
November 6, 2019
Juneau, Alaska

USFWS Report MMM 2020-01
September, 2020

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# Executive Summary

Sea otter conservation and management in Southeast Alaska has been highly successful from the perspective of the recovery of an extirpated marine mammal population. Sea otter recovery in Southeast Alaska has resulted in reductions of some shellfish stocks of value to commercial, subsistence, personal use, and sport harvesters. Because of these economic and social impacts, many user groups wish to explore ways to mitigate sea otter and fisheries conflicts through collaborative management efforts.

In response to these concerns, the U.S. Fish and Wildlife Service (Service) convened the *Southeast Sea Otter Stakeholder Meeting* on November 6, 2019 in Juneau, Alaska to solicit ideas from stakeholders about how to address the concerns of a variety of Southeast user groups while still providing for the continued protection of sea otters in the region. The intended focus of the workshop was to identify actionable items that could effectively address the issue within the framework of the Marine Mammal Protection Act, which sets the Service's management authority.

Approximately 91 attendees gathered at the Andrew P. Kashevaroff building in Juneau for a full day of presentations and breakout group discussions. Participants included representatives of government, businesses, non-profit organizations, Alaska Native tribes and communities, artists, expert scientists, seafood harvesters, wildlife conservationists and subsistence users. Several actionable items, recommendations, ideas and suggestions were developed and discussed over the course of the day.

The first section of this workshop report (*Background Information*) provides information about sea otters in Southeast Alaska from ecological, management, and stakeholder perspectives. The next section (*Workshop Overview*) provides an overview of the workshop structure and objectives. The third section (*Workshop Presentations*) provides summaries of the spoken presentations heard at the meeting. The fourth section (*Workshop Breakout Sessions*) summarizes the outcomes of fourteen separate breakout discussions by workshop participants. The fifth section (*What we Heard*) synthesizes the suggested actions, questions, and recommendations generated at the breakout sessions into overarching themes. The report concludes by identifying (*Next Steps*) recommended courses of action for addressing sea otter management issues in Southeast Alaska.

## Background Information

Historically, northern sea otters (*Enhydra lutris kenyoni)* populated Alaska's entire North Pacific coastline. Intensive commercial hunting led to the extirpation of sea otters from Southeast Alaska by the early 1900s. Several hundred sea otters collected from remnant populations in the Aleutian Islands and Prince William Sound were reintroduced to Southeast Alaska in the 1960s. Since that time, the Southeast stock of northern sea otters has expanded in range and numbers with the most recent estimate (2012) indicating that the population had grown to just over 25,000 animals. Sea otter distributions and densities are variable across Southeast Alaska: sub-populations in long-occupied areas have stabilized as they reach the local carrying capacity, while sub-populations in newly occupied areas are still increasing.

Sea otters strongly influence the ecosystems they inhabit. Areas where sea otters have recovered tend to have more abundant and stable kelp forests, which benefit finfish and many other species that rely on kelp habitat. Sea otter recovery can also lead to healthier seagrass beds, which provide for carbon sequestration as well as important nursery habitat for many species. At the same time, many of the shellfish consumed by sea otters—including urchins, clams, crabs, abalone and sea cucumbers—have become significantly less abundant in occupied areas.

Southeast Alaska's growing sea otter population offers direct competition to subsistence, sport and commercial shellfish harvesters. Commercial dive fisheries for red sea urchins, sea cucumbers and geoduck clams have been impacted by declining biomass, leading to area closures. Southeast sea otter recovery has also led to the revival of sea otter skin sewing traditions and the sale of clothing and handicrafts made from sea otter pelts. Sea otter viewing has also become a favorite tourist experience in some localized areas.

Perceptions and observations regarding the impact of sea otters on Southeast shellfish stocks have led to calls for the active management of sea otter populations to protect commercial and subsistence shellfish resources. Sea otters are a trust resource of the U.S. Fish and Wildlife Service. Management authority and structure is provided by the Marine Mammal Protection Act of 1972 (MMPA). The MMPA established a general moratorium—with few exceptions and exemptions —on the "taking" of all marine mammals in U.S. waters, thus limiting options for managing sea otter numbers in ways that could reduce their impacts on commercial fisheries and other species. An important exemption under the MMPA provides for Alaska Natives to harvest sea otters for the purpose of subsistence and the manufacture of traditional Native handicrafts. In addition to the formal management structure, some small-scale informal management has occurred when Alaska Native tribes have focused their harvest efforts in specific locations, thus reducing sea otter abundance in locally important shellfish areas near their communities.

## Workshop Overview

Sea otter population growth is a subject of interest to a number of diverse stakeholder groups in Southeast Alaska. The identification of areas of conflict over sea otter management makes clear that a careful and inclusive dialogue is necessary to find solutions. To this end, the U.S. Fish and Wildlife Service, in cooperation with Alaska-based consulting firm North Star Group, worked with a steering committee consisting of federal and state managers, sea otter researchers, commercial fisheries and tribal representatives to organize and host a stakeholder workshop.

The purpose of the workshop was to create an inclusive forum for participants to review and discuss information about sea otter biology and management issues and to share recommendations to address resource conflict issues. Workshop objectives included:

1. *Invite a wide variety of stakeholders to ensure that all voices affected by this issue are heard and considered.* Through encouraging active participation, the issues were reviewed in a representative manner. Stakeholders had the opportunity to learn about current data, discuss the issues, and formulate ideas for solutions, which were instrumental for ensuring a successful meeting.
2. *Develop a clear understanding of mechanisms of action in sea otter management that are available under federal law.* Through this understanding, the meeting conversation was steered toward providing tangible answers, as opposed to exploring scenarios that may be prohibited or too difficult to implement under federal law.
3. *Build a clear and accurate understanding of what the most recent research shows regarding sea otter population size, habitat expansion, and impacts.* With the most recent data—as provided in the opening presentations—participants had an accurate understanding of the situation, which provided the basis for well-informed and constructive dialog.
4. *Bridge the gap between Western science and Indigenous knowledge.* Understanding the impacts of sea otter population change from Indigenous knowledge holders and community members, provided crucial information to help explain the current situation and will contribute to informing future management decisions.

Representatives from the following groups were invited to participate in the workshop:

1. Subsistence users and federally recognized tribes
2. The commercial dive fishing industry
3. The wider commercial fishing industry, including crab fishermen
4. Scientists
5. Conservationists
6. Recreational and personal use harvesters
7. Tourism industry representatives; sightseeing vessel operators
8. Craft-makers and artisans working with traditional and natural materials
9. Federal and state wildlife and fisheries managers (with authority over federal and state regulations that govern species management, harvests, and other key dynamics)

Over ninety participants gathered in Juneau, Alaska for the workshop, while nearly a dozen others tuned in via webcast. Several presentations established a clear foundation of understanding for the subsequent breakout discussions. Presentation topics ranged from the most current sea otter research and existing legal frameworks, to economic impacts on commercial fishing harvests, and a case study about potential targeted sea otter harvesting by Alaska Natives.

Following the presentations, attendees participated in three sets of breakout discussion sessions. Led by professional facilitator Brian Rogers, the breakout sessions were conducted in a way that promoted action-oriented and legally feasible solutions through the "Open Space" facilitation method. Open Space fosters inclusive, free, and open discussion, encouraging stakeholders to create and manage the agenda themselves by nominating topics and participating in discussions most aligned with their interests. It encourages participants to roam freely between discussion groups, promoting the sharing of knowledge and ideas. At the end of the day, the participants met as a large group and representatives of each breakout session presented their conclusions and main takeaways. The breakout session summaries were streamed live and posted on the event's website (https://www.seaotterstakeholders.com).

## Workshop Presentations

The meeting started with a series of presentations that served to provide an overview of sea otter management from various ecological, economic, and cultural perspectives, as well as lay the groundwork for mutual knowledge and understanding at the subsequent group discussions. All presentations were streamed live and posted on the event's website (https://www.seaotterstakeholders.com). Written summaries of the presentations are included below.

## *Summary of Population Status and Harvest Impacts*[1]

*Dr. M. Tim Tinker, U.S. Geological Survey, U.C. Santa Cruz, Nhydra Ecological Consulting*

Sea otter populations in Southeast Alaska have increased dramatically over the past five decades, rising from fewer than 500 translocated animals in the late 1960s. The recovery of sea otters to ecosystems from which they had been absent has affected coastal food webs, including commercially important fisheries: therefore, information on expected growth and equilibrium abundances can help inform resource management. We compiled available survey data for Southeast Alaska and fit a Bayesian state-space model to estimate past trends and current abundance. Our model improves upon previous analyses by partitioning and quantifying sources of estimation error, accounting for over-dispersion of aerial count data, and providing realistic measurements of uncertainty around point estimates of abundance at multiple spatial scales. We also provide the first estimates of carrying capacity (*K*) for Southeast, at both regional and sub-regional scales, and analyzed growth rates, current population status and expected future trends.

