

HJR

26

<TARGET><BILL>HJR 26</BILL><SUBJECT>HJR
26</SUBJECT><COMM>SRES27</COMM></TARGET>



Alaska State Legislature

Representative Peggy Wilson
House District 2

MEMORANDUM

Date: March 21, 2012

To: Senator Paskvan, Resources Committee Chair and Senator Wagoner, Resources Committee Chair

From: Representative Peggy Wilson *PW*

Re: HJR 26 - Sea Otter Management

I would like to request the Senate Resources Committee schedule a hearing on HJR 26 as soon as possible.

Thank you for your consideration of this important piece of legislation. If you need further information please contact my staff Arthur Martin at 465-5269.

ALASKA STATE LEGISLATURE

Interim:
P.O. Box 109
Wrangell, AK 99929
Phone: (907) 874-3088
Fax: (907) 874-3055



Session:
State Capitol, Room 406
Juneau, AK 99801-1182
Phone: (907) 465-3824
1-800-686-3824
Fax: (907) 465-3175

REPRESENTATIVE PEGGY WILSON
HOUSE DISTRICT 2

SPONSOR STATEMENT House Joint Resolution 26

“Urging federal agencies to work with the Alaska Department of Fish and Game, Southeast Alaska Native leaders, and other interested parties to establish strategies and plans for the sustainable management of the reintroduced sea otter population of Southeast Alaska.”

In 1965-69, sea otters were reintroduced in SE with no management plan for an eventual overabundance.

Since 1972, under the Marine Mammal Protection Act (MMPA), the federal government who has the sole responsibility for managing has focused on a general harvesting moratorium, with few exceptions.

The 1994 Conservation Plan for the Sea Otter in Alaska states that although the optimum sustainable population range has not been numerically defined for sea otters in Alaska, the stock is believed to be within that range. That was eighteen years ago. The preface states, this plan will be reviewed annually and revised at least every three to five years.

The Southeast sea otters have flourished, with an annual growth rate of 12 percent a year in southern Southeast and four percent in northern Southeast Alaska. There is a known population of some 20,000 sea otters in Southeast. Sea otters eat approximately 23% of their body weight in crab, clams, abalone, mollusk and other dive fisheries or up to 253,000 pounds of food in a single day. According to a McDowell Report in November of 2011, they estimated that Sea Otter predation in the red sea cucumber, geoduck clam, red sea urchin, and Dungeness crab fisheries have already *cost* the Southeast Alaska economy 28.3 million dollars directly and indirectly since 1995.

With the MMPA being 40 years old, it is time to consider broadening the scope of allowable uses of sea otters in Alaska Native handicraft. A long-term sustainable management plan has to be created in regards to sea otter populations, in order to facilitate the means by which all Southeast Alaska people can share in a more robust sport, subsistence, and economic base.

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REPRESENTATIVE PEGGY WILSON
HOUSE DISTRICT 2

HJR 26 Sea Otter Management

To: Senate Resources Committee

Date: 3/20/12

Explanation of Changes

- The CS from Resources clarified the sale and use of sea otters pelts by suggesting that the Marine Mammal Protection Act definition of handicrafts be changed to read, "Alaska native articles of handicraft."
- CS from the House Floor added two clarifying whereas clause regarding the Marine Mammal Protection Act and investment in fisheries resources.

FISCAL NOTE

STATE OF ALASKA
2012 LEGISLATIVE SESSION

Bill Version HJR 26
 Fiscal Note Number _____
 () Publish Date _____

Identifier (file name) HJR26-LEG-COU-1-26-12 Dept. Affected Legislature
 Title "Urging federal agencies to work with the ADFG, etc for sustainable mgmt of the reintroduced sea otter..." Appropriation Legislative Council
 Allocation Council and Subcommittees
 Sponsor Reps Peggy Wilson, Thomas, and Austerman
 Requester House Resources OMB Component Number 783

Expenditures/Revenues (Thousands of Dollars)

Note: Amounts do not include inflation unless otherwise noted below.

| | FY13 Appropriation Requested | Included in Governor's FY13 Request | Out-Year Cost Estimates | | | | |
|-------------------------------|------------------------------------|--|-------------------------|-------------|-------------|-------------|-------------|
| | | | FY14 | FY15 | FY16 | FY17 | FY18 |
| OPERATING EXPENDITURES | FY13 | FY13 | FY14 | FY15 | FY16 | FY17 | FY18 |
| Personal Services | | | | | | | |
| Travel | | | | | | | |
| Services | | | | | | | |
| Commodities | | | | | | | |
| Capital Outlay | | | | | | | |
| Grants, Benefits | | | | | | | |
| Miscellaneous | | | | | | | |
| TOTAL OPERATING | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

FUND SOURCE (Thousands of Dollars)

| | | | | | | | |
|--------------|------------------|------------|------------|------------|------------|------------|------------|
| 1002 | Federal Receipts | | | | | | |
| 1003 | GF Match | | | | | | |
| 1004 | GF | | | | | | |
| 1005 | GF/Prgm (DGF) | | | | | | |
| 1037 | GF/MH (UGF) | | | | | | |
| 1178 | temp code (UGF) | | | | | | |
| TOTAL | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

POSITIONS

| | | | | | | |
|-----------|--|--|--|--|--|--|
| Full-time | | | | | | |
| Part-time | | | | | | |
| Temporary | | | | | | |

CHANGE IN REVENUES

| | | | | | | |
|--|--|--|--|--|--|--|
| | | | | | | |
|--|--|--|--|--|--|--|

Estimated **SUPPLEMENTAL (FY12) operating costs** _____ (separate supplemental appropriation required)
 (discuss reasons and fund source(s) in analysis section)

Estimated **CAPITAL (FY13) costs** _____ (separate capital appropriation required)
 (discuss reasons and fund source(s) in analysis section)

Why this fiscal note differs from previous version (if initial version, please note as such)

Initial Version

Prepared by Jessica Geary, Finance Manager
 Division Legislative Affairs Agency
 Approved by Pamela Varni, Executive Director
Legislative Affairs Agency

Phone 465-6626
 Date/Time 1/26/12 1:11 PM
 Date 1/26/2012

FISCAL NOTE

**STATE OF ALASKA
2012 LEGISLATIVE SESSION**

BILL NO. HJR 26

Analysis

This Legislation has zero fiscal impact on the Legislative Affairs Agency.

