11.26.05

Exxon Valdez Oil Spill Trustee Council

May 14, 2010

Agenda

DRAFT 5/13/10

Exxon Valdez Oil Spill Trustee Council

441 W. 5th Ave., Suite 500 • Anchorage, AK 99501-2340 • 907 278 8012 • fax 907 276 7178

AGENDA
EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
May 14, 2010, 9:30 a.m. – 11:30 p.m.
Anchorage, Alaska

Trustee Council Members:

DANIEL S. SULLIVAN
Attorney General
Alaska Department of Law

LARRY HARTIG
Commissioner
Alaska Department of
Environmental Conservation

DENBY S. LLOYD
Commissioner
Alaska Department of Fish and Game

CRAIG O'CONNOR
Special Counsel
National Oceanic & Atmospheric
Administration
U.S. Department of Commerce

KIM ELTON
Senior Advisor to the Secretary for
Alaska Affairs
Office of the Secretary
U.S. Department of the Interior

STEVE ZEMKE
Trustee Alternate
Chugach National Forest
U.S. Department of Agriculture

Meeting in Anchorage, Trustee Council Office 441 West 5th Avenue, Suite 500
Teleconference number: 800.315.6338. Code: 8205
Federal Chair: _____

1. Call to Order – 9:30 a.m.

2.	Consent Agenda - Approval of Agenda* - Approval of Meeting Notes* April 30, 2010		
3.	Public Advisory Committee comments (9:40)		
4.	Public comment – 9:50 a.m. (3 minutes per person)		
5.	Executive Director's Report - Status of remodel/move - FY 2011 Invitation	(5 minutes)	Elise Hsieh, Executive Director
6.	Investment Group Meeting Summary -Resolution Re: Asset Allocation*	(25 minutes)	Bob Mitchell, ADOR
7.	2010 Injured Resources and Services Update* (20 minutes)		Catherine Boerner EVOSTC Science Coordinator
8.	Draft Supplemental Environmental Impact Statement (DSEIS)*	(20 minutes)	Craig O'Connor, NOAA
9.	PAC Charter*	(15 minutes)	Doug Mutter Designated Federal Officer USDOI
10.	Kodiak Island Borough ADF&G Building (25 minutes)		Jerome Selby, Mayor Rick Gifford, Borough Manager Kodiak Island Borough
11.	Executive Session, as needed		

Adjourn – by 12:00 p.m.

* Indicates action items

April 30, 2010
Meeting Notes

DRAFT 4/30/10

Exxon Valdez Oil Spill Trustee Council

441 W. 5th Ave., Suite 500 • Anchorage, AK 99501-2340 • 907 278 8012 • fax 907 276 7178

TRUSTEE COUNCIL MEETING NOTES

Anchorage, Alaska

April 30, 2010

Chaired by: Larry Hartig
Trustee Council Member

Trustee Council Members Present:

Steve Zemke, USFS *
Kim Elton, US DOI
Craig O'Connor, NOAA **
Craig Tillery, ADOL ***
Denby Lloyd, ADF&G
• Larry Hartig, ADEC

• Chair
* Steve Zemke alternate for USFS
** Craig O'Connor alternate for James Balsiger
*** Craig Tillery alternate for Daniel Sullivan

The meeting convened at 10:05 p.m., April 30, 2010 in Anchorage at the EVOS Conference Room.

1. Approval of the Agenda

APPROVED MOTION: Motion to approve the April 30, 2010 agenda as amended, executive director report, summary of NEPA meetings, approval of April 30, 2010 agenda and February 26, 2010 meeting notes, then DSEIS discussion

Motion by Zemke, second by Tillery

2. Approval of February 26, 2010 meeting notes

APPROVED MOTION: Motion to approve the February 26, 2010 meeting notes

Motion by O'Connor, second by Tillery

Public Advisory Committee (PAC) comments: Stacy Studebaker, PAC Chair

Public comment opened at 10:16 a.m.

One public comment was offered.

Public comment closed at 10:20 a.m.

Off the record (teleconference difficulties) 10:22 a.m.
On the record (teleconference re-established) 10:40 a.m.

3. Draft Supplemental Environmental Impact Statement (DSEIS)

APPROVED MOTION: Motion to approve NOAA going forward with publishing the DSEIS with the five focal points as articulated in the preferred alternatives including amendments to Section 2.4.2. Lingering Oil and Section 2.4.3 Long-term monitoring of marine conditions. In Section 2.4.2, paragraph 2, line 1, change "Passive and subsistence uses" to "Recreational, tourist, subsistence, commercial fisheries and passive uses". In Section 2.4.2, paragraph 2, line 3, change "passive and subsistence uses" to "human uses". In Section 2.4.3 change title to Long-term monitoring of marine conditions and injured resources. In paragraph 3, last sentence, add "as well as injured resources".

Motion by O'Connor, second by Lloyd

5. Adjourn — Motion to adjourn by Zemke, second by Tillery

Off the record 11:20 a.m.

Asset Allocation

Exxon Valdez Oil Spill Trustee Council

Investment Presentation

May 14, 2010

Investment Fund Performance

Fund Returns	Month	Quarter	1 Year	3 Years	5 Years	Since Inception	Inception Date
EVOS Research Fund	4.11%	3.63%	35.37%	-0.02%	4.27%	3.95%	11/1/2000
Target Index	4.17%	3.62%	36.81%	-0.13%	4.31%	3.60%	
EVOS Habitat Fund	4.11%	3.63%	34.83%	-0.24%	4.12%	6.66%	11/1/2002
EVOS Koniag Fund	4.11%	3.62%	34.59%	-0.37%	4.04%	6.59%	11/1/2002
Target Index	4.17%	3.62%	36.81%	-0.13%	4.31%	6.89%	

Investment Pool Returns	Month	Quarter	1 Year	3 Years	5 Years	Since Inception	Inception Date
EVOS Domestic Equities	6.29%	5.93%	52.42%	-3.83%	2.50%	0.92%	11/1/2000
Russell 3000	6.30%	5.94%	52.44%	-3.99%	2.39%	0.37%	
EVOS International Equities	6.27%	1.15%	48.19%	-4.32%	4.43%	3.80%	11/1/2000
MSCI EAFE	6.24%	0.87%	54.44%	-7.02%	3.75%	2.96%	
EVOS Domestic Bonds	-0.21%	1.78%	9.39%	5.74%	5.38%	6.16%	11/1/2000
Barclays Capital Aggregate	-0.12%	1.78%	7.69%	6.14%	5.44%	6.09%	
EVOS Short Term Pool	0.03%	0.20%	2.31%	0.19%	1.87%	2.18%	11/1/2000
91 Day Treasury Bill	0.00%	0.01%	0.17%	1.99%	2.91%	2.64%	

Source: State Street

2010 Capital Market Expectations

Return and Risk

Asset Class	Index	Projected Return			Projected Risk			
		Single-Period Arithmetic	10-year Geometric *	Real	Standard Deviation	Projected Yield	2009	
Equities								
Broad Domestic Equity	Russell 3000	9.70%	8.50%	5.75%	17.30	2.00	9.40%	16.90
Large Cap	S&P 500	9.30%	8.30%	5.55%	16.00	2.20	9.10%	15.25
Small/Mid Cap	Russell 2500	11.20%	9.00%	6.25%	23.00	1.20	9.80%	22.70
International Equity	MSCI EAFE	9.85%	8.30%	5.55%	19.30	2.00	9.10%	19.30
Emerging Markets Equity	MSCI EMF	12.05%	8.80%	6.05%	27.00	0.00	9.80%	27.00
Global ex-US Equity	MSCI ACWI ex-US	10.30%	8.70%	5.95%	19.75	1.70	9.10%	18.90
Fixed Income								
Domestic Fixed	BC Aggregate	4.50%	4.50%	1.75%	4.50	4.50	5.25%	5.00
Long Duration	BC Long Gov't/Credit	5.40%	5.00%	2.25%	9.90	5.40	5.75%	9.30
Defensive	BC Gov't 1-3 Year	3.75%	3.75%	1.00%	3.00	4.00	4.00%	2.30
TIPS	BC TIPS	4.30%	4.20%	1.45%	6.00	4.30	4.90%	6.00
High Yield	CSFB High Yield	6.60%	6.10%	3.35%	11.25	7.45	7.00%	11.50
Non-US$ Fixed	Citi Non-US Gov't	4.40%	4.00%	1.25%	9.60	4.40	5.15%	9.60
Other								
Real Estate	Callan Real Estate	7.90%	6.80%	4.05%	16.10	6.00	7.50%	16.10
Private Equity	VE Post Venture Cap	16.40%	9.65%	6.90%	38.00	0.00	10.60%	38.00
Absolute Return	Callan Hedge FoF	6.45%	6.10%	3.35%	10.00	0.00	6.95%	10.00
Commodities	GSCI	6.80%	4.40%	1.65%	22.50	4.00	5.15%	22.50
Cash Equivalents	90-Day T-Bill	3.00%	3.00%	0.25%	0.80	3.00	3.00%	0.80
Inflation	CPI-U	2.75%	2.75%		1.40		2.75%	1.40

** Geometric returns are derived from arithmetic returns and the associated risk (standard deviation).*

Source: Callan Associates Inc.

2010 Capital Market Expectations

Correlation Coefficient Matrix

Key to Constructing Efficient Portfolios

Correlation	Broad	Lg Cap	Small/Mid	Int'l Eq	Emerg	Glob ex-US	Dom Fix	Long Dur	Defensive	TIPS	Hi Yield	NUS Fix	Real Est	Pvt Equity	Abs Ret	Comm	T-Bill
Broad Dom Eq	1.00																
Large Cap	0.98	1.00															
Small/Mid Cap	0.94	0.92	1.00														
Int'l Equity	0.72	0.72	0.67	1.00													
Emerging Mkts	0.83	0.82	0.77	0.74	1.00												
Global ex-US Eq	0.78	0.78	0.73	0.98	0.85	1.00											
Domestic Fixed	0.13	0.15	0.12	0.14	0.07	0.13	1.00										
Long Duration	0.30	0.32	0.28	0.26	0.20	0.26	0.90	1.00									
Defensive	0.00	0.00	0.00	0.00	-0.10	-0.05	0.85	0.70	1.00								
TIPS	0.03	0.05	-0.02	-0.01	-0.05	-0.02	0.60	0.40	0.50	1.00							
High Yield	0.60	0.60	0.56	0.47	0.51	0.50	0.25	0.20	0.05	0.15	1.00						
Non-US$ Fixed	-0.03	-0.01	-0.07	0.15	-0.07	0.09	0.38	0.40	0.30	0.30	0.09	1.00					
Real Estate	0.60	0.60	0.55	0.54	0.52	0.56	0.15	0.20	0.00	0.05	0.50	0.01	1.00				
Private Equity	0.90	0.89	0.87	0.84	0.84	0.88	0.04	0.15	0.00	-0.05	0.52	-0.01	0.60	1.00			
Absolute Return	0.63	0.62	0.56	0.53	0.52	0.55	0.33	0.30	0.15	0.20	0.44	0.11	0.43	0.55	1.00		
Commodities	0.18	0.20	0.16	0.23	0.20	0.23	0.04	0.00	0.00	0.25	0.10	0.10	0.15	0.15	0.20	1.00	
T-Bills	-0.12	-0.10	-0.15	-0.20	-0.15	-0.20	0.30	0.20	0.40	0.20	0.07	0.10	-0.06	-0.10	0.15	0.15	1.00

Source: Callan Associates Inc.

The Capital Markets

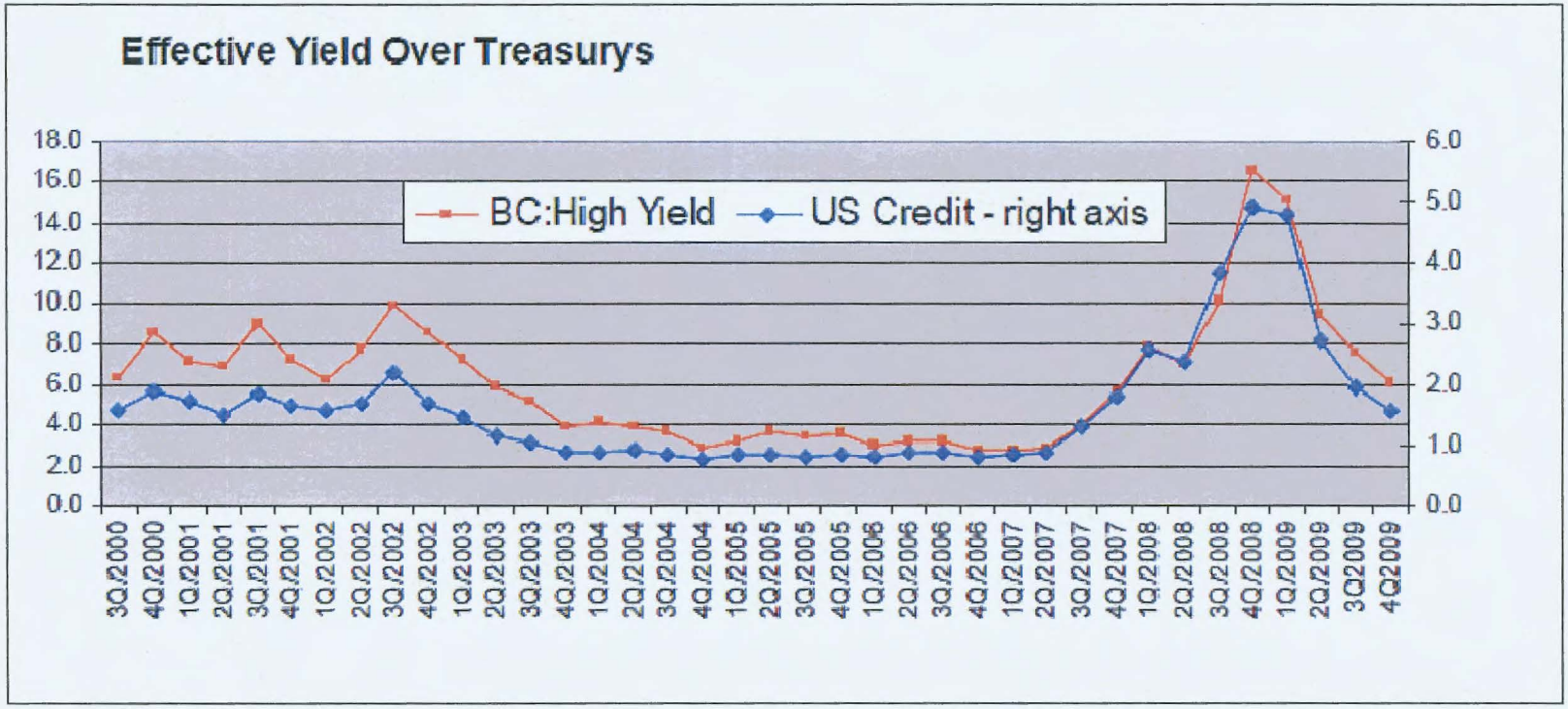
What a Difference One Year Can Make

							Average Annual Return					
							Five Years	Five Years	Ten Years	Ten Years	Fifteen Years	Fifteen Years
	2004	2005	2006	2007	2008	2009	2004-08	2005-09	1999-08	2000-2009	1994-08	1995-2009
Broad U.S. Stock Market												
Russell 3000	11.95	6.12	15.72	5.14	-37.31	28.34	-1.95	0.76	-0.80	-0.20	6.36	8.13
S&P Super Composite 1500	11.78	5.66	15.34	5.47	-36.72	27.25	-1.89	0.69	-0.76	-0.20	6.59	8.29
Large Cap U.S. Stocks												
Russell 1000	11.40	6.27	15.46	5.77	-37.60	28.43	-2.04	0.79	-1.09	-0.49	6.47	8.23
S&P 500	10.88	4.91	15.79	5.49	-37.00	26.47	-2.19	0.42	-1.38	-0.95	6.46	8.04
Small Cap U.S. Stocks												
Russell 2000	18.33	4.55	18.37	-1.57	-33.79	27.17	-0.93	0.51	3.02	3.51	5.89	7.73
S&P 600 Small Cap	22.65	7.68	15.11	-0.30	-31.07	25.57	0.88	1.36	5.18	6.35	7.80	9.80
Non-U.S. Stock Markets												
EAFE ($US)	20.25	13.54	26.34	11.17	-43.38	31.78	1.66	3.54	0.80	1.17	3.52	4.92
MSCI Emerging Markets	25.95	34.54	32.59	39.78	-53.18	79.02	8.02	15.88	9.31	10.11	2.73	7.34
Fixed Income Markets												
BC Aggregate	4.33	2.43	4.33	6.97	5.24	5.93	4.65	4.97	5.63	6.33	6.18	6.79
Citi Non-US Bonds	12.14	-9.21	6.95	11.45	10.11	4.38	5.97	4.46	5.59	6.60	6.47	6.37
Cash Market												
90-day T-bill	1.33	3.07	4.85	5.00	2.06	0.21	3.25	3.02	3.45	2.99	4.02	3.74
Inflation												
CPI-U*	3.26	3.42	2.54	4.08	0.09	2.72	2.67	2.56	2.51	2.52	2.47	2.47

* CPI-U data are measured as year-over-year change

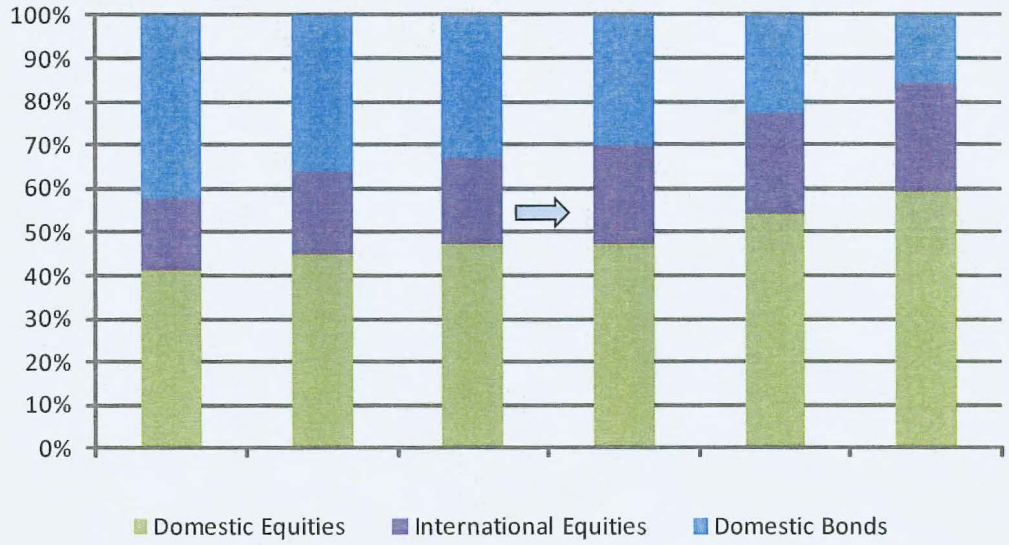
- **Results for 2009 show an incredible rebound in all equity segments.**
- **Five-year returns through 2008 turned negative for equity, now they are positive. Ten-year results are weak as the tech bubble years continue to roll out of the calculations. Fifteen-year results are still below long-run averages, but are now higher than those of fixed income.**

Credit Spreads Widened From Record Lows to Record Highs



- Option adjusted spreads based on Barclays Capital Indexes
- U.S. Credit = Investment Grade
- High Yield Index yields on left axis.

Mean-Variance Optimization Analysis



			Current Allocation	Proposed Allocation		
Domestic Equities	41%	45%	47%	47%	54%	59%
International Equities	17%	19%	20%	23%	23%	25%
Domestic Bonds	42%	36%	33%	30%	23%	16%
Totals	100%	100%	100%	100%	100%	100%
Projected Return	7.27%	7.51%	7.63%	7.75%	8.01%	8.25%
Projected Risk	10.13%	11.03%	11.49%	11.96%	13.04%	14.14%
1 Yr. Probability of Loss	24.0%	25.2%	25.8%	26.2%	27.3%	28.2%
5 Yr. Probability of Loss	6.1%	7.2%	7.7%	8.2%	9.5%	10.7%
10 Yr. Probability of Loss	1.4%	1.9%	2.2%	2.5%	3.2%	4.0%

Investment Considerations

- Preserve the inflation-adjusted value of invested capital on endowment funds. - Exxon Valdez Oil Spill Trustee Council (EVOS) Investment Policy, Page X-14. EVOS has adopted a five percent spending rule.

- Callan provides capital market projections that are calibrated on an inflation projection of 2.75%. Therefore, EVOS should target 7.75% to be consistent with its investment policy.

- Revenue staff performed a stochastic mean-variance optimization process to minimize expected standard deviation while achieving 7.75% goal.

- The following proposed asset allocation is expected to achieve a 7.75% return over the next 10 years with standard deviation of 11.96%:

(as of May 6, 2010)	Research Fund	Habitat Fund	Koniag Fund	Current Target	Proposed Target
Domestic Equity	49.08%	49.05%	49.02%	47% +/- 7%	47% +/- 7%
International Equity	17.99%	18.03%	18.07%	20% +/- 7%	23% +/- 7%
Domestic Bonds	32.92%	32.92%	32.91%	33% +/- 5%	30% +/- 5%
Cash	0.00%	0.00%	0.00%		

EVOS Research Investment Fund - Asset Allocation

FUND: AY02

As of: *April 27, 2010* *View Date:* *April 28, 2010*

STATE STREET.

Fund	Asset ID	Security Name	Market Value	% Total	Asset Allocation
AY02	629991985	AY73 BROAD MKT FXD INC POOL	31,802,323	31.63%	33% +/- 7%
AY02	77999W977	RUSSELL 3000 INDEX CTF	49,872,438	49.60%	47% +/- 7%
AY02	8259909G1	AY70 SHORT TERM POOL	463	0.00%	
AY02	83399D999	AY66 SOA INTL EQUITY POOL	18,867,686	18.77%	20% +/- 5%
Policy Effective Date:		**May 29, 2009**	**$100,542,911**	**100.00%**	

EVOS Habitat Investment - Asset Allocation

FUND: AY2H

As of: April 27, 2010 *View Date: April 28, 2010*

STATE STREET.

Fund	Asset ID	Security Name	Market Value	% Total	Asset Allocation
AY2H	629991985	AY73 BROAD MKT FXD INC POOL	10,204,377	31.63%	33% +/- 7%
AY2H	77999W977	RUSSELL 3000 INDEX CTF	15,994,756	49.57%	47% +/- 7%
AY2H	8259909G1	AY70 SHORT TERM POOL	1,089	0.00%	
AY2H	83399D999	AY66 SOA INTL EQUITY POOL	6,066,002	18.80%	20% +/- 5%
Policy Effective Date:		**May 29, 2009**	**$32,266,224**	**100.00%**	

EVOS Koniag Investment - Asset Allocation

FUND: AY2J

As of: *April 27, 2010* *View Date:* *April 28, 2010*

STATE STREET.

Fund	Asset ID	Security Name	Market Value	% Total	Asset Allocation
AY2J	629991985	AY73 BROAD MKT FXD INC POOL	14,381,265	31.62%	33% +/- 7%
AY2J	77999W977	RUSSELL 3000 INDEX CTF	22,530,677	49.54%	47% +/- 7%
AY2J	8259909G1	AY70 SHORT TERM POOL	482	0.00%	
AY2J	83399D999	AY66 SOA INTL EQUITY POOL	8,570,610	18.84%	20% +/- 5%
Policy Effective Date:		**May 29, 2009**	**$45,483,035**	**100.00%**	

2010-2012
PAC Charter

EXXON VALDEZ OIL SPILL PUBLIC ADVISORY COMMITTEE CHARTER

1. OFFICIAL DESIGNATION: *Exxon Valdez* Oil Spill Public Advisory Committee (hereinafter referred to as the Committee).

2. AUTHORITY: The Committee is established as mandated by Paragraph V.A.4 of the Memorandum of Agreement and Consent Decree entered into by the United States of America, through the Department of Justice, and the State of Alaska, through the Attorney General, on August 27, 1991 and approved by the United States District Court for the District of Alaska in settlement of United States of America v. State of Alaska, Civil Action No. A91-081 CV (hereinafter referred to as the MOA) and shall be located in Alaska. Additional authority for its creation is found in the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. subsection 9601 et seq. This Committee is established in accordance with the provisions of the Federal Advisory Committee Act (FACA), as amended, 5 U.S.C., App.

3. SCOPE AND OBJECTIVES: By order of the District Court for the District of Alaska, the Committee is to advise the Trustees (State of Alaska Department of Law, State of Alaska Department of Fish and Game, State of Alaska Department of Environmental Conservation, U.S. Department of Agriculture, the National Oceanic and Atmospheric Administration of the U.S. Department of Commerce, and the U.S. Department of the Interior) appointed to administer the fund established in settlement of United States v. Exxon Corporation, Civil Action No. A91-082, and State of Alaska v. Exxon Corporation, Civil Action No. A91-083, both in the United States District Court for the District of Alaska, in all matters described in Paragraph V.A.1 of the MOA referenced above.

4. DESCRIPTION OF DUTIES: The Committee functions are advisory only, and its officers shall have no administrative authority by virtue of their membership. The Committee shall advise the Trustees through the Trustee Council with respect to the following matters:

   All decisions relating to injury assessment, restoration activities, or other use of natural resource damage recoveries obtained by the Governments, including all decisions regarding:

   a. Planning, evaluation, and allocation of available funds;
   b. Planning, evaluation, and conduct of injury assessments and restoration activities;
   c. Planning, evaluation, and conduct of long-term; monitoring and research activities;
   d. Coordination of a, b, and c.

5. AGENCY OR OFFICIAL TO WHOM THE COMMITTEE REPORTS: The Committee shall report to the *Exxon Valdez* Settlement Trustee Council through the Federal members of the Trustee Council.

6. BUREAU RESPONSIBLE FOR PROVIDING NECESSARY SUPPORT: Support for the Committee shall be provided by the Trustee Council's Executive Director, who shall

procure all needed space, supplies, equipment, and support for the Committee. The Executive Director shall prepare an annual budget for the Committee. The budget shall provide for the Committee such funds as the Trustee Council deems appropriate for administrative support for the Committee, from the *Exxon Valdez* Oil Spill Investment Fund established as a result of the settlement of United States v. Exxon Corporation and State of Alaska v. Exxon Corporation.

7. ESTIMATED ANNUAL OPERATING COSTS: The estimated annual operating cost for the Committee is $35,000, including all direct and indirect expenses. It is estimated that .4 staff years will be required to support the Committee. Members of the Committee serve without compensation. However, while away from their homes or regular places of business, members engaged in Committee business approved by the Trustee Council Executive Director or the Designated Federal Officer will be allowed travel expenses, including per diem in lieu of subsistence, in the same manner as persons employed intermittently in Government service.

8. DESIGNATED FEDERAL OFFICER: The Designated Federal Officer is the U.S. Department of the Interior, Alaska Office of Environmental Policy and Compliance's Regional Environmental Assistant, or his/her designee.

9. ESTIMATED NUMBER AND FREQUENCY OF MEETINGS: The Committee is expected to meet approximately, and no less than, two times per year.

10. DURATION: The requirement for the Committee will continue throughout the life of the settlement agreement referenced in item 2, above.

11. TERMINATION DATE: The Committee is subject to the provisions of FACA and is subject to biennial review and will terminate two years from the date the charter is filed, unless, prior to that time, the charter is renewed in accordance with section 14 of FACA.

12. MEMBERSHIP AND DESIGNATION: The Committee shall consist of 8 representative members, including a Chair and Vice-Chair elected by the Committee members. Each member will serve a two-year term and members are eligible for re-nomination and reappointment. No member shall participate in any matter specifically concerning a lease, license, permit, contract, claim, agreement, or related litigation in which the member has a direct financial interest. One member will be appointed representing each of the interests identified below.

    a. aquaculturist/mariculturist (e.g., fish hatcheries and oyster/shellfish farming)
    b. commercial fisher (e.g., commercial fishing for salmon, halibut, herring, shellfish and bottom fish; including boat captains and crews, cannery owners/operators, and fish buyers)
    c. commercial tourism business person (e.g., promoting or providing commercial travel or recreational opportunities, including charter boating, guiding services, visitor associations, boat/kayak rental)
    d. recreation user (e.g., recreation activities that occur within the area, including kayaking, power boating, sailing, sightseeing)
    e. conservationist/environmentalist (e.g., organizations interested in the wise use and protection of natural resources)

f. Native landowner (e.g., regional or village corporations in the affected area established by the Alaska Native Claims Settlement Act)
g. sport hunter/fisher (e.g., hunting and/or fishing for pleasure)
h. subsistence user (e.g., customary and traditional use of wild renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools or transportation; for the making and selling of handicraft articles; and for customary trade)

13. SUBCOMMITTEES: The Committee may, upon approval of the Trustee Council, establish such workgroups or subcommittees as it deems necessary for the purpose of compiling information or conducting research. However, such work groups or subcommittees may not conduct business and must report to the full Committee.

14. RECORDKEEPING: Records of the Committee, and any workgroups or subcommittees established, will be handled as part of the Trustee Council's Official Record, available at their office. A public copy of those records is available at the Alaska Resources Library and Information Services. These records shall be available for public inspection and copying, subject to the Freedom of Information Act, 5 U.S.C. 552.

15. FILING DATE:

_____ _____
Secretary of the Interior Date

_____
Date Filed

DRAFT

9 PAC Seats to Retain - These positions are supposed to represent people, services and/or entities directly affected/impacted by the EVOS

1. Aquaculturist/mariculturist (e.g., fish hatcheries and oyster/shellfish farming)

2. Commercial fisher (e.g., commercial fishermen for salmon, herring, halibut, shellfish and bottom fish; including boat captains and crews, cannery owners/operators, and fish buyers)

3. Commercial tourism business person (e.g., promoting or providing commercial travel or recreational opportunities, including charter boating, guiding services, visitor associations, boat/kayak rental)

4. Recreation user (e.g., recreation activities that occur within the area, including kayaking, birding, wildlife photography, power boating, sailing, sightseeing)

5. Conservationist/environmentalist (e.g., non-government organizations interested in the wise use and protection of natural resources)

6. Native landowner (e.g., regional and village corporations in the affected area established by the Alaska Native Claims Settlement Act)

7. Regional monitoring program operator (e.g., monitoring and reporting on environmental conditions in the affected area, including monitoring for pollution and the status of biological resources)

8. Sport hunter/fisher (e.g., hunting and/or fishing for pleasure)

9. Subsistence user (e.g., federally recognized tribes in the affected area) (e.g., traditional user of wild renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools or transportation for the making and selling of handicrafts articles; and for customary trade)

10. Science →

No less than 2 face-to-face PAC meetings per year plus teleconference meetings when necessary.

One field trip every other year.

PAC Chair attends all PAC and Trustee Council meetings in person, and sits at the table with the TC.

Budget: ~~$50,000.~~ 30,000.

Exxon Valdez Oil Spill Public Advisory Committee
Attendance: October 2002-August 2004

Member/ Interest Represented	PAC Meetings/Briefings/Field Trips (excludes participation in subgroups, work sessions, public meetings, or other Trustee Council activities)									
	12-3-02	1-14-03	2-6-03	6-7-03	7-23-03	8-14-03	1-15-04	2-25-04	5-19-04*	7-21-04
Torie Baker Commercial Fishing		X		X		X				X
John Devens Regional Monitoring	X	X				X	X			
Gary Fandrei Aquaculture/Mariculture	X	X		X		X	X	X	X	X
John Gerster Public-at-Large	X	X				X		X	X	X
Bret Huber (Chair) Sport Hunting & Fishing	X	X		X		X				
Charles Hughey Subsistence	X	X						X		X
R J Kopchak Public-at-Large	X	X				X	X	X		X
Pat Lavin Conservation/Environmental	X	X		X		X	X	X	X	X
Charles Meacham (Vice-Chair) Science/Academic	X	X		X		X	X	X	X	X
Brenda Norcross Science/Technical and STAC	X	X		X		X	X		X	X
Pat Norman Native Landowner								X		X
Ed Page Marine Transportation	X			X		X	X		X	X
Martin Robards Conservation/Environmental	X	X		X		X	X	X		X
Stan Senner Conservation/Environmental	X	X				X	X			
Gerald Sanger Commercial Tourism	X									

Member/ Interest Represented	PAC Meetings/Briefings/Field Trips (excludes participation in subgroups, work sessions, public meetings, or other Trustee Council activities)									
	12-3-02	1-14-03	2-6-03	6-7-03	7-23-03	8-14-03	1-15-04	2-25-04	5-19-04*	7-21-04
Scott Smiley Public-at-Large	X	X						X		
Stacy Studebaker Recreation Users	X			X		X			X	X
Michael Vigil Tribal Government	X	X								X
Kate Williams Conservation/Environmental	X	X		X		X				
Ed Zeine Local Government				X		X	X	X	X	X

Member/ Interest Represented	PAC Meetings/Briefings/Field Trips (excludes participation in subgroups, work sessions, public meetings, or other Trustee Council activities)									
	12-3-02	1-14-03	2-6-03	6-7-03	7-23-03	8-14-03	1-15-04	2-25-04	5-19-04*	7-21-04
Torie Baker Commercial Fishing		X		X		X				X
John Devens Regional Monitoring	X	X				X	X			
Gary Fandrei Aquaculture/Mariculture	X	X		X		X	X	X	X	X
John Gerster Public-at-Large	X	X				X		X	X	X
Bret Huber (Chair) Sport Hunting & Fishing	X	X		X		X				
Charles Hughey Subsistence	X	X						X		X
R J Kopchak Public-at-Large	X	X				X	X	X		X
Pat Lavin Conservation/Environmental	X	X		X		X	X	X	X	X

Member/ Interest Represented	PAC Meetings/Briefings/Field Trips (excludes participation in subgroups, work sessions, public meetings, or other Trustee Council activities)									
	12-3-02	1-14-03	2-6-03	6-7-03	7-23-03	8-14-03	1-15-04	2-25-04	5-19-04*	7-21-04
Charles Meacham (Vice-Chair) Science/Academic	X	X		X		X	X	X	X	X
Brenda Norcross Science/Technical and STAC	X	X		X		X	X		X	X
Pat Norman Native Landowner								X		X
Ed Page Marine Transportation	X			X		X	X		X	X
Martin Robards Conservation/Environmental	X	X		X		X	X	X		X
Stan Senner Conservation/Environmental	X	X				X	X			
Gerald Sanger Commercial Tourism	X							[redacted]	[redacted]	[redacted]
Scott Smiley Public-at-Large	X	X						X		
Stacy Studebaker Recreation Users	X			X		X			X	X
Michael Vigil Tribal Government	X	X								X
Kate Williams Conservation/Environmental	X	X		X		X	[redacted]	[redacted]	[redacted]	[redacted]
Ed Zeine Local Government				X		X	X	X	X	X

X = attended
* = Trustee Council meeting

Exxon Valdez Oil Spill Public Advisory Committee
Attendance: October 2004-August 2006

Member and Interest Represented	PAC Meetings/Briefings/Field Trips (excludes participation in subgroups, work sessions, public meetings, or other Trustee Council activities)									
	1-27-05	3-18-05	4-28-05	6-11-05	7-19-05	1-26-06	3-06-06	7-14-06	8-24-06	
Torie Baker Commercial Fishing	X			X		X	X		X	
Jason Brune Public-at-Large	X	X	X	X		X	X	X		
Kurt Eilo Sport Hunting and Fishing	[redacted]					X				
Larry Evanoff Native Landowners	X					X		X		
Gary Fandrei Aquaculture/Mariculture		X	X	X		X	X		X	
John Gerster (Chair) Science/Technical	X	X		X	X	X				
Randy Hagenstein Recreation Users	X			X		X	X			
Lisa Ka'aihue Regional Monitoring	X	X	X	X	X		X	X	X	
R J Kopchak Commercial Fishing	X	X		X		X			X	
Pat Lavin Conservation/Environmental				X		X	X			
Vern McCorkle Public-at-Large	[redacted]					X	X	X	X	
Brenda Norcross Science/Technical and STAC	X	X	X	X			X	X	X	
Pat Norman Native Landowner	X	X	X	X						
Ed Page Marine Transportation										
Ron Peck Commercial Tourism	X		X	X	X	X				

Member and Interest Represented	PAC Meetings/Briefings/Field Trips (excludes participation in subgroups, work sessions, public meetings, or other Trustee Council activities)									
	1-27-05	3-18-05	4-28-05	6-11-05	7-19-05	1-26-06	3-06-06	7-14-06	8-24-06	
Martin Robards Conservation/Environmental	X		X	X		X	X		X	
Stacy Studebaker (Vice-chair) Recreation Users	X	X	X	X		X	X	X		
Mead Treadwell Science/Technical			X	X	X		X	X		
Andrew Teuber Subsistence	X	X	X				X			
Ed Zeine Local Government			X	X	X	X	X	X	X	

X = attended

Exxon Valdez Oil Spill Public Advisory Committee
Attendance: October 2006-September 2008

Member and Interest Represented	PAC Meetings/Briefings/Field Trips (excludes participation in subgroups, work sessions, public meetings, or other Trustee Council activities)										
	11-2-06	1-25-07	2-1-07	3-2-07	7-24-07	8-30-07	12-6-07	1-24-08	3-5-08	9-3-08	9-17-08
Torie Baker Marine Transportation	X		X	X	X	X	X	X	X		X
Jason Brune Public-at-Large	X	X	X	X	X	X	X	X	X		X
Kurt Eilo Sport Hunting and Fishing	X		X	X	X	X	X		X	X	X
Larry Evanoff Native Landowners	X					X	X				X
Gary Fandrei Aquaculture/Mariculture	X	X	X	X	X	X	X	X	X	X	X
Mark King Tribal Government	X										
R J Kopchak Commercial Fishing	X	X	X	X	X	X	X		X		X
Pat Lavin Conservation/Environmental	X	X			X	X	X			X	
Steve Lewis Regional Monitoring	X		X	X		X	X			X	
Vern McCorkle Public-at-Large	X	X		X	X	X					
Ron Peck Commercial Tourism				X	X	X	X				
Martin Robards Science/Technical	X	X	X	X	X				X		
Stacy Studebaker Recreation Users	X	X	X	X	X	X	X	X			X
Martha Vlasoff Subsistence	X	X	X		X	X		X			
Ed Zeine Local Government	X	X	X	X	X	X	X	X	X	X	X

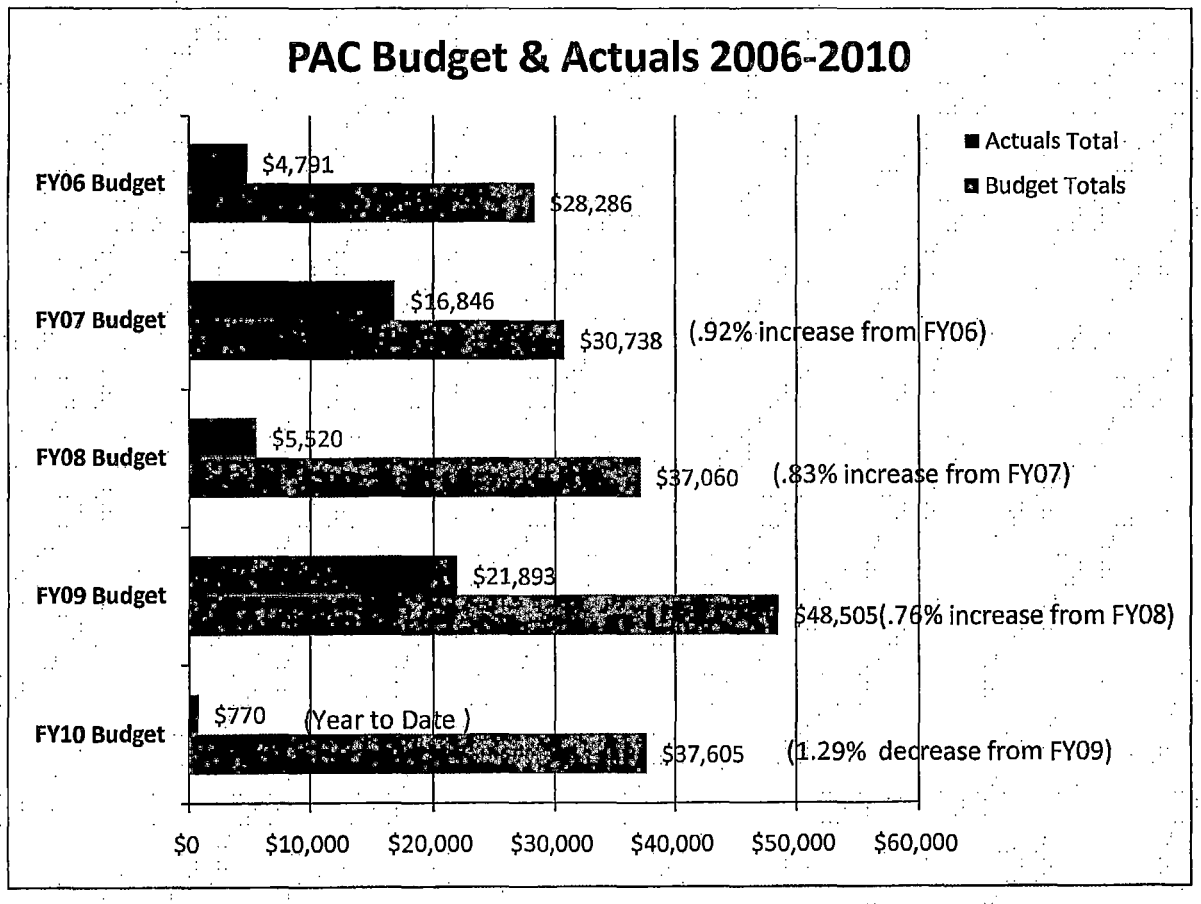
X = attended

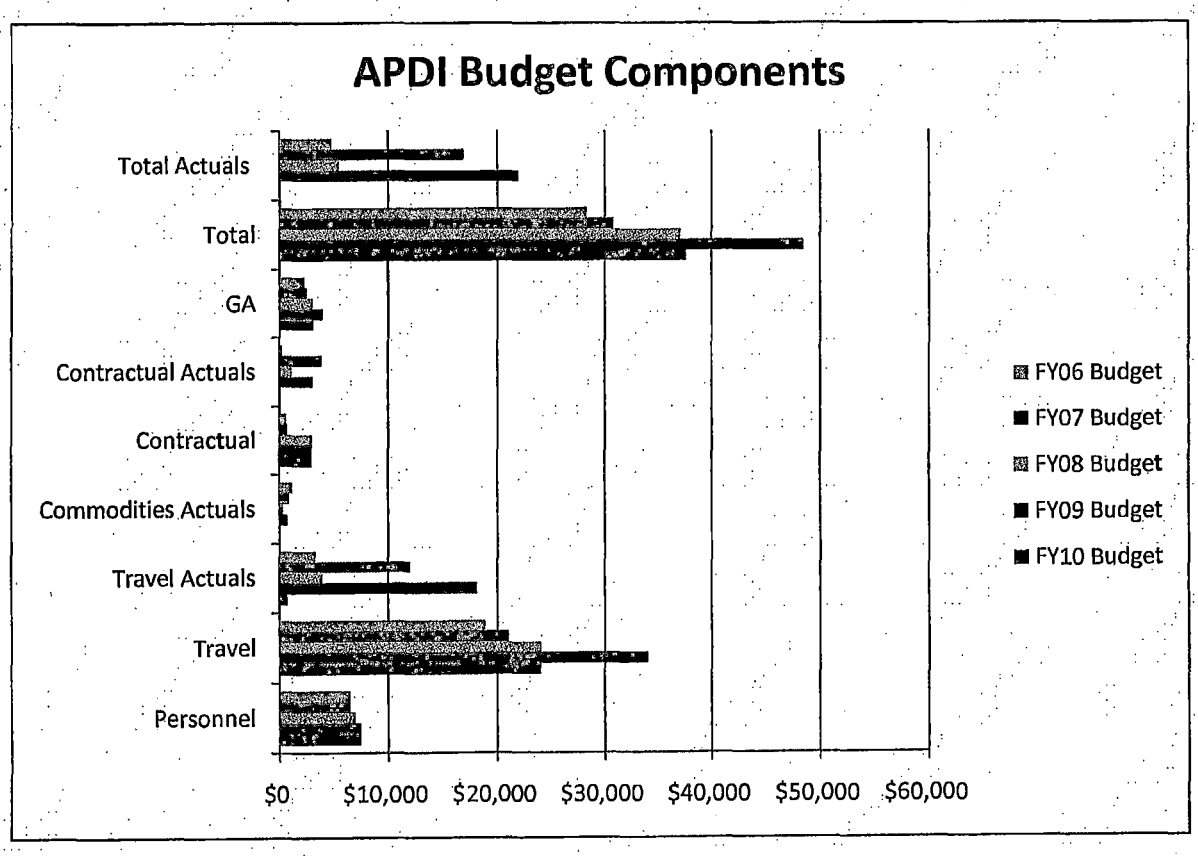
Exxon Valdez Oil Spill Public Advisory Committee
Attendance: October 2008-September 2010 **revised 5/3/10**

Member and Interest Represented	PAC Meetings/Briefings/Field Trips (excludes participation in subgroups, work sessions, public meetings, or other Trustee Council activities)										
	1-9-09	2-4-09	5-28-09	6-25-09	8-26-09	1-13-10	4-19-10				
Torie Baker Marine Transportation	X	X			X	X					
Amanda Bauer Commercial Tourism	X	X	X	X	X	X	X				
Jason Brune Public-at-Large	X	X	X	X	X		X				
Kurt Eilo Sport Hunting and Fishing	X		X			X	X				
Larry Evanoff Native Landowners	X	X		X	X	X					
Gary Fandrei Aquaculture/Mariculture	X	X		X	X	X	X				
Patience Anderson Faulkner Subsistence	X	X	X	X		X					
John French Regional Monitoring	X	X	X	X	X	X	X				
Jennifer Gibbins Conservation/Environmental	X	X	X	X	X	X	X				
John Renner - appt Oct 2009 Commercial Fishing						X					
Commercial Fishing - *vacant*											
Bill Rosetti Science/Technical	X	X		X	X	X					
Stacy Studebaker Recreation Users	X	X	X	X	X	X	X				
David Totemoff – appt Oct 2009 Tribal Government						X	X				
Lori "Sue" Johnson - *resigned* Tribal Government	X										
Lori Polasek - appt Oct 2009 Public-at-Large						X	X				
JoAnn Vlasoff - *resigned* Public-at-Large	X		X	X							

Member and Interest Represented	PAC Meetings/Briefings/Field Trips (excludes participation in subgroups, work sessions, public meetings, or other Trustee Council activities)										
	1-9-09	2-4-09	5-28-09	6-25-09	8-26-09	1-13-10	4-19-10				
Local Government											

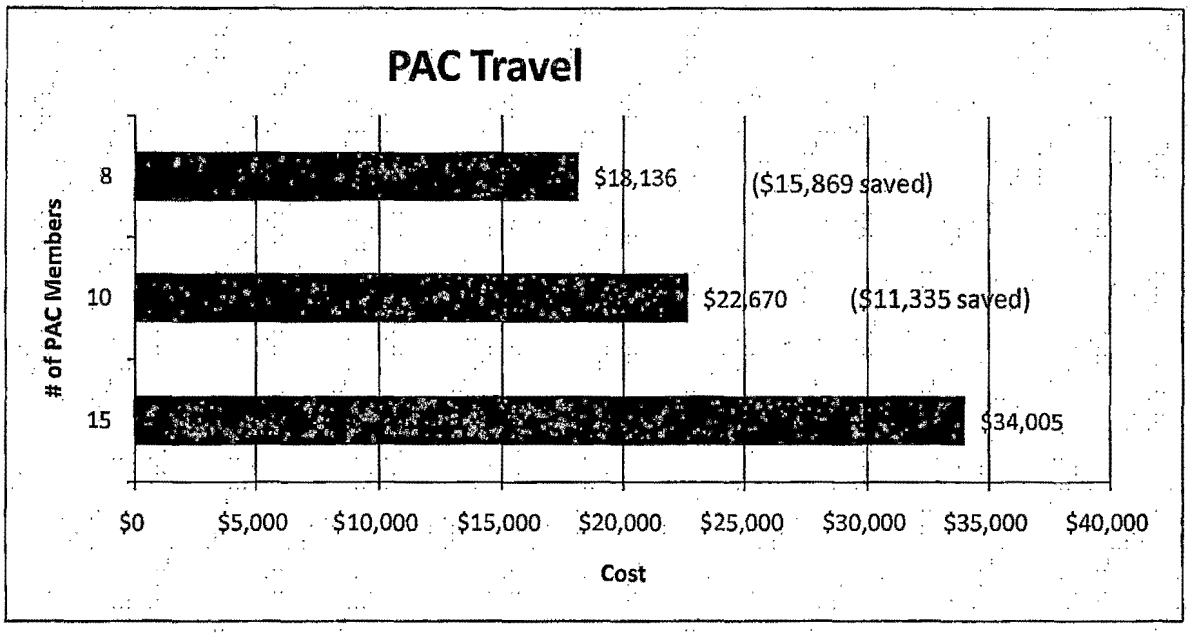
X = attended

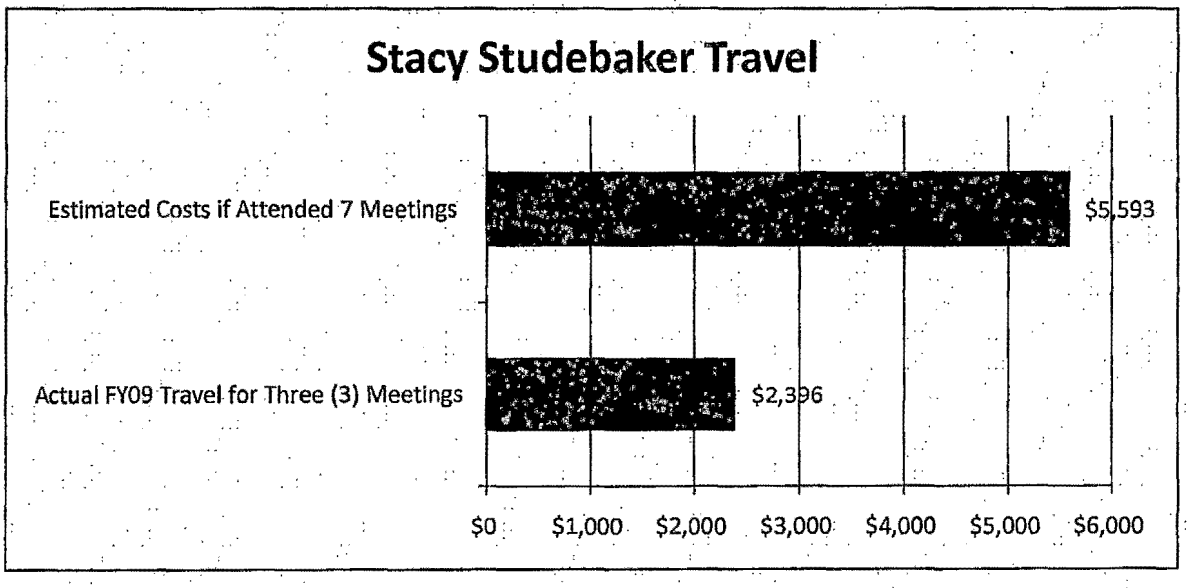

PAC Budget & Actuals 2006-2010
Actuals Total
Budget Totals
FY06 Budget
$4,791
$28,286
FY07 Budget
$16,846
$30,738
(.92% increase from FY06)
FY08 Budget
$5,520
$37,060
(.83% increase from FY07)
FY09 Budget
$21,893
$48,505(.76% increase from FY08)
FY10 Budget
$770
(Year to Date)
$37,605
(1.29% decrease from FY09)
$0
$10,000
$20,000
$30,000
$40,000
$50,000
$60,000


APDI Budget Components
Total Actuals
Total
GA
Contractual Actuals
Contractual
Commodities Actuals
Travel Actuals
Travel
Personnel
FY06 Budget
FY07 Budget
FY08 Budget
FY09 Budget
FY10 Budget
$0
$10,000
$20,000
$30,000
$40,000
$50,000
$60,000

PAC Cost Comparisons

(examples using 2009 budget - staff time not inclued)





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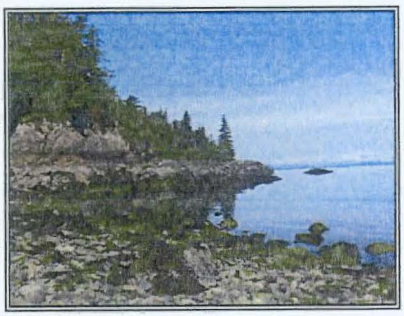

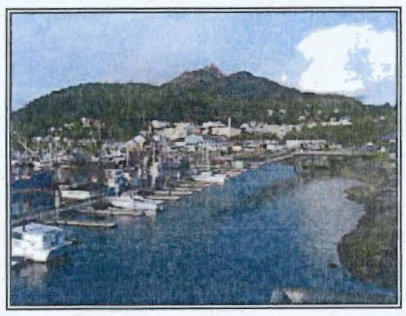

Exxon Valdez *Oil Spill*
Restoration Plan

2010 UPDATE
INJURED RESOURCES AND SERVICES

April 27~~1~~, 2010

Exxon Valdez *Oil Spill Trustee Council*
441 W. 5th Avenue, Suite 500
Anchorage, AK 99501
907-278-8012
www.evostc.state.ak.us

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2010 UPDATE ON INJURED RESOURCES AND SERVICES

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2010 UPDATE ON INJURED RESOURCES AND SERVICES

INTRODUCTION

Purpose of the Injured Resources and Services List

In November 1994, the *Exxon Valdez* Oil Spill Trustee Council adopted an official list of resources and services injured by the *Exxon Valdez* Oil Spill (EVOS) as part of its Restoration Plan. The Injured Resources and Services List (List) serves three main purposes in the Restoration Program:

1. Initially, the List identified natural resource and human service injuries caused by the oil spill and clean-up efforts.

