11.16.08

Exxon Valdez Oil Spill Trustee Council

November 10, 2005
teleconference

Agenda

AGENDA
EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
Teleconference
November 10, 2005 10:00 a.m.
Anchorage, Alaska

DRAFT 11/07/05, 11:30AM

Trustee Council Members:

SCOTT NORDSTRAND
Commissioner, Dept. of Admin.
State of Alaska

JAMES BALSIGER
Administrator, Alaska Region
National Marine Fisheries Service

KURT FREDRIKSSON
Commissioner
Alaska Department of
Environmental Conservation

DRUE PEARCE
Senior Advisor to the Secretary
for Alaskan Affairs
U.S. Department of the Interior

MCKIE CAMPBELL
Commissioner
Alaska Department of Fish
and Game

JOE MEADE
Forest Supervisor
U.S. Department of Agriculture
Forest Service

Teleconference meeting in Anchorage, Trustee Council Office, 441 West 5th Avenue, Suite 500
Teleconference # 1-800-315-6338, code 5151
_____ Federal Chair

1. Call to Order – 10:00 a.m.

2. Consent Agenda
   - Approval of Agenda*
   - Approval of Trustee Council meeting notes*
     August 5, 2005
     August 10, 2005
     September 21, 2005

3. Public comment – 10:10 a.m.

4. Public Advisory Committee dialogue – 10:20 a.m.
   - PAC Chairman's Report

- PAC member's comments

5. Executive Director's Report
   - EVOSTC/AKY-SSI Memorandum of Agreement (attached)
   - Recap of existing EVOSTC MOAs and MOUs (attached)
   - Establishment of Lingering Oil Committee under IGD
   - Report on Public Records Act Request from Trustee of Alaska (attached)

6. Adams/Mullins Revised Proposal 060784 *

7. Bickford 060782 additional funding request*

8. Proposals considered non-responsive to FY 06 Invitation (attached)*
   - o Saupe (new attachment)
   - o Willette
   - o Walker

9. Small Parcel Acquisition Policy*

10. FY 2006 Admin Budget/Continuing Resolution for December 2005*

11. Miscellaneous Correspondence
   - PWSSC Resolution re the Reopener
   - American Fisheries Letter of Appreciation

Executive Session if necessary

12. Adjourn

* Indicates action items

August 5, 2005
Meeting Notes

Exxon Valdez Oil Spill Trustee Council

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

TRUSTEE COUNCIL MEETING NOTES (teleconference)
Anchorage, Alaska
August 5, 2005

DRAFT DRAFT

Chaired by: Scott Nordstrand (at EVOS office)
Trustee Council Member

Trustee Council Members Present:

Joe Meade, USFS (T)
Drue Pearce, DOI (T)
James Balsiger, NMFS *
McKie Campbell, ADF&G (T)
Kurt Fredriksson, ADEC (T)
•Scott Nordstrand, ADOL

• Chair
* Peter Hagen (T) alternate for James Balsiger
(T) via teleconference

Teleconference convened at 7:50 a.m., August 5, 2005 in Anchorage at the EVOS Conference Room.

1. Approval of the Agenda

APPROVED MOTION: Approved the August 5, 2005 agenda

Motion by Pearce, second by Fredriksson

Public comment period began at 7:50 a.m.

There was no public comment.

Public comment period closed at 7:50 p.m.

2. Executive Session

APPROVED MOTION: Motion to move to Executive Session to discuss personnel matters

Motion by Fredriksson, second by C...

Off the record 7:53 a.m.

mtg notes
8/5, 8/10, 9/21

Exxon Valdez Oil Spill Trustee Council

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

TRUSTEE COUNCIL MEETING NOTES (teleconference)
Anchorage, Alaska
August 5, 2005

DRAFT DRAFT

Chaired by: Scott Nordstrand (at EVOS office)
Trustee Council Member

Trustee Council Members Present:

Joe Meade, USFS (T)	McKie Campbell, ADF&G (T)
Drue Pearce, DOI (T)	Kurt Fredriksson, ADEC (T)
James Balsiger, NMFS *	•Scott Nordstrand, ADOL

• Chair
* Peter Hagen (T) alternate for James Balsiger
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There was no public comment.

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2. Executive Session

APPROVED MOTION: Motion to move to Executive Session to discuss personnel matters

Motion by Fredriksson, second by Campbell

Off the record 7:53 a.m.

Meeting adjourned during Executive Session without coming back into open session at 8:40 a.m.

Motion by Campbell, second by Pearce

August 10, 2005
Meeting Notes

Exxon Valdez Oil Spill Trustee Council

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

TRUSTEE COUNCIL MEETING NOTES
Anchorage, Alaska
August 10, 2005

DRAFT DRAFT

Chaired by: Drue Pearce
Trustee Council Member

Trustee Council Members Present:

Joe Meade, USFS
•Drue Pearce, DOI
James Balsiger, NMFS *
McKie Campbell, ADF&G
Kurt Fredriksson, ADEC
Scott Nordstrand, ADOL

• Chair
* Peter Hagen alternate for James Balsiger

Meeting convened at 9:08 a.m., August 10, 2005 in Anchorage at the EVOS Conference Room.

1. Approval of the Agenda

APPROVED MOTION: Approval of the revised August 10, 2005 agenda: moving discussion of the Interim Action Plan to earlier on the agenda, moving Executive Session to the last item, and moving PAC meeting report from Executive Director's report to PAC dialogue.

Motion by Campbell, second by Nordstrand

2. Approval of June 11, 2005 meeting notes

APPROVED MOTION: Approval of June 11, 2005 meeting notes with the following revisions: remove notation of attachments A, B, and C referred to in Items 1, 2 and 3; change Attachment D to A; indicate 11 public comments were received instead of 11 comments from Cordova residents; and amend Item 7 to reflect that the Trustees asked EVOS staff to work with liaisons to review quarterly, annual and final reports and to address procedures for overdue reports.

Motion by Fredriksson, second by Campbell

APPROVED MOTION: Approve adopting public comment portion of the June 11, 2005 meeting transcript as a part of the June 11, 2005 meeting notes.

Motion by Fredriksson, second by Meade

Public comment period began at 9:20 a.m.

Five individuals offered public comment.

Public comment period closed at 9:45 a.m.

Public Advisory Committee (PAC) and Trustee Council dialogue began at 9:48 a.m.

Dr. John Gerster, Chairman, gave a summary of the June 11 PAC meeting and July 19 briefing. Additional comments were offered by six other PAC members: Stacy Studebaker, Co-chair; Jason Brune; Torie Baker; Ed Zeine; Pat Lavin; and Brenda Norcross.

PAC Dialogue closed at 11:05 a.m.

Off the record 11:08 a.m.
On the record 11:25 a.m.

3. Removal of 10-year budget survey item from agenda

APPROVED MOTION: Motion to remove the 10-year budget survey from the agenda.

Motion by Campbell, second by Nordstrand

Off the record 12:10 p.m.
On the record 12:27 p.m.

4. Public Advisory Committee

APPROVED MOTION: Motion to request the Secretary of the Department of Interior to remove inactive member Bob Patterson from the Public Advisory Committee.

Motion by Nordstrand, second by Campbell

APPROVED MOTION: Motion to request the Secretary of the Department of Interior to appoint Kurt Eilo and Vern McCorkle to the remaining 2004-2006 term of the Public Advisory Committee.

Motion by Hagen, second by Fredriksson

5. Anchor River small parcels

APPROVED MOTION: Motion to approve funding $175,000 toward the purchase of two Anchor River parcels (Jacobs and Mutch properties).

Motion by Meade, second by Nordstrand

6. Revision for filing past final reports

APPROVED MOTION: Motion to approve having the EVOS staff finalize overdue final reports, without providing five copies to the delinquent reporting Principle Investigator and to work with the agency liaisons to revise the Policies and Procedures for submission of future final reports.

Motion by Meade, second by Hagen

Off the record 1:29 p.m.
On the record 1:52 p.m.

7. Interim Guidance Document

APPROVED MOTION: Motion to adopt the August 9, 2005, 2:21 p.m. version of the Interim Guidance Document, August 2005 through December 2006.

Motion by Campbell, second by Nordstrand

8. Small Parcel paper

APPROVED MOTION: Motion to approve adopting Small Parcel Process document without inclusion of reference to specific employees within the sponsoring agencies.

Motion by Campbell, second by Fredriksson

9. ARLIS–060550 Budget

APPROVED MOTION: Motion to approve the ARLIS–060550 budget request of $139,600.

Motion by Campbell, second by Hagen

10. Ben-David–060781 and Keifer–060792 proposals

FAILED MOTION: Motion to approve the Ben-David–060781 and Keifer–060792 proposals.

Motion by Campbell, second by Fredriksson

11. Bodkin–060788 proposal

FAILED MOTION: Motion to approve the Bodkin proposal.

Motion by Hagen, second by Nordstrand

12. Jacobs–060783 proposal

APPROVED MOTION: Motion to approve funding the Jacobs–060783 project, for $501,400.44 as part of the FY 2006 Work Plan contingent upon the receipt of a revised proposal which satisfactorily addresses the concerns raised during the scientific and technical STAC review process. Specifically, the revised proposal shall provide a more detailed plan to engage contributing scientists that have expertise and experience with the EVOS affected resources and location. This revision will also include the identification of appropriate experts as well as budget revisions that provide for adequate compensation and a plan for necessary coordination. Integral is to be asked also to fund the public workshops element of its proposal while staying within the requested budget and to use the annual science symposium sponsored by the Trustee Council as a venue for one of the proposed workshops.

Motion by Fredriksson, second by Meade

13. Adams–060784 proposal

WITHDRAWN MOTION: Motion to fund Adams–060784.

Motion by Campbell, second by Nordstrand

Off the record 4:00 p.m.
On the record 4:15 p.m.

WITHDRAWN MOTION: Motion requesting the EVOS staff to work with the PIs to modify the proposal to meet the Trustee Council's objectives and needs, and develop a maintenance budget for consideration at the next Trustee meeting.

Motion by Meade, second by Hagen

APPROVED MOTION: Motion to provide Adams–060784 an opportunity to modify their proposal working with the EVOS Executive Director, staff and STAC and resubmit.

Motion by Meade, second by Campbell

14. Esler–060777, Hoover-Miller–060789, Irons–060787, Rusanowski–060785, and Short–060786 proposals

FAILED MOTION: Motion to fund Esler-060777, Hoover-Miller-060789, Irons-060787, Rusanowski-060785 and Short-060786.

Motion by Campbell, second by Hagen

15. Bickford–060782 proposal

APPROVED MOTION: Motion to approve Bickford-060782, $52,211.

Motion by Campbell, second by Pearce

16. Out-year funding of FY 04 and 05 projects

APPROVED MOTION: Motion to approve FY 06 funding for projects: Ballachey–040775, $34,900; Batten–040624, $135,200; Bechtol–040693, $56,000; Bishop–

040635, $151,390; Bodkin–040620, $6,500; Cokelet–040699, $145,900; DeLorenzo–040210, $133,200; Finney–040703, $81,117; Heintz–040706, $14,000; Honnold–040707, $86,800; Nelson–040290, $22,200; Okkonen–040614, $31,455; Rice–040620, $29,100; Schneider–040610, $63,000; Thorne–040725, $108,943; Walker–040726, $149,700; Weingartner–040340, $64,950; Willette–040670, $27,900; Woody–040712, $152,632; Baird–050743, $28,900; Bodkin–050750, $104,400; Hoover-Miller–050749, $130,300; Irons–050751, $32,700; Matkin–050742, $22,300; Otis–050769, $89,400; Rice–050794, $30,783.56; Saupe–050764, $201,900; Short–050763, $58,900; Willette–050765, $65,900. The funding of these projects is contingent on receipt by the EVOS staff of annual reports in the proper format.

Motion by Nordstrand, second by Fredriksson

17. Defer action on the EVOS Administrative Budget–060100

APPROVED MOTION: Approve motion deferring action on the EVOS Administrative Budget–060100 until a subcommittee of trustees, trustee representatives, and EVOS staff reviews it. The budget is to be brought back to the Trustee Council by mid-late September, 2005.

Motion by Campbell, second by Nordstrand

18. Executive Session

APPROVED MOTION: Approved motion to move to executive session to discuss personnel issues.

Motion by Nordstrand, second by Campbell

EXECUTIVE SESSION
Off the record: 4:49

Meeting adjourned following Executive Session at 6:18 p.m.

Motion by Fredriksson

September 21, 2005
Meeting Notes

Exxon Valdez Oil Spill Trustee Council

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

TRUSTEE COUNCIL MEETING NOTES
Anchorage, Alaska
September 21, 2005

DRAFT DRAFT

Chaired by: McKie Campbell
Trustee Council Member

Trustee Council Members Present:

Joe Meade, USFS
Drue Pearce, DOI
James Balsiger, NMFS *
• McKie Campbell, ADF&G
Kurt Fredriksson, ADEC
Scott Nordstrand, ADOL **

• Chair
* Peter Hagen alternate for James Balsiger
** Craig Tillery alternate for Scott Nordstrand

Meeting convened at 10:08 a.m., September 21, 2005 in Anchorage at the EVOS Conference Room.

1. Approval of the Agenda

APPROVED MOTION: Approval of the September 21, 2005 agenda

Motion by Pearce, second by Meade

Public comment period began at 10:15 a.m.

Tom Royer, Chair, Science and Technical Advisory Committee (STAC) and Cordova resident Ross Mullins offered public comment.

Public comment period closed at 10:20 a.m.

Public Advisory Committee (PAC) and Trustee Council dialogue began at 10:20 a.m.

Comments were offered by five PAC members: Stacy Studebaker, Co-chair; Pat Lavin; Dr. John Gerster, Co-chair; RJ Kopchak; and Pat Norman.

PAC dialogue closed at 10:50 a.m.

2. Arctic Yukon Kuskokwim Sustainable Salmon Initiative

APPROVED MOTION: Motion to approve entering into a Memorandum of Agreement between *Exxon Valdez* Oil Spill Data Management and the Arctic Yukon Kuskokwim Sustainable Initiative (AYK SSI) sharing data through the utilization of the peer review data system located at the *Exxon Valdez* Oil Spill office

Motion by Fredriksson, second by Nordstand

APPROVED MOTION: Motion to approve a Cooperative Agreement whereby *Exxon Valdez* Oil Spill Data Management will provide in kind support to the Arctic Yukon Kuskokwim Sustainable Salmon Initiative (AYK SSI) staff in the utilization of the system and AYK will in turn provide funds up to $25,000 for the costs of the peer review database redevelopment effort that is scheduled to take place between October 1 and December 30 of FY 06

Motion by Meade, second by Fredriksson

At 12:25 p.m. a short at ease was called for Deputy Attorney General Nordstrand to be excused. Assistant Attorney General Tillery participated in his place until the meeting recessed at 1:00 p.m.

Off the record 12:25 p.m.
On the record 12:35 p.m.

3. Jacobs' – 060783 revised proposal

APPROVED MOTION: Motion to approve funding the Integral (Jacobs) 060783 proposal at the new recommended level of $565,312.46. The project will be completed by July 1, 2006. Integral will address the Council's additional expectations regarding inclusion of a representative with Traditional Ecological Knowledge (TEK) and two Public Advisory Committee (PAC) representatives on the Technical Review Panel (TRP), and community involvement through public meetings.

Motion by Fredriksson, second by Nordstand

4. Meeting recessed

APPROVED MOTION: Motion to recess until 4:00 p.m.

Motion by Pearce, second by Fredriksson

Off the record 1:00 pm
On the record 4:00 pm

5. Meeting resumed

APPROVED MOTION: Motion to resume meeting at 4:00 p.m.

Motion by Nordstrand, second by Meade

Deputy Attorney General Nordstrand resumed his place on the Council during this time.

6. FY 2006 Interim Administrative Budget funding

APPROVED MOTION: Motion to approve Resolution 06-03 of the *Exxon Valdez* Oil Spill Trustee Council regarding the FY 06 Work Plan Project 060100 – Interim EVOS Administrative Budget amending the agency costs with an increase of 1/6 for project management to the agencies and Project 060783 – Jacobs

Motion by Nordstrand, second by Pearce

7. Arctic Yukon Kuskokwim Sustainable Salmon Initiative

APPROVED MOTION: Motion to rescind previous motion between EVOS Data Management and AYK SSI and replace with: Motion to approve entering into a Memorandum of Agreement between the *Exxon Valdez* Oil Spill Trustee Council and the Arctic Yukon Kuskokwim Sustainable Salmon Initiative (AYK SSI) sharing data through the utilization of the peer review data system located at the *Exxon Valdez* Oil Spill office

Motion by Pearce, second by Fredriksson

8. Executive Session

APPROVED MOTION: Approved motion to move to executive session to discuss personnel issues.

Motion by Nordstrand, second by Meade

EXECUTIVE SESSION
Off the record: 4:30

APPROVE MOTION: Motion to come out of Executive Session

Motion by Fredriksson, second by Nordstrand

Commissioner Campbell reported that the Trustees were out of Executive Session during which time they discussed personnel matters and no action was taken.

Meeting adjourned following the Executive Session at 6:45 p.m.

Motion by Fredriksson, second by Nordstrand

Exxon Valdez Oil Spill Trustee Council

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

MEMORANDUM

To: Trustee Council **Date:** October 25, 2005

From: Gail Phillips **Re:** EVOS/AYK MOA

Attached is a draft MOA describing the collaborative effort between AYK and EVOS to redevelop the peer review database located in the EVOS office, as approved by motions during your last TC meeting (9/21/05).

Data Manager Rob Bochenek sent out a draft to all parties on October 17th and this final draft includes the suggestions and changes that were recommended from the attorneys and the liaisons.

Unless there are further changes recommended by the Council today, I plan to sign this MOA and finalize the agreement following today's meeting.

MEMORANDUM OF AGREEMENT

BETWEEN
ARCTIC-YUKON-KUSKOKWIM SUSTAINABLE SALMON INITIATIVE
&
THE EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
REGARDING SHARED USE OF THE
EVOS PEER REVIEW DATABASE

The following memorandum of agreement between the Arctic-Yukon-Kuskokwim Sustainable Salmon Initiative (herein referred to as the AYK SSI) whose address is 705 Christensen Drive, Anchorage, AK 99501, and the Exxon Valdez Oil Spill Trustee Council (herein referred to as the EVOS), whose address is 441 West Fifth Avenue, Suite 500, Anchorage, AK 99501, is entered into for the purpose of defining the Initiative's use and accessibility to the EVOSTC Peer Review Database (herein referred to as the Database).

I. Background and Purpose of Agreement

It is the intent of this memorandum of agreement to establish a one year cooperative agreement providing computer access, software modifications and technical support necessary for utilizing the Trustee Council's existing peer review database.

This agreement will further the restoration and programmatic goals of both EVOS and AYK-SSI by improving the ability of both programs to fund scientifically sound projects. It creates a collaborative, cost-sharing means to extend the database structure to provide more efficient proposal reviews and expands the pool of peer reviewers by combining expert lists associated with both programs. When implemented, this agreement it will expedite scientific peer review of both AYK SSI and EVOS research proposals.

This memorandum of agreement is intended to formalize and implement the attached collaborative database sharing proposal which was unanimously approved by the Council at their September 21, 2005 Trustee Council meeting and was unanimously approved by the AYK-SSI Steering Committee at their September 8-9, 2005 meeting.

II. Conditions of the Agreement

The Council agrees to the following:

Data Management staff will complete the following tasks and provide the following services:

- Expansion of existing keywords in the database related to salmon fisheries science and any related sub-fields as agreed upon between the AYK SSI and EVOS

- Software modifications will be made to existing user interfaces as needed in order for AYK to utilize the automated peer reviewer system at EVOS. These modifications will include the creation of a set interface specific to AYK SSI's proposal format and review criteria, data structure, etc.

- EVOS Data Management staff will design and administer a new web survey to new and existing reviewers.

- EVOS Data Management staff will provide AYK SSI staff with necessary training and will provide technical support as needed for trouble shooting during the implementation phase as needed.

- During modification and implementation phases, EVOS Data Management staff will provide computer database access and storage space as appropriate and will perform routine backups of all data.

- EVOS Data Management will provide the tools to access the data system, the reports generated by the data system, and support at such times and in such form as is requested by the staff of AYK.

EVOS Data Management staff would complete all software modifications necessary to make the peer review database operative for the purposes of the Initiative by December 5, 2005.

The AYK SSI agrees to the following:

Provide $25K to the Council to provide for: 1) direct cost-recovery for Data Management staff to complete the database modifications described above; 2) sharing of costs associated with maintaining, improving and utilizing peer review data management system.

The AYK SSI will protect the confidentiality of all sensitive information, such as contact information of volunteer peer reviewers, and follow all data security measures stipulated by the Council.

The AYK SSI will provide all information and data necessary for database system modifications to EVOS Data Management staff in a timely way. This will include lists of potential peer reviewers which can be included into the joint database.

III. Timelines:

A. Cooperative Agreement Start date: **October 15, 2005**

B. Cooperative Agreement end date: **October 15, 2006**

IV. General Provisions of the Agreement

1. Except as specifically provided herein, nothing in this agreement shall obligate any party in the expenditure of funds, or future payments of money, in excess of appropriations authorized by law.

2. Nothing herein is intended to conflict with federal, state or local laws or regulations. If there are conflicts, this agreement will be amended at the first opportunity to bring it into conformance with conflicting laws and regulations.

3. The effective date of this agreement shall be October 15, 2005. Participation in this agreement by either signatory organization may be terminated by providing to the other party notice in writing 30 days in advance of the date on which its termination becomes effective.

4. This agreement may not be amended except by mutual written consent of the parties.

V. Approval Signatures

_____ _____

Gail Phillips, Executive Director Date

_____ _____

Dr. John White, Chair AYK SSI Steering Committee Date

Attachment: Collaborative Peer Review Data Base: Proposal to AYK SSI to Utilize EVOS Computer-based Peer Review System

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APPROVED MOTION: Motion to approve entering into a Memorandum of Agreement between *Exxon Valdez* Oil Spill Data Management and the Arctic Yukon Kuskokwim Sustainable Initiative (AYK SSI) sharing data through the utilization of the peer review data system located at the *Exxon Valdez* Oil Spill office

Motion by Fredriksson, second by Nordstand

APPROVED MOTION: Motion to approve a Cooperative Agreement whereby *Exxon Valdez* Oil Spill Data Management will provide in kind support to the Arctic Yukon Kuskokwim Sustainable Salmon Initiative (AYK SSI) staff in the utilization of the system and AYK will in turn provide funds up to $25,000 for the costs of the peer review database redevelopment effort that is scheduled to take place between October 1 and December 30 of FY 06

Motion by Meade, second by Fredriksson

At 12:25 p.m. a short at ease was called for Deputy Attorney General Nordstrand to be excused. Assistant Attorney General Tillery participated in his place until the meeting recessed at 1:00 p.m.

Off the record 12:25 p.m.
On the record 12:35 p.m.

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Motion by Fredriksson, second by Nordstand

4. Meeting recessed

APPROVED MOTION: Motion to recess until 4:00 p.m.

Motion by Pearce, second by Fredriksson

Off the record 1:00 pm
On the record 4:00 pm

5. Meeting resumed

APPROVED MOTION: Motion to resume meeting at 4:00 p.m.

Motion by Nordstrand, second by Meade

Deputy Attorney General Nordstrand resumed his place on the Council during this time.

6. FY 2006 Interim Administrative Budget funding

APPROVED MOTION: Motion to approve Resolution 06-03 of the *Exxon Valdez* Oil Spill Trustee Council regarding the FY 06 Work Plan Project 060100 – Interim EVOS Administrative Budget amending the agency costs with an increase of 1/6 for project management to the agencies and Project 060783 – Jacobs

Motion by Nordstrand, second by Pearce

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Motion by Pearce, second by Fredriksson

Exxon Valdez Oil Spill Trustee Council

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

MEMORANDUM

To: **Trustee Council** **Date:** **October 25, 2005**

From: **Gail Phillips**
Executive Director Gail **Re:** **EVOS MOAs/MOUs**

During the last Trustee Council meeting, you requested a report on all of the MOAs and MOUs that are in existence in this office today. The attached spread sheet lists all of the agreements we currently have and provides details on each.

EVOS MOAs/MOUs in Existence
Effective October 2005

Between	Reason	Date Initiated	Expires	EVOS Dollar Amount	Explanation
SOA & EVOSTC (State of Alaska and the *Exxon Valdez* Oil Spill Trustees Council)	MOA establishing EVOSTC Executive Director and Staff	12/1/1993	May be modified/amended by mutual agreement of the parties in writing only and properly executed	Annual Budget	Civil Action No. A 91-081 CV
EVOSTC & UA (Exxon Valdez Oil Spill Trustees Council & University of Alaska)	MOU re UA's role in restoration and addressing questions about the ecological health of the PWS and Northern GOA ecosystems and the factors which limit recovery of resources injured by the '89 EVOS	12/7/1997	Until terminated by agreement by giving notice at least 6 months prior to termination	No funds expended at present	The Sea Grant book was included in funding. This is an ongoing working agreement for research
EVOSTC, NPRB & UA (*Exxon Valdez* Oil Spill Trustees Council, North Pacific Research Board & University of Alaska)	MOA...providing a framework for cooperative efforts to accomplish missions and provide for long term health and sustainability of Alaska's oceans and watersheds	5/21/03 by Dave Benton, Chairman NPRB (3rd party to execute, subject to funding)	Until terminated by agreement	No funds expended at present	
UAA, BLM, NPS, USF&WS, MMN, USGS and EVOSTC (University of Alaska Anchorage, Bureau of Land Management, National Park Service, United States Fish & Wildlife Service, Minerals & Management Service, United States Geological Survey, and Exxon Valdez Oil Spill Trustee Council)	MOU for Organization and Operation of ARLIS (Alaska Resource Library & Information Services)	Original 5-year agreement signed 9/15/97; renewed on 7/16/2003 for another 5 years.	5 yrs (7/16/08) unless canceled, extended or renewed	In FY98 and FY99, the EVOSTC funded 2 librarians, plus $50,000 cash. Since FY00, the EVOS TC has funded 1.0 FTE librarian plus a cash contribution of varying amounts. Actual amounts, incl GA: FY98 $197,700; FY99 $195,600; FY00 $130,200; FY01 $129,100: FY02 $94,000; FY03 $ 95,000; FY04 $180,900; FY05 $130,800; FY06 $139,600;	ARLIS was established by consolidating seven agency libraries and the Oil Spill Public Information Center, to maintain and improve efficiency and cost savings through eliminating duplication, increasing staffing efficiency, and improving public access to natural and cultural resources information by pooling the resources of all of the agencies in a single location. The collections will continue to be for the agencies' joint use and for the use of all library users including the general public, students, and the private sector, as well as agency researchers. The library is to be located in Anchorage, AK. Additional public or nonprofit entites may join as founders. This MOU is supplemented by a cooperative agreement between the Dept. of Interior agencies, an assistance agreement between BLM and UAA, and another MOU between ADF&G and UAA to facilitate the transfer of funds.
AMHS & EVOSTC (Alaska Marine Highway System and *Exxon Valdez* Oil Spill Trustees Council)	MOA establishes terms governing the relationship between AMHS and EVOSTC during design, installation and removal of oceanographic instruments on the vessel Tustemena	11/1/2003	3 year project (9/30/2006) To be extended based on future invitation and budget	FY04: $171,500; FY05: $185,900; FY06: $145,900	Renewable by AMHS for another year (10/1/05 - 9/30/06) Removal of equipment to be arranged between parties. Project 040699 Annual reports for FY04 & FY05 on file

Between	Reason	Date Initiated	Expires	EVOS Dollar Amount	Explanation
UA, NPRB, EVOSTC, PWSSC, ASC, NOAA, USDOI, ARC, BASC and KBRR (University of Alaska, North Pacific Research Board, Exxon Valdez Oil Spill Trustee Council, Prince William Sound Science Center, Alaska Sealife Center, National Ocean & Atmosphere Association, United States Department of Interior, Arctic Research Commission, Barrow Arctic Science Consortium, and Katchemak Bay Research Reserve)	MOA establishing the AOOS (Alaska Ocean Observing System)	2/19/04 by John Calder NOAA Office of Arctic Programs (3rd party to execute, subject to funding)	Until terminated by agreement	No monetary funding from EVOSTC	Will serve as the first Alaska member of the National Federation of Regional Associations of Coastal Ocean Observing Systems. The association will serve as the Alaska regional node for integrating coastal and ocean observing activities...a concerted effort and commitment to maintain, monitor, and protect the long-term sustainability and health of these ecosystems, their habitats and resources...accomplished...through...efforts by the Parties... This MOA will provide a framework...to more effectively accomplish...missions and enhance broad user access to ocean knowledge, data, tools, and products.
PWSSC & EVOSTC (Prince William Sound Science Center & *Exxon Valdez* Oil Spill Trustees Council)	MOU establishes agreement...for enhancement of the Hinchinbrook Entrance/Montague Straits project within the PWS Ocean Observing System, ...within the nascent regional Alaska Ocean Observing System...to prepare...a contract for EVOSTC to receive a Congressional earmark titled "Gulf of Alaska Ecosystem Monitoring"... The essence of this agreement is to enhance the abilities of the signatorey organizations to meet their respective legislative mandates and obligations. (NOS Grant)	4/5/2004	Upon acceptance of a final report by the NOS (National Ocean Service) for the grant which is anticipated for NLT 4/1/07	$750,000.00	This was a direct transfer of federal grant funds through EVOSTC to PWSSC.
NPRB & EVOSTC (North Pacific Research Board & *Exxon Valdez* Oil Spill Trustee Council Gulf Ecosystem Monitoring)	MOA to Purchase, configure and use Linux server for the development of a data management system for regional oceanographic data sets as authorized in the GEM FY04 work plan ($3,000.00 from NPRB; $4,654.03 from EVOSTC)	7/8/2004	At the end of it's useful life	$4,654.03	To reduce costs, increase efficiency, and avoid duplication of effort, the Parties agree to expedite access to and sharing of each other's facilities and equipment, pooled inventories of costly technology development projects, and scarce human skill sets, consistent with each Party's policies and procedures. Should one party stop using it as described, the other is free to use at will.

Exxon Valdez Oil Spill Trustee Council

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

MEMORANDUM

To: **Trustee Council** **Date:** **October 26, 2005**

From: **Gail Phillips**
Executive Director Gail

Re: **Lingering Oil Committee**

The IGD Steering Committee is in the process of developing the structure for the Lingering Oil Committee as outlined in the Interim Guidance Document. We are working on the roles and responsibilities, the projects to the considered by the committee and the anticipated workload, the time frame for their existence and the make-up of the committee.

The Steering Committee is reviewing the proposal for the committee structure at this time and will meet on November 2nd to formalize a presentation to be considered by the Council during the November 10th meeting.

I am placing this memo into your packets at this time as a placeholder to make you aware that we plan to have a proposal ready for you during the meeting.

Exxon Valdez Oil Spill Trustee Council

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

MEMORANDUM

To: **Trustee Council** **Date: October 26, 2005**

From: **Gail Phillips**
Executive Director

Re: Public Records Act Request from Trustees for Alaska

On October 10, 2005 we received a Public Records Act Request from the Trustees for Alaska on behalf of Stacy Studebaker, Rick Steiner, Riki Ott, the Cook Inlet Keeper, the Alaska Forum for Environmental Responsibility and the Alaska Public Interest Research Group for certain EVOSTC records relating to Integral Consulting, the Interim Guidance Document and the Reopener. The request letter from Trustees for Alaska is attached.

The Request was logged in with the ADF&G's Commissioner's Office and Craig Tillery of the ADOL is coordinating our response.

To date, staff and I have put in about 25 hours collecting all requested records and turning them in to Mr. Tillery.

TRUSTEES FOR ALASKA

A Nonprofit, Public Interest Law Firm Providing Counsel to Protect and Sustain Alaska's Environment

1026 W. 4th Ave., Ste. 201 Anchorage, AK 99501 (907) 276-4244 (907) 276-7110 Fax Email: ecolaw@trustees.org
Web: www.trustees.org

FACSIMILE COVER SHEET

Pages (including cover): 4

To: Executive Director Gail Phillips
Exxon Valdez Oil Spill Trustee Council

Fax No.: 907/276-7178

From: Justin Massey

Date: October 10, 2005

Re: PUBLIC RECORDS ACT REQUEST

Please find the attached Public Records Act request.

TRUSTEES FOR ALASKA

A Nonprofit Public Interest Law Firm Providing Counsel to Protect and Sustain Alaska's Environment

1026 W. 4th Ave., Suite 201 Anchorage, AK 99501 (907) 276-4244 (907) 276-7110 Fax Email: ecolaw@trustees.org
Web address: www.trustees.org

October 10, 2005

Gail Phillips
Executive Director
Exxon Valdez Oil Spill Trustee Council
441 West 5th Avenue, Suite 500
Anchorage, AK 99501

Re: PUBLIC RECORDS ACT REQUEST – Certain Records of the *Exxon Valdez* Oil Spill Trustee Council and the *Exxon Valdez* Oil Spill trust

[SENT VIA FACSIMILE]

Dear Director Phillips:

Pursuant to the Alaska Public Records Act (PRA), Alaska Stat. tit. 40, ch. 25, and its implementing regulations, Alaska Admin. Code tit. 6, pt. 9, ch. 96, and on behalf of Stacy Studebaker, Rick Steiner, Riki Ott, the Cook Inlet Keeper, the Alaska Forum for Environmental Responsibility, and the Alaska Public Interest Research Group, Trustees for Alaska requests the following records related to the *Exxon Valdez* Oil Spill (EVOS) Trustee Council and the EVOS trust in the custody of or subject to the control of the EVOS Trustee Council:

1. All public records related to work performed by Integral Consulting, Inc., pursuant to contracts funded by the EVOS trust;
2. All public records related to the Interim Guidance Document adopted by the EVOS Trustee Council on August 10, 2005, including the preparation, development, and analysis thereof, and consideration by or on behalf of the Trustees thereon; and
3. All public records created since August 1, 2003 related to the Reopener for Unknown Injury contained in the Memorandum of Agreement and Consent Decree (MOA) constituting the final judgment in Civil Action Nos. A91-082 and A91-083 before the District Court for the District of Alaska.[1]

The term "public records" should be interpreted as broadly as possible and "means books, papers, files, accounts, writings, including drafts and memorializations of conversations, and other items,

[1] The *Exxon Valdez* Oil Spill Trustee Council is a "public agency" under the Alaska Public Records Act. *See* Alaska Stat. § 40.25.220(2) ("'public agency' means a political subdivision, department, institution, board, commission, division, authority, public corporation, council, committee, or other instrumentality of the state or a municipality").

You may omit public records that are permanently posted in a publicly accessible location and format on the EVOS Trustee Council website from your response to this request.

regardless of format or physical characteristics, that are developed or received by a public agency, or by a private contractor for a public agency, and that are preserved for their informational value or as evidence of the organization or operation of the public agency." Alaska Stat. § 40.25.220(3).

None of the requestors is a party, or represents a party, involved in litigation with the State or a public agency to which the requested records are relevant.

The requested records are public records of the EVOS trust. Alaska Stat. § 37.14.425 ("For purposes of AS 40.25.120, records of the trust in the custody of or subject to the control of state officers and agencies are public records."). Furthermore, the requested records are public records regardless of their relevance to litigation involving any State agency. *Id.* § 40.25.122. You must resolve any doubt regarding the disclosability of these records in favor of disclosure. *See e.g. Fuller v. City of Homer*, 75 P.3d 1059, 1061-1062 (Alaska 2003) ("We have repeatedly held that the act creates a presumption in favor of disclosure and that the act's implicit legislative policy of broad public access requires courts to narrowly construe exceptions to disclosure.").

In responding to this request, please provide responsive records possessed by any field or other office of the EVOS Trustee Council. *See* Alaska Admin. Code tit. 6, §§ 96.320(a) (agencies "shall promptly forward the request to the office responsible for maintaining those records"), 96.325(d)(1).

If you determine that any of the requested records are nondisclosable, please specify the legal authority and facts supporting nondisclosure. *See id.* at §§ 96.325(a)(2) (agencies shall identify "specific legal authority and specific facts supporting nondisclosure"), 96.335(c); *Gwich'in Steering Comm. v. State*, 10 P.3d 572, 580 (Alaska 2000) ("[T]he Governor provided information about each document's author, subject matter, date, length, and reason for nondisclosure.").

If you determine that portions of any of the requested records are nondisclosable, please segregate those portions, specify the legal authority and facts supporting nondisclosure, and release the remainder of the record. *See* Alaska Admin. Code at §§ 96.325(a)(2), 96.330 (requiring segregation and disclosure of disclosable portions of documents).

We request that you waive any fees associated with this request pursuant to section 40.25.110(d) of the Alaska Statutes. Waiver of fees would be consistent with the PRA and would enable the public to meaningfully participate in the EVOS restoration process. *See Fuller*, 75 P.3d at 1061-1062 ("[W]e have emphasized that broad public access to government records is a vitally important part of our contemporary system of government.") (citing *Jones v. Jennings*, 788 P.2d 732, 735-736 (Alaska 1990)). In addition to the general importance of public participation in State government reflected in the PRA, the importance of meaningful public participation in the EVOS restoration process is recognized throughout the MOA, the regulations governing the EVOS Trustee Council, and the EVOS Restoration Plan. *See e.g.* EVOS Trustee Council, *Exxon Valdez Oil Spill Restoration Plan* 8-9 (Nov. 1994) ("The importance of public participation in the restoration process was recognized in the Exxon settlement and is an integral part of the agreement between the state and the federal governments."). The requestors will examine these

records to educate themselves, their members, and the public about how the EVOS Trustee Council manages the restoration process, the role Integral Consulting plays in this process, and any information the EVOS Trustee Council possesses with respect to the Reopener for Unknown Injury. The requested records will thus enable the requestors and the public to meaningfully participate in the EVOS restoration process as the PRA intends and as the documents that govern the EVOS restoration process prescribe.

If you decide not to grant a fee waiver, or if fees associated with this request will amount to more than $25, please contact me before fulfilling this request. Please also contact me if I can clarify this request or if you need further information.

We look forward to receiving your response within 10 working days of your receipt of this request. Alaska Admin. Code tit. 6, § 96.325(a). Thank you in advance for promptly attending to this request.

Yours truly,

Justin Massey
Staff Attorney

Exxon Valdez Oil Spill Trustee Council

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

MEMORANDUM

To: Trustee Council

Date: October 27, 2005

From: Gail Phillips
Executive Director

Re: Proposals considered being non-responsive to '06 Invitation

When Council considered and adopted the '06 Work Plan during the August 10th meeting, there were three proposals that had been submitted that were deemed non-responsive to the '06 Invitation with its very specific instructions regarding synthesis projects. These three projects were the Saupe, Willette and Walker projects (attached).

Council instructed staff to bring these three projects forward for review regardless of their responsiveness and to make sure that this is the policy in the future – all projects are to be included in the report to the Trustees, whether or not they fit under the guidelines of an Invitation.

Attached, you will find:

- A copy of each original proposal
- The recommendations for each of these proposals
- An updated letter of support from the CIRCAC, dated 10-05-05, in support of reconsideration of funding for the Saupe project.

Recommendations for Project Modifications

Saupe - modification request

STAC
Do not fund.

The request for additional years of funding to add new research falls outside of the concept of modification to a currently funded proposal. The FY05/06 was funded for Kodiak not for PWS.

This is a valuable product conducted by competent people. STAC supports the project for future funding. However, it is not time critical for FY06.

PAC
Do not fund.

This is not a synthesis but considered to be a new project. This is a valuable project that PAC supports for funding in FY07.

Science Coordinator
Do not fund.

The request for additional years of funding to add new research falls outside of the concept of modification to a currently funded proposal. The FY05/06 was funded for Kodiak not for PWS.

This is a valuable product conducted by competent people. STAC supports the project for future funding. However, it is not time critical for FY06 when syntheses are needed. STAC suggests that this be given serious consideration for funding in FY07.

Executive Director
Do not fund

This proposal does not qualify either as a synthesis nor a modification of an existing project. It covers a new project in a new area.

Walker - modification request

STAC
Do not fund.
The request for additional years of funding to add new research falls outside of the concept of modification to a currently funded proposal. Additionally, the proposal as

written does not provide enough information for STAC to understand the basis of conclusions on which the modification for new research is based.

PAC
Do not fund.

This is not a modification, but a new project. As this is not a synthesis, it does not fall within the guidelines for funding in FY06.

Science Coordinator
Do not fund.

Agree with STAC

Executive Director
Do not fund

This is a new project, not a modification of an existing project. It does not fit the criteria established in the Invitation, nor is it a synthesis proposal.

Willette - modification request

STAC
This modification request is based on gathering physical data, but collection of long-term data by repeating July each year is not correct from the point of interpreting the physical system of Cook Inlet. As proposed, this will not provide an understanding of the physical system because it does not collect data for the physical setting. This proposal does not have any modification over previous one, i.e., does not appear to have considered the STAC comments from FY04 proposal. To be viable, the proposers need to employ accepted proper long-term monitoring strategies, i.e., add a mooring to provide seasonal sampling. No 2004 data were included to put this request in context. To be meaningful to EVOS the usefulness of this collection must extend beyond the applicability to the July salmon test fishery. STAC also questions value of interpreting physical data in Cook Inlet with productivity and concentration of salmon.

This is acceptable as a management tool, but not as an EVOS physical monitoring tool, which is the basis of the request. This appears to be asking for "long-term monitoring" one year at a time. However, long-term EVOS strategy has not determined that Lower Cook Inlet is a focus for long-term monitoring. Either do not collect physical data (not fund) or collect more physical data to put it in context (fund more).

PAC
Do not fund.

This is not a modification, but a request for funding for an additional field season. PAC determined that this is not a synthesis project, but a request for routine ADF&G funding, and as such is not eligible for EVOS funds.

Science Coordinator
Do not fund

Agree with STAC

Executive Director
Do not fund

This is not a synthesis proposal and is not responsive to the Invitation. It appears to be a management tool for ADF&G which would fall under their normal scope of responsibility.

Cherri Womac

From: Richard Dworsky
Sent: Thursday, October 20, 2005 7:28 AM
To: Cherri Womac; Carolyn Rosner; Robert j. Bochenek
Cc: Gail Phillips
Subject: FW:





Gail -PWS ShoreZone Budget Just-Ne alanus - Pink Ltr-Gail_Phillips-Kline-PWSSCFY SReZooplankto... Kline-Zooplankt ABforms(nonTmSampling.doc .

Cherrie we are going to add the Saupe, Willett and walker projects to the Nov 10 meeting along with Adams. We are also going to include the PWSSC project. I will send it to you.(see attached- apparently it was deferred in an earlier cycle. (Nancy's letter to Gail Dear Gail,

I briefly discussed this revised proposal with Dick when he was here for our Board meetings. While it is an out-of-cycle request, we wanted to follow up after receiving word of an award from the M.J. Murdock Charitable Trust which supports the equipment costs and a substantial portion of other project costs.)

Susan's letter should be attached to her proposal (attached)

Rob could you please get all of the reports onto the internet along with STAC, PAC comments and additional letters. There will be a letter from Adams also. D3

Richard F. Dworsky, PhD., Science Coordinator
Gulf of Alaska Ecosystem Monitoring and Research Program
Exxon Valdez Oil Spill Trustee Council
441 W. 5th Ave., Suite 500
Anchorage, AK 99501-2340
907-278-8012
907-276-7178 fax

-----Original Message-----
From: Susan Saupe [mailto:saupe@circac.org]
Sent: Wednesday, October 19, 2005 5:02 PM
To: Gail Phillips
Cc: Richard Dworsky
Subject:

Hi Gail,

The Cook Inlet RCAC Board of Directors approved this letter to go out requesting that the EVOS Trustees re-evaluate their decision to not fund the PWS ShoreZone mapping proposal for conducting field work in summer 2006. We believe that it is very important to fill in this major data gap. The letter hopefully ties the project to issues that the Trustees have prioritized. Thank-you for your strong support of this project in the past and we hope that it will move forward.

I will be out of the country until 2 November but will have periodic access to the internet, so can respond to any e-mail questions. Otherwise, you could reach my boss, Mike Munger, at the number below. Thank-you.

Sue

Susan Saupe
Director of Science and Research
Cook Inlet RCAC
910 HIghland Ave.
Kenai, AK 99611
(907) 283-7222
(907) 283-6102 (FAX)

"The mission of the Council is to represent the citizens of Cook Inlet in promoting environmentally safe marine transportation and oil facility operations in Cook Inlet."

COOK INLET RCAC

Members

Alaska State Chamber of Commerce

Alaska Native Groups

Environmental Groups

Recreational Groups

Aquaculture Associations

Fishing Organizations

City of Kodiak

City of Kenai

City of Seldovia

City of Homer

Kodiak Island Borough

Kenai Peninsula Borough

Municipality of Anchorage

October 5, 2005

Gail Phillips, Executive Director
EVOS Trustee Council
441 West 5th Ave., Suite 500
Anchorage, AK 99501

Dear Ms. Phillips,

The Cook Inlet Regional Citizens Advisory Council (CIRCAC) requests that the EVOS Trustee Council reconsider its decision regarding funding for ShoreZone mapping in Prince William Sound that we proposed under your FY06 RFP. As you know, Prince William Sound is one of the last sections of coastline in the northern Gulf of Alaska, and specifically in the oil spill region, that has not been mapped to Alaska ShoreZone standards. Our Board of Directors, who represents numerous organizations within the oil spill region, has strongly supported obtaining a comprehensive database for a contiguous Gulf of Alaska coastline using standard protocols. This ensures that data on coastal habitats throughout the region are comparable. We have successfully built a program through numerous agency and organizational partnerships, including one with your organization, and hope to close the data gap currently existing for Prince William Sound.

