Oceanic and Nearshore Research and Monitoring in the Northern Gulf of Alaska

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**Place name Keywords:**

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One copy to the SWAN Coordinator.
One copy to each SWAN Technical Committee member.
### Acronyms:

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>ACC</td>
<td>Alaska Coastal Current</td>
</tr>
<tr>
<td>ADCP</td>
<td>Acoustic Doppler Current Profiler</td>
</tr>
<tr>
<td>ALAG</td>
<td>Alagnak Wild River</td>
</tr>
<tr>
<td>ANIA</td>
<td>Aniakchak National Monument &amp; Preserve</td>
</tr>
<tr>
<td>CPR</td>
<td>Continuous Plankton Recorder</td>
</tr>
<tr>
<td>CTD</td>
<td>Conductivity Temperature and Depth</td>
</tr>
<tr>
<td>HAB</td>
<td>Harmful Algal Bloom</td>
</tr>
<tr>
<td>I&amp;M</td>
<td>Inventory &amp; Monitoring (Program)</td>
</tr>
<tr>
<td>KATM</td>
<td>Katmai National Park &amp; Preserve</td>
</tr>
<tr>
<td>KBRR</td>
<td>Kachemak Bay Research Reserve</td>
</tr>
<tr>
<td>KEFJ</td>
<td>Kenai Fjords National Park</td>
</tr>
<tr>
<td>LAACL</td>
<td>Lake Clark National Park &amp; Preserve</td>
</tr>
<tr>
<td>NPS</td>
<td>National Park Service</td>
</tr>
<tr>
<td>PWS</td>
<td>Prince William Sound</td>
</tr>
<tr>
<td>SWAN</td>
<td>Southwest Alaska Network</td>
</tr>
<tr>
<td>TDR</td>
<td>Time Depth Recorders</td>
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</table>

### Organization Acronyms:

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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</thead>
<tbody>
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<td>ARGO</td>
<td>A Global Array of Profiling Floats</td>
</tr>
<tr>
<td>ADNR</td>
<td>Alaska Department of Natural Resources</td>
</tr>
<tr>
<td>ABSC</td>
<td>Alaska Biological Science Center</td>
</tr>
<tr>
<td>ADFG</td>
<td>Alaska Department of Fish and Game</td>
</tr>
<tr>
<td>ADFG/KBRR</td>
<td>Alaska Department of Fish and Game, Kachemak Bay Research Reserve</td>
</tr>
<tr>
<td>ADFG/DWC</td>
<td>Alaska Fish and Game, Division of Wildlife Conservation</td>
</tr>
<tr>
<td>AFSC</td>
<td>Alaska Fisheries Science Center</td>
</tr>
<tr>
<td>ASC</td>
<td>Alaska Science Center</td>
</tr>
<tr>
<td>ASLC</td>
<td>Alaska Sea Life Center</td>
</tr>
<tr>
<td>ARSC/UA</td>
<td>Arctic Regional Supercomputing Center, University of Alaska</td>
</tr>
<tr>
<td>ABL</td>
<td>Auke Bay Laboratory</td>
</tr>
<tr>
<td>BPA</td>
<td>Bonneville Power Authority</td>
</tr>
<tr>
<td>CORI</td>
<td>Coastal and Ocean Resources, Inc.</td>
</tr>
<tr>
<td>CIAP</td>
<td>Coastal Impacts Assistance Program</td>
</tr>
<tr>
<td>CIRCAC</td>
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</tr>
<tr>
<td>EVOS Trustee</td>
<td>Exxon Valdez Oil Spill Trustee Council</td>
</tr>
<tr>
<td>FOC/IOS</td>
<td>Fisheries and Oceans Canada/Institute of Ocean Sciences</td>
</tr>
<tr>
<td>GLOBEC</td>
<td>Global Ocean Ecosystem Dynamics</td>
</tr>
<tr>
<td>GEM</td>
<td>Gulf Ecosystem Monitoring</td>
</tr>
<tr>
<td>IODP</td>
<td>Integrated Ocean Drilling Program</td>
</tr>
<tr>
<td>JOI/USSSP</td>
<td>Joint Oceanographic Institutions/US Science Support</td>
</tr>
<tr>
<td>Acronym</td>
<td>Program</td>
</tr>
<tr>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td>KEFJ</td>
<td>Kenai Fjords National Park</td>
</tr>
<tr>
<td>NASA</td>
<td>National Aeronautics and Space Administration</td>
</tr>
<tr>
<td>NFWF</td>
<td>National Fish and Wildlife Foundation</td>
</tr>
<tr>
<td>NIEHS</td>
<td>National Institute of Environmental Health Sciences</td>
</tr>
<tr>
<td>NIST</td>
<td>National Institute of Standards and Technology</td>
</tr>
<tr>
<td>NMFS</td>
<td>National Marine Fisheries Service</td>
</tr>
<tr>
<td>NMML</td>
<td>National Marine Mammal Laboratory</td>
</tr>
<tr>
<td>NOAA</td>
<td>National Oceanic and Atmospheric Administration</td>
</tr>
<tr>
<td>NODC</td>
<td>National Oceanographic Data Center</td>
</tr>
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<td>NSF</td>
<td>National Science Foundation</td>
</tr>
<tr>
<td>NOAA/NOS/CO-</td>
<td>NOAA National Ocean Service/ Center for Operational Oceanographic Products and Services</td>
</tr>
<tr>
<td>NOAA/AFSC/ABL</td>
<td>NOAA, Alaska Fisheries Science Center, Auke Bay Laboratory</td>
</tr>
<tr>
<td>NOAA/AFSC/REFM</td>
<td>NOAA, Alaska Fisheries Science Center, Resource Ecology and Fisheries Management</td>
</tr>
<tr>
<td>NOAA/NMFS</td>
<td>NOAA, National Marine Fisheries Service</td>
</tr>
<tr>
<td>NOAA/PMEL</td>
<td>NOAA, Pacific Marine Environmental Laboratory</td>
</tr>
<tr>
<td>NOAA/SSLR</td>
<td>NOAA, Steller's Sea Lion Research</td>
</tr>
<tr>
<td>NGOS</td>
<td>North Gulf Oceanic Society</td>
</tr>
<tr>
<td>NPMRI</td>
<td>North Pacific Marine Research Institute</td>
</tr>
<tr>
<td>NPRB</td>
<td>North Pacific Research Board</td>
</tr>
<tr>
<td>NPUMMRC</td>
<td>North Pacific University Marine Mammal Research Consortium</td>
</tr>
<tr>
<td>PBS</td>
<td>Pacific Biological Station</td>
</tr>
<tr>
<td>PM</td>
<td>Pratt Museum</td>
</tr>
<tr>
<td>PWSSC</td>
<td>Prince William Sound Science Center</td>
</tr>
<tr>
<td>RU</td>
<td>Rutgers University</td>
</tr>
<tr>
<td>SFU</td>
<td>Simon Fraser University</td>
</tr>
<tr>
<td>SAHFOS</td>
<td>Sir Alister Hardy Foundation For Ocean Science</td>
</tr>
<tr>
<td>SI</td>
<td>Smithsonian Institute</td>
</tr>
<tr>
<td>UAF/SFOS/IMS</td>
<td>University of Alaska Fairbanks, School of Fisheries and Ocean Science, Institute of Marine Science</td>
</tr>
<tr>
<td>UAM</td>
<td>University of Alaska Museum</td>
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<tr>
<td>AU</td>
<td>University of Arkansas</td>
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<tr>
<td>UFL</td>
<td>University of Florida</td>
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<td>UME</td>
<td>University of Maine</td>
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<td>FWS</td>
<td>US Fish and Wildlife Service</td>
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<tr>
<td>USGS</td>
<td>US Geological Survey</td>
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<tr>
<td>USGS/ASC</td>
<td>US Geological Survey, Alaska Science Center</td>
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<td>NPS</td>
<td>US National Park Service</td>
</tr>
<tr>
<td>VPA</td>
<td>Vancouver Public Aquarium</td>
</tr>
</tbody>
</table>
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ABSTRACT
The National Park Service, Southwest Alaska Network (SWAN) is currently in the early design phase of developing a long-term vital signs monitoring program for four national Park Units containing 1,100 miles of coastline in the Northern Gulf of Alaska (NGOA). Knowledge of on-going physical and biological marine research and monitoring occurring in the area encompassing the SWAN is lacking. To prevent needless duplication of effort, enhance efficiency, and pave the way for collaborative monitoring and research, it is crucial to determine the state of knowledge and identify all on-going and planned future data collection efforts that are relevant to the SWAN planning process.

To meet this need, the National Park Service and the Kachemak Bay Research Reserve recently conducted a questionnaire survey of approximately 100 known principal investigators working in the NGOA. From these completed surveys a compilation database and document of marine research and monitoring project summaries has been completed for on-going and planned biological and physical oceanographic research occurring in 2003 within the National Park Service Southwest Alaska Network. The intent of this project is three-fold: 1) to provide scientists working within the NGOA a reference document of known on-going and planned research 2) to help in the identification of research gaps in the NGOA and 3) to provide the first document, of potentially a long-term project that produces an annual reference for on-going and planned research in the NGOA.
EXECUTIVE SUMMARY

The National Park Service – Southwest Alaska Network is in the process of designing a long-term monitoring effort for the four parks that fall within the unit – Lake Clark N.P., Katmai N.P., Aniakchak N.P., and Kenai Fjords N.P. To design an effective monitoring program, a thorough knowledge of on-going and planned physical and biological marine research occurring in the northern Gulf of Alaska is desired. To meet this goal, the Kachemak Bay Research Reserve was contracted to survey marine researchers working in the northern Gulf of Alaska and compile these findings into a database and report.

Using personal interviews and Internet searches approximately 100 potential investigators were identified to receive the survey via email. In addition, broadcast emails were sent to existing research listserves, regional University marine science faculty as well as currently funded researchers from the Exxon-Valdez Oil Spill Trustee Council’s, Gulf of Alaska Ecosystem Monitoring and Research program. The response rate for this survey cannot be determined due to the unknown number of recipients receiving the email announcement, but the response rate is estimated to be extremely low. The survey asked only if the researcher was currently involved in a project in the northern Gulf of Alaska. It was beyond the scope of this survey to determine past research activity or future research emphasis in the region. Also, by using various listserves, the survey team had no ability to pre-select recipients who are known to have worked, or are currently working in the Gulf of Alaska.

Fifty-four completed surveys were submitted for inclusion into the compilation document and database. These surveys were categorized into four marine research focus areas: biological, physical, cultural and other. Further delineation into subtopics was then undertaken using the following focus areas; benthic, intertidal, oceanic, plankton, birds, fish, marine mammals.

Results showed 57% of the submitted projects (31) were involved in biological research, with 74% of the biological projects focusing on fish, birds and marine mammals. Projects focusing on the physical marine environment made up 30% of the submitted projects (16), with 56% of the physical projects looking at the oceanic environment.

The majority of the researchers (57%) were shown to be employees of the federal government, with 24% employed by academic institutions.

Results showed that funding for the submitted projects was overwhelmingly provided by one or more entities within the federal government, with 91% of the projects having some level of federal support. The State of Alaska was also actively involved in financial support of numerous projects, with 50% of the submitted projects showing some level of state support.

As expected, a large percentage of the submitted projects focused on the Gulf of Alaska with 43% of the submitted projects occurring in the Gulf. The Cook Inlet/Kachemak Bay region was also strongly represented with 26% of the submitted projects focusing on the region.

It is extremely difficult to draw conclusive results from this survey. This survey is an excellent first step and can be used to justify continuing this process in future years. This survey did show the groups or entities that are conducting research in the Gulf of Alaska, and where
future surveys might concentrate their energies in future years. It also showed the diversity of funding sources that are committing funds to the region. And most importantly, it shows who is currently working in the region, allowing for potential future collaborations.

The compilation document, and associated detailed project information for each submitted project can be viewed at the National Park Service - Southwest Area Network website at http://www.nature.nps.gov/im/units/swan/index.cfm or the Kachemak Bay Research Reserve website at www.kbayrr.org.
INTRODUCTION
The National Park Service (NPS) Southwest Alaska Network (SWAN) is in the early design phase of developing a long-term vital signs monitoring program for four national Park Units containing 1,100 miles of coastline in the Northern Gulf of Alaska. At the present time, a thorough knowledge of on-going physical and biological marine research and monitoring occurring in the area encompassing the SWAN is lacking. To prevent needless duplication of effort, enhance efficiency, and pave the way for collaborative monitoring and research, it is crucial to determine the state of knowledge and identify all on-going and planned future data collection efforts that are relevant to the SWAN planning process.

Alaska Department Fish and Game through the Kachemak Bay Research Reserve (KBRR) agreed to cooperatively produce with the National Park Service, a compilation database and document of marine research and monitoring project summaries for on-going and planned biological and physical environment research within the NPS SWAN area (Lake Clark National Park and Preserve, Katmai National Park and Preserve, Kenai Fjords National Park, Aniakchak National Monument and Preserve, excluding Bristol Bay).

Alan Bennett, Monitoring Coordinator for the Southwest Area Network, National Park Service and Dr. Carl Schoch, then Science Director for the Kachemak Bay Research Reserve formulated the design for the compilation document, modeled after a similar document produced by the Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO).

METHODS
As work began on the compilation project it became clear that there was not a comprehensive list of past or on-going research projects, or a list of primary investigators working in the northern Gulf of Alaska or SWAN regions. Initial work on the project therefore required numerous personal interviews with various regional researchers as well as Park Service staff, in conjunction with an Internet search of past and on-going research occurring in the northern Gulf of Alaska. Using these techniques, a list of approximately 100 potential principal investigators were identified and contacted via email beginning May 13, 2003. In addition to these individuals, the faculty of the University of Alaska – Fairbanks, School of Fisheries and Ocean Sciences; Oregon State University, College of Oceanic and Atmospheric Sciences; and the University of Washington, College of Ocean and Fishery Sciences were contacted with assistance from their respective school Deans. The ARCUS (Arctic Research Consortium of the US) listserv was also used as a means of contact, as well as staff from the Exxon-Valdez Oil Spill Trustee Council assisted in the distribution of the survey by sending emails to all currently funded principal investigators. It is expected that many researchers received numerous emails requesting participation depending on their involvement with the listserves as well as their university and funding affiliations.

The email sent to each individual included a cover letter (Appendix A) introducing the project and the expected outcomes of the compilation document, as well as the 12-question survey (Appendix B). It was the intent of this project to minimize the time required of the principal investigators to complete the survey. Therefore, survey questions were designed to allow the respondents to cut and paste information from existing sources, thus limiting the amount of original writing needed to complete the survey. A limited subset of respondents was asked in
opportunistic follow-up phone conversations about the length of time necessary to complete the survey, and it was found to take approximately 10 minutes to complete. Respondents were initially given approximately 6 weeks to complete the requested survey however surveys were received and included in the final document that arrived up to 2 months following the established deadline.

Following receipt of the completed surveys, each of the submitted projects was reviewed and edited for uniformity and file naming nomenclature. An Excel database was developed by the National Park Service Southwest Area Network Data Manager to manage the received questionnaires. KBRR staff was used to input questionnaire data into the database.

