SB

60

<TARGET><BILL>SB 60</BILL><SUBJECT>SB
60</SUBJECT><COMM>SJUD28</COMM></TARGET>

Fiscal Note

State of Alaska
2013 Legislative Session

Bill Version: SB 60
Fiscal Note Number: 1
(S) Publish Date: 3/18/13

Identifier: SB060-DFG-WCD-03-08-13
Title: BOUNTY ON SEA OTTERS
Sponsor: STEDMAN
Requester: Senate Resources Committee

Department: Department of Fish and Game
Appropriation: Wildlife Conservation
Allocation: Wildlife Conservation Special Projects
OMB Component Number: 474

Expenditures/Revenues

Note: Amounts do not include inflation unless otherwise noted below. (Thousands of Dollars)

	FY2014 Appropriation Requested	Included in Governor's FY2014 Request	Out-Year Cost Estimates				
OPERATING EXPENDITURES	**FY 2014**	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**
Personal Services							
Travel							
Services	28.0		28.0	28.0	28.0	28.0	28.0
Commodities							
Capital Outlay							
Grants & Benefits							
Miscellaneous							
Total Operating	**28.0**	**0.0**	**28.0**	**28.0**	**28.0**	**28.0**	**28.0**
Fund Source (Operating Only)							
1004 Gen Fund	28.0		28.0	28.0	28.0	28.0	28.0
Total	**28.0**	**0.0**	**28.0**	**28.0**	**28.0**	**28.0**	**28.0**
Positions							
Full-time							
Part-time							
Temporary							
Change in Revenues							

Estimated SUPPLEMENTAL (FY2013) cost: 0.0

Estimated CAPITAL (FY2014) cost: 0.0

ASSOCIATED REGULATIONS

Does the bill direct, or will the bill result in, regulation changes adopted by your agency? No
If yes, by what date are the regulations to be adopted, amended or repealed?

Why this fiscal note differs from previous version:

Initial version.

Prepared By:	Doug Vincent-Lang, Director	Phone:	(907)267-2339
Division	Wildlife Conservation	Date:	03/08/2013 12:00 PM
Approved By:	Kevin Brooks, Deputy Commissioner	Date:	03/08/13
	Department of Fish and Game		

FISCAL NOTE ANALYSIS #1

STATE OF ALASKA
2013 LEGISLATIVE SESSION

BILL NO. SB 60

Analysis

The current population of sea otters is about 28,000 animals. Their annual growth rate is 12-14%. For the purposes of calculating a bounty we assume the goal is to slow the growth of the sea otter population to reduce impact to fisheries resources and the fisheries they support. We used a target 10% removal rate, which translates into a target harvest of 2,800 otters (28,000 X .10 = 2,800 sea otters). If each of these sea otters qualified for a bounty this would translate into a total cost of $28,000. The administration of this payment should not require a dedicated position. Staff time associated with administering this payment would be spread over numerous division staff making any fiscal impact difficult to predict.

ALASKA STATE LEGISLATURE

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SENATOR BERT K. STEDMAN

Sponsor Statement

SB 60 – Bounty on Sea Otters

In Southeast Alaska, the growing sea otter population is devastating the shellfish biomass. Sea otters are the only marine mammals without blubber. As a result, the animals have a high metabolism and require large amounts of food to survive. The sea otter diet consists mainly of marine invertebrates including: crabs, clams, sea urchins, sea cucumbers, shrimp and abalone. Sea otters can consume up to 25 percent of their body weight per day. One male otter can consume up to 7,300 pounds of food per year. As of 2012, it is estimated that there are 21,500 sea otters in Southeast Alaska. Using an average body weight of 65 lbs. and a daily food intake of 25% of body weight, a sea otter population of 21,500 animals will consume over 127 million pounds of shellfish per year. To put that into perspective, the entire 2010 Southeast Alaska harvest in the dive and dungeness crab fisheries was 5.9 million pounds.

In Southern Southeast, the annual population growth rate is as high as 12 - 14%. If the population continues to go unchecked, predation from sea otters inevitably threatens the future of dive fisheries and crab fisheries in Southeast; jeopardizing hundreds of jobs and tens of millions of dollars in economic activity for the region. The dramatically increasing and currently high number of sea otters has, in some areas of Southeast, depleted shellfish stocks to a degree that subsistence, personal use, sport and commercial fishing have been halted. In recent years, ADFG has closed 17 dive fishery harvest areas due to the shrinking biomass.

The Marine Mammal Protection Act (MMPA) of 1972 removed marine mammals from the State of Alaska's management denying most Alaskans the opportunity to harvest sea otters. Section 101 of the MMPA provides an exemption for Alaska Natives to harvest sea otters for subsistence and artisanal purposes. 2012 was the highest reported subsistence harvest of sea otters in Southeast Alaska with 842 animals taken. According to the United States Fish and Wildlife Service (USFWS), the potential biological removal of sea otters from Southeast Alaska is 2,180 animals per year. The potential biological removal is a calculation used to determine the maximum number of animals, not including natural mortalities, that may be harvested from the sea otter stock while maintaining its optimal sustainable population. In the absence of any realistic effort by the USFWS to provide a sustainable harvest management regime for sea otters, it is my intention through the introduction of SB 60 to incentivize the lawful harvest of sea otters by Alaska Natives to, at the very least, reach the potential biological removal target. The incentive will come in the form of a $100 bounty paid by the Alaska Department of Fish and Game for every sea otter harvested.

To whom it may concern.

When I started commercial fishing in the early 1970's there were no sea otters in southern Southeast Alaska either in inside waters or out on the coast. About 1978 I started fishing out of Pelican Alaska, the western most port in Southeast. When I first got there fishermen were beginning to complain about the surge of the sea otter population in the area. At the time I wasn't familiar with the animal and being a novelty to me I enjoyed watching them float on their backs breaking open shellfish and gulping them down. Over the next 12 years I watched the population grow until there were times when I would see rafts of 50 or more grouped together eating always eating. As the sea otters scoured an area we noticed the kelp was growing thicker than before. Entrances to harbors like Hoktaheen on Yakobi island became so thick with kelp only the stabilizers from the trollers coming and going through the entrances kept the harbors open. People inquired as to why the kelp was coming in so thick and the answer was the sea otters were eating all the shellfish and sea urchins, part of the food chain that helped keep the kelp growth down.

As the years passed I began seeing sea otters off Sitka Sound and then off Kuiu Island and Warren Island. After I quit power trolling I spent more time in southern Southeast and several years ago I saw a few up inside Clarence Strait. Now there is a large colony in Moira Sound and in places where I used to pick a few abalone in the 70's there are no abalone to be found. I don't have all the statistics but the Fish and Game and others do and it's apparent the cause of the shellfish decline in Southeast is because of these handsome but voracious creatures.

Hopefully the government will do the right thing and allow some sort of predator control to keep the Southeast Alaska sea otter population in check. Yes the Russian hunters went too far and apparently there is some decline in the Aleutians possibly by killer whales or maybe they've just eaten themselves out of a place to live but in Southeast Alaska sea otters are alive and well and a they are a definite threat to the shellfish population.

Thank you for your time.

Carl H (Chip) Porter
P.O. Box 7844
Ketchikan, Alaska 99901

Born in Ketchikan in 1949 and a commercial fisherman since 1972

Sealaska Heritage Institute

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March 30, 2012

US Fish and Wildlife Service
Marine Mammals Management Office
1011 East Tudor Road MS-341
Anchorage, AK 99503

RE: Draft issued by the USFWS, Dept. of Interior regarding "Significantly Altered" in MMPA

Dear Ms. Frances Mann:

Sealaska Heritage Institute (SHI) opposes the use of the terminology "significantly altered" in its entirety.

Congress was very clear in that "authentic Native articles of handicrafts and clothing" means items composed wholly or in some significant respect of natural materials, and which are produced, decorated, or fashioned in the exercise of traditional Native handicrafts. Moreover, Congress stated that "Traditional Native handicrafts" include, but are not limited to weaving, carving, stitching, sewing, lacing, beading, drawing, and painting.

However, by including the language "significantly altered," in its regulation of sea otter Handicrafts, the USFWS is effectively legislating rather than regulating, and is not taking the intentions of Congress into account. Statutes should not be interpreted in a manner that renders another section of the same statute meaningless. In this case, it is the insertion of the language "significantly altered" which changes the customary and traditional culture of creating arts and crafts with sea otter.

The issue in the MMPA was not what can or cannot be made, but how to limit the creation of sea otter handicrafts to cottage industries and prevent a mass commercial harvest of marine mammals. Congress' solution was to define "authentic Native article of handicraft and clothing" to exclude mass copying devices [16 U.S.C. § 1371(b)(2)]. Had congress intended to limit these sales by defining significantly altered in such a way as to inhibit artistic ability, customs, traditions, and creativity, surely they would have expressly done so.

To provide some historical context, in 1972 on the Senate floor, Senator Hollings, the bill manager, announced that he would defer to Senator Stevens "for further elaboration on this point." 118 Cong. Rec. 25,254 (1972). Senator Stevens explained to the Senate how the S. 2871 Native hunting exemption was intended to operate. In doing so, Stevens made considerable effort to describe the importance of Native marine mammal hunting to obtain animal parts for handicrafts and clothing, rather than meat [25,258-63]. Stevens told the Senate:

> *"For many Alaska Natives, the selling of their handicrafts, fashioned painstakingly and with great skill from ocean mammals is the sole basis of their cash economy. These include the carving of ivory, the sewing of fur, and the sale of mammal food to other Natives."*

Senator Stevens elaborated on his language under this part when S. 2871 was reported: "Many Alaska Natives are completely dependent upon ocean mammal resources for their existence. For these people, ocean mammals provide not only food and clothing, but also, through the sale of meat, seal oil, handicrafts, and clothing, the only available source of money income with which they may purchase a few

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of the basic human needs taken for granted by everyone else in America. I feel our nation is morally bound to respect the traditions and lifestyle of these people." Senator Stevens went on to state that Alaska Natives be "permitted to make a living" through the sale of these arts and crafts and he more fully recognized that "by stripping these rights from them, they will face the certain fate of cultural extinction."

While it was the Senate version of this part that was adopted in Conference Committee, SHI believes that as the exemption's principal sponsor, Senator Stevens' explanation of the S.2871 Native hunting and crafts, as well as the cottage industry exemption, should be afforded significant weight. This has previously been recognized in "Ernst and Ernst v. Hochfelder, 425 U.S. 185, 203 (1976)."

Sealaska Heritage Institute believes that inclusion of "significantly altered" language by the USFWS is flawed, and its inconsistent interpretation is bringing about the very cultural extinction of skin sewing that Congress feared most. SHI believes that the "significantly altered" language is an unlawful attempt to legislate. In this case, the USFWS's use of the term "significantly altered" is meant to inhibit individuals from continuing their time-honored traditions of creating arts and crafts. Further, and more to the point, Sealaska Heritage Institute does not condone the USFWS including the language "significantly altered anywhere in the regulations regarding sea otter handicrafts.

Conclusion:

For the reasons stated above, the USFWS should move to support and enforce the interpretation that Congress intended whereby "authentic Native articles of handicrafts and clothing" means "items composed wholly or in some significant respect of natural materials, and which are produced, decorated, or fashioned in the exercise of traditional Native handicrafts," and furthermore, that traditional Native handicrafts include, *but are not limited to* "weaving, carving, stitching, sewing, lacing beading, drawing, and painting" and allow the uninhibited sale of arts and handicrafts that follow the general rules that congress established.

There is significant need for this small, culturally-centered "cottage-industry" as it has a significant impact on Alaska Natives. The harvest of sea otter and the use of its pelts are significant and crucial in the livelihood of a great many Alaska Natives, but these activities are being hindered by such illogical language as "significantly altered." By continuing this practice, the USFWS will surely bring about the cultural extinction of skin sewing with sea otter, obliterating a life Alaska Natives and their ancestors have lived for thousands of years.

Sincerely,

Rosita Worl

Rosita Worl
President, Sealaska Heritage Institute

Clarification of the term "significantly altered" by the hunters and handicrafters at the sea otter co-management workshop in Anchorage

October 10-12, 2012

A sea otter will be 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, which includes 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 ;

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.

USFWS internal proposed definitions

March 1, 2013

1. Dwells on the Coast.-Dwells on the coast refers to residing in Alaska and living permanently in an area or community that is adjacent to waters that are tidally influenced or in an area commonly inhabited and used by marine mammals.

2. Large-scale Mass Production.-Large-scale mass production refers to the use of mass copying devices such as pantographs, multiple carvers, embroidery machines, cutting presses, stencils, transfers, stamps, and/or the use of assembly line production. The formation of traditional Native groups or cooperatives and the use of modern implements such as sewing machines are permitted. However, there can be no manufacturing on a large-scale by means of extensive mechanization or division of labor, such as using a standardized pattern on a large-scale.

3. Significantly Altered From Their Natural Form.-

a. In order to be considered significantly altered from its natural form, a tanned, dried, cured, or preserved part of a sea otter hide, devoid only of the head, feet, and tail (i.e., blocked), or any other remaining parts of the hide, must be substantially changed through means including, but not limited to: weaving, carving, stitching, sewing, lacing, beading, drawing, painting, or other handicrafting methods. Examples of significantly altered items include those items typically known as: mitten; hats; neck rolls; gloves; mukluks; purses; and blankets or scarves made from a hide or pieces of hide with a backing or lining and stitched around the edges.

b. Items will not be considered significantly altered from their natural form where merely minimal changes have been made to a hide devoid only of the head, feet, and tail (i.e., blocked), and where those items can be easily converted back to an unaltered piece of hide. Examples of items not considered to be significantly altered include: a cape that consists of a large hide with a single button neck closure; a hide that has been drawn on with a marker; a blanket with a few stitches.

Senator John Coghill, Jr.
Senate Judiciary Committee
Juneau, AK 99801

March 17, 2013

RE: SB 60

Dear Senator Coghill:

I am a commercial fisherman that lives in Petersburg. I have fished Dungeness crab since 1991. It has been, and still is a viable endeavor, despite losing several productive areas to sea otter predation. With the current rate of growth of the sea otter population it is just a matter of time before our commercial fishery is lost. That is why I am strongly supporting SB 60 as a start to remedy the devastation of our state's valuable resources.

Since this is the Judiciary Committee, I assume legal aspects of this bill will be addressed here. While I am not an attorney, I do not see anywhere in this bill anything that would preempt the existing federal law that manages sea mammals. A bounty would ONLY be paid on proof to the state that a sea otter was taken by a person who legally could, AFTER that person had met his federal obligations.

A good friend of mine who is native, and who harvests sea otters explained the nuts and bolts of the system to me. When he harvests an otter, he notifies the local National Fish and Wildlife agent, who tags the animal. This tag has a specific and unique number on it. My friend is given a receipt, a copy of which is retained by the agent, and my friends obligation is complete. There are restrictions of what can be done with that pelt, but those issues are the sole responsibility of federal agency policing the management. The receipt received by my friend should be ample evidence for the state as to the legal taking of an otter.

This bill does nothing to the current management regime currently in effect. It does not, in any way, enable anybody to harvest that isn't already allowed to do so.

Once again, I will disqualify myself as an attorney. It does seem to me that at worst, this bill would be arguable in a court of law. I feel very strongly about Alaska's resources, and I find it unconscionable that the state of Alaska is not allowed to the table when it comes to management of a highly predatory species that is having an extremely negative effect on those resources that we are constitutionally obligated to protect and preserve. I see this bill as a possible way that our great state can have a hand, or at least a foot into the door, in bringing responsible management to all resources important to both economic and traditional users.

Thanks,

Max Worhatch

Craig Fleener – Sea Otter Testimony – SB 60

- In 1960 Alaska assumed management authority for sea otters. The management program conducted by the state included the successful reintroduction of sea otters to unoccupied habitat in Southeast Alaska, British Columbia, and Washington.

- The reintroduction was conducted with the intent that the state would retain management authority in perpetuity. However, the MMPA removed management authority from the state in 1972, transferring authority to the USFWS and breaking the commitment made to the state.

- The MMPA, blindly and imprudently, provides all-encompassing protections for every marine mammal irrespective of their abundance, impact to other species, or detrimental impacts to humans.

- The MMPA prohibits the take (i.e., hunting, killing, capture, and /or harassment) of marine mammals, and enacts a moratorium on the import, export, and sale of marine mammal parts and products. However, coastal-dwelling Alaska Natives are provided an exemption to hunt marine mammals for subsistence purposes and the making and selling of authorized handicraft items. There is also an exception for entities that apply for and are granted authorization for the incidental take of marine mammals during the course of an otherwise legal activity (such as incidentally caught otters while commercial fishing).

- Congress found that sea otters should be maintained at their optimal sustainable population level. The MMPA defines OSP as "maximum productivity of the population" and further interpreted by the USFWS as meaning "species which is the largest supportable within the ecosystem to the population level that results in maximum net productivity."

- In 2013, the USFWS found the estimated abundance of sea otters in Southeast Alaska to be over 25,000 individuals, growing at a rate of 12-14% and, based on that rate, is likely nowhere near carrying capacity.

- Sea otters are members of the weasel family (Mustelidae) and are related to mink and river otters. Adult males weigh 70 to 90 pounds (32-41 kg) with some individuals weighing 100 pounds. Females average 40 to 60 pounds (18-27 kg). Adults may reach a length of 4.5 feet (1.4 m).

- Because sea otters don't have an insulating blubber layer, they depend upon air trapped in their fur and require about 25% of their body weight in food each day to help them maintain body temperature. Sea urchins, crabs, clams, mussels, octopus, other marine invertebrates, and fishes make up the normal diet of sea otters. They usually dive to the bottom in up to 300 feet of water and return with several items of food, roll on their backs, place the food on their chests and eat it piece by piece using their forepaws, sometimes with a rock to crack shells.

- A principle part of their diet is shellfish and marine invertebrates including abalone, sea cucumbers, urchins, and geoducks. In recent years, sea otters have been linked to declines in these species to a degree that has led to fisheries restrictions or closures.

- Dive fisheries impacted by sea otters, including Dungeness crab, red sea urchin, California sea cucumber, and geoduck clams, are valued at about 16 million dollars annually. Sea otters also consume, to a lesser degree, other commercially important species, including shrimp, tanner crab, red king crab, and pinto abalone. The dive fisheries in Ketchikan, Craig, Sitka, and Petersburg are likely losing $2 million each year because of sea otter depredation and, if the current trajectory continues, the Guideline Harvest Level (GHL) cannot sustain these fisheries.

- Sea otters are an important element of the Southeast Alaska ecosystem and should be managed under conservation principles that assure long-term health. However, sea otters should not be protected at the expense of other elements of the ecosystem. It is important to manage this species to assure it does not destroy the very ecosystem it depends on for its ultimate survival. Sea otters are having a significant predatory effect on shellfish in Southeast Alaska, especially on sea cucumbers and Dungeness crab.

- The State of Alaska (SOA) has long expressed grave concerns about the devastating impact Southeast Alaska sea otters are having on shellfish populations, subsistence and commercial fishing opportunities.

- Over the past several years the state has considered several options to return Southeast waters to a holistic and more sensible ecosystem-based approach that manages for sustainable shellfish and sea otter populations. These include:

    - Statutory change to ease restrictions on sale of hides.
    - Returning management authority to the SOA under state management mechanisms.
    - Legislative amendments that exempt states from the MMPA for species that states reintroduce.
    - Exempting sea otters in Southeast Alaska from the MMPA.
    - Assisting coastal Alaska Natives in developing MMPA-authorized co-management plans that focuses Alaskan Native sea otter harvest in important fishing areas.
    - Working with coastal Alaska Natives with funding applications that assist in revitalizing a Southeast Alaska cottage industry to promote sustainable economies, enhance availability of sea otter pelts for traditional regalia, and impart harvest, handling, and traditions to the next generation.

- The SOA long-term goals are to:

    - Continue to encourage the USFWS to ease overbearing federal enforcement on subsistence hunters.
    - Work with the USFWS to liberalize federal interpretation of "handicraft" item and "significantly altered" to be more responsive to the customs and traditions of coastal Alaska Natives.
    - Work with Congress to amend components of the Endangered Species Act and MMPA to better reflect the health and abundance of Southeast Alaska sea otter populations.
    - Work closely with Southeast Alaska coastal Natives to develop sea otter management plans that are compliant with the MMPA, encouraging increased sea otter harvest.

- Restore shellfish populations to healthy sustainable levels to meet subsistence needs and provide commercial fishing opportunities.
- Ensure holistic management approaches in Southeast Alaska that ensure the persistence of a fully functional and healthy coastal ecosystem.
- Seek federal reimbursement to commercial fishers for lost economic opportunity.

From: Patricia OBrien
Sent: Friday, March 15, 2013 11:56 AM
To: Sen. Cathy Giessel
Subject: SB 60 Bounty on Sea Otters
Importance: High

Dear Senator Giessel,

This is to oppose SB 60 and request that this e-mail be shared with the senate resources committee, if possible this afternoon. The rhetoric on this issue has been vehement and one sided, including the scientific information from DF&G. At my age (72) it is discouraging to see only selective biological information provided, especially from a state agency.

Yes, sea otters eat shell fish. But there has been no mention that after the sea otter was nearly wiped out, sea urchins mowed down the kelp forests, depriving us of the healthy ocean ecosystem that previously existed and is now being restored. The value of the kelp forests is not yet fully understood, but it is known that kelp forests are a nursery for many fin fish including salmon and rock fish. Kelp absorbs an amazing amount of carbon from the atmosphere. Sea otters also are a lucrative tourism draw in California with interest by SE guides to build a sea otter tourism business. Following is a web site with succinct information on the resource benefits and conflicts related to sea otters: http://seaotters.com/2012/03/24/resource-benefits-and-conflicts-of-sharing-a-coast-with-sea-otters/

Here also is balanced scientific information from the recent UAS-SE symposium on sea otters: http://www.uas.alaska.edu/arts_sciences/naturalsciences/biology/sea_otter_symposium/index.html

Thank you for considering my comments.

Patricia O'Brien

Juneau, Alaska

789-9405

Southeast Alaska Fishermen's Alliance
9369 North Douglas Highway
Juneau, AK 99801
Phone: 907-586-6652 Email: seafa@gci.net
Fax: 907-523-1168 Website: http://www.seafa.org

March 12, 2013

Senate Resources Committee
Alaska State Legislature
State Capitol, Rm 205
Juneau, AK 99801

RE: Support for SB 60 – an act related to sea otter population management

Dear Senator Giessel, Chair and Resource Committee Members,

Southeast Alaska Fishermen's Alliance (SEAFA) is a multi-gear/multi-species membership based organization representing our members involved in the salmon, crab, shrimp and longline fisheries of Southeast Alaska/Yakutat.

SEAFA supports SB 60 as a mechanism for discussion and education about the effect of the expanding sea otter population on shellfish population so important to the local rural communities, subsistence users and commercial fishermen. SEAFA believes in the need for stabilizing the expanding population of sea otters in order to not completely deplete and end up listing other shellfish species as endangered. This legislation **supports only the legal harvest** of sea otters. Over 2,000 sea otters would have to be harvested to hold the population steady (not decline) and last winter 800 were harvested. On the alternative side the population will double in 6 years if more harvest does not occur. Using the current population of 25,000 sea otters in Southeast Alaska and a very conservative amount of 13.75 lbs of food a day eaten they are consuming approximately 125 million pounds a year.

SB 60 will help the Alaskan Natives with the cost of legally harvesting sea otters and hopefully elevate the discussion regarding the seriousness of the impact an expanding sea otter population will have on the shellfish species of Southeast Alaska.

Sincerely,

Kathryn Hansen

Kathy Hansen, Executive Director

UNITED FISHERMEN OF ALASKA

Mailing Address: PO Box 20229, Juneau AK 99802-0229
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Email: ufa@ufa-fish.org **Website:** www.ufa-fish.org

March 15, 2013

Senator Cathy Geissel, Chair
Senate Resources Committee
State Capitol
Juneau, AK 99801-1182
Email: Senator.Cathy.Giessel@akleg.gov

RE: Support for SB 60 / HB 145 regarding Re-introduced Sea Otters

Dear Senator Geissel, and members of the Senate Resources Committee;

United Fishermen of Alaska (UFA) is the largest statewide commercial fishing trade association, representing 36 commercial fishing organizations participating in fisheries throughout the state and its offshore federal waters. Fishermen in Southeast Alaska and UFA member groups for years have been alarmed by the rapid increase in sea otter populations, and noticeable impacts on shellfish and fishery resources throughout the region.

In 2009, UFA unanimously adopted Resolution 2009-1 (attached) supporting decreasing hurdles to Alaska Natives in their utilization of this resource, and requesting the Alaska Dept of Fish and Game to become more actively involved with USFWS in the management of sea otters and documenting their effects, among other concepts to address the sea otter situation.

In December of 2011, the McDowell Group released a report sponsored by UFA member group Southeast Alaska Regional Dive Fisheries Association (SARDFA), titled Sea Otter Impacts on Commercial Fisheries in Southeast Alaska, which can be found online at:
http://www.scribd.com/doc/74857876/MCDOWELL-GROUP-2011-Sea-Otter-Impacts-Report
This report estimates a direct loss of $12.8 million in ex-vessel value, and $22.4 million in first wholesale value to the Southeast Alaska economy attributable to increased sea otter populations since 1995. This represents a significant number of jobs lost in communities that already face very challenging circumstances.