2. The List helped guide the *Restoration Plan* and was especially important in 1994 when the plan was first adopted. The List was created as guidance for the expenditure of public restoration funds under the Plan, and assisted the Trustees and the public with ensuring that money was expended on resources that needed attention. The List continues to serve that purpose today.

3. Finally, the status of injured resources on the List provides the Trustees and the public a way to monitor recovery of ecological functions and human services that depend on those resources.

Although the fish and wildlife resources that appear on the List experienced population-level or chronic injury from the spill, not every species that suffered some degree of injury was included. For example, carcasses of about 90 different species of oiled birds were recovered in 1989, but only 10 species of birds were included on the List.

Moreover, it should be noted that the analysis of resources and services in relation to their recovery status only pertains to amelioration of effects from the 1989 oil spill. When the Restoration Plan was first drafted, the distinction between effects of the oil spill and the effects of other natural or anthropogenic stressors on affected natural resources was not clearly delineated. At that time, the spill was recent; the impact to the spill area ecosystem was profound and adverse effects of the oil on biological resources were apparent. As time passes, the ability to distinguish effects of oil from other factors affecting fish and wildlife populations diminishes. Currently, natural and human perturbations may be hindering recovery of some resources initially injured by the spill. While those perturbations warrant consideration in defining and assessing recovery, they do not negate the responsibility of the Trustee Council to pursue restoration of spill-affected resources. However, the passage of time and the evolution of science from the listing of species to an ecosystem approach have shifted the purpose and utility of the Injured Resources and Species List. The Council recognizes that the complexities and the difficulties in measuring the continuing impacts from the spill result in some inherent uncertainty in defining the status of a resource or service through a specific list and the Council's focus has accordingly expanded to a more ecosystem approach. The 1994 Plan also outlined an ecosystem approach to restoration and this more integrated view has become increasingly recognized as essential and the original organization of efforts through a list of species in the Update is no longer a viable approach.

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Recognizing that funding for future restoration is limited and that it is becoming increasingly difficult to distinguish between spill impacts and other effects in measuring recovery, the Council's efforts are now focused on making an organized and strategic transition to a modest program which focuses the remaining funds on a few specific programs. Building on its past efforts, the Council has identified the following areas of focus: (1) herring; (2) lingering oil; (3) long-term monitoring of marine conditions; (4) harbor protection and marine restoration; and (5) habitat acquisition and protection.

The Council also recognizes that long-term management of species and resources initially injured by the spill lies with the agencies and entities that have the mandate and resources to pursue these long-term goals. To support natural restoration and to enable management consistent with this long-term restoration, the Council has increasingly directed funds toward research that provides information that is critical to monitor and support the healthy functioning of the spill ecosystem.

Restoration Goals and Objectives

The *Restoration Plan* guides the Trustee Council's restoration efforts with respect to resources and services in the spill-affected area (Figure 1).

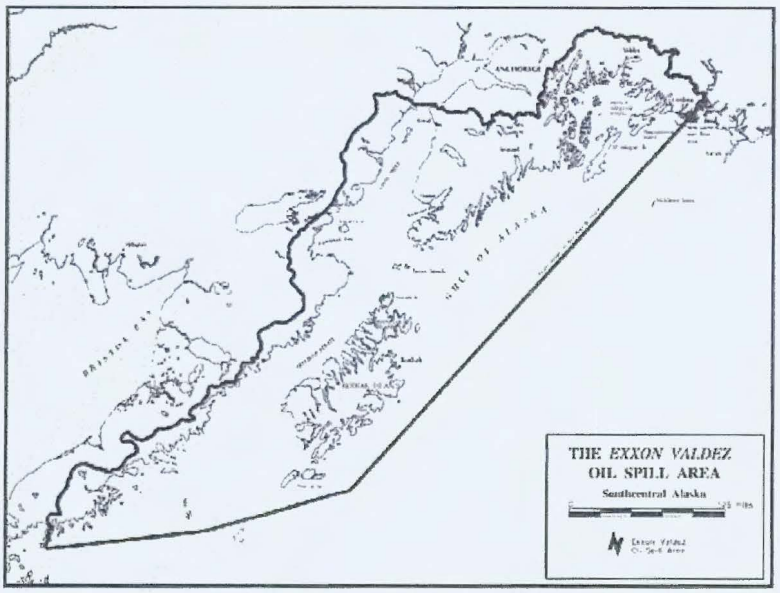

Figure 1: Map produced by: Alaska Department of Natural Resources, Land Records Information Service

It contains policies for making restoration decisions and describes how restoration actions will be implemented. As part of the *Restoration Plan*, the List was created to document injured resources that were of concern to the Trustee Council. The benchmarks that were established at that time to assess the status of the resources and services injured by the oil spill include:

- **Restoration Goal:** The overarching goal of the Restoration Program is the recovery of all injured resources and services, sustained by healthy, productive ecosystems to maintain naturally occurring diversity.

- **Recovery Goal of Injured Resources and Services:** The primary goal for all recovering injured resources and services is a return to conditions that would have existed had the spill not occurred.

- **Recovery Objective/s:** Specific, measurable parameters that, when achieved, signal the recovery of an injured resource or service.

It is difficult to predict conditions that would have existed in the absence of the spill. Therefore, the recovery objectives include measurable and biologically substantive parameters that can be used as proxies for these conditions. In some cases, multiple objectives are used for individual resources. For some resources, so little is known about the original or current injury or status that identifying a recovery objective has not been possible.

Recovery Status Categories

The List has historically included four categories of recovery which are defined below. A fifth category was introduced in 2010, "Very Likely Recovered." Together, these categories represent a scale along which an injured resource can progress:

- **Not Recovering**: Resources that are Not Recovering continue to show little or no clear improvement from injuries stemming from the oil spill. Recovery objectives have not been met.

- **Recovering:** Recovering resources are demonstrating substantive progress toward recovery objectives, but are still adversely affected by residual impacts of the spill or are currently being exposed to lingering oil. The amount of progress and time needed to attain full recovery varies depending on the species.

- **Recovered:** Recovery objectives have been met, and the current condition of the resource is not related to residual effects of the oil spill.

- **Very Likely Recovered:** While there has been limited scientific research on the recovery status of these resources in recent years, prior studies suggest that there had been substantial progress toward recovery in the decade following the spill. In addition so much time has passed since any indications of some spill injury, including exposure to oil, it is unlikely that there are any residual effects of the spill.

- **Recovery Unknown:** For resources in the unknown category, data on life history or the extent of injury from the spill is limited. Moreover, given the length of time since the spill, it is unclear if new or further research will provide information that will help in

Comment [cwb1]: **ADFG** - *The new 'Very Likely Recovered' category conveys a level of certainty that a resource or service is recovered that is higher than conveyed by the 'unknown' category but not as high as conveyed by the 'recovered' category. Care is needed to ensure that the higher level of certainty claimed by the new category is supported by available information. However, the text under the three resources it is applied to does not provide sufficient support.*

Comment [cwb2]: **USFWS** - *Consider removing this statement. In most of these species, there has never been enough data collected to indication further exposure to or effects from oil. So, no one has looked to see if there were any "indications of some spill injury." The statement, that, because "time has passed", no injury should be occurring is not supportable. Until last year, we had no idea that harlequins were still being exposed to oil. In that case, someone has been looking for 20 years and time was only relevant because of the long –term date set that resulted. Hardly any of the other species have this kind of data.*

comprehensively assessing the original injury or determining the residual effects of the spill such that a better evaluation of recovery can occur.

Human services that rely on natural resources were also injured by the oil spill and can thus be placed in one of the above categories. Because the recovery status of injured services is inextricably linked to the state of the resource on which it depends, full recovery of the spill area cannot occur until both resources and services are restored.

List Update History

The *Restoration Plan* states that the List should be reviewed periodically and updated to reflect results from scientific studies and other information. A summary of how the list has changed since 1996 is available in Table 1.

A reassessment of the List is necessary to understand the consequences of the original spill and the effects of oil remaining in the environment. It also provides a way to identify areas where additional restoration activities are needed and documents each resource's progress toward its recovery objectives.

The List was first updated in September 1996. At that time, the bald eagle was upgraded from recovering to recovered. In March 1999, a major review of recovery objectives and status occurred and several more changes were made. River otters were then considered to be recovered, and five resources—black oystercatchers, clams, marbled murrelets, Pacific herring, and sea otters—were upgraded to recovering. One resource, the common loon, was moved from recovery unknown to not recovering. Five resources remained as recovery unknown. All four human services were classified as recovering.

Recovery continued to progress and more changes were made to the List in 2002. Five more species or resources were moved to the recovered category: archaeological resources, black oystercatchers, common murres, sockeye salmon and pink salmon. In addition, designated wilderness areas were moved from the recovery unknown to the recovering category; Pacific herring were moved back from the recovering to the not recovering category; subtidal communities were moved from the recovering to recovery unknown category; and killer whales were moved from not recovering to recovering. In all, seven resources were considered fully recovered from the effects of the oil spill; 16 resources and all four human services were not fully recovered; and the recovery of five resources was still considered unknown.

In 2006, the Update acknowledged the recovery of common loons, cormorants, Dolly Varden, and harbor seals from the effects of the spill. Harlequin ducks were moved from not recovering to recovering based on positive population trends, and marbled murrelets were moved from recovering to unknown. In addition, in the 2006 Update the following factors were considered in the development of the Recovery Objectives established for injured resources:

- Return to pre-spill levels: Used where population estimates or indices were available prior to 1989. For species that are highly variable, these numbers could reflect a range of values. Where possible, these numbers account for the effects of other influences on injured populations, such as from climate change, although these other effects may interact with oil spill effects.

- Hydrocarbon exposure: Used where hydrocarbon exposure itself was part of the original basis for injury, where hydrocarbon exposure may limit recovery, or where hydrocarbon exposure in an injured resource may be a pathway to injury in other resources. Oil exposure may refer to background concentrations, which takes into account hydrocarbon exposure from natural oil seeps, natural coal deposits, and oil released from the Valdez petroleum plant as a result of the 1964 earthquake.

- Stable or increasing population: Used where resources were in decline before the spill or where ongoing declines unrelated to the spill may be occurring.

- Productivity: Reproductive success and population demographics are used in lieu of or to supplement data on population sizes. Measures include such indicators as eggs produced per female, young successfully reared, returns per spawning adult and growth rates.

In 2010, 21 years after oil spill, the Council again evaluated the status of injured resources and services and provided a synopsis of the most current information available. Based on the recommendations from the Science Panel and agency experts, the recovery objectives have been reviewed for each resource and service to provide objectives are attainable and scientifically valid.

In 2010, a fifth Recovery Status was added. "Very Likely Recovered" was added to reflect the status of species for which there has been limited scientific research on the resource's recovery status in recent years and prior studies suggest that there had been substantial progress toward recovery in the decade following the spill. In addition, so much time has passed since any indications of some spill injury, including exposure to oil; it is unlikely that there are any residual effects of the spill.

Barrows goldeneyes were added to the List in 2010, based on their continuing exposure to oil. Lastly, the Recovery Objectives were also updated to address:

- Stressors other than oil that may be currently affecting a population.

- The likelihood that a resource has recovered given the amount of time that has lapsed since the spill.

Changes to the environment in Prince William Sound since 1989 may make returning some resources to pre-spill levels unlikely.

Recovery Status Determination

The recovery goal for injured resources is a condition that would exist in the absence of the *Exxon Valdez* oil spill. It is important to understand that ecosystems are dynamic and the spill-affected area would have changed even without the spill. Given limited ability to predict multi-year changes in marine ecosystems, it is difficult to know precisely what changes were inevitable had the spill not occurred. However, it is still possible to assess the recovery status of a particular resource by reviewing multiple sources of applicable information.

Types of information that were used to assess the recovery status of a particular resource or service included:

- initial magnitude of oil impacts to a population in the spill area
- comparisons of population demographic in oiled and reference areas
- survey data of community members in oiled and reference areas
- continued exposure to residual oil in the spill area as measured by the biomarker cytochrome P450 or tissue concentrations of petroleum hydrocarbons
- exposure potential as evaluated by the distribution of lingering oil; overlap in spatial distribution of lingering oil and a resource; and identification of an exposure pathway
- persistence of sublethal or chronic injuries
- intrinsic ability of the population to recover
- other natural or human-caused stressors

Even with such an evaluation, direct links cannot always be drawn between effects from the oil spill and the observed, current condition of a particular resource: in most cases the amount or type of data is insufficient to complete a cause and effect relationship. Specifically, there is little pre-spill data for many of the injured resources. Moreover, the physiological effects of oil on key species of wildlife and subsequent population consequences were not well understood at the time of the spill. As a result, few species exist for which there is complete knowledge of the original impacts of the oil spill.

Uncertainties in Evaluating Recovery Status

To mitigate the uncertainties inherent in evaluating recovery, the Council reviewed current, relevant scientific information while acknowledging the limitations of assigning an ultimate cause and effect relationship using the existing data. The types of uncertainty found in the literature include:

1. *Variability in population estimates.* Because the patterns of animal distribution present challenges in getting accurate counts (especially of highly mobile fish, birds and marine mammals), most estimates of population size have wide ranges of variability associated with the data.

2. *Lack of pre-spill data.* For many of the resources affected by the spill there was limited or no recent data on their status in 1989. Additionally, some of the available pertinent data were the result of limited sampling, which consequently produced wide confidence intervals around the population estimates.

3. *Interaction of spill and natural factors.* It is increasingly difficult to separate what may be lingering effects of the spill from changes that are natural or caused by factors unrelated to the oil spill.

4. *Scale.* The geographic scale of studies conducted over the years has varied among resources and this disparity must be considered when interpreting data and applying results to recovery status. Some studies were conducted at the large spatial scale to address population and ecosystem concerns, while other studies focused on localized exposure and effects of oil.

Table 1: Historical and current overview of the status of injured resources and services during each reassessment year.

Resource	1996 Status	1999 Status	2002 Status	2006 Status	2010 Status
Archaeological Resources	Recovering	Recovering	Recovered	Recovered	Recovered
Bald Eagles	Recovered	Recovered	Recovered	Recovered	Recovered
Barrow's goldeneye	N/A	N/A	N/A	N/A	Recovering
Black Oystercatchers	Unknown	Recovering	Recovered	Recovering	Recovering
Clams	Unknown	Recovering	Recovering	Recovering	Recovering
Common Loons	Unknown	Not recovering	Not recovering	Recovered	Recovered
Common Murres	Recovering	Recovering	Recovered	Recovered	Recovered
Cormorants	Not recovering	Not recovering	Not recovering	Recovered	Recovered
Cutthroat Trout	Unknown	Unknown	Unknown	Unknown	~~Unknown~~Very likely recovered
Designated Wilderness	Unknown	Unknown	Recovering	Recovering	Recovering
Dolly Varden	Unknown	Unknown	Unknown	Recovered	Recovered
Harbor Seals	Not recovering	Not recovering	Not recovering	Recovered	Recovered
Harlequin Ducks	Not recovering	Not recovering	Not recovering	Recovering	Recovering
Intertidal Communities	Recovering	Recovering	Recovering	Recovering	Recovering
Killer Whales-AB	Not recovering	Not recovering	Recovering	Recovering	Recovering
Killer Whales-AT1	N/A	N/A	N/A	N/A	Not recovering
Kittlitz's Murrelets	Unknown	Unknown	Unknown	Unknown	Unknown
Marbled Murrelets	Not recovering	Recovering	Recovering	Unknown	Unknown
Mussels	Recovering	Recovering	Recovering	Recovering	Recovering
Pacific Herring	Not recovering	Recovering	Not recovering	Not recovering	Not recovering
Pigeon Guillemots	Not recovering	Not recovering	Not recovering	Not recovering	Not recovering
Pink Salmon	Recovering	Recovering	Recovered	Recovered	Recovered
River Otters	Unknown	Recovered	Recovered	Recovered	Recovered
Rockfish	Unknown	Unknown	Unknown	Unknown	~~Unknown~~Very likely recovered
Sea Otters	Not recovering	Recovering	Recovering	Recovering	Recovering
Sediments	Recovering	Recovering	Recovering	Recovering	Recovering
Sockeye Salmon	Recovering	Recovering	Recovered	Recovered	Recovered
Subtidal Communities	Recovering	Recovering	Unknown	Unknown	Very likely recovered~~Unknown~~

Human Service	1996 Status	1999 Status	2002 Status	2006 Status	2010 Status
Commercial Fishing	Recovering[a]	Recovering	Recovering	Recovering	Recovering
Passive Use	Recovering[a]	Recovering	Recovering	Recovering	Recovering
Recreation & Tourism	Recovering[a]	Recovering	Recovering	Recovering	Recovering
Subsistence	Recovering[a]	Recovering	Recovering	Recovering	Recovering

[a] *Classified as "Lost or Reduced Service" in 1996 Update, meaning that the service was negatively indirectly impacted by the spill due to its connection with impacted natural resources*

More Effective Use of Remaining Funds
For some species, no further actions have been taken with regard to future funding of studies to assess recovery. This may be based upon the factors discussed above and may also include a consideration of the following:

1. *Additional studies expensive.* More study, with sufficient effort and scope to achieve powerful tests of the impacts of lingering oil, would be relatively expensive.

2. *Unable to definitively demonstrate an effect.* Natural variability, confounding effects, and lack of tools to estimate important metrics make it unlikely that an effect could be detected with a high degree of confidence.

3. *Effects likely small.* Based on available data, mechanistic principles, and knowledge of past spill impacts on processes of recovery, the likely effects are deemed to be minimal.

4. *Effects unlikely to be of ecological importance.* Based on available data, understanding of ecological interactions, and the expected small size of lingering impacts, it is unlikely that the effect (if any) will impair function of the ecological system.

5. *No effective restoration options available.* Even if demonstrated, there are no reasonable options for restoration of the injured resource.

6. *More effective uses of funds.* Other projects provide promise of more definitive results, greater significance to the ecosystem, or more potential for restoration.

Ecosystem Perspective and Recovery
The List consists mainly of single species and resources, but it provides a basis for evaluating the recovery of the overall ecosystem; its functions and the services it provides to people. In fact, through the *Restoration Plan*, the Trustee Council adopted an ecological approach to restoration, and the studies and projects the Trustee Council sponsors have been ecologically-based.

The *Restoration Plan* defines ecosystem recovery as follows:

> *Full ecological recovery will have been achieved when the population of flora and fauna are again present at former or pre-spill abundances, healthy and productive, and there is a full complement of age classes at the level that would have been present had the spill not occurred. A recovered ecosystem provides the same functions and services as would have been provided had the spill not occurred.*

Although significant progress has been made using this definition of recovery, the coastal and marine ecosystems in the oil spill region have not fully recovered at this time from the effects of the oil spill. For example, harlequin ducks still show signs of oil exposure and may be negatively affected by such exposure. A number of other species and communities are showing signs of recovery, but are still not fully recovered from the effects of the oil spill. Although full

ecological recovery has not been achieved, the spill area ecosystem is making progress towards recovery 20 years after the *Exxon Valdez* oil spill.

INJURED RESOURCES

ARCHAEOLOGICAL RESOURCES

Injury
The oil spill area is believed to contain more than 3,000 sites of archaeological and historical significance. Twenty-four archaeological sites on public lands are known to have been adversely affected by clean-up activities or looting and vandalism linked to the oil spill. Additional sites on both public and private lands were probably injured, but damage assessment studies were limited to public land and not designed to identify all such sites.

Documented injuries included theft of surface artifacts, masking of subtle clues used to identify and classify sites, violation of ancient burial sites, and destruction of evidence in layered sediments. In addition, residual oil may have contaminated sites.

Recovery Objective
Archaeological resources are nonrenewable: they cannot recover in the same sense as biological resources. Archaeological resources will be considered to have recovered when spill-related injury ends, looting and vandalism are at or below pre-spill levels, and the artifacts and scientific data remaining in vandalized sites are preserved (e.g., through excavation, site stabilization, or other forms of documentation).

Recovery Status
Assessments of 14 sites in 1993 suggested that most of the archaeological vandalism that can be linked to the spill occurred early in 1989, before adequate constraints were put into place over the activities of oil spill clean-up personnel. Most vandalism took the form of "prospecting" for high yield sites. Once these problems were recognized, protective measures were implemented and successfully limited additional injury. Although some cases of vandalism were documented in the 1990s, there appears to be no spill-related vandalism at the present time.

From 1994–1997, two sites in Prince William Sound were partly documented, excavated, and stabilized by professional archaeologists because they had been so badly damaged by oiling and erosion. The presence of oil in sediment samples taken from four sites in 1995 did not appear to have been the result of re-oiling by *Exxon Valdez* oil. Residual oil does not appear to be contaminating any known archaeological sites.

In 1993, the Trustee Council provided part of the construction costs for the Alutiiq Archaeological Repository in Kodiak (www.alutiiqmuseum.com). This facility now houses Kodiak area artifacts that were collected during spill response. In 1999, the Trustee Council approved funding for an archaeological repository and local display facilities for artifacts from Prince William Sound and lower Cook Inlet. Local displays are open to the public in Port Graham, Cordova, Seward, Seldovia, and Tatitlek. The facility in Seward serves as the repository for the Chugach region.

Based on the apparent absence or extremely low rate of spill-related vandalism and the preservation of artifacts and scientific data on archeological sites, archaeological resources are considered to be recovered.

BALD EAGLES

Injury

The bald eagle is an abundant resident of marine and riverine shorelines throughout the oil spill area. Following the oil spill, a total of 151 eagle carcasses were recovered from the spill area. Prince William Sound provides year-round and seasonal habitat for about 6,000 bald eagles, and within the Sound it is estimated that about 250 bald eagles died as a result of the spill. There were no estimates of mortality outside the Sound, but there were deaths throughout the spill area. In addition to direct mortalities, productivity was reduced in oiled areas of Prince William Sound in 1989.

Recovery Objective

Bald eagles will have recovered when their population and productivity (reproductive success) have returned to pre-spill levels.

Recovery Status

Productivity (or reproductive success as measured by chicks per nest) was back to pre-spill levels in 1990 and 1991, and an aerial survey of adults in 1995 indicated that the population had returned to or exceeded its pre-spill level in the Sound.

In September 1996, the Trustee Council classified the bald eagle as recovered from the effects of the oil spill.

BARROW'S GOLDENEYES

Injury

Barrow's goldeneyes are sea ducks that winter in protected nearshore marine waters in Prince William Sound and feed in the intertidal zone, consuming primarily mussels~~, aquatic insects, fish and fish eggs~~.

Some acute mortality of Barrow's goldeneyes was observed in the weeks and months immediately following the *Exxon Valdez* oil spill in March 1989. Total acute mortality of Barrow's goldeneyes is difficult to determine, given uncertainty in carcass identification and recovery rates, but sea ducks, generally, were vulnerable to acute mortality and constituted approximately 25 percent of the carcasses recovered in Prince William Sound. Given the number of Barrow's goldeneyes present at the time of the spill, acute mortality was likely in the low thousands.

Of more concern are longer-term effects due to either chronic exposure to lingering oil or indirect effects of trophic web disruption. Because Barrow's goldeneyes occur exclusively in intertidal and shallow subtidal habitats, they are particularly vulnerable to lingering oil exposure and the potential for physiological effects. Similarly, reliance on intertidal invertebrate prey suggests that Barrow's goldeneyes are particularly vulnerable to disruptions of intertidal

communities. Barrow's goldeneyes ~~have~~ were ~~been~~ shown to have higher levels of induction of cytochrome P4501A (CYP1A) in oiled areas compared to unoiled areas_~~. Elevated CYP1A induction in Barrow's goldeneyes from oiled areas of Prince William Sound~~ of PWS in 1996, 1997 and 2005. However, in March 2009, average CYP1A was similar between areas, suggesting that exposure to residual oil had abated by that time.~~was documented in 1997 and 2005. While these do not necessarily demonstrate subsequent injury, the potential for individual or population level effects of exposure to residual oil is plausible.~~

Recovery Objective

Barrow's goldeneyes will have recovered when ~~breeding and nonbreeding season~~ demographics and biochemical indicators of hydrocarbon exposure in goldeneyes in oiled areas of Prince William Sound are similar to those of goldeneyes in unoiled areas.

Recovery Status

Within their wintering range, Prince William Sound is an important area, supporting between 20,000 and 50,000 wintering individuals. Survey data from the U.S. Fish and Wildlife Service indicated that winter numbers of goldeneyes on oiled areas were stable from 1990–1998, in contrast to significantly increasing numbers on unoiled areas during that same time period. That was interpreted as evidence of lack of recovery, as the prediction would be that lack of continued injury would result in parallel population trajectories and that recovery would be indicated by more positive trajectories on oiled areas. In the most recent published survey (through March 2005), slopes were parallel and stable over time, although this was due primarily to a decrease in goldeneye abundance on unoiled areas.

A study of Barrow's goldeneye habitat use in oiled and unoiled portions of Prince William Sound found that densities of birds in oiled areas were at expected levels, given the habitat, suggesting that food limitations in the intertidal were not restraining recovery. Lingering oil still remains in intertidal habitats used by Barrow's goldeneyes, maintaining the possibility of continued exposure and chronic effects.

Interpretation of surveys and habitat selection is constrained by lack of full understanding of Barrow's goldeneye demography, particularly rates of site fidelity and dispersal. These values have important implications for understanding the process of population recovery.

Lack of elevated CYP1A in oiled relative to unoiled areas suggests that exposure to lingering oil has ceased in the Barrow's goldeneyes, and thus, that at least part of the recovery objective has been met. Barrow's goldeneyes are considered to be recovering from the effects of the oil spill.

~~**The continued induction of CYP1A through March 2005 and only recent lack of difference between oiled and unoiled areas, suggest that the Barrow's goldeneyes have not yet recovered from the effects of the oil spill.**~~

BLACK OYSTERCATCHERS

Injury

Black oystercatchers spend their entire lives in or near intertidal habitats and are highly vulnerable to oil pollution. They are fully dependent on the nearshore environment and forage

exclusively on invertebrate species along shorelines. It is estimated that 1,500–2,000 oystercatchers breed in south-central Alaska. Only nine carcasses of adult oystercatchers were recovered following the spill, but the actual number of mortalities may have been several times higher.

In addition to direct mortalities, breeding activities were disrupted by the oil and clean-up activities. When comparing 1989 with 1991, significantly fewer pairs occupied and maintained nests on oiled Green Island, while during the same two years the number of pairs and nests remained similar on unoiled Montague Island. Nest success on Green Island was significantly lower in 1989 than in 1991, but Green Island nest success in 1989 was not lower than on Montague Island. In 1989, chicks disappeared from nests at a significantly greater rate on Green Island than from nests on Montague Island. Disturbance associated with clean-up operations also reduced productivity on Green Island in 1990. In general, the overt effects of the spill and clean-up had dissipated by 1991, and in that year productivity on Green Island exceeded that on Montague Island.

Recovery Objective

Black oystercatchers will have recovered when the population ~~returns to pre-spill levels~~, reproduction and productivity ~~within normal bounds~~ have reached levels that would have existed without the spill. An increasing population trend and comparable hatching success and growth rates of chicks in oiled and unoiled areas, after taking into account geographic differences, will indicate that recovery is underway.

Recovery Status

Black oystercatchers are long-lived (15+ years) and territorial, occupying nests in rocky areas close to the intertidal zone and returning in successive years to nest again in the same vicinity. In the early 1990s, elevated hydrocarbons in feces were measured in chicks living on oiled shorelines. Deleterious behavioral and physiological changes including lower body weights of females and chicks were also recorded. Because foraging areas are limited to a few kilometers around a nest, contaminations of mussel beds in the local vicinity was thought to provide a source of exposure. In 1998 the Trustee Council sponsored a study to reassess the status of this species in Prince William Sound. The data indicated that oystercatchers had fully reoccupied and were nesting at oiled sites in the Sound. The breeding phenology of nesting birds was relatively synchronous in oiled and unoiled areas, and no oil-related differences in clutch size, egg volume, or chick growth rates were detected. However, a higher rate of nest failure occurred on oiled Green Island: at the time this was thought to be the result of predation, not lingering effects of oil. Because the extent of shoreline with persistent contamination was limited and lingering oil was patchy, it was concluded that the overall effects of oil on oystercatchers in the Sound had been minimal. However, the reasons that predation was higher at oiled Green Island than at Montague were not investigated. It is not clear whether predation was higher because there were higher numbers of predators, lower number of nests initiated or a behavioral change in the parents that would have led to lower nest protection.

Based on this study and one year of boat-based surveys (2000) of marine birds in Prince William Sound indicating that there were increases in numbers of oystercatchers in both the oiled and unoiled areas for that year, the black oystercatcher was identified as recovered. Since 2002, however, additional information has come to light indicating that designation may have been premature. A long-term (1989– 2007~~5~~) evaluation of marine bird population trends suggest that

populations of black oystercatchers in the Sound have likely not recovered to conditions had the spill not occurred.

Further, ongoing oil exposure to oystercatchers was documented in 2004 using a biochemical marker of exposure, cytochrome P450IA. Given our more recent understanding of the persistence of oil in sediments along shorelines that initially received heavy or moderate oiling, it is likely that black oystercatchers in oiled areas have suffered chronic exposure as has been shown for sea otters and harlequin ducks. Hydrocarbon exposure in 2004 is likely considerably less than in the early 1990's, but at this time, we do not know if there are any significant physiological or population level consequences from chronic exposure.

Black oystercatchers will have recovered when population levels, reproduction rates, productivity and oil exposure biomarkers have reached levels that would have existed without the spill. Evidence, however, still shows a high rate of nest failure and the continued exposure to oil. Population trends indicate a continued status of "recovering."
~~**Therefore, because population trends do not indicate recovery over 18 years of surveys, because a high rate of nest failure occurred in the oiled study area in the late 1990s, and because in 2004, continuing exposure of black oystercatchers to oil was reported, this species is listed as recovering.**~~

CLAMS

Injury

Clams are widely distributed throughout the oil spill area. They can be found in a variety of substrates and are most abundant in the lower intertidal and subtidal zones. Clams are important prey for various fish and wildlife resources including sea otters, some sea birds, sea ducks and others.

The magnitude of the immediate impacts of oil on clam populations varied depending on species of clam, degree of oiling and location. Although direct mortality of some clam species like littlenecks and butter clams were assessed for several years after the spill, other more sensitive species, (e.g., *Macoma* and *Mya* spp) were not the focus of much study, and the immediate impact of the oil to these species remains unknown. In 1990 and 1991, growth of littleneck clams at oiled sites was less than at reference sites, and growth rate was directly proportional to hydrocarbon concentrations. Additionally, mortality was higher and growth rates lower in clams transplanted from oiled areas to clean areas, five to seven years after the spill.

Clean-up technologies, including hot water, high pressure washing, manual and mechanical scrubbing and physical removal of oiled sediments, were detrimental to clam populations. Hot water washing caused thermal stress, oil dispersal into the water column, animal displacement and burial, and the transportation of fine grain sediment from the upper intertidal into the lower intertidal zone. Early assessments reported that clean-up activities resulted in reductions in clam abundance and distribution on treated (oiled-but-treated) beaches up to three years after the spill.

Recovery Objective

Clams will have recovered when population and productivity measures at oiled and washed sites are comparable to populations and productivity measures at unwashed sites, when there is no oil exposure, and when abundances of large clams can provide adequate, uncontaminated food

supplies for predators and subsistence users. ~~Clams will have recovered when population and productivity measures (such as size and distribution) at oiled sites are comparable to populations and productivity measures at unoiled sites, taking into account geographic differences.~~

Recovery Status

Studies have indicated that abundances of some species of clams were lower on treated beaches through 1996. Densities of littleneck and butter clams were depressed through 1997 on cleaned mixed-sedimentary shores where fine sediments had been washed down the beach during pressured water treatments.

As part of an investigation of sea otter populations conducted from 1996-1998, researchers compared clam densities between oiled sites on Knight Island and unoiled sites on Montague Island. They reported an increase in mean size of littlenecks and butter clams at Knight Island, where numbers of sea otters, a major predator of clams were significantly reduced. Absolute densities of littlenecks and butter clams were not different between oiled and unoiled sites; however, oiled sites had fewer juvenile clams and lower numbers of other clam species. In 2002, differences in species richness, diversity and abundance of several species were still measurable between cleaned (oiled and treated) and untreated (oiled but untreated) beaches. Moreover, as of 2005, several wildlife species that use the intertidal zone and feed on clams (e.g., harlequin ducks and black oystercatchers) are still being exposed to oil. These resources are included on the injured resources list and although the exact route of oil contamination has not been established for these birds, it is likely they are ingesting oil with their prey.

Some overlap occurs between areas where lingering oil and populations of littleneck and butter clams co-exist. Given the burrowing behavior of these animals, it is likely they would be exposed to oil as they dig into the subsurface sediments known to contain oil. In fact, it has been demonstrated that littleneck clams exposed for a year to the surface layer of contaminated sediments did not accumulate oil, but if the clams were buried in sediments mixed with oil, accumulation did occur.

Clam populations found on oiled but untreated beaches have likely recovered from the effects of the spill. However, several factors continue to impact clam populations on oiled and treated beaches: Abundances and distribution differences are still measurable between cleaned and untreated sites; Lingering oil occurs in habitats with clams, and exposure of clams to oil could result in upper trophic level predators eating contaminated prey and other species on the injured resources list are still being exposed to oil and are known to forage on clams.

Clams are continuing to recover in the Sound, but there still exists a difference in abundance between oiled and washed, oiled and unwashed, and unoiled sites. Data have suggested that disturbance of the rock armor of beaches continues to impede recovery. If this is true, then recovery may require geological re-armoring processes that operate on decadal scales.

Current population trends indicate a status of recovering. ~~**Based on all of the evidence summarized above, clams continue to recover, but are not yet fully recovered from the effects of the oil spill.**~~

Injury
Carcasses of 395 loons of four species were collected following the spill, including 216 common loons. Current population sizes in the spill area are not known for any of these species, but it is estimated that the 216 collected common loons represented between 720–2,160 total individuals that died as a result of the initial oiling event. Common loons in the spill area may number only a few thousand, including only hundreds in Prince William Sound. Common loons injured by the spill probably included a mixture of wintering and migrating birds. The specific breeding areas used by the loons affected by the spill are not known.

Recovery Objective
Common loons will have recovered when their population returns to pre-spill levels in the oil spill area. An increasing population trend in Prince William Sound will indicate that recovery is underway.

Recovery Status
Boat-based surveys of marine birds in Prince William Sound give some insight into the recovery status of the loons affected by the oil spill. Pre-spill counts of loons exist only for 1972-1973 and 1984-1985. After the spill, contrasts between oiled and unoiled areas of the Sound indicated that loons as a group were generally doing better in unoiled areas than in oiled areas. Thus, the survey data suggested that the oil spill had a negative effect on numbers of loons (all species combined) in the oiled parts of the Sound.

Common loons exhibited declines in population numbers and habitat usage in oiled areas in 1989 but not in 1990. There was a weak negative effect of oiling on population numbers again in 1993, but not in 1996 or 1998. Based on the boat surveys carried out through 2000, there were indications of recovery, because in that year the highest counts ever recorded for common loons in PWS. In addition, July 2000 counts were the third highest of the 11 years since 1972, although these increases were limited to the unoiled portion of the Sound. Loons are a highly mobile species with widely variable population numbers and the pre-spill data were limited, thus, this one year of high counts in the unoiled areas was insufficient to indicate that recovery had started.

Population surveys conducted from 1989–2007~~5~~ found increasing winter population trends in common loon densities in oiled areas. The summer counts do not show a consistent positive relationship, however the summer counts of loons are usually low and variable because they are predominately found on their breeding grounds in other areas during the summer. Common loons have an intrinsically low population growth rate and relatively large numbers of carcasses were recovered after the spill, yet post spill winter population counts of common loons have met or exceeded available pre-spill counts for all years measured since the spill, except 1993.

Given the long-term positive changes in winter population information, common loons are considered recovered from effects of the oil spill.

COMMON MURRES

Injury
About 30,000 carcasses of oiled birds were picked up in the first four months following the oil spill, and 74 percent of them were common and thick-billed murres (mostly common murres).

Many more murres probably died than actually were recovered. Based on surveys of index breeding colonies at such locations as the Barren Islands, Chiswell Islands, Triplet Islands, Puale Bay, and Ugiaushak Island, the spill area populations may have declined by about 40 percent following the spill. In addition to direct losses of murres, there is evidence that the timing of reproduction was disrupted and productivity decreased. Interpretation of the effects of the spill, however, is complicated by incomplete pre-spill data and by indications that populations at some colonies were in decline before the oil spill.

Recovery Objective

Common murres will have recovered when populations at index colonies have returned to pre-spill levels and when reproductive success (productivity) is sustained within normal bounds. Increasing population trends at index colonies will be an indication that recovery is underway.

Recovery Status

Post-spill monitoring at the breeding colonies in the Barren Islands indicated that productive success was within normal bounds by 1993, and it has stayed within these bounds each breeding season since then. During the period 1993–1997, the murres nested progressively earlier by two to five days each year, suggesting that the age and experience of nesting birds were increasing, as might be expected after a mass mortality event. By 1997, the numbers of murres at the Barren Island had increased, probably because three- and four-year old non-breeding sub-adult birds that were hatched there in 1993 and 1994 were returning to their natural nesting colony. Although counts were low in 1996, the counts in 1997 at this index site brought the colony size to pre-spill levels.

The population size coupled with normal reproductive success (productivity), indicate that recovery has been achieved for common murres.

CORMORANTS

Injury

Cormorants are large fish-eating birds that spend much of their time on the water or perched on rocks near the water. Three species of cormorants are typically are found within the oil spill area. Carcasses of 838 cormorants were recovered following the oil spill, including 418 pelagic, 161 red-faced, 38 double-crested, and 221 unidentified cormorants. From this sample, direct oil spill related mortality was estimated at between 2,900 and 8,800 deaths. In 1996, the U.S. Fish and Wildlife Service Alaska Seabird Colony Catalog, however, listed counts of 7,161 pelagic cormorants, 8,967 red-faced cormorants, and 1,558 double-crested cormorants in the oil spill area. These are direct counts at colonies, not overall population estimates, but they suggest that population sizes are small. In this context, it appears that injury to all three cormorant species was significant.

Counts on the outer Kenai Peninsula coast suggested that the direct mortality of cormorants due to oil resulted in fewer birds in this area in 1989 compared to 1986. In addition, there were statistically significant declines in the estimated numbers of cormorants (all three species combined) in the oiled portion of Prince William Sound based on pre and post-spill boat surveys in July 1984-85 compared to 1989-91. It is not known what the counts and trends of cormorants would have been in the absence of the oil spill.

DRAFT

Recovery Objective

Pelagic, red-faced, and double-crested cormorants will have recovered when their populations return to pre-spill levels in oiled areas. An increasing population trend in Prince William Sound will indicate that recovery is underway.

Recovery Status

Marine bird surveys were conducted during ten of the 16 years during1989-2005. For cormorants, trends for both summer and winter populations were increasing in the oiled area of Prince William Sound. Moreover, population estimates for cormorants in summer 2004 ranged from 9,000– – 11,000 birds, which falls within the range of 10,000–30,000 estimated in 1972.

Therefore, although population estimates of cormorants are highly variable throughout their range, the recovery objectives have been met and cormorants are considered to be recovered.

CUTTHROAT TROUT

Injury

Anadromous streams throughout the spill zone were oiled following the spill in 1989, and oil was sequestered in the intertidal sediments at stream mouths and along shorelines. Subsequently, it was documented that cutthroat trout emigrating within the oiled areas in 1989–1990 grew more slowly than those in the unoiled areas. When trout leave their freshwater spawning areas they feed primarily in the nearshore environment, thus it is likely cutthroats were exposed to oil in this environment. The difference in growth rates between trout in oiled versus unoiled streams persisted through 1991. It was hypothesized that the slower rate of growth in oiled streams was the result of reduced food supplies or direct exposure to oil, and there was concern that reduced growth rates resulted in reduced survival.

Recovery Objective

Cutthroat trout will have recovered when growth rates within oiled areas are similar to those for unoiled areas, after taking into account geographic differences.

Recovery Status

Limited information exists regarding the current status of cutthroat trout. Recent exposure to lingering oil is unlikely, because most of the bioavailable oil appears to be confined to subsurface intertidal areas, and not dissolved in the water column. Moreover, distribution of cutthroat trout is patchy throughout the Sound, thus access to oil is restricted. However, the Sound is the northern edge of cutthroat trout range and dispersal during marine migration is restricted, thereby increasing their susceptibility to habitat alteration and pollution. Cutthroat trout populations in the Sound are small and geographically isolated from each other: These characteristics suggest that recovery of a population would depend less on mixing with nearby aggregates than on the productivity of the endemic population and the extent to which it was injured by the spill. Confounding factors such as sport fishing and habitat alteration of spawning streams (e.g., through logging) may also inhibit successful recruitment of young into a population and subsequent increase in numbers.

Given the ecological similarities in summer diet and foraging ecology along shorelines between cutthroat trout, pink salmon and Dolly Varden, and the absence of ongoing injury to those other

two species, further research would be very unlikely to demonstrate any evidence of continuing differences between oiled and unoiled areas due to the spill. ~~between oiled and unoiled areas.~~ Thus, funding the additional research necessary to provide current growth rate and abundance data for this species is not a cost-effective scientific priority.

Cutthroat trout ~~recovery status is~~ are very likely recovered. Additional study, with sufficient effort and scope to achieve powerful tests of the impacts of lingering oil, would be relatively expensive, would likely be unable to definitively demonstrate an effect, and any effects would likely be minimal. For these reasons, it is unlikely that additional research will clarify this species' injury status

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DESIGNATED WILDERNESS AREAS

Injury

The spill deposited oil into the waters and tidelands adjoining areas designated as Wilderness or Wilderness Study Areas by Congress or the Alaska State Legislature. During the intense clean-up seasons of 1989 and 1990, thousands of workers and hundreds of pieces of equipment were at work in the spill zone. This activity was an unprecedented imposition of people, noise, and activity on the area's undeveloped and normally sparsely occupied landscape. Although human activity levels on these wilderness shores have returned to normal, lingering oil still occurs at some locations. The spill-affected areas were: designated wilderness in the Katmai National Park, wilderness study areas in the Chugach National Forest and Kenai Fjords National Park, and Kachemak Bay Wilderness State Park.

Recovery Objective

Designated wilderness areas will have recovered when oil is no longer encountered in them and the public perceives that they are recovered from the spill.

Recovery Status

Six moderately to heavily oiled sites on the Kenai and Katmai coasts were surveyed in 1994, at which time some oil mousse persisted in a remarkably unweathered state on boulder-armored beaches at five sites. These sites were visited again in 1999, and oil was found along park shorelines of the Katmai coast. Surveys carried out in 2001 and 2003 to determine the surface and subsurface distribution of oil in Prince William Sound found lingering oil on shorelines within designated wilderness study areas. Finally, in 2005 the sites surveyed in 1999 were again sampled. Although surface cover of oil had declined, the subsurface oil persisted in amounts similar to those found in 1999. Moreover, the oil at those sites was compositionally similar to samples collected 11 days after the spill.

Lingering oil persists in designated wilderness areas, and quantitative studies of lingering oil outside of Prince William Sound are lacking. However, in many areas, the amount of oil has diminished since 1990. ~~However, in many areas absolute amounts of oil are diminishing.~~ Therefore, designated wilderness areas are considered to be recovering.

DOLLY VARDEN

Injury

Dolly Varden are widely distributed in the spill area. Adults spawn in natal streams and most overwinter in contiguous freshwater lakes. Migration into the marine environment occurs in the summer where the fish spend time feeding in nearshore waters. Many fish were in freshwater when the oil spill occurred but emigrated in and out of the spill area later in the season. Concentrations of hydrocarbons in the bile of Dolly Varden were some of the highest of any fish sampled in 1989. Like the cutthroat trout, there is evidence from 1989–90 that Dolly Varden, in a small number of oiled index streams in Prince William Sound, grew more slowly than in unoiled streams. It was hypothesized that the slower rate of growth in oiled streams was the result of reduced food supplies or exposure to oil, and there was concern that reduced growth rates would result in reduced survival.

Recovery Objective

Dolly Varden will have recovered when growth rates within oiled streams are comparable to those in unoiled streams, after taking into account geographic differences.

Recovery Status

The growth differences between Dolly Varden in oiled and unoiled streams did not persist into the 1990–91 winter, but no growth data have been gathered since 1991. In addition, by 1990 the concentrations of hydrocarbons in bile had dropped substantially and a biochemical marker of oil exposure had a diminished.

In a 1991 restoration study sponsored by the Trustee Council, some tagged Dolly Varden moved considerable distances among streams within Prince William Sound, suggesting that mixing of overwintering stocks takes place during the summer in saltwater. Follow up studies indicate that Dolly Varden are abundant throughout the Sound, and genetically similar among geographically different aggregates. Frequent genetic exchange among groups of fish implies that mixing occurs, and outside populations are available to enhance depleted stocks. Moreover, fishing pressure on Dolly Varden is likely not as intense as that on coastal cutthroat trout. Populations are larger, the fish are more widely spread throughout the Sound and larger numbers can better tolerate harvest. Finally, current exposure to lingering oil is unlikely because most of the bioavailable oil is confined to subsurface intertidal areas and not dissolved in the water column.

Given the available evidence, Dolly Varden are considered to be recovered from effects of the oil spill.

HARBOR SEALS

Injury

Harbor seal numbers were declining in the Gulf of Alaska, including in Prince William Sound, before the oil spill. *Exxon Valdez* oil affected harbor seal habitat, including key haul-out areas and adjacent waters, in Prince William Sound and as far away as Tugidak Island, near Kodiak. Estimated mortality as a direct result of the oil spill was about 300 seals in oiled parts of Prince William Sound. In some parts of the Sound, 80 percent of the seals had oil on them in May 1989 and remained oiled until their molt in August. Some of the haul-out sites were oiled through the pupping season, and many pups became oiled shortly after birth. Based on aerial surveys conducted at trend-count haulout sites in central Prince William Sound before (1988) and after (1989) the oil spill, seals in oiled areas declined by 43 percent, compared to 11 percent in unoiled areas.

Recovery Objective
Harbor seals will have recovered from the effects of the oil spill when their population is stable or increasing.

Recovery Status
Harbor seal populations in the Sound were declining before the oil spill and the decline continued after the spill occurred. Factors contributing to this decline may involve environmental changes that occurred in the 1970's in which the amount and quality of prey resources were diminished. It is possible that the changes in the availability of high quality forage fish such as Pacific herring and capelin altered the ecosystem such that it may now support fewer seals than it did prior to the late 1970's. Other sources of mortality that may be contributing to lower seal numbers could include predation, subsistence hunting, and commercial fishery interactions (e.g., entanglement and drowning in nets).

Satellite tagging studies sponsored by the Trustee Council and genetic studies carried out by the National Marine Fisheries Service indicate that harbor seals in the Sound are largely resident throughout the year and have limited movement and interbreeding with other subpopulations in the northern Gulf of Alaska. This suggests that recovery must come largely through recruitment and survival within resident populations.

Based on annual counts from haulouts concentrated in the south-central region of the Sound, seal numbers stabilized from 1996–2005 and likely increased between 2001–2005. From 1990–2005, seal numbers at sites that were not oiled decreased at a greater rate than oiled sites, indicating no localized effects of the spill. However, the entire spill zone was not surveyed, and trends may have been influenced by movements of seals from oiled to unoiled sites after the spill and a return to more oiled sites in recent years. This hypothesis has not been studied directly.

Harbor seals are considered recovered due to collective evidence from the last ten years indicating that harbor seal population numbers are stabilizing or increasing.

HARLEQUIN DUCKS

Injury
Harlequin ducks spend most of their time in intertidal and shallow subtidal habitats where much of the oil was initially stranded. In Prince William Sound, about 150 harlequin duck carcasses were collected immediately after the spill in 1989. From these recovered birds, it was estimated that 1,000 harlequins were killed by the initial oiling event, which represented about 7 percent of the wintering population. In addition to acute effects, harlequin ducks were one of the few species for which chronic injury related to long-term exposure to lingering oil was documented.