At the regional scale, the population increased from 13,221 otters in 2003 (95% credible interval or $CI_{95}$: 9,990 – 16,828) to 25,584 otters in 2011 ($CI_{95}$ 18,739 – 33,163). The average annual growth rate in southern Southeast (7.8%) was higher than northern Southeast (2.7%); however, growth rates varied at the sub-regional scale, with a negative relationship between growth rate and the number of years sea otters were present in an area. Local populations vary in terms of both current densities and expected future growth: the mean estimated density at Carrying Capacity (*K*) was 4.2 ($\pm$1.58) sea otters per $km^2$ of habitat (defined as the sub-tidal benthos between 0-40 m depth) and current densities in occupied habitats correspond on average to 50% of projected equilibrium values (range = 1% to 97%) with the earliest-colonized sub-regions tending to be closer to *K*. Assuming a similar range of equilibrium densities for currently un-occupied habitats in Southeast, the projected value of *K* for all of Southeast is 74,650 sea otters ($CI_{95}$ =36,778–136,506). Future analyses can improve upon the precision of these *K* estimates by employing more frequent surveys at index sites and incorporating environmental covariates into the process model to generate habitat-specific estimates of equilibrium density.

We also investigated the spatial and temporal patterns of subsistence sea otter harvest and assessed the effects of subsistence harvest on population abundance and growth rates. U.S.

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[1] As cited in:

Tinker, M. T., V. A. Gill, G. G. Esslinger, B. J.L., M. Monk, M. Mangel, D. H. Monson, W. E. Raymond, and M. Kissling. 2019. Trends and Carrying Capacity of Sea Otters in Southeast Alaska. *Journal of Wildlife Management* early edition. https://doi.org/10.1002/jwmg.21685

Raymond, W. W., M. T. Tinker, M. L. Kissling, B. Benter, V. A. Gill, and G. L. Eckert. 2019. Location specific factors influence patterns and effects of subsistence sea otter harvest in Southeast Alaska. *Ecosphere* 10:e02874

federal law permits subsistence harvest of sea otters by coastal Alaska Natives and sale of clothing and handicrafts made from the fur. These harvests are self-reported by hunters along with information on date, location, age class and sex. Using harvest data collected from 1988 to 2015, we developed a spatially explicit, age-structured, density-dependent population simulation model to explore the potential impacts of harvest on sea otter population dynamics. The simulation model predicted population trends and per-capita harvest rates that were very similar to those estimated from aerial survey data, thereby providing confidence in model results. We examined patterns of harvest and simulation model results at two spatial scales: the Southeast Alaska stock overall, and three smaller sub-regions that vary in sea otter occupation time and carrying capacity. The sub-regions examined were Sitka Sound, Keku Strait, and the Maurelle Islands.

Estimated mean annual harvest rate (expressed as a percentage relative to population abundance) was 2.8 percent at the Southeast Alaska stock level but ranged from 0 to 39.3 percent across the three focal sub-regions. Results of the simulation model suggest that harvest levels that exceed 10 percent of local population abundance can significantly reduce population abundance and growth rates at the sub-regional scale, and the effects are also evident at the regional scale in years where multiple sub-regions experience harvest rates greater than 10 percent. Variation in harvest impacts is explained by several factors, including local harvest rates, time since recolonization and population status with respect to carrying capacity. For long-established sub-regions such as Sitka Sound, consistently high rates of spatially focused harvest (>10% local population size) can substantially reduce local abundance and may cause re-distribution of animals away from the area of concentrated harvest. For more recently colonized areas, such as Keku Strait, consistently high rates of harvest can substantially reduce the rate of local population growth and may even prevent animals from using localized areas around the area of concentrated harvest. We emphasize that subsistence harvest and its population effects are scale and location dependent: effects that are significant at small scales may be “averaged out” at larger scales. We recommend that higher spatial and temporal resolution sea otter population and hunting data could help address emerging sea otter management and conservation concerns in this region.

## *Ecosystem-Level Changes with Sea Otter Recovery: from Alaska through British Colombia to California*

*Dr. Lynn Lee, Parks Canada, Gwaii Haanas National Park Reserve, National Marine Conservation Area Reserve, and Haida Heritage Site*

Sea otters are a keystone species and apex predator in coastal ecosystems of the northeastern Pacific Ocean. They have a dramatic effect on the ecosystems where they live because they have no blubber layer to keep them warm in cold north Pacific waters and must therefore maintain a very high metabolic rate, which means they eat up to 20% to 30% of their body

weight per day. Their prey are primarily large invertebrates like sea urchins, abalone, sea cucumbers, clams and crabs, many of which are also culturally and economically important to people. One of their prey species, sea urchins, plays an important role as a key grazer of kelp and other seaweeds along rocky intertidal and subtidal areas. As a result, the presence or absence, abundance, and occupation time of sea otters in local areas can cause significant changes in the areas where they are foraging. When enough sea otters have been foraging over a wide enough area, their local effects scale up into ecosystem-level effects along whole sections of coastline.

Sea otters once ranged widely from Alaska through to Baja California, Mexico, but were extirpated in British Columbia (BC) and other places along North America's west coast by the maritime fur trade. By the mid-1800s, few sea otters remained in BC and they were largely ecologically extirpated. Between 1969 and 1972, sea otters were re-introduced to the northern west coast of Vancouver Island (WCVI) near Kyuquot. From there, the population has expanded and now extends south to Tofino and north to BC's central and northern mainland coasts. This incremental population growth and range expansion has provided researchers with opportunities to study the ecosystem effects of sea otter recovery.

These ecosystem effects are largely caused by what ecologists call a 'trophic cascade' in which direct effects of predators eating prey species have cascading indirect effects on lower levels of the food web. In the case of sea otters foraging on rocky reef ecosystems, when a lot of sea otters are eating sea urchins, far fewer sea urchins are present to graze on kelp. As a result, more kelp can grow in areas where sea otters are foraging and controlling urchin abundance and size. When sea otters were ecologically extirpated, their large invertebrate prey no longer faced high predation pressure, allowing these shellfish to increase in abundance and size compared to when sea otters were part of the ecosystem. Over a century and a half of sea otter absence allowed large invertebrates to increase in abundance and this, in turn, facilitated development of many contemporary commercial shellfish fisheries, including those for sea urchins, abalone (closed in BC since 1990 due to overfishing), sea cucumbers, geoducks, intertidal clams, and Dungeness crabs).

As sea otters recover and expand their range in BC and other places, their foraging activities are directly competing with cultural, recreational and commercial shellfish fisheries. Extensive literature from Alaska and BC has shown that the direct effects of sea otters on the shellfish that people also consume can be very immediate with, in some cases, a dramatically large decline in these prey species within a few years of sea otters moving into an area.

Through this trophic cascade on rocky reefs, sea otter predation on urchins indirectly results in increased abundance and depth of kelp forest habitat, and this has been well-documented by subtidal observations and satellite kelp mapping. Kelp forests can become four times deeper and 19 times larger after sea otters recovered along WCVI, increasing both the surface area and

volume of kelp habitat. The ecological effects resulting from sea otters fostering larger and deeper kelp forests has been less well-documented because many of these ecosystem changes happen over longer decadal timescales. Some data from WCVI showed that kelp forest fish abundance, including rockfish, lingcod and greenlings, increased with sea otter occupation. The density of rockfishes per area increased, and with the projected increase in kelp forest area overall, up to 46 times more rockfish could result after over a decade of sea otter recovery. Unpublished data also showed increased catch per unit effort for lingcod, kelp greenling and copper rockfish in areas where otters were present, regardless of human fishing pressure. The catch per unit effort for these fish was lowest where sea otters were absent and human fishing pressure was high.

Less is known about sea otter effects in soft sediment habitat. One study in California showed that a sea otter-induced trophic cascade led to increased eelgrass health and up to a 600 percent increase in eelgrass biomass. In Alaska, sea otter effects on intertidal clams were most pronounced on beaches with higher clam biomass, with little effect where clam densities were lower.

Unpublished data from WCVI showed an increase in overall biodiversity of rocky reef ecosystems following sea otter recovery, particularly with increasing diversity of smaller invertebrates. Increased rockfish genetic diversity was documented in kelp forests where sea otters have recovered compared to those with no sea otters. Increased biodiversity is also reflected in copper rockfish, which eat prey items that are higher in trophic level and diversity in areas with sea otters compared to those without sea otters.

Research throughout the BC coast along gradients of sea otter occupation time showed abalone behavior is affected by the presence of sea otters. Abalone that were in hiding doubled in density after sea otters returned, whereas abalone out in the open declined in density with increasing sea otter occupation. Importantly, abalone densities at depth also increased, likely because of deeper kelp forests that may also increase success of fertilization and larval settlement for abalone and other broadcast spawners, thus having potential population-level benefits for these species.

On Haida Gwaii, in Gwaii Haanas National Marine Conservation Area Reserve and Haida Heritage Site, a number of universities, the Haida Nation, commercial urchin fishing sector, Fisheries & Oceans Canada and Parks Canada, are working to restore kelp forests along three kilometres of the coastal subtidal in a project called Chiixuu Tll iinasdll - Nurturing Seafood to Grow. The project is mimicking sea otter predation on urchins to encourage kelp forest growth at Murchison Island. Researchers are finding that red urchins in or close to the kelp edge have much greater gonad weights than those in urchin barrens habitat with little to no kelp growing in the area. Red urchins in the barrens also have much lower respiration rates than those that have access to more kelp. This project showed kelp density increases from less than ten to well

over 200 kelp plants along the same sampling area after the restoration work, resulting in increased overall kelp abundance and area of kelp canopy cover. Continuing research here will examine changes in growth and metabolic rates of urchins and abalone, food web changes, and changes in diversity of the seaweed, invertebrate and fish communities over time.

