Summary of Sea Duck Joint Venture Research Projects for FY2024

PROJECT # and TITLE	PARTNERS	DESCRIPTION	ESTIMATED COST TO SDJV IN FY2024
SDJV #172: The Mitik of Nunatsiavut and Beyond: Using satellite telemetry, contaminant analysis and Indigenous knowledge to uncover movements, key areas of habitat use and threats for the Common Eiders of northern Labrador throughout their range	Nunatsiavut Government, Acadia University, Canadian Wildlife Service, Ducks Unlimited Canada, Environment and Climate Change Canada Science and Technology Branch	This research project, centered in Nunatsiavut, Northern Labrador, Canada, focuses on the Common Eider (*Mitik* in Inuktitut). The study area overlaps the subspecies division between the American (*S. m. dresseri*) and Northern (*S. m. borealis*) Common Eiders and falls within Sea Duck Key Site 40. The project, led by the Nunatsiavut Government, aims to deploy satellite PTTs on up to 25 Common Eiders, measure contaminant levels, and integrate Indigenous knowledge and scientific data to understand the species' migratory patterns, habitat use, and risks to improve sea duck conservation and management. This research builds upon previous and on-going studies and will improve our understanding of affiliations between Labrador eiders and wintering areas in the USA. By enhancing our understanding of risks faced by eiders both inside and outside Nunatsiavut waters, this project supports the Nunatsiavut Government's efforts to conserve a culturally significant species and fosters cross-jurisdictional collaboration in eider management. Additionally, community engagement and participatory mapping will ensure that Indigenous knowledge is incorporated into both study planning and interpretation of our findings, enhancing local and scientific understanding of the Common Eider's importance and informing marine conservation efforts in the region.	$46,900 (Year 1 of 3)
SDJV #173: Unifying the coast: Advancing image-based surveys to support sea duck conservation along the Pacific Flyway	USGS Western Ecological Research Center, Washington Department of Fish and Wildlife, Canadian Wildlife Service	For most of their annual cycle, North American sea ducks are densely distributed in estuaries and along the coastal nearshore where they are susceptible oil spills, energy development, changing ocean conditions, and other potential threats. Observer-based aerial surveys have been an important tool for evaluating coastal distributions and estimating population abundances to understand sea duck responses to their changing environment. However,	$84,947 (Year 1 of 4)

		safety, expense, observer bias and lack of methodological consistency are rising concerns associated with observer-based surveys, making it imperative to transition to more sustainable methods. Digital aerial surveys (DAS) that automate counts from aerial imagery using convolutional neural network (CNN) models are one way to improve survey safety and count accuracy. Here we propose to develop a standardized DAS for the lower Pacific Flyway to help maximize safety, while improving data consistency and model accuracy among important regions within the Flyway. To accomplish this goal, we will complete the following objectives: 1) Collect imagery of Pacific Coast sea ducks using standardized digital aerial survey hardware and imagery collection methodology, 2) Retrain an existing Pacific Coast seabird CNN model using an iterative reclassification process to create a sea duck-specific model, and 3) Conduct digital aerial surveys at key sea duck sites in the Pacific Flyway to quantify sea duck abundance and species composition. We will focus our work in two Sea Duck Key Habitat Sites, the Puget Sound and San Francisco Bay, where we can leverage secured funding for observer-based aerial surveys to help develop robust DAS methods that will be transferrable across the Pacific Flyway. Our products will include documented sea duck DAS methodology, an extensive public annotated image library, a CNN model fine-tuned to detect Pacific Flyway sea ducks, and a peer reviewed manuscript documenting survey results and efficacy.	
SDJV # 174: Regional variation on common eider exposure to oil-related contaminants in Atlantic Canada	University of Manitoba, Environment and Climate Change Canada, Canadian Wildlife Service	Exposure of marine birds to acute and chronic oil pollution has widespread impacts, including direct mortality as well as a variety of sub-lethal effects such as reduced breeding success and increased physiological stress. These oil-related impacts are due to the toxicity of various substances within oil and gas, notably polycyclic aromatic compounds, PACs. Sea ducks, as diving birds and benthic foragers, may have increased exposure to oil-related pollutants through contact on the water surface, in the water column, and from accumulated toxins in benthic prey which they feed on. Declining populations of common eiders (*Somateria*	$38,830 (Year 1 of 2)