Our proposal was not recommended for funding, in part, because it was considered to not be responsive to the specific requests for projects that 1) fully evaluate and benchmark the restoration of injured resources and services identified in the 1994 Exxon Valdez Restoration Plan and 2) identify options for reaching recovery and/or potential additional restoration projects. The invitation was predicated on synthesizing all relevant information to provide information relevant to determining the current status of injured resources and services identified in the 1994 Exxon Valdez Oil Spill Restoration Plan.

We believe strongly that this database is a key component of synthesizing coastal biophysical information and it can and should be a key component for the restoration program and for future nearshore programs and projects.

Below, I will outline how we believe that a completed ShoreZone database can help the EVOSTC meet their restoration goals and improve future planning efforts.

Need for Project in Prince William Sound

In FY05, ShoreZone mapping of the entire oil spill region was identified as a priority in the EVOSTC Invitation for Proposals. At that time, the EVOSTC funded our proposal to complete surveys and mapping of the Kodiak Island Archipelago. The STC review of our Kodiak project was very favorable for this type of data:

> *The proposal is recommended for funding. This proposal is well written, stating clear objectives, methods and expected accomplishments. The principle investigators are the best qualified to undertake this, as they have been involved in all aspects of the shore-zone mapping projects that have been finished to date. Saupe has secured considerable amounts of funds from sources outside EVOSTC to make this broad-scale mapping one the heaviest leveraged to date. This proposal comprehensively addresses the need for an accessible*

database, and presents the format of it. Furthermore, the PIs have presented extremely successful workshops over the past year that were attended by resource agency personnel, local citizens and other user groups such as the US Coast Guard. The data are on a user-friendly website that can be accessed readily. In short, there is no doubt that these PI's can produce what they promise, and on time, as evidenced by their strong track record of doing so. This is a one-time project that will not have to be repeated for another 10-25 years and is an excellent investment as it will serve as a basis for all future nearshore and watershed projects. Outside reviews were overwhelmingly positive.

We would like to re-emphasize the statement that a ShoreZone mapping database "*...is an excellent investment as it will serve as a basis for all future nearshore and watershed projects.*" The arguments put forth for the Kodiak proposal are equally relevant to Prince William Sound, as well as to other areas in the state[1].

Existing databases for Prince William Sound do not include the information that ShoreZone data provides and without using the same, systematic protocols applied elsewhere, Prince William Sound cannot be included in region-wide comparisons or probabilistic study designs in the northern Gulf. In 2004, a small portion of Prince William Sound was mapped with ShoreZone methods using funding and in-kind services by the PWSRCAC, CIRCAC, NMFS, and OSRI. These data clearly showed that the existing data provided by ESI maps and industry's Geographic Response Database, while valuable tools for their specific applications, do not meet the high-resolution mapped data standards for nearshore biological habitats that ShoreZone provides.

ShoreZone mapping was identified as a top priority at an EVOSTC-sponsored workshop in 2003 because it provides a foundation for monitoring and research in the nearshore habitat and also provides a valuable assessment tool for oil spill responders and agency coastal planners and permitters. Personnel from four of the agencies that are represented on the EVOSTC (NOAA, DOI, ADEC, and ADF&G) are currently participating on workgroups that are identifying ShoreZone applications and methods for serving up the data to agency users. Through these groups, efforts have moved forward in southeastern Alaska, as well, and currently the surveyed shorelines in the Gulf of Alaska include much of the Alaska Peninsula; the Kodiak Island Archipelago; Cook Inlet; the outer Kenai Peninsula coast and the Gulf coast to the entrance of Prince William Sound; a portion of Western Prince William Sound; the outer Gulf coast from Icy Bay to Cape Spencer; and the northern portion of southeast Alaska including Icy Straits, Lynn Canal, Baranof Island, and many other passages and islands. In effect, it is now a contiguous shoreline from the Alaska Peninsula to the middle of southeast Alaska, *except Prince William Sound.*

Ties to Restoration, Lingering Oil, Agency Needs, and Future Studies

The 1994 Restoration Plan states that for general restoration activities, preference is given to projects that benefit multiple species rather than to those that benefit a single species. The list of injured resources includes many species that use intertidal and shallow subtidal areas for habitat or feeding either during their entire life-cycle, seasonally, or specific life-stages. Without a solid inventory of these habitats, it is difficult to evaluate the links of these species to their available habitats. As stated in the Restoration Plan, restoration goals are complex and research and monitoring should lead to a "better understanding of the ecosystem, along with significant improvements in the tools fish and wildlife managers use to evaluate populations, means better

[1] NPRB Workshop Report : Southeast Alaska Synthesis of Biology and Oceanography (ed., G. Ekkert): "*The ShoreZone project (described above) is an excellent mapping project that will provide valuable data to many users.*"

decisions for the health of those populations and the people who depend on them." ShoreZone does and will continue to provide these tools.

Surveys for lingering oil that were conducted in the intertidal zone of Prince William Sound randomly selected sites from sections of shoreline that had been previously oiled. The results show that lingering oil occurs on certain types of beaches in the oiled areas and in areas known to be utilized as habitat for injured species, such as otters and harlequin ducks. These species feed in the intertidal and shallow subtidal. A detailed database of along-shore and cross-shore biophysical habitat will allow much more detailed estimates of specific preferred habitats of these animals. In addition, ShoreZone data can be queried for very specific features to estimate spatial extent of the habitats preferred by their prey.

ShoreZone data provide a spatial framework for more detailed monitoring studies, augment trustee agencies resource management information for coastal areas and for oil spill response, and through the publicly accessible website, raises public awareness to coastal resources.

Finally, this year we successfully completed both aerial surveys and vessel-based shore-station surveys throughout the Kodiak Island Archipelago through our original contract with EVOSTC and with additional agencies who provided direct funding and in-kind services (ADNR, TNC, NMFS, and OSRI). This project truly demonstrated the partnerships and commitment many organizations have to ShoreZone. We fully anticipate being able to coordinate such partnerships and participation by NMFS, PWS RCAC, ADNR, and others for the Prince William Sound area. ADFG and USFW also contributed 2005 funding for southeast Alaska and may be interested in partnering for Prince William Sound, as well. We will also work closely with NMFS to coordinate web access to the data, as they have expressed interest in hosting the entire ShoreZone database. This has previously been a significant cost to our organizations.

Aside from a modest adjustment to accommodate the recent rise in fuel costs, this ShoreZone project is ready to execute according to the estimates submitted in the proposal. We will work closely with your staff to provide any necessary adjustments to the budget. I appreciate this opportunity to request a re-evaluation of our ShoreZone proposal. If you have any questions, please contact me or our Director of Science and Research, Susan Saupe, using the number below, or at saupe@circac.org.

Sincerely,

Michael Munger
Executive Director

GEM PROPOSAL SIGNATURE FORM

THIS FORM MUST BE SIGNED BY THE PROPOSED PRINCIPAL INVESTIGATOR AND SUBMITTED ALONG WITH THE PROPOSAL. If the proposal has more than one investigator, this form must be signed by at least one of the investigators, and that investigator will ensure that Trustee Council requirements are followed. Proposals will not be reviewed until this signed form is received by the Trustee Council Office.

By submission of this proposal, I agree to abide by the Trustee Council's data policy (*Trustee Council/GEM Data Policy**, adopted July 9, 2002) and reporting requirements (*Procedures for the Preparation and Distribution of Reports***, adopted July 9, 2002).

PROJECT TITLE: ____ ShoreZone mapping for Kodiak Island _____

Printed Name of PI: ____Susan M. Saupe_____

Signature of PI: _____ Date __15 April 05__

* Available at http://www.evostc.state.ak.us/pdf/admin/datapolicy.pdf
** Available at http://www.evostc.state.ak.us/pdf/admin/reportguidelines.pdf

Trustee Council Use Only
Project No: 050764
Date Received: _____

GEM PROPOSAL SUMMARY PAGE
(To be filled in by proposer)

Project Title: Original Project Title: ShoreZone mapping for Kodiak Island
This Proposed Project Addition Title: ShoreZone mapping for Prince William Sound

Project Period: FY06-FY07

Proposer(s): Susan M. Saupe, Cook Inlet RCAC, saupe@circac.org

Study Location: Prince William Sound

Abstract: This is a proposal to amend the FY05/06 project "ShoreZone Mapping for Kodiak Island" to complete ShoreZone mapping in Prince William Sound. This will complement the 8400 km of existing mapping in the GEM region, including 1600 km surveyed in Prince William Sound in 2004, as well as an additional 3300 km to be mapped in Kodiak this summer. To date, over 1.5M dollars has been committed to ShoreZone mapping in the Gulf of Alaska that includes the GEM area as well as areas east (e.g. eastern Gulf of Alaska) by numerous organizations and agencies including the EVOSTC, CIRCAC, PWSRCAC, NPS, USF&WS, ADNR (CIAP), NMFS, and the Kenai Peninsula Borough.

The ShoreZone data is recognized as a significant tool for spill response planning and as a spatial framework for GEM planning and the Prince William Sound data would ***provide a contiguous data set from across the entire spill area using identical methods.*** Three 6-day AVI surveys (est. 4000 km of shoreline) and subsequent mapping are proposed.

A completed ShoreZone mapping database will provide researchers with a regional characterization of the shore-zone features throughout the entire GEM project area. ShoreZone has been recognized at EVOSTC and CIRCAC-sponsored workshops as a much-needed planning and management tool. In addition to the agency and researcher support, there has been significant community support for the mapping and imagery data.

Funding: Additional EVOS Funding Requested:	FY 06	$	229,334.91
(must include 9%GA)	FY 07	$	252,008.00
	FY 08	$	
			TOTAL: $ 481,342.91
Non-EVOS Funds to be Used:	FY 06	$	150.0
	FY 07	$	
	FY 08	$	TOTAL: 150.0

Date: 15 April 2005

Background and Introduction

ShoreZone Mapping has been implemented or is planned for this summer on about 16,000 km of coastline in the Gulf of Alaska over the past four years, including 11,700 km in the GEM area alone (Fig. 1; green and red in GEM area). This followed a 2001 pilot program initiated by the Cook Inlet Regional Citizens Advisory Council (RCAC). ShoreZone is providing coastal habitat data that has been lacking for most of Alaska. A variety of agencies have subsequently funded the mapping efforts in the Gulf of Alaska (Table 1). The shorelines of Prince William Sound are some of the only shorelines that have not been mapped in the GEM area. Completion of this area would provide a contiguous data set for much of the northern Gulf of Alaska.

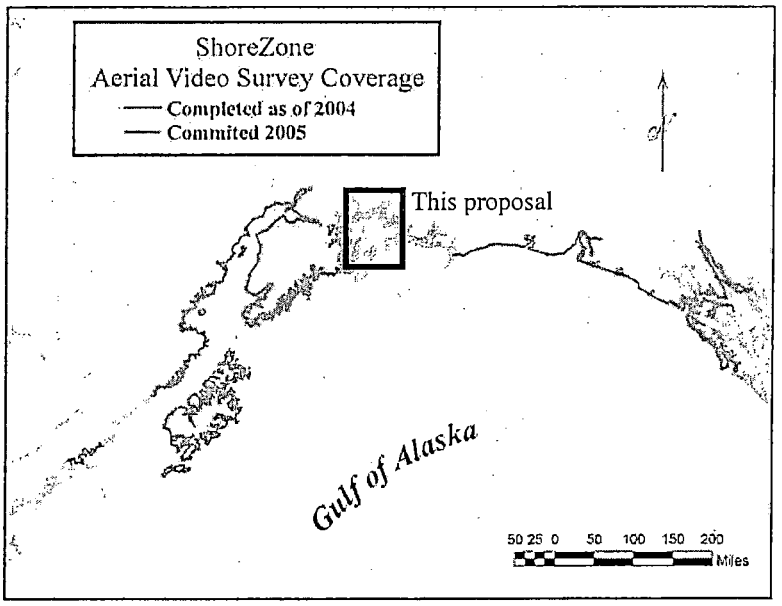

Figure 1 Existing (green) ShoreZone mapping coverage (green) and areas planned for 2005 (red) in the Gulf of Alaska.

The ShoreZone mapping approach is based on the same protocol used throughout Washington and British Columbia (WaDNR 2000; Harper and Berry 2001; Howes 2001). However, several modifications and additional components were added during the pilot program that have been carried into the Alaska Shorezone Protocols for the Gulf of Alaska (Harper and Morris 2003). Aerial video imagery is collected during the lowest tides of the year and this imagery, along with field observations by a geomorphologist and coastal ecologist, provides the primary data for the mapping.

The ShoreZone Mapping Products appeal to users at a number of levels, ranging from individuals to communities and to regional planners. The ShoreZone products offer a *significant planning tool for oil spill response* as well as for a spatial framework for potential GEM monitoring program. The ShoreZone dataset provides a single, region-wide dataset for the entire oil spill impact region with data collected to a single mapping standard (Harper and Morris 2003).

II. NEED FOR THE PROJECT

A. Statement of Problem

Prince William Sound has an enormously varied shoreline habitat of seastacks, reefs, rocky headlands, mud flats, eelgrass beds, wetlands, kelp forests, and cobble beaches. But no quantitative information exists on where and how much of these habitats occur in the Sound even after 15 years of research and monitoring following the *Exxon Valdez* oil spill. This proposal will complete a systematic high resolution, low-tide mapping database for the entire oil spill area by providing data for the rest of Prince William Sound.

Shoreline mapping was identified as a top priority in recent nearshore workshops sponsored by the *Exxon Valdez* Oil Spill Trustee Council (Schoch et al, 2002; EVOSTC 2002; Norcross, 2003), because it provides a foundation for monitoring and research of the nearshore habitat under the GEM program, and also provides a valuable assessment tool for oil spill responders and planners. The PWS Sensitive Areas Work Group has noted that eelgrass, a resource known to be sensitive to oil spills, a critical habitat for herring spawn and one of the resources mapped with ShoreZone, is not currently systematically inventoried within PWS (Mutter et al 2003).

Existing Environmental Sensitivity Index (ESI; NOAA 2000; see also Ruby *et al* 1979, and Issacs Associates 1985) maps occur within the region but do not include web-posted imagery, are of much lower resolution than ShoreZone, are not web accessible and are not of sufficient resolution for ecosystem monitoring. The ESI maps are only partially available in a digital format throughout the GEM region; they do not include explicit exposure, substrate, morphology or biotic data, as does the ShoreZone mapping data.

Alyeska SERVS has imaged some of the PWS shoreline (Gail Colby, pers. comm. 2004), mainly focused in the central Sound, *but this imagery does not include any ancillary data on habitat type or biological and only derived products (e.g. GRP maps) are made available by Alyeska SERVS*. Therefore, this imagery is not suitable for Shore-Zone mapping, and if it were to be used, new mapping protocols would need to be utilized and this would undoubtedly compromise the comparability of this Shore-Zone product with other Shore-Zone mapping efforts underway in other parts of the GOA and the west coast of North America. Figure 2 is one illustration where the Alyeska Geographic Response Database (GRD) lacks some of these crucial data. Eelgrass mapped as a component of ShoreZone in 2004 is compared to eelgrass beds shown in the GRD for Evans Island, an area where both methods have been completed. There is significantly more eelgrass beds that occur in this area as shown by ShoreZone than was incorporated through the GRD process which only included eelgrass beds *known* by agencies. It is apparent that critical biological habitat data is not captured in existing databases.

ShoreZone data is provided as georeferenced data and, thus, can be incorporated into the GRD and can provide additional layers to any ESI maps. ShoreZone also includes a detailed across-shore characterization of morphology, substrate type and biota. The ShoreZone mapping system also provides the benefit of the public availability of the digital video imagery in conventional formats (VHS tapes or DVD) or web-based images (www.coastalaska.net).

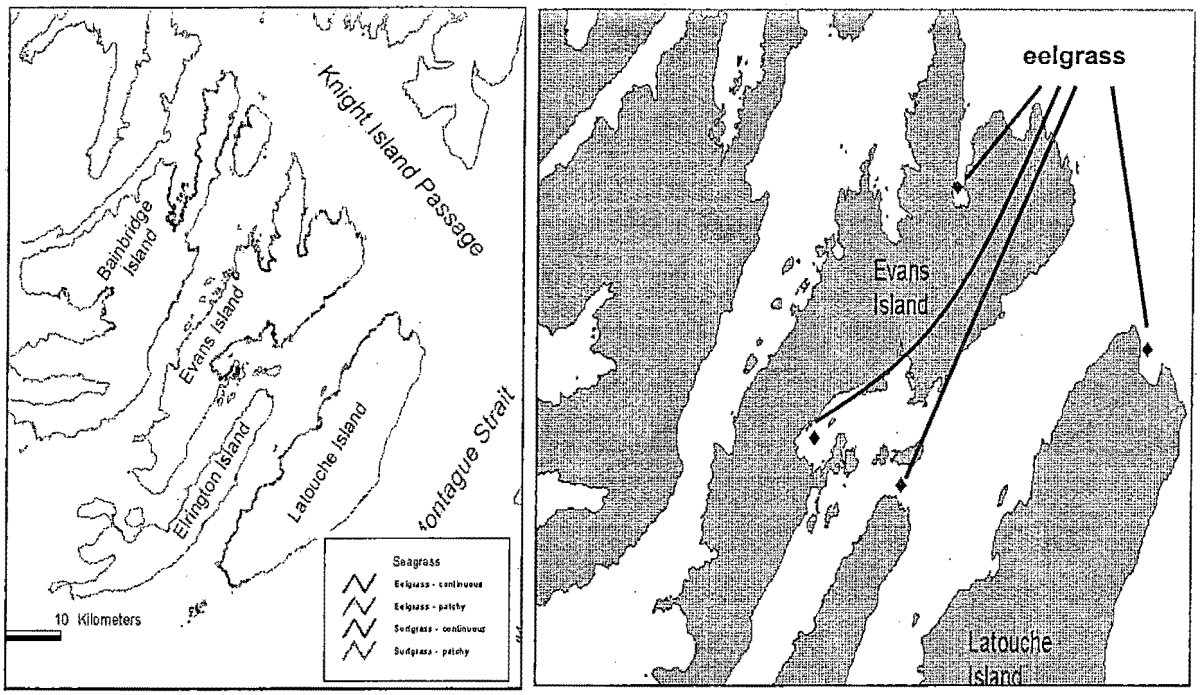

Figure 2. Comparison of eelgrass data mapped from ShoreZone (left; light green and red lines) and the eelgrass data presently included in the Alyeska Geographic Response Database (right; 4 diamonds shown with arrows) for Evans Island.

Table 1. Summary of ShoreZone Projects in Gulf of Alaska (2001-2005).

Year	Location	Project Activity	Funding
2001	lower Cook Inlet	Aerial imaging; pilot mapping; web-posting of imagery	CIRCAC
2002	outer Kenai, western Cook Inlet	aerial imaging; mapping; web-posting of imagery	CIRCAC/KPB
	outer Kenai	aerial imaging; mapping; web-posting of imagery	EVOS/NPS
	outer Kenai	shore stations – ground-truthing	CIRCAC/KPB
	Kodiak	aerial imaging; web-posting	EVOS/ADNR (CIAP)
2003	Upper Cook Inlet	aerial imaging; mapping; public awareness	USFW/CIRCAC
	Katmai National Park	aerial imaging; mapping; web-posting; ground station survey	NPS/CIRCAC
	Aniakchak Nat. Park	aerial imaging; mapping; web-posting	NPS/CIRCAC
	Kodiak	mapping 2002 imagery; workshop in Kodiak	CIAP/CIRCAC
	Gulf of Alaska	coastal users workshop; development of a ShoreZone mapping protocol	EVOS
	Gulf of Alaska	development of shore station database; web-posting	CIRCAC
2004	Gulf of Alaska	development of a 1-stop website for access to ShoreZone imagery and data	EVOS/CIRCAC
	PWSound	Aerial imaging; web-posting	PWSRCAC
	Southeast Alaska	ShoreZone imaging; mapping; web-posting	NMFS-Habitat
2005	Kodiak	Aerial imaging; mapping; web-posting	EVOS/ADNR
	SE Alaska	ShoreZone imaging and mapping	NMFS-/ADNR (CIAP)/TNC
	Prince William Sound	Mapping	PWSRCAC (proposed)/ADNR (CIAP – proposed)

Funding Sources Acronyms from Table 1 Above:

CIRCAC Cook Inlet Regional Citizens Advisory Council

EVOS	Exxon Valdez Oil Spill Trustee Council
KPB	Kenai Peninsula Borough
USFW	US Fish and Wildlife Service
NPS	National Park Service
ADNR (CIAP)	Alaska Dept. Natural Resources (Alaska Coastal Impact Assistance Program)
NMFS	National Marine Fisheries Service – Habitat Division
TNC	The Nature Conservancy

B. Rationale/Link to Restoration

The completed ShoreZone project will provide high-resolution data on physical and biological resources throughout the GEM project region. It is expected that the ShoreZone dataset will contribute substantially by providing a spatial framework for more detailed monitoring studies, by augmenting trustee agencies resource management information for oil spill response and by raising public awareness to coastal resources.

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C. Link to GEM Program Document

The proposed ShoreZone mapping project addresses the GEM Mission (inset, right) in a number of specific ways. The project is particularly relevant to three of the GEM goals:

> ***GEM Mission Statement***
> Sustain a healthy and biologically diverse marine ecosystem in the northern Gulf of Alaska (GOA) and the human use of the marine resources in that ecosystem through greater understanding of how productivity is influenced by natural changes and human activities.

1. *Understanding* - by providing a near synoptic, high-resolution picture of coastal resource distribution throughout the Gulf, spatial variation in biological resources will be related to important physical constraints (substrate, exposure, water quality) as well as man-made impacts (harvesting, seawall construction).

2. *Informing* - the data products associated with the ShoreZone proposal provide immediate public access to imagery, often the only low-tide imagery available, and short-term access to synthesized mapping data in GIS format; previously imaged shorelines of Prince William Sound have been publicly web-posted since last summer. Previous experience in the state of Washington and the Province of British Columbia, and earlier Gulf of Alaska ShoreZone projects indicates that the data will be utilized by a wide range of resource agencies for shore-spawning fish habitat assessment (Washington Department of Fish and Wildlife), for bird habitat capability (Washington Department of Fish and Wildlife), for oil spill sensitivity assessments (Burrard Clean Operations Inc., BC Ministry of Environment and Washington Department of Ecology, NOAA), for marine park siting (Orcas Pass Marine Protected Area Initiative), and planning (Olympic Marine Sanctuary, Pacific Rim National Park, Gwaii Hanaas National Marine Park). Non-governmental organizations have been significant users of the information (see Fig.

6) and the dataset is routinely used by universities in research projects (Dr. T. Klinger, U of W, pers. communication 2002).

3. *Solve* - the proposed ShoreZone project includes highly innovative components for making imagery and ultimately mapping data web-accessible for use in a variety of programs that may need shoreline data for solving issues. With support of the organizations and agencies listed in Table 1, approximately 8,400 km of shoreline imagery has recently been posted on an ArcIMS web site, allowing web-users to "fly" much of the Gulf of Alaska shoreline during the lowest tides of the year.

The Prince William Sound ShoreZone project will complement the GEM project in the following ways:

Innovative Information Transfer: The existing and proposed ShoreZone mapping project incorporates a highly innovative procedure for displaying all shoreline imagery collected on a publicly-accessible web site. One-second video captures are incorporated onto an ArcIMS web site to allow any web user to literally "fly" the shoreline. This may represent the first use of the ArcIMS mapping technology as part of the GEM project. It is anticipated that the entire mapping dataset will be web-accessible through an ArcIMS, allowing users to generate distribution maps without the need of a GIS. The web-accessible imagery and data products represent an extremely useful tool for oil spill response.

Modeling Applications: The Prince William Sound ShoreZone dataset will complete the mapping for GEM shorelines and will provide uniform biophysical data throughout the Gem area and will complement the existing 8,400 km already surveyed within the GEM project area. The data provide a rationale for extrapolating site-monitoring data beyond the actual monitoring site.

Cross-Habitat Linkages: The proposed ShoreZone dataset includes mapping of resources in *estuaries* and, as such, provides direct linkage between *nearshore* resources and *watershed* resources. In addition, the ShoreZone data set will provide site-specific information on intertidal epibenthos, which is partly related to water quality characteristics of the *Alaskan Coastal Current*. It is expected that large-scale spatial variations in this epibenthos will be strongly related to variation within the *Alaska Coastal Current* ecosystem.

III. PROJECT DESIGN

A. Objectives

Specific objectives of the proposed Prince William Sound ShoreZone project are:

1. Continue to collect high resolution, low-tide imagery of the remainder of the Prince William Sound coastline and make this imagery publicly accessible.

2. Map shoreline features using the Alaska ShoreZone Protocol and making this data publicly accessible through data repositories and ideally through web-accessible (e.g., ArcIMS) sites.

B. Procedural Methods

B.1 Low-Tide, High Resolution Aerial Video Imagery Collection

Fig 3. Aerial video image capture, south coast of Nuka Is, Kenai Peninsula. Ground survey station KP25 was conducted at this site.

Aerial video imagery (AVI) of the surveyed shorelines is collected during the aerial surveys. This oblique, color imagery (Fig. 3) is collected during the lowest daylight tides of the year, while tides are below "zero feet". The imagery includes a continuous geomorphological description of the shore zone on one sound track and a continuous biological description of the shore zone on the other sound track. A three-chip video camera is used for imaging, GPS location is burned onto each frame (Fig. 3), GPS trackline data is electronically recorded and all imagery is recorded on digital tapes. Helicopters are used as the primary flying platform on most surveys but fixed-wing aircraft can be used on "straight" coastlines (e.g., western Cook Inlet).

Standard data products from the AVI surveys are: (a) a flightline manual documenting the flightline tracks and the electronic data files, (b) videotape copies and (c) web-posted 1 second image captures that allow web-users to fly the coastline through an ArcIMS site.

The coastline length by region is summarized in Table 2 and indicates there is about 16,000 km of shoreline within the GEM region. Approximately 8,400 km or 53% has already been imaged to the Alaska ShoreZone Standard. An additional 3300 km will be imaged this summer. There are roughly 4,100 km remaining to be imaged in Prince William Sound (excluding the Copper River Delta). With about 1,600 km of imagery acquired during a typical 5 to 6-day low-tide window, three separate AVI surveys would be required to complete the proposed Prince William Sound work.

Table 2 Shoreline Length per Region

Region	Shoreline Length (km)	Completed AVI Surveys (km)	% Completed
Cook Inlet, Upper	625	625	100%
Cook Inlet, Lower	1,614	1,614	100%
Kenai Peninsula	1,969	1,969	100%
Kodiak Is	5,006	1,700	34%
PWS, East	1,357	0	0%
PWS, West	4,266	1,600	38%
Katmai National Parks	870	870	100%
Totals:	***15,707***	***8,378***	***53%***

A suggested AVI survey schedule for Prince William Sound is included in Table 3. There are only 4 to 5 tides per year where it is appropriate to collect ShoreZone data and spring and early summer are the preferred tide windows for aerial imaging.

Table 3 Suggested Prince William SoundAVI Survey Schedule and Costs

Calendar Period	AVI Surveys	Coastline Imaged (km)	Cost per Survey
Summer 2006 - Tide 1	PWS, West/North	1,166	$ 55k
Summer 2006 - Tide 2	PWS, Central	1,500	$ 55k
Summer 2006 - Tide 3	PWS, East	1,357	$ 55k
	Total:	***4,023***	***$ 165k***

AVI Collection Task Deliverables

- a web-based flight coverage map and database
- videotapes (can be ordered via web)
- web-posted 1 sec images, web-accessible through an ArcIMS website.

B.3 Shore-Zone Mapping

The primary data product of the proposed ShoreZone mapping project is a georeferenced database of biophysical ShoreZone data. The shoreline is segmented into *along-shore units* or segments and into *across-shore components* (Fig. 4). A database contains attributes on each unit and component (Tables 4 & 5); units may be either polygons, lines or points and are referenced through GIS. The shoreline features will be classified by geomorphologists and by biologists according to the Alaska ShoreZone Mapping Protocol (Harper and Morris 2003).

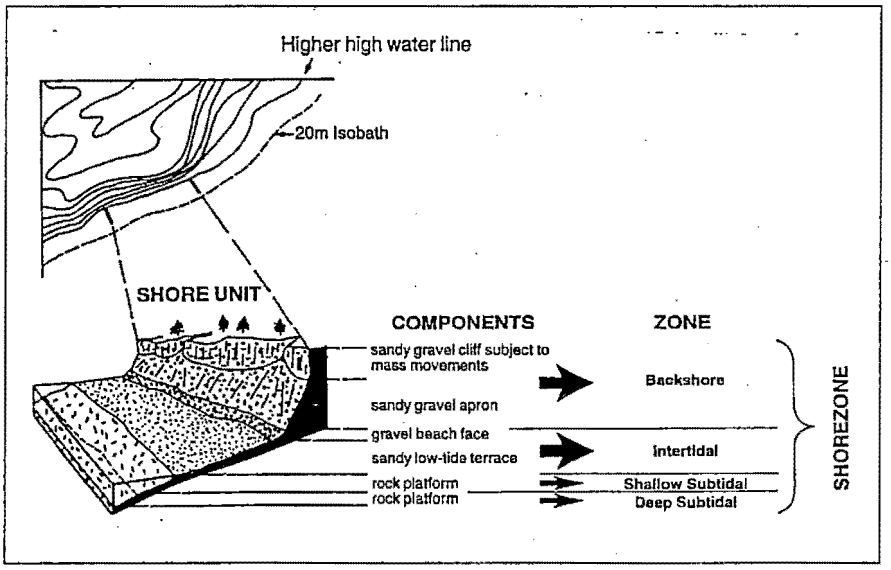

Figure 4. Schematic of the subdivision of the shoreline in *alongshore units* and *across-shore components*.

The ShoreZone mapping products are tied to individual AVI surveys for costing purposes. That is, each 6-day AVI survey is assumed to result in approximately 1,600 km of imagery for mapping.

Table 4 Summary of Data Attributes Recorded for Each Shore Unit

ShoreZone Mapping Task Deliverables
- ArcView spatial coverage of units
- Access database of shoreline attributes

Category	Attribute	Description
General	Unit ID	unique identifier used to link database to maps
	Type	polygon, line or point features
	Length	alongshore length of unit
	Area	area of polygon
	Source	sources of imagery
	Mapper	name of mapper
	Map Date	date of mapping
	Editor	name of editor
	Edit Date	date of editing
Exposure	Exposure Calculated	exposure class calculated by GIS model (6 classes)
	Exposure Observed	exposure class observed by mapper (6 classes)
	Exposure Biological	exposure class determined by observed biota within unit
	Effective Fetch	fetch window
	maximum fetch length	maximum measured fetch
	max fetch direction	direction of maximum fetch
	orientation	shore normal direction to shoreline orientation
Shore Character	Shore Type	substrate/morphology summary (34 classes)
	Habitat Type	biological summary based on exposure and substrate (10 classes)
Sediment	Abundance	index of sediment (3 classes)
	Source	source of sediment in unit (3 classes)
	Transport Direction	direction of alongshore transport
Shore Modification	Mod1 type	type of primary shore modification
	Mod1 %	% of shore modification in unit
	Mod1 length	length of shore modification
	Mod2 type	type of secondary shore modification
	Mod2 %	% of shore modification in unit
	Mod2 length	length of shore modification
	Mod3 type	type of tertiary shore modification
	Mod3 %	% of shore modification in unit
	Mod3 length	length of shore modification
Other	Riparian %	% of riparian vegetation in unit
	Riparian Length	length of riparian
	Oil Residence Index	derived estimate of potential oil residence based sediment type and exposure

Table 5. Data Attributes Recorded for Each Across-Shore Component within a Shore Unit

Category	Attribute	Description
General	Component ID	unique identifier linked component to a unit
	Zone	the elevation of the component in the shore zone (3 classes)
	Sequence	the sequence of the component in the zone
Geologic	Component Morphology	a descriptor of the morphology (22 classes)
	Component Sediment	a descriptor of the sediment (22 classes)
	Component Width	width of component
	Component Slope	slope of component
	Process	dominant process (5 classes)
Biologic (Biobands)	VER	'Verrucaria'
	PUC	salt-tolerant grasses
	GRA	Grasses
	BAR	upper barnacle
	FUC	'Fucus'
	BLGR	Blue-green
	ULV	'Ulva'
	HAL6	'Halosaccion'
	BMU	blue mussel
	RED6	mixed filamentous & blade reds
	ALA1	Intertidal *Alaria* spp. with *Semibalanus cariosus*
	SBR6	Soft browns
	CHB6	Chocolate browns
	RED7	Bright red zone
	ZOS	'Zostera'
	ALA2	Dragon kelp
	NER	Nereocystis

B.4 Collection of Intertidal Species Data

The Alaska ShoreZone Protocol specifies procedures for field verification of the aerial video imagery interpretations and to provide descriptions of species assemblages associated with the mapped biobands. These procedures were originally developed for the BC and Washington mapping programs (Morris *et al.*, 1995) and have been modified for the Alaska program. To date, approximately 150 intertidal stations have been surveyed on the Katmai, Lower Cook Inlet and Kachemak Bay, and outer Kenai coasts (e.g., Fig. 5). This proposal does not, however, propose to conduct ground station surveys at this time. There may be sufficient existing information that can be accessed from previous detailed on-shore biological surveys to provide the information needed to describe the mapped bioband species. These data will be accessed and evaluated.

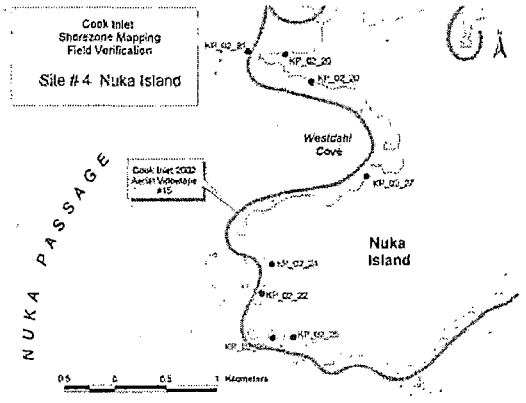

Fig. 5 Aerial video flightline (green) map of outer Nuka Is also showing the location of 2002 ground-survey stations.

C. Statistical Methods

No specialized statistical analysis is required for the proposed ShoreZone Mapping Program.

D. Description of Study Area

The Prince William Sound survey would encompass unmapped portions of Prince William Sound minus the Copper River Delta area (Fig. 1) and will complement other mapping programs in the Gulf of Alaska. The project includes the primary impact area of the *Exxon Valdez* spill. This PWS proposal, if funded in its entirety, would image and map an additional 4,023 km of GOA shoreline habitats.

It is assumed that all communities in Prince William Sound would benefit from the proposed project in that the imagery and ShoreZone data are available directly through web-access. The direct web-access of imagery should benefit lay-users, including tourists and recreational users. The direct, web-access of the ShoreZone data should benefit regional spill responders, resource managers and interest groups.

E. Coordination and Collaboration with Other Efforts

The proposed ShoreZone Mapping Project complements a number of ongoing projects in the Gulf of Alaska, including existing mapping initiatives funded by the organizations and agencies listed in Table 1. The proposed mapping is a precursor for more detailed mapping/monitoring initiatives by various other researchers that are likely to be part of GEM by providing region-wide data that can be queried for specific information related to each PI's project. Presentations have been provided to oil industry operators and response organizations in Cook Inlet and Prince William Sound, the state Alaska Regional Response Team, as well as the workgroup representing ADEC, industry, citizens, and other agencies who are leading the development of Geographic Response Strategies within the EVOS area.

The Prince William Sound RCAC provided $60K in funding to conduct aerial surveys along a portion (~1600 km) of the western Sound in 2004. They are proposing to contribute an additional $40K in their FY2006 budget that begins in July 2005 to conduct the subsequent mapping of these data. In addition, ADNR's Coastal Impact Assistance Program (CIAP) is proposing in their budget to include the remainder of the funding needed to complete the mapping along those shorelines where aerial surveys took place in 2004.

In-kind services were provided for the 2004 aerial surveys in Prince William Sound by the Cook Inlet RCAC, NMFS's Habitat Division in Auke Bay, and by the Oil Spill Recovery Institute. These organizations provided personnel time to conduct portions of the surveys. It is anticipated that they will continue to provide these in-kind services. Finally, the data collected during this proposed project will be coordinated with any effort to coordinate all of the regional ShoreZone data into a single-source database.

Special Comment on Alyeska Coastal Imagery and Data – it has been suggested that existing Alyeska coastal video imagery and data be used for ShoreZone. The critical difference between the two imagery sets is that Alyeska imagery does not include habitat information or biological commentary and without this verbal commentary, biological resources can not be mapped (e.g., kelp and eelgrass beds). The geomorphological description included on the Alyeska imagery is potentially useful for ShoreZone mapping but the existing Alyeska mapping data is not nearly as detailed as ShoreZone. The use of Alyeska imagery would result in a substantially different data product for PWS and would not allow comparison to other regions. However, because the ShoreZone system is more detailed than the Alyeska data, Alyeska classifications could be included in the new Shore-Zone maps so that derivative models presently used by Alyeska (e.g., ShoreClean) could be applied for areas of PWS not currently imaged by Alyeska.

IV. SCHEDULE

A. Project Milestones

Objective 1	Collect Aerial Video Imagery	
	PWS, West/North	May 2006
	PWS, Central	June 2006
	PWS, East	July 2006
Objective 2	Web-post all aerial imagery	August 2006
Objective 3	Complete ShoreZone Mapping	April 2007

B. Measurable Project Tasks

The proposed project tasks are organized in terms of our "suggested" schedule and assuming that the proposed Prince William Sound ShoreZone project is fully EVOS funded. There is flexibility with these tasks).

FY06, 1st quarter (October 1 – December 31, 2005)

1 October 2005	Project funding approved by EVOSTC

FY 06, 2nd quarter (January 1- March 31, 2006)

January 2006	Annual EVOS Workshop

FY 06, 3rd quarter (April 1 - June 30, 2006)

15 April 2006	Contracts in place for helicopters; field plan produced
May 2006	First AVI survey during one 5 to 6-day low-tide series
June 2006	Second AVI survey during one 5 to 6-day low-tide series

FY06, 4th quarter (July 1 – September 30, 2006)

July 2006	Third AVI survey during one 5 to 6-day low-tide series
August 2006	All aerial video imagery web-posted
Sept 2006	AVI flight manuals complete, tape copies
September 2006	Begin mapping of imagery from AVI surveys

FY 07, 1st quarter (October 1 – December 31, 2006)

January 2005	Annual EVOS Workshop
	Continue mapping of imagery from AVI surveys

FY07, 2nd quarter (January 1 - March 31, 2007)

	Continue mapping of imagery from AVI survey

FY 07, 3rd quarter (April 1 - June 30, 2007)

30 April 2006	2005 Shore-Zone Mapping Complete; Final database submitted

V. RESPONSIVENESS TO KEY TRUSTEE COUNCIL STRATEGIES

A. Community Involvement and Traditional Ecological Knowledge (TEK)

No specific program is included for inclusion of TEK as part of this project.

Our AVI surveys are based as close as possible to the flight areas. For the western PWS surveys funded by the PWS RCAC, we based the surveys from the village of Chenega with attendant boarding and logistical support. For the eastern PWS we anticipate basing surveys from Tatitlek and Cordova. The Center for Alaska Coastal Studies in Homer, Alaska, is currently incorporating ShoreZone data and website imagery into their 2005 curriculum and we envision that similar organizations can use the Prince William Sound as part of public outreach. In the Washington ShoreZone project, community groups have welcomed the systematic, state-wide dataset and have groomed the ShoreZone data for use in their own areas of interest (Fig. 6).

ShoreZone Information and Communities

ShoreZone information includes web-accessible imagery and environmental data, unlike existing ESI data. In several regional workshops (Homer, Kodiak, Anchorage), we have received enthusiastic endorsement from coastal communities, including scientists, teachers, planners and city managers. The ShoreZone data is considered a community asset that will provide a valuable planning tool for decades to come. Our survey programs have been based in GEM communities, including Kodiak, Kenai, Homer, Whittier, Seward and Chenega. Communities are actively aware of the program – the smaller the community, the greater the awareness (Fig. 7).

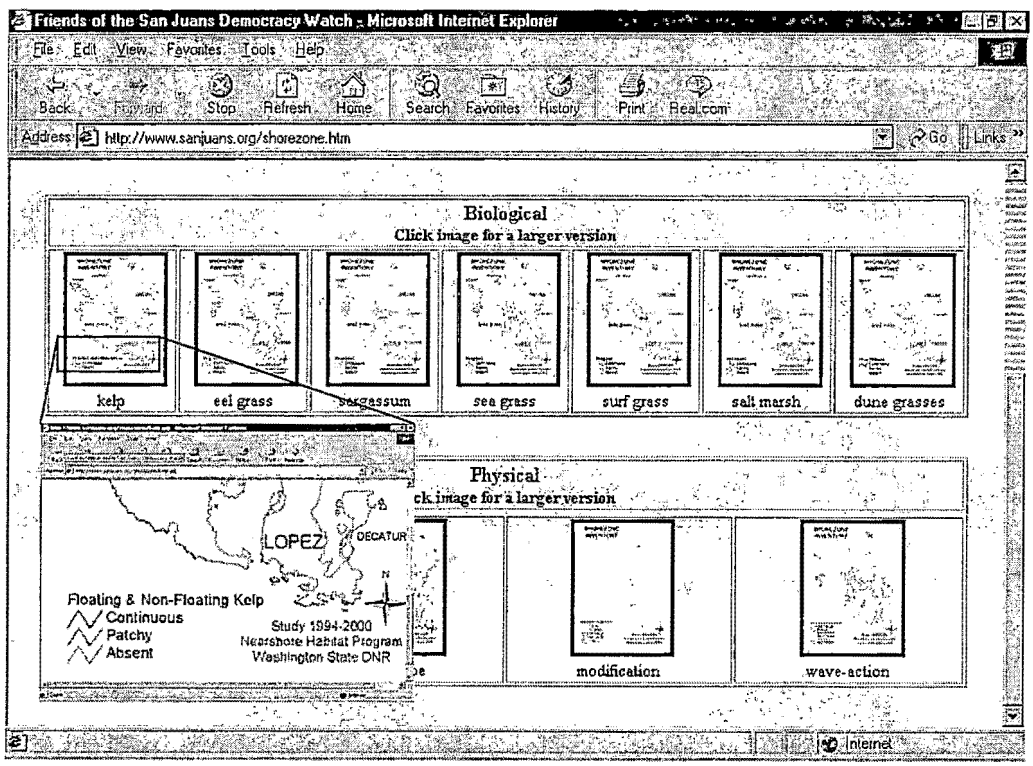

Figure 6 Example of the Washington ShoreZone data adapted by the Friends of the San Juan's for their web site (http://www.sanjuans.org/shorezone.htm). Inset (lower left) shows blow-up of the kelp distribution map.

Figure 7. The Village of Chenega hosts the ShoreZone crew during overflights in July 2004.

B. Resource Management Applications

The ShoreZone mapping data has a range of potential resource management applications; actual uses of the ShoreZone data in Washington and BC are summarized (inset below).

Resource Management Applications

1. mapping of critical habitat (eelgrass)
2. oil spill sensitivity mapping
3. oil spill response
4. GRS site planning
5. sandlance spawning capability
6. bird habitat management
7. recreational planning
8. riparian vegetation disturbance
9. shore-zone modification (seawalls)
10. marine protected area planning
11. archaeological site potential
12. community resource mapping

VI. PUBLICATIONS AND REPORTS

We anticipate publishing a peer-reviewed paper summarizing coastal resource distribution in the Gulf of Alaska. The two most appropriate journals appear to be:

- Coastal Management Journal
- Journal of Ocean and Coastal Zone Management (publication in preparation)

VII. PROFESSIONAL CONFERENCES

We anticipate presenting preliminary results in at least one scientific conference, preferably one that focuses on the Pacific Northwest. Potential candidates are:

- International Conference on Remote Sensing for Marine and Coastal Environments
- Pacific Estuarine Research Society Conference

VIII. PERSONNEL

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C. Contracts

The primary subcontractor will be Coastal & Ocean Resources Inc. with additional subcontracting for biological mapping components to Archipelago Marine Research Ltd.

IX. LITERATURE CITED

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Howes, D.E. 2001. BC Biophysical Shore-Zone Mapping System – A Systematic Approach to Characterize Coastal Habitats in the Pacific Northwest. Proceedings of the Puget Sound Research 20011 Conference, Seattle, Washington.

Jon Issacs and Associates 1985. Kodiak Island Borough Coastal Sensitivity Study Technical and Citizens Manuals. Kodiak Island Borough, Community development Department, Kodiak, Alaska

Morris, M., J.R. Harper , P.D. Reimer, H.R. Frith and D.E. Howes 1995. Coastal biotic mapping system using aerial video imagery. *In* Proceedings of the Third Thematic Conference on Remote Sensing for Marine and Coastal Environments, Seattle WA, p. 200-210.