Recovery Objective
Harlequin ducks will have recovered when breeding- and ~~nonbreeding~~non-breeding-season demographics and biochemical indicators of hydrocarbon exposure in harlequins in oiled areas of Prince William Sound are similar to those in harlequins in unoiled areas.

DRAFT

Recovery Status

Winter populations of harlequin ducks in Prince William Sound have ranged from a high of 19,000 ducks in 1994 to a low of around 11,000 ducks in March of 1990, one year after the spill. The 2000 estimate of wintering harlequin ducks in the Sound was approximately 15,000.

Several post-spill studies were designed to measure the extent and severity of injuries to the Prince William Sound harlequin duck population from the oil spill and assess recovery. Through 1998, oil spill effects were still evident although the extent and magnitude of the injury remained unclear. Supporting studies provided evidence of continuing injury to harlequins through the following mechanisms: 1) invertebrate recovery in upper intertidal and subtidal areas remained incomplete for some species, thereby impacting potential prey base for harlequins; 2) oil persisted in intertidal areas of Prince William Sound where it was identified as a source of contamination of benthic invertebrates; 3) the possibility of external oiling of feathers remained due to lingering surface oil; 4) a biochemical marker of oil exposure (cytochrome P450) was greater in tissues of harlequin ducks captured in oiled areas than in reference areas and 5) overwinter female survival was lower in oiled than reference areas.

More recent studies indicate improving conditions. From 1997–2007, age composition and population trends were compared in harlequin ducks between oiled and unoiled areas of the Sound. No difference in population trends was observed between areas. Although populations in the oiled area were no longer declining as they were in the mid 1990s, a positive trend was not observed. Overall, more males than females occurred Sound-wide which is consistent with other Pacific populations of harlequin ducks. The ratio of immature to adult males was similar between areas, thus indicating similar recruitment into both populations. However, there remains a disproportionately lower number of female ducks in the oiled areas. From 2000–2002, ~~measurements of cytochrome P450 activity and~~ female survival rates were converging between oiled and unoiled areas. However, in 2005 ~~and 2008 the~~through 2009 P450 biomarker was elevated in ducks from the oiled areas. Finally, lingering oil still remains in habitats used by harlequins, thereby maintaining the possibility of chronic effects related to continued exposure.

Recent analyses still show a pattern of higher cytochrome P450 induction in oiled than unoiled areas. ~~A temporal trend towards c~~Convergence between oiled and unoiled populations in over-wintering survivorship ~~chemical biomarkers and over-winter survivorship~~ indicates that harlequin ducks are in the process of recovering. Survey data does not provide evidence that oiled populations have increased sufficiently to account for losses from initial and chronic spill mortality and a sustained increase in abundance numbers is needed in oiled areas for full recovery. The rate of population change may be controlled by intrinsic demographic properties of the species and once oil spill effects have abated full recovery may still take many years. ~~However, survey data does not provide evidence that oiled populations have increased sufficiently to account for losses from initial and chronic spill mortality and a sustained increase in abundance is needed in oiled areas for full recovery. The rate of population change may be controlled by intrinsic demographic properties of the species and once oil spill effects have abated full recovery may still take many years.~~

~~**Harlequin ducks are considered to be recovering as populations in the oiled area are stable or slightly increasing, age ratios are similar between oiled and unoiled treatments, oil exposure rates have declined, and female survival has improved in oiled areas.Evaluation of population trends, survival measures, and indicators of exposure through 2008 indicates a positive relationship among these parameters within harlequin duck populations in the**~~

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~~Sound. The evidence suggests that harlequin ducks are recovering, but have not fully recovered from the effects of the oil spill.~~

Harlequin ducks are considered to be recovering, as indications of negative effects (reduced survival and declining numbers) in oiled areas have abated, although the recovery objective has not been fully realized..

INTERTIDAL COMMUNITIES

Injury

Over 1,400 miles of coastline were oiled by the spill in Prince William Sound, on the Kenai and Alaska peninsulas, and in the Kodiak Archipelago. Heavy oiling affected approximately 220 miles of this shoreline. It is estimated that 40–45 percent of the 11 million gallons of crude oil spill by the *Exxon Valdez* washed ashore in the intertidal zone. For months after the spill in 1989, and again in 1990 and 1991, both oil and intensive clean-up activities had significant impacts on the flora and fauna of this environment.

Initial impacts to the intertidal zone occurred at all tidal levels and in all types of habitats throughout the oil spill area. Direct assessment of the spill effects included sediment toxicity testing, documenting abundance and distribution of intertidal organisms and sampling ecological parameters of community structure. Dominant species of algae and invertebrates directly affected by the spill included common rockweed, speckled limpet, several barnacle species, blue mussels, periwinkles, and oligochaete worms. At lower elevations on gravel and mixed sand/gravel beaches, the abundance of sediment organisms and densities of clams declined. Large numbers of dead and moribund clams were documented on treated beaches, but these effects were likely due to a combination of oil toxicity and hot water washing. Intertidal fish were also affected. In a study conducted in different habitats, density and biomass of fish at oiled sites showed declines relative to reference sites in 1990.

Recovery Objective

Intertidal communities will have recovered when such important species as *Fucus* (marine algae/seaweed) have been reestablished at sheltered rocky sites, clams and mussels at soft or mixed sediment beaches are not contaminated by residual oil, the differences in community composition and organism abundance on oiled and unoiled shorelines are no longer apparent after taking into account geographic differences, and the intertidal and nearshore habitats provide adequate, uncontaminated food supplies for predators and subsistence users.

Recovery Status

By 1991, in the lower and middle intertidal zones, algal coverage and invertebrate abundances on oiled rocky shores had returned to conditions similar to those observed in unoiled areas. However, large fluctuations in the algal coverage in the oiled areas caused a subsequent alteration in community structure. The *Fucus* canopy was initially eliminated in most of the areas that underwent extensive cleaning, thereby removing the protection provided by this alga to intertidal organisms from predation, desiccation and abrasion. This early eradication of *Fucus* led to instability of this alga's subsequent populations because the single-aged stands present after recolonization of the habitat were susceptible to large synchronous die-offs. Until a broader distribution of mixed-aged stands is established, this cycle may continue for many generations. Meanwhile, full recovery of *Fucus* is crucial for the recovery of intertidal communities at oiled sites, because many intertidal organisms depend on the shelter this seaweed provides.

As of 1997, *Fucus* had not yet fully recovered in the upper intertidal zone on shores oriented towards direct sunlight, but in many locations, recovery of intertidal communities had been substantial. In other habitat types, such as estuaries and cobble beaches, many species did not show signs of recovery when they were last surveyed in 1991. Studies on the effects of clean-up activities on oiled and washed beaches showed some invertebrates, like molluscs and annelid worms were still much less abundant than on comparable unoiled beaches through 1997. It is undetermined how much recovery has occurred in these locations since 1997, because further work has not been conducted.

Lingering oil is still present in some intertidal areas within the spill zone. Recent studies indicate that at beaches with pockets of buried lingering oil, high amphipod mortality is associated with elevated hydrocarbon concentrations. Moreover, the recovery objective states that the intertidal zone must provide uncontaminated food to top predators, including human subsistence users. As recently as 2009~~5~~, some bird species which rely exclusively on the intertidal zone (harlequin ducks~~, Barrow's goldeneye and black oystercatchers~~) were still being exposed to hydrocarbons. Although the route of oil exposure has not been established, it is possible they are consuming contaminated prey during feeding. In addition, the slow recovery of some soft-sediment intertidal invertebrates, the presence of lingering, bioavailable oil, the continuing oil exposure of obligate intertidal foragers that are known to eat bivalves, and the lack of recent data characterizing the intertidal community indicate that this resource has not fully recovered from the effects of the oil spill.

~~Reestablishment of functioning intertidal communities, is progressing, and they are classified as recovering. However, the slow recovery of some soft-sediment intertidal invertebrates, the presence of lingering, bioavailable oil, the continuing oil exposure of obligate intertidal foragers that are known to eat clams, and the lack of recent data characterizing the intertidal community indicate that this resource has not fully recovered from the effects of the oil spill.~~

Intertidal communities are considered to be recovering, due to the progress in the reestablishment of functioning intertidal communities.

KILLER WHALES

Injury

More than 160 killer whales in eight resident (fish eating) pods regularly use Prince William Sound/Kenai Fjords as part of their ranges. Transient (marine mammal eating) groups are observed in the Sound less frequently, but some (the AT1 population) use the Sound year-round. After the spill, the loss of individual whales from the resident AB pod was of particular concern. At the time of the spill, this group numbered 36 animals, and from 1989–1990, fourteen whales disappeared. During that time no young were recruited into the population. Members of the transient AT1 population were also observed in the area of the spill and adjacent to the tanker as it was leaking oil. Two stranded whales were found in 1990, but their cause of death was not determined.

The original link between the AB pod losses and the oil spill was largely circumstantial. No carcasses of any resident whales were discovered. However, whales were observed surfacing in

Exxon Valdez oil slicks following the spill in 1989 and nearly all of the deaths occurred at the time of the spill or the following winter. It is likely that petroleum or petroleum vapors were inhaled by whales, and it is also possible that they ate contaminated fish. The mortality rate for the AB pod was 19 percent in 1989 and 21 percent in 1990, compared to an expected natural mortality rate of 2.2 percent or less.

The AT1 population appears to range only through Prince William Sound and the Kenai Fjords region. From 1984–1989, their numbers were stable at 22 regularly observed individuals, but in a retrospective analysis it was determined that nine whales disappeared shortly after the spill. Because transients may occasionally leave their groups and swim with other transient whales, it could not be immediately determined if these whales were dead. However, in the subsequent 2015 years these individuals were not seen by researchers with any other transient groups and they had not reappeared with their original group. Thus, they were considered deceased. It was hypothesized that these whales died from inhaling toxic oil vapors or as a result of eating oiled harbor seals. The timing and magnitude of missing individuals directly following the spill and the fact that the ATI pod is a year-round resident of the Sound suggest that oil may have caused a decline immediately after the spill.

Since 1989, a total of 154 of 22 whales have gone missing from the AT1 group and are now presumed dead (five of the carcasses were found on beaches). During that same period there has been no recruitment of calves into this genetically unique group of transients. The AT1 transients are a distinct population segment and considered depleted under the Marine Mammal Protection Act.

Recovery Objective

The recovery objective for killer whales is a return to a pre-spill number of 36 for the AB pod and a stable population trend in the AT1 population.

Recovery Status

From 1990–1995 seven calves were born within the AB pod: however, additional mortalities occurred and by 2005, the number of whales was only 287. AB pod continues a slow recovery and in 1990 numbered 30 individuals, although the pod has now split and travels as two distinct units. Killer whales are long-lived and slow to reproduce. Female killer whales give birth about every five years, and are likely to produce only four to six calves throughout their life. Moreover, a disproportionate number of females were lost at the time of the spill, and population modeling has demonstrated that the spill impacted the AB pod primarily through the loss of young and reproductive females. Unexpected mortalities in the years since the spill have also impacted this group. These factors indicate that the recovery rate of this population will continue to be slow.

Transient killer whales, such as the AT1 population, largely prey on marine mammals, especially harbor seals. From data collected at haul-outs in the south-central region of the Sound, it appears that harbor seals numbers may have increased over the past five years. It is unclear how the population dynamics of harbor seal influence transient whale populations, but changes in the availability of such an important prey species could impact survival of individuals and reproductive success within groups. Research sponsored by the Trustee Council on contaminants in killer whales in the Sound indicates that individuals of the AT1 population are carrying elevated levels of PCBs, DDT, and DDT metabolites in their blubber. Although the presence of these contaminants is not related to the oil spill, the high concentrations found in these transients are comparable to levels that cause reproductive problems in other marine mammals.

Accordingly, it is likely that the population dynamics of this population are being influenced by factors other than residual oil which may further hinder their ability to rebound from the initial injury from the spill.

Since 1990, the AB Pod females that survived EVOS have produced nearly as many calves as would be expected based on the number of females and their ages. The lack of recovery of AB Pod, thus, can be largely attributed to the loss of young adult females, which reduced the number of reproductive females by half, and by the loss of juveniles, such that fewer animals matured to replace the reproductive females that died. As a result, the annual birth rate in AB Pod since the EVOS has been about 70 percent the birth rate observed in other resident pods, which was significantly lower than expected. This pod is considered recovering. Full recovery can be expected over decades if recruitment rates remain positive and unexpected mortalities do not occur. The AT1 transient population of killer whales, however, continues to decline, and therefore, is considered not recovering. Progress toward recovery appears unlikely as key breeding females have been lost and no new recruitment observed.

The AB killer whale pod is considered to be recovering due to the low but stabilized reproduction rate of the pod. The recovery status of the AT1 killer whale population is considered to be not recovering due to the population's continuing decline.

KITTLITZ'S MURRELETS

Injury

The Kittlitz's murrelet is found only in Alaska and portions of the Russian Far East. A large percentage of the world population, which may number only a few tens of thousands, breed in Prince William Sound. The Kenai Peninsula coast and Kachemak Bay are also important concentration areas for this species.

Seventy-two Kittlitz's murrelets were positively identified among the bird carcasses recovered after the oil spill. Nearly 450 more Brachyramphus murrelets were not identified to the species level, and it is reasonable to assume that some of these were Kittlitz's. In addition, many more murrelets probably were killed by the oil than were actually recovered. Estimates of the total number of Kittlitz's murrelets that died as a result of the spill vary from 255–2,000; it has been suggested that this represents 5–10 percent of the world's population.

Recovery Objective

Kittlitz's Murrelets will have recovered when their population has recovered to a level had the spill not occurred. Stable or increasing productivity within normal bounds will be an indication that recovery is underway.

~~No recovery objective can be identified for Kittlitz's murrelet at this time.~~

Recovery Status

Few studies have been conducted on Kittlitz's murrelets, however they are known to nest in areas of glacial outcroppings, and they are thought to reside within the Sound from May until September/October. Kittlitz's murrelets have an intrinsically low population growth rate, thus recovery from an acute loss is likely to be slow.

The Kittlitz's murrelet is a candidate species for listing as threatened or endangered under the federal Endangered Species Act. They declined 99 percent from 1972 to 2004 and 88 percent

from 1989–2004. While this decline likely started prior to the spill, the rate of decline was 18 percent per year from 1972, but beginning in 1989 that rate increased to 31 percent.

Natural recovery has not restored this resource to pre-spill levels or levels that would have existed had the spill not occurred. What little evidence is available reveals possible predator limitation, within their feeding areas, and impacts due to a shifting climate. While it is likely that basic biological studies would be useful to understand what may be limiting recovery, it is unlikely, due to these confounding effects that further study will clarify whether there are still residual effects of the spill. In addition, the rarity of this species makes it difficult and expensive to study.

~~The recovery status of Kittlitz's is complicated because confounding factors influence their current population growth. The decline may be attributable in part to a decline in a primary food source; high-lipid forage fish, like sand lance and Pacific herring. However, other factors with no potential connection to the oil spill e.g., habitat loss, likely play a significant role as well. For example, most of the tidewater glaciers in the Sound associated with these birds are receding, and this is apparently causing a concurrent shift in murrelet distribution. **Because of the uncertainties surrounding the original extent of injury and the current limited availability of life history data, the Kittlitz's murrelets remain in the unknown category.**~~

The recovery status for the Kittlitz's murrelet remains unknown. Further, due to the small populations and confounding effects discussed above, other than ongoing marine bird surveys to track population trends, it is unlikely that additional surveys would inform a determination of the species' injury status.

MARBLED MURRELET

Injury

Marbled murrelets are found throughout the northern Gulf of Alaska and are known to concentrate in Prince William Sound. Carcasses of nearly 1,100 Brachyramphus murrelets were found after the spill, and about 90 percent of the murrelets that could be identified to the species level were marbled murrelets. Since they are a small bird and not easily seen, many more murrelets probably were killed as a result of the oil than were found. Estimates vary but between 2,900 and 14,800 individuals were killed by the initial oiling and this represented 6–12 percent of the marbled murrelets in the spill area. In addition to direct mortality, foraging activity and behavior was likely disrupted during the clean-up activities.

Recovery Objective

Marbled murrelets will have recovered when their population has recovered to a level had the spill not occurred. Sustained or increasing productivity within normal bounds will be an indication that recovery is underway.

~~*Marbled murrelets will have recovered when their populations are stable or increasing. Sustained or increasing productivity within normal bounds (based on adults and juveniles on the water) will be an indication that recovery is underway.*~~

Recovery Status

Marbled murrelets were declining in the Sound before the oil spill, and the decline has continued since the spill. It is listed as a threatened species in Washington, Oregon, California and British Columbia. Marbled murrelets have low intrinsic productivity and a slow population growth rate. Therefore, recovery from an acute loss will likely take many years.

~~*in theSummer populations in the Sound declined from an estimated 304,000 birds in 1972 to 97,000 shortly after the spill. Population trends from 1989 – 2005 do not indicate increasing numbers of marbled murrelets. Comparing summer population trend data of marbled murrelets between oiled and unoiled areas is difficult because of widespread nesting distributions and overlapping foraging ranges. Moreover, declines in marbled murrelet breeding populations are occurring in both oiled and unoiled areas. Similar trends throughout the Sound suggest that factors, other than or in addition to the oil spill are influencing murrelet populations. Marbled murrelets rely on forage fish such as Pacific herring and sand lance, which are declining in the spill area for various reasons including a potential link to the oil spill. Although a correlation between the availability of forage fish and the production of young murrelets appears to exist, there is conflicting evidence that links declines in prey resources with the oil spill. However, other factors with no potential link to the spill, such as climate change, decreases in habitat availability and mortalities from the gill net fisheries are probably influencing marbled murrelet population dynamics. Although lingering oil exists in the Sound, the dietary preference and foraging areas of marbled murrelets do not provide much opportunity for current exposure.*~~

~~Marbled murrelets do not meet their specific recovery objective of increasing or stable populations. Moreover, their decline could be attributable in part to a decline in a primary food source; high-lipid forage fish, like sand lance and Pacific herring. Based on available data, we cannot make a direct link among the decline in forage fish, the effects of the spill and the decline in marbled murrelets. Therefore, the recovery status for marbled murrelets is unk~~Marbled murrelets rely on forage fish such as Pacific herring and Pacific sand lance, which may be declining in the spill area due to various reasons including a potential link to EVOS. Their dietary preferences and foraging areas make significant contact with lingering oil unlikely. Exogenous factors such as climatic factors, decreases in habitat availability, and shifts in forage fish populations are the most likely drivers of murrelet population dynamics. Marbled murrelets do not meet their original recovery objective of increasing or stable populations. Moreover, their decline could be attributable in part to a decline in a primary food source; high-lipid forage fish, particularly sand lance and Pacific herring. Based on available data and scientific understanding, the mechanistic linkage between the oil spill, reduction in high-lipid forage fishes and the decline in marbled murrelets remains uncertain. Because of the great variability in the marbled murrelet annual census in the years after the spill, it is unlikely that the loss of even as much as 7–12 percent of the PWS population (the estimated spill mortality) would have been detectable by census techniques.

The recovery status for marbled murrelets remains unknown due to conflicting information and a lack of critical data. Further, due to the confounding effects discussed above, additional studies would likely be unable to clarify this species' injury status.

MUSSELS

Injury

DRAFT

Mussels are a keystone species in the nearshore environment throughout the spill area and are locally important for subsistence users. They provide prey for harlequin ducks, black oystercatchers, juvenile sea otters, river otters and many other species. Mussel beds are also important components of intertidal habitats because they provide physical stability and habitat for other organisms in the intertidal zone. Although mussels were coated with oil from the *Exxon Valdez*, dense mussel beds were purposely not disturbed during clean-up operations so the stability and habitat they provided would be preserved. However, some unconsolidated groups of mussels were subjected to hot water high pressure washing.

In 1989, after the spill, concentrations of oil in mussel tissue from the oiled area increased rapidly. These concentrations were typically far higher than in mussels from nonoiled areas (or in mussels sampled from 1977-1979). The chemical composition of this oil was consistent with *Exxon Valdez* oil. Long-term mussel contamination occurred where substantial amounts of oil was trapped in sediment; primarily within coarse-textured habitats, including heavily oiled beaches exposed to considerable wave and storm energy (e.g., Sleepy Bay). In 1991, high concentrations of relatively unweathered oil were found in the mussels and in underlying byssal mats and sediments in certain dense mussel beds. No differences in abundance or biomass were documented in sheltered rocky and estuarine habitats. However, in coarse-textured habitats along the Kenai Peninsula, mussel populations were still affected.

Recovery Objective

Mussels will have recovered when population and productivity at oiled sites are comparable to populations and productivity at unoiled sites, when chemical markers no longer indicate oil exposure, and when mussels can provide adequate, uncontaminated food supplies for predators and subsistence users.

~~Mussels will have recovered when concentrations of oil in the mussels reach background concentrations, and mussels do not contaminate their predators.~~

Recovery Status

The primary route by which mussels accumulate oil is through ingestion of petroleum hydrocarbons in the water. Much of the lingering oil in the Sound and the Gulf of Alaska is sequestered in the subsurface sediments. Mussels are found both as epibiota, attached to the surface substrates, and also partially embedded in coarse sediment, where they could come into close contact with oiled sediments. It is possible that mussels could filter particulate and dissolved hydrocarbons from the water if the oil is re-suspended during storm surges, wave action or when underlying sediments are disturbed by predators. The current distribution of oil within a mussel bed is determined by water flow, amount of oil present, sediment grain size, and disturbance history.

After the spill, hydrocarbons accumulated in mussels for about a decade at sites where oil was retained in sediments. Remaining oil was biologically available for many years after the spill, but the frequency of occurrence and average hydrocarbon concentrations in mussel tissue has declined with time. In most instances concentrations of oil in mussels from the most heavily oiled beds in Prince William Sound were largely indistinguishable from background by 1999. However, concentrations in sediment underlying the mussel beds remained elevated.

Recent data indicate that hydrocarbon concentrations in mussels are declining, even in armored beaches where elimination has been slow, and at many sites concentrations are not different from background. While a decrease in tissue concentration addresses part of the recovery objective, in

order to be fully recovered mussels must provide uncontaminated food to top predators, including human subsistence users. As recently as 2008, some bird species which rely exclusively on the intertidal zone (harlequin ducks, Barrow's goldeneye and black oystercatchers) were still being exposed to hydrocarbons. The route of oil exposure has not been established for these birds, however, it is possible that they are consuming contaminated prey or foraging in contaminated sediment during feeding. For many of these species mussels are a known prey item, and they could be foraging in contaminated sediments underlying mussel beds.

Because it cannot be verified that predators are not being exposed to oil while foraging in mussel beds, mussels are considered to be recovering from the effects of the oil spill.

PACIFIC HERRING

Injury

Pacific herring are an ecologically and commercially important species in the PWS ecosystem. They are central to the marine food web; providing food to marine mammals, birds, invertebrates and other fish. Herring are also commercially fished for food, bait, sac-roe and spawn on kelp.

Pacific herring spawned in intertidal and subtidal habitats in Prince William Sound shortly after the oil spill. All age classes and a significant portion of spawning habitats and staging areas in the Sound were contaminated by oil. Juvenile and adult herring typically come to surface at night to feed and would have had increased exposure probability at this time. Lesions and elevated hydrocarbon levels were documented in some adult Pacific herring from the oiled areas. Laboratory studies showed abnormalities and possible depressed immune functions in Pacific herring exposed to oil. Significant adult mortality was not observed in 1989, but this would not be unexpected given the heavy predation or scavenging by different groups of predators. Egg mortalities and larval deformities were also documented in the 1989 year class, but population level effects of the spill were never clearly established.

Prior to the spill, herring populations in the Sound were increasing as documented by record harvests in the late 1980s. However, four years after the spill a dramatic collapse of the fishery occurred, and the herring population has never rebounded. Herring populations are dominated by occasional, very strong year classes that are recruited into the overall population. The 1988 pre-spill year-class of Pacific herring was large in Prince William Sound, and as a result, the estimated peak biomass of spawning adults in 1992 was high. Despite the expectation that this large spawning event would lead to high numbers of fish, the population exhibited a density-dependent reduction in size of individuals, and in 1993 there was an unprecedented crash of the adult herring population in PWS. The overall 1993 harvest was about 14 percent of the 1992 harvest, and the 1989 year class was one of the smallest cohorts ever to return as spawning adults.

Recovery Objective

~~Pacific herring will have recovered when the next highly successful year-class is recruited into the population and when other indicators of population health (such as biomass, size-at-age, and disease expression) are within normal bounds in Prince William Sound.~~

The population of PWS Pacific herring will be considered recovered when the spawning biomass has been above the current regulatory fishery threshold of 43,000 tons for 6 to 8 years; two

strong recruitments (> 220 million) of age-3 fish have occurred during those 6 to 8 years, and spawning occurs in at least three geographic regions of the Sound.

Recovery Status

The herring fishery in the Sound has been closed for 15 of the 21 years since the spill. The population began increasing again in 1997 and the fishery was opened briefly in 1997 and 1998. However, the population increase stalled in 1999, and recent research suggests that the opening of the fishery in 1997 and 1998 stressed an already weakened population and contributed to the 1999 decline. The fishery has been closed since then and no trend suggesting healthy recovery has occurred.

One of the primary factors currently limiting recovery of herring in the Sound seems to be disease. Two pathogens, a virus and a fungal infection are prevalent in herring populations among several age classes. Conditions which made herring susceptible to these two diseases (viral hemorrhagic septicemia and Icthyophonus hoferi infection) are unknown, but it appears they have been impacting herring for over a decade. These diseases do not usually distress fish populations for such a long duration, and this cycle seems to be unique to the herring of Prince William Sound.

Lingering oil exists in the Sound; however there does not appear to be much overlap between current herring spawning areas and sites known to harbor residual oil. In 2006, some herring spawn was observed in areas of the Sound that were oiled however, the spatial extent was limited, and this was the first year in decades that it has been reported. Therefore, it is not likely that lingering oil is directly affecting spawning adults, eggs or larvae.

Low genetic diversity does not appear to be a limitation within herring populations. It was suggested that historic overfishing coupled with the population crash of 1993 could have resulted in a population with low genetic diversity. Similar genetic structure could limit a population's ability to tolerate disease or recover from acute losses, but the genetic diversity of Prince William Sound herring is no different from other northwest populations.

Multigenerational toxicity and effects from original contact with oil does not seem plausible, however this hypothesis has not been directly investigated.

Other factors may have contributed to the crash of 1993. Some evidence implies that zooplankton production in the 1990's was less than in the 1980's, thereby causing food to be limited at the time of a peaking population. This hypothesis is offered some support by the fact that the average size-at-age of herring had been decreasing since the mid-1980s as population numbers were rising. Poor nutrition may also increase susceptibility of herring to disease.

Predation also plays a role in herring population dynamics, as they are a primary forage fish within the Prince William Sound ecosystem. It is plausible that the small herring population is fighting an on-going disease problem and is further being kept in check by predators such as whales, seals, sea lions and seabirds.

Despite the numerous studies directed at understanding the effects of oil on herring, the causes constraining population recovery are not well understood. A combination of factors, including disease, predation and poor recruitment appear to contribute to the continued suppression of herring populations in the Sound. In summary, PWS Pacific

herring have not met their recovery objective. No strongly successful year class has been recruited into the population and health indices suggest that herring in the Sound are not fit. Therefore, the Pacific herring are considered to be not recovering from the effects of the spill.

PIGEON GUILLEMOTS

Injury

Although pigeon guillemots are widely distributed in the North Pacific region, they do not occur anywhere in large concentrations. An estimated 2,000–6,000 guillemots, representing 10–15 percent of the spill area population, died from acute oiling. Additionally, an increase in nest predation of pigeon guillemot chicks and incubating adult birds occurred in the Sound after the spill. Researchers speculated that immediately after the spill, predators such as river otters and minks preyed more heavily on nesting guillemots due to heavy oiling and subsequent reduction of their customary shellfish prey.

Recovery Objective

Pigeon guillemots will have recovered when their population is stable. Sustained or increasing productivity within normal bounds will be an indication that recovery is underway.

Recovery Status

Pigeon guillemot populations were likely declining prior to the spill and this decline has continued through 2008. The causes of the decline are unclear and the extent to which the spill has been a factor has not been determined. From 1989 to 1991, pigeon guillemot abundance decreased more in oiled areas than in unoiled areas, and this accelerated decrease persisted in most years through 2001. Summer surveys along both oiled and unoiled shorelines of the Sound have indicated that numbers of guillemots continued to decline through 2005. March surveys reveal no significant trends in abundance although the data appear to suggest a decline at this time of year as well.

As of 1999, adult pigeon guillemots in the oiled areas were still being exposed to oil as indicated by elevation of a biochemical marker of exposure, cytochrome P450. No differences were found between P450 activity in chicks from oiled and unoiled sites. The difference in P450 activity between adults and chicks is probably due to the fact that pigeon guillemot chicks are fed primarily fish, while adults eat a combination of fish and invertebrates. Invertebrates are more likely to sequester petroleum compounds, whereas fish metabolize them. Data collected in 2004 indicated that there was no difference in P450 activity in adult pigeon guillemots collected in oiled and unoiled parts of the Sound.

Lingering oil occurs in habitats used by pigeon guillemots. They feed on fish and invertebrates by diving and probing the substrate with their bills. Because their diet includes benthic organisms living in the intertidal zone, they could encounter subsurface oil while foraging. However, guillemots do not use the intertidal zone exclusively and can travel several miles offshore to feed. Thus, their exposure to lingering oil is likely intermittent.

Reduction in forage fish, specifically herring and sand lance, has been implicated in declines of pigeon guillemots. The extent to which the oil spill resulted in the depletion of these species could indirectly injure guillemots and other seabirds by removing the food resources on which they depend. Other factors, such as predation and interactions with commercial fisheries, might

be contributing to the negative population trend; however comprehensive studies including these variables have not been conducted.

~~**Pigeon guillemot populations are Not recovering in the spill area.** In fact, populations have been steadily declining throughout the Sound since the spill. The reduction of Pacific herring as a prey species, coupled with the potential for direct exposure of pigeon guillemots to lingering oil in localized intertidal areas, supports a conclusion that pigeon guillemots remain in the category of Not recovering from the effects of the spill.~~

The pigeon guillemot population continues to decline in both oiled and unoiled areas of Prince William Sound. Nest predation is a potential source of mortality that may be limiting recovery in some areas, implying that predator removals could prove an effective restoration option. More data on productivity levels is needed to determine if the recovery objective of increasing abundance and productivity has been met.

Pigeon guillemots are considered to be not recovered from the effects of the spill.

PINK SALMON

Injury

Up to 75 percent of wild pink salmon in Prince William Sound spawn in the intertidal portions of streams. Eggs deposited in gravel and developing embryos were chronically exposed to hydrocarbon contamination from the water column and from leaching oil deposits on adjacent beaches. When juvenile pink salmon migrate to saltwater, they spend several weeks foraging for food in nearshore habitats. Thus, juvenile salmon entering seawater from both wild and hatchery sources were likely exposed to oil as they swam through contaminated waters and fed along oiled beaches. Two primary types of injury impacted early life stages of pink salmon: 1) growth rates in both wild and hatchery-reared juvenile pink salmon from oiled parts of the Sound were reduced; and 2) increased embryo mortality was documented in oiled versus unoiled streams.

Recovery Objective

Pink salmon will have recovered when population indicators, such as juvenile growth and survival, are within normal bounds and when ongoing oil exposure, which may cause injury to pink salmon embryos (eggs), is negligible.

Recovery Status

In the years preceding the spill, returns of wild pink salmon in Prince William Sound varied from a maximum of 23.5 million fish in 1984 to a minimum of 2.1 million in 1988. Many factors, such as the timing of spring plankton blooms and changes in water circulation patterns throughout the Gulf of Alaska are likely to have a great influence on year-to-year returns in both wild and hatchery stocks of pink salmon. Since the spill, returns of wild pinks have varied from a high of about 12.7 million fish in 1990 to a low of about 1.9 million in 1992. In 2001 the return of wild stock fish was estimated to be 6.7 million fish.

The decade preceding the oil spill was a time of peak productivity for pink salmon in the Sound. In 1991 and 1992, it appears that wild adult pink salmon returns to the Sound's Southwest District were reduced by 11 percent; however wild salmon returns are naturally highly variable. Furthermore, the methods used to estimate this decrease could not be used to produce reliable injury estimates across multiple generations of salmon. An analysis of escapement data from

1968-2001 did not show any differences in annual escapements between oiled and unoiled parts of the Sound. Therefore, population-level effects from the spill did not impact wild pink salmon or were short-lived.

Sound-wide population levels appear to be within normal bounds. In addition, reduced juvenile growth rates in Prince William Sound occurred only in the 1989 season. Since then, juvenile growth rates have been within normal bounds.

Higher embryo mortality persisted in oiled streams when compared to unoiled streams through 1993: These differences were not detected from 1994 - 1996, but higher embryo mortality was again reported in 1997. It could not be determined if the reemergence of elevated embryo deaths was due to the effects of lingering oil (perhaps newly exposed by storm-related disturbance of adjacent beaches), or due to other natural factors (e.g., differences in the physical environment). Although patches of lingering oil still persist in or near intertidal spawning habitats in a few of the streams used by pink salmon in southwestern Prince William Sound, the amounts were considered negligible based on 1999 and 2001 studies. In 1999, dissolved oil was measured in six pink salmon streams that had been oiled in 1989. Only one of the six streams had detectable concentrations of oil, and they were about a thousand times lower than concentrations reported as toxic to developing pink salmon embryos.

Based on these results, continuing exposure of pink salmon embryos to lingering oil is negligible and unlikely to limit pink salmon populations. Given the fact that pink salmon population levels and indicators such as juvenile growth and survival are within normal bounds, pink salmon were considered recovered from the effects of the oil spill in 1999.

RIVER OTTERS

Injury

River otters have a low population density in Prince William Sound. Twelve river otter carcasses were found following the spill, but the actual total mortality is not known. Studies conducted during 1989–91 identified several differences between river otters in oiled and unoiled areas in the Sound, including biochemical alterations, reduced body size, and increased home-range size. The lack of comparable pre-spill information precluded any effort to determine if these differences were the result of the oil spill.

Recovery Objective

The river otter will have recovered when biochemical indicators of hydrocarbon exposure or other stresses and indices of habitat use are similar between oiled and unoiled areas of Prince William Sound, after taking into account any geographic differences.

Recovery Status

Although some of the differences (e.g., values of blood characteristics) between river otters in oiled and unoiled areas in Prince William Sound were apparent through 1996, they did not persist in 1997 and 1998.

In 1999, the Trustee Council considered river otters to be recovered, because the recovery objectives had been met and indications of possible lingering injury from the oil spill were not present.

ROCKFISH

Injury

Dead rockfish were observed throughout the Sound immediately following the spill, but an absolute count was never documented. Necropsies of five fish indicated that oil ingestion was the cause of death. Additionally, hydrocarbon concentrations in dead fish from oiled areas were higher than those from unoiled areas. Closures to salmon fisheries apparently caused increasing fishing pressure on rockfish, which may have adversely affected local populations.

Recovery Objective

Due to the continuing lack of data on rockfish, no recovery objective can be identified.

Recovery Status

From 1989–1991, higher petroleum hydrocarbon concentrations were measured in rockfish from oiled areas when compared to unoiled areas. Interpretation of these data is limited, however, because oil accumulation differs by species and by age of the fish, and these variables were not fixed across sites. Other Council-funded studies have been conducted on rockfish since the spill, including 1) an examination of larval growth of fish, (including rockfish) in 1989; 2) a genetics investigation designed to identify species of rockfish larvae and young in the Gulf of Alaska and 3) a microscopic examination of fish tissues to identify lesions associated with oil exposure. These studies were inconclusive as none of them directly linked exposure of *Exxon Valdez* oil to any of the endpoints that were measured.

It is unlikely that rockfish are currently being exposed to lingering oil because known pockets of lingering oil rarely occur in their preferred habitat. Documented lingering bioavailable oil is in the subsurface sediments of the intertidal zone, and rockfish mostly occur in differing habitats of subtidal areas and in pelagic environments. From 1999–2000, no differences were measured in physiological responses to oil in rockfish from oiled and unoiled areas.

Since the spill, few studies have provided information about rockfish abundance, species composition and the impacts of commercial fisheries. Although it is unlikely that most species and life-stages of rockfish are currently being exposed to lingering oil, the original extent of injury was not documented. Rockfish do utilize the nearshore environment as young-of-the-year and juvenile rockfish. Since lingering oil is present in the intertidal zone, the risk of exposure may be present during early life history stages.

Therefore, the current understanding of the long-term effects of the original spill cannot be determined and rockfish are ~~unknown~~very likely recovered. In addition, based on the available data, understanding of ecological interactions and the expected small size of lingering impacts, it is unlikely that an effect, if any, will impair function of the ecological system and, thus, there are likely more effective uses of research funds than on further study of this species.

SEA OTTERS

Injury

DRAFT

Sea otters were originally found throughout the north Pacific including Japan, Russia, the United States, ~~and~~ Canada and Mexico. By the late 1800s, they had been eliminated from most of their range due to over-harvest by ~~Russian and American~~ fur traders. Sea otters came under international protection in ~~the early~~ 1911~~00s~~ and since then, their numbers have rebounded. Today, sea otters can only be harvested for subsistence purposes. Surveys of sea otters in the 1970s and 1980s indicated a healthy and expanding population in most of Alaska, including Prince William Sound.

More than a thousand ~~Hundreds of~~ otters became coated with oil in the days following the spill, and 871 carcasses were collected throughout the spill area. Estimates of the total number of sea otters lost to acute mortality vary, but range as high as 40 percent (2,650) of the approximately 6,500 sea otters inhabiting the western areas of the Sound. In 1990 and 1991, higher than expected proportions of prime-age adult sea otters were found dead in western Prince William Sound. Higher mortality of recently weaned juveniles in oiled areas was documented through 1993. Continuing studies of mortality rates, based largely on sea otter carcass recoveries, suggest that relatively poor survival of otters in the oiled area ~~has~~ persisted for well over a decade.

Recovery Objective

Sea otters will have recovered when the population in oiled areas returns to conditions that would have existed had the spill not occurred and when biochemical indicators of hydrocarbon exposure in otters in the oiled areas are similar to those in otters in unoiled areas. An increasing population trend and normal reproduction and age structure in western Prince William Sound will indicate that recovery is underway.

Recovery Status

No apparent population growth occurred for Prince William Sound sea otters through 1991. After 1993, the population in the western Sound began increasing at a rate approximately one-half of the pre-spill rate of increase. From 1993–2000, the number of otters increased by 600 animals which represents an annual growth rate of 4 percent. However, in areas that were heavily oiled, such as northern Knight Island, sea otter populations have remained well below pre-spill numbers, and population trends continued to decline through 2005. Moreover, the demographics within this group apparently are not stable as many of the females are below reproductive age and young, non-territorial males have moved into and out of the population.

The lack of recovery may reflect the extended time required for population growth for a long-lived mammal with a low reproductive rate, but likely reflects the effects of chronic exposure to hydrocarbons, or a combination of both factors. Food limitation does not appear to be a factor limiting recovery in the Knight Island group, because food resources are at least as plentiful there as they are at unoiled Montague Island. Productivity is also similar between oiled and unoiled sites. Exposure of sea otters to lingering oil is plausible because their foraging sites and prey species occur in habitats harboring oil. Additionally, biochemical responses (cytochrome P450) of oil exposure were elevated in animals from oiled sites through 2002. By 2004–2005, the response of this biomarker was similar in animals from oiled and unoiled areas. However, additional years of data areneeded to determine if the similarity is true convergence, and the apparent diminishing exposure to oil is a long-term trend.

Sea otters will have recovered when population levels, reproduction and productivity are within normal bounds in oiled and unoiled areas and have reached levels that would have existed

without the spill. Recovery will also be substantiated when the biochemical indicators of hydrocarbon exposure are similar within the oiled and unoiled areas.

~~Sea otter recovery is underway for much of western Prince William Sound, and sea otters are generally increasing in much of the spill area. However, the data from otters in heavily oiled Knight Island reflect a population that is not rebounding. Factors affecting this population could include residual or continuing oil effects, predation, subsistence use or a combination of multiple causes. Therefore, sea otters continue to be in the recovering catego~~

Although there has been a slow increase since 2005 in the sea otter population within the heavily-oiled areas, there has been a greater rate of overall increase in the population within Prince William Sound. Therefore, sea otters are considered to be recovering.

SEDIMENTS

Injury

The *Exxon Valdez* spilled approximately 11 million gallons of crude oil into Prince William Sound, and much of this oil washed up on shores and was deposited in intertidal and subtidal zones of the spill area. Intertidal shorelines captured approximately 40 – 45 percent of the oil, and up to 13 percent of the oil settled in subtidal habitats. Using a variety of methods, manual removal eliminated some of the oil from the intertidal zone early in the response phase, and within a few months of the spill, 89 percent of the moderately to heavily oiled beaches had been treated. Clean-up activities also occurred in 1990 and 1991. According to Shoreline Clean-up Assessment Team (SCAT) surveys, by 1992, approximately 10 km of the original estimated 583 km beaches with surface oiling remained uncleaned. The SCAT surveys were focused on documenting surface oiling as a way to direct clean-up activities. Therefore, subsurface and subtidal oil was not as closely monitored.

Recovery Objective

Sediments will have recovered when there are no longer significant residues of *Exxon Valdez* oil on shorelines (both intertidal and subtidal) in the oil spill area. Declining oil residues and diminishing toxicity are indications that recovery is underway.

Recovery Status

Approximately 10 acres of *Exxon Valdez* oil remains in surface sediments of Prince William Sound, primarily in the form of highly weathered, asphalt-like or tar deposits. In 2003, it was estimated that 20 acres of unweathered, lingering oil may still be present in subsurface, intertidal areas of the Sound, which could represent up to 100 tons of remaining oil. Most of this oil is found in protected, unexposed bays and beaches. Subsurface oil was not subjected to the original clean-up activities, and because this oil is trapped beneath a matrix of cobbles, gravel and finer sediments, it is not easily exposed to natural weathering processes.

The most recent studies documenting residual oil occurred on those beaches that were considered heavily or moderately oiled in 1989. Beaches reported as lightly oiled were not surveyed. Moreover, beaches outside of the Sound were not included, so the amount and extent of residual oil in the entire spill zone is not known, but one estimate suggests as much as 200 tons of oil may still exist. Several studies have evaluated the extent of lingering oil on armored oiled beaches along the outer Kenai Peninsula coast, the Alaska Peninsula, and Kodiak Archipelago. These

studies looked at the same sites repeatedly at intervals from 1992–2005. By 1995, little visible oiling was observed in the study area on Kodiak. Overall, by 1995, hydrocarbon concentrations in sediments at the Gulf of Alaska sites were generally lower than for sites in Prince William Sound, but at some locations substantial concentrations persisted. Through 2005, surface oil was not frequently observed in these areas, and subsurface oil was present as mostly unweathered mousse.

In 1989, chemical analysis of oil in subtidal sediments was conducted at a small number of index sites in Prince William Sound. In the subtidal areas, petroleum hydrocarbon concentrations were highest at depths of 1–60 feet (below mean low water) and diminished out to depths of 300 feet. It is likely that oil in subtidal sediments have decreased substantially since the spill. In 2001, several sites that were sampled after the spill were re-visited, and no oil was found in the subtidal sediment from these locations.

Twenty-one years after the spill, lingering oil has persisted in the intertidal zones of Prince William Sound and on northwest shorelines of the spill area. The presence of subsurface oil continues to compromise wilderness and recreational values, expose and potentially harm living organisms, and offend visitors and residents, especially those who engage in subsistence activities along still-oiled shorelines. Although much of the oil has diminished over time, pockets of unweathered oil exist, and natural degradation of this oil is very slow. Moreover, some obligate intertidal foraging bird species are still being exposed to oil.

Therefore, sediments are considered to be recovering.

SOCKEYE SALMON

Injury
Commercial salmon fishing was closed in Prince William Sound and in portions of Cook Inlet and near Kodiak in 1989 to avoid the possibility of contaminated salmon being sold at market. As a result, there were higher-than-desirable numbers (i.e., "overescapement") of spawning sockeye salmon entering the Kenai River and Red and Akalura lakes on Kodiak Island. Initially, these high escapements produced an overabundance of juvenile sockeye that overgrazed the zooplankton, and altered planktonic food webs in the nursery lakes. As a result, growth rates were reduced during the freshwater stage of the salmon's life cycle, which led to a decline in returns of spawning adults. The net result was an initial loss of sockeye production.

Recovery Objective
Sockeye salmon in the Kenai River system and Red and Akalura lakes will have recovered when adult returns-per-spawner are within normal bounds.

Recovery Status
Although sockeye freshwater growth tends to return to normal within two or three years following an overescapement event, there are indications that the populations are less stable for several years. The overescapement following the spill resulted in lower sockeye productivity, (as measured by return per spawner) in the Kenai River watershed from 1989–92. However, production of zooplankton in both Red and Akalura lakes on Kodiak Island quickly rebounded from the initial effects overgrazing. By 1997, Red Lake had responded favorably in terms of smolt and adult production and was at or near pre-spill production of adult sockeye. At Akalura Lake there were low juvenile growth rates in freshwater during the period 1989–92, and these

years of low growth correspond to low adult escapements during the period 1994–97. Starting in 1993, however, the production of smolts per adult increased sharply and the smolt sizes and age composition suggested that rearing conditions had improved. It is possible that overescapement also affected lakes on Afognak Island and on the Alaska Peninsula. However, analysis of sockeye freshwater growth rates of juveniles from Chignik Lake on the Alaska Peninsula did not identify any impacts associated with a 1989 overescapement event. On the basis of catch data through 2001 and in view of recent analyses of return per spawner estimates presented to the Alaska Board of Fisheries in 2001, the return-per-spawner in the Kenai River system is within historical bounds. Therefore, it is highly unlikely that the effects that reverberated from the overescapements in 1989 continue to affect sockeye salmon.

In 2002, this species was considered to be recovered from the effects of the oil spill.

SUBTIDAL COMMUNITIES

Injury

Subtidal habitats encompass all of the seafloor below the mean lower low water tide line to about 800 meters, although deeper habitats are often referred to as the deep benthos. For purposes of this List and evaluating oil spill effects, the impacted subtidal zone generally ranges from the lower intertidal zone to a depth of about 20 meters. Communities in the near subtidal areas are typically characterized by dense stands of kelp or eelgrass and comprise various invertebrate species, such as amphipods, polychaete worms, snails, clams, sea urchins and crabs. Subtidal habitats provide shelter and food for an array of nearshore fishes, birds, and marine mammals.

It is estimated that up to 13 percent of the oil that was spilled deposited in the subtidal zones. The direct toxicity of the oil, as well as subsequent clean-up activities caused changes in the abundance and species composition of plant and animal populations below lower tides. Initial injuries were evident for several oil-sensitive species. Infaunal amphipods, a prominent prey species in subtidal communities, were consistently less abundant at oiled than at unoiled sites. Reduced numbers of eelgrass shoots and flowers were also documented and may have resulted from increased turbidity associated with clean-up activities. Two species of sea stars and helmet crabs also were less abundant at oiled sites when compared to oiled areas. However, stress tolerant organisms, including polychaete worms, snails and mussels were more abundant at oiled sites. It has been suggested that these species may have benefited from organic enrichment of the area from the oil or from reduced competition or predation because other, more sensitive species were depleted.

Recovery Objective

Subtidal communities will have recovered when community composition in oiled areas, especially in association with eelgrass beds, is similar to that in unoiled areas or consistent with natural differences between, sites such as proportions of mud and sand, and that the subtidal community and sediments found within are no longer contaminated by lingering oil.

Recovery Status

Invertebrate assemblages within eelgrass beds and adjacent areas of soft sediment, were compared at oiled and unoiled sites from 1990–1995. It was hypothesized that reduction in eelgrass and kelp could alter the habitat structure of subtidal communities and continue to impact resident species because food and shelter resources were removed from the environment. By

1995, some benthic species within eelgrass habitats of the oiled areas had recovered. However, important species such as amphipods, certain bivalves, crabs and sea stars were not as abundant at oiled sites as they were in unoiled areas. It was difficult to interpret the findings of these studies, because it was not possible to distinguish between natural conditions and differences in habitat characteristics caused by the spill or subsequent clean-up activities.

More recently, a census of marine life throughout the Gulf of Alaska measured biodiversity indices of plants and animals in the intertidal and shallow subtidal zones. Measurements of species abundance, richness and evenness were compared among areas in Prince William Sound, Kodiak Island and Kachemak Bay. Generally, community structure was significantly different between intertidal and subtidal areas with intertidal communities comprising more species and being more variable than subtidal communities. However, direct comparisons between oiled and unoiled sites were not evaluated for each community, and comparisons in these communities at a smaller scale are not known.

Concentrations of oil in subtidal areas declined by 1995, but were still slightly elevated over unoiled sites. In 2001, at a few random sites adjacent to heavily or moderately oiled intertidal areas, little or no oil was found in the subtidal sediments. However, a systematic sampling of sediments from subtidal areas in the entire spill zone has not been conducted.

~~**In the early 90s, several benthic organisms using the subtidal zones showed trends towards recovery, and hydrocarbon concentrations had declined in many areas. However, consistent, systematic surveys have not been conducted for many species The recovery status of subtidal communities is very likely recovered.**~~

In the early 1990's, several benthic organisms using the subtidal zones showed trends towards recovery, and hydrocarbon concentrations had declined in many areas. However, consistent, systematic surveys have not been conducted for many species. Given the length of time since evidence of injury was last documented, the lack of subtidal oil for many years, and the resiliency and short generation times for the species that had shown lower populations in the oiled areas, it seems likely that recovery has occurred.

Subtidal communities are very likely recovered. In addition, further study, with sufficient effort and scope to achieve powerful tests of the impacts of lingering oil, would be relatively expensive and unlikely to definitively demonstrate an effect of the oil spill on this resource.

HUMAN SERVICES

COMMERCIAL FISHING

Injury

Commercial fishing was injured as a result of the spill's direct impacts to commercial fish species (see individual resource accounts) and through subsequent emergency fishing closures. Fisheries for salmon, herring, crab, shrimp, rockfish and sablefish were closed in 1989 throughout Prince William Sound, Cook Inlet, the outer Kenai coast, Kodiak and the Alaska Peninsula. Shrimp and salmon commercial fisheries remained closed in parts of Prince William Sound through 1990.

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Recovery Objective

Commercial fishing will have recovered when the commercially important fish species have recovered and opportunities to catch these species are not lost or reduced because of the effects of the oil spill.