		mollissima subspecies *dresseri*) in Atlantic Canada are exposed to a wide range of anthropogenic activities with associated oil-related pollution, but baseline levels of PACs are unknown. Quantifying contaminant loads throughout their breeding range is important for understanding exposure and impacts to the species, but also integral understanding to food safety for Inuit and First Nations in the region who consume eiders and their eggs. Initial studies of PACs in eider eggs from northern Labrador have led to recommendations on limitations to monthly consumption. This study will quantify PAC concentrations in eggs of common eiders across 18 breeding sites in eastern Canada, including Labrador, Newfoundland, the Gulf of St. Lawrence, the Scotian Shelf, and the Bay of Fundy (Gulf of Maine). This will allow for comparisons with PAC concentrations in these and other species across their range, and regional pollution risks (i.e., vessel traffic patterns and pollution incident reports). These results will form baselines against which managers can 1) quantify the impacts of current anthropogenic activities, future spills, and changes in vessel traffic patterns, and 2) assess long-term trends and recovery from oil-related pollution.	
SDJV # 175: What are the ducks telling us? Documenting K'ahsho Got'ine knowledge about scoters	Fort Good Hope Renewable Resources Council, Tuyeta Management Board, K'ahsho Got'ine Foundation, Canadian Wildlife Service, Environment and Climate Change Canada	We propose to work with Indigenous partners and Indigenous Government Organizations in the Fort Good Hope area (Sahtú Settlement Area, Northwest Territories) to (i) develop and implement an Indigenous Knowledge survey related to areas historically used by priority sea duck species (Surf Scoter; *Melanitta perspicillata* and White-winged Scoter; *M. deglandi*) during spring and summer and (ii) evaluate current use of these areas by scoters through ground-based surveys. By building a foundation for Indigenous partnership and providing much needed information on local distributions for these species, natural resources that are shared between Canada and the US, the proposed study will benefit US citizens, as well as those in Canada. In particular, scoter species are significant in Indigenous identity and culture in both Alaska and Canada – learning to work respectfully and effectively with Indigenous partners is a critical first step in integrating human	$35,430 (year 1 of 2)

		dimensions into management of sea duck populations across the continent. Although the study will be under the direction of Environment and Climate Change Canada personnel and will take place in Canada, it will provide a much-needed foundation for expanding similar projects to other geographic areas in northern North America where sea ducks constitute an important component of subsistence harvesting and traditional ways of life.	
SDJV # 176: An integrated model of scoter populations in eastern North America with a focus on estimating survival	Pennsylvania State University, USFWS	Sea duck demographic parameters are difficult for researchers to estimate at a range-wide scale because their breeding and wintering areas are challenging to access and/or work in. Recent population modeling (Koneff et al. 2017) has provided insight into which demographic parameters are most important for better understanding the harvest potential of these species, hence improving management, and providing a sustainable recreational opportunity. There were concerns with the previous approach and a stated need for updated models of sea duck population dynamics. Though data sources are limited, we believe there is sufficient data from small-scale studies and larger monitoring programs that can provide a more complete view of changing sea duck populations. We propose to use integrated population models to improve estimates of annual survival, estimate the effect of changing harvest regulations on survival, and provide insight into what data needs are most useful for improving demographic rate estimates. Target species are black scoter (*Melanitta americana*), surf scoter (*M. perspicillata*), and white-winged scoter (*M. deglandi*) in eastern North America. Our goal is to integrate Christmas Bird Count trend data with demographic parameter estimates obtained from on-going fecundity surveys and prior knowledge of scoter survival. We propose a one-year project that will utilize the skills of quantitative biologists to integrate the various sources of data and analyze population demographics of scoters in eastern North America and determine the sensitivity of the model to uncertainty in fecundity and survival rates.	$43,869