Finally, the contemporary condition of these coastal ecosystems resulted from ecological extirpation of sea otters during the maritime fur trade from the late 1700s through the 1800s. In areas where sea otters are now recovering, they are shifting ecological conditions to have fewer large shellfish, more kelp and eventually more kelp-associated species including fish and smaller invertebrates. Before the maritime fur trade, the social-ecological system from Alaska to Baja included relationships between people, sea otters and shellfish. Midden sites show human hunting of sea otters and use of their shellfish prey over millennia. Restoring balance between people, sea otters, shellfish, fish and kelp will be part of the challenge as sea otters continue to recovery through their historic range. Continuing research to understand the long-term ecological effects of sea otters on coastal ecosystems and the role of human hunting in maintaining interactions within that system will be critical for sound management decision-making.

## *Sea Otter Management under the Marine Mammal Protection Act*

*Charles S. Hamilton, Marine Mammals Management, U.S. Fish and Wildlife Service*

The Marine Mammal Protection Act (MMPA) was signed into law in 1972. The MMPA's overarching goal is to maintain the health of the marine ecosystem. To reach this goal, MMPA recognizes that marine mammals contribute significantly to the overall health of the oceans and directs the U.S. Fish and Wildlife Service (Service), through the Secretary of Interior, to maintain populations of marine mammals at an Optimum Sustainable Population (OSP). The primary tool it uses to reach this goal is by placing a general moratorium on most forms of taking marine mammals.

OSP is a key driver under the MMPA for how the Service should manage marine mammal stocks under its jurisdiction. It is defined in the law at the stock level as the number of animals which will result in the maximum productivity of the population or species. For marine mammals such as sea otters, OSP is considered as a population range between the Maximum Net Productivity Level (MNPL) and Carrying Capacity (*K*); the lower threshold of OSP (MNPL) is generally between 60 to 80 percent of *K*.

Importantly, as sea otters re-colonize areas from which they were extirpated, the population may exceed localized carrying capacity before stabilizing at lower levels. Additionally, while there may be areas of local abundance, the Service has not determined across the entire Southeast stock of northern sea otters whether that stock is at its MNPL.

The MMPA does provide mechanisms whereby the Service can authorize waivers to the moratorium on taking. Specifically, the law allows for permits to be issued that authorize taking or hunting of sea otters. For example, the Service may issue permits authorizing the taking of sea otters if it determines that there is an overpopulation of a particular stock. However, in considering such a permit, the Service must also consider the status of the entire stock, not just a locally abundant region within the stock. The Service must also determine if transplanting animals from over-populated areas to historical range areas—where they don't currently exist—would be more desirable.

The MMPA has provisions which provide for the return of management authority for sea otters to the State of Alaska. Such a return must occur prior to the State enacting or implementing any independent laws, regulations, or management actions regarding sea otters. The law requires that subsequent to any transfer, the State must manage sea otters consistent with the purposes of the MMPA. Importantly, the State must determine that any allowances for taking, e.g. hunting, does not result in reducing the stock to a level below its OSP. It is also important to note that in the 1970s the State of Alaska sought management for northern sea otters, polar bears and Pacific walrus, and the Service transferred Pacific walrus to Alaska for management purposes. However, because MMPA recognizes a primary exception for Alaska Natives that at the time the State could not fulfill, Pacific walrus management was returned to the Service and the State withdrew its request in regard to sea otters and polar bears. In part because of these requirements, the law also requires the State of Alaska to adopt and implement statutes or regulations that ensure a priority for subsistence uses.

The MMPA also has an exemption for Alaska Natives that allows for the harvest of sea otters for subsistence and handicraft purposes, provided the harvest is not wasteful. The Service also has a Marking, Tagging and Reporting requirement as allowed under the law that requires harvests to be reported, and skulls and hides tagged, within 30 days of harvest.

The Service recognizes past concerns over handicraft production but worked with Alaska Native subsistence users several years ago to provide clarity on a number of issues. A number of local Alaska Native management actions have occurred that seek to encourage subsistence hunting in specific areas to not only provide for sea otter harvests but to offer added benefits in targeting specific locations that may result in less competition for other marine resources from sea otters. Such mechanisms can be used in other areas by Alaska Natives.

Though other MMPA provisions allow or authorize the taking of marine mammals—such as permits for research, enhancement or public display, as well as incidental taking that may result from fisheries or other activities—these authorizations or allowances are not relevant to this discussion and, as such, they are only just noted.

## *Sustainable Arts Case Study*

*Mike Miller, Sitka Tribe of Alaska and Lee Kadinger, Sealaska Heritage Institute*

Sea otter reintroduction into Southeast Alaska has created both conflict and opportunity for tribal members. Furthermore, increasing numbers of sea otters have had a dramatic impact on important subsistence and commercial shellfish resources in the region. Sea otters are marine mammals and are protected by the Marine Mammal Protection Act (MMPA). The MMPA contains an existing exemption that allows Alaska Natives to harvest and utilize sea otters for handicrafts, to be sold for economic gain.

Several organizations in the region have looked for additional provisions to expand the harvest of sea otters, in an effort to reduce competition for economically important shellfish. Sealaska Heritage Institute (SHI) has already significantly increased the harvest of sea otters in the region through its Sustainable Arts initiative, which was initially funded by the State of Alaska. This increase in harvest occurred under the existing rules and regulations.

Sitka and SHI worked closely with the U.S. Fish and Wildlife Service, along with others including the State of Alaska, scientific researchers, educational systems and tribal governments in the region, in all stages of the project. The increased harvest of sea otters, due to initiatives like the Sustainable Arts program, appears to have had a positive localized impact on important subsistence shellfish populations in the Sitka area, which had previously been depleted by a large local population of sea otters. We are encouraged by the local results in the Sitka area, and are looking for additional funding to attempt to recreate the results in another community.

Other attempts to change the MMPA could have a negative impact on Alaska Natives around the State, and thus are controversial, with less chance of being implemented in the near term. Meanwhile, the Sitka Tribe of Alaska's Marine Mammal Commission and SHI have worked within the existing rules and interpretations of MMPA regulations to create economic opportunities for Tribal Members across the region.

This effort appears to have great potential for expansion, if properly funded. While much time and effort is often spent on controversial and uncertain fixes, we would like to call attention to the results that can be achieved under the existing regulations. The increased cultural, economic, and subsistence opportunities that are taking place are due to a methodical, common sense approach to the issue and directed funding.

We encourage all who are concerned with the issue of sea otter populations and their competition with important shellfish resources to support our initiatives, like the Sustainable Arts program, and to work with us to expand the effort.

## *Sea Otter Impacts to Fisheries in Southeast Alaska*

*Kyle Hebert, Division of Commercial Fisheries, Alaska Department of Fish and Game*

Several fisheries in Southeast Alaska have been and continue to be impacted as sea otters expand throughout their original habitat. Affected fisheries include those for subsistence, personal use, commercial, and recreational purposes, and include numerous species that are favored prey of sea otters. Species and fisheries that are most noticeably affected include benthic invertebrates, such as sea urchins, abalone, geoducks, sea cucumbers, and Dungeness crab. Other species and fisheries that likely have been or are soon to be affected include Tanner crab, red king crab, and several species of clams. The Alaska Department of Fish and Game (ADF&G) conducts stock assessment surveys for red sea urchins, sea cucumbers, and geoducks, making it possible to gauge the impacts of sea otter predation on these species. However, for all other species, data do not exist to determine the extent of predation, and impacts are only known through reports of observations of sea otters feeding or assumptions that when present, they are responsible for declines in populations.

Commercial fisheries for red sea urchins, sea cucumbers and geoducks have been greatly affected by sea otter re-expansion throughout Southeast Alaska. These fisheries are collectively known as the “dive fisheries”, because dive equipment is required for their harvest. Red sea urchins and geoducks are primarily found in waters around Prince of Wales Island, the islands and mainland to the south of Ketchikan, southern Kuiu Island, and along southwestern Baranof Island. Sea cucumbers are ubiquitous in waters of Southeast Alaska. Outer coastal areas, such as western Prince of Wales Island, are where sea otter populations are among the highest and where species supporting dive fisheries are most productive. Consequently, dive fisheries have been greatly impacted in these areas. Here, “impacted” is defined as fishery management areas that have either been closed or are in decline due to sea otter predation. Percentage of impacted dive fishery management areas by species are as follows: red sea urchins – 66 percent, geoducks – 68 percent, and sea cucumbers – 39 percent. Re-survey of sea cucumber fishery management areas from 7 to 12 years after closure due to low abundance found that populations had not recovered.

Commercial fisheries for crab have also been affected by sea otter predation, especially the Dungeness crab fishery. This fishery occurs throughout most waters of Southeast Alaska, but bays and inlets found in the inside waters are particularly important contributors to overall harvest. Since a stock assessment survey program is not in place for Dungeness crab, estimates and trends of abundance are not available. However, harvest has dropped substantially in areas occupied by sea otters and reports of sea otter predation of Dungeness crab have increased. Other crab fisheries, such as Tanner crab and red king crab have likely been affected as well and are expected to be increasingly affected as the sea otter population continues to expand into inside waters, where these species are most abundant.

Subsistence fisheries have been affected by sea otter expansion, as have personal use and recreational fisheries. Many benthic invertebrates that sea otters target as prey are also important for these fisheries, including crab, clams, shrimp, abalone, and octopus. Household surveys conducted by ADF&G revealed that the amount of subsistence harvest of shellfish has declined in several communities, and the decline has been attributed to sea otter predation. Subsistence fisheries are also suffering from secondary effects of sea otter predation. This occurs when commercial harvesters, displaced from long-time commercial fishing grounds due to low abundance of target species, then seek harvest opportunities in areas traditionally used for subsistence harvests.

