

Canvasback Harvest Strategy

July 2008

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INTRODUCTION

Historically, several harvest-management strategies for the canvasback (*Aythya valisineria*) have been implemented. These strategies have used changes in bag limits, closure of specific areas to canvasback hunting, prohibition of canvasback hunting during the regular duck season, and special canvasback seasons within the regular duck hunting seasons to achieve population goals and harvest objectives.

In 1990, the Service recommended that the Flyway Councils review canvasback data to identify criteria for guiding the development of annual harvest regulations. Specific questions for which the Service sought answers were:

- (1) whether existing population thresholds and regulatory options were the most appropriate for maintaining desired population levels, and if not, what new approaches should be considered; and
- (2) whether the grouping of canvasbacks into eastern and western populations correctly represented 2 distinct populations.

During 1992, the Division of Migratory Bird Management (MBM) reviewed canvasback databases and assessed their utility for providing guidance during the development of canvasback harvest regulations (Office of Migratory Bird Management 1993). In February 1993, MBM drafted a proposed harvest strategy for canvasbacks. The proposal was reviewed by the Flyways, and their comments were forwarded to MBM. Based on results of the review of canvasback databases and comments from the Flyways regarding the 1993 proposed strategy, the Service formally adopted a Canvasback Harvest Strategy for the 1994-95 duck hunting season (Office of Migratory Bird Management 1994; 60 FR 44466), and that strategy has guided annual harvest-management recommendations since its adoption. Briefly, the strategy had the following components:

Population on which Harvest Regulations are Based--

Canvasback harvest regulations are based on a single, continental breeding population. If data become available in the future to warrant another treatment, this aspect of the harvest strategy should be revisited.

Objective for the Size of the Spring Population--

The objective for the size of the spring population is 500,000 birds.

Use of a Population Model--

A model describing population dynamics will be used to guide management recommendations. The model incorporates density-independent production and completely additive hunting mortality (Appendix A) and is conservative. Other more liberal models initially considered suggested canvasback harvest opportunity potentially lost if one of these models were correct appeared small.

Seasons and Harvest--

A limited sport harvest using a 1 canvasback (either sex)/day bag limit is permitted during any year in which spring abundance together with expected production, minus the number of birds expected to be harvested, results in an expected abundance of $\geq 500,000$ birds the following spring. Otherwise, the season on canvasback is closed.

Allocation of Harvest--

The allocation of the canvasback harvest to Canada should be treated as a constant until the question of international allocations can be discussed by appropriate authorities in Canada and the U.S. This allotment should be subtracted from the total predicted allowable harvest to derive an allowable harvest for the United States.

DETAILS OF THE HARVEST STRATEGY

In 1995, the Service adopted Adaptive Harvest Management (AHM) as the method by which annual duck hunting regulations would be promulgated (see U.S. Fish and Wildlife Service 2003a for a detailed explanation of AHM). An element of AHM is the specification of fixed, discreet regulatory alternatives that specify the frameworks (i.e., season lengths, outside dates, and bag limits) for the hunting season. Given these regulatory alternatives and a specific management objective regarding the desired abundance of mallards (*Anas platyrhynchos*), each year a regulatory alternative is selected for regular duck-hunting seasons.

Typically, the selected season length for the regular duck season applies to all species of ducks that can be taken legally. However, the Service assessment indicated that the status of canvasbacks in some years cannot withstand the harvest associated with full length of the regular duck season (selected based on mallard status) without their numbers falling below the spring-abundance objective. Nevertheless, a smaller amount of harvest associated with a reduced number of days in which canvasbacks could be hunted within the regular duck seasons could result in attainment of the spring objective in some cases. Therefore, based on its own assessment and recommendations by the Flyway Councils, the Service has chosen to modify the canvasback harvest strategy to allow the following canvasback season structures:

(1) An open season with a daily bag and possession limit of 1 and 2 canvasbacks (either sex), respectively, for the entire regular duck season whenever the allowable harvest projects a breeding population in the subsequent year of $\geq 500,000$ canvasbacks. If the subsequent year's predicted breeding population equals or exceeds 725,000, the option for a daily bag limit of 2 canvasbacks (either sex) and a possession limit of 4 will be offered based on revisions to the strategy in 2008.

(2) A partial season at the "restrictive" package level (currently 30 days in the Atlantic and Mississippi Flyways, 39 days in the Central Flyway, and 60 in the Pacific Flyway) within the regular duck season whenever a full season projects a breeding population in the subsequent year of less than 500,000 but a partial season projects a breeding population $\geq 500,000$ birds; and

(3) A closed season in all Flyways whenever the allowable harvest under both the full and partial seasons project a breeding population in the subsequent year of less than 500,000.

Further, Alaska will be allowed to hunt canvasbacks for the entire season (with daily bag and possession limits of 1 and 2, respectively) in most years, but would not be permanently exempted from this strategy. A decision whether to allow hunting of canvasbacks in Alaska will be made by the Service each year.

ASSESSMENT OF STRATEGY PERFORMANCE

Each year, the Service will use results from the Waterfowl Breeding Population and Habitat Survey (Smith 1995) and harvest surveys conducted in the U.S. (e.g., U.S. Fish and Wildlife Service 2003*b*) and Canada (e.g., Canadian Wildlife Service 2004) to assess the performance of the strategy. Specifically, the Service will compare predicted harvests to those observed, and will use the abundance and harvest information to compare spring-abundance and fall-age-ratio predictions from the canvasback population model to empirical estimates (Dubovsky 1998, Dubovsky and Johnson 2003). The Service will periodically adjust input values to the model when sufficient evidence warrants such changes, or when necessary due to changes in AHM protocols. In considering an adjustment to the strategy to support the option for a 2 bird bag limit when predicted population size is at least 725,000, the Service conducted an assessment of the predicted effects on the expected increase in the frequency of closed seasons of the 2 bird option. While this assessment suggested that the expected increase in frequency of closed seasons would be small when predicted population size was greater than 600,000, the Service noted limitations of the existing assessment framework for canvasbacks and suggested that refinements to the modeling framework were warranted as time and resources permit.

CONCLUSIONS

This harvest-management strategy for canvasbacks promotes objective guidelines useful during establishment of annual harvest regulations for canvasbacks, while striving to maintain acceptable abundances of breeding birds. Also, by permitting limited canvasback hunting seasons within the regular duck season and extending the option for a 2 bird bag limit when population size is large, this strategy provides more hunting opportunity than was previously allowed.

LITERATURE CITED

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Appendix A. Structure and parameter definitions for MBM's density-independent production, completely-additive hunting mortality model to describe the population dynamics of canvasbacks.

Model Structure:

$$\left| \begin{array}{l} \text{Abundance}_{t+1} \\ N_{t+1} \end{array} \right. = \begin{array}{l} ((\text{Fall Adults})_t + (\text{Fall Juveniles})_t - \text{Harvest}_t) \quad (\text{Winter Survival}) \\ (N_t S_s + N_t S_s A_t - H_t / (1 - C)) \quad S_w \end{array}$$

Parameter Definitions:

N_t = abundance in spring for year t

S_s = constant summer (May - August) survival rate for adults (= 0.936)

A_t = year t estimated production rate (immatures/adult)

For density - independent production :

$$A_t = PCT(-0.063 + [(1.48 \times 10^{-7})PCAN_t])$$

where :

PCT = adjustment factor (= 0.75)

$PCAN_t$ = number of May ponds in Prairie Canada in year t

H_t = year t harvest

C = constant crippling - loss rate (= 0.30)

S_w = constant winter (February - May) survival rate for adults (= 0.926)