UFA commends the SB 60 / HB 145 sponsors for drawing attention to this issue. We appreciate the intention to reduce the monetary hurdle incurred by Alaska natives that are legally authorized to harvest sea otter for use in handicrafts, and note that the bounty that would be authorized for legal harvest of sea otters would help alleviate the high costs of the necessary tanning and processing of hides, and materials needed to convert them to salable handicrafts. The involvement of ADF&G in providing the bounty and confirming the

legality of the take would also increase the level of coordinated activity with U.S. Fish and Wildlife in addressing the sea otter overpopulation.

Thank you for your attention to this issue, and your support of SB 60.

Sincerely,

Julianne Curry
Executive Director

CC:
Senator Bert Stedman
Representative Charisse Millett

Attachment

UNITED FISHERMEN OF ALASKA

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E-Mail: ufa@ufa-fish.org
www.ufa-fish.org

Resolution 2009-1

SEA OTTER RESOLUTION

WHEREAS, United Fishermen of Alaska (UFA) represent commercial fishermen organizations and individual fishermen involved in fisheries throughout Alaska in both state and federal waters; and

WHEREAS, sea otters are abundantly healthy and impacting important commercial, subsistence and personal use fishery resource such as crab, abalone, sea cucumbers, sea urchins and geoduck clams in some areas of the State; and

WHEREAS, sea otters are depressed in other areas of the State and critical habitat designation may affect fishery infrastructure and coastal development; and

WHEREAS, sea otters are protected by the federal government under the Marine Mammal Protection Act (MMPA); and

WHEREAS, the only allowable use of sea otters under the MMPA is by coastal Alaska Natives for subsistence or for the making of handicrafts by Alaskan Natives; and

NOW THEREFORE BE IT RESOLVED THAT, UFA supports appropriate local collaborative research projects and grant funding for sea otters whether the population is increasing or declining; and

THEREFORE BE IT FURTHER RESOLVED THAT, UFA supports management strategies which will decrease hurdles to Alaska Natives in their utilization of this resource; and

THEREFORE BE IT FURTHER RESOLVED THAT, UFA request that the Alaska Dept of Fish and Game become more actively involved with USFWS in the management of sea otters and documenting their effect within a region on fishery resources; and

THEREFORE BE IT FURTHER RESOLVED THAT, UFA requests the Federal and State agencies, Tribal community organizations and other entities affected by sea otters in the area to meet regionally and develop ecosystem-based sea otter management plans benefiting all users of these resources and protecting the fishery resources from depletion by sea otters and providing for access to resources in areas of sea otter depletion.

By UFA Board of Directors, November 18, 2009:

Joe Childers, UFA President

Attest: Mark D. Vinsel, UFA Executive Director

National Oceanic & Atmospheric Administration

NATIONAL MARINE SANCTUARIES

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Ecosystems: Kelp Forests

Kelp forests grow predominantly on the Pacific Coast, from Alaska and Canada to the waters of Baja California. Tiered like a terrestrial rainforest with a canopy and several layers below, the kelp forests of the eastern Pacific coast are dominated by two canopy-forming, brown macroalgae species, giant kelp (*Macrocystis pyrifera*) and bull kelp (*Nereocystis leutkeana*).

Giant kelp, perhaps the most recognized species of brown macroalgae, forms the more southern kelp forests, from the southern Channel Islands, California to northwestern Baja.

Four national marine sanctuaries harbor kelp forests. Giant kelp inhabits the Channel Islands National Marine Sanctuary as well as the Monterey Bay National Marine Sanctuary, where giant kelp and bull kelp coexist. In the more northern Gulf of the Farallones and Olympic Coast National Marine Sanctuaries, kelp forests are comprised of predominantly bull kelp.

Conditions required for growth: Kelp forests grow along rocky coastlines in depths of about 2 m to more than 30 m (6 to 90+ ft). Kelp favors nutrient-rich, cool waters that range in

The Importance of the Keystone

In nature, all living things are in some way connected. Within each community each species depends on one or more of the others for survival. And at the core of individual ecosystems is a creature, or in some cases a plant, known as a keystone species.

temperature from 5o to 20o C (42o to 72o F). These brown algae communities live in clear water conditions through which light penetrates easily. Kelp recruits most successfully in regions of upwelling (regions where the ocean layers overturn, bringing cool, nutrient-rich bottom waters to the surface) and regions with continuously cold, high-nutrient waters. Because the amount of dissolved inorganic nitrogen decreases significantly in marine waters warmer than 20oC, kelp experiences reduced or negative growth rates in warm water. This phenomenon is particularly evident in southern California where giant kelp forests deteriorate in the summer months.

Along the central California coast where the distribution of giant kelp and bull kelp overlap, giant kelp out competes bull kelp for light.

Kelp survival is positively correlated with the strength of the substrate. The larger and stronger the rock on which it is anchored, the greater the chance of kelp survival. Winter storms and high-energy environments easily uproot the kelp and can wash entire plants ashore.

The kelp forests in Gulf of the Farallones National Marine Sanctuary are small and localized compared to those in the Channel Islands, Monterey Bay, and Olympic Coast sanctuaries. Conditions influencing kelp forest development in Gulf of the Farallones National Marine Sanctuary may include: increased wave motion, unsuitable substrate, urchin predation, and turbidity and salinity effects of

This species operates much like a true key stone, which is the stone at the top of an arch that supports the other stones and keeps the whole arch from falling down. When a keystone species is taken out of its environment, the whole system could collapse.

In California's Monterey Bay National Marine Sanctuary the sea otter is a keystone species in the kelp forest ecosystem. Kelp forests provide food and shelter for large numbers of fish and shellfish. Kelp also protect coastlines from damaging wave action. One of the sea otter's favorite delicacies is the sea urchin who in turn loves kelp.

When present in healthy numbers, sea otters keep sea urchin populations in check. But when sea otters decline, urchin numbers explode and grab onto kelp like flies on honey. The urchins chew off the anchors that keep the kelp in place, causing them to die and float away, setting off a chain reaction that depletes the food supply for other marine animals causing their numbers to decline.

By the early 20th century when sea otters were nearly hunted out of existence for their fur, kelp beds disappeared and so did the marine life that depended on kelp. Years later, conservationists moved some

the San Francisco Bay plume.

Unique Characteristics of Kelp Plants: Instead of tree-like roots that extend into the substrate, kelp has "anchors" called holdfasts that grip onto rocky substrates.

From the holdfasts, kelp plants grow toward the water's surface. Gas bladders called pneumatocysts, another unique feature of kelp, keep the upper portions of the algae afloat. A giant kelp plant has a pneumatocyst at the base of each blade. In contrast, a bull kelp plant has only one pneumatocyst that supports several blades near the water's surface.

Life histories: Giant kelp is a perennial (i.e. it lives for several years) while bull kelp is an annual (i.e. it completes its life cycle in one year). Both types of kelp have a two-stage life cycle. They exist in their earliest life stages as spores, released with millions of others from the parent kelp, the sporophyte. The spores grow into a tiny male or female plant called a gametophyte, which produces either sperm or eggs. After fertilization occurs, the embryos may grow into mature plants (sporophytes), completing the life cycle.

remaining otters from Big Sur to Central California. Gradually, their numbers grew, sea urchin numbers declined, and the kelp began to grow again. As the underwater forests grew, other species reappeared.

Protecting keystone species, like sea otters, is a priority for conservationists. Often, the extent of the keystone functions of a species aren't known until the species has been removed from its environment and the ecosystem changes. Rather than wait until it may be too late for the system's health and survival, scientists make every effort to keep an ecosystem working as nature had intended.

(Photo Kip Evans)

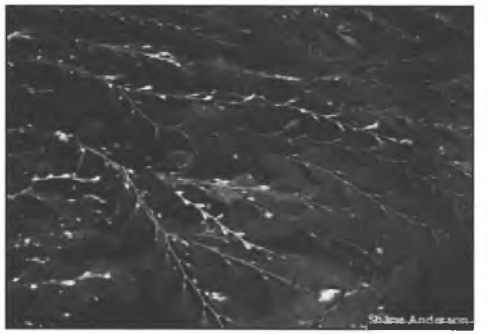
Holdfast of a giant kelp (Photo: John Heine)

Giant kelp can live up to seven years. Factors such as the severity of winter storms may affect its life span. Its average growth (in spring) is 27 cm/day (~10 inches/day), yet it may grow up to 61 cm/day (2 ft/day). The average growth of bull kelp is 10 cm/day (~4 inches/day).

The Kelp Forest Ecosystem: A host of invertebrates, fish, marine mammals, and birds exist in kelp forest environs. From the

holdfasts to the surface mats of kelp fronds, the array of habitats on the kelp itself may support thousands of invertebrate individuals, including polychaetes, amphipods, decapods, and ophiuroids.

California sea lions, harbor seals, sea otters, and whales may feed in the kelp or escape storms or predators in the shelter of kelp. On rare occasions gray whales have been spotted seeking refuge in kelp forests from predatory killer whales. All larger marine life, including birds and mammals, may retreat to kelp during storms or high-energy regimes because the kelp helps to weaken currents and waves.



Giant kelp (Photo: Shane Anderson)

Perhaps the most familiar image of kelp forests is a picture of a sea otter draped in strands of kelp, gripping a sea urchin on its belly. Both sea otters (*Enhydra lutris*) and sea urchins (*Strongylocentrotus spp.*) play critical roles in the stable equilibrium ecosystem. Sea urchins graze kelp and may reach population densities large enough to destroy kelp forests at the rate of 30 feet per month. Urchins move in "herds," and enough urchins may remain in the "barrens" of a former kelp forest to negate any attempt at regrowth. Sea otters, playing a critical role in containing the urchin populations, prey on urchins and thus control the numbers of kelp grazers.

UC Santa Cruz

UCSC study shows how urchin-loving otters can help fight global warming

Hearty appetite allows kelp forests to thrive and absorb CO2

September 07, 2012
By Guy Lasnier

Can an abundance of sea otters help reverse a principal cause of global warming?

A new study by two UC Santa Cruz researchers suggest that a thriving sea otter population that keeps sea urchins in check will in turn allow kelp forests to prosper. The spreading kelp can absorb as much as 12 times the amount of CO2 from the atmosphere than if it were subject to ravenous sea urchins, the study finds.

Sea otters convene in a kelp bed near Kodiak Island, Alaska. (Photo by Arthur Morris)

The theory is outlined in a paper released online today (September 7, 2012) in *Frontiers in Ecology and the Environment* by lead authors UC Santa Cruz professors Chris Wilmers and James Estes.

"It is significant because it shows that animals can have a big influence on the carbon cycle," said Wilmers, associate professor of environmental studies.

Wilmers, Estes, a professor of ecology and evolutionary biology, and their co-authors, combined 40 years of data on otters and kelp bloom from Vancouver Island to the western edge of Alaska's Aleutian Islands. They found that otters "undoubtedly have a strong influence" on the cycle of CO2 storage.

Comparing kelp density with otters and kelp density without otters, they found that "sea otters have a positive indirect effect on kelp biomass by preying on sea urchins, a kelp grazer." When otters are around, sea urchins hide in crevices and eat kelp scraps. With no otters around, sea urchins graze voraciously on living kelp.

Kelp is particularly efficient at sequestering CO2 from the atmosphere through photosynthesis. CO2 concentration in the atmosphere has increased 40 percent since the beginning of the industrial revolution, causing global temperatures to rise, the authors write.

Wilmers and Estes acknowledge that a spreading otter population won't solve the problem of higher CO2 in

the atmosphere but argue that the restoration and protection of otters is an example how managing animal populations can affect ecosystems abilities to sequester carbon.

"Right now, all the climate change models and proposed methods of sequestering carbon ignore animals," Wilmers said. "But animals the world over, working in different ways to influence the carbon cycle, might actually have a large impact.

"If ecologists can get a better handle on what these impacts are, there might be opportunities for win-win conservation scenarios, whereby animal species are protected or enhanced, and carbon gets sequestered," he said.

Mitigating increased CO2 in the atmosphere is a pressing issue in global environmental conservation with many obstacles and no easy solutions, the authors write. They note that markets have been established in Europe and the United States to trade carbon credits and thus inject an economic incentive into either reducing CO2 output or increasing CO2 sequestration.

They estimate that the CO2 removed from the atmosphere via the otter-kelp link could be worth between $205 million and $408 million on the European Carbon Exchange. "An alluring idea," they write, would be to sell the carbon indirectly sequestered by the sea otter protected kelp forest "as a way to pay for their reintroduction and management or to compensate losses to shell fisheries from sea otter predation."

The paper, "Do trophic cascades affect the storage of flux of atmospheric carbon? An analysis of sea otters and kelp forests," will be published in the October issue of *Frontiers in Ecology and the Environment*. Wilmers and Estes were joined by Matthew Edwards, San Diego State University; Kristin L. Laidre, University of Washington; and Brenda Konar, University of Alaska.

Funding for the research came from the National Science Foundation and the National Oceanic and Atmospheric Administration.

See Also

- Article in Frontiers in Ecology and the Environment [http://www.esajournals.org/doi/abs/10.1890/110176]

Est.1958 Southeast Conference

612 W. Willoughby., Suite B • P.O. Box 21989 Juneau, AK 99802• 907-523-4350• Fax 907-463-5670 • info@seconference.org

Senator Stedman
Capitol Building Room 31
Juneau, AK 99811

RE: Support for SB 60 – an act relating to sea otter population management

Dear Senator Stedman,

I am writing on behalf of the Southeast Conference. Southeast Conference is a regional, nonprofit corporation that advances the collective interests of the people, communities and businesses in Southeast Alaska. Members include municipalities, Native corporations and village councils, regional and local businesses, civic organizations and individuals from throughout the region.

I would like to express the support of Southeast Conference for SB 60 – an act related to sea otter population management – as a mechanism to spark a productive and urgent conversation about solutions to conserve our shellfish species in Southeast Alaska (SEA).

Recent research by the U.S. Fish & Wildlife Service (USFWS) has documented the following facts about the sea otter population in SEA. The sea otter population is approximately 25,000 and growing at 12-14% per year. These marine mammals consume shellfish at a rate of approximately 25% of their body weight (average of 65 lbs) each day, equating to an average annual shellfish harvest of 148 million pounds. By comparison, the annual commercial shellfish harvest in SEA was less than 5 million pounds in 2012. Projecting this growth out to the year 2018, the sea otter population will be approximately 50,000 and the annual shellfish harvest by otters will be approximately 300 million pounds.

The sea otter is decimating the shellfish populations in SEA. This fact has been documented by commercial divers, fishermen, subsistence users and biologists at the Alaska Dept. of Fish & Game. If the growth of the sea otter population is not reduced, not only will all commercial shellfish harvests in SEA be closed, but also sport, personal use and subsistence harvests will end.

SB 60 will encourage the legal harvest of sea otters by Alaska Natives in order to save shellfish species in SEA. SB 60 will also elevate the discussion and the seriousness of the problem. We hope further productive discussions regarding proactive sea otter management will lead to innovative ideas which will provide a win-win solution for all who depend upon the shellfish resources in the region.

Thank you for your consideration.

Shelly Wright
Executive Director, Southeast Conference

ARDOR
Alaska Regional Development Organizations
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LEGAL SERVICES

DIVISION OF LEGAL AND RESEARCH SERVICES
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Mail Stop 3101

State Capitol
Juneau, Alaska 99801-1182
Deliveries to: 129 6th St., Rm. 329

MEMORANDUM December 6, 2012

SUBJECT: Establishing a bounty on sea otters
(Work Order No. 28-LS0160\A)

TO: Senator Bert Stedman
Attn: Darwin Peterson

FROM: Alpheus Bullard
Legislative Counsel

This memorandum accompanies the bill described above. Please be aware that providing a state bounty for sea otters taken by Alaska Natives is likely to be interpreted as conflicting with federal law. Sea otters are protected under 16 U.S.C. 1361 - 1421h (Marine Mammal Protection Act (MMPA)).[1] The Act prohibits the harvest of sea otters, permitting only certain Alaska Natives to take sea otters for subsistence or "for purposes of creating and selling authentic native articles of handicraft and clothing" under 16 U.S.C. 1388.[2]

Providing a state bounty for harvested sea otters, even if the sea otters are only taken by those persons permitted to do so under the MMPA, is likely to be interpreted as conflicting with the intention and purposes of the MMPA.

Under the Supremacy Clause of the federal constitution, state laws that interfere with federal laws are invalid.[3] To avoid preemption, state law must be consistent with (or

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[1] In addition to protections offered by the MMPA, note that in 2005, the U.S. Fish and Wildlife Service listed the southwestern Alaska sea otter population, which ranges from Kodiak Island through the western Aleutian Islands, as threatened under section 4 of the Endangered Species Act. See 70 FR 46366. In 2009, the U.S. Fish and Wildlife Service designated nearly 5,900 square miles as critical habitat for sea otters in the Aleutian Islands, Bering Sea, and Alaska Peninsula. See 74 FR 51988.

[2] This section (enacted as section 119, MMPA amendments of 1994 (Public Law 103-238)) permits the National Marine Fisheries Service and the U.S. Fish and Wildlife Service to enter into cooperative agreements with Alaska Native organizations. For the regulation adopted under this section that permits certain Native Alaskans to take marine mammals without a permit, see 50 C.F.R. sec. 216.23 ("Native exceptions").

more protective than) the federal law. Providing a bounty, and thus incentivizing the taking of sea otters for reasons other than subsistence and artisanal purposes, is likely to be interpreted as contrary to both the purposes and objectives of Congress in enacting the MMPA and in establishing a narrow exception for certain Native Alaskans to take sea otters for subsistence and artisanal purposes.

If you have questions, please do not hesitate to contact me.

TLAB:ljw
12-503.ljw

Enclosure

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[3] "'Federal laws can preempt state laws in the following three ways: (1) if Congress expressly declares that state law is preempted; (2) if Congress demonstrates an intent to occupy a field exclusively; and (3) if there is an actual conflict between federal and state law.' When considering preemption, courts 'start with the assumption that the historic police powers of the States were not to be superseded by [a] Federal Act unless that was the clear and manifest purpose of Congress.'" State v. Progressive Casualty Ins. Co., 165 P.3d 624, 631 (Alaska 2007) (footnotes and citations omitted).

Sea Otter Impacts on Commercial Fisheries in Southeast Alaska

Prepared for:

Southeast Alaska Regional Dive Fisheries Association

Prepared by:

McDowell GROUP

Juneau • Anchorage

November 2011

Table of Contents

Executive Summary

Purpose

The purpose of this report is to estimate the economic loss to Southeast Alaska commercial fisheries due to growing sea otter predation. The sea cucumber, geoduck, red sea urchin, and Dungeness crab fisheries are examined. This current document is an update of a similar economic loss assessment conducted by McDowell Group at the end of 2005. The 2005 study was, in turn, based on estimated loss of commercial species volume and ex-vessel value calculated by the Alaska Department of Fish and Game (ADFG). This current study uses similar methodology utilizing data collected by ADFG.

Methodology

Economic loss estimates in this report are based on scientific biomass data generated by subdistrict bottom surveys conducted by ADFG biologists and divers. Every dive fishery area is surveyed by ADFG divers on a rotational basis in transects prior to commercial openings in order to calculate biomass and generate Guideline Harvest Limits (GHL) for each fishery. Staff (primarily biologists) then note fishery areas which display physical evidence of sea otter predation and areas where sea otters are active.

McDowell Group has consulted extensively with ADFG staff and employed the same methods to calculate the estimated loss due to sea otter predation in the sea cucumber, geoduck, and red sea urchin fishery. In the Dungeness crab fishery, areas with high otter populations were compared to those with fewer otters to estimate the volume lost due to sea otter predation. Methodology is described in detail in this report body.

Summary of Study Findings

Economic Impacts of Sea Otter Predation on Commercial Species

- Sea otter predation in the red sea cucumber, geoduck clam, red sea urchin, and Dungeness crab fisheries is estimated to have cost the Southeast Alaska economy $28.3 million in direct, indirect, and induced impacts since 1995.

Economic Impacts of Sea Otter Predation on Southeast Alaska Commercial Fisheries

Fishery	Estimated Pounds Lost due to Sea Otter Predation	Estimated Ex-Vessel Value Lost Due to Sea Otter Predation	Estimated Wholesale Value Lost Due to Sea Otter Predation	Time Period
Sea Cucumbers	3,254,000	$5,294,000	$8,951,000	1996-2011
Geoducks	530,500	3,237,000	4,210,000	2005-2011
Red Sea Urchins	3,102,000	1,024,000	3,972,000	1995-2005
Dungeness Crab	2,681,000	3,317,000	5,301,000	2000-2010
Total	9,567,500	$12,872,000	$22,434,000	-

Source: ADFG data and McDowell Group estimates.

- Since 1995, it is estimated $22.4 million in wholesale value has been lost due to sea otter predation. The secondary (multiplier) impact of these losses on the regional economy is estimated to be an additional $5.8 million, for a total of $28.2 million.

- Dive fisheries and Dungeness crab fisheries in Southeast Alaska had a first wholesale value of $25 million in 2010, employing roughly 625 fishermen as well as processing workers and tender operators. The secondary economic activity resulting from these fisheries is estimated to be $6.5 million or equivalent to 59 full-time jobs.

Sea Cucumbers

- Since 1995, the sea cucumber fishery has lost an estimated 3.3 million pounds worth $9.0 million in wholesale terms, and $5.3 million in ex-vessel terms, due to sea otter predation.

- Sea otter impacts were particularly harmful in 2011, as an estimated 235,000 pounds was lost due to predation worth $2.23 million in wholesale value.

- As a result of sea otter predation, the average commercial diver harvesting sea cucumbers in 2011 lost an estimated $7,000 in ex-vessel value.

- Since 1992, ADFG has closed seven areas either specifically due to sea otter predation or presumably due to sea otter predation. Sea otters have been noted to be negatively affecting 12 other harvest areas. See Appendix 2 for a complete list and map of fishery areas affected by sea otter predation.

Geoduck Clams

- Since 2005, the geoduck clam fishery has lost an estimated 530,500 pounds worth $4.2 million in wholesale terms, and $3.2 million in ex-vessel terms, due to sea otter predation.

- Impacts were particularly costly in 2011, as an estimated 140,900 pounds were lost due to predation worth $2.0 million in wholesale value.

- As a result of sea otter predation, the average commercial diver harvesting geoducks in 2011 lost an estimated $20,000 in ex-vessel value.

- No geoduck harvest areas have yet been closed due to sea otter predation, but ADFG has identified 27 fishery areas with evidence of sea otter predation. About 70 percent of the commercial geoduck harvest comes from these 27 fishery areas, where surveys note large craters and shell fragments left over from sea otter predation.

- Although no areas have yet been closed due to sea otter predation, some prospective fishery areas found by commercial divers with sizable geoduck populations were never proposed to ADFG and therefore never opened. Sea otter predation in the area made it likely the fishery would not be worth surveying and managing by the time it could be opened (Doherty 2011, personal communication).

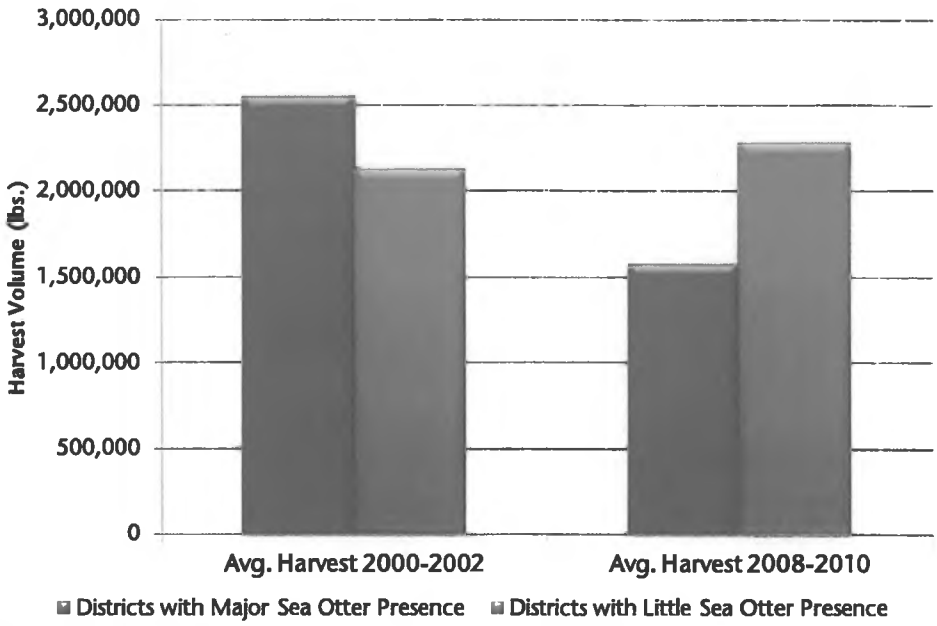
Red Sea Urchin

- The harvest of red sea urchins has declined substantially since 2006. Industry sources indicate only one or two divers are harvesting urchins in 2011, with only one active buyer. Sea otter predation impacts since 2005 have not been compiled, due to the decline of the fishery and the confidential nature of most data associated with it.
- The decline of the red sea urchin fishery in recent years is related to market factors and not due to sea otter predation.
- Prior to 2006, an estimated 3.1 million pounds of sea urchin harvest was lost due to sea otter predation, worth $4.0 million in wholesale value.
- Despite declining effort in the sea urchin fishery, sea otter predation continues to negatively impact stocks. The 2011/12 red sea urchin GHL is 3.28 million pounds, a 40 percent decline from the 2008/09 GHL of 5.44 million pounds. If the market value rebounds and fishery participation increases, the lost GHL due to sea otters will be realized in future years as GHL's are expected to decline.