2-7-12

House Resource Committee:
Re: House Initiative Resolution 26

House Resource Committee,

First I would like to start by applauding Rep. Peggy Wilson for getting something on the table. My name is Frank W. Neidiffer, my background information begins with logging in S.E. Alaska in the 70's. In the mid 80's I started commercial fishing, trolling, crabbing, and long lining. For the last 25 years I have spent a substantial amount of time in lower Chatam, Sumner, and Fredrick Sound. I would like to testify to the "march of the otter" and their scorched earth policy they adhere to.

It's well past time to take action. I do believe Proposition 26 is a start. I think it's very important to revisit the M.M.P.A., and read our Alaska State Constitution. Please make note that we have a viable resource that is destroying resources along with lifestyles and employment opportunities, which also affects the Alaska State economy. Thank You for your time.

Frank W. Neidiffer
518-0188

Frank Neidiffer

Box 1746

PSG. AK 99833

neidiffer@gci.net

From: Eric Riemer [<mailto:torsch2@gmail.com>]
Sent: Tuesday, March 20, 2012 9:32 AM
To: Rep. Peggy Wilson
Subject: Sea Otter Legislation

Dear Representative Wilson,

Thank you for your recent support of Alaska's dive fisherman and Native artists in the matter of sea otter predation. As a fisherman and environmentalist, it is important to me to see a healthy management plan in place for the control of the southeast sea otter population: if left unchecked, these beasts will ravage the healthy shellfish populations of southeast. However, there is always a place in the ecosystem for a healthy predator population; after all, a thriving predator population equates to a healthy biomass of consumable product.

It's my belief that in the days of yore (i.e. before the aggressive hunting of the sea otter by Russians for their pelts) there had to have been a balance between the otter and their foodstocks. In the more recent vacuum left by the absence of otters, shellfish stocks increased exponentially, leading to the development of a valuable commercially sustainable resource. The reintroduction of the sea otter predator in the past twenty years has virtually given them an all-you-can-eat buffet, and they aren't interested in leaving the table, or saving some for later.

If we do nothing to cull the sea otter population, they will literally eat themselves out of house and home: the population will continue to explode and soon there will be more otters than the stocks can support, leading to a population crash. It has happened before with other predator species, such as wolves. By introducing legislation that checks unmanageable otter population growth, you are not only preserving the valuable commercial resource, but also practicing responsible environmental stewardship and securing jobs for fisherman and Native artists alike.

It seems the most likely avenue of success in this situation is the loosening of restrictions on Native artists that harvest the animal and use its pelt for their wares. This would be a responsible and productive first step in the management of the sea otter population.

Again, many thanks for your support on this matter!

Sincerely,
Eric Riemer
Commercial Fisherman and Harvest Diver

From: cornelis@comcast.net [mailto:cornelis@comcast.net]

Sent: Tuesday, March 20, 2012 10:08 AM

To: Rep. Peggy Wilson

Subject: Sea Otter Bill

Thank you for this bill. This is an issue that shouldn't be an issue. But, the Federal Government's refusal to allow any reasonable management plan for otters and the potentially disastrous effect on SouthEast shellfish fisheries with the subsequent negative economic effects on our communities is unbelievable. I am tired of being a Washington DC social experiment. The State of Alaska should be able to manage otters like any other wild animal. We should be able to take into account the otters overall effects on the environment, fisheries and communities as part of an overall resource management plan. It is obvious that the Federal managers are biased towards the otter and against SE residents given their recent stance on even something as basic as Native and subsistence rights of use. Alaska's economic well being should not be held hostage by this small group of bureaucrats. This issue is about our rights as Alaskans to our resources vs. Federal Agencies establishing a policy of dictating our natural resources use to us. Thank you again for this bill.

Cornelis Bakker
POB 5253
Ketchikan, AK 99901

From: tokeencove@gmail.com [mailto:tokeencove@gmail.com] **On Behalf Of** Eric Wyatt

Sent: Tuesday, March 20, 2012 10:30 AM

To: Rep. Peggy Wilson

Subject: Sea Otter Management Resolution

Dear Rep. Wilson:

Thank you for your efforts vis-a-vis our sea otter problem. The "little critters" have demolished our little neck clam beds.

Let me assure you that the reports of sea otter destruction are not hyperbole. I see what they are doing on a daily basis.

Sincerely,

Eric R Wyatt
President - Alaska Oyster Cooperative



UNITED FISHERMEN OF ALASKA

211 Fourth Street, Suite 110
Juneau, Alaska 99801-1172
(907) 586-2820
(907) 463-2545 Fax
E-Mail: ufa@ufa-fish.org
www.ufa-fish.org

February 2, 2012

Representative Paul Seaton, Co-Chair
Representative Eric Feige, Co-Chair
House Resources Committee
Alaska State Legislature
120 4th St, State Capitol, Room 3
Juneau, AK 99801-1182

RE: Support for HJR 26 regarding Re-introduced Sea Otters

Dear Co-Chairmen Seaton & Feige, and Committee Members,

United Fishermen of Alaska (UFA) is the largest statewide commercial fishing trade association, representing 37 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:

- research on sea otter populations and their effects;
- decreasing hurdles to Alaska Natives in their utilization of this resource;
- requesting the Alaska Dept of Fish and Game to become more actively involved with USFWS in the management of sea otters and documenting their effect.
- requesting 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.

This December, 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:

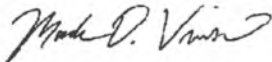
<http://www.scribd.com/doc/74857876/MCDOWELL-GROUP-2011-Sea-Otter-Impacts-Report>

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 bill's sponsors for drawing attention to this issue where the currently popular term of "ecosystem based management" should be applied through management strategies to address this predatory element that is well known to be "out of balance." We also commend the sponsors for calling for broadening the scope of allowable uses for sea otters taken by subsistence users.

Thank you for your attention to this issue, and your support of HJR 26.



