EVOS ANNUAL PROJECT REPORT

All recipients of funds from the *Exxon Valdez* Oil Spill Trustee Council must submit an annual project report in the following format by September 1 of each fiscal year for which project funding is received, with the exception of the final funding year in which a final report must be submitted. Satisfactory review of the annual report is necessary for continuation of multi-year projects. Failure to submit an annual report by September 1 of each year, or unsatisfactory review of an annual report, will result in withholding of additional project funds and may result in cancellation of the project or denial of funding for future projects.

PLEASE NOTE: Significant changes in a project's objectives, methods, schedule, or budget require submittal of a new proposal that will be subject to the standard process of proposal submittal, technical review, and Trustee Council approval.

Project Number: 040699

Project Title: Biophysical Observations aboard Alaska Marine Highway System Ferries

PI Name: Edward D. Cokelet, Calvin W. Mordy and W. Scott Pegau

Time Period Covered by Report: 10 November 2003-31 August 2004

Date of Report: 31 August 2004

1. **Work Performed:** *Summarize work performed during the reporting period, including any results available to date and their relationship to the original project objectives. Describe and explain any deviation from the original project objectives, procedural or statistical methods, study area, or schedule. Also describe any known problems or unusual developments, and whether and how they have been or can be overcome. Include any other significant information pertinent to the project.*

The Alaska Coastal Current (ACC) is important because it flows along the continental shelf of the Gulf of Alaska carrying the river runoff, nutrients and plankton that fuel this rich ecosystem. The first-year goal of this project was to design and install an oceanographic observation system aboard an Alaska state ferry to measure the near-surface water properties of the ACC. The Alaska Marine Highway System (AMHS) ferry *Tustumena* was chosen as the observing vessel because it crosses the ACC 284 times each year and makes over 30 additional excursions into Prince William Sound.

Working with AMHS and *Tustumena* personnel we decided to locate the instruments in the ship's port shaft alley where we could tap into the sea chest to sample seawater. We produced a preliminary design and then sought guidance from Art Anderson Associates, a Seattle marine architecture firm, to finalize a design that would meet American Bureau of Shipping requirements for safety. The instrument seawater intake line taps off an existing vent for the ship's sea chest. Water passes through copper-nickel pipe to an in-line temperature sensor, to a coarse filter to remove marine debris and into a self-contained instrument enclosure. There

water passes through a medium filter, a pump and a debubbler and into the instrument loop consisting of a nitrate meter, a dissolved organic matter and a chlorophyll fluorometer, and to a thermosalinograph. Finally water is dumped into the bilge where the ship's bilge pumps remove it. A computer in this enclosure governs the sampling via a LabView program. A second instrument enclosure contains a marine-grade uninterruptible power supply and a computer to drive the passenger-lounge display. Near the ship's bridge are a GPS receiver and an Iridium satellite modem.

Plumbing and electrical work began during the ship's annual shipyard period in March-April 2004. Owing to shipyard delays, this work was not completed during the scheduled time. It was completed during a 36-hour layover in Seward on 21 May.

The system is designed to operate remotely for days at a time. It automatically backflushes with fresh water when it senses the filter clogging. Data are collected and sent back daily to our laboratory via an Iridium satellite modem. Also new instructions can be sent to the system via satellite to change its sampling criteria and rates. Periodically personnel from the Kachemak Bay Research Reserve will come aboard in Homer to clean the sensors and take calibration samples.

There have been a few setbacks. The EVOS Trustee Council decision to fund GEM was delayed a month. We did not receive project funds until 28 June 2004, 8 months later than expected. Shipyard work was completed 6 weeks later than planned. During testing we found that large volumes of air are entrained downward and pushed forward into the sea chest when the ship reverses during dockside maneuvers, overwhelming our debubbler system and airlocking our pump. All of these problems have been overcome.

Project personnel have worked aboard the *Tustumena* in April, May and July 2004. We plan to complete system debugging by 15 September 2004, and have an operational system with satellite data delivery at that time.

