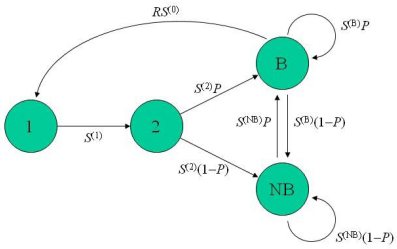
USGS
science for a changing world

Patuxent Wildlife Research Center

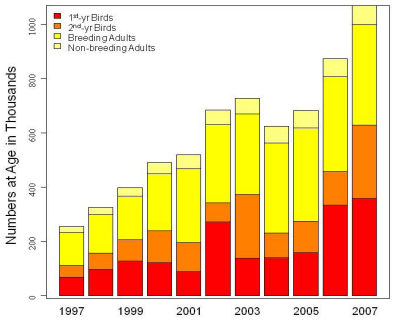
Harvest Theory for Age-Structured Populations: Atlantic Population Canada Geese

The Challenge: Atlantic Population (AP) Canada geese were overharvested in the late 1980s and early 1990s, so much so that the hunting season for them had to be closed for a number of years. The population recovered and harvest has resumed, but managers are careful not to repeat the problem. One of the difficulties is that a late age-at-first-reproduction creates a complex age-structure in the population. As a result, managers need to consider the long-term effects of their actions.



Age-structured population model for APCG.

The Science: We developed an age-structured population model for AP geese, and estimated the parameters using Bayesian hierarchical methods. With this model, we derived an optimal state-dependent harvest strategy using adaptive stochastic dynamic programming. Further, we explored the effects of uncertainty on the harvest recommendations.



Reconstructed age-structure of the APCG population.

The Future: The USFWS and the Atlantic Flyway Council use this model to inform their annual harvest management decisions. Ongoing work is designed to provide general conclusions about the harvest management of age-structured populations.

Contact: Michael Runge at (301)497-5748 or mrunge@usgs.gov