BIRD STUDY NUMBER 11

Study Title:Injury Assessment of Hydrocarbon Uptake by Sea Ducks

Lead Agency:ADF&G

PROJECT JUSTIFICATION

The goal of this project was to determine whether the Exxon Valdez oil spill had measurable sublethal effects on six species of migratory and resident seaducks in Prince William Sound and the Kodiak Archipelago. The six seaduck species were harlequin ducks, Barrow's and common goldeneyes, and surf, black, and white-winged scoters. The harlequin ducks are both resident in and winter migrants to the oil spill area. The other species do not breed in the oil spill area but are winter migrants. The postulated mode of sublethal oil exposure to these seaducks was by ingestion of petroleum hydrocarbons through the food chain.

Results of biochemical sampling indicate a spectrum of petroleum residues contaminated liver tissue of harlequin ducks and Barrow's and common goldeneyes in western Prince William Sound and south-western Kodiak Island. Concentrations of naphthalene and phenan-threne were found in bile extracts.

Results from necropsies indicated that there were a significantly greater number of harlequin ducks in physiologically poor condition (with minimal adipose tissue) in western Prince William Sound and Kodiak than in control sites. Other physiological effects included poor plumage condition and lethargy displayed by many individuals.

The most important oil spill effect documented by NRDA Bird Study Number 11 was the cessation of harlequin duck reproduction in the oil spill area of Prince William Sound. Harlequin ducks, although present in the Exxon Valdez oil spill area of western Prince William Sound, were observed not to form breeding pairs, display courtship behavior, nor seek nest sites. No harlequin broods were observed in the oil spill area in 1990. Only one brood was reported in the oil spill area in 1991. Harlequins reproduced normally in northern, eastern, and southern Prince William Sound in 1990-91.

The mode of sublethal petrochemical exposure to these ducks is highly likely consumption of oiled invertebrate prey items. The degree of exposure is related to the foraging areas of the respective species. The zone of maximum oil impact is the intertidal. Harlequin ducks, feeding on a wide variety of

invertebrates in the intertidal, appear most exposed. Goldeneyes, which feed subtidally, appear moderately exposed; white-winged scoter, feeding on benthic organisms such as scallops in deeper water, appear less exposed.

The goal of this closeout proposal is to produce a final report including food habits analysis and all results of chemical analyses of seaduck proventriculus samples, liver, bile, and histopathology. Pending petroleum toxicology analysis of blue mussels (Mytilus) and other invertebrates from seaduck proventriculus samples will be related to histopathological analyses and to the continued reproductive failure of Prince William Sound harlequin ducks.

	BUDGET ($K)
Salaries	$ 19.5
Travel	0.0
Contractual	0.0
Supplies	0.5
Equipment	0.0
Subtotal	$ 20.0
General Administration	2.9
Total	$ 22.9