Dungeness Crab

- Sea otters regularly eat Dungeness crab, which are an attractive food source given their abundance in Southeast Alaska, considerable size, and relative ease of capture.

Comparison of Southeast Alaska Dungeness Crab Harvest in Districts with Major Vs. Minor Sea Otter Presence



Note: Districts with major sea otter presence include districts: 3, 5, 6, 9, 10, and 13.
Source: ADFG harvest data.

- The three-year average harvest from districts with significant sea otter presence was 975,000 pounds less in 2008 through 2010, compared to the 2000-2002 period, a decline of 38 percent. In comparison, districts with less sea otter presence saw average harvests increase 151,000 pounds between the two periods, an increase of 7 percent.

- The Southeast Alaska Dungeness crab fishery has lost an estimated 2.7 million pounds of commercial harvest due to sea otter predation since 2000, worth $3.3 million in ex-vessel terms and $5.3 million in wholesale value.

Sea Otter Population Growth

According to available data, the Southeast Alaska sea otter population has increased significantly, particularly in southern Southeast Alaska where the region's dive fisheries occur. The most recent population survey was completed in 2002 and 2003, indicating a Southeast Alaska population estimate of 8,949 animals. More recent studies suggest annual growth rates are 12 percent in southern Southeast Alaska and 4 percent in northern Southeast Alaska (Hoyt 2011, personal communication). Other authoritative literature suggests sea otter populations can grow at an annual rate of 20 percent per year when expanding into new territory (Paul 2009).

The Southeast Alaska sea otter population is projected to be approximately 19,000 in 2011, increasing from less than 9,000 animals in the most recent published population estimate. By 2015, the Southeast population is expected to approach 28,000 animals. These estimates incorporate the subsistence harvest of sea otters by Alaska Natives.

Estimated Southeast Alaska Sea Otter Population, 2002 - 2015

Season	Last Population Survey (2002/2003)	Projected 2011 Population	Projected 2015 Population	Survey Coefficient of Variation (CV%)
Southern Southeast				
12% Annual Growth Rate	5,845[1]	14,472	22,772	0.14
Northern Southeast (including Glacier Bay)				
4% Annual Growth Rate	3,104[2]	4,418	5,168	0.16
Total Southeast Alaska				
Estimated Population	**8,949**	**18,890**	**27,940**	-

[1]Population estimate is from 2003.
[2]Population estimate is from 2002.
Source: U.S. Fish and Wildlife Service, Hoyt 2011 (personal communication), and McDowell Group calculations.

Given current foraging research, a conservative estimate about body weight (50 lbs.) and daily food intake (20 percent of body weight); a sea otter population of 27,940 would consume just over 10 million pounds of commercial species per year in Southeast Alaska. The entire 2010 Southeast Alaska harvest in the dive and Dungeness crab fisheries was 5.9 million pounds.

Abalone

A commercial fishery for northern abalone (*Haliotis kamtschatkana*) existed in Southeast Alaska from the late 1970s to mid 1990s. Guideline harvest levels where not applied until the 1980/81 season and the fishery slowing declined thereafter. Similar collapses occurred in British Columbia and Washington state.

The fishery collapsed almost certainly because of excessive harvests in the late 1970s and early 1980s. There was not a sufficient stock assessment or research program in place when the Alaska fishery boomed and there was insufficient support to develop a program within the department. Further, there was inadequate understanding among the global research community of the special vulnerabilities of abalone populations to overharvest (ADFG Report to Alaska Board of Fisheries 1999).

The decline of the abalone is probably a long-term condition now that sea otters have expanded to occupy much of their former range. Otter populations have grown exponentially since their reintroduction into outer coastal waters of southeast Alaska in the 1960s, and there are only a few pockets of abalone habitat that have not yet seen a resurgence of otters. The two species share the same environment. Otters are uniquely adapted to prey on abalone and it is clear that abalone cannot co-exist in commercial quantities with sea otters (ADFG Report to Alaska Board of Fisheries 1999).

The decline of the abalone fishery, like the decline of the red sea urchin fishery, was not related to sea otter predation. However, given current otter populations and population growth rates, it is virtually impossible that these species will abound in commercial quantities in the future. By limiting the abalone's population from fully rebuilding - enough to support a commercial fishery - sea otters have diminished the future value of Southeast Alaska's commercial dive fisheries.

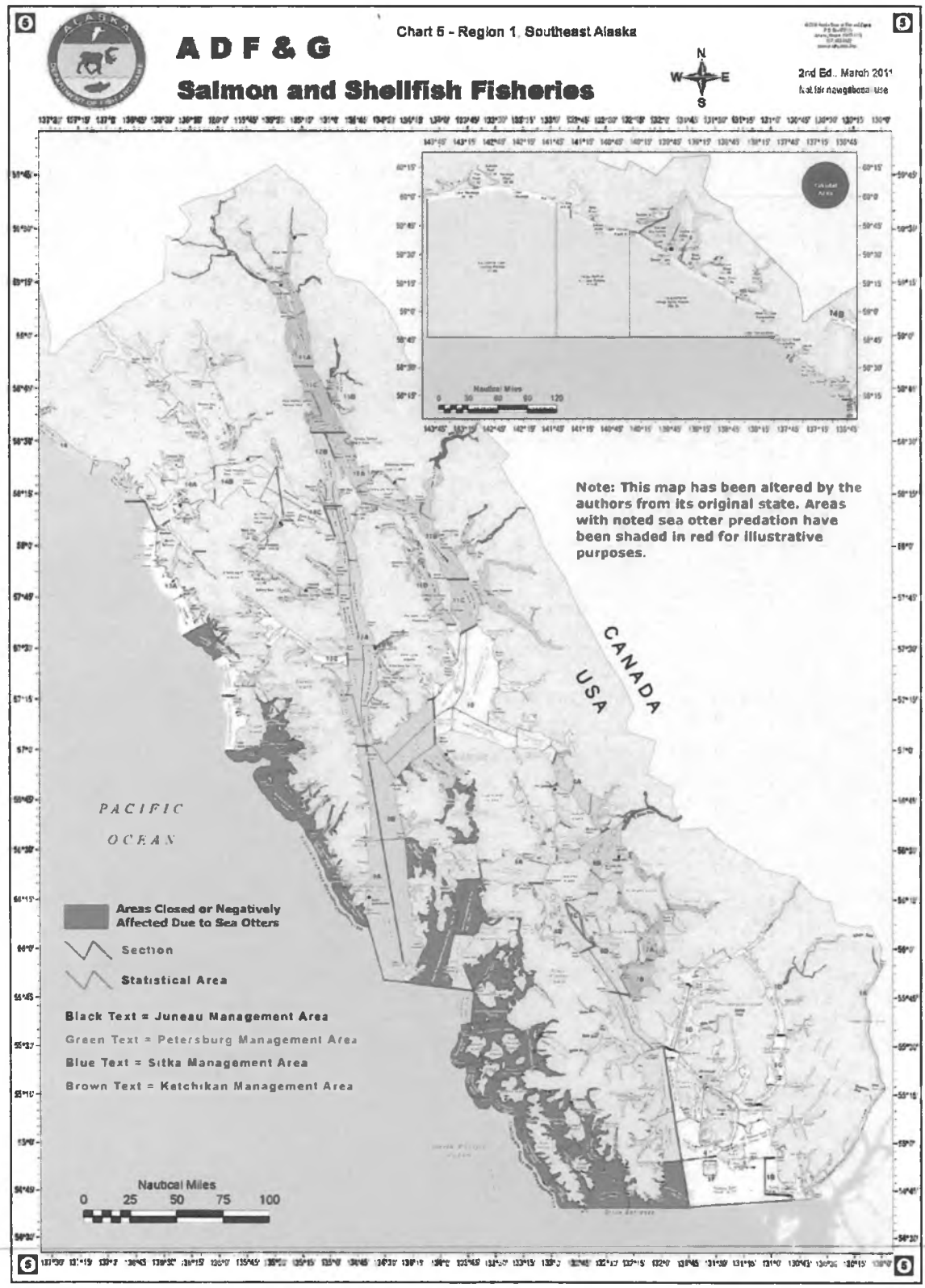
Observations of Sea Otter Predation on Commercial Species

ADFG field research and industry divers support the notion that sea otters are having a significant negative impact on the harvest volumes of geoduck, urchins, crab and other marine species. Growing sea otter populations have led to the depletion of many of these resources within the otters' range, closing some fisheries and leaving others economically unfeasible. In recent years, ADFG has closed 17 dive fishery harvest areas due to sea otter predation.

Given the food source which developed during the last 100 years with little otter predation, it is expected the outer coastline will eventually become continuously populated with sea otters from Dixon Entrance to well north of Cape Spencer (Pritchett and Hoyt, 2008). In addition, many commercial fishermen have noted otter populations in inside waters, expanding their range beyond the coastal areas.

This report contains estimates of financial losses incurred by commercial divers in the past and present, due to sea otter predation. However, large sea otter populations inevitably threaten the future of dive fisheries and crab fisheries; jeopardizing hundreds of jobs and tens of millions of dollars in economic activity for the region.

Map of Fishery Areas Negatively Affected by Sea Otters



Introduction

Purpose of the Research

The commercial harvest closures have resulted in measurable economic impacts on the seafood sector and on communities in Southeast Alaska. Harvesters, processors, and seafood-dependent communities experience lost employment, wages, tax revenue, and related economic activity. The Southeast Alaska Regional Dive Fisheries Association (SARDFA) contracted with McDowell Group to quantify and explain these impacts in 2005. Since the 2005 report, otter populations have continued to grow, further impacting dive fisheries and crab fisheries. This report uses current ADFG data and sea otter research to update the impacts of sea otter predation on Southeast Alaska fisheries and communities.

Methodology

In 2005, the Alaska Department of Fish and Game (ADFG) estimated the lost guideline harvest level (GHL) due to sea otter predation in the red sea urchin and sea cucumber fisheries. These estimates were contained in a November 2005 memorandum. McDowell Group consulted with ADFG biologists who survey the fishery and calculated the original estimates of lost GHL. Using new ADFG biological survey data regarding biomass and sea otter predation, McDowell Group has employed the same methods as those used in 2005 to update the estimates of economic loss.

The Alaska Department of Fish and Game provided McDowell Group with publicly available biomass survey data and professional input (based on survey experiences and institutional knowledge). The scientific survey data and interviews with expert professionals in the department are used in this report. In addition, prior to release of this report, ADFG professionals reviewed the report to ensure data and information provided by ADFG is objectively and accurately represented.

It is important to note, however, ADFG has not conducted controlled experiments to examine the effects of sea otter predation on invertebrate populations. Their estimates are based on regular, direct observations made during dive surveys and the department's expertise as fishery managers.

Estimates of lost harvest volume were combined with average ex-vessel price data from ADFG to estimate the lost value in ex-vessel earnings. Wholesale values are based on data from the ADFG Commercial Operators Annual Report (COAR) database.

Wholesale value impacts are inclusive of impacts reflected by the loss of ex-vessel value. This is because wholesale value of a product, or the revenues a processing company gains through sale of the product, must pay for the expenses incurred in the procurement and processing of that product. This includes the purchase of the raw material from harvesters, which is reflected as the ex-vessel value.

Sea Otters in Southeast Alaska

Species Profile and Diet

Sea otters (*Enhdyra lutris*) are a member of the weasel family and a significant predator in the ecosystems of much of coastal Alaska, from Southeast to the Aleutian Islands. Their average life span is 15 to 20 years. Adult male otters weigh typically weight 70 to 90 pounds and average about 4.5 feet in length, while females average 40 to 60 pounds.

The sea otters' only natural predators are sharks, killer whales (orcas), and bald eagles. Sharks and killer whales are not particularly plentiful in Southeast Alaska, and there is no shortage of other food sources for these predators. There is a very narrow window for bald eagles to hunt sea otter pups. Relatively soon after being born, the pups are able to dive and evade the eagles.

Sea otters are the only marine mammal without blubber. As a result, the animals have a high metabolism and require large amounts of food to survive. Sea otters in captivity will consume up to 25 percent of the body weight per day.[1] One male otter, therefore, can consume up to 7,300 pounds of food in one year.

Instead of blubber, sea otters have a dense, water resistant coat which traps air close to their body insulating them from the frigid waters of the North Pacific. Sea otters have the densest coat of any mammal, with roughly a million hair follicles per square inch. By comparison, the human scalp has only 20,000 hairs in total.

Sea otters typically forage in depths of 9 to 27 feet; however, a dive of 291 feet was recorded by an animal which drowned while attempting to remove bait from a crab pot.

Many studies have been conducted on the foraging habits of sea otters. Aside from the tremendous volume of food needed to sustain otters, researchers found significant differences in foraging habits depending on location and available prey. Antonelis et al. (1981) and Ostfeld (1982) found evidence to confirm the hypothesis that otters choose prey with the highest ratio of caloric-value to energy expended foraging (Barnes 2002).

Other studies tend to support the notion that sea otters are opportunistic generalists which adapt their predation to their environment. Studies from the Aleutian chain to Prince William Sound to Southeast Alaska have found different foraging habits. The most recent study, (Hoyt 2010), is collecting foraging data on sea otters in southern Southeast Alaska. Preliminary data from this study suggests when sea otters move into new areas they

[1] U.S. Fish and Wildlife Service. "Wildlife Biologue – Northern sea otter in Alaska (*Enhydra lutris kenyoni*)." p2.

are more likely to prey on commercials species. Over all, that study suggests commercial species make up 10 percent of the sea otter diet in southern Southeast Alaska.

Historical Population

Sea otters were completely removed from their natural range in Southeast Alaska by intense pressure from fur traders in the 18th and 19th centuries. Prior to the fur trade period sea otter populations in the entire North Pacific Rim – extending from Japan to Alaska to Baja California – ranged from 200,000 to 300,000 (Hoyt 2010). Sea otters were believed to have been eliminated from Southeast before 1900 (Pitcher 1989). In 1911, an international treaty, the North Pacific Fur Seal Convention, passed protecting sea otter populations in the United States, Russia, and Japan from further intensive exploitation.

The reintroduction of the sea otter into the Southeast region occurred from 1965 to 1969. A total of 402 animals were relocated from the Aleutian Islands and from Prince William Sound. Otter relocation sites included Khaz Bay, Yakobi Island, Biorka Island, the Barrier Islands, the Maurelle Islands, and Cape Spencer. The Southeast Alaska sea otter population remained low until 1987 when it began a period of rapid growth (Pitcher and Imamura, 1990).

Since that time, sea otter populations have been increasing, and the range of the animals has expanded and shifted correspondingly. The most recently completed population survey, conducted in 2002 and 2003, estimated the Southeast sea otter population at 8,949 animals. Based on aerial surveys performed in 2010 southern Southeast Alaska sea otter populations are believed to be growing at 12 percent per year. Sea otter populations in northern Southeast and Glacier Bay are believed to be growing at 4 percent (Hoyt 2011, personal communication).

Estimated Southeast Alaska Sea Otter Population, 2002 - 2015

Season	Last Population Survey (2002/2003)	Projected 2011 Population	Projected 2015 Population	Coefficient of Variation (CV%)
Southern Southeast				
12% Annual Growth Rate	5,845[1]	14,472	22,772	0.14
Northern Southeast				
4% Annual Growth Rate	1,838[2]	2,616	3,060	0.17
Glacier Bay				
4% Annual Growth Rate	1,266[2]	1,802	2,108	0.15
Total Southeast Alaska	8,949	18,890	27,940	-

[1]Population estimate is from 2003.
[2]Population estimate is from 2002.
Source: U.S. Fish and Wildlife Service, Hoyt 2011 (personal communication), and McDowell Group calculations.

Based on 2003 survey work, and a 12 percent annual growth rate, the current sea otter population of southern Southeast is believed to contain about 14,500 animals. By 2015, the southern Southeast population is expected to exceed 22,700 animals.

With a large food source available, high population growth rates will likely persist for some time. By 2015, the Southeast Alaska sea otter population is conservatively projected to contain 27,940 sea otters. Given current foraging research and a conservative estimate about body weight (50 lbs.) and daily food intake (20 percent of body weight), a sea otter population of 27,940 would consume just over 10 million pounds of commercial species per year in Southeast Alaska. The entire 2010 Southeast Alaska harvest in the dive fisheries and Dungeness crab fisheries was 5.9 million pounds. Southeast Alaska sea otters consumed an estimated 6.9 million pounds of commercial species in 2011.

Population growth rates may actually increase if otters migrate further outside of their current territory. Sea otter populations can grow by 20 percent per year when colonizing new areas with sufficient food sources and few predators (Watson 2000). From 1975 to 1987, the growth rate of the sea otter population in southeast Alaska was estimated at 17.6 percent per year (Estes 1990).

Population growth rates are limited primarily by three factors: abundance of food, predators, and population size. As a population grows larger, it consumes more resources and mortality rates increase. The fact that sea otter populations are growing three times faster in southern Southeast, despite a population which is three times larger would indicate a substantial food source available to the southern Southeast otters. One of the key differences between northern and southern Southeast, as they relate to sea otters, is the presence of large macroinvertebrate populations in the southern region.

Updated sea otter population figures will be forthcoming. The U.S. Fish and Wildlife Service (USFWS) performed aerial surveys during the summer of 2010 and 2011, but has not yet released their findings.

Recent Sea Otter Research in Southern Southeast Alaska

The most direct observation of sea otter effects on commercial fisheries comes from dive surveys performed by ADFG biologists and an ongoing North Pacific Research Board project headed up by researchers from the USFWS and the University of Alaska – Fairbanks (UAF).

ADFG performs annual dive surveys on areas open to commercial dive fisheries. Divers survey the near-shore seabed in pairs for sea cucumbers, geoducks, and sea urchins covering 2-meter-wide transects. Sea otter presence is noted during these surveys.

Observations made by ADFG divers on the outer coast of Southeast Alaska suggest sea otters select red sea urchins and pinto abalone when foraging on rock habitat and on several species of clams including geoduck clams when foraging on soft sand and mud substrate. Once these species have been depleted it appears they turn to less desirable prey such as sea cucumbers and snails (Walker, Pritchett and Hoyt, 2006).

A collaboration of researchers and specialists from UAF and USFWS embarked on a four-year project beginning in July 2010 to study interactions between sea otters and commercially important prey in southern Southeast Alaska. The project will also survey sea otter populations and study movement, habitat, and diets of otters in Southern Southeast Alaska. Preliminary results from this project have revealed the following:

- Otters can consume up to 23 percent of their body weight in a day, as they have a very high metabolic rate.

- Distribution of sea otter populations have grown and moved further inland from outer coastal areas.
- Preliminary foraging data suggests commercially important species make up 10 percent of sea otters' diet. (However, this data was collected from areas with relatively small populations of commercial dive species, and other studies have noted different foraging behavior in different regions).
- When sea otters initially colonize an area, they consume larger amounts of commercially important species such as sea cucumbers and Dungeness crab.

Potential Consequences for Sea Otters and Commercial Fisheries

The sea otter population will likely continue to expand rapidly in coming years as otters consume the large biomasses of crab and macro invertebrate, species which built up in the absence of sea otters during the past century. When these biomasses have been depleted otters will need to find other food sources and many may die off due to starvation. However, 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 natural balance between sea otters and their prey, which existed before fur traders wiped out sea otters in Southeast Alaska, did not allow for an imbalance between sea otters, crabs, and macro invertebrates. The population of one group either limited or fueled growth in the other. In such a situation, large-scale commercial dive fisheries and Dungeness crab fisheries may not be possible because crab and macro invertebrate populations would not be able to reach a size large enough to support a fishery of current proportions (given unabated sea otter predation).

In short, commercial dive fishing and large populations of sea otters cannot coexist in the same waters. In addition, once the commercially viable biomass of crab and macro invertebrates – such as sea cucumbers and geoducks - is gone, it likely will not return given sustained sea otter predation.

Southeast Alaska Dive Fisheries

Southeast Alaska dive fisheries occur primarily during the fall and harvest three species of bottom-dwelling marine invertebrates: geoduck clams (*Panopea generosa*), California sea cucumbers (*Parastichopus californicus*), and red sea urchins (*Strongylocentrotus franciscanus*). All three fisheries occur primarily in southern Southeast Alaska waters. Entry into the fishery is limited, but those who hold permits compete to harvest commercial species within the limits of guideline harvest levels established by ADFG.

Alaska dive fisheries started to develop in the mid-1960s, with a fishery for pinto abalone. In the 1980s commercial dive fisheries developed for sea cucumbers, sea urchins, and geoducks. In 2000, the Alaska Commercial Fisheries Entry Commission (CFEC) limited access to the fishery, restricting further growth in the number of participants.

In 2010, Southeast Alaska dive fisheries produced a first wholesale value of $16.7 million and paid out $9.4 million to divers. Roughly 180 permitted divers participated in the fishery in 2010 for average earnings of $52,100 per diver. This revenue is shared with crew, as the average commercial diver employs 0.8 crew members according to surveys done by the Alaska Department of Labor and Workforce Development.

Impacts to the Southeast dive fisheries extend beyond payments made to divers. The fisheries occur during the fall, after the busy summer season when harvests of salmon, halibut, black cod, and herring are finished (or nearly finished). Dive fishery harvests provide processors with additional revenue and the ability to extend some seasonal processing jobs by allowing some processing staff to handle dive fisheries production. In addition, the fisheries add to the state, local, and federal tax base and create business for local dive shops, transport companies, and other related businesses.

Geoduck Clams

Geoduck clams command the highest price of the three dive species. Virtually all Alaska geoducks are exported to China and in 2010 geoduck clams sold for an average wholesale price of $8.72 per pound. Quality geoducks, in the proper retail market, can command prices upwards of $20 per pound.

Southeast Alaska Geoduck Clam Dive Fishery Snapshot

	2010/11 Season	Pct. Change Since 2005/06
Number of Active Divers	69	-3%
Average Permit Value	$81,600	+93%
Total Harvest (in lbs.)	887,500	+39%
Total Ex-Vessel Value	$5.9 million	+197%
Average Ex-Vessel Price	$6.67	+114%
Total First Wholesale Value	$8.0 million	+186%
Average First Wholesale Price (per processed lb.)	$8.72	+94%
Average Revenue Generated Per Diver	$115,900	+195%

Source: ADFG.

Geoduck fisheries take place throughout southern Southeast Alaska, and in waters surrounding Baranof Island. A total of 69 divers fished in 2010, although there were 91 permits for the fishery. The fishery had an ex-vessel value of $5.9 million in 2010, and a wholesale value of $8.0 million.

The value of the fishery has increased in recent years, as prices and harvest volumes have both risen. Harvest volume has grown in spite of sea otter predation because new harvest areas were discovered and added to the fishery. However the 2011/12 quota is only 557,900 pounds – the lowest since 2003 when there were fewer harvest areas. Further harvest reductions are likely because most of the region has been surveyed and areas with commercial quantities have already been opened. So as established areas lose GHL to otter predation, new areas are not expected to make up for the shortfall as they have in the past.

During the past several years, SARDFA surveyors have found substantial geoduck clam beds but in some instances did not attempt to open these areas because sea otters where active in the vicinity. By the time the areas could be surveyed, studied, and opened (at a cost ultimately borne by the industry) the beds would most likely be depleted below a commercially viable level.

Sea Cucumbers

Sea cucumbers are also sold primarily into Chinese markets. Sea cucumbers are raised in large numbers in China in artificial ponds and man-made tide pools. Wild Alaska sea cucumbers tend to be much larger and have higher nutritional value, therefore command a premium price in the Chinese market.

Southeast Alaska Sea Cucumber Dive Fishery Snapshot

	2010/11 Season	Pct. Change Since 2005/06
Number of Active Divers	180	-9%
Average Permit Value	$11,300	+27%
Total Harvest (in lbs.)	1.27 million	-12%
Total Ex-Vessel Value	$3.4 million	-
Average Ex-Vessel Price	$2.65	+16%
Total First Wholesale Value (per processed lb.)	$8.1 million	+60%
Average First Wholesale Price	$10.88	+45%
Average Revenue Generated Per Diver	$45,000	+75%

Source: ADFG.

A total of 180 divers fished in 2010, although there were 291 permits for the fishery. Alaska sea cucumbers had an ex-vessel value of $3.4 million in 2010, and a wholesale value of $8.1 million.

The fishery's value has increased substantially in recent years due to rising prices. Because areas are only harvested once every three years, the harvest can fluctuate greatly from year to year. Despite the fluctuations due to harvest area rotation, the 2011/12 quota is very low. The 2011/12 quota of 999,000 pounds is the lowest since the late 1990s.

Red Sea Urchins

Red Sea Urchins are harvested for their gonads, which is a delicacy in Japan. Male and female sea urchin gonads, both known as *uni* in Japanese, are served in sashimi or in sushi.

Participation in the urchin fishery has declined since 2000, although 2010 posted the first increase in participation since 2004. Still, only 12 divers fished in 2010, out of 71 permits. The fishery had an ex-vessel value of $148,000 in 2010. The average gross earnings of $12,300 per diver in 2010 is the lowest since access to the fishery was limited in 2000. An industry source reports only "one or two" divers are participating in the 2011/2012 fishery, with only one buyer.

