now? That's the dilemma that we're in."

-Patrick Norman
Chief
Sugpiaq Tribe, Port Graham, Alaska



“The return of the sea otter certainly raises the kinds of issues that require people to think really carefully about how they manage local ocean spaces and begin to ask these questions in another way; ‘What do we really want here?’ And that sounds like it will call for and certainly benefit from the reassertion of territorial rights on the part of the First Nations groups in this area.”

-Bonnie McKay
Professor Emerita, Rutgers University

5. Successful examples of Indigenous co-management of marine mammals by the Inuvialuit in the Canadian Beaufort Sea (beluga whales), by the Inuit people of Nunavut (narwhals), and by the Inupiat in northern Alaska (bowhead whales) provide evidence that increasing local Indigenous decision-making authority grounded in traditional knowledge and practice is possible⁸.

6. In Canada, government commitments to reconciliation with Indigenous peoples has opened the door to new federal agreements for collaborative fisheries (2019 Fisheries Resources Reconciliation Agreement) and marine spatial planning (2018 Reconciliation Framework Agreement for Bioregional Oceans Management and Protection), along with the formal adoption of UNDRIP in BC provincial legislation.

7. The recently modernized Fisheries Act makes clear that the Act is meant to uphold the rights of the Indigenous peoples of Canada²⁴. It also requires consideration of Indigenous knowledge for decisions made under the Act. Canadian fisheries regulations, policies and processes need to be re-vamped to uphold these new provisions and UNDRIP.



“I would like to believe that the federal government will be open to negotiations as to our way of life in our territories and that we can come up with a plan that will sustain our people and the ocean life. I believe that if we use the information that our Elders know of, how it used to be in the past, that we work with that, hopefully the powers that be would work with us and come up with a plan that is going to be sustainable for the people and the sea otters.”

-The late Hiišiiqwth Natalie Jack
Beach Keeper and Educator, Kyuquot/Cheklesah Nation



ILJA HERB

VISIONING OUR FUTURE

POLICY RECOMMENDATIONS TO ENABLE COEXISTENCE BETWEEN PEOPLE AND SEA OTTERS

Our research, based on workshop focus groups and community surveys with Nuu-chah-nulth, Haida, and Heiltsuk Nations and two Sugpiaq Tribes, revealed a suite of strategies to improve coastal Indigenous peoples' ability to adapt to the social, ecological and cultural changes that are triggered by the recovery of sea otters^{1,3,6-8}. Some of these recommendations are generalizable to both the US and Canada, while others may be more relevant to a specific country, Nation or Tribe.

1 Strengthen Indigenous Authority in Ocean Governance

- Share power between Indigenous and federal governments in making decisions about sea otter, kelp forest, and coastal fisheries policy by engaging in joint planning processes, management objectives, research and monitoring.

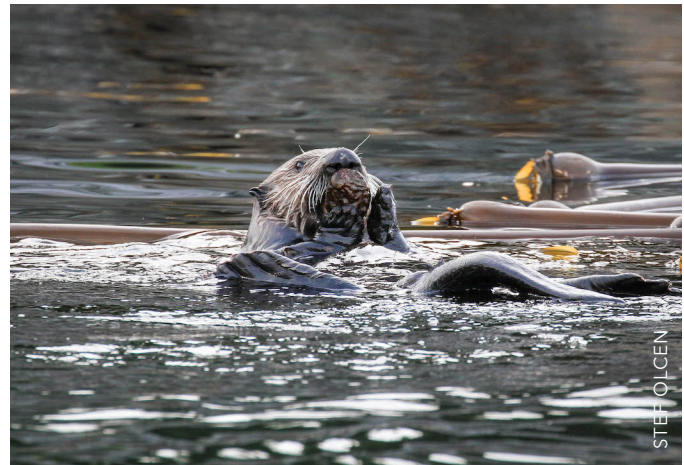


Hereditary Chiefs, Skil-Hillans and Wii-tsts-koom, and matriarch, Kii'ijuus, learning from Sugpiaq hunter, Nick Tanape Sr.

- Implement locally designed and regionally coordinated co-management plans for sea otters, kelp forests, and shellfish fisheries that can be adapted based on the effects of management actions that are carefully monitored and as traditional and scientific knowledge is gained.
- Specify recovery goals for sea otters, kelp forests and shellfish at local and regional scales so that sea otters and their ecosystem-level impacts can be managed and monitored by local stewardship offices that are regionally coordinated.

2 Establish Decentralized Adaptive and Collaborative Ecosystem Management

- Develop a coordinated and nested ecosystem-based management system informed by the demographic structure and spatial ecology of sea otters, key food web interactions, and governance protocols between partnering Nations and Tribes.



Sea otter foraging on an endangered northern abalone.

- Uphold Indigenous protocols, practices and rights to hunt and manage sea otters and maintain productive shellfish fisheries.