Mark Vinsel
Executive Director

Attachment

MEMBER ORGANIZATIONS

Alaska Bering Sea Crabbers • Alaska Crab Coalition • Alaska Independent Fishermen's Marketing Association
Alaska Independent Tendermen's Association • Alaska Longline Fishermen's Association • Alaska Scallop Association • Alaska Trollers Association
Alaska Whitefish Trawlers Association • Aleutian Pribilof Islands Community Development Association • Armstrong Keta • At-sea Processors Association
Bristol Bay Reserve • Bristol Bay Regional Seafood Development Association • Cape Barnabas Inc. • Concerned Area "M" Fishermen
Cook Inlet Aquaculture Association • Cordova District Fishermen United • Crab Group of Independent Harvesters • Douglas Island Pink and Chum
Groundfish Forum • Kenai Peninsula Fishermen's Association • Kodiak Regional Aquaculture Association • North Pacific Fisheries Association
Northern Southeast Regional Aquaculture Association • Petersburg Vessel Owners Association • Prince William Sound Aquaculture Corporation
Purse Seine Vessel Owner Association • Seafood Producers Cooperative • Southeast Alaska Herring Conservation Alliance
Southeast Alaska Fisherman's Alliance • Southeast Alaska Regional Dive Fisheries Association • Southeast Alaska Seiners
Southern Southeast Regional Aquaculture Association • United Catcher Boats • United Cook Inlet Drift Association
United Southeast Alaska Gillnetters • Valdez Fisheries Development Association



UNITED FISHERMEN OF ALASKA

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Juneau, Alaska 99801-1172
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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



*Grand Camp
Alaska Native Brotherhood*

RESOLUTION #29-09

Title: Sea Otter Management

WHEREAS, tribal residents of Southeast Alaska have hunted for sea otters since time immemorial; and

WHEREAS, Section 119 of the US Marine Mammal Protection Act (MMPA) allows for tribally authorized local harvest management plans with US Fish and Wildlife Service; and

WHEREAS, tribal residents of Southeast, Alaska have reported diminished harvest of important traditional foods such abalone, crab, clams and other foods that are consumed by sea otters; and

WHEREAS, due to depressed rural economies, local tribal governments and tribal entities must continue to face the responsibility of developing economic opportunities such as value added fur products in a manner consistent with our uses of marine mammals since time immemorial; and

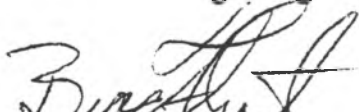
WHEREAS, with education regarding the traditional hunting practices coupled with the entry into co-management with the Federal government a balance could be achieved between healthy sea otter populations and the availability of healthy traditional foods for residents of Southeast, Alaska; and

WHEREAS, recent Federal enforcement actions have highlighted a need for education and outreach to provide clear and consistent guidance to tribal hunters and artists regarding federal regulations governing the take and use of sea otter; and

WHEREAS, the Sitka Marine Mammal Commission spent many years planning for the establishment of a tannery in Sitka, Alaska which has now been in operation for five years, providing for full-utilization of marine mammals and other animals hunted for food so that artists would be able to use those skins to create handicrafts that could be sold to create additional economic opportunities in our community; and

NOW THEREFORE BE IT RESOLVED, that the Alaska Native Brotherhood's Grand Camp increased education, outreach regarding Federal regulations governing the take and use of sea otter and support in developing local harvest management plans and small business opportunities for tribal residents of Southeast Alaska.

NOW THEREOFRE BE IT FURTHER RESOLVED, the Alaska Native Brotherhood's Grand Camp respectfully requests a region-wide meeting with the US Fish and Wildlife, representation from Southeast tribal communities, USDA Rural Development, and the US Economic Development Administration address the concerns regarding sea otter management as outlined in this resolution.



ANB Grand President



ANS Grand President

ATTEST: I certify that this resolution was adopted by the ANB/ANS Grand Camp in convention at Juneau, Alaska, during the week of October 6-10, 2009.



ANB Grand Secretary

CITY OF PETERSBURG, ALASKA

RESOLUTION # 1958

A RESOLUTION REQUESTING THAT STATE AND FEDERAL AUTHORITIES BECOME MORE ACTIVELY INVOLVED IN MANAGING THE SEA OTTER POPULATION AND FIND WAYS TO REVIVE LOST ECONOMIES DUE TO THE RELOCATION AND RE-COLONIZATION OF SEA OTTERS IN SOUTHEAST ALASKA

WHEREAS, the City of Petersburg, Alaska is a small island fishing community located in Southeast Alaska with a population of approximately 3,000 citizens; and

WHEREAS, residents of the Petersburg community are dependent on abundant, sustainable resources from the coastal waters of Southeast Alaska; and

WHEREAS, in the late 1960's the Alaska Department of Fish and Game reintroduced approximately 400 sea otters in six different locations to near shore waters of Southeast Alaska with no management plan; and

WHEREAS, the federal government has jurisdiction under the Marine Mammal Protection Act (MMPA) and has no active management plan protecting the ecosystems affected by sea otters; and

WHEREAS, without proper management, the sea otter population in southern Southeast Alaska is growing at an alarming rate (5,000 observed in 2003 and a 2010 aerial survey by the United States Fish and Wildlife Service revealed an estimate of over 10,000 otters); and

WHEREAS, this drastic increase in sea otters is threatening the population of many shellfish species, such as crab, abalone, urchins, sea cucumbers, geoducks and others, to a point that subsistence, sport and commercial fishing has been stopped in many areas due to the low abundance; and

WHEREAS, a degradation in the ecological balance of a diversity of species has taken place in many areas; and

WHEREAS, residents of Petersburg and many other communities throughout Southeast Alaska rely on shellfish not only for their livelihood, but for survival in a subsistence way of life; and

WHEREAS, the loss of commercial harvests have resulted in negative economic impacts to the seafood industry. Fisherman, processors and seafood dependent communities have experienced a loss in employment wages and associated economic activities.

THEREFORE BE IT RESOLVED, the Petersburg City Council requests that State and Federal agencies work with tribal leaders in Southeast Alaska to become more actively involved in management of the sea otter population and look to remedy the problems already created.

RESOLVED FURTHER, the State and Federal government managing authorities are requested to find ways to revive the lost economies from the Southeast Alaska region due to the relocation and re-colonization of sea otters in southern Southeast Alaska

PASSED and **APPROVED** by the City Council of the City of Petersburg, Alaska this 18th day of January, 2011.