Economic Impacts of Sea Otter Predation

As sea otter populations have recovered in areas of the Pacific Coast, conflict has arisen with commercial and subsistence fisheries. Sea otters prey on sea urchins, Dungeness crab, shrimp, clams, abalone, sea cucumbers, and geoducks, among other animals. There are multiple studies that note sea otter population growth can have a negative effect on commercial stocks of these species, potentially resulting in the closure or drastic reduction of the commercial fishery. In one such example, Watson and Smith, in their 1996 paper examining sea otter/fishery interactions in British Columbia, noted there is "no doubt that sea otters threaten urchin fisheries."

Indeed, as sea otters have reestablished themselves in various areas of Southeast Alaska, formerly abundant stocks of several invertebrate species have been locally depleted below commercially harvestable levels. Since 1993 the Alaska Department of Fish and Game has closed 17 dive fishery harvest areas due to presumed sea otter predation. The Department estimates sea otter predation affects 39 percent of Southeast dive fishery harvest areas.

Summary of Dive Fishery Areas Affected by Sea Otter Predation

Species	Total Harvest Areas	Areas Closed Due to Sea Otters	Areas Closed, Presumably Because of Sea Otters	Areas Affected by Sea Otters but Not Closed	Percentage of Areas Affected or Closed Due to Sea Otters
Geoducks	41	0	0	27	66%
Sea Cucumbers	67	3	4	12	28%
Red Sea Urchins	59	4	6	9	32%
Total	**167**	**7**	**10**	**48**	**39%**

Source: ADFG.

The financial impact of sea otter predation affects commercial divers, processors, dive shop owners, and communities both inside and outside of Alaska. This section focuses on the cost of sea otter predation to divers and processors, who have lost revenue in the form of ex-vessel earnings and wholesale revenues due to sea otters.

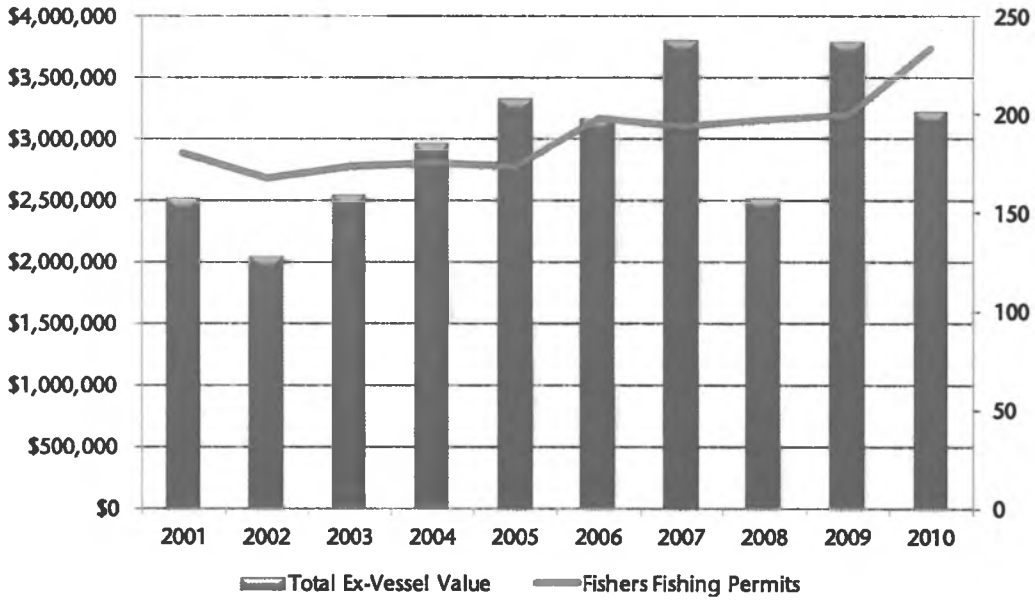
Sea otter predation has had obvious and measureable economic impacts on the sea cucumber, red sea urchin, geoduck, and Dungeness crab fisheries of Southeast Alaska. This report quantifies the estimated impacts sea otters have had on these species. In addition, sea otters affect the tanner and king crab fisheries of Southeast Alaska; however, data to quantify these impacts on these fisheries is not yet available.

Sea Cucumbers

Historical Harvest and Value

Sea cucumber fisheries occur throughout much of Southeast Alaska, in waters surrounding Prince of Wales Island, including Clarence Strait, east to the Behm Canal and waters around Revillagigedo, Gravina, and Annette Islands, and south. Fisheries also occur around Sitka, and in Sumner and Chatham Straits. Each subdistrict opens once every three years. Although divers are allowed to harvest sea cucumbers from October through March of the following year, virtually 100 percent of the harvest occurs during October and November. So although the 2011/12 season will run through March 31, 2012, most of the GHL has already been harvested.

Sea Cucumber Ex-Vessel Value and Participation
2001 - 2010



Source: CFEC.

In 2000, the Commercial Fisheries Entry Commission limited access to the fishery. Since limited access to the fishery, participation has ranged from a peak of 234 permits fished in 2001 to a low of 168 permits fished in 2009. A total of 180 permits were fished in 2010, and fishermen earned a total of $3.2 million or $17,850 per diver.

From 2007 to 2010, ex-vessel prices ranged from $2.86 to $2.56 per pound, but prices are much higher in 2011. Reports from the grounds indicate divers are being paid $5.50/lb. for sea cucumbers this season. While the price appreciation is certainly a positive for fishermen, total ex-vessel values may not increase as much because the guideline harvest level for the 2011/12 season is down. Fishermen will be allowed to harvest roughly 1 million pounds of sea cucumber this season, a 12 percent decline from the 2008/09 season - the last time these this group of subdistricts was harvested.

Impacts of Sea Otters on Southeast Alaska Sea Cucumber Fishery

Sea otters are opportunistic generalists, consuming a wide variety of near-shore prey. Data collected in 2010 on the foraging habits of sea otters near Kake, Alaska revealed sea cucumbers made up 3.1 percent of the sea otters' diet. Similar foraging observations were made in Southwest Alaska during a 2003 study.

Although sea cucumbers do not represent the majority of sea otters diet, otters do consume large amounts of sea cucumbers each year which has had an adverse of effect on the sea cucumber fishery.

Since 1996, sea otter predation has resulted in an estimated lost GHL of 3.25 million pounds worth $5.3 million in ex-vessel terms and $8.4 million in wholesale markets.

In 2011, sea otter predation led to a loss of roughly $7,000 for every active sea cucumber diver.

Estimated Sea Cucumber GHL and Value Lost Due to Sea Otters, 1996/97 – 2011/12

Season	GHL Lost Due to Sea Otters	Ex-Vessel Price ($)	Estimated Ex-Vessel Value Lost Due to Sea Otters	First Wholesale Value/lb. (round weight basis)	Estimated Wholesale Value Lost Due to Sea Otters
2011/12*	235,000	$5.50	$1,293,000	$9.50	$2,231,000
2010/11	151,000	$2.65	400,000	$6.37	961,000
2009/10	192,000	$2.59	497,000	$3.78	725,000
2008/09	241,000	$2.56	617,000	$3.94	949,000
2007/08	116,000	$2.86	332,000	$4.40	511,000
2006/07	143,000	$1.99	285,000	$3.35	480,000
2005/06	184,000	$2.29	421,000	$3.45	634,000
2004/05	140,000	$2.12	297,000	$3.48	488,000
2003/04	150,000	$1.47	213,000	$3.48	522,000
2002/03	84,000	$1.26	106,000	$2.51	211,000
2001/02	100,000	$1.75	175,000	$2.43	243,000
2000/01	130,000	$2.23	290,000	$2.41	313,000
1999/00	59,000	$1.94	115,000	$2.91	172,000
1998/99	40,000	$1.55	62,000	$3.09	124,000
1997/98	90,000	$1.66	147,000	$3.37	304,000
1996/97	34,000	$1.28	44,000	$2.44	83,000
Total	**3,254,000**	-	**$5,294,000**	-	**$8,951,000**

* 2011/12 data is preliminary and based on prices reported by industry.
Source: ADFG data and McDowell Group estimates.

Sea otter predation has forced closures, been observed, or affected 19 sea cucumber harvest areas out of a total of 67 harvest areas. Since 1993, ADF&G has closed three harvest areas specifically due to sea otter predation and has noted four additional areas were probably closed due to sea otters. Two new harvest areas were closed in 2011, specifically due to sea otters.

Geoducks

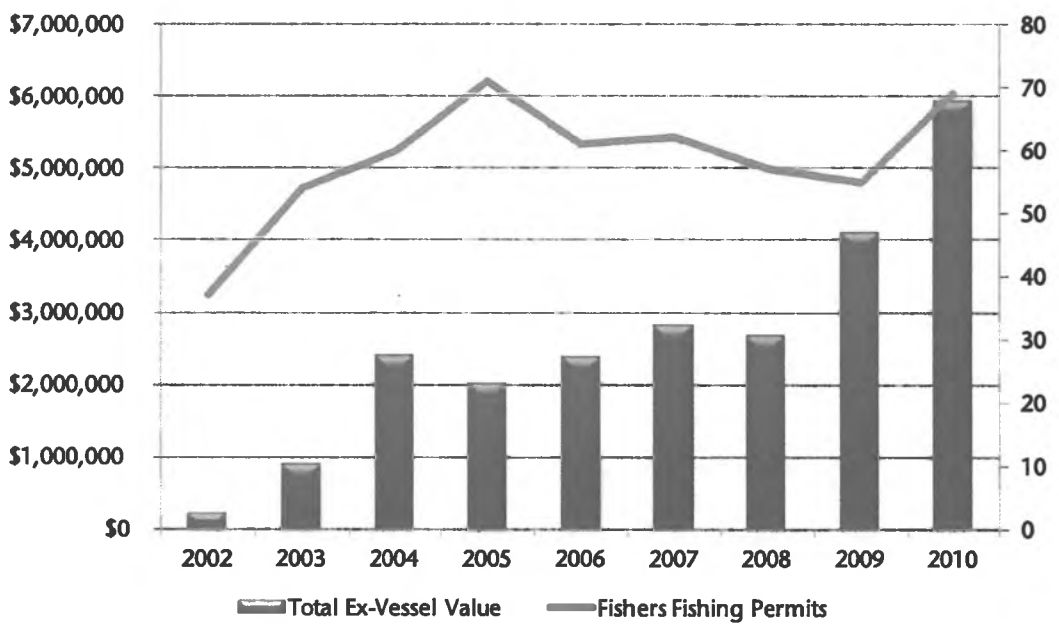
Historical Harvest and Value

Currently there are 39 commercial geoduck clam harvest areas in Southeast Alaska and 2 control areas not open for harvest. All of these areas are located in southern Southeast Alaska, with most of the GHL contained in areas surrounding the communities of Ketchikan, Craig, and Sitka.

Since 2004, and particularly in the last three years, the Southeast Alaska geoduck fishery has become a lucrative fishery. Ex-vessel prices for geoducks have nearly tripled since 2008. Reports indicate geoduck divers are receiving $10.50/lb. from processors this season (2011/12).

Geoduck prices have increased in recent years primarily because coordination between government regulators, fishery managers, and commercial divers has improved. Better communication and coordination has allowed the industry to now sell all geoduck clams as live product. Live geoduck clams command a significantly higher price.

Geoduck Ex-Vessel Value and Participation,
2002 - 2010



Source: CFEC.

Harvest volume has been relatively steady since 2004, ranging from 557,900 to 824,800 pounds. Participation in the fishery has also been steady, with 55 to 71 divers participating in the fishery. In 2010, a total of 69 divers out of 91 permit holders harvested geoducks.

Impacts of Sea Otters on Southeast Alaska Geoduck Clam Fishery

Sea otter predation has become more evident in geoduck clam fisheries since the early 2000s (Walker 2011, personal communication). With geoduck fisheries becoming more commercially important in recent years, these adverse effects have become more costly for commercial divers.

Otter predation in the geoduck fishery is especially evident. Otters dig large holes into the seabed, pull up the geoduck clam, eat the meat and discard the shells – leaving behind a large hole and shell debris which divers note in their surveys. Surveys performed in 2009 on the Portillo Channel (Subdistrict 103-50) area revealed notable otter presence in 70 of 74 transects. Surveys performed on the Lower Cordova Bay (102-10 and 103-11) area showed sea otter presence in over half that district's 60 transects (Rumble and Siddon, 2011).

McDowell Group employed the same methodology used by ADFG to estimate effects on the sea cucumber and sea urchin fisheries from 1996/97 to 2005/06 to estimate geoduck harvest volume and value lost to sea otter predation.

Evidence of sea otter predation has been observed at 27 of the 39 geoduck harvest areas. Biomass has decreased significantly in seven of these 27 areas since 2003. Given the noted sea otter activity in these geoduck fishery areas and lack of other natural predators, it is believed the declining biomass can be attributed to sea otters for these seven harvest areas.

Since 2005, sea otter predation has resulted in an estimated lost GHL of 530,500 pounds worth $3.2 million in ex-vessel terms and $4.2 million in wholesale markets. In 2011, sea otter predation was particularly costly, leading to a loss of roughly $20,000 for every active geoduck diver. This is money which is directly taken out of family budgets and local economies.

Estimated Geoduck GHL and Value Lost Due to Sea Otters
2005/06 – 2011/12

Season	GHL Lost Due to Sea Otters	Ex-Vessel Price ($)	Estimated Ex-Vessel Value Lost Due to Sea Otters	First Wholesale Value/lb. (round weight basis)	Estimated Wholesale Value Lost Due to Sea Otters
2011/12*	140,900	$10.50	$1,479,000	$13.97	$1,969,000
2010/11	43,800	$6.61	289,000	$9.03	77,000
2009/10	142,300	$5.48	780,000	$6.46	919,000
2008/09	18,700	$3.66	69,000	$5.38	101,000
2007/08	95,100	$3.50	333,000	$4.76	452,000
2006/07	10,200	$3.67	37,000	$5.00	51,000
2005/06	79,500	$3.15	251,000	$4.06	323,000
Total	530,500	-	$3,237,000	-	$4,210,000

* 2011/12 ADF&G data is preliminary and values are based on prices reported by industry.
Source: ADFG data and McDowell Group estimates.

Geoducks are in a precarious situation due to sea otters. While prices are high and divers are earning good money harvesting them, that could soon end.

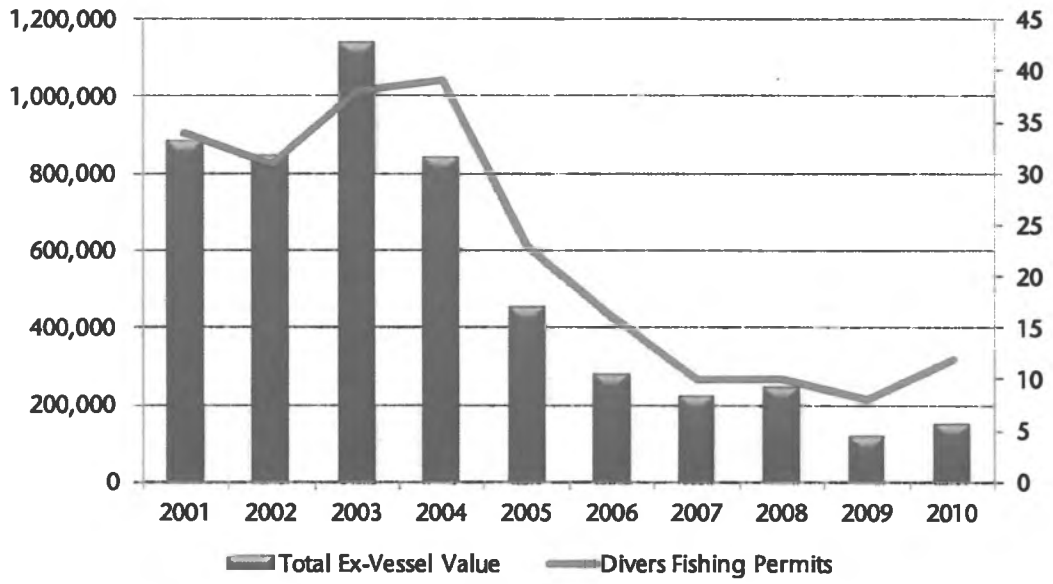
Evidence of sea otter predation has been observed at 27 geoduck fishery areas, but only seven of those areas exhibited significant biomass declines in recent years. However, if those other areas with sea otter activity become harder hit, the impact on the fishery could be devastating because sea otter predation has been noted in harvest areas containing 70 percent of the geoduck biomass. Should otters focus on geoducks as a food source more in the future, it is unlikely the geoduck biomass could reproduce quickly enough to support a commercial fishery which is economically feasible or biologically sustainable.

Red Sea Urchins

Historical Harvest and Value

Participation in the Southeast Alaska red sea urchin fishery has declined rapidly in recent years, approaching zero. During the 2011/12 season, only "one or two" are harvesting urchins with only one buyer, according to an industry source. In 2005, the fishery harvested 1.6 million pounds of red sea urchin worth an ex-vessel value of $453,000. By 2010, production dwindled to 509,000 pounds, harvested by 12 divers who shared $147,700 in total ex-vessel value. The 2010 harvest was just 10 percent of the 4.95 million pound guideline harvest level.

Red Sea Urchin Ex-Vessel Value and Participation, 2001 - 2010



Source: CFEC.

In the red sea urchin fishery, dwindling participation is not being driven by sea otter predation, but rather a falling market value for the product. The gonads of red sea urchins, called *uni* by the Japanese, are a popular sushi item. Virtually all of Alaska's urchin production gets exported to Japan. In general, other urchin fisheries in Russia and the west coast harvest enough supply for the Japanese *uni* market. In addition, there have been market issues with Alaska urchins stemming from inconsistent quality (due to biological factors) and mishandled product by shippers.

In 2000, red sea urchins were fetching $0.45/lb. on the grounds. Ex-vessel prices have steadily declined since then, and in 2010, the 12 divers who participated in the fishery were paid an average price of $0.29/lb. Meanwhile, ex-vessel prices for geoducks and sea cucumbers have risen substantially during this period, along with fuel costs and other operating costs. Low volume and the opportunity cost of harvesting urchins, when a diver could be targeting geoducks or sea cucumbers, has made the fishery uneconomical for most divers and processors.

Impact of Sea Otters on the Southeast Alaska Red Sea Urchin Fishery

In 2008, the average sea urchin diver grossed $24,000, and prior to that time divers generally averaged $20,000 to $30,000 per season. Because sea urchins are a major food source for otters, the financial impact on commercial divers was significant.

Sea otter predation resulted in an estimated harvest shortfall of 3.1 million pounds from 1996 to 2005 worth 1.0 million in ex-vessel terms and 4.0 million in wholesale value.

Estimated Red Sea Urchin GHL, Harvest and Value Lost Due to Sea Otters, 1995/96 – 2005/06

	GHL Lost Due to Sea Otters	Estimated Harvest Lost Due to Sea Otters (adjusted lbs.)	Estimated Ex Vessel Value Lost Due to Sea Otters	Estimated Wholesale Value Lost Due to Sea Otters
Total	6,285,000	3,102,000	$1,024,000	$3,972,000

Source: ADFG data and McDowell Group estimates.

Participation in the fishery is now so low that many figures on the fishery are confidential, and since only a small portion of the GHL is harvested, the impact of sea otters in recent years is likely very small. For these reasons, sea otter impacts have not been calculated for the 2006/07 through 2011/12 seasons. However, sea otters did have a large impact on the fishery in the past, and will continue to feed on urchins in the future. In an area from the southern shoreline of Sitka Sound to West Crawfish Inlet it was estimated 16 million sea urchins were consumed by sea otters over a 15-month period from December 1992 through February 1993 (Davidson, et al., 2008).

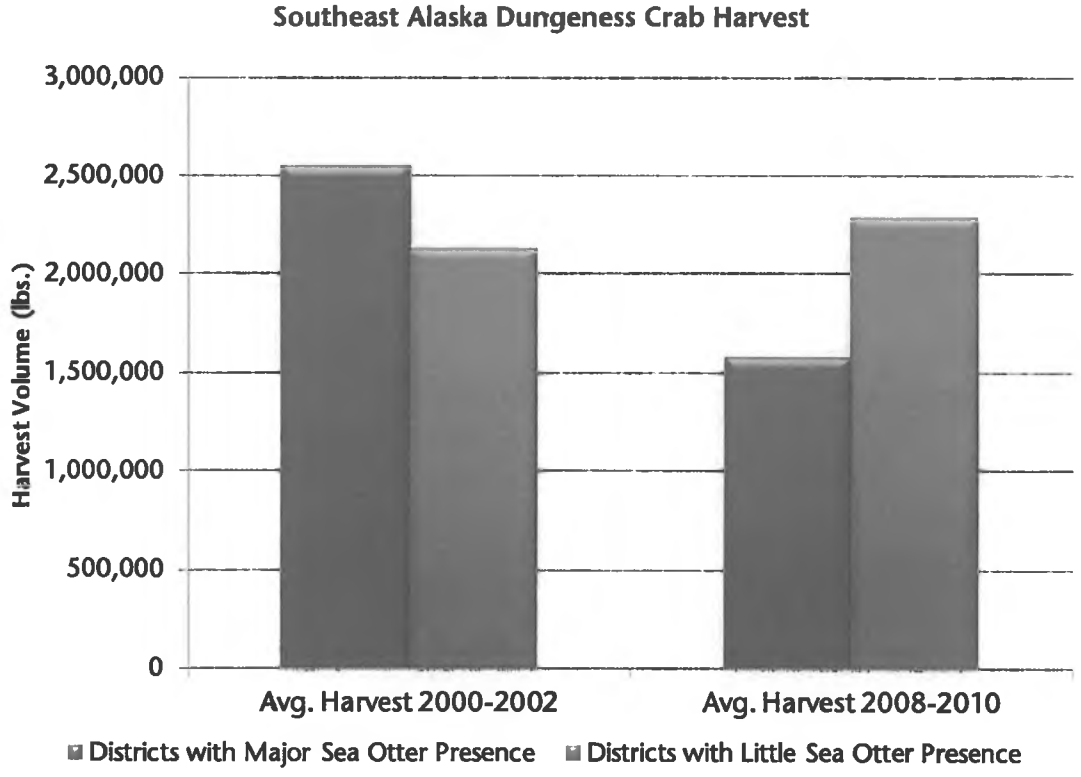
Although the majority of the red sea urchin fishery will go unharvested this season, sea otters are still having a large impact on the biomass. The 2011/12 GHL is 3.3 million pounds; a 42 percent decline from the 2006/07 season (which marks two fishery area rotations). If this trend continues, the fishery may not improve regardless of market price.

Dungeness Crab

Dungeness crab are a substantial food source for otters. Dungeness crab are typically found at depths of 15 to 100 feet, are plentiful in many Southeast Alaska estuaries, and offer a good nutritional return per unit of energy expended.

It is clear areas with a significant sea otter presence have fared much worse in recent years than areas which are not near large sea otter populations. Out of 15 shellfish districts in Southeast Alaska, six have significant sea otter populations or include translocation sites (where sea otters were released in the 1960s).

These six districts have lost nearly 1 million pounds of harvest activity while districts without sea otters have seen harvests increase slightly since the early 2000s. The greatest loss comes from District 9, near Kake, which had a harvest decline of 776,000 pounds from 2007 to 2010 alone.



Note: Districts with major sea otter presence include districts: 3, 5, 6, 9, 10, and 13.
Source: ADF&G harvest data.

It is very likely sea otter predation is the driving force behind the majority of these lost harvest volumes. Fishermen and biologists note the effect of sea otter predation. Not surprisingly, fishermen are leaving the fishery. The Wrangell-Petersburg census area, which includes Kake and the surrounding waters, was home to fishermen who landed crab under 134 Dungeness crab permits in 2005. By 2010, only 111 permits were fished – a loss of 23 permits or roughly 46 jobs (including 1 crew member and the skipper).

According to the Alaska Department of Labor and Workforce Development, the Southeast Alaska crab fisheries employed 638 workers in 2009. The majority of these jobs are in the Dungeness crab fishery. Expanding sea otter populations seriously jeopardize these jobs.

Methodology For Estimating Dungeness Crab Harvest Lost to Sea Otter Predation

Using field research done by ADFG, USFWS, and UAF, several Dungeness crab harvest districts were identified, which included waters known to have significant populations of sea otters. Crab harvests from these areas were compared to harvests in other districts. In effect, districts with fewer sea otters were treated as a control group. If sea otter predation was a serious issue in the areas identified, the harvest of crab should decrease in those districts relative to harvests in other districts (with fewer otters). This is exactly what took place from 2000 to 2010.

Impact of Sea Otter Predation

Districts 3, 5, 6, 9, 10, and 13 – located in southern part of the region and the outside coast line, have lost out on an estimated 2.7 million pounds of Dungeness crab since 2000. It is assumed all or most of this loss is associated with sea otters, as there are no other known factors which affect crab biomass in these districts and not others in Southeast Alaska.

In 2000, these six districts with large sea otter populations, accounted for 61 percent of the Southeast Alaska Dungeness crab harvest. By 2010, they accounted for just 33 percent; after seeing a gradual decline throughout the decade relative to districts without large sea otter populations.