The ADF&G faces a challenge when managing fisheries in areas that sea otters have re-occupied. The State of Alaska constitution and the ADF&G mission statement require that fisheries be managed consistent with the sustained yield principle. However, managing for sustainability is difficult in sea otter occupied areas where shellfish and other invertebrate species decline rapidly whether fisheries occur or not. Reduction of fishery harvest does not appear to alter the trajectory of declining shellfish in areas where sea otters are abundant.

A second element of ADF&G's mission is to manage fisheries in the interest of the economy and well-being of the citizens of the State. Therefore, a goal of ADF&G is to find balance between protection of the marine resources affected by sea otter predation and providing some opportunity to harvest by fishery stakeholders.

### *Economic Impacts to the Dive Fisheries Industry*

*Phil Doherty, Southeast Alaska Regional Dive Fisheries Association*

The Southeast Alaska Regional Dive Fisheries Association (SARDFA) is a private, non-profit, economic development organization representing approximately 180 to 200 harvest divers, processors, and communities of Southeast Alaska. SARDFA formed in 1998 under Alaska statute 43.76.150-210, which established mandatory taxes on the dive fisheries in order to pay the State of Alaska to manage, assess, and research red sea urchins, geoduck clams, and sea cucumbers. All other monies generated by SARDFA, but not paid directly to The Alaska Department of Fish and Game (ADF&G) are used for required testing, administrative overhead, and research. SARDFA works cooperatively with ADF&G in developing its Annual Operating Plan, which determines how the dive assessments (self-imposed tax on the dive resources) will be spent.

The fisheries target sea cucumber, geoduck clams, and red sea urchins. All those fisheries are being directly impacted by the increasing sea otter population in Southeast Alaska. These fisheries are a late fall and wintertime fishery in Southeast Alaska. Wintertime fisheries are an important economic generator in Southeast Alaska. The commercial dive fisheries support year-round processing facilities, employ approximately 100 to 150 tenders, and allow fishermen to

keep fishing vessels operating year-round. They are a small boat fishery with only one or two divers operating per boat. Most permit holders are from Alaska. In the geoduck clam fishery, divers use high pressure water hoses to harvest the geoducks which are found three to four feet in the substrate.

In the last ten years, the geoduck industry has employed 55 to 70 geoduck divers, who have harvested 450,000 to 800,000 pounds on an annual basis. The ex-vessel value (money paid directly to the fishermen) is between $2.7 to $6 million. ADF&G research shows that over 66 percent of commercially viable geoduck areas have been impacted by sea otters.

Over the past ten years in the sea cucumber fishery, 175 to 200 divers have made landings on an annual basis, with over 1.0 to 1.8 million pounds harvested annually. The ex-vessel value of the fishery ranges between $2.5 to $9.3 million. ADF&G research shows that over 30 percent of commercially viable sea cucumber areas have been impacted by sea otters.

The sea urchin fishery has been impacted more than the geoduck clam and sea cucumber fisheries. Since 1997, the sea urchin harvest has decreased from 5 million pounds to a low of 208,000 pounds in 2012 because of predation by sea otters. In 1997, 150 divers participated in the fishery. In recent years, only six to 12 divers have made deliveries. The ex-vessel value of the fishery has dropped from $1.8 million in 1997 to $162,000 in 2017. ADF&G research shows that over 60 percent of sea urchin areas have been impacted by sea otters.

The sea otter population will likely continue to expand rapidly in coming years as otters consume the large biomass of crab and macro invertebrate, species which built up in the absence of sea otters during the past century. When these stocks have been depleted, otters will need to find other food sources and many may die off due to starvation. Because sea otters are opportunistic generalists, it is likely commercial dive fisheries and Dungeness crab fisheries in Southeast Alaska may never return to biomass levels that allow sustainable commercial harvests.

The biggest sea otter impact in Southeast Alaska is on the west coast Islands, though sea otters are now being seen in many inside water areas. The Southeast Alaska sea otter population was estimated to be >25,000 in 2012, and has continued to grow and expand since that time (*see "Summary of Population Status and Harvest Impacts"*). Over the past decade, many towns, villages, associations, and legislators have written resolutions expressing concern over the unchecked growth of sea otters in Southeast Alaska. While the U.S. Fish and Wildlife Service has held discussions with concerned stakeholders, resolution to adequately address local concerns has remained elusive.

## Workshop Breakout Sessions

Following the morning presentations, participants nominated topics for the breakout sessions. Fourteen self-nominated topics were discussed throughout the afternoon, with designated note-takers responsible for recording the main points of each conversation. At the conclusion of the meeting, a representative from each group presented an overview of the key recommendations and takeaways. Based on those notes and presentations, this section of the report offers a summary of the outcomes from each discussion.

### *Definition and Solution to the Problem*

While this conversation was originally intended to be solution-focused, it quickly became evident that there was not a general consensus on the definition of "the problem". For some participants, the problem is that sea otter populations are already threatening shellfisheries as they move towards carrying capacity. Others see the problem as a conflict in identifying ecosystem balance, and whether or not equitable management can be achieved in a balance between commercial industries, subsistence users, and recovering sea otter populations. Ultimately, the problem statement was defined as: *How to design and manage a system that supports commercial, otters, subsistence, artists, and tourism, in a time of change?*

Potential solutions focused on the Southeast Alaska region, and several recommendations emerged:

1. Increase state funding for artisan training and the marketing of Native handicrafts
2. Improve communication amongst managers, user groups and stakeholders
3. Conduct a new population survey
4. Update the species conservation plan
5. Create a working group with stakeholders
6. Evaluate resources for data collection

### *Optimum Sustainable Population (OSP) and Subsistence*

The main critique of OSP from this group was that it does not take into consideration the human, or social, dimension of what is "sustainable." Ultimately, the conversation kept circling back to spatial management consideration; the various user groups from subsistence, commercial industries, tourism, and conservation all have needs that are shifting in time and space, with the participants pondering the question of how those diverse needs can best be met.

Currently, OSP and Carrying Capacity (*K*) are considered on a regional scale. However, as research has shown, sea otter behavior takes place on a much smaller scale, leading to a mismatch between the regional framework and the spatial realities of how these dynamics play

out. Furthermore, local spatial management is complicated, and it needs to be in writing in order to meet legal requirements and stand up to challenges.

With this in mind, a group suggestion was the creation of a coordinated plan, or network, that functions at the local scale, but is embedded in a network accountable at the regional level. There was a recommendation that a comprehensive sea otter management plan should be developed with local input from each community. The group also discussed how to create and manage a dialogue with the commercial, subsistence, and sea otter commission, and identified the need for funds to help make these dialogues and networks possible.

### *Section 119 of the Marine Mammal Protection Act (MMPA)*

This group discussed a proposal to create a Memorandum of Understanding with the U.S. Fish and Wildlife Service (Service) based on Section 119 of the MMPA, which allows for cooperative agreements with Alaska Native organizations. Working with a Prince of Wales tribal sea otter commission, managers could conduct population studies, ecosystem assessments, and develop local management structures for sea otters and other resources that local people rely upon. Ideas included population studies, possibly using drones, establishing a bio-sampling program, and conducting ecosystem assessments together with youth. All would provide locally-generated data that engages an important local resource – Alaska Native knowledge. That said, participants agreed on the importance of initiating training programs for qualified local hire, as well as setting up an effective local monitoring program in order to ensure the quality of the data. A proposed framework for this project already exists and is awaiting minor edits.

Currently, this Prince of Wales commission has seven tribes involved and ready to initiate these studies – four from Prince of Wales, the Wrangell Cooperative Association, the Organized Village of Kake, and the Ketchikan Indian Community – and they want to implement it as soon as possible. Federal funding from agencies such as the Bureau of Indian Affairs could provide some resources for this effort. Regional dive fisheries could also potentially play a role.

It was stressed that, from a tribal perspective, when people collect shellfish, they work together as a family unit to ensure the safety and well-being of the community. The current situation of otters depleting shellfish is putting this way of life at risk, so there is a strong interest from many Alaska Natives in working towards local solutions.

The group acknowledged that other Alaska Tribal representatives from Southeast Alaska were unable to participate in this workgroup session, and that the recommendations may be missing a larger perspective necessary for discussions on Co management under the MMPA.

### *Expanding Markets for Sea Otter Products*

One of the key limiting factors in the subsistence harvest of sea otters is the limited market for sea otter fur products. This discussion focused solely on market expansion in the lower 48

states, not internationally, as that is a much more complex issue. One immediate need is to create an informational brochure for visitors explaining the legalities of sea otter harvest and handicraft production, as well as the rules for travel and transport with sea otter products. Public awareness can be increased and improved by providing more clear and concise information, along with the Service and arts and crafts board stamps of approval to ensure credibility.

Additionally, a disconnect exists between otter harvests and sales. The Sitka Tribal Tannery, for example, has an inventory of over 200 hides. More markets are needed for sea otter products, and though the Sustainable Arts project offers an example of what can be done, no funding currently is available for continuing this or similar initiatives. Another recommendation was to establish an Alaska Native certification scheme that can certify sustainable sea otter products.