- Experiment with and learn from traditional sea otter deterrence and hunting practices like the spatial exclusion of sea otters from specific shellfish beds, shellfish seeding or transplants, restoring ancient clam gardens, and small-scale kelp harvest, adapted to today's environmental conditions.
- Provide sustained funding, capacity, training, efficient administration, monitoring and enforcement of new rules to promote the long-term success of co-management plans.

3 Gather and Incorporate Indigenous Knowledge, Objectives, and Ancient Laws in Sea Otter, Kelp Forest, and Coastal Fishery Management Plans

- Ensure contemporary management is informed by Indigenous knowledge of sea otters, kelp forests and associated coastal fisheries in addition to western scientific knowledge^{6,8}.
- Ensure Indigenous social, cultural, and livelihood objectives are equitably considered along with western conservation and fisheries objectives in the evaluation of alternative sea

otter management policies⁶. This would include acknowledging the primacy of valuing the ocean as a source of food for coastal First Nations and Tribes.

- Consider humans as active and enduring components of fully functioning ecosystems and by extension, ecosystem models that inform management strategies.



Qixatasu sharing his knowledge of clam gardens and fish traps with scientists and journalists.

- Acknowledge, revitalize and uphold ancient governance practices such as fishery trade agreements and treaties between coastal Nations and Tribes in the creation of a coordinated nested management system for sea otter, kelp forest and coastal fisheries. This would

include discussions and consensus between Hereditary Chiefs of Nations involved in ancient treaties and trade agreements. Benefits associated with sea otter, kelp forest and shellfish management would be shared within and between partnering Nations and Tribes for the well-being of all community members⁶. This would allow for the exchange and regional coordination of ecosystem costs and benefits, caused by spatially explicit sea otters hunting and conservation strategies, among partnering Nations and Tribes.

4 Build Learning Platforms and Create Opportunities for Knowledge Exchanges

- Create forums and networks so that Nations and Tribes can share experiences and information on sea otter management and adaptation approaches, and their social, ecological and cultural outcomes. Communities anticipating sea otter return can learn and become better prepared, while communities in the midst of sea otter recovery can exchange sea otter, kelp and shellfish management plans - both what has worked and what has failed.



Jenn Burt, facilitating a community knowledge exchange in Port Graham, Alaska.

- Strengthen cultural educational programs, focusing on youth, to build public appreciation of Indigenous worldviews that consider humans as part of ecosystems and Indigenous laws that persist throughout the Northwest Coast. These could include, for example, Haida Laws of Yahguudang dlljuu (Respectful acts) and Dlaang (Being whole), the Nuu-chah-nulth laws of Tsawalk (Everything is one) and Isaak (Respect with caring), and Heiltsuk Gvi'ilas (Laws of the ancestors).

5 Strengthen Government Accountability

- Develop policies, based on Indigenous and non-Indigenous laws, that strengthen accountability among all marine resource decision-makers.

6 Train the Next Generation of Marine Stewards

- o Train emerging Indigenous and non-Indigenous marine stewards, managers and researchers in Indigenous and scientific worldviews, stewardship principles and research methods to mobilize Indigenous knowledge alongside western science to generate new insights, build respectful cross-cultural relationships, reinforce the legitimacy of each knowledge system and foster a new, more inclusive way of stewarding ocean spaces.



Nicholas Meganack teaching researchers and Indigenous leaders about Sugpiaq sea otter hunting practices.

Lydia McMullen sharing her sea otter fur hat with a youth at our community knowledge exchange.



NEXT STEPS FOR RESEARCH COLLABORATION

In 2019, we received a 5-year grant from the Natural Sciences and Engineering Research Council of Canada to model how Indigenous practices to manage sea otters and shellfish through ancient hunting and fishing methods will affect coastal fisheries, Indigenous food and nutritional security, sea otters and other ecosystem considerations such as kelp forest fish habitat, carbon sequestration, and coastal erosion protection while accounting for climate change.

Guided by our Hereditary Chiefs steering committee and our partners at the Coastal First Nations-Great Bear Initiative, we aim to create decision support tools and processes to help inform local and regional fisheries management decisions surrounding sea otter recovery amid climate change.

Opportunities to inform such decisions exist within the implementation of recent fisheries reconciliation agreements and ongoing marine spatial planning initiative like the Marine Plan Partnership and Marine Protected Area network planning.

IN MEMORY OF

Our work is dedicated to the memory and teachings of Sugpiaq hunter, knowledge holder and past steering committee member Nick Tanape Sr., ecological titan Robert T. Paine, knowledge holder and beach keeper Hiišiiqwth Natalie Jack, Haida Hereditary Chief and past steering committee member Giteewans Vernon Brown, and Haida language and knowledge holder Dr. Gaaying'uhlas Roy Jones Sr.

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**NUU-CHAH-NULTH
TRIBAL COUNCIL**



**Council of the
Haida Nation**



**Heiltsuk
Tribal Council**



Chugachmiut

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