Since 2000, the lost harvest volume attributed to sea otters was worth $5.3 million in wholesale value and $3.3 million in ex-vessel value.

Estimated Dungeness Crab Harvest and Value Lost Due to Sea Otters in Southeast Alaska, 2000/01 – 2010/11

	Estimated Harvest Lost Due to Sea Otters (live wt.)	Estimated Ex-Vessel Value Lost Due to Sea Otters	Estimated Wholesale Value Lost Due to Sea Otters
Total	2,681,000	$3,317,000	$5,301,000

Source: ADFG harvest data and McDowell Group estimates.

Quantifying the Impact of Sea Otter Predation

Dive fisheries in Southeast Alaska are managed by the Alaska Department of Fish and Game. Management is supported by a tax on the ex-vessel value of red sea urchins, sea cucumbers, and geoducks. This tax is used to pay for management staff and perform scientific dive surveys that allow managers to monitor the biomass of commercial species in established subdistricts, or new harvest areas.

Dive surveys are performed by SCUBA divers surveying established, or new, subdistricts along 2-meter wide transects running perpendicular to the shoreline. To complete transects, divers swim along the transect holding a 2-meter rod made of white PVC pipe in a horizontal position. Transect direction is maintained by a compass mounted on the rod.

Every harvest area gets surveyed before a fishery is opened for a given season, in addition to a group of control areas which are surveyed every year. The harvest areas, or subdistricts, open on a rotational basis, depending on the species and results of the dive surveys.

Photo Credit: Alaska Department of Fish and Game.

Dive surveys are expensive, but necessary for sustainable fishery management. In addition to providing data on the biomass, size, and density of commercial species, the dive surveys also allow managers a chance to maintain data on the invertebrates' habitat and eco-system. Divers have noted the presence and evidence of sea otter predation on each transect for each species, in each fishery area. Areas affected by sea otters are often distinguished by large holes with clam shell fragments (from where an otter has dug up a geoduck) or sea urchin carcasses littering the seabed. In the case of sea cucumbers, no physical evidence is left because otters consume the entire animal. However, divers note areas with active sea otter predation and have attributed large biomass declines in various subdistricts to sea otters.

Detailed survey data from thousands of dives recorded by fishery biologists, combined with information on historical biomass and GHL's, allows for a conservative estimate of sea otter predation. The estimated harvest volume lost due to sea otter predation can be translated into dollar terms by applying the ex-vessel price or wholesale price of a particular species in a given year.

Because virtually 100 percent of the GHL is harvested in the geoduck and sea cucumber fisheries, only the lost GHL is calculated and financial impacts are based on GHL. In the red sea urchin fishery, harvests volumes have not historically met the GHL. Therefore, impacts on the red sea urchin fishery were adjusted to reflect dollars and pounds lost are based the assumed harvest, and not on the GHL.

Accurately quantifying the impact of sea otter predation is only possible because ADFG data on sea otter predation, affected areas, commercial harvests, biomass, and market values is very good.

Because of ADFG's rigorous data collection, these estimates are believed to accurately portray the real, direct impact of sea otters on commercial species. Without such data, other studies such as Loomis (2006) have attempted to explain the value of sea otters in terms of existence value or the value of the public's "willingness to pay." These estimates are theoretical and obtained by surveying a sample of the population about what dollar value they place on knowing a certain species, in a certain locale, is flourishing or what dollar value they *would* pay to engage in a suggested recreational activity involving the species. In contrast, the effect of sea otter predation on commercial divers, seafood processors, and Southeast Alaska communities is not hypothetical.

Sea Otter Predation Impacts on Communities

Sea otter predation has led to an estimated loss of $22.4 million in wholesale value for southern Southeast Alaska communities since 1995. Lost sales for fishermen and processors are estimated to have resulted in indirect and induced losses of $5.8 million during that time. These losses reflect lost economic activity in industries outside the seafood industry in southern Southeast Alaska, resulting from lower wages, less household spending by affected families, less spending on indirect business costs, and less taxes collected from fisheries.

In total, sea otter predation is estimated to have cost southern Southeast Alaska communities $28.3 million since 1995. Any revenue derived from eco-tours, expanded subsistence harvests (above what would normally occur), or economic activity associated with scientific studies, stemming from sea otter expansion have likely been negligible, in comparison.

Southern Southeast Alaska Communities Most Affected by Sea Otter Predation

Ketchikan	Sitka	Kake
Petersburg	Craig	Port Alexander
Klawock	Hydaburg	Wrangell

The livelihood of Southeast Alaska commercial divers, crab fishermen, tender operators, and seafood processing workers is currently being jeopardized by expanding sea otter populations. These include hundreds of basic sector jobs which form the foundation of a regional economy.

Residents of the Wrangell-Petersburg census area have seen 23 fewer permits fished in recent years, part of which may be attributed to sea otter predation. Employment has not declined substantially in the sea cucumber and geoduck fisheries, but sea otter predation is estimated to have cost each geoduck diver $20,000 and each sea cucumber divers $7,000 in 2010. Based on the estimated value of product lost in recent years and the amount of economic activity resulting from the typical full-time job in southern Southeast Alaska, the secondary impacts of sea otter predation has been equivalent to a loss of 5 to 10 full-time average-paying jobs (depending on the year).

The wholesale value of Southeast Alaska sea cucumbers, geoducks, red sea urchins, and Dungeness crab was roughly $25 million in 2010. These fisheries employ roughly 625 fishermen and dozens more tender operators and processing workers. Using economic multipliers developed by IMPLAN[2], it is estimated the $25 million in wholesale value associated with these fisheries results in indirect and induced activity worth $6.5 million - equivalent to 53 additional full-time average-paying jobs[3]. Just like commercial divers and crab fishermen, these jobs are at risk of being lost as well. Indirect losses are more often more difficult to see, but they are economically real, as less money circulates in the economy leading to contracting employment.

[2] IMPLAN is an economic modeling software package widely used to perform economic impact analysis.

[3] The estimated number of jobs created is calculated by dividing the value of the secondary impact ($6.5 million) by the average output created per full-time equivalent (FTE) job in Southeast Alaska ($123,992 per FTE job). Therefore, the term "average-paying" refers to a full-time job producing an average amount of economic output, and paid accordingly.

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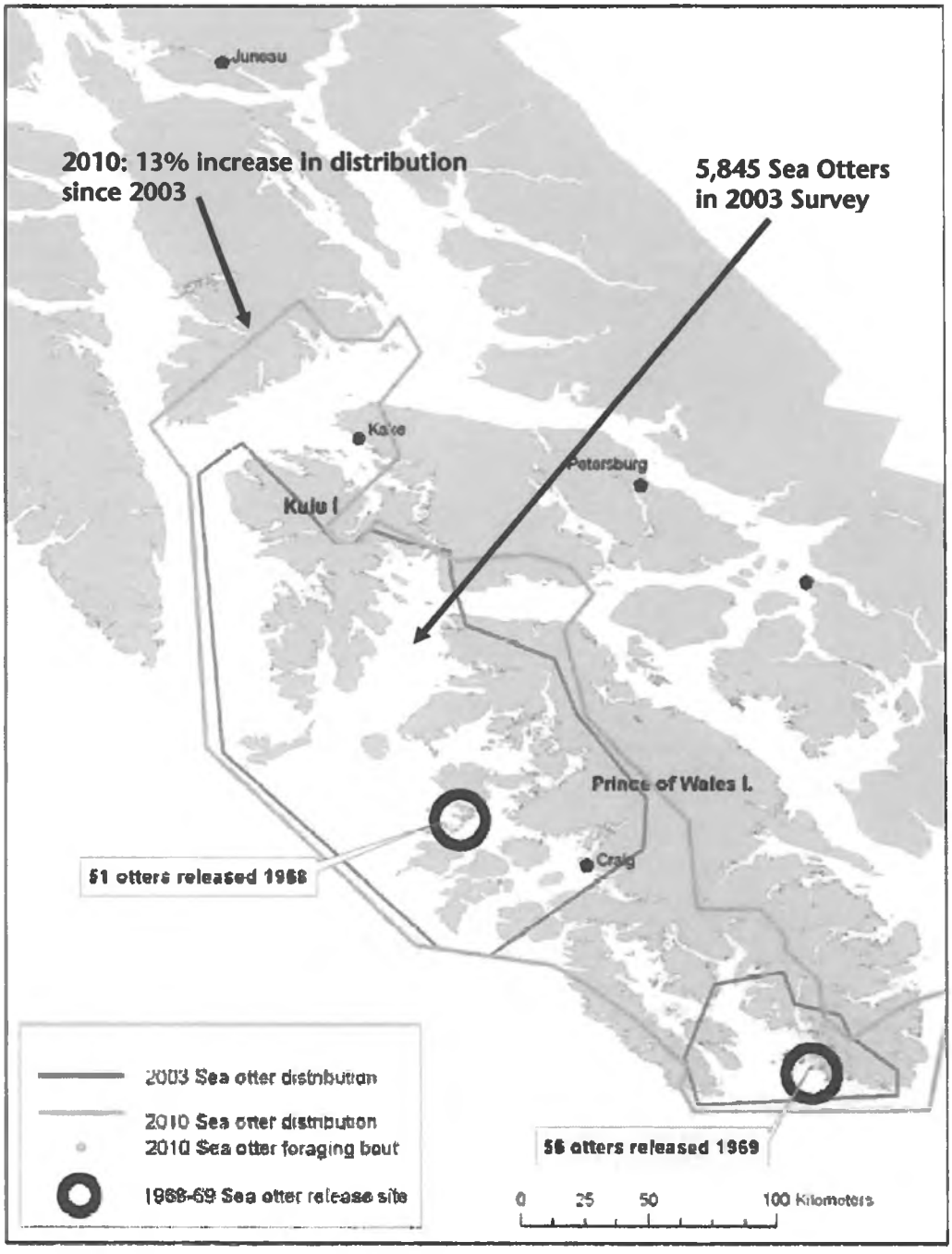
Appendix 1: Map of Otters in Southeast Alaska



Source: Hoyt, Z., Gill, V., Eckert, G., Rice, S., "Recolonization, prey selection and resource competition by sea otters, *Enhydra lutris,* in southern southeast Alaska." November 2010 presentation.

Appendix 2: Impact of Sea Otters on Dive Fishery Areas

Sea Cucumbers

Fishery Areas Negatively Affected by Sea Otter Predation

Fishery Area	Subdistrict(s)
Cape Chacon	102-10
Cordova Bay	103-11, 15
Long Island – Cordova Bay	103-21, 30
Hetta and Nutkwa	103-23, 25
Eastern Shore of Dall Island and Soda Bay	103-40-001, 002, 004
Bucarelli Bay	103-50
St Nicholas Channel	103-60, 70-002
Boca and Tonowek	103-80
West Dall Island	104-10, 20, 30
Port Camdon	109-43, 105-32
Deep Inlet and Sitka Sound South	113-38, 41
Sitka Sound North	113-40, 42, 43

Areas Closed Due to Sea Otter Predation

Fishery Area	Subdistrict(s)
Sea Otter Sound	103-90
Affleck Canal and Port Beauclerc	105-10, 20
Shaken Bay	105-41, 42
Saginaw and Security Bay	109-44, 45
Tebenkof Bay	109-62
Baranof Island	113-31, 32, 33
Khaz Bay	113-71, 72, 73

Geoduck Clams

Fishery Areas Negatively Affected by Sea Otter Predation

Fishery Area	Subdistrict(s)
Kaigani Strait	103-30-001
Tlevak Strait	103-40, 50-009
South Cordova Bay	103-11
Bucareli Bay	103-50-003
Cone Island North	103-50-005, 104-40-005
Cone Island South and Paloma Pass	103-50-006, 104-35-006
Port Rea Marina	103-50-007
Portillo Channel	103-50-008
Port Mayoral (Control Area)	103-50-CON
East San Fernando Island	103-60-001
Maurelle Islands	103-70, 80, 104-40, 50-009
Ulitka Bay	103-70-001
Little Steamboat Bay	103-70-002
Steamboat Bay	103-70-003
Blanquizal Island	103-70-005
Palisades Islands	103-70-006
St. Nicholas Channel and North Lulu Island	103-70-007
Port Alice and Cone Bay	103-90-002
Turn Point	103-90-003
Davidson Inlet	103-90-004
Warren Island and Kosciusko Island	103-90-005, 105-41, 43, 50-005
Northwest Dall Island	104-20, 30-003
Port Santa Cruz	104-30-002
Taigud and Kolosh Islands	113-31, 41-004
Symonds Bay	113-31-002
Biorka and Legma Islands	113-31-003
Elovoi, Golf, and Gornoi Islands	113-31-005

Red Sea Urchins

Fishery Areas Negatively Affected by Sea Otter Predation

Fishery Area	Subdistrict(s)
Lower Clarence Strait	102-20
Tlevak Strait	103-40
Central Dall Island	104-20-001

Areas Closed Due to Sea Otter Predation

Fishery Area	Subdistrict(s)
Cape Chacon	102-10
Dixon Entrance and Kaigani Strait	103-30
Bucareli Bay and Port Real Marina	103-50
St. Nicholas Channel	103-70
Southwest Dall Island	104-10
Meares Passage and Bucareli Bay	104-30
Western Baker Island and Cone Island	104-35
Western Noyes Island and Cone Island	104-40
Whale Bay	113-22
Baranof Island	113-11, 21

Julie Decker
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Senator Cathy Giessel, Chair, Senate Resources Committee
State Capitol Room 427, Juneau AK, 99801
Phone: 907-465-4843; Fax: 907-465-3871
Senator.Cathy.Giessel@akleg.gov

March 13, 2013

RE: Support for SB 60 / HB 145 – sea otter population management

Dear Chair Giessel & Senate Resources Committee,

I am a past commercial diver in Southeast Alaska (SEA). My husband continues to commercially dive. Our family also commercially fishes for other species in SEA. I was the former executive director of the Southeast Alaska Regional Dive Fisheries Association (SARDFA). I have also worked on this otter issue as a member of the Board of Directors of the Southeast Conference (SEC), the United Fishermen of Alaska (UFA), the Co-Chair of the Ocean Cluster working group, and the Chair of the Wrangell Economic Development Committee.

I am writing to support for SB 60 / HB 145 – an act related to sea otter population management – as a mechanism to encourage legal sea otter harvest and to spark a productive and urgent conversation about solutions to conserve our shellfish species in Southeast Alaska (SEA).

Recent research by the U.S. Fish & Wildlife Service (USFWS) has documented the following facts about the sea otter population in SEA. The sea otter population is approximately 25,000 and growing at 12-14% per year. These marine mammals consume shellfish at a rate of approximately 25% of their body weight (average of 65 lbs) each day, equating to an average annual shellfish consumption of 148 million pounds. By comparison, the annual commercial shellfish harvest in SEA was less than 5 million pounds in 2010. Projecting this growth out to the year 2018, the sea otter population will be approximately 50,000 and the annual shellfish consumption by otters will be approximately 300 million pounds.

As commercial divers, we have personally observed the destruction to the ecosystem due to sea otter predation. Sea otters are a special type of predator. They eat 100% of the shellfish in an area and then move on, including crab, urchins, abalone, clams, sea cucumbers, geoducks, starfish and gumboots. They do not leave females or undersized creatures for further propagation.

Certain individuals and groups are promoting the idea that the continued growth of the sea otter population is a good thing, because sea otters eat urchins, which in turn eat kelp, which in turn reduced carbon dioxide in the ocean/atmosphere. These people infer that more sea otters

in SEA will therefore reduce global climate change. From what I have observed as a commercial diver, this is NOT the whole truth. The interaction between sea otters and urchins is merely one sliver of the interactions occurring within the entire ecosystem of the near-shore ocean bottom. For example, what does the removal of all the filter-feeders from the near-shore ocean bottom do to the ecosystem and the health of the kelp beds? What will happen to the ecosystem in areas in which habitat does not support urchins and kelp already exists? Commercial divers can tell you that these areas look like waste lands - even the sediment changes consistency. These observations may not be "scientific", but they are supported by an accumulation of thousands of hours of dive time.

The sea otter is decimating the shellfish populations in SEA. This fact has been documented by commercial divers, fishermen, subsistence users and biologists at the Alaska Dept. of Fish & Game, as commercial harvest areas are closed after sea otters move into these areas. If the growth of the sea otter population is not reduced, not only will all commercial shellfish harvests in SEA be closed, but also sport, personal use and subsistence harvests will end.

Sea otters are a renewable resource that, if properly managed and marketed (as other Alaska renewable resources are), could add to the economy of the region. For at least the past ten thousand years, the "natural" environment in SEA included human interaction and harvest of sea otters. Humans were a part of the natural balance of otter populations until approximately 100 years ago, when the harvest became imbalanced and protections were placed on otters. The rebound of otters in SEA is a positive conservation story, which instead has turned into a nightmare due to the inability and/or unwillingness of USFWS to evolve its conservation strategies under the MMPA.

SB 60 will encourage the legal harvest of sea otters by Alaska Natives in order to save shellfish species in SEA. SB 60 will also elevate the discussion and the seriousness of the problem. We hope further productive discussions regarding proactive sea otter management will lead to innovative ideas which will provide a win-win solution for all who depend upon the shellfish resources in the region.

In conclusion, the State of Alaska spends millions of dollars to market Alaska Seafood as sustainably managed to the world. In this case, the Federal government is blocking the ability of the State of Alaska to sustainably manage the shellfish species in SEA. The State of Alaska needs to address this inconsistency with our Constitution and it sounds like Governor Parnell's Administration is willing to help.

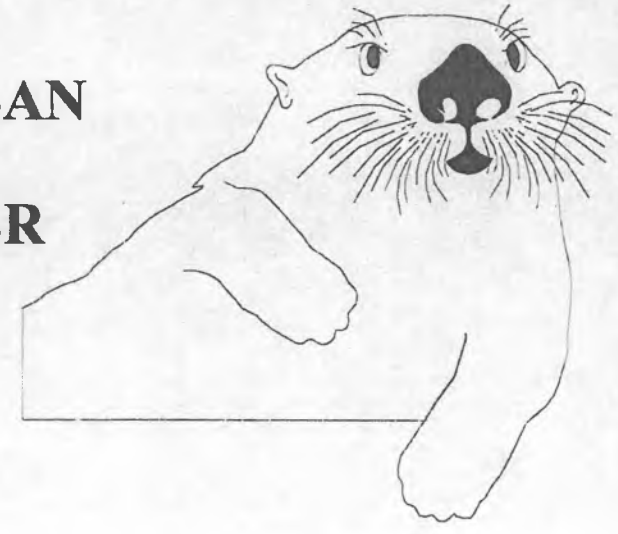
Thank you for your consideration.

Julie Decker, commercial fishing family

CONSERVATION PLAN

FOR THE SEA OTTER

IN ALASKA



June 1994

U.S. FISH AND WILDLIFE SERVICE
Marine Mammals Management
Anchorage, Alaska

CONSERVATION PLAN FOR THE

SEA OTTER IN ALASKA

June 1994

U.S. Fish and Wildlife Service
Marine Mammals Management
4230 University Drive, Suite 310
Anchorage, AK 99508

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ACKNOWLEDGMENTS

The U.S. Fish and Wildlife Service thanks the members of the Sea Otter Management Plan Advisory Team for their assistance, patience and review of earlier drafts of this plan: Mr. James Bodkin, U.S. Fish and Wildlife Service; Ms. Kathryn Frost, Alaska Department of Fish and Game; Dr. Robert Hofman, Marine Mammal Commission; Ms. Mara Kimmel-Hoyt, Alaska Sea Otter Commission; Mr. Steve Landino, Minerals Management Service; Mr. Jack Lentfer, Marine Mammal Commission; Ms. Cindy Lowry, Greenpeace; Mr. Lloyd Lowry, Alaska Department of Fish and Game; Dr. Douglas Miller, National Wildlife Federation; Mr. Gilbert Olsen, Alaska Sea Otter Commission; Dr. Donald Siniff, University of Minnesota; and Ms. Kate Wynne, University of Alaska. Mr. James Bodkin, Ms. Angela Doroff, Mr. Thomas Evans, Ms. Carol Gorbics, Mr. Ancel Johnson and Mr. Jon Nickles also reviewed earlier drafts of the plan. Ms. Elaine Rhode, with the assistance of Mr. Douglas Burn and Ms. Angela Doroff, prepared the executive summary which was provided to the public for comment.

The primary author of this plan was Mr. Anthony R. DeGange, U.S. Fish and Wildlife Service. This plan is based in part on a draft conservation plan for sea otters in Alaska provided by the Marine Mammal Commission.

PREFACE

This conservation plan for sea otters in Alaska has been approved by the U.S. Fish and Wildlife Service. It will be used by the U.S. Fish and Wildlife Service in the ongoing management and conservation of sea otters. It was prepared by staff of the Marine Mammals Management office, U.S. Fish and Wildlife Service, with the assistance of the Marine Mammal Commission and the Sea Otter Management Plan Advisory Team. While many of the contributions and recommendations made by participating individuals and organizations have been incorporated into this plan, it does not necessarily represent the views of these individuals and organizations. Parts of this conservation plan solely represent the views of the U.S. Fish and Wildlife Service.

This plan will be reviewed annually and revised at least every three to five years. It will be modified subject to new findings, changes in species status, completion of tasks, legal interpretations, policy changes or Congressional direction. Completion of most tasks is dependent on obtaining new funds.

Literature Citation should read as follows:

U. S. Fish and Wildlife Service. 1993. Conservation Plan for the Sea Otter in Alaska. Marine Mammals Management, USFWS, Anchorage, AK. 47pp.

Approved:_____ Date:_____
Regional Director

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

ADF&G	Alaska Department of Fish and Game
ADNR	Alaska Department of Natural Resources
ASOC	Alaska Sea Otter Commission
AWRTA	Alaska Wilderness Recreation and Tourism Association
FWS	Fish and Wildlife Service
GIS	Geographic Information System
NBS	National Biological Survey
MLML	Moss Landing Marine Laboratory
MMS	Minerals Management Service
MMPA	Marine Mammal Protection Act
MOA	Memorandum of Agreement
NMFS	National Marine Fisheries Service
NPS	National Park Service
NRDA	Natural Resources Damage Assessment
OSP	Optimum Sustainable Population
TDR	Time-Depth Recorder
UAF	University of Alaska-Fairbanks
UCSC	University of California at Santa Cruz
UM	University of Minnesota
USFS	U.S. Forest Service

I. INTRODUCTION

Sea otters (*Enhydra lutris*) are conspicuous members of ice-free but cold temperate and sub-arctic nearshore ecosystems of the North Pacific. The Marine Mammal Protection Act (MMPA) of 1972, as amended, transferred management authority for sea otters in Alaska from the State to the U.S. Fish and Wildlife Service (FWS). Since passage of the MMPA, the FWS's management approach has been conservative, allowing populations of sea otters to increase in number and re-occupy most of their historic range. In some regions, populations of sea otters have reached equilibrium densities.

The return of sea otters from near extinction, and the re-occupation of most of their historic range is one of the great wildlife conservation stories of the century. However, the species' recovery has not come without controversy. The conflict between sea otters and humans over shellfish resources is probably the most serious problem that has arisen. With healthy populations of sea otters firmly established in most of their historic range in coastal Alaska, now is an appropriate juncture to examine existing and potential management problems and resource conflicts, and consider potential solutions to those management problems and conflicts.

Preparation of this plan follows a recommendation from Congress in a report accompanying the 1988 amendments to the MMPA which calls upon the Secretary of the Interior to consider whether non-depleted species of marine mammals would benefit from preparation of conservation plans, as well as a 1989 recommendation from the Marine Mammal Commission that the FWS prepare a conservation plan for sea otters in Alaska. This plan is a vehicle for guiding ongoing conservation and management activities for sea otters in Alaska.

This plan was developed with the assistance and input of many individuals and groups. The planning process was initiated in 1991 with the establishment of a Planning Advisory Team. Members of the planning team included representatives from most organizations with a major interest in sea otters, including: Alaska Natives, conservationists, environmentalists, sport hunters, commercial fishermen, scientists, oil and gas industry, Alaska Department of Fish and Game (ADF&G), Minerals Management Service (MMS), and the Marine Mammal Commission (MMC). A Draft Management Plan was completed after input and review by the MMC, Alaska Native representatives and other members of the Planning Team and released for public comment on January 15, 1993, following a Federal Register Notice. The Draft Management Plan also incorporated proposed legislative amendments to the Marine Mammal Protection Act.

The public comment period on the draft sea otter management plan began on January 15, 1993, and ended on February 28, 1993. Comments continued to be received and evaluated until mid-March. Public meetings during the comment period were held in Anchorage, Cordova, Homer, Hoonah, Kodiak, Larsen Bay, Nanwalek, Seward, and Valdez. Public meetings also were held prior to the formal comment period in various Southeast Alaska towns and villages, including: Angoon, Hoonah, Hydaburg, Juneau, Kake, Ketchikan, Sitka, and Yakutat. A draft final plan was published in April 1993. Additional comments were received on that plan and have been considered in the preparation of this document.

During the comment period or after the comment period had closed, 195 written comments were received. These comments were from a variety of sources, including: five organizations representing Alaska Natives, four Federal or State government offices, two tourism/marine recreation organizations, four conservation/environmental organizations, and numerous individuals. Seventy-six of the responses were the tear-off portions of the Executive Summary. Ninety-one of the responses were duplicated letters originally signed by citizens of Kodiak Island. In addition to comments on the plan, three resolutions from Alaska Native organizations were received. With the exceptions of written responses from three conservation organizations and three individuals, all written responses were from Alaska. Appendix B contains a summary of the public comments.