Recovery Status

In the 1994 Restoration Plan, the Trustee Council specifically recognized the declines in pink salmon and Pacific herring populations, and considered the reduction in these two fisheries as the biggest contributors to injury of the commercial fishing service in the spill area. Therefore, many restoration activities were focused towards these resources. The strategy for restoring commercial fishing included funding projects that accelerated fish population recovery, protected and purchased important habitat and monitored recovery progress. By 2002, the Trustee Council considered pink salmon and sockeye salmon to be recovered from the oil spill. However, recovery was not considered complete for Pacific herring and the recovery status of this resource remains 'Not recovering' (see individual resource accounts).

Income from commercial fishing dramatically declined immediately after the spill, and for a variety of reasons, disruptions to income from commercial fishing continue today, as evidenced by changes in average earnings, ex-vessel prices and limited entry permit values. Natural variability in fish returns and a number of economic changes in the commercial fishing industry since 1989 probably mean that many of these changes in income are not directly attributable to the spill. However, these factors also make discerning spill-related impacts difficult. Economic changes confronting the industry include the increased world supply of salmon (due primarily to farmed salmonids) and corresponding reduced prices, entry restrictions in certain fisheries (such as Individual Fishing Quotas, for halibut and sablefish), allocation changes (e.g., a reduction in the allocation of Cook Inlet sockeye salmon to commercial fishermen), reduction in processing capacity, and spatial limitations of groundfish fisheries in the spill areas in conjunction with sea lion management. Finally, competition among commercial, recreational, and subsistence fishers influence management decisions of these shared resources.

~~No spill-related district-wide fishery closures related to oil contamination have been in effect since 1989, and populations of pink and sockeye salmon are considered recovered from the effects of the spill. However, the Prince William Sound herring fishery has been closed for 15 of the 20 years since the spill and herring are not considered recovered. **Therefore, commercial fishing, as a lost or reduced service, is in the process of recovering from the effects of the oil spill, but full recovery has not been achieved.**~~

Since 1989, there have been no non-herring, spill-related, district-wide fishery closures related to oil contamination, and populations of pink and sockeye salmon are considered recovered from the effects of the spill. The Prince William Sound herring fishery has been closed for ~~15~~ 21~~7~~ years since the spill and herring are not considered recovered.

Commercial fishing, as a lost or reduced service, is considered to be recovering from the effects of the oil spill.

PASSIVE USE

Injury

Passive use is the service provided by natural resources to people that will likely not visit, contact, or otherwise use the resource. Thus, injuries to passive use are tied to public perceptions

of injured resources. Passive use is the appreciation of the aesthetic and intrinsic values of undisturbed areas and the value derived from simply knowing that a resource exists. The oil spill occurred in what many Americans viewed as an undisturbed area and caused visible injury to shorelines, fish and wildlife. The loss to passive use following the oil spill was estimated by the State of Alaska at $2.8 billion. Using a contingent valuation approach, this was the median value that those surveyed were willing to pay to prevent a catastrophe similar to the *Exxon Valdez* Oil Spill from happening again.

Recovery Objective
Passive use will have recovered when people perceive that aesthetic and intrinsic values associated with the spill area are no longer diminished by the oil spill.

Recovery Status
The Trustee Council determined that passive use injuries occurred as a result of the oil spill because natural resources including scenic shorelines, wilderness areas, and popular wildlife species, from which passive uses are derived, were injured. The key to the recovery of passive use is providing the public with current information on the status of injured resources and the progress made towards their recovery.

Two vital components of the Trustee Council's restoration effort are the research, monitoring, and general restoration program and the habitat protection and acquisition program. Extensive work has been done to restore and monitor resources and communicate these findings to the public. The research, monitoring, and general restoration program is funded each year through the annual work plan, which documents the projects that are currently funded to implement restoration activities for injured resources and services. The habitat protection program preserves habitat important to injured resources through the acquisition of land or interests in land. As of 2006, the Council has protected more than 630,000 acres of habitat, including more than 1,400 miles of coastline and over 300 streams valuable for salmon spawning and rearing.

Other public information efforts in which the Council is currently engaged follows:

- The Trustee Council's website (www.evostc.state.ak.us) offers detailed information regarding past, current, and future restoration efforts
- The Trustee Council prepares a number of documents for distribution to the public including:
    - The *Invitation for Proposals*, which solicits restoration project ideas from the scientific community and the public,
    - The Annual Work Plan (described above),
    - Updates to the *Restoration Plan* (1996, 1999, 2002, & 2006) which periodically provides new information on the recovery status of injured resources and services.
- Project final reports are available to the public at the Trustee Council's website, through the Alaska Resource Library and Information Services (ARLIS) in Anchorage as well as at several other libraries in the State, at the Library of Congress, and through NTIS (National Technical Information Service). In addition, the Council supports researchers in publishing their project results in peer-reviewed scientific literature, which expands their audience well beyond Alaska.
- The Council supports an annual marine science symposium, which is open to the public that provides a venue in which to report the progress of restoration in the spill area.

- Public Input: The Public Advisory Committee (PAC) is an important means of keeping stakeholders and others informed of the progress of restoration and providing the public's opinions to the Trustee Council as they make decisions. Additionally, public meetings are held periodically throughout the spill area. All meetings of the Council are widely advertised and opportunity for public comment is always provided.

Until the public no longer perceives that lingering oil is adversely affecting the aesthetics and intrinsic value of the spill area it cannot be considered recovered.

Because recovery of a number of injured resources is incomplete, the Trustee Council considers services related to passive use to be recovering from the effects of the spill.

Recreation and Tourism

Injury

Recreation and tourism in the spill area dramatically declined in 1989 in Prince William Sound, Cook Inlet and the Kenai Peninsula. Injuries to natural resources led resource managers to limit access to hunting and fishing areas, and users such as kayakers were prevented from enjoying those beaches that harbored visible oil. Recreation was also affected by changes in human use in response to the spill, because areas that were unoiled become more heavily used as activity was displaced from the oiled areas.

Recovery Objective

Recreation and tourism will have recovered, in large part, when the fish and wildlife resources on which they depend have recovered, and recreation use of oiled beaches is no longer impaired.

Recovery Status

Recreation and tourism accounted for 26,000 jobs, generated $2.4 billion in gross sales and contributed $1.5 billion to Alaska's economy in 2003. The number of visitors to Alaska has increased in the years since the spill and it is expected that the recreation and tourism industry in south-central Alaska will grow approximately 28 percent per year through 2020. By 2001, over $10 million had been spent on repair and restoration of recreational facilities in the spill area, and damage caused by the spill or clean-up efforts at the Green Island cabin and Fleming Spit campsites were repaired.

Telephone interviews conducted in 1999 and 2002 of people who used the spill area for recreation before and after the spill, indicated that, although oil remained on beaches, it did not deter them from using the area. However, they continued to report diminished wildlife sightings in Prince William Sound, particularly in heavily oiled areas such as around Knight Island. They also reported seeing fewer seabirds, killer whales, sea lions, seals, and sea otters than were generally sighted before the spill, but also reported observing increases in the number of seabirds over the last several years. Key informants with experience along the outer Kenai coast reported diminished sightings of seabirds, seals, and sea lions. However, they indicated that the possible presence of residual oil has no effect on recreational activities along the outer Kenai coast, the Kodiak Archipelago, and the Lake Clark and Katmai national park coastlines. Changes in the amount of wildlife observed could be due to a variety of factors, including the spill.

Recreation and tourism rely on both consumptive and non-consumptive uses of natural resources. Although these activities have increased since the spill, several resources have not yet recovered from the spill and beaches used for recreation contain lingering oil. Resources that are important to recreation and tourism, but are still not considered recovered from the spill or their recovery is unknown include harbor seals, Kittlitz's and marbled murrelet, pigeon guillemot, clams, mussels, harlequin ducks, sea otters and killer whales. Sportfishing resources for which the recovery status is unknown are cutthroat trout and rockfish. However, the salmon species that were injured (pink and sockeye salmon) are recovered from the effects of the spill.

Even though visitation has increased since the oil spill, the Trustee Council's recovery objective requires that the injured resources important to recreation be recovered and recreational use of oiled beaches not be impaired. Lingering oil remains on beaches and in some localized areas this remains a concern for users. Moreover, several natural resources have not recovered from the effects of the spill.

Therefore, the Trustee Council finds recreation and tourism to be recovering from the effects of the spill, but not yet recovered.

SUBSISTENCE

Injury

Fifteen predominantly Alaskan Native communities (with a total population of about 2,200 people) in the oil spill area rely heavily on harvests of subsistence resources, such as fish, shellfish, seals, deer, and waterfowl. Oil from the spill disrupted subsistence activities for the people of these villages and approximately 13,000 other subsistence permit holders in the area. Oil affected the subsistence harvests through a variety of mechanisms including reduced availability of fish and wildlife due to injury, concern about possible health effects of eating oiled fish and wildlife, and disruption of the traditional lifestyle due to clean-up and related activities.

Recovery Objective

Subsistence will have recovered when injured resources used for subsistence are healthy and productive and exist at pre-spill levels. In addition, there is recognition that people must be confident that the resources are safe to eat and that the cultural values provided by gathering, preparing, and sharing food need to be reintegrated into community life.

Recovery Status

After the spill, subsistence harvest declined between 9–77 percent in 10 villages within Prince William Sound, Cook Inlet and Kodiak. Villages in Tatitlek and Chenega reduced their harvest by 56 and 57 percent, respectively. Outside of the Sound, harvest declined in Akhiok (on the lee side of Kodiak Island) by nine percent, but by 77 percent in Ouzinkie, which is on the northern side of the island. The primary reason that harvest declined so dramatically was the fear that oil had contaminated the resources and made them unfit to eat.

Harvest levels have generally increased in many communities since the spill, but results of harvest surveys have been variable. By 2003, they were generally higher than pre-spill levels in the communities in Cook Inlet, but lower in Kodiak and Prince William Sound (except for Cordova). Even though the harvest levels in the PWS communities were not as high as pre-spill

estimates, they were within the range of other Alaska rural communities. Harvest composition was also altered by the spill. In the first few years following the spill, people harvested more fish and shellfish than marine mammals because of the reduced number of marine mammals and the perception that these resources were contaminated and unsafe to eat.

Both safety concerns and the reduced availability of shellfish contributed to a decline in harvest levels. From 1989–94, subsistence foods were tested for evidence of hydrocarbon contamination, with no or very low concentrations of petroleum hydrocarbons found in most subsistence foods. However, concerns about oil contamination remained, and there was a belief that the increase in paralytic shellfish poisoning (PSP) was linked with *Exxon Valdez* oil. By 2003, most subsistence users expressed confidence in foods such as seals, finfish and chitons. However, the safety of certain shellfish, such as clams was still met with skepticism.

Subsistence use is a central way of life for many of the communities affected by the spill, thus the value of subsistence cannot be measured by harvest levels alone. The subsistence lifestyle encompasses a cultural value of traditional and customary use of natural resources. Following the oil spill, there was concern that the spill disrupted opportunities for young people to learn cultural subsistence practices and techniques, and that this knowledge may be lost to them in the future. In a 2004 survey of the spill area communities, 83 percent of respondents stated that their "traditional way of life" had been injured by the oil spill and 74 percent stated that recovery had not occurred.

Many factors may contribute to the changes observed in subsistence harvests and the lifestyle surrounding this tradition. Demographic changes in village populations, ocean warming, increased competition for subsistence resources by other people (e.g., sport fishing charters), predators (e.g., sea otters), and increased awareness of PSP and other contaminants may play a role in resource availability, food safety, and participation in traditional practices.

Fears about food safety have diminished since the spill, but it is still a concern for some users. Additionally, harvest levels from villages in the spill area are comparable to other Alaskan communities. However, many subsistence resources injured by the spill, including clams and mussels, have still not recovered from the effects of the spill.

For these reasons, subsistence is considered to be recovering from the effects of the oil spill.

~~For these reasons, subsistence continues to recover from the effects of the oil spill., but has not yet reco~~

REFERENCES

Currens, K.P., K.E. Griswold and G.H. Reeves. 2003. Relations between Dolly Varden Populations and Between Coastal Cutthroat Trout Populations in Prince William Sound. *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 98145), USDA Forest Service, Pacific Northwest Research Station, Corvallis, Oregon.

Eadie, J. M., J.P. L. Savard, and M. L. Mallory. 2000. Barrow's Goldeneye (*Bucephala islandica*). *In* The Birds of North America, No. 548 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.

Esler, D. 2000. Recovery status of Barrow's goldeneyes, *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 00466), U.S. Geological Survey, Alaska Biological Science Center, Anchorage, Alaska.

Exxon Valdez Oil Spill Trustee Council. 1994. *Exxon Valdez* Oil Spill Restoration Plan. *Exxon Valdez* Oil Spill Trustee Council, Anchorage, AK. 56 pages.

Exxon Valdez Oil Spill Trustee Council. 1996. *Exxon Valdez* Oil Spill Restoration Plan: Update of Injured Resources and Services September, 1996. *Exxon Valdez* Oil Spill Trustee Council, Anchorage, Alaska. 23 pages.

Exxon Valdez Oil Spill Trustee Council. 1999. *Exxon Valdez* Oil Spill Restoration Plan: Update of Injured Resources and Services March, 1999. *Exxon Valdez* Oil Spill Trustee Council, Anchorage, Alaska. 27 pages.

Exxon Valdez Oil Spill Trustee Council. 2002. *Exxon Valdez* Oil Spill Restoration Plan: Update of Injured Resources and Services August, 2002. *Exxon Valdez* Oil Spill Trustee Council, Anchorage, Alaska. 28 pages.

Fall, J.A., R.J. Walker, R.T. Stanek, W. Simeone, L. Hutchinson-Scarbrough, P.C. Kenner, L.Williams, B. Davis, T. Krieg, B. Easley and D. Koster. 2005. Update of the Status of Subsistence Uses in *Exxon Valdez* Oil Spill Area Communities. *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 040471). *Exxon Valdez* Oil Spill Trustee Council, Anchorage, AK.

Hoover-Miller, A., C. Jezierski, and S. Atkinson. 2008. Harbor Seal Monitoring in Southern Kenai Peninsula Fjords. Gulf Ecosystem Monitoring and Research Project Final Report (Project 050749), Alaska SeaLife Center, P.O. Box 1329, Seward, Alaska. 99664.

Integral Consulting Incorporated. 2006. Information Synthesis and Recovery Recommendations for Resources and Services Injured by the *Exxon Valdez* Oil Spill. *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 060783), Integral Consulting, Inc., Mercer Island, Washington. 282 pages.

Irons, D.B., S.J. Kendall, W.P. Erickson, L.L. McDonald, and B.K. Lance. 2000. Nine years after the *Exxon Valdez* oil spill: Effects on marine bird populations in Prince William Sound, Alaska. The Condor 102:723-737.

Irvine, G.V., D.H. Mann and J.W. Short. 2006. Monitoring Lingering Oil from the *Exxon Valdez* Spill on Gulf of Alaska Armored Beaches and Mussels Beds Sixteen Years Post-Spill. *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 040708), USGS-Biological Science Office, Anchorage, Alaska. Draft.

Kopp, R.J. and V.K. Smith. 1993. Valuing Natural Assets: The Economics of Natural Resource Damage Assessment. R.J. Kopp and V.K. Smith (eds). 1993 Washington D.C.

Konar, B. and K. Iken. 2005. Alaska Natural Geography in Shore Areas: An Initial Field Project for the Census of Marine Life. *Exxon Valdez* Oil Spill Gulf Ecosystem Monitoring and Research Project Final Report (Gulf Ecosystem Monitoring and Research Project 040666), Alaska Department of Fish and Game, Habitat and Restoration Division, Anchorage, Alaska.

Kuletz, K.J. 2005. Foraging behavior and productivity of a non-colonial seabird, the marbled murrelet (*Brachyramphus marmoratus*), relative to prey and habitat. Ph.D Dissertation. University of Victoria, Victoria, BC, Canada.

Matkin, C.O., Saulitis, E.L., Ellis, G.M, Olesiuk, P., Rice, S.D. 2008. Ongoing population-level impacts on killer whales *Orcinus orca* following the '*Exxon Valdez*' oil spill in Prince William Sound, Alaska. Marine Ecology Progress Series 356: 269-281.

McKnight, A., K. M. Sullivan, D.B. Irons, S. W. Stephensen, and S. Howlin. 2006. Marine bird and sea otter population abundance of Prince William Sound, Alaska: trends following the T/V *Exxon Valdez* oil spill, 1989-2005. *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 050751), U. S. Fish and Wildlife Service, Anchorage, Alaska. Draft.

Rosenberg, D.H., M.J. Petrula, D.D. Hill and A.M. Christ. 2005. Harlequin Duck Population Dynamics: Measuring Recovery from the *Exxon Valdez* Oil Spill. *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 050407), Alaska Department of Fish and Game, Division of Wildlife Conservation, Anchorage, Alaska. Draft.

Shigenaka, G., D.A. Coats, and A.K. Fukuyama. 2008. Population recovery status of littleneck clams in Prince William Sound: An unexpected turn of events. *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 070829), National Oceanic & Atmospheric Administration, Seattle, Washington.

DRAFT

DRAFT

If you believe you have been discriminated against in any program, activity, or facility please write:

- ADF&G ADA Coordinator, P.O. Box 115526, Juneau, AK 99811-5526.

The department's ADA Coordinator can be reached via phone at the following numbers: (VOICE) 907-465-6077, (Statewide Telecommunication Device for the Deaf) 1-800-478-3648, (Juneau TDD) 907-465-3646, or (FAX) 907-465-6078.

- U.S. Fish and Wildlife Service, 4040 N. Fairfax Drive, Suite 300 Webb, Arlington, VA 22203
  Office of Equal Opportunity, U.S. Department of the Interior, Washington DC 20240.

KIB ADFG Building

KODIAK NEAR ISLAND
RESEARCH FACILITY

Why Construct a New Research Facility in Kodiak?

- Strategic location, poised on the edge of the Gulf of Alaska
- Homeport to one of the nation's largest commercial fishing fleets
- Expands existing research campus with partner agencies
- Eliminate extreme overcrowding, thus reducing the risk of accident and increasing productivity
- Land donated by the City of Kodiak

KODIAK ISLAND BOROUGH kindly requests the **EVOSTC's** participation to increase and share our understanding of the Gulf of Alaska and the future of its unique ecosystem. **Here's why.**

OFFICES IN EXISTING FACILITY

FACTS & FIGURES

Existing Funding	$4.95M
Total Cost	**$24.95M**

ECI/Hyer is in the design development stage working closely with ADF&G staff and the Kodiak Island Borough Engineering/ Facilities Department. Bid ready documents are scheduled for the Fall of 2010.

KEY PROJECT REWARDS

1. **Resolves current unmet need for ADF&G spaces**
2. **Locates staff adjacent to currently leased seawater lab spaces**
3. **Provides close proximity to NOAA, the UAF School of Fisheries, and other research agencies for collaboration and shared resources**

MARK BEGICH
ALASKA

COMMITTEE ON ARMED SERVICES

COMMITTEE ON
COMMERCE, SCIENCE, AND TRANSPORTATION

COMMITTEE ON VETERANS' AFFAIRS

United States Senate

WASHINGTON, DC 20510

SUITE 524
RUSSELL BUILDING
WASHINGTON, DC 20510
(202) 224-3004

SUITE 760
510 L STREET
ANCHORAGE, AK 99501
(907) 271-5915

December 7, 2009

The Honorable Gary Locke
Secretary
U.S. Dept. of Commerce
1401 Constitution Ave. NW
Washington, DC 20230-0001

Dear Secretary Locke:

I am writing in support of the Kodiak Island Borough's proposal to the Exxon Valdez Oil Spill Trustee Council (EVOSTC) for funding to construct a new Alaska Department of Fish and Game (ADF&G) Research Facility on Near Island in Kodiak, Alaska.

Kodiak is ideally situated to conduct federal and state research on fish, shellfish, and marine bird resources located in the Exxon Valdez Spill Zone. Research in Kodiak is directed to herring, salmon, rockfish, and shellfish resources which suffered injury during the Exxon Valdez oil spill. Many species of birds were also injured during the spill. Both the State of Alaska and the U.S. Government conduct research on these Gulf of Alaska marine species. NOAA has a state-of-the-art research facility on Near Island in Kodiak. The Alaska Department of Fish and Game, in contrast, occupies an older and smaller facility which lacks lab space. This is inhibiting ADF&G's ability to conduct its research mission in the spill zone region.

The Kodiak Island Borough has proposed half of the $20 million needed to construct a new facility be provided by the EVOSTC, with the other half of the funds being provided by the borough and the State of Alaska. The proposed research facility would increase Alaska's capacity to monitor and protect the many marine fish and bird species which were damaged by the oil spill. I believe the facility falls within the scope of the EVOS Settlement Agreement and urge the Department of Commerce to support the use of EVOS funding for a portion of the facility.

Sincerely,

Mark Begich
United States Senator

MARK BEGICH
ALASKA

COMMITTEE ON ARMED SERVICES

COMMITTEE ON
COMMERCE, SCIENCE, AND TRANSPORTATION

COMMITTEE ON VETERANS' AFFAIRS

United States Senate

WASHINGTON, DC 20510

SUITE SR-104
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(202) 224-2004

SUITE 750
510 L STREET
ANCHORAGE, AK 99501
(907) 271-5915

December 7, 2009

The Honorable Ken Salazar
Secretary
Department of the Interior
1849 C Street, N.W.
Washington, DC 20240-0002

Dear Secretary Salazar:

I am writing in support of the Kodiak Island Borough's proposal to the Exxon Valdez Oil Spill Trustee Council (EVOSTC) for funding to construct a new Alaska Department of Fish and Game (ADF&G) Research Facility on Near Island in Kodiak, Alaska.

Kodiak is ideally situated to conduct federal and state research on fish, shellfish, and marine bird resources located in the Exxon Valdez Spill Zone. Research in Kodiak is directed to herring, salmon, rockfish, and shellfish resources which suffered injury during the Exxon Valdez oil spill. Many species of birds were also injured during the spill. Both the State of Alaska and the U.S. Government conduct research on these Gulf of Alaska marine species. NOAA has a state-of-the-art research facility on Near Island in Kodiak. The Alaska Department of Fish and Game, in contrast, occupies an older and smaller facility which lacks lab space. This is inhibiting ADF&G's ability to conduct its research mission in the spill zone region.

The Kodiak Island Borough has proposed half of the $20 million needed to construct a new facility be provided by the EVOSTC, with the other half of the funds being provided by the borough and the State of Alaska. The proposed research facility would increase Alaska's capacity to monitor and protect the many marine fish and bird species which were damaged by the oil spill. I believe the facility falls within the scope of the EVOS Settlement Agreement and urge the Department of Commerce to support the use of EVOS funding for a portion of the facility.

Sincerely,

Mark Begich
United States Senator

LISA MURKOWSKI
ALASKA

COMMITTEES:

[illegible]

[illegible]

[illegible]

[illegible]

United States Senate
WASHINGTON, DC 20510-6203
[illegible]

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[illegible]

[illegible]

[illegible]

October 20, 2009

James Balsiger
Federal Trustee
Exxon Valdez Oil Spill Trustee Council
Post Office Box 21668
Juneau, Alaska 99802-1668

Dear Trustee Balsiger:

I am writing again to support the proposal submitted to the Exxon Valdez Oil Spill Trustee Council (EVOSTC) by the Kodiak Island Borough for funding to construct a new Alaska Department of Fish and Game Research Facility on Near Island.

I continue to believe that this project fits the goals of the EVOS Trustee Council mission and is a good use of the funding. It will provide a state-of-the-art research facility to provide for long-term monitoring and research of the Gulf of Alaska ecosystem and compliment the work that is ongoing studying the effects of the oil spill.

I believe that there is precedent to spend these funds on facilities such as this and I believe the Trustee Council has supported this type of funding in the past. I would like to offer my support to do so again in this instance.

This project is supported by the City and Borough of Kodiak, as well as the State Legislature and State of Alaska. It is my understanding that the funding by the Trustee Council will be matched, as required, but a combination of non-federal funds from these other sources.

Sincerely,

Lisa Murkowski
United States Senator

JAMES R ARNESON, D.D.S., INC.

506 Marine Way
Kodiak AK 99615
Tel 907-486-3269
Fax 907-486-3260

SUPPORT FISH AND GAME FACILITY

Kodiak has the opportunity to provide first class lab space and support facilities by constructing a research facility for the Alaska Department of Fish and Game.

It is my understanding that research completed at this facility will further our understanding of Exxon's Oil Spill destruction as well as recovery status of our environment.

I support the forward thinking shown by the Exxon Valdez Oil Spill Trustee Council as they consider funding this important project.

Sincerely,

James Arneson, DDS

Aug 13, 2008

R. M. Ross
1218 Madsen Ave.
Kodiak, AK 99615

August 9, 2008

To Whom it May Concern:

This community still feels the effects of the '89 oil spill. The economic decline of our fishing industry is not solely the result of the spill, but it is certainly a contributing factor.

Fisheries research is an endeavor vital to the health of our fisheries. It receives tremendous support from the industry and the community, and is widely perceived to be critical to the economic well-being of both.

I would urge the Council to approve funding for the ADF&G research facility in Kodiak.

Sincerely,

R. M. Ross

Office of the Mayor and Council

710 Mill Bay Road, Room 220, Kodiak, Alaska 99615

August 8, 2008

Via fax: (907) 276-7178 and U.S. mail

Exxon Valdez Oil Spill Trustee Council
441 West 5th Avenue, Suite 500
Anchorage, AK 99501-234

Re: Support for ADF&G Research Facility, Kodiak, Alaska

Dear Trustee Council Members:

The City of Kodiak fully supports the efforts of the Kodiak Island Borough to obtain funding from the *Exxon Valdez* Oil Spill Trustee Council to construct a new Alaska Department of Fish and Game (ADF&G) research facility on Near Island. The new ADF&G facility will serve to support research functions related to damages resulting from the *Exxon Valdez* Oil Spill.

The *Exxon Valdez* Oil Spill caused significant damage to the area surrounding the City of Kodiak and the entire Kodiak Island Borough. The event adversely effected wildlife (including marine mammals, fish, and birds), as well members of our communities, whose livelihood depends on commercial, sport, and subsistence fishing. Resources in the Kodiak region—including pacific herring, clams, pigeon guillemots, commercial and subsistence fishing, to name a few—remain, nearly twenty years later, listed as "Recovering" and "Not Recovering" in the Trustee Council's 2006 Injured Resources and Services Update.

The Kodiak Island Borough, in conjunction with ADF&G, has determined that the best way to assist restoration efforts is to provide support for the Alaska Department of Fish and Game's work in research, monitoring, managing, and protecting resources in the Kodiak and Alaska Peninsula areas. To this end the Kodiak Island Borough proposes to build a research facility that will provide appropriate lab and office space for the Alaska Department of Fish & Game to conduct research and restoration activities, on property currently owned by the City of Kodiak.

The City of Kodiak is supporting the project through the donation of land for the new facility adjacent to property already donated by the City to the Kodiak Island Borough for the Kodiak Fisheries Research Center. Having a State research facility dedicated to restoration efforts in the Kodiak and Alaska Peninsula areas will allow continued monitoring and restoration of the injured species and their ecosystems in the future.

The City of Kodiak encourages you to fully fund the Kodiak Island Borough's proposal for the construction of the new Kodiak ADF&G research facility.

Sincerely,

Carolyn L. Floyd

Carolyn L. Floyd
Mayor

Telephone (907) 486-8636 / Fax (907) 486-8633
mayor@city.kodiak.ak.us

Kodiak Island Housing Authority

3137 Mill Bay Road, Kodiak AK 99615
www.kodiakislandhousing.org
Phone: 907- 486-8111 Toll Free: 1 (800) 478-5442
Fax: 907- 486-4432

August 6, 2008

Exxon Valdez Oil Spill Trustee Council
441 West 5th Avenue, Suite 500
Anchorage, Alaska 99501-234

Dear Trustee Council;

The Kodiak Island Borough lies in the heart of the Gulf of Alaska in the midst of the Exxon Valdez Oil Spill Area. Resources in the Kodiak Island Borough injured by the oil spill included wildlife, fish, birds, designated wilderness, tidal communities, sediments, archeological sites, and human services. Many resources in the Kodiak Island Borough such as Pacific Herring, Clam, Pigeon Guillemots, Commercial Fishing and Subsistence, to name a few, remain listed as Recovering and Not Recovering in the 2006 Injured Resources and Services Update.

The Kodiak Island Borough has determined that the best way of assisting restoration efforts is to provide support to the Alaska Department of Fish and Game's work in research, monitoring, managing and protecting resources in the Kodiak and Alaska Peninsula areas. A needs assessment conducted in 2002 by ASCG, Inc. found that the work of the ADF&G in Kodiak required high-tech lab space with supporting offices that can only be accommodated by building a new facility.

To support and advance restoration efforts in the Kodiak and Alaska Peninsula areas, the Kodiak Island Borough proposes to build a research facility that will provide appropriate lab and office space for the Alaska Department of Fish & Game to conduct research and restoration activities. The research completed at this facility will allow continued monitoring and restoration of the injured species and their ecosystem for many years into the future. This project will continue the EVOS restoration efforts on a long term basis.

The Kodiak Island Housing Authority fully supports the Kodiak Island Borough's proposed project. Thank you for your consideration of this proposal and for all the support that you have provided to Alaska's coastal communities.

Sincerely,

Marty Shuravloff
Executive Director

Kodiak Area Native Association

3449 Rezanof Dr. East
Kodiak, Alaska 99615
Phone (907) 486-9800

August 5, 2008

Exxon Valdez Oil Spill Trustee Council
441 West 5th Avenue, Suite 500
Anchorage, AK 99501-234

The Kodiak Area Native Association (KANA) strongly supports efforts by the Kodiak Island Borough to build a research facility in Kodiak to provide appropriate lab and office space for the Alaska Department of Fish and Game (ADF&G). A Needs Assessment conducted by ASCG, Inc. in 2002 found that the ADF&G requires newly constructed lab and support space in Kodiak.

The Exxon Valdez oil spill injured wildlife, fish, birds, designated wilderness, tidal communities, sediments, archaeological sites and human services. Kodiak is dependent upon natural resources, and we rely upon the work of the ADF&G to protect and restore these natural resources. We urge you to support and advance research and restoration efforts in the Kodiak and Alaska Peninsula areas through funding a new research facility in Kodiak. Thank you.

Sincerely,

Andy Teuber, President/CEO

Cc: Jerome Selby, Kodiak Island Borough Mayor

August 5, 2008

Perry L Page
P.O. Box 4492
Kodiak, AK 99615

Exxon Valdez Oil Spill Trustee Council
441 West 5th Avenue, Suite 500
Anchorage, AK 99501-234

Re: Support for ADF&G Research Facility – Kodiak, Alaska

Dear Council Members:

As a private Alaskan citizen I am concerned about getting the best benefit for the states money. Kodiak would seem the logical place for a restoration research facility. Kodiak is already home to several research facilities that could cooperate with the new facility.

Having an ADF&G research facility dedicated to the restoration efforts in the Kodiak and Alaska Peninsula areas will allow continued monitoring and restoration of the injured species and their ecosystems in the future.

Please give serious consideration to fully funding the proposal for an ADF&G research facility submitted by the Kodiak Island Borough.

Yours truly,

Perry L Page

Perry L Page
ppage@gci.net

Box 8935
Kodiak, AK 99615
August 5, 2008

Exxon Valdez Oil Spill Trustee Council
441 West 5th Avenue, Suite 500
Anchorage, AK 99501-234

Dear Council Members:

It has come to my attention that the EVOS Trustee Council is considering the funding of an Alaska Department of Fish and Game office building in Kodiak. I am in great support of a financial endeavor that will better equip the Fish and Game staff to make more accurate assessments of fish stocks, to manage game more effectively, and to continue to monitor and protect the resources that were affected by the Exxon Valdez oil spill.

It is my understanding through the Kodiak Island Borough and the Department of Fish and Game that a high tech laboratory is essential for monitoring and rescuing wildlife, fish, birds, and tidal dwellers that are still recovering from the devastation of the oil spill. It is because of the wildlife and ocean environment that our community even exists, so please won't you show your support and respect for the people of Kodiak and their lifestyle through a financial commitment that will benefit the entire community. The creation of a state-of-the-art facility for ADF&G in Kodiak will ensure that the best possible scientific resources are accessible for future research, management and monitoring of our wildlife and fisheries

Sincerely yours,

Susan Reid

Susan Reid
(Resident of Kodiak for 31 years)

United States Senate

Ted Stevens
Alaska

Washington, DC 20510
(202) 224-3004
Fax (202) 224-2354

Committees:
Vice Chairman
Commerce, Science, and Transportation

Appropriations
Governmental Affairs
Rules and Administration
Library of Congress

August 1, 2008

Mr. Joe L. Meade
Supervisor
Chugach National Forest
3301 C Street, Suite 300
Anchorage, Alaska 99503

Dear Mr. Meade:

I am writing to convey my strong support for the FY2008 proposal submitted to the EVOSTC by the Kodiak Island Borough for funding to construct a new Alaska Department of Fish & Game Research Facility on Near Island in Kodiak, Alaska. It is my understanding that this is the final FY2008 funding request being considered by the Council.

The Borough's plan to construct a state-of-the-art research facility would enhance long-term monitoring and research in the Gulf of Alaska ecosystem, as a component of the Gulf of Alaska Ecosystem Monitoring and Research (GEM) Program. I believe the Kodiak proposal is consistent with the goals and priorities set by the Trustee Council. The new ADF&G facility would help expand Alaska's capacity to monitor and protect the Gulf of Alaska and other critical ecosystems, including those damaged by the oil spill.

Thank you for your consideration of my support for the Kodiak Island Borough proposal to the Exxon Valdez Oil Spill Trustee Council.

With best wishes,

Cordially,

Ted Stevens

TED STEVENS

cc: Acting Director James Balsiger
Director Randall Luthi

Anchorage (907) 271-5915 | Bethel (907) 543-1658 | Fairbanks (907) 456-0261 | Girdwood (907) 783-3501 | Juneau (907) 586-7400 | Kenai (907) 283-5808 | Ketchikan (907) 225-6880 | Wasilla (907) 376-7665

United States Senate

Ted Stevens
Alaska

Washington, DC 20510
(202) 224-3004
Fax (202) 224-2354

Committees:
Vice Chairman
Commerce, Science, and Transportation

Appropriations
Governmental Affairs
Rules and Administration
Library of Congress

August 1, 2008

Dr. James W. Balsiger
Acting Director
National Marine Fisheries Service
1315 East West Highway
Silver Spring, Maryland 20910

Dear Dr. Balsiger:

I am writing to convey my strong support for the FY2008 proposal submitted to the EVOSTC by the Kodiak Island Borough for funding to construct a new Alaska Department of Fish & Game Research Facility on Near Island in Kodiak, Alaska. It is my understanding that this is the final FY2008 funding request being considered by the Council.

The Borough's plan to construct a state-of-the-art research facility would enhance long-term monitoring and research in the Gulf of Alaska ecosystem, as a component of the Gulf of Alaska Ecosystem Monitoring and Research (GEM) Program. I believe the Kodiak proposal is consistent with the goals and priorities set by the Trustee Council. The new ADF&G facility would help expand Alaska's capacity to monitor and protect the Gulf of Alaska and other critical ecosystems, including those damaged by the oil spill.

Thank you for your consideration of my support for the Kodiak Island Borough proposal to the Exxon Valdez Oil Spill Trustee Council.

With best wishes,

Cordially,

Ted Stevens

TED STEVENS

cc: Supervisor Joe Meade
Director Randall Luthi

Anchorage (907) 271-5915 | Bethel (907) 543-1638 | Fairbanks (907) 456-0261 | Girdwood (907) 783-3501 | Juneau (907) 586-7400 | Kenai (907) 283-5808 | Ketchikan (907) 225-6880 | Wasilla (907) 376-7665

United States Senate

Ted Stevens
Alaska

Washington, DC 20510
(202) 224-3004
Fax (202) 224-2354

Committees:
Vice Chairman
Commerce, Science, and Transportation

Appropriations
Governmental Affairs
Rules and Administration
Library of Congress

August 1, 2008

Randall Luthi
Director
Minerals Management Service
Department of the Interior
1849 C Street, NW
Washington, D.C. 20240

Dear Mr. Luthi:

I am writing to convey my strong support for the FY2008 proposal submitted to the EVOSTC by the Kodiak Island Borough for funding to construct a new Alaska Department of Fish & Game Research Facility on Near Island in Kodiak, Alaska. It is my understanding that this is the final FY2008 funding request being considered by the Council.

The Borough's plan to construct a state-of-the-art research facility would enhance long-term monitoring and research in the Gulf of Alaska ecosystem, as a component of the Gulf of Alaska Ecosystem Monitoring and Research (GEM) Program. I believe the Kodiak proposal is consistent with the goals and priorities set by the Trustee Council. The new ADF&G facility would help expand Alaska's capacity to monitor and protect the Gulf of Alaska and other critical ecosystems, including those damaged by the oil spill.

Thank you for your consideration of my support for the Kodiak Island Borough proposal to the Exxon Valdez Oil Spill Trustee Council.

With best wishes,

Cordially,

Ted Stevens

TED STEVENS

cc: Supervisor Joe Meade
Acting Director James Balsiger

Anchorage (907) 271-5915 | Bethel (907) 543-1658 | Fairbanks (907) 456-0261 | Girdwood (907) 783-3301 | Juneau (907) 586-7400 | Kenai (907) 283-5808 | Ketchikan (907) 225-6880 | Wasilla (907) 376-7665

JAMES E. CARMICHAEL

P.O.Box 2545, Kodiak, Alaska 99615
Phone (907) 486-6874 Fax (208) 545-4525
<JEC@JECarmichael.com>

August 1, 2008

Exxon Valdez Oil Spill Trustee Council
441 West 5th Avenue, Suite 500
Anchorage, AK 99501-234

Dear Trustees:

Subj: Support for funding for ADFG research laboratory and related offices in Kodiak.

I urge you fund construction of an Alaska Department of Fish and Game research laboratory and related offices in Kodiak. Here are the reasons for my advocacy:

- ADF&G researchers are most appropriate for much of the ongoing research needs for fish and wildlife in the Gulf of Alaska and adjacent areas, especially research upon resources affected by the Exxon Valdez Oil Spill.
- Kodiak is the optimal location because of its location central in ecosystems important for research.
- Kodiak is the optimal location for synergism with research efforts by others including the University of Alaska and National Marine Fisheries Service.
- The needs assessment conducted by ASCG, Inc. in 2002 found the work of ADF&G in Kodiak requires high-tech lab space with supporting offices that can only be accommodated by building a new facility.

My experience is as a professional forester, years in Kodiak as a resource manager working primarily with Afognak Island, a commercial fisherman, and marine engineering. My experience qualifies me to understand the need for quality research. The ADF&G research laboratory and related offices in Kodiak will best fulfill much of those research needs. This is especially true for the ecosystems affected by the Exxon Valdez Oil Spill and long term restoration.

Sincerely,

Jim Carmichael

Jim Carmichael

LISA MURKOWSKI
ALASKA

COMMITTEES:
ENERGY AND NATURAL RESOURCES
RANKING MEMBER
SUBCOMMITTEE ON ENERGY

FOREIGN RELATIONS
RANKING MEMBER, SUBCOMMITTEE ON
EAST ASIAN AND PACIFIC AFFAIRS

HEALTH, EDUCATION, LABOR,
AND PENSIONS

INDIAN AFFAIRS
VICE-CHAIRMAN

United States Senate

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(202) 224-5301 FAX

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(907) 271-3735

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FAIRBANKS, AK 99701-6278
(907) 456-0233

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JUNEAU, AK 99802
(907) 586-7400

110 TRADING BAY ROAD, SUITE 105
KENAI, AK 99611-7718
(907) 283-5808

540 WATER STREET, SUITE 101
KETCHIKAN, AK 99901-6378
(907) 225-6880

851 EAST WESTPOINT DRIVE, SUITE 307
WASILLA, AK 99654-7142
(907) 376-7665

P.O. BOX 1030
311 WILLOW STREET, BUILDING 3
BETHEL, AK 99559-1030
(907) 543-1639

July 30, 2008

James Balsiger
Federal Trustee
Exxon Valdez Oil Spill Trustee Council
Post Office Box 21668
Juneau, Alaska 99802-1668

Dear Trustee Balsiger:

I am writing to support the FY2008 proposal submitted to the Exxon Valdez Oil Spill Trustee Council (EVOSTC) by the Kodiak Island Borough for funding to construct a new Alaska Department of Fish and Game Research Facility on Near Island in Kodiak. I believe the project is an important component of long-term monitoring and research in the Gulf of Alaska ecosystem as a part of the Gulf of Alaska Ecosystem Monitoring and Research (GEM) Program.

I understand the Kodiak Island Borough is prepared to meet the 50 percent match requirements specified by the EVOSTC program. I believe the proposal is consistent with both the goals and priorities set by the Trustee Council and beneficial to the Borough of Kodiak and the State of Alaska.

This project serves to update and increase Alaska's capacity to monitor and protect the Gulf of Alaska and other critical ecosystems, especially those damaged by the Oil Spill. The Kodiak Island Borough's FY2008 proposal to construct a state-of-the-art research facility would clearly benefit the region.

Sincerely,

Lisa Murkowski
United States Senator

LISA MURKOWSKI
ALASKA

COMMITTEES:
ENERGY AND NATURAL RESOURCES
RANKING MEMBER
SUBCOMMITTEE ON ENERGY

FOREIGN RELATIONS
RANKING MEMBER, SUBCOMMITTEE ON
EAST ASIAN AND PACIFIC AFFAIRS

HEALTH, EDUCATION, LABOR, AND PENSIONS

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WASILLA, AK 99654-7142
(907) 376-7665

P.O. BOX 1030
311 WILLOW STREET, BUILDING 3
BETHEL, AK 99559-1030
(907) 543-1639

July 30, 2008

Joe Meade
Federal Trustee
Exxon Valdez Oil Spill Trustee Council
3301 C Street
Suite 300
Anchorage, Alaska 99503

Dear Trustee Meade:

I am writing to support the FY2008 proposal submitted to the Exxon Valdez Oil Spill Trustee Council (EVOSTC) by the Kodiak Island Borough for funding to construct a new Alaska Department of Fish and Game Research Facility on Near Island in Kodiak. I believe the project is an important component of long-term monitoring and research in the Gulf of Alaska ecosystem as a part of the Gulf of Alaska Ecosystem Monitoring and Research (GEM) Program.

I understand the Kodiak Island Borough is prepared to meet the 50 percent match requirements specified by the EVOSTC program. I believe the proposal is consistent with both the goals and priorities set by the Trustee Council and beneficial to the Borough of Kodiak and the State of Alaska.

This project serves to update and increase Alaska's capacity to monitor and protect the Gulf of Alaska and other critical ecosystems, especially those damaged by the Oil Spill. The Kodiak Island Borough's FY2008 proposal to construct a state-of-the-art research facility would clearly benefit the region.

Sincerely,

Lisa Murkowski
United States Senator

LISA MURKOWSKI
ALASKA

COMMITTEES:
ENERGY AND NATURAL RESOURCES
RANKING MEMBER
SUBCOMMITTEE ON ENERGY

FOREIGN RELATIONS
RANKING MEMBER, SUBCOMMITTEE ON
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HEALTH, EDUCATION, LABOR,
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(907) 225-6880

851 EAST WESTPOINT DRIVE, SUITE 307
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(907) 376-7665

P.O. BOX 1030
311 WILLOW STREET, BUILDING 3
BETHEL, AK 99559-1030
(907) 543-1639

July 30, 2008

Randall Luthi
Federal Trustee
Exxon Valdez Oil Spill Trustee Council
1849 C Street, NW
Washington, D.C. 20240

Dear Trustee Luthi:

I am writing to support the FY2008 proposal submitted to the Exxon Valdez Oil Spill Trustee Council (EVOSTC) by the Kodiak Island Borough for funding to construct a new Alaska Department of Fish and Game Research Facility on Near Island in Kodiak. I believe the project is an important component of long-term monitoring and research in the Gulf of Alaska ecosystem as a part of the Gulf of Alaska Ecosystem Monitoring and Research (GEM) Program.

I understand the Kodiak Island Borough is prepared to meet the 50 percent match requirements specified by the EVOSTC program. I believe the proposal is consistent with both the goals and priorities set by the Trustee Council and beneficial to the Borough of Kodiak and the State of Alaska.

This project serves to update and increase Alaska's capacity to monitor and protect the Gulf of Alaska and other critical ecosystems, especially those damaged by the Oil Spill. The Kodiak Island Borough's FY2008 proposal to construct a state-of-the-art research facility would clearly benefit the region.

Sincerely,

Lisa Murkowski
United States Senator

July 30, 2008

Exxon Valdez Oil Spill Trustee Council
441 West 5th Avenue, Suite 500
Anchorage, Alaska 99501-234

Re: ADF&G Research Facility in Kodiak

Dear Council Members,

This letter is hand-written because I am at my summer fish camp in a remote bay on Kodiak Island. I hope my longhand will not diminish what I have to say.

I am a commercial salmon fisherman and have lived in Kodiak for 36 years. I also serve on the Kodiak Island Borough Assembly but am not now speaking for the Assembly. I am writing today to urge you to grant financial support for construction of the ADF&G research facility in Kodiak because I strongly believe it will insure that monitoring and restoration efforts continue in the Gulf of Alaska for the long-term in response to the Exxon Valdez oil spill.

Please consider the following points:

- Kodiak is ideally situated for a research base from which to conduct monitoring and restoration activities. The city of Kodiak on Kodiak Island is located in the central Gulf of Alaska and the Kodiak Island Borough lies in the midst

of the area polluted by the Exxon Valdez Oil Spill.

- Kodiak Island Borough resources injured by the oil spill include wildlife, commercial fisheries, designated wilderness areas, tidal zones and habitat, and archaeological sites.
- Kodiak Island Borough resources listed on the "2006 Injured Resources & Service Update" include Pacific Herring, Clams, Pigeon Guillemots, Commercial Fishing and Subsistence Resources.
- A modern ADF&G facility with laboratories and support offices in Kodiak will improve interagency collaboration between the Alaska Department of Fish & Game, NOAA/NMFS, National Wildlife Refuge and University of Alaska as their respective biologists work in the Gulf of Alaska regions of the oil spill, including the Kodiak Island Archipelago and the Alaska Peninsula.
- A modern ADF&G facility, with improved labs and support offices, will enhance communication between long-time commercial fishermen and subsistence users in the oiled regions of the Gulf of Alaska and ADF&G researchers monitoring the recovery and restoration of injured resources and marine species and the ecosystem that supports them.

- Kodiak is a major port and population hub for the Gulf of Alaska, including the Alaska Peninsula, that supports ADF&G's work in monitoring, managing and protecting resources in the GOA and Alaska Peninsula.

In conclusion, your granting financial support for construction of the new ADF&G Facility in Kodiak will further the good work of the Exxon Valdez Oil Spill Trustee Council to monitor the recovery and restoration of the resources and ecosystems in the oiled regions of the Gulf of Alaska for generations to come. Your careful consideration of this matter is greatly appreciated.

Sincerely,

Susan Jeffrey

Susan Jeffrey
P.O. Box 3363
Kodiak, Alaska
99615

July 28, 2008

KONIAG
INCORPORATED

Michael Baffrey
Executive Director
Exxon Valdez Oil Spill Trustees Council
411 West 5th Avenue, Suite 500
Anchorage, AK 99501

Re: Kodiak Island Borough
Alaska Department of Fish & Game
Kodiak Research Facility

Dear Mr. Baffrey:

It has come to my attention that the Kodiak Island Borough is seeking funding from the Exxon Valdez Oil Spill Trustees Council to help pay for the construction of a new Alaska Department of Fish and Game research facility in the city of Kodiak. I am writing to express my support for this important project.

The native community of Kodiak Island has always had a close connection to the sea. Many of us continue to depend on a variety of commercial fisheries to earn a living, and the subsistence harvest of a wide range of marine life is a vital part of our culture. Even after nearly two decades, the impact of the oil spill on the Alutiiq people of Kodiak continues to be a serious concern.

Unfortunately, the ability to monitor the numerous species impacted by the oil spill, and the means to work toward the restoration and recovery of these injured species has been impeded by the lack of adequate research facilities. Therefore, I support the construction of the proposed ADF&G research facility in Kodiak and urge the EVOS Trustees Council to provide funding.

Sincerely,

KONIAG, INC.

William Anderson, Jr.
President and CEO

104 Center Ave., Suite 205
Kodiak, Alaska 99615
1-800-658-3818
(907) 486-2550
FAX (907) 486-3325

July 27, 2008

Exxon Valdez oil Spill Trustee Council
441 West 5th Avenue, Suite 500
Anchorage, AK 99501-234

Dear Exxon Valdez oil Spill Trustee Council:

As more than 25 year residents and involved community members of Kodiak Island, we encourage the Exxon Valdez Oil Spill Trustee Council to assist restorations efforts for our island by building a research facility that is essential in maintaining adequate science to keep our fisheries maintained.

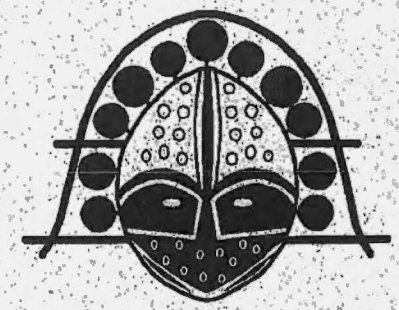
Kodiak Island continues to be one of the top fisheries communities in the United States. This coastal community's basic economy relies on the fisheries. And in order to maintain those fisheries, appropriate science is needed. With a new lab and office space for the Alaska Department on Fish and Game in the research park area of Near Island, monitoring as well as needed research and restoration of injured species and their ecosystem would assure fisheries would continue in the future on along term basis.

We urge the Council to fund this restoration project in Kodiak.

Sincerely,

Patricia Branson
Box 3888
Kodiak, Alaska 99615

Gordon Gould



Natives Of Kodiak, Inc.

July 25, 2008

Exxon Valdez Oil Spill Trustee Council
441 West 5th Avenue, Suite 500
Anchorage, AK 99501-234

Re: ADF&G Research Facility – Kodiak Project

Natives of Kodiak, Inc., an Urban Corporation formed pursuant to ANCSA, representing the descendants of Kodiak's original inhabitants, supports the development of a new facility in Kodiak for the purpose of housing the proposed Alaska Department of Fish and Game research laboratory and related offices.

This new facility will provide ADF&G the physical space necessary to continue their research and restoration activities related to EVOS restoration efforts.

Sincerely,

Anthony Drabek
President and CEO

215 Mission Road, Suite 201, Kodiak, Alaska 99615 • (907) 486-3606 • fax (907) 486-2745

July 24, 2008

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
441 WEST 5TH AVENUE, SUITE 500
ANCHORAGE AK 99501-234

RE: Proposed ADF & G Research Facility – Near Island, Kodiak project

Dear Council Members:

As a 30 year resident of Kodiak, I can't think of a better way to spend dollars, which will have a very long lasting effect on the Kodiak marine environment, than to invest in a modern, fuel efficient facility to boost research efforts on the mess left behind by the Exxon Valdez disaster. The State of Alaska Department of Fish and Game needs modern tools to work efficiently and this is a chance to provide one. The proposed building site on Near Island is a wonderful choice and I would request the Council's full support for this project.

