

EVOSTC ANNUAL PROJECT REPORT

Recipients of funds from the *Exxon Valdez* Oil Spill Trustee Council must submit an annual project report in the following format by Sept. 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). Please help ensure that continued support for your project will not be delayed by submitting your report by Sept. 1. Timely receipt of your report allows more time for court notice and transfer, report review and timely release of the following year's funds.

Satisfactory review of the annual report is necessary for continuation of multi-year projects. Failure to submit an annual report by Sept. 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: 10100132A

Project Title: Prince William Sound Herring Survey: Plankton and Oceanographic Observation

PI Name: Robert W. Campbell

Time period covered: Oct 1.2010 - Sept. 1 2011

Date of Report: August 31, 2011

Report prepared by: Robert W. Campbell

Project website (if applicable):

Work Performed: Summarize work performed during the reporting period, including any results available to date and their relationship to the original project objectives. Explain deviations 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.

Cruises were done in October and November 2010, and January, March, April (two cruises), May, June, July and August 2011, on most cruises the standard cruise track (fig. 1) was followed, with some exceptions outlined below. Temporal coverage of the 2011 spring bloom was quite good, as exemplified by chlorophyll contours from the two Simpson Bay stations displayed in fig. 2. The surface temperature and integrated surface chlorophyll time series for all the stations is shown in fig. 3. Surface temperature varies by up to ~3 °C among the stations at any given time, and warming/cooling rates in spring/summer are also quite different between stations. The different sites also show differences in productivity (as seen in the integrated chlorophyll time series). The best temporal resolution of the spring bloom is for 2011, and the integrated chlorophyll time series suggests that the spring bloom initiates first at the heads of the bays (presumably driven by enhanced thermal and buoyancy stratification), then at more open sites, but that overall productivity is higher in open water regions (presumably because there is more total nitrogen available in the deeper water column). The chlorophyll contours in Simpson Bay (fig. 2) show this as well, productivity was more compressed by depth at the head of the bay.

Deviations to objectives, methods, study area or schedule

No deviations have been made from the objectives, methods or study area. The project is still slightly behind schedule in terms of the analysis of plankton samples, but we have prioritized samples for

which the data is required by other projects (those samples have been completed and the data passed on), and are now progressing through samples by geographic area (e.g. station), and will continue to catch up. It is expected that we will have caught up on the samples by the second quarter of FY11. Analysis of nutrient samples is completed up to June, and is progressing.

Problems and developments

After a somewhat slow start with cruise timing and charter vessel difficulties in 2010, this project is progressing well. The PWSSC vessel has generally been performing well, circuits of PWS are now routine; we have been keeping to the planned schedule of approximately monthly surveys. There was a single mechanical failure in 2011, an engine problem during the April cruise necessitated aborting the survey prematurely with half the stations done. The CTD used by the project had a memory malfunction in July, which corrupted all the data for that cruise (although bottle samples were still taken). The CTD was returned to the manufacturer for repair and recalibration and is back on-line.

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

No changes are planned to the objectives outlined in the proposal. We will continue to play catch-up on the analysis of plankton samples into the upcoming year and will continue to prioritize samples that are required for other subcomponents of the herring project.

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

Joint cruises were done with Evelyn Brown ("PWS herring survey: Sound Wide Juvenile Herring, Predator, and Competitor Density via Aerial Surveys") in June and July. A custom camera mount was installed aboard the *New Wave*, and it was used to ground truth aerial observations of fish schools. The system worked very well: Evelyn was able to vector the vessel in to the schools by radio, and the camera was dropped in and then maneuvered to stay in the school as much as possible. A second, HD quality camera was added in July to try to improve the quality of the images collected (underwater filming in PWS is challenging because the water is very turbid). Plankton and environmental (temperature, salinity, chlorophyll-a and turbidity) data has also been passed on to the energetics group supervised by Ron Heinz ("PWS Herring Survey: Predictors of Winter Performance in YoY Herring from PWS").

Although not in the proposal, there has also been coordination with other projects as well. Water samples for CO₂ analysis were collected in late 2010 and early 2011 cruises, for researchers at the Ocean Acidification Research Center at UAF and bioluminescent *Metridia* copepods were sent to Dr. Linda Chun (Harvard) for constructing cDNA libraries of the luciferase gene.

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.

Results and updates from this first year's work have been disseminated in articles in the local paper, on local radio, and updates to the PWSSC blog, in coordination with Scott Pegau's outreach activities.

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. *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.*

No publications or presentations were done during the reporting period; as outlined in the proposal, the intention is to have another annual cycle covered before beginning a full analysis. Data is being archived in a consistent format and is available to all members of the project.