The Sea Otter Conservation Plan is divided into two parts: 1) a conservation plan, prepared with the assistance of the Marine Mammal Commission; and 2) an implementation plan which details how the FWS will implement the conservation plan. This plan is not intended as a primary reference on sea otter natural history and ecology. For more information on these subjects, readers are referred to other sources, including: Kenyon (1969), Estes (1980), VanBlaricom and Estes (1988), Rotterman and Simon-Jackson (1988), Garshelis (1990) and Riedman and Estes (1990).

II. GOALS AND OBJECTIVES OF THE CONSERVATION PLAN

In order to fulfill the requirements of the MMPA and continue to ensure the conservation of sea otters in Alaska, several specific goals and objectives were identified to guide the development and implementation of this plan. Additionally, the April 30, 1994 amendments to the MMPA allow for co-management of subsistence use by Alaska Natives and the FWS which will require participation by both organizations to implement the goals and objectives of this plan. Section V. of this document provides additional detail on each of the objectives presented here.

Goal A. Maintain the Alaska sea otter population within its optimum sustainable population range

In the MMPA, Congress found that marine mammal species and population stocks should not be permitted to diminish beyond the point at which they cease to be a significant functioning element in the ecosystem of which they are a part, and should not be permitted to diminish below their optimum sustainable population (OSP) level. The term OSP is defined in the MMPA as "...the number of animals which will result in the maximum productivity of the population or the species, keeping in mind the carrying capacity of the habitat and the health of the ecosystem of which they form a constituent element." This statutory definition has been interpreted by both the FWS and the National Marine Fisheries Service (NMFS) for application in the management context as follows: "Optimum sustainable population is a population size which falls within a range from the population level of a given species or stock which is the largest supportable within the ecosystem to the population level that results in maximum net productivity. Maximum net productivity is the

greatest net annual increment in population numbers or biomass resulting from additions to the population due to reproduction and/or growth less losses due to natural mortality" (50 CFR 216.3). Although the OSP range has not been numerically defined for sea otters in Alaska, the stock is believed to be within that range.

Three specific objectives have been identified to meet this goal:

> Objective 1: Identify the optimal sustainable population range of sea otters including those factors which may influence how such a range is defined;
> Objective 2: Monitor size, status, and trends of sea otter populations and collect life history data for use in population models and for establishing removal guidelines; and
> Objective 3: Establish cooperative working relationships with Alaska Natives to provide support in their conservation and management efforts related to Native sea otter harvest and use.

Goal B. Maintain Healthy Habitats for Sea Otters

Most sea otter habitats in Alaska are under the jurisdiction of the State. In general, sea otter habitats are relatively healthy in Alaska, although on a local basis threats to habitats may exist.

One specific objective has been identified to meet this goal:

> Objective 4: Characterize sea otter habitat and monitor habitat status and trends.

Goal C. Allow for a Variety of Human Uses

Use of sea otters by Alaska Natives as authorized by the MMPA: The MMPA permits Alaska Natives to harvest sea otters for subsistence purposes or for the purposes of creating authentic Native articles of handicrafts and clothing, provided this is accomplished in a non-wasteful manner.

Scientific research and public display: The MMPA authorizes permits to be issued to allow the capture of sea otters for scientific research and public display.

Incidental take in commercial fisheries: The MMPA allows the take of sea otters incidental to commercial fishing operations. One of the goals of the MMPA is to reduce this incidental take to insignificant levels.

Incidental take due to other human activities: A number of human activities may pose threats to the otter population and its habitat in Alaska, e.g., the development of oil and gas resources, and logging.

Competition for shellfish resources: Following extirpation of sea otters from Alaska waters, the

abundance of shellfish and other species eaten by sea otters presumably increased. Commercial, recreational, and subsistence shellfish fisheries subsequently developed in parts of Alaska in the absence of sea otters. Recolonization of such areas is resulting in sea otters and commercial/subsistence/recreational users competing for the same shellfish.

Viewing, photography, and public enjoyment: Tourism is a growing industry in Alaska. Many tourists and Alaskan residents enjoy viewing and photographing sea otters as part of their marine recreational activities. There also exists in the United States a large constituency that has never seen and may never see a sea otter, yet cares deeply that sea otter populations and their habitats are healthy and vital.

Two specific objectives have been identified to meet this goal:

> Objective 5: Identify, avoid and minimize human threats to the sea otter population and habitat, and resolve conflicts; and
> Objective 6: Establish cooperative programs to further the conservation and management of sea otters in Alaska.

III. BACKGROUND

The genus *Enhydra* consists of only one species, the sea otter, *Enhydra lutris*. It is one of the smallest marine mammals in the world. Three subspecies have been proposed (Wilson et al. 1991), only one of which, *E. l. kenyoni*, occurs in Alaskan waters. The FWS currently recognizes one population stock (as defined in the MMPA) of sea otters in Alaska, although there may be subpopulations which are geographically, and possibly reproductively, isolated.

A. Distribution and Abundance

Historically, sea otters occurred in nearshore waters around the North Pacific rim from Hokkaido, Japan, through the Kuril Islands, Kamchatka Peninsula, the Commander Islands, the Aleutians, peninsular and south coastal Alaska, and southward to Baja California (Kenyon 1969; Wilson et al. 1991). Sea otters were commonly harvested by coastal Alaska Natives. Examination of archeological evidence indicates that periodic local reductions of sea otters likely occurred (Simenstad et al. 1978). However, the species was abundant throughout its range before the onset of commercial exploitation. The worldwide population of sea otters in the early 1700s has been estimated at 150,000 (Kenyon 1969) to 300,000 (Johnson 1982).

Extensive commercial hunting of sea otters began following the arrival in Alaska of Russian explorers in 1741. Continued exploitation during the 18th and 19th centuries reduced the species throughout its range, completely eliminating them in some areas. Although the number of animals killed is not well documented, Kenyon (1969) estimated that from 500,000 to 1 million sea otters were taken from Alaska between 1740 and 1911.

By 1911, when sea otters were protected under the International Fur Seal Treaty, the species survived in only 13 small and widely scattered remnant groups (Kenyon 1969). These groups were in the Kuril Islands and along the Kamchatka Peninsula, the Commander and Aleutian islands, the Alaska Peninsula and northern Gulf of Alaska, the Queen Charlotte Islands in British Columbia, the Point Sur area in California, and Islas San Benito in Mexico (Figure 1). Total abundance at that time may have been as few as 1,000 to 2,000 animals (Johnson 1982).

By 1929, the two remnant groups in Canada and Mexico had become extinct. The remaining 11 survived and, during the past 80 years, animals from these groups have recolonized a substantial part of their previous range in Russia, the Aleutian Islands, the Alaska Peninsula, the Kodiak Archipelago, Prince William Sound, and California. At present, sea otters have repopulated most of their former range in Alaska although they have not yet reached equilibrium densities in some areas.

In 1965 the Alaska Department of Fish and Game (ADF&G) initiated efforts to reintroduce sea otters into areas that otherwise might not have been recolonized for years or decades. From 1965 to 1972, 708 sea otters captured at Amchitka Island and in Prince William Sound were transplanted to unoccupied habitat in Alaska, British Columbia, Washington and Oregon. These efforts were successful in southeast Alaska, British Columbia and Washington. They failed in Oregon and may have failed in the Pribilof Islands (Jameson et al. 1982, Riedman and Estes 1990).

With passage of the MMPA in 1972, the authority of State governments to manage marine mammals was transferred to the Federal government. However, the MMPA included provisions by which States could petition for return of marine mammal management authority, subject to certain conditions. During the 1970s, the State of Alaska requested return of management authority for 10 species of marine mammals, including the sea otter. In considering the petition and the State's accompanying request for a waiver of the MMPA's moratorium on taking marine mammals, all affected species were subjected to an Administrative Law Judge review to determine whether the species were within their OSP range, as defined by the MMPA.

With regards to sea otters, the Administrative Law Judge found that sea otters in Alaska occur in a number of individual colonies which are all part of a single stock or population. The Administrative Law Judge further found that the Alaska sea otter stock, which was estimated at 100,000 to 140,000 animals, was, as a whole, within the range of OSP (Federal Register, 1979). However, other actions prevented approval of the State's request for management authority.

As noted above, sea otters have reoccupied most of their historic range in Alaska. Calkins and Schneider (1985) estimated a 1976 Alaska sea otter population of 100,000 to 150,000 animals. Based on the best available data, the FWS believes the current population size is within the range proposed by Calkins and Schneider. A new state-wide population estimate will be revised following analysis of data collected in recent years.

Abundance information by geographic area of Alaska has been compiled by the FWS (DeGange

and Bodkin, in prep.) and is summarized below.

Near Islands: A minimum of 4,115 sea otters are present in the Near Islands, which were reoccupied in the mid-1960s. The subpopulation[1] at Attu Island, which has been surveyed periodically since the mid-1970s, has grown at about 17 percent annually. The subpopulation in the Near Islands is presumably below equilibrium density.

Rat Islands: A remnant colony of sea otters survived at Amchitka Island and possibly elsewhere in the Rat Islands. It is estimated that as many as 14,400 to 20,650 sea otters are present in the waters around the Rat Islands and that the numbers have reached equilibrium density (Estes 1990).

Andreanof Islands: Sea otters are now distributed throughout this island group and the subpopulation is probably at equilibrium density (Estes 1990). The latest available estimate of 5,805 animals dates from 1965 and may not be indicative of current numbers.

Islands of Four Mountains: Sea otters were first seen at this location in 1978 (A. Johnson, pers. comm.) In 1982, 69 sea otters were counted (Bailey and Trapp 1986). Although the Islands of Four Mountains contain limited habitat for sea otters, this subpopulation is believed to be growing.

Fox Islands: There is no evidence that a remnant colony survived in the Fox Islands, but by 1965 a subpopulation was well established. In 1986, 858 animals were counted near the islands but the survey was incomplete (Brueggeman 1988). This subpopulation is believed to be below equilibrium density and still growing.

North Alaska Peninsula/Unimak Island: At least one remnant colony may have survived in this region near the eastern end of Unimak Island. Based on the most recent survey in 1986, this subpopulation is estimated at 13,091 animals (Brueggeman 1988); its status with respect to equilibrium density is unknown.

South Alaska Peninsula: At least two remnant colonies may have survived, one near Sanak Island and the Sandman Reefs and the other in the Shumagin Islands. The subpopulation is currently estimated at slightly more than 27,000 (FWS, unpubl. data). Its status with respect to equilibrium density is unknown.

Kodiak Archipelago: At least two remnant sea otter colonies may have survived in this area, one north of Shuyak Island and another at the southern end of Kodiak Island. The subpopulation continues to expand throughout the area and is currently estimated at 13,200 sea otters (FWS, unpubl. data).

Pribilof Islands: Commercial exploitation extirpated the Pribilof Islands' sea otter population and efforts to reintroduce the species in 1952 and 1972 may have failed according to Jameson et al. (1982). However, seven animals were observed in 1988, and local residents have reported seeing up to 30 animals. The current status of sea otters in the Pribilof Islands is unknown.

Kenai Peninsula: At present, sea otters are found continuously from Kachemak Bay and Anchor Point to the western entrance of Prince William Sound. In 1989, 2,300 sea otters were observed along the Kenai Peninsula (FWS, unpubl. data). It is not known whether numbers are increasing, decreasing, or stable.

Prince William Sound: A remnant colony survived in southwestern Prince William Sound and has been the source of animals that have recolonized the Sound and waters along the Kenai Peninsula. Sea otters were distributed throughout the Sound and abundance may have been as high as 10,000 prior to the *Exxon Valdez* oil spill in March 1989. An estimated 2,787 (500-5,000) sea otters may have been killed by the spill in Prince William Sound (Garrott et al. 1993). A 1991 boat survey suggests a population of 6,200 sea otters in Prince William Sound, exclusive of Orca Inlet (FWS, unpubl. data).

Northern Gulf of Alaska: A remnant colony of otters may have survived west of Kayak Island in Controller Bay. In the past decade, sea otters have also expanded out of Prince William Sound into Orca Inlet and the Copper River Flats. A population of sea otters is also established in Yakutat Bay. An estimated 2,830 animals inhabit the region. Numbers are probably below equilibrium density.

Southeast Alaska: Commercial harvesting eliminated sea otters from southeast Alaska. In the late 1960s, 412 animals were transplanted from Prince William Sound and the Aleutian Islands to this area. There are now three distinct groups of sea otters in southeast Alaska. The regional subpopulation is currently estimated at more than 7,000 animals and is growing at a rate of approximately 20 percent a year. Large areas of unoccupied habitat and abundant food resources remain.

B. Natural History and Ecology

Although sea otters are among the smallest of marine mammals, they are the largest of the North American mustelids. Male sea otters in Alaska may exceed 100 lbs. Females are considerably smaller, rarely exceeding 70 lbs. Unlike most marine mammals, sea otters lack a well-developed blubber layer for insulation, relying instead on air trapped within a thick, luxuriant coat of fur. Their fur, together with a high metabolic rate, allows them to thrive in the cold subarctic waters of the North Pacific.

Sea otters are moderately long-lived, with female sea otters in Alaska living to be 15-20 years old and males 10-15 years. They are gregarious and tend to segregate by sex into male areas and female areas. However, reproductively mature males establish and defend territories within female-dominated areas. Groups of more than 1,000 sea otters have been observed in Alaska. Sea otters are polygamous, and males are capable of breeding with a number of females that visit their territories. Reproductive activity can occur throughout the year, although pupping is concentrated in late spring and early summer and breeding occurs primarily in the fall during or following the period of weaning.

Reproductive rates, mortality rates, life-span, and other vital rates for sea otters have been measured in both California and Alaska sea otter populations. In general, demographic variables vary with sex and age, and may be affected by density, habitat quality, especially food abundance, condition of the animals, weather, and other factors. Females usually breed for the first time between three and five years of age.

Female sea otters usually give birth to one pup. Twinning has been documented but is rare. Females usually reproduce annually, although survival of offspring to age one is highly variable, ranging from 30 to 75 percent, depending to a large extent on habitat quality and the severity of winter. Survival of prime age sea otters in Alaska is high; typically more than 85 percent of the population survive each year. Survival of dependent pups past their first few weeks of life also is high and may be related to the age and experience of their mothers. The months following independence are critical ones for young sea otters.

Sea otters feed primarily on sessile and slow-moving marine invertebrates such as abalone, clam, crab, mussel, and sea urchin. The eating of fish is locally common, and occurs most frequently in some rocky habitats at or near carrying capacity. The effects of sea otters on nearshore benthic communities are both direct and indirect. The best documented direct effect is the reduction in benthic invertebrate populations by sea otter predation. In places where prey species recruit infrequently, such as sea urchins and abalones in southeast Alaska, British Columbia and California, sea otters are capable of nearly eliminating some prey populations or confining them to refugia such as deep water and crevices in rocky bottoms. In other areas such as the Aleutian Islands where sea urchins recruit frequently, the prey population may shift in size frequency and density with a concurrent substantial drop in biomass. Effects similar to those observed in the Aleutian Islands have been documented in soft sediment bottoms where intense predation by sea otters can significantly reduce the size, density, and biomass of clam populations.

The primary indirect effect of sea otter predation is habitat modification. In rocky substrates this modification occurs as the result of the elimination or reduction in grazing pressure from sea urchins with a subsequent release of kelp and other macroalgae. The kelp forests that result provide habitat for a host of other invertebrates and fish that were unable to exist in large numbers in urchin-dominated areas. The indirect effects of sea otter predation in soft-bottom habitats are more subtle and include disturbance of the sea floor and sea floor communities through pit excavation, and the deposition of clam shells that provide attachment substrate for various kelp species and other invertebrates.

C. Current Conservation Framework

The MMPA provides the general framework for the conservation of sea otters. The MMPA calls for a general moratorium on the taking (defined as to harass, hunt, capture, kill or attempt to harass, hunt, capture or kill) of any marine mammal with few exceptions, which include: 1) take for purposes of scientific research, public display, or to enhance the survival or recovery of a species or stock; 2) incidental take in the course of certain commercial fishing operations; 3) intentional take in the course of certain activities following a Secretarial waiver, provided the form of take is compatible with the MMPA; and 4) incidental take of marine mammals in specific

activities other than commercial fishing. In all cases, the MMPA specifies that allowable forms of take must either have a negligible impact on the affected species or stock of marine mammal or must not disadvantage the affected species or stock. The moratorium on the taking of marine mammals does not apply to Native Alaska Indians, Aleuts, or Eskimos who reside in Alaska and dwell on the coast of the North Pacific Ocean or Arctic Ocean provided such taking is for subsistence purposes, or is done for purposes of creating authentic native articles of handicrafts and clothing, provided this is not accomplished in a wasteful manner. The MMPA also provides a mechanism for the return of marine mammal management to individual states. With respect to sea otters, the MMPA is implemented through FWS rules and regulations published in the Code of Federal Regulations.

In 1988, the FWS promulgated regulations to establish a marking, tagging, and reporting program as authorized under Section 109(i) of the MMPA. The action was designed to assist the FWS in monitoring the subsistence and handicraft harvests of sea otters, polar bears, and walrus, and in obtaining essential biological data needed to manage these species or stocks. Under the rule, Native sea otter hunters have 30 days from the date of a kill to present the hide and skull to a FWS tagging representative for marking and tagging. Tagging representatives, often village residents, have been hired in nearly every village or town from which sea otters, polar bears, or walruses are harvested in Alaska.

Besides the marking and tagging program, there are a number of other activities in which the FWS is involved. Conducting surveys is an integral part of the management program. To date, most surveys have been conducted in areas where there are management conflicts, but they have not generally been conducted using methods that ensure repeatability and comparison with future efforts. Research is underway to develop a survey technique for monitoring population trends of sea otters in Alaska.

The FWS has worked cooperatively with the National Marine Fisheries Service (NMFS) to implement the 1988 amendments to the MMPA, which provided a general authorization for the incidental take of sea otters in commercial fishing operations. Logbooks were submitted by commercial fishermen indicating the date and location of all fishing activity and the species and number of sea otters taken. Observers were also placed in certain fisheries in Alaska to monitor incidental takes of sea otters and other marine mammals. The FWS will again work cooperatively with NMFS to implement the 1994 amendments to the MMPA.

The FWS is also responsible for issuing permits that authorize the taking or importation of sea otters for purposes of scientific research, public display, or enhancing the survival or recovery of a stock. The FWS may also issue regulations, for a period not to exceed five years, that authorize the incidental, but not intentional, taking of small numbers of sea otters in specific activities. Other management-related activities that the FWS is involved with include enforcement of laws and regulations, education, coordination with other State and Federal organizations over issues that affect sea otters, and oil spill contingency planning.

Alaska Natives remain vitally concerned about sea otters, reflecting their long history of co-existence. The exemption to the moratorium on taking afforded to Alaska Natives in the MMPA

maintains their unique and long-standing role as stewards of marine mammal resources in Alaska. In 1988 the Alaska Sea Otter Commission (ASOC) was formed by Alaska Natives, in part, as a demonstration of their continued concern for ensuring healthy populations of sea otters and continued traditional use. The ASOC is composed of coastal Alaska Native communities from each of six coastal Native regions in Alaska: SeaAlaska, Chugach, Cook Inlet, Koniag, Bristol Bay, and Aleut. Each region is represented on the ASOC by one commissioner. The ASOC is currently developing regional sea otter management plans. These plans are based on local needs and knowledge about sea otters and reflect concepts of self-regulation. The FWS plans to assist the ASOC in these efforts. The FWS, ASOC, and the ADF&G have entered into a Memorandum of Agreement that defines how the organizations will cooperate on management activities.

IV. CONSERVATION ISSUES

The sea otter population in Alaska has made a dramatic recovery since it was protected in 1911. However, management conflicts have arisen, and there are a number of activities that potentially could threaten one or more local populations and perhaps impede maintenance of the total population within its optimum sustainable size range. The principal threats, management conflicts, and conservation issues are: incidental take in commercial fisheries; competition with shellfish fisheries for the same prey resources; displacement from prime habitat by mariculture operations; oil and gas exploration, development and transportation; Native hunting; possible commercial and recreational hunting; and take for scientific research and public display.

A. Incidental Take in Commercial Fisheries

Sea otters are taken incidentally in salmon gillnet fisheries and other fisheries in several areas of Alaska, including Prince William Sound, the Kodiak Archipelago, the Alaska Peninsula, and the Aleutian Islands. Under the 1988 amendments to the MMPA, commercial fishermen were given a five-year exemption from the MMPA's General Permit and "small take" provisions which governed the taking of marine mammals incidental to fishing operations. The National Marine Fisheries Service (NMFS) was given responsibility for developing and implementing the interim exemption program, as well as for recommending a permanent regime to be implemented when the exemption ends in 1993. Under the interim exemption program, fishing vessel owners are required to maintain a log book detailing the taking of all marine mammals by species and number. In addition, the NMFS is required to place observers on a subset of vessels engaged in fisheries that take marine mammals frequently. The log book and observer reports should provide information necessary to determine the nature and extent of the problem.

Observations of dead sea otters on the Copper River Flats in the mid-1980s raised concerns about losses of sea otters in salmon gillnets. Although sample sizes were small, data from the observer programs in the Prince William Sound and Copper River Flats drift and set gillnet fisheries in 1990 and 1991, and the South Unimak Pass drift gillnet fishery in 1990 and 1991, suggest that incidental mortality of sea otters in these fisheries is low (Wynne 1990; Wynne et al. 1991, 1992).

The extent of sea otter mortality associated with other gear types is unknown.

B. Competition for Shellfish Resources

Following the extirpation of sea otters from much of their range, populations of their prey species, such as sea urchins, clams, mussels, chitons, abalone, and crabs, presumably increased. In some areas, these shellfish became the basis for significant commercial, recreational or subsistence fisheries. With the recolonization of much of the species' historic range, sea otters are competing with these fisheries for the same resources.

Sea otters were implicated in the demise of the recreational and commercial Dungeness crab fisheries in Orca Inlet and eastern Prince William Sound (Kimker 1985; Garshelis et al. 1986). In addition, Alaska Natives and others residing in coastal villages from Atka Island in the Aleutian Island chain eastward through southeast Alaska have expressed concern over the impact of sea otter predation on abalone, clam, crab, gumboot chiton, and sea urchin resources used for subsistence.

Existing or potential conflicts between human commercial and recreational fisheries and sea otters also exist in Lower Cook Inlet over razor and hardshell clams, and Dungeness crabs, at Kodiak Island for Dungeness crabs and sea urchins; and in southeast Alaska for abalone, Dungeness crabs, sea urchins, and perhaps geoduck clams. King and tanner crabs also are fished in most of these areas, and although the interaction between these species and sea otters is poorly known, there is concern that stocks of these species could also be negatively affected by sea otter predation.

C. Mariculture

A new industry to grow clams, mussels, oysters and scallops is developing in southeast and south-central Alaska. Such operations could lead to displacement of sea otters from protected coastal waters and may lead to increased mortality through entanglement (Monson and DeGange 1988). Also, depredation of shellfish in unprotected mariculture facilities by sea otters could lead to efforts by the facilities' operators to exclude sea otters by harassment or lethal means. Little information is available on the interaction between mariculture operations and sea otters.

The U.S. Army Corps of Engineers issued a general permit for constructing mariculture facilities in navigable waters in 1991, which eliminated the mechanism through which Federal agencies, such as the FWS, comment on specific proposed operations. Permitting of new mariculture operations is now done entirely by the State of Alaska.

D. Oil and Gas Exploration, Development and Transportation

Activities and oil spills associated with offshore oil and gas exploration, development and transportation have the potential for adversely impacting sea otters and their habitat in Alaska. Because sea otters rely on air trapped in their fur for warmth and buoyancy, they are the marine mammals most likely to be affected adversely by oil spills (Costa and Kooyman 1982; Geraci and

St. Aubin 1990). The *Exxon Valdez* oil spill in March 1989 illustrates the impact that oil spills can have on sea otters. It is estimated that approximately 4,028 (range 2,028 to 11,280) sea otters died in Alaska as a result of the spill. In addition, continuing studies suggest that otters still are being affected by oil in their environment in western Prince William Sound.

E. Use by Alaska Natives

Alaska Natives currently may take sea otters for subsistence use or for creating and selling authentic Native articles of handicrafts and clothing, provided that the taking is not wasteful. There is no evidence that the harvest by Alaska Natives has affected populations of sea otters or limited the distribution or productivity of sea otters in Alaska. However, if over harvest occurs, reductions of some local populations in Alaska could occur.

Hunting of sea otters, including hunting by Alaska Natives, was prohibited by the 1911 Fur Seal Treaty and later by Alaska State law. Since 1911, relatively few sea otters are known to have been killed in Alaska, including 62 between 1912-1936, and 2,556 killed by the ADF&G during an experimental harvest in the late 1960s and early 1970s.