RESULTS
Fifty-four completed surveys were received for inclusion into the compilation document (Appendix C). The final response rate for this survey is unknown, but it is estimated to be extremely low. The exact number of individual recipients who received the emailed invitation to participate cannot be determined due to the use of listserves and broadcast emails within academic institutions and granting agencies. Also, by using various listserves, the survey team had no ability to pre-select recipients who are known to be currently working in the Gulf of Alaska. It is possible, and highly probable that many principal investigators were contacted multiple times through the various email lists. Also, the survey asked only if the researcher was currently involved in a Gulf of Alaska project. It was beyond the scope of this survey to determine the past research activity or future research emphasis of a particular researcher in the region.

The 54 surveys were categorized into four major topic areas: biological, physical, cultural and other. These major categories were then grouped into subtopics that included the following breakdown:

**Biological:**

<table>
<thead>
<tr>
<th>Subtopic</th>
<th>Projects Submitted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benthic</td>
<td>3</td>
</tr>
<tr>
<td>Birds</td>
<td>7</td>
</tr>
<tr>
<td>Fish</td>
<td>9</td>
</tr>
<tr>
<td>Intertidal</td>
<td>1</td>
</tr>
<tr>
<td>Marine mammals</td>
<td>7</td>
</tr>
<tr>
<td>Oceanic</td>
<td>3</td>
</tr>
<tr>
<td>Plankton</td>
<td>1</td>
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**Physical:**

<table>
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<th>Projects Submitted</th>
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</thead>
<tbody>
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<td>1</td>
</tr>
<tr>
<td>Fish</td>
<td>2</td>
</tr>
<tr>
<td>Intertidal</td>
<td>3</td>
</tr>
<tr>
<td>Oceanic</td>
<td>9</td>
</tr>
<tr>
<td>Plankton</td>
<td>1</td>
</tr>
</tbody>
</table>
Cultural:

<table>
<thead>
<tr>
<th>Subtopic</th>
<th>Projects Submitted</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>Other</td>
<td>1</td>
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</tbody>
</table>

Other:

<table>
<thead>
<tr>
<th>Subtopic</th>
<th>Projects Submitted</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>Plankton</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
</tr>
</tbody>
</table>

Within these 54 submitted projects, 68 scientists were listed as principal investigators, these included 36 employees of the U.S. Federal Government, 8 are State of Alaska employees, 16 are employed by academic institutions (U.S. and Canada), four work for non-profits and four are employed by Fisheries and Ocean Canada. Nine of the responding principal investigators provided responses for multiple projects. The following is a breakdown of individual employees and their associated agency/institution:

Federal Agencies:

<table>
<thead>
<tr>
<th>Agency</th>
<th>Number of Investigators</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Institute of Environmental Health</td>
<td>2</td>
</tr>
<tr>
<td>National Institute of Standards and Technology</td>
<td>1</td>
</tr>
<tr>
<td>National Oceanic and Atmospheric Administration</td>
<td>6</td>
</tr>
<tr>
<td>Alaska Fisheries Science Center</td>
<td>2</td>
</tr>
<tr>
<td>National Marine Mammal Laboratory</td>
<td>5</td>
</tr>
<tr>
<td>National Marine Fisheries Service</td>
<td>8</td>
</tr>
<tr>
<td>Agency</td>
<td>Number of Investigators</td>
</tr>
<tr>
<td>-------------------------------------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>Pacific Marine Environmental Laboratory</td>
<td>5</td>
</tr>
<tr>
<td>Smithsonian</td>
<td>1</td>
</tr>
<tr>
<td>U.S. Fish and Wildlife Service</td>
<td>3</td>
</tr>
<tr>
<td>U.S. Geological Survey</td>
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</table>

### State Agencies:

<table>
<thead>
<tr>
<th>Agency</th>
<th>Number of Investigators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alaska Department of Fish and Game</td>
<td>8</td>
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### International Agencies:

<table>
<thead>
<tr>
<th>Agency</th>
<th>Number of Investigators</th>
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<tbody>
<tr>
<td>Fisheries and Ocean Canada</td>
<td>4</td>
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### Academic Institutions:

<table>
<thead>
<tr>
<th>Institution</th>
<th>Number of Investigators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simon Fraser University</td>
<td>1</td>
</tr>
<tr>
<td>University of Alaska – Fairbanks</td>
<td>10</td>
</tr>
<tr>
<td>University of Alaska Museum</td>
<td>1</td>
</tr>
<tr>
<td>University of Arkansas</td>
<td>1</td>
</tr>
<tr>
<td>University of British Columbia</td>
<td>1</td>
</tr>
<tr>
<td>University of Florida</td>
<td>1</td>
</tr>
<tr>
<td>University of Maine</td>
<td>1</td>
</tr>
</tbody>
</table>

### Non-Profit:

| Organization | Number of |
A wide range of agencies, institutions and private funding sources were identified within the 54 projects. Project support ranged from single entities to multi-agency/institution involvement. Analysis of the respondents showed that 12 federal agencies were identified as providing some level of support to 49 projects. Seven academic institutions and/or consortiums financially supported 10 projects, and the State of Alaska supported 19 projects. Five non-profits or foundations supported 9 projects.

### Federal:

<table>
<thead>
<tr>
<th>Agency</th>
<th>Projects Funded</th>
</tr>
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<tbody>
<tr>
<td>Bonneville Power Administration</td>
<td>2</td>
</tr>
<tr>
<td>GLOBEC</td>
<td>3</td>
</tr>
<tr>
<td>Integrated Ocean Drilling Program</td>
<td>1</td>
</tr>
<tr>
<td>National Aeronautics and Space Admin</td>
<td>3</td>
</tr>
<tr>
<td>National Institute of Environmental Health Sciences</td>
<td>1</td>
</tr>
<tr>
<td>National Institute of Standards and Technology</td>
<td>1</td>
</tr>
<tr>
<td>National Oceanic and Atmospheric Administration</td>
<td>9</td>
</tr>
<tr>
<td>Alaska Fisheries Science Center</td>
<td>1</td>
</tr>
<tr>
<td>Agency</td>
<td>Projects Funded</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>National Ocean Service, Center for Operational Oceanographic Products and Services</td>
<td>1</td>
</tr>
<tr>
<td>National Marine Fisheries Service</td>
<td>8</td>
</tr>
<tr>
<td>National Marine Mammal Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>National Science Foundation</td>
<td>3</td>
</tr>
<tr>
<td>North Pacific Research Board</td>
<td>3</td>
</tr>
<tr>
<td>U.S. Fish and Wildlife Service</td>
<td>5</td>
</tr>
<tr>
<td>U.S. Geological Survey</td>
<td>5</td>
</tr>
<tr>
<td>U.S. National Park Service</td>
<td>2</td>
</tr>
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</table>

State of Alaska:

<table>
<thead>
<tr>
<th>Agency</th>
<th>Projects Funded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alaska Department of Fish and Game</td>
<td>13</td>
</tr>
<tr>
<td>Exxon-Valdez Oil Spill Trustee Council – Gulf Ecosystem Monitoring</td>
<td>6</td>
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</table>

Academic:

<table>
<thead>
<tr>
<th>Institution</th>
<th>Projects Funded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arctic Regional Supercomputing Center</td>
<td>1</td>
</tr>
<tr>
<td>Joint Oceanographic Institutions/U.S. Science Support Program (18 member institutions)</td>
<td>1</td>
</tr>
<tr>
<td>University of Alaska</td>
<td>1</td>
</tr>
<tr>
<td>North Pacific University Marine Mammal Research Consortium - Oregon State University University of Alaska University of British Columbia University of Washington</td>
<td>1</td>
</tr>
<tr>
<td>Simon Fraser University</td>
<td>1</td>
</tr>
</tbody>
</table>
Review of the 54 projects showed a diverse area of study, but a majority of projects were conducted in two areas, the Gulf of Alaska and the Cook Inlet/Kachemak Bay region.

<table>
<thead>
<tr>
<th>Region</th>
<th>Number of Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aleutian Islands</td>
<td>3</td>
</tr>
<tr>
<td>Cook Inlet/Kachemak Bay</td>
<td>14</td>
</tr>
<tr>
<td>Gulf of Alaska</td>
<td>23</td>
</tr>
<tr>
<td>Kodiak/Alaska Peninsula</td>
<td>3</td>
</tr>
<tr>
<td>Prince William Sound</td>
<td>5</td>
</tr>
<tr>
<td>Statewide</td>
<td>6</td>
</tr>
</tbody>
</table>

The compilation document, and associated detailed project information for each submitted project can be viewed at the National Park Service - Southwest Area Network website at [http://www.nature.nps.gov/im/units/swan/index.cfm](http://www.nature.nps.gov/im/units/swan/index.cfm) or the Kachemak Bay Research Reserve website at [www.kbayrr.org](http://www.kbayrr.org).
CONCLUSIONS
Following completion of the project a number of limitations or “lessons learned” became apparent. These identified limitations can be used to make future survey compilation projects more efficient. These limitations were:

- **Time of year of the survey:** This survey was undertaken during the early field season of 2003. Future compilation projects should be initiated during the late fall/winter months, with completion of the project to occur in late winter/early spring.

- **Better description of how contributing to the project will help other PI’s:** Comments received both directly and indirectly revealed that many survey recipients did not give the project serious consideration.

- **Potential of using a web-based survey:** A higher response rate might have been achieved if the respondents were provided with an easier mode of completing the survey. KBRR staff has been associated with other surveys that used a web-based format – those surveys achieved response rates in excess of 70%.

- **Better follow-up with potential respondents to ensure a higher level of participation.**

- **Change the format of the questionnaire:** Future surveys should consider a more user-friendly format to both the respondents and data entry staff.

- **Have required fields in the survey:** Too many of the surveys were returned with incomplete information. This suggestion can be achieved by using a web-based survey, where the respondent cannot proceed without answering specific questions.

- **Garner support from leaders of research entities (e.g. universities, government agencies, research organizations) to ensure participation by their staff:** University Deans gave support to the project, but actual participation by university staff appeared to be limited.

ACKNOWLEDGEMENTS
This project is due to the efforts of several dedicated individuals.

Thank you to Alan Bennett and Dorothy Mortensen from the National Park Service – Southwest Alaska Network. Alan had the vision for the project and the means to make it happen. Dorothy did an incredible job with creation of the database and making all the necessary changes to make it functional.

Thank you to Carl Schoch who, when this project began was the Science Director for the Kachemak Bay Research Reserve – Carl built on Alan’s vision and helped in the formulation of a plan to make the project a reality.

Thanks again to each of you!
Dear Colleague,

We are compiling a list of marine research projects for 2003 in the Northern Gulf of Alaska (e.g. Icy Straits to Cold Bay). Such a compilation would help individual investigators identify complimentary datasets or fruitful opportunities for collaboration. Furthermore, as the concept of a broad area ocean observing system advances in the political and scientific arenas, a means of tracking data gathering efforts can help isolate data gaps in space and time as well as identify new data needs. It has been our experience that investigators gathering data in the Gulf of Alaska often represent many different institutions with broad geographic distributions. This makes it challenging to integrate multi-disciplinary datasets and coordinate activities. Your help in providing a brief description of your project in the area will ensure the success of this effort.

Alaska now has several long-term marine science programs unrivaled in North America including the North Pacific Research Board (NPRB: http://www.nprb.org/), and the Gulf of Alaska Ecosystem Monitoring and Research program (GEM: http://www.oilspill.state.ak.us). In addition, the National Park Service (NPS) is developing a long-term monitoring program for four coastal Parks: Lake Clark, Katmai, Aniakchak, and Kenai Fjords (SWAN: http://www1.nature.nps.gov/im/units/nw01/). These park units represent about 1,100 miles of coastline in the Northern Gulf of Alaska. We currently lack a thorough inventory of marine research and monitoring occurring in the region. To prevent needless duplication of effort, enhance collaboration, and pave the way for coordinated monitoring and research, it is crucial to identify all data collection efforts that are currently in progress or scheduled for 2003.

The Kachemak Bay Research Reserve (KBRR) is assisting NPS with this survey by compiling the submitted information and making the results available via email to respondents as soon as possible, and generally via the KBRR web page (www.kbayrr.org) at a later date. Planned annual updates to this compilation will help researchers stay abreast of data collected in the Northern Gulf of Alaska.

You have been identified as a potential Principle Investigator with an on-going marine research project or projects in the Northern Gulf of Alaska. Please provide the information requested (attached) for each project and return by email the questionnaire and map to us at your earliest convenience. Please feel free to pass this request on to others who may have been omitted from our distribution list. We would like to thank you in advance for your cooperation. Please return to completed questionnaire to Terry Thompson at terry_thompson@fishgame.state.ak.us <mailto:terry_thompson@fishgame.state.ak.us>. If
you have questions concerning this project or the information requested, you may also contact Terry Thompson at (907) 235-4799 x 7.

In an effort to ensure widespread coverage of our project we are using several email lists, which may cause you to receive multiple email notices requesting your participation. We ask for your patience if you have already received this email.

Sincerely,

G. Carl Schoch  
Science Director  
Kachemak Bay Research Reserve  
email: carl_schoch@fishgame.state.ak.us

Alan Bennett  
Inventory and Monitoring Coordinator  
Southwest Alaska Network  
National Park Service  
email: alan_bennett@nps.gov
Appendix B: Questionnaire

Project title:

Principle investigator(s) and contact information:

Primary contact:

Project affiliation:

Web site address:

Hypotheses or objective (e.g. proposal abstract):

Data being collected in 2003:

Type and location (latitude/longitude) of deployments, experiments, transects, etc:

Expected duration of project:

How and when will the data be made available?

List of published and unpublished reports:

Research area – Please include map:
If a map of your research area is unavailable, please use one of the following links to generate a map of the research area:

Small spatial scale projects: http://www.topozone.com/default.asp
Large spatial scale projects: http://rimmer.ngdc.noaa.gov/coast/getcoast.html
Oceanic and Nearshore Research and Monitoring in the Northern Gulf of Alaska

Appendix C: Project Summaries
Oceanic and Nearshore Research and Monitoring in the Northern Gulf of Alaska

Project Summaries

April 2004
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Assessment of the distribution, composition, and trophic role of microphytobenthos occupying tidal flats in Kachemak Bay

Hypotheses:
The main objectives of this project are to answer the following:
1. Does the spatial distribution of microalgae in Kachemak Bay indicate certain “hot spots” of food availability for suspension and deposit feeders, as a result of circulation patterns?
2. Are littleneck clams utilizing benthic microalgae as an important food source?
3. Are microalgae occupying tidal flat habitats providing significant primary production to support shellfish and filter feeders occupying either tidal flats or other habitats in Kachemak Bay?
4. Are harmful algal bloom (HAB) species a component of the microalgal community in Kachemak Bay?
5. Does starvation invoke a measurable change in biomarker stress proteins and stable isotope signature of littleneck clams?

Data Being Collected:
Data being collected in 2003: None, due to lack of funding

Progress: In work
First Year Collected: 2002
Duration of Project: 2003
Duration Description: Field collections were completed in September 2002
Laboratory analysis will be completed in September 2003

Publications:
Unpublished Progress Report September 2002

Comments:
Map showing water column stations was not included because database would not accept 2 maps. Data collected includes sediment particle-size and organic matter content, chlorophyll content of upper 3 cm, microphytobenthos taxonomic composition, stable C and N isotope composition of microphytobenthos, macroalgae, eelgrass, bivalves and other benthic macrofauna.