A copy of this Resolution is to be sent to our Federal Legislators; the Southeast Alaska State Senators and Representatives; State and Federal Wild Life Agencies; and the Coastal Communities of Southeast.



Al Dwyer, Mayor

ATTEST:



Kathy O'Rear, City Clerk

resolved

CITY AND BOROUGH OF WRANGELL, ALASKA

RESOLUTION NO. 02-11-1217

A RESOLUTION OF THE ASSEMBLY OF THE CITY AND BOROUGH OF WRANGELL, ALASKA, REQUESTING THAT STATE AND FEDERAL AUTHORITIES BECOME MORE ACTIVELY INVOLVED IN MANAGING THE SEA OTTER POPULATION AND FIND WAYS TO REVIVE LOST ECONOMIES DUE TO THE RELOCATION AND RE-COLONIZATION OF SEA OTTERS IN SOUTHEAST ALASKA

WHEREAS, the City and Borough of Wrangell, Alaska is a small island fishing community located in Southeast Alaska with a population of approximately 2,000 citizens; and

WHEREAS, residents of the Wrangell community are dependent on abundant, sustainable resources from the coastal waters of Southeast Alaska; and

WHEREAS, in the last 1960's the Alaska Department of Fish and Game reintroduced approximately 400 sea otters in six different locations to near shore waters of Southeast Alaska with no management plan; and

WHEREAS, the federal government has jurisdiction under the Marine Mammal Protection Act (MMPA) and has to active management plan protecting the ecosystems affected by sea otters; and

WHEREAS, without proper management, the sea otter population in southern Southeast Alaska is growing at an alarming rate (5,000 observed in 2003 and a 2010 aerial survey by the United States Fish and Wildlife Service revealed an estimate of over 10,000 otters); and

WHEREAS, this drastic increase in sea otters is threatening the population of many shellfish species, such as crab, abalone, urchins, sea cucumbers, geoducks and others, to a point that subsistence, sport and commercial fishing has been stopped in many areas due to the low abundance; and

WHEREAS, a degradation in the ecological balance of a diversity of species has taken place in many areas; and

WHEREAS, residents of Wrangell and many other communities throughout Southeast Alaska rely on shellfish not only for their livelihood, but for survival in a subsistence way of life; and

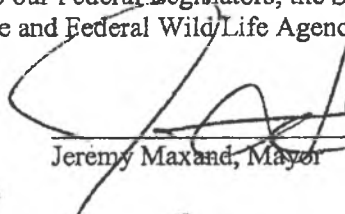
WHEREAS, the loss of commercial harvests have resulted in negative economic impacts to the seafood industry. Fisherman, processors and seafood dependent communities have experienced a loss in employment wages and associated economic activities.

NOW, THEREFORE, BE IT RESOLVED THAT THE ASSEMBLY OF THE CITY AND BOROUGH OF WRANGELL, ALASKA, requests that State and Federal agencies work with tribal leaders in Southeast Alaska to become more actively involved in management of the sea otter population and look to remedy the problems already created.

LET IT BE RESOLVED FURTHER, the State and Federal government managing authorities are requested to find ways to revive the lost economies from the Southeast Alaska region due to the relocation and re-colonization of sea otters in southern Southeast Alaska.

ADOPTED: _____ February 8 _____, 2011.

A copy of this Resolution is to be sent to our Federal Legislators; the Southeast Alaska State Senators and Representatives; State and Federal Wild/Life Agencies; and the Coastal Communities of Southeast.



Jeremy Maxand, Mayor

ATTEST: 

Christie L. Jamieson, Borough Clerk



KETCHIKAN GATEWAY BOROUGH

RESOLUTION NO. 2313

A Resolution of the Assembly of the Ketchikan Gateway Borough, Requesting that State and Federal Authorities Become More Actively Involved in Managing the Sea Otter Population and Find Ways to Revive Lost Economies Due to the Relocation and Re-Colonization of Sea Otters in Southeast Alaska; and Providing for an Effective Date

RECITALS

- A. **WHEREAS**, the community of Ketchikan, Alaska is a coastal island located in Southeast Alaska with a population of approximately 13,000 citizens; and
- B. **WHEREAS**, residents of the community of Ketchikan are dependent on abundant, sustainable resources from the coastal waters of Southeast Alaska; and
- C. **WHEREAS**, in the late 1960's the Alaska Department of Fish and Game reintroduced approximately 400 sea otters in six different locations to near shore waters of Southeast Alaska with no management plan; and
- D. **WHEREAS**, the federal government has jurisdiction under the Marine Mammal Protection Act (MMPA) and has no active management plan protecting the ecosystems affected by sea otters; and
- E. **WHEREAS**, without proper management, the sea otter population in southern Southeast Alaska is growing at an alarming rate (5,000 observed in 2003 and a 2010 aerial survey by the United States Fish and Wildlife Service revealed an estimate of over 10,000 otters); and
- F. **WHEREAS**, a degradation in the ecological balance of a diversity of species has taken place in many areas; and

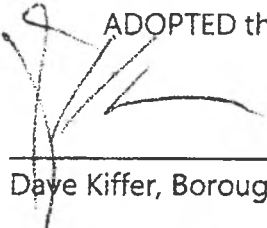
NOW, THEREFORE, IN CONSIDERATION OF THE ABOVE FACTS, IT IS RESOLVED BY THE ASSEMBLY OF THE KETCHIKAN GATEWAY BOROUGH as follows:

Section 1. The Ketchikan Gateway Borough Assembly requests that State and Federal agencies work with tribal leaders in Southeast Alaska to become more actively involved in management of the sea otter population and look to remedy the problems already created.

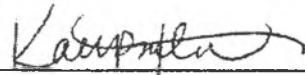
Section 2. State and Federal government managing authorities are requested to find ways to revive the lost economies from the Southeast Alaska region due to the relocation and re-colonization of sea otters in southern Southeast Alaska.

Section 3. This resolution is effective immediately.

ADOPTED this 28th day of February, 2011.