### *Clarifying the Rules of Harvest*

This discussion highlighted the need for more clear and concise information regarding the rules of harvest. Participants sought clarity on a number of questions including blood quantum, as well as whether or not non-Natives are able to steer boats, or even be on board, when sea otters are taken. (Note: responses to many of the questions raised during this breakout session are addressed in *Appendix 1: Frequently asked Questions about Sea Otter Hunting in Alaska*).

### *Questions on the Marine Mammal Protection Act (MMPA) Specific to Sea Otters*

This discussion began as a question and answer session about MMPA, particularly in relation to sea otters. A Department of the Interior representative agreed that the gathering and dissemination of information must be improved. The department should collect current information about the status of stocks, as well as the health and well-being of habitat and prey species. However, up-to-date information, and the funding for collecting it, is lacking.

This group also discussed the one-quarter Alaska Native blood quantum level as prescribed in MMPA. A presenter noted that in the original act, harvest was allowable for “coastal-dwelling Alaska Natives,” but the one-quarter definition was later lifted from ANCSA and applied to the MMPA. While going back to the original definition of “coastal-dwelling” might open sea otter harvesting to more people, more problems could result if it was applied to other protected species such as walrus and polar bears. The group wondered whether or not a mechanism exists to change this definition solely for the purpose of sea otter harvest?

### *Gaps in Knowledge and Research*

This group identified areas where knowledge about sea otters and their ecosystems could be improved upon, noting several potential areas of study. Much of the discussion circled back to incorporating traditional ecological knowledge in studies of historical sea otter range, sea otter behavioral patterns on local scales, and spatial monitoring for changes in shellfish population.

Other suggestions were further studies on the ecosystem benefits that sea otters provide, as well as examining other factors that influence sea otter population dynamics. An additional suggestion was about cruise ship tourism impacts on sea otter populations, although it was not clear how studies on the topic would directly relate to sea otter management.

### *Carrying Capacity (K)*

Members of this group sought clarifications regarding carrying capacity (*K*) and how it was studied. Questions included: How are different population densities of prey species considered on the calculation of *K?* Is it by averaging uninhabited versus inhabited areas? How do the fluctuating cycles of shellfish species play into Optimal Sustainable Population (OSP) and *K,* and at what point does harvest count in *K*? One clarification offered was that OSP is a population range bounded at the upper level by *K* (the carrying capacity of the environment) and at the lower level by the Maximum Net Productivity Level (MNPL). The MNPL of a marine mammal stock is usually around 60-80 % of *K*. It was also clarified that for the purposes of managing marine mammal stocks, OSP is typically considered a regional (stock wide) estimate (in this case Southeast Alaska-wide).

The conversation then evolved into a discussion on management, and several more questions arose:

1. Is the one-quarter blood quantum level a regulation, or is it written into the Marine Mammal Protection Act? If it is a regulation, it may be easier to change.
2. How can areas that need protection be determined, along with feasibility of protection, in a timely manner? How can this be done with cooperation from tribes, agencies and user groups?
3. The Sitka tribe's management plan contains a lot of interesting data, but it is one singular case. Are there other places where this plan could be replicated to see if the same results are achieved?

The group recommended that sub-regional management plans should be developed in consultation with all stakeholder groups. However, they must fit into a larger regional plan, as the stock is measured at the regional level. The main concern is the amount of time required to develop these plans in a way that meets the immediate needs of all groups. Ultimately, the group had more questions than answers.

### *Functioning Ecosystems*

This group agreed on the definition of a functioning ecosystem as "*complex, resilient, diverse, and balanced, but also constantly in flux.*" Opinions diverged on what a functioning ecosystem should look like in the interplay of sea otters and humans. The group identified a need to establish a balance with sea otters and recommended that any management strategy be adaptive and stakeholder-driven, addressing the needs of tribal, federal, state, and user groups.

Another recommendation was to study areas with differing otter population densities in order to compare how the local ecosystems are impacted by sea otters. If pursued, these studies should include Traditional Ecological Knowledge and recognize that while sea otters provide benefits for kelp, carbon sequestration and fish species, they also create imbalances by consuming large amounts of shellfish resources. Furthermore, a holistic look at ecosystems must take human culture and history into account, as well as the socioeconomic impacts on communities.

Finally, acknowledging that this stakeholder meeting is only the first step in a longer process of collaboration, the group recommended continuing the conversation through channels such as chat rooms or blogs.

### *Identifying Funding Needs and Potential Sources*

This group focused on obstacles to increasing subsistence harvest levels in rural communities. Four primary funding needs and their potential funding sources were identified:

1. Marketing: developing and expanding markets for artisans to sell their products. This could be funded by tourism industry, Alaska Seafood Marketing Institute, the Made in Alaska scheme, or other sea otter groups directly affected by sea otters.
2. Training: helping harvesters or artisans develop skills to produce quality otter pelt products. Vocational-technical training requirements should be changed in order to extend funding and scholarship opportunities to artisans and craftspeople.
3. Infrastructure: including tanneries, supplies, community boats for hunting. Mixed funding sources may be available for this.
4. Data: there is a pressing need for more population information, as no comprehensive survey effort has been carried out in the region for more than seven years.

To address these needs, the group brainstormed a variety of funding sources:

1. State or federal government funding
2. Environmental groups (for impact studies)
3. Impacted industries, such as dive fisheries, or crabbers
4. Private investors and foundations
5. Alaska Native corporations
6. Federal or social service grants

### *Solutions: The Role of the State*

Provisions in MMPA, such as Section 109, may allow the State of Alaska more management control. Several options were discussed, both in terms of managerial and facilitator roles. That said, if the State has management control, it also incurs costs. The State government must be sure it has the resources to responsibly engage with the management process.

One suggestion was that the State could promote management together with the tribal authorities, as was attempted in Sitka. A number of other tribes and communities have documented management plans over the years, but they have largely not been used nor seen; the State could help revive these plans and assist in their development and implementation.

The State could advocate for federal funding to be allocated to the Service for population surveys or other priorities. The challenge is that federal funding has been flat while agencies such as ADF&G's Marine Mammal Program are grants-based and currently have no sea otter projects. The Service, however, has plans for a Southeast Alaska survey for sea otters, possibly in 2021 with an approximate cost of $250,000.

Other suggestions for the State included convening stakeholders to revise the conservation plan, which has not been updated since 1994, or help to create a public repository for sea otter sightings for better data collection, harnessing citizen science to improve communication.

### *Tourism*

The vast majority of tourists who travel to Southeast Alaska come to see marine wildlife, though there is little information about sea otter tourism in particular. In order to address the lack of awareness about sea otters' impacts on the ecosystem, as well as their sociocultural and economic role in Southeast Alaska, a need exists for clear and consistent messaging for visitors regarding sea otters. Until now, tourism and marketing campaigns have not consulted with Alaska Native voices to help visitors recognize that harvesting wildlife is part of Southeast Alaska's living culture. An Alaska Travel Industry Association representative mentioned that any information strategy would have to be targeted for not only sea otters, but for all marine wildlife.

### *Carrying Capacity at Sub-Regions*

This group had two main takeaways. First, in order to actually manage a stock, frequent abundance surveys are needed, and right now they only happen every 10 years. Second, the objective of a management plan should be to work with communities to identify sea otter and non-sea otter areas in order to optimize both shellfish and sea otter populations.

### *Lack of Culture-Bearing Hunters*

Many Alaska Natives are able to hunt sea otters, but do not because of barriers such as lack of cultural training, and no access to boats and other equipment for harvest or production. In order to encourage and enable greater participation in sea otter hunting, one suggestion was for the federal government to co-manage sea otter populations together with tribes and villages. Other suggestions were to extend professional apprenticeships and have 'culture camps' where more hunters can be trained.

### *Revisiting the Sustainable Arts Program*

Some questions were raised about legal requirements for producing sea otter products, including what the options are, and who can participate. For example, can northern Alaska Natives harvest and use marine mammals in and from Southeast Alaska, and vice-versa? (See *Appendix 1: Frequently asked questions about sea otter hunting in Alaska*).

Considerable interest was expressed in learning skin sewing, so a priority is to expand the trainings that have so far occurred in nearly a dozen communities. Setting up a cooperative that could ensure uniform quality control in sea otter products was also suggested. Another suggestion was to create a brochure about sea otter products, similar to an existing ivory brochure that has a stamp of approval from the Service. Outreach and communications work would also be helpful. For example, working with conservationists and others to foster an understanding that harvesting and working with sea otter pelts are traditional cultural practices and have considerable value to indigenous populations. Outreach could also address fur and animal product bans on websites such as Facebook and Etsy.

## What we Heard: Key Messages from the Workshop

The presentations and breakout sessions provided an in-depth summary of the status of sea otters in Southeast Alaska and their ecological, socio-cultural, and economic impact where they occur. Sea otters can simultaneously provide benefits and costs depending on the perspective of the stakeholder. One of the primary goals of this workshop was to allow all stakeholders the opportunity to voice their concerns and provide recommendations for a balanced management strategy moving forward.

In the following paragraphs, we aim to summarize 'what we heard' as the key messages from the presentations and break-out sessions related to subsistence harvest of sea otters for handicrafts, conflicts with subsistence and commercial shellfish fisheries, and sea otter population ecology and ecosystem-level research. We then summarize stakeholder recommendations to address the issues and questions raised, including opportunities for local or co-management, policy considerations, and requests for further information and clarification.