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. *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.*

There have been no significant differences or problems between actual and budgeted expenditures, beyond delays in charging some of the salary allocations (from the lag between the planned and actual start date, and because of the delay in processing plankton samples described above), and some as yet unspent charter funds. We will work to address those delays as quickly as possible. The Alaska Ocean Observing System (AOOS) has shared some ship time with the project, and is also funding the installation of a thermosalinograph system aboard the PWSSC vessel, which will improve measurements of surface salinity, temperature, turbidity and chlorophyll fluorescence.

We can accept your annual report as a digital file (Microsoft Word or WordPerfect), with all figures and tables embedded. Acrobat Portable Document Format (PDF) files (version 4.x or later) are also acceptable; please do not lock PDF files or include digital signatures.

Please submit reports electronically in [ProjectView](#) or by email to catherine.boerner@alaska.gov. Also, please be sure to post your annual report on your own website, if you have one.



We appreciate your prompt submission of your annual report and thank you for your participation.

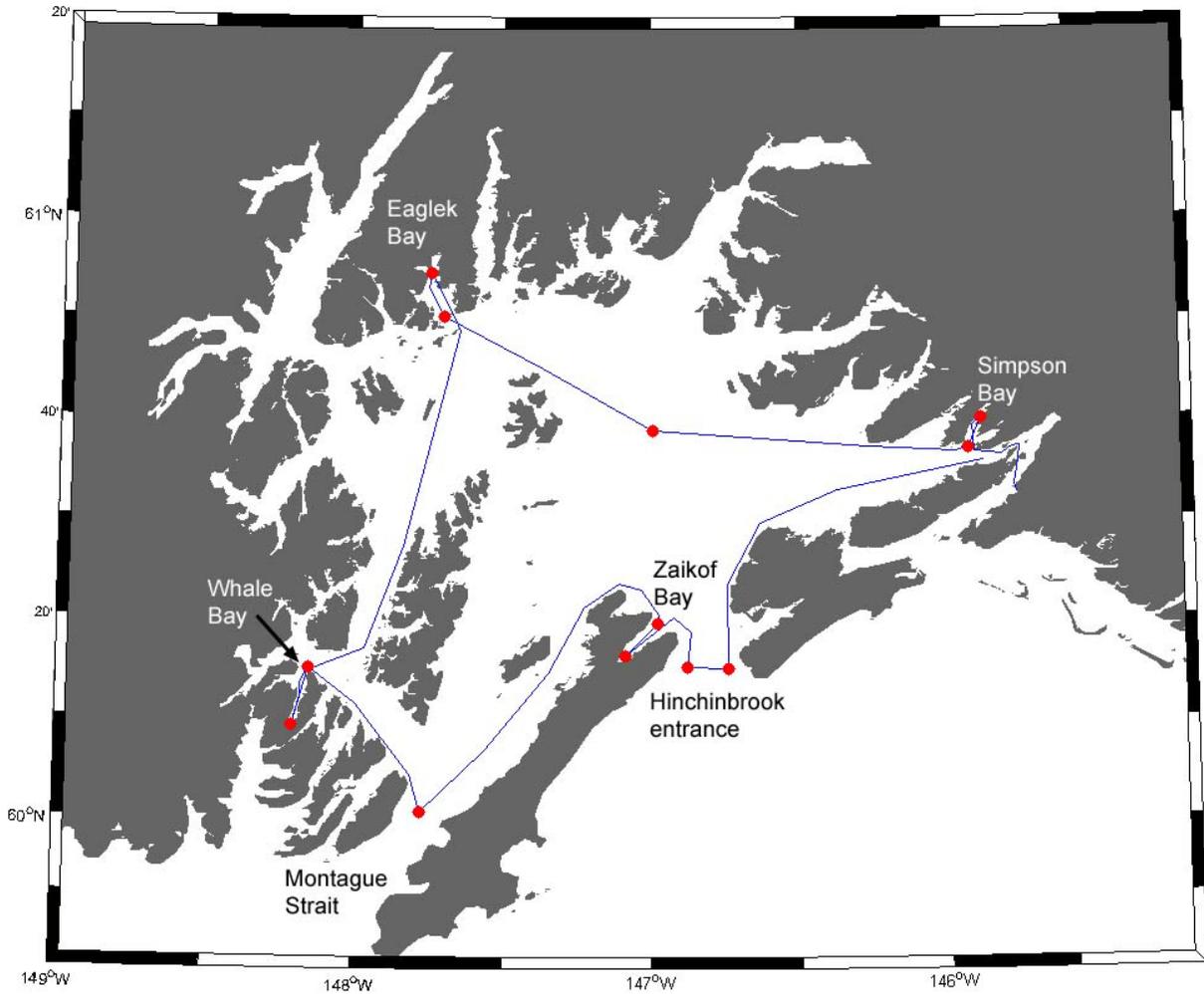


Figure 1: The standard cruise track, the route is generally done clockwise to be able to pick favorable weather in Hinchinbrook Entrance. Two stations are done in each of the SEA bays, one at the head, one at the mouth. Additional stations are done on the west and east sides of Hinchinbrook Entrance, in Montague Strait, and in central PWS.