Map Description: Tidal flat stations sampled in July and September 2002 by NOAA Beaufort Laboratory.
Maps:
Figure 1. Tidal flat stations sampled in July and September 2002 by NOAA Beaufort Laboratory. Data collected includes sediment particle-size and organic matter content, chlorophyll content of upper 3 cm, microphytobenthos taxonomic composition, stable C and N isotope composition of microphytobenthos, macroalgae, eelgrass, bivalves and other benthic macrofauna.
Figure 2. Water column stations sampled in July and September 2002 by NOAA Beaufort Laboratory. Data collected include temperature, salinity, chlorophyll, phytoplankton taxonomic composition and stable C and N isotopic composition of particulate matter.
Freezing tolerance and survival of intertidal invertebrates in Kachemak Bay, AK

Related Park: Southwest Alaska Network
Project Affiliations: University of Alaska Fairbanks, School of Fisheries and Ocean Science, Institute of Marine Science
Website Address: none given

Primary Contact: Heather Patterson, graduate student
University of Alaska Fairbanks, School of Fisheries and Ocean Science, Institute of Marine Science
No address
Voice: (907)474-7074 fax: none given fthkp@uaf.edu

Hypotheses:
1. Survival of Mytilus, Balanus, Protothaca at various temps (0, -10, -20) - Limpets, Katharina, Fusitriton, Leptasterias too but with less data - also includes survival at different times of the year (~2 years)
2. Supercooling pts of Mytilus and Protothaca

Data Being Collected:
Data being collected in 2003: Data collection finished May 03

Progress: In work
First Year Collected: West: -152
Duration of Project: East: -150.75
Duration Descript: North: 59.9
Data collection finished May 03 South: 59.3
Biological, Benthic

Reconnaissance of horse clams (Tresus capax) near Kodiak Island, Alaska

Related Park: Katmai National Park and Preserve

Project Affiliations: University of Alaska Fairbanks, School of Fisheries and Ocean Science, Institute of Marine Science; Alaska Department of Fish and Game

Website Address: http://www.sfos.uaf.edu/directory/faculty/jewett/

Primary Contact: Stephen Jewett, Research Professor
University of Alaska Fairbanks, School of Fisheries and Ocean Science, Institute of Marine Science
Fairbanks, AK 99775 United States
Voice: (907)474-7841 fax: (907)474-7204 jewett@ims.uaf.edu

Principal Investigators:

Hypotheses:
This project focuses on the horse (gaper) clam resource along the northeast side of Kodiak Island. Using a chartered vessel, a remote video system, and diving biologists, commercial quantities of clams will be assessed through a reconnaissance survey. Divers from University of Alaska Fairbanks will gather size, abundance and biomass information with oversight provided by ADF&G biologists. The findings will be used to form the basis for an application to develop a fishery under the department's Developing Fisheries Plan.

Data Being Collected:
Data being collected in 2003: Density, biomass, size, age structure, and habitat of horse clams

Progress: In work
First Year Collected: 2003
Duration of Project: 1 year
Duration Descipt: 

West: -155
East: -151.5
North: 59
South: 56.1
Barren Islands Seabird Studies

Related Park: Southwest Alaska Network
Project Affiliations: US Fish and Wildlife Service
Website Address: http://www.r7.fws.gov/nwr/akmnwr/akmnwr.html

Primary Contact: Arthur Kettle
US Fish and Wildlife Service
2355 Kachemak Drive, Ste.101
Homer, AK 99603 United States
Voice: (907)235-6546  fax: none given
Arthur_Kettle@fws.gov

Principal Investigators:

Hypotheses:
Monitor seabird population size, nesting dates, reproductive success, chick growth, and chick diet at the Barren Islands, Alaska.

Data Being Collected:
Data being collected in 2003: Monitoring of population size, nesting dates, reproductive success, chick growth, and chick diet of seabirds at East Amatuli Island. Also sea surface temperature.

Progress: In work
First Year Collected: 2003
Duration of Project: 2003
Duration Descript: 7 weeks

West: -152.5
East: -151.5
North: 59.25
South: 58.75

Publications:

Map:
Harlequin Duck population recovery following the Exxon Valdez Oil Spill

Related Park: Alaska Region
Project Affiliations: US Geological Survey; Simon Fraser University; Alaska Science Center
Website Address: none given

Primary Contact: Dan Esler
Simon Fraser University
5421 Robertson Road
Delta, BC V4K 3N2 Canada
Voice: (604)940-4652  fax: none given
desler@sfu.ca

Principal Investigators:

Hypotheses:
Harlequin ducks have not fully recovered from the EVOS, based on population-level demographic differences between oiled and unoiled areas. Further, in oiled areas, harlequin ducks show elevated cytochrome P4501A (CYP1A) through 1998, almost certainly reflecting continued exposure to oil. We propose to explore links between oil exposure and the lack of population recovery, with the intent of understanding constraints to full recovery of harlequin ducks and the nearshore environment generally. We also will monitor the progress of recovery of the species and the system. Proposed work consists of both field and experimental lam component. Field studies will examine the relationships between survival and CYP1A and, further, will serve to monitor these key parameters. Captive experiment on harlequin ducks will examine the relationships between oil exposure and CYP1A induction, and the metabolic and behavioral consequences of exposure to oil.

Data Being Collected:
Data being collected in 2003: 2003 is the last year of data collection; we have just received the final survival monitoring and P450 data from field studies. Types of data included capture data for ducks (sex, age, mass, morphometrics, etc), telemetry data for females and cytochrome P549 data for females. Captive experiments were conducted at the Alaska SeaLife Center in Seward, using female harlequin ducks captured in Prince William Sound (Montague Island) during fall wing molt in 2000 and 2001. Data sets from experiments include behavior monitoring, metabolism (BMR and DEE), and p540 response to oil ingestion treatments. Behavior and metabolism data also were collected for externally oiled birds.

Progress:
In work
West: -149
First Year Collected: East: -144.5
2003 North: 61.5
Duration of Project: South: 59.7
Duration Descrit: Data collection in complete. Reports and papers from the early years of the study (95-98) are described below. Reports and publications from the latest round of work (2000-03) are in preparation.

Publications:


Population delineation of Prince William Sound harlequin ducks

Related Park: Southwest Alaska Network
Project Affiliations: Alaska Department of Fish and Game; National Fish and Wildlife Foundation
Website Address: http://www.state.ak.us/ adfg/wildlife.duck/duck.htm

Primary Contact: Dan Rosenberg
Alaska Department of Fish and Game
525 W. 67th Ave
Anchorage, AK 99518 United States
Voice: (907)267-2453 fax: none given
dan_rosenberg@fishgame.state.ak.us

Principal Investigators:

Hypotheses:
Population Delineation, Migration, Philopatry

Data Being Collected:
Data being collected in 2003: Movement and Distribution

Progress:
In work

First Year Collected:
2003

Duration of Project:
2004

Duration Descript:
2003 – 2004

West:
-148.5

East:
-146

North:
60.5

South:
59.5

Publications:

Map:
Seabird Research and Monitoring on Middleton Island

Related Park: Alaska Region
Project Affiliations: US Geological Survey, Alaska Science Center
Website Address: http://www.absc.usgs.gov/staff/MFEB/shatch.php

Primary Contact: Scott Hatch
US Geological Survey, Alaska Science Center
1011 E. Tudor Road
Anchorage, AK 99503 United States
Voice: (907)786-3512  fax: none given
Scott_Hatch@usgs.gov

Principal Investigators:

Hypotheses:

1. Collect adipose tissue samples from black-legged kittiwakes, including individuals subjected to controlled diets of known prey types, for fatty acid signature analysis.
2. Monitor populations, productivity, survival, breeding chronology, and food habits of several species on Middleton including black-legged kittiwakes, pelagic cormorants, common murreas, tufted puffins, rhinoceros auklets, and glaucous-winged gulls.

Data Being Collected:

As above.

Progress: In work  West: -148
First Year Collected:  East: -145
Duration of Project:  North: 60
Duration Descript:  South: 59

Ongoing; will continue as long as funding permits.
Seasonal Movements and Distribution of wintering Steller's Eiders (Polysticta stelleri)

Related Park: Southwest Alaska Network
Project Affiliations: Alaska Department of Fish and Game; US Fish and Wildlife Service
Website Address: http://www.state.ak.us/adfg/wildlife.duck/duck.htm

Primary Contact:
Dan Rosenberg
Alaska Department of Fish and Game
525 W. 67th Ave
Anchorage, AK 99518 United States
Voice: (907)267-2453 fax: none given
dan_rosenberg@fishgame.state.ak.us

Principal Investigators:

Hypotheses:
Abundance, Population Structure, Population Delineation, Migration, Philopatry, Distribution

Data Being Collected:
Data being collected in 2003: Survey in lower Cook Inlet

Progress: In work
First Year Collected: 2003
Duration of Project: 2005
Duration Descript: 2003-2005

Map:
Semidi Islands Seabird Research and Monitoring

**Related Park:** Alaska Region

**Project Affiliations:** US Geological Survey, Alaska Science Center

**Website Address:** Scott Hatch: http://www.absc.usgs.gov/staff/MFEB/shatch.php


**Primary Contact:**
Scott Hatch
US Geological Survey, Alaska Science Center
1011 E. Tudor Road
Anchorage, AK 99503 United States
Voice: (907)786-3512 fax: none given
Scott_Hatch@usgs.gov

**Principal Investigators:**
Vernon Bird
US Fish and Wildlife Service
2355 Kachemak Drive, Ste.101
Homer, AK 99603 United States
Voice: (907)235-6546 fax: none given
Vernon_Byrd@fws.gov

**Hypotheses:**
(1) Obtain samples of adipose tissue from adult and young-of-the-year northern fulmars for analysis of fatty acid profiles and development of techniques for assessing seabird diets through fatty acid signature analysis.

(2) Deploy satellite transmitters on breeding northern fulmars at the Semidi Islands and track birds to wintering areas during 2003-2004.

(3) Monitor population sizes, productivity, survival, and breeding chronology of several seabird species on the Semidi Islands for addition to long-term data sets at this site.

**Data Being Collected:**
Adipose tissue samples (via live biopsy) from northern fulmars; Argos satellite telemetry locations from four northern fulmars (beginning August 2003); catalog of fulmar culmen markings for individual identification and monitoring of adult survival in northern fulmars; estimates of annual breeding productivity in northern fulmars, black-legged kittiwakes, thick-billed and common murres.

**Progress:** In work

**First Year Collected:**

**Duration of Project:**

**Duration Descript:** 1-year, with possible follow-up visits in 2004 for additional fat sampling in northern fulmars.

**Publications:**
See websites given above for Hatch and Byrd for bibliographies from long-term research and monitoring on the Semidi Islands.
Small boat and aerial survey of waterfowl in Kachemak Bay, Alaska

**Related Park:** Southwest Alaska Network

**Project Affiliations:** Alaska Department of Fish and Game; National Fish and Wildlife Foundation

**Website Address:** http://www.state.ak.us/dfg/wildlife.duck/duck.htm

**Primary Contact:**
Michael Petrula  
Alaska Department of Fish and Game  
525 W. 67th Ave  
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**Principal Investigators:**
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525 W. 67th Ave  
Anchorage, AK 99518 United States  
Voice: (907)267-2453  
Fax: none given  
dan_rosenberg@fishgame.state.ak.us

**Hypotheses:**
Long-term Monitoring

**Data Being Collected:**
Data being collected in 2003: Survey

**Progress:** In work

**First Year Collected:** 1999

**Duration of Project:** 2003

**Duration Descript:** 1999-2003

**Publications:**

**Map:**

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Oceanic and Nearshore Research and Monitoring Summaries  
April 2004
Canada-USA Shelf Salmon Survival Study

Related Park: Alaska Region
Project Affiliations: Fisheries and Oceans Canada/Institute of Ocean Sciences; Bonneville Power Authority
Website Address: none given

Primary Contact: Principal Investigators:
David Welch  
Fisheries and Oceans Canada/Institute of Ocean Sciences  
Pacific Biological Station  
Hammond Bay Road  
Nanaimo, BC V9T 6N7 Canada  
Voice: (250)756-7218 fax: (250)756-7053  
welchd@pac.dfo-mpo.gc.ca

Hypotheses:
The primary objective of this study is to obtain a single coast-wide set of data that will allow US and Canadian scientists to begin identifying broad regions of good or poor salmon growth in the ocean, and to begin defining the reasons why growth differs between regions. Based on these preliminary results it will be possible to refine sampling locations for future years and determine the appropriate sampling frequency that is needed. A secondary goal will be to establish which specific stocks of salmon remain resident in the areas of poorest growth, and to therefore begin to develop some understanding of why marine survival may differ between different stocks of salmon in the ocean.

Data Being Collected:
Data being collected in 2003: Salmon & oceanographic data collection off SE will occur in March, June, and October of 2003. Data collection includes: CTD stations, Surface Chl-a, Zooplankton from double Bongo-tow, abundance (CPUE) of each salmon species, size (length and weight), stomach contents, fat content, and Cesium content (for bioenergetic analysis).

Progress: In work  
First Year Collected: West: -140  
Duration of Project: East: -143  
Duration Descipt: North: 60  
South: 47

Publications:


GLOBEC 2000: Factors affecting the distribution of juvenile salmon in the Gulf of Alaska

Hypotheses:
Remarkable changes in atmospheric, oceanic and biological conditions have occurred in recent decades in the North Pacific Ocean including declines in the marine survival of some salmon stocks. Fishery scientists generally agree that in the first few months after leaving freshwater, salmon survival and growth are linked to oceanic variability. The purpose of this research is to focus National Marine Fisheries Service studies on the GLOBEC region, augment oceanographic measurements and determine what biological and physical factors influence the distribution of juvenile salmon. Three general hypotheses are explored in this proposal:

1. juvenile salmon prefer the buoyancy-driven Alaska Coastal Current (ACC) at the head of the Gulf of Alaska,
2. they associate with oceanic temperature, salinity, current and prey fields, and
3. they migrate landward of Kodiak Island in the ACC rather than seaward in the Alaskan Stream.

Data Being Collected:
Data Collected in the past 2 years:

Sea-surface temperature, salinity, fluorescence and nutrients. Temperature, salinity and fluorescence profiles from CTD casts at each station. Currents from ADCP and satellite-tracked drifting buoys. Surface zooplankton net tows. Juvenile salmon distribution, migration, size and condition in relation to oceanographic features from surface trawls.