Yours very truly,

Timothy J Hurley

TJH/amp

Afognak Native Corporation

215 Mission Road, Suite 212
Kodiak, Alaska 99615
(800) 770-6014 • (907) 486-6014
Fax (907) 486-2514

Exxon Valdez Oil Spill Trustee Council
441 West 5th Avenue, Suite 500
Anchorage, AK 99501-234

To Whom It May Concern:

On behalf of Afognak Native Corporation, I am writing this letter of support for the Kodiak Island Borough's Alaska Department of Fish & Game (ADF&G) Research Facility – Kodiak project.

The Kodiak Island Borough is submitting a proposal to obtain funding from the Exxon Valdez Oil Spill Trustee Council to support research functions related to damages resulting from the Exxon Valdez Oil Spill (EVOS). Resources in the Kodiak Island Borough injured by the oil spill included wildlife, fish, birds, designated wilderness, tidal communities, sediments, archeological sites, and human services.

The Kodiak Island Borough has determined that the best way of assisting restoration efforts is to provide support to the ADF&G's work in research, monitoring, managing and protecting resources in the Kodiak and Alaska Peninsula areas. To support and advance restoration efforts in these areas, the Kodiak Island Borough proposes to build a research facility that will provide appropriate lab and office space for the ADF&G to conduct research and restoration activities. The research completed at this facility will allow continued monitoring and restoration of the injured species and their ecosystem for many years into the future. This project will continue the EVOS restoration efforts on a long term basis.

Afognak Native Corporation fully supports this project in the Kodiak community.

Sincerely,

Richard Hobbs, II
President/CEO

KODIAK CHAMBER OF COMMERCE

100 E. Marine Way, Suite 300, Kodiak Alaska 99615 • (907) 486-5557 • FAX: (907) 486-7605
www.kodiak.org • Email: chamber@kodiak.org

July 21, 2008

Exxon Valdez Oil Spill Trustee Council
441 West 5th Avenue, Suite 500
Anchorage, AK 99501-234

Re: Support for ADF&G Research Facility – Kodiak, Alaska

To Whom It May Concern:

The Kodiak Chamber of Commerce fully supports the efforts of the Kodiak Island Borough to obtain funding from the Exxon Valdez Oil Spill Trustee Council to construct an Alaska Department of Fish and Game research facility. The new ADF&G facility will serve to support research functions related to damages resulting from the Exxon Valdez Oil Spill.

The Exxon Valdez oil spill caused significant damages to the area surrounding the Kodiak Island Borough. The wildlife including marine mammals, birds and fish were affected as well as those coastal communities whose livelihood depend on sport and commercial fishing.

Having a research facility dedicated to the restoration efforts in the Kodiak and Alaska Peninsula areas will allow continued monitoring and restoration of the injured species and their ecosystems in the future.

Please give serious consideration to fully funding the proposal for an ADF&G research facility submitted by the Kodiak Island Borough.

Yours in economic prosperity,

John Whiddon
President

RECEIVED
AUG 04 2008
EXXON VALDEZ OIL SPILL
TRUSTEE Council

Dedicated to Kodiak's Economic Future

Kodiak Island Borough School District
722 Mill Bay Road
Kodiak, AK 99615
Office of the Superintendent
(907) 481-6200

July 21, 2008

Exxon Valdez Oil Spill Trustee Council
441 West 5th Avenue, Suite 500
Anchorage, AK 99510-234

Dear Trustee Council Members:

The Kodiak Island Borough lies in the heart of the Gulf of Alaska in the midst of the Exxon Valdez Oil Spill Area. Resources in the Kodiak Island Borough injured by the oil spill included wildlife, fish, birds, designated wilderness, tidal communities, sediments, archeological sites, and human services. Many resources in the Kodiak Island Borough such as Pacific Herring, Clams, Pigeon Guillemots, Commercial Fishing and Subsistence, to name a few, remain listed as Recovering and Not Recovering in the 2006 Injured Resources and Services Update.

The Kodiak Island Borough has determined that the best way of assisting restoration efforts is to provide support to the Alaska Department of Fish and Game's work in research, monitoring, managing and protecting resources in the Kodiak and Alaska Peninsula areas. A needs assessment, conducted in 2002 by ASCG, Inc., found that the work of the Alaska Department of Fish &Game in Kodiak requires high-tech lab space with supporting offices that can only be accommodated by building a new facility.

To support and advance restoration efforts in the Kodiak and Alaska Peninsula areas, the Kodiak Island Borough proposes to build a research facility that will provide appropriate lab and office space for the Alaska Department of Fish and Game to conduct research and restoration activities. The research completed at this facility will allow continued monitoring and restoration of the inured species and their ecosystem for many years into the future. This project will continue the Exxon Valdez Oil Spill restoration efforts on a long term basis.

Sincerely,

Stewart McDonald
Superintendent

Memo: Exxon Valdez Oil Spill Trustee Council
441 W. 5th Ave. Suite 500
Anchorage, AK 99501-234

From: Craig Johnson, Edward Jones Financial Advisor

Date: July 21, 2008

Re: Support for ADF&G Research Facility on Near Island, Kodiak

Please receive this as written to support funding for a new ADF&G Research Facility on Near Island, near downtown Kodiak. This would support research funcations realted to damages from the Exxon Valdez Oil Spill of 1989.

If you have questions on this please call me; office, 907 486 5000, home, 486 4826.

Sincerely,

Craig H. Johnson

Craig H. Johnson
2705 Mill Bay Rd. Suite 201
c/o Edward Jones Investments
Kodiak, Alaska 99615

Providence Kodiak Island Medical Center
Hospital Administration
1915 East Rezanof Drive
Kodiak, AK 99615
t: 907.486.9595
f: 907.486.2336
www.providence.org

PROVIDENCE
Kodiak Island
Medical Center

July 21, 2008

Exxon Valdez Oil Spill Trustee Council
441 West 5th Avenue, Suite 500
Anchorage, AK 99501-234

Re: Kodiak Island Research Facility

Dear Council Members:

This letter is written in support of the Exxon Valdez Oil Spill Council funding for a new research facility for the Alaska Department of Fish and Game.

It is my understanding that the best way of assisting restoration efforts is to provide support to the Alaska Department of Fish and Game's work in research, monitoring, managing, and protecting resources in the Kodiak and Alaska Peninsula areas.

The Kodiak Island Borough proposes to build a research facility that will provide appropriate lab and office space for the Alaska Department of Fish and Game to conduct research and restoration activities. This research will allow continued monitoring and restoration of the injured species and their ecosystem for many years into the future.

Please look favorably upon this request for funding of this research facility on Kodiak Island.

Sincerely,

Donald J. Rush, CEO

4 Nickerson, Suite 400, Seattle, WA 98109
P.O. Box 31179, Seattle, WA 98103-1179
phone (206)726-9900 fax (206) 726-1667

North pacific SEAFOODS

July 21, 2008

Exxon Valdez Oil Spill Trustee Council
441 West 5th Avenue, Suite 500
Anchorage, AK 99501-234

To whom it may concern:

Please accept this letter of support for the current efforts to build a research facility with appropriate lab and office space for the Alaska Department of Fish and Game to conduct research and restoration activities in the Kodiak and Alaska Peninsula areas. The Kodiak Island Borough has proposed to build this new research facility and I strongly support this effort. The Alaska Department of Fish and Game needs an updated facility in order to continue their work in research, monitoring, managing, and protecting marine resources affected by the Exxon Valdez Oil Spill.

North Pacific Seafoods is a seafood processing facility in Kodiak and we have operated in Kodiak since the 1970's. Proper research and management of our marine environment is crucial for the longevity and sustainability of the seafood industry. Like most other businesses in coastal communities in the Gulf of Alaska, our economy is dependent upon responsible resource utilization from the marine environment. Harvesters, support businesses and processing workers derive their livelihoods from the oceans bounty. We support continued restoration activities to the areas of Kodiak Island and the Alaska Peninsula affected by the Exxon Valdez Oil Spill.

North Pacific Seafoods employs over 200 local processing workers as part of our crew. All of these people are full time residents of Kodiak. We also take deliveries from over 150 different commercial fishing vessels during the year. Most of these vessels are ported in the Gulf of Alaska with local crews. All of these people have been affected by the Exxon Valdez Oil Spill and on behalf of all of these people I strongly urge your support for a new Alaska Department of Fish and Game Research Facility.

Thank you very much for consideration to fund this important project.

Sincerely,

Matthew Moir
General Manager

Kodiak Filipino Women's Council
P.O. Box 3964
Kodiak, AK 99615

July 18, 2008

Exxon Valdez Oil Spill Trustee Council
441 West 5th Avenue, Suite 500
Anchorage, AK 99501-234

To the EVOS Trustee Council:

I would like to express my support to the Kodiak Island Borough's effort to support research functions related to damages resulting from the Exxon Valdez Oil Spill by constructing a new facility in Kodiak that will house the Alaska Department of Fish and Game research laboratory and related offices.

The Kodiak Island Borough lies in the heart of the Gulf of Alaska in the midst of the Exxon Valdez Oil Spill Area. Resources in the Kodiak Island Borough injured by the oil spill included wildlife, fish, birds, designated wilderness, tidal communities, sediments, archeological sites, and human services. Many resources in the Kodiak Island Borough such as Pacific Herring, Clams, Pigeon Guillemots, Commercial Fishing and Subsistence, to name a few, remain listed as Recovering and Not Recovering in the 2006 Injured Resources and Services Update.

The Kodiak Island Borough has determined that the best way of assisting restoration efforts is to provide support to the Alaska Department of Fish and Game's work in research, monitoring, managing and protecting resources in the Kodiak and Alaska Peninsula areas. A needs assessment conducted in 2002 by ASCG, Inc. found that the work of the ADF&G in Kodiak requires high-tech lab space with supporting offices that can only be accommodated by building a new facility.

To support and advance restoration efforts in the Kodiak and Alaska Peninsula areas, the Kodiak Island Borough proposes to build a research facility that will provide appropriate lab and office space for the Alaska Department of Fish & Game to conduct research and restoration activities. The research completed at this facility will allow continued monitoring and restoration of the injured species and their ecosystem for many years into the future. This project will continue the EVOS restoration efforts on a long term basis.

Sincerely,

Signature	Printed Name	Address in Kodiak	Date
Mercedes A Hawver	MARY GUILAS-HAWVER	PO Box 3621	7/18/08

ADDITIONAL SIGNATURES to the Kodiak Island Borough's effort to support research functions related to damages resulting from the Exxon Valdez Oil Spill by constructing a new facility in Kodiak that will house the Alaska Department of Fish and Game research laboratory and related offices.

Signature	Printed Name	Address in Kodiak	Date
Adela Guilas	ADELA GUILAS	PO Box 8688	7/18/08
	MEDI SAHTOMARCH	1014 LARCH ST KODIAK 99615	7/26/08
Adelaida Llave	ADELAIDA LLAVE	1812 Simonoff Kodiak AK	7/26/08
	DELIA N. ASPIRAS	P.O. Box 28, Kodiak AK	07/26/08
	VIRGINIA M. BORNMEN	P.O Box 4082 KODIAK, AK	07-26-08
	GEMMA ANASTACIO	P.O. BOX 4294 KODIAK, AK 99615	07/26/08
	GLORIA ANSECHO	709 HEMLOCK KODIAK	7/26/08
	Imelda Amid	812 Willow	7/26/08
	JACKIE BARRERA	1013 HEMLOCK ST.	7/26/08
	MARITES M	Mill Bay Rd.	7/26/08
	ELSA FRANCISCO	P.O. BOX 1069, KODIAK	7/26/08
Violet Garcia	Violet Garcia	717 Willow St.	7/26/08
	TERESITA A. GARCIA	1013 Hemlock St.	7/26/08

Alaska Whitefish Trawlers Association

P.O. Box 991
Kodiak, AK 99615
(907) 486-3910
alaska@ptialaska.net

July 18, 2008

To: Exxon Valdez Oil Spill Trustee Council
441 West 5th Avenue, Suite 500
Anchorage, AK 99501

Re: Supporting ADF&G Research Facility in Kodiak

The Alaska Whitefish Trawlers Association urges the EVOS Trustee Council to make available funds for a new research center in Kodiak.

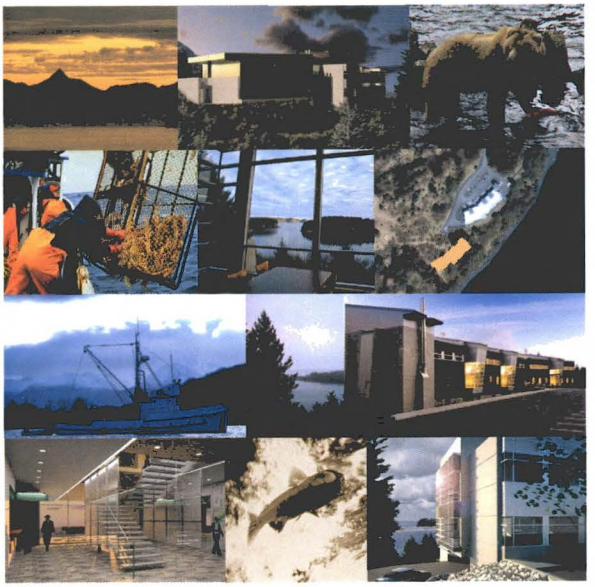
Kodiak's fisheries were badly damaged by the oil spill. Fishermen are still hurting from that summer. The environment is still hurting—you can dig a hole on most any beach and dig up oil that's left over from the spill.

Kodiak's fisheries are vital to this town and to the people who live here. Fisheries research is vital to the continued good health of our stocks. A new research facility with the latest testing equipment will allow continued monitoring and restoration of all the injured species, not just fish, and their ecosystems.

Using EVOS money to help restore Kodiak's and the state's fisheries and marine habitats is a fitting use for the funds.

Thank you for your consideration,

Alvin R. Burch
Executive Director
Alaska Whitefish Trawlers Association



KODIAK NEAR ISLAND
RESEARCH & ADMINISTRATION FACILITY

PROGRAM/CONCEPT DESIGN REPORT

June 2009

ECI/Hyer, Inc. Architecture & Interiors

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

Kodiak Island Borough • Owner
710 MILL BAY ROAD
KODIAK, ALASKA 99615
907.986.9343

State of Alaska Department of Fish & Game Region IV • User Agency
211 MISSION ROAD
KODIAK, ALASKA 99615
907.486.1801

ECI/Hyer, Inc. • Architecture & Interiors
101 W. BENSON BOULEVARD, SUITE 306
ANCHORAGE, ALASKA 99503
907.561.5543

HMS, Inc. • Cost Estimating
4103 MINNESOTA DRIVE
ANCHORAGE, ALASKA 99503
907.561.1653

PROGRAM SUMMARY

In October 2008, ECI/Hyer met with representatives of the Region IV headquarters of the Alaska Department of Fish and Game (ADF&G) along with Borough and State representatives to discuss the program requirements for the new facility. Those discussions and subsequent communications focused on site and space needs as well as space adjacencies. The space list included in this report summarizes the area allocations resulting from that initial effort. More detailed program requirements will be solicited during subsequent design phases and will build on user questionnaires supplied by ADF&G. These will include specific furnishing and equipment needs, environmental criteria, etc.

	Subtotal NSF
Office Space	**8,865**
Administration	649
Finfish Management	1,708
Finfish Research	1,712
Shellfish/Groundfish Management	1,539
Shellfish/Groundfish Research	1,088
Statewide Scallops	284
Biometricians	200
Sport Fish	607
Wildlife Conservation	428
Subsistence	0
IT	650
Support Space	**9,094**
Lobbies	600
Conference Room(s)	950
Library/Conference	900
Kitchen/Break Room	240
Copy Centers	320
Printer Alcoves	200
File/Storage Rooms	700
Mail Room	80
Laboratory	2,535
Loading Dock	300
Gear Storage, Lockers, Showers	330
IT Server & Storage	350
Restrooms	800
Maintenance, Housekeeping, Janitor	300

Subtotal NSF:	**17,959**
Circulation	35%
Subtotal GSF:	24,245
Walls & Structure	10%
Subtotal GSF:	26,669
Mechanical/Electrical:	8%
***Projected GSF** (not incl Parking Level):*	**28,803**

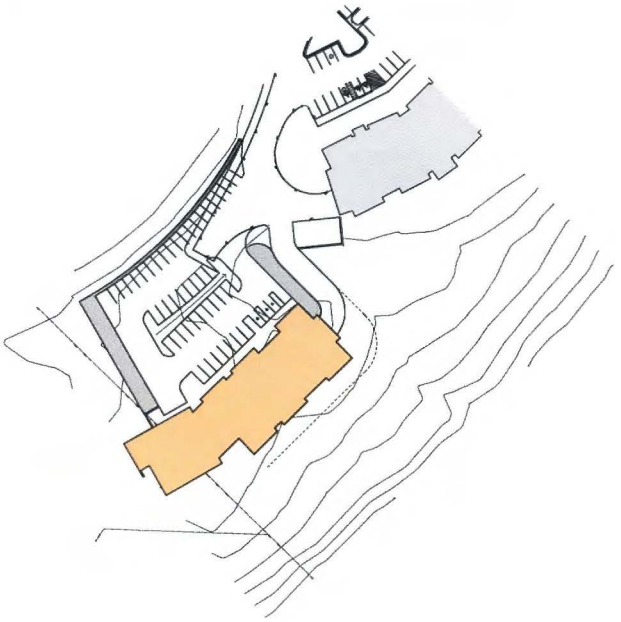
Parking spaces 75
Includes 8-10 government vehicles
Bike Storage

ARCHITECTURAL DESIGN NARRATIVE

The proposed Research & Administration Facility is located on Near Island in the City of Kodiak and will be home to Region IV of the Alaska Department of Fish and Game. The site is immediately adjacent to the Kodiak Fisheries Research Center (KFRC) which was constructed in the late 1990's and with which ADF&G currently shares some facilities.

Site Planning

The existing KFRC driveway is extended to the south to serve the new building. Parking is provided for employees and visitors using a combination of on-grade and covered spaces. The covered parking on the lowest level of the building is a necessary measure to provide the required number of spaces while reducing the development impact on the sloping site. When KFRC was constructed, underground services were extended to the south end of the existing driveway in anticipation of future development. This provides access to utilities for the new structure.



Plan Organization

The new Research and Administration Facility will house research and management components for the Finfish, Shellfish, Groundfish, Sport Fish and Wildlife divisions of ADF&G along with administrative offices and IT support services.

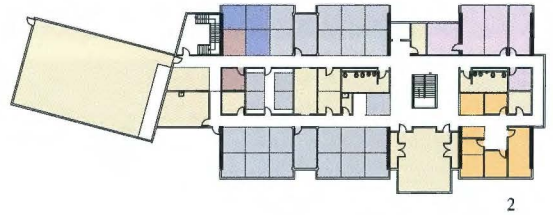
The concept plan is arranged on three levels with the lowest level as an open parking garage accessible by driveway at the north end of the building. The middle level is the main entry floor with grade-level access from the parking lot and includes office and laboratory spaces. The upper level consists of offices and major mechanical and electrical spaces.

This facility must accommodate a lot of public access, so ease of orientation by new visitors is essential. One central lobby space provides access to reception for each of the principal areas of Finfish, Shellfish/Groundfish and Sport Fish/Wildlife and administration. A central, open stair provides public access to the upper level and opens the space visually for orientation. The single, main entry will also facilitate supervision and security. There are conference rooms on each of the office floors immediately accessible from the lobby for both staff and visitor use. Glass storefronts along these rooms will allow dramatic views from the lobby to Trident Basin beyond.

Above: Concept design for interior lobby

The plan features a flexible arrangement of one, two and three-person offices to easily accommodate future modifications and to maximize access to daylight and views. The office planning module is largely influenced by the structural needs of the parking level, but works well on the office floors. Many of the offices are shared two-person offices, which overlays with the 10 foot by 20 foot parking module. Three-person offices can be paired in a yin-yang arrangement using the equivalent of three parking modules.

The central core of the office wing houses support functions and some open office, seasonal workstations. Restrooms are located for both staff and public use. Major mechanical and electrical services transit the building core on each floor.



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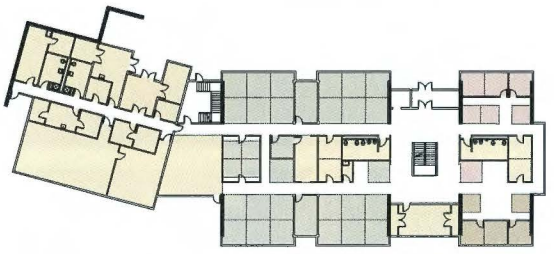

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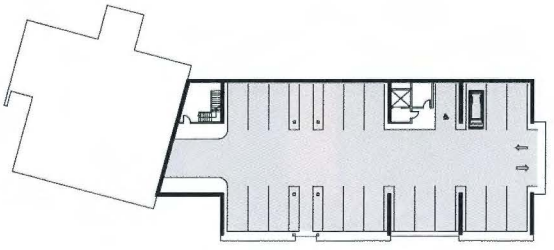

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DESIGN NARRATIVE (CON'T)

The laboratories are located in their own wing on the south end of the building and include a chemistry lab, wet lab, aging lab, wildlife lab and lab support functions. The wildlife lab is located adjacent to the loading area for receiving large game. A bear sealing area is also located adjacent to the loading dock.

Shared library and break room spaces are located in the 'knuckle' between the office and laboratory wings with views to the water.

The design team will work closely with ADF&G and the Borough early in the schematic design phase to reconcile review comments based on the included floor plans.

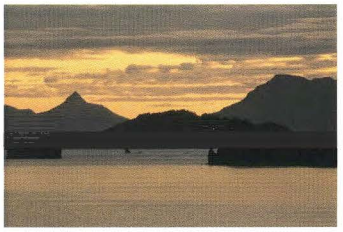
Above: Kodiak Fisheries Research Center
Below: Concept design exterior views

Exterior Design

The building exterior adopts some themes from the existing KFRC building while maintaining its own identity. Common elements include the use of a green profiled metal panel, exposed concrete wall panels and window patterns. With the exception of the roof over the mechanical rooms, low-slope roofs are used throughout. This will mitigate snow-slide issues and eliminate unnecessary building volume. The 'spline' that runs the full length of the building (enclosed by the green siding) provides space for mechanical distribution.

Structure

The building structure is anticipated to be non-combustible concrete and steel.



COST SUMMARY

01	**SITEWORK**	
	Site Preparation and Earthwork	$227,792
	Site Improvements	429,028
	Site Mechanical	206,474
	Site Electrical	111,688
02	**SUBSTRUCTURE**	252,607
03	**SUPERSTRUCTURE**	1,764,737
04	**EXTERIOR CLOSURE**	1,435,139
05	**ROOF SYSTEMS**	259,559
06	**INTERIOR CONSTRUCTION**	1,033,051
07	**CONVEYING SYSTEMS**	102,810
08	**MECHANICAL**	1,828,347
09	**ELECTRICAL**	838,515
10	**EQUIPMENT**	186,456
11	**SPECIAL CONSTRUCTION**	69,403
	Subtotal:	**$8,745,606**
12	**GENERAL REQUIREMENTS**	3,203,145
	Subtotal:	**$11,948,751**
13	**CONTINGENCIES**	2,678,717
	Total Estimated Construction Cost (2011):	**$14,627,468**

INDIRECT COSTS (% of construction cost)			
	FF&E		
	Design Fees		
	Site Investigation & Survey		
	Construction Management		
	In-House Construction Management		
	Owner's Administration		
	Legal/Counseling		
	Financing		
	Art Work		
	Subtotal:	29.0%	**$18,869,434**
PROJECT CONTINGENCY		10.0%	1,886,943
	Total Estimated Project Cost (2011):		$20,756,377

PROGRAM SPACE LIST - OFFICES

Heavy outline denotes shared office occupants

Division	#	Name	Title SOA Equivilant	Range	Code See table	Space Type See table	Qty	NSF	Group With # If shared office	Adjacent To # Primary adjacency	Contact 1=low; 10=high
100 Administration											
	110.01	Jim McCullough	RS	22	D	CF-Private	1	195		110.02	3
	110.02	Robin Gardner	AOI	17	E	CF-Group	1	100	none	110.01	2
	110.03	Lori Ryser	ACCT T II	14	G	CF-Group	1	80			1
	110.04	Renee Canete	AC	10	I	CF-Group	1	60			1
	110.05	Sandra Moore	AA II	14	I	CF-Open	1	75		Reception	2
	110.06	Blair Murray	ADC III	10	I	CF-Open	1	75			8
	110.07	Seasonal W/S			I	MSF-Open	1	64		110.05	0
						Subtotals:	***7***	***649***			
200 Finfish											
Finfish Management	210.01	Dave Sterritt	FB IV	20	E	CF-Group	1	180	none		5
	210.02	Jeff Wadle	FB III	18	E	CF-Group	1	120	none	Reception	8
	210.03	Jeff Spalinger	FB II	16	E	CF-Group	1	120			5
	210.04	Joe Dinnocenzo	FB II	16	E	CF-Group	1	120			5
	210.05	Iris Caldentey	FB I	14	E	CF-Group	1	120			3
	210.06	Aaron Poetter	FB III	18	E	CF-Group	1	120			3
	210.07	Unfilled	FB II	16	E	CF-Group	1	120			1
	210.08	Unfilled	FB II	16	E	CF-Group	1	120			1
	210.09	James Jackson	FB II	16	E	CF-Group	1	120	220.03-.05		1
	210.10	Todd Anderson	FB II	18	E	CF-Group	1	120	220.03-.05		1
	210.11	Bob Murphy	FB III	18	E	CF-Group	1	120			1
	210.12	Trent Harthill	FB II	16	E	CF-Group	1	120			1
	210.13	Joanne Shaker	FWT III	11	G	CF-Open	1	80		Receptionist	10
	210.14	Seasonal W/S			G	MSF-Group	2	128			0
						Subtotals:	***15***	***1708***			
Finfish Research	220.01	Steve Honnold	FB IV	20	E	CF-Group	1	180	none		5
	220.02	Stephen Schrof	FB III	18	E	CF-Group	1	120	none		4
	220.03	Heather Finckle	FB II	16	E	CF-Group	1	120	210.09-10		3
	220.04	Unfilled	FB II	16	E	CF-Group	1	120	210.09-10		2
	220.05	Darin Ruhl	FB I	14	E	CF-Group	1	100	210.09-10		1
	220.06	Mark Witteveen	FB III	18	E	CF-Group	1	120			4
	220.07	Matt Foster	FB III	16	E	CF-Group	1	120			4
	220.08	Elisabeth Creelman	FB I	14	E	CF-Group	1	100			1
	220.09	Steven Thomsen	FB I	14	E	CF-Group	1	100			2
	220.10	Robert Baer	FB II	16	E	CF-Group	1	120			2
	220.11	Unfilled	FB II	16	E	CF-Group	1	120			2
	220.12	Unfilled	FWT II	9	G	MSF-Group	1	64			1
	220.13	Lisa Marcato	PUB S II	16	E	CF-Group	1	100	none		4
	220.14	Michelle Moore	FWT III	11					Use FM6		1
	220.15	Abby Reed	FWT II	9					Use FM6		1
	220.16	Gregory Watchers	FB I	14	E	CF-Group	1	100	.17		1
	220.17	Seasonal W/S			G	MSF-Group	2	128			0
						Subtotals:	***16***	***1712***			
300 Shellfish - Groundfish											
Shellfish Management	310.01	Wayne Donaldson	FB IV	20	E	CF-Group	1	180	none	Reception	8
	310.02	Patricia Conley	ADC III	10	I	CF-Open	1	75		Receptionist	10
	310.03	Nicolas Sagalkin	FB III	18	E	CF-Group	1	120		Reception	10
	310.04	Mark Stichert	FB II	16	E	CF-Group	1	120		Reception	10
	310.05	Kally Spalinger	FB II	16	E	CF-Group	1	120			5
	310.06	Aaren Ellsworth	FB I	14	E	CF-Group	1	100			2
	310.07	Sonya Elmejjati	FB II	16	E	CF-Group	1	120			5
	310.08	Rachal Latham	FB I	14	E	CF-Group	1	100			2
	310.09	Kimberly Phillips	FWT III	11	G	MSF-Group	1	64			7
	310.10	Paul Converse	FWT III	11	G	MSF-Group	1	64			7
	310.11	Vacant	FB I	14	E	CF-Group	1	100			2
	310.12	Vacant	FB II	16	E	CF-Group	1	120			2
	310.13	Dusty Parsons	FWT II	9	G	MSF-Group	1	64			2
	310.14	Unfilled	FWT III	11	G	MSF-Group	1	64			2
	310.15	Unfilled	FWT II	9	G	MSF-Group	1	64			2
	310.16	Seasonal W/S			G	MSF-Group	1	64	320.16 & Grndfsh		0
						Subtotals:	***16***	***1539***			

PROGRAM SPACE LIST - OFFICES (CON'T)

Division	#	Name	Title SOA Equivilant	Range	Code See table	Space Type See table	Qty	NSF	Group With # If shared office	Adjacent To # Primary adjacency	Contact 1=low; 10=high
Shellfish Research	320.01	Doug Pengilly	FB IV	20	E	CF-Group	1	180	none		2
	320.02	Carrie Worton	FB III	18	E	CF-Group	1	120			1
	320.03	Phillip Tschersich	FB I	16	E	CF-Group	1	100			1
	320.04	Future	FB I	14	E	CF-Group	1	100			1
	320.05	Laura Slater	FB II	16	E	CF-Group	1	120			1
	320.06	Jasslyn Bradbury	FWT III	11	G	MSF-Group	1	64			1
	320.07	Robert Gish	FB III	18	E	CF-Group	1	120			1
	320.08	Leslie Watson	FB II	16	E	CF-Group	1	120			1
	320.09	Susan Byersdorfer	FB I	14	E	CF-Group	1	100			1
	320.10	Seasonal W/S			G	MSF-Group	1	64	310.16 & Grndfsh		0
						Subtotals:	***10***	***1088***			
Statewide Scallops	330.01	Gregg Rosencranz	BIOM III	20	E	CF-Group	1	100	none	2,3 +BIOM	1
	330.02	Ryan Burt	FB II	16	E	CF-Group	1	120			5
	330.03	Marsha Spafford	FWT III	11	G	MSF-Group	1	64			5
						Subtotals:	***3***	***284***			
Biometricians	340.01	David Barnard	BIOM III	20	E	CF-Group	1	100	none		5
	340.02	Perdue Vacant	BIOM III	19	E	CF-Group	1	100	330.01	1	4
						Subtotals:	***2***	***200***			
400 Sportfish - Wildlife Conservation											
Sportfish	410.01	Doris Mensch	Tech	12	I	CF-Open	1	75		Receptionist also for WL	10
	410.02	Len Schwarz	FB III	18	E	CF-Group	1	120	none		6
	410.03	Donn Tracy	FB II	16	E	CF-Group	1	120		Reception	8
	410.04	Suzanne Schmidt	FB I	14	E	CF-Group	1	100			7
	410.05	Future Intern	Tech	11	I	MSF-Open	1	64			2
	410.06	Future Intern	Tech	9	I	MSF-Open	1	64		Wildlife	1
	410.07	Seasonal W/S			I	MSF-Group	1	64	420.05		
						Subtotals:	***7***	***607***			
Wildlife Conservation	420.01	Larry Van Daele	WB III	18	E	CF-Group	1	100	none	Reception	8
	420.02	John Crye	WB I	12	E	CF-Group	1	100		Reception	8
	420.03	Vickie Vanek	WB II	16	E	CF-Group	1	100			6
	420.04	Future Intern	Tech	9	I	MSF-Open	1	64		Sportfish	2
	420.05	Seasonal W/S			I	MSF-Group	1	64	410.07		
						Subtotals:	***5***	***428***			
500 IT											
	510.01	Ric Shepard	AP IV	20	E	CF-Group	1	200	none		5
	510.02	Neil Moomey	AP III	18	E	CF-Group	1	100	none		4
	510.03	Doug Dorner	MNS I	18	E	CF-Group	1	175			5
	510.04	Darren Asuncion	PC Tech II	16	E	CF-Group	1	175			5
						Subtotals:	***4***	***650***			

Total NSF:	***8865***
Total Workstations:	***85***

PROGRAM SPACE LIST - SUPPORT

#	Sub #	Name	Qty	NSF	Subtotal NSF	Adjacent To Primary adjacency	Remarks
610.01		Lobby/Reception Counter	3	200	600	Each division	
610.02		Large Conference Room	1	650	650	Public access	
610.03		Small Conference Room	1	300	300		
610.04		Library/Conference Room	1	900	900		Could be split by floor
610.05		Kitchen/Break Room	1	240	240	Centralized	
610.06		Copy Center	2	160	320	Each floor	
610.07		Printer alcoves	4	50	200	Distributed	
610.08		File/Storage Room	7	100	700	Each division	
610.09		Mail Room	1	80	80	Entry	
610.10		Chemistry Lab	1	965	965		For genetics and limnology
610.11		Pressing/Aging Lab					
	610.11a	Aging Lab - Scale Room	1	150	150	Chem Lab	
	610.11b	Aging Lab - Dark Room	1	100	100	Chem Lab	
	610.11c	Aging Lab - Storage	1	80	80	Chem Lab	
610.12		Wet Lab	1	485	485		
610.13		Cooler/Freezer Room	1	200	200	Wet Lab	
610.14		Wildlife Lab	1	225	225		
610.15		Wildlife Freezer	1	100	100	Wildlife Lab	
610.16		Lab Storage	1	100	100	Labs	
610.17		Pot-tag Storage Room	1	50	50		
610.18		Video Lab	1	80	80	Shellfish/Groundfish	
610.19		Loading Dock	1	300	300		
610.20		Field Gear Storage/Lockers	1	200	200	Loading dock	
610.21		Toilet/Shower Rooms	2	165	330	Loading dock	
610.22		Server Room	1	150	150	IT	
610.23		IT Storage	1	200	200	IT	
610.24		Radio Room	1	64	64	Shellfish/Groundfish	
610.25		Restrooms	4	200	800	2 ea floor	
610.26		Maintenance/Housekeeping	1	200	200		
610.27		Janitor Closets	2	50	100	Each floor	
610.28		Bear Sealing	1	225	225		Outside
				Total NSF:	***9,094***		

OUTLINE SPECIFICATION

02 SITE CONSTRUCTION

- Site preparation:
  - Minimize site disturbance beyond construction limits
- Topsoil: Remove, stockpile and reinstall install to the extent possible
- Filling and backfilling: NSF materials
- Erosion and Sediment Control: Comply with state and local regulations
- Rock retaining walls and embankments; match existing type
- Utilities:
  - Extend existing utilities where terminated under KFRC project
  - Lift station
  - Site lighting
- Bituminous pavement: Parking and drive lanes
- Concrete pavement: Sidewalks
- Site improvements:
  - Bicycle racks; accommodate 12 bicycles
  - Traffic signage: Directional and accessible signage
- Planting:
  - Nursery-grown species TBD
  - One year maintenance

03 CONCRETE

- Footings, foundations, retaining walls, slab-on-grade, parking slab, composite slabs and structural above-grade walls
- Board-formed (or form liner) where indicated

04 MASONRY (Not used)

05 METALS

- Structural steel framing including columns, beams, joists, metal decks and bracing. Assume composite floor slabs
- Cold-formed exterior structural wall studs
- Metal fabrications:
  - Exit stair: Concrete-filled metal pan treads on steel channel stringers; fully welded; pipe railings
  - Monumental stair: 3/8" 316 stainless steel diamond plate treads on steel stringers and tread supports; perforated steel risers; fully welded; ornamental metal cable railings with stainless steel handrails
- Decorative wire mesh display panels and cable support system at lobby stair

- Display walls in lobbies: Perforated, galvanized steel sheet over Homasote panels
- Expansion control:
  - Extruded aluminum seismic roof, wall and floor assemblies with elastomeric inserts

06 WOOD AND PLASTICS

- Rough carpentry: Fire-retardant treated lumber and sheet products in all concealed locations
- Finish carpentry:
  - Misc. standing and running trim: Clear, white hardwoods
  - Hardwood plywood paneling: Face veneer species TBD; clear finish
- Architectural woodwork:
  - Custom cabinets and casework: Reception desks, built-in casework, lavatories; plastic laminate and wood veneer faced units with plastic laminate and solid surface countertops; flush overlay; satin stainless hardware; AWI Custom Grade

07 THERMAL AND MOISTURE PROTECTION

- Waterproofing: Fluid-applied waterproofing with drainage mat at all below-grade locations bounding habitable space and parking garage
- Dampproofing: Foundation walls not included above
- Thermal protection:
  - Vapor retarder: 10 mil polyethelene at stud walls; 40 mil composite, self-adhering sheet (Henry Blueskin WP 200) at roof and soffit
  - Air and moisture barrier: Vaproshield
  - Batt insulation: Formaldehyde-free fiberglass; fill stud cavity (R-19 min)
  - Board insulation: R-11 extruded polystyrene foundation insulation; R-38 extruded polystyrene or polyiso roof insulation; tapered roof insulation where required to maintain min. 3/8" per foot slope at main slopes, ¼" per foot at valleys
- Wall and soffit panels:
  - Prefinished, insulated metal wall panels: Centria 'Formawall Dimension Series' ; 2" thickness with aluminum face; 70% Kynar metallic finish – Versacore PF
  - Prefinished, formed metal siding: Centria 'Concept Series' in aluminum over 2" Centria 'Metal Wrap' insulated backing panels (or field assembled system of Z-furring, 2" board insulation and gypsum sheathing); color to match KFRC building
  - Metal soffit panels: Centria 'Versawall'; 4" insulated panel with striated face at parking garage soffit
- Membrane roofing:
  - 0.060 EPDM or PVC (TBD)
  - Fully-adhered or mechanically fastened (TBD)
  - FMG 4450 and 4470; Fire/Windstorm Class 1A-120; Hail resistance SH
  - Vapor retarder: 40 mil composite
  - Cushion sheet and deck sheathing: Glass mat faced gypsum panels
  - Flashings: Same as membrane material
  - Walking pads: As required for mechanical items
- Roof Accessories: Roof hatch(es)
- Joint Sealers suitable for location and finish
- Firestopping: At rated separations

Roof , Wall and Soffit Assemblies:

- Roof: Membrane roofing; cushion board; rigid and tapered insulation; vapor retarder; deck sheathing; metal decking

- Walls:
  - Wall Assembly A: Insulated metal panels; air and moisture barrier; gypsum sheathing; metal studs with full batt insulation; vapor retarder; gypsum wallboard (2" Z-furring with GWB in office areas for electrical distribution)
  - Wall Assembly B: preformed metal siding; air and moisture barrier; insulated backing panels (or alternate field-built assembly); gypsum sheathing; metal studs with full batt insulation; vapor retarder; gypsum wallboard
  - Wall Assembly C: concrete panels; air and moisture barrier; gypsum sheathing; 2" rigid insulation on Z-furring; metal studs with full batt insulation; vapor retarder; gypsum wallboard
- Soffit Assembly: metal soffit panels; vapor retarder (Blueskin); gypsum sheathing; metal studs and/or suspension system

08 DOORS AND WINDOWS

- Steel doors and frames:
  - Exterior doors: 14 ga. G60 galvanized, seamless
  - Interior doors: 14 ga., seamless
  - Welded steel frames, galvanized at exterior
  - UL listed at rated openings
- Flush wood doors: AWI Custom Grade; species TBD
- Fiberglass doors: May be a consideration at wet labs
- Aluminum curtainwall: Kawneer 1600, CMI ___; clear anodized
- Hardware: Heavy-duty commercial grade; keyed to Borough standards
- Glazing:
  - Exterior curtainwall: High-performance, low-E, insulated units; PPG XL70
  - Safety glazing at code-specified locations
  - Wired glass at rated openings and doors

09 FINISHES

- Metal support assemblies:
  - 22ga. interior, non-load bearing wall studs at 16" OC
  - Stud deflection track at roof connections
  - Misc. furring
  - Ceiling suspension system with seismic restraint
- Gypsum board:
  - 5/8" Type X
  - ½" water-resistant gypsum backer board and/or tile backer board
  - Fiberglass sound batts at sound-rated partitions (typical between occupied spaces)
- Suspended acoustical ceilings:
  - Basis: USG Millennia ClimaPlus (NRC 0.70), 2x2 tegular, standard grid; at offices, conference rooms, corridors, etc.
  - Specialty ceilings: Partial ceilings in lobby and conference rooms – material TBD
- Resilient Flooring:
  - Static –dissipative VCT: Server and telecom rooms
  - Linoleum tile: Kitchen/break room, copy rooms, mail room,
  - Sheet vinyl with welded seams: Laboratories; lab corridor
  - Coved rubber base
- Carpet tile at offices, conference rooms, office corridors, libraries; allow $48 SY.
- Tile:
  - Porcelain floor and full-height wall tile at restrooms
  - Natural slate tile at lobbies

08 DOORS AND WINDOWS

- Steel doors and frames:
  - Exterior doors: 14 ga. G60 galvanized, seamless
  - Interior doors: 14 ga., seamless
  - Welded steel frames, galvanized at exterior
  - UL listed at rated openings
- Flush wood doors: AWI Custom Grade; species TBD
- Fiberglass doors: May be a consideration at wet labs
- Aluminum curtainwall: Kawneer 1600, CMI ___; clear anodized
- Hardware: Heavy-duty commercial grade; keyed to Borough standards
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- Tile:
  - Porcelain floor and full-height wall tile at restrooms
  - Natural slate tile at lobbies
- Veneer wall panels: Marlite MAP 40 System at conference rooms, or equivalent custom built
- FRP wall panels: At loading area, maintenance areas and some laboratory walls over GWB
- Painting: Standard commercial grade paint systems

10 SPECIALTIES

- Visual display boards:
  - Marker boards in offices, conference rooms and labs
  - Tackboards in copy rooms and labs
- Compartments and cubicles: Solid plastic or phenolic toilet and shower partitions
- Louvers: Architectural louvers with 70% Kynar finish

- Wall and corner guards: Full-height stainless steel corner guards in office corridors; wall bumper guard in lab corridor
- Flagpoles: (2) 30' concealed halyard type
- Identification devices:
  - Exterior panel signs at road entry and at entry to parking area
  - Cast aluminum letters on exterior building wall
  - Interior panel signs for department identification/public wayfinding
  - Room plaque signs at all doors; accessibility standards
- Lockers: (12) 18x18x72 ventilated lockers in Gear Storage; galvanized with baked finish
- Fire extinguishers, cabinets: Recessed cabinets except in utility spaces
- Metal storage shelving: Heavy-duty type at storage rooms
- Toilet and bath accessories: Typical configuration

11 EQUIPMENT

- Library shelving: Metal shelving with end panels; book and periodical types
- Projection screens: Motorized, ceiling recessed in conference rooms
- Dock bumpers and leveler
- Residential equipment: In Kitchen/Break Room – range, microwave, refrigerator, dishwasher, range hood, trash compactor; heavy-duty residential grade
- Laboratory equipment:
  - Fume hoods: (1) 8' hood in Chemistry Lab; (2) 6' hoods in Wet Lab
  - Glass drying racks at each sink
  - Ventilated storage cabinets
  - Necropsy table?
  - Overhead service carriers
  - Emergency eyewash/showers

12 FURNISHINGS

- Floor mats: Recessed entry mats
- Laboratory casework:
  - Chemistry Lab: Laboratory-grade plastic laminate faced units with reagent and acid-resistant shelving; epoxy resin countertops with integral sinks; reveal overlay with PVC edges
  - Wet Lab, Aging Lab and Wildlife Lab: Same as above with option for polypropylene cabinets and/or 316 stainless steel countertops
- Window shades:
  - Mechoshade, perforated shades at all exterior windows except stair and entry curtainwall
  - Motorized Mechoshade, dual perforated and blackout shades at conference rooms

13 SPECIAL CONSTRUCTION

- Cold storage rooms: Laboratory walk-in freezer and cooler with recessed freezer floor; Wildlife freezer with recessed floor

14 CONVEYING SYSTEMS

- Hydraulic elevator: 3-stop, 3,000 lb. passenger elevator
- Crane rail and electric hoist in Wildlife lab; 1500 lb. capacity

CODE SUMMARY

Kodiak Zoning Regulations

Chapter 17.130 Public Use Lands District

Permitted use
Setbacks:
- Front Yard: 25 feet
- Side Yard: 25 feet
- Rear Yard: 25 feet

Building height limit: 50 feet

2006 IBC

Chapter 3 – Use and Occupancy Classification

Occupancy:
A-3 (Assembly) – Conference rooms > 50 occupancy
B (Business) – Offices, laboratories
S-1 Storage rooms
S-2 Open parking garage
H-3 – Generator room (if used) – diesel is a Class II combustible liquid – the maximum allowable quantity is: 480 gallons. If this quantity is exceeded this area is a H-3 (verify pressurization of the tank does not exceed 15 pounds per square inch; if the pressure does exceed 15 psi the area is H-2)

Control Areas: A single control area for the entire building is assumed. Hazardous materials associated with the laboratories will need to be quantified to verify this approach.

Chapter 4 – Special Detailed Requirements Based on Use and Occupancy

406.2 - Parking Garages

406.2.7 Separation from other occupancies per 508.3
406.3.3 Types I, II, or IV construction required
406.3.3.1 Open Parking Garage requirements for use of natural ventilation:
- Openings on two or more sides
- Area of openings ≥ 20% of total perimeter wall area
- Aggregate length of openings ≥ 40% of perimeter wall length

Chapter 5 - General Building Heights and Areas

502.1 The parking level is not a Basement since the story above the parking level is greater than 12 feet above grade at any one point

503.1.2 Buildings on the same lot: ADF&G and KFRC are to be regulated as separate buildings

Table 503 – Allowable Area for type II B construction (assumed):

Occupancy	Area	Height (55 feet)
A-3[1]	9,500 s.f.	*2 stories*
B	23,000 s.f.	4 stories
S-1	17,500 s.f.	3 stories
S-2[2]	50,000 s.f.	8 tiers

(1) Most restrictive area – use this area as basis for nonseparated uses (except parking)
(2) Table 406.3.5

504 – Height Modifications
504.2 – Automatic sprinkler system increase:
- 55 feet + 20 feet (increase) = 75 feet maximum
- 2 stories + 1 story (increase) = 3 stories maximum

506 - Area Modifications

506.2 Frontage increase: Assume open space on 4 sides; min. 30 feet.
506.3 Automatic sprinkler system increase applies
506.4 Maximum Area Determination:
Max. allowable area per story: 35,625 SF (see attached calculation)
x 3 stories
Max. allowable area total: 106,875 SF

Actual measured area (IBC measured to inside face of exterior wall):
Parking Level: 9,962 square feet
Level 1: 15,245
Level 2: 13,234
Total: 38,441 square feet

508 – Mixed Use and Occupancy

508.3.2.1 - Nonseparated uses: The most restrictive occupancy shall also determine the requirements under section 403 (High Rise building section is not applicable to this project) and Chapter 9 (Fire Protection Systems).

508.3.2.2 - The required type of construction and the allowable height and area shall be determined by the most restrictive occupancy.

508.3.2.3 Separation – no separations required. Exception a generator room (H-3 occupancy) which would be separated from the other occupancies by 2 hour rated walls and floor ceiling assembly per NFPA 110 chapter 7.2.1.1.

509.7 – Special Provisions

509.7 – Open parking garage beneath Groups A, I, B, M and R

- Shall not exceed height and area limitations under 406.3 (50,000sf; 8 tiers)
- Height and area of building above shall not exceed limitations of 503.
- Height in stories and feet for building above parking shall not exceed 503 as taken from grade plane including parking level (3 stories; 75 ft).
- 2-hour horizontal occupancy separation between parking garage and building above
- 2-hour vertical separations between parking garage and exit and elevator enclosures
- 2-hour protected structural and bracing elements supporting building above

Chapter 6 - Types of Construction

Assume Type II B construction

Table 601 – Fire-Resistance Rating Requirements for Building Elements

Non combustible non rated construction:

Structural Frame ..... 0 hours
Bearing Walls Interior and Exterior ..... 0 hours
Nonbearing walls and partitions – Exterior ..... 0 hours
Nonbearing walls and partitions – Interior..... 0 hours
Floor Construction..... 0 hours
Roof Construction ..... 0 hours

Table 602 – Fire-Resistance Rating Requirements for Exterior Walls Based on Fire Separation Distance:

Fire Separation	Rating for S-1 Occupancy	Rating for A, B & S-2 Occupancy
<5 feet	2 hours	1 hour
≥5 feet and < 10 feet	1 hour	1 hour
≥10 feet and < 30 feet	0 hours	0 hours
≥ 30 feet	0 hours	0 hours

Chapter 7 - Fire-Resistance-Rated Construction

Table 704.8 – Maximum Area of Exterior Wall Openings – note "g" Buildings whose exterior bearing wall, exterior nonbearing wall and exterior structural frame are not required to be fire-resistance rated shall be permitted to be unlimited unprotected openings.

706 – Fire Barriers

707 - Shaft Enclosures

707.4 – 1 hour fire barrier where connecting less than 4 stories, except 2 hour at parking garage per above. (see also Ch. 10)

707.14.1 – Elevator lobbies not required if connecting 3 floors or less. Rated enclosure at parking level required per above

711 – Horizontal Assemblies – 2-hour separation between parking garage and building above

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Assume Type II B construction

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711 – Horizontal Assemblies – 2-hour separation between parking garage and building above

Chapter 8

Interior Finishes

Table 803.5

Occupancy	Vertical exits and exit passageways	Exit access corridors and other exit-ways	Enclosed rooms
A-3*	Class C	Class B	Class C
B	Class C	Class C	Class C
S-1	Class C	Class C	Class C
S-2	Class C	Class C	Class C

Chapter 9

Fire Protection Systems

Sprinklers provided per NFPA 13

905
Stand Pipes – Not required – Level 2 is less than 30 feet above the lowest level of fire department vehicle access.

906 – Portable Fire Extinguishers – as per the International Fire Code

907 – Fire Alarm and Detection Systems – provided per 907.2.1 through 907.2.23

Chapter 10

Means of Egress

Section 1004.1.1 – Occupant Load per table 1004.1.1:

Level	Occupancy	Area SF	Area/Occ	Occupants
Parking	S-2	9,962	200	50
1	B	15,245	100	153
2	A-3 (Conf Rm)	621	7	89
2	B	10,387	100	104
2	Mech	2226	300	8
			Total:	404

S-1 Storage rooms are included in B Occupancy calculation

1005 – Required exit width

Level 1 = 153 occupants (.15" doors) = 23 inches of door width; provide required min. door widths per 1008
Level 2 = 201 (.2" stairs) = 41 inches = 2 stairs at 21" each; provide min. stair widths per 1009

1014.3 – Common Path of egress travel shall not exceed 100 feet for occupancies B and S (exception 2 for buildings with sprinkler systems)

Table 1015.1 – rooms with one exit:

- A, B, F = maximum 49 occupants
- S = maximum 29 occupants

Rooms with occupant loads greater than those listed above shall have two exits.