### *Subsistence Harvest of Sea Otters for Handicrafts*

Sea otter harvest has been an important component of Alaska Native communities' cultural practices for generations. Passage of the Marine Mammal Protection Act (MMPA) allowed Alaska Native community members to continue to harvest sea otters for their pelts and creation of handicrafts. The expansion of sea otters across Southeast Alaska has created economic opportunities for individuals involved in harvest, as well as sea otter hide tanning and modifications of the hides for artistic purposes and sale of handicrafts.

Programs such as the Sustainable Arts Initiative in the Sitka area have provided a template for how sea otter harvest programs can benefit local communities from harvest to sale of handicrafts. Outside of this initiative, several issues and concerns were raised by other Alaska Native stakeholders about implementing similar programs in their communities. First, many Alaska Native community members lack the training, access to a boat, and equipment to harvest sea otters. For those that do have access, there is concern over the blood quantum policy, including whether non-Native individuals can be on harvest vessels and whether Alaska Native individuals from communities outside of Southeast Alaska are eligible. Second, some community members lack training in sea otter hide preparation, including skin sewing, and artistic modifications of the hides. Third, there are concerns over access to markets for selling handicrafts. Although the region receives a large number of tourists each year, there is currently a lack of awareness by tourists on cultural harvest practices and the legality of purchasing sea otter and other marine mammal handicrafts.

*Recommendations*

Representative stakeholders expressed interest in increased inter-community collaboration to learn from harvest and handicraft programs that exist already and explore the potential for adoption in other regions. Creation of a regional stakeholder network composed of Alaska Native communities, State, and federal partners would benefit the broader community by providing a forum for sharing ideas. This effort could potentially fall within the framework of Section 119 of the MMPA, which allows for establishment of cooperative agreements with Alaska Native organizations. A working group could develop and sustain communications through forums on a website, a social media platform, or an electronic or paper newsletter.

There were several requests for clarification on blood quantum policy and eligibility for participation in subsistence harvest practices. These clarifications could alleviate uncertainties regarding legal take. Another major obstacle to implementation of subsistence programs is funding. Stakeholders expressed interest in seeking financial support for training in all aspects of harvest and handcrafts, including harvest techniques, pelt production, and the arts. Funding in support of vocational program or scholarships for attendance would be beneficial. Some of these ideas may be of mutual interest with State and government agencies.

Stakeholders emphasized a desire for better communication with tourists. This could be achieved through preparation of an informational brochure explaining cultural harvest practices and the legalities of purchasing handicrafts. This could be coordinated by Alaska Native communities, the U.S. Fish and Wildlife Service (Service), and the National Marine Fisheries Service (responsible for management of whales, seals, sea lions, dolphins and porpoises), and the tourism industry. There were additional requests to explore options for handicraft market expansion in the United States. The addition of a certification scheme that authenticates sea otter handicrafts from Alaska by Alaska Native communities could help ensure quality control.

### *Conflicts with Subsistence and Commercial Shellfish Fisheries*

For Alaska Native communities, traditional harvest practices often included localized harvest of sea otters to alleviate predation pressure on shellfish by sea otters, which in turn, could increase availability of shellfish for harvest. Shellfish collection continues to be an important component of Alaska Native community cultural practices, but the situation since sea otter reintroduction and range expansion has been complicated with additional legal considerations and stakeholder interests.

Commercial shellfish fisheries emerged in Southeast Alaska when sea otters were absent. Without sea otter predation, certain shellfish populations thrived and allowed for productive fisheries on these species to develop. Since the sea otter reintroduction, sea otter population size has increased and the range has expanded, putting sea otters into direct conflict with these commercial fisheries. Productivity of shellfish fisheries have declined as sea otters have increased, causing some fisheries to become unprofitable or close all together. Regional depletion can result in operators shifting their focus to other species and/or new areas, which could put them into conflict with Alaska Native communities and other personal use fisheries. The State of Alaska works closely with commercial fisheries to manage shellfish fisheries under a principle of sustained yield. There is an increasing need to coordinate subsistence and commercial shellfish harvest practices to allow opportunity for fisheries to continue in a manner that is in alignment with state and federal policies.

*Recommendations*

Sea otters are currently managed at the regional stock level, but their impacts are apparent at the local level. For this reason, subsistence and commercial fishery stakeholders expressed interest in exploring ideas for spatial management of sea otters in a coordinated manner. The Sustainable Arts Initiative in the Sitka area may provide a template for how coordinated sea otter subsistence harvests can help to protect local subsistence shellfish areas near a community. It is uncertain whether this approach could be replicated at a scale sufficient to address the concerns of commercial shellfisheries. Some commercial operators have suggested that if sea otters continue to expand, buy-back programs may become necessary to reduce the size of the fleet.

Section 109 of the MMPA allows for the involvement of the State of Alaska in future management efforts. This may be an avenue where Alaska Native communities, commercial fisheries, the State of Alaska, and the Service could collaborate to identify strategies that provide balance between MMPA policy and an appreciation of the socio-cultural and economic value of shellfish fisheries to community members.

### *Sea Otter Population Ecology and Ecosystem Status*

The Service is responsible under the MMPA to collect data on sea otter population size, distribution, and trends. These population surveys should be carried out regularly using standardized and reliable methods to accurately document population trends. Additional information on the abundance and distribution of shellfish as prey for sea otters and suitable habitat are also important for understanding how the ecosystem affects, and is affected, by sea otters. This ecological information is challenging to gather at the local and regional scales, and monitoring changes through time is even more challenging. Stakeholders expressed interest in future research and monitoring efforts to provide current estimates of sea otter population size and distribution, and the dynamics among sea otters, shellfish, and nearshore habitats.

Stakeholders requested further clarification on Optimum Sustainable Population (OSP), carrying capacity (*K*), and Maximum Net Productivity Level (MNPL). These terms are used within the MMPA and are therefore a critical component of how sea otters and their ecosystems are managed. Some stakeholders asked for clarification on how these values are estimated. Other stakeholders requested further clarification on how spatial variation in shellfish resources, habitat, and harvest practices across the region are included in these estimates. All of these terms relate to the sustainability of this sea otter population at the regional level. Stakeholders sought clarity on whether social, cultural, and economic sustainability are also factored into these classifications.

Stakeholder groups recognize the substantial ecological role sea otters play in the ecosystem. Sea otters have experienced drastic changes over the past few hundred years, in which they went from being locally abundant, to entirely absent in the early 20th century, to their current status of recovery and range expansion into former habitats. There are differing perspectives on how this ecosystem should function in the future and how balance can be achieved among all stakeholders.

*Recommendations*

Workshop participants requested that the Service conduct a comprehensive sea otter population survey in Southeast Alaska as soon as possible. This ideally would occur in 2021 to provide current information on population size, distribution, and range expansion. Additional information on shellfish resources, including their availability pre- and post-sea otter occurrence, could facilitate shellfish fisheries management and further understanding of sea otter impacts and potential impacts in the future. Alaska Native community representatives expressed their interest in facilitating collection of Traditional Ecological Knowledge to better understand how sea otters and associated ecosystems have changed through time. Representatives also identified how local community members, particularly youth, could be included in future citizen science data collection methods to document distribution of sea otters, shellfish, and habitat. This citizen science program could increase collaboration among

local, state, and federal partners, provide localized and repeatable data, that if standardized across the region, could help identify spatial and temporal trends. Overall, there was broad interest in increasing the amount of available data to update the regional sea otter conservation plan and identify strategies for local management.

## Next Steps

At the conclusion of the workshop, the steering committee reconvened to review the recommendations generated during the breakout sessions and identify priority action items. The following is a list of actions and management approaches that can be accomplished under current federal and state laws. It should be noted that many of the actions listed below are beyond the jurisdiction of the Service. Our hope is that these recommendations will help to guide future collaborative efforts in the region to address sea otter management and resource conflict issues in Southeast Alaska by all engaged agencies and organizations.

### *Stakeholder Engagement*

It is clear that there are a broad diversity of viewpoints on sea otter management issues among stakeholder groups. Addressing areas of conflict will require careful, continuing, and inclusive dialog. The workshop steering committee recommended that a working group representing a cross section of regional stakeholders, researchers and managers (referenced hereafter as the sea otter stakeholder working group) be formed and meet periodically to review progress on these research and management recommendations and to identify areas for additional collaboration.

### *Research and Information Needs*

Estimate abundance. Several workshop sessions emphasized the need for new sea otter abundance information to help inform management decisions. The U.S. Fish and Wildlife Service (Service) is currently working on an aerial survey design for Southeast Alaska, and plans to initiate aerial surveys in the summer of 2021 (conditional on the availability of funds).

Estimate population status relative to Optimal Sustainable Population (OSP) levels. In addition to a new abundance estimate, efforts should be made to evaluate the status of the Southeast stock of sea otters relative to its OSP range. This will require additional modelling efforts to estimate the lower bound of the OSP range (the Maximum Net Productivity Level).

Investigate the ecological and economic role of sea otters in Southeast Alaska. Focused research on predator-prey relationships and the ecological and economic impacts (both positive and negative) on commercially important shellfish and finfish species is needed to inform sound management decisions. The steering committee noted that there were already some efforts in this direction being carried out by researchers with the College of Fisheries and Ocean Sciences

in Juneau. The steering committee recommended inviting an appropriate representative to sit in on the sea otter stakeholder working group meetings.

Support local and citizen science. Several workshop participants expressed interest in participating in community based research. Researchers and managers should consider the knowledge base that exists within the communities of Southeast Alaska to help inform and implement their research activities. Collaborative science programs could help to foster trust and understanding between managers and stakeholder groups.