In 1972, the MMPA exempted Alaska Natives from the prohibition on taking and, in the early 1980s, some Alaska Natives resumed hunting sea otters and used their fur to create handicrafts, which they then sold. Between 1982 and 1986, a minimum of 1,049 sea otters were reported legally killed by Alaskan Natives (Rotterman and Simon-Jackson 1988). From late October 1988 through the end of calendar year 1992, the number of sea otters reported killed by Alaskan Natives each year were: 1988 - 55; 1989 - 268; 1990 - 166; 1991 - 236, 1992 - 637 and 1993 - 1229 (FWS, unpubl. data). The 1994 sea otter harvest as of May 5, 1994 was 286 (FWS, unpubl. data).

F. Commercial and Recreational Hunting

Many Alaskans, particularly those living in isolated coastal areas, view sea otters and other wildlife as renewable resources with considerable economic as well as subsistence value (Johnson 1982). As sea otters increase in numbers and expand their range, and as interactions with fisheries continue to increase, it is possible that individuals or organizations will seek authorization to hunt sea otters for commercial and/or recreational purposes. Such take would require a waiver of the moratorium on taking established by the MMPA. The FWS does not at this time intend to seek a waiver of, or amend the MMPA, to allow non-Native Alaskans to harvest sea otters for commercial or recreational purposes.

G. Public Display and Scientific Research

Between 1976 and 1988, nearly 100 sea otters were taken from Alaskan waters, primarily from Prince William Sound, for public display in aquaria (Rotterman and Simon-Jackson 1988). Hundreds more have been captured, handled, tagged and released as part of research projects. There have been no observed effects on sea otter populations from either of these activities.

H. Other Potential Issues

Logging and log transfer facilities are proposed for some protected bays along the Alaska coast inhabited by sea otters. If bark and debris are not removed from waters around these facilities, benthic food resources for sea otters in localized areas could be impacted. Disturbance from such activities could also cause sea otters to avoid or abandon areas that otherwise would be prime habitat.

Contamination of sea otter habitat also could result from seafood processing activities (both land-based and floating) and associated dumping of shells, bones and other organic wastes. Other development activities in the coastal zone, especially those that create disturbances in nearshore waters or release effluent, could have negative effects on sea otters.

V. CONSERVATION PLAN

This section includes 5 broad objectives that will contribute towards achievement of the overall goals of the conservation plan. Under each objective, a series of tasks are identified which may be required to meet these goals and those of the MMPA towards resolution of the aforementioned conservation issues. Lead and cooperating organizations, duration, priority and estimated cost are identified for each task in the implementation plan.

Objective 1: Identify the optimal sustainable population range of sea otters including those factors which may influence how such a range is defined

Sea otters have recolonized much, but not all, of their known former range in Alaska. Current abundance is estimated to be more than 100,000 animals. The Alaska sea otter population was determined in 1977 to be within its OSP range. It is the FWS's goal to maintain the sea otter stock in Alaska within its OSP range.

11. Complete the ongoing state-wide population survey to provide up-to-date information on present distribution and abundance

The best available information concerning sea otter distribution and abundance in parts of their Alaska range is from surveys done more than 20 years ago. The FWS has initiated a state-wide survey to obtain more up-to-date information on distribution and relative densities in these areas. This survey will provide an abundance estimate and more up-to-date information on present distribution and relative densities of sea otters. Distribution and abundance information is necessary to (a) reaffirm that the Alaska sea otter population is presently within its optimum sustainable range, (b) better determine the nature and rate of recolonization within different geographic areas and with different habitat characteristics, and (c) identify areas where sea otters (i) are important to the Alaska tourism and recreation industry, (ii) are impacting, or are likely to

impact, subsistence, recreational, or commercial shellfish fisheries, and (iii) are being impacted by Native hunting, incidental take in commercial fisheries, offshore oil and gas development, logging, coastal development, etc.

12. Review taxonomic and genetic data on sea otters in Alaska, and if necessary, redefine population stocks

Currently the FWS recognizes one population stock of sea otters in Alaska. However, two genetic studies on Alaskan sea otters were recently completed. Because the results of these studies may influence how sea otters are managed in Alaska, it is important that they be evaluated.

13. Define the OSP range for the sea otter stock(s) in Alaska

Although the sea otter population in Alaska is believed to be within its OSP range, that range has never been numerically defined. Sufficient population data may exist from parts of the sea otter's range in Alaska to estimate the population of sea otters at carrying capacity. The maximum net productivity level will be more difficult to define but it will be necessary to estimate that value given the mandate in the MMPA to manage above that level.

14. Using available data, define regional conservation units for sea otters in Alaska

Given the size of the range of sea otters in Alaska, and the local differences in the kind and intensity of management conflicts, it is likely that management of sea otters will be regionally based. The State of Alaska, during the Administrative Law Judge hearings for return of management in the 1970s, proposed that the sea otter range in Alaska be divided into 15 management units. The ASOC has divided their management efforts into six different coastal native regions. Those management units defined by the State of Alaska and the ASOC should be considered in the definition of regional conservation units for sea otters.

15. Establish target population levels for regional conservation units and estimate the maximum number of animals that could be removed from those units while maintaining target levels

Under an exemption to the MMPA, Alaska Natives are allowed to harvest sea otters for subsistence and handicraft purposes, without limit, provided the take is not wasteful and the stock remains above the lower bound of OSP. In addition, sea otters are taken incidentally in commercial fishing gear, for public display, and in research operations. One way to ensure that the stock remains within its OSP range is to cooperatively limit removals of sea otters on a regional basis, with the Alaska Native subsistence harvest receiving priority over other forms of take. Once conservation units and management goals for those units are defined, guidelines for harvest and other forms of take should be established using the best scientific information

available.

Objective 2: Monitor size, status, and trends of sea otter population(s) and collect life history data for use in population models and for establishing removal guidelines

Long-term monitoring of sea otter population size or trends in population size will be required to ensure that human activities do not directly or indirectly cause the stock to be reduced below the lower limit of its OSP range. The monitoring program requirements will depend, in part, upon the threats and the level at which the population is maintained. For example, accurate, range-wide monitoring will be required if there are substantial threats or the population is maintained at or near its maximum net productivity level. Occasional or periodic monitoring of selected index areas might be sufficient if the threats are relatively benign and the population is maintained at or near its carrying capacity level. Collection of life history and composition data will be important for constructing population models and for establishing removal guidelines that can be used for managing the take of sea otters.

21. Develop standard methods for estimating population size and/or trends

With few exceptions, available information on size of the sea otter population is insufficient to serve as a baseline for detecting and judging the significance of any future changes in population size. Accurate baselines and precise monitoring programs will be required if there are significant threats or if the population is being held near its maximum net productivity level. Therefore, studies should be designed and conducted to identify the survey procedures and effort that will be required to obtain reliable baselines and to detect changes in population size and trends with enough precision to detect small-scale changes.

22. Develop and implement a program to monitor sea otter population size or trends

Once a survey technique for sea otters is developed, a program must be implemented to monitor population size or population trend. That program would best be concentrated in those regional conservation units where conflicts with sea otters are most prevalent and where a management program may be applied, and in those areas where the Native harvest is most intense.

23. Monitor the health, status, condition, and life history variables of sea otter populations

More detailed information on health, condition, and life history variables of sea otters would be useful for assessing potential impacts to sea otter populations from various environmental and ecological perturbations such as oil spills and other contaminants, development, commercial fishing, disturbance, and harvest. The FWS recommends the following tasks (231 - 236).

231. Develop a biological sampling program for sea otters harvested by Alaskan Natives

Animals harvested by Alaska Natives can provide a valuable source of information on the general health or condition of individual animals, and the vital parameters (e.g., age composition, age at first reproduction, ovulation and parturition rates, diet) of sea otters in the areas where they are hunted. Such information is essential to effective monitoring of population status. Thus, biological sampling of sea otters taken by Alaska Natives for subsistence and handicraft purposes should be initiated as soon as possible.

232. Develop indirect indices of sea otter population status, health, and condition

Once a biological sampling program is established, material will be available for developing indices of health, condition, and population status. Besides serving as baselines in the event of environmental and ecological perturbations, these indices, especially those dealing with population status, could be used as criteria for deciding when and where to harvest sea otters and the level of that harvest.

233. Estimate life history variables for sea otters in Alaska

In addition to providing baseline information for assessing the effects of environmental and ecological perturbations or changes, life history data can be used in population modelling and ultimately in establishing guidelines to govern harvest and other forms of take. A number of studies designed to investigate sea otter life history attributes have been undertaken in Alaska and California. Most of these studies have been conducted in areas with increasing sea otter populations. A study was recently initiated at Amchitka Island to examine the population ecology of sea otters at a location presumably at carrying capacity. Life history data from previous studies should be compiled and evaluated for use in population models. Recommendations for additional studies also should be made.

234. Develop baseline information on contaminant levels of sea otters from various coastal regions in Alaska

With the exception of hydrocarbon data from the Natural Resources Damage Assessment for the *Exxon Valdez* oil spill, little is known of contaminant levels for sea otters in Alaska. Preliminary data from the Aleutian Islands suggest that DDT/DDE ratios were unexpectedly high. Additional data on existing levels of contaminants in sea otter tissues from various regions in Alaska would be useful for assessing the affects of future environmental catastrophes, or as a baseline to assess the effects of future development in coastal Alaska. A regional program for assessing contamination levels in sea otters should be established.

235. Archive tissue samples in the Marine Mammal Tissue Bank administered by the National Marine Fisheries Service and other tissue banks, as appropriate

The Marine Mammal Tissue Bank is collecting and archiving tissues for future investigations of contaminants in marine mammals. Duplicate samples collected under Task 234 will be archived in the tissue bank. Tissue samples will also be made available to facilities such as the University of Alaska Museum which archive tissues for genetic analysis.

236. Cooperate with the Secretary of Commerce to prepare a comprehensive stock assessment for sea otters, as directed by the 1994 amendments to the MMPA

The 1994 amendments to the MMPA direct the Secretary of Commerce, in consultation with the appropriate regional scientific review group, to prepare stock assessments for each marine mammal stock which occurs in waters under the jurisdiction of the United States.

Objective 3: Establish cooperative working relationships with Alaska Natives to provide support in their conservation and management efforts related to Native sea otter harvest and use.

31. Develop a Memorandum of Agreement with the Alaska Sea Otter Commission and the Alaska Department of Fish and Game that defines cooperative responsibilities towards conservation and management of sea otters in Alaska

Successfully implementing a conservation and management program for sea otters will depend on cooperation among the FWS, Alaska Natives, and the Alaska Department of Fish and Game. Such cooperation would be facilitated by developing a formal agreement specifying how the groups will work together to achieve the desired ends. As noted above, Alaska Natives have established the Alaska Sea Otter Commission to (1) promote the conservation and well-being of sea otter populations; (2) involve Alaska Natives in resource decisions affecting sea otters; (3) educate and inform the public on the traditional and contemporary relationship between the sea otter and Alaska Natives; and (4) work with regulatory agencies toward the common goal of enhancing and promoting healthy populations of sea otters. At the same time, the FWS has statutory responsibility for ensuring that Native taking is not wasteful and does not result in the population being reduced below the lower bound of its optimum sustainable population range. The ADF&G has responsibility for other fish and wildlife (e.g., shellfish resources) that may affect and be affected by sea otters. On February 1, 1994, the FWS, ASOC and ADF&G signed a MOA outlining common goals, objectives, roles and responsibilities.

311. Assist the Alaska Sea Otter Commission with the development of regional management plans

The Alaska Sea Otter Commission is currently developing draft regional management plans. The goal of the plans are to strive for a balance between maintaining a sustainable sea otter population and providing beneficial use opportunities for Alaska Natives. The Alaska Sea Otter Commission will have the major responsibility of ensuring harvest levels are consistent with maintaining the population within its OSP range. Because the FWS has no authority to limit harvest of sea otters by Alaska Natives until the species or stock is declared depleted, a regional management system will require a substantial level of cooperation between the FWS and Alaska Natives. The FWS could best contribute to such a program by providing survey and population composition data, and cooperating in population model development, harvest monitoring, and biological sampling. The FWS and the ASOC will cooperate in regional planning efforts to ensure the plans are consistent with sound principles of wildlife management and with the MMPA, and with FWS's statutory responsibilities under the MMPA.

312. Incorporate traditional knowledge of sea otters from Alaska Natives into management and conservation strategies

Alaska Natives, through knowledge passed down from generations in oral traditions or through extensive personal contact with the natural resources around them, often have important insights into natural history that are unavailable to western science. These forms of traditional knowledge could make a valuable contribution to any management or conservation program that is adopted for sea otters in Alaska.

313. Work with Alaska Natives to establish guidelines for the humane, efficient, and non-wasteful harvesting of sea otters

As Alaska Natives become increasingly interested in harvesting sea otters, occasionally sea otters may be wounded or killed and not retrieved by Native hunters. A representative subset of Native sea otter hunters should be interviewed to determine what proportion of the sea otters shot are not retrieved, and what factors are responsible for the loss. Using information from skilled hunters, guidelines should be developed and provided to hunters emphasizing efficient and non-wasteful harvesting methods, as well as preferred methods for caring for sea otter skins after harvest. In addition, the Service should work with Alaska Natives to develop sound harvest guidelines to ensure a sustainable harvest regime. Consideration should be given to the harvest ratios of (1) males to females and (2) sub-adult to adult animals based on local sea otter populations, geographic region, resource conflicts, and harvest intensity.

314. Strengthen the Marking, Tagging, and Reporting Program to document the number, age and sex composition of animals taken for subsistence and handicraft purposes

Accurate information on the number, age and sex of sea otters taken state-wide by Alaska Natives for subsistence and handicraft purposes is necessary to determine how the take affects the

distribution, size, and productivity of the population. Thus, the marking/tagging program established by the FWS should be continued and, if necessary, expanded to provide accurate information on the numbers of sea otters taken annually, by location, age and sex. Compliance with the program should be evaluated.

315. Work with the Secretary of Commerce on the scientific research program related to the Bering Sea marine ecosystem on research related to subsistence uses of marine resources in that ecosystem

The MMPA amendments of April 30, 1994 state that the FWS should work with the Secretary of Commerce to undertake a scientific research program to monitor the health and stability of the Bering Sea marine ecosystem and shall include research on subsistence uses of marine resources in that ecosystem and ways to provide for the continued opportunity for such uses. The FWS will support this effort as it pertains to subsistence use of sea otters in the Bering Sea ecosystem. To the maximum extent practicable, this research program shall be conducted in Alaska and shall utilize, where appropriate, traditional local knowledge and may contract with a qualified Alaska Native organization to conduct such research.

Objective 4: Characterize sea otter habitat and monitor habitat status and trends

The availability and accessibility of information on sea otter habitat is important to ensure that effects of activities sharing that habitat can be considered. Many planning efforts require this information including oil spill contingency planning, permit reviews in coastal areas, mariculture design and development, and other development which occurs within or in close proximity to important sea otter habitat areas. Maintaining the optimum sustainable sea otter population in Alaska will require protection of habitats necessary to sustain sea otters throughout their life cycle.

In addition, the MMPA amendments of April 30, 1994 require the FWS work with the Secretary of Commerce to recommend a program of research to monitor the health and stability of the Bering Sea marine ecosystem which includes sea otters.

41. Review existing knowledge of sea otter habitat requirements and define habitat data needs

Characterizing, monitoring, and evaluating habitat are difficult and complex tasks. Equally difficult is defining such terms as critical, important, and essential with reference to sea otter habitat. This information will be needed in order to foster habitat conservation, and hence, maintenance of the northern sea otter population within its optimum sustainable population range. Defining habitat data needs is one task that could be undertaken by the proposed sea otter technical group (see Task 52).

42. Define sea otter habitat bathymetrically

Because sea otters are often seen over deep water, and have been caught in crab pots set as deep as 300 ft, recent sea otter surveys have attempted to sample shoreward of the 300 ft bathymetric line. In some regions of Alaska, this results in a huge survey area which is costly and difficult to survey. A study should be designed and conducted to better define sea otter habitat for use in defining population survey boundaries. The use of time-depth recorders may be considered in the study design.

43. Review and plot available sea otter distribution and habitat-use data to identify important breeding, feeding, rafting, and haul-out sites in areas likely to be impacted by development or otherwise at risk from human activities

This task is essential to determining (a) areas and habitat types (e.g., hard- and soft-bottom communities) of particular importance to the long-term health and stability of the Alaska sea otter population; (b) existing and foreseeable threats to important habitats and/or habitat components; and (c) measures that will be required to protect habitats essential to maintaining the optimum sustainable sea otter population in Alaska. This task can be accomplished primarily in areas where long-term studies of sea otters have occurred by analysis of telemetry data. Relevant data will be incorporated into a geographic information system.

44. Monitor the status of sea otter prey populations and the effects of sea otter predation

Benthic prey populations are a major component of sea otter habitat. A number of studies have been initiated to examine the status of sea otter prey populations and to determine the effects of sea otter predation on those populations. However, a number of those studies are located in remote areas, often far removed from areas of existing or potential management conflicts. A program to monitor prey populations in areas where conflicts are occurring or are expected should be initiated.

45. Develop more effective liaisons with other State and Federal agencies, and with private organizations for tracking and influencing development and activities that might affect sea otters and sea otter habitat

Permits for development or to conduct commercial activities in coastal Alaska are issued by a variety of State and Federal agencies. Negative effects of development on natural resources can sometimes be prevented or mitigated. To do so, however, requires effective consultation and coordination among various agencies and organizations. Networks must be developed to foster this coordination to protect sea otters and sea otter habitat.

46. Work with the Secretary of Commerce to undertake a scientific research program to monitor the health and stability of the Bering Sea marine ecosystem

The MMPA amendments of April 30, 1994 state that the FWS should work with the Secretary of Commerce to undertake a scientific research program to monitor the health and stability of the Bering Sea marine ecosystem and to resolve uncertainties concerning the causes of population declines of marine mammals, sea birds, and other living resources of the Bering Sea ecosystem. The FWS will support this effort as it pertains to sea otters in the Bering Sea ecosystem. To the maximum extent practicable, this research program shall be conducted in Alaska and shall utilize, where appropriate, traditional local knowledge and may contract with a qualified Alaska Native organization to conduct such research.

Objective 5: Identify, avoid, and minimize human threats to sea otters and their habitat, and, if possible, resolve resource conflicts

A number of human activities may pose threats to the sea otter population and its habitat in Alaska. As management conflicts or threats to sea otters arise, innovative solutions may be required to minimize these conflicts and threats. Changes in fishing gear and fishing techniques or protective enclosures around mariculture facilities may be needed. These potential threats, and actions needed to assess and avoid, minimize, or mitigate them, are described below.

51. Monitor incidental and deliberate take during commercial fishing operations

Sea otters and other marine mammals are known to be taken incidentally in salmon and other gillnet fisheries in several areas of Alaska (e.g., southeast Alaska, Prince William Sound, lower Cook Inlet, Kodiak Island). In California, incidental take in coastal set net fisheries is thought to have effectively prevented population growth and range expansion from the mid-1970s through the early 1980s (Riedman and Estes 1990). The magnitude of the incidental and deliberate take in Alaska is not well documented. There is no evidence of decreased abundance in areas where fisheries occur, suggesting that the take may be biologically insignificant. Also, studies currently underway have not documented a deleterious effect on sea otter populations.

511. Review available data and, as necessary, continue existing reporting and observer programs

Observers have been placed in a subset of the gillnet fisheries known or thought to take sea otters in Alaska. The results of the observer program suggest that the incidental take of sea otters in drift and set net fisheries on the Copper River Flats and in Prince William Sound is biologically insignificant. Data from the logbook program on the incidental and deliberate take of sea otters in Alaska fisheries have not yet been evaluated fully. The available data should be compiled and reviewed to determine the nature and extent of the incidental take.

The 1994 amendments to the MMPA require that certain vessels register with NMFS in order to obtain an authorization to incidentally take sea otters. In addition, monitoring programs are required to be established in certain fisheries, as determined by the Secretary (of Commerce). The FWS will work in cooperation with NMFS to implement these amendments with respect to gathering information on the incidental take of sea otters and recommending a course of action that should be considered by regional take reduction teams if and when incidental take plans are prepared for sea otters.

512. If necessary, design and conduct a study to determine how to reduce incidental mortality and injury by modifying fishing gear and practices

One of the goals of the MMPA is to reduce the mortality and serious injury of marine mammals incidental to commercial fishing operations to insignificant levels. If after the above review (Task 511), incidental mortality is believed to be of concern it will be determined if there is a practical alternative to existing gear or practices.

513. Identify and implement education, regulatory, and enforcement programs necessary to ensure that incidental take is reduced to insignificant levels

The success of efforts to reduce or eliminate the accidental and deliberate take of sea otters in the course of commercial fishing operations will depend upon fishermen being aware of, and complying with, applicable statutes, regulations, and guidelines. Therefore, if Tasks 511 and 512 indicate that something should be done to reduce the incidental and deliberate taking of sea otters, education, regulatory, and enforcement programs should be developed and implemented.

52. Competition for shellfish resources

Following extirpation of sea otters, the abundance of shellfish and other species eaten by sea otters presumably increased. Commercial, recreational, and subsistence shellfish fisheries have developed in parts of Alaska in the absence of sea otters. Recolonization of such areas is resulting in sea otters and commercial/subsistence/recreational users competing for the same shellfish.

521. Compile available information on sea otter distribution and human use of shellfish resources in Alaska to determine areas where competition for shellfish resources is occurring, and is likely to occur in the future

Some form of management may be necessary or desirable to minimize sea otter predation on shellfish in areas where such predation might preclude commercial, subsistence, or recreational fisheries that have developed in the absence of otters. Available information on the demography and utilization of shellfish resources by sea otters and humans in Alaska must be compiled and

compared to determine areas where competition is occurring and is likely to occur in the foreseeable future. Shellfish harvest data from the ADF&G and sea otter distribution and habitat-use data from FWS (Task 33) will be analyzed and overlaid in a geographical information system to assist with this task.

522. Determine whether the competition between humans and sea otters for shellfish is affecting humans adversely

Re-occupation of historic range by sea otters will provide an opportunity to assess the effects of sea otter predation on subsistence and commercial shellfish fisheries by examining pre-sea otter and post-sea otter harvest data collected by the Subsistence and Commercial Fisheries divisions of the ADF&G.

523. Initiate studies to determine the effects of sea otter predation on valuable species of shellfish in commercial, recreational, and subsistence fisheries

Sea otter populations will reduce densities of some shellfish prey species, e.g. sea urchins, to levels that cannot sustain commercial fisheries. For other species, e.g., Dungeness, king, and tanner crabs, the effects of sea otter predation are less clear. Studies should be initiated to evaluate the possible effects of sea otter predation on crabs and other valuable species of shellfish.

524. Identify and initiate such education, regulatory, and enforcement programs as necessary to protect sea otters

As sea otters re-occupy historic range and come into conflict with human users of shellfish, they occasionally are deliberately and maliciously killed. If sea otters are being affected adversely as a result of competition with commercial, recreational, or subsistence shellfish users, it may be necessary to develop education, regulatory, and/or enforcement programs to prevent or reduce the impacts.

53. Mariculture and fish farming

Efforts are underway in southeastern and south central Alaska to "farm" mussels, clams, and oysters. In addition, programs have been initiated in Prince William Sound and elsewhere to augment natural production of certain salmon stocks. Such programs may: exclude sea otters from certain areas through disturbance; introduce or expedite the spread of diseases that may kill or reduce the productivity of important sea otter prey species; or cause conflicts which will lead mariculture operators to seek exclusion of sea otters from areas where the conflicts occur.

531. Review, and if necessary, modify applicable Federal, State, and local licensing and permit processes, and monitoring programs to ensure that they include adequate provisions for identifying and avoiding possible adverse impacts on sea otters

Various Federal, State, and local agencies are responsible for licensing and ensuring that mariculture and hatchery programs comply with applicable Federal, State, and local statutes and regulations. It is not clear whether the responsibilities are well defined and being met. As a first step towards ensuring that the responsible agencies are aware of and are meeting their responsibilities, a review should be done to identify (1) all relevant statutes and regulations, (2) the agencies responsible for implementing and ensuring compliance with the statutes and regulations, and (3) any deficiencies in the statutes and agency efforts to implement them.

532. Determine effects on sea otters and, if necessary, recommend gear modifications to protect sea otters and shellfish

As mariculture operations become more abundant in coastal Alaska, conflicts with sea otters are developing. A study should be undertaken to determine the effects of those operations on sea otters, and to determine if sea otter predation is affecting the shellfish growers.

54. Oil and gas exploration, development, and transportation

Exploration, development and transportation of coastal and offshore oil and gas resources could affect sea otters and their habitat in Alaska in several ways. For example, noise and disturbance from ship and aircraft traffic, rig construction, drilling, etc. could cause sea otters to avoid or abandon otherwise ideal habitat. Also, as demonstrated by the grounding of the oil tanker T/V *Exxon Valdez* in Prince William Sound, oil spills can both kill sea otters and damage or destroy important sea otter habitat.

541. Complete Natural Resources Damage Assessment and close-out of studies, and continue sea otter restoration studies and mitigation following the *Exxon Valdez* oil spill

Studies were initiated in March 1989, as part of the *Exxon Valdez* damage assessment program, to determine how the oil spill and related clean-up operations affected sea otters and their habitat in Prince William Sound and adjacent areas affected by the spill. Preliminary results indicate that 4,028 (range 2,028 to 11,280) sea otters were killed by contact with the spilled oil and that additional otters were and are being affected by sub-lethal contact and/or food chain effects. The studies should be continued until both first-order and second-order effects are quantified.