2. **Future Work:** *Summarize work to be performed during the upcoming year, if changed from the original proposal. Describe any proposed changes in objectives, procedural or statistical methods, study area, or schedule. [**PLEASE NOTE**: Significant changes in a project's objectives, methods, schedule, or budget require submittal of a new proposal that will be subject to the standard process of proposal submittal, technical review, and Trustee Council approval.]*

Future work will be performed as originally proposed.

3. **Coordination/Collaboration:** *Describe efforts undertaken during the reporting period to achieve the coordination and collaboration provisions of the proposal, if applicable.*

No specific coordination/collaboration provisions were mentioned in the proposal. We do anticipate this work to be of value to other Alaska Coastal Current investigators, and we are prepared to collaborate with them.

4. **Community Involvement/TEK & Resource Management Applications:** *Describe efforts undertaken during the reporting period to achieve the community involvement/TEK and resource management application provisions of the proposal, if applicable.*

The Alaska Marine Highway System has cooperated with the project by granting permission to install instruments on the ferry *Tustumena*. AMHS Port Engineering staff and the ship's captains and crew have suggested instrument locations, liaised with the shipyard, assisted with moving gear and hosted us during equipment installation and check-out cruises. When routine observations commence, a computer display in the passenger lounge will show the ship's position and maps of oceanographic variables measured underway. It will be accompanied by an informative poster that explains the project.

Seward Ship's Drydock installed the plumbing and electrical cables for the instruments.

5. **Information Transfer:** *List (a) publications produced during the reporting period, (b) conference and workshop presentations and attendance during the reporting period, and (c) data and/or information products developed during the reporting period. [**PLEASE NOTE:** Lack of compliance with the Trustee Council's data policy and/or the project's data management plan will result in withholding of additional* project funds, cancellation of the project, or denial of funding for future projects.]

(a) Publications – none to date.
(b Conference and workshop presentations – Cokelet and Mordy attended the Marine Science in Alaska 2004 Symposium in Anchorage, 12-14 January 2004, and presented the following poster: Cokelet, E. D., C. W. Mordy and P. J. Stabeno, "Maps of Salinity, Nitrate and Chlorophyll over the Gulf of Alaska Continental Shelf."
(c) Data and/or information products – none to date.

6. **Budget:** *Explain any differences and/or problems between actual and budgeted expenditures, including any substantial changes in the allocation of funds among line items on the budget form. Also provide any new information regarding matching funds or funds from non-EVOS sources for the project. [**PLEASE NOTE:** Any request for an increased or supplemental budget must be submitted as a new proposal that will be subject to the standard process of proposal submittal, technical review, and Trustee Council approval.]*

Expenditures were roughly in line with what was expected. Shipyard and naval architect fees totaled $4.5k more and supplies $4.0k more than budgeted.

Report Prepared By: Edward D. Cokelet
Project Web Site Address: Not yet implemented

SUBMIT ANNUAL REPORTS ELECTRONICALLY TO brenda_ramos@evostc.state.ak.us. THE REPORTS WILL BE POSTED ON THE TRUSTEE COUNCIL'S WEB SITE AND SHOULD ALSO BE POSTED ON THE PI'S WEB SITE. The subject line of the e-mail transmitting the report must include the project number and the words "annual report" (e.g., "035620 Annual Report"). Electronic reports must be submitted either as an Acrobat Portable Document Format (PDF) file or word processing document (Microsoft Word 2000 for Windows or lower or WordPerfect 9.0 or lower) with any figures and tables imbedded. Acrobat PDF 4.0 or above file format must be used, preferably in 'formatted text with graphics' (called "PDF normal" under Acrobat PDF 4.0) format. Minimally, "PDF searchable image" (called "PDF original image with hidden text" under Acrobat PDF 4.0) may be used if pre-approved by the Trustee Council Office. In either case, the PDF file must not be secured or locked from future editing, or contain a digital signature from the principal investigator.