### *Information Sharing*

Several questions were raised during the workshop about where to find information regarding sea otter management; applicable laws and policies; sea otter population status and trends; and information on subsistence sea otter hunting. Recommendations to improve information sharing included:

Develop a set of "Frequently asked Questions" for subsistence hunters and artisans (see Appendix 1)

Develop a web-based portal for finding sea otter information The steering committee recommended consolidating information regarding sea otter research, management and relevant laws and policies on a website, with links to other partners and stakeholder websites.

Engage in community outreach and dialog. There were several requests from workshop participants for direct dialog between sea otter managers and affected user groups on sea otter issues.

### *Subsistence Harvests*

Alaska natives are authorized to harvest sea otters for subsistence and the manufacture of handicrafts, which can provide economic opportunities in rural Alaska communities, and potentially serve as a mechanism for controlling sea otter numbers on a local scale. Workshop participants identified several barriers to participation in sea otter hunting activities and marketing their handicraft products. Recommendations to overcome these hurdles included:

Develop outreach products for potential buyers of authentic native handicrafts. The Indian Arts and Craft Board, in partnership with the Service and the Sea Alaska Heritage Institute are collaborating on the development of a Point of Sale brochure for potential customers wishing to purchase clothing and handicraft items manufactured from sea otter pelts. The brochure will address legal considerations for people wishing to purchase authentic native handicrafts.

Seek funding to support development of Alaska native artists. Several workshop participants recommended launching a region-wide program to teach skin sewing in an effort to perpetuate the traditional art practice of using sea otter fur and to create cottage industries in Southeast

Alaska. Support for marketing campaigns emphasizing the legal and sustainable use of sea otters by Alaska natives were also identified as a priority to help develop the market for sea otter fur products.

### *Management Planning*

Develop local harvest management plans. Coordinating subsistence harvest activities at a local spatial scale is a customary and legal practice. The Sustainable Arts Initiative appears to have had a positive localized impact on subsistence shellfish populations in the Sitka area, while providing economic opportunities to local hunters and artisans through the manufacture and sale of sea otter fur products. Several communities on Prince of Wales Island have expressed interest in replicating this type of project in their communities and are starting to develop local harvest management plans. The workshop steering committee encouraged the development of local harvest management plans and recommended that the development and implementation of local harvest management plans be networked at a regional scale and coordinated where possible.

Link local management plans at a regional scale. To share knowledge between local communities and governance agencies at different scales, local management plans should be coordinated at a regional scale. The workshop steering committee recommended that the Service consider developing a regional management plan for sea otters that considers and incorporates local harvest management plans. Regional coordination would also provide opportunities for investigation and research into strategies for optimal allocation of harvest effort at various scales in order to achieve social, economic, and ecological objectives. Stakeholders should be provided meaningful opportunities for input on the development of a regional management plan. The sea otter stakeholder working group could potentially serve as a forum for helping to identify a vision and structure for this regional management plan.

# Acknowledgments

We would like to thank the Alaska-based consulting firm North Star Group for their assistance in organizing, coordinating and facilitating the stakeholders meeting. We would also like to thank our Steering Committee for their help and guidance in planning, and implementing the meeting. Steering Committee members included:

Phil Doherty, *Southeast Alaska Regional Dive Fisheries Association*
Kathy Hansen, *Southeast Alaska Fishermen's Alliance*
Dr. Lynn Lee, *Parks Canada, Gwaii Haanas National Park Reserve, National Marine Conservation Area Reserve, and Haida Heritage Site*
Dr. Patrick Lemons, *U.S. Fish and Wildlife Service*
Mike Miller, *Indigenous Peoples Council for Marine Mammals*
Dr. Lori Polasek, *Alaska Department of Fish and Game*
Dr. Tim Tinker, *USGS, Nhydra Ecological Consulting*

Finally, we would like to acknowledge the Sealaska Heritage Institute's generous support of the opening reception in the Walter Soboleff building. It was a great success and set a positive, collaborative tone for the meeting.

# Appendix 1: Frequently-Asked Questions about Sea Otter Hunting in Alaska

The Marine Mammal Protection Act, (MMPA) 16 United States Code 1361 et seq. and 50 Code of Federal Regulations Part 18, are the law and regulations that apply to sea otters.

## *Before the Hunt*

**Who may hunt sea otters?**

The MMPA prohibits all "taking" (including hunting) or importation of marine mammals and marine mammal products. There is an exemption providing for the taking (hunting) of marine mammals by any Indian, Aleut, or Eskimo who resides in Alaska and who dwells on the coast of the North Pacific Ocean or the Arctic Ocean if such taking—

(1) is for subsistence purposes; or

(2) is done for purposes of creating and selling authentic native articles of handicrafts and clothing

(3) in each case, is not accomplished in a wasteful manner.

**Why does the U.S. Fish and Wildlife Service (Service) require Alaska Native people to have one-fourth degree Alaska Native blood?**

50 CFR 18.3 provides:

> Alaskan Native means a person defined in the Alaska Native Claims Settlement Act (43 U.S.C. section 1603(b) (85 Stat. 588)) as a citizen of the United States who is of one-fourth degree or more Alaska Indian (including Tsimshian Indians enrolled or not enrolled in the Metlaktla Indian Community), Eskimo, or Aleut blood, or combination thereof.

**If I am Native American from Washington State but live in Alaska, can I hunt sea otters?**

No, only Alaska Natives can hunt sea otters.

**Can a person who is Alaska Native but is no longer living in Alaska return temporarily to hunt sea otters? (Such as vacationing in Alaska)**

No, because they are no longer residing in Alaska and dwelling on its coast.

**Is there a hunting season for sea otters?**

Alaska Native people can hunt sea otters anytime of the year.

**Do Alaska Native persons need a permit to hunt sea otters?**

Not from the Service. Some Tribal governments may require a permit. Please check with the Tribal government in the area you are hunting.

**Is there a specific area that I cannot hunt in?**
The MMPA does not limit the areas of Alaska where sea otters may be harvested. However, there may be some areas with hunting or access restrictions, such as National Parks (e.g. Glacier Bay National Park), state game sanctuaries, or private land. Some areas have state or local ordinances limiting where firearms can be discharged. Some Tribal governments encourage hunting in some areas and discourage hunting in other areas.

**Do I need to check with a Native entity before I hunt?**
The Service does not require this, but we encourage you to check with the Tribal government in the area you are hunting.

**Can an Alaska Native person stay in non-Alaska Native lodging prior to and after the hunt?**
Yes.

**If a sea otter hunter lives on the coast in one area, can he or she hunt in another area hundreds of miles from his home?**
Yes.

**Are there age restrictions for Alaska Native sea otter hunters?**
No.

### *During the Hunt*

**Is there a harvest limit for sea otters?**
No.

**Is there a limit of how many family members can hunt?**
No.

**Can a non-Alaska Native person accompany an Alaska Native person during the hunting of sea otters?**
Yes, as long as the non-Alaska Native person does not actively participate in the take (i.e. search for animals, shoot the animal, run the boat while the animal is being hunted, harvested, herded, recovered or collected).

**Can an Alaska Native person charter a boat from a non-Alaska Native person to go sea otter hunting?**
An Alaska Native person can rent a boat from a non-Alaska Native person. However, the non-Alaska Native person cannot actively participate in the hunt, including driving the boat while the animal is being hunted, harvested, herded, recovered or collected.

**Can a non-Alaska Native person drive the boat that is taking sea otter hunters out?**
A non-Alaska Native person can drive the boat until the sea otter hunt begins. Once hunting, harvesting, herding, recovering or collecting of sea otters begins, only an Alaska Native person can drive the boat. The non-Alaska Native person may drop a hunter off at a hunting location.

**If an Alaska Native person uses a skiff to hunt sea otters, and is based out of a larger boat operated by a non-Alaska Native person, can the Alaska Native person leave harvested sea otters on the larger boat while out hunting?**

The hunter may leave the harvested otters on the larger boat. However, the MMPA prohibits the transportation of marine mammals by non-Alaska Native people. Therefore, the Alaska Native person must be on board the larger boat when the otters are transported.

**If the meat is not desirable to eat, how can the hide be harvested in a manner which is not regarded as wasteful?**

50 CFR 18.23 provides for the taking of marine mammals for subsistence purposes or purposes of creating and selling authentic Native articles of handicraft and clothing. This regulation requires only the hide and skull to be kept from a harvested sea otter.

**What does "wasteful manner" mean?**

Wasteful manner is defined in 50 CFR 18.3 as:

> Any taking or method of taking which is likely to result in the killing or injuring of marine mammals beyond those needed for subsistence purposes or for the making of authentic native articles of handicrafts and clothing or which results in the waste of a substantial portion of the marine mammal and includes without limitation the employment of a method of taking which is not likely to assure the capture or killing of a marine mammal, or which is not immediately followed by a reasonable effort to retrieve the marine mammal.

## *After the Hunt*

**Do sea otter harvests need to be reported?**

Yes, sea otter hides and skulls must be tagged by a Service representative (known as "taggers") within 30 days of the harvest. For a list of taggers in your area contact the Service Marine Mammal Marking and Tagging Program. Call (907) 786-3800 or 1-800-362-5148

**Why do these remains need to be tagged?**

This allows harvest numbers to be monitored and provides important biological information about the health of the sea otter population.