Progress: In work
First Year Collected: 2001
Duration of Project: 2005
Duration Descript:  

West: -157
East: -136
North: 62
South: 54

Publications:


Gulf of Alaska Biennial Bottom Trawl Survey of Groundfish Resources

Related Park: Alaska Region
Project Affiliations: National Marine Fisheries Service
Website Address: http://www.afsc.noaa.gov/

Primary Contact: Mark Wilkins
National Marine Fisheries Service
7600 Sand Point Way, NE
Seattle, WA 98115 United States
Voice: (206)526-4104  fax: (206)526-6723
Mark.Wilkins@noaa.gov

Hypotheses:
The major survey objective is to extend the biennial time series monitoring trends in distribution and abundance of important groundfish species begun in 1999 and to describe and measure various biological and environmental parameters. Between 1984 and 1999 these surveys were conducted triennially. Results of the survey are used in most of the stock assessments that are developed for Gulf of Alaska groundfish species. Data and specimens for various biological studies are also collected during this work.

Data Being Collected:
The survey is being conducted in 2003 between May 20 and August 9 aboard three chartered commercial trawlers. Data on fishing effort, environmental variables, catch rate, and biological characteristics of various species are being collected at pre-selected stations throughout the Gulf of Alaska.

Progress: In work
First Year Collected: 1984
Duration of Project: North: 61
Duration Descr: This biennial bottom trawl series is planned to continue indefinitely.
Duration Descr: This biennial bottom trawl series is planned to continue indefinitely.
Duration Descr: This biennial bottom trawl series is planned to continue indefinitely.
Duration Descr: This biennial bottom trawl series is planned to continue indefinitely.

West: -170
East: -132
South: 47
North: 61

Publications:

Comments:
A short Cruise Results is released within two months after the conclusion of the survey summarizing the number and location of samples, preliminary estimates of CPUE, and an indication of abundance trends. A Report to Industry is compiled and released approximately six months after the survey that depicts the distribution and relative abundance of various commercially important species from the survey results. A Data Report is published approximately 12 months following the survey, which includes more detailed analyses of abundance, distribution, size and age composition, and other biological information about fish and invertebrates in the region derived from survey results. Results of the survey are also used in virtually all stock assessments of Gulf of Alaska groundfish.
Map Description: Gulf of Alaska continental shelf and upper continental slope between Dixon Entrance (132°30'W longitude) and the Islands of the Four Mountains (170°W longitude) at depths from 15-1,000 m.

Map:

Gulf of Alaska continental shelf and upper continental slope between Dixon Entrance (132°30'W longitude) and the Islands of the Four Mountains (170°W longitude) at depths from 15-1,000 m.
Kamishak Bay herring stock assessment

**Related Park:** Southwest Alaska Network

**Project Affiliations:** Alaska Department of Fish and Game

**Website Address:** none given

**Primary Contact:**
Ted Otis  
Alaska Department of Fish and Game  
3298 Douglas Place  
Homer, AK 99603 United States  
Voice: (907)235-1723  
fax: none given  
Ted_Otis@fishgame.state.ak.us

**Principal Investigators:**
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Alaska Department of Fish and Game  
3298 Douglas Place  
Homer, AK 99603 United States  
Voice: (907)235-1723  
fax: none given  
Ted_Otis@fishgame.state.ak.us

**Hypotheses:**
Monitor stock status (abundance, and composition, spawning distribution) of herring spawning in Kamishak Bay

**Data Being Collected:**
Data being collected in 2003: Aerial and vessel survey observations of herring distribution and abundance, spawning locations, and age, sex, and size distribution of spawning fish

**Progress:** In work

**First Year Collected:** 1978

**Duration of Project:** Conducted annually from ~April 20-June 10, since 1978

**Duration Descript:** Conducted annually from ~April 20-June 10, since 1978

**West:** -155  
**East:** -149.5  
**North:** 60.5  
**South:** 58.7

**Publications:**


**Map Description:**
Map of the Lower Cook Inlet management area, including the 5 management districts and 35 index streams on which ADF&G monitors salmon escapements.
Figure 1. Map of the Lower Cook Inlet management area, including the 5 management districts and 35 index streams on which ADF&G monitors salmon escapements.
Lower Cook Inlet salmon catch and escapement monitoring

Related Park: Southwest Alaska Network
Project Affiliations: Alaska Department of Fish and Game
Website Address: none given

Primary Contact: Ted Otis
Alaska Department of Fish and Game
3298 Douglas Place
Homer, AK 99603 United States
Voice: (907)235-1723 fax: none given
Ted_Otis@fishgame.state.ak.us

Principal Investigators:

Hypotheses:
Monitor commercial catch and escapements for in-season management of commercial fisheries and collect age, sex, size data to characterize the catch.

Data Being Collected:
Data being collected in 2003:
- Annual escapement indices for streams supporting commercial harvests of pink, chum, and/or sockeye salmon (pink and chum escapement indices are based on area-under-the-curve estimates derived from periodic aerial and/or foot surveys, sockeye escapements are peak aerial counts or estimates derived from weirs and/or remote video escapement recorders);
- Daily and weekly in-season catch reports to monitor harvests from individual fishery subdistricts.
- Age (scales), weight, length, and sex composition information from commercial landings, and from salmon escaping to

Progress: In work
First Year Collected: 1950
Duration of Project: North: 60.5
Duration Descipt: Salmon catch and escapements in Lower Cook Inlet have been monitored annually since the 1950's
West: -155
East: -149.5
South: 58.7

Publications:


Map Description: Map of the Lower Cook Inlet management area, including the 5 management districts and 35 index streams on which ADF&G monitors salmon escapements.

Map:
Resource Ecology and Ecosystem Modeling Program

Related Park: Southwest Alaska Network
Project Affiliations: NOAA, National Marine Fisheries Service
Website Address: http://www.afsc.noaa.gov/refm/reem/Default.htm

Primary Contact:
Pat Livingston
National Marine Fisheries Service
7600 Sand Point Way, NE
Seattle, WA 98115 United States
Voice: (206)526-4242  fax: none given
pat.livingston@noaa.gov

Principal Investigators:

Hypotheses:
The Resource Ecology and Ecosystem Modeling Task at the Alaska Fisheries Science Center focuses on the collection and analysis of data relating to trophic interactions in the North Pacific and incorporation of these data into environmental assessments and single-species and multispecies models. Systematic collection and analysis of groundfish food habits data is performed. Data on size-at-age is integrated with bioenergetic information to estimate food consumption rates by fish populations. Information on marine mammal and bird diet is obtained from other Center programs or outside researchers. Quantifying food web linkages is essential to increase our understanding of how external forces such as fishing may cause unanticipated shifts in ecosystem composition. The importance of this research is also elevated given the increasing emphasis on fishery-mammal interactions: groundfish predation interactions are an important part of knowing the true nature of resource availability to mammals and birds.

Stomach samples are collected at virtually no cost to the program, utilizing fishery observers and existing assessment cruises for collection platforms. Samples are analyzed in the laboratory and entered into a food habits database. These data allow assessment of factors influencing individual species food habits, including interannual changes. Predation effects by groundfish populations are then quantified and incorporated into assessment models.

Data Being Collected:
Data being collected in 2003: In the GOA: Stomach samples from arrowtooth flounder, walleye pollock, Pacific cod, Pacific halibut, sablefish, Atka mackerel, Alaska skate, big skate, giant grenadier, silvergray rockfish, yellowtail rockfish, and shortspine thornyhead.

Progress: In work
First Year Collected: West: -169.5
First Year Collected: East: -141
First Year Collected: North: 61.25
First Year Collected: South: 52

Duration of Project: Biennial collections on shelf-wide survey, annual collections in NMFS Pavlov Bay shrimp survey and ADF&G summer large mesh survey in Barnabas and Chiniak Gullies.

Duration Descript: Biennial collections on shelf-wide survey, annual collections in NMFS Pavlov Bay shrimp survey and ADF&G summer large mesh survey in Barnabas and Chiniak Gullies.

Publications:
See program web site for list of publications.

Map:
Southeast Alaska Coastal Monitoring (SECM)

<table>
<thead>
<tr>
<th>Related Park:</th>
<th>Alaska Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Affiliations:</td>
<td>National Marine Fisheries Service</td>
</tr>
</tbody>
</table>
| Website Address:    | http://www.afsc.noaa.gov/abl/  
                      | http://www.afsc.noaa.gov/abl/MarSalm/4secm.htm |

**Primary Contact:**

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joe.orsi@noaa.gov

**Principal Investigators:**

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fax: none given

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National Marine Fisheries Service  
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Juneau, AK 99801 United States  
Voice: none given  
fax: none given

**Hypotheses:**

The primary goal of the Southeast Alaska Coastal Monitoring (SECM) research is to build and maintain a time series of biophysical oceanographic indices related to the seasonal growth, distribution, abundance, and habitat utilization of juvenile salmon stocks. Another goal is to examine relationships between juvenile salmon and ecologically-related species. According to research needs identified by the Auke Bay Laboratory and international science programs (North Pacific Anadromous Fish Commission and Global Ocean Ecosystem Dynamics) long term sampling commitment over varying environmental conditions is needed to better understand relationships between early marine growth and survival, and between marine habitat utilization and carrying capacity of salmon.

**Data Being Collected:**

Data being collected in 2003: At most stations:  
- CTD (temp, salinity, and sigma-t) to 200m,  
- surface chlorophyll/nutrients,  
- 20-m Norpac vertical zooplankton haul (243 mesh),  
- double oblique BONGO tow to 200m (333 and 505 mesh),  
- surface trawling (NORDIC 264 trawl) for juvenile salmon and ecologically related species, and  
- salmon predator stomach analysis.

**Progress:**

In work  
West: -137

**First Year Collected:**

1997  
East: -132
Duration of Project: 2005
Duration Descript: North: 58.3
South: 57

Publications:


Comments:
Type and location (latitude/longitude) of development, experiments, transects, etc:
Table 1.—Localities and coordinates of stations sampled monthly in marine waters of the northern region of southeastern Alaska, May–August 2003.

<table>
<thead>
<tr>
<th>Locality</th>
<th>Station</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Offshore distance (km)</th>
<th>Bottom depth (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auke Bay Monitor</td>
<td>ABM</td>
<td>58E 22.00NN</td>
<td>134E 40.00NW</td>
<td>1.5</td>
<td>60</td>
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<tr>
<td>Upper Chatham Strait</td>
<td>UCA</td>
<td>58E 04.57NN</td>
<td>135E 00.08NW</td>
<td>3.2</td>
<td>400</td>
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<tr>
<td>Upper Chatham Strait</td>
<td>UCB</td>
<td>58E 06.22NN</td>
<td>135E 00.91NW</td>
<td>6.4</td>
<td>100</td>
</tr>
<tr>
<td>Upper Chatham Strait</td>
<td>UCC</td>
<td>58E 07.95NN</td>
<td>135E 04.00NW</td>
<td>6.4</td>
<td>100</td>
</tr>
</tbody>
</table>
Map Description: Stations sampled monthly in marine waters of the northern region of southeastern Alaska, May–August 2003.
Surface Nutrients Over the Shelf and Basin in Summer - Bottom up Control of Ecosystem Diversity

Hypotheses:
To better understand the extraordinary variability of nutrients (spatial, interannual and decadal), and the factors controlling nearshore communities, and zooplankton and juvenile salmon distributions in the northern Gulf of Alaska, we propose monitoring nitrate over the shelf and basin. Underway samples will be collected as part of the GLOBEC salmon survey in July/August of 2003 and 2004. This survey includes a transit across the central GOA and 10 cross-shelf oceanographic and juvenile salmon transects from Yukatat to Kodiak Island. This will be the broadest nutrient survey of the northern GOA. Nutrient maps will be used to support NPZ models and satellite-derived models of nitrate and new production, to examine mechanisms of nutrient supply such as mixing over banks and transport up submarine canyons, and to assist resource management of salmon and other commercially important species. Funding in 2003 ($38k) is vital as this is GLOBECs final intensive field season.

Data Being Collected:
Data being collected in 2003: Underway nitrate in conjunction with GLOBEC measurements of underway temperature, salinity, and fluorescence.
Utilization of Alaska kelp beds by commercially important fishes

**Related Park:** Southwest Alaska Network

**Project Affiliations:** University of Alaska Fairbanks, School of Fisheries and Ocean Science, Institute of Marine Science

**Website Address:** none given

**Primary Contact:** Judy Hamilton, graduate student

University of Alaska Fairbanks, School of Fisheries and Ocean Science

Voice: (907) 235-0677  
Fax: none given

**Hypotheses:**
To investigate correlations between kelp and fish communities, and to consider seasonal and annual variation in such correlations.

**Data Being Collected:**
Data being collected in 2003: Monthly scuba surveys of fish and kelp.

**Progress:** In work

**First Year Collected:** 2002  
**Duration of Project:** 2004  
**Duration Descript:** May 2002 – August 2003

**East:** -150.8  
**West:** -152  
**North:** 60  
**South:** 59.25

**Comments:**
Ten sites:
1. MacDonald Spit: UTM 5 579176E 6593916N;
2. Herring Islands: 583748E 6594353N;
3. Jakolof Bay entrance: 582930E 6593190N;
4. Inside Jakolof Bay: 583098E 6592875N
5. Little Jakolof Bay: 584302E 6593378N
6. Little Tutka Bay: 585826E 6593601N
7. Tutka Bay: 586862E 6595908N
8. Sadie Cove: 587258E 6596903N
9. Anisom Point: 587573E 6600408N
10. Hesketh Island: 583225E 6597279N.

**Map:** Seldovia C-5 SE.
Factors affecting herbivores and predators along a vertical gradient in Kachemak Bay

**Related Park:** Southwest Alaska Network

**Project Affiliations:** University of Alaska Fairbanks, School of Fisheries and Ocean Science, Institute of Marine Science

**Website Address:** http://www.sfos.uaf.edu

**Primary Contact:** Gayle Neufeld  
University of Alaska Fairbanks, School of Fisheries and Ocean Science, Institute of Marine Science  
Voice: none given, fax: none given  
gneufeld@sfos.uaf.edu

**Hypotheses:**  
The effect of grazing and predation varies along small-scale gradients within a single community.

**Objectives:**
- To determine the effect of tidal height and depth on herbivory and predation.
- To determine if herbivory and predation have an effect in structuring the intertidal and subtidal community at Outside Beach.
- To measure vertical environmental gradients of physical and chemical factors at Outside Beach.

**Data Being Collected:**
Data being collected in 2003: Pilot study, measure differences in herbivory/predation by exclusionary cages at different tidal heights and subtidal depths.

**Progress:** In work

**First Year Collected:**

**Duration of Project:**

**Duration Descript:** 2-3 years

**West:** -152

**East:** -150.75

**North:** 59.9

**South:** 59.3
Biological, Marine Mammals

Abundance and distribution of harbor seals (Phoca vitulina) in the Gulf of Alaska (including the south side of the Alaska Peninsula, Kodiak Island, Cook Inlet and Prince William Sound) during 2001

Related Park: Alaska Region
Project Affiliations: Alaska Fisheries Science Center
Website Address: http://www.afsc.noaa.gov/

Primary Contact: David Withrow
National Marine Mammal Laboratory
Alaska Fisheries Science Center
National Marine Fisheries Service, NOAA
Seattle, WA 98115 United States
Voice: none given  fax: none given

Principal Investigators: John Bengtson
National Marine Mammal Laboratory
7600 Sand Point Way, NE
Seattle, WA 98115 United States
Voice: none given  fax: none given

Hypotheses:
Minimum population estimates were obtained for harbor seals, Phoca vitulina richardsi, in the Gulf of Alaska region which runs from Unimak Pass in the west to Kayak Island (Cape Suckling) in the east, including the south side of the Alaska Peninsula and offshore islands, Kodiak Island, Cook Inlet, Kenai Peninsula and Prince William Sound. The study area was subdivided into 13 zones such that each section was surveyed by separate observers at about the same time. Zones 1 and 2 were flown from 12-20 August 2000 and Zones 3-13 were flown from 12-25 August 2001. A total of 590 haulout sites were identified. The mean number of seals counted was 24,428 with a 95% confidence interval between 23,265 and 25,591. The CV of the mean was equal to 2.4%.