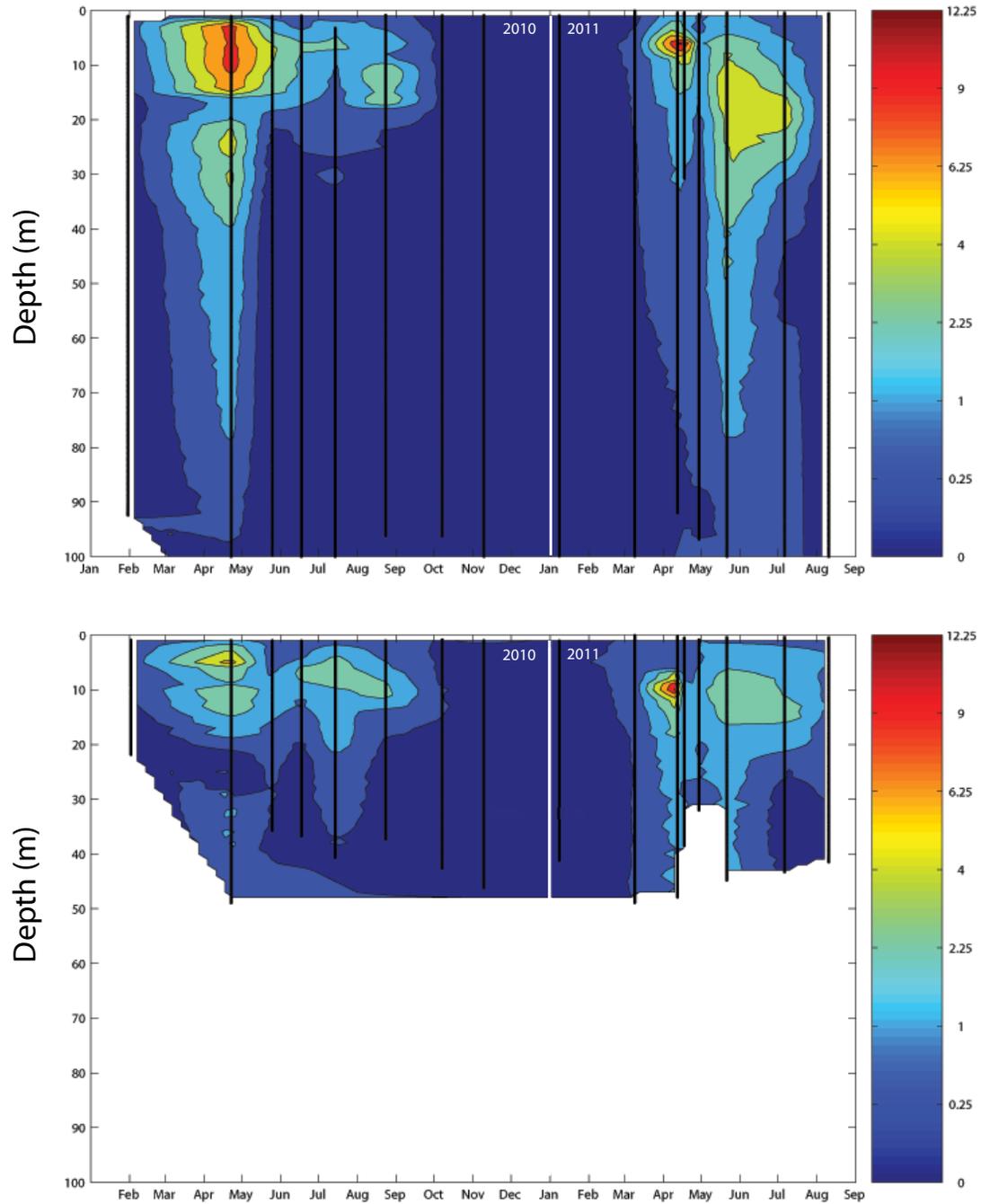


Figure 2: *In situ* chlorophyll ($\mu\text{g l}^{-1}$) time series measured with a WETlabs ECO fluorometer for Simpson Bay mouth (upper panel) and head (lower panel) stations. Color axis is the same for both figures, and has been square-root transformed to better show lower chlorophyll regions. Individual measurements are denoted by black dots (which are closely spaced and appear as lines). Linear interpolation was used to produce the contour grid, and the grid spacing was one week by time and one meter by depth.

