

DEVELOPMENT OF AN INTEGRATED, ADAPTIVE MANAGEMENT PROTOCOL FOR AMERICAN BLACK DUCKS

ANNUAL REPORT

JULY 19, 2001

Update on major accomplishments during 2000-2001

- ! Submitted a [monograph](#) describing black ducks modeling efforts to Wildlife Monographs. Pre-submission reviews of the monograph resulted in major changes to the current black duck AHM models (see [summary](#)).
- ! Conducted a [workshop](#) on spatial modeling of black ducks in Sandusky, Ohio, 17 November 2000.
- ! Organized and conducted the second [working group meeting](#) of the Black Duck Adaptive Harvest Management Working Group (BDAHM) in Québec City, 11-13 June 2001. Workshop included discussion of technical and nontechnical issues in AHM, and hands-on demos of modeling software.
- ! Re-parameterized a single-population optimization [model](#) in program ASDP and as a java applet. The current version of the AHM model has 2 state variables.
 - " Black duck breeding abundance– based on the total population size as estimated by the CWS helicopter plot surveys, all strata combined and
 - " Mallard breeding abundance– estimated from the stratum 51-54 and 56 USFWS surveys, plus the northeast plot surveys for breeding mallards in the US (Maine to Virginia). This is currently the state variable used for the eastern mallard model.The black duck model currently considers 16 alternative models based on combinations of 4 alternative production models (presence or absence of mallard competition impacts together with presence or absence of habitat effects) and 4 survival models (absence or presence of compensation to harvest, and absence or presence of winter habitat effects). The model now directly incorporates dynamics of eastern mallards (see [eastern mallard model](#)).
- ! Explored the relationship between harvest [regulations](#) continentally and by region of the US and Canada (see summaries), in an effort to suggest groups of regulatory packages that might be efficacious for AHM
- ! Developed a 2-population, 4-harvest area [spatial model](#) in ASDP for exploration of spatially-stratified AHM (including the costs and benefits of refined management scale).
- ! Developed statistical estimates of [production rates, movement rates, and fidelity rates](#) based on wing, band recovery, and capture-recapture data for black ducks.
- ! Began preliminary exploration of optimal harvest strategies

Goals for 2001-2002

- ! Complete exploration of single population model, including asymptotic behavior of submodels.
- ! Resolve certain model issues such as the proper computation of age ratios based on wing data
- ! Continue investigations of the impacts of constraints such as NAWP goals on optimal decision making
- ! Complete development of spatial AHM model for 2-3 breeding populations. This will necessitate first
 - " Completing estimation of movement and fidelity rates
 - " Resolving issues of breeding reference area boundaries and possible delineation of northern versus southern areas in Atlantic Flyway
- ! Begin analysis of alternative management scales
- ! Explore alternative computational strategies such as MCMC optimization that may be necessitated by spatial and multi-species modeling
- ! Coordinate with Fred Johnson on combined AHM strategies for black ducks and mallards.

