

**Project Title: FY11 amendment to EVOSTC restoration project 11100808:  
Nearshore synthesis – sea otters and sea ducks.**

**Project Period for the Amendment: October 1, 2010 – September 30, 2011**

**Primary Investigator:  
Dan Esler, Simon Fraser University and Pacific WildLife Foundation**

**Study Location: Western Prince William Sound**

**Abstract:**

**As part of EVOSTC restoration project 070808, harlequin ducks (along with other nearshore vertebrates) were examined for lingering exposure to residual *Exxon Valdez* oil. This work determined that harlequin ducks in oiled areas of PWS continued to show biomarker evidence of elevation of cytochrome P4501A through 2009, which was interpreted to indicate exposure to *Exxon Valdez* oil up to 20 years after the spill (Esler et al. 2010). In this amendment, I am requesting additional funding to replicate the harlequin duck sampling in March 2011 and conduct laboratory analyses, to continue to track the timeline over which exposure is indicated. This information will be used to gauge the status of recovery of harlequin ducks from the 1989 spill.**

**FY11 EVOS funds requested, including GA: \$103,200  
Lead agency: U.S. Geological Survey**

**Procedural and Scientific Methods**

**Objective 1.** Harlequin duck CYP1A sampling and analysis.

Methods will replicate those from previous work (Trust et al. 2000, Esler et al. 2010) to facilitate comparisons. In brief, in March 2011 we will capture harlequin ducks in several areas that were oiled during the *Exxon Valdez* spill, including Bay of Isles, Herring Bay, Crafton Island, Lower Passage, and Green Island, as well as in nearby unoiled northwestern Montague Island. In each area, 20 harlequin ducks will have small (< 0.5g) liver biopsies taken while under general anesthesia. Biopsies will be frozen in liquid nitrogen immediately and will be maintained in a frozen state until laboratory analysis at UC Davis by collaborators Keith Miles, Jack Henderson, and Barry Wilson. CYP1A induction will be determined by measuring hepatic 7-

ethoxyresorufin-*O*-deethylase (EROD) activity, which is a catalytic function principally of hydrocarbon-inducible CYP1A enzymes. Data analysis will follow that of Esler et al. (2010) and will evaluate average differences in EROD between oiled and unoiled areas, accounting for any effects of age, sex, or mass.

**Estimated budget**

*Personnel:*

Esler	3 mo @ \$8K	24.0	K
Lead Tech	1 mo @ \$3.5K	3.5	K
Techs	1 mo @ 2.0K *2	4.0	K
Vet	20 days @ \$0.5K/day	10.0	K

*Travel:*

Vancouver to ANC (*5)		5.0	K
Misc Travel		1.5	K
Shipping		2.0	K
Boat Charter (14 days @ \$1.8K)		25.2	K

*Supplies:*

Vet Supplies (\$100/bird * 40)		4.0	K
Misc		3.0	K

*Lab Analysis:*

EROD Activity (UC Davis; 40*\$200)		8.0	K
------------------------------------	--	-----	---

Subtotal		90.2	K
----------	--	------	---

PWLF Administrative Fees (5%)		4.5	K
-------------------------------	--	-----	---

Subtotal		94.7	K
----------	--	------	---

USGS GA (9%)		8.5	K
--------------	--	-----	---

PROJECT TOTAL		103.2	K
---------------	--	-------	---

**Measurable Project Tasks**

FY 2011, 1<sup>st</sup> quarter (October 1, 2010 – December 31, 2010)

Project funding approved by the Trustee Council

Begin arrangements of field logistics, personnel, and contracts

FY 2011, 2nd quarter (January 1, 2011– March 31, 2011)

Continue with field logistics and contracts

Prepare field gear  
Conduct field work during March 2011

FY 2011, 3rd quarter (April 1, 2011 – June 30, 2011)

Ship samples to UCDavis  
Maintain and store field gear  
Finalize project administration

FY 2011, 4<sup>th</sup> quarter (July 1, 2011 – Sept. 30, 2011)

Receive results from laboratory  
Conduct data analyses  
Prepare report of findings by 30 September as an amendment to 090808 final report

References Cited:

- Esler, D., K. A. Trust, B. E. Ballachey, S. A. Iverson, T. L. Lewis, D. J. Rizzolo, D. M. Mulcahy, A. K. Miles, B. R. Woodin, J. J. Stegeman, J. D. Henderson, and B. W. Wilson. 2010. Cytochrome P4501A biomarker indication of oil exposure in harlequin ducks up to 20 years after the Exxon Valdez oil spill. *Environmental Toxicology and Chemistry* 29:1138-1145.
- Trust, K. A., D. Esler, B. R. Woodin, and J. J. Stegeman. 2000. Cytochrome P450 1A induction in sea ducks inhabiting nearshore areas of Prince William Sound, Alaska. *Marine Pollution Bulletin* 40:397-403.