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Norcross, B., 2003. Biological and Physical Mapping of the Shoreline In the Exxon Valdez Oil Spill Area, Alaska Workshop Summary and Recommendations March 20-21, 2003 Exxon Valdez Oil Spill Restoration Office Conference Room 441 W. 5th Ave. Suite 500 Anchorage, AK.

Ruby, C.H., M.O. Hayes, P.J. Reinhat and K. Finkelstein 1979. Oil spill vulnerability, coastal morphology and sedimentation of the Kodiak archipelago. Contract Report by the University of South Carolina, Columbia, S.C. 149p.

Schoch, G.C., G.L. Eckert and T.A. Dean, Long-Term Monitoring in the Nearshore: Designing Studies to Detect Change and Assess Cause, Project Number: 02395, Workshop Summaries and Recommendations, November 9, 2001, Santa Barbara, California, January 24, 2002, Anchorage, Alaska.

Schoch, G.C., J.R. Harper and M. Dethier 1998. The physical classification and biological modeling of nearshore habitats in Carr Inlet. Technical Report for the Washington State Department of Natural Resources, Olympia, WA, 70p.

WaDNR 2001. Washington State ShoreZone Inventory. Technical Data Report Distributed on CD-ROM by the Washington State Department of Natural Resources, Olympia, Washington (http://www2.wadnr.gov/nearshore/data/).

Zacharias, M.A., D.E. Howes, J.R. Harper and P. Wainwright 1998. The British Columbia Marine Ecosystem Classification: Rationale, development and verification. Coastal Management 26:105-124.

C.V. of Susan M. Saupe

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saupe@circac.org work: (907) 283-7222

Education:

M.S. Chemical Oceanography, Univ. of Alaska, Fairbanks, May 1990
B.S. Chemistry, Univ. of Alaska, Fairbanks, May 1985
University of Oregon, Eugene, 9/80-6/81.

Professional Experience:

2001-2004	**Lead Scientist,** Alaska Environmental Monitoring and Assessment Program (EMAP), through MOU between Cook Inlet RCAC and ADEC, Anchorage, AK.
1996-present	**Director of Science and Research**, Cook Inlet Regional Citizens Advisory Council, Kenai, AK
1990-1996	**Crew Leader/Data Analysis Supervisor**, Institute of Marine Science, Univ. of Alaska, Fairbanks, AK
1988-1991	**Research Assistant**, The Ecosystems Center, Marine Biological Laboratory, Woods Hole, MA
1985-1988	**Graduate Research Assistant**, School of Fisheries and Ocean Science, Univ. of Alaska, Fairbanks, AK
1984-1985	**Laboratory Technician**, Inst. of Northern Engineering/Water Research Center, Univ. of Alaska, Fairbanks, AK
1982-1984	**Teaching Assistant**, Chemistry Dept., Univ. of Alaska, Fairbanks, AK

Field Experience:

7/04-8/04	**Chief Scientist,** Alaska EMAP, Southeast Aalska
7/04	**Shoreline Ecologist,** Prince William Sound ShoreZone Aerial Surveys, AK.
6/2003	**Chief Scientist,** Katmai ShoreZone Vessel Surveys, Katmai National Park, AK.
6/02-8/02	**Chief Scientist,** Alaska EMAP, Gulf of Alaska
5/02; 6/01	**Shoreline Ecologist/Project Manager,** ShoreZone Mapping Project, Cook Inlet and Kenai Peninsula Coastline
9/00	**Project Manager,** Intertidal Reconnaissance Surveys, central Cook Inlet, AK
6/99	**Invited Scientist,** Collaborated with NOAA Hazmat Scientists for Intertidal Studies, Kasitsna Bay, Alaska.
6/99	**Project Manager**, Acoustic Doppler Current Profile Study conducted by University of Alaska Fairbanks, Cook Inlet, Alaska.
6/98	**Invited Scientist,** Collaborated with NOAA Hazmat Scientists for Intertidal Studies, Prince William Sound, Alaska.
3/94-9/96	**Chief Scientist,** Intertidal Studies, Kachemak Bay, Alaska (4 months).
6/96-7/96	**Scientific Diver**, Nearshore Vertebrate Predators. R/V *Bering Explorer*
6/90-9/95	**Chief Scientist**, Intertidal Damage Assessment and Restoration Studies, Prince William Sound and Ke Peninsula, R/Vs *Bering Explorer*, *Pacific Star*, *Sea Haven*, and *Acania* (17 mos.).
3/92-4/92	**Contractor** to University of Texas, Under-Ice Photosynthesis Studies in Boulder Patch, Endicott Island, Alaska.
8/88-3/91	**Research Assistant,** Estuarine Modeling Study, Cape Ann and Cape Cod, MA (2 mos.).
8/88	**Contractor** to Kinnetic Laboratories, Pulp mill effluent effects on primary production. R/V *Curlew*.
4/88-5/88	**Graduate Student,** Bering Sea marginal ice zone study. R/V *Alpha Helix*.
9/87	**Graduate Student,** Stable isotope food web study, Chukchi Sea. R/V *Surveyor*.
8/87	**Graduate Student,** Nitrate uptake experiments, Northern Bering and Chukchi Seas. R/V *T.G. Thomson*
2/87-3/87	**Contractor** to LGL Alaska, Water and zooplankton collections, Aleutian Islands. R/V *Miller Freeman*
10/86	**Graduate Student,** Zooplankton collections, Beaufort Sea. USCGC *Polar Star*.
9/86	**Graduate Student,** Stable isotope Study, Chukchi Sea. R/V *Oceanographer*.
9/84-8/85	**Graduate Student,** Carbon Energetics Study, Southeastern Bering Sea (4 mos.) R/V *Miller Freeman*.

Project Management:

2001-present	**ShoreZone Mapping,** Contracts with Coastal and Ocean Resources
2003-present	**Cook Inlet Physical Oceanography,** Contracts with Coastal Marine Institute
2001-2004	**Alaska Environmental and Monitoring Program for southcentral and southeast Alaska,** ADEC
2000-2002	**Intertidal Reconnaissance Surveys,** Contract with Littoral Ecological and Ecosystem Services, Inc.
2000	**Tide-Rip Study in Cook Inlet,** Contract with Dr. Mark Johnson, University of Alaska Fairbanks
1996-1998	**P450 Reporter Gene System Assays,** Contract with Jack Anderson, Columbia Analytical Inc.
1996-1997	**Cook Inlet Shelikof Strait Project,** Contract with Kinnetic Laboratories Incorporated
1997-1998	**Kenai River Estuary Sediment Characterization Study,** Contract with Kinnetic Laboratories, Inc.
1997-1998	**Cook Inlet Sediment Toxicity Study,** Contract with Kinnetic Laboratories, Inc.
1994-1998	**Kachemak Bay Intertidal Recruitment and Succession Study,** Contract through CMI

Additional Experience and Education:

- Shoreline Countermeasures Assessment Team Training, April 1999
- Adjunct Faculty, Kenai Peninsula Community College, Jan 98-May 2000
- Commercial Longline and Set-net Salmon Fisherman in Kodiak, 1984, 1992
- NAUI Openwater II SCUBA Certification (Dry-Suit Trained)
- Chart Navigation, Massachusetts Maritime Academy
- Outboard Engine Repair Classes (Mass. Maritime and Fairbanks Community Schools)
- Welding Technology (SMAW, Tanana Valley Community College)

Misc. Steering and Planning Committees

- Alaska Non-Indigenous Species Working Group, Representative for CIRCAC
- Oil Spill Recovery Institute, At-large member of Advisory Board
- Habitat Committee, EVOS Trustee GEM Program
- Alaska Water Quality Program Rebuild Working Group, Alaska Department of Environmental Conservation
- ARRT, Science and Technology Work Group, Representative for CIRCAC
- Kachemak Bay National Estuarine Research Reserve, Research Committee
- Environmental Monitoring Committee and Prevention, Response, Operations, and Safety Committee, Cook Inlet RCAC

Misc. Publications/Presentations related to Proposal

Harper, J.R. and S. M. Saupe. 2002. Intertidal Biophysical Mapping of Kachemak Bay and Cook Inlet Using Low-Tide Oblique Aerial Video Imaging. Proceedings Kachemak Bay Conference, Homer, AK.

Saupe, S.M. 2002. Shoreline Inventory Mapping System. EVOS Trustee Council Workshop Detecting and Understanding Change in Nearshore Environments: Planning for Habitat Mapping in the Gulf of Alaska, Homer, AK.

Saupe, S.M.2003. Mapping Coastal Habitats in Southcentral Alaska using the ShoreZone Technique. Quarterly newsletter of Alaska Chapter of the American Fisheries Society, Vol. 23 No.2., Juneau, AK.

Harper, J., H. Berry, and S. Saupe. 2003. A Summary of the ShoreZone Mapping System. Proceedings of the Northeastern Pacific Marine Habitat Classification Workshop, 27 May 2003, CA.

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JOHN R. HARPER
P. Geo.

SPECIALTIES:

- **oilspill research and planning**
- **multidisciplinary marine studies**
- **coastal zone management**
- **coastal and nearshore habitat**

EDUCATION:

B.Sc.	Geology (cum laude), University of Massachusetts (1973); L.R. Wilson Award for Excellence in Geology
M.Sc.	Marine Science, Louisiana State University (1976)
Ph.D.	Marine Science, Louisiana State University (1978)

WORK EXPERIENCE:

1987-present	**Principal**, Coastal and Ocean Resources (previously Harper Environmental Services), British Columbia and Nova Scotia
1989-present	**Adjunct Professor**, Centre of Earth and Ocean Resources, University of Victoria, Victoria, British Columbia
2004-present	**President** of the Board of Directors, Marine Ecology Centre
1987-1989	**Marine Geologist/Coastal Coordinator**, Committee for Co-ordination of Joint Prospecting for Mineral Resources in South Pacific Offshore Areas (CCOP/SOPAC), Suva, Fiji
1986-1987	**Manager**, Maritime Region, Dobrocky Seatech Ltd., Halifax, Nova Scotia
1985-1986	**Manager**, West Coast Region, Dobrocky Seatech Ltd., Sidney, BC
1983-1985	**Manager**, Geosciences and Hydrographic Services, Dobrocky Seatech Ltd.
1980-1983	**Senior Project Scientist**, Woodward-Clyde Consultants, Victoria, British Columbia and San Francisco, California
1978-1980	**Post-Doctoral Fellow**, Geological Survey of Canada, Pacific Geoscience Centre., Sidney, British Columbia
1973-1978	**Research Assistant**, Coastal Studies Institute, Louisiana State University, Baton Rouge, Louisiana

GEOGRAPHIC EXPERIENCE:

East, west and arctic coasts of Canada; east, west and arctic coasts of the United States; Brazil; Costa Rica; Fiji; Kenya; Kiribati; Papua New Guinea; Tonga; Western Samoa

PROJECT MANAGEMENT

Over the past 15 years, Dr. Harper has personally managed over 250 separate projects related to coastal and marine resources including the following disciplines:

Coastal Zone Management - Dr. Harper has been closely involved with coastal management planning in British Columbia and is currently conducting a resource inventory and user needs assessment for the province of British Columbia. He is also involved with the development of marine region classification of Canada for use in environmental ecosystem monitoring. Dr. Harper has been closely involved with the development of coastal habitat classification and mapping systems over the past three years, using state-of-the-art remote sensing and GIS systems.

Oil Spill Research, Planning and Response - oil spill research studies since 1980, including several years of field studies associated with the Baffin Island Oil Spill experiment, sensitivity evaluations for the coasts of northern California, British Columbia, Kodiak Island, the Chukchi and Beaufort Sea coasts of Alaska, the Beaufort Sea coast of Canada, Labrador and Newfoundland. Other research areas have included the long-term fate of oil on shorelines, decision-making for shoreline cleanup operations and long-term monitoring programs. In 1984, he designed and implemented a physical monitoring program of the MV Puerto Rican oil spill off San Francisco. In 1991, Harper Environmental Services compiled the first Directory of Canadian Marine Oilspill Specialists. In 1992, he directed an Oil Spill Sensitivity Mapping Workshop in Costa Rica for ARPEL.

Dr. Harper has been extensively involved in the EXXON Valdez oil spill cleanup operation in Prince William Sound (1989-1992) with participation in quality assurance for preparation of oiling maps, coordination of the Prince William Sound Fate and Persistence Studies, bioremediation monitoring surveys.

Coastal Research/Marine Geology - coastal and nearshore studies since 1971 and with research projects on all major coastlines of North America and throughout the South Pacific. Research topics have included: beach monitoring, coastal mapping, sediment transport predictions and measurements, coastal erosion and scour monitoring, and coastal storm surge surveys.

Environmental Impact - since 1973, Dr. Harper has been closely involved with large, multidisciplinary impact assessments including: the first superport to be developed in the US (Harper, 1974), major construction projects at Prudhoe Bay (causeway construction and oil field waterflood construction), siting and impact evaluation of a major marine oil terminal in Santa Barbara, and the Beaufort Sea Environmental Monitoring Project (BEMP). Also he has been extensively involved with oil spill contingency planning in the marine environment with input to plans for offshore drilling in western Canada (Chevron, PetroCanada), the Beaufort Sea (Dome Petroleum) and Prudhoe Bay, Alaska (ARCO).

Marine Parks - numerous marine park studies including field studies of coastal landforms to delineation of new marine park sites in the Canadian arctic. In 1983, Dr. Harper conducted a strategic planning study for Parks Canada to delineate the marine regions of Canada; major segments of this study, including the delineated regions, have recently been incorporated into Parks Canada policy. Two field seasons of field work have been conducted within Pacific Rim National Park. He is currently directing a major biophysical mapping project of the newest marine park in Canada, South Moresby/Gwaii Haanas National Park Reserve.

Selected publications

Harper, J.R., B.D. Bornhold, B. Burd, B. Emmett, C. Picard and P. Thuringer 2003. Use of Seabed Imaging and Mapping System for Use in Change Detection Monitoring (Abstract). Proceedings of the 2003 Georgia Basin/Puget Sound Conference, Vancouver, BC.

Harper, J.R., B.D. Bornhold and B. Burd. 2003b. Evaluation of the Towed Video Imagery for Eelgrass Mapping and Monitoring (Abstract). Proceedings of the 2003 Estuarine Research Federation Conference, Seattle, Washington.

Emmett, E., P. Thuringer and **J.R. Harper** 2001. Using towed underwater video to map the physical and biological features of Victoria and Esquimalt Harbours, British Columbia (Abstract). Proceedings fo the Submerged Lands 2001 Conference, Seattle, Washington.

Harper, J.R., B.D. Bornhold, P. Thuringer and D. McCullough 1999. Application of Underwater Video Imaging for Seabed Engineering and Habitat Assessment. *In* Proceedings of the 1999 Canadian Coastal Conference, Victoria, BC, 12p.

Harper, J.R., B. Emmett, D.E. Howes and D. McCullough 1998. Seabed imaging and mapping system – seabed classification of substrate, epiflora and epifauna. *In* Proceedings of the 1998 Canadian Hydrographic Conference, Victoria, BC, 13p.

Zacharias, M.A., D.E. Howes, **J.R. Harper** and P. Wainwright 1998. The British Columbia Marine Ecosystem Classification: Rationale, development and verification. Coastal Management 26:105-124.

Zacharias, M.A., D.E. Howes and **J.R. Harper** 1998. The development of an ecosytem classification using an ecosystem-based approach. Approaches to Marine Ecosystem Delineation in the Strait of Georgia: Proceedings of a DFO Workshop, Sidney, B.C., 4-5 November 1997 Canadian Technical Report of Fisheries and Aquatic Sciences 2247 p96-104

Harper, J.R., G. Sergy and M. Kory. 1997. Orimulsion-sediment interaction scoping experiments. Proceedings of the 20th Annual Arctic Marine Oilspill Project (AMOP) Technical Seminar, Vancouver, BC, in press.

Harper, J.R. and D.E. Howes. 1997. Development of a shoreline protection strategy for the West Coast of Vancouver Island. Proceedings of the 20th Annual Arctic Marine Oilspill Project (AMOP) Technical Seminar, Vancouver, BC, in press.

Odhiambo, B.K., R.W. Macdonald, M.C. O'Brien, **J.R. Harper** and M.B. Yunker 1996. Transport and fate of mine tailings in a coastal fjord of British Columbia as inferred from the sediment record. Science and the Total Environment: 191:77-94.

Hodgins, D.O., **J.R. Harper** and Andree Chevier 1995. Technical guidance for physical monitoring at ocean disposal sites. Proceedings of the 1995 Canadian Coastal Conference, National Research Council of Canada, (in press).

Morris, M., **J.R. Harper** , P.D. Reimer, H.R. Frith and D.E. Howes 1995. Coastal biotic mapping system using aerial video imagery. *In* Proceedings of the Third Thematic Conference on Remote Sensing for Marine and Coastal Environments, Seattle WA, p. 200-210.

Sergy, G., S. Blenkinsopp, **J.R. Harper**, B. Humphrey and E.H. Owens 1995. Recent and emerging Canadian studies addressing oil-on-shoreline issues. Proceedings of of Special Conference on Oil Poluution, International Maritime Organization, London, 13p.

Harper., J.R. and P.D. Reimer 1995. Review of aerial video imagery (AVI) applications and development of AVI standards for the Province of British Columbia. *In* Proceedings of the Third Thematic Conference on Remote Sensing for Marine and Coastal Environments, Seattle WA, p. 700-709.

Harper, J.R., G. Sergy and T. Sagayama 1995. Subsurface oil in coarse sediments experiments (SOCSEX II). Proceedings of the 18th Annual Arctic Marine Oilspill Project (AMOP) Technical Seminar, Edmonton, AB,. p.867-886.

Sergy, G., S. Blenkinsop, **J.R. Harper**, B. Humphrey and E.H. Owens 1995. Recent and emerging Canadian studies addressing oil-in-shorelines issues. Proceedings of the Second International Research and Development Forum, International Maritime Organization, London.

Humphrey, B. and **J.R. Harper**, 1993. Coarse sediment oil persistence laboratory studies and model. Proceedings of the 1993 Arctic Marine Oil Spill Conference, Calgary, AB

Gillie, R.D., **J.R. Harper** and R. Howorth, 1992. Beach profile changes at Tarawa, Kiribati, 1991-92. 7th International Coral Reef Symposium.

Harper, J.R., D.F. Dickins, D. Howes and G. Sergy, 1992. Recent shoreline mapping projects in British Columbia and significance to oil spill countermeasure planning. Proceedings of the 15th Arctic and Marine Oil Spill Technical Seminar (AMOP), Environment Canada, p. 293-300.

Harper, J.R., 1991. Non-carbonate sediment budgets. Keynote Paper, Proceedings of the 1987 CCOP/SOPAC Workshop on Coastal Processes in the South Pacific Island Nations, SOPAC Technical Bulletin 7:55-58.

Harper, J.R. and E.H. Owens, 1991. Post-cyclone coastal hazard assessment and mapping using a simple aerial videorecording system. Proceedings of the 1987 CCOP/SOPAC Workshop on Coastal Processes in the South Pacific Island Nations, SOPAC Technical Bulletin 7:163-164.

Harper, J.R., J. Dempsey, W. Duval, J. Haggarty,
B. Humphrey, L. Solsberg and G. Tidmarsh, 1991. Development of a directory of Canadian marine oilspill response specialists. Proceedings of the 14th Arctic and Marine Oilspill Program (AMOP) Technical Program, Environment Canada, p. 207-213.

Budget Addition Justification for
ShoreZone Mapping for Prince William Sound

FY06 (210.4K+ trustee agency GA 9% = 229.3K)
(total requested for FY06/FY07 = 440.4K + trustee agency GA 39.6K = 480.0K)

Personnel:
Susan M. Saupe, Director of Science and Research at Cook Inlet RCAC, will be the Project Manager for this proposal to oversee the field survey scheduling and develop agreements for the various survey teams. She will also participate in the aerial surveys as a coastal ecologist. Her salary match will be provided by Cook Inlet RCAC for a total of 10K.

All other personnel on this project will be participating as sub-contractors to Cook Inlet RCAC and are shown in the "Contractual Costs" part of our submitted detailed budget.

Request: **(0K)**

Travel:
Travel is requested for Susan Saupe's travel from Kenai to Prince William Sound – most likely Cordova for one field survey. The costs include a R/T ticket from Kenai/Cordova, and per diem (hotel plus food) for 8 days. Cook Inlet RCAC will provide travel match for her travel to the annual EVOS Marine Sciences meeting.

Request: **(1.9K)**

Contractual:
The bulk of this proposal is for contractual costs. These are:
Coastal and Ocean Resources, Inc. – to conduct ShoreZone Aerial Surveys, on-the-ground surveys, and biophysical mapping. This includes personnel costs, travel, equipment rental, phone/courier, and services such as the web-posting of the digital imagery and the digitizing of appropriate coastlines for the GIS database. Coastal and Ocean Resources, Inc. (CORI) was selected for this subcontract as they are currently the only group conducting coastal mapping using the Alaska ShoreZone Mapping Protocols as developed under an earlier EVOS TC contract to CORI.

Dr. Harper will be providing planning, gear preparation, geomorphology services during 3 six-day AVI surveys, biophysical mapping, and reporting. Neal Borecky will be providing planning, mob/demob of field gear, navigational and GIS services during 3 six-day AVI surveys. Marry Morris will be providing planning, mob/demob of field gear, nearshore biology services during two six-day AVI surveys, and reporting for the AVI survey data.

Travel to CORI:
John Harper, Mary Morris, and Neal Borecky will each travel R/T from Victoria, Canada to Cordova for three separate surveys (Mary will only travel for two surveys). The costs for each R/T tick are estimated at 1.3K each. Per diem is for two days of travel for each survey and six days of surveys during each AVI survey. Per diem includes hotel and food. Travel costs are included for the pilot to include per diem for food and lodging while working in the Sound for three surveys. Travel also included for Harper and Morris to attend annual EVOSTC meeting and to meet with project manager in January.

Other services to CORI
CORI will also be contracted to provide equipment during the field and AVI surveys totaling 3K (3 surveys using their AVI equipment and cameras @ 1K per survey). Phone/courier costs are estimated at 0.2K. CORI will have costs associated with posting all of the digital video collected during the AVI surveys to a web site and paying for an ArcIMS licensee to host the data via the web. These costs are estimated at 6K. Finally, 2K is included for services associated with digitizing appropriate coastlines for the development of the coastal GIS biophysical database.

Other Contracts
Helicopter costs are estimated at 4K per day for six days of surveys for each of 3 surveys. Additional helicopter time is included for 1 day of fuel slinging and positioning for each of three surveys.

Requested: **(188.5K)**

Commodities:

Commodities include the purchase and production of videotapes from the AVI surveys and costs are estimated at 0.15K per set of tapes for 1 sets totaling 2.7K. Film for the 35 mm camera document photos are estimated at 1.4K per survey for three AVI surveys totaling 4.2 K. Miscellaneous field supplies such as herbarium paper, survey tapes, data sheets, etc...are estimated at 1.0K for each field survey. Charts will be purchased for the survey area for use during the AVI and field surveys and are estimated at 0.1K.

Request: **(10K)**

Equipment:
No funds for equipment purchases are requested.

Request: **(0K)**

Indirect:

Cook Inlet RCAC is charging overhead at a rate of 5% to cover administrative support costs.

Request: **(10K for CIRCAC and 18.94K for Trustee Agency GA = 28.94K)**

FY 2007

Personnel:
None

Travel:
Travel also included for Harper and Morris to attend annual EVOSTC meeting and meet with project manager in January.

Requested: **(4.2K)**

Contractual:
A contract to Coastal and Ocean Resources, Inc. (CORI) will include 214K for the biophysical mapping of all of the shorelines surveyed during the three AVI surveys. "Biophysical mapping" includes converting the digital image and audio data into georeferenced data and producing a database that links the geomorphology and biological habitat data for the ShoreZone areas. This work will be completed by geomorphology mappers at CORI and coastal ecologists at Archipelago Marine Research, Ltd. Costs are estimated at $53.00 per kilometer of survey. Additional contractual costs to CORI will include their phone/courier, miscellaneous printing and binding of reports for a total of:

Requested: **(216K)**

Commodities:
None

Equipment:
None

Indirect:
Cook Inlet RCAC is charging overhead at a rate of 5% to cover administrative support costs.

Request: **(11.0K for CIRCAC and 20.8K for Trustee Agency GA = 31.8K)**

EXXON VALDEZ OILSPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 05 - FY 07

Budget Category:	Proposed FY 05	Proposed FY 06	Proposed FY 07		TOTAL PROPOSED	
Personnel	$0.0	$0.00	$0.00		$0.0	
Travel	$0.0	$1,900.00	$1,800.00		$3,700.0	
Contractual	$0.0	$188,480.00	$217,419.00		$405,899.0	
Commodities	$0.0	$10,000.00	$0.00		$10,000.0	
Equipment	$0.0	$0.00	$0.00		$0.0	
Subtotal	$0.0	$200,380.00	$219,219.00		$419,599.0	
Indirect (rate will vary by proposer)	$0.0	$10,019.00	$10,960.95		$20,980.0	
Project Total	$0.0	$210,399.00	$230,179.95		$440,579.0	
Trustee Agency GA (9% of Project Total)	$0.0	$18,935.91	$20,716.20		$39,652.1	
Total Cost	$0.0	$229,334.91	$250,896.15		$480,231.1	

Comments:

This budget includes costs for FY06 in addition to the existing funds that were made available in FY06 to complete the Kodiak mapping. FY06 is when the AVI surveys would take place in Prince William Sound so this FY06 budget includes funds for travel associated with the field survyes and travel to annual meeting. The FY07 number above includes the request to create the actual biophysical data from the aerial survey imagery and commentary conducted in FY06. This FY07 budget number includes mapping costs of $53.00 for biophysical mapping per km. This mapping work includes the costs for a geomorphologist to break the shoreline into units based on the geomorphology viewed and described in the AVI surveys, creating a database of all alongshore and cross-shore attributes in each unit; and then mapping the biological habitat onto each unit and geomorphic cross-shore unit.

Please note that this is significantly less than was submitted in previous years because the PWS RCAC has committed significant funds and has already completed surveys in a portion of the Sound and has plans to work with other organizations to complete the mapping for the shorelines surveyed in 2004.

Cost-share Funds:

$60K has been provided by PWS RCAC for AVI surveys of the western shore.
$40K is proposed in PWSRCAC FY06 budget for mapping of the western shore.
$40-50K is proposed by ADNR (CIAP) in their budget for mapping of the western shore.
$10K in FY05 and 06 of Cook Inlet RCAC funds will be used as cost share to support Susan Saupe for project management and AVI surveys.

FY 06-07

Date Prepared:

Project Number:
Project Title: ShoreZone Mapping for Kodiak Island
Proposer: Susan M. Saupe, Cook Inlet RCAC

EXXON VALDEZ OILSPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 05 - FY 07

Personnel Costs:			Months	Monthly		Personnel
Name	Description		Budgeted	Costs	Overtime	Sum
						0.0
		Subtotal	0.0	0.0	0.0	
					Personnel Total	$0.0

Travel Costs:		Ticket	Round	Total	Daily	Travel
Description		Price	Trips	Days	Per Diem	Sum
					Travel Total	$0.0

FY 05

Project Number:
Project Title: ShoreZone Mapping for Kodiak Island
Proposer: Susan M. Saupe, Cook Inlet RCAC

EXXON VALDEZ OILSPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 05 - FY 07

Contractual Costs:	Contract
Contractual Total	$0.0

Commodities Costs:	Commodity
Description	Sum
Commodities Total	$0.0

FY 05

Project Number:
Project Title: ShoreZone Mapping for Kodiak Island
Proposer: Susan M. Saupe, Cook Inlet RCAC

EXXON VALDEZ OILSPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 05 - FY 07

New Equipment Purchases: Description	Number of Units	Unit Price	Equipment Sum
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
		New Equipment Total	$0.0

Existing Equipment Usage: Description	Number of Units	Inventory Agency

FY 05

Project Number:
Project Title: ShoreZone Mapping for Kodiak Island
Proposer: Susan M. Saupe, Cook Inlet RCAC

EXXON VALDEZ OILSPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 05 - FY 07

Personnel Costs:			Months	Monthly		Personnel
Name	Description		Budgeted	Costs	Overtime	Sum
Saupe	Project management					0.0
	AVI Surveys					0.0
						0.0
	(no charge)					0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
		Subtotal	0.0	0.0	0.0	
					Personnel Total	$0.0

Travel Costs:		Ticket	Round	Total	Daily	Travel
Description		Price	Trips	Days	Per Diem	Sum
Saupe	Travel to field (Kenai to PWS)	300.0	1	8	200.0	1,900.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
					Travel Total	$1,900.0

FY 06

Project Number:
Project Title: ShoreZone Mapping for Kodiak Island
Proposer: Susan M. Saupe, Cook Inlet RCAC

EXXON VALDEZ OILSPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 05 - FY 07

Contractual Costs:								Contract
Description								Sum
Contract to Coastal and Ocean Resources, Inc.								Sum
Aerial Surveys:								
Coastal and Ocean Resources, Inc. (Dr. John Harper)								
J.	Harper	AVI Surveys - Three 6 day surveys/planning/mob/demob.		27	660.00			17,820.0
N.	Borecky	AVI Surveys - Three 6 day surveys/planning/mob/demob.		30	380.00			11,400.0
M.	Morris	AVI Surveys - Three 6 day surveys/planning/mob/demob.		22	450.00			9,900.0
J.	Harper	Reporting		6	660.00			3,960.0
M.	Morris	Reporting		10	450.00			4,500.0
N.	Borecky	Reporting		10	380.00			3,800.0
		Field Survey (reporting)		15	380.00			5,700.0
Travel			Ticket Price	Round Trips	Total Days		Per Diem	
J.	Harper	AVI Surveys (x2, 6 day surveys)	1300.0	3	24		200.0	8,700.0
N.	Borecky	AVI Surveys (x2, 6 day surveys)	1300.0	3	24		200.0	8,700.0
M.	Morris	AVI Surveys (x2, 6 day surveys)	1300.0	2	16		200.0	5,800.0
	Pilot	AVI Surveys (x2, 6 day surveys)	0.0	0	24		200.0	4,800.0
J.	Harper	EVOS Annual Meeting	1100.0	1	5		200.0	2,100.0
M.	Morris	EVOS Annual Meeting	1100.0	1	5		200.0	2,100.0
Equipment Rental								3,000.0
phone/courier/faxing								200.0
Web-posting of Imagery (ArcIMS Hosting fees, etc...)								6,000.0
Digitizing of coastline support								2,000.0
						Rate		
Helicopter charter (surveys)					18	4000.0		72,000.0
Helicopter or vessel charter (fuel positioning)					4	4000.0		16,000.0
If a component of the project will be performed under contract, the 4A and 4B forms are required.						**Contractual Total**		$188,480.0

Commodities Costs:				Commodity
Description				Sum
videotapes & copies	18	150		2,700.0
film	3	1400		4,200.0
Miscellaneous field supplies	3	1000		3,000.0
Charts	1	100		100.0
			Commodities Total	$10,000.0

FY 06

Project Number:
Project Title: ShoreZone Mapping for Kodiak Island
Proposer: Susan M. Saupe, Cook Inlet RCAC

EXXON VALDEZ OILSPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 05 - FY 07

New Equipment Purchases: Description	Number of Units	Unit Price	Equipment Sum
None			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
		New Equipment Total:	$0.0

Existing Equipment Usage: Description	Number of Units	Inventory Agency

FY 06

Project Number:
Project Title: ShoreZone Mapping for Kodiak Island
Proposer: Susan M. Saupe, Cook Inlet RCAC

EXXON VALDEZ OILSPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 05 - FY 07

Personnel Costs:			Months	Monthly		Personnel
Name	Description		Budgeted	Costs	Overtime	Sum
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
		Subtotal	0.0	0.0	0.0	
					Personnel Total	$0.0

Travel Costs:		Ticket	Round	Total	Daily	Travel
Description		Price	Trips	Days	Per Diem	Sum
						0.0
Susan Saupe (Project Manager) travel to meet with contractors (Kenai/Victoria, B.C.)		1000.0	1	4	200.0	1,800.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
					Travel Total	$1,800.0

FY 07

Project Number:
Project Title: ShoreZone Mapping for Kodiak Island
Proposer: Susan M. Saupe, Cook Inlet RCAC

EXXON VALDEZ OILSPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 05 - FY 07

Contractual Costs:								Contract
Description								Sum
Contract to Coastal and Ocean Resources, Inc.								
Biophysical Mapping of the Aerial Survey Data				km		$/km		
		2004 aerial survey data (potential matching funds from PWSRCAC and CIAP)			1600	0		0.0
		PWS, West/North			1166	53		61,798.0
		PWS, Central			1500	53		79,500.0
		PWS, East			1357	53		71,921.0
J.	Harper	EVOS Annual Meeting		1100.0	1	5	200.0	2,100.0
M.	Morris	EVOS Annual Meeting		1100.0	1	5	200.0	2,100.0
						Contractual Total		$217,419.0

Commodities Costs:	Commodity
Description	Sum
Commodities Total	$0.0

FY 07

Project Number:
Project Title: ShoreZone Mapping for Kodiak Island
Proposer: Susan M. Saupe, Cook Inlet RCAC

EXXON VALDEZ OILSPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 05 - FY 07

New Equipment Purchases:	Number	Unit	Equipment
Description	of Units	Price	Sum
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
		New Equipment Total	$0.0

Existing Equipment Usage:	Number	Inventory
Description	of Units	Agency

FY 07

Project Number:
Project Title:
Proposer:

PROPOSAL SIGNATURE FORM

THIS FORM MUST BE SIGNED BY THE PROPOSED PRINCIPAL INVESTIGATOR AND SUBMITTED ALONG WITH THE PROPOSAL. If the proposal has more than one investigator, this form must be signed by at least one of the investigators, and that investigator will ensure that Trustee Council requirements are followed. Proposals will not be reviewed until this signed form is received by the Trustee Council Office.

By submission of this proposal, I agree to abide by the Trustee Council's data policy (*Trustee Council Data Policy**, adopted July 9, 2002) and reporting requirements *(Procedures for the Preparation and Distribution of Reports***, adopted July 9, 2002).

PROJECT TITLE: Fate of salmon spawners and the role of nutrient limitation on MDN effects in Kenai Peninsula streams: a proposed amendment to GEM EVOS project #040726

Printed Name of PI: Coowe Walker

Signature of PI: Coowe Walker _____ Date: April 15, 2005

Printed Name of co-PI: Mark Wipfli

Signature of co-PI: _____ Date _____

Printed Name of co-PI: Craig Stricker

Signature of co-PI: _____ Date _____

* Available at http://www.evostc.state.ak.us/pdf/admin/datapolicy.pdf

** Available at http://www.evostc.state.ak.us/pdf/admin/reportguidelines.pdf

Trustee Council Use Only
Project No: ____
Date Received: ____

PROPOSAL SUMMARY PAGE
(To be filled in by proposer)

Trustee Council Use Only
Project No: ____
Date Received: ____

PROPOSAL SUMMARY PAGE
(To be filled in by proposer)

Project Title: **Fate of salmon spawners and the role of nutrient limitation on MDN effects in Kenai Peninsula streams: a proposed amendment to GEM EVOS project #040726**

Project Period: FY06 – FY08

Proposer(s):

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Stable Isotope Laboratory
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Study Location: Central Kenai Peninsula and the south side of Kachemak Bay.

Abstract: Marine derived nutrients and carbon (MDN) delivered by salmon to watersheds are considered important drivers in riverine ecosystems, providing nutrients and food to land-based food webs. Our investigations into the presence and effects of MDN compared to other nutrient and carbon sources (e.g., watershed-derived) in the Gulf of Alaska region, have revealed two unexpected outcomes. First, despite strong salmon returns, very few spawners and carcasses were observed during stream surveys. Second, food web responses were much lower than measured in other areas of Alaska, suggesting that stream food webs on the southern Kenai Peninsula may not be nutrient limited due to the underlying phosphorous-rich geology. The objectives of this study are to augment the ongoing GEM-EVOS MDN study #040726 to gain an understanding of how carcass fate and retention and watershed geology affect stream water chemistry and food web responses to MDN inputs from spawning salmon.

Funding: EVOS Funding Requested: FY 06 –FY08 $136,228
(must include 9%GA) TOTAL: $148,488.5

Non-EVOS Funds to be Used: KBRR bunkhouse, lab space, fluorimeter, drying oven, freezer, and office equipment will be provided at no cost to the project.
TOTAL: $148,488.50

Date: April 14, 2005

(NOT TO EXCEED ONE PAGE)

FATE OF SALMON SPAWNERS AND THE ROLE OF NUTRIENT LIMITATION ON MDN EFFECTS IN KENAI PENINSULA STREAMS
A Proposed Amendment to GEM EVOS project #040726

PROJECT PLAN

I. NEED FOR THE PROJECT

A. Statement of Problem

The focus of our currently funded GEM EVOS project (#070726) is to develop tools for monitoring marine derived nutrients (MDN) in watersheds on the southern Kenai Peninsula, Alaska. Our approach for year one of the three-year study was to link water chemistry, marine isotope signatures, and lipid and fatty acid measures along a gradient from headwaters to river mouth in watersheds with and without spawning salmon (the North Fork of the Anchor River and Happy Valley Creek, respectively). The goal was to determine which variables were most suitable for monitoring MDN presence and effects. The first year of the project was very successful, revealing: 1) North Fork taxa were enriched with MDN over Happy Valley taxa; 2) no obvious pulse of MDN was observed immediately post-spawning, perhaps due to the lack of nutrient limitation or bear predation; 3) longitudinal enrichment was noted in each system, indicating likely increased trophic complexity with stream size regardless of spawning salmon presence; and 4) certain species appeared to be more diagnostic or have higher potential as indicator species than others. These results indicated that stable isotopes, lipids and fatty acids are likely reliable measures of MDN in resident fish, invertebrates and streamside vegetation. Years 2 and 3 will include a broader look at the most promising responses across multiple drainages throughout the Kenai Peninsula.

Further, we had two somewhat unexpected outcomes. First, despite high salmon returns to the North Fork Anchor River during 2004, stream surveys during the runs revealed very few noticeable spawners and carcasses in the stream. We postulate that salmon were removed by bears, other carnivores, or scavengers, or that we simply could not see the carcasses as they accumulated in pools and other areas of deeper water. Second, food web responses (objectives 2 and 3 from the currently-funded GEM EVOS project) were much lower than expected, based on that recorded in past studies in the Copper River Delta and Southeast Alaska (Wipfli et al. 1998, 1999, 2003; Heintz et al. 2004; Hicks et al. 2005). This suggests that food webs in the Anchor River and likely neighboring streams on the phosphorous-rich underlying geology of this region may not be nutrient limited like other coastal areas in Alaska. We believe that exploring both outcomes is crucial to understanding MDN presence and effects on the Kenai Peninsula.

MDN from returning salmon penetrate riverine food webs and can dramatically increase stream food web productivity, improving fish health and elevating fish production, in Alaska and the Pacific Northwest (Kline et al. 1990, 1997, Bilby et al. 1996, 1998; Wipfli et al. 1998, 1999, 2003; Chaloner et al. 2002a, Stockner 2003; Heintz et al. 2004; Hicks et al. 2005). Streams generally appear to be nutrient (nitrogen or phosphorus) limited throughout the Pacific Northwest and Alaska, which is believed to largely be a result of

underlying igneous geology (Peterson et al. 1983; Borchardt 1996; Ashley and Slaney 1997). Even small additions of marine nutrients can have dramatic effects on aquatic productivity in SE Alaska (Wipfli et al. 1999). Because of the more phosphorus-rich geology on some parts of the lower Kenai Peninsula, streams in these areas may not be nutrient limited, and therefore might be all or part of the reason we observed much weaker responses to MDN enrichment in the North Fork of the Anchor River during 2004. Further, bears and other scavengers can remove most or all of the salmon from streams, especially if streams are relatively small and shallow (Willson et al. 1998; Gende et al. 2004; Ben-David et al. 1998; Jauquet et al. 2003). Bears frequent most of the salmon streams on the Kenai Peninsula, and have the potential to dramatically reduce the number of spawners and carcasses remaining in streams in some areas (S. Farley, personal comm.). In addition, stream and terrestrial invertebrates can speed the carcass decay process along to the point where the dead fish quickly become hard to recognize and locate (Wipfli et al. 1998, Chaloner et al. 2002b).

Understanding the role of nutrient limitation in Kenai streams, as well as the fate of carcasses, including consumption by carnivores and scavengers, deposition and burial in stream pools, and retention in habitats where salmon spawn, will greatly advance our understanding of where and why MDN from salmon runs do or do not affect riverine food webs in Kenai Peninsula ecosystems.

B. Relevance to 1994 Restoration Plan Goals and Scientific Priorities

This project amendment addresses two unexpected outcomes of the currently funded GEM EVOS watershed project. Specifically, we will explore carcass fate (disappearance and retention) in streams and effects of nutrient limitation from underlying geology on stream chemistry and responses to MDN. We will employ nutrient-diffusing substrates and bioassay units which provide excellent means for testing nutrient-limitation in streams, and for determining which nutrient (usually N or P) is limiting (described in more detail later in this proposal). This project directly addresses the watershed concept described in the GEM Working Draft Science Plan for fiscal years 2003-2007. This concept, which is intended to guide the research and monitoring projects funded through GEM, states that GEM projects should focus on understanding how natural escapement variability of anadromous species affect nutrients and productivity in watersheds. Specifically, this project addresses several of the identified watershed research needs including:

1. Understanding annual and spatial variation in levels of MDN in key indicator species of riverine food webs through stable isotope and fatty acid analyses.
2. Assessing the proportion of riverine food web productivity resulting from MDN subsidies.

This project will provide critical ecological and management-relevant information to account for differences in watershed geology and carcass fate and retention in developing MDN monitoring programs for the GEM watershed program.

II. PROJECT DESIGN

A. Objectives

The objectives of this study are to determine 1) the fate of salmon spawners that enter Kenai Peninsula streams and 2) extent of nutrient limitation in streams across the P-rich and P-poor geologies of the Kenai Peninsula.

Objective 1: Determine the fate of salmon spawners that enter Kenai Peninsula streams.

> No Hypothesis-observational study: Salmon spawners have various fates: a fraction is removed from streams by bears and other vertebrates, and a fraction (carcasses) is retained by in-stream habitats (pools, woody debris, boulders, etc.) and eventually consumed by aquatic invertebrates. Fates depend on the vertebrate species and stream habitat features present at any given site.

Objective 2: Determine the extent of nutrient limitation in streams across P-rich and P-poor geologies of the Kenai Peninsula.

> Hypothesis: Stream food webs within P-rich geologies *are not* nutrient limited and food webs within P-poor geologies *are* nutrient limited.

Rationale: Simply because salmon enter streams does not mean that their nutrients are sequestered by receiving food webs. Contrary to most evidence from studies investigating MDN incorporation into Alaskan stream food webs (Kline et al. 1990, 1997; Chaloner et al. 2002a), analyses from our ongoing study revealed a relative lack of response to MDN. By looking at both carcass fate and nutrient-limitation within the two predominant geologies on the Kenai Peninsula, we will be able to decipher why streams appear to be responding much differently compared to responses documented in other parts of Alaska. Stream productivity along the Pacific coast is often limited by N, P, or both, and depends upon parent geology (Borchardt 1996). We speculate that streams not limited by nutrients, or that have most of their spawners removed by scavengers, will show little if any response to MDN enrichment from salmon runs. Conversely, streams with low baseline nutrient concentrations, and that receive substantial amounts of spawners that are not scavenged by vertebrate predators will show stronger MDN responses. These and associated study sites, will directly complement our current GEM-funded MDN project that began in the 2004 field season.

B. Procedural and Scientific Methods

Objective 1: Determine the fate of salmon spawners that enter Kenai Peninsula streams.

We will use three complementary approaches for determining carcass fate: stream walks, snorkel surveys, and mark and track studies. Four streams will be used which have

already been selected for our previously GEM-funded MDN study that have summer chinook runs, three in P-rich (Ninilchik R, NF Anchor R, SF Anchor R) and one in P-poor (Quartz Cr) geologies on the Peninsula (Figure 1). Stream walks will involve twice-monthly visual surveys of spawners and carcasses during summer (the period of time when we observed lack of MDN responses during 2004) in and along pre-selected 500-m stream reaches, three per stream (upper, middle, lower drainage). Snorkel surveys will be concurrently completed in pools too deep to survey from the shoreline at each site. Surveys, both stream walks and snorkeling, will begin soon after spawners enter streams and continue until salmon are finished running or high water or winter weather conditions interfere. Live and dead salmon will be counted and their distributions mapped for each of the three stream reaches for each stream every two weeks. Approximate state of carcass decomposition (0-100%) will also be recorded. In addition, we will note how and where carcasses are being retained – riffles, pools, woody debris, rocks, or by other features.

