

## *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: 070816*

*Project Title: Evaluating Harlequin Duck Population Recovery: CYP1A Monitoring and a Demographic Population Model*

*PI Name: Dan Esler*

*Time period covered: FY08 (1 Sept 07 - 31 August 08)*

*Date of Report: 5 September 2008*

*Report prepared by: Dan Esler*

*Project website (if applicable): n/a*

### Work Performed:

Studies have proceeded according to schedule. Harlequin duck liver biopsies for quantification of CYP1A induction were successfully collected during field excursions in November 2006 and March 2007. Samples were sent to the lab at UC Davis for determination of EROD activity. Samples were analyzed blindly, i.e., without knowledge of collection location, date, gender, or age of the birds. Raw data have been returned, data analyses have been performed, and summaries have been prepared, as well as a draft manuscript. In brief, the data strongly support the conclusion that average EROD activity was higher in areas oiled during the Exxon Valdez spill relative to unoiled areas (Fig. 1). EROD activity was not strongly influenced by age, sex, or mass of individuals, nor by the season in which samples were collected. These results suggest that harlequin ducks continued to be exposed to residual Exxon Valdez oil up to 18 years following the spill.

Similarly, the population model work is nearing completion. Available data sources for harlequin duck demographic attributes were gathered, including unpublished data from my research group in British Columbia, published studies of harlequin duck demography in Prince William Sound and elsewhere, and reports on population numbers, age and sex ratios, and dynamics in oiled and unoiled areas of Prince William Sound (Rosenberg EVOS report and Irons EVOS report). The modeling expert, Sam Iverson, has used these data to construct a set of projection matrix models to evaluate the timing and extent of mortality related to the spill, as well as to estimate a timeline to recovery under different scenarios and assumptions. The analyses are nearly complete and text is being prepared for presentation of this information in a final report to the EVOSTC and in a manuscript to be submitted to a journal.

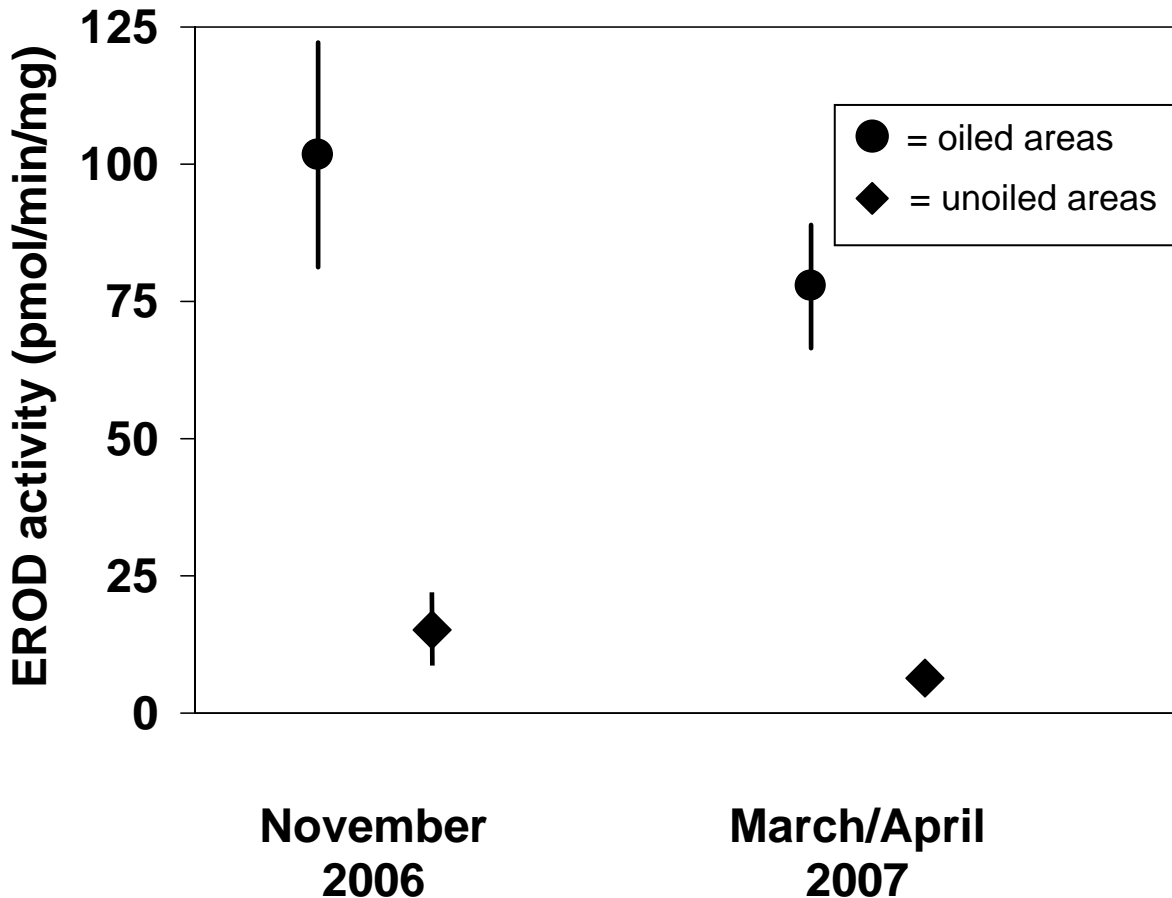


Figure 1. Average ( $\pm$  SE) hepatic 7-ethoxyresorufin-O-deethylase (EROD) activity of harlequin ducks ( $n = 90$ ) captured during winter 2006-2007 in areas of Prince William Sound, Alaska oiled during the *Exxon Valdez* spill and nearby unoiled areas.

**Future Work:**

As indicated above, future work involves finalizing a manuscript related to the P450 objective and to finalize analyses and a manuscript for the population model work. These will be completed shortly and there are no adjustments to the project's objectives, methods, or budget required.

**Coordination/Collaboration:**

Collaboration and coordination have proceeded as described in the DPD. We have been in touch with scientists with expertise in interpretation of CYP1A induction, and we have exercised a high degree of collaborative communication when gathering data for the population modeling aspect of the project.

**Community Involvement/TEK & Resource Management Applications:**

There has been limited opportunity to engage in these. However, we have made an effort to use local sources for contracts when possible (e.g., boat charters). Also, I (Esler) attended the Marine

Science in Alaska Symposia in January 2007 and 2008, which facilitated interaction with scientific colleagues and other interested parties. Also, we anticipate that project results will be presented in a number of oral and written formats, so that interested individuals and organizations will have access to the information. These will include implications for recovery and restoration of EVOS injuries, and broader implications to other systems and issues.

**Information Transfer:**

We have not produced any publications thus far, although manuscripts describing P450 and population modeling results are nearing completion, and will be submitted within the coming months. I expect to continue to attend the annual symposium, as a forum for discussing the results of this work.

**Budget:**

We have remained well within the budget described for this project. There may be slight redistributions among budget line items, but we expect this to be minor.