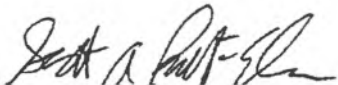


Dave Kiffer, Borough Mayor



Kacie Paxton, Borough Clerk

APPROVED AS TO FORM:



Scott A. Brandt-Erichsen, Borough Attorney

| EFFECTIVE DATE: | | FEBRUARY 28, 2011 | | |
|---|-----|-------------------|--------|---|
| ROLL CALL | YES | NO | ABSENT | |
| Bailey | ✓ | | | |
| Harrington | ✓ | | | |
| Moran | | | | ✓ |
| Phillips | ✓ | | | |
| Rotecki | ✓ | | | |
| Salazar | | | | ✓ |
| Shoemaker | ✓ | | | |
| Mayor (tie votes only) | | | | |
| 4 AFFIRMATIVE VOTES REQUIRED FOR PASSAGE | | | | |

Sea Otter Impacts on Commercial Fisheries in Southeast Alaska

Prepared for:
**Southeast Alaska Regional
Dive Fisheries Association**



Research-Based Consulting

Juneau
Anchorage

November 2011

Sea Otter Impacts on Commercial Fisheries in Southeast Alaska

Prepared for:
**Southeast Alaska Regional
Dive Fisheries Association**

Prepared by:



Juneau • Anchorage

November 2011

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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).

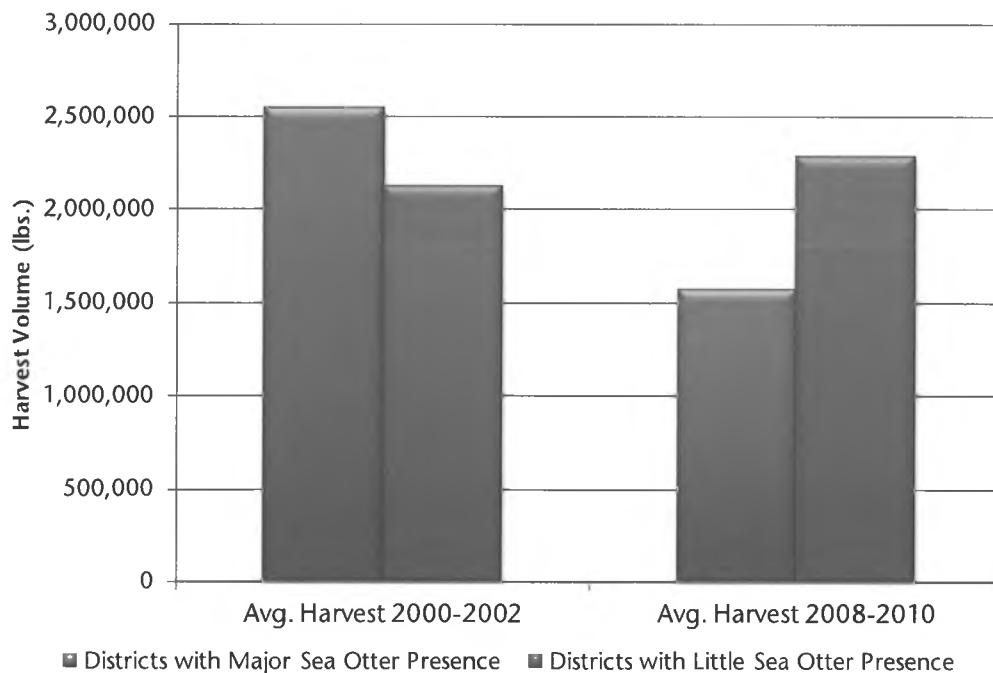
Red Sea Urchin

- 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 | - |

¹Population estimate is from 2003.

²Population 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 were not applied until the 1980/81 season and the fishery slowly 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.

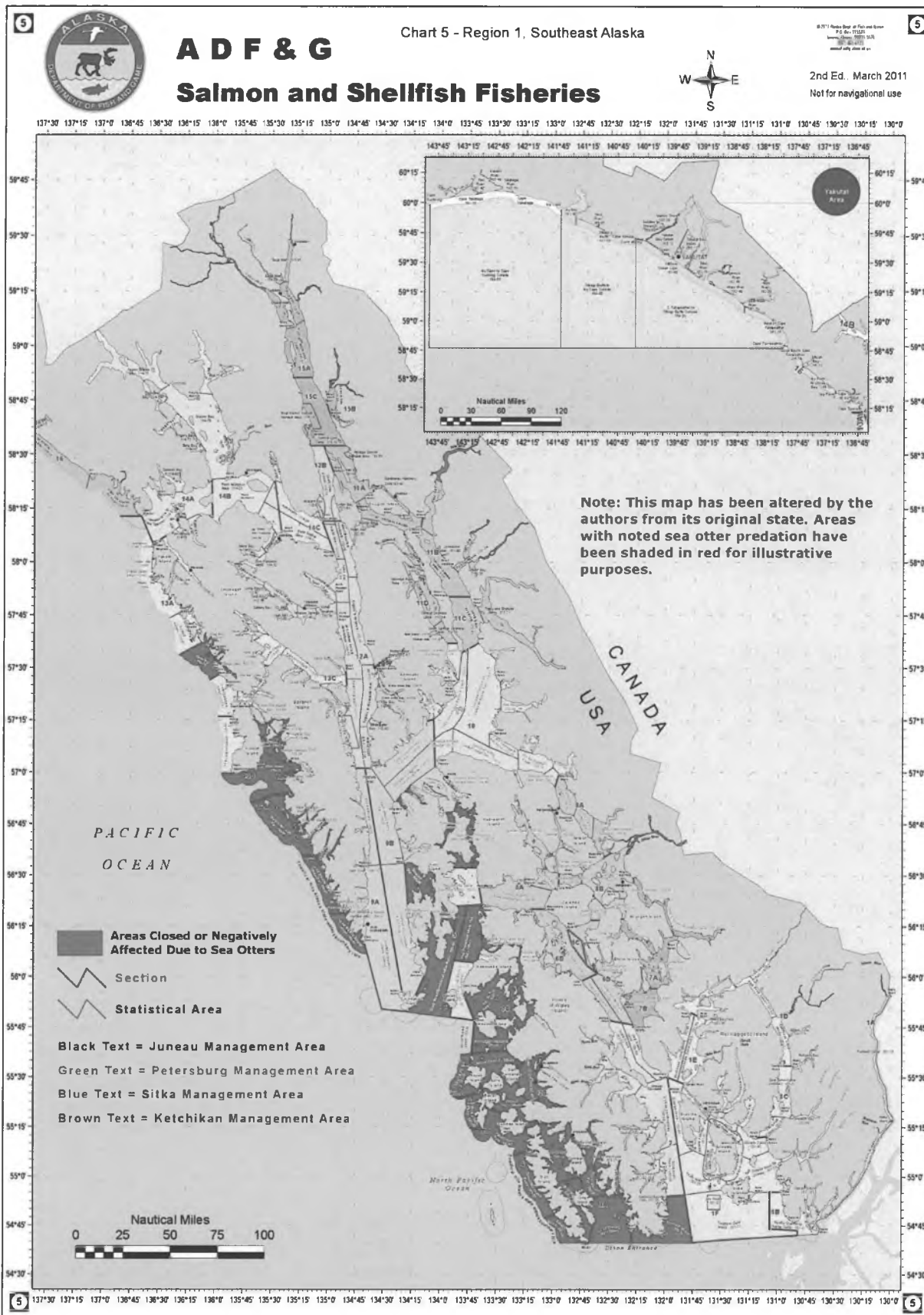
Observations of Sea Otter Predation on Commercial Species