At each site, 25 recently deceased spawners will be marked and individually numbered with fluorescent forestry flagging tied through the gills and mouth, at each study reach and stream. Their beginning position will be initially mapped, and every week their new position recorded and distance traveled since the last stream visit measured. This will be completed twice during the season to coincide with salmon runs (sockeye, chinook or coho) until the marked fish have decomposed beyond 75% or can no longer be found. How and where carcasses are retained (as noted above), and how long it takes for 75% decomposition will be recorded.

Escapement into each of the study streams is currently being estimated by ADF&G, and we will use those data to predict how many carcasses would be present in each stream at any given time, assuming no loss from flushing, burial or scavengers. Differences between the number of salmon entering streams and carcasses located will be recorded. Based on past work on salmon decomposition rates in SE AK streams (Wipfli et al. 1998, Chaloner et al. 2002b), we will assume a 1-month. window of time is enough for carcasses to decompose beyond 75%, and that salmon that entered more than one month before surveys are undertaken will not be included in the tally used for calculating fish disappearance (to avoid overestimating spawner loss).

We will conduct the carcass surveys and retention experiments for two years to account for annual variability in escapement levels, stream flow, temperature, scavenging, and other factors.

Objective 2: Determine the extent of nutrient limitation in streams across P-rich and P-poor geologies of the Kenai Peninsula.

Nutrient-diffusing substrates (NDS) amended with N, P, and N+P (Grimm and Fisher 1986, Pringle and Triska 1996; Pringle et al. 1998) will be placed in all ten study streams (Figure 1). Control NDS will not be amended with N or P and will also be deployed in each study stream. Three NDS per site per treatment (N, P, N+P, control) will be placed in streams in summer, a time when aquatic productivity will be at its annual highest (and

therefore effects will be most detectable), and monitored for biofilm development. Biofilm (biomass measured as ash free dry mass) and chlorophyll a will be quantitatively sampled on each substrate and analyzed in the Reserve's laboratory. Ash free dry mass and chlorophyll a will be used as surrogate measures of in-stream primary production. Response variables for the nutrient amendment(s) that differ significantly relative to the control will provide experimental confirmation of nutrient limitation. If different and telling patterns of biofilm development are apparent from diffusing substrate experiments in year 1 (which is anticipated), we will follow-up with flow-through flume (bioassay) experiments in a small subset of streams (P-rich vs. P-poor) in year 2, to measure more precisely limitation effects on biofilm (Rosemond et al. 1993, Pringle and Triska 1996).

The flumes will be placed in streams, and nutrients (N, P, N+P, control) at 2× and 10× ambient concentrations metered through time to measure biofilm (mass and chlorophyll a) accrual. Flumes (four of which will comprise a single bioassay unit) will be made of 1.2-m sections of clear plastic 9-cm diameter tubing attached by U-bolts to the top of a sheet of 1.2m x 1.2m Plexiglas (Pringle and Triska 1996). Each flume represents a treatment. The bioassay unit (four side-by-side flumes) will be suspended in the stream with metal posts holding a wooden frame, to which the Plexiglas® sheet is secured with flumes aligned parallel to stream flow. Five sets of six microscope slides each will be secured to a narrow strip of Plexiglas® and placed inside each flume for sampling biofilm (sampling frequency will depend upon rate of biofilm accrual). Mariotte bottles equipped with Teflon® minibore plastic tubing will be attached above each flume, nutrient mixtures calibrated and added to the bottles, and time-dripped into the flumes. Biofilm will develop on the slides, and slides will be collected, scraped of biofilm, and processed as described above. The difference in biofilm development between nutrient treatments and the control indicates the type and extent of nutrient limitation (Pringle and Triska 1996). A total of four bioassay units will be constructed, and two employed per stream (one for 2× ambient and one for 10× ambient) across two streams at any given time. Units will be left in place for up to several weeks. We anticipate assaying up to six streams during the season, depending upon biofilm accrual rates, and unforeseen challenges such as flooding, vandalism, or loss from bears.

C. Data Analysis and Statistical Methods

Carcass fate. Means and variances for distance traveled by tagged carcasses will be generated, but no statistical procedures applied (statistical analyses are not appropriate for these observational data). Means will also be generated for the habitat features responsible for retaining carcasses (both tagged and not tagged), as well as for time to 75% decomposition. Number of fish not accounted for (difference between ADF&G escapement estimates and our carcass count data) will also be calculated for each site.

Nutrient limitation. Biofilm data (mass, chlorophyll a) will be analyzed via ANOVA, contrasting P-rich and P-poor systems, with and without salmon. Data will also be regressed for individual streams across the three sampling points in each stream (low, medium, high) to look for longitudinal patterns from headwaters (high in drainage, low in MDN enrichment) to mouth (low in drainage, high in MDN enrichment). We expect

modest statistical power because of high among- and within-stream variability, but given the constraints of time and money, we feel this is an appropriate balance that will provide good returns for the effort. Further, the double analysis (ANOVA and regression) will provide additional confidence that a single analysis type would not provide.

D. Description of Study Area

Field work will be conducted in multiple drainages in three regions on the Kenai Peninsula – near Cooper Landing, north of Homer, and on the south shore of Kachemak Bay (Figure 1). The three regions are in different parent geologies but are otherwise geomorphologically similar to the extent possible (i.e., similar basin area, elevation, channel slope, etc.).

The Cooper Landing set (over P-poor parent geology) consists of three subcatchments within the Kenai River consisting of the Russian River and Quartz Creek as salmon-enriched sites, and Juneau Creek as the control. The Russian River receives two annual runs of sockeye salmon: the early run has recently averaged ~50,000 fish and most fish pass the weir during the second half of June; the late run has recently averaged ~100,000 fish and most fish pass the weir from mid-July to mid-August. The Russian River also receives a smaller run of coho salmon (5,000 – 10,000 fish) during September. Quartz Creek typically receives between 1,000 and 20,000 sockeye spawners, although >66,000 were surveyed in 2002. A much smaller number of chinook salmon (<100 fish) spawn prior to the sockeye. The exact timing of Quartz Creek runs is uncertain due to the lack of a weir on this stream, however, ADF&G spawner surveys conducted from mid- to late August indicated a mix of live and dead sockeye, suggesting that this period is near peak spawning.

The Homer set (over P-rich parent geology) consists of the North Fork Anchor River, South Fork of the Anchor River and the Ninilchik River as MDN-enriched streams. Happy Valley Creek is the control stream. The North Fork of the Anchor River system supports anadromous runs of chinook (~11,900 chinook from May – July 2004), coho (~5,700 during August), and steelhead, as well as anadromous and resident populations of Dolly Varden. The Anchor supports anadromous runs of chinook (Ninilchik River receives ~2,000 chinook during June and July; this stream also receives a coho run in late summer but counts are unavailable as the weir is not maintained during this run.

The Kachemak Bay set (over P-poor geology) consists of Humpy Creek and Barabara Creek as enriched salmon-enriched streams, and China Poot Creek above the fish barrier as the control stream. The lower reaches of Humpy Creek receive a small run of chum salmon that spawn in early August and a sizeable run of pink salmon that spawn during mid to late August. Ground assessments conducted by ADF&G commercial fisheries personnel have estimated pink salmon runs of 22,000 to 91,000 over the past five years. Barabara Creek receives runs of pink salmon that average 5,600 fish (based on ADF&G Commercial Fisheries ground assessments) that spawn in the lower reaches of the stream.

Bounding coordinates for the study area are 60.63 (north), -149.51 (east), 59.40 (south), -151.85 (west).

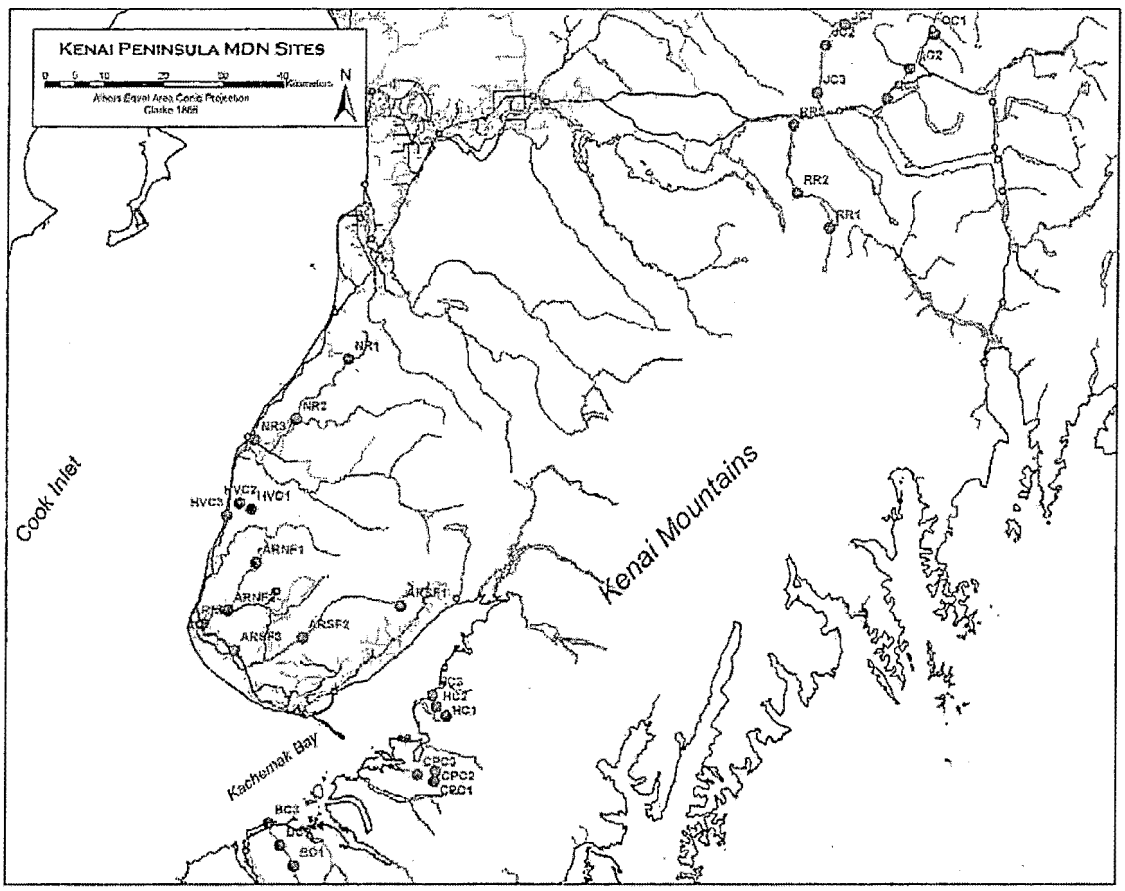

Figure 1. Study sites.

E. Coordination and Collaboration with Other Efforts

This project will not only provide valuable information towards the development of GEM's long-term watershed monitoring program, but will also directly benefit ADF&G fisheries managers, and provide outreach to the community through citizen involvement. It will be directly integrated into the currently funded GEM EVOS funded project #040726, which is designed to develop monitoring tools for tracking MDN in Alaskan watersheds.

We are coordinating with several other ongoing research projects and agency operations. The Environment and Natural Resources Institute (ENRI) of the University of Alaska, Anchorage is engaged in a project to investigate the effects of the spruce bark beetle epidemic on large woody debris and salmonid habitats in the Anchor River. We are collaborating with ENRI researchers, Dan Rinella and Dan Bogan to share information on field sites and reports on study progress. The Lower Kenai Watershed Health

Program is an ongoing project led by the Cook Inlet Keeper and the Homer Soil and Water District to collect water quality data on four watersheds of the lower Kenai Peninsula, including the North and South Forks of the Anchor River and Ninilchik River. We are collaborating with Cook Inlet Keeper stream ecologist, Sue Mauger to share sample locations where possible and study progress reports.

ADFG Sport Fisheries managers are intensely interested in several of the rivers that we are using as study sites, including the Anchor River, Ninilchik and Russian Rivers, which support well-known and used recreational salmon fisheries. ADF&G Commercial Fisheries managers maintain assessments of Quartz Creek, Barabara Creek, and Humpy Creek salmon stocks. This project has been developed in coordination with ADF&G managers, who will be collecting and sharing salmon stock assessments and enumerations on the streams included in this study, specifically Nicky Szarzi and Carol Kirkviliet for the Anchor River and Ninilchik River; Larry Marsh for the Russian River; Bob Decino for Quartz Creek; and, Lee Hammarstrom for Barabara Creek and Humpy Creek.

III. SCHEDULE

A. Project Milestones

Objective 1. Assess carcass fate and retention.
Phase one (yr-1) to be met by March 2006, phase 2 (yr-2) by March 2007.

Objective 2. 1) Assess the effects of nutrient limitation in streams across P-rich and P-poor geologies with nutrient-diffusing substrates.
To be met by March 2006.

2) Determine the effects of nutrient limitation in streams across P-rich and P-poor geologies with flumes.
To be met by March 2007.

B. Measurable Project Tasks

FY 05, 3rd quarter (April 1, 2005 – June 30, 2005)

May 31: Project funding approved by Trustee Council.
Stream study reach selection, commence
stream walks and snorkel surveys, and carcass marking.

FY 05, 4th quarter (July 1, 2005 – September 31, 2005)

July 15: Install nutrient diffusing substrates, sample biofilm and chlorophyll a.
Continue stream walks and snorkel surveys, track tagged carcasses.

FY 06, 1st quarter (October 1, 2005 – December 31, 2005)

December 15:	Finish lab analyses of biofilm/chlorophyll a samples.

FY 06, 2nd quarter (January 1, 2006 – March 31, 2006)

February 15:	Finish analyses of stream walk surveys, snorkel surveys, carcass marking and biofilm, chlorophyll a.
Dates not yet known:	Annual Marine Science Symposium

FY 06, 3rd quarter (April 1, 2006 – June 30, 2006)

May 15:	Select stream sites for flume experiments.
June 1:	Install flumes.
	Commence yr-2 of carcass surveys and retention.

FY06, 4th quarter (July 1, 2006 – September 31, 2006)

	Conduct flume experiments.
	Continue carcass surveys and retention experiments.

FY07, 1st quarter (October 1, 2006 – December 31, 2006)

December 15:	Finish lab analyses of flume samples for all streams.

FY07, 2nd quarter (January 1, 2007 – March 31, 2007)

February 15:	Finish statistical analyses of flumes data for all streams.

FY 07, 3rd quarter (April 1, 2007 – June 30, 2007)

April 15:	Submit final report. This will consist of a draft manuscript for publication to the Trustee Council Office.

IV. RESPONSIVENESS TO KEY TRUSTEE COUNCIL STRATEGIES

A. Community Involvement and Traditional Ecological Knowledge (TEK)

Communities affected by this research including Homer, Fritz Creek, Seldovia, Halibut Cove, Anchor Point, Ninilchik and Cooper Landing, will be informed of the project through several venues, including: an annual oral presentation given for the Kachemak Bay Research Reserve Council public meeting; a project profile distributed within the affected communities; an article in the Kachemak Bay Research Reserve newsletter, and a project description posted on the Reserves website. In addition, we continue to participate in regular meetings to share our research and coordinate with other local watershed researchers, including the Cook Inlet Keeper, Homer Soil and Water District, Kenai Watershed Forum, and Tribal Organizations (Ninilchik, Seldovia, Port Graham and Nanwalek).

Financial support to the local community includes analysis of water chemistry samples by the Cook Inlet Keeper laboratory in Homer, hiring of local project technician, and local supplies and gas purchases. This project will result in the development of MDN monitoring tools that could be incorporated into community monitoring programs. We

will continue to work with local community contacts, including Joel Cooper (Cook Inlet Keeper), Robert Ruffner (Kenai Watershed Forum), Lindsay Winkler (Homer Soil and Water District), Michael Opiem (Seldovia Village Tribe), Darrell Williams (Ninilchik Native Association), Glen Chen and Laura Hardin (Bureau of Indian Affairs) to advance an MDN monitoring program.

B. Resource Management Applications

ADF&G Sport Fisheries managers are keenly interested in the Anchor River, Ninilchik River and Russian River, which support well-known and used recreational salmon fisheries. ADF&G Commercial Fisheries managers maintain interest in Humpy Creek, Barabara Creek, and Quartz Creek, and conduct annual ground assessments on these systems. Insights gained from this project will be integrated with GEM EVOS project # 040726 to create regionally applicable tools for monitoring MDN presence and effects, specifically providing information on how the natural variability in carcass distribution and carcass fate affect incorporation of MDN into stream food webs and support juvenile salmon. This project will also provide insights for managers into how underlying geology influences stream nutrient limitation, intrinsic stream productivity, and response to MDN. Developing effective MDN monitoring tools will provide managers and local communities with techniques for assessing the effects of land and fisheries management practices on MDN subsidies to streams.

We have presented reviews of the currently funded GEM EVOS project # 040726 project findings during annual regional research reviews; engaged in project planning discussions and in preliminary field planning and project scoping with several ADF&G managers in the Divisions of Sport Fisheries (SF) and Commercial Fisheries (CF); including: Nicky Szarzi (SF), Carol Kirkviliet (SF), Jim Hasbrouck (SF), Bob Clark (SF), Larry Marsh (SF), Lee Hammarstron (CF) and Ted Otis (CF). ADF&G fisheries managers have agreed to share weir, sonar and ground assessments of salmon escapement for the streams proposed in this project.

V. PUBLICATIONS AND REPORTS

In addition to the quarterly, annual and final project reports required by the general conditions of the Trustee Council, the project will result in at least one publication submitted to a peer reviewed journal. This paper *'The role of carcass retention and baseline nutrient levels in determining the relative importance of marine derived nutrients (MDN) in riverine systems of Alaska'* will likely be submitted to the Canadian Journal of Fisheries and Aquatic Sciences in the fall of 2008. The principal investigators for the project will attend and present project summaries at the annual EVOS workshop in Anchorage. All Trustee Council policies will be followed in publishing results of this project.

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Chaloner, D.T., M.S. Wipfli, and J.P. Caouette. 2002b. Mass loss and macroinvertebrate colonization of Pacific salmon carcasses in southeastern Alaska streams. Freshwater Biology. 47: 263-273.

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Heintz, R.A., B.D. Nelson, J.P. Hudson., M. Larsen, L. Holland, and M.S. Wipfli. 2004. Marine subsidies in fresh water: effects of salmon carcasses on the lipid class and fatty acid composition of juvenile coho salmon. Transactions of the American Fisheries Society. 133: 559-567.

Hicks, B.J., M.S. Wipfli, D.W. Lang, and M.E. Lang. 2005. Marine-derived nitrogen and carbon in freshwater-riparian food webs of the Copper River Delta, southcentral Alaska. Oecologia. In press.

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APPENDIX A

RESUME'S AND PENDING SUPPORT FORMS

(Note: We have included updated information for Co-PI, Mark Wipfli, whose position has changed since the submittal of our currently funded GEM EVOS project. We would be happy to provide updated information for the other PI's on the project if necessary, however their positions have not changed since the original proposal.)

Dr. Mark S. Wipfli
Associate Professor of Biology and Fisheries
Assistant Fisheries Leader, USGS Alaska Cooperative Fish and Wildlife Research Unit
School of Fisheries and Ocean Sciences & Dept of Biology and Wildlife
Institute of Arctic Biology
University of Alaska Fairbanks
907-474-6654, mark.wipfli@uaf.edu

Education

Michigan State University, E. Lansing, MI; Ph.D. in Aquatic Ecology and Environmental Toxicology, 1992.

University of Wisconsin, Madison, WI; M.S. in Entomology, 1987.

University of Wisconsin, Madison, WI; B.S. in Natural Science, 1984.

Professional Experience

Associate Professor of Biology and Fisheries, University of Alaska Fairbanks, Dec. 2003 to present.

Assistant Leader - Fisheries, Alaska Cooperative Fish and Wildlife Research Unit, USGS, University of Alaska Fairbanks, Dec. 2003 to present.

Research Scientist, Pacific Northwest Research Station, USFS, Wenatchee, WA, 2001-2003.

Research Scientist, Pacific Northwest Research Station, USFS, Juneau, AK, 1995-2000.

Postdoctoral Associate, Pacific Northwest Research Station, USFS, Juneau, AK, 1993-1994.

Most Relevant Publications

Hicks, B.J., M.S. Wipfli, D.W. Lang, and M.E. Lang. 2005. Marine-derived nitrogen and carbon in freshwater-riparian food webs of the Copper River Delta, southcentral Alaska. Oecologia. In press.

Wipfli, M.S., J.P. Hudson, and J.P. Caouette. 2004. Restoring productivity of salmon-based food webs: contrasting effects of salmon carcass and salmon analog additions on stream-resident salmonids. Transactions of the American Fisheries Society.

Heintz, R.A., B.D. Nelson, J.P. Hudson., M. Larsen, L. Holland, and M.S. Wipfli. 2004. Marine subsidies in fresh water: effects of salmon carcasses on the lipid class and fatty acid composition of juvenile coho salmon. Transactions of the American Fisheries Society. 133: 559-567.

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Gende, S.M., R.T. Edwards, M.F. Willson, and M.S. Wipfli. 2002. Pacific salmon in aquatic and terrestrial ecosystems. BioScience. 52: 917-928.

Other Recent Publications

Wipfli, M.S. 2005. Trophic linkages between headwater forests and downstream fish habitats: implications for forest and fish management. Landscape and Urban Planning. In press.

Chaloner, D.T., G.A. Lamberti, R.W. Merritt, N.L. Mitchell, P.H. Ostrom, and M.S. Wipfli. 2004. Variation in responses to spawning Pacific salmon in three southeastern Alaska streams. Freshwater Biology. 49: 587-599.

Allan, J.D., M.S. Wipfli, J.P. Caouette, A. Prussian, and J. Rodgers. 2003. Influence of streamside vegetation on terrestrial invertebrate inputs to salmonid food webs. Canadian Journal of Fisheries and Aquatic Sciences. 60(3): 309-320.

Wipfli, M.S., J.P. Hudson, D.T. Chaloner, and J.P. Caouette. 1999. Influence of salmon spawner densities on stream productivity in Southeast Alaska, USA. Canadian Journal of Fisheries and Aquatic Sciences. 56: 1600-1611.

Wipfli, M.S., J.P. Hudson, and J.P. Caouette. 1998. Influence of salmon carcasses on stream productivity: response of biofilm and benthic macroinvertebrates in southeastern Alaska, USA. Canadian Journal of Fisheries and Aquatic Sciences. 55: 1503-1511.

Professional Activities

Developing and teaching a new graduate-level course for Fall 2005 at UAF on Freshwater Foodwebs.

Co-Program Chair for the North American Benthological Society meetings to be held in Anchorage, AK in 2006.

Program Committee Member for the North American Benthological Society meetings held in Vancouver, BC in 2004.

Graduate Students and Post-docs Advised (beginning Jan. 2004)

Chris Binckley (Post-doc), Meagan Boltwood (Ph.D., Fisheries), David Gregovich (M.S., Fisheries), Aaron Martin (M.S., Fisheries), Bruce Medhurst (M.S., Biology), Cassie Mellon (M.S., Fisheries), Daniel Rinella (Ph.D., Biology)

Professional Affiliations

American Fisheries Society
American Society of Limnology and Oceanography
North American Benthological Society

Recent External Funding Received

2004-2006, DOE ($675,000). *Developing Monitoring Protocols for Assessing Productivity and Watershed Condition in Headwater Subcatchments of the Wenatchee Basin.*

2004-2006, Exxon Valdez Oil Spill Trustee Council – Gulf of Alaska Ecosystem Monitoring Program (EVOS) ($450,000). *Presence and Effects of Marine Derived Nutrients (MDN) in Stream, Riparian and Nearshore Ecosystems on Southern Kenai Peninsula, Alaska.*

2003-2007, USFS ($205,000). *Wildfires and Stream Food Webs.*

2000-2003, USFS ($200,000). *Responses of Aquatic and Riparian Food Webs to Marine-Derived Nutrients in the Copper River Delta, Cordova, Alaska.*

2000-2003, USFS ($1.2 million). *Managing Young Upland Forests in Southeast Alaska for Wood Products, Wildlife, Aquatic Resources, and Fishes.*

2000-2002, USDA-CSREES, NRI ($420,000). *Influence of Marine Nutrients from Salmon on Stream Ecosystems.*

CURRENT AND PENDING SUPPORT FORM

The following information must be provided for each investigator and other senior personnel. Failure to provide this information may delay consideration of this proposal.

Investigator: Mark S. Wipfli	Other agencies to which this proposal has been/will be submitted: None

Support: XX Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title: Monitoring Productivity of Headwater Catchments in the Columbia River Basin

Source of Support: US Department of Energy

Total Award Amount: $650,000 Total Award Period Covered: FY 04 – FY 08

Location of Project: North Cascades, Washington

Months of Your Time Committed to the Project: 1 FY05 1 FY 06 1 FY 07 Sumr:

Support: XX Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title: Marine-Derived Nutrients in the Kenai River Watershed

Source of Support: Kenai Watershed Forum

Total Award Amount: $80,000 Total Award Period Covered: FY 05 – FY 06

Location of Project: Kenai River, Alaska

Months of Your Time Committed to the Project: 1 FY 05 1 FY 06 FY 07 Sumr:

Support: XX Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title: Presence and Effects of Marine Derived Nutrients (MDN) in Stream, Riparian and Estuarine Ecosystems on Southern Kenai Peninsula, Alaska

Source of Support: EVOS-GEM

Total Award Amount: $450,000 Total Award Period Covered: FY 04 – FY 06

Location of Project: Kenai Peninsula, Alaska

Months of Your Time Committed to the Project: 1 FY05 1 FY 06 FY 07 Sumr:

Support: XX Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title: Restoring Aquatic Productivity Following Placer Mining in Resurrection Creek, Alaska

Source of Support: USDA Forest Service, Region 10

Total Award Amount: $120,000 Total Award Period Covered: FY 04 – FY 06

Location of Project: Kenai Peninsula, Alaska

Months of Your Time Committed to the Project: 1 FY 05 1 FY 06 FY 07 Sumr:

*If this project has previously been funded by another entity, please list and furnish information for immediately preceding funding period.

APPENDIX B

PROJECT BUDGET

Budget Justification

FY05. Requested funds $51,912

Personnel: Personnel funds requested in year one for project management.

Travel: There are no travel funds requested in year one.

Contractual. Funds are requested for salary, tuition, travel to the annual EVOS meeting and field travel (mileage and per diem) for a University of Alaska Fairbanks graduate student, who will be advised by co-PI, Mark Wipfli. Funds are requested for water nutrient analysis to be performed at the Cook Inlet Keeper laboratory.

Commodities. Funds are requested in year one for field and laboratory supplies that are essential for carrying out the objectives of this study including protective clothing for in stream sampling, equipment for nutrient limitation investigations, computer, sample containers and chemicals. The cost for these supplies is based on known costs associated with accessing field sites on the lower Kenai Peninsula, the number of scheduled field visits, and the number of samples to be collected.

Equipment: There are no equipment funds requested in year one.

Itemized Commodity Funds Requested-FY05

Item	Number of Units	Cost per unit ($)	Total ($)
general laboratory supplies (chemicals, vials, sample containers)			1000
general field supplies (markers, field notebooks, coolers, dry ice, paper, filters, tape, sample containers, gas for field transportation)			1500
drysuits	2	500	1000
nutrient substrates	360	5	1800
laptop computer	1	2500	2500
		Total	$7,800

FY06: Requested funds $57,798

Personnel salaries. In year two one and half months of salary are requested for Walker to cover project coordination, management and outreach.

Travel: There are no travel funds requested in year two.

Contractual. Funds are requested for salary, tuition, travel to the annual EVOS meeting, field travel (mileage and per diem), and travel to attend two professional meetings for a

University of Alaska Fairbanks graduate student, who will be advised by co-PI, Mark Wipfli. Funds are requested for water nutrient analysis to be performed at the Cook Inlet Keeper laboratory.

Commodities. Funds are requested in year two for general field and laboratory supplies that are essential for carrying out the objectives of this study including equipment for nutrient limitation investigations, sample containers and chemicals. The cost for these supplies is based on known costs associated with accessing field sites on the lower Kenai Peninsula, the number of scheduled field visits, and the number of samples to be collected.

Itemized Commodity Funds Requested-FY06

Item	Number of Units	Cost per unit ($)	Total ($)
general laboratory supplies (chemicals, vials, sample containers)			1000
general field supplies (markers, field notebooks, coolers, dry ice, paper, filters, tape, sample containers, gas for field transportation)			1500
flumes (bioassay units)	4	750	3000
nutrient substrates	360	5	1800
		Total	$7,300

Equipment. There are no funds requested for equipment in year two.

FY07: Requested funds $42,593.

Personnel. In year two one and a half months of salary are requested for Walker to cover project coordination, management and outreach.

Travel. There are no travel funds requested in year three.

Contractual. Funds are requested for salary, tuition, travel to the annual EVOS meeting, and travel to attend two professional meetings, for a University of Alaska Fairbanks graduate student, who will be advised by co-PI, Mark Wipfli. Funds are also requested for the graduate student to publish the results of this investigation in a peer reviewed journal.

Commodities. There are no commodity funds requested in year three.

Equipment. There are no funds requested for equipment in year three.

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 04 - FY 06

Budget Category:	Proposed FY 05	Proposed FY 06	Proposed FY 07	TOTAL PROPOSED
Personnel	$3,360.0	$9,600.0	$9,600.0	$22,560.0
Travel	$0.0	$0.0	$0.0	$0.0
Contractual	$36,326.0	$39,626.0	$32,976.0	$108,928.0
Commodities	$7,800.0	$7,300.0	$0.0	$15,100.0
Equipment	$0.0	$0.0	$0.0	$0.0
Subtotal	$47,486.0	$56,526.0	$42,576.0	$146,588.0
General Administration (9% of Subtotal)	$4,273.7	$5,087.3	$3,831.8	$13,192.9
Project Total	$51,759.7	$61,613.3	$46,407.8	$159,780.9

Cost-share Funds:
In this box, identify non-EVOS funds or in-kind contributions used as cost-share for the work in this proposal. List the amount of funds, the source of funds, and the purpose for which the funds will be used. Do not include funds that are not directly and specifically related to the work being proposed in this proposal.

The Kachemak Bay Research Reserve will provide bunkhouse accomodations and office space for the graduate student and co-principal investigators, office equipment, including printers, plotters, and computers; laboratory space and equipment, including a flourometer for analysis of chlorophyl, a drying oven for analysis of biofilm dry mass, freezer and refrigerator units for holding samples.

FY 05-07

Date Prepared:

Project Number: amendment to GEM EVOS project #040726
Project Title: Fate of salmon spawners and the role of nutrient limitation on MDN effects in Kenai Peninsula streams

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 04 - FY 06

Personnel Costs:		GS/Range/	Months	Monthly	
Name	Description	Step	Budgeted	Costs	Overti
Coowe Walker	project management	HBII	0.6	5.6	
		Subtotal	0.6	5.6	
					Personnel Tc

Travel Costs:	Ticket	Round	Total	D
Description	Price	Trips	Days	Per Di
				Travel Tc

FY 05

Project Number: amendment to GEM EVOS project #040726
Project Title: Fate of salmon spawners and the role of nutrient limitation on MDN effects in Kenai Peninsula streams

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 04 - FY 06

Contractual Costs:			
Description			
graduate student salary			
graduate student tuition			
graduate student EVOS meeting travel			
graduate student field travel (mileage and per diem)			
nutrient analysis ($25 per sample, 90 samples)			
If a component of the project will be performed under contract, the 4A and 4B forms are required.			**Contractual To**
Commodities Costs:			
Description			
field laboratory supplies (see budget breakdown for details)			
			Commodities To

FY 05

Project Number: amendment to GEM EVOS project #040726
Project Title: Fate of salmon spawners and the role of nutrient limitation on MDN effects in Kenai Peninsula streams

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 04 - FY 06

New Equipment Purchases:	Number of Units	U Pr
Description		
		New Equipment Tc

Existing Equipment Usage:	Numl of Ur
Description	
computer	
low temperature freezer (-70)	
freezer	
flourometer	
printer/copier	
plotter	
drying oven	

FY 05

Project Number: amendment to GEM EVOS project #040726
Project Title: Fate of salmon spawners and the role of nutrient limitation on MDN effects in Kenai Peninsula streams

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 04 - FY 06

Personnel Costs:		GS/Range/ Step	Months Budgeted	Monthly Costs	Overti
Name	Description				
Coowe Walker	project mangement	HBII	1.5	6.1	
	Subtotal		1.5	6.1	
					Personnel Tc

Travel Costs:	Ticket Price	Round Trips	Total Days	Da Per Di
Description				
				Travel Tc

FY 06

Project Number: amendment to GEM EVOS project #040726
Project Title: Fate of salmon spawners and the role of nutrient limitation on MDN effects in Kenai Peninsula streams

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 04 - FY 06

Contractual Costs:
Description
graduate student salary
graduate student tuition
graduate student EVOS meeting travel
graduate student professional meetings travel (2)
nutrient analysis ($25 per sample, 90 samples)
If a component of the project will be performed under contract, the 4A and 4B forms are required. **Contractual Tc**
Commodities Costs:
Description
field laboratory supplies (see budget breakdown for details)
Commodities To

FY 06

Project Number: amendment to GEM EVOS project #040726
Project Title: Fate of salmon spawners and the role of nutrient limitation on MDN effects in Kenai Peninsula streams

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 04 - FY 06

New Equipment Purchases:	Number of Units	L Pr
Description		
	New Equipment Tc	

Existing Equipment Usage:	Numl of Ur
Description	
computer	
low temperature freezer (-70)	
freezer	
flourometer	
printer/copier	
plotter	
drying oven	

FY 06

Project Number: amendment to GEM EVOS project #040726
Project Title: Fate of salmon spawners and the role of nutrient limitation on MDN effects in Kenai Peninsula streams

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 04 - FY 06

Personnel Costs:		GS/Range/ Step	Months Budgeted	Monthly Costs	Overti
Name	Description				
Coowe Walker	project management	HBII	1.5	6.1	
	Subtotal		1.5	6.1	
					Personnel Tc

Travel Costs:	Ticket Price	Round Trips	Total Days	D Per Di
Description				
				Travel Tc

FY 07

Project Number: amendment to GEM EVOS project #040726
Project Title: Fate of salmon spawners and the role of nutrient limitation on MDN effects in Kenai Peninsula streams

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 04 - FY 06

Contractual Costs:
Description
graduate student salary
graduate student tuition
graduate student EVOS meeting travel
graduate student professional meetings travel (2)
nutrient analysis ($25 per sample, 90 samples)
publication costs
Contractual To

Commodities Costs:
Description
Commodities To

FY 07

Project Number: amendment to GEM EVOS project #040726
Project Title: Fate of salmon spawners and the role of nutrient limitation on MDN effects in Kenai Peninsula streams

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 04 - FY 06

New Equipment Purchases:	Number of Units	L Pr
Description		

New Equipment Tc

Existing Equipment Usage:	Numl of Ur
Description	

FY 07

Project Number: amendment to GEM EVOS project #040726
Project Title: Fate of salmon spawners and the role of nutrient limitation on MDN effects in Kenai Peninsula streams

PROPOSAL SIGNATURE FORM

THIS FORM MUST BE SIGNED BY THE PROPOSED PRINCIPAL INVESTIGATOR AND SUBMITTED ALONG WITH THE PROPOSAL. If the proposal has more than one investigator, this form must be signed by at least one of the investigators, and that investigator will ensure that Trustee Council requirements are followed. Proposals will not be reviewed until this signed form is received by the Trustee Council Office.

By submission of this proposal, I agree to abide by the Trustee Council's data policy (*Trustee Council/GEM Data Policy**, adopted July 9, 2002) and reporting requirements *(Procedures for the Preparation and Distribution of Reports***, adopted July 9, 2002).

PROJECT TITLE: Monitoring dynamics of the Alaska coastal current and development of applications for management of Cook Inlet salmon

Printed Name of PI: T. Mark Willette

Signature of PI:  Date 4/15/2005

Printed Name of co-PI: Scott Pegau

Signature of co-PI: _____ Date _____

Printed Name of co-PI: _____

Signature of co-PI: _____ Date _____

* Available at http://www.evostc.state.ak.us/pdf/admin/datapolicy.pdf

** Available at http://www.evostc.state.ak.us/pdf/admin/reportguidelines.pdf

2001 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2000 - September 30, 2001

Budget Category:	Authorized FY 2005	Authorized FY 2006	Proposed FY 2006
Personnel	22900	$23,600.0	$22,900.00
Travel	1000	$1,000.0	$1,000.00
Contractual	37500	$1,000.0	$37,500.00
Commodities	1000	$0.0	$1,000.00
Equipment	0	$0.0	$0.00
Subtotal	$62,400.0	$25,600.0	$62,400.00
General Administration	$5,600.00	$2,300.0	$5,616.00
Project Total	$68,000.00	$27,900.0	$68,016.00
Full-time Equivalents (FTE)			1450.0
Other Resources			

LONG RANGE FUNDING REQUIREMI

Estimated FY 2007
$68.0

Dollar amounts are shown in thousands of dollars.

Comments:

Cost-share Funds (annual):

Item	Purpose	Source	Amount
Vessel charter	data collection	ADFG	37.5
Personnel	data analysis	ADFG	17.4
CTD & Fisheries Sonar	data collection	ADFG	52.0

FY06

Prepared:

Project Number: G-040670
Project Title: Monitoring dynamics of the Alaska coastal current and development of applications for management of Cook Inlet salmon
Agency: ADFG

2001 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2000 - September 30, 2001

Personnel Costs:			GS/Range/	Months	Monthly	
Name	Position Description		Step	Budgeted	Costs	
Mark Willette	Fishery Biologist III	18K	1.0	6700.0		
Scott Pegau	Senior Scientist	18C	2.0	5500.0		
Robert Decino	Fishery Biologist II	16C	1.0	5200.0		
		Subtotal		17400.0	0.0	
						Pers

Travel Costs:	Ticket	Round	Total	
Description	Price	Trips	Days	
Attend annual EVOS workshop	100.0	2	8	

FY06

Prepared:

Project Number: G-040670
Project Title: Monitoring dynamics of the Alaska coastal current and development of applications for management of Cook Inlet salmon
Agency: ADFG

2001 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 2000 - September 30, 2001

Contractual Costs:

Description
Vessel charter for 34 days (1/2 of total cost requested)
When a non-trustee organization is used, the form 4A is required. **Contr**

Commodities Costs:

Description
Field and laboratory supplies (rigging for two body, diskettes, rite-in-rain paper)
Commo

FY06

Prepared:

Project Number: G-040670
Project Title: Monitoring dynamics of the Alaska coastal current and development of applications for management of Cook Inlet salmon
Agency: ADFG

2001 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 2000 - September 30, 2001

New Equipment Purchases:	Number of Units	
Description		

Those purchases associated with replacement equipment should be indicated by placement of an R. **New Equi**

Existing Equipment Usage:	
Description	
300 kHz portable acoustic doppler current profiler 200 kHz DT 6000 echosounder with split-beam transducer Conductivity-temperature-depth (CTD) profiler w/ fluorometer & transmissometer Vessel charter for 34 days (1/2 of total cost)	

FY06

Prepared:

Project Number: G-040670
Project Title: Monitoring dynamics of the Alaska coastal current and development of applications for management of Cook Inlet salmon
Agency: ADFG

Trustee Council Use Only Project No: _____ Date Received: _____	**PROPOSAL SUMMARY PAGE** **(To be filled in by proposer)**
Project Title:	Monitoring dynamics of the Alaska coastal current and development of applications for management of Cook Inlet salmon
Project Period:	FY 06
Proposer(s):	T. Mark Willette, Alaska Dept. of Fish and Game, 43961 Kalifornsky Beach Rd, Ste B, Soldotna, Alaska 99669-8367. (907)262-9368 ph, (907)262-4709 fax, mark_willette@fishgame.state.ak.us. W. Scott Pegau, Kachemak Bay Research Reserve, 2181 Homer, Alaska 99603. ph: 907-235-4799 ext. 6, fax 907-235-4794, email: spegau@coas.oregonstate.edu
Study Location:	Cook Inlet
Abstract:	This project will use a vessel of opportunity to collect physical oceanographic and fisheries data along a transect across lower Cook Inlet from Anchor Point to the Red River delta. Logistical support for the field sampling will be provided in part by the Alaska Department of Fish and Game which has chartered a vessel annually to fish along this transect each day during July providing inseason projections of the size of salmon runs returning to the inlet. Oceanographic transects in lower Cook Inlet will also be sampled in May and June. The work proposed here is for long-term monitoring of oceanographic conditions in Cook Inlet as part of these ongoing fisheries surveys. Investigators will also use physical oceanographic data collected by the project to improve management of Cook Inlet salmon through improved inseason salmon run projections. Several hypotheses regarding effects of changing oceanographic conditions on salmon migratory behavior will be tested. The oceanographic data collected by the project will also provide for valuable validation of remote sensing products, improved understanding of ocean dynamics in lower Cook Inlet, and a highly powerful statistical evaluation of the oil spill risk analysis models. Funding is requested in FY06 to support continuation of long-term monitoring of oceanographic conditions and development of management applications. A break in funding will delay production of useful results particularly if salmon runs or oceanographic conditions in 2006 are unusual, because these outlier events often provide insight into biological processes.
Funding:	EVOS Funding Requested: FY 06 $ 68.5 TOTAL: $ 68.5 Non-EVOS Funds to be Used: FY 06 $ 106.9 TOTAL: $106.9
Date: 4/15/2005	Date proposal prepared

(NOT TO EXCEED ONE PAGE)

GEM RESEARCH PLAN

I. NEED FOR THE PROJECT

A. Statement of Problem

Since 1979, the ADF&G has conducted an offshore test fishing (OTF) project near the southern boundary of the Upper Cook Inlet (UCI) salmon management area (Figure 1). The objective of this project has been to estimate the total run of sockeye salmon, *Oncorhynchus nerka,* returning to UCI before these fish reach commercial harvest areas. Sockeye salmon returning to UCI have been sampled by fishing geographically fixed stations along a transect between Anchor Point and Red River Delta (Figure 1). These data have been extremely important to ADF&G management biologists as they set and adjust commercial fishing times and areas to most effectively harvest sockeye salmon that are surplus to spawning needs. Test fishing results have been reported annually since 1979 (Waltemyer 1983a, 1983b, 1986a, 1986b, Hilsinger and Waltemyer 1987, Hilsinger 1988, Tarbox and Waltemyer 1989, Tarbox 1990, 1992, 1994, 1995, 1996, 1997, 1998a, 1998b, 1999).

In 1999, the Alaska Board of Fisheries adopted a sliding range of inriver escapement goals for late-run Kenai River sockeye salmon that were based upon preseason and inseason projections of the annual return of this salmon stock. The OTF project provides the primary source of information used to project the return of this stock inseason. Achievement of inriver escapement goals and allocation of salmon to commercial, personal use, and recreational user groups is thus largely dependent on the accuracy of these projections. The accuracy of the population estimates provided by the OTF project typically increases as the season progresses. Projections made on July 20 have ranged from -5.4% to +103% of the actual run. The program often fails to accurately predict runs that are earlier than normal. Failure to accurately predict very large runs can result in large escapements, loss of revenue to the commercial fishery, and reduced production in future years due to overgrazing of plankton stocks by large fry populations in rearing lakes. Failure to accurately predict weak runs can result in over harvest by the commercial fishery, loss of fishing opportunities in personal use and recreational fisheries, and reduced production in future years. Improving the accuracy of inseason sockeye salmon population estimates will enable ADF&G to better manage for inriver escapement goals and maximum sustained yield thus benefiting the economy of the UCI area.

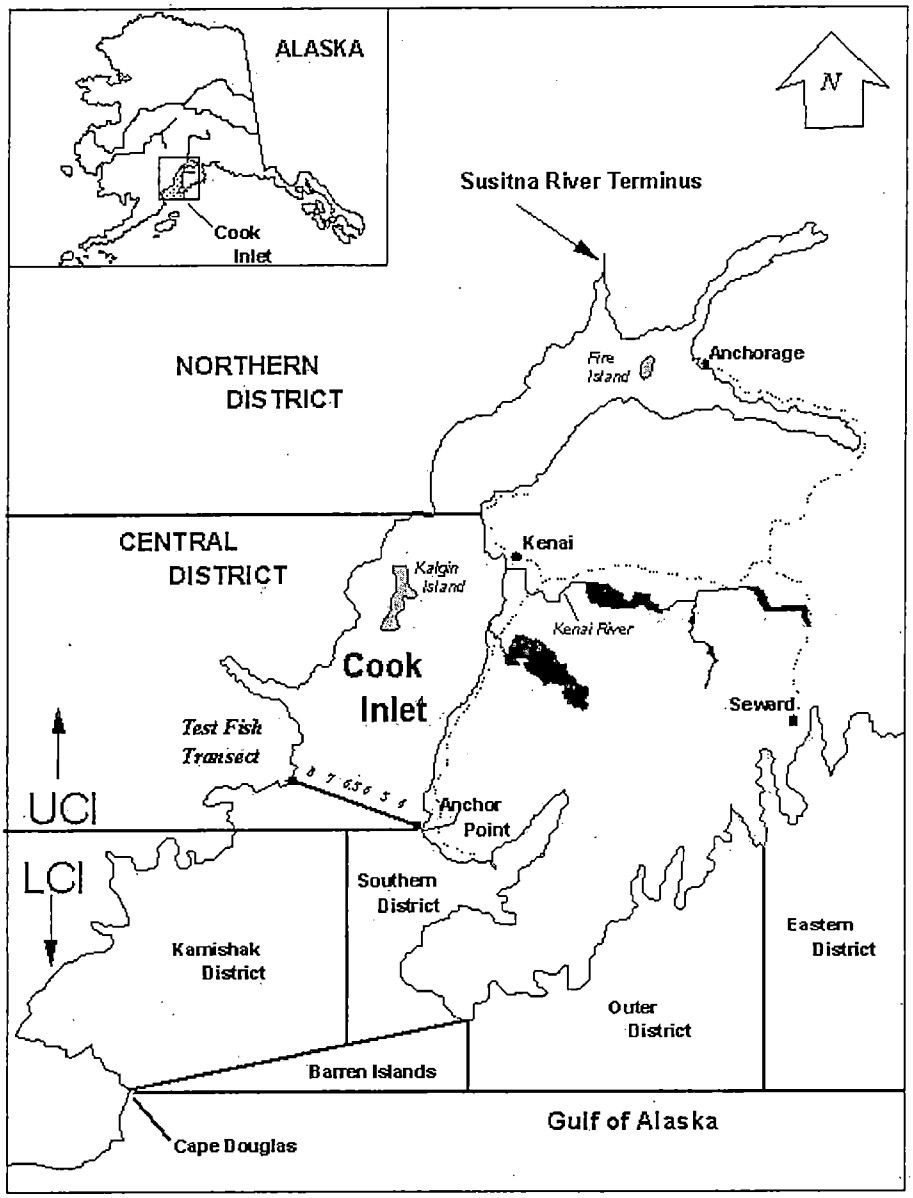

Figure 1. Location of fishing districts and offshore test fish transect in Cook Inlet, Alaska, 2001.