1015.2.1 – Exception 2. Exit separation is 1/3 of area served where two exits are required.

1016
Exit Access Travel Distance

Occupancy	Travel Distance
*A-3**	250 feet
B	300 feet
S-1	250 feet
S-2	400 feet

Table 1017.1 – Corridor Fire Resistance Rating
Non-rated corridors in A, B, F, and S occupancy (building is equipped with a sprinkler system)

1017.3 – Dead Ends
50' for sprinklered B occupancies

Chapter 11
Accessibility

This project is required to comply with ICC /ANSI 117.51 and ADA requirements.

Chapter 29
Plumbing Systems
Table 2902.1

Occupancy	Occupant Load	Water Closets		Lavatories		Drinking Fountains
A-3 & B	354	M	F	M	F	
		5	5	4	4	4

S-2 Not included

Based on 2006 IBC

Assumptions: A-3 Occupancy (most restrictive)
Type II-B construction; fully sprinklered
Separation on 4 sides
3 Story

IBC SECTION 506 AREA MODIFICATIONS

Description	Sym.	Value	Notes
Building perimeter which fronts on a public way or open space having 20 feet open minimum width.	(F)	615 ft.	*insert value and ref. Section 506.2*
Minimum width of public way or open space	(W)	30 ft.	*insert value, 20 ft min. 30 ft max; weighted avg for varying widths; see Section 506.2.1 for exceptions*
Perimeter of entire building	(P)	615 ft.	*insert value*
Area increase due to frontage in percent calculated in accordance with Section 506.2	(I_f)	75%	*do not insert value, this cell is calculated from the prior cells.* ***(Equation 5-2)*** $I_f = 100\ [(F/P) - 0.25]\ W/30$
Area increase due to sprinkler protection (percent) as calculated in accordance with Section 506.3	(I_s)	200%	*insert percent increase per section 506.3, enter '0' if no sprinklering.* I_s *= 200% for multi-story buildings &* I_s *= 300% for single story buildings.*
Tabular area per story in accordance with Table 503 (square feet)	(A_t)	9,500 sf	*enter basic allowable from Table 503*
Adjusted allowable area per story due to frontage (square feet)	(A_a)	**35,625 sf**	***(Equation 5-1)*** $A_a = A_t\ [A_t I_f/100] + [A_t I_s/100]$

2006 International Energy Conservation Code

Table 502.2 Building Envelope Requirements: Opaque Assemblies

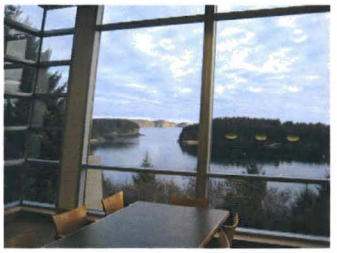
Climate Zone 7

Roofs	
Insulation entirely above deck	R-20 ci
Walls, Above Grade	
Mass	R-11.4 ci
Metal framed	R-13 plus R3.8 ci
Walls, Below Grade	
Below grade wall	R-7.5 ci
Floors	
Mass	R-15 ci
Joist/Framing	R-30
Slab-on-Grade Floors	
Unheated slabs	No Requirement
Heated slabs	R-10 for 36in. Below
Opaque Doors	
Swinging	U-0.70
Roll-up or sliding	U-0.50

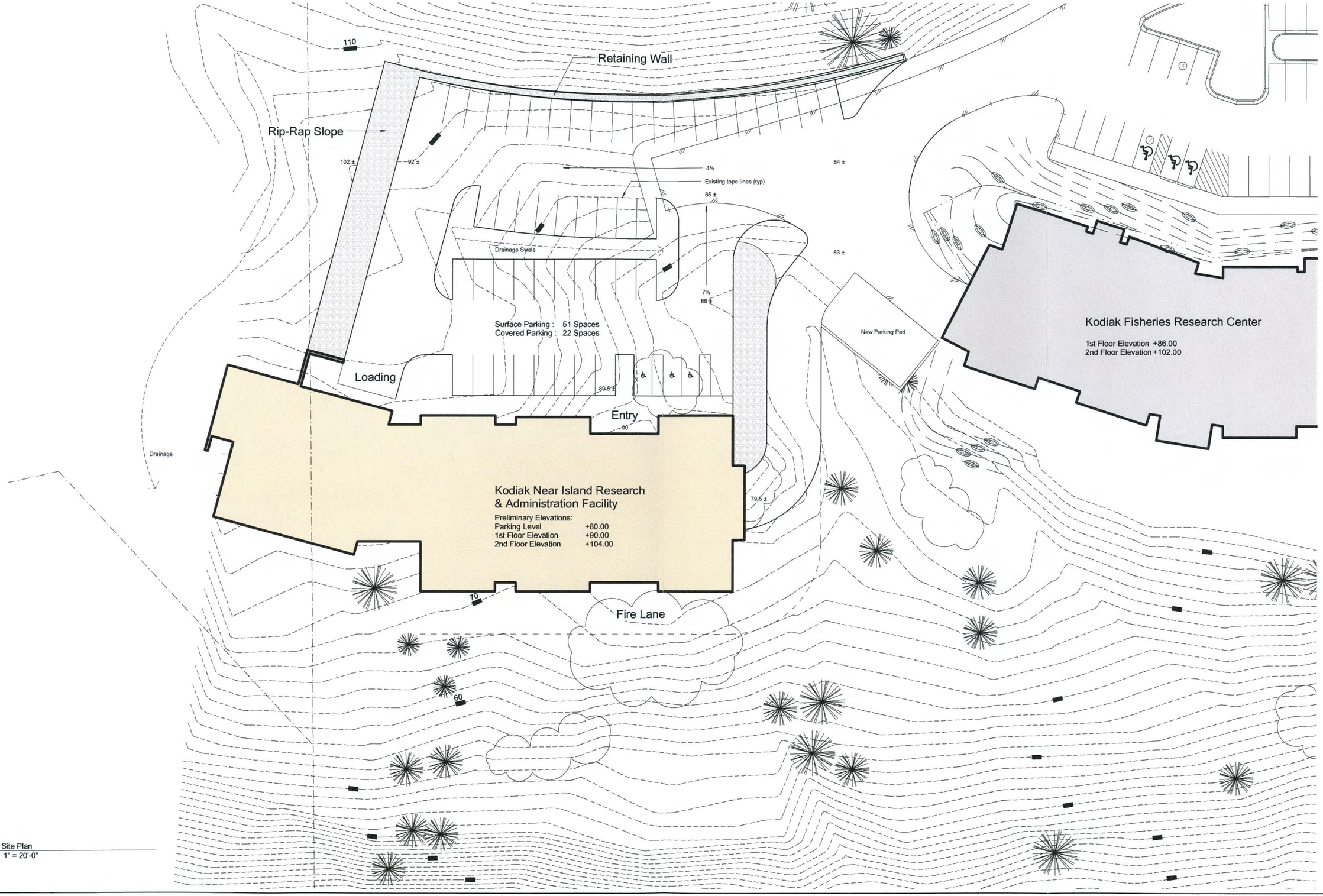
Table 502.3 Building Envelope Requirements: Fenestration

Metal framing with or without thermal break	
Curtain Wall/Storefront U-factor	0.45
Entrance Door U-factor	0.8
All Other U-factor	0.5
SHGC - All Frame Types	No Requirement

ci: Continuous Insulation



CONCEPT DESIGN DRAWINGS



1 Site Plan
1" = 20'-0"

Kodiak Near Island Research & Administration Facility

Kodiak Island Borough

State of Alaska
Department of Fish & Game

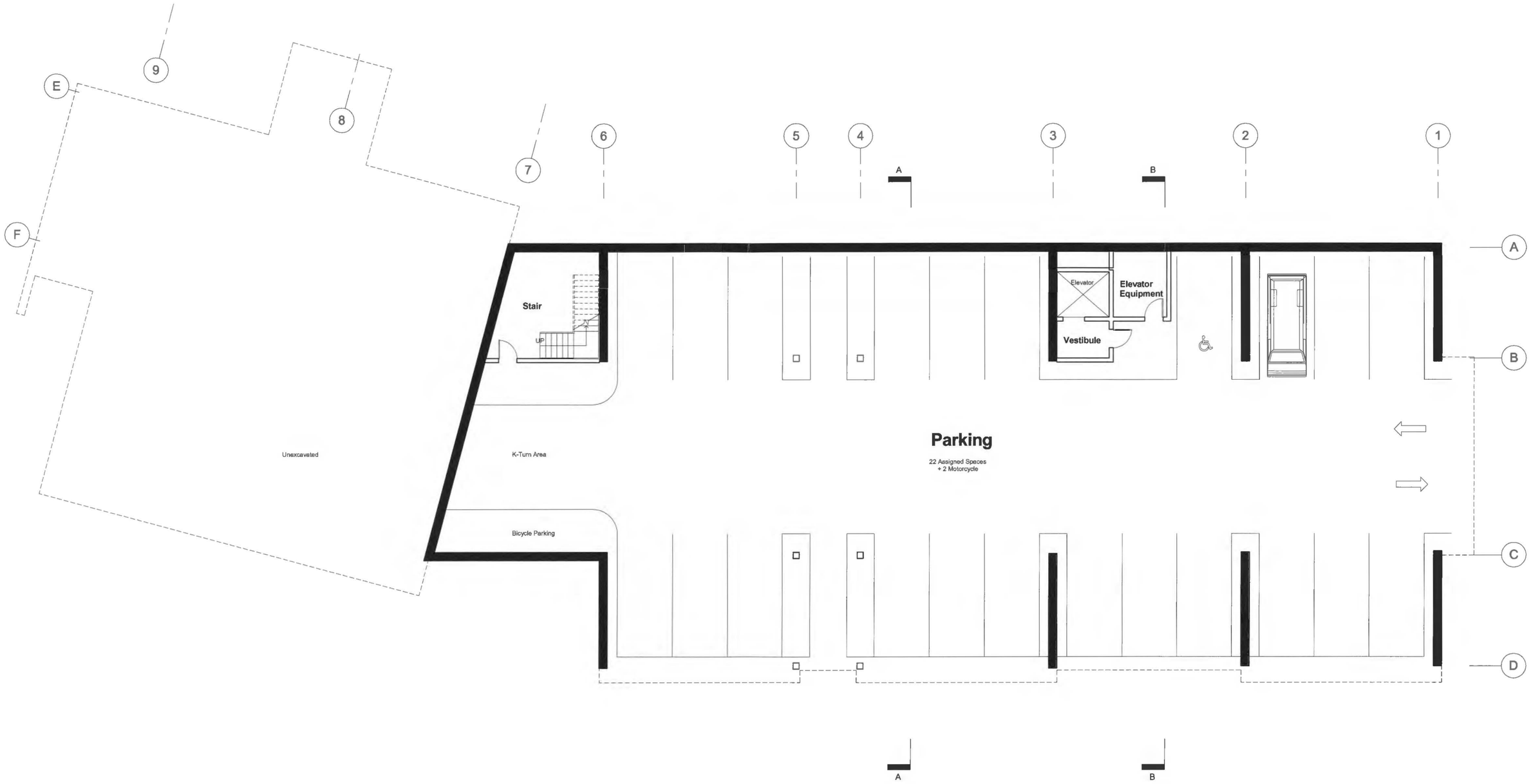
ECI/Hyer, Inc. Architects HYER

N

0 10 20 40'

SITE PLAN

Concept Design
June 2009



1 PARKING LEVEL
1/8" = 1'-0"

0 4 8 16'

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PARKING LEVEL PLAN

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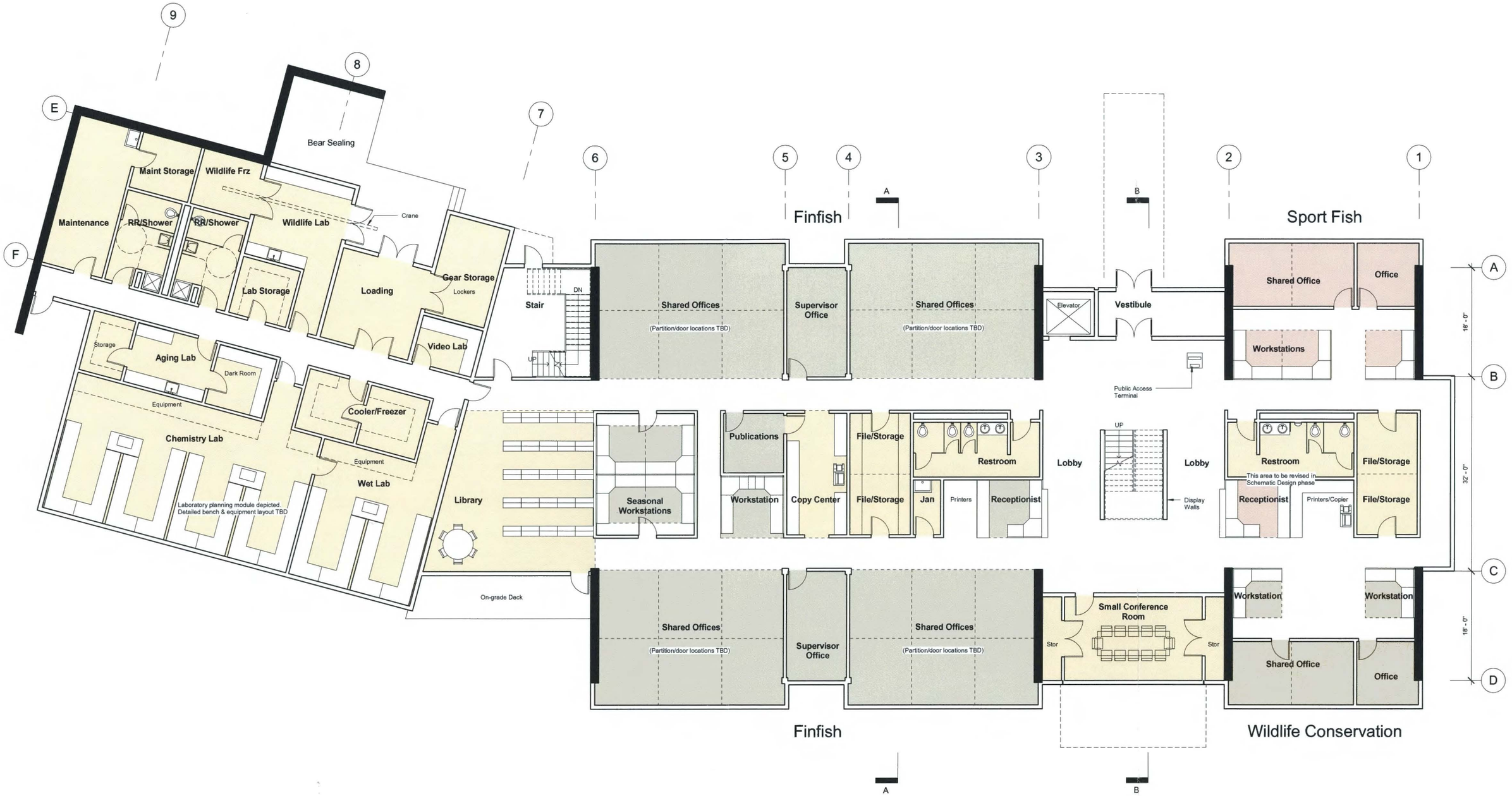

1 LEVEL 1
1/8" = 1'-0"

0 4 8 16'

PLAN NORTH

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LEVEL 1 FLOOR PLAN

Concept Design
June 2009

1 LEVEL 2
1/8" = 1'-0"

0 4 8 16'

PLAN NORTH

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LEVEL 2 FLOOR PLAN

Concept Design
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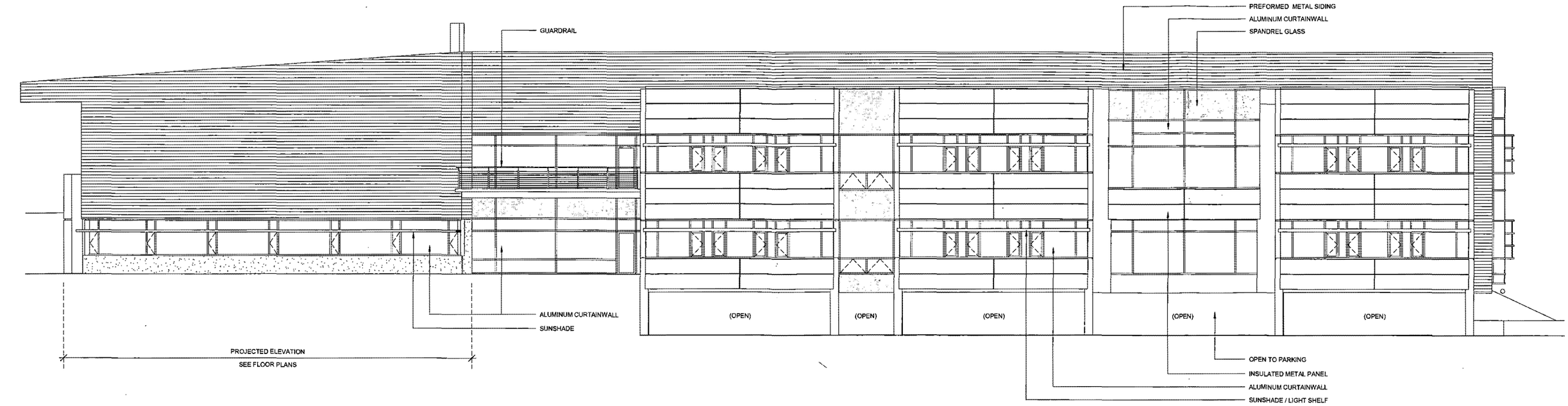
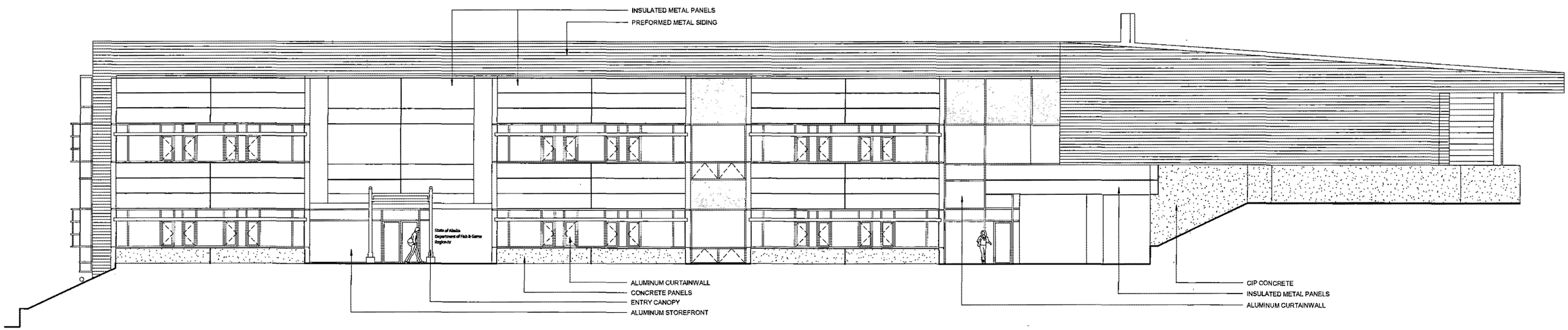


1 SOUTH ELEVATION
1/8" = 1'-0"



2 NORTH ELEVATION
1/8" = 1'-0"

0 4 8 16'

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EXTERIOR ELEVATIONS

Concept Design
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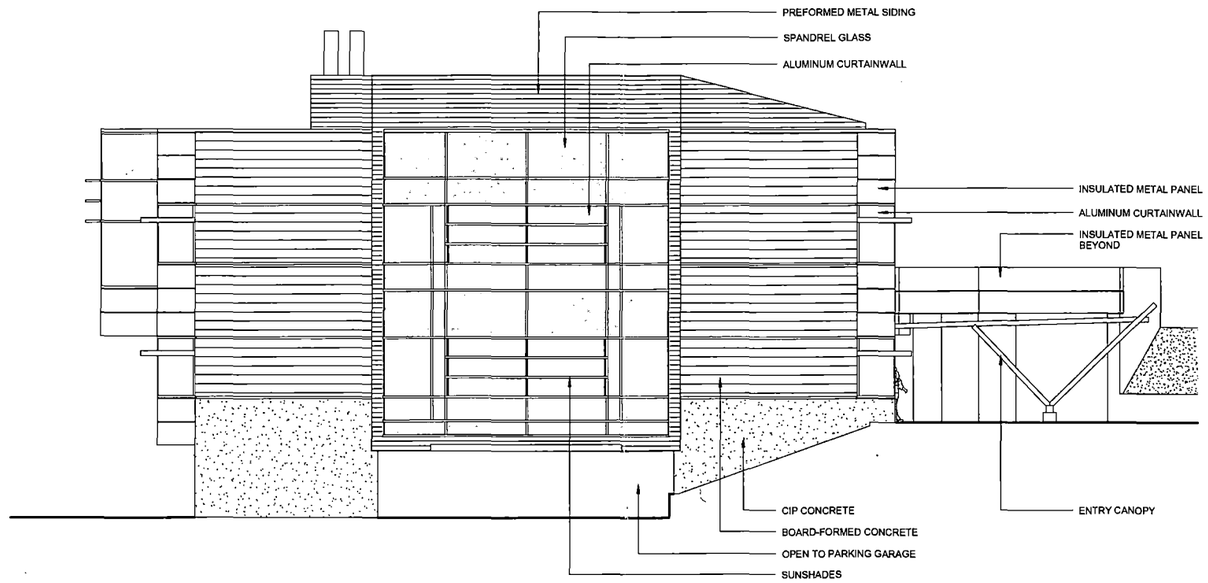
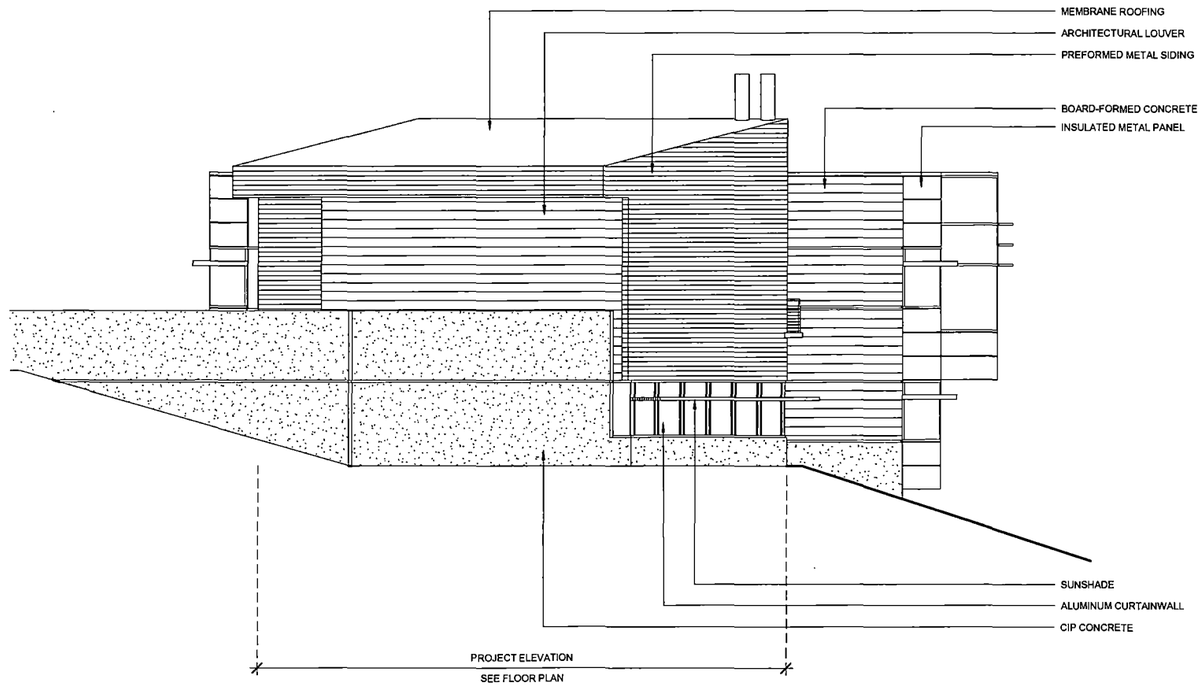


① EAST ELEVATION
1/8" = 1'-0"



② WEST ELEVATION
1/8" = 1'-0"

0 4 8 16'

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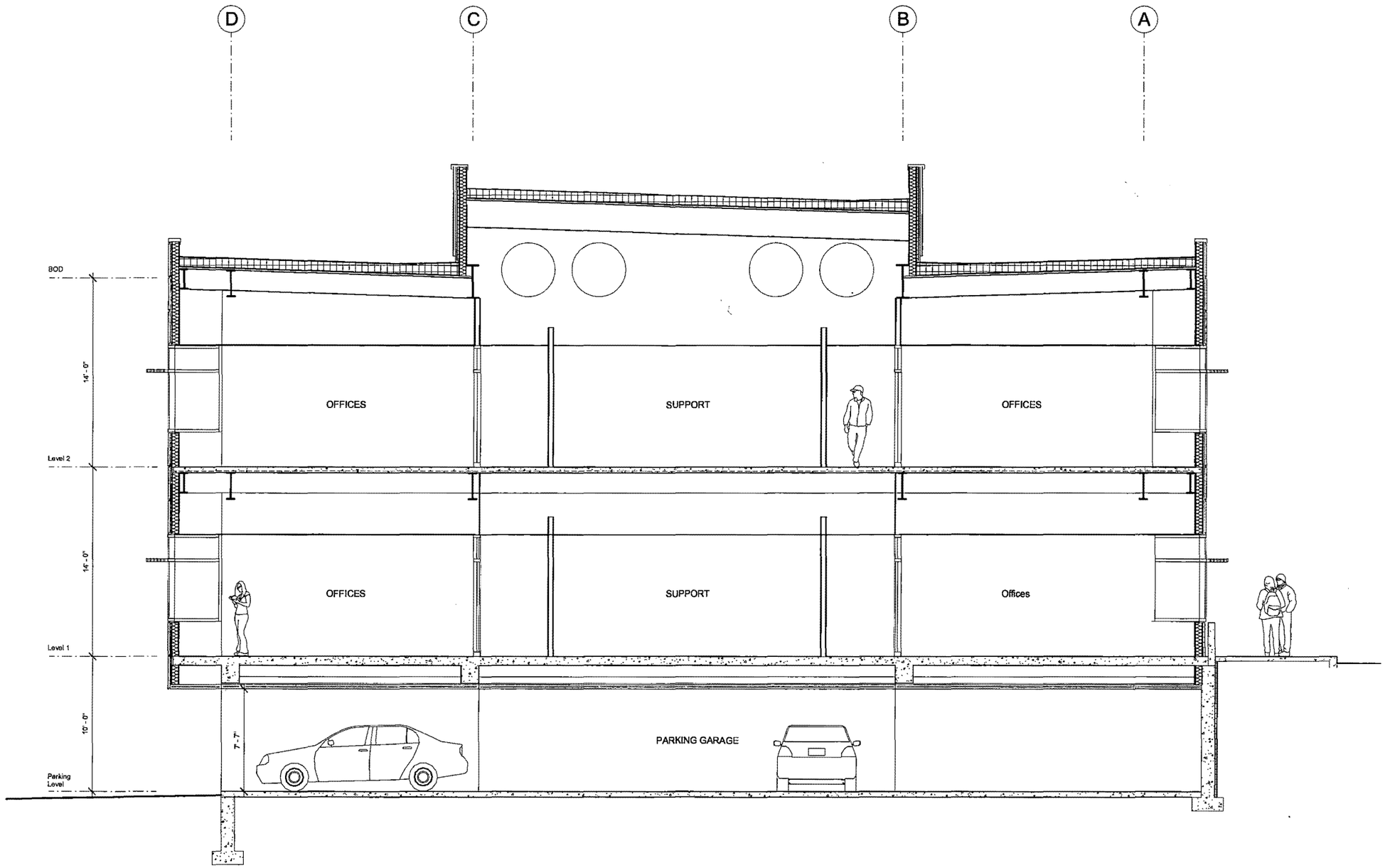
EXTERIOR ELEVATIONS

Concept Design
June 2009



1 BUILDING SECTION A-A
1/4" = 1'-0"

0 2 4 6'

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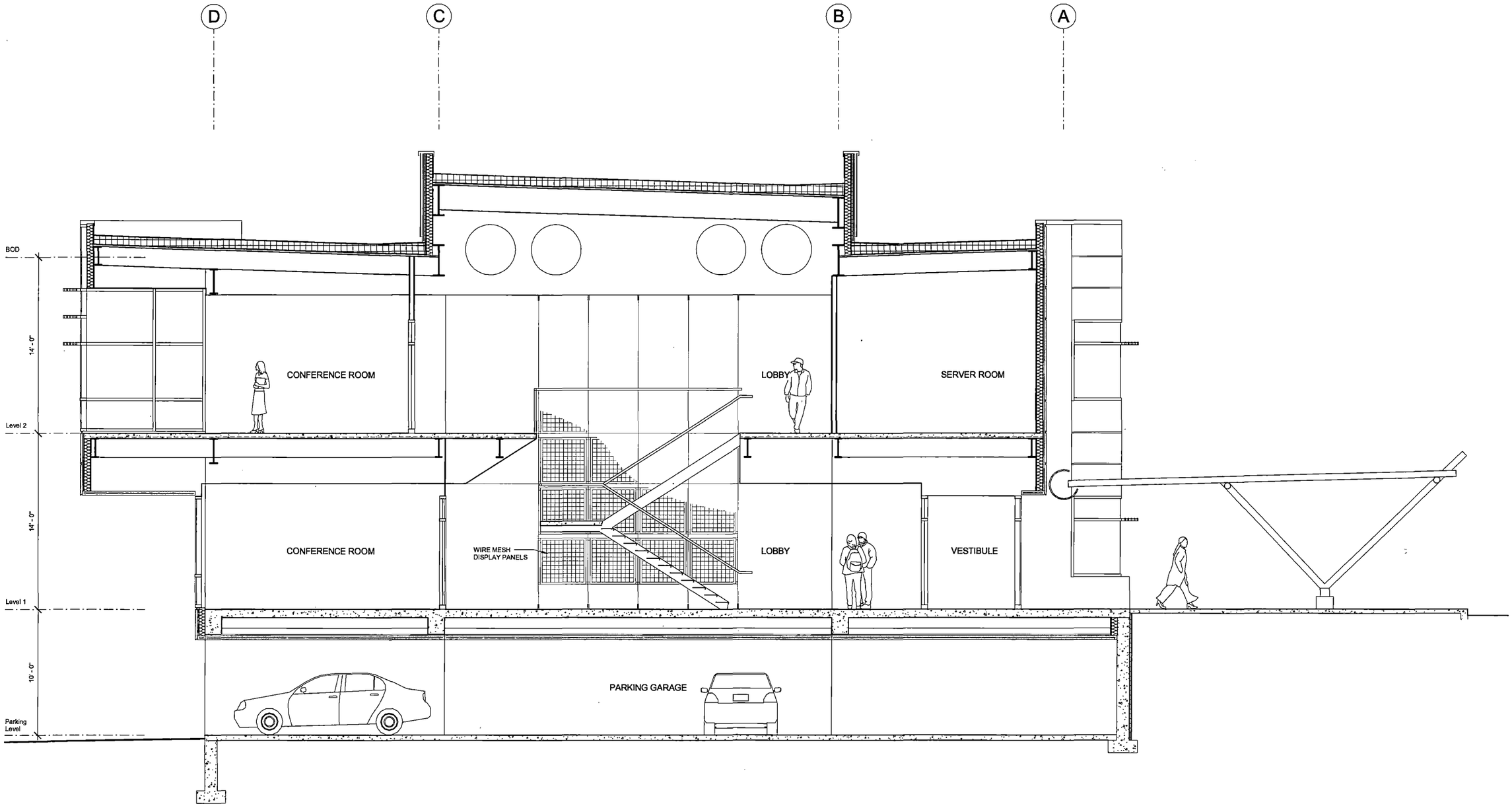
BUILDING SECTION

Concept Design
June 2009



1 BUILDING SECTION B-B
1/4" = 1'-0"

0 2 4 8'

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Department of Fish & Game

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BUILDING SECTION

Concept Design
June 2009

5/14

A DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT
FOR THE *EXXON VALDEZ* OIL SPILL RESTORATION PLAN

MAY 2010

LEAD AGENCY:
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
OFFICE OF GENERAL COUNCIL
7600 SAND POINT WAY NE, BUILDING 1
SEATTLE, WA 98115
CONTACT – LAUREL JENNINGS, 206.526.4525

COOPERATING AGENCIES:
ALASKA DEPARTMENTS OF LAW, ENVIRONMENTAL CONSERVATION, AND FISH AND GAME
U.S. FOREST SERVICE, U.S. DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY, U.S. DEPARTMENT OF THE INTERIOR

ABSTRACT:
NOAA, as a member of the *Exxon Valdez* Oil Spill Trustee Council (Council), has prepared a draft supplement to the existing environmental impact statement (EIS) on the Council's restoration efforts, in accordance with the National Environmental Policy Act of 1969, (NEPA). This supplemental EIS (SEIS) is necessary to respond to significant new circumstances bearing on the Council's restoration efforts as assessed in the original EIS. Specifically, as the restoration funds remaining from the *Exxon Valdez* settlement diminish, the Council seeks a more discrete and efficient funding mechanism by which to direct the remaining funds. The SEIS assesses the environmental impacts of the Council's proposal to narrow and refine the scope of the Council's restoration efforts to five defined restoration categories: herring; lingering oil; long-term monitoring of marine conditions; harbor protection and marine restoration; and habitat acquisition and protection.

PUBLIC COMMENTS ON THE DRAFT SEIS MUST BE RECEIVED BY FRIDAY JULY 16, 2010

EXECUTIVE SUMMARY

Table of Contents

Table of Figures

CHAPTER 1 - INTRODUCTION

1.1 Background

More than twenty years ago, on March 24, 1989, the tanker *Exxon Valdez* ran aground on Bligh Reef in Prince William Sound, Alaska, causing the largest tanker oil spill in U.S. history. Approximately 11 million gallons of North Slope crude oil subsequently moved through southwestern Price William Sound and along the western coast of the Gulf of Alaska, causing injury to both natural resources and services (the functions performed by a natural resource for the benefit of another natural resource and/or human uses) in the area. During the summer of 1989, oil from the spill was found as far away as 600 miles from Bligh Reef.

The State of Alaska and the United States brought claims against Exxon Corporation and related companies for the natural resources damage resulting from the spill and the resolution of the civil claims resulted in a $900 million civil settlement. The *Exxon Valdez* Oil Spill Trustee Council (EVOSTC or Council) was formed in 1991 to oversee the use of these funds to work to restore the natural resources and ecosystem damaged by the 1989 spill. The Council consists of three state (AK Departments of Law, Environmental Conservation and Fish and Game) and three federal trustees (U.S. Departments of the Interior, Agriculture and NOAA) (or their designees) and is advised by members of the public and by members of the scientific community. As part of their efforts, the Council adopted a Restoration Plan (Plan) in 1994 to guide restoration through research and monitoring, habitat protection and general restoration.

The *Exxon Valdez* Oil Spill Trustee Council originally approved and released a *Draft Restoration* Plan in 1993, followed by a *Draft Environmental Impact Statement* in June 1994, which reviewed the potential effects of implementing the plan. In September 1994, the Council issued a *Final Environmental Impact Statement*, followed by their signing of a Record of Decision in October 1994 and adoption of the *Restoration Plan* in November 1994. The Council has prepared this supplement to the existing environmental impact statement (EIS) issued in 1994, in accordance with the National Environmental Policy Act of 1969, 42 U.S.C. § 4321 *et seq.* (NEPA).

1.2 Proposed Action

Of the approximately $780 million of joint trust funds initially managed by the Council, which consisted of payments by Exxon Companies and interest and earnings on those payment, more than $180 million has been used for research, monitoring and general restoration and more than $375 million has funded habitat protection. Council annual program development, implementation and administration costs have totaled more than $45 million Approximately $15 million will be needed to fund the ongoing and final stages of EVOSTC administration. Approximately $65 million is currently contractually-committed to multi-year projects, habitat purchases and other previously approved projects. Therefore, as of spring 2010, approximately

$81~~76~~ million remain available for research, monitoring and general restoration, and $2524 million remain available for habitat acquisition and protection. These joint trust funds are invested in State of Alaska investment accounts which have produced additional income for restoration activities. The proposed funding of future restoration activities must allow for annual flexibility in order to respond to market fluctuations which affect the income produced by these investment accounts. Accordingly, the monetary amounts proposed by the Council are approximate figures and represent proportional allocations of remaining restoration funds.

Recognizing that funding for future restoration is limited and that it is becoming increasingly difficult to distinguish between spill impacts and other effects in measuring recovery, the Council is considering an organized and strategic transition to a modest program which would focus the remaining funds on a few specific programs and habitat protection. Long-term management of species and resources initially injured by the spill lies with the agencies and entities that have the mandate and resources to pursue these long-term goals. To advance long-term resource management of injured resources, the Council has increasingly directed funds toward research that provides information critical to the support of and healthy functioning of the spill ecosystem.

The Council proposes to narrow the scope of its future restoration work. Building on its past efforts, the Council has identified five areas of focus for its remaining work: (1) herring; (2) lingering oil; (3) long-term monitoring of marine conditions and injured resources; (4) harbor protection and marine restoration; and (5) habitat acquisition and protection.

1.3 Purpose and Need

The purpose of the proposed action analyzed in this Supplemental Environmental Impact Statement (SEIS) is to continue to restore the injured natural resources and services affected by the spill. The Federal and State governments, acting as Trustees for natural resources, are responsible for taking actions necessary to restore resources and the services they provide that were injured by the spill. The Federal Water Pollution Control Act (Clean Water Act) (33 U.S.C. § 1321[f] and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)(42 U.S.C. § 9607[f]) provide the legal basis for these responsibilities. This SEIS also responds to significant new circumstances bearing on the Council's restoration efforts as assessed in the original EIS. Specifically, as the restoration funds remaining from the *Exxon Valdez* settlement diminish, the Council seeks a more discrete and efficient funding mechanism by which to direct the remaining funds. This SEIS assesses the environmental impacts of the Council's proposal to narrow and refine the scope of the Council's restoration efforts to five defined restoration categories: 1) herring; 2) lingering oil; 3) long-term monitoring of marine conditions and injured resources; 4) harbor protection and marine restoration; and 5) habitat acquisition and protection. Each of these focus areas falls within the original 1994 *Restoration Plan. See Restoration Plan* at pp. 19 – 28.

1.4 Action Area

The spill area is located in Southcentral Alaska, including the northern and western portions of the Gulf of Alaska, and encompasses a surface area of approximately 75,000 square miles. The spill area is divided into three regions: Prince William Sound, Cook Inlet/Kenai Peninsula, and the Kodiak Archipelago and the Alaska Peninsula. *See also*, The *Exxon Valdez* Oil Spill Area General Land Status Map, 1994 Restoration Plan at pg. V.

1.5 Public Participation Process

1.5.1 Notice of Intent

As part of the process to develop the Draft Supplemental Environmental Impact Statement, NOAA, on behalf of the Council, solicited the input of stakeholders and the public on the scope and scale of the Draft SEIS. NOAA began the formal scoping process by publishing a Notice of Intent (NOI) in the *Federal Register* on Friday January 22, 2010 (75 FR 3706).

1.5.2 Scoping Process

NOAA also released public notices of six public meetings in February and March 2010 in the following locations:

Table 1: Scoping Process, Public Meeting Locations and Times

February 16, 2010 - Homer, Alaska 6:00 PM - 8:00 PM Alaska Islands and Oceans Visitor Center 95 Sterling Highway Homer, AK 99603	**March 16, 2010 - Seward, Alaska** 6:00 PM - 8:00 PM K.M. Rae Building 125 Third Avenue Seward, AK 99664
February 17, 2010 - Anchorage, Alaska 6:00 PM - 8:00 PM Dena'ina Civic & Convention Center- Kahtnu Room #1 600 West 7th Ave. Anchorage, AK 99501	**March 17, 2010 - Valdez, Alaska** 6:00 PM - 8:00 PM Valdez Civic Center 110 Clifton Drive Valdez, AK 99686
February 18, 2010 - Cordova, Alaska 7:00 PM - 9:00 PM Cordova Public Library 622 First Street Cordova, AK 99574	**March 18, 2010 - Kodiak, Alaska** 6:00 PM - 8:00 PM Kodiak Refuge Visitor Center 402 Center Street Kodiak, AK 99615

These notices were sent though email distribution lists, posted on the Council website, mailed to municipalities and tribal governments, and published in local and state newspapers. Through both the NOI and the public meetings, NOAA requested comments from the public regarding potential environmental concerns or impacts, additional categories of impacts to be considered, measures to avoid or lessen impacts, and suggestions on restoration priorities and projects.

At the six public meetings a representative from NOAA, as the Lead Administrative Trustee, gave an overview of the NEPA process and discussed the direction the Council plans to take with regard to streamlining its administrative structure. The Council website was updated so that it contained much of the same information released through the NOI and the public meetings.

For more information on the comments gathered through the scoping process, visit the EVOSTC website at http://www.evostc.state.ak.us/NEPA/Comments.cfm

CHAPTER 2 – ALTERNATIVES, INCLUDING THE PROPOSED ACTION

2.1 Introduction

This chapter describes the management alternatives considered by the Council in their proposal to narrow and refine the scope of their restoration efforts and concurrently to implement a more discrete and efficient funding mechanism by which to direct the remaining funds. The Council has considered two management alternatives: (1) no action – a continuation of the current program; and (2) a narrowing of the Council's scope to five defined restoration categories. The analysis in this SEIS pertains to the broadly defined alternatives, and as such, does not consider specific restoration projects. Project- and site-specific analyses will be conducted by the appropriate agencies for all future actions.

2.2 Program Elements Common to both Alternatives

Both alternatives share the common elements outlined in the September 1994 *Final Environmental Impact Statement* (FEIS, Ch. 2, pg. 2-5). These elements include policies that:

- take an ecosystem approach to restoration;

- require that restoration projects designed to restore or enhance an injured service must have a sufficient relationship to an injured resource;

- encourage competition and efficiency in restoration efforts;

- require that restoration projects be subject to open, independent scientific review before Council approval;

- require that restoration must include meaningful public participation in planning, project design, implementation and review; and

- specify that government agencies will be funded only for restoration projects that they would not have conducted had the spill not occurred.

2.3 Alternative 1: No Action

The "no action" alternative consists of the Council continuing its activities in research, monitoring, general restoration and habitat protection, as it has done for the last twenty-one years, pursuant to the Preferred Alternative (5) in the FEIS. This current practice involves approximately $2 million in administrative costs annually for funding of Trustee Agency Liaisons, science support, Restoration office administration, Public Advisory Committee operations, and project management. These funds also support numerous meetings by the Council, researchers, stakeholders and the public to review and approve individual projects of a limited length, typically one to three years.

As outlined in the September 1994 *Final Environmental Impact Statement* (FEIS, Ch. 2, pg. 6-7), agency monitoring of natural recovery would remain at present levels and agency responsibility

would remain unchanged. In addition, under this alternative, the remaining funds from the civil settlement would be spent as they have in the past until they were fully depleted. This includes the Council considering individual projects under their own project management and current methods of Council administration, as described above. Under this scenario, it is likely the administrative costs would remain similar or slightly below their present levels, despite the diminishing expenditures on restoration by the Council.

2.4 Alternative 2: The Proposed Action - Focused Restoration

This alternative addresses the same policies, locations, restoration goals, assumptions used for impact assessment, as outlined for the FEIS Proposed Action Modified Alternative 5: FEIS, Ch. 2, pg. 14-16. However, the General Restoration list of FEIS Alternative 5 is supplanted by the Council's proposed five focus areas: herring, lingering oil, long-term monitoring of marine conditions and injured resources, harbor protection and marine restoration; and habitat acquisition and protection, which are discussed in detail below. In addition, instead of considering individual, discrete projects that were typically one year in length, the Council proposes to fund longer-term, integrated programs. The Council would also shift many of its current administrative functions, such as scientific and technical review and planning, peer review, and the solicitation and management of individual projects, to the entity responsible for the funded focus area. By narrowing its focus areas and by delegating many of its existing administrative functions to a select number of entities, the Council would streamline and reduce administrative functions and allow the funded entities to design and implement longer-term, integrated programs supporting restoration goals and objectives.

2.4.1 Herring

The Council has classified the Prince William Sound (PWS) population of Pacific herring (*Clupea pallasi*) as a resource that has not recovered from the effects of the 1989 oil spill. The PWS herring population was increasing prior to 1989 with record harvests reported just before the spill. The 1989 year class was one of the smallest cohorts of spawning adults recorded and by 1993 the fishery had collapsed with only 25 percent of the expected adults returning to spawn. The PWS fishery was closed from 1993 to 1996, but reopened in 1997 and 1998, based on an increasing population. Numbers again declined in 1999, and the fishery remains closed today. The 1993 collapse can be explained by several competing hypotheses; however, data uncertainties make it unlikely that the true reasons will ever be known.

The Council recognizes the uncertainty with regard to the role of the 1989 spill and the current depressed state of the PWS herring population. However, herring are considered a keystone species in the marine ecosystem and play a vital role in the food chain of many injured species. Thus, rebuilding the herring population has the potential to support the restoration of these injured species. In addition, supporting a healthy herring population may compensate for some of the losses in fishing opportunities that resulted from the spill and its damage to salmon and species other than herring. In April 2006, prompted by public comments about the continuing

impacts to human communities and commercial fishermen from herring losses, the Council convened scientists and researchers, commercial and subsistence fishermen, and natural resource managers for a herring workshop. One of the most important outcomes of the workshop was the consensus that a long-term strategic herring restoration program was needed if viable herring recovery activities were to be implemented. From 2006 to 2008, Council representatives met with natural resource managers, commercial fishers, scientists, the Public Advisory Committee (PAC) and Alaska Native residents of spill area communities to gain sufficient input to draft a cost-efficient, scientifically credible, and coordinated program. This effort produced the first draft of the Integrated Herring Restoration Program (IHRP) in December 2008. The IHRP is currently undergoing its final revision and will inform the final *Invitation for Proposals FY 2012* that may be issued by the Council in October 2010 if Alternative 2 of this SEIS is chosen for implementation.

The goal of the IHRP is to determine what, if anything, can be done to successfully restore PWS herring; to determine what steps can be taken to examine the reasons for the continued decline of herring in the Sound; to identify and evaluate potential recovery options; and to recommend a course of action for restoration. The Council is currently funding a package of multi-year proposals that are focused on factors limiting recovery.

The Council proposes funding a long-term herring program that focuses on core monitoring at a level that allows detection of population change, at a precision meaningful to restoration objectives, and that focuses on identifying limiting factors for the continued decline of herring in Prince William Sound (PWS), to identify and evaluate potential recovery options and to recommend a course of action for restoration of PWS herring.

The Council has proposed to use approximately $20 million for research in this area over a twenty-year period. The program would conduct studies that may include monitoring of herring population, disease, predators, habitat and related oceanographic conditions.

2.4.2 Lingering Oil

One of the most surprising revelations from two decades of research and restoration efforts since the 1989 spill is the persistence of subsurface oil in a relatively unweathered state. This oil, estimated to be around 97.2 metric tons (or 23,000 gallons), is contained in discontinuous patches across beaches that were initially impacted by the spill. The patches cannot be visually identified on the beach surface, but their presence may be a source for continued exposure to oil for sea otters and birds that seek food in sediments. The survey work completed to date indicates that the oil is decreasing at a rate of zero to four percent per year, with only a five percent chance that the rate is as high as four percent. As a result, it may persist for decades.

Subsistence, recreational, commercial fishing and passive~~Passive and subsistence~~ uses were significantly impacted by the spill and this has affected the overall health of the communities in Prince William Sound. Lingering oil has also impacted the public's perception of the spill area

as the pristine environment that was present before the spill occurred. This perception has continued to preclude full recovery for some human~~passive and subsistence~~ uses. It may require additional resources to evaluate, monitor, and redress the impact of lingering oil on these uses in the spill area. An important function of this information gathering would be to pass this information back to the communities and the general public.

In an effort to address the issue of lingering oil, the governments developed a restoration plan in 2006 under the terms of the Reopener provision in the Consent Decree with Exxon (http://www.evostc.state.ak.us/facts/reopener.cfm). Efforts to date include the development of a spatial probability model to identify beach segments with a high likelihood of persistent oil, and investigations of the reasons for the persistence of oil as a means to consider options that may accelerate the oil degradation. The Council has also funded a number of studies to determine the effects of lingering oil on the nearshore environment and the species that forage there, including sea otters, harlequin ducks and Barrow's goldeneyes.

It is possible that the results of currently funded and ongoing projects, or information developed by the research of other entities, will identify information gaps that will need to be filled. Under the lingering oil initiative, the Council envisions completion of the studies underway to reach a decision point on further efforts for active remediation. Upon receiving additional lingering oil information from these current lingering oil studies and the resolution of the Reopener, the Council will evaluate the need for restoration of services that may be affected by lingering oil, and thus no prospective funding amount has been proposed. If there is a need for additional projects, these may include proposals to measure the exposure of recovering or not recovered resources to lingering oil and the effects of such exposure, in addition to direct restoration of impacted services if practical and feasible, particularly in the nearshore ecosystem.

2.4.3 Long-term monitoring of marine conditions and injured natural resources

In the twenty-one years since the *Exxon Valdez* oil spill, it has become apparent that the ocean ecosystem can undergo profound changes naturally and such changes likely preclude a return to pre-spill conditions. The 1994 *Restoration Plan* (Plan) recognized that recovery from the spill would likely take decades. A Restoration Reserve was created from the Plan in part to provide for long-term observation of injured resources and services and provide for appropriate restoration actions into the future. To further this effort, in 1999 the Council also supported the development of a long-term research and monitoring program, which did not progress to implementation.

Long-term monitoring has two components: monitoring the recovery of resources from the initial injury and monitoring how factors other than oil may inhibit full recovery or adversely impact recovered resources. This second type of monitoring collects data on environmental factors that drive ecosystem-level changes. Monitoring factors such as temperature, salinity, turbidity, and zooplankton availability can play an important role in determining the overall health of the ecosystem. Data produced from this type of monitoring is increasingly valuable in illuminating the larger ecosystem shifts that impact and influence a broad variety of species and resources

injured by the spill. In addition, by monitoring such changes, agencies and interested parties may be able to adjust their own activities and management strategies to adapt to what may lie ahead and to further support injured resources in these quickly-shifting marine ecosystems. The Council has a history of supporting oceanographic monitoring by helping to establish and fund long-term data collections.