Data Being Collected:
None in this area.

Progress: In work
First Year Collected: West: -166
Duration of Project: East: -141
Duration Descriptor: North: 61
Repeats every 5 years South: 52

Publications:
Alaska Marine Mammal Tissue Archival Project (AMMTAP)

**Related Park:** Alaska Region

**Project Affiliations:** US Geological Survey, Alaska Science Center; National Oceanic and Atmospheric Administration; National Institute of Standards and Technology

**Website Address:** [http://www.absc.usgs.gov/research/ammtap/index.htm](http://www.absc.usgs.gov/research/ammtap/index.htm)

**Primary Contact:**

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National Institute of Standards and Technology  
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Voice: (803)762-8503  
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Paul.Becker@noaa.gov

**Principal Investigators:**

**Hypotheses:**

The objectives of AMMTAP are to collect tissue samples from Alaska marine mammals and to store these samples under the best conditions so that they can be analyzed in the future for environmental contaminants. The role of specimen banking in research and monitoring enables future investigators to extend their research into the past (hind casting) and provides for future verification of analytical results (quality assurance).

**Data Being Collected:**

Data being collected in 2003: Marine mammal tissue samples (liver, kidney, and blubber/fat) from subsistence harvested and recently stranded marine mammals across the state of Alaska (including harbour seal, sea otter, and sea lion).

**Progress:**

First Year Collected: In work

Duration of Project: Into the foreseeable future

Duration Descript: Into the foreseeable future

Publications:


Becker, P.R. 1993. Studies of contaminants in Arctic marine mammals. Coastal Zone 93: Proceedings of the 8th Symposium on Coastal and Ocean Management (New Orleans, LA), O.T.


Becker, P.R. 1993. Studies of contaminants in Arctic marine mammals. Coastal Zone 93: Proceedings of the 8th Symposium on Coastal and Ocean Management (New Orleans, LA), O.T.


**Gulf of Alaska cetacean survey**

**Related Park:** Alaska Region  
**Project Affiliations:** National Marine Fisheries Service; National Oceanic and Atmospheric Administration  
**Website Address:** http://nmml.afsc.noaa.gov  
**Primary Contact:**  
Janice Waite  
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7600 Sand Point Way, NE  
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Sue.Moore@noaa.gov

**Principal Investigators:**  
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Seattle Fisheries Science Center  
Seattle, WA 98115 United States  
Voice: (206)526-4021  
Sue.Moore@noaa.gov

**Hypotheses:**  
Commercial harvests of baleen whales were extensive in the North Pacific and Bering Sea, especially between 1835 and 1850 for North Pacific right whales and between 1965 and 1979 for fin and humpback whales. The effect of these large-scale removals on the marine ecosystem is largely unknown. Similarly, some species of toothed whales (odontocetes) are sometimes killed in the course of commercial fishing operations. Pelagic dolphins and Dall’s porpoise were especially vulnerable during high seas driftnet fishing in the North Pacific in the 1980s, with the long-term ramifications of these removals also unknown. One reason for this uncertainty is the lack of data on current cetacean distribution and estimates of abundance in pelagic environments. Surveys to determine distribution and abundance are costly and therefore often confined to coastal waters where the logistics are most practical, or to areas of the ocean where marine mammal mortality associated with commercial fishing is particularly high. The pelagic waters of the Gulf of Alaska have not met either criteria and so are comparatively under-sampled for cetaceans. In addition to the line-transect survey, the opportunity to collect identification photographs and biopsy samples of different cetacean species is highly valuable. For species such as North Pacific right whales, killer whales and humpback whales, there are currently studies using photographs for abundance estimation, and genetic information from biopsies to help define stock structure. Additional photographs and biopsy samples, especially from areas that are not routinely surveyed, greatly contribute to these studies. In 1997, 1999, 2000, and 2002, The National Marine Mammal Laboratory (NMML) placed marine mammal observers on the NOAA ship Miller Freeman during the Alaska Fisheries Science Center Midwater Assessment and Conservation Engineering=acoustic-trawl survey to conduct a line-transect survey while the ship surveyed between trawling sites. During those years, the acoustic survey was conducted on the Bering Sea shelf. The cetacean surveys were invaluable for updating information on cetacean distribution and abundance in that area. Photographs and genetic samples collected also contributed a great deal of information for mark-recapture studies and stock identification. The Miller Freeman 2003 acoustic survey is in the Gulf of Alaska. Leg 2, on the shelf east of Kodiak Island, will be in a region that has not been well surveyed for marine mammals and provides a great opportunity to collect information on distribution and abundance of cetaceans in that area.

**Data Being Collected:**  
NMML will conduct a marine mammal line-transect survey along transect lines during Leg 2 of the Miller Freeman trawl survey, and collect photographic and biopsy data, on a not-to-interfere basis with the acoustic trawl survey. Species of interest would include killer whales, humpback whales, fin whales and right whales. Other species could be targeted if the opportunity arises.

**Progress:** Complete  
**West:** -161.25  
**First Year Collected:** 2003  
**East:** -147  
**Duration of Project:** 2003  
**North:** 60.5  
**Duration Descript:** 26 June – 16 July, 2003  
**South:** 54

**Publications:**  


**Map Description:** The research area will include the eastern part (Leg 2) of the map below, probably including Shelikof Strait and the shelf east of Kodiak Island to Prince William Sound.

**Map:**

![Map of the research area](image)

Figure 1. Proposed trackline for the 2003 summer echo integration-trawl survey of the Gulf of Alaska.
Investigations of harbor seals in Alaska

Related Park: Alaska Region
Project Affiliations: Alaska Fish and Game, Division of Wildlife Conservation
Website Address: http://www.state.ak.us/adfg/wildlife/wildmain.htm

Primary Contact:
Gail Blundell
Alaska Fish and Game, Division of Wildlife Conservation
P.O. Box 240020
Douglas, AK 99824-0020 United States
Voice: (907)465-4345 fax: none given

Principal Investigators:

Hypotheses:
Monitor trends in harbor seal populations statewide, design/conduct research to determine why some populations of harbor seals are declining in Alaska, vital rates research, foraging behavior. Multiple projects -- statewide research program.

Data Being Collected:
Year 2003: Time Depth Recorders (TDR), long-term (5 yr) VHF implants for vital rates study, seal condition, diet data, photo ID study, foraging under predation risk (sonic tags and prey assessment)

Data Collected in the past 2 years:
Time Depth Recorders (TDR), long-term (5 yr) VHF implants for vital rates study, seal condition, diet data, photo ID study, foraging under predation risk (sonic tags and prey assessment)

Progress: In work
First Year Collected: 2008
Duration of Project: expected end date 2008
Duration Descript: expected end date 2008

Publications:
see website

Comments:
Kodiak TDR deployment ends July 2003, VHF vital rates study in PWS 5 years (ends 2008?), PWS foraging study ends 2004.
Biological, Marine Mammals

Sea Otters and Coastal Ecosystems

Related Park: Alaska Region
Project Affiliations: US Geological Survey, Alaska Science Center
Website Address: http://www.absc.usgs.gov/research/sea_otters/index.htm

Primary Contact: James Bodkin
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1011 E. Tudor Road
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James_Bodkin@USGS.gov

Hypotheses:
Nearshore marine communities support a wide array of commercially, recreational and culturally valuable resources. Taxa include, but are not limited to, algae, invertebrates, fish, birds and mammals. A broad array of processes are responsible in structuring nearshore marine communities including both physical factors (e.g., temperature, salinity, currents) and biological factors (e.g., reproduction, growth, succession, competition, and predation). Human induced impacts in the coastal regions of Alaska are inevitable and increasing in scale and magnitude. In order to understand, quantify and attribute cause to changes in the nearshore ecosystem it is imperative to understand primary sources of community structuring and of natural or background levels of variation in the system. The sea otter, once nearly extinct, is currently reoccupying previous habitat in much of the North Pacific. The process of recolonization provides a unique opportunity to apply the experimental approach to describing the effects of a large mammalian predator on its prey and subsequent community organization. The role of sea otters in structuring nearshore marine communities in the north Pacific Ocean are recognized as significant, particularly among exposed rocky shorelines. Much less is known of the effects of sea otter reintroduction into soft sediment habitats. It is now possible to examine effects of sea otter foraging as they begin to recolonize Glacier Bay National Park and Preserve in southeast Alaska, a predominately soft sediment marine community. Information on the distribution and abundance of sea otters in and around Glacier Bay will provide the description of the spatial and temporal process of sea otter recolonization and provide the basis for study sites to evaluate changes in community structure before and after the effects of sea otters. Study of sea otter food habits will provide a measure of the direct effects of prey removal. Study of sea otter diving behavior will provide a measure of the bathymetric extent of sea otters in structuring communities. Study of prey populations will allow documentation of changes in abundance and size distributions resulting from sea otter foraging.

Data Being Collected:
Data being collected in 2003: We conduct a diverse array of research on coastal marine ecosystems, focusing on the role of sea otters on structuring communities and the effects of changing marine communities on sea otter populations. Data includes, but may not be limited to: distribution, abundance, density, age/sex composition, survival, fecundity, reproduction, behavior, physiology, morphology, diet, energetics, diving. We also conduct study of marine community species composition, density, and age/size class distributions, focusing on marine algae, benthic invertebrates, fishes, birds and other marine mammals.

Progress: In work
First Year Collected: West: -169
Duration of Project: East: -141
Duration Descript: North: 61
South: 50

Publications:


Map:
Biological, Marine Mammals

Steller sea lion pup counts and branding

Related Park: Alaska Region

Project Affiliations: National Oceanic and Atmospheric Administration; National Marine Mammal Laboratory; National Marine Fisheries Service

Website Address: http://nmml.afsc.noaa.gov/AlaskaEcosystems/sslhome/stellerhome.html

Primary Contact: Tom Loughlin
National Marine Mammal Laboratory
7600 Sand Point Way, NE
Seattle, WA 98115 United States
Voice: (206)526-4040 fax: none given

Hypotheses:

Objectives specific to this research category will include:
• Conduct pup counts and brand pups on selected rookeries as part of studies to monitor the population, determine dispersal rates, and estimate vital rates,
• Conduct brand resight cruises to determine dispersal rates and estimate vital rates

These surveys provide the baseline data required to evaluate the multiple hypotheses proposed for sea lion declines/lack of recovery (nutritional limitation, predation, climate change, etc).

As part of the core research program, researchers on these surveys will collect and analyze biological information related to Steller sea lion:
• Status and trends: To monitor population changes, better understand sea lion movement patterns, seasonal variation in distribution, and relationships between the distributions of sea lions, their prey, and fisheries,
• Stock structure: To elucidate sea lion demographic units and their trends, and develop protective measures that are appropriately scaled,
• Foraging ecology: To describe the diet and prey of sea lions, predator-prey dynamics, energetics, and foraging distributions of sea lions,
• Mortality and life history: To determine age-specific mortality rates and reproduction rates for population modeling, including pup branding and resighting.

Data Being Collected:

Pup counts, brand resights

Progress:

West: -180
East: -147
North: 61
South: 51

Publications:


Comments:

Sites are numerous--lat/long of sites are listed at:
Map Description: Steller sea lion rookeries and haul-outs from the Aleutian Islands to the Kenai Peninsula

Map:

Steller sea lion rookeries and haul-outs from the Aleutian Islands to the Kenai Peninsula
Biological, Marine Mammals

Steller Sea Lions and Predation by Killer Whales in Kenai Fjords/Prince William Sound; Killer Whale Monitoring in Kenai Fjords/Prince William Sound, Killer Whales and Steller sea lions; Predator/Prey Relationships

Related Park: Alaska Region
Project Affiliations: Alaska Sea Life Center; North Gulf Oceanic Society; North Pacific University Marine Mammal Research Consortium; Exxon Valdez Oil Spill Trustee Council
Website Address: none given

Primary Contact:
Craig Matkin
North Gulf Oceanic Society
Homer, AK 99603 United States
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Principal Investigators:
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Voice: (604)244-4345
barrett@zoology.ubc.ca

Hypotheses:
Determine impact of Killer Whales on Steller sea lion populations (Hypothesis: Killer whales are responsible for the lack of recovery of Steller sea lion populations). Determine population trajectories for Resident and Transient killer whale populations in Kenai Fjords/Prince William Sound and long-term impacts of EVOS (Hypothesis: Resident and transient killer whales have recovered from the effects of the Exxon Valdez Oil Spill).

Data Being Collected:
Data being collected in 2003: Identification Photos of Individual Killer Whales, Genetic and Contaminant sampling of known individuals, Acoustic recordings of groups, Distribution and Movements, Feeding Habits

Progress: In work
First Year Collected: 1994
Duration of Project: In work
Duration Descript:

Publications:

Map:
AnaGisa - Census of Marine Life

Related Park: Southwest Alaska Network

Project Affiliations: University of Alaska Fairbanks, School of Fisheries and Ocean Science, Institute of Marine Science

Website Address: http://www.westnurc.uaf.edu

Primary Contact: Brenda Konar
University of Alaska Fairbanks, School of Fisheries and Ocean Science, Institute of Marine Science
No address
Voice: none given        fax: none given

Katrin Iken
University of Alaska Fairbanks, School of Fisheries and Ocean Science, Institute of Marine Science
No address
Voice: none given        fax: none given

Hypotheses:
Near-shore biodiversity studies along a pole-to-pole latitudinal gradient by applying protocols developed under the Census of Marine Life program. After initial sampling in south central Alaska, the gradient will develop further throughout Alaska, along the pacific coast of North and South America into the Antarctic.

Data Being Collected:
Data being collected in 2003: Collection of flora and fauna for identification and voucher collection

Progress:
In work

First Year Collected:
2003

Duration of Project:
2004

Duration Descrip:
2 years

West: -155
East: -145
North: 61.5
South: 56
Database on the Marine Invertebrate Macrofauna of Prince William Sound: An Addition to the University of Alaska Museum’s ARCTOS Network

Related Park: Alaska Region
Project Affiliations: University of Alaska Museum
Website Address: http://arctos.museum.uaf.edu

Primary Contact: Nora R. Foster
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Voice: (907)474-7731 fax: (907)474-5469
fyaqua@uaf.edu

Principal Investigators:

Hypotheses:
Data sets that present basic taxonomic and biogeographic information at the species level for 1876 plant and animal species from Prince William Sound were compiled as part of research on potential introductions of nonindigenous species. This proposal seeks funding to edit the data on the 1343 invertebrate species, and to make the literature and specimen records of their occurrences available on the University of Alaska Museum’s ARCTOS web-accessible database.