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



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 (*Enhydra 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 commercial 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 | - |

¹Population estimate is from 2003.

²Population 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, SARDFAs surveyors have found substantial geoduck clam beds but in some instances did not attempt to open these areas because sea otters were 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.

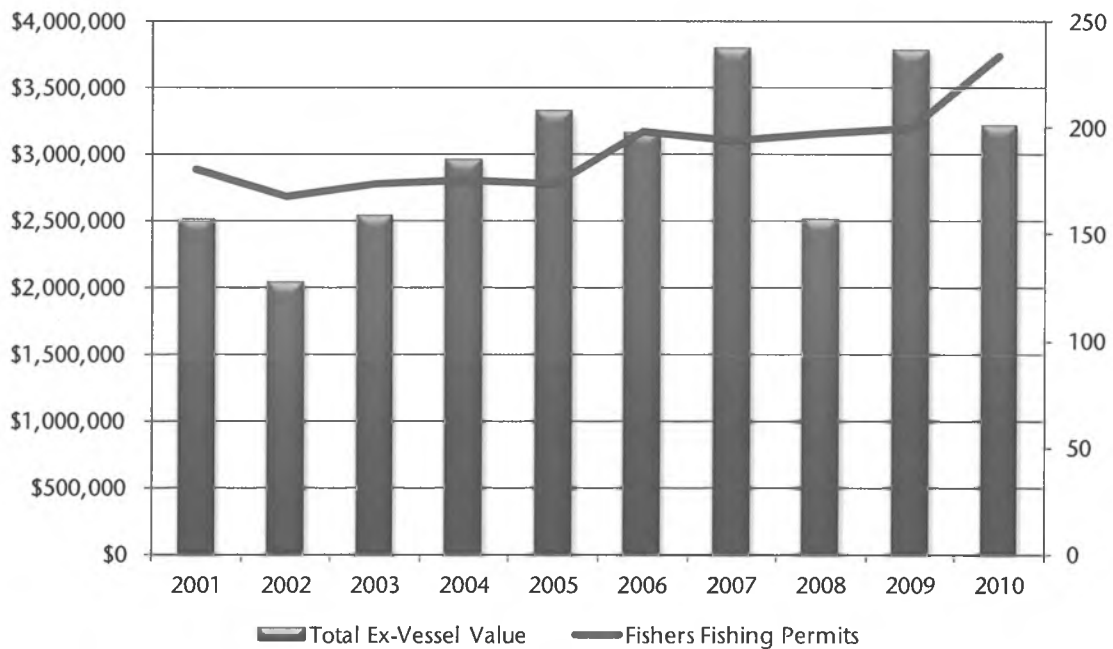
Sea otter predation has had obvious and measureable economic impacts on the sea cucumber, red sea urchin, geoduck, and Dungeness crab fisheries of Southeast Alaska. This report quantifies the estimated impacts sea otters have had on these species. In addition, sea otters affect the tanner and king crab 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 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 | GH L 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

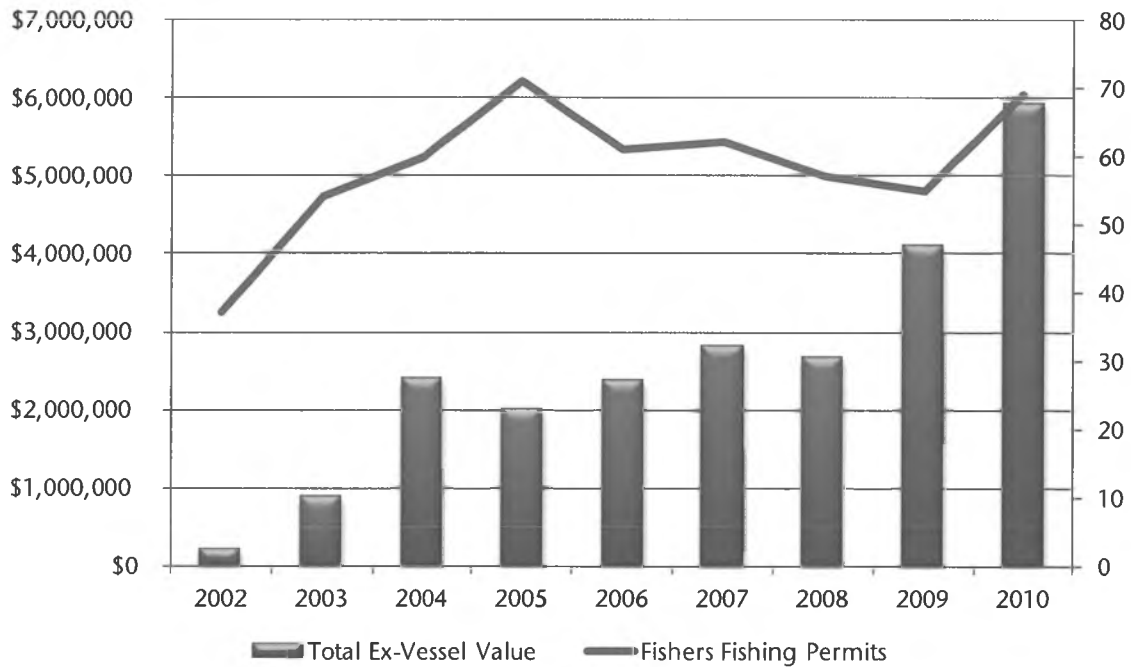
Historical Harvest and Value

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.