542. Identify possible impacts of exploration, development, and transport activities on sea otters and their habitat early in the planning stages

Oil and gas exploration and development is ongoing or planned in several parts of the sea otter's range in Alaska (e.g., Cook Inlet, Shelikof Strait, the northeast Gulf of Alaska, and St. George Basin). The Minerals Management Service is responsible for assessing and ensuring that exploration, development, and related activities in Federal waters do not disadvantage sea otters or other components of potentially affected ecosystems. The Alaska Departments of Fish and Game, Environmental Conservation, and Natural Resources have similar responsibilities regarding development in State waters. These agencies, in consultation with FWS, have conducted or provided support for surveys and other studies necessary to determine where and how sea otters might be affected by proposed or existing activities. Additional studies may be necessary if other areas are proposed to be opened for oil and gas exploration and development.

543. Implement systematic surveys of sea otters in areas of oil and gas exploration, development and transportation

One of the major drawbacks in trying to estimate acute damage to sea otters following the *Exxon Valdez* oil spill was lack of recent survey data in Prince William Sound and along the Kenai Peninsula. Systematic surveys of sea otters must routinely be conducted in areas of intense oil and gas activity, such as Prince William Sound, in the event of future oil spills.

544. Develop and prepare to implement oil spill contingency plans

Many deficiencies in planning and preparedness were illustrated by the failure to effectively contain and prevent significant environmental damage from the *Exxon Valdez* oil spill. Steps have been taken to assess and correct the deficiencies. The FWS has initiated development of a detailed oil spill contingency plan for sea otters to guide response and clean-up activities. An additional plan is needed that addresses data needs and methods for conducting a natural resources damage assessment. These plans will incorporate information from the *Exxon Valdez* spill, state plans and other relevant information.

545. Develop and implement post-lease monitoring programs to verify that there are no unacceptable first- and second-order effects

If oil and gas exploration and development occur in a significant portion of the Alaska sea otter range, post-lease monitoring programs should be developed and instituted to verify the predicted first- and second-order effects. At a minimum, on-going studies of the demography and dynamics of sea otters and the characteristics of sea otter habitats in Prince William Sound should be continued to provide baseline information and models for predicting possible effects in other areas.

55. Port construction, harbor development, logging, and other human activities

It is likely that tourism, logging, and other commercial enterprises in Alaska will continue to increase. If so, there likely will be a requirement for additional shipping, port development, etc. Such activities could have adverse impacts upon sea otters and their habitat.

551. Design and conduct a study to determine the effects of logging in coastal habitats on sea otters

Logging adjacent to sea otter habitat is widespread on Afognak Island in the Kodiak Archipelago, along the Kenai Peninsula, in southeast Alaska, and in portions of eastern Prince William Sound. Sea otters could potentially be affected by displacement from disturbance, and through habitat destruction by bark and tree waste deposition in foraging habitat. Proposed logging in eastern Prince William Sound could provide an ideal setting for conducting such a study.

552. Review, and if necessary, modify applicable assessment, licensing, regulatory, and monitoring programs to ensure that they provide adequate protection for sea otters and their habitat

A number of different Federal, State and local agencies are responsible for assessing, licensing, regulating, and monitoring activities that could affect sea otters and their habitat. A study should be done to identify and determine whether existing assessment, licensing, regulatory, and monitoring programs are adequate to identify and avoid potential problems. This task and Task 531 should be done cooperatively.

553. Quantify the level and importance of tourism in coastal towns and villages within the sea otters' range in order to reduce conflicts with other human activities

Tourism is an economic mainstay of many coastal communities in Alaska and sea otters are an important part of their viewing experience. Additional information on which communities have tourism industries and where tourists go to view sea otters will be important to reduce conflicts with other human activities that might affect sea otters.

56. Evaluate information on the location and severity of existing or potential conflicts between sea otters and humans and determine where it may be desirable to regulate sea otter distribution or abundance and/or human activities to maintain the Alaska sea otter population within its OSP range, and to maintain or protect other important resources

Available information indicates that the sea otter population in Alaska may be affected by a variety of human activities. Available information also suggests that sea otters may be important to the tourism industry in certain areas and that certain subsistence, recreational, and commercial shellfish fisheries may be impacted adversely if sea otters are allowed to fully recolonize all of their former Alaska range. Management of sea otter populations to protect shellfish might be easier and require affecting fewer animals if management options were implemented before sea otters recolonize selected areas. Likewise, human-related threats to sea otters and their habitat can be avoided or mitigated more easily if they are identified before they develop. Therefore, evaluation of existing or potential conflicts should be afforded high priority. A geographic information system (GIS) should be developed to help organize and evaluate the relevant data sets.

57. Considering the results of task 46, identify and evaluate the likely cost, humaneness, and effectiveness of alternative means for implementing a strategy to protect shellfish fisheries

If some form of management is necessary to protect shellfish fisheries, it must be decided (1) how the distribution and/or densities of sea otters can be regulated in a cost-effective and humane manner; (2) how Native hunting, incidental take in fisheries, and other forms of taking (e.g., live-captures and removals for public display) can be governed collectively to ensure that the sea otter population is not reduced below the lower level of its optimum sustainable range; (3) how fishery development, mariculture development, offshore mining, dredging, logging, etc. can be regulated to ensure that they do not directly or indirectly (e.g., through habitat alteration) cause the sea otter population to be reduced below its maximum net productivity level; and (4) how the population and its habitat can be cost effectively monitored to ensure that they are not affected adversely by human activities.

Sec. 104(b) of the MMPA would require that capture and relocation be considered to expedite recolonization of certain unoccupied areas, and to retard reoccupation of areas where sea otters would impact subsistence, recreational, or commercial shellfish fisheries. Capture and relocation has been used in California sea otter populations, however, it was costly and ineffective. Further, there is no known practical, safe, or predictably reversible way to regulate births through surgical sterilization or chemical contraception (Hofman 1985). Once most or all of the available habitat has been recolonized, lethal means presumably would have to be used. It also should be recognized that fewer animals likely would have to be taken and that it likely would be much easier to maintain the desired distribution and densities if the management program were initiated as or before sea otters begin to recolonize an area, rather than after desired reduced density zones have been recolonized.

Perhaps the most effective way to determine how population distribution and densities can best be

managed in different circumstances would be to design and carry out a series of pilot studies in a representative subset of areas proposed to be managed.

Takings of sea otters specifically to protect shellfish could only be achieved through a waiver to the moratorium on taking as provided for in Sec. 101 (a)(3)(A) of the MMPA. At this time, the Secretary of Interior is not considering waiving the moratorium to remove or restrict sea otters in order to protect shellfish, but individuals and organizations may formally request such a waiver.

Objective 6: Establish cooperative programs to further the conservation and management of sea otters in Alaska

Many individuals, government agencies, and private organizations have an interest in sea otters and their conservation and management.

61. Maintain open and continuous communication with Alaska Natives and sea otter interest groups

Many organizations have responsibilities relative to the conservation and protection of sea otters, and to activities that may affect or be affected by sea otters in Alaska including government agencies, Alaska Native organizations, industry, and public interest groups with particular interests in sea otters. The responsible organizations should be involved, and the affected interest groups should be consulted, in the process of determining sea otter conservation strategies and their implementation. The FWS, under the lead of the Sea Otter Program Biologist will ensure that open communication regarding sea otter management issues and public involvement continue with all interested parties.

62. Establish a sea otter technical group to assist with technical tasks associated with managing sea otters

If sea otters are to be managed effectively in Alaska, a variety of technical expertise will be needed. Much of this expertise is outside the FWS and the ASOC and can be made more accessible with establishment of a technical group similar to those that exist for polar bear and walrus. This group should meet as needed or on a scheduled basis.

63. Develop and implement an information and education program concerning sea otter conservation

The success of the sea otter conservation program will depend on ensuring that the public is aware of various conservation and management issues, and complies with applicable regulations, statutes, and guidelines. There is a specific need to develop materials with Alaska Natives for

dissemination in villages along the coast. Therefore, a comprehensive education program should be designed and implemented as a matter of high priority. The program should be reviewed periodically (e.g., at 3-5 year intervals) to ensure that it is effectively meeting the program objectives.

631. Establish guidelines to ensure that viewing does not result in harassment of sea otters

As tourism continues to increase in coastal Alaska, sea otters could suffer chronic harassment as boat captains jockey to place tourists in close proximity. As a step to resolving a similar problem, the NMFS has published draft guidelines for viewing whales and pinnipeds. In the draft guidelines, recommendations on approach distances and a protocol governing how more than one vessel would interact around a group of marine mammals are provided. The FWS may also publish marine mammal viewing guidelines for species under its jurisdiction.

632. Recommend and publicize areas for sea otter viewing in Alaska

Tourism is a rapidly growing industry in Alaska. Many tourists include visits to coastal areas of Alaska as part of their travels and often desire to view marine wildlife, including sea otters. Pamphlets and other educational materials that identify good viewing areas and responsible viewing guidelines could be developed and distributed.

64. Continue consultation and coordination with Federal and State agencies responsible for conservation of sea otters and their habitat in California and Washington

The FWS and State agencies in California and Washington have responsibilities for assessing, monitoring, and conserving sea otters and their habitat in the coastal waters of California and Washington. Continued consultation and sharing of ideas with these agencies may contribute to determining how best to assess and monitor population and habitat status and trends and to conserve sea otters.

65. Continue and, as feasible, expand cooperative programs with Canada, Russia, Japan and Mexico

The United States and Russia exchange information and develop programs concerning sea otters and other marine mammals under the auspices of the U.S./Russia Environmental Agreement. Sea otter researchers from the United States exchange information with Canadian colleagues through informal channels. These efforts should be continued and expanded to include interested individuals in Japan and Mexico as feasible.

VI. IMPLEMENTATION SCHEDULE

This plan advocates a cooperative approach towards managing and conserving sea otters in Alaska. The following table provides specific information concerning tasks identified and discussed in the Conservation Plan. Where possible, duration of tasks, lead and participating agencies, and estimated costs of each task for the next five fiscal years are included. Cost estimates are provided for some tasks. Others will be provided when more information is available or when detailed budgets are prepared. Cost estimates are subject to change and do not reflect a commitment on the part of any agency or organization to fund these tasks. Cost estimates are also provided for work anticipated to be done in Fiscal Year 1994. However, actual funding levels are uncertain and subject to change. What is certain is that a sound conservation program for sea otters will be expensive.

Priorities were assigned using the following criteria:

A1 -- task completion essential to determine the population's optimum sustainable size, or to avoid or resolve a potentially serious conservation problem

A2 -- task completion necessary to obtain or maintain the population's optimum sustainable size

A3 -- task completion possibly desirable, but not currently essential or necessary, to determine or to achieve and maintain the OSP

B1 -- task must be completed before other high priority tasks can be initiated or completed

B2 -- task cannot be undertaken before another task is done

B3 -- task not time or event dependent

Organizations listed in the following tables by abbreviation are as follows:

ADF&G	Alaska Department of Fish and Game
ADNR	Alaska Department of Natural Resources
ASOC	Alaska Sea Otter Commission
AWRTA	Alaska Wilderness Recreation and Tourism Association
FWS	Fish and Wildlife Service
NBS	National Biological Survey
MLML	Moss Landing Marine Laboratory
MMPA	Marine Mammal Protection Act
MMS	Minerals Management Service
NMFS	National Marine Fisheries Service
NPS	National Park Service
UAF	University of Alaska
UCSC	University of California at Santa Cruz
UM	University of Minnesota
USFS	U.S. Forest Service

Other abbreviations that appear in the table are:

Indef.	indefinitely
"K"	carrying capacity
nd	not determined
NRDA	Natural Resources Damage Assessment
TDR	Time-Depth Recorder
y	year

Table 1. Sea Otter Conservation Plan Implementation Schedule

SEA OTTER MANAGEMENT PLAN IMPLEMENTATION SCHEDULE						Estimated Fiscal Year Costs					
	TASK			AGENCY		(thousands of $$)					
Brief Description of Task	**#**	**Priority**	**Duration**	**Lead**	**Coop**	**Year 1 (FY94)**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Comments**
IDENTIFY OSP RANGE OF SEA OTTERS	**1**										
Complete state-wide estimate	11	A1 B1	.5y	FWS		3-FWS	5				
Review population stock	12	A1 B1	.5y	FWS	NBS	5-NBS 5-FWS					
Define OSP range	13	A1 B1	1.5y	FWS	ADFG NBS		15	5			involve technical group
Define regional conservation units	14	A2 B1	.5y	FWS ASOC	ADFG						use ADFG proposal
Estimate take levels for management units	15	A2 B2	ongoing	FWS ASOC	ADFG		nd	nd	nd	nd	
MONITOR SIZE, STATUS, AND TRENDS OF SEA OTTER POPULATIONS AND COLLECT LIFE HISTORY DATA	**2**										
Develop standard survey methods	21	A1 B1	1.5y	FWS NBS		120-NBS & EVOS	90	90			oil spill restoration funds in FY93
Develop and implement population monitoring program	22	A1 B1	5y	FWS	ADFG ASOC	90-FWS	50	50	50	50	southeast survey - FY94
Monitor biological variables	23										

SEA OTTER MANAGEMENT PLAN IMPLEMENTATION SCHEDULE						Estimated Fiscal Year Costs					
	TASK			AGENCY		(thousands of $$)					
Brief Description of Task	**#**	**Priority**	**Duration**	**Lead**	**Coop**	**Year 1 (FY94)**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Comments**
Develop biological sampling program	231	A2 B1	ongoing	FWS ASOC	NBS ADFG NMFS	10-NBS 15-FWS	30	30	10	10	
Develop indices of population status	232	A3 B3	nd	FWS NBS	ASOC		30	30	10	10	
Estimate life history variables	233	A2 B2	ongoing	FWS NBS UM		40-NBS 150-NSF	200	200	200	200	need data from pop. at "K"
Develop baseline on contaminants	234	A3 B3	3y	FWS	UCSC		20	15	15		
Archive tissue samples	235	A3 B3	3y	FWS	NMFS ASOC UAF		1	1	1		
Develop stock assessment	236	A1	1y	NMFS		?					
ESTABLISH COOPERATIVE WORKING RELATIONSHIPS WITH ALASKA NATIVES	3										
Develop MOA with ASOC and ADFG	31	A1 B1	.5y			5-FWS					signed 2/1/94
Assist the ASOC with development and implementation of regional management plans	311	A2 B2	ongoing	ASOC FWS	ADFG	10-FWS	20	20	20	20	
Incorporate traditional knowledge	312	A3 B3	indef.	ASOC	FWS		nd	nd	nd	nd	
Establish guidelines for efficient and non-wasteful use of sea otters	313	A2 B3	1y	FWS ASOC	ADFG		3	2			interviews with hunters

SEA OTTER MANAGEMENT PLAN IMPLEMENTATION SCHEDULE						Estimated Fiscal Year Costs					
	TASK			AGENCY		(thousands of $$)					
Brief Description of Task	**#**	**Priority**	**Duration**	**Lead**	**Coop**	**Year 1 (FY94)**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Comments**
Strengthen marking and tagging	314	A2 B1	ongoing	FWS	ASOC ADFG	5-FWS	10	10	10	10	
Subsistence use in Bering Sea	315	B1	1y	NMFS FWS	ASOC	?					
CHARACTERIZE SEA OTTER HABITAT AND MONITOR STATUS AND TRENDS	4										
Review existing knowledge and define habitat data needs	41	A2 B2	.5y	FWS NBS	ASOC ADFG		5				involve technical group
Define sea otter habitat by bathymetry	42	A2 B2	3y	FWS NBS		35-NBS	80	80	80	80	use TDR
Identify habitat at risk	43	A1 B1	ongoing	FWS	ADFG ASOC MMS		10	10	10	10	
Monitor effects of sea otter predation on prey populations	44	A2 B3	ongoing	FWS NBS MLML	ASOC NPS NMFS	35-NBS	80	80	80	80	establish permanent plots
Develop liaisons with other agencies	45	A2 B3	ongoing	FWS ADFG MMS	EPA USFS NPS		0	0	0	0	
Monitor health of Bering Sea ecosystem	46			NMFS FWS							

SEA OTTER MANAGEMENT PLAN IMPLEMENTATION SCHEDULE						Estimated Fiscal Year Costs					
	TASK			AGENCY		(thousands of $$)					
Brief Description of Task	**#**	**Priority**	**Duration**	**Lead**	**Coop**	**Year 1 (FY94)**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Comments**
IDENTIFY, AVOID, AND MINIMIZE HUMAN THREATS TO SEA OTTERS AND THEIR HABITAT	**5**										
Monitor incidental take	51										
Review incidental take data	511	A1 B1	1y	FWS UAF	NMFS		5				
Design studies to reduce mortality in fishing gear	512	A3 B2	nd	NMFS FWS	UAF						as necessary
Implement programs to reduce fishing-related mortality if needed	513	A3 B2	nd	FWS UAF	NMFS						as necessary
Competition for shellfish resources	52										
Compare shellfish use by humans and sea otters	521	A1 B1	2y	FWS	ASOC NBS ADFG		5	20	10		see 46
Determine if sea otter predation on shellfish affects humans adversely	522	A1 B2	5y	FWS	ASOC ADFG NMFS		20				after 421
Determine effects of sea otter predation on valuable shellfish	523	A1 B1	3y	FWS NBS	ASOC NPS NMFS ADFG		120	120	120		SE Alaska
Initiate programs to protect sea otters from malicious killing	524	A3 B2	nd	FWS	UAF						as necessary

SEA OTTER MANAGEMENT PLAN IMPLEMENTATION SCHEDULE						Estimated Fiscal Year Costs					
	TASK			AGENCY		(thousands of $$)					
Brief Description of Task	**#**	**Priority**	**Duration**	**Lead**	**Coop**	**Year 1 (FY94)**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Comments**
Mariculture and fish farming	53										
Review statutes and regulations for shellfish mariculture	531	A3 B3	.5y	FWS UAF	ASOC	2-FWS					
Determine effects of mariculture on sea otters	532	A3 B2	1y	FWS UAF	ASOC ADFG		10	40	40	40	contract UAF
Oil and gas exploration, development, and transportation	54										
Continue *Exxon Valdez* restoration	541	A3 B3	?	FWS NBS		240-EVOS	?	?	?	?	funding uncertain
Identify possible impacts of oil-related activities	542	A1 B1	ongoing	MMS ADNR	FWS ADFG		?	?	?	?	lease sale dependent
Implement systematic surveys in areas of oil-related activity	543	A2 B2	periodic	FWS MMS		60-EVOS	0	75	0	75	dependent on restoration funds in 94
Develop and prepare to implement oil spill contingency plans	544	A2 B1	2y	FWS	MMS ADFG	5-FWS	25	30	nd	nd	
Implement post-lease monitoring programs	545	A3 B3	nd	FWS MMS	ADFG						as necessary
Port construction, harbor development, logging and other activities	55										
Determine effects of logging on sea otters and habitat	551	A3 B3	nd	FWS NBS	USFS ADNR		60	60	60	60	not funded; depends on logging schedule

SEA OTTER MANAGEMENT PLAN IMPLEMENTATION SCHEDULE						Estimated Fiscal Year Costs					
	TASK			AGENCY		(thousands of $$)					
Brief Description of Task	**#**	**Priority**	**Duration**	**Lead**	**Coop**	**Year 1 (FY94)**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Comments**
Review regulatory programs to ensure they protect sea otters	552	A3 B3	.5y	FWS	many	3-FWS					
Quantify the levels of tourism	553	A3 B3	nd	FWS	AWRT A		nd				
Identify areas of conflict between sea otters and humans	56	A1 B1	ongoing	FWS	ASOC ADFG		45	15	15	15	use GIS
Evaluate management strategies	57	A1 B2	1y	FWS	ASOC ADFG		nd				
ESTABLISH COOPERATIVE PROGRAMS TO FURTHER CONSERVATION AND MANAGEMENT	**6**										
Maintain open communication	61	A2 B1	ongoing	FWS	many	5-FWS	20	20	20	20	
Establish technical group	62	A2 B1	ongoing	FWS	many	5-FWS	20	20	20	20	convene in FY94
Develop Information and Education Program for sea otters	63	A3 B3	nd	FWS ASOC	ADFG		nd	nd	nd	nd	very desirable
Establish guidelines to prevent harassment from tour boats	631	A3 B3	.5y	FWS	ADFG NMFS		2	nd	nd	0	follow NMFS lead
Recommend and publicize viewing areas for sea otters	632	A3 B3	nd	FWS	ADFG ASOC		nd	nd	nd	nd	
Consult with State and Federal agencies on sea otters	64	A3 B3	ongoing	FWS	many	1-FWS	1	1	1	1	

SEA OTTER MANAGEMENT PLAN IMPLEMENTATION SCHEDULE						Estimated Fiscal Year Costs					
	TASK			AGENCY		(thousands of $$)					
Brief Description of Task	**#**	**Priority**	**Duration**	**Lead**	**Coop**	**Year 1 (FY94)**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Comments**
Continue cooperative work with Canada and Russia	65	A3 B3	ongoing	FWS	many	15-FWS	0	15	?	?	US-Russia workshop in FY94

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VIII. APPENDICES

Appendix A. Sea Otter Management Plan Advisory Team

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Appendix B. Summary of Comments and Responses on the Draft Management Plan

As expected, responses to the draft plan and draft final were diverse. To facilitate the summarization of written comments, they were organized into five groups: Alaska Native organizations; conservation\tourism organizations, Federal/State agencies; individual Alaskans; and individual non-Alaskans. It should be kept in mind that written responses to the draft plan were not necessarily received from a balanced cross-section of individuals and groups within and outside of Alaska. For example, a surprisingly large number of comments were received from individuals in Petersburg, Alaska, concerned about sea otter depredation on commercial stocks of some shellfish species. Similarly, nearly 100 individually signed form letters were received from individuals on Kodiak Island sympathetic with the position of Alaska Natives relative to the draft plan. Because the responses do not represent a valid cross-section of the public, tallies were not kept on the responses to individual policy questions raised in the draft plan.

Alaska Native Organizations: In general Alaska Native organizations did not support the draft plan as it was first presented. They view the draft plan only as a first step in the management planning process, because they believe the FWS developed the draft plan unilaterally. They wish they had more of an opportunity than just to react to the FWS and believe they should be involved as a partner in future planning activities. They believe too much emphasis of the draft plan is placed on the Native harvest, which they view as a non-problem, and they consider the draft plan as a vehicle for the Federal government to gain regulatory control of the Native harvest before depletion, and strongly oppose this effort. Alaska Native organizations strongly feel that the FWS should support the ASOC in its regional management planning efforts and that the FWS should focus its resources on developing a strong information base to support a regional management program. Alaska Native organizations are strongly opposed to the opening of harvest to non-Natives as well as the sale of raw sea otter pelts. They urged the FWS to cooperate on the completion of the Memorandum of Agreement with the ASOC and the State of Alaska.

State/Federal agencies: Concern was expressed that the management options portion of the draft plan was not formally discussed with the planning advisory team and that if it remains in the draft plan, it should be clearly identified as the FWS position only. It was suggested that the management policy material be taken out of the draft plan in order to develop consensus. There was concern that if management positions that depended on changes to the MMPA are kept in the draft plan, the plan will be dated if those amendments are not achieved. It was suggested that roles and responsibilities of the FWS, ASOC, and State of Alaska be more clearly defined in the final plan. The State of Alaska expressed concern about FWS overstepping its bounds concerning State jurisdiction on State lands and waters.

Conservation/Tourism Organizations: These organizations uniformly opposed predator control, allowing non-Natives to harvest sea otters, and the sale of raw sea otter pelts. Some supported amending the MMPA to give the FWS authority to regulate Native harvest. Tourist organizations wanted the value of sea otters to non-consumptive users better recognized in the draft plan. Some wanted areas set aside as no-hunting zones. In general these organizations believe that the FWS needs better empirical documentation of

management conflicts before solutions to these conflicts are implemented. If implementation is proposed, non-lethal methods should be tried. Most of these organizations support a closer working relationship between the FWS and Alaska Natives.

Individual Alaskans: As a group, Alaskans have widely divergent opinions on how sea otters should be managed, ranging from the status quo to opening up a tightly controlled harvest to everyone. Many people are concerned about the effects sea otters have on shellfish stocks exploited commercially and for subsistence and recreation. There was general support for some form of zonal management ranging from protecting sea otters more in some areas to reducing populations in other areas to protect shellfish. However, many of those supporting the concept of zonal management did not embrace the full range of zone types presented in the draft plan. In other words those supporting more protection for sea otters were frequently opposed to predator control, and vice-versa. There was considerable interest in harvesting sea otters by non-Natives residing in coastal areas affected by sea otter predation on shellfish. Many of those individuals, as well as some Alaska Natives, support sale of raw pelts. Opinions on regulating the harvest ranged from status quo to full regulation to return of management to the State.

Non-Alaskans: Most of the responses by individuals from outside of Alaska were concerned about the effects of sea otter predation on shellfish stocks. These individuals wanted to see a balance between sea otters and shellfish by establishing shellfish management zones. They support the harvest by Alaska Natives.

[1] As noted above, during review of the State of Alaska's petition for return of marine mammal management authority, it was concluded that the sea otters in Alaska constituted a single population. In this paper, the term "subpopulation" is used to denote components of the population in different geographic areas.