Data Being Collected:
Data being collected in 2003: Data sets describing biodiversity of Prince William Sound compiled from peer reviewed literature, input from other experts, UAM specimens obtained as part of Project no. 02608 funded by EVOS in FY2002:Permanent Archiving of Specimens Collected in Nearshore Habitats, and work lead by Brenda Konar to GEM and the Census of Marine Life for Alaska Natural Geography in Shore Areas (ANaGISA).

Progress: In work
First Year Collected: East: -144.5
Duration of Project: North: 61.5
Duration Descript: South: 59.7

Publications:

Westward Region Small-Mesh Trawl Survey

**Related Park:** Southwest Alaska Network

**Project Affiliations:** Alaska Department of Fish and Game

**Website Address:** none given

**Primary Contact:**

Dave Jackson  
Alaska Department of Fish and Game  
211 Mission Road  
Kodiak, AK 99615 United States  
Voice: (907)486-1846  
Fax: none given  
david_jackson@fishgame.state.ak.us

**Principal Investigators:**

**Hypotheses:**

The first objective is assessment of the distribution and abundance of pandalid shrimp populations primarily northern or pink shrimp *Pandalus borealis*, sidestriped shrimp *Pandalopsis dispar*, and humpy shrimp *Pandalus goniurus*. Population estimates for shrimp will be produced using an area swept technique and compared with established thresholds to determine the potential for commercial fishery openings. Secondary objectives include determining the species composition of the entire catch in survey hauls, obtaining length frequencies of commercially important shrimp and groundfish, generating relative density estimates for forage fish species and tagging Pacific cod *Gadus macrocephalus* as part of a mark-recapture study.

**Data Being Collected:**

Data being collected in 2003: Approximately 120 sample stations will be selected from survey grids and strata that have been utilized since the middle 1970s in the ADF&G shrimp research program. The entire catch for each tow will be sorted to species and weighed. Commercially important groundfish, shrimp, and forage fish will be sampled for length and weight data. Population estimates for shrimp will be generated using an area swept technique.

**Progress:**

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**Duration Descript:**

Work is planned for September 2003 through February 2004 with the at sea portion 9/29/03-10/28/03.

**Publications:**


**Comments:**

The sampling gear is an 18.6-m high opening research trawl with 3.1-cm stretch mesh throughout the mouth, body, and codend. The triple bridle net will be towed for a standard distance of 1.85 km at each site.
Map Description: Map showing haul locations from the 2001 small-mesh trawl survey. Sample sites will be similarly located in 2003.
Biological, Plankton

A Continuous Plankton Recorder based survey to monitor the Gulf of Alaska and detects ecosystem change

Related Park: Alaska Region
Project Affiliations: Exxon Valdez Oil Spill Trustee Council; Gulf Ecosystem Monitoring; North Pacific Research Board
Website Address: http://www.sahfos.org/pacific_project.htm

Primary Contact: Sonia Batten, Sir Alister Hardy Foundation For Ocean Science, SAHFOS, c/o 4737 Vista View Crescent, Nanaimo, BC V9V 1N8 Canada
Voice: none given  fax: none given
soba@mail.pml.ac.uk

Principal Investigators: David Welch, Pacific Biological Station, Nanaimo, BC V9R 5K6 Canada
Voice: none given  fax: none given
welch@pac.dfo-mpo.gc.ca

Hypotheses:
Plankton are a critical link in the marine food chain that respond rapidly to climate change and form the link between the atmosphere and upper trophic levels. Many important marine resources in the GoA are strongly influenced by changes in the ocean climate. We present evidence from recent CPR work showing that significant changes occurred in all plankton communities in the GoA, associated with the recent climate shift, and the CPR is an appropriate tool for detecting such changes. This project collects seasonal plankton data across the North Pacific using commercial vessels.

Data Being Collected:

Data Collected in the past 2 years: Phytoplankton and zooplankton abundance data

Progress: In work  West: -180
First Year Collected: East: -120
Duration of Project: North: 62
Duration Descript: at least until 2006  South: 32

Publications:


Kenai Fjords Oral History and Archaeology Project

**Related Park:** Kenai Fjords National Park

**Project Affiliations:** US National Park Service; Alaska Sea Life Center

**Website Address:** http://www.mnh.si.edu/arctic/html/alaska_kenai.html

**Primary Contact:**

Aron L. Crowell  
Smithsonian Institute  
121 W. 7th Ave  
Anchorage, AK 99501 United States  
Voice: (907)343-6162  
Fax: (907)343-6130  
acrowell@alaska.net

**Principal Investigators:**

Aron L. Crowell  
Smithsonian Institute

**Hypotheses:**

In collaboration with Alutiiq (Alaska Native) villages and the Pratt Museum (Homer), the Arctic Studies Center (National Museum of Natural History, Smithsonian Institution) will investigate the cultural and environmental history of Kenai Fjords National Park (KEFJ). Artifacts and faunal samples from excavations at Aialik Bay archaeological sites, combined with oral histories and traditional knowledge about coastal subsistence practices, will provide data on ecosystem change and human responses during the Little Ice Age (A.D. 1250-1900).

**Data Being Collected:**

Data being collected in 2003: Archaeological artifacts (stone and bone tools, historic period artifacts) and faunal samples from sites in Aialik Bay. Stable isotope analysis (O18, N15, C13) of sea mammal, fish, and shellfish remains from two late Little Ice Age dates (ca. A.D. 1800 and 1880).

**Progress:**


**First Year Collected:** 2003

**Duration of Project:** 2005

**Duration Descriptor:** Fieldwork July 7 - August 17, 2003. Total duration of project 3 years (2002-2004).

**West:** -150

**East:** -149

**North:** 60

**South:** 59.4

**Publications:**


Preliminary report on 2002 fieldwork (available from PI)
Prehistoric and Historic Subsistence-Settlement Patterns on the Central Alaska Peninsula

Hypotheses:
This dissertation studies the archaeological, ethnographic, and environmental record bearing on the prehistoric/historic lifeways of the people of the Alaska Peninsula. The primary focus is on creating and testing a predictive model of the subsistence-settlement behavior of the inhabitants of the Peninsula. The research questions being addressed are:
· Why have people on the Alaska Peninsula chosen to live where they have?
· How have people arranged their subsistence activities within the region after around 1,000 years ago?
· What factors went into selecting placement of habitation sites? What are some correlates of site selection? What particular landscape features and natural resources do archaeological sites in the study area correspond with?
· Which model or models have value for predicting the location of habitation sites on the Pacific coast of the Alaska Peninsula?

The basis for constructing the models is the archaeological record (records of known habitation sites on the Alaska Peninsula), the ethnographic record, oral history given by living descendents, and data on habitat and subsistence resources to build the model. As appropriate, these data are statistically analyzed to ascertain patterns that might be employed as a basis for modeling. Ethnographic patterns are compared to archaeological patterns. A hybrid model for site prediction for the Alaska Peninsula, based on archaeology and ethnography, is then proposed.

Proposed Project: I wish to apply the model I constructed, and test it against the archaeological record on the Alaska Peninsula Pacific coast. I’m interested in studying environmental change through time, continuing to use an interdisciplinary approach.

Data Being Collected:
No data have been or will be collected in 2003. I’ve been completing my dissertation, giving presentations, and writing a journal article.

Progress:
West: -158.5
East: -153
North: 58.5
South: 56.5

Publications:

### Cultural, Fish

#### Risks and Benefits of Rural Diet

**Related Park:** Alaska Region  
**Project Affiliations:** National Institute of Environmental Health Sciences; US Fish and Wildlife Service  
**Website Address:** N/A

**Primary Contact:**  
Sue Unger, Research Coordinator  
National Institute of Environmental Health Sciences  
Anchorage, AK 99501 United States  
Voice: (907)222-4215  
sueu@apiai.com

**Principal Investigators:**  
Michael Brubaker, Community Services Director  
National Institute of Environmental Health Sciences  
Anchorage, AK 99501 United States  
Voice: (907)222-4217  
fax: (907)279-4351

**Hypotheses:**

Hypothesis: The benefits traditional foods outweigh the risks posed by contaminants. A diet composed largely of traditional foods (protein) is more healthy than a diet composed of substitute protein that can be purchased from rural stores.

Objective: Development of a model which combines community specific data on health effects, diet, and contaminant data to provide a process for understanding risks and benefits associated with subsistence and store bought diet in rural Alaska.

**Data Being Collected:**

Data being collected in 2003: Samples of halibut and perhaps other subsistence species will be collected and analyzed for nutrient content and a variety of contaminants.

**Progress:**  
In work

**First Year Collected:**

West: -177  
East: -150

**Duration of Project:**

2005  
North: 60

**Duration Descript:**

Through 2005  
South: 51

**Publications:**

Alaska Native Diet - Introduction to Dietary Benefits and Risks in Alaskan Villages (video) 2002  
Alaska Native Diet - The Importance of Traditional Foods (video) 2003  
**National Estuarine Research Reserve System-Wide Monitoring Program**

**Related Park:** Southwest Alaska Network  
**Project Affiliations:** Alaska Department of Fish and Game, Kachemak Bay Research Reserve  
**Website Address:** http://cdmo.baruch.sc.edu/home.html, and http://www.kbayrr.org/

**Primary Contact:**  
Scott Pegau, Research Coordinator  
Alaska Department of Fish and Game, Kachemak Bay Research Reserve  
2181 Kachemak Drive  
Homer, AK 99603 United States  
Voice: (907)235-4799  
scott_pegau@fishgame.state.ak.us

**Principal Investigators:**  
Carl Schoch, Research Coordinator  
Alaska Department of Fish and Game, Kachemak Bay Research Reserve  
2181 Kachemak Drive  
Homer, AK 99603 United States  
Voice: none given  
fax: none given

**Hypotheses:**  
Water quality and meteorological data are collected by the Kachemak Bay Research Reserve in accordance with NOAA directives. Water quality parameters are collected using YSI 6600 dataloggers and monthly grab samples. Meteorological data is collected using a Campbell Scientific CR10X which samples every five seconds to produce both hourly and daily averages. An instantaneous sample is also taken every 15 minutes. Yearly edited data are available for download in a comma delimited text file and can be imported directly into a database or spreadsheet program.

**Data Being Collected:**  
Data being collected in 2003: Water temperature, specific conductivity, salinity, dissolved oxygen, depth, pH, chlorophyll fluorescence, and turbidity; nitrate, nitrite, ammonium, ortho-phosphate, silica, and chlorophyll-a; air temperature, relative humidity, solar radiation, barometric pressure, rainfall, wind speed and wind direction.

**Progress:** In work  
**West:** -152

**First Year Collected:** 2001  
**East:** -150.75

**Duration of Project:**  
**North:** 59.9

**Duration Descript:** 2001 to ?  
**South:** 59.3

**Publications:**  
Annual metadata reports are available by contacting Carl Schoch or Scott Pegau at the KBRR.

**Comments:**  
There are four water quality dataloggers deployed one meter above the bottom at a depth of eight meters: a moored instrument at Port Graham (N59 22.236 W151 53.771), a fixed mount at Seldovia (N59 26.499 W151 43.400), a moored instrument at Bear Cove (N59 42.912 W151 05.454), and a fixed mount at Homer (N59 36.209 W151 25.053). Monthly grab samples are collected at the Seldovia and Homer fixed instruments. A full tidal cycle is also sampled approximately every two hours for 24 hours at Homer using an automated sampler.

**Map:**
Visible remote sensing of the Gulf of Alaska

Related Park: Alaska Region
Project Affiliations: Alaska Department of Fish and Game, Kachemak Bay Research Reserve; Gulf Ecosystem Monitoring
Website Address: N/A

Primary Contact: Scott Pegau
                 Research Coordinator
                 Alaska Department of Fish and Game, Kachemak Bay Research Reserve
                 2181 Kachemak Drive
                 Homer, AK 99603 United States
                 Voice: (907)235-4799    fax: (907)235-4794
                 scott_pegau@fishgame.state.ak.us

Principal Investigators:

Hypotheses:
A number of visible remote sensing satellites have been observing the Gulf of Alaska and its watersheds for the past five years and will continue to make observations into the future. Much of the data is available through NASA; however, the data is not easily accessible, fully quality controlled, or necessarily the variables of interest. This synthesis proposal aims to
1) determine which products would be useful to resource managers and scientists,
2) develop a system to process and provide the existing and future satellite data in a format useful to most users, and
3) provide quality control.
The satellite imagery covers all zones described in the GEM Program Document, but this proposal focuses on the oceanic components. The work is a collaborative effort led by the Kachemak Bay Research Reserve with the University of Alaska-Fairbanks providing processing facilities.

Data Being Collected:
Data being collected in 2003: Ocean color estimates of surface chlorophyll

Progress: In work
First Year Collected: 1997
Duration of Project: 2003
Duration Descript: 1997-2003

West: -176
East: -130
North: 62
South: 50

Map:
Data within the dashed box will be processed to 5 km resolution. Data within the gray box will be processed to full 1 km resolution in order to provide the highest detail of small current structures associated with the ACC and allow the data to extend as close as possible to the complex coastline.
GLOBEC Northeast Pacific: Satellite-observed ocean variability

Related Park: Alaska Region
Project Affiliations: National Aeronautics and Space Administration; National Science Foundation; National Oceanic and Atmospheric Administration
Website Address: http://WAVY.UMEOCE.MAINE.EDU

Primary Contact: Andrew Thomas
University of Maine
5741 Libby Hall
Orono, ME 04469-5741 United States
Voice: (207)581-4335 fax: none given
thomas@maine.edu

Hypotheses:
The overall goal of this project is to use data from multiple satellite sensors to characterize and quantify the dominant modes of variability in the Northeast Pacific surface transport, SST and pigment concentrations on three space/time scales: Basin- and Interannual scales; Mesoscale and Event-to-Seasonal; Small-scale and Event.

Data Being Collected:
Data being collected in 2003: Daily 1km and 4km resolution SeaWiFS ocean color satellite data, fully processed, cloud masked and geo-registered, weekly composites, monthly composites

Progress: In work
First Year Collected: 2003
Duration of Project: 2004
Duration Descript: Daily throughout 2003 – 2004

West: -160
East: -135
North: 61
South: 50
Evaluating Decadal-Scale Climate Change and Geomagnetic Paleointensity Records in Continental Shelf Strata on the Subarctic Pacific: Site Augmentation for IODP Proposal 597

Hypotheses:
Southern Alaska presents a key area in the northern hemisphere where high quality records of the interplay of Late Cenozoic tectonics and climate can be examined. The extreme Quaternary sediment accumulation rates (upwards of 5 cm/yr) of glacially derived silty clays have resulted in a potentially sub-decadal resolution stratal record. Following the Spring 2002 review of IODP proposal 597 “A high-resolution marine sedimentary record of late Cenozoic climate and tectonics: A transect across the southern Alaska continental margin” by both iSSEPs, it was advised by the panels that future coring in support of drilling should be aimed at determining whether high-resolution records of the key paleoceanographic proxies can be obtained at the proposed sites. I am submitting a site augmentation proposal to obtain new data, as there are no preserved cores or samples of high quality that can be used to address concerns of the iESSEP regarding high-resolution records. I propose to utilize a cruise of opportunity that has been made available to me in July 2003 as part of the Northeast Pacific Global Ocean Ecosystem Dynamics (NEP-GLOBEC) program in which to collect a limited set of 3-m long kasten cores at key GLOBEC sampling sites in order to demonstrate decadal-scale changes in sedimentary properties using very high down-core sampling for proxy records of freshwater discharge directly related to the Pacific Decadal Oscillation. Additionally, preliminary environmental magnetism studies of modern Gulf of Alaska sediments indicate their strong potential as paleomagnetic dating tools. Consequently, along with Drs. Joseph Stoner and J.E.T. Channel, I am proposing to use direct observational data from the Sitka Alaska geomagnetic observatory and the global field model of Jackson et al., (2000) as a template to test the fidelity of these sediments as geomagnetic records and the refinement of an additional Holocene chronometer.