Errors in OTF program estimates of run size appear to be due to interannual changes in migratory timing and catchability. Migratory timing is defined as abundance as a function of time in a fixed geographic reference frame (Mundy 1982). The sockeye salmon run entering Cook Inlet normally peaks on July 15, but peak migratory timing has varied from July 6 to July 19. Variations in migratory timing are likely due to a range of biotic and physical factors that affect rates of maturation and migration. Ocean temperature (Burgner 1980), the strength of oceanic fronts (Mundy 1982), and tidal currents (Stasko et al. 1973a) are likely important physical factors affecting both the rate of maturation and migration. Catchability is defined as the fraction of the population captured by a unit of fishing gear. The OTF program estimates cumulative catchability to date from the ratio of cumulative catch per unit effort (CPUE) obtained from the test fishing vessel and estimates of total return to date. Cumulative catchability varies by a factor of 2 among years. Variations in catchability are likely due to biotic factors, e.g. fish size, as well as physical factors that affect the vertical and horizontal distribution (Huse and Holm 1993, Winters and Wheeler 1985) and migration rate of salmon (Hakoyama 1995).

The physical oceanography of Cook Inlet is characterized by a net inflow along the eastern boundary and a net outflow along the western boundary (Burbank 1977). Near the entrance of the inlet the inflowing water includes the ACC. The ACC then turns west and joins the outflowing water. The point at which the ACC turns west remains unresolved. Burbank (1977) shows a major portion of the ACC extending north past Anchor Point, while Muench et al. (1978) indicates that only a small portion of the ACC extends northward of Anchor Point. But, since these two studies were conducted in different years, it seems likely that the different current trajectories observed may simply indicate interannual variability. Driftcards released more recently off Point Adam as part of EVOS project 02671 were primarily recovered off Kenai indicating the surface flow of the ACC has a component that extends far northward of Anchor Point. This northward flowing component is then mixed within Cook Inlet and returns along the western boundary. A significant component of the water along the western boundary originates from Knik Arm and the Susitna River and is typically more turbid than the water further east due to the heavy glacial runoff from these drainages. However, the net flow is a minor component of the circulation, tidal currents largely determine current velocities. Tidal current velocities range from 1-2 kts at the entrance to 5-6 kts at the head of the inlet (Whitney 1999). Three distinct convergence zone, known at tide rips, have been identified in the inlet. The east rip is typically located 2-3 km offshore of the eastern boundary. The west and mid-channel rips are located just east of Kalgin Island. These two rips are associated with a 50-80 m deep channel running north to south along the inlet. During flooding and ebbing conditions, water flows faster through the channel due to lower bottom friction compared to the shallower areas east and west. The result is a surface convergence and strong turbulence along the rips.

The migration of salmon into the inlet is clearly influenced by the strength and location of tide rips. Fishermen working the inlet are very aware of tide rips and use the rips to locate and capture migrating salmon (Wilson and Tomlins 1999). Salmon have likely evolved behaviors that allow them to use tide rips and associated current structures to minimize the energy expended to reach their natal rivers (Scholz et al. 1972, Stasko et al. 1973b). Although tide rips clearly result from strong velocity gradients, they also represent boundaries between waters masses and may be associated with strong salinity gradients.

We propose to collect data to test the following hypotheses regarding effects of changing oceanographic conditions on the migratory behavior and catchability of salmon entering Cook Inlet.

Hypotheses

1. Salmon migration is delayed when fish encounter strong salinity gradients. Turbulence caused by strong tidal currents or winds breaks down salinity gradients increasing the rate of migration.
2. Interannual changes in freshwater outflow from UCI or the northward extent of the ACC affect salmon migratory timing. A stronger outflow or reduced northward flow of the ACC delays the migration, as salmon require more time to acclimate at frontal zones.
3. The variance of relative salmon density is a function of salmon abundance and the structure of tide rips along the OTF transect. When salmon abundance is low (high), relative salmon density is more contagiously (homogeneously) distributed. Strongly (weakly) developed tide rips cause salmon density to be more contagiously (homogeneously) distributed.
4. Salmon use tidal currents in UCI to facilitate their northward migration. On the flood tide, salmon density is highest between the west and mid rips where current speeds are maximum. On the ebb tide, salmon density is highest immediately east of the mid rip and west of the west rip where turbulence reduces the net southward flow.

Preliminary results from the first 2 years of this project indicated that salmon catches were greater in areas where the water column was more highly stratified, and salmon run timing was delayed 2 days in 2004 when average water column temperatures measured along the transect were cooler than the previous year. We are requesting funds for field sampling in FY06 to insure continuity of our environmental monitoring and development of management applications. A break in funding will delay production of useful results particularly if salmon runs or oceanographic conditions in 2006 are unusual, because these outlier events often provide insight into biological processes.

B. Relevance to 1994 Restoration Plan Goals and Scientific Priorities

This project will monitor the strength, structure, dynamics and mixing of the ACC as it intrudes into lower Cook Inlet (Burbank 1977). The location of the transect off Anchor Point and the high temporal sampling rate provided by the project will enable investigation of interactions between the ACC and processes such as tidal mixing, wind driven circulation, and frontal propagation, improving our understanding of linkages between the ACC and the nearshore estuarine habitat of the inlet.

The physical oceanographic data collected by the project will also be made available to other investigators studying how the dynamics of this current system affect the productivity of the biological resources in the region. The ADCP data in particular will be useful in determining the flow regimes that control larval, sediment, and contaminant dispersal within the inlet. The recent 20-year decline in seabird abundance at Chisik Island on the western end of the OTF transect and

a concomitant increase in their abundance at Gull Island in Kachemak Bay (Piatt and Anderson 1996) provides an example of the kind of changes in resource productivity that might be explained by a long time series of physical oceanographic measurements in the region. Increases in turbid, nutrient-poor freshwater inflows into upper Cook Inlet, which flow southward along the west side of the inlet, may be linked to the decline of the Chisik Island seabirds. Studies of the Gull Island population may provide insights into processes sustaining seabird populations throughout the Gulf of Alaska, since this colony is the only one along the coast that has increased in recent years.

The proposed project could also contribute to our understanding of anthropogenic effects on resource productivity in the region by providing data for validation of the Oil Spill Risk Analysis (OSRA) model being developed by the Minerals Management Service for Cook Inlet and Shelikof Strait. The high temporal sampling rate proposed for this project will provide sufficiently numerous observations of temperature, salinity, and current velocity structures along the southern boundary of the inlet for a highly powerful statistical evaluation of the OSRA model.

II. PROJECT DESIGN

A. Objectives

1. Conduct an offshore test fishing (OTF) program to estimate the population size of sockeye salmon returning to Upper Cook Inlet.
2. Measure the horizontal distribution of relative salmon density along the OTF transect using side-looking acoustic equipment.
3. Measure environmental variables as well as the vertical distributions of temperature and salinity along the OTF transect and construct cross sections.
4. Measure the vertical distribution of current velocity along the OTF transect using an acoustic doppler current profiler and construct cross sections.
5. Identify northward incursions of the ACC into Cook Inlet.
6. Conduct statistical analyses to test major hypotheses.

B. Procedural and Scientific Methods

Objective 1

Sockeye salmon returning to Upper Cook Inlet will be sampled by fishing six geographically fixed stations between Anchor Point and Red River Delta (Figure 1). Stations will be numbered consecutively from east to west, with station locations being determined using a differential global positioning system. A chartered test-fishing vessel will sample stations 4 - 8 daily, traveling east to west on odd-numbered days and west to east on even-numbered days.

Sampling will start on 1 July and continue through 30 July. The chartered vessel will fish a 366 m x 10 m drift gill net with 13 cm multi-filament web at each station. Once deployed at a station, gillnets will be fished 30 min before retrieval is started.

All captured salmon will be identified to species and sex. Fork length (mid-eye to fork-of-tail) will be measured to the nearest millimeter. The number of fish caught at each station will be expressed as a catch per unit of effort (CPUE) statistic for each species:

$$CPUE_S = \frac{100\,fm \;x\; 60\,\text{min} \;x\; number\,of\,fish}{fm\,of\,gear \;x\; MFT} \qquad (1)$$

where $CPUE_s$ = CPUE for station s, and
MFT = mean fishing time.

Mean fishing time will be calculated as:

$$MFT = (C - B) + \frac{(B - A) + (D - C)}{2} \qquad (2)$$

where A = time net deployment started,
B = time net fully deployed,
C = time net retrieval started, and
D = time net fully retrieved.

Daily CPUE ($CPUE_d$) will be calculated as:

$$CPUE_d = \sum_{s=1}^{n} CPUE_s \,. \qquad (3)$$

Daily CPUE statistics will be used to estimate the size of the migrating salmon population as described by Mundy (1979).

Objective 2

A Biosonics model DT6000 scientific 200 kHz echosounder will be used to measure relative salmon densities along the OTF transect. A 6.6° circular split-beam transducer will be mounted in a side-looking orientation on a 2.0-m long aluminum sled. Fish will be acoustically sampled at 3-5 pings sec^{-1}, at ranges from 0-100 m, using a pulse width of 0.2 ms, and a –47 dB threshold. Data will be stored on a laptop computer and geo-referenced using a differential global positioning system (DGPS). Later in the laboratory, fish targets will be counted by 20-m range bins using autotracking software.

Acoustic equipment will be operated along transects between the 6 stations fished with the drift gill net each day. Transects will be traversed at 3-6 m sec^{-1} depending on sea state. As sea state increases, the sled will be towed lower in the water column to reduce surface reverberation. However, at Beaufort sea states greater than 5, surface reverberation will preclude useful acoustic estimates (Tarbox and Thorne 1996). The area swept by the sonar along each transect will be calculated by multiplying each 20 m range strata by the length of the transect. Relative salmon densities (no. m^{-2}) will be estimated for 500 m by 20 m report areas. The data from each range strata will be used to evaluate detection characteristics as a function of range (Tarbox and Thorne 1996).

Our estimates of relative salmon density will be based upon assumptions that (1) fish targets can be separated from entrained air and debris in most cases, (2) target strengths of individual fish vary randomly, and (3) nearly all fish targets within the surface layer (0-20 m) are salmon. Tarbox and Thorne (1996) found that fish were often associated with frontal zones as were entrained air and debris, but fish were near these zone and not actually in them, so separation appeared to be possible in most cases. Ping-to-ping target strengths of individual fish are highly variable due to the stochastic nature of the reflectance of sound, and fish movement, orientation, and behavior (Burwen et al. 1998, Dahl and Matheisen 1982, Dawson and Karp 1987, Ehrenberg et al. 1981, Eggers 1994, Love 1969, 1977). These variations in target strength may result in underestimation of actual fish density when target strengths fall below threshold, but relative fish densities can still be estimated if target strengths vary randomly over relatively large spatial scales (i.e. 500 m report lengths). The larger number of pings obtained from each fish at ranges exceeding 60 m increases the probability of fish detection (Tarbox and Thorne 1996). Our assumption that nearly all fish targets in the surface layer are salmon is supported by catches in 291 purse seine (20 m depth) net sets in our study area during July 2002 (Willette et al. 2003).

Objective 3

A conductivity-temperature-depth profiler (CTD) equipped with a fluorometer and transmissometer will be used to measure the vertical distribution of temperature, salinity, fluorescence and turbidity from the surface to the bottom at each fixed station. Additional CTD casts will be made on each side of obvious frontal zones. The data will be used to construct a cross section of the distribution of these variables along the OTF transect each day. A continuously-recording CTD equipped with a transmissometer will also be towed along the entire transect each day. The data from this instrument will enable investigators to better define the location of frontal structures.

Air temperature, wind velocity, tide stage, water depth, and water clarity will also be measured at each station using methods employed over the past 20 years of the OTF program. Wind speed will be measured in knots and direction recorded as 0 (no wind), 1 (north), 2 (northeast), 3 (east), 4 (southeast), 5 (south), 6 (southwest), 7 (west), or 8 (northwest). Tide stage will be classed as flood, ebb or slack by observing the movement of the vessel while drifting with the gill net. Water depth will be measured in fathoms using a Simrad echo sounder, and water clarity will be measured using a 17.5 cm secchi disk.

Objective 4

A 300 kHz acoustic doppler current profiler (ADCP) will be used to measure the vertical distribution of current velocity along the OTF transect. The ADCP will be mounted in a down-looking orientation on a 2-m long aluminum sled. A 2-m cell depth size will be used providing a velocity measure with a standard deviation of 66 mm sec^{-1}. A bottom-tracking algorithm will be used to measure the survey vessel's velocity over the bottom. Absolute current velocity will be calculated in real time by subtracting the vessel's velocity from the relative current velocities measured by the ADCP. Data will be stored on a laptop computer and geo-referenced using a DGPS. Acoustic equipment will be operated along transects between the 6 stations fished with the drift gill net each day. Transects will be traversed at 3-6 m sec^{-1} depending on sea state.

Objective 5

We will identify possible changes in flow within our study area that are related to changes in flow of the ACC. Northward incursions of the ACC should be identifiable in hydrographic data and mean current fields. To identify the ACC from the hydrographic data, it is necessary to know the hydrographic characteristics of the ACC as it flows into Cook Inlet. To identify the ACC in water current measurements, the data must undergo a process to remove the tidal component of velocity measurements.

To determine the presence of the ACC hydrographically, we will coordinate our efforts with a hydrographic study of lower Cook Inlet that is being planned for 2004. That study will be conducted by the Cook Inlet Regional Citizens Advisory Council (CIRCAC) and will consist of CTD transects across Kennedy Entrance, Stevenson Entrance, Shelikof Strait, and along the Anchor Point to Red River line that the OTF cruise follows. These surveys will be conducted in the odd numbered months in 2004. The Kachemak Bay Research Reserve will be assisting CIRCAC with their study and will have access to the hydrographic data. Coordinating our work with that of CIRCAC will allow us to better identify northward incursions of the ACC and set our high frequency measurements into context with the yearly pattern. We will share expenses for the May CIRCAC cruise and add a June hydrographic survey using the same transects. These cruises will allow us to test our sampling techniques before the July field exercises and provide us with the data necessary to understand springtime changes in ACC flow into Cook Inlet.

De-tiding of ADCP data is not required to determine the position of fronts and the association of fish with current flows. However, de-tiding the data will be necessary to identify incursions of the ACC within our water velocity measurements. Techniques have been described for de-tiding repeat transects made using shipboard ADCP measurements (Candela et al., 1992). However, errors associated with removing the extreme tidal currents in Cook Inlet may limit the value of this technique in determining the mean flow. A more promising approach will be to coordinate our work with the present NOAA study of tides within Cook Inlet. Over the next two years NOAA's Coastal and Estuarine Circulation Analysis Team (CECAT) will be deploying bottom mounted ADCP's in central and lower Cook Inlet. Currently two of these ADCPs are to be deployed just north of our study area. We are working with the NOAA group to coordinate our

efforts with the hopes of having the two planned moorings moved south to coincide with our stations. We would then be able to use the tidal information they collect to de-tide our data. Depending on the timing of the NOAA deployment and analysis, the de-tiding effort may not be achieved within the three years of our study, but an effort will be made to ensure that the proper data is available for such efforts.

In addition to the oceanographic shipboard measurements, we will examine the possibility of using CODAR data and modeling results to examine changes in flow of the ACC. A pair of CODAR units were installed during the summer of 2003. The water velocity data has been made available to us to examine the practicality of using CODAR to observe changes in flow of the ACC. We will coordinate our work with any future CODAR deployments in the area. We will also collaborate with the SALMON project and the MMS funded work of Mark Johnson to evaluate the accuracy and resolution of oceanographic modeling results. The optimal data set is likely to be a mixture of high-resolution shipboard measurements and the non-ship intensive studies of CODAR and modeling.

C. Data Analysis and Statistical Methods

Hypothesis 1:

Salmon migration is delayed when fish encounter strong salinity gradients. Turbulence caused by strong tidal currents or winds breaks down salinity gradients increasing the rate of migration.

The gradient of salinity (Δo/oo m^{-1}) across tide rips will be calculated using CTD data collected on each side of the rip zones. The gradient of salinity across the tide rips will then be plotted against wind speed and tidal current velocities measured using the ADCP. Linear and non-linear regression analyses will be conducted to determine the model that best fits the data and test the hypothesis that strong tidal currents or winds are associated with weaker salinity gradients. We will also examine the feasibility of using our split-beam acoustic system to measure salmon swimming speeds. If practical, this will provide the data needed to directly test whether migration rate is related to salinity gradients. It is unlikely that sufficient data will be available the first year to test this hypothesis. However, the next hypothesis addresses this same issue although many years of data will be required to test it.

Hypothesis 2:

Interannual changes in freshwater outflow from UCI affect salmon migratory timing. A stronger (weaker) outflow delays (accelerates) the migration.

Salmon migratory timing will be estimated using CPUE data from the OTF drift gill net vessel. Cumulative daily $CPUE_t$ will be calculated as:

$$CPUE_t = \sum_{d=1}^{n} CPUE_d \quad (4)$$

Daily estimates of $CPUE_t$ and $CPUE_d$ will be used to estimate cumulative proportions of $CPUE_t$, and the data will be fit to a non-linear model (Mundy 1979):

$$y_d = 1/(1+e^{-(a+bd)}) \quad (5)$$

where: y_d = cumulative proportion of $CPUE_t$ on day d,
a and b = coefficients of model,
d = day of observation.

The mean date of the salmon migration (*M*) is then estimated as (Tarbox 1999):

$$M = a/b \quad (6)$$

Average salinity measured west of the west rip will be calculated using all data collected during July each year. The mean date of migration (M) will then be plotted against average salinity. Linear, non-linear, and multiple regression analyses will be conducted to determine the model that best fits the data and test the hypothesis. Covariates in multiple regressions will include salinity in Cook Inlet, and sea surface temperature in the Gulf of Alaska (Burgner 1980). Multiple years of data will be required to test this hypothesis.

Hypothesis 3:

The variance of relative salmon density is a function of salmon abundance and the structure of tide rips along the OTF transect. When salmon abundance is low (high), relative salmon density is more contagiously (homogeneously) distributed. Strongly (weakly) developed tide rips cause salmon density to be more contagiously (homogeneously) distributed.

The mean and variance of relative salmon density along the OTF transect will be calculated for each day and plotted against one another. If the abundance hypothesis is correct, a plot of the variance against the mean density should indicate an asymptote at high salmon densities. Various transformations of the data will be explored to satisfy assumptions for regression analysis (Zar 1984). Linear, non-linear and multiple regression analyses will be conducted to determine the model that best fits the data and test the hypothesis. Covariates in multiple regressions will include the relative salmon density, and the gradients of salinity (Δo/oo m^{-1}) and velocity (Δm/sec m^{-1}) across tide rips (as a measures of the strength of the rips). Since data collected on each day of the cruise will be used as the sample unit in this analysis, spatial autocorrelation should not affect statistical tests. Sufficient data may be available the first year for a preliminary test of this hypothesis.

Hypothesis 4:

Salmon use the tidal currents in UCI to facilitate their northward migration. On the flood tide, salmon density is highest between the west and mid rips where current speeds are maximum. On the ebb tide, salmon density is highest immediately east of the mid rip and west of the west rip where turbulence reduces the net southward flow.

The gradients of salinity, current velocity, and visual observations will be used to determine the location of the west and mid rips each day. The ratio of the mean relative salmon density between and outside of the two rips will be calculated for each day. An analysis of variance will be conducted to test whether the ratio of the two densities is significantly different during the flood versus the ebb tide. Various transformations of the data will be explored to satisfy assumptions for analysis of variance (Zar 1984). Sufficient data may be available the first year for a preliminary test of this hypothesis.

D. Description of Study Area

This project will be conducted in lower Cook Inlet along a transect running from Anchor Point on the east to the Red River delta on the west. The vessel will operated out of Homer and will return to Homer every other day. The sampling region for this project lies north of latitude 59.675, west of longitude 152.833, south of latitude 60.000 and east of longitude 153.666.

E. Coordination and Collaboration with Other Efforts

The physical oceanographic data collected by this project will be made available to others studying the dynamics of the ACC. The data collected by this project will complement the dataset of physical conditions at station GAK 1 near the mouth of Resurrection Bay. To determine the presence of the ACC hydrographically, we will coordinate our efforts with a hydrographic study of lower Cook Inlet conducted by the CIRCAC which will consist of CTD transects across Kennedy Entrance, Stevenson Entrance, Shelikof Strait, and along the Anchor Point to Red River line. The proposed project could also provide data for validation of the Oil Spill Risk Analysis (OSRA) model being developed by the Minerals Management Service for Cook Inlet and Shelikof Strait, as well as the modeling efforts being conducted by Mark Johnson and SALMON projects. The high temporal sampling rate provided by the proposed project increases the likelihood of encountering clear weather conditions for validation of remote sensing products and will provide sufficiently numerous observations of temperature, salinity, and current velocity structures along the southern boundary of the inlet for a highly powerful statistical evaluation of the OSRA model. We hope that the NOAA CODAR units currently installed will remain during this study so that we can compare in-water measurements against the surface measurements of CODAR. We are working with the NOAA group (CECAT) that is deploying bottom mounted ADCPs to ensure that are programs are complimentary. We will coordinate our measurements with vessel-of-opportunity efforts that will be making similar surface property measurements in Lower Cook Inlet and the Gulf of Alaska.

III. SCHEDULE

A. Project Milestones

Objective 1. Conduct an offshore test fishing (OTF) program to estimate the population size of sockeye salmon returning to Upper Cook Inlet.
To be met by August 2006.

Objective 2. Measure the horizontal distribution of relative salmon density along the OTF transect using side-looking acoustic equipment.
To be met by December 2006.

Objective 3. Measure environmental variables as well as the vertical distributions of temperature and salinity along the OTF transect and construct cross sections.
To be met by December 2006.

Objective 4. Measure the vertical distribution of current velocity along the OTF transect using an acoustic doppler current profiler and construct cross sections.
To be met by December 2006.

Objective 5. Identify northward incursions of the ACC into Cook Inlet.
To be met by April 2007.

Objective 6. Conduct statistical analyses to test major hypotheses.
To be met by April 2007.

B. Measurable Project Tasks

FY 06, 2nd quarter (January 1, 2006-March 31, 2006)
(dates not yet known) Annual GEM Workshop

FY 06, 3rd quarter (April 1, 2006-June 30, 2006)
June 1: Award contract for vessel charter

FY 06, 4th quarter (July 1, 2006-September 30, 2006)
August 1: Complete field sampling

FY 07, 1st quarter (October 1, 2006-December 31, 2006)
December 31: Complete analyses of fisheries acoustic and ADCP data

FY 07, 2nd quarter (January 1, 2007-March 31, 2007)
(dates not yet known) Annual GEM workshop
March 31: Complete preliminary tests of major hypotheses if possible.

FY 07, 3rd quarter (April 1, 2007-June 30, 2007)

June 30: Submit annual report to Trustee Council Office.

IV. RESPONSIVENESS TO KEY TRUSTEE COUNCIL STRATEGIES

A. Community Involvement and Traditional Ecological Knowledge (TEK)

This project will utilize the traditional knowledge of local fishers who have observed the migratory behavior of salmon entering the inlet for many years. This knowledge will help the investigators interpret the quantitative data collected during the course of the project. A local hire preference will be employed for all contracts and technicians recruited during the course of the project. The Kachemak Bay Research Reserve will design a program of public education to disseminate knowledge obtained from the project to the community.

B. Resource Management Applications

This project will conduct research needed to improve the accuracy of inseason projections of migratory salmon populations entering Cook Inlet. The tools developed by the project will help ADF&G better manage for inriver escapement goals and maximum sustained yield of the salmon resource in the inlet. The physical oceanographic data collected by the project will also be used by resource managers to better understand the dynamics of the ACC system and how physical conditions affect the productivity of the biological resources in the region.

V. PUBLICATIONS AND REPORTS

A manuscript describing the "Effects of oceanographic conditions on the migratory behavior of salmon entering Cook Inlet" will be submitted to the Fisheries Oceanography during fall of 2006.

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CURRICULUM VITAE

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Educational Background:

Bachelor of Science, Fisheries Science, 1983, University of Alaska Fairbanks.
Master of Science, Fisheries Oceanography, 1985, University of Alaska Fairbanks.

Appointments:

Research Project Leader, AK Dept. Fish & Game, Soldotna, AK	2000-present
Research Project Leader, AK Dept. Fish & Game, Cordova, AK	1999-2000
Research Biologist, AK Dept. Fish & Game, Cordova, AK	1991-2000
Assistant Research Professor, University of Alaska, Fairbanks, AK	1990-1991
Instructor of Fisheries, University of Alaska, Fairbanks, AK	1986-1990
Graduate Research Assistant, University of Alaska, Fairbanks, AK	1983-1986

Current Duties:

Design and implement research projects to assess the abundance, size and age composition of salmon returning to Upper Cook Inlet and develop preseason and inseason forecasts of abundance. These projects include sonar enumeration of sockeye salmon in the Kenai, Kasilof, Crescent, and Yentna rivers, sampling of commercial catches and escapements to estimate size and age composition, preseason forecasts of abundance from assessment of juvenile salmon populations in rearing lakes, inseason forecasts of abundance from test fishery statistics, and evaluation of biological escapement goals.

Selected Publications:

Willette, T.M., R. DeCino, N. Gove. 2003. Mark-recapture population estimates of coho, pink, and chum salmon runs to upper Cook Inlet in 2002. Alaska Dept. of Fish and Game, Regional Information Report no. 2A03-20, 65 p.

Tobias, T., and T.M. Willette. 2003. An estimate of the return of sockeye salmon to upper Cook Inlet, Alaska 1976-2002. Alaska Dept. of Fish and Game, Regional Information Report no. 2A03-11, 425 p.

Willette, T.M., R.T. Cooney, V. Patrick, D.M. Mason, G.L. Thomas, and D. Scheel. 2001. Ecological processes influencing mortality of juvenile pink salmon (*Oncorhynchus gorbuscha*) in Prince William Sound, Alaska. *Fish. Oceanogr.* **10** (suppl. 1): 14-41.

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Professional Preparation:

University of Alaska, Fairbanks	Physics	B.S./1990
Oregon State University	Oceanography	Ph.D./1996
Oregon State University	Oceanography	Post doc./1996-1997

Appointments:

Senior Scientist, Kachemak Bay Research Reserve (KBRR)	2002-present
Assistant Professor (tenure track), Oregon State University	1999-present
Faculty Research Associate, Oregon State University	1997-1999
Faculty Research Associate (Post Doc), Oregon State University	1996-1997
Graduate Research Assistant, Oregon State University	1990-1996
Research Assistant, University of Alaska, Fairbanks	1987-1990

Current duties:

Current duties at KBRR include maintaining and expanding the in-situ monitoring program, and developing new research programs examining the circulation and primary production in Kachemak Bay and Lower Cook Inlet. I am maintaining a quarter time position at OSU while completing grants from the Navy and NASA to investigate uses of hyperspectral remote sensing data, developing an autonomous underwater vehicle program, and discrimination of phytoplankton taxa using ocean color remote sensing.

Expertise:

My primary area of expertise is the interpretation of in-situ and remote optical measurements to determine types of materials in the water column, determination of vertical distributions from space, water masses, and circulation patterns. I have extensive experience in the conceptual design and deployment of sensors on a number of platforms ranging from traditional cages, ferry vessels, and autonomous vehicles. I also have experience determining heat fluxes using meteorological and oceanographic measurements.

5 related publications:

Pegau, W. Scott, Inherent optical properties of the central Arctic surface waters, *J. Geophys Res*, **107**, doi. 10.1029/2000JC000382, 2002.

Pegau, W. S., E. Boss, and A. Martinez, Ocean color observations of eddies during the summer in the Gulf of California, *Geophys. Res. Lett.*, **29**, 10.1029/2001GL014076, 2002.

Chang G. C., T. D. Dickey, O. M. Schofield, A. D. Weidemann, E. Boss, W. S. Pegau, M. A. Moline, and S. M. Glenn, Nearshore physical forcing of bio-optical properties in the New York Bight. *J. Geophys. Res.*, **107**, 10.1029/2001JC001018, 2002.

Twardowski, M. S., E. Boss, J. B. MacDonald, W. S. Pegau, A. H. Barnard, J. R. V. Zaneveld, A model for estimating bulk refractive index from the optical backscattering ratio and the implications for understanding particle composition in case I and case II waters, *J. Geophys. Res.*, **106**, 14129-14142, 2001.

Boss, E., W. S. Pegau, J. R. V. Zaneveld, and A. H. Barnard, Spatial and temporal variability of absorption by dissolved material at a continental shelf, *J. Geophys. Res.* **106**, 9499-9508, 2001.

5 other publications

Bartlett, J. S., M. R. Abbott, R. M. Letelier, and W. S. Pegau, Analysis of a method to estimate chlorophyll-a concentration from irradiance measurements at varying depths, *J. Atmos. Ocean. Tech.*, **18**, 2063-2073, 2001.

Weideman, A. D., D. J. Johnson, R. J. Holyer, W. S. Pegau, L. A. Jugan, and J. C. Sandidge, Remote imaging of internal solitons in the coastal ocean, *Remote Sensing of Environment,* **76**, 260-267, 2001.

Boss, E., and W. S. Pegau, The relationship of light scattering at an angle in the backward direction to the backscattering coefficient, *Appl. Opt.*, **40**, 5503-5507, 2001.

Pegau, W. S., J. R. V. Zaneveld, A. H. Barnard, H. Maske, S. Avarez-Borrego, R. Lara-Lara, and R. Cervantes, Inherent optical properties of the Gulf of California, *Ciencias Marinas,* **25,** 469-485,1999.

Pegau, W. S., D. Gray, and J. R. V. Zaneveld, Absorption of visible and near-infrared light in water: the dependence on temperature and salinity, *Applied Optics*, **36**, 6035-6046, 1997.

CollaboratorsE. L. Andreas (CRREL), S. Alvarez-Borrego (CICESE), D. G. Barber, A. H. Barnard (Bigelow), J. C. Blakey, E. Boss (OSU), G. C. Chang (UCSB), G. F. Cota (ODU), J. A. Curry, T. D. Dickey (UCSB), H. Eiken (UAF), C. W. Fairall, W. D. Gardner (TAMU), S. Glenn (Rutgers), D. Gray (TAMU), M. Gregg (UW), T. C. Grenfell (UW), A. J. Gow, R. E. Green (WHOI), P. S. Guest, J. Intrieri, D. R. Johnson (NRL), D. Kadko(U. Miami), R. W. Lindsay(UW), M. Landry, R. Lara-Lara (CICESE), J. Longacre, J. MacKinnon (UW), H. Maske (CICESE), M. G. McPhee, C. D. Mobley (Sequoia Scientific), M. Moline, J. Morison (UW), R. E. Moritz (UW), J. L. Mueller (SDSU), R. G. Onstott, C. A. Paulson (OSU), D. K. Perovich (CRREL), P.O.G. Persson, A. A. Petrenko, R. Pinkel (SIO), R. A. Maffione (Hobilabs), M. J. Richarson, J. A. Richter-Menge (CRREL), C. S. Roesler (Bigelow), O. Schofield (Rutgers), E. Skyllingstad (OSU), H. M. Sosik (WHOI), T. Stanton, H. Stern, M. Sturm (CRREL), W. B. Tucker III (CRREL), T. Uttal, M. Twardowski (WETLabs), E. Valdez-Holguin, I. D. Walsh (OSU), A. Weidemann (NRL), A. J. Williams III (WHOI), J. R. V. Zaneveld (OSU/Wetlabs)

Budget Justification:

FY06:

Personnel

Requested funds: $22.9
In-kind funds: $17.4

Funds requested for S. Pegau (1 mm) and R. Decino (1 mm) are needed to support these staff during the 1 month of field sampling required for this project (objectives 1-4). An additional 1 mm of funding for S. Pegau and 1 mm for M. Willette are needed for data analysis and report writing (objectives 2-6). In-kinds funds support an additional 1 mm for each investigator for data management, data analysis, and report writing (objectives 2-6).

Travel

Requested funds: $1.0
In-kind funds: $0.0

Funds requested for S. Pegau and M. Willette to travel to annual GEM workshop.

Contractual

Requested funds: $37.5
In-kind funds: $37.5

Funds requested for one half of the total vessel charter needed for field sampling (objectives 1-4). In-kind funds support the other half of total charter cost. We request that the EVOS TC fund one half of the total charter cost, because the oceanographic data collected by the project will provide for valuable validation of remote sensing products, improved understanding of ocean dynamics in lower Cook Inlet, and a highly powerful statistical evaluation of ocean circulation models. In the past, the ADFG has funded this fisheries survey from sale of fish captured by the test fishing vessel, but this is not longer possible due to the lower ex-vessel price for salmon in recent years.

Commodities

Requested funds: $1.0
In-kind funds: $0.0

Funds requested for hardware needed to rig acoustic tow body on board charter vessel, as well as, miscellaneous supplies needed for data management (objectives 1-4).

Equipment

Requested funds: $0.0
In-kind funds: $52.0

No funds requested.

Data Management and QA\QC Statement:

Objective 1

Sockeye salmon returning to Upper Cook Inlet will be sampled by fishing six geographically fixed stations between Anchor Point and Red River Delta (See research plan, p. 2, Fig.1). Detailed methods are described by Shields (2003). Daily CPUE statistics will be used to estimate the size of the migrating salmon population as described by Mundy (1979). Air temperature, wind velocity, tide stage, water depth, and water clarity will also be measured at each station (See research plan, p. 7) using methods employed over the past 20 years (Shields 2003). This project does not involve retention of any samples.

Mundy, P.R. 1979. A quantitative measure of migratory timing illustrated by application to the management of commercial salmon fisheries. Doctoral dissertation, University of Washington, Seattle, Washington, USA.

Shields, P.A. 2003. An estimate of the migratory timing and abundance of sockeye salmon into upper Cook Inlet, Aalksa, in 2002. Regional Information Report No. 2A03-01.

FGDC Metadata File: Fisheries Net Catch Data

Identification_Information:
Citation:
Citation_Information:
Originator: Alaska Department of Fish and Game
Publication_Date: 20060930
Title: Fisheries Net Catch Data
Edition: 1.0
Geospatial_Data_Presentation_Form: section
Publication_Information:
Publication_Place: Soldotna, Alaska USA
Publisher: Alaska Department of Fish and Game
Online_Linkage: none
Description:
Abstract: This dataset contains gill net catch data from Cook Inlet, Alaska. The catch data are referenced by date, time of day, latitude, longitude, and station number.
Purpose: These net catch data were collected to estimate the abundance of adult salmon entering Cook Inlet.
Time_Period_of_Content:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 20040701
Ending_Date: 20060930
Currentness_Reference: publication date
Status:
Progress: Complete

Maintenance_and_Update_Frequency: None planned
Spatial_Domain:
Bounding_Coordinates:
West_Bounding_Coordinate: -153.666
East_Bounding_Coordinate: 152.833
North_Bounding_Coordinate: 60
South_Bounding_Coordinate: 59.675
Keywords:
Theme:
Theme_Keyword_Thesaurus:
Theme_Keyword: fish
Theme_Keyword: peces
Place:
Place_Keyword_Thesaurus:
Place_Keyword: Cook Inlet
Place_Keyword: Alaska USA
Temporal:
Temporal_Keyword_Thesaurus:
Temporal_Keyword: 2004-2006
Access_Constraints: none
Use_Constraints: none
Browse_Graphic:
Browse_Graphic_File_Name: none
Browse_Graphic_File_Description: none
Browse_Graphic_File_Type:
Spatial_Data_Organization_Information:
Direct_Spatial_Reference_Method: Point
Distribution_Information:
Distributor:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Mark Willette
Contact_Organization: Alaska Department of Fish and Game
Contact_Address:
Address_Type: Mailing and Physical Address
Address: 43961 Kalifornsky Beach Rd, Ste B
City: Soldotna
State_or_Province: Alaska
Postal_Code: 99669
Country: USA
Contact_Voice_Telephone: 907-262-9368
Contact_Facsimile_Telephone: 907-262-4709
Contact_Electronic_Mail_Address: mark_willette@fishgame.state.ak.us
Resource_Description: FCATCH
Distribution_Liability: none
Metadata_Reference_Information:

Metadata_Date: 20030604
Metadata_Contact:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Mark Willette
Contact_Organization: Alaska Department of Fish and Game
Contact_Address:
Address_Type: Mailing and Physical Address
Address: 43961 Kalifornsky Beach Rd, Ste B
City: Soldotna
State_or_Province: Alaska
Postal_Code: 99669
Country: USA
Contact_Voice_Telephone: 907-262-9368
Contact_Facsimile_Telephone: 907-262-4709
Contact_Electronic_Mail_Address: mark_willette@fishgame.state.ak.us
Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998

Data Fields: Fisheries Acoustic Data

Variable	Format
Date	MMDDYYYY
Time of Day	military time
Latitude	decimal degrees
Longitude	decimal degrees
Station Number	*unique station number (4, 5, 6, 6.5, 7, 8)*
Air Temperature	degrees centigrade
Wind Speed	meters sec^{-1}
Wind Direction	quadrants
Tide Stage	flood, ebb, slack
Water Depth	meters
Water Clarity	meters (secchi depth)
Catch Sockeye Salmon	number caught
Catch Coho Salmon	number caught
Catch Chum Salmon	number caught
Catch Pink Salmon	number caught
Catch Chinook Salmon	number caught

Objective 2

A Biosonics model DT6000 scientific 200 kHz echosounder will be used to measure relative salmon densities along the OTF transect (See research plan, p. 6). Data will be stored on a laptop computer and geo-referenced using a differential global positioning system (DGPS). Raw acoustic data files will be backed up daily on board the sampling vessel. Sonar equipment will be

calibrated by the manufacturer (http://www.biosonicsinc.com) prior to the field season, and field calibrations will be conducted periodically using a 38 mm tungsten carbide sphere to verify that acceptable data quality is maintained.

Later in the laboratory, fish targets will be counted by 20 m range bins using autotracking software. We will use SonarData's (http://www.sonardata.com) Echoview software to track and edit fish targets. Echoview incorporates a target-tracking program developed by Peter Withler (Department of Fisheries and Oceans, British Columbia, Canada) which uses Blackman's algorithm (Blackman 1986).

Blackman, S.S. 1986. Multiple-Target Tracking with Radar Applications. Artech House, Inc.

FGDC Metadata File: Fisheries Acoustic Data

Identification_Information:
 Citation:
  Citation_Information:
   Originator: Alaska Department of Fish and Game
   Publication_Date: 20060930
   Title: Fisheries Acoustic Data
   Edition: 1.0
   Geospatial_Data_Presentation_Form: section
   Publication_Information:
    Publication_Place: Soldotna, Alaska USA
    Publisher: Alaska Department of Fish and Game
   Online_Linkage: none
 Description:
  Abstract: This dataset contains acoustic target strengths measured in Cook Inlet, Alaska. The target strength measurements are referenced by date, time of day, latitude, longitude, and depth.
  Purpose: These target strength data were collected to estimate densities of migrating adult salmon entering Cook Inlet.
 Time_Period_of_Content:
  Time_Period_Information:
   Range_of_Dates/Times:
    Beginning_Date: 20040701
    Ending_Date: 20060930
  Currentness_Reference: publication date
 Status:
  Progress: Complete
  Maintenance_and_Update_Frequency: None planned
 Spatial_Domain:
  Bounding_Coordinates:
   West_Bounding_Coordinate: -153.666
   East_Bounding_Coordinate: 152.833
   North_Bounding_Coordinate: 60
   South_Bounding_Coordinate: 59.675

Keywords:
Theme:
Theme_Keyword_Thesaurus:
Theme_Keyword: fish
Theme_Keyword: peces
Place:
Place_Keyword_Thesaurus:
Place_Keyword: Cook Inlet
Place_Keyword: Alaska USA
Temporal:
Temporal_Keyword_Thesaurus:
Temporal_Keyword: 2004-2006
Access_Constraints: none
Use_Constraints: none
Browse_Graphic:
Browse_Graphic_File_Name: none
Browse_Graphic_File_Description: none
Browse_Graphic_File_Type:
Spatial_Data_Organization_Information:
Direct_Spatial_Reference_Method: Point
Distribution_Information:
Distributor:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Mark Willette
Contact_Organization: Alaska Department of Fish and Game
Contact_Address:
Address_Type: Mailing and Physical Address
Address: 43961 Kalifornsky Beach Rd, Ste B
City: Soldotna
State_or_Province: Alaska
Postal_Code: 99669
Country: USA
Contact_Voice_Telephone: 907-262-9368
Contact_Facsimile_Telephone: 907-262-4709
Contact_Electronic_Mail_Address: mark_willette@fishgame.state.ak.us
Resource_Description: FSONAR
Distribution_Liability: none
Metadata_Reference_Information:
Metadata_Date: 20030604
Metadata_Contact:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Mark Willette
Contact_Organization: Alaska Department of Fish and Game
Contact_Address:

Address_Type: Mailing and Physical Address
Address: 43961 Kalifornsky Beach Rd, Ste B
City: Soldotna
State_or_Province: Alaska
Postal_Code: 99669
Country: USA
Contact_Voice_Telephone: 907-262-9368
Contact_Facsimile_Telephone: 907-262-4709
Contact_Electronic_Mail_Address: mark_willette@fishgame.state.ak.us
Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998

Data Fields: Fisheries Acoustic Data

Variable	Format
Target ID number	unique identification number
Date	MMDDYYYY
Time of Day	military time
Latitude	decimal degrees
Longitude	decimal degrees
Range	meters
Mean Target Strength	decibels

Objective 3

A conductivity-temperature-depth profiler (CTD) equipped with a fluorometer and transmissometer will be used to measure the vertical distribution of temperature, salinity, fluorescence and turbidity from the surface to the bottom at each fixed station (See research plan, p. 7). Raw data files will be backed up daily on board the sampling vessel. CTD will be calibrated by the manufacturer

FGDC Metadata File: Conductivity Temperature Depth Data

Identification_Information:
Citation:
Citation_Information:
Originator: Alaska Department of Fish and Game
Publication_Date: 20060930
Title: Conductivity Temperature Depth Data
Edition: 1.0
Geospatial_Data_Presentation_Form: section
Publication_Information:
Publication_Place: Homer, Alaska USA
Publisher: Alaska Department of Fish and Game
Online_Linkage: none
Description:

Abstract: This dataset contains conductivity, temperature, depth (CTD) data from Cook Inlet, Alaska. The data are referenced by date, time of day, latitude, longitude,

Purpose: These CTD data were collected to determine the physical structure of the water column along the test fishing transect in lower Cook Inlet.