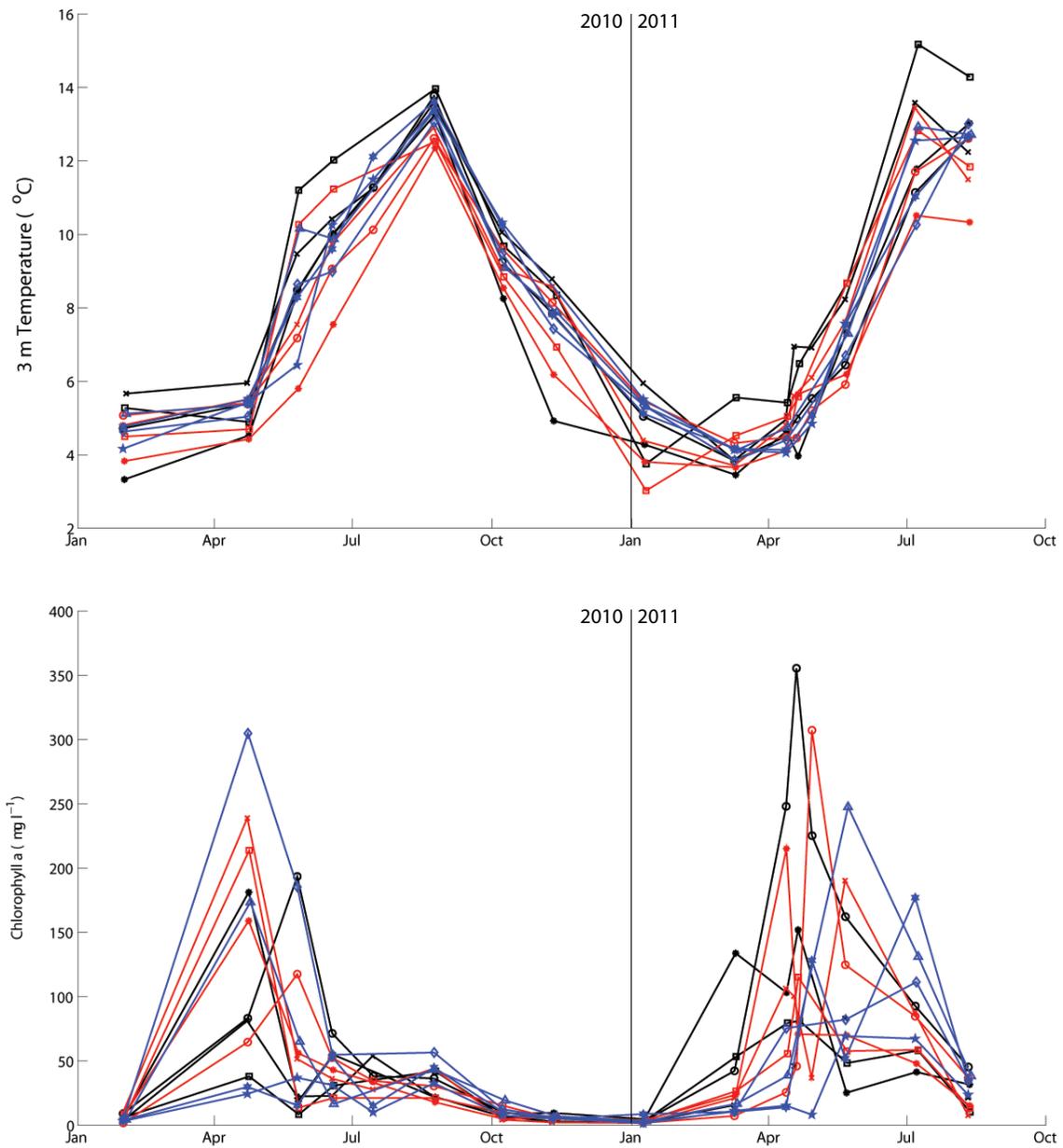


Figure 3: Surface (3 m) temperature (top panel) and integrated surface chlorophyll (bottom panel) time series for all stations. Black denotes stations at the heads of bays, red denotes mouth stations, and non-bay stations are blue (\square =Eaglek, \circ =Zaikof, X=Simpson, \star =Whale; \diamond =Montague Strait, Δ =Central PWS, pentagon=Hinchinbrook East, hexagon=Hinchinbrook West). Chlorophyll concentrations were numerically integrated from 50 m (or bottom) to surface using the trapezoid rule.