Data Being Collected:
Data being collected in 2003: Four sediment gravity cores collected; Each core analyzed for physical properties (bulk density and magnetic susceptibility using GEOTEK multisensor core logger); grain size; sedimentary structures via x-radiography; mass percent opal, carbon, nitrogen; stable carbon and nitrogen isotopes; geochronology via Pb-210/Cs-137.

Progress: In work
First Year Collected: 2003
Duration of Project: 2004
Duration Descript: Through summer 2004

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

Hypotheses:
This project will collect physical oceanographic and fisheries data along a transect across lower Cook Inlet from Anchor Point to the Red River delta each day during July. The data will be made available to other researchers studying how the physical dynamics of the Alaska coastal current affects the productivity of biological resources in the region. Logistical support for the field sampling will be provided in part by an existing test fishing vessel chartered annually by the Alaska Department of Fish and Game to provide inseason projections of the size of salmon runs returning to the inlet. The project aims to use the physical oceanographic data 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 project will demonstrate the use of vessels-of-opportunity for collection of oceanographic data.

Data Being Collected:
Temperature, salinity, water velocity, salmon acoustics

Comments:
CTD casts at 6 stations
59 49.5  152 9.1
59 50.2  152 13.5
59 51.0  152 17.6
59 51.1  152 19.8
59 51.7  152 22.0
59 52.4  152 26.3
Towed ADCP, CTD, and fish acoustics between stations.
Physical, Fish

Shelf Salmon Survival Study, Highseas Salmon program, Fisheries and Oceans, Canada

Hypotheses:
The Shelf Salmon Survival Study operates a multi-year research survey to map ocean conditions determining the growth and survival of Pacific salmon along the West Coast of North America from the British Columbia-Washington border to Icy Strait, Alaska, and to identify where specific stocks of salmon forage in the continental shelf of these areas. We would like to expand the survey to west of Kodiak Island, Alaska. The NMFS is currently surveying the area off Washington and Oregon, and NMFS researchers work cooperatively with us on this project, particularly in the area of stock identification of the chinook and coho collected off British Columbia and Alaska, using their extensive baseline data.

Our initial results clearly demonstrate that West Coast salmon are undertaking rapid, directed migrations that take them well out of their region of origin and into regions of differing growth and survival potential.

Our research shows that different populations of salmon move to different locations along the coastal zone where they establish their ocean feeding grounds and (presumably) over-winter. The feeding success, growth, and fat content of chinook and coho salmon in different parts of the coastal zones of British Columbia and Alaska is very different. The relative survival of different stocks of salmon in the ocean therefore depends on where in the ocean they migrate to feed. For example, our calculations indicate that the ocean survival of Snake River chinook should be much lower than that of other Columbia River stocks that they have been compared to (such as the Hanford Reach stock) because they migrate to different parts of the ocean.

Our results also indicate that ocean conditions in 1998 substantially reduced the growth and survival of salmon foraging off southern British Columbia relative to salmon foraging farther north. However, ocean conditions in 1999 were dramatically different and apparently similar to those holding in the early 1970s, at the time that the Snake River hydrosystem was just being completed – and should have led to significantly better survival conditions. It appears that in 1999 the North Pacific Ocean underwent a sudden and dramatic shift in ocean conditions to one more favourable to Columbia River salmon, including a much deeper mixed layer and substantially higher nutrient concentrations. Associated with this change are better observed growth rates for juvenile salmon. It is important to measure these improved conditions now, while they persist, because they are likely to be short-lived; greenhouse gas forcing is likely to drive ocean climate back towards a more extreme version of the warmer climate holding through the 1980s and 1990s. As the 1980s and 1990s appeared to be a time of progressively poorer marine survival for salmon – with many populations becoming unsustainable even in the absence of all fishing – direct measurement of the degree to which the ocean affects various salmon populations needs to be made.

There are persistent resource conflicts in the Pacific Northwest between salmon and other resource uses (hydropower, forestry, and agriculture). Salmon are affected by many factors in both freshwater and the ocean. Because the number of salmon smolts entering the ocean are monitored in few populations, it has been the norm to assume that when the number of adults returning drops that it is the result of events happening in freshwater. Informed debate about the effect of these alternative resource sectors on salmon requires a direct assessment of the effect of ocean conditions on salmon populations; otherwise the effects of ocean conditions on salmon population declines are confounded with events occurring in freshwater. We intend to address this problem by establishing growth and potential survival conditions over a broad range of the coast of direct relevance to Columbia River salmon.

Data Being Collected:

Progress:
First Year Collected:
Duration of Project:
Duration Description:
West: -140
East: -123
North: 60
South: 47
5-10 years

Oceanic and Nearshore Research and Monitoring Summaries
April 2004
Publications:


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48.082   128.987   OFF ESTEVAN PT, WCVI
47.946   129.247   OFF ESTEVAN PT, WCVI
47.810   129.507   OFF ESTEVAN PT, WCVI
47.674   129.767   OFF ESTEVAN PT, WCVI

INSIDE WCVI, CANADA
49.892   126.804   ESPERANZA INLET, I_WCVI
49.873   126.919   ESPERANZA INLET, I_WCVI
49.775   127.132   ESPERANZA INLET, I_WCVI
49.914   125.205   IMPERIAL EAGLE CH
49.941   127.301   KYUQUOT CH, I_WCVI
49.976   127.256   KYUQUOT CH, I_WCVI
50.005   127.186   KYUQUOT CH, I_WCVI
50.067   127.254   KYUQUOT CH, I_WCVI
50.083   127.171   KYUQUOT CH, I_WCVI
49.914   127.561   KYUQUOT CH, I_WCVI
49.924   127.424   KYUQUOT CH, I_WCVI
50.514   127.69    QUATSINO SD, I_WCVI
50.501   127.742   QUATSINO SD, I_WCVI
50.478   127.809   QUATSINO SD, I_WCVI
50.471   127.902   QUATSINO SD, I_WCVI
48.847   125.149   TREVOR CH, I_WCVI
48.92   125.049   TREVOR CH, I_WCVI
**High resolution mapping of intertidal and shallow subtidal shores in Kachemak Bay, Alaska**

**Related Park:** Southwest Alaska Network

**Project Affiliations:** Alaska Department of Fish and Game, Kachemak Bay Research Reserve; Gulf Ecosystem Monitoring

**Website Address:** http://www.oilspill.state.ak.us/, and http://www.kbayrr.org/

**Principal Investigators:**

Carl Schoch, Research Coordinator
Alaska Department of Fish and Game, Kachemak Bay Research Reserve
2181 Kachemak Drive
Homer, AK 99603 United States
Voice: none given  fax: none given

**Hypotheses:**

Monitoring biological communities for a response to natural or anthropogenic perturbations must acknowledge the inherent problem of large temporal and spatial variability of natural systems. Evidence suggests that highly stratified sampling designs with multiple replicates can lower the variability of abundance estimates for benthic populations. But an objective means of identifying sample sites based on physical forcing functions is generally not available for intertidal and subtidal shores. A method was developed to partition complex shorelines into physically homogeneous segments and to quantify the physical features known to influence benthic community structure. The 543 km shoreline of Kachemak Bay, Alaska was partitioned into over 3,000 alongshore segments and the physical features of each segment were quantified. Data from nearshore moored instruments and CTD transects were used to identify oceanic gradients. These data were assembled into a GIS spatial model to provide a powerful tool for identifying replicate benthic habitats. Replicate segments were randomly selected and sampled. Population abundance estimates from biological transects were extrapolated from small to larger spatial scales within the spatial limits imposed by oceanic scale variability. This method is a first step in studying the physical mechanisms causing a response in estuarine and marine biodiversity and benthic community structure.

**Data Being Collected:**

Data being collected in 2003: Primary, secondary, and interstitial substrate size, substrate roundness, wave energy, aspect, rock type, debris volume, slope angle, dynamism, roughness, human use, dominant invertebrates and algae. ArcView shape files will be developed to depict the high tide and low tide shorelines, alongshore segments, and across-shore zones, orthophoto quadrangles, and segment attributes. Segment attributes will also be available in an MS Access database.

**Progress:** In work

**First Year Collected:**

**Duration of Project:** 2004

**Duration Descript:** Completion in 2004

**Theme Keywords:** habitat mapping

**Place Keywords:** Kachemak Bay

**Publications:**

Annual project reports are available by contacting the Exxon Valdez Trustee Council office (see above).

**Map:**
Modeling intertidal habitats: Producing a biological inventory for coastal management, resource assessment, and monitoring

**Related Park:** Southwest Alaska Network

**Project Affiliations:** Alaska Department of Fish and Game, Kachemak Bay Research Reserve; National Oceanic and Atmospheric Administration

**Website Address:** N/A

**Primary Contact:**

Carl Schoch, Research Coordinator  
Alaska Department of Fish and Game, Kachemak Bay Research Reserve  
2181 Kachemak Drive  
Homer, AK 99603 United States  
Voice: none given  
fax: none given

**Hypotheses:**

Detailed maps will be developed of the biological resources and habitat alterations in the KBRR/Kachemak Bay & Fox River. This will include over 540 km of shoreline. The increasing number of stresses on estuarine and marine ecosystems has challenged scientists and managers to find a method for determining rates and spatial extents of ecological effects related to changes in environmental conditions. One significant problem that masks these changes is the large natural fluctuation of biological populations in space and time. Furthermore, no method exists to extrapolate data collected from local monitoring sites to large areas. A method developed in Alaska (Cook Inlet and Shelikof Strait), partitions complex shorelines into physically homogeneous segments to minimize the variability of the biological community caused by physical forces. Groups of similar segments can then be aggregated to extrapolate biological transect data collected from small areas to larger spatial scales. This method is proposed for implementation in Kachemak Bay as a first step in monitoring biodiversity of this estuarine system.

**Data Being Collected:**

The Reserve will collect detailed information on (a) surface and subsurface plants and animals of the intertidal zone and (b) structures and other habitat alterations of the intertidal zone. All spatial and attribute data will be compiled in a Geographic Information System (GIS). The Reserve will produce a digital computer disk (CD) with all spatial and attribute data, presented in a user friendly, ArcView format with metadata files.

**Progress:** In work

**First Year Collected:**

**Duration of Project:** 2004

**Duration Descipt:** Completion in 2004

**Publications:**

A report and all metadata will be available upon completion of this project.

**Map:**
Shore-zone mapping in the Gulf of Alaska

Related Park: Southwest Alaska Network
Project Affiliations: Exxon Valdez Oil Spill Trustee Council; US Fish and Wildlife Service; US National Park Service; Cook Inlet Regional Citizens Advisory Council
Website Address: http://www.coastalandoceans.com
Gulf of Alaska Coastal Imagery Web Site: http://imf.geocortex.net/mapping/cori/launch.html

Principal Investigators:
John Harper
Coastal and Ocean Resources, Inc.
214 – 9865 W. Saanich Rd
Sidney, BC V8L 5Y8 Canada
Voice: (250)655-4035 fax: (250)655-1290
John@coastalandoceans.com

Hypotheses:
Objective is to inventory the coastline following the Alaska ShoreZone Mapping Protocol, presently under development with EVOS.

Data Being Collected:
Katmai National Park Shoreline, Aniakchak National Park Shoreline, Upper Cook Inlet (E. Foreland to W. Foreland)

Progress: Complete
First Year Collected: 2003
Duration of Project: 2003
Duration Descript: 1 year
West: -165
East: -150
North: 61.5
South: 56

Publications:
A High Frequency Radar System for Real-time Surface Current Mapping in the Northern Gulf of Alaska

**Related Park:** Southwest Alaska Network  
**Project Affiliations:** National Oceanic and Atmospheric Administration  
**Website Address:** http://www.salmonproject.org

**Principal Investigators:**
Dave Musgrave  
University of Alaska Fairbanks, School of Fisheries and Ocean Science, Institute of Marine Science  
No address  
Voice: none given  
Fax: none given  
musgrave@ims.uaf.edu

**Hypotheses:**

The surface circulation of the Northern Gulf of Alaska is forced by the winds and the buoyant (low-density) influx of freshwater from rivers. The wind response is reasonably well understood. It consists of a surface current flowing downwind with having broad spatial scales (often >100 km) and temporal scales similar to the wind field. Winds over the Gulf of Alaska are primarily alongshore (east-west) with the surface currents generally fluctuating in the alongshore direction. However the introduction of vertical and horizontal density gradients through buoyancy forcing can significantly complicate the wind-forced circulation response. Planktonic species present in waters influenced by buoyancy inputs might follow trajectories considerably different from those forced solely by winds. The difference arises because strong horizontal density gradients (fronts) generated by the buoyant influx will generate alongfront currents that could impede or enhance the wind-induced flow. Often these fronts are narrow (~10 km or less) and include regions of high current shear. The fronts can also become unstable forming energetic current meanders and detached eddies that might propagate away from their region of formation. These processes can disperse planktonic both along and across the shelf often in unpredictable ways. The conditions under which these motions are spawned are poorly understood in even simple settings such as constant winds and freshwater runoff.

The situation is even more complicated in the Northern Gulf of Alaska because of the complex bathymetry and tremendous seasonal variability in river discharge, precipitation rate, and wind. Clearly these processes inhibit the predictive capability of ocean circulation models and therefore complicate resource management planning. Current measurements of these circulation phenomena from ships and/or moored instruments are difficult for several reasons. The currents are probably very shallow (~10 m) making it difficult to obtain near-surface current measurements from a vessel without specially constructed instrumentation. Moreover, several vessels would need to be running continuously in order to obtain synoptic coverage of the current field. In principle, moored instrumentation could obtain the necessary measurements; however, an impractically large numbers of such instruments would have to be deployed to achieve this goal. Satellite measurements can be of value in estimating spatial scales of variability but provide no information on current magnitude. Moreover, the frequently heavy cloud cover in this region results in relatively few useful images throughout the year.