With regard to the monitoring of individual species, the Council also proposes to monitor some key indicator species. While it would be virtually impossible to monitor every injured resource and service in the entire geographic area of the oil spill, it is possible to select key indicator species that will provide an overview of the health of the ecosystem. Examples of these key species may include forage fish, killer whales, seabirds, bivalves, and sea otters. Monitoring these indicator species in two trophic levels (pelagic and benthic) as well as the environmental drivers (oceanographic conditions) of the system can provide a combination of data that can greatly contribute to an understanding of the state of recovery in the spill areas.

In this initiative, the Council envisions seeking partnerships with scientific entities or consortiums able to maintain those collections, demonstrate an ability to leverage this support, and develop science-based products to inform the public of environmental changes and the impacts of these changes on injured resources and services. The Council proposes to fund this effort with approximately $25 million, to be spent over a twenty-year period. As a part of this effort, the Council seeks to monitor ocean and nearshore conditions such as current, temperature, and the climate of those areas that influence the spill area, as well as injured resources.

2.4.4 Harbor protection and marine restoration

a. Storm water, wastewater, and harbor projects

Many coastal communities in the spill area have a limited ability to collect and properly dispose of waste, such as oily bilge water, used engine oil, paints, solvents, and lead-acid batteries. Improper disposal of these wastes in landfills adversely affects the quality of nearby marine waters through runoff and leaching. In some cases, these wastes are discharged directly into marine waters. Chronic marine pollution stresses fish and wildlife resources, possibly delaying recovery of resources injured by the oil spill. For example, with regard to the worldwide mortality of seabirds, the effects of chronic marine pollution are believed to be at least as important as those of large-scale spills.

The Council has approved the funding of several projects to prepare waste management plans and has contributed to their implementation. These projects resulted in the acquisition of waste oil management equipment and the construction of environmental operating stations for the drop-off of used oil, household hazardous waste and recyclable solid waste in Cordova, Valdez, Chenega Bay, Tatitlek and Whittier, Kodiak and lower Cook Inlet. The Council seeks to further reduce pollution in the marine environment to facilitate the recovery of injured natural resources or services and is considering funding this effort with approximately $10 million.

b. Marine debris removal

Marine debris is an issue in the marine and near-shore environment in Alaska, where it is likely that thousands of tons of marine debris exist within three nautical miles of the Alaska coastline. Marine fish and wildlife become entangled in and ingest debris from foreign and domestic sources that may be a day or decades old and that range from small plastic items to very large fishing nets. Approximately 175 metric tons of debris was collected from Alaska coasts by citizen cleanup projects in 2007. Marine debris removal projects can result in an immediate improvement to the coastal habitat.

Coastal communities are effective in marine debris cleanups due to their intimate knowledge of the locations of debris accumulation. In addition, when communities participate in marine debris cleanups, they often alter the common practices that led to marine debris as their awareness of the effects of the debris on their coastline and the fisheries upon which they depend increases. Marine debris removal reduces marine pollution affecting injured resources and services and, thus, further supports natural restoration. The Council proposes to fund marine debris removal with approximately $3 million.

c. Response, damage assessment and restoration implications

Damage to natural resources occurs not only with an initial oil spill, but also potentially through spill response efforts. Damage assessment from the 1989 spill has yielded information that can assist in mitigating damage from spill response activities in future spills. Skilled damage assessment also quantifies the extent of injury and allows for the accurate monitoring and measurement of restoration after a spill. Organizing, preserving, and passing on such information will help responders and those conducting future damage assessments. These efforts ensure that restoration efforts are truly effective. Outreach efforts could include a conference or series of papers sharing information to be used by future responders, including natural resource assessment, the long-term costs of high-pressure washing, use of dispersants in the near-shore, sub-arctic environment, and the effects of potential burning scenarios. The Council proposes to fund this effort with approximately $1 million.

2.4.5 Habitat acquisition and protection

The protection of habitat is an important component of the *Exxon Valdez* oil spill restoration program. The acquisition of private lands or partial interests in private lands promotes the natural recovery of spill-injured resources and associated services by removing the threat posed by additional development impacts. The program is implemented by state and federal resource agencies, often in partnership with non-governmental organizations. The habitat program has protected approximately 650,000 acres of valuable habitat through a variety of purchases of various property rights, ranging from fee simple acquisition to conservation and timber easements. The goals of the habitat protection program remain viable. Resource and land management agencies, such as the Alaska Department of Natural Resources, Alaska Department of Fish and Game, U.S. Fish and Wildlife Service, National Park Service and U.S. Forest Service, continue to receive parcel nominations for Council consideration. Approximately $24

million remains within the habitat subaccount for future habitat protection efforts. The Council is considering alternatives for allocation of these funds. For example, half of the funds remaining may be allocated to protect large parcels within a period of two to three years, and the remaining half to a program spanning a 12-year period focused on the protection of small parcels less than 1,000 acres or $1 million in price. The Council proposes to utilize the approximately $24 million remaining to continue the habitat program. A variety of administrative options, funding allocations, time frames, and management strategies will be considered.

2.5 Other Alternatives Considered and Rejected

In their deliberations, the Council has considered alternatives that consisted of expending the remaining funds in a short time frame, transferring the monies to agencies to administer, and reallocating habitat monies to other restoration uses. Each of these alternatives was rejected without detailed consideration, as noted below.

2.5.1 Expending funds in the immediate future

Expending the funds in a very short time frame, for example within three years, as a method to decrease the overall expenditure in administrative costs that accrue over time was rejected. While it could possibly achieve some measure of purely economic efficiency with regard to overall administrative expenditures and might be appropriate for some projects, e.g. marine debris removal, it would not necessarily represent the most effective way to pursue restoration of injured resources and services. For example, it would not serve the considerable long-term scientific needs of monitoring and long-term herring research; nor would it benefit habitat protection, where taking the time to develop sensitive negotiations with willing sellers are required.

2.5.2 Funds Transferred to Agencies

Transferring the remaining funds to agencies to be expended as limited and required by the *Exxon Valdez* settlement, was rejected as unnecessary and inhibits the opportunity to allow non-governmental organizations to propose creative collaborations and participation that could result in an efficient and creative use of resources.

2.5.3 Reallocation of Habitat Funds:

Reallocating habitat monies to other restoration uses was rejected because the Council supports using the remaining funds (approximately $24 million) currently designated for habitat protection for that valuable use. In addition, the Council noted that this allocation of funds is mandated by federal law. -*See*, Public Law 106-113, 113 Stat 1501A-207 (1999). An effort to amend the legal requirement would entail an additional and unnecessary use of administrative resources and time.

2.5.4 Funds used for an Endowment

Using the remaining funds for a permanent endowment was rejected without detailed consideration due to legal issues which could hinder a permanent endowment.

2.6 Comparison of Alternatives

2.6.1 Alternative 1

This alternative would vary in terms of the scope of restoration activities proposed, as it would not be limited to the five focus areas. Without reducing the array of restoration activities, restoration efforts for species that would benefit from activities under one of the five focus areas could experience diminished benefits or benefits of a shorter duration than they would under Alternative 2, as Alternative 1 allows the remaining funds to be spent on a broad variety of proposals without a strategic focus or comprehensive plan to guide the spending. In addition, under this alternative, the Council would remain the sole administrator of the funds, thus requiring funds that could be used for restoration activities to be allocated toward administration (approximately an additional $10–$25 million, depending upon the duration of the Council). This alternative also does not envision an organized or strategic end to the expenditure of funds, thus potentially creating an abrupt end to the Council's funding of restoration activities when the funds are fully depleted.

2.6.2 Alternative 2

This option envisions actions focused on the five proposed restoration areas that would aid in the recovery of a broad spectrum of injured resources and services. Focus areas such as long-term monitoring of oceanographic conditions and injured resources and herring research can also produce information that can be used by a wide variety of researchers, members of the public, stakeholders, state and federal agencies. Under this approach, the remaining Council funds would be expended in a strategic and organized manner, with an emphasis on producing information to support the future management and natural restoration of injured species and, thus, the human services that depend upon them. In addition, the information produced by such activities can enable management consistent with long-term restoration. This important data can assist those agencies and entities that have the mandate and resources to pursue long-term restoration goals for these injured species and services and which will exist beyond the life of the Council.

The Council's restoration effort has been evolving over time and the current proposal represents this progression. With regard to research and restoration proposals, this alternative refines the Council's efforts in these five areas, rather than funding individual projects that typically lasted for one year and typically focused on a singular injured resource. The single-species perspective has been driven largely by the original listing of injured resources and species. Consistent with this, the September 1994 FEIS and the 1994 Plan were largely organized by individual species. The 1994 Plan also acknowledged the importance of the ecosystems in the spill area, and this perspective has grown with time and as science has illuminated the complex and interdependent relationships of ecosystems.

Under Alternative 2, the Council contemplates restoration activities for specific species which serve the focus areas. For example, t~~T~~he Council ~~does~~ includes herring as a single-species focus

area in its current proposed alternative. However, this species is considered a keystone species in the marine ecosystem and herring play a vital role in the food chain of many injured species. Thus, rebuilding the herring population has the potential to support the restoration of a broad range of injured species. Supporting a healthy herring population also has the potential to compensate for some of the losses in fishing opportunities that resulted from the spill and its damage to species other than herring. In this way, the Council's focus on this single species may serve a broad range of injured species and services. In addition, as discussed with regard to long-term monitoring, the Council contemplates monitoring a number of key species in the spill-affected ecosystems in order to contribute to the overall understanding of the spill-affected ecosystem.

Alternative 2 also emphasizes an effort to reduce administrative spending through funding long-term proposals administered largely by third parties which have exiting infrastructure that can accommodate administering such a program and therefore potentially allowing a higher allocation of funds (approximately an additional $10–25 million, depending upon the duration of the Council) to be used for restoration activities. By narrowing its focus to provide benefits for a broad range of injured species over the long-term, the Council increases the opportunity for continuing research to support the future management and long-term restoration goals for individual species and benefit the ecosystems hosting numerous species originally injured by the spill.

Chapter 3 – Affected Environment

3.1 Introduction

This Chapter provides a current summary of the status of the environment affected by the spill. As discussed above, the Council's research has been largely organized by individual injured species, consistent with the *Injured Resources and Services List* (List) which it adopted in November 1994 as part of its *Restoration Plan* and updated in 1996, 1999, 2002, 2006 and 2010. The List served three main purposes in the Restoration Program:

1. Initially, the List identified natural resource and human service injuries caused by the oil spill and clean-up efforts.

2. The List helped guide the Plan and was especially important in 1994 when the plan was first adopted. The List was created as guidance for the expenditure of public restoration funds under the Plan, and assisted the Council and the public to ensure that money was expended on resources that needed attention. The List continues to serve that purpose today.

3. Finally, the status of injured resources on the List provides the Council and the public a way to monitor recovery of individual species, and the related ecological functions and human services that depend on those resources.

Although the fish and wildlife resources that appear on the List experienced population-level or chronic injury from the spill, not every species that suffered some degree of injury was included. For example, carcasses of about 90 different species of oiled birds were recovered in 1989, but only 10 species of birds were included on the List.

Moreover, it should be noted that the analysis of resources and services in relation to their recovery status only pertains to amelioration of effects from the 1989 oil spill. When the Plan was first drafted, the distinction between effects of the oil spill and the effects of other natural or anthropogenic stressors on affected natural resources was not clearly delineated. At that time, the spill was recent; the impact to the spill area ecosystem was profound and adverse effects of the oil on biological resources were apparent. As time passes, the ability to distinguish effects of oil from other factors affecting fish and wildlife populations diminishes. Currently, natural and human perturbations may be hindering recovery of some resources initially injured by the spill. However, the passage of time and the evolution of science from the listing of species to an ecosystem approach have shifted the purpose and utility of the Injured Resources and Species List. The Council recognizes that the complexities and the difficulties in measuring the continuing impacts from the spill result in some inherent uncertainty in defining the status of a resource or service through a specific list and the Council's focus has accordingly expanded to a

more ecosystem approach. The 1994 Plan also outlined an ecosystem approach to restoration and this more integrated view has become increasingly recognized as essential and the original organization of efforts through a list of species in the Update is no longer a viable approach.

Recognizing that funding for future restoration is limited and that it is becoming increasingly difficult to distinguish between spill impacts and other effects in measuring recovery, the Council's efforts are now focused on making an organized and strategic transition to a modest program which focuses the remaining funds on a few specific programs. Building on its past efforts, the Council has identified the following areas of focus: (1) herring; (2) lingering oil; (3) long-term monitoring of marine conditions; (4) harbor protection and marine restoration; and (5) habitat acquisition and protection.

The Council also recognizes that long-term management of species and resources initially injured by the spill lies with the agencies and entities that have the mandate and resources to pursue these long-term goals. To support natural restoration and to enable management consistent with this long-term restoration, the Council has increasingly directed funds toward research that provides information that is critical to monitor and support the healthy functioning of the spill ecosystem.

3.2 Ecosystem Perspective and Recovery

Recognizing the difficulties inherent with the listing of individual species, as discussed above, the Council has moved towards an ecosystem approach. In practice, and through the Plan, the Council has increasingly adopted an ecological approach to restoration, and, consistent with this, the studies and projects the Council sponsors have been progressively more ecologically-based.

The 1994 Plan defines ecosystem recovery as follows:

Full ecological recovery will have been achieved when the population of flora and fauna are again present at former or pre-spill abundances, healthy and productive, and there is a full complement of age classes at the level that would have been present had the spill not occurred. A recovered ecosystem provides the same functions and services as would have been provided had the spill not occurred.

Although significant progress has been made using this definition of recovery, some of the coastal and marine ecosystems in the oil spill region have not fully recovered at this time from the effects of the oil spill. For example, harlequin ducks still show signs of oil exposure and may be negatively affected by such exposure. A number of other species and communities are showing signs of recovery, but are still not fully recovered from the effects of the oil spill. Although full ecological recovery has not been achieved, the spill area ecosystem is making progress towards recovery 21 years after the *Exxon Valdez* oil spill.

Consistent with the Council's shift from individual species to an ecosystem approach, in this chapter we will discuss each injured resource and service as part of its larger system, including the nearshore, offshore, and human services.

3.3 Recovery Status Determination

The information contained in this Chapter, drawn from the Injured Resources and Services List, also provides the List's recovery status for each species.[1] The recovery goal for injured resources is a condition that would exist in the absence of the *Exxon Valdez* oil spill (EVOS). It is important to understand that ecosystems are dynamic and the spill-affected area would have changed even without the spill. Given the limited ability to predict multi-year changes in marine ecosystems, it is difficult to know precisely what changes were inevitable had the spill not occurred. However, it is still possible to assess the recovery status of a particular resource by reviewing multiple sources of applicable information.

Types of information that were used to assess the recovery status of a particular resource or service included:

- initial magnitude of oil impacts to a population in the spill area
- comparisons of population demographic in oiled and reference areas
- survey data of community members in oiled and reference areas
- continued exposure to residual oil in the spill area as measured by the biomarker cytochrome P450 or tissue concentrations of petroleum hydrocarbons
- exposure potential as evaluated by the distribution of lingering oil; overlap in spatial distribution of lingering oil and a resource; and identification of an exposure pathway
- persistence of sublethal or chronic injuries
- intrinsic ability of the population to recover
- other natural or human-caused stressors

Even with such an evaluation, direct links cannot always be drawn between effects from the oil spill and the observed, current condition of a particular resource: in most cases the amount or type of data is insufficient to complete a cause and effect relationship. Specifically, there is little pre-spill data for many of the injured resources. Moreover, the physiological effects of oil on key species of wildlife and subsequent population consequences were not well understood at the time of the spill. As a result, few species exist for which there is complete knowledge of the impacts of the oil spill.

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[1] The *Exxon Valdez* Oil Spill Trustee Council Update of Injured Resources and Services 20** (*****, 20**), available on the Council's website at http://www.evostc.state.ak.us, provides the information presented in this Chapter and may be consulted for additional detail and annotations.

3.3.1 Uncertainties in Evaluating Recovery Status

To mitigate the uncertainties inherent in evaluating recovery the Council reviewed current, relevant scientific information while acknowledging the limitations of assigning an ultimate cause and effect relationship using the existing data. The current List combines the available literature and limitations of data into one document using best professional judgment. The types of uncertainty found in the published literature include:

1. Variability in population estimates. Because the patterns of animal distribution present challenges in getting accurate counts (especially of highly mobile fish, birds and marine mammals), most estimates of population size have wide ranges of variability associated with the data.

2. Lack of pre-spill data. For many of the resources affected by the spill there was limited or no recent data on their status in 1989. Additionally, some of the available pertinent data were the result of limited sampling, which consequently produced wide confidence intervals around the population estimates.

3. Interaction of spill and natural factors. It is increasingly difficult to separate what may be lingering effects of the spill from changes that are natural or caused by factors unrelated to the oil spill.

4. Scale and scope. The geographic scale and scientific scope of studies conducted over the years has varied among resources and this disparity must be considered when interpreting data and applying results to recovery status. Some studies were conducted at the large spatial scale to address population and ecosystem concerns, while other studies focused on localized exposure and effects of oil. In addition, some studies examined one characteristic over multiple species while other studies investigated many characteristics in a focused number of species.

For some species, no further actions have been taken with regard to future funding of studies to assess recovery. This may be based upon the factors discussed above and may also include a consideration of the following:

1. Additional studies are expensive. More study, with sufficient effort and scope to achieve powerful tests of the impacts of lingering oil, would be relatively expensive.

2. Unable to definitively demonstrate an effect. Natural variability, confounding effects, and lack of tools to estimate important metrics make it unlikely that an effect could be detected with a high degree of confidence.

3. Effects are likely undetectable. Based on available data, mechanistic principles, and knowledge of past spill impacts on processes of recovery, the likely effects are deemed to be minimal.

4. Effects unlikely to be of ecological importance. Based on available data, understanding of ecological interactions, and the expected small size of lingering impacts, it is unlikely that the effect (if any) will impair function of the ecological system.

5. No effective restoration options available. Even if a demonstrated need exists, there are no reasonable options for restoration of the injured resource.

6. More effective uses of funds. Other projects provide promise of more definitive results, greater significance to the ecosystem, or more potential for restoration.

More information on the recovery status of impacted species is available in the following section. The species listed are separated by nearshore and offshore designations but many can traverse the designations during life stages, time of year, or in response to predation.

3.4 Nearshore: Recovering

More than 1,400 miles of coastline were oiled by the spill in Prince William Sound, on the Kenai and Alaska peninsulas, and in the Kodiak Archipelago. Heavy oiling affected approximately 220 miles of this shoreline. It is estimated that 40–45 percent of the 11 million gallons of crude oil spill by the *Exxon Valdez* washed ashore in the intertidal zone. For months after the spill in 1989, and again in 1990 and 1991, both oil and intensive clean-up activities had significant impacts on the flora and fauna of this environment.

Initial impacts to the nearshore occurred at all tidal levels and in all types of habitats throughout the oil spill area. Direct assessment of the spill effects included sediment toxicity testing, documenting abundance and distribution of nearshore organisms and sampling ecological parameters of community structure. Dominant species of algae and invertebrates directly affected by the spill included common rockweed, speckled limpet, several barnacle species, blue mussels, periwinkles, and oligochaete worms. At lower elevations on gravel and mixed sand/gravel beaches, the abundance of sediment organisms and densities of clams declined. Large numbers of dead and moribund clams were documented on treated beaches, but these effects were likely due to a combination of oil toxicity and hot water washing. Nearshore fish were also affected. In a study conducted in different habitats, density and biomass of fish at oiled sites showed declines relative to reference sites in 1990.

The Nearshore Vertebrate Predator (NVP) project was a six-year study (1995-2001) of factors limiting recovery of four indicator species that use the nearshore environment. The possible factors included: food availability, continued damage from oil, and population demographics. The $6.4 million project focused on two fish-eaters, river otters and pigeon guillemots, and two species that feed on shellfish and other invertebrates, harlequin ducks and sea otters. Nearshore areas were the hardest hit by the *Exxon Valdez* oil, which clung to beaches and polluted waters on each succeeding tide. When this project was designed, all four predators exhibited signs of stress in oiled areas. For sea otters and harlequin ducks, long-term effects continued in the oiled areas, as shown by the lack of population recovery in these areas, and symptoms of oil exposure in harlequin ducks. At the time, researchers predicted that food was the most likely factor limiting recovery, but their studies proved that it was not. When large quantities of lingering oil were discovered in 2001, it became clear that there was linkage between known effects and the remaining oil.

3.4.1 Bald Eagles: Recovered

Productivity (or reproductive success as measured by chicks per nest) was back to pre-spill levels in 1990 and 1991, and an aerial survey of adults in 1995 indicated that the population had returned to or exceeded its pre-spill level in the Sound. In September 1996, the Council classified the bald eagle as recovered from the effects of the oil spill.

3.4.2 Barrow's Goldeneyes: Recovering

Prince William Sound is an important area for this species as the area is within their wintering range and supports between 20,000 and 50,000 wintering individuals. Survey data from the U.S. Fish and Wildlife Service indicated that winter numbers of goldeneyes on oiled areas were stable from 1990–1998, in contrast to significantly increasing numbers on unoiled areas during that same time period That was interpreted as evidence of lack of recovery, as the prediction would be that lack of continued injury would result in parallel population trajectories and that recovery would be indicated by more positive trajectories on oiled areas. In the most recently published survey (through March 2007), slopes were parallel and stable over time, although this was due primarily to a decrease in goldeneye abundance on unoiled areas. A study of Barrow's goldeneye habitat use in oiled and unoiled portions of Prince William Sound found that densities of birds in oiled areas were at expected levels, given the habitat; food limitations in the intertidal are not restraining recovery. Lingering oil still remains in intertidal habitats used by Barrow's goldeneyes, maintaining the possibility of continued exposure and chronic effects.

Interpretation of surveys and habitat selection is constrained by lack of full understanding of Barrow's goldeneye demography, particularly rates of site fidelity and dispersal. These values have important implications for understanding the process of population recovery. Lack of elevated CYP1A measured in oiled areas in 2009 relative to unoiled areas suggests that exposure to lingering oil has ceased in the Barrow's goldeneyes, and thus, that at least part of the recovery

objective has been met. Barrow's goldeneyes are considered to be recovering from the effects of the oil spill.

3.4.3 Black Oystercatchers: Recovering

Black oystercatchers are long-lived (15+ years) and territorial, occupying nests in rocky areas close to the intertidal zone and returning in successive years to nest again in the same vicinity. In the early 1990s, elevated hydrocarbons in feces were measured in chicks living on oiled shorelines. Deleterious behavioral and physiological changes including lower body weights of females and chicks were also recorded. Because foraging areas are limited to a few kilometers around a nest, contaminations of mussel beds in the local vicinity was thought to provide a source of exposure. In 1998 the Council sponsored a study to reassess the status of this species in Prince William Sound. The data indicated that oystercatchers had fully reoccupied and were nesting at oiled sites in the Sound. The breeding phenology of nesting birds was relatively synchronous in oiled and unoiled areas, and no oil-related differences in clutch size, egg volume, or chick growth rates were detected. However, a higher rate of nest failure occurred on oiled Green Island: at the time this was thought to be the result of predation, not lingering effects of oil. Because the extent of shoreline with persistent contamination was limited and lingering oil was patchy, it was concluded that the overall effects of oil on oystercatchers in the Sound had been minimal. However, the reasons that predation was higher at oiled Green Island than at Montague were not investigated. It is not clear whether predation was higher because there were higher numbers of predators, lower number of nests initiated or a behavioral change in the parents that would have led to lower nest protection.

Based on this study and one year of boat-based surveys (2000) of marine birds in Prince William Sound indicating that there were increases in numbers of oystercatchers in both the oiled and unoiled areas for that year, the black oystercatcher was identified as recovered. Since 2002, however, additional information has come to light indicating that designation may have been premature. A long-term (1989–2007) evaluation of marine bird population trends suggest that populations of black oystercatchers in the Sound have likely not recovered to pre-spill conditions.

Further, ongoing oil exposure to oystercatchers was documented in 2004 using a biochemical marker of exposure, cytochrome P450IA. Given the more recent understanding of the persistence of oil in sediments along shorelines that initially received heavy or moderate oiling, it is likely that black oystercatchers in oiled areas have suffered chronic exposure as has been shown for sea otters and harlequin ducks. Hydrocarbon exposure in 2004 is likely considerably less than in the early 1990's, but at this time, we do not know if there are any significant physiological or population level consequences from chronic exposure.

Black oystercatchers will have recovered when population levels, reproduction rates, productivity and oil exposure biomarkers have reached levels that would have existed without

the spill. Evidence, however, still shows a high rate of nest failure and the continued exposure to oil. Population trends indicate a continued status of "recovering."

3.4.4 Clams: Recovering

Studies have indicated that abundances of some species of clams were lower on treated beaches through 1996. Densities of littleneck and butter clams were depressed through 1997 on cleaned mixed-sedimentary shores where fine sediments had been washed down the beach during pressured water treatments.

As part of an investigation of sea otter populations conducted from 1996-1998, researchers compared clam densities between oiled sites on Knight Island and unoiled sites on Montague Island. They reported an increase in mean size of littlenecks and butter clams at Knight Island, where numbers of sea otters, a major predator of clams were significantly reduced. Absolute densities of littlenecks and butter clams were not different between oiled and unoiled sites; however, oiled sites had fewer juvenile clams and lower numbers of other clam species. In 2002, differences in species richness, diversity and abundance of several species were still measurable between cleaned (oiled and treated) and untreated (oiled but untreated) beaches. Moreover, as of 2007, several wildlife species that use the intertidal zone and feed on clams (e.g., harlequin ducks and black oystercatchers) are still being exposed to oil. These resources are included on the List and although the exact route of oil contamination has not been established for these birds, it is likely they are ingesting oil with their prey.

Some overlap occurs between areas where lingering oil and populations of littleneck and butter clams co-exist. Given the burrowing behavior of these animals, it is likely they would be exposed to oil as they dig into the subsurface sediments known to contain oil. In fact, it has been demonstrated that littleneck clams exposed for a year to the surface layer of contaminated sediments did not accumulate oil, but if the clams were buried in sediments mixed with oil, accumulation did occur.

Clam populations found on oiled but untreated beaches have likely recovered from the effects of the spill. However, several factors continue to impact clam populations on oiled and treated beaches: abundances and distribution differences are still measurable between cleaned and untreated sites; a lingering oil occurs in habitats with clams, and exposure of clams to oil could result in upper trophic level predators eating contaminated prey; and other species on the List are still being exposed to oil and are known to forage on clams.

Clams are continuing to recover in the Sound, but there still exists a difference in abundance between oiled and washed, oiled and unwashed, and unoiled sites. Data have suggested that disturbance of the rock armor of beaches continues to impede recovery. If this is true then recovery may require geological re-armoring processes that operate on decadal scales. Current population trends indicated a status of recovering.

3.4.5 Common Loons: Recovered

Boat-based surveys of marine birds in Prince William Sound give some insight into the recovery status of the loons affected by the oil spill. Pre-spill counts of loons exist only for 1972–1973 and 1984–1985. After the spill, contrasts between oiled and unoiled areas of the Sound indicated that loons as a group were generally doing better in unoiled areas than in oiled areas. Thus, the survey data suggested that the oil spill had a negative effect on numbers of loons (all species combined) in the oiled parts of the Sound.

Common loons exhibited declines in population numbers and habitat usage in oiled areas in 1989 but not in 1990. There was a weak negative effect of oiling on population numbers again in 1993, but not in 1996 or 1998. Based on the boat surveys carried out through 2000, there were indications of recovery, because in that year the highest counts ever recorded for common loons in PWS. In addition, July 2000 counts were the third highest of the 11 years since 1972, although these increases were limited to the unoiled portion of the Sound. Loons are a highly mobile species with widely variable population numbers and the pre-spill data were limited, thus this one year of high counts in the unoiled areas was insufficient to indicate that recovery had started.

Population surveys conducted from 1989–2007 found increasing winter population trends in common loon densities in oiled areas. The summer counts do not show a consistent positive relationship, however the summer counts of loons are usually low and variable because they are predominately found on their breeding grounds in other areas during the summer. Common loons have an intrinsically low population growth rate and relatively large numbers of carcasses were recovered after the spill, yet post spill winter population counts of common loons have met or exceeded available pre-spill counts for all years measured since the spill, except 1993. Given the long-term positive changes in winter population information, common loons are considered recovered from effects of the oil spill.

3.4.6 Common Murres: Recovered

Post-spill monitoring at the breeding colonies in the Barren Islands indicated that productive success was within normal bounds by 1993, and it has stayed within these bounds each breeding season since then. During the period 1993–1997, the murres nested progressively earlier by two to five days each year, suggesting that the age and experience of nesting birds were increasing, as might be expected after a mass mortality event. By 1997, the numbers of murres at the Barren Island had increased, probably because three- and four-year old nonbreeding sub-adult birds that were hatched there in 1993 and 1994 were returning to their natural nesting colony. Although counts were low in 1996, the counts in 1997 at this index site brought the colony size to pre-spill levels. The population size coupled with normal reproductive success (productivity), indicate that recovery has been achieved for common murres.

3.4.7 Cormorants: Recovered

Marine bird surveys were conducted during ten of the 16 years during1989–2005. For cormorants, trends for both summer and winter populations were increasing in the oiled area of Prince William Sound. Moreover, population estimates for cormorants in summer 2004 ranged from 9,000–11,000 birds, which falls within the range of 10,000–30,000 estimated in 1972. Therefore, although population estimates of cormorants are highly variable throughout their range, the recovery objectives have been met and cormorants are considered to be recovered.

3.4.8 Cutthroat Trout: Unknown -Very Likely Recovered

Limited information exists regarding the current status of cutthroat trout. Recent exposure to lingering oil is unlikely, because most of the bioavailable oil appears to be confined to subsurface intertidal areas, and not dissolved in the water column. D~~Moreover, d~~istribution of cutthroat trout is patchy throughout the Sound~~,, thus access to oil is restricted~~however populations are known to occur in areas directly impacted by the spill T~~. However, t~~he Sound is the northern edge of cutthroat trout range and dispersal during marine migration is restricted, thereby increasing their susceptibility to habitat alteration and pollution. Resident c~~C~~utthroat trout populations in the Sound are small and geographically isolated from each other: These characteristics suggest that recovery of a population would depend less on mixing with nearby aggregates than on the productivity of the endemic population and the extent to which it was injured by the spill. However, anadromous forms are also present. Confounding factors such as sport fishing and habitat alteration of spawning streams (e.g., through logging) may also inhibit successful recruitment of young into a population and subsequent increase in numbers.

Given the ecological similarities in summer diet and foraging ecology along shorelines between cutthroat trout, ~~pink salmon~~ and Dolly Varden, and the absence of ongoing injury to ~~those~~ Dolly Varden, ~~other two species~~ further research would be very unlikely to demonstrate any evidence of continuing differences due to the spill between oiled and unoiled areas. Thus, funding the additional research necessary to provide current growth rate and abundance data for this species is not a cost-effective scientific priority.

The Council considers c~~C~~utthroat trout to be ~~are~~ very likely recovered. Additional study, with sufficient effort and scope to achieve powerful tests of the impacts of lingering oil, would be relatively expensive, would likely be unable to definitively demonstrate an effect, and any effects would likely be minimal. For these reasons, it is unlikely that additional research will clarify this species' injury status.

3.4.9 Dolly Varden: Recovered

The growth differences between Dolly Varden in oiled and unoiled streams did not persist into the 1990–91 winter, but no growth data have been gathered since 1991. In addition, by 1990 the concentrations of hydrocarbons in bile had dropped substantially and a biochemical marker of oil exposure had a diminished.

In a 1991 restoration study sponsored by the Council, some tagged Dolly Varden moved considerable distances among streams within Prince William Sound, suggesting that mixing of overwintering stocks takes place during the summer in saltwater. Follow up studies indicate that Dolly Varden are abundant throughout the Sound, and genetically similar among geographically different aggregates. Frequent genetic exchange among groups of fish implies that mixing occurs, and outside populations are available to enhance depleted stocks. Moreover, fishing pressure on Dolly Varden is likely not as intense as that on coastal cutthroat trout. Populations are larger, the fish are more widely spread throughout the Sound and larger numbers can better tolerate harvest. Finally, current exposure to lingering oil is unlikely because most of the bioavailable oil is confined to subsurface intertidal areas and not dissolved in the water column. The recovery status of Dolly Varden is recovered.

3.4.10 Harbor Seals: Recovered

Harbor seal populations in the Sound were declining before the oil spill and the decline continued after the spill occurred. Factors contributing to this decline may involve environmental changes that occurred in the 1970s in which the amount and quality of prey resources were diminished. It is possible that the changes in the availability of high quality forage fish such as Pacific herring and capelin altered the ecosystem such that it may now support fewer seals than it did prior to the late 1970s. Other sources of mortality that may be contributing to lower seal numbers could include predation, subsistence hunting, and commercial fishery interactions (e.g., entanglement and drowning in nets).

Satellite tagging studies sponsored by the Council and genetic studies carried out by the National Marine Fisheries Service indicate that harbor seals in the Sound are largely resident throughout the year and have limited movement and interbreeding with other subpopulations in the northern Gulf of Alaska. This suggests that recovery must come largely through recruitment and survival within resident populations.

Based on annual counts from haulouts concentrated in the south-central region of the Sound, seal numbers stabilized from 1996–2005 and likely increased between 2001–2005. From 1990–2005, seal numbers at sites that were not oiled decreased at a greater rate than oiled sites, indicating no localized effects of the spill. However, the entire spill zone was not surveyed, and trends may have been influenced by movements of seals from oiled to unoiled sites after the spill and a return to more oiled sites in recent years. This hypothesis has not been studied directly. Harbor

seals are considered recovered due to collective evidence from the last ten years indicating that harbor seal population numbers are stabilizing or increasing.

3.4.11 Harlequin Ducks: Recovering

Winter populations of harlequin ducks in Prince William Sound have ranged from a high of 19,000 ducks in 1994 to a low of around 11,000 ducks in March of 1990, one year after the spill. The 2000 estimate of wintering harlequin ducks in the Sound was approximately 15,000.

Several post-spill studies were designed to measure the extent and severity of injuries to the Prince William Sound harlequin duck population from the oil spill and assess recovery. Through 1998, oil spill effects were still evident although the extent and magnitude of the injury remained unclear. Supporting studies provided evidence of continuing injury to harlequins through the following mechanisms: 1) invertebrate recovery in upper intertidal and subtidal areas remained incomplete for some species, thereby impacting potential prey base for harlequins; 2) oil persisted in intertidal areas of Prince William Sound where it was identified as a source of contamination of benthic invertebrates; 3) the possibility of external oiling of feathers remained due to lingering surface oil; 4) a biochemical marker of oil exposure (cytochrome P450) was greater in tissues of harlequin ducks captured in oiled areas than in reference areas and 5) overwinter female survival was lower in oiled than reference areas.

More recent studies indicate improving conditions. From 1997–2007, age composition and population trends were compared in harlequin ducks between oiled and unoiled areas of the Sound. No difference in population trends was observed between areas. Although populations in the oiled area were no longer declining as they were in the mid 1990s, a positive trend was not observed. Overall, more males than females occurred Sound-wide which is consistent with other Pacific populations of harlequin ducks. The ratio of immature to adult males was similar between areas, thus indicating similar recruitment into both populations. However, there remains a disproportionately lower number of female ducks in the oiled areas. From 2000–2002, measurements of cytochrome P450 activity and female survival rates were converging between oiled and unoiled areas. However, in 2005 through 2009 the P450 biomarker was elevated in ducks from the oiled areas. Finally, lingering oil still remains in habitats used by harlequins, thereby maintaining the possibility of chronic effects related to continued exposure.

Recent analyses still show a pattern of higher cytochrome P450 induction in oiled than unoiled areas. A temporal trend towards convergence between oiled and unoiled populations in over-winter survivorship indicate that harlequin ducks are in the process of recovering. However, a sustained increase in abundance numbers is needed in oiled areas for full recovery. Harlequin ducks are considered to be recovering, as indications of negative effects (reduced survival and declining numbers) in oiled areas have abated, although the recovery objective has not been fully realized..

3.4.12 Mussels: Recovering

The primary route by which mussels accumulate oil is through ingestion of petroleum hydrocarbons in the water. Much of the lingering oil in the Sound and the Gulf of Alaska is sequestered in the subsurface sediments. Mussels are found both as epibiota, attached to the surface substrates, and also partially embedded in coarse sediment, where they could come into close contact with oiled sediments. It is possible that mussels could filter particulate and dissolved hydrocarbons from the water if the oil is re-suspended during storm surges, wave action or when underlying sediments are disturbed by predators. The current distribution of oil within a mussel bed is determined by water flow, amount of oil present, sediment grain size, and disturbance history.

After the spill, hydrocarbons accumulated in mussels for about a decade at sites where oil was retained in sediments. Remaining oil was biologically available for many years after the spill, but the frequency of occurrence and average hydrocarbon concentrations in mussel tissue has declined with time. In most instances concentrations of oil in mussels from the most heavily oiled beds in Prince William Sound were largely indistinguishable from background by 1999. However, concentrations in sediment underlying the mussel beds remained elevated.

Recent data indicate that hydrocarbon concentrations in mussels are declining, even in armored beaches where elimination has been slow, and at many sites concentrations are not different from background. While a decrease in tissue concentration addresses part of the recovery objective, in order to be fully recovered mussels must provide uncontaminated food to top predators, including human subsistence users. As recently as 2008, some bird species which rely exclusively on the intertidal zone (harlequin ducks, Barrow's goldeneye and black oystercatchers) were still being exposed to hydrocarbons. The route of oil exposure has not been established for these birds, however, it is possible that they are consuming contaminated prey or foraging in contaminated sediment during feeding. For many of these species mussels are a known prey item, and they could be foraging in contaminated sediments underlying mussel beds. Because it cannot be verified that predators are not being exposed to oil while foraging in mussel beds, mussels are considered to be recovering from the effects of the oil spill.

3.4.13 Pink Salmon: Recovered

In the years preceding the spill, returns of wild pink salmon in Prince William Sound varied from a maximum of 23.5 million fish in 1984 to a minimum of 2.1 million in 1988. Many factors, such as the timing of spring plankton blooms and changes in water circulation patterns throughout the Gulf of Alaska are likely to have a great influence on year-to-year returns in both wild and hatchery stocks of pink salmon. Since the spill, returns of wild pinks have varied from a high of about 12.7 million fish in 1990 to a low of about 1.9 million in 1992. In 2001 the return of wild stock fish was estimated to be 6.7 million fish.

The decade preceding the oil spill was a time of peak productivity for pink salmon in the Sound. In 1991 and 1992, it appears that wild adult pink salmon returns to the Sound's Southwest District were reduced by 11 percent; however wild salmon returns are naturally highly variable. Furthermore, the methods used to estimate this decrease could not be used to produce reliable injury estimates across multiple generations of salmon. An analysis of escapement data from 1968-2001 did not show any differences in annual escapements between oiled and unoiled parts of the Sound. Therefore, population-level effects from the spill did not impact wild pink salmon or were short-lived.

Sound-wide population levels appear to be within normal bounds. In addition, reduced juvenile growth rates in Prince William Sound occurred only in the 1989 season. Since then, juvenile growth rates have been within normal bounds. Higher embryo mortality persisted in oiled streams when compared to unoiled streams through 1993: these differences were not detected from 1994–1996, but higher embryo mortality was again reported in 1997. It could not be determined if the reemergence of elevated embryo deaths was due to the effects of lingering oil (perhaps newly exposed by storm-related disturbance of adjacent beaches), or due to other natural factors (e.g., differences in the physical environment). Although patches of lingering oil still persist in or near intertidal spawning habitats in a few of the streams used by pink salmon in southwestern Prince William Sound, the amounts were considered negligible based on 1999 and 2001 studies. In 1999, dissolved oil was measured in six pink salmon streams that had been oiled in 1989. Only one of the six streams had detectable concentrations of oil, and they were about a thousand times lower than concentrations reported as toxic to developing pink salmon embryos.

Based on these results, continuing exposure of pink salmon embryos to lingering oil is negligible and unlikely to limit pink salmon populations. Given the fact that pink salmon population levels and indicators such as juvenile growth and survival are within normal bounds, pink salmon were considered recovered from the effects of the oil spill in 1999.

3.4.14 River Otters: Recovered

Although some of the differences (e.g., values of blood characteristics) between river otters in oiled and unoiled areas in Prince William Sound were apparent through 1996, they did not persist in 1997 and 1998. In 1999, the Council considered river otters to be recovered, because the recovery objectives had been met and indications of possible lingering injury from the oil spill were not present.

3.4.15 Sea Otters: Recovering

No apparent population growth occurred for Prince William Sound sea otters through 1991. After 1993, the population in the western Sound began increasing at a rate approximately one-half of the pre-spill rate of increase. From 1993–2000, the number of otters increased by 600

animals which represents an annual growth rate of 4 percent. However, in areas that were heavily oiled, such as northern Knight Island, sea otter populations have remained well below pre-spill numbers, and population trends continued to decline through 2005.Moreover, the demographics within this group apparently are not stable as many of the females are below reproductive age and young non-territorial males have moved into and out of the population.

The lack of recovery may reflect the extended time required for population growth for a long-lived mammal with a low reproductive rate, but likely reflects the effects of chronic exposure to hydrocarbons, or a combination of both factors. Food limitation does not appear to be a factor limiting recovery in the Knight Island group, because food resources are at least as plentiful there as they are at unoiled Montague Island. Productivity is also similar between oiled and unoiled sites. Exposure of sea otters to lingering oil is plausible because their foraging sites and prey species occur in habitats harboring oil. Additionally, biochemical responses (cytochrome P450) of oil exposure were elevated in animals from oiled sites through 2002. By 2004–2005, the response of this biomarker was similar in animals from oiled and unoiled areas. However, additional years of data are needed to determine if the similarity is true convergence, and the apparent diminishing exposure to oil is a long-term trend.

Sea otters will have recovered when population levels, reproduction and productivity are within normal bounds in oiled and unoiled areas and have reached levels that would have existed without the spill. Recovery will also be substantiated when the biochemical indicators of hydrocarbon exposure are similar within the oiled and unoiled areas.

Although there has been a slow increase since 2005 in the sea otter population within the heavily-oiled areas, there has been a greater rate of overall increase in the population within Prince William Sound. Therefore, sea otters are considered to be recovering.

3.5 Sediments: Recovering

Approximately ten acres of *Exxon Valdez* oil remains in surface sediments of Prince William Sound, primarily in the form of highly weathered, asphalt-like or tar deposits. In 2003, it was estimated that 20 acres of unweathered, lingering oil may still be present in subsurface, intertidal areas of the Sound, which could represent up to 100 tons of remaining oil. Most of this oil is found in protected, unexposed bays and beaches. Subsurface oil was not subjected to the original clean-up activities, and because this oil is trapped beneath a matrix of cobbles, gravel and finer sediments, it is not easily exposed to natural weathering processes.

The most recent studies documenting residual oil occurred on those beaches that were considered heavily or moderately oiled in 1989: beaches reported as lightly oiled were not surveyed. Moreover, beaches outside of the Sound were not included, so the amount and extent of residual oil in the entire spill zone is not known, but one estimate suggests as much as 200 tons of oil may

still exist. Several studies have evaluated the extent of lingering oil on armored oiled beaches along the outer Kenai Peninsula coast, the Alaska Peninsula, and Kodiak Archipelago: These studies looked at the same sites repeatedly at intervals from 1992–2005. By 1995, little visible oiling was observed in the study area on Kodiak. Overall, by 1995, hydrocarbon concentrations in sediments at the Gulf of Alaska sites were generally lower than for sites in Prince William Sound, but at some locations substantial concentrations persisted. Through 2005, surface oil was not frequently observed in these areas, and subsurface oil was present as mostly unweathered mousse.

In 1989, chemical analysis of oil in subtidal sediments was conducted at a small number of index sites in Prince William Sound. In the subtidal areas, petroleum hydrocarbon concentrations were highest at depths of 1– 60 feet (below mean low water) and diminished out to depths of 300 feet. It is likely that oil in subtidal sediments have decreased substantially since the spill. In 2001, several sites that were sampled after the spill were revisited, and no oil was found in the subtidal sediment from these locations.

Twenty-one years after the spill, lingering oil has persisted in the intertidal zones of Prince William Sound and on northwest shorelines of the spill area. The presence of subsurface oil continues to compromise wilderness and recreational values, expose and potentially harm living organisms, and offend visitors and residents, especially those who engage in subsistence activities along still-oiled shorelines. Although much of the oil has diminished over time, pockets of unweathered oil exist, and natural degradation of this oil is very slow. Moreover, some obligate intertidal foraging bird species are still being exposed to oil. Therefore, sediments are considered to be recovering.

3.6 Offshore - Recovering

Subtidal habitats encompass all of the seafloor below the mean lower low water tide line to about 800 meters, although deeper habitats are often referred to as the deep benthos. For purposes of evaluating oil spill effects, the impacted subtidal zone generally ranges from the lower intertidal zone to a depth of about 20 meters. Communities in the near subtidal areas are typically characterized by dense stands of kelp or eelgrass and comprise various invertebrate species, such as amphipods, polychaete worms, snails, clams, sea urchins and crabs. Subtidal habitats provide shelter and food for an array of nearshore fishes, birds, and marine mammals.

It is estimated that up to 13 percent of the oil that was spilled deposited in the subtidal zones. The direct toxicity of the oil, as well as subsequent clean-up activities caused changes in the abundance and species composition of plant and animal populations below lower tides. Initial injuries were evident for several oil-sensitive species. Infaunal amphipods, a prominent prey species in subtidal communities, were consistently less abundant at oiled than at unoiled sites. Reduced numbers of eelgrass shoots and flowers were also documented and may have resulted

from increased turbidity associated with clean-up activities. Two species of sea stars and helmet crabs also were less abundant at oiled sites when compared to oiled areas. However, stress tolerant organisms, including polychaete worms, snails and mussels were more abundant at oiled sites. It has been suggested that these species may have benefited from organic enrichment of the area from the oil or from reduced competition or predation because other, more sensitive species were depleted.

3.6.1 Killer Whales: Recovering (AB Pod), Not Recovering (AT1 Population)
From 1990–1995 seven calves were born within the AB pod: however, additional mortalities occurred and by 2005, the number of whales was only 27. Killer whales are long-lived and slow to reproduce. Female killer whales give birth about every five years, and are likely to produce only four to six calves throughout their life. Moreover, a disproportionate number of females were lost at the time of the spill, and population modeling has demonstrated that the spill impacted the AB pod primarily through the loss of young and reproductive females. Unexpected mortalities in the years since the spill have also impacted this group. These factors indicate that the recovery rate of this population after a large loss of individuals will be slow.

Transient killer whales, such as the AT1 population, largely prey on marine mammals, especially harbor seals. From data collected at haul-outs in the south-central region of the Sound, it appears that harbor seals numbers may have increased over the past five years. It is unclear how the population dynamics of harbor seal influence transient whale populations, but changes in the availability of such an important prey species could impact survival of individuals and reproductive success within groups. Research sponsored by the Council on contaminants in killer whales in the Sound indicates that individuals of the AT1 population are carrying elevated levels of PCBs, DDT, and DDT metabolites in their blubber. Although the presence of these contaminants is not related to the oil spill, the high concentrations found in these transients are comparable to levels that cause reproductive problems in other marine mammals. Accordingly, it is likely that the population dynamics of this population are being influenced by factors other than residual oil which may further hinder their ability to rebound from the initial injury from the spill.

Killer whales will have recovered when population levels, reproduction and productivity are within normal bounds in spill-affected pods of killer whales, as would have existed without the spill. The weighted average annual productivity rate of the AB resident pod is 3.3 percent. This pod is considered recovering. The AT1 transient population of killer whales, however, continues to decline, and therefore, is considered not recovering. The progress toward recovery is slow as key breeding females have been lost. The AB killer whale pod is considered to be recovering due to the stabilized reproduction rate of the pod. The recovery status of the AT1 killer whale population is considered to be not recovering due to the population's continuing decline.

..* Pigeon Guillimot: Not Recovered

As of 1999, adult pigeon guillemots in the oiled areas were still being exposed to oil as indicated by elevation of a biochemical marker of exposure, cytochrome P450. No differences were found between P450 activity in chicks from oiled and unoiled sites. The difference in P450 activity between adults and chicks is probably due to the fact that pigeon guillemot chicks are fed primarily fish, while adults eat a combination of fish and invertebrates. Invertebrates are more likely to sequester petroleum compounds, whereas fish metabolize them. Data collected in 2004 indicated that there was no difference in P450 activity in adult pigeon guillemots collected in oiled and unoiled parts of the Sound.

Lingering oil occurs in habitats used by pigeon guillemots. They feed on fish and invertebrates by diving and probing the substrate with their bills. Because their diet includes benthic organisms living in the intertidal zone, they could encounter subsurface oil while foraging. However, guillemots do not use the intertidal zone exclusively and can travel several miles offshore to feed. Thus, their exposure to lingering oil is likely intermittent.

Reduction in forage fish, specifically herring and sand lance, has been implicated in declines of pigeon guillemots. The extent to which the oil spill resulted in the depletion of these species could indirectly injure guillemots and other seabirds by removing the food resources on which they depend. Other factors, such as predation and interactions with commercial fisheries, might be contributing to the negative population trend; however comprehensive studies including these variables have not been conducted.

The pigeon guillemot population continues to decline in both oiled and unoiled areas of Prince William Sound. Nest predation is a potential source of mortality that may be limiting recovery in some areas, implying that predator removals could prove an effective restoration option. To establish the recovery of this species to the recovery objective of increasing levels of abundance and productivity that would have existed without the spill, additional data on productivity needs to be gained to form a reasonable estimate. Pigeon guillemots are considered to be not recovered from the effects of the spill.

3.6.2 Rockfish: Unknown -Very Likely Recovered

From 1989–1991, higher petroleum hydrocarbon concentrations were measured in rockfish from oiled areas when compared to unoiled areas. Interpretation of these data is limited, however, because oil accumulation differs by species and by age of the fish, and these variables were not fixed across sites. Other Council-funded studies have been conducted on rockfish since the spill, including 1) an examination of larval growth of fish, (including rockfish) in 1989; 2) a genetics investigation designed to identify species of rockfish larvae and young in the Gulf of Alaska and 3) a microscopic examination of fish tissues to identify lesions associated with oil exposure. These studies were inconclusive as none of them directly linked exposure of *Exxon Valdez* oil to any of the endpoints that were measured.

It is unlikely that adult rockfish are currently being exposed to lingering oil because known pockets of lingering oil rarely occur in their preferred habitat. Documented lingering bioavailable oil is in the subsurface sediments of the intertidal zone, and adult rockfish mostly occur in differing habitats of subtidal areas and in pelagic environments. From 1999–2000, no differences were measured in physiological responses to oil in rockfish from oiled and unoiled areas. Nearshore environments, however, provide important rearing habitat for young-of-the-year and juvenile rockfish of a number of species. Since lingering oil is present in the intertidal zone, the risk of exposure is present during early life history stages for those species.

