

Update on major accomplishments during 1999-2000

1. Recruited 2 graduate students: Nathan Zimpfer (M.S.) started fall semester 1999. His work will focus on development of production submodels for the black duck adaptive management model. Christopher Fannesbeck (Ph.D.) started spring 2000. His work will focus on development of spatially stratified optimization models.
2. Developed and parameterized a single-population optimization model in program ASDP, based initially on midwinter inventory estimates as a surrogate for breeding abundance of black ducks and mallards. The model has 2 state variables (black duck and mallard abundance), a single harvest decision, and random variation based on the residuals from the revised production model (below). A model set contains 4 alternative models involving combinations of compensation or lack of compensation to harvest, and negative or no effects of mallards.
3. Re-analyzed band recovery, harvest, and population survey data to reparameterize above model in terms of breeding population estimates, with revised estimates for the production and survival functions.
4. Organized and conducted the first working group meeting of the Black Duck Adaptive Harvest Management Working Group (BDAHMH) in Athens, 5-7 June 2000. Workshop included discussion of technical and nontechnical issues in AHM, and hands-on demos of modeling software.
5. Developed a web site and listserv for communication and dissemination of information for BDAHMH.
6. Developed in schematic form a preliminary spatially structured AHM model for black ducks: 2 breeding, 4 harvest, and 2 wintering areas. Model has 4 state variables (black ducks
7. Coded a version of the above model in ASDP with assumed parameter values for population-specific reproduction, harvest, and movement rates. Encountered severe limitations (speed, memory) in ASDP that at present allow only a heavily discretized model to run. We anticipate that some of these limitations can be overcome through programming, platform, or other modifications but that eventually we will need to explore alternatives to dynamic programming (e.g., genetic algorithms).

Goals for 2000-2001

1. Complete refinements of single population AHM model. Further explore equilibrium behavior of the model via simulation. Modify the objective function to eliminate negative return values.
2. Analysis of harvest rates in U.S. and Canada in relation to regulations, in order to develop the probabilistic decision-outcome relationship.
3. Further refinement of age ratio estimates and refitting of production function using density, environmental, and habitat information.
4. Analysis of harvest distribution and derivation to estimate 1) harvest area-specific effects of harvest, and 2) transition probabilities for spatial AHM model.
5. Develop a working spatial AHM model and begin exploration of alternative harvest management strategies.

Project has been modified for a new termination date of June 2003.