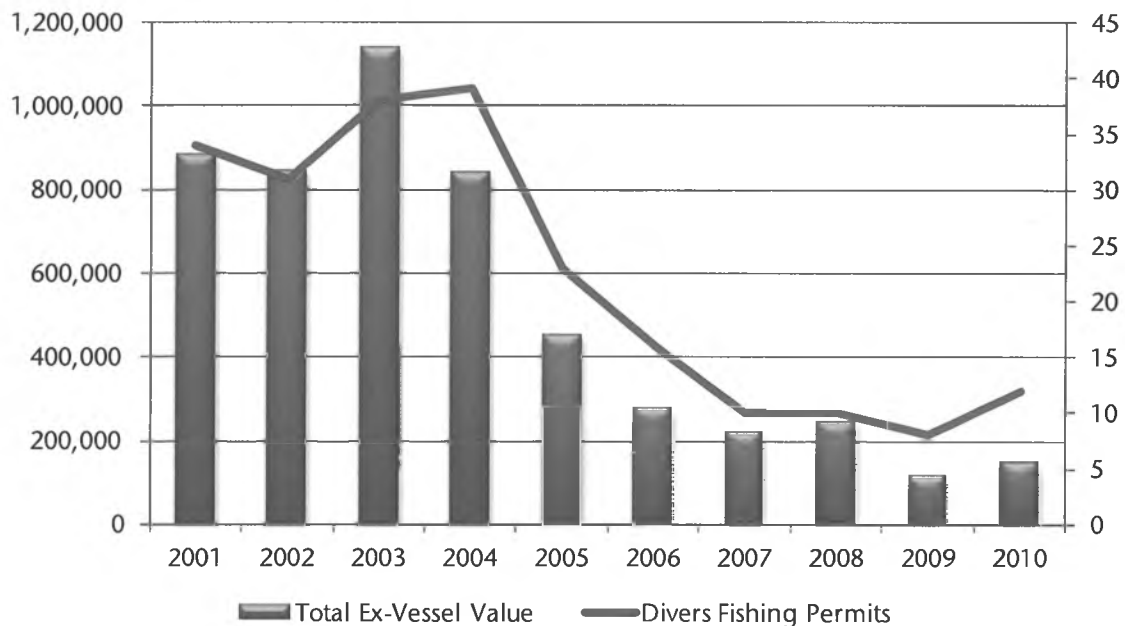
Evidence of sea otter predation has been observed at 27 geoduck fishery areas, but only seven of those areas exhibited significant biomass declines in recent years. However, if those other areas with sea otter activity become harder hit, the impact on the fishery could be devastating because sea otter 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.

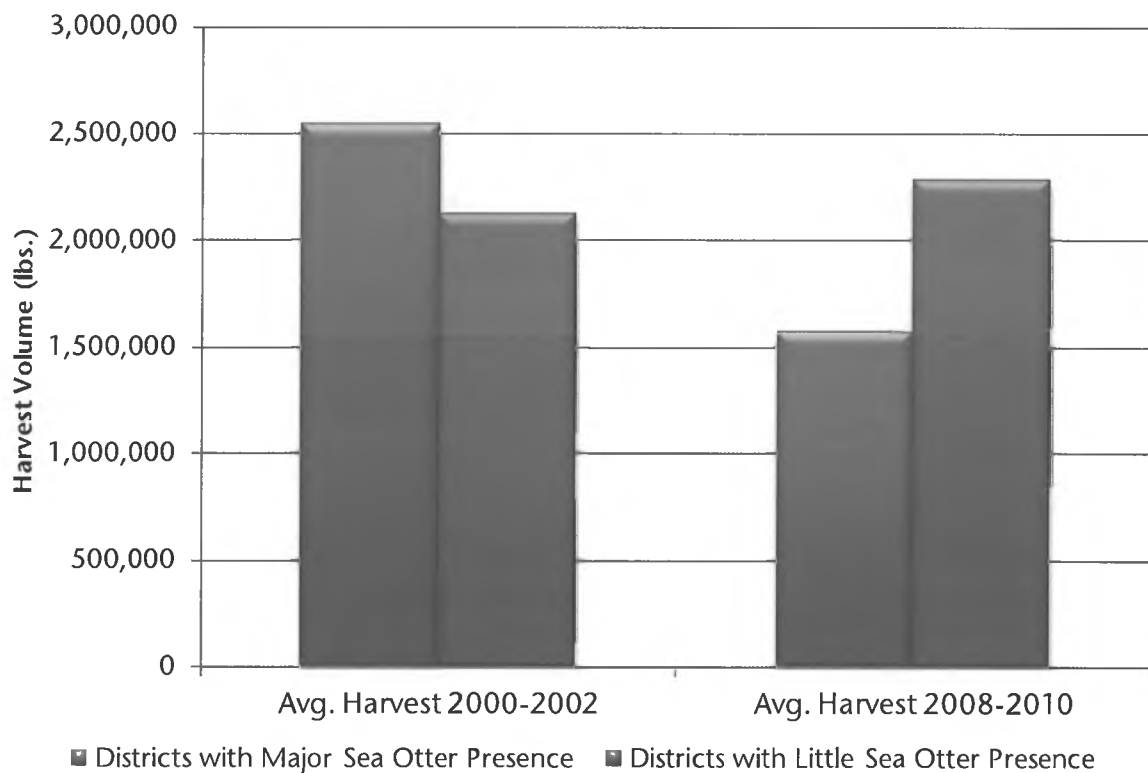
Dungeness Crab

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.