~~Since the spill, few studies have provided information about rockfish abundance, species composition and the impacts of commercial fisheries.~~ Although it is unlikely that most species and life-stages of rockfish are currently being exposed to lingering oil, the original extent of injury was not documented and the potential for continued exposure by young-of-the-year and juveniles of some species is present. Since the spill, few studies have provided information about rockfish abundance, species composition and the impacts of commercial fisheries. Therefore, the current understanding of the long-term effects of the original spill cannot be determined and the Council considers the status of rockfish to be ~~are~~ very likely recovered. ~~In addition, b~~Based on the available data, understanding of ecological interactions and the expected small size of lingering impacts, it is unlikely that an effect, if any, will impair function of the ecological system and thus there are likely more effective uses of research funds than on further study of this species.

3.6.3 Sockeye Salmon: Recovered

Although sockeye freshwater growth tends to return to normal within two or three years following an overescapement event, there are indications that the populations are less stable for several years. The overescapement following the spill resulted in lower sockeye productivity, (as measured by return per spawner) in the Kenai River watershed from 1989–92. However, production of zooplankton in both Red and Akalura lakes on Kodiak Island quickly rebounded from the initial effects overgrazing. By 1997, Red Lake had responded favorably in terms of smolt and adult production and was at or near pre-spill production of adult sockeye. At Akalura Lake there were low juvenile growth rates in freshwater during the period 1989–92, and these years of low growth correspond to low adult escapements during the period 1994–97. Starting in 1993, however, the production of smolts per adult increased sharply and the smolt sizes and age composition suggested that rearing conditions had improved. It is possible that overescapement also affected lakes on Afognak Island and on the Alaska Peninsula. However, analysis of sockeye freshwater growth rates of juveniles from Chignik Lake on the Alaska Peninsula did not identify any impacts associated with a 1989 overescapement event. On the basis of catch data through 2001 and in view of recent analyses of return per spawner estimates presented to the Alaska Board of Fisheries in 2001, the return-per-spawner in the Kenai River system is within historical bounds. Therefore, it is highly unlikely that the effects that reverberated from the

overescapements in 1989 continue to affect sockeye salmon. In 2002, this species was considered to be recovered from the effects of the oil spill.

3.6.4 Kittlitz's Murrelet: Unknown

Few studies have been conducted on Kittlitz's murrelets, however they are known to nest in areas of glacial outcroppings, and they are thought to reside within the Sound from May until September/October. Kittlitz's murrelets have an intrinsically low population growth rate, thus recovery from an acute loss is likely to be slow.

The Kittlitz's murrelet is a candidate species for listing as threatened or endangered under the federal Endangered Species Act. They declined 99 percent from 1972 to 2004 and 88 percent from 1989–2004. While this decline likely started prior to the spill, the rate of decline was 18 percent per year from 1972, but beginning in 1989 that rate increased to 31 percent.

Natural recovery has not restored this resource to pre-spill levels or levels that would have existed had the spill not occurred. What little evidence is available reveals possible predator limitation, within their feeding areas, and impacts due to a shifting climate. While it is likely that basic biological studies would be useful to understand what may be limiting recovery, it is unlikely, due to these confounding effects, that further study will clarify whether there are still residual effects of the spill. In addition, the rarity of this species makes it difficult and expensive to study.

The recovery status for the Kittlitz's murrelet remains unknown. Further, due to the small populations and the confounding effects discussed above, it is likely that additional studies would be both relatively expensive and unable to demonstrate an effect of the spill or to clarify this species' injury status.

3.6.5 Marbled Murrelets: Unknown

Marbled murrelets were declining in the Sound before the oil spill, and the decline has continued since the spill. It is listed as a threatened species in Washington, Oregon, California and British Columbia. Marbled murrelets have low intrinsic productivity and a slow population growth rate. Therefore, recovery from an acute loss will likely take many years.

Marbled murrelets rely on forage fish such as Pacific herring and Pacific sand lance, which may be declining in the spill area due to various reasons including a potential link to EVOS. Their dietary preferences and foraging areas make significant contact with lingering oil unlikely. Exogenous factors such as climatic factors, decreases in habitat availability, and shifts in forage fish populations are the most likely drivers of murrelet population dynamics. Marbled murrelets do not meet their original recovery objective of increasing or stable populations. Moreover, their decline could be attributable in part to a decline in a primary food source; high-lipid forage fish,

particularly sand lance and Pacific herring. Based on available data and scientific understanding, the mechanistic linkage between the oil spill, reduction in high-lipid forage fishes and the decline in marbled murrelets remains uncertain. Because of the great variability in the marbled murrelet annual census in the years after the spill, it is unlikely that the loss of even as much as 7–12 percent of the PWS population (the estimated spill mortality) would have been detectable by census techniques.

The recovery status for marbled murrelets remains unknown due to conflicting information and a lack of critical data. Further, due to the confounding effects discussed above, additional studies would likely be unable to definitively demonstrate an effect of the spill with a high degree of confidence or to clarify this species' injury status.

3.6.6 Pacific Herring: Not Recovered

The herring fishery in the Sound has been closed for 15 of the 21 years since the spill. The population began increasing again in 1997 and the fishery was opened briefly in 1997 and 1998. However, the population increase stalled in 1999, and recent research suggests that the opening of the fishery in 1997 and 1998 stressed an already weakened population and contributed to the 1999 decline. The fishery has been closed since then and no trend suggesting healthy recovery has occurred.

One of the primary factors currently limiting recovery of herring in the Sound seems to be disease. Two pathogens, a virus and a fungal infection are prevalent in herring populations among several age classes. Conditions which made herring susceptible to these two diseases (viral hemorrhagic septicemia and Icthyophonus hoferi infection) are unknown, but it appears they have been impacting herring for over a decade. These diseases do not usually distress fish populations for such a long duration, and this cycle seems to be unique to the herring of Prince William Sound.

Lingering oil exists in the Sound, however there does not appear to be much overlap between current herring spawning areas and sites known to harbor residual oil. In 2006, some herring spawn was observed in areas of the Sound that were oiled however, the spatial extent was limited, and this was the first year in decades that it has been reported. Therefore, it is not likely that lingering oil is directly affecting spawning adults, eggs or larvae.

Low genetic diversity does not appear to be a limitation within herring populations. It was suggested that historic overfishing coupled with the population crash of 1993 could have resulted in a population with low genetic diversity. Similar genetic structure could limit a population's ability to tolerate disease or recover from acute losses, but the genetic diversity of Prince William Sound herring is no different from other northwest populations.

Multigenerational toxicity and effects from original contact with oil does not seem plausible, however this hypothesis has not been directly investigated. Other factors may have contributed to the crash of 1993. Some evidence implies that zooplankton production in the 1990s was less than in the 1980s, thereby causing food to be limited at the time of a peaking population. This hypothesis is offered some support by the fact that the average size-at-age of herring had been decreasing since the mid-1980s as population numbers were rising. Poor nutrition may also increase susceptibility of herring to disease.
Predation also plays a role in herring population dynamics, as they are a primary forage fish within the Prince William Sound ecosystem. It is plausible that the small herring population is fighting an on-going disease problem and is further being kept in check by predators such as whales, seals, sea lions and seabirds.

Despite the numerous studies directed at understanding the effects of oil on herring, the causes constraining population recovery are not well understood. A combination of factors, including disease, predation and poor recruitment appear to contribute to the continued suppression of herring populations in the Sound. In summary, Prince William Sound Pacific herring have not met their recovery objective. No strongly successful year class has been recruited into the population and health indices suggest that herring in the Sound are not fit. Therefore, the Pacific herring are considered to be not recovering from the effects of the spill.

3.7 Human Services

The Spill had tremendous negative impacts, both culturally and economically, on the people who live in the spill area. The Council recognizes the enormous stress and economic and cultural dislocation caused by the spill. In an effort to address these losses, the Council has devoted a major portion of restoration funds to the restoration of the fish, birds, marine mammals, and archaeological resources that support human communities in the spill area.

The lives of the people who live, work, and recreate in the areas affected by the spill were completely disrupted in the spring and summer of 1989. Commercial fishing families did not fish and their vessels sat dormant. Those people who traditionally subsisted on the fish, shellfish, wildlife, and plants of the region no longer trusted what they were eating and instead turned to high-priced groceries. Recreational use was mostly shut down and the world-wide image of Prince William Sound as a pristine ecosystem was tarnished with oil.

Twenty-one years later, the spill and the effects of the lingering *Exxon Valdez* oil in the ecosystem, continue to affect the social fabric of native villages and communities throughout the affected area. Subsistence gathering in some intertidal areas has never resumed and commercial herring fisheries remain disrupted.

Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. While not a part of NEPA itself, EO 12898 (Environmental Justice, 59 FR 7629 [1994]) requires each federal agency to achieve environmental justice by addressing "disproportionately high and adverse human health and environmental effects on minority populations and low-income populations." In order to understand environmental justice, federal agencies need to look at the populations likely to be affected and make a determination of impact in regard to each of the considered alternatives. This type of determination is further described in Chapter 4, sections 4.1 and 4.2 for this case.

3.7.1 Recreation and Tourism: Recovering

Recreation and tourism accounted for 26,000 jobs, generated $2.4 billion in gross sales and contributed $1.5 billion to Alaska's economy in 2003. The number of visitors to Alaska has increased in the years since the spill and it is expected that the recreation and tourism industry in south-central Alaska will grow approximately 28 percent per year through 2020. By 2001, more than $10 million had been spent on repair and restoration of recreational facilities in the spill area, and damage caused by the spill or clean-up efforts at the Green Island cabin and Fleming Spit campsites were repaired.

Telephone interviews conducted in 1999 and 2002 of people who used the spill area for recreation before and after the spill, indicated that, although oil remained on beaches, it did not deter them from using the area. However, they continued to report diminished wildlife sightings in Prince William Sound, particularly in heavily oiled areas such as around Knight Island. They also reported seeing fewer seabirds, killer whales, sea lions, seals, and sea otters than were generally sighted before the spill, but also reported observing increases in the number of seabirds over the last several years. Key informants with experience along the outer Kenai coast reported diminished sightings of seabirds, seals, and sea lions. However, they indicated that the possible presence of residual oil has no effect on recreational activities along the outer Kenai coast, the Kodiak Archipelago, and the Lake Clark and Katmai national park coastlines. Changes in the amount of wildlife observed could be due to a variety of factors, including the spill.

Recreation and tourism rely on both consumptive and non-consumptive uses of natural resources. Although these activities have increased since the spill, several resources have not yet recovered from the spill and beaches used for recreation contain lingering oil. Resources that are important to recreation and tourism, but are still not considered recovered from the spill or their recovery is unknown include harbor seals, Kittlitz's and marbled murrelet, pigeon guillemot, clams, mussels, harlequin ducks, sea otters and killer whales. Sportfishing resources for which the recovery status is unknown are cutthroat trout and rockfish. However, the salmon species that were injured (pink and sockeye salmon) are recovered from the effects of the spill.

Even though visitation has increased since the oil spill, Council's recovery objective requires that the injured resources important to recreation be recovered and recreational use of oiled beaches not be impaired. Lingering oil remains on beaches and in some localized areas this remains a concern for users. Moreover, several natural resources have not recovered from the effects of the spill. Therefore, Council finds recreation and tourism to be recovering from the effects of the spill, but not yet recovered.

3.7.2 Passive Use: Recovering

The Council determined that passive use injuries occurred as a result of the oil spill because natural resources including scenic shorelines, wilderness areas, and popular wildlife species, from which passive uses are derived, were injured. The key to the recovery of passive use is providing the public with current information on the status of injured resources and the progress made towards their recovery.

Passive use is the service provided by natural resources to people that will likely not visit, contact, or otherwise use the resource. Thus, injuries to passive use are tied to public perceptions of injured resources. Passive use is the appreciation of the aesthetic and intrinsic values of undisturbed areas and the value derived from simply knowing that a resource exists. The oil spill occurred in what many Americans viewed as an undisturbed area and caused visible injury to shorelines, fish and wildlife.

Two vital components of the Council's restoration effort are the research, monitoring, and general restoration program and the habitat protection and acquisition program. Extensive work has been done to restore and monitor resources and communicate these findings to the public. The research, monitoring, and general restoration program is funded each year through the annual work plan, which documents the projects that are currently funded to implement restoration activities for injured resources and services. The habitat protection program preserves habitat important to injured resources through the acquisition of land or interests in land. As of 2006, the Council has protected more than 630,000 acres of habitat, including more than 1,400 miles of coastline and over 300 streams valuable for salmon spawning and rearing.

Other public information efforts in which the Council is currently engaged include:

- The Council's website (www.evostc.state.ak.us) offers detailed information regarding past, current, and future restoration efforts
- The Council prepares a number of documents for distribution to the public including:
    - The *Invitation for Proposals*, which solicits restoration project ideas from the scientific community and the public
    - The Annual Work Plan (described above)

- Updates to the *Restoration Plan* (1996, 1999, 2002, & 2006) which periodically provides new information on the recovery status of injured resources and services.

- Project final reports are available to the public at the Council's website, through the Alaska Resource Library and Information Services (ARLIS) in Anchorage, as well as at several other libraries in the State, the Library of Congress, and through NTIS (National Technical Information Service). In addition, the Council supports researchers in publishing their project results in peer-reviewed scientific literature, which expands their audience well beyond Alaska.
- The Council supports an annual marine science symposium, which is open to the public that provides a venue in which to report the progress of restoration in the spill area.
- Public Input: The Public Advisory Committee (PAC) is an important means of keeping stakeholders and others informed of the progress of restoration and providing the public's opinions to the Council as they make decisions. Additionally, public meetings are held periodically throughout the spill area. All meetings of the Council are widely advertised and opportunity for public comment is always provided.

Until the public no longer perceives that lingering oil is adversely affecting the aesthetics and intrinsic value of the spill area it cannot be considered recovered. Because recovery of a number of injured resources is incomplete, the Council considers services related to passive use to be recovering from the effects of the spill.

3.7.3 Subsistence: Recovering

After the spill, subsistence harvest declined between 9–77 percent in 10 villages within Prince William Sound, Cook Inlet and Kodiak. Villages in Tatitlek and Chenega reduced their harvest by 56 and 57 percent, respectively. Outside of the Sound, harvest declined in Akhiok (on the lee side of Kodiak Island) by nine percent, but by 77 percent in Ouzinkie, which is on the northern side of the island. The primary reason that harvest declined so dramatically was the fear that oil had contaminated the resources and made them unfit to eat.

Harvest levels have generally increased in many communities since the spill, but results of harvest surveys have been variable. By 2003, they were generally higher than pre-spill levels in the communities in Cook Inlet, but lower in Kodiak and Prince William Sound (except for Cordova). Even though the harvest levels in the PWS communities were not as high as pre-spill estimates, they were within the range of other Alaska rural communities. Harvest composition was also altered by the spill. In the first few years following the spill, people harvested more fish and shellfish than marine mammals because of the reduced number of marine mammals and the perception that these resources were contaminated and unsafe to eat.

Both safety concerns and the reduced availability of shellfish contributed to a decline in harvest levels. From 1989–94, subsistence foods were tested for evidence of hydrocarbon contamination, with no or very low concentrations of petroleum hydrocarbons found in most subsistence foods. However, concerns about oil contamination remained, and there was a belief that the increase in paralytic shellfish poisoning (PSP) was linked with *Exxon Valdez* oil. By 2003, most subsistence users expressed confidence in foods such as seals, finfish and chitons. However, the safety of certain shellfish, such as clams was still met with skepticism.
Subsistence use is a central way of life for many of the communities affected by the spill, thus the value of subsistence cannot be measured by harvest levels alone. The subsistence lifestyle encompasses a cultural value of traditional and customary use of natural resources. Following the oil spill, there was concern that the spill disrupted opportunities for young people to learn cultural subsistence practices and techniques, and that this knowledge may be lost to them in the future. In a 2004 survey of the spill area communities, 83 percent of respondents stated that their "traditional way of life" had been injured by the oil spill and 74 percent stated that recovery had not occurred.

Many factors may contribute to the changes observed in subsistence harvests and the lifestyle surrounding this tradition. Demographic changes in village populations, ocean warming, increased competition for subsistence resources by other people (e.g., sport fishing charters), predators (e.g., sea otters), and increased awareness of PSP and other contaminants may play a role in resource availability, food safety, and participation in traditional practices.

Fears about food safety have diminished since the spill, but it is still a concern for some users. Additionally, harvest levels from villages in the spill area are comparable to other Alaskan communities. However, many subsistence resources injured by the spill, including clams and mussels, have still not recovered from the effects of the spill. For these reasons, subsistence is considered to be recovering from the effects of the oil spill.

3.7.4 Commercial Fishing: Recovering

In the 1994 *Restoration Plan*, the Council specifically recognized the declines in pink salmon and Pacific herring populations, and considered the reduction in these two fisheries as the biggest contributors to injury of the commercial fishing service in the spill area. Therefore, many restoration activities were focused towards these resources. The strategy for restoring commercial fishing included funding projects that accelerated fish population recovery, protected and purchased important habitat and monitored recovery progress. By 2002, the Council considered pink salmon and sockeye salmon to be recovered from the oil spill. However, recovery was not considered complete for Pacific herring and the recovery status of this resource remains 'Not recovering' (see individual resource accounts).

Income from commercial fishing dramatically declined immediately after the spill, and for a variety of reasons, disruptions to income from commercial fishing continue today, as evidenced

by changes in average earnings, ex-vessel prices and limited entry permit values. Natural variability in fish returns and a number of economic changes in the commercial fishing industry since 1989 probably mean that many of these changes in income are not directly attributable to the spill. However, these factors also make discerning spill-related impacts difficult. Economic changes confronting the industry include the increased world supply of salmon (due primarily to farmed salmonids) and corresponding reduced prices, entry restrictions in certain fisheries (such as Individual Fishing Quotas, for halibut and sablefish), allocation changes (e.g., a reduction in the allocation of Cook Inlet sockeye salmon to commercial fishermen), reduction in processing capacity, and spatial limitations of groundfish fisheries in the spill areas in conjunction with sea lion management. Finally, competition among commercial, recreational, and subsistence fishers influence management decisions of these shared resources.

Since 1989, there have been no non-herring, spill-related, district-wide fishery closures related to oil contamination and populations of pink and sockeye salmon are considered recovered from the effects of the spill. The Prince William Sound herring fishery has been closed for 15 of the 21 years since the spill and herring are not considered recovered. Commercial fishing, as a lost or reduced service, is considered to be recovering from the effects of the oil spill.

3.7.5 Archeological Resources: Recovered

Assessments of 14 sites in 1993 suggested that most of the archaeological vandalism that can be linked to the spill occurred early in 1989, before adequate constraints were put into place over the activities of oil spill clean-up personnel. Most vandalism took the form of "prospecting" for high yield sites. Once these problems were recognized, protective measures were implemented and successfully limited additional injury. Although some cases of vandalism were documented in the 1990s, there appears to be no spill-related vandalism at the present time.

From 1994–1997, two sites in Prince William Sound were partly documented, excavated, and stabilized by professional archaeologists because they had been so badly damaged by oiling and erosion. The presence of oil in sediment samples taken from four sites in 1995 did not appear to have been the result of re-oiling by *Exxon Valdez* oil. Residual oil does not appear to be contaminating any known archaeological sites.

In 1993, the Council provided part of the construction costs for the Alutiiq Archaeological Repository in Kodiak (www.alutiiqmuseum.com). This facility now houses Kodiak area artifacts that were collected during spill response. In 1999, the Council approved funding for an archaeological repository and local display facilities for artifacts from Prince William Sound and lower Cook Inlet. Local displays are open to the public in Port Graham, Cordova, Seward, Seldovia, and Tatitlek. The facility in Seward serves as the repository for the Chugach region.

Based on the apparent absence or extremely low rate of spill-related vandalism and the preservation of artifacts and scientific data on archeological sites, archaeological resources are considered to be recovered.

3.7.6 Designated Wilderness Areas: Recovering

Six moderately to heavily oiled sites on the Kenai and Katmai coasts were surveyed in 1994, at which time some oil mousse persisted in a remarkably unweathered state on boulder-armored beaches at five sites. These sites were visited again in 1999, and oil was found along park shorelines of the Katmai coast. Surveys carried out in 2001 and 2003 to determine the surface and subsurface distribution of oil in Prince William Sound found lingering oil on shorelines within designated wilderness study areas. Finally, in 2005 the sites surveyed in 1999 were again sampled. Although surface cover of oil had declined, the subsurface oil persisted in amounts similar to those found in 1999. Moreover, the oil at those sites was compositionally similar to samples collected 11days after the spill.

However, in many areas, the amount of oil has diminished since 1990. Therefore, designated wilderness areas are considered to be recovering.

CHAPTER 4 – ENVIRONMENTAL CONSEQUENCES

This chapter contains the analysis of the environmental consequences that could result from implementing the two alternatives described. As with the September 1994 Final Environmental Impact Statement, this supplemental environmental impact statement (SEIS) differs from many EISs in that this analysis focuses on the ~~various~~ two alternatives for creating increases in populations or services from some existing level, rather than ~~alternatives to harming~~ the degree of loss or gain to natural resources from implementation of alternatives.

4.1 Alternative 1: No Action

If the Alternative 1: No Action was implemented, the current practices of the Council would continue and the scope of present Council activities or programs would not change. Similarly, agency monitoring of natural recovery would remain at present levels, and their responsibilities would remain unchanged. The remaining funds from the civil settlement would be spent on a broad range of restoration activities in an annual cycle through Council administration, as it is at present.

The analysis of Alternative 1 in the SEIS is consistent with that presented in the FEIS for Alternative 5. FEIS, Ch. 4, pg. 111–136. In addition, the efforts the Council had initially implemented to achieve environmental justice will be continued so that future work continues to be fair and equitable. FEIS, Ch. 2, pg. 2–4.

4.2 Alternative 2: The Proposed Action

In this alternative, the Council focuses on five defined areas of restoration: herring, lingering oil, long-term monitoring of oceanographic conditions and injured resources and services, harbor protection and marine restoration and habitat acquisition and protection. The analysis of Alternative 2 is consistent with that presented in the FEIS for Alternative 5, with the following analysis categorized by focus area and detailed below. FEIS, Ch. 4, pg. 111–136. Although the focus of future restoration projects will be on the restoration of injured species and services, other considerations will be made. Specifically, environmental justice issues will be considered, analyzed, and determined on a case-by-case basis as future projects are decided upon, consistent with the Council's policies. FEIS, Ch. 2, pg. 2–4. The Council strives for fairness in all impacts of these future projects, however the location of projects are largely determined by the geographic location of each species' preferred habitat.

4.2.1 Long-Term Herring Research

The September 1994 FEIS preferred Alternative (5) contemplated the natural recovery of Pacific herring through habitat protection and acquisition, found in FEIS, Ch. 4, pg. 134. Alternative 2 envisions long-term monitoring and research of herring to examine the reasons for the continued

decline of herring in Prince William Sound (PWS), to identify and evaluate potential recovery options and to recommend a course of action for restoration of PWS herring.

The activities contemplated by this proposed action are consistent with the research and monitoring activities outlined in the 1994 Plan analyzed by the FEIS. *Exxon Valdez* Oil Spill *Restoration Plan*, Ch. 3 at pg. 25 (November 1994). As noted in the FEIS, long-term monitoring and research activities could result in projects that would be only informational in nature but extremely beneficial to the restoration of injured resources or the services they provide. These benefits either depend on the results of research that is not yet completed or require an agency management action that is outside the jurisdiction of the Council. Therefore, the impact of ongoing research and management actions by other agencies will not be analyzed in this SEIS. *See also*, FEIS, Ch. 1, pg. 22.

4.2.1.1 Environmental Consequences

The environmental consequences of long-term research and monitoring of Pacific herring populations on the offshore ecosystem were evaluated for the short-term and the long-term. With respect to long-term monitoring, "short-term" pertains to a four-year period after these research and monitoring activities begin, i.e., one herring spawning cycle. "Long-term" pertains to the period over four years after these research and monitoring activities begin.

Short-term: Negligible benefits. Although some benefits may accrue quickly, it is not reasonable to expect substantial results that can then be applied within one lifecycle of herring.

Long-term: ~~Moderate~~ Uncertain level of benefits. These actions may assist in the recovery and long-term management of herring populations. However, the long-term recovery of Pacific herring is unknown because, although there is evidence to suggest that the spill had an effect on Pacific herring reproduction, it is not possible to attribute their population declines solely on the spill.

4.2.1.2 Social and Economic Impacts

The impacts of long-term research and monitoring of Pacific herring populations on social and economic uses, such as subsistence, sport and commercial fishing, and wilderness, which are dependent upon the resource were evaluated for the short-term and the long-term. With respect to long-term monitoring, "short-term" pertains to a four-year period after these research and monitoring activities begin, i.e., one herring spawning cycle. "Long-term" pertains to the period over four years after these research and monitoring activities begin.

Short-term: Negligible benefits. Although some benefits may accrue quickly, it is not reasonable to expect substantial results that can then be applied within one lifecycle of herring.

Long-term: ~~Moderate~~ Uncertain level of benefits. These actions may assist in the recovery and long-term management of herring populations which could contribute to an increase in these uses. However, the long-term recovery of Pacific herring is unknown because, although there is

evidence to suggest that the spill had an effect on Pacific herring reproduction, it is not possible to blame their population declines solely on the spill and thus a projection of benefits is speculative.

4.2.2 Long-Term Monitoring of Oceanographic Conditions and injured resources

The activities contemplated by this proposed action are consistent with the research and monitoring activities outlined in the 1994 Plan analyzed by the FEIS, but rather than focusing on a list of species, the Council proposes to focus on broader oceanographic conditions and key indicator species. *Exxon Valdez* Oil Spill *Restoration Plan*, Ch. 3 at pg. 25 (November 1994); NOI, Fed. Reg. Vol. 75, No. 14 at pg. 3708 (Jan. 22, 2010).

The Council contemplates monitoring a number of key species in the spill-affected ecosystems including forage fish, killer whales, seabirds, bivalves, and sea otters. The Council also realizes the importance of changing oceanographic conditions in the Sound as playing a vital role in the recovery of many injured resources and services. Monitoring factors such as temperature, salinity, turbidity, and zooplankton availability will play an important role in determining the overall health of the ecosystem.

As noted in the FEIS, long-term monitoring and research activities could result in projects that would be only informational in nature but extremely beneficial to the restoration of injured resources or the services they provide if the information were used or acted upon by the Council or other relevant agencies. The realization of these benefits may require an agency management action that is outside the jurisdiction of the Council. Therefore, the impacts of such potential specific management actions are not analyzed in this SEIS. *See also*, FEIS, Ch. 1, pg. 22. Rather, the impacts of implementing long-term monitoring projects are evaluated.

4.2.2.1 Environmental Consequences

The environmental consequences of long-term monitoring of oceanographic conditions and biological resources in~~for~~ nearshore and offshore ecosystems were evaluated for the short-term and the long-term.~~:~~ With respect to long-term monitoring, "short-term" pertains to a five-year period after monitoring begins. "Long-term" pertains to the period over five years after monitoring begins.

Short-term: Uncertain or Low benefits. ~~Although some benefits may accrue quickly, it is not reasonable to expect substantial results within a five-year period.~~Depending on the nature and design of the long-term monitoring, some benefits could be experienced within five years after the start of implementation, such that information learned during the study may be made available for the Council or other relevant agencies to enhance impending restoration or management activities. However, for studies that rely on a compilation of multiple years of new data, the maximum potential benefits will not likely be realized within five years. Unless the Council is committed to implementing activities based on the findings of the long-term monitoring, any benefits generated by long-term monitoring will rely on action being taken ~~by~~

by the agencies which have responsibility for managing these natural resources. Since such action is beyond the control of the Council, the actual realization of restoration benefits is uncertain.

Long-term: Uncertain to Moderate benefits. It can be expected that these actions will produce information that may illuminate the larger ecosystem shifts that impact and influence a broad variety of species and resources injured by the spill and, thus enable management strategies and long-term restoration that will support spill area marine ecosystems. Unless the Council is committed to implementing management activities based on the findings of the long-term monitoring, any benefits generated by long-term monitoring will rely on action being taken by the agencies which have responsibility for managing these natural resources. Since such action is beyond the control of the Council, the actual realization of restoration benefits is uncertain.

4.2.2.2 Social and Economic Impacts

The impacts of long-term monitoring of oceanographic conditions for nearshore and offshore ecosystems on social and economic uses, such as subsistence, wilderness, recreation and tourism, sport and commercial fishing, which depend on these marine ecosystems were evaluated for the short-term and the long-term. With respect to long-term monitoring, "short-term" pertains to a five-year period after monitoring begins. "Long-term" pertains to the period over five years after monitoring begins.

Short-term: Low benefits. Although some benefits, such as use of real-time oceanographic conditions data, may accrue quickly, it is not reasonable to expect substantial results within a five-year period.

Long-term: Moderate benefits. It can be expected that these actions will produce information that may illuminate the larger ecosystem shifts that impact and influence a broad variety of species and resources injured by the spill. This information can be used to support these uses, as well as supporting management strategies and long-term restoration that will support spill area marine ecosystems and thus further facilitate additional social and economic use of these resources.

4.2.3 Lingering Oil

The Council previously provided funding to studies that would determine the extent, distribution and biodegradability of lingering oil in the nearshore marine environment~~is currently being determined and will be important in understanding the potential courses of action in this area and their attendant benefits or harms~~. Current research is also underway to quantify the degree of injury caused by the remaining lingering oil, evaluate the feasibility of additional remediation activities, and evaluate whether additional remedial activities would adversely affect the environment.

Lingering oil research activities may also result in projects that would be only informational in nature but potentially beneficial to the restoration of injured resources or the services through

either informing the active removal of lingering oil or producing information indicating that removal of the oil would increase the injury to affected species. As discussed above, the nature of the benefits from lingering oil research depend on the results of research that is not yet completed or require an agency management action that is outside the jurisdiction of the Council. ~~Therefore~~Since it is not currently known if additional remedial activities are warranted, the impact of potential remedial~~these~~ actions will not be analyzed in this SEIS.

4.2.3.1 Environmental Consequences

Environmental Consequences of lingering oil research With respect to lingering oil research, "short-term" pertains to a five-year period after research activities begin. "Long-term" pertains to the period over five years after research activities begin.

Short-term effects: Unknown effects. For direct restoration actions, effects are unknown because these potential actions are still being tested.

Long-term effects: Unknown effects. For direct restoration actions, effects are unknown because these potential actions are still being tested.

4.2.3.2 Social and Economic Impacts

The impacts of lingering oil research on social and economic uses, such as subsistence, sport and commercial fishing, wilderness, recreation and tourism and archeological/cultural resources, were evaluated for the short-term and the long-term. With respect to lingering oil research, "short-term" pertains to a five-year period after research activities begin. "Long-term" pertains to the period over five years after research activities begin.

Short-term effects: Unknown to Low effects. For direct restoration actions, effects are largely unknown because these potential actions are still being tested. There has been some moderate benefit as the current activities which have employed some spill-area personnel and equipment to conduct these research activities.

Long-term effects: Unknown effects. For direct restoration actions, effects are unknown because these potential actions are still being tested.

4.2.4 Harbor Protection and Marine Restoration

4.2.4.1 Storm Water, Wastewater, and Harbor Projects

The Council seeks to further reduce pollution in the marine environment to contribute to the recovery of injured natural resources or services with actions to reduce the improper disposal of waste, such as oily bilge water, used engine parts, paints, solvents and lead-acid batteries. Improper disposal of these wastes in landfills adversely affects the quality of nearby marine waters through runoff and leaching. Chronic marine pollution stresses fish and wildlife resources, possibly delaying recovery of resources injured by the spill. In the past, the Council has approved the funding of several projects to prepare waste management plans and has

contributed to their implementation. The proposed alternative envisions similar actions, such as the acquisition of waste oil management equipment and the construction of environmental operating stations for the drop-off of used oil and other hazardous waste in spill area coastal communities.

4.2.4.1.1 Environmental Consequences

The environmental consequences of storm water, wastewater and harbor projects on nearshore and offshore marine ecosystems near coastal communities in spill area were evaluated for the short-term and the long-term. With respect to these projects, "short-term" pertains to a ten-year period after such projects begin. "Long-term" pertains to the period over ten years after these projects begin.

Short-term: High benefits. The proposed actions may substantially benefit associated marine ecosystems in areas of implementation in the short-term after implementation of the activities.

Long-term: Low benefits. The initial benefits of the proposed actions to areas in which they are implemented may gradually lessen with the passage of time and a continuation or increase in sources of pollution in these areas.

4.2.4.1.2 Social and Economic Impacts

The impacts of storm water, wastewater and harbor projects on social and economic uses, such as subsistence, wilderness, recreation and tourism, sport and commercial fishing and archeological/cultural resources were evaluated for the short-term and the long-term. With respect to these projects, "short-term" pertains to a ten-year period after research activities begin. "Long-term" pertains to the period over ten years after the project begins.

Short-term: High benefits. The proposed actions may substantially benefit human services associated with the marine ecosystems in areas of implementation in the short-term after implementation of the activities.

Long-term: Low benefits. The initial benefits of the proposed actions to social and economic uses which depend upon the areas in which they are implemented may gradually lessen with the passage of time and a continuation or increase in sources of pollution in these areas.

4.2.4.2 Marine Debris Removal

The Council proposes to fund marine debris removal that affects the spill area marine ecosystem. Marine debris is an issue in the marine and near-shore environment, where it is likely that thousands of marine debris exist within three nautical miles of the Alaska coastline. Marine debris removal projects can result in an immediate improvement to the coastal habitat, reduces entrapment hazards for marine wildlife, and reduces marine pollution affecting natural resources injured by the spill and thus further supports restoration.

4.2.4.2.1 Environmental Consequences

The environmental consequences of marine debris removal on nearshore and offshore marine ecosystems in the spill area were evaluated for the short-term and the long-term. With respect to these projects, "short-term" pertains to a five-year period after such activities begin. "Long-term" pertains to the period over five years after such activities begin.

Short-term: High benefits. The proposed actions may substantially benefit associated marine ecosystems in areas of implementation in the short-term after implementation of the activities. However, some marine debris may provide habitat for marine organisms. For example, old fishing gear can provide substrate for barnacle or algae attachment and may provide shelter for crustaceans. Removing such "habitat" will have an immediate adverse effect on the microcosm of organisms using it.

Long-term: Low benefits. This restoration activity only removes deposited marine debris. To reduce marine debris in the long-term would require education and a change in human waste generation activities. In the absence of such behavioral shifts, new marine debris will continue to be deposited in areas that were previously cleaned. Thus, the initial benefits of the proposed actions to areas in which they are implemented may gradually lessen with the passage of time and a continuation or increase in sources of pollution in these areas.

4.2.4.2.2 Social and Economic Impacts

The impacts of marine debris removal on social and economic uses, such as subsistence, recreation and tourism, wilderness, sport and commercial fishing and possibly archeological/cultural resources, were evaluated for the short-term and the long-term. With respect to these projects, "short-term" pertains to a five-year period after activities begin. "Long-term" pertains to the period over five years after such activities begin.

Short-term: High benefits. The proposed actions may substantially benefit the uses associated with the marine ecosystems in areas of implementation in the short-term after implementation of the activities. Depending on how a marine debris removal program is structured, the program could offer immediate local employment opportunities.

Long-term: Low benefits. The initial benefits of the proposed actions on social and economic uses which depend upon the areas in which they are implemented may gradually lessen with the passage of time and a continuation or increase in sources of pollution in these areas. Depending on how a marine debris removal program is structured, the program could offer long-term local employment opportunities.

4.2.4.3 Sharing Information on Response, Damage Assessment and Restoration ~~Implications~~

Damage to natural resources can occur not only with the initial spill, but additional damage can also be caused by spill response efforts. The Council proposes to organize, preserve and pass information regarding skilled damage assessment and how to mitigate damage from spill response activities in future spills. Activities envisioned in this effort include outreach efforts

such as a conference or series of papers sharing information to be used by future responders, including natural resource assessment, the long-term costs of high-pressure washing, use of dispersants in the near-shore, sub-arctic environment and the effects of potential burning scenarios. The level of environmental and socioeconomic benefits likely to be generated by sharing of information on response, damage assessment, and restoration will depend on the location, frequency and magnitude of future oil spills.

4.2.4.3.1 Environmental Consequences

The environmental consequences of sharing information on response, damage assessment and restoration ~~implications~~ on nearshore and offshore ecosystems were evaluated for the short-term and the long-term. With respect to these activities, "short-term" pertains to a five-year period after such activities begin. "Long-term" pertains to the period over five years after such activities begin.

Short-term: Moderate benefits. Depending upon the incidence of future spills, it can be expected that these actions, if a spill occurs, will assist in mitigating harm from spill response activities.

Long-term: Low benefits. It can be expected that these actions assist in mitigating harm from spill response activities in future spills. Unless funded at higher levels that could sustain future activities in this area with the passage of time and the development of additional knowledge in this area, the utility of the information organized, preserved and developed with this effort will diminish.

4.2.4.3.2 Social and Economic Impacts

The impacts of response, damage assessment and restoration implications on the social and economic uses, such as subsistence, sport and commercial fishing, wilderness, recreation and tourism and archeological/cultural resources, which are located near or depend upon nearshore and offshore ecosystems were evaluated for the short-term and the long-term. With respect to these activities, "short-term" pertains to a five-year period after activities begin. "Long-term" pertains to the period over five years after such activities begin.

Short-term: Moderate benefits. Depending upon the incidence of future spills, it can be expected that these actions, if a spill occurs, will assist in mitigating harm from spill response activities and thus support related social and economic uses.

Long-term: Low benefits. It can be expected that these actions assist in mitigating harm from spill response activities in future spills and thus support related social and economic uses. Unless funded at higher levels that could sustain future activities in this area, with the passage of time and the development of additional knowledge in this area, the utility of the information organized, preserved and developed with this effort will diminish.

4.2.5 Habitat Acquisition and Protection

At the time of the September 1994 FEIS, the Habitat Acquisition and Protection program was a primary component that was to receive the largest portion of remaining settlement funds. In both the proposed alternative and the no action alternative, this program remains a fundamental component, allotted approximately 25% of remaining funds, see FEIS, Ch. 4, pg. 111.

As discussed in the FEIS, parcels available for protection are still being developed and cannot be individually analyzed in this SEIS.

4.2.5.1 Environmental Consequences

The environmental consequences of habitat acquisition and protection on upland, nearshore and offshore ecosystems were evaluated for the short-term and the long-term.- With respect to these activities, "short-term" pertains to a five-year period after such activities begin. "Long-term" pertains to the period over five years after such activities begin.

Short-term: Unknown level to high level of benefits. Depending upon the expected usage of parcels if they were not protected, the short-term effects of land acquisition could be of varying benefit ranging from high to moderate.

Long-term: Moderate benefits. The long-term effects of habitat protection actions for reducing disturbance or preventing additional injury to injured species and spill-affected ecosystems are moderately beneficial and with the type of benefit to various injured species and spill-affected ecosystems vary among parcels.

4.2.5.2 Social and Economic Impacts

The impacts of habitat acquisition and protection on social and economic uses, such as wilderness, subsistence, sport and commercial fishing and recreation and tourism and archeological/cultural resources, were evaluated for the short-term and the long-term With respect to these activities, "short-term" pertains to a five-year period after such activities begin. "Long-term" pertains to the period over five years after such activities begin.

Short-term: Unknown. Depending upon the expected usage of parcels if they were not protected, the short-term effects of land acquisition could be of varying benefit to related social and economic uses.

Long-term: Moderate benefits. The long-term effects of habitat protection actions for reducing disturbance or preventing additional injury to related social and economic uses are moderately beneficial and with the type of benefit to various injured human services vary among parcels.

4.3 Cumulative Effects

The CEQ regulations for implementing NEPA define cumulative effects as: "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-

federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7). It is critical to evaluate past and present actions as well as those that will happen in the foreseeable future in the action area. For the purposes of this SEIS, past and present actions include both human controlled events and natural events. Events taking place in the foreseeable future are considered on a ten year time frame, lasting until 2020.

Actions that may affect EVOSTC restoration include the list of projects and environmental influences below. Many of these projects were identified and discussed at length in the 1994 FEIS (Chapter 4, pages 152-163). Where there is additional information to supplement the original discussion in the 1994 FEIS, it is included below the table.

Table 2: Projects that may impact EVOS restoration efforts

ACTIVITY	PAST	PRESENT	FUTURE	COMMENT
Whittier Road Access and Whittier Harbor Expansion	X			(see below for additional information)
Trans-Alaska Gas Pipeline Terminal	X			
Institute for Marine Science at Seward	X			(Completed as Alaska SeaLife Center)
Child's Glacier Tourism Development	X			(see below)
FY 1992-1994 EVOSTC Projects	X			
Cordova Road Access	X			
Lower Cook Inlet Oil Development		X		(see below)
Yakutat Oil Development		X		
Shepard Point (Nelson Bay) Dredging		X		
Coastal Development in Cook Inlet		X		(see below)

Tankering from the Trans-Alaska Pipeline Terminal at Valdez			X	
FY 2010-2012 EVOSTC Projects			X	(see below)
Cordova Center			X	(see below)
Global Climate and Ocean Regime Changes		X	X	(see below)
Mortality			X	(see below)
Government Administration			X	(see below)

4.3.1 Project Management and Government Administration

FY10 – FY12 EVOSTC Projects: Projects funded during these fiscal years are scientific in nature and will not have any significant impact on the environment of the spill area. Each funded project has received a Categorical Exclusion (Section 6.03.c.3 (a)) from the National Environmental Policy Act.

Government Administration: External factors that potentially impact Council management and administration are new legislation, annual budgets, new leadership, and litigation.

Potential Impacts of the Alternatives on Management and Administration
Alternative 1 would not change the way EVOSTC projects are selected or funded, the same methods used to select projects and research objectives in the past would be implemented again. However, Alternative 2 would allow for a focused and narrowed approach to project selection, . Neither alternative would impact -administration, as government administration is beyond the Council's control.

Potential Cumulative Impacts of Management and Administration
~~State~~Government administration could significantly impact the Council's ability to meet its restoration goals in that pressures of time, personnel, and workload impact the staff's ability to meet work requirements. New leadership or other administrative changes at levels higher than the Council ~~I~~will impact current and future work, as it may require time necessary ~~time~~ for adjustment. Projects selected by the Council for the future fiscal years will be a positive impact on the restoration goals of the Council; they will help ensure the goals and objectives are met.

4.3.2 Area Development

Lower Cook Inlet Oil Development: MMS lease sales were discussed in 2007 and one sale was proposed for Cook Inlet (#211). However, it was canceled due to lack of industry interest. A second special interest sale was mentioned in the Federal Register (73 FR 39032), but a sale number was not identified, it is assumed to still be under consideration.

Coastal Development in Cook Inlet: Port facilities improvements and expansions in the towns of Anchorage, Kenai, and Homer are ongoing.

Whittier Road Access and Whittier Harbor Expansion: This project has largely been completed. A Notice of Intent has been issued to prepare an Environmental Impact Statement for Whittier Harbor Navigation Improvements Feasibility Study. This study would consider the feasibility of expanding the existing moorage capacity for vessels at Whittier. A final EIS for this project is scheduled no sooner than January 2011. If this project were to be finalized, potential cumulative impacts of the past, present and reasonably foreseeable future actions include impacts resulting from harbor construction and resultant increase in vessel traffic. *See Notice of Intent*, Fed. Reg. Vol. 74, No. 127 (July 6, 2009).

Child's Glacier Tourism Development: Child's Glacier recreational area improvements have been completed. In addition, the Child's Glacier Lodge may be completed in Summer 2011, with overnight capacity for twelve and recreations activities including jet boat, glacier and kayak tours.

The Cordova Center: This project, for which the Council has approved partial funding, will be required to complete an Environmental Impact Statement (EIS) prior to construction. Specific impacts will be discussed at length in that document.

Potential Impacts of the Alternatives on Area Development

With respect to Alternative 1, the potential impacts to area development would be minimal, as this option does not emphasize these activities. In development areas where marina work is proposed, the harbor protection and marine restoration activities focus of Alternative 2, would be beneficial. Funding would be available for work within certain areas and expertise and guidance could be shared with interested parties. Regional development work could be carried out with a focus on water protection, marine debris removal, and restoration implications with new support.

Potential Cumulative Impacts of Area Development

As the spill-affected area continues to become more developed there is less habitat available for species survival and less opportunity for recovery at an ecosystem level. Development not only impacts land use but also the air and water quality of the area. This multi-dimension impact can be lessened with project design and engineering, but careful thought and planning needs to take place at every level to achieve minimal impacts to sensitive species and resources.

4.3.3 Large Scale Factors

Global Climate and Ocean Regime Changes: Global climate change and ocean regime changes will likely impact restoration projects in the future. These outcomes cannot yet be determined but impacts to restoration will be considered and analyzed at the time of future project selection.

Mortality: Death due to predation, disease and animal stranding are likely to occur in the action area in the next ten years.

Potential Impacts of the Alternatives on large-scale factors

Neither of the two alternatives will have an impact on the large-scale items discussed above as these factors are larger than either alternative. The decisions the Council makes to benefit impacted resources will be in response to, not due to, the factors of ocean and climate change, fluctuations in administration, and species mortality among other considerations. The data collection and interpretation within the long-term monitoring focus of Alternative 2 would assist the Council and others in determining the scope and scale of the large-scale ecological factors in regional habitats, however the work being performed in Alternative 2 would not be significant enough to contribute to or impact these large occurrences.

Potential Cumulative Impacts of large-scale factors

The cumulative consequences of these large-scale factors could be significant in both the short and long term. The Council is already working with these factors in mind, as new projects are being designed and funded researchers are considering what the habitat will be like in changing conditions, how disease and other sources of mortality can be minimized, and how to incorporate resiliency in projects. If the timing and potentially additive nature of these large-scale factors were to combine, the work of the Council would be very difficult and improvements to injured species and resources would be slowed.

CHAPTER 5 – DOCUMENT PROCESSING

5.1 List of Preparers

The following persons were primarily responsible for preparing the environmental impact statement or significant background papers.

Catherine Boerner, Science Coordinator, EVOSTC Restoration Office, 10 years experience in natural resource management and wildlife biology, prepared Chapter 3 on the Affected Environment.

Elise Hsieh, Executive Director and Attorney, EVOSTC Restoration Office, thirteen years of experience in Environmental Law, prepared the DSEIS in conjunction with EVOSTC staff and Trustee Agency Liaisons, excluding the process and public process sections in Chapter 1 and Chapter 3, the Affected Environment.

Laurel Jennings, NEPA Coordinator, NOAA Restoration Center, NW Region, three years of experience in federal environmental compliance and habitat restoration, prepared the format for the SEIS and assisted with other sections, including the Public Participation Process sections in Chapter 1.

5.2 Distribution of the draft SEIS

Below is a list of the Agencies, Organizations, and Persons to whom a notice of the availability of the draft SEIS was sent.

5.2.1 Agencies

U.S. Department of the Interior

U.S. Department of Agriculture

Alaska Department of Law

Alaska Department of Environmental Conservation

Alaska Department of Fish and Game

Alaska Department of Natural Resources

5.2.2 Organizations

Native Village of Afognak, Nancy Nelson, President

Native Village of Chenega, Pete Komkoff, President

Native Village of Chignik Lagoon, Clemens Grunert, President

Chignik Lake Village Council, John Lind, President

Native Village of Eyak, Bruce Cain, Executive Director

Native Village of Karluk, Alicia Reft, President

Larsen Bay Tribal Council, Susan Aga, Manager

Nanwalek IRA Council, Wally Kvasnikoff, Chief

Port Lions Traditional Tribal Council, Arnold Kewan, President

Native Village of Tatitlek, Roy Totemoff, President & CEO

Old Harbor Tribal Council, Emil Peterson, President

Native Village of Ouzinkie, Daniel Ellanak, President

Seldovia Village Tribe IRA and Seldovia Native Assn., Crystal Collier, CEO and Fred Elvsaas

Chenega Corporation, Brian Fox

Chugach Alaska Corporation, John F.C. Johnson

English Bay Corporation

Grouse Creek Corporation, Esther Ronne

Knikatnu, Inc, Paul Theodore

Native Village of Port Graham, Eleanor McMullen

Ninilchik Village Traditional Council, Bruce Oskalkoff

Tatitlek Corporation, Carroll Kompkoff

YAK-TAT-KWAAN INC., Donald Bremner

Chickaloon Native Village, Alan Larson

Eyak Corporation, Dan McDaniel and Rod Wohl

Kenaitze Indian Tribe, Rose Tepp

Salmatof Native Association, Jim Segura

Tyonek Native Corporation, Ted Kroto

Eklutna, Inc.

Ninilchik Native Association, Inc.

Valdez Native Tribe, Brenna Hughey

Cook Inlet Region, Inc

5.2.3 Persons

Public Advisory Committee Members:

Patience Anderson Faulkner

Torie Baker

Amanda Bauer

Jason Brune

Kurt Eilo

Larry Evanoff

Gary Fandrei

John French

Jennifer Gibbins

Lori Polasek

John Renner

Bill Rosetti

Stacy Studebaker

David Totemoff

Leaders of Municipalities:

City of Soldotna, Peter A. Micciche, Mayor

City of Valdez, Bert Cottle, Mayor

City of Whittier, Lester Lunceford, Mayor

City of Ouzinkie, Zack Chichenoff, Mayor

City of Seldovia, Keith Gain, Mayor

City of Seward, Willard Dunham, Mayor

City of Old Harbor, Rick Berns, Mayor

City of Port Lions, Steve Andresen, Mayor

City of Akhiok, Linda Amodo, Mayor

City of Chignik, Richard Sharpe, Mayor

City of Cordova, Tim Joyce, Mayor

City of Homer, James C. Hornaday, Mayor

City of Kodiak, Carolyn Floyd, City Clerk

Kodiak Island Borough, Jerome Selby, Mayor

City of Larsen Bay, Valen Norell, Mayor

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CHAPTER 6 – REFERENCES

Final Environmental Impact Statement for the *Exxon Valdez* Oil Spill Restoration Plan September 1994).

Notice of Intent, Fed. Reg. Vol. 75, No. 14 at pg. 3708 (Jan. 22, 2010).

Exxon Valdez Oil Spill *Restoration Plan* (November 1994).

Exxon Valdez Oil Spill Trustee Council 2009 Status Report

Exxon Valdez Oil Spill Trustee Council. http://www.evostc.state.ak.us/NEPA/http://www.evostc.state.ak.us/NEPA/

Exxon Valdez Oil Spill Trustee Council Update of Injured Resources and Services 20** (*****, 20**)

Exxon Valdez Oil Spill Trustee Council. http://www.evostc.state.ak.us/NEPA/http://www.evostc.state.ak.us/NEPA/

Exxon Valdez Oil Spill Trustee Council. http://www.evostc.state.ak.us/NEPA/