



**Project Title:** Habitat Vulnerability Assessment for Wintering American Black Ducks in the Chesapeake Bay Refuge System in the Face of Impending Sea-Level Rise and Land Use Change Scenarios.

**Headline Title:** Habitat vulnerability assessment for wintering black ducks.

**Brief Summary:** The project is modeling the amount of energetically viable habitat as a function of quality prey dispersion, availability, and resultant food web interactions and how these are altered by sea-level rise and land development projections for wintering black ducks within the Chesapeake Bay refuges.

**Project Location:** Patuxent National Wildlife Refuge (NWR), Eastern Neck NWR, Blackwater NWR, Martin NWR, Rappahannock NWR, Presquille NWR, James River NWR, Plum Tree NWR

**Partners:** This project involves researchers from USGS, Black Duck Joint Venture, Atlantic Coast Joint Venture, Ducks Unlimited, University of Delaware, USFWS refuges

**Background:** As specified in the Chesapeake Bay Executive Order, the USFWS is tasked with increasing black duck habitat by 10% across the National Wildlife Refuge System to reach a 3-year population average of 100,000 wintering black ducks in the Chesapeake Bay by 2025. Managing the black duck population at a time when land use and sea-level rise pose a recognized peril to this species and their habitats will require a strategic approach. The critical first step in this process is having a firm understanding of current black duck habitat utilization within the refuge system.

**Project Goals:** This bioenergetics model determines the amount viable habitat (where energy intake balances or exceeds the energetic costs during foraging bouts plus prorated costs incurred when ducks are not foraging) within the Chesapeake refuge system. The model produced from this proposed study will demonstrate the extent to which sea-level rise and land-use change may affect black duck habitat at particular refuges. Using this information, refuge managers will be able to evaluate effectiveness of different efforts for black duck habitat restoration across the refuge system.

**Strategy Goals Implemented:** Goal 5, Strategy 5.3, Action 5.3.4: Develop and use models of climate-impacted physical and biological variables and ecological processes at temporal and spatial scales relevant for conservation.

Goal 4, Strategy 4.2, Action 4.2.3: Conduct vulnerability and risk assessments for habitats and priority species (threatened and endangered species, species of greatest conservation need, and species of socioeconomic and cultural significance).