Time_Period_of_Content:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 20040701
Ending_Date: 20060930
Currentness_Reference: publication date
Status:
Progress: Complete
Maintenance_and_Update_Frequency: None planned
Spatial_Domain:
Bounding_Coordinates:
West_Bounding_Coordinate: -153.666
East_Bounding_Coordinate: 152.833
North_Bounding_Coordinate: 60
South_Bounding_Coordinate: 59.675
Keywords:
Theme:
Theme_Keyword_Thesaurus:
Theme_Keyword: aquatic habitat
Theme_Keyword: hábitat acuático
Place:
Place_Keyword_Thesaurus:
Place_Keyword: Cook Inlet
Place_Keyword: Alaska USA
Temporal:
Temporal_Keyword_Thesaurus:
Temporal_Keyword: 2004-2006
Access_Constraints: none
Use_Constraints: none
Browse_Graphic:
Browse_Graphic_File_Name: none
Browse_Graphic_File_Description: none
Browse_Graphic_File_Type:
Spatial_Data_Organization_Information:
Direct_Spatial_Reference_Method: Point
Distribution_Information:
Distributor:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Scott Pegau
Contact_Organization: Alaska Department of Fish and Game
Contact_Address:

Address_Type: Mailing and Physical Address
Address:
Kachemak Bay Research Reserve
2181 Kachemak Dr.
City: Homer
State_or_Province: Alaska
Postal_Code: 99603
Country: USA
Contact_Voice_Telephone: 907 235-4799 x6
Contact_Facsimile_Telephone: 907 235-4794
Contact_Electronic_Mail_Address: scott_pegau@fishgame.state.ak.us
Resource_Description: CTD
Distribution_Liability: none
Metadata_Reference_Information:
Metadata_Date: 20030604
Metadata_Contact:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Scott Pegau
Contact_Organization: Alaska Department of Fish and Game
Contact_Address:
Address_Type: Mailing and Physical Address
Address:
Kachemak Bay Research Reserve
2181 Kachemak Dr.
City: Homer
State_or_Province: Alaska
Postal_Code: 99603
Country: USA
Contact_Voice_Telephone: 907 235-4799 x6
Contact_Facsimile_Telephone: 907 235-4794
Contact_Electronic_Mail_Address: scott_pegau@fishgame.state.ak.us
Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998

Data Fields: Conductivity Temperature Depth Data

Variable	Format
Date	MMDDYYYY
Time of Day	military time
Latitude	decimal degrees
Longitude	decimal degrees
Depth	meters
Salinity	parts per thousands
Temperature	deg.C

Chlorophyll	ug/L
Turbidity	NTU

Objective 4

A 300 kHz acoustic doppler current profiler (ADCP) will be used to measure the vertical distribution of current velocity along the OTF transect (See research plan, p. 7). Raw ADCP data files will be backed up daily on board the sampling vessel. ADCP equipment will be calibrated by the manufacturer

FGDC Metadata File: Acoustic Doppler Current Profiler Data

Identification_Information:
 Citation:
  Citation_Information:
   Originator: Alaska Department of Fish and Game
   Publication_Date: 20060930
   Title: Acoustic Doppler Current Profiler Data
   Edition: 1.0
   Geospatial_Data_Presentation_Form: section
   Publication_Information:
    Publication_Place: Homer, Alaska USA
    Publisher: Alaska Department of Fish and Game
   Online_Linkage: none
 Description:
  Abstract: This dataset contains acoustic doppler current profiler (ADCP) data from Cook Inlet, Alaska. The data are referenced by date, time of day, latitude, longitude,
  Purpose: These CTD data were collected to determine the current structure in the water column along the test fishing transect in lower Cook Inlet.
 Time_Period_of_Content:
  Time_Period_Information:
   Range_of_Dates/Times:
    Beginning_Date: 20040701
    Ending_Date: 20060930
  Currentness_Reference: publication date
 Status:
  Progress: Complete
  Maintenance_and_Update_Frequency: None planned
 Spatial_Domain:
  Bounding_Coordinates:
   West_Bounding_Coordinate: -153.666
   East_Bounding_Coordinate: 152.833
   North_Bounding_Coordinate: 60
   South_Bounding_Coordinate: 59.675
 Keywords:

Theme:
Theme_Keyword_Thesaurus:
Theme_Keyword: aquatic habitat
Theme_Keyword: hábitat acuático
Place:
Place_Keyword_Thesaurus:
Place_Keyword: Cook Inlet
Place_Keyword: Alaska USA
Temporal:
Temporal_Keyword_Thesaurus:
Temporal_Keyword: 2004-2006
Access_Constraints: none
Use_Constraints: none
Browse_Graphic:
Browse_Graphic_File_Name: none
Browse_Graphic_File_Description: none
Browse_Graphic_File_Type:
Spatial_Data_Organization_Information:
Direct_Spatial_Reference_Method: Point
Distribution_Information:
Distributor:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Scott Pegau
Contact_Organization: Alaska Department of Fish and Game
Contact_Address:
Address_Type: Mailing and Physical Address
Address:
Kachemak Bay Research Reserve
2181 Kachemak Dr.
City: Homer
State_or_Province: Alaska
Postal_Code: 99603
Country: USA
Contact_Voice_Telephone: 907 235-4799 x6
Contact_Facsimile_Telephone: 907 235-4794
Contact_Electronic_Mail_Address: scott_pegau@fishgame.state.ak.us
Resource_Description: ADCP
Distribution_Liability: none
Metadata_Reference_Information:
Metadata_Date: 20030604
Metadata_Contact:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Scott Pegau
Contact_Organization: Alaska Department of Fish and Game

Contact_Address:
Address_Type: Mailing and Physical Address
Address:
Kachemak Bay Research Reserve
2181 Kachemak Dr.
City: Homer
State_or_Province: Alaska
Postal_Code: 99603
Country: USA
Contact_Voice_Telephone: 907 235-4799 x6
Contact_Facsimile_Telephone: 907 235-4794
Contact_Electronic_Mail_Address: scott_pegau@fishgame.state.ak.us
Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998

Data Fields: ADCP Data

Variable	Format
Date	MMDDYYYY
Time of Day	military time
Latitude	decimal degrees
Longitude	decimal degrees
Depth	meters
Current Velocity	meters\sec

Adams 060784
proposal

FRANK H. MURKOWSKI
GOVERNOR
GOVERNOR@GOV.STATE.AK.US

P.O. BOX 110001
JUNEAU, ALASKA 99811-0001
(907) 465-3500
FAX (907) 465-3532
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STATE OF ALASKA
OFFICE OF THE GOVERNOR
JUNEAU

October 14, 2005

Mr. Kenneth Adams
P.O. Box 1855
Cordova, AK 99574

Dear Mr. Adams:

Thank you for informing me of your scientific endeavors and for sharing your concerns regarding the salmon stocks and fisheries in Prince William Sound.

The prosperity of Alaska's fishermen and their communities is a high priority for my administration. When I came into office, I recognized the difficulties confronting the salmon industry in general and the communities of Prince William Sound in particular. In response, I initiated a Fishery Revitalization Strategy in 2004 and invested nearly $2,000,000 in the industry in your area. This funding was directed to increasing enhanced chum salmon production, value added processing equipment, harbor improvements, and salmon marketing.

Although the economic picture for the industry may be improving in many areas, I recognize there is much yet to be done and many who have yet to benefit from the upturn in the markets. Coordinating processing capacity with markets and transportation infrastructure, as well as variability in the salmon runs, poses significant challenges for many Alaska fisheries. Considerations specific to Cordova, such as limits on access and power costs, further complicate any solution. We have not yet seen the complete measure of benefit we can expect from the investments we made in salmon marketing and infrastructure and I intend to continue working to strengthen the industry.

While I support revitalization of the industry, I must also ensure that the management of our resources is based on sound science. I agree that it is appropriate to use the Exxon Valdez Oil Spill (EVOS) trust funds to benefit the commercial fisheries in the spill-affected areas. I can assure you that the state members of the EVOS Trustee Council (EVOSTC) including Commissioner McKie Campbell of Fish and Game and Commissioner Kurt Fredriksson of Environmental Conservation concur and are committed to targeting the remaining EVOS

funds to projects with real benefit for the fish, wildlife, and people in the spill-affected areas.

I understand that your recent work with the Prince William Sound Fisheries Research Applications and Planning organization, with funding support from the EVOSTC, has been well received by resource managers and area fishermen. I also see a potential benefit to improved forecasting of pink salmon returns to Prince William Sound. Although the EVOSTC did not approve continuing your project at their August meeting, they did extend the opportunity for you to provide a revised proposal for future consideration. I am sure you can rely on the council to give your revised proposal their full consideration subject, as are all proposals, to scientific and programmatic review and assessment.

Thank you for sharing your views with me and for the time and energy you invest in the future of your community and the resources on which it depends.

Sincerely yours,

Frank H. Murkowski
Governor

Exxon Valdez Oil Spill Trustee Council

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

MEMORANDUM

To: **Trustee Council** **Date:** **October 26, 2005**

From: **Gail Phillips**
Executive Director Gail

Re: **Adams' Revised Proposal #060784**

During the August 10, 2005 Trustee Council meeting, the Council approved a motion to provide Ken Adams and Ross Mullins an opportunity to modify their proposed EVOS project #060784 "Commercial Fisheries Synthesis and Modeling" and to resubmit it for Council's consideration.

Mr. Adams and Mr. Mullins rewrote their proposal and we forwarded it to the STAC for their consideration. The STAC responded on 9-27-05 that the reworked proposal was significantly revised and improved and it addressed all the changes requested by the Executive Director and the STAC. The PAC concurred with those requested changes.

The STAC further stated "this proposal now provides a well-described background and states what they did in the past with the money EVOS previously funded. Furthermore, the proposal is refocused on commercial fishing as an injured service, a realistic and viable approach. This was something that the Trustee Council strongly suggested. Additionally, the revised proposal explains that they are using data collected under SEA funding. As SEA funded some synthesis, but did not complete synthesis at the level of the model proposed, this is actually a synthesis project.

All five of the STAC members have reviewed the Adams-Mullins proposal and recommend that the proposal be funded. However, we still caution that this is a multi-year effort and that EVOS should be prepared to fund it over a long period of time to reap the most benefit from it."

The STAC's September review was submitted to the Trustee Council and to the PAC.

Attached to this cover letter is a copy of the revised proposal, the STAC's recommendation, a letter of support for the project from UAF's School of Fisheries and Ocean Sciences and a new cover letter, dated October 21, 2005 from Ken and Ross.

This revised proposal is before you today for consideration for funding.

October 21, 2005

Exxon Valdez Oil Spill Trustee Council
Attention: Gail Phillips, Executive Director
441 W. Fifth Avenue, Suite 500
Anchorage, AK 99501

Dear Trustee Council Member:

We have been advised that our proposal revision- titled " Ongoing Synthesis and Modeling Activities Restoring Injured Commercial Fishery Services" has been reviewed and found acceptable by the Science and Technical Advisory Committee (STAC). Since that revision was directed toward largely technical matters, we have taken a few moments to compose a follow-on letter to call to your attention the degree to which our proposal also complies with programmatic criteria that are stipulated within the FY06 invitation. Our proposal's response to an abbreviated version of the programmatic criteria follows:

#1. Responsiveness to the invitation
The invitation focuses upon synthesis of information relevant to injured resources or services. In our case, the synthesis nature of our proposal is relevant to the recovering PWS commercial fishing industry. Implementation of the pink salmon model is essentially a synthesis activity. It utilizes information derived from a number of projects conducted within the SEA program which are relevant to the survival of juvenile pink salmon and PWS commercial fishing. This has been affirmed during the STAC review.

#2 Compliance with the 1994 Restoration Plan
Due to the importance of the Restoration Plan in providing guidance for project selection, we are pleased to report that our proposal is directly or indirectly compliant with all but three of the policies, which we consider non-applicable (#'5,7,21), listed in chapter two of the Restoration plan.

#3 Likelihood of achievement of restoration objectives.
Although pink salmon are currently listed as having recovered from EVOS, implementation of the pink salmon model will be of economic benefit to the still recovering commercial fishing industry of Prince William Sound (PWS). The depressed population of PWS herring and consequent lack of any related economic opportunity continues to burden the industry. Our project seeks to mitigate this economic loss by improving forecasting of the highly variable annual pink salmon return. Improved forecasting will provide adequate time to best plan an informed response to a given year's return thereby reducing resource wastage, lost harvesting and processing activities, and subsequent lost economic opportunities.

#4 Local or traditional ecological knowledge involvement?
Our project will utilize local knowledge provided by ongoing ecosystem monitoring activities of two PWS salmon enhancement programs, acoustic zooplankton and predator fish sampling programs of the PWS Science Center, and field sampling activities of ADF&G. Our past workshops have and future workshops will always provide opportunities for local public participation.

#5 Resource management application ?
Our project will further refine and implement the pink salmon model and will take an ecosystem approach to a better understanding of factors controlling juvenile pink salmon survival. It will utilize this information to help improve forecasting of adult salmon returns a year later. We anticipate making a significant contribution to this resource management application.

#6 Organization, management, personnel experience and qualifications ?
The PWSFRAP collaborative group members have extensive knowledge of the PWS ecosystem and its resources. The group will organize and manage the project. Members of PWSFRAP include marine scientists and resource managers, a number of whom have been principal investigators of the Sound Ecosystem Assessment (SEA) program as well as fishermen with long time familiarity with the fisheries of PWS.

On a final note, we are aware that the EVOS STAC has alerted the Council that once implemented, the pink salmon survival modeling program will require several years of continued funding to begin producing results. A commitment to restoration projects needing long term support is acknowledged in the'94 Restoration Plan. However, we believe that once the model has demonstrated its utility, an expanded program of inquiry might be at least partially supported by other sources - industry, agencies, private foundations, other.

We are pleased that our request is in the final stages of review and look forward to beginning the work. Funding the pink salmon survival model will represent a historical step toward the eventual implementation of research products leveraged by the Restoration program following the spill in 1989. Many have been skeptical about the Council ever applying the results of many tens of millions of dollars invested in fisheries and related research in PWS. It now seems within your grasp to begin this important and final step in the restoration. We feel privileged to be assisting with that effort.

Yours truly,

The PWSFRAP collaborative group

From: Richard Dworsky [richard_dworsky@evostc.state.ak.us]
Sent: Monday, October 10, 2005 9:17 AM
To: Carrie Holba; Torie Baker; Andy Teuber; Brenda L. Norcross; Douglas L. (Doug) Mutter; Ed Zeine; Edward Page; Gary Fandrei; Jason Brune; John Gerster; Larry Evanoff; Lisa Ka'aihue; Martin Robards; Mead Treadwell; Pat Norman; Patrick Lavin; Randy Hagenstein; Robert J. (RJ) Kopchak; Ron Peck; Stacy Studebaker; Thomas C. Royer; Leslie Holland-Bartels PhD; Ronald O'Dor; Stephen R Braund; Steve Zemke; Brett Huber; Cam Toohey; Carol Fries; Dede Bohn; Jenifer Kohout; Larry Dietrick; Michael Baffrey; Peter Hagen; Tim Obst; Craig O'Connor; Craig Tillery; Gina Belt; Maria Lisowski; Ruth Bauman; Carolyn Rosner; Cherri Womac; Gail Phillips; Michael Schlei; Paula Banks; Richard Dworsky; Robert j. Bochenek
Cc: Kenneth Adams; Ross Mullins
Subject: ADams-Mullins Proposal

The STAC reviewed the Adams- Mullins proposal and their comments follow.
"Adams and Mullins submitted a proposal that is significantly revised and improved and addressed all the changes requested by the Executive Director and the STAC. The PAC concurred with those requested changes. This proposal now provides a well-described background and states what they did in the past with the money EVOS previously funded. Furthermore the proposal is refocused on commercial fishing as an injured service, a realistic and viable approach. This was something that the TC strongly suggested. Additionally, the revised proposal explains that they are using data collected under SEA funding. As SEA funded some synthesis, but did not complete synthesis at the level of the model proposed, this is actually a synthesis project.

All five of the STAC members have reviewed the Adams-Mullins proposal recommend that the proposal be funded. However, we still caution that this is multi-year effort and that EVOS should be prepared to fund over a long period of time to reap the most benefit from it."

The STAC's recommendations have been forwarded to the TC. We are trying to schedule a meeting for November 10th to address both this project and the budget. The date is not firm yet, but hopefully will be firmed up in the next day or so.

Please respond to me (electronically) if you have any additional information or material, that hasn't already been presented to the Trustee Council, and that you would like for us to submit as part of this packet.

Richard F. Dworsky, PhD., Science Coordinator
Gulf of Alaska Ecosystem Monitoring and Research Program
Exxon Valdez Oil Spill Trustee Council
441 W. 5th Ave., Suite 500
Anchorage, AK 99501-2340

907-278-8012
907-276-7178 fax

Funding Recommendations

Scientific & Technical Advisory Committee (STAC) Funding Recommendation: Fund
Scientific & Technical Advisory Committee (STAC) Funding Justification: Note that pink salmon is recovered and therefore that is a species that is not a target to be addressed. There is no evidence of participation (no letters of support, no matching funds) from cooperators, e.g., ADF&G. FY05 funding was specifically for one year funding to test the concept. Thus, though this project was funded for a year, no results from the first year of work were included in the proposal. The basis of this proposal is that a model for pink salmon will be available to be used by fishermen. However, this proposal does not state what the model does. Additionally, the budget only has money for ?transporting? the model to PWSFRAP. There is nothing about the model in here, i.e., there is no testing of model. There is no plan for implementing the model. IDL software is a renewal license, requires a competent person to run this. There is not evidence of such a person available to run it. Nothing is promised to be produced from this one year of work.

This is very expensive for no product. This is obviously a multi-year effort, as all costs appear to be recurring annually. This is only a request to support the office in Cordova. Note this proposal also asks EVOS to buy computer for UMD, which is inappropriate as the model is to be transferred from Maryland to PWSFRAP. If TC thinks this is important (STAC does not think the technical content is important), then TC needs to define a commitment to this project with a long-term plan because most of the costs in the proposal appear to be fixed. If this is to be funded, STAC suggests site visits.

U P D A T E 10/07/05 (after Adams and Mullins revised their proposal and met 9/16 deadline): Adams and Mullins submitted a proposal that is significantly revised and improved and addressed all the changes requested by the Executive Director and the STAC. The PAC concurred with those requested changes. This proposal now provides a well-described background and states what they did in the past with the money EVOS previously funded. Furthermore the proposal is refocused on commercial fishing as an injured service, a realistic and viable approach. This was something that the TC strongly suggested. Additionally, the revised proposal explains that they are using data collected under SEA funding. As SEA funded some synthesis, but did not complete synthesis at the level of the model proposed, this is actually a synthesis project.

All five of the STAC members have reviewed the Adams-Mullins proposal recommend that the proposal be funded. However, we still caution that this is multi-year effort and that EVOS should be prepared to fund over a long period of time to reap the most benefit from it.

Science Director Funding Recommendation: Do Not Fund
Science Director Funding Justification: This proposal does not meet the invitation requirements and does not provide any information on the status of either species and/or services. While this proposal could have long term merit, it would be much stronger if there was a project management plan detailing the outputs, coordination points and identification of check points to provide a review and determination of current and future actions and directions.

Public Advisory Committee (PAC) Funding Recommendation: Modify
Public Advisory Committee (PAC) Funding Justification: PAC strongly supports Adams proposal and recommends revisions proposed by STAC. A modified proposal should be submitted which includes an update on progress of currently funded project and a timeline for projected products. The report from Adams should be reviewed when received and if the results are acceptable, then fund for FY06.

Executive Director Funding Recommendation: Modify
Executive Director Funding Justification: This is a strongly-supported Community Involvement project. It should not be funded in its current form. The PIs are submitting a modified proposal. Their modification needs to describe the results of work previously accomplished on this project and the outcomes achieved. If the Council accepts their modified proposal, it needs to be reevaluated.

Trustee Council Funding Decision: Modify
Trustee Council Funding Justification: The public and some reviewers recognized the potential value of this proposal. Several members of the Trustee Council expressed an interest in their intention to aid commercial fishermen, as ?commercial fishing? is officially designated as a ?not fully recovering? resource. Under these auspices, this proposal would fit with restoration objectives. The recommendation from TC during their 10 August 2005 meeting is to ask Adams and Mullins to modify their proposal and resubmit it to the Executive Director for consideration for funding. This is not to be construed as a recommendation for funding, but rather as an opportunity to address concerns expressed by the STAC, PAC and TC. This proposal will go back out for review once it is received. In their revised proposal, we strongly urge that they (1) address the concerns of the STAC (i.e., state what they have done to date and include results, give objectives and methods for what they propose to do in the future, and prepare a budget that is fully explained, including how funding for a consultant is to be spent); (2) emphasize and clarify the recovery objectives relating to the injured resource; i.e., commercial fishing and lost economic opportunity; and (3) clearly link the proposed model as a synthesis component of the SEA program.

PROPOSAL SIGNATURE FORM

By submission of this proposal, I agree to abide by the Trustee Council's data policy (*Trustee Council Data Policy**, adopted July 9, 2002) and reporting requirements (*Procedures for the Preparation and Distribution of Reports***, adopted July 9, 2002).

PROJECT TITLE: Ongoing Synthesis and Modeling Activities Restoring Injured Commercial Fishery Services.

Submitted Under the BAA

Printed Name of co-PI: Ken Adams

Signature of co-PI: Ken Adams Date 9-15-05

Printed Name of co-PI: Ross Mullins

Signature of co-PI: Ross Mullins Date 9-15-05

Trustee Council Use Only
Project No:
Date Received: ____

PROPOSAL SUMMARY PAGE

Project Title: Ongoing Synthesis and Modeling Activities Restoring Injured Commercial Fishery Services –Submitted under the BAA

Project Period: FY06-FY07

Proposer(s): Ken Adams, PWSFRAP kadams@gci.
Ross Mullins, PWSFRAP rmullins@gci.net

Study Location: Prince William Sound www.pwsfrap.org.

Abstract: Our revised proposal requests funding to continue a collaborative synthesis and modeling study designed specifically to help to fully restore the as yet to be recovered commercial fishery in Prince William Sound, Alaska, through an understanding of ecosystem-level processes that affect fisheries production. Using information obtained by the EVOS TC-sponsored SEA program (1994-99), we are working with Alaska Department of Fish and Game, the regional aquaculture corporations, the Prince William Sound Science Center, local fishing organizations and the Universities of Maryland and Alaska and other collaborators, to implement a previously developed pink salmon survival model (PSSM) that we believe will greatly improve resource forecasting and the assessment of ecosystem health. The results of this work are expected to improve the management and enhancement of salmon in the region, substantially assisting the recovery of injured commercial fishing services that are now characterized by the continuing loss of herring resources.

Funding:

EVOS Funding Requested: FY 06 $ 108,400
(must include 9%GA)

TOTAL: $108,400

Non-EVOS Funds to be Used: FY 06 $ 13.0 in kind contribution from ADF&G of 1 man month for Steve Moffitt and 1 man month for a department biometrician.

TOTAL: $108,400

Date: September 14, 2005

(NOT TO EXCEED ONE PAGE)

PROJECT PLAN

I. NEED FOR THE PROJECT

A. Statement of the problem

The *historically important fisheries economy* of resource dependent communities in Prince William Sound (PWS) Alaska continues to suffer from oil spilled in March, 1989. Our proposal describes a means to mitigate aspects of this ongoing problem by applying sophisticated numerical tools and new insights on ecosystem form and function leveraged by previous studies funded by the Exxon Valdez Oil Spill Trustee Council (EVOSTC) and other sponsors. One of these studies, the Sound Ecosystem Assessment (SEA) program spent $20 million dollars over a 6-year period describing the factors influencing the survival of juvenile pink salmon and herring in PWS. The modeling activity we propose is a direct extension of that important body of results.

The instability of herring and pink salmon stocks are hindering management practices and the efficient harvest of these resources. Pacific herring have failed to recover following the spill and now contribute nothing to the local economies where once they were a mainstay. Pink salmon (wild and hatchery origin) are abundant, but a recent "boom and bust" pattern of returns is disrupting the fishery – during unexpected boom years (2003, 2005) processing capacity has been unable to accommodate the resource resulting in substantial product waste and a reduced participation of fishers. Similarly, during the weak years (2002, 2004) there has been an over-capacity of fishers compete for a limited resource that must also accommodate spawning escapements, cost recovery and an egg take required to restock local salmon hatcheries. Under both conditions – boom or bust - the overall fisheries economy of the region is diminished.

We contend the economic problems (damaged human services) associated with a wildly fluctuating pink salmon production cycle can be alleviated (in part) by achieving more reliable information about "expected levels of adult returns" a year in advance of the fishery. When this is accomplished, management, stakeholders and the industry will have time to adjust their various activities in appropriate and cost effective ways. Unfortunately, the track record for pink salmon run forecasting (State and private) in PWS has been inconsistent and rarely useful to management or the fishing industry. The inability to identify even the most extreme highs (50-60 million adults) and lows (15-20 million) means that until better information becomes available, there can be no meaningful "planning in advance" to mitigate the continuing economie damages associated with these unprecedented production swings.

To address this issue, a continuing synthesis of SEA findings has resulted in the further development and testing of a numerical model designed to simulate processes affecting the survival of juvenile pink salmon in PWS. When properly initialized and updated with environmental information, this comprehensive mathematical formulation tracks the evolving "state" of the juvenile pink salmon stock while it rears for 3-4 months in the Sound each year. Most believe that losses occurring during this *critical period* establish future production levels. If so, *the key to reliable forecasts of run strength rests with accurately accounting for the survival of juveniles in PWS during late spring and early summer.* We propose to do this using the SEA juvenile pink salmon model.

Unlike the statistical methods commonly used to forecast adult returns by others, the SEA model is deterministic, using biological mechanisms described previously as the important modifiers of juvenile salmon survival (primarily environmentally-modulated predator/prey relationships). When in use, the model is embedded in a matrix of upper-ocean measurements that continuously update (force) the simulation process (see Section VI for model details). Ordinarily, obtaining time-series of forcing variables would involve a very expensive field component for any future forecasting program. However, in a fortuitous twist of fate, this requirement can now be met (in large measure) through partnering with the new and growing Prince William Sound Observing System (PWSOS) sponsored by the Oil Spill Recovery Institute (OSRI) and NOAA. A recently completed PWSOS and Alaska Ocean Observing System (AOOS) workshop in Cordova (June, 2005) clearly demonstrated an area for collaboration between those who track the state of the ocean through elaborate local monitoring schemes, and those who require this same information to model aspects of the system that cannot be observed directly; for example – the crucial time-varying state of local fry stocks each spring and summer.

Commercial fishing is recognized in the EVOSTC 1994 Restoration Plan and the 2002 Update on Injured Resources and Services as an *oil spill injured human service*. It is currently listed as recovering but *in need of enhancement*. The goal of securing and sustaining the recovery of the PWS marine ecosystem and the economic services it provides is a stated priority for the EVOSTC as well as for those living in the PWS spill impacted region. Achieving this goal will require the Council's long-term commitment to environmental surveillance and resource analysis. Given the successes of the Trustee Council's Restoration Plan so far, including the suite of research results produced within the Sound Ecosystem Assessment (SEA) program (1994-99), we believe that much of that goal is now attainable. A continuing synthesis of TC sponsored SEA and other results, the integration (including resource economic issues) of that effort with studies recently completed by the NSF/NOAA GLOBEC program in the adjacent Gulf of Alaska, and new oceanographic monitoring at the Prince William Sound Science Center define the major operational elements required to track the ecological health of PWS and guard its cherished fisheries resources.

It is unlikely these important collaborations would be succeeding were it not for TC sponsorship of the Prince William Sound Fisheries Research Applications and Planning (PWSFRAP) group. This grass-roots association serves to facilitate scientific exchanges between partners working on local fisheries problems (including salmon forecasting), and creates functional and efficient linkages between stakeholders and the TC restoration process.

The marine economies and communities of PWS are natural partners for realizing an eventual overall economic recovery. Commercial fishermen have the involvement, personal resources, and the intense motivation - through long-term financial commitment and risks - to be dedicated and effective partners with the EVOSTC. We have always believed that joint investments can accomplish significantly more toward a common goal than is possible through the same investments expended independently. Our experiences since the inception of PWSFRAP in 2002 clearly demonstrate the EVOSTC's wisdom in promoting and sustaining our activities as a means to more fully engage the resources and historical experiences of those who make their living harvesting the valued resources of this region. This partnership continues to demonstrate the contributions possible with strong public sector involvement. In fact, the communications process we have

initiated with EVOSTC support may well become a model for others seeking to find applications for basic science results.

B. Relevance to the 1994 Restoration Plan Goal and Scientific Priorities.

The 1994 Restoration Plan clearly stated its intention that *"restoration will take an ecosystem approach to better understand what factors control the populations of injured resources"*. The work we have undertaken in preparation for the application of previous science results to current economic issues – our proposed juvenile pink salmon modeling - has its roots in the oceanographic and fisheries results produced by the Council with its 6-year SEA program. Without this fundamental background information – achieved through the ecosystem approach - and the synthesis efforts that have followed, we would have no basis for developing a recovery strategy for injured commercial fishing services. However, now that we understand many of the most fundamental aspects of the juvenile pink salmon and herring ecosystems, we are able to offer solutions addressing the continuing production instabilities associated with the non-recovered fishery services. Our goal in proceeding this way is directly aligned with the Trustee Council's 1994 Restoration Plan. While we cannot influence the vagaries of Mother Nature, we are confident that our numerical modeling approach will add to the growing environmental "tool kit" available to those who manage, enhance and use the fishery resources of PWS.

Because of the nature of the ecosystem approach and the expense of large integrated studies, we continuously seek to utilize the knowledge arising from other existing stand-alone programs in PWS: 1) the extensive private hatchery springtime plankton watch; 2) Oil Spill Recovery Institute (OSRI)-supported acoustic and net sampling of zooplankton and fish; 3) Alaska Department of Fish and Game (ADF&G) sampling of late-season surviving juvenile salmon; 4) Global Oceans Ecosystem Dynamics (GLOBEC) pink salmon research in the nearby Gulf of Alaska (GOA); 5) the developing ocean observing systems (Alaska Ocean Observing System (AOOS) and PWS Observing System (PWSOS. In a synthetic sense, our future modeling work is expected to provide a working framework, integration of, and linkages to the above programs resulting in significant research efficiencies and an important sharing of intellectual capital.

II. PROJECT DESIGN

A. Objectives

1. Modeling: Prepare the PWSFRAP office for future operation of the juvenile pink salmon survival model in Cordova by installing the model code in a local server. Test and refine the model formulations, and update the design to accommodate new information obtained after 1998 with attention to issues of initial values and marking fry, forcing and boundary conditions, data assimilation, and economic applications (see Section VI below).

2. Communication: Continue to expand the PWSFRAP website as a readily accessible portal to research accomplishments of interest to the EVOSTC, commercial fishers and the public, and also use the site as a repository for the results of eventual modeling activities serving all project collaborators, stakeholders and others who wish to access the information.

3. Synthesis: Maintain the PWSFRAP office with funds to support critical collaborations between modeling participants and field investigators inADF&G, AOOS, PWSOS, and other cooperating programs such as GLOBEC. Encourage a continual analysis and understanding of previous field and modeling results (an ongoing synthesis) among program participants through interdisciplinary seminars, reports, peer-reviewed manuscripts and workshops/symposiums.

B. Procedures and Scientific Methods

Objective 1. A copy of the IDL program code defining the model will be transported from the University of Maryland to a server that will be installed at the PWSFRAP office in Cordova. Dr. Patrick (the principle author of the pink salmon model) will obtain the required IDL language license from RSI Inc., and complete the installation. The model will be tested and enhanced in FY06 prior to implementation in coming years. Preparation for model applications will draw on a science planning project undertaken in FY05 and expected to be completed and reviewed in FY06.

An off-site portable computer/workstation is requested so that Dr. Patrick can remain engaged with model modifications as necessary from locations outside Cordova and the University of Maryland. Dr. Patrick has plans to spend the major fraction of the remaining FY05 and FY06 in Cordova to address the above-mentioned modeling tasks and to coordinate the effort with participating individuals and other programs in the region. Dr. Patrick's commitment to the future success of our pink salmon modeling project is one of the most important aspects of our work ensuring that the modeling activity will finally be brought to a point of practical application.

The deterministic SEA juvenile pink salmon survival model is composed of a series of linked evolution equations that specify instantaneous rates of change for variables defining important parts of the pink salmon survival system (see Section VI for model details). From any starting point – for example, the numbers of fry entering PWS (provided by the hatcheries and ADF&G) - the equations compute the direction and rate of change for fry in the system. In the forecasting application we are pursuing, the model will provide a spring/summer survival trajectory *and estimate the numbers of fry successfully completing their first 3-4 months at sea (in PWS).* We believe modeled survivals at this time will generally predict the numbers of actual adults returning the following year – high, low or average numbers.

One might wonder if it would be less expensive and more straightforward to directly census the numbers of fry surviving their period of early marine residence in PWS? Unfortunately, the sampling problems associated with these kinds of statistical estimates (timing, spatial distributions, numbers of samples, and gear considerations) result in huge costs and uncertainties that overwhelm the direct sampling approach. This is precisely why a numerical solution and analysis is required.

Objective 2. Our work during FY05 included the design and posting of a PWSFRAP website (www.pswfrap.org) that is being used to inform local communities of past accomplishments (see Appendix 1 for details), and serves as a point of contact for collaborators and others interested in understanding what we are doing. The site was created, and continues to be updated with substantial in-kind support from investigators within PWSFRAP. We view this integrating and synthesis activity, and the evolving web product it represents, as one of the most useful tools our

communications process has undertaken over the past year and we intend to continue to build on what has been initiated by directly supporting its expansion.

Locally, PWSFRAP provides a presence and liaison between the EVOSTC, PWS fishermen and processors, the public, and science and resource management personnel in Cordova and elsewhere. This is a stakeholder initiated project highlighting the need for continued investigation and monitoring of the ecosystem that provides the livelihood for much of the region. Staying in touch with the community that has supported our work is one of our highest priorities.

Objective 3. The continuing analysis and interpretation of our past and present work, and the review and application of the results produced by others defines an *ongoing synthesis activity* that is a major structural element of PWSFRAP. Facilitation of the SEA juvenile salmon survival modeling is a current example of how the organization uses this to draw together expertise and the financial support required to bring real-world problems into alignment with appropriate funding sources. Our past coordinating effectiveness has been enhanced by an identifiable "office" in Cordova where we originate conference calls, internet exchanges and small-person gatherings. In the coming year (FY06), we request continuing support for the office and its work in the community. This work includes maintaining contact with the scientific team that has been creating a science plan to steer future modeling studies, hosting a local workshop demonstrating the pink salmon model and its economic applications, providing the coordination for participation in the further planning of PWSOS and AOOS activities in relation to our salmon modeling, and sponsoring and encouraging the joint publication of reports, manuscripts, and presentations that describe the work the Trustee Council is supporting through grass-roots efforts in Cordova.

The project support we are requesting for FY06 is designed to prepare the way for the eventual full-scale use of the pink salmon survival model at some future date. Deliverables expected in the coming year are: 1) an internally reviewed science plan for future model implementation; 2) a more expansive PWSFRAP website; 3) installation and testing of pink salmon model code in a local Cordova server; 4) hosting a modeling workshop demonstrating the pink salmon model; and 5) a draft plan for the use of PWSOS and other data streams in future modeling efforts.

C. Data Analysis and Statistical Methods

Although the work we envision with the installation of the pink salmon survival model in Cordova is not likely to be stochastic, there will be some comparative analyses of previous runs to assure that the model is behaving correctly. As such, this anticipated work will constitute a model analysis.

D. Description of the Study Area

The PWSFRAP office will be maintained in Cordova and will serve as the communication hub for team collaboration, project administration and public interactions. Presentations of project progress will be made at various locations in Cordova including the PWS Science Center, PWS Aquaculture Corporation, and Cordova District Fishermen United. Continuing project progress will be posted on our website.

E. Coordination and Collaboration with Other Efforts

PWSFRAP will work closely with the developing ocean observing programs on both the state level (Alaska Ocean Observing System (AOOS) and the regional level (Prince William Sound Ocean Observing System (PWSOOS) to discuss and identify physical and biological monitoring products of value to the community and our future modeling effort. We also anticipate participation in synthesis discussions of GLOBEC's recently concluded pink salmon field work conducted over the Gulf of Alaska coastal shelf in the vicinity of PWS. The SEA program investigated the near-shore or estuarine survival of young pink salmon and this work, especially the salmon modeling which incorporates factors influencing juvenile salmon survival, is a direct compliment to GLOBEC's studies on the coastal shelf. Taken together, these two programs offer the promise of even greater understanding of the chief causes of pink salmon marine mortality each year

III. SCHEDULE

A. Project Milestones

October 05-September 06: Continue development of the PWSFRAP website

October 05-January 06: Transfer model code from Univ. of Md. to Cordova site

October 05-April 06: Update the output module for the model that provides real-time assessment of time-varying conditions during each model run.

October 05-Nov 05: Relocate Dr. Patrick to Cordova.

January 06: Attend the annual EVOS workshop in Anchorage.

April 06: Submit a proposal for a pink salmon survival model pilot program.

October 05- Mar 06: Configure and schedule the PI/Collaborator FY06 workshop.

March 06-Sept 06: Hold a Planning workshop for PI's and collaborators that will be open to the public.
October 05-September 06: PWSFRAP would welcome site visits by TC and or staff.

September 06: Submit a report of work completed in FY06

B. Measurable Project Tasks

Complete an internally reviewed Science Plan for the future implementation of the pink salmon survival model in PWS (completes a task begun with FY05 funding).

Development and updating of the PWSFRAP website <www.pwsfrap.org>

Transfer of the computer code from UMD to Cordova; model testing and evaluation.

Development of a draft plan for the use of information streams to and from partnering programs (AOOS/PWSOS, ADF&G, private hatcheries, and other).

Planning workshop for PI's and collaborators that will be open to the public.

Final report of FY06 work.

C. Consolidated View FY05 Accomplishments and FY06 Project Tasks.

Table 1 (pg.15) places the proposed tasks in the context of *a*) general model issues (see p9), *b*) PWS-specific and pink-specific issues (see p11-14), and *c*) the progress during FY2005. The column headers in Table 1 arise directly from *a*) and *b*). The topics "Initial Values," "Boundary Conditions," and "Data Assimilation" are common to all models of this class. Fry marking is region-specific and operationally is part of the initial conditions. However, for this work it is the role of marking in data assimilation that is a priority topic for FY06. (see p14). Routes and pathways is another region-specific topic, one with a large number of applications. Ocean survival is the subject of a companion project that was supported by the Trustees during 2005. The last header reflects the emphasis on economic integration noted several times herein.

The left column of Table 1 is a draft outline of the stages and steps of an application development. Items in this list completed in FY2005 are labeled "05", items starting in FY2006 are labeled "06," and those continuing are labeled "05, 06."

Activities during FY2005 were intentionally broad and diverse. The breadth of the effort is reflected in the distribution of progress across the seven components; the diversity can be seen in the more detailed presentation of FY2005 accomplishments in the bottom three sections. Because of FY2005, the plan for 2006 gives higher priority to the topics of the first, second, fourth, and seventh columns. While all seven subject areas must "work together" in the end, these four are simultaneously the most difficult technically and the most essential for success.

Because of this, the work in 2006 requires much greater direct engagement and interactions with the entities identified in the table because success depends on the effectiveness and commitment of each one. And that goal requires greater immediacy and accessibility and more communication and exchanges by all. The relocation of personnel and of technical capacity to the region is one aspect of the strategy to meet these requirements. A second aspect is the restoration of some of the prior computing capacity in the region and its increased utilization in the planned workshops and online communications

IV. RESPONSIVENESS TO KEY TRUSTEE COUNCIL STRATEGIES

A. Community Involvement and Traditional Ecological Knowledge (TEK)

PWSFRAP is fundamentally a community involvement process or rather, a project continuum seeking to build bridges between the local resource dependent communities, science, and project support providers. In FY'02 and '03, a series of workshops were conducted in Cordova with

participation from the public and project advisors to identify community issues and needs. Other targeted workshops were conducted in '04 to address and begin the resolution of the earlier issues. In FY'05 we began the planning process for implementation of the pink salmon survival model, conducted jointly with an ADF&G project to census out-migrating juvenile pink salmon and partition marine and estuarine survivals. The PWSFRAP project continuum was initiated by members of the fishing community in Cordova. Ken Adams and Ross Mullins are the principal architects of the organization, and their work over the past 4 years has kept the organization alive and responsive to local fisheries needs.

B. Resource Management Applications

The wild pink salmon resource in PWS is managed by ADF&G to sustain its productivity over time. Regional escapement levels have been adopted to assure optimal reproduction each year in the face of changing marine and freshwater survivals and the largest pink salmon hatchery program in the world. Over the years, ADF&G attempted to design a reliable forecasting tool to alert managers, and the fishing industry about anomalous returns – huge or very small. For a variety of complex reasons, a reliable forecasting tool has yet to be developed. The pink salmon survival model discussed here has demonstrated predictive capability in a limited evaluation undertaken during the SEA years (1994-98). In the future we anticipate two complementary approaches to define the forecasting work: indexing of numbers of surviving juveniles emigrating from PWS each year by ADF&G (first-order estimates we believe "may" be related statistically to the adult return), and *estimates of calculated juvenile survivals* driven by observed growth conditions (food and temperature) and predator stocks arising as model results.

Fully implemented in a program of long-term monitoring (PWSOS), the pink salmon survival model will provide an increasingly refined means to both understand the ecological processes causing observed changes in annual survivals, and to produce modeled forecasts based on calculated juvenile survivals during early marine residence. The model will also be used to assist hatchery managers in determining optimal release strategies for fry entering the Sound under different conditions of ocean climate. Finally, the model has demonstrated promise for "experimental" studies of wild and hatchery stock interactions in PWS, a long-standing issue in the region. These other uses will be phased in as the modeling program matures.

V. PUBLICATIONS AND REPORTS

Timely quarterly reports will be provided to the project's NOAA project manager. A project interim report will be made available to the EVOSTC by April 1, 2006 and an annual report will be made available by September 30, 2006.

VI. DESCRIPTION OF THE MODEL, STATUS IN 2004, ADVANCES DURING 2005, ADVANCES AHEAD

Description of the model

Models for Prince William Sound (PWS) are a major legacy of the EVOS Restoration Program. The legacy includes models for circulation, plankton dynamics, herring larval drift, age-0 herring winter survival, *Neocalanus* transport, and pink salmon fry survival—each of these a separate product of the Sound Ecosystem Assessment Program (*SEA*). The legacy also properly includes the continued and continuing development of the models for circulation and plankton dynamics due to support from the Oil Spill Recovery Institute and from the AOOS and PWSOOS programs, with contributions from EVOSTC. The point of this long list is to highlight the fact that all of the models are the same type; the foundation of each is a system of evolution equations. This foundation is the source of some internal and necessary structure. That structure is a natural guide to use in formulating projects involving these models and the natural guide for managing, administering, or working on such projects. This Appendix starts with the structure and then commences to paint the picture of the pink salmon fry survival model on and over this structure. The painting is not abstract; the painting proceeds in chronological order through a real history. The bottom line is the hope that future encounters with this or related models will be a lot more obvious with this Appendix than without it.

A second reason for this Appendix is its role in a full and effective response to the many thoughtful and useful comments and requests received. Many of the requests are understood by us to be looking not only at the issue at hand but looking past that issue and into the body of this work—what it was, what it did or still does or could do and to what end. The sense of the collaboration was that a significant fraction of those interested enough to ask could not be properly answered without the inclusion of something like this Appendix in this revised proposal. With that, we turn to the common structure.

The models share the following three-component structure:

M-1. For the subject environmental or ecological subsystem, an approximating representation in the form of a system of evolution equations; (Patrick et al., 2006, v1 chs 3, 4)
M-2. A numerical analysis of the equations and an approximating numerical solution;
M-3. A computer program which implements the numerical solution.

The term "evolution equations" denotes a class of differential equations in which the equations have a specific form. Let t denote time, and let u be a time-varying function of a scalar variable x, with values denoted by $u(x,t)$. The function u is described by an evolution equation if the defining equation can be put in the form

$$\frac{\partial u}{\partial t} = G(u,t) \qquad \text{along with initial and boundary conditions} \qquad \text{(A1.1)}$$

where G is a time-varying differential operator which acts on u only by $\frac{\partial}{\partial x}$ (any order). In particular, $\frac{\partial}{\partial t}$ appears only on the left side of the equation and only first order. If u is multivariate, $u = (u_1, u_2, \ldots, u_m)$, then there is a system of m evolution equations and a set of m operators G_i, $i = 1, \ldots, m$, with $\frac{\partial u_i}{\partial t} = G_i(u,t)$. Similarly, we can have $x = (x_1, x_2, \ldots, x_n)$

and the corresponding n partial derivatives $\frac{\partial}{\partial x_j}$, $j = 1, 2, \ldots, n$. For the special case of u depending only on t or that of G being a time varying function of u (i.e., not an operator, no derivatives of u), then (A1.1) reduces to a first order ordinary differential equation.

For M-1 to be more than a conjecture, we need M-2 and M-3 and we also need the following:

A-1. A source of either historical or realtime real-world data for initial conditions and forcing conditions, data which satisfies requirements regarding coverage of the relevant domain (i.e., time interval or time plus spatial region) and sampling frequency; (Patrick et al., 2006, v1 chs 2, 6; v2) (Willette et al., 2001)

A-2. Procedures whereby modeled states of the system (past, present, or future) are compared with corresponding observed states; (Patrick et al., 2006, v1 ch 2) (Willette et al., 2001; Willette et al., 2000)

A-3. If the time interval of interest is longer than the interval during which the model with A-1 and A-2 alone satisfies accuracy requirements, procedures for observation-based adjustments that reduce the difference between computed and observed states (i.e., data assimilation).