**How long does the tag need to remain in the hide?**

The tag must remain attached to the hide throughout the tanning process and until the skin has been cut into parts for creating an authentic Native article of handicraft or clothing.

**Why is the skull required for tagging?**

The skull provides the Service with valuable biological data about the sea otter. For example, teeth are used for aging the animal.

**What do I do if the tag breaks?**
Contact the Service Marine Mammal Marking and Tagging Program. Call (907) 786-3800 or 1-800-362-5148

**Where do sea otter hides need to be taken for tanning?**
Sea otter hides may be home tanned by Alaska Native peoples or they may be tanned at tanneries that are registered with the Service. For a list of registered tanneries contact (907) 786-3800 or 1-800-362-5148.

**Must a sea otter hide be tagged before tanning?**
A sea otter hide must be tagged within 30 days. If the hide is tanned within 30 days of the sea otter take, it doesn't need to be tagged before it's tanned. If the hide was tagged before tanning, the tag must stay on throughout the tanning process. A tannery may require the hide be tagged before they accept it.

## *Making and Selling Sea Otter Products*

**May unaltered (tanned or untanned) sea otter hides be sold or transferred?**
Yes, but unaltered hides may only be sold/transferred from one Alaska Native Person to another Alaska Native person or to a registered agent for re-sale to other Alaska Native peoples.

**Can sea otters be used for educational purposes, such as a cultural camp or skin sewing class?**
Raw sea otter parts may be used in classroom situations to make handicrafts provided the individuals using the material are Alaska Native peoples. If non-Alaska Native students wish to participate in such a class, substitutions for sea otter parts, such as moose hide, may be used.

**As an Alaska Native person, can I travel across the international border with a sea otter hide or product?**
A CITES permit is generally required for sea otter products to move internationally. However, different countries have different requirements and some may allow sea otter products to move across the border if they are personal effects.

**Can I take/trade sea otter pelts/products with my family in Canada?**
Canadian law prohibits the take of sea otters and does not allow commerce or trade involving sea otter products.

**Is there a limit on the number of sea otter hides that can be sold or on the amount of money that can be made from the sales?**
There are no limits on the number of sea otter hides sold or on the amount of money made from those sales.

**Is it legal for an Alaska Native person to sell sea otter products to a non-Alaska Native person?**

Yes, however federal regulation requires that all marine mammal parts be significantly altered, and made into authentic Native articles of handicraft and clothing before being sold to non-Alaska Native peoples or sold in interstate commerce.

**Who can make authentic Native articles of handicraft and clothing?**

Only Alaska Native peoples may make authentic articles of handicraft and clothing.

**Can an Alaska Native person who no longer lives in Alaska make handicrafts from sea otter pelts?**

Yes. Any Alaska Native person residing anywhere can make and sell handicrafts from sea otter parts. However, if taking, selling, or transferring raw parts from Alaska to another State, you must work with a registered agent.

**What qualifies as significantly altered?**

A sea otter hide is considered significantly altered when it is no longer recognizable as a whole sea otter hide, and has been made into a handicraft or article of clothing as is identified below:

1. A tanned, dried, cured, or preserved sea otter hide, devoid of the head, feet, and tail (i.e., blocked) that is substantially changed by any of the following, but is not limited to: weaving, carving, stitching, sewing, lacing, beading, drawing, painting, other decorative fashions, or made into another material or medium; and cannot be easily converted back to an unaltered hide or piece of hide.
2. Tanned, dried, cured, or preserved sea otter head, tail, or feet, or other parts devoid of the remainder of the hide which includes any of the following, but is not limited to: weaving, carving, stitching, sewing, lacing, beading, drawing, or painting, other decorative fashions, or made into another material or medium.

**Do non-Alaska Native peoples who purchase sea otter handicrafts need proof the item was made by an Alaska Native person?**

No proof is required by law or regulation.

**Are there labeling requirements for sea otter handicrafts?**

There are no labeling requirements for the items themselves.

**Do I have to keep a record of all the sea otter handicrafts I sell?**

No.

**Can I sell a sea otter blanket to a non-Alaska Native person?**

Yes, provided it is significantly altered.

**How many hides sewn together constitute a blanket?**
There is no minimum or maximum number of hides needed to constitute a blanket, as long as the final product is significantly altered.

**Can one make a rug in the shape of a sea otter?**
Yes, as long as it is not sold to a non-Alaska Native person. To sell it to a non-Alaska Native person, a rug may not be made out of the complete hide of a sea otter because it would not meet the definition of significantly altered. A blocked hide cut into the shape of a sea otter, lined and stitched on the back, would be significantly altered, and may be sold to a non- Alaska Native person.

**Can I make a life-sized stuffed sea otter?**
A whole sea otter mount would not be considered significantly altered and could not be sold to non-Alaska Native peoples. A stuffed toy, made from pieces of sea otter hide sewn together, would be considered significantly altered and could be sold to non-Alaska Native peoples.

**Can sea otters be made into pillows (for example blocking the hide and sewing it into a pillow with no liner)?**
Yes, that would meet the definition of significantly altered.

**Can a sea otter skull be sold as a display or made into a handicraft? How about if it is cleaned, bleached and has a painted native design on it?**
A cleaned skull or a cleaned skull mounted on a board would not be considered significantly altered and could not be sold to non-Alaska Native persons. Skulls, like ivory, claws, or bones, must be significantly altered, which would mean it has been substantially carved or scrimshawed. Painting alone, which could be removed easily from such hard parts, would not be considered a significant alteration.

**Can the claws, feet, and bacula of sea otters be made to jewelry and/or hunting implements for sale?**
Yes, when the hard parts are substantially altered; for example, carved or scrimshawed.

**Can you make yarn out of sea otter fur and sell the spun yarn to a non-Alaska Native person?**
Yes. The yarn would be considered significantly altered. However, a non-Alaska Native person could not create a new handicraft (scarf, sweater, etc.) from the yarn for resale. However, a non-Alaska Native person could use the yarn to create a garment for personal use.

**Does the Service have a clearinghouse or place handicrafters can take their items to be approved for sale?**
The Service will answer individual questions, but does not have a handicrafter clearing house.

**What kind of punishment or consequence is there for selling an item that is not significantly altered?**

Violation of the MMPA is a Class A federal misdemeanor. The maximum penalty is a fine of up to $100,000 and up to one year in jail. This is the maximum penalty only. Each case is evaluated individually.

**What do I have to do to sell internationally?**

All sea otter populations are listed in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Therefore, exports of raw or finished products require a CITES export document before legally leaving the United States. Our issuance of a CITES Appendix-II export permit for a sea otter handicraft relies on two findings:

1. the specimen being exported was legally acquired (i.e., came from a legally- harvested otter and otherwise complied with legal requirements, including applicable requirements of the MMPA and ESA), and
2. the export is not detrimental to the survival of the species, such as by contributing to the unsustainable harvest of sea otters to produce such items. If an item is derived from a legally-authorized and sustainable subsistence harvest and otherwise complies with the legal requirements for such handicrafts, the Service can issue a CITES export permit for it.

For more information contact the Service import/export office in Anchorage at (907) 271-6198.

**What is the definition of mass production?**

The MMPA (16 USC 1371(b)(2)) requires that handicrafts be made "without the use of pantographs, multiple carvers, or other mass copying devices". The regulation at 50 CFR 18.3 also require that handicrafts be made "without the use of pantographs, multiple carvers, or similar mass-copying devices." Further, the regulation states: "Improved methods of production utilizing modern implements such as sewing machines or modern techniques at a tannery may be used so long as no large-scale mass-production industry results. The formation of traditional native groups, such as a cooperative is permitted so long as no large-scale mass production results."

**Can two or more people work on the same sea otter garment?**

Yes, so long as no large-scale mass production results.

**If I have 10 sewing machines and my friends and I make otter coats, is that considered mass production?**

Not if each of your friends makes and sells their own coats, even if they use your sewing machines.

## *Further Questions Related to Sea Otters*

**Can a non-Alaska Native person alter a significantly altered product?**

If a non-Alaska Native person purchases or acquires a significantly altered product, they – as the owner -- may alter that item. However, once they alter the item, they may no longer sell the product.

**What jurisdiction does the State of Alaska (Alaska State Troopers) have as far as telling a person what is significantly altered?**

None. The MMPA is a federal law under the jurisdiction of the Service and the National Oceanic and Atmospheric Administration (NOAA).

**Are museums allowed to display un-handicrafted sea otter pelts?**

Yes, with a permit from the Service.

**Are sea otters listed under the Endangered Species Act (ESA)?**

Yes, but only the Southwest Alaska population. The ESA provides an exemption for Alaska Native peoples to take sea otters from the Southwest Alaska population, if such taking is for subsistence purposes and is not accomplished in a wasteful manner.

**What should be done if a dead or sick sea otter is found?**

Report it to the Alaska SeaLife Center's 7 day/24 hour hotline. Call 1-888-774-7325. The SeaLife Center then contacts the appropriate Service Marine Mammals Management biologist.

**Does the same process of hunting and tagging apply to seals and sea lions?**

No. NOAA regulates these species and should be consulted.

**What do we do if we observe non-Alaska Native peoples killing sea otters or violating federal wildlife laws?**

Report your observation to Service Office of Law Enforcement with as much pertinent information as you can. Call Anchorage (907) 271-2828, Fairbanks (907) 456-2335, Juneau (907) 586-7545, Nome (907) 443-2479.