

SDJV Science Needs
FINAL FY 2023

SDJV considers the following species high priority because of the magnitude of information needs of each given an assessment of available information and predicted current/future stressors: Common Eider, King Eider, Harlequin Duck, Surf Scoter, Long-tailed Duck, White-winged Scoter, Black Scoter, and Barrow's Goldeneye.

SDJV priority research needs for FY 2023 include:

1. Information on migratory connectivity and habitat use of sea ducks to improve survey design, harvest management, and development of conservation actions. New studies could target geographic gaps from previous satellite telemetry studies or analyze existing datasets. Priorities include, *but are not limited to*, large-scale projects that provide information on population delineation (Pacific vs. Atlantic) for species where populations overlap, and projects focusing on priority sea duck species, particularly Long-tailed Ducks, western Harlequin Ducks, and King Eiders.
2. Improve the quality of data and information on sea ducks by exploring alternative protocols, improved analytical methods, or new technology. Desired products include: (a) A review of current efforts, information and technological gaps, and suggestions for future research and efforts for aerial survey methods. This would require assembling and reviewing the current methods available to automate the counting and speciation of sea ducks in aerial photographs and remotely sensed imagery, and determining the similarities, differences, strength, weaknesses, and most likely paths forward for automated counts of birds. (b) A method to integrate high-definition aerial survey data being collected at offshore wind areas throughout the Atlantic coast with sea duck monitoring priorities. (c) The development of remote tracking techniques including tags, remote sensing, and other tools that have specific applications to our other priorities. (d) The collection and integration of Indigenous Knowledge to inform broad questions about sea duck ecology and management related to SDJV priorities.
3. Studies focused on estimating rates of fecundity (e.g., estimating breeding propensity, nesting phenology, clutch size, nest success, and/or fledging success on the breeding areas, or determining fall or winter age and sex ratios to provide an index of annual productivity) and survival (all life stages, and including harvest) of priority sea duck species. Large-scale projects focused on investigating factors that influence these demographic parameters and provide information to inform harvest estimates and population-level management decisions will be prioritized. Projects that test capture methods, occur in new areas, and/or contribute to developing cost-effective, large-scale approaches may also be considered for short-term funding.

4. Identify and characterize ecological attributes of habitat used by priority sea duck species to determine critical dependencies and vulnerabilities to anthropogenic effects and climate change. Large-scale studies, and those focused on areas where increased development/human use is anticipated, will be prioritized. Desired products include, *but are not limited to*: (a) estimates of energetic demands or time activity budgets for molting or wintering sea ducks to inform future estimates of landscape carrying capacity, (b) habitat suitability models for priority sea duck species; (c) evaluation and prediction of the effects of climate change on sea ducks, including changes in northern breeding areas and coastal habitats, altered phenology of life history patterns, changes in food resources and predator landscapes, and other conditions that degrade or enhance productivity and survival, (d) evaluation of the effects of wind energy and other industrial and agricultural development on sea ducks, and (e) development and testing of potential methods to reduce negative effects of industrial or agricultural development on sea ducks.

5. Improve our understanding of the viewpoints of various stakeholders in sea duck conservation. Desired products include, *but are not limited to*, estimates of the size and composition of fall/winter general hunting and spring/summer subsistence harvest, an assessment of the derivation and distribution of harvest, an assessment of the values and concerns of other stakeholders, including birdwatchers, the waterfowl management community, habitat joint ventures, and other groups, and the collection and integration of Indigenous Knowledge regarding historical and current subsistence use of sea ducks.

6. Assess the effect of changing predator communities (e.g., bald eagle, polar bear, mink, fox) on sea duck foraging behavior, breeding success, diurnal and long-term distribution patterns, and the effects of potential distribution shifts on the interpretation of survey data from long-term monitoring studies.