Southeast Alaska Dungeness Crab Harvest



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.

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.

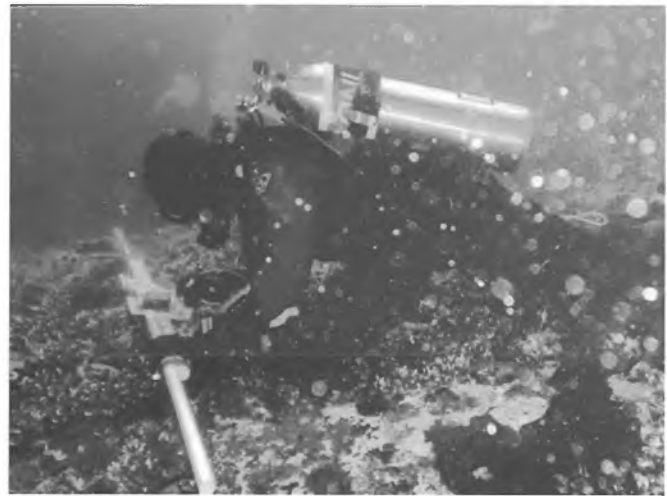


Photo Credit: Alaska Department of Fish and Game.

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 IMPLAN², 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 jobs³. 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.

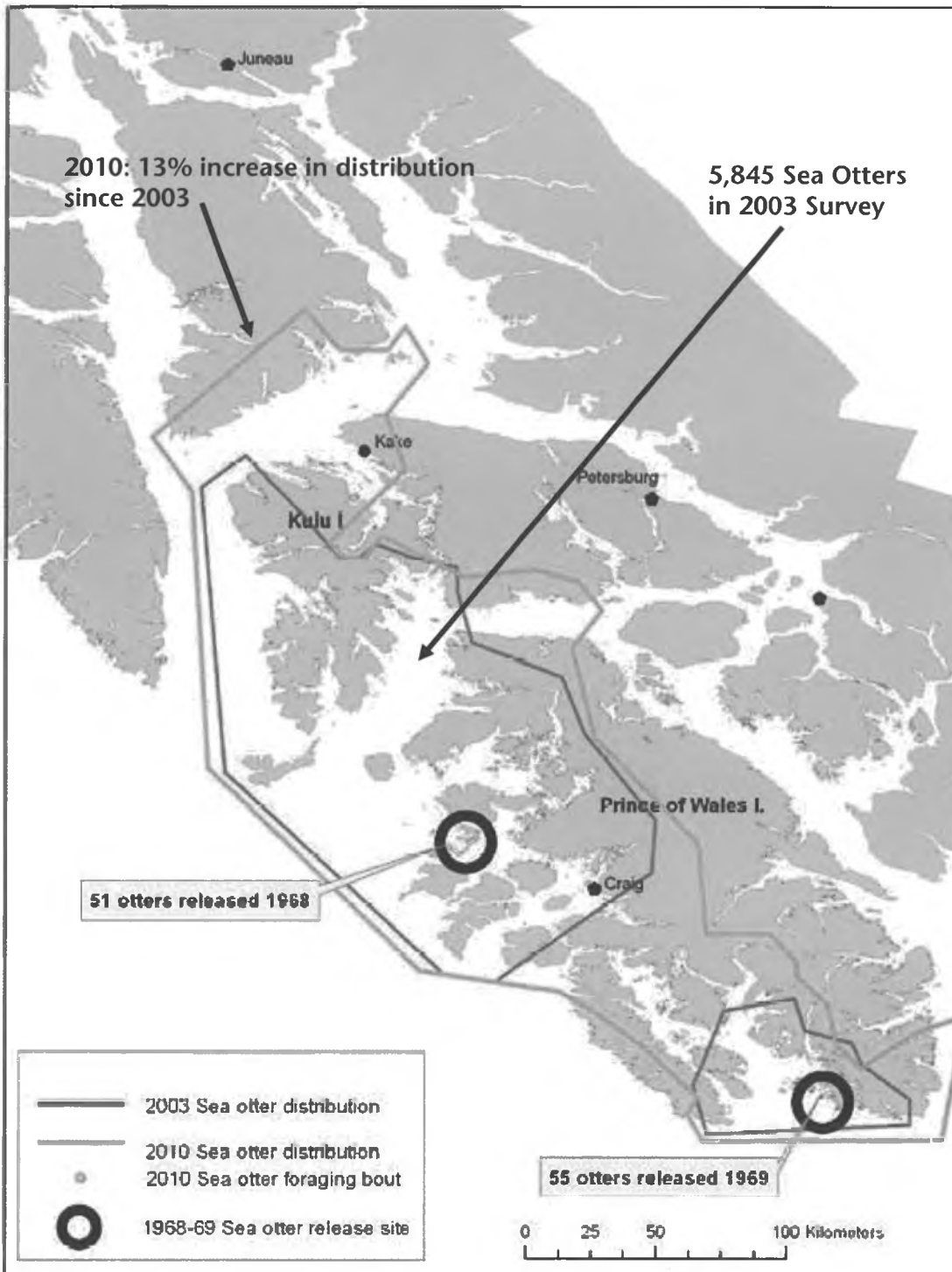
³ The estimated number of jobs created is calculated by dividing the value of the secondary impact (\$6.5 million) by the average output created per full-time equivalent (FTE) job in Southeast Alaska (\$123,992 per FTE job). Therefore, the term "average-paying" refers to a full-time job producing an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

| <u>Fishery Area</u> | <u>Subdistrict(s)</u> |
|---|-----------------------|
| 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

| <u>Fishery Area</u> | <u>Subdistrict(s)</u> |
|----------------------------------|-----------------------|
| 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

| <u>Fishery Area</u> | <u>Subdistrict(s)</u> |
|--|--------------------------------|
| 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 |
| Elovoj, Golf, and Gornoi Islands | 113-31-005 |

Red Sea Urchins

FISHERY AREAS NEGATIVELY AFFECTED BY SEA OTTER PREDATION

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

AREAS CLOSED DUE TO SEA OTTER PREDATION

| <u>Fishery Area</u> | <u>Subdistrict(s)</u> |
|--------------------------------------|-----------------------|
| 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 |