High frequency radar technology offers the potential for efficiently mapping surface currents in a synoptic manner. These land-based radars (CODAR) can generate synoptic surface current maps with a spatial resolution of ~5 km over a broad horizontal domain. These measurements can be made at a rapid rate (half-hourly or longer sampling intervals) and be transmitted in near real-time via the Internet. The system consists of two or more antenna and a data acquisition system. The CODAR is small and easily transported by a pickup truck or helicopter. CODARs are proven and operational in several coastal regions throughout the Lower 48 and there are plans at IMS to deploy several of these in the Gulf of Alaska. Our proposal has two main objectives. First, we will purchase, install, and operate a CODAR system in the vicinity of Cook Inlet during the 2003 winter and spring season (~mid-December - May). Data from the CODAR will be distributed via Internet and immediately accessible to any interested parties (state and federal agencies, citizens, oil industry, etc.). Tentatively we plan to deploy the CODAR at locations in Kenai and Kasilof, Alaska. These sites are attractive primarily because the logistics are straightforward. Both sites are accessible by vehicle and both have sufficient power to operate the CODAR. The proposed CODAR system will map the surface circulation over a 70 km x 70 km area with a resolution of 1 km. Data communications between the field and the Fairbanks central node will be established through the STARBAND satellite communication system. We will use the Cook Inlet setting to develop and evaluate an autonomous power system (battery powered and re-charged by wind and solar power with a propane-fueled backup generator). At the conclusion of this phase we will have a fully autonomous CODAR system that could be deployed at remote sites along the Gulf of Alaska. The second goal of the proposal is to deploy the autonomously powered CODAR system at remote sites along the Gulf of Alaska. To achieve this we propose to re-deploy the CODAR system to the Gulf of Alaska after the field effort in Cook Inlet ends (September 2003). We will propose to NOAA in fall 2003 to continue the mapping of surface currents in the nearshore Gulf of Alaska during the 2004 seasons and beyond.
**Data Being Collected:**
Data being collected in 2003: Surface Current Velocities in Cook Inlet and the nearshore Gulf of Alaska between Prince William Sound and Kennedy Entrance

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<th>Metric</th>
<th>2003 Measurements</th>
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<tr>
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<td>-145</td>
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<tr>
<td>North</td>
<td>61.5</td>
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<td>South</td>
<td>58</td>
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**Progress:**
- **First Year Collected:** 2002
- **Duration of Project:** 2004
- **Duration Description:** December 2002 and March 2004
ARGO (A Global Array of Profiling Floats) and Line P surveys 2. Line P Time-Series Program

Related Park: Alaska Region
Project Affiliations: Fisheries and Oceans Canada/Institute of Ocean Sciences
Website Address: http://www.sci.pac.dfo-mpo.gc.ca/osap/data/linep/linepselectdata_e.htm

Primary Contact:
Robert Marie
Fisheries and Oceans Canada/Institute of Ocean Sciences
No address
Voice: none given    fax: none given
robertm@pac.dfo-mpo.gc.ca

Frank Whitney
Fisheries and Oceans Canada/Institute of Ocean Sciences
No address
Voice: none given    fax: none given
whitneyf@pac.dfo-mpo.gc.ca

Howard Freeland
Fisheries and Oceans Canada/Institute of Ocean Sciences
No address
Voice: none given    fax: none given
freelandhj@pac.dfo-mpo.gc.ca

Hypotheses:
1. ARGO intends to populate the world ocean with 3000 drifters which will profile from 2000 m to surface every 10 days. Data is quickly available on the web e.g. www.argo.jcommops.org/ Through IOS efforts; the Gulf of Alaska is well populated with floats at present.
2. Line P surveys are carried out in winter; spring and late summer each year to monitor ocean change. Data has been collected since 1956 which makes the data set invaluable in assessing the affects of climate variability and change on the Gulf of Alaska.

Data Being Collected:
Data being collected in 2003: Line P surveys in Feb, Jun and September. ARGO T and S profiles every 10 days.

Progress:
In work

First Year Collected:

Duration of Project:

Duration Descript:
Many years

Publications:
Many. Contact PI’s

Maps: Available on web sites above.
Cook Inlet Current Survey

**Related Park:** Southwest Alaska Network

**Project Affiliations:** NOAA National Ocean Service/ Center for Operational Oceanographic Products and Services

**Website Address:** http://www.co-ops.nos.noaa.gov

**Primary Contact:**
Karen Grissom
NOAA National Ocean Service/ Center for Operational Oceanographic Products and Services
1305 East West Highway
Silver Spring, MD 20910 United States
Voice: (757)436-0200  fax: none given
Karen.grissom@noaa.gov

**Principal Investigators:**
Peter Stone
NOAA National Ocean Service/ Center for Operational Oceanographic Products and Services
1305 East West Highway
Silver Spring, MD 20910 United States
Voice: (301)713-2890 x149  fax: none given

**Hypotheses:**
To collect data and information on surface currents in Southern Cook Inlet for tidal analysis, and to help determine future locations of sub-surface Acoustic Doppler Current Profiler installations. The information will be used to verify and update existing tidal current predictions and produce predictions at new locations, all to affect the safe and efficient marine transportation within Cook Inlet.

**Data Being Collected:**
Data being collected in 2003: Summer months of 2003

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<td>North: 60.5</td>
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<td>Duration Descript: 3 months</td>
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**Map:**

Cook Inlet Physical Oceanography Project
CODAR Coverage
Near Real-Time Biophysical Moorings for the Monitoring of Chiswell Ridge

Related Park: Kenai Fjords National Park
Project Affiliations: Alaska Sea Life Center; National Marine Fisheries Service
Website Address: http://www.salmonproject.org

Primary Contact:
Dave Musgrave
University of Alaska Fairbanks, School of Fisheries and Ocean Science, Institute of Marine Science
No address
Voice: none given fax: none given musgrave@ims.uaf.edu

Hypotheses:
The goal of this project is to develop and demonstrate a low-cost system for retrieving biological and physical oceanographic data from instruments in the coastal ocean and delivering these data in near real-time. This work is conducted in co-operation with the Alaska SeaLife Center for the purposes of monitoring the state of the ecosystem within the near-shore foraging zone of Stellar Sea Lions located at the Chiswell Island rookery.

Data Being Collected:
Data being collected in 2003:
- Water column currents
- Temperature
- Salinity
- Fluorescence
- Transmissivity
- Photosynthetically available radiation

Progress: In work
First Year Collected: 2003
Duration of Project: 2004
Duration Descript: Summer 2003 through Summer 2004

Map Description: Location of the Chiswell Ridge near real-time buoy
Map:
NOAA/ Pacific Marine Environmental Laboratory Ocean Climate Research Profiling Floats

**Related Park:** Alaska Region

**Project Affiliations:** NOAA, Steller's Sea Lion Research

**Website Address:** http://floats.pmel.noaa.gov/floats/

**Primary Contact:**
Gregory C. Johnson  
NOAA, Pacific Marine Environmental Laboratory  
7600 Sand Point Way, NE  
Seattle, WA 98115 United States

**Voice:** none given  
**fax:** none given

**Hypotheses:** To describe the large-scale oceanographic conditions in the Southeast Bering Sea and south of the Aleutian Islands from seasonal to decadal time-scales.

**Data Being Collected:** Profiling CTD float data

**Progress:** In work

**First Year Collected:**

**Duration of Project:**

**Duration Descript:** Until floats cease reporting, which could be through 2007.

**Publications:**  

**Map:**
NOAA/ Pacific Marine Environmental Laboratory Ocean Climate Research Profiling Floats

**Related Park:** Alaska Region

**Project Affiliations:** NOAA, Steller's Sea Lion Research

**Website Address:** http://floats.pmel.noaa.gov/floats/

**Primary Contact:**

Gregory C. Johnson  
NOAA, Pacific Marine Environmental Laboratory  
7600 Sand Point Way, NE  
Seattle, WA 98115 United States  
Voice: none given  
Fax: none given

**Hypotheses:**
To describe the large-scale oceanographic conditions in the Southeast Bering Sea and south of the Aleutian Islands from seasonal to decadel time-scales.

**Data Being Collected:**
Year 2003 - Profiling CTD float data

**Progress:** In work

**First Year Collected:** 2007

**Duration of Project:** 2007

**Duration Descript:**

- **West:** 171
- **East:** -156
- **North:** 67
- **South:** 51

**Publications:**

**Comments:**
Expected duration: Until floats cease reporting, which could be through 2007

**Map:**

![Map of the region with float locations as of June 2003.](image-url)
Nowcast/Forecast System for Prince William Sound: Observational Oceanography

Related Park: Alaska Region
Project Affiliations: Prince William Sound Science Center
Website Address: http://www.pwssc.gen.ak.us

Primary Contact: Shari Vaughan
Prince William Sound Science Center
P. O. Box 705
Cordova, AK 99574 United States
Voice: (907)424-5800  fax: none given
vaughan@pwssc.gen.ak.us

Principal Investigators:

Hypotheses:
To collect current and T/S data for numerical circulation model validation

Data Being Collected:
Data being collected in 2003: T/S data (XCTDs) at 3 stations in central PWS and Hinchinbrook Entrance, current data (towed downward looking ADCP) in central PWS and Hinchinbrook Entrance

Progress: In work
First Year Collected: 2003
Duration of Project: 2006
Duration Description: Approval for FY03, probably continued funding in FY04-FY06

West: -149
East: -145.5
North: 61.4
South: 59.75
Physical forcing of marine productivity: monitoring moorings on the Gulf of Alaska shelf

Hypotheses:
We propose to continue two years of monitoring meteorological conditions, freshwater input, temperature, salinity, velocity, nutrient and chlorophyll levels for the purpose of establishing the mechanistic links between physical forcing and biological responses such as primary productivity. We plan to place two closely spaced moorings on the shelf of the Gulf of Alaska about 60 km offshore of Seward. One mooring will monitor temperature, salinity and horizontal velocities, and the other will monitor nitrate levels, sinking particulate matter, fluorescence and light levels. This proposed study, in conjunction with the present GLOBEC monitoring study in the Gulf of Alaska, will permit us to understand the relationship between physical forcing and higher trophic levels (marine mammals, birds, and fish). The proposed research addresses the NPRB priority to investigate "marine ecosystem structure and processes." Specifically, the factors affecting marine productivity, including nutrient transport and availability, the effects of water column stability, the influence of climate variability on chemical and biological processes, unusual occurrences of organisms and long term monitoring of phytoplankton and zooplankton in relation to biophysical parameters are the subjects of the proposed work.

Data Being Collected:
Data being collected in 2003:
- Water column currents.
- Temperature
- Salinity
- Fluorescence
- Transmissivity
- Photosynthetically available radiation
- Dissolved nitrate
- Sinking particulate matter

Progress: Complete
First Year Collected: 2000
Duration of Project: 2003
Duration Descript: August 2000 through August 2003
Map Description: Location of the GAK4 buoy
Map:
Real-Time AVHRR Imagery

Related Park: Alaska Region

Project Affiliations: National Aeronautics and Space Administration

Website Address: http://www.salmonproject.org/avhrr

Primary Contact:
Dave Musgrave
University of Alaska Fairbanks, School of Fisheries and Ocean Science, Institute of Marine Science
No address
Voice: none given  fax: none given
musgrave@ims.uaf.edu

Rachel Potter
University of Alaska Fairbanks, School of Fisheries and Ocean Science, Institute of Marine Science
No address
Voice: none given  fax: none given
rpotter@ims.uaf.edu

Principal Investigators:

Hypotheses:
This project provides real-time sea surface temperatures for the year 2003, not only the Gulf of Alaska but in coastal waters all around the state. Users can view .gif images, either in real-time or historically, from the region of their choice via the World Wide Web. The actual data for these areas is available upon request. This is a component of a project that hopes to delve into operational oceanography and is provided as a service to any interested end user.

Data Being Collected:
Data being collected in 2003: Hourly Regional Sea Surface Temperatures

Progress: In work  
First Year Collected: 2003  
Duration of Project: 
Duration Descript: may continue depending on interest and funding

Map Description: images are available on website

Map:
Physical, Oceanic

Simulation of the Circulation, Mixing and Lower Trophic Levels in the Gulf of Alaska

Related Park: Alaska Region
Project Affiliations: Global Ocean Ecosystem Dynamics; National Aeronautics and Space Administration; Arctic Regional Supercomputing Center, University of Alaska
Website Address: http://www.salmonproject.org

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Hypotheses:
This project simulates the physics and lower trophic level interactions in the Gulf of Alaska. To achieve high resolution three grids, 3-km, 10-km and 40-km, are nested with domains that include, respectively, the Gulf of Alaska, Baja California to Kamchatka and the entire N. Pacific (20 S to the Bering Sea). We are developing a 1-km model for the Northern Gulf of Alaska. The model used is the Regional Ocean Model System developed at Rutgers University. It has 482x482 grid points horizontally and uses an S-coordinate with 30 levels in the vertical. It uses a Large-McWilliams-Doney vertical mixing scheme. Forcing includes monthly climatology for heat and momentum flux, the first 6 tidal harmonics and a line source of fresh water runoff from Royer.

A 10-12 component lower trophic level ecosystem (including nutrients, phytoplankton and zooplankton) is also being developed.

New simulations will include daily wind forcing and large river (Alsek, Copper and Sustina R) point sources of runoff.

Data Being Collected: N/A

Progress: In work  West: -162
First Year Collected: East: -130
Duration of Project: North: 60
Duration Descript: Ongoing model development  South: 48

Map Description: Note: the cyan box on the west coast of the US is an ongoing project in the California Current System and the cyan box in the Bering Sea was a modeling project proposed to the NPRB.

Map:
Delta $x = 20-40$ km  \qquad Delta $x = 10$ km  \qquad Delta $x = 3$ km  \qquad Delta $x = 1$ km

Note: the cyan box on the west coast of the US is an ongoing project in the California Current System and the cyan box in the Bering Sea was a modeling project proposed to the NPRB.
Physical, Plankton

GLOBEC-NEP: Topographic Control of Mesoscale Variability in the Gulf of Alaska

Related Park: Kenai Fjords National Park
Project Affiliations: National Science Foundation
Website Address: http://www.salmonproject.org

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Hypotheses:
This proposal addresses studies of the physical and biological distributions and processes and their effect on juvenile salmon recruitment on the Gulf of Alaska shelf. The spatial scope of the study is from Montague Strait to west of the Chiswell Ridge. The overriding theme of the proposal is that along-shelf and cross-shelf mesoscale structures are due to bathymetric control of the currents. Physical and biological oceanographic characteristics associated with the Alaska Coastal Current, its offshore excursions in the Seward Eddy and Seward Counter Eddy, the shelfbreak front, slope eddies and meanders and the deep flow. These features affect the transport and distribution of deep-water zooplankton that are alleged to be an important food source for juvenile salmon and may determine their survival. An undulating, underwater, towed vehicle (SeaSoar) will be used to continuously map salinity, temperature, depth (CTD), biooptical parameters, and mesozooplankton (optical plankton counter). Surface samples of the above (minus depth), nutrients, and chlorophyll fluorescence will be measured continuously using similar sensors. We will use an Acoustic Doppler Current Profiler (ADCP) to measure along- and cross-track velocities to 150 m. We will calibrate the above with on-station samples of salinity, temperature, nutrients, phytoplankton. In May and July, 2003, we will conduct two to three synoptic surveys (5 days each) of cross-shelf transects spaced every 10 km along shelf.

Data Being Collected:
Data being collected in 2003: Temperature, salinity, chlorophyll, absorption, attenuation, ocean color, scattering, nitrate, phosphate, silicate

Progress: In work
First Year Collected: 2003
Duration of Project: 2003
Duration Descipt: May and July 2003

Map:

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