Progress Report: Informing habitat delivery for non-breeding black ducks (*Anas rubripes*) along the Atlantic coast.

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Background and Current Status

The Black Duck Joint Venture (BDJV) is developing a decision support framework to inform strategic habitat conservation and achieve the goals of the North American Waterfowl Management Plan (NAWMP) for the American black duck. The decision framework is based on a conceptual model that links changes in habitat carrying capacity (due to habitat loss or habitat delivery) to seasonal vital rates (i.e., survival or reproduction) and continental population growth. This conceptual model assumes black duck survival during the non-breeding period is limited by the amount of energy (i.e., food) that is available on the landscape. The BDJV and the Atlantic Coast Joint Venture (ACJV) have been pursuing a collaborative program consisting of field research, laboratory research, and modeling to parameterize the non-breeding component of the life-cycle model and to identify areas of priority conservation need.

The BDJV, ACJV, and our partners have developed methods for estimating energetic carrying capacity and energetic demand along the U.S. Atlantic Coast from Rhode Island to North Carolina. The current prototype model provides static estimates of energetic surplus (e.g., in the Chesapeake Bay region) and energetic deficiencies (e.g., Long Island Sound region). However, this initial prototype is based on several important assumptions that must be addressed before meaningful management recommendations can be made. For example, the current prototype does not include estimates of competition from other waterfowl species for available resources. Our current focus is to address these assumptions to make the framework more realistic and to incorporate state dependency that will allow us to make management recommendations that consider not only the current state of the system (i.e., how much energy is available today) but future states (i.e., how much energy will be available given urban growth and sea level rise). The increased realism will allow the BDJV and ACJV to make useful recommendations regarding how much habitat is needed and where it is needed to achieve the goals of the NAWMP.

In addition to on-going modeling efforts the BDJV has funded several research projects to address key information gaps and assumptions of the decision framework. Projects include a field study in Connecticut quantifying the effects of saltmarsh restoration on black duck food abundance and habitat use; a laboratory study designed to estimate black duck daily energetic demand; black duck habitat use and home range size as a function of regional food availability; and black duck energetic capacity and winter ecology in New Brunswick, Canada. The results of these studies will be used to parameterize the developing decision support model.

Relationship to Habitat GIT

The decision framework currently being developed by the BDJV and ACJV is scalable meaning it can be used to estimate energetic need and to target priority conservation areas at different spatial scales. The BDJV and ACJV believe the final model will be useful for informing black duck habitat delivery needs in the Chesapeake Bay. As part of the modeling effort, the BDJV has identified the need to quantifying the effects of wetland habitat management, restoration, and enhancement on black duck food resources. The BDJV is interested in collaborating with on-going wetland management programs to design and implement field research to obtain this important information.

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