While the capability to numerically reproduce or track the evolution of the state of the real-world system is essential if M-1 is to have scientific and application relevance, in the case of knowledge-directed objectives, objectives whose statements use words such as "explanations" and "understanding," this capability alone is only marginally more enlightening than the observed data it seeks to reproduce. The path to objectives of this type is through two further common items:

Q-1. Qualitative analyses of the evolution equations of M-1; (Patrick et al., 2006, v1 chs 5, 6)

Q-2. Collections and accounts of the results of the analyses. (Willette et al., 2001)

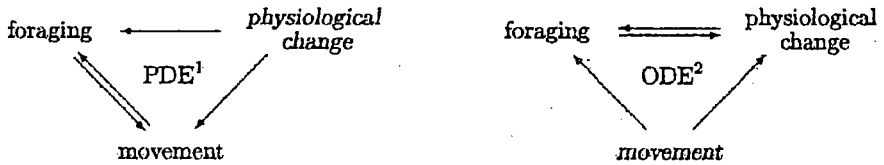
In principle, all that is needed for Q-1 and Q-2 is a completed M-1. However, the history of the psf model development consistently shows that serious advances in Q-1 and Q-2 occur only in response to unanticipated, unexplained results from numerical simulations of real-world scenarios, i.e., questions that **follow from** the activities in A-1 through A-3.

The pursuit of an effective, applicable, economically viable, evolution equation representation of the ecological subsystem associated with pink salmon fry in PWS (more briefly, *pink salmon fry survival model*; more briefly still, *psf model*) is now in its thirteenth year. By the end of 2003, seven of the eight common features above had been realized. Because of support during 2005 and 2006, the realization of an informal version of data assimilation, the remaining item, is at hand. Project managers should find the foregoing description useful because the order used for the presentation is the "natural" order to use in constructing a project plan for model development.

The most current draft of the nearly complete two-volume book on the psf model addresses the topic of M-1 in Chapters 3 and 4 of Volume 1 (Patrick et al., 2006). That treatment begins with the most general and most current formulation (developed in 2003) and then describes the representation of 1998 as an approximation of the more general form. Because the 1998 version is the basis for the existing implementation (i.e., M-2 to A-3) and because the interest here is both programmatic and technical, the presentation below is chronological, moving from origins to 1998 approximation to later refinements and up to today.

Developmental history and milestones

The diagram in (A1.2) shows the three mechanisms by which the spatial distribution (i.e., density function) of a trophic group's biomass is changed: 1) foraging, i.e., consumption, changes labels—mass that before consumption carried the label of a prey trophic group is designated "gut content" of a predator trophic group after consumption; 2) assimilation and metabolic processes determine the fraction of the consumed mass that ends up with the label of the predator's trophic group; 3) a trophic group may simply change its location or alter its spatial distribution or both. Stating the three processes mathematically and similarly stating the three interdependences is what M-1 above is all about. From 1989 through 1998, the model development pursued in parallel the two 2-component problems in (A1.2): *a*) the representation of foraging and movement and their interdependence (double arrows in left diagram); *b*) the representation of foraging and physiological change as a closed-loop system (double arrows in right diagram).



(A1.2)

1989–1992 Mason and Patrick wrote the first version of what later would become the psf model (Mason and Patrick, 1993). Aware of the simplicity of the pelagic ecosystem of Lake Michigan and with an interest in the debate-of-the-day regarding ecology as a science (Peters, 1991; Guilizzoni, 1996; Egler, 1977; Egler, 1986), they set about exhibiting a mathematical representation of the system dynamics. The real pelagic system was approximated by a tropic web $\mathcal{T}$ with four trophic groups spanning three trophic levels. The **state** of this system at time t is, by construction, the instantaneous values of the four, time-varying population density functions $u_f(x,t)$, f in $\mathcal{T}$. For this initial study, all densities save that for the group in the middle (alewife) were assumed known for all space and time (i.e., forcing), as were all relevant environmental variables. The evolution of the unknown density u_f, f = alewife, was described by the diffusion-taxis equation (A1.3) with D_f and χ_f constants, with zero-flux boundary conditions, and applied to scenarios with short time intervals such that physiological changes are negligible (i.e., fixed and forcing) and predation losses can be ignored (i.e., $\Re_f = 0$).

$$\frac{\partial u_f}{\partial t} = D_f \operatorname{div}\operatorname{grad} u_f + \chi_f \operatorname{div}\Big(u_f \operatorname{grad} \lambda^f(x,t)\Big) - \Re_f(x,t) \qquad \text{(A1.3)}$$

The focus of the work was the "loss function" $\lambda^f(x,t)$, a function which for each time t examines the foraging rate at x together with a suitably defined predation risk at x and outputs a measure of the "unfavorableness" of position x relative to alternative nearby sites. By construction, individual movement is "downhill," from larger to smaller values of $\lambda^f(x,t)$. The evolution equation (A1.3) was not solved numerically, instead, the quasi-stationarity $\frac{\partial u_f}{\partial t} = 0$ observed for most time was assumed to hold for all time.

1 In the 1998 approximation, this component is represented by partial differential equations (PDE).
2 In the 1998 approximation, this component is represented by ordinary differential equations (ODE).

1994–1996 EVOSTC / SEA

1. Finite element, hybrid method solution for systems of equations of type (A1.3).

Investigators: Prof. R. H. Nochetto, U.MD.; S. P. Rao, Santa Monica.

Scope: constant diffusivity D_f; constant taxis coefficient χ_f; any loss function λ^f; any reaction function $\Re_f$; any number of trophic groups (i.e., number of equations).

Completion: Mixed-method, 1D solution, coded in C, tested and operational in 1995. Migration to 2D and 3D explored but abandoned due to insufficient resources. A smaller, faster hybrid solver for (A1.3) was completed in mid-1996, coded in IDL, and made the solver in the new Combined Code by winter.

Documentation: (Nochetto, 1993; Nochetto and Rao, 1996; Nochetto and Rao, 1997)

2. Closed-loop representation of individual foraging-physiology in (A1.2).

Investigators: E. V. Patrick, D. M. Mason.

Scope: integration of foraging, gastric evacuation, and bioenergetics;

State variables: mass a_j of prey type j, $j = 1, \ldots, n$, in gut [or total mass $a = \sum_j a_j$]; energy b in fast-access buffer; whole body (wet) mass m; fork length ℓ.

Representation: $n + 3$ [or 4] ODEs, solved numerically within model code.

Features in 1996: autoselection of particle or ram feeding mode (by optimum mass flux); foraging includes submodels for *schooling* and *capture probability*. two feedback variables b and $a = \sum_j a_j$ enable accurate reproduction of published reports regarding fry feeding behavior (Godin, 1981a; Godin, 1981b; Godin, 1990) as well as non-continuous, episodic feeding of adults.

Completion: tested, coded in IDL, operational in 1995, in Combined Model in 1996.

Documentation: VOL 1 CH 5 "Foraging and physiological change" (Patrick et al., 2006).

1997 EVOSTC / SEA

Investigators: E. V. Patrick, T. M. Willette, R. T. Cooney, J. R. Allen, D. M. Mason

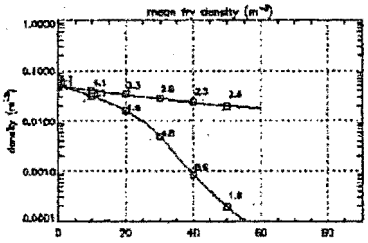
3. Model simulations exhibited the instability in Figure A1-1. The lower curve is the change from the upper curve due to a doubling of the number of predators. This raised three questions: Is the model flawed? If not, where is there evidence of survival rates as low as is indicated? If such a record exists, what are the "mechanics" of this "sensitivity" and of the "crash" or "bloom" alternative outcomes?

The historical record for annual mean survival for individual hatcheries has never exhibited a return as low as Figure A1-1 indicates is possible. However, Coded Wire Tag records of survival (Figure A1-2) do.

A qualitative analysis was undertaken to determine the origins and properties of the instability in Figure A1-1, and the Crash-Bloom Lemma (Patrick et al., 2006, VOL 1 CH 6), (Patrick, 1997) is the formal statement of the results. The lemma and Fig A1-1 describe a simplified predator-prey scenario in which the predator is satiated (less than 24 hours to fill gut), a situation also called "predator swamping" by hatchery managers. Although relatively simple in form, the lemma is a source of many excellent lessons about ecosystems and mathematics.

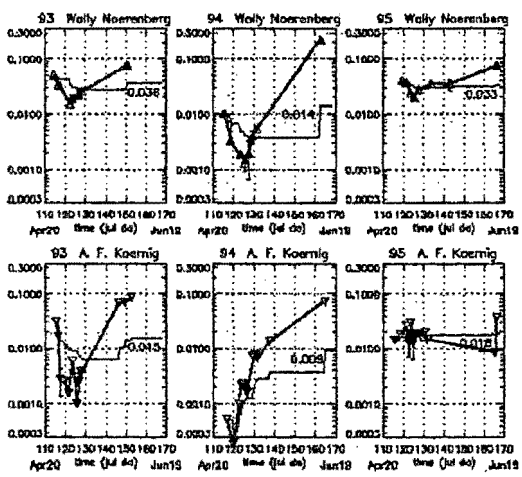
4. Coded Wire Tags (CWT) had a critical role in the development of the psf model.

- The "signals" in survival data were strong and their reproduction was absolutely essential.
- The structure of tagged groups was used to define model subgroups.
- CWT survival data shares the spotlight with the inability of contemporary sensors to track the surface adhering pink salmon fry and their inability to monitor the movement and distribution of adult fish relative to the nearshore as the reason for changing the implementation plan from transversal to parallel relative to the migration path;
- Implementation included comparisons between field observed and simulated physiology data collected or computed at times spanning the migration period. (Willette et al., 2001; Willette et al., 2000)



x-axis: time since release (das.)
y-axis: fry density (m^{-3})

Figure A1-1 Fry evolution under identical scenarios except predator density for lower curve is twice that for upper curve.



x-axis: Julian date of group's release

Figure A1-2

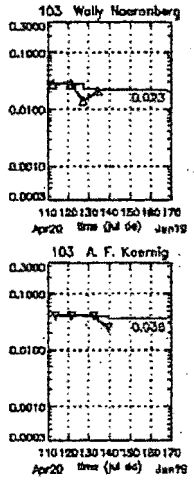


Figure A1-3 thermally marked

CWT survival records total marine survival of a group. The *relative pattern* is a PWS fingerprint if the survival for all groups once outside PWS is relatively uniform. In 1998, this was assumed to be the case. At the PWSFRAP workshop in March 2004, Prof. Lew Haldorson reported that his findings from his GLOBEC studies in the PWS-GOA transition region were consistent with the 1998 assumption.

1999

5. The 1998 version of the model had performed reasonably well, but it had been unable to reproduce the dominant feature in the WHN 1994 survival, a strong mid-release minimum.

The construction of the model had been parsimonious in the sense of what processes were included. The foraging model had been left non-discriminating, that is, the attack probabilities for all prey encountered were the same. The appropriateness of an optimizing foraging model was left open and none had been implemented. It was known that the WHN 1994 survival pattern could not be generated by a linear process. An optimum mass flux submodel was added to the psf model in early 1999; almost immediately thereafter the model successfully reproduced the survival pattern of WHN 1994.

2000–2004

6. Success in 1999 created two new problems for 2000. First, despite repeated examinations of all the simulation outputs, no one could identify from inspection how the modeled physiological system, in conjunction with the several time-varying forcing conditions, had reproduced the WHN 1994 survival data. In addition, there was the pending high costs of independent production of a peer reviewed, publishable paper on the psf model. The obvious second problem was the fact that the paper could not be written without a second independent investment in the research required to solve the first problem.

This marked the beginning of efforts to integrate these activities into the economy. The mystery was solved regarding the mechanisms responsible for the WHN 1994 data, the paper was written and accepted (Willette et al., 2001), and private investment covered the costs. The dilemma of cost recovery was addressed by rolling the half-year effort into a further effort, the production of the book cited herein and made available for review. The WHN 1994 question was non-trivail; its solution is split across chapters 5 and 6 of the book.

Summary of development and findings in 2005 and fundamental factors

The foregoing makes clear that the in-sound resource in 2005 are very different from the resources in 1998. The year began with the view on the alignment between problem and new resources that was blurry and undifferentiated. The year ends with much sharper focus and significant progress with project resources as well as with project structure. It is hoped that this is conveyed by Table 1. The structure of the table is a result in itself; that structure mirrors the project structure which is behind the details described herein.

During 2005, the goal was undifferentiated—establish collaborative awareness of the resources available now relative to the seven components. The entries "05" and "05, 06" mark progress. The entries "06" identify tasks to commence October 2005. The relative projected progress is misleading; it reflects not just priority and level of effort but also past relationships and previously established progress. At the end of 2005, the perspective on priority is as follows: 1) "I.V. & Markings," "Data Assimilation," "Economics," "Model (in itself)"; 2) "Routes & Pathways," "Ocean Survival"; and 3) "Forcing & Boundary Conditions."

The position here is that projections will be meaningful and useful only when there is a solution to the problem of data assimilation during fry outmigration. From Figure A1-2, one could assume that the CWT signatures would be evident in the fry population *prior to* departure from PWS. Unfortunately, the very limited number of tags used kills that idea. However, thanks to CWT, we learned just how far we can go with knowledge of relative values for observables (e.g., escapement). The conversion to thermal marking (Hagen et al., 1995; Munk et al., 1993) gives us one step forward and one step back. 100% marking solves the problem of sample size with CWT. However, Figure A1-3 shows that the resolution now available with otolith marks is very limited and possibly further degraded by new release techniques. At PWSRAP workshops, both VFDA and PWSAC are consistently optimistic regarding more marks. There is another advance. The summer monitoring of outmigrating fry by ADF&G, now with 100% marked fish, is a new resource for data assimilation that we have begun to study in 2005 and will be examining in depth in 2006. This problem of data assimilation in PWS in 2005 is reminiscent of the problem of evolution equation models for PWS in 1993. We repeat here what we said in 1993: This problem is solvable.

III. SCHEDULE C. Consolidated view of FY05 accomplishments and FY06 project tasks

Common and PWS-Custom Components of a Model-based Application Development Program

Table 1

(see Sec VI p9-10)

Stages & Tasks for Model-based Dev. (see Sec III-C p7)	MODEL eqns numerics code, hrdwr	INITIAL VALUES & MARKINGS	FORCING & BNDRY CONDTNS	DATA ASSIMILTN	ROUTES & PATHWAYS	OCEAN SURVIVAL	ECONOMICS open source	ECONOMICS cost recovery
information / expertise and owners / maintainers	K. Adams R. Mullins PWSFRAP COLLABORATION V. Patrick T. Cooney S. Moffitt M. Willette	VFDA PWSAC ADFG CDV UAF Juneau P. Hagen	PWSOOS AOOS PWSSC OSRI VFDA PWSAC U. Maine JPL	ADFG CDV UAF Juneau ADFG Soldtn U. Maine JPL	PWSOOS AOOS ADFG CDV ADFG Soldtn OSRI PWSSC U. Maine JPL	ADFG CDV ADFG Soldtn	EcoTrust Mar Adv Prg CRWP EPC Simon Fraser PWSFRAP	EcoTrust Mar Adv Prg CRWP EPC Simon Fraser PWSFRAP
[06] = begin - partial completion <06> = as needed, context dependent	adv comm							
INPUTS & CONSTRUCTION								
design								
init. contact -- agree to contin	05	05	05	05	05		05	05
exploratory & info exchange	05	06	05 , 06	05	06		05	06
testing -- issue resolution	06	<06>	<06>	<06>	<06>	05		
hardening	06	06	06	06	06	06	06	06
agreement	06	06	[06]	06	[06]		06	06
Request for Comments (RFC)	[06]			[06]			[06]	[06]
implement								
feasibility -- tech & finance	[06]	[06]	[06]	[06]	[06]		[06]	[06]
establish financing								
agreement to commence								
schedule hardening								
start								
manage								
eval -- technical								
eval -- financial								
continue / stop								
OUTPUTS	(during development, pre-implement.)							
this proposal	05	05	05	05	05	05	05	n/a
extranet & reports	05 , 06	06	06	06	05 , 06		05 , 06	n/a
collaboration server, intranet	05 , 06	05 , 06	05 , 06	05 , 06	05 , 06	05 , 06	05 , 06	n/a
technical library	05 , 06	05 , 06	05 , 06	05 , 06	06	05	05 , 06	06
data library	05 , 06	05 , 06	06	05 , 06	[06]		06	06
publishing	00-03							05 , 06
curriculum	05 , 06	[06]	[06]	[06]	[06]		05 , 06	05 , 06
COLLABORATION								
size & scope of active involvement	6	3	3	5	1	3	3	3
teleconferences	total: over 30	4 or more collab/confer		min 2 teleconf per implement component in 2005				
on-site workshops								
PWSFRAP Cordova, Oct 24-27, 2004	spkr V. Patrick		spkr T. Cooney		invited spkr Carl Schoch	spkr Mark Willette	guest speaker Astrid Scholz, EcoTrust	
AOOS - PWSOOS Conference Cordova, June 15-18	invited speaker, T. Cooney	session lead R. Mullins						
Economic sector interviews (participants unaffiliated)	1 economist 2 organizer	conserv org native interests	3 snr. comm fisherman 4 snr. comm fisherman		5 hatchery founder, ex. dir 6 elected official, city gov		7 snr. mangr	processor
TECH LIBRARIES	Sci Plan *Oct 2004* psf book Int - full text Ext - samples *Dec 2004* psf curriculum modules *in progress*	thermal mark 5 doc/pubs *Dec 2004* AK Salmon Hatchery Annual Rprt AFK 1997-2004 CCH 1997-2004 SGH 1997-2004 WNH 1997-2004 *Jan 2005*	PWSOOS / AOOS Conf Jun 2005 transcripts *Sep 2005*		LIDAR 2 tech docs pws surv 01 pws surv 02 *Dec 2004* PWSOOS / AOOS Conf Jun 2005 transcripts *Sep 2005*	mark recapture 1 item natural mort 1 item		
DATA LIBRARIES	psf model simulations'99 graphic dsply animations online *Aug 2005*	CWT codes, srvvl RY1976-1987 RY1988-1996 complete *Aug 1997* Thermal Mrk codes,srvvl 1997 - 2004 complete *Jan 2005*	PWSSC/OSRI R. Thorne zooplankton acous. survey agreemnt w/ PI access TBD *Dec 2004* VFDA/PWSAC Wells / Reggiar zoopl. & T, S (hatch. watch) agreemnt w/ Di *Oct 2004*	ADFG summer fry surveys 1997 - 2003 complete *Mar 2005* GLOBEC summer fry surveys 1998 - 2001 ?? agreemnt w/ PI *Dec 2004* access TBD				

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A line from Guilizzoni's recollections followed by a quote (slant type) said to come from a Peter's letter:

...I also recall your doubts, your desire to transform ecology into a quantitative science like other scientific disciplines.

...

I think the "Critique" is part of a movement that is unsatisfied with hand-waving and impotency, with the feeling that we know very little. I hope it will encourage people to produce real, albeit simple predictions, because once one gets the taste for useful, informative science, the pallid imitations offered by classical ecology are not satisfying.

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RESUMES

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Brief Summaries of Professional Histories

In late February of FY02 and continuing in FY03, Adams and Mullins were provided funding for a "pilot project" by the EVOSTC entitled "Fisheries Management Applications" (02636 and 03636). Adams and Mullins have acted as co-coordinators for this **Community Involvement Project.** The name adopted by the Co-PI's for their project is Prince William Sound Fisheries Research Applications and Planning group (PWSFRAP).

In FY03 PWSFRAP incorporated into the project a volunteer Science Advisory Panel that was comprised of Mr. Mark Willette, former SEA PI and ADF&G research biologist; Mr. Tim Joyce, a former ADF&G management biologist, hatchery operator, US Forest Service subsistence biologist and currently serving as mayor of Cordova; Dr. Richard Thorne, a scientist at the PWS Science Center working on zooplankton and acoustic bio-mass fishery issues. Dr. Tom Kline, a scientist with PWSSC working in the area of marine isotope linkages in the ecosystem, and Dr. Ted Cooney (retired) chief scientist of the SEA program with a long history of PWS science involvement and Dr. Vince Patrick, former SEA P.I. modeler and dedicated supporter of community involvement process.

PWSFRAP was funded in FY'04 for continuation of the needs identification and resolution project begun in FY '02 and '03. After extensive collaboration with advisors and financial support from the EVOS Trustee Council and the Oil Spill Recovery Institute, Adams and Mullins hosted a successful three day workshop in Cordova from March 16-18, '04 aimed at improving pink salmon forecasting accuracy in PWS. In FY '05, PWSFRAP collaborators working jointly with personnel from the Alaska Department of Fish and Game, began the planning process for implementation of the Pink Salmon Survival Model (PSSM) developed within the SEA program. The PSSM implementation holds considerable promise for assisting with resource forecasting, harvest and enhancement.

Ken Adams

Ken Adams has been a commercial fisherman for 25 years. During that time he has held permits and owned vessels in a number of the fisheries of PWS.
Adams obtained an MA degree in biology from San Francisco State College (1970) and a BA in Science from Trenton State College in Trenton, New Jersey (1967). In addition Adams has completed approximately 30 credit hours toward a PHD degree in biology at the University of California, Santa Barbara. He has taught science classes in high school (1974-1980) and at the PWS Community College in the mid '80's.

Adams has held seats on the Board of Directors of PWS Aquaculture Corp., Cordova District Fishermen United, and PWS Science Center. He is currently serving as a Board member of the American Seafood's community advisory board. During 1993 Adams was a participant in the four-month planning process that created the Sound Ecosystem science plan and served on the BOD of the PWSSC for nine years. Adams has actively followed the progress of the overall restoration plan with the goal of identifying results that can now contribute to securing and sustaining the recovery of commercial fishing.

Ross Mullins

Ross Mullins has resided in Cordova since 1963 where he has pursued an active career in the varied commercial fisheries of the PWS-Copper River area. He has been both the owner operator of various vessels and, during the time that the herring fisheries were viable, he was President of MSP Corporation, a processor of herring products for export to Japan.

Mr. Mullins has been active in the various fishery related organizations of the region. He has served on the BOD and Executive Committee of PWSAC for many years since that organizations inception. Mullins has been a member of the BOD of CDFU and the former Cordova Aquatic Marketing Association for many years. In the late 60's and early 70's Mullins created the "Marine Pollution Committee" of the Cordova District Fisherman's Union with the intent to alert the community to the dangers posed by the transportation of oil by super tanker through PWS. This group funded an effort to prevent the siteing of the oil terminus at Valdez and promoted transport of oil to the lower 48 via pipeline through Canada. Mullins is a member of the Copper River Salmon Producers Assn. Mullins served on the BOD of the Alaska Commercial Fishing and Agriculture Bank for 13 years. Mr. Mullins is the founder and chairman of the PWS Fishermen Plaintiff's Committee, an organization that serves to provide that serves to provide an interface for information to the local community relating to the Exxon Valdez oil spill litigation. Mullins was a participant in the planning process that created the Sound Ecosystem science plan. That plan was the foundation document for the SEA program. During the period since the close of the SEA program Mullins has remained involved in attempting to understand the results of the technical assets and resources acquired through the SEA program.

Mr. Mullins attended the University of New Hampshire, the University of Michigan, and obtained a BFA degree in photography from the San Francisco Art Institute.

Chief Project Collaborators

Robert "Ted" Cooney

Robert "Ted" Cooney is a Professor of Marine Science Emeritus at the University of Alaska Fairbanks where he served in the Institute of Marine Science for nearly 30 years. His major publications are in the areas of marine zooplankton, marine ecology and fisheries oceanography, most notably descriptions of the juvenile salmon ecosystem. His teaching experience centers around graduate level courses and seminars in biological oceanography. From 1994 to1998, Dr. Cooney served as Lead Scientist for the EVOS Trustee Council funded Sound Ecosystem Assessment (SEA) program. Most recently, Ted has been working with Alaska Department of Fish and Game, the Prince William Sound Science Center, the regional aquaculture corporations in Prince William Sound, and other university scientists on the problem of extending the scientific breakthroughs of SEA to practical fisheries applications. As an advisor to the Prince William Sound Fishery Research Applications Program (PWSFRAP), he has assisted with workshops on resource forecasting and pink salmon modeling. He presently serves on the science and technical committee of the Oil Spill Recovery Institute in Cordova.

Steve Moffitt

Steve Moffitt is the Area Research Project Leader for Commercial Fisheries Finfish Research with the Alaska Department of Fish and Game in Cordova. Steve has a B.S. in Wildlife Management from the University of Alaska Fairbanks (1989). His previous careers include work as a Land Surveyor and six years managing the family dairy farm in Palmer, Alaska. He started work with the Department of Fish and Game in Cordova as a college intern in 1988. Steve has been working full time in the Cordova office since 1989. His current research duties include preseason and inseason forecasting and biological escapement goal analysis

E. Vincent Patrick

Vince Patrick is currently a Research Associate at the Institute for Systems Research at the University of Maryland, College Park, MD. He first traveled to Cordova in November 1992. In September 1993, he returned to serve as a member of PWSFERPG and later as principal investigator for the Information Systems and Model Development Project for the SEA Program. Since 1999, Vince has been an independent investigator, organizer and occasional writer. In March 2000, he left Cordova and returned to Maryland. A continuing interest is the incompatibility of the commons and the corporation. To that end, he has studied contemporary banking and monetary systems: he had a math note acknowledged and posted by a popular online lecturer. He established CFIMS Press to resolve his own issues with traditional academic publishing versus contemporary economic realities. Vince has remained actively involved with long-time collaborators among the Cordova fishermen and with the senior project managers at the PWS Regional Citizens' Advisory Council. Vince received a B.A. in Physics from Thiel College in Pennsylvania in 1967, and a M.A. and a Ph.D. from the University of Maryland in

1982 and 1987 respectively. Previous positions include Senior Engineer at AIMS, Inc. in Rockville, Maryland, and Physicist at the Center for Night Vision. Dr. Patrick will move from Maryland to Cordova, Alaska to oversee the transition of the model code from the University of Maryland to a server at the Cordova office of PWSFRAP and to work on model code in preparation for future model implementation.

Richard Thorne

Dick Thorne received a M.S. in Biological Oceanography (zooplankton ecology) from the University of Washington in 1968 (at the same time Ted Cooney was working on his doctoral research) and a Ph.D. in Fisheries from the University of Washington in 1970. He remained at UW on the research faculty of the School of Fisheries, specializing in fisheries acoustics, eventually reaching the rank of Research Professor. In 1989, he left for BioSonics, Inc., in Seattle, where he became Vice President and Director of Technical Services. He worked primarily on Columbia River downstream salmon migration issues at hydroelectric dams. In January 2000 Dick came to Cordova at the urging of PWSSC President, Gary Thomas, a long-time friend and colleague. He has three main projects at the Science Center: Zooplankton Monitoring, Herring and Pollock Monitoring, and Stellar sea lions.

Mark Willette

Mark Willette is currently the Research Project Leader for the ADF&G Commercial Fisheries Division in Upper Cook Inlet with research interests in preseason and inseason forecasting of salmon returns, and studies examining productivity of salmon stocks. He is currently working on research projects examining effects of oceanographic conditions of run timing and catchability of adult sockeye salmon and ecology and energetics of juvenile sockeye salmon. He was previously the principal investigator for EVOS Damage Assessment and SEA studies on juvenile pink salmon in Prince William Sound.

Project Consultants

Milo Adkison

Milo Adkison is an Associate Professor at the Juneau Center, School of Fisheries and Ocean Sciences, University of Alaska Fairbanks. He earned a doctorate in fisheries from the University of Washington in 1994. He has also worked for the Biological Resources Division of USGS and as crew on a Bristol Bay gillnetter. He specializes in the quantitative aspects of management of Pacific salmon fisheries. Some of his current projects include: forecasting SE AK pink and chum salmon returns, estimating abundance and escapement for Yukon and Kuskokwim chum, identifying the determinants of early marine survival in SE AK Coho, improving the Chinook Technical Committee model, setting escapement goals when climate is changing productivity;, and adjusting sockeye escapement goals to account for nutrients in carcasses.

Lewis Haldorson

Lew Haldorson received his Ph.D. (1978) and M.A.(1973) from University of California Santa Barbara and B.S.(1963) from University of Minnesota. His primary interests are teaching and research in biology of marine fishes. Research interests include ecological relationships and population dynamics of nearshore fish populations with an emphasis on Arctic and SubArctic rocky reef communities. Other research is focused on the early life histories of marine fishes, with emphasis on larval ecological relationships. Apparently, most of the variation in year class strength of marine fish species results from differential mortality during egg and larval stages. Studies are being conducted to determine the effects of prey availability on growth and survival of selected marine larval fishes. Lew has been a principal investigator of GLOBEC's multi year study of the Gulf of Alaska's coastal shelf in the vicinity of PWS. Their focus has been on climate change and response of key species such as pink salmon.

Alex Wertheimer

Alex Wertheimer is a Research Fisheries Biologist with NOAA Fisheries, National Marine Fisheries Service Auke Bay Laboratory. He has been involved with research on Alaska salmon for over 30 years, during which time he has focused on enhancement technologies and strategies; marine ecology of Pacific salmon during their early ocean residency; straying rates of salmon; status reviews of Alaska salmon; the effects of hydrocarbon contamination on early-life stages of salmon; and ecological and genetic interactions of wild and hatchery salmon.

2006 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2006 - September 30, 2007

Budget Category:	Authorized FY 2005	Proposed FY 2006
Personnel	$37.7	$37.8
Travel	$9.9	$6.2
Contractual	$31.9	$37.3
Commodities	$0.3	$0.3
Equipment	$0.0	$11.6
Subtotal	$79.8	$93.2
Indirect	$6.2	$6.2
Project Total	$86.0	$99.4
Trustee Agency GA (9% of Project Total)	$7.7	$9.0
Total Cost	$93.7	$108.4
Full-time Equivalents (FTE)		1.0
Other Resources	$18.0	$13.0

LONG RANGE FUNDING REQUIREMENTS

Estimated FY 2007
$150.0

Dollar amounts are shown in thousands of dollars.

Comments:

ADF@G in their FY05 companion proposal was funded by the EVOSTC for the PIT tag field research($18k). For FY06 ADF&G has agreed to provide a $13k in kind contribution for data and statistical analysis consisting of 1 man month for Steve Moffitt and 1 man month for a department biometrician.

Indirect rate: 5.8% (Includes office lease @ $4.3 {$360 x 12mo}; utilities @ $1.2 {$100 x 12mo}; liability insurance @$.07)

Trustee Agency GA (9% of Project Total) $9.0 (this amount is entered manually above as no row was available in the TC provided format.)

Co-PI's Adams and Mullins devote essentially full time to the project with the exception of approximately 4 months in summer when fisheries are conducted.
Mullins is retired and maintains project activity during summer months as required.

FY06

Prepared: 09/14/2005

Project Number: 060784-BAA
Project Title:Ongoing Synthesis and Modeling Activities Restoring Injured
Commercial Fishery Services
Name: Ken Adams and Ross Mullins

FORM 4A
Non-Trustee
SUMMARY

2006 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2006 - September 30, 2007

Personnel Costs:			Months	Monthly		Proposed
	Name	Position Description	Budgeted	Costs	Overtime	FY 2006
	Ken Adams	Co-PI	2.5	4.8		12.0
	Ross Mullins	Co-PI	2.5	4.8		12.0
	Liz Senear	Tech/Admin	2.0	3.0		6.0
	Ted Cooney (Retired)	Consult	0.4	6.4		2.6
	Dick Thorne (OSRI/PWSSC)	Consult	0.4	6.4		2.6
	Lew Haldorson (GLOBEC)	Consult	0.4	6.4		2.6
	*EV Patrick UMD(PS model development)	See contractual	3.9			0.0
	*Mark Willette (ADF&G Fisheries Researc	agency consult at no cost				0.0
	*Steve Moffitt (ADF&G Fisheries Researcl	agency consult at no cost				0.0
						0.0
						0.0
						0.0
		Subtotal	12.1	31.8	0.0	
					Personnel Total	$37.8

Travel Costs:			Ticket	Round	Total	Daily	Proposed
	Description		Price	Trips	Days	Per Diem	FY 2006
	Ken Adams		0.28	1	4	0.10	0.68
	Ross Mullins		0.28	1	4	0.10	0.68
	FY06 Workshop: 4 participants travel:	Patrick 1@$1200	1.20	1	3	0.15	1.65
		Cooney 1@$1100	1.10	1	3	0.15	1.55
		Haldorsor 1@$350	0.35	1	3	0.15	0.80
		Willette 1@$400	0.40	1	3	0.15	0.85
							0.00
							0.00
							0.00
							0.00
							0.00
							0.00
						Travel Total	$6.2

FY06

Prepared: 09/14/2005

Project Number: 060784-BAA
Project Title: Ongoing Synthesis and Modeling Activities Restoring Injured
Commercial Fishery Services
Name: Ken Adams and Ross Mullins

FORM 4B
Personnel
& Travel
DETAIL

Contractual Costs:			Proposed FY 2006
Description			
Phone	$60.00	month x 12	0.72
Internet	$176.00	month x12	2.11
Photocopies	annual		0.20
Conference calls	annual		1.89
Cater for conference	annual		0.35
Subcontract E.Vincent Patrick. Contractor will continue to maintain and develop the website for use by collaborators for continued development of the PS fry model and implementation plan. Contractor Patrick was the lead PI in the SEA pink salmon fry survival model development and agrees to continue working with project coordinators in all aspects of model development and implementation. Dr. Patrick agrees to relocate to Cordova and to continue work on the planning efforts and to move model code from the mainframe at the Univ of Maryland to a server that will be installed in the PWSFRAP office at Cordova. Startup and trouble-shooting of system will be conducted to prepare for model implementation. Dr Patrick's compensation results in a rate of 3.9 man months totaling $32k.			32.00
		Contractual Total	$37.27

Commodities Costs:	Proposed FY 2006
Description	
Computer and office supplies	0.30
Commodities Total	$0.3

FY06

Project Number: 060784-BAA
Project Title: Ongoing Synthesis and Modeling Activities Restoring Injured
Commercial Fishery Services

FORM 4B
Contractual & Commodities DETAIL

2006 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 2006 - September 30, 2007

Prepared: 09/14/2005

New Equipment Purchases:	Number	Unit	Proposed
Description	of Units	Price	FY 2006
Computer server/ workstation for Cordova office to house model code	1	8.6	8.59
IDL language license for model code			3.00
			0.00
			0.00
			0.00
			0.00
			0.00
			0.00
			0.00
			0.00
Those purchases associated with replacement equipment should be indicated by placement of an R.			0.00
		New Equipment Total	$11.6

Existing Equipment Usage:		
Description	Number	
Computer equipment purchased in FY02 and FY03 will continue to be utilized	of Units 1	

FY06

Project Number: 060784-BAA
Project Title: Ongoing Synthesis and Modeling Activities Restoring Injured
Commercial Fishery Services
Name: Ken Adams and Ross Mullins
PWS Fisheries Research Applications and Planning group

FORM 4B
Equipment
DETAIL

Prepared: 09/14/2005

BUDGET JUSTIFICATION

FY-06- **Ongoing Synthesis and Modeling Activities Restoring Injured Commercial Fishery Services** -Project Development Continuation. Project Number 060784-BAA

Total funding requested: $108,400.00

Personnel:
Co-PI's Adams and Mullins are each budgeted @ $30/hr for 2.5 man months for a total of 5.0 man months and a gross amount of $24.0 k annually. Senear the tech/admin office person is budgeted @ $20.hr for 2.0 man months for a total of $6.0 k annually. All personnel work essentially year round on the project with the exception of part time in the months of June, July, August and September when Adams is engaged in commercial fishing activity. Mullins is retired and devotes time to project activity also during summer months. FY06 will be a continuation from FY05 and will ensure maintaining the organization of an effective interdisciplinary project design team for the implementation of a multi-year observational and fry survival model prototype. This task requires a blending of disciplines and communication skills that rely on previous personal interrelationships and assets brought forth in a series of workshops held in Cordova from late FY02-FY05. The installation of a computer server/workstation platform at the Cordova office will be utilized to house the model with backup facility at the University of Md. The IDL language license will be acquired which is necessary for operating the model. Total for Adams, Mullins and Senear is $30.0k. There is no set hourly rate.

Richard Thorne is budgeted for compensation of $2.6k. Dr. Thorne is chief scientist with the Prince William Sound Science Center and will be devoting time helping to continue the design of the implementation plan anticipated for the FY07 season. Dr. Thorne is currently working on hydro-acoustic measurement of fish populations and conducts seasonal zooplankton assessments in selected areas of PWS. Total for Dr. Thorne $2.6k. There is no set hourly rate.

Ted Cooney is budgeted for compensation of $2.6k. Dr. Cooney is a retired researcher from the University of Alaska School of Fisheries. Dr. Cooney has extensive experience in PWS with observational studies and project design dating back to the early 1970's and will continue to contribute invaluable insights and time to the overall planning development process. Total for Dr. Cooney is $2.6k. There is no set hourly rate.

E.V. Patrick will be compensated through a contract that will be signed between the PWS Fisheries Research Application and Planning group (PWSFRAP) and Dr. Patrick upon approval of this continued planning grant proposal. Dr. Patrick was the principal PI in the EVOSTC funded SEA project (1993-1999) in PWS that developed the Pink Salmon Survival Model (PSSM) and the Herring Advection Model. Dr. Patrick is presently at the University of Maryland. He has agreed to relocate to Cordova for the FY06 work with the Psmodel and will continue to provide his expertise consulting on the issues relating to model implementation anticipated for the future. Dr. Patrick will also continue to provide and maintain a virtual web presence for project planners to utilize for the posting of writing and editing assignments required during the continuing project development process. This web presence is an invaluable adjunct to the planning group for maintaining active communication and plan development. Dr. Patrick will be in charge of moving the model code from the mainframe computer at the Univ. of Md where it is currently housed, to a server to be installed in the PWSFRAP Cordova office. Dr. Patrick will be responsible for acquiring current licensing for the IDL software and will be conducting startup and trouble-shooting of the system in preparation for model implementation. Working closely in cooperation with Dr. Patrick is fundamental to

the successful plan development and to the anticipated implementation of the PSSM in the future. (See contract amount of $32.0k under contractual section of this proposal budget.)

Mark Willette and Steve Moffitt are ADF&G researchers that will be devoting time to the planning process and will be the primary PI's for the fieldwork involving the PIT tag feasibility portion of the project. (The budget request for the FY05 PIT tag feasibility study was previously submitted and approved under trustee agency submission and will be conducted during this 05 summer season

The personnel costs of $37.8 will be expended on time relating to preparation for and conducting a planning workshop in Cordova, participation in relevant ocean observing programs, presentations and model visualization development and for compensation of time expended by planners. The planning team will meet frequently by teleconference for discussion and problem resolution. The PWSFRAP website <www.pwsfrap.org> will continue development and maintainance by Dr. Patrick. and this will provide a valuable interactive resource for the posting, editing and communication between the planners. Additionally, this website provides synthesis of resources from the SEA plan funded under the 1994 restoration plan. The site will continue to evolve as a comprehensive source of background of the SEA evolution as perceived by the PWSFRAP organizers. Under pass word access the web site provides an enhanced opportunity for the projects planners to interact with each other at times that are convenient and available for each planning team members' circumstance.
Total personnel budget request is $37.68.

Travel:
Each Co-PI is budgeted for $0.68 k for attending the EVOS/GEM annual symposium. This includes round trip travel, lodging and meals. Total for this is $1.36 k.
The remaining travel budget of $4.8 k is for bringing planners together at a three day workshop to be held in Cordova during FY06. This travel budget includes the cost of lodging and meals while attending the workshop.
Total travel requested is $6.2 k.

Contractual Costs:
Contractual costs consists of telephone @ $60 per month totaling $.72k
Internet (high speed)@ $176.00 per month totaling $2.11k
Photocopying is budgeted annually at $0.2k
Conference calls for meetings is budgeted annually @ $1.89k. Our experience shows that costs are on average .10 cents per minute per person and we anticipate several conference calls per month at approximately $130 each.
Catering for three day planning workshop is budgeted @ $.0.35k
Subcontract with Dr. E.V. Patrick includes his relocation to Cordova where he will work on model development and planning through the PWSFRAP office.. Dr. Patrick's background with the Univ. of Md will ensure that computer assets available through that institution will continue to be available to the project.. Subcontract cost is $32.0k.
Total contractual requested is $37.27k.

Commodities Cost:
The cost of office supplies, computer/printer/ disks/consumables is budgeted at $.3k annually.
Total commodities requested is $.3k.

New Equipment Purchases: PWSFRAP will purchase two computers in FY06. Computer #1 @ $2.91will be for a computer workstation for the use of Dr. Patrick at the Cordova office to assist with updating model code continued web site support. www.pwsfrap.org.

Computer # 2 @ $5.68 is a server for the PWSFRAP office into which the PS model code and IDL language license will reside. This server will provide in house computing capability and will be mandatory for model implementation anticipated in the future.
Computer pricing was obtained from various supplier sources through the internet.
Total new equipment requested is $11.6k

Indirect Rate: 5.8%
Indirect rate cost includes office lease @360 mo x 12 totaling $4.3k, Utilities @$100/mo x12 totals $1.2k. Liability and workman's compensation insurance for the project is $0.7k annually. The indirect costs are for maintenance of a small office where project business is conducted and office equipment is housed. This office serves as an important interface with the community and creates a local presence for the EVOSTC programs. The total for all indirect costs is $6.22k.

Trustee Agency GA (9% of project total) is $9.0k.

The total requested for all of the proposed budget items is: $108.4k.

ADF&G in kind contribution: ADF@G in their FY05 companion proposal was funded for the PIT tag field research($18k). For this FY06 submission ADF&G agrees to provide PWSFRAP a $13k in kind contribution for data and statistical analysis consisting of 1 man month for Steve Moffitt and 1 man month for a department biometrician.
Total other contributions: $13.0k

Appendix 1

PRINCE WILLIAM SOUND
FISHERIES RESEARCH APPLICATIONS AND PLANNING

PWSFRAP Projects

- Workshops
- pink salmon fry
- juvenile herring
- OOS applications
- technologies for distributed collaborations

Sister Projects

- PWSFERPG
- CFIMS Press
- EEZ Watch
- Trade Watch
- Commons Watch

Projects Next-Door

- EPC
- CRWP
- PWSSC
- PWSOOS

in Sister Regions

- PICA-Maine FTC
- WCVI AMB

Foundation Programs

- OSRI
- Restoration Reserve
- Ecotrust CRP
- Moore
- RFA
- SURDNA

revised Tue 09 Aug 2005 02:09 AKDT

LATEST NEWS 08 AUG 2005

Four animations of numerical simulations in pink salmon fry / animations and juvenile herring / animations

Quick links to online technical documentation for pink salmon fry — representation by evolution equations and for age-0 Pacific herring — first winter physiology and survival

New in Audio
- R. Mullins talks about Exxon on KDHX St Louis, Aug 2
- public comments, TC-PAC, Cordova, Jun 11

Noted with sadness — "Jay Hammond,... governor [who] helped define modern Alaska, died Tuesday." (LA Times obit)

Welcome to the PWSFRAP website!

You will be viewing the results of several years of collaboration between marine scientists, resource managers, salmon enhancement personnel, fishermen and others to help resolve problems of an ecosystem nature in Prince William Sound (PWS) Alaska. In this context, PWSFRAP has provided the forum for identification and discussion of issues and needs of importance to the resource dependent community of this region. Our collaborative efforts have resulted in the development and submission of proposals for project funding to the *Exxon Valdez* Oil Spill Trustee Council (EVOSTC), the authority created to administer the award received jointly by the state of Alaska and the federal government from the Exxon Corporation on behalf of the resources and human services damaged by the *Exxon Valdez* oil spill.

We wish to acknowledge and to express our appreciation to each person involved with the two groups responsible for the results and the information found here — to each of our collaborators, past and present, and to each of the many committed professionals whose efforts and services are formally identified as that of the *Exxon Valdez* Oil Spill Trustee Council.

continued ...

PWSFRAP

- Publications
- Presentations
- Bibliography
- Bibliography 2
- In the Media
- Status&Records
- Collaborators
- Contact
- FAQ
- Donations
- Thanks
- License

News

- Conferences
- Other Events
- Audio

How it works
well approximated by ASF governance (links below to ASF)

- Introduction
- Meritocracy
- Structure
- Roles
- Collaboration
- Infrastructure
- Incubator
- Other entities
- Glossary
- Voting

local empowerment through integration

- Mailing Lists
- Version Control

- Our Fundamental Premise
- Tired of paying — ready to learn
- Brief historical overview -1992-1999
- Origins of PWSFRAP
- Our current focus: Implementation of the pink salmon fry survival model
- Partnership with Alaska Department of Fish & Game (ADF&G)

update: *in ADF&G's PWS pink salmon forecast, Dec 13, 2004, Rick Merizon's "Forecast Discussion" includes a placeholder for anticipated results from PWSFRAP's application initiative for pink salmon.*

brief descriptions of the **Sections**

PWSFRAP Projects: links to technical (but accessible) presentations of the primary projects.
PWSFRAP: individual project plans and reports, by year; contemporary and historical literature; resources; the vertical integration concepts and goals built into and demonstrated by current projects.
Sister Projects thru **Foundation Programs.** PWSFRAP is one node in a network wherein every node must "work" for any one node to "work" and for the network itself to deliver useful, holistic advances.
News: "press-release" reports on: external events; recognition of PWSFRAP in applications; contributions by PWSFRAP to fundamantal questions whose answers are antecedants of applications; contributions to public and priviate deliberations and decision-making.
How it works: PWSFRAP governance.

Some of the projects described on this site have been supported in part by the *Exxon Valdez* Oil Spill Trustee Council. Any findings and conclusions herein are those of the investigators and do not necessarily reflect views or positions of the Trustee Council.

PRINCE WILLIAM SOUND
SCIENCE CENTER
CORDOVA ALASKA
P.O. Box 705 – Cordova, AK 99574
(907) 424-5800 – fax 424-5820

September 14, 2005

Gail Phillips
Executive Director
Exxon Valdez Oil Spill Trustee Council
441 West Fifth Ave., Suite 500
Anchorage, AK 99503

Dear Gail:

I am writing to express support for a proposal which I understand is currently in review by the Trustee Council. This proposal, by Prince William Sound Fisheries Research Applications and Planning group, is to revive and apply the juvenile pink salmon model for Prince William Sound which was initially developed during the Sound Ecosystem Assessment (SEA) project.

The workshops organized by PWSFRAP in the past two years have been excellent and have resulted in better communications among resource managers, scientists and fishermen. They have focused on applying the results of scientific inquiries. Their revised proposal now before you aims to improve pink salmon predictions using all data sources available from the past and present.

I encourage you and the Trustee Council to reconsider this proposal and give it support.

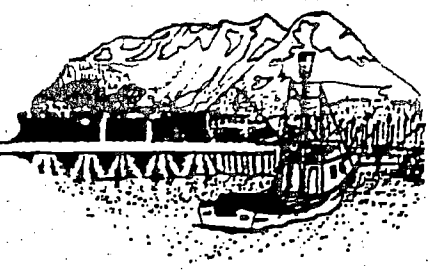
Thank you.

Sincerely,

Nancy Bird
President

bird@pwssc.gen.ak.us - www.pwssc.gen.ak.us

CITY OF CORDOVA



April 20, 2005

Prince William Sound Fisheries Research Application and Planning
PO Box 1848
Cordova, AK 99574

Re: Letter of Support

Dear Mr. Adams:

The City of Cordova agrees with the recommendation of the Fisheries Advisory Committee to the City Council to support the work undertaken by the Prince William Sound Fisheries Research Application and Planning (PWSFRAP) group. We acknowledge the desirability of science application for improved fishery management. The Sound Ecosystem Assessment (SEA) program funded by the EVOS Trustee Council did vast quantities of research, which provided insight into the mechanisms governing salmon and herring production in Prince William Sound. Unfortunately, the information gained from that research has not been put into practice for use in managing those fisheries. PWSFRAP is attempting to develop methods for utilizing the information collected by the SEA project, which will benefit Prince William Sound and Cordova. As such, the City of Cordova continues to support your efforts.

Sincerely,

Timothy L. Joyce
Mayor

TLJ:lk

VALDEZ FISHERIES
DEVELOPMENT ASSOCIATION INC.
P.O. Box 125
Valdez, Alaska 99686
Phone 835-4874 Fax 835-4831

August 29, 2005

Ross Mullin & Ken Adams
PWSFRAP
Box 436
Cordova, Ak 99574

Dear Ross & Ken:

Thank you for your work with PWSFRAP and your efforts to design a predictive model of pink salmon returns in PWS.

Valdez Fisheries Development struggles with estimating returns. We are at this time only able to give the industry averages of our returns for the past five years. Such averages are of little value for planning.

A predictive model might in the future allow VFDA to alter its release strategy, but for now all we can do is release the maximum, healthiest, fry possible and hope for the best.

We are hopeful that EVOSTC will see the value of your work and chose to fund your efforts.

Thanks again.

Sincerely,

Jason C. Wells

Jason Wells
Executive Director

DEDICATED TO THE UTILIZATION, CONSERVATION,
AND REHABILITATION OF ALASKA'S FISHERY RESOURCE
WITHIN THE 200-MILE LIMIT

Cordova District Fishermen United

P.O. Box 939
Cordova, Alaska 99574
(907) 424-3447 FAX (907) 424-3430

September 15, 2005

Gail Phillips
Executive Director
Exxon Valdez Oil Spill Trustee Council
441 West Fifth Ave., Suite 500
Anchorage, AK 99503

Dear Gail:

The Board of Directors of Cordova District Fishermen United (CDFU) supports the the efforts of the Prince William Sound Fisheries Research Application and Planning (PWSFRAP) group to further develop and implement the pink salmon survival model.

The Trustee Council funded SEA, the major ecosystem investigation of PWS from 1994 to 1999 but unfortunately, few results of SEA were ever applied for improvement of the fisheries and management. The pink salmon survival model, a product of the SEA program, will utilize ecosystem insights to aid salmon forecasting. Currently, forecasts are based solely upon yearly averages and are of little value for planning in any given year.

We urge the Trustee Council's support for the PWSFRAP project and recognize the potential benefit to the fisheries and local economies that may result from this model's implementation.

Yours truly,

Diane Platt

Diane Platt
Executive Director
CDFU

Juneau Center
School of Fisheries and Ocean Sciences

University of Alaska Fairbanks
11120 Glacier Highway
Juneau, Alaska 99801

(907) 465-6441 Office
(907) 465-6447 FAX
fysfosj@aurora.alaska.edu

19 September 2005

To: Exxon Valdez Oil Spill Trustee Council (EVOSTC)

From: Lewis Haldorson
Professor Emeritus
School of Fisheries and Ocean Sciences
University of Alaska Fairbanks

RE: Proposal by PWSFRAP

I have read the proposal submitted to EVOSTC by PWSFRAP, and I am familiar with the PWS juvenile pink salmon survival model that PWSFRAP intends to implement. I am also aware of the economic problems that exist because of the tremendous variation in marine survival of pink salmon originating in PWS. This problem was clearly demonstrated this summer when extremely high marine survival resulted in an unexpectedly large return of adult pink salmon in PWS. Understanding the causes of variation in marine survival of salmon has high scientific and economic priority, as evidenced by the funding of the SEA research program by EVOSTC and funding of the GLOBEC program by the National Science Foundation and NOAA. I have been a participant in GLOBEC studies since 1997, and am aware of the complex processes that affect juvenile salmon when they enter the ocean. I think the project proposed by PWSFRAP has great merit, as it will make real headway in applying the results of the SEA project to the problem of juvenile salmon survival. A great deal of research support went into the SEA project, and it would seem appropriate to use those results. I strongly support the work of PWSFRAP, and I urge you to support their research program.

Bickford 060782
additional funding

Exxon Valdez Oil Spill Trustee Council

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

MEMORANDUM

To: **Trustee Council** **Date: October 27, 2005**

From: **Gail Phillips**
Executive Director *Gail*

Re: Revised budget request for Bickford Project #060782

The Trustee Council approved Bickford's "Herring Larval Drift" project #060782 for $52,211 during the August 10, 2005 meeting.

Unfortunately, the amount of overhead costs to the University (F&A) were miscalculated in the original proposal. An additional amount of $1,263.00 is needed for this project in order to cover the F&A rate to the tuition costs for the Masters student who is the only salary personnel budgeted for in this proposal.

This will increase the cost of the project from $52,211 to $53,474.

Your approval for an additional $1,263.00 for this project is solicited.

Cc: Nate Bickford, UAF
Carolyn Rosner, EVOSTC

Gail Phillips

From: Cherri Womac
Sent: Thursday, October 27, 2005 8:24 AM
To: Gail Phillips
Subject: FW: Bickford-060782-Herring larval drift

Cherri Womac
Administrative Officer
EVOS TC
441 West 5th Avenue, Suite 500
Anchorage, AK 99501-2340
907.265.9339 direct line
907.276.7178 fax
cherri_womac@evostc.state.ak.us

-----Original Message-----
From: Richard Dworsky
Sent: Thursday, October 20, 2005 7:54 AM
To: Gail Phillips; Cherri Womac; Robert j. Bochenek
Cc: Carolyn Rosner; Richard Dworsky
Subject: FW: Bickford-060782-Herring larval drift

Subject: FW: Bickford-060782-Herring larval drift

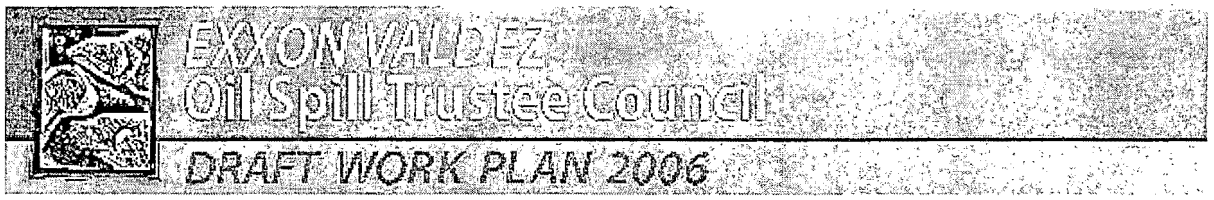
Recommendation- Approval of $1,263.00 for Bickford project subject to revised budget proposal.

E-mail letter to Executive Director
Re: Bickford-060782-Herring larval drift
(FY06 Funds Requested: $52,211.00)
(http://www.gem.state.ak.us/fy06workplan/FY06workplan.cfm?nav=FY06Recs#Bickford-060782-Herring%20larval%20drift)

N. Bickford, Institute of Marine Science, School of Fisheries and Ocean Sciences, Univ. of Alaska Fairbanks, was recently notified that his proposed project (EVOS 060782) was recommended for funding at the level of $52,211 ($47,900 actual to UAF); it has come to my attention that the proposed budget, although approved by the UAF Office of Sponsored Programs, was calculated incorrectly-- the F and A amount was incorrectly computed; the accurate amount results in a total of $53,474 ($49,059 actual to UAF), an increase of $1,263.00. The difference results in applying the 25% F and A rate to the tuition costs for the MS student, who is the only salary personnel budgeted in the proposal.

Is it possible that UAF might be able to submit a revised proposal budget for the increased estimated costs?
The difference is small; the slight increase would make the project costs follow the guidelines set forth by your agency.

Thank you.



Introduction FY06 Proposal Summaries and Recommendations Projects Receiving Funding In FY06 Fiscal Analysis Complete Workplan (For Printing)

FY06 EVOSTC Proposal Summaries and Recommendations

The function of the FY06 Proposal Summaries and Recommendations is to provide information detailing those proposals which responded to the FY06 EVOSTC Request for Proposals (RFP). Table 1 provides information detailing the funds requested by each proposal which responded the RFP. Table 2 details the Science and Technical Advisory Council (STAC), Public Advisory Council (PAC), Science Coordinator and Executive Director's funding recommendations. Table 2 also contains a blank column which will contain the funding decision of the Trustee Council once the decision has been finalized at the August 10th and 11th meeting. These two tables provide hyperlinks which will navigate the reader to more explicit information describing both the proposals and funding recommendations.

Table 1: FY06 Proposal Funding Requests

Project (Click to navigate to recommendations)	FY06 Funding Requests
Adams-060784-Commercial Fishery Synthesis and Modeling	$108,184.70
Ben-David-060781-Climatic effects of nutrient transfer	$82,838.69
Bickford-060782-Herring larval drift	$52,211.00
Bodkin-060788-Database for Nearshore Resources	$65,836.00
Esler-060777-Harlequin Duck Quantitative Synthesis	$48,941.00
EVOS Administration-060550-ARLIS – Alaska Resources Library	$139,600.00
Hoover-Miller-060789-Status of Harbor Seals	$105,839.00
Irons-060787-Marine Bird and Sea Otter Synthesis	$96,901.00
Jacobs-060783-Information Synthesis and Recovery	$501,400.44
Kiefer-060792-GIS System for EVOS	$120,301.12
Rusanowski-060785-Assesment of EVOS Restoration Plan	$435,740.60
Short-060786-EVO in Sediment	$28,677.00

Table 2: FY06 Proposal Recommendations

Project (Click to navigate to recommendations)	STAC	PAC	Science Coord.	Executive Director	TC Decision
Adams-060784-Commercial Fishery Synthesis and Modeling	Fund	Modify	Do Not Fund	Modify	Modify

Ben-David-060781-Climatic effects of nutrient transfer	Do Not Fund	Do Not Fund	Do Not Fund	Do Not Fund	Do Not Fund
Bickford-060782-Herring larval drift	Fund	Fund	Do Not Fund	Fund	Fund
Bodkin-060788-Database for Nearshore Resources	Modify	Do Not Fund	Do Not Fund	Do Not Fund	Do Not Fund
Esler-060777-Harlequin Duck Quantitative Synthesis	Modify	Modify	Modify	Modify	Do Not Fund
EVOS Administration-060550-ARLIS – Alaska Resources Library	Not Received Yet	Fund	Not Received Yet	Fund	Fund
Hoover-Miller-060789-Status of Harbor Seals	Modify	Modify	Modify	Modify	Do Not Fund
Irons-060787-Marine Bird and Sea Otter Synthesis	Do Not Fund in Current Form	Modify	Modify	Modify	Do Not Fund
Jacobs-060783-Information Synthesis and Recovery		Modify	Do Not Fund	Modify	Fund
Kiefer-060792-GIS System for EVOS	Do Not Fund	Do Not Fund	Do Not Fund	Do Not Fund	Do Not Fund
Rusanowski-060785-Assesment of EVOS Restoration Plan	Do Not Fund	Do Not Fund	Do Not Fund in Current Form	Modify	Do Not Fund
Short-060786-EVO in Sediment	Modify	Modify	Modify	Modify	Do Not Fund

Adams-060784-Commercial Fishery Synthesis and Modeling

Abstract: Our proposal requests funding to continue a collaborative synthesis and modeling study designed specifically to fully restore the as yet to be recovered commercial fishery in Prince William Sound, Alaska, through an understanding of ecosystem-level processes that affect fisheries production. Using information obtained by the EVOS TC-sponsored SEA program (1994-99), we are working with Alaska Department of Fish and Game, the regional aquaculture corporations, the Prince William Sound Science Center, local fishing organizations and the Universities of Maryland and Alaska to implement a previously developed pink salmon survival model (PSSM) that we believe will greatly improve resource forecasting and the assessment of ecosystem health. The results of this work are expected to improve the management and enhancement of pink salmon in the region, substantially assisting the recovery of injured commercial fishing services.

FY06 Funds Requested: $108,184.70

STAC Recommendation: Fund

STAC Recommendation Justification: Note that pink salmon is recovered and therefore that is a species that is not a target to be addressed. There is no evidence of participation (no letters of support, no matching funds) from cooperators, e.g., ADF&G. FY05 funding was specifically for one year funding to test the concept. Thus, though this project was funded for a year, no results from the first year of work were included in the proposal. The basis of this proposal is that a model for pink salmon will be available to be used by fishermen. However, this proposal does not state what the model does. Additionally, the budget only has money for "transporting" the model to PWSFRAP. There is nothing about the model in here, i.e., there is no testing of model. There is no plan for implementing the model.

Ben-David-060781-Climatic effects of nutrient transfer

Abstract: Changes in sea surface temperatures, nutrient fluxes, primary productivity, abundance and species composition of invertebrates and fishes in the Gulf of Alaska, will likely affect the coastal terrestrial landscape. River otter predation on pelagic fishes in nearshore environments creates a flux of marine nutrients from sea to land. Nutrient deposition by otters can be several orders of magnitude higher than other inputs in this system and may increase biodiversity several fold. Using the relation between abundance and distribution of fishes and otter abundance and behavior, we propose to develop a model that will forecast changes in landscape heterogeneity of coastal forests along the GOA. Input data to this model will be the output of proposed climate-ocean-fish interaction models. Output data will be in the form of digital maps describing deposition of nitrogen and phosphorus along the coast based on the relations between fish and river otters.

FY06 Funds Requested: $82,838.69

STAC Recommendation: Do Not Fund

STAC Recommendation Justification: This proposal is not responsive to call in FY06. It is not synthesis and the proposed study is for a recovered species, river otters, which is not a target of research this year. The conceptual design is not good (as per peer reviews). The premise is that a climate change will affect schooling fishes (p. 5 ref are inadequate), which will then affect river otters and finally affect landscape. However, they have not shown proof that schooling fishes will change with climate. There also is no reference to support the statement that river otters feed on schooling fishes. There is poor coordination because model input on which this is dependent (Kiefer) does not exist. The model as proposed is not predictive; the result should be a nice conceptual model that cannot be disproved for years.

PAC Recommendation: Do Not Fund

PAC Recommendation Justification: PAC concurs with STAC. Recommends do not fund.

Science Coordinator's Recommendation: Do Not Fund

Science Coordinator's Justification: Agree with STAC

Executive Director's Recommendation: Do Not Fund

Executive Director's Justification: This project is not responsive to the Invitation nor is it a synthesis study.

Bickford-060782-Herring larval drift

Abstract: Chemical analyses of herring otoliths can be used to consider the effect the Exxon Valdez oil spill continues to have on the recovery of the herring population in PWS. Studying the regional elemental signatures within the core of the herring otolith enables researchers to identify the spawning

areas (Objective 1), and the edge of the otolith will identify nursery area (Objective 2). The 3D-PWS model describing larval drift and larval retention in PWS (Norcross et al., 2001a) has never been field-tested. Comparing the two methods for describing larval drift could validate this model as a tool for understanding the impediments to herring recovery in PWS (Objective 3). With these otolith chemical data combined with the 3D-PWS model, fishery managers will have the tools necessary to better predict recruitment and estimate herring spawning habitat recovery.

FY06 Funds Requested: $52,211.00

STAC Recommendation: Fund

STAC Recommendation Justification: Bickford's unsolicited proposal does not respond to the FY 2006 EVOS Request for Proposals, but is potentially a valuable addition to the FY06 work plan. Because herring is not a recovered or recovering species in Prince William Sound, new information on this fishery might help answer the question as to why it has not recovered. The proposed study uses chemical analyses of the herring otoliths to determine the spawning location of herring larvae and path of drift in PWS. While the technique is straightforward it has not been applied previously to this fishery. It will be used to test the validity of the 3-D transport model, which could be critical to the management of herring and its recovery. The proposal has great potential, is exciting science, addresses the herring issue and is moderately priced. The investigator is well versed in the techniques and is very competent to carry out this work. STAC recommends funding this proposal at the requested level.

PAC Recommendation: Fund

PAC Recommendation Justification: Concur with STAC. PAC recommends to fund and to require the PI to work in collaboration with other PIs of Herring Synthesis.

Science Coordinator's Recommendation: Do Not Fund

Science Coordinator's Justification: Do not fund at this time.

Executive Director's Recommendation: Fund

Executive Director's Justification: This project is not responsive to the Invitation; however, it could be a valuable addition to the work plan. If it is funded, the PI should be directed to work with the PIs doing the Herring synthesis project.

Bodkin-060788-Database for Nearshore Resources

Abstract: There is currently no mechanism for getting historical data of interest, relating to injured resources, into the long-term data storage system developed by EVOS projects G-030687 and 050750. Many of these data sets were initially gathered to address specific questions unrelated to the oil spill or long-term monitoring and were initiated in an era when currently available technological tools for data storage and manipulation were unavailable. Important data sets that are of more recent origin were input and are available in documented databases, but are not in a form that allows for web-based access or efficient integration. As a result, there is a need to collate important historical data, update the format of

Small Parcel
Acquisition Policy

Exxon Valdez Oil Spill Trustee Council

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

MEMORANDUM

To: **Trustee Council** **Date:** **October 26, 2005**

From: **Gail Phillips**
Executive Director *Gail*

Re: **Amendment to the Small Parcels Policies**

The Trustee Council considered and adopted The Small Parcel Process during their August 10, 2005 meeting.

In conjunction with the Process, an amendment to the Small Parcels Policy (originally adopted by the Trustee Council July 9, 2002 as Habitat Protection and Acquisition) is needed.

Attached, for your consideration, is an amendment to the Small Parcels Policies that was adopted by the Small Parcels Acquisition Program committee on October 12, 2005. The amendment establishes the funding strategy for future small parcel acquisitions. The proposed policy will allocate resources equally between the state and federal governments. It requires the Restoration Office to develop an annual funding recommendation for consideration by the Council based upon a 4.5% - 4 year average percent of market value (POMV) to be applied to the funds remaining within the Habitat Fund. This annual recommendation is a guideline and does not prevent the Council from considering a parcel(s) that exceeds the amount established, should the Council decide that this is warranted.

The adoption of the attached Policy will allow staff to move forward with the revised Small Parcels Program.

Upon approval of this Policy amendment, staff will develop an information packet describing the revised process and policies which will be posted on our website and made available to the public upon request. The brochure will be designed to answer questions relative to the nomination of small parcels, the structure of the program and the expected timeline of results of the nomination, review and approval process.

AMENDMENT
Habitat Protection and Acquisition Policies adopted by the Trustee Council 7-09-02

SMALL PARCEL POLICIES

The following steps are recommended for funding the Small Parcels program. This proposal includes recommendations for administering land purchases at both the State and Federal levels, lead agency designations, preauthorized spending authority of the State and recommendations for agency program support costs.

1. Lead Agency Designations

For the State of Alaska, the Department of Natural Resources will be considered the Lead Agency for coordinating all EVOS land purchase requests.

For the federal government, parcel purchase requests will be coordinated through the appropriate federal agency.

2. Parcel Nominations

Parcels may be nominated through a sponsoring agency.

3. Public Involvement in the Small Parcel Program

The general public, municipalities, governmental or non-governmental organizations are provided the opportunity to have a parcel considered for Council review through a sponsoring agency. There is no intent to exclude anyone from the program or the nominating process.

4. Small Parcel Program Funding

Funding Strategy
An annual spending authorization will be established by the Trustee Council for the Small Parcel Acquisition Program and shall be allocated 50% to the State and 50% to the federal government. The Restoration Office will develop an annual funding recommendation for consideration by the Trustee Council based upon a 4.5% - 4 year average Percent of Market Value (POMV) to be applied to the funds remaining within the Habitat Fund. This annual recommendation is a guideline and does not prevent the Council from considering a parcel(s) that exceeds the amount established, should the Council find that circumstances warrant such consideration. In addition, should the state or federal government choose not to expend the authorized funds in one year, those funds may accrue within the Habitat Fund for future use by that government.

Program Costs

An amount up to $100,000 is allocated for the base agency small parcel acquisition costs. These funds will be made available to sponsoring agencies as part of the annual work plan through a multi-agency budget. Funds will be appropriated at 50% to the state agencies and 50% to the federal agencies. This budget will address agency costs for gathering and preparing parcel nominations for submittal to the Council. In addition to preparing parcel nominations, these funds will also be used to conduct a preliminary review of title and hazardous materials issues and may include a site inspection in order to increase the likelihood that only viable proposals move forward.

Acquisitions

For viable proposals, the sponsoring agency will submit, consistent with the "Small Parcel Process", a proposal to the Council which includes a draft budget outlining anticipated acquisition costs such as appraisals, title insurance, hazardous materials inspections and agency due diligence. The Council will, at that point, make funds available, as warranted, from the annual spending authorization for acquisitions to support appraisals and other due diligence requirements of the sponsoring agency. Prior to signing a purchase agreement, the sponsoring agency will request approval to purchase the subject parcel. Should the Council agree to the purchase, funds (from the annual acquisition budget) will be noticed to the court and requested through the Alaska Department of Law and the U S Department of Justice, for the acquisition and associated costs due at closing.

Agency Budget Requirements

All participating agencies will be responsible for addressing state and federal budgeting requirements and processes.

Exxon Valdez Oil Spill Trustee Council

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

MEMORANDUM

To: Trustee Council

Date: October 28, 2005

From: Gail Phillips
Executive Director

Re: Continuing Resolution for '06 Budget – one month extension

The Budget Subcommittee met on October 27th to review the new budget format prepared by Tom Lawson and Jeff Hoover (Admin and Budget – ADF&G). The new format received positive acceptance. It will provide a better understanding of our budget and also will make tracking budget numbers much easier in the future.

The State Trustees present at this meeting, Scott Nordstrand and Kurt Fredriksson, were not prepared to send the annual budget to the Trustees until they had a spreadsheet showing a 5-year budget history.

Lawson and Hoover will work on putting this document together and the Subcommittee is planning to meet again on 11-10-05 at 8:30am before the Trustee Council Meeting.

I will update the figures in the budget to provide additional funds that will be needed for the Lingering Oil committee and implementation of the Interim Guidance Document, plus dollars for the Small Parcels Acquisition Program, if the SPAP Policy is adopted by the Trustee Council.

Because the first continuing resolution on the budget was only approved for two months, October and November, it will be necessary for the Council to adopt a second continuing resolution at this meeting to provide operational funds for the month of December. I will get this resolution to you as soon as I can get it approved by our legal staff.

It is the intent, at this time, to have the budget ready for the Trustee Council during the December 2, 2005 meeting.

MEMORANDUM

TO: Trustee Council **DATE:** 11-07-08

FROM: Gail Phillips, Executive Director **RE:** Budget Documents for December '05 Budget

Attached are the draft budget documents for the December '05 budget that is on your agenda for Thursday's meeting.

Key changes between this budget and the 2-month budget for October and November that you previously approved include the following:

1. Internal Personnel costs include funding for the Science Director position, a decrease in the amount budget for the Admin Manager (Paula) changing this position to a Admin Officer at a lower beginning salary and the deletion of the ARLIS Librarian position (you previously approved this budget item).

2. Travel costs increase from -0- to $5,800 to cover travel costs for Trustee travel ($2,000) and travel costs for the STAC to meet with you prior to the December 2nd meeting, as requested by the TC ($3,800). The STAC request covers the expenses for two STAC members traveling from the lower '48, one coming from Fairbanks and parking expenses for the two Anchorage STAC members. It is anticipated that this meeting will be scheduled for the evening of December 1st, prior to the TC meeting on the 2nd.

3. Under Contractual Administrative Expenses, in September you approved the total annual expense for staff parking ($4,284.00). This annual bill was paid and does not need to be budgeted for now.

4. Under Science Management, I've added $33,000 to cover the anticipated expenses for conducting peer reviews on all of our projects that have not yet been peer reviewed. This includes 23 older projects and 11 lingering oil projects. We have budgeted for two peer reviews for each project at an average of five hours per each review at $100 per hour, which equates to $1,000 to review each of the 33 projects. The Steering Committee discussed the need for these peer reviews to be accomplished as soon as possible so that the Lingering Oil Committee can proceed with their review of all the lingering oil projects. We cannot take the older projects off the "incomplete" list until the peer reviews are completed and they can be finalized and published. It was the consensus that in order to get the reviews done, we would need to pay for them. I've contacted Bob Spies to see if he will coordinate this review process, and he has agreed to do so. He's done this for the Council in the past.

5. Under Science Management, I've added $20,000 in expenses to establish the Lingering Oil Committee, as required in the Interim Guidance Document. The L.O. Committee is not in existence at this time and according to mandates in the IGD, this committee is charged with reviewing all of the current lingering oil projects and reporting back to the Steering Committee. I've asked Bob Spies to Chair this committee as he has done for years in the past and knows what we need from the committee. He has agreed to do so. The December budget calls for one committee meeting in December to review the current body of work on lingering oil issues. The budget includes:

One two-day meeting in Anchorage in person or via teleconference to review the current lingering oil projects.....$20,000.00

1. Chairman Bob Spies..... $7,800.00
   - Non-professional expenses (hotel and air fare).....$1,600
   - Professional Charges (1 week's time to set up meetings, contact and make travel arrangements for all members and produce a written report after each meeting.....$6,200

2. Committee Member Expenses.....$11,600
   - Two members from out of State
     - Airfare and Per diem..... $3,200
     - Professional Fees ($100/hour x 20 hrs)..... 2,000
   - Three members from Juneau agencies
     - Airfare and Per Diem..... 2,850
   - Three members from Anchorage agencies
     - Parking expense for 2 days..... 50
   - Two members from Fairbanks agencies
     - Airfare and Per Diem..... 1,700
   - One member from Cordova
     - Airfare and Per Diem..... 800
     - Professional Fees ($100/hour x 10 hrs) 1,000

3. Meeting Expenses.....$ 600
   - Meal Expenses for two days..... 400
   - Incidental Supplies..... 200

The Steering Committee has discussed the make-up and role and responsibilities of the Lingering Oil Committee. There exists a difference of opinion in whether or not this committee is necessary or not. Because of the mandates of the IGD, and the need for moving forward as quickly as possible on the body of lingering oil projects and the reviews of same, plus the instructions in the IGD that the Lingering Oil Committee make recommendations for the '07 Invitation, I am including this item in the December budget. Other than Bob, I have not confirmed members of this committee until I know what the Council wants to do about the budget for the Committee.

Please keep in mind that these figures are estimates and may vary a little as actual expenses are accrued.

REPORTS THAT NEED PEER REVIEW

COMPLETED REPORTS 22 files	ESTIMATED PEER REVIEW COST 2 REVIEWERS- 5 HOURS PER REVIEWER @$100 PER HOUR
11/04/05: FINAL REPORTS THAT NEED PEER REVIEW	
00454-Rice_Wild Pink Salmon and Habitat Recovery_FINAL.pdf	$1,000
00482-Jellett_Diagnostic Test Kiits for Paralytic Shellfish Poisoning_FINAL.pdf	$1,000
00501-Piatt_Protocols for Long-Term Monitoring of Seabird Ecology_FINAL.pdf	$1,000
00598-Short_Background and Weathered EV Spill-Oil_FINAL.pdf	$1,000
01327-Roby_Pigeon Guillemot Restoration Research_FINAL.pdf	$1,000
01338-Piatt_Survival of Adult Murres_FINAL.pdf	$1,000
01452-Thorne_Predators of Pink Salmon Fry_FINAL.pdf	$1,000
01599-Short-Evaluation of Yakataga Oil Seeps_FINAL.pdf	$1,000
02256-Schelske_Sockeye Salmon Establishment_FINAL.pdf	$1,000
02407-Rosenberg_Harlequin Duck Population Dynamics_FINAL.pdf	$1,000
02543-Short_Evaluation of Oil Remaining_FINAL.pdf	$1,000
02561-Roseneau_Community Based Forage Fish_FINAL.pdf	$1,000
030476-Heintz_Effects of Oiled Incubation Substrate on Pink Salmon_FINAL_CH2.pdf	$1,000
030585-Ballachey_Lingering Oil Bioavailability and Effects_FINAL.pdf	$1,000
030596-Cooper_Securing Flow Data_FINAL.pdf	$1,000
030625-Kline_PWS Isotope Ecology Synthesis_FINAL.pdf	$1,000
030666-Konar_AK Natural Geography in Shore Areas_FINAL.pdf	$1,000
030685-Pegau_Visible remote sensing of GOA_FINAL.pdf	$1,000
030687-Bodkin_Alternative Sampling Designs for Nearshore_FINAL.pdf	$1,000
040556-Pegau_Mapping Intertidal Habitats_FINAL.pdf	$1,000
040716-Macklin_A Comprehensive Metadatabase of Marine-Related Physical and ... Biological Databases of the Northern GOA_FINAL.pdf	$1,000
040724-Short_Development of a Strategy for Monitoring Exxon Valdez Oil_FINAL.pdf	$1,000
	$22,000

LINGERING OIL PROJECTS WITH PENDING FINAL REPORTS(+ 2 completed) (ONLY 05 AND 06 REPORTS INCLUDED HERE)			2 REVIEWERS- 5 HOURS PER REVIEWER @$100 PER HOUR
Number	Final Due	Draft Rec'c PI and Project Title	
30574	completed	Lees_Bivalve Recovery.pdf	$1,000
40471	completed	Fall_Update on Status of Subsistence .pdf	$1,000
620	15-Apr-06	Rice - Lingering Oil: Pathways of Exposure and Population Status (ABL)	$1,000
740	15-Apr-06	Rice - Lingering Oil: Contaminant Inputs to PWS and CYP1A induction in Fish	$1,000
772	15-Apr-06	Day - Sediment Quality Survey of Heavily-Oiled Beaches in Prince William Sound	$1,000
774	15-Apr-06	Ballachey - Oil exposure biomarkers and population trends of PWS marine vertebrates	$1,000
776	1-Nov-05	Jacobs - 2004 Assessment of Lingering Oil and Resource Injuries from the Exxon Valdez Oil Spill	$1,000
51	15-Apr-06	Irons - Surveys to Monitor Marine Bird Abundance in PWS during Winter and Summer 2005	$1,000
759	15-Apr-06	Rosenberg - Harlequin Duck Population Dynamics in Prince William Sound: Measuring Recovery	$1,000
777	15-Apr-06	Esler - Quantifying Temporal Variation in Harlequin Duck Exposure to Exxon Valdez Oil	$1,000
778	16-Nov-05	Michel - Identify and Evaluate Oil Remediation Technologies Applicable to Lingering Oil in PWS	$1,000
11 files			$11,000
		EST. TOTAL COST	**$33,000**

Interim EVOS Administrative Budget
FY 2006 – December 1, 2005 through December 31, 2005

I. PERSONNEL **$96,088.60**

A. EVOS Internal Staff.....$ 75,055.26
B. Agency Staff.....$ 21,033.34
  i. Project Management - $19,533.34
  ii. Administrative Support - $ 1,500.00

II. TRAVEL **$5,800.00**

A. Administrative
B. Science Management
C. Data Management
D. Community Involvement
E. Trustee Council Member $2,000.00
F. PAC
G. STAC $3,800.00

III. CONTRACTUAL **$79,508.50**

A. Administrative $18,592.00
B. Science Management 7,916.50
  1. Peer Review Expenses 33,000.00
  2. Lingering Oil Committee 20,000.00

IV. GENERAL ADMINISTRATION **$14,088.67**

TOTAL REQUESTED.....$195,485.77

SUMMARY OF EXPENSES
(12-01-05 – 12-31-05)

I. PERSONNEL **$96,088.60**

A, EVOS Personnel Costs for December (Internal)* $75,055.26

JOB TITLE	PRIOR R & S	RANGE/ STEP	SALARY	BENEFITS	TOTAL SALARY & BENEFITS
Executive Director	28L	28M	$9,702.00	$3,961.67	$13,663.67
Science Director		26E	7,527.00	3,362.00	10,889.00
Science Coordinator	22L	22M	7,087.00	3,209.83	10,296.83
Data Systems Manager	22D	22E	5,904.00	2,811.17	8,715.17
Administrative Officer	18D	18E	4,518.00	2,344.08	6,862.08
Analyst/Programmer III		18B	4,095.00	2,201.50	6,296.50
Research Analyst		18A	3,956.00	2,154.67	6,110.67
Administrative Officer		18A	3,956.00	2,154.67	6,110.67
Administrative Assistant		18A	3,956.00	2,154.67	6,110.67
	TOTALS		$50,701.00	$24,354.26	$75,055.26

(*Changes from last month include the addition of a Science Director, decrease in the salary for the new hire Administrative Officer and removal of the Librarian's salary which was previously approved by Council.)

B. Agency Staff (External) $21,033.34

Project Management

Agency	2005 Allocation for PM	Total Allocation for December
ADFG	$90,000.00	$7,500.00
ADNR	8,400.00	700.00
DOI/USGS	44,800.00	3,733.34
NOAA	91,200.00	7,600.00
TOTALS	$234,400.00	$19,533.34

Administrative Support

Agency	2005 Allocation for AS	Total Allocation for December
DOI.USGS (Nesslage)**	15,000.00	1,250.00
DOI/USGS (Mutter)***	3,000.00	250.00
TOTALS	$18,000.00	$1,500.00

** Nesslage is the NRDAR Finance Officer

*** Mutter is the Federal Representative for the PAC and is shown in Project 100 under DOI

SUMMARY OF EXPENSES continued

II. TRAVEL **$5,800.00**

Trustee Council Travel	$2,000.00
STAC Travel for December meeting with TC	$3,800.00

III. CONTRACTUAL **$79,508.50**

A. Administrative

Office Space Lease	$12,000.00
Utilities (Phone, long distance and cable)	2,200.00
Postage	250.00
Courier Service	100.00
Equipment Maintenance	650.00
Transcription Services	500.00
Computer Service lan/wan ETS/SPR	1,350.00
TC Meeting Expense	125.00
Office Supplies	1,417.00
TOTAL	$18,592.00

B. Science Management

Applied Marine Science (Spies Contract)	$ 7,916.50
Project Peer Review Expenses	33,000.00
Lingering Oil Committee Expenses	20,000.00
TOTAL	$60,916.50

IV. GENERAL ADMINISTRATION **$14,088.67**

ADF&G	$8,108.18
DOI/USGS	1,551.00
ADNR	3,745.49
NOAA	684.00
TOTAL	$ 14,088.67

TOTAL EXPENSES FOR DECEMBER.....$195,485.77

FUND DISTRIBUTION TO AGENCIES

ADF&G

Personnel – Internal	$75,055.26
Project Management	$ 7,500.00
Contractual – Administrative	$ 6,592.00
Contractual – L.O. Committee	$20,000.00
Travel	$ 5,800.00
GA	$ 8,108.18
TOTAL	$123,055.44

DOI/USGS

Project Management	$ 3,733.34
Administrative Support	$ 1,500.00
Contractual*	$ 12,000.00
GA	$ 1,551.00
TOTAL	$ 18,784.34

ADNR

Project Management	$ 700.00
Contractual**	$ 7,916.50
Contractual – Peer Reviews	$33,000.00
GA	$ 3,745.49
TOTAL	$45,361.99

NOAA

Project Management	$ 7,600.00
GA	$ 684.00
TOTAL	$ 8,284.00

TOTAL FUNDS TO AGENCIES.....$195,485.77

*DOI/USGS – Funds to support 1 month EVOS office space
*ADNR – Funds to support 1 month Applied Marine Science Contract

PRINCE WILLIAM SOUND
SCIENCE CENTER
CORDOVA, ALASKA

P.O. Box 705 – Cordova, AK 99574
(907) 424-5800 x 225 – fax 424-5820

October 20, 2005

The Honorable David Marquez
Attorney General, State of Alaska
P.O. Box 110300
Juneau, AK 9811-0300

Dear Attorney General Marquez:

On behalf of the Board of Directors of the Prince William Sound Science Center, I am sending you a resolution urging that a claim be filed for the re-opener clause of the Exxon Valdez oil spill settlement. I would be glad to provide further information about the research referenced in the resolution.

The Science Center's mission is to contribute to our scientific understanding of this incredibly rich and diverse region, to promote productivity and sustainable use of its renewable resources, and to educate about the critical interdependence of the biology and regional economies in Alaska. We have advocated for long-term, community based research and monitoring that will both assist resource managers and improve our knowledge about Prince William Sound's complex ecosystems.

Injuries not known at the time of the settlement clearly exist. Without additional financial resources, it is not likely that we will be able to monitor the on-going effects of lingering oil in the marine environment and work to develop remediation techniques.

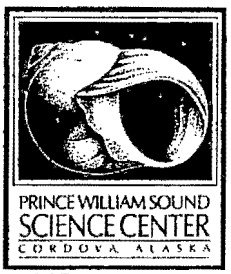
Thank you for your consideration.

Yours very truly,

Nancy Bird
President

cc: Attorney General, United States of America
Governor Frank Murkowski
Senator Ted Stevens
Senator Lisa Murkowski
Congressman Don Young
EVOS Trustee Council
Gail Phillips, Executive Director, EVOS Trustee Council

bird@pwssc.gen.ak.us - www.pwssc.net



P.O. Box 705 – Cordova, AK 99574
(907) 424-5800 x 225 – fax 424-5820

October 20, 2005

The Honorable Alberto R. Gonzales
Attorney General, United States of America
U.S. Department of Justice
950 Pennsylvania Avenue, NW
Washington, D.C. 20530-0001

Dear Attorney General Gonzales:

On behalf of the Board of Directors of the Prince William Sound Science Center, I am sending you a resolution urging that a claim be filed for the re-opener clause of the Exxon Valdez oil spill settlement. I would be glad to provide further information about the research referenced in the resolution.

The Science Center's mission is to contribute to our scientific understanding of this incredibly rich and diverse region, to promote productivity and sustainable use of its renewable resources, and to educate about the critical interdependence of the biology and regional economies in Alaska. We have advocated for long-term, community based research and monitoring that will both assist resource managers and improve our knowledge about Prince William Sound's complex ecosystems.

Injuries not known at the time of the settlement clearly exist. Without additional financial resources, it is not likely that we will be able to monitor the on-going effects of lingering oil in the marine environment and work to develop remediation techniques.

Thank you for your consideration.

Yours very truly,

Nancy Bird
President

cc: Attorney General, State of Alaska
Governor Frank Murkowski
Senator Ted Stevens
Senator Lisa Murkowski
Congressman Don Young
EVOS Trustee Council
Gail Phillips, Executive Director, EVOS Trustee Council

Prince William Sound Science Center

Resolution 05-01

A Resolution urging the U.S. and Alaska Attorney Generals to file a claim for $100 million for unanticipated injury from the Exxon Valdez oil spill

Whereas the 1991 settlement between the United States, the State of Alaska and Exxon over damage to public's natural resources from the 1989 Exxon Valdez oil spill contains a provision allowing for additional claims up to $100 million for injury not known at the time of the settlement;

Whereas the Prince William Sound Science Center's scientific team has published recent research which details a pathway for injury from the oil spill to the Sound's Pacific herring population not known at the time of the settlement;

Whereas Exxon Valdez Oil Spill Trustee Council-sponsored research has conclusively shown that oil from the Exxon Valdez spill has lingered in the marine environment (including intertidal and subtidal areas) longer than originally anticipated and in a more toxic state than originally anticipated;

Therefore, be it resolved that the Prince William Sound Science Center Board of Directors urges the U.S. Attorney General and the State of Alaska Attorney General to file a claim before the U.S. District Court in the Exxon settlement case for unanticipated injury from the 1989 oil spill detailing this unanticipated injury and that these funds be used to restore the lingering damage in the following ways:

1. Endow a long-term (50 years or more) program to study and monitor the long-term life and effects of lingering Exxon Valdez oil in the marine environment, as well as to assess new remediation techniques, and to specifically include,
2. A long-term (50 years or more) herring research and restoration program to study the life history of Pacific herring and advise fisheries management entities on further restoration efforts.

Be it further resolved that the Prince William Sound Science Center offers and reaffirms its support to all parties involved in the process of objectively understanding these issues, whether dedicated to the "reopener," the existing restoration process, or ongoing monitoring and management of the incomparable and irreplaceable resources of Prince William Sound.

Edward H. Backus, Chair
Board of Directors

September 24, 2005

PWS Science Board Executive Committee

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American Fisheries Society
ALASKA CHAPTER

October 18, 2005

Gail Phillips
Executive Director
Exxon Valdez Oil Spill Trustee Council
441 West 5th Avenue, Suite 500
Anchorage, Alaska 99501

Dear Ms. Phillips,

The Alaska Chapter of the American Fisheries Society successfully hosted the 135th Annual Meeting of the American Fisheries Society. The financial aid contributed by the Exxon Valdez Oil Spill Trustee Council helped the Chapter provide a quality venue for the meeting. In fulfillment of Cooperative Agreement # COOP-06-006, I have enclosed the required Final Report of the meeting. The Alaska Chapter extends a sincere "Thank You" to the Exxon Valdez Oil Spill Trustee Council for their support. Please contact me if you have any questions or need further information.

Sincerely,

Larry Peltz

Larry Peltz
Budget and Finance Chairman, AFS 2005
National Marine Fisheries Service
222 W. 7th Ave., #43
Anchorage, AK, 99513

American Fisheries Society
2005 Meeting Final Report

The 135th Annual Meeting of the American Fisheries Society was held in Anchorage, Alaska from September 10 – 15, 2005. The meeting was held in Downtown Anchorage utilizing rooms in the Egan Center, Performing Arts Center and the Hilton Hotel. A summary of meeting statistics are as follows:

	Goal	Actual
Total Attendance	1700	2500
Meeting Expenditures	$692,000	$700,000
Total Symposia	40	50
Daily Sessions	12	17
Oral Presentations	800	1200
Posters Displayed	400	600

The Anchorage meeting broke all previous records for an annual American Fisheries Society Meeting. All goals set by the planning committee were achieved. Attendance for the meeting surpassed the previous high mark of 1930 at the 1993 Meeting in Portland, Oregon. The attendance record set by the Anchorage meeting will not be broken any time soon. The meeting provided a forum for 50 Symposia with a huge range of topics. The most symposia previously held within a meeting were 38 in Quebec City. Approximately 1200 oral presentations were made at the meeting. This exceeds the previous high of 986 presentations. Over 600 posters were on display at this meeting. The previous high for posters exhibited at a meeting was 196. More fisheries science information was exchanged at the 2005 meeting than any other meeting in the 135 year history of the American Fisheries Society.

The meeting attracted approximately 430 students. A special student colloquium and job fair were a component of the meeting. The students had a unique opportunity to interact with a large number of professional fisheries scientists and learn a great deal about the fisheries profession and potential employment.

Continuing education was an important component of the meeting. A total of 15 courses were offered covering a variety of far ranging topics. Over 400 meeting attendees participated in the classes.

The 135th Annual Meeting of the American Fisheries Society provided an unparalleled opportunity for over 2500 fisheries professionals to exchange information and ideas.

Through this opportunity for information exchange, it is likely that scientific advances will occur in many sectors of fisheries science. In addition, this meeting provided a tremendous opportunity for many individuals to make professional contacts that will be invaluable in the future. Everyone attending had high praise for the meeting organization, venue and opportunities to interact with other professionals.