

BLACK DUCK JOINT VENTURE

Triennial Report to the North American
Waterfowl Management Plan Committee
July 2008

EXECUTIVE SUMMARY

The American black duck (*Anas rubripes*) population declined by >50% between 1950s and 1980s. In response to this decline the black duck was identified as a species of international concern by the U.S. and Canadian federal governments. The Black Duck Joint Venture (BDJV) was established in 1989 as the first species joint venture under the North American Waterfowl Management Plan (NAWMP) to lead a coordinated monitoring, research, and communications program to restore the population to 640,000 breeding black ducks.

As part of the first Continental Assessment of the NAWMP, the BDJV was commended for bringing increased focus and management effort to eastern North America. However, the authors of the Continental Assessment identified several areas of concern and provided recommendations for improving the BDJV. These concerns included the need for a range-wide breeding population monitoring program, improved linkages with habitat joint ventures and the Mississippi Flyway, renewed research effort to identify population limiting factors, and a need to update key planning documents. The BDJV agreed with the Authors and have committed time and resources to addressing each of these concerns. Since the completion of the Continental Assessment the BDJV has completed the development and implemented the Integrated Eastern Survey, re-instituted a competitive grant program to address high priority information needs, and vastly improved communication and linkages with associated habitat joint ventures and the Atlantic and the Mississippi Flyways. Finally, the BDJV Management Board recently approved a revised BDJV Strategic Plan for 2008-2013.

The revised BDJV Strategic Plan lays out a vision for progress rooted in the “Desired Characteristics of Species Joint Ventures.” This template provides a tool for self-assessment and identification of priority tasks to ensure progress toward the achievement of NAWMP goals. Though the BDJV has made great progress in fulfilling these characteristics, we have identified priority efforts that we must pursue over the next 5-years. The first priority is to increase and improve our understanding of black duck limiting factors, particularly related to productivity. This will require conducting spatially replicated field studies using standardized protocols. Also, the BDJV has begun developing integrated population/habitat models to contrast hypotheses about limiting factors as recommended by the Joint Task Group. The second priority is to improve our understanding of black duck habitat ecology and aid habitat joint ventures in their delivery of strategic habitat conservation. This need will be addressed through our competitive grant program and the development of integrated population/habitat models. Our third priority is to continue developing and refining monitoring programs to provide data necessary for adaptive management of black ducks. Specifically, we need to evaluate alternative methods to monitor range-wide productivity. Finally, we need to improve the timeliness and usefulness of BDJV communications products to effectively share information with associated habitat joint ventures, management agencies, and the general public.

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INTRODUCTION

The American black duck is distributed throughout eastern North America from Ontario to the Maritime Provinces and south through the Mississippi and Atlantic Flyway states (Fig. 1). Historically, the American black was the most abundant duck species in eastern North America and was highly prized by hunters. Despite the value of black ducks to hunters and wildlife enthusiasts, the black duck population experienced a decline of >50% between the 1950s and 1980s (Fig. 2). The most current monitoring data paints a mixed picture of the status and future sustainability of the black duck population. Data from the Mid-Winter Inventory (MWI) indicates the black duck population declined slowly between 1990 and 2007 (Fig. 3). In contrast, data from the Breeding Population Survey (BPOP) suggests the population slowly increased during the same time period (Fig. 3). Finally, estimates of the pre-season age ratio between 1990 and 2004 ($\bar{x} = 0.82, \pm 0.14$ S.D.; Fig. 4) suggest productivity is low and may not be sufficient to maintain a growing population.

In response to the long-term decline of the American black duck the framers of the original North American Waterfowl Management Plan (NAWMP; 1986) identified the black duck as a species of international concern and established a recovery goal of 385,000 birds as measured by the MWI. The 1994 update of the NAWMP revised the population goal to reflect a desired breeding population of 640,000^a birds. The Black Duck Joint Venture (BDJV) was established in 1989 as the first “species joint venture” to lead efforts to achieve the NAWMP population goal for the American black duck. The mission of the BDJV is to implement and coordinate a cooperative population monitoring, research, and communications program to provide information required to manage black ducks and restore numbers to the NAWMP goal. The goals of the BDJV are:

- I. *Develop, support and guide monitoring programs to provide information on the distribution, population growth trends, and demographic parameters of black ducks throughout their annual range;*

^a The American black duck population objective was developed from the predictions of a model relating MWI counts to population estimates derived from the Breeding Waterfowl Plot Survey (BWPS) of eastern Canada. The objective, and average population size, corresponds to that portion of the black duck breeding range sampled during the BWPS. For management purposes, the black duck objective has been partitioned for three portions of the breeding range: eastern, central, and western. In the future, combined estimates from fixed-wing and helicopter surveys may be evaluated for monitoring and objective-setting for this species (North American Waterfowl Management Plan, Plan Committee 2004).

- II. *Support and guide research on black duck population dynamics, habitat ecology, monitoring programs, and management techniques to identify and mitigate limiting factors; and*
- III. *Communicate results of monitoring and research programs to associated habitat joint ventures, natural resource agencies, policy-makers, and stakeholders to support black duck conservation efforts.*

Since its inception, the BDJV has led the efforts to develop the infrastructure (e.g., monitoring programs) necessary to address and fill information needs related to the restoration and management of the American black duck. Through these efforts the BDJV has contributed to the management and conservation of waterfowl species throughout eastern North America. For example, the Integrated Eastern Survey and composite estimator provides breeding population estimates of a variety of waterfowl species including eastern mallards (*Anas platyrhynchos*) and green-winged teal (*Anas crecca*). These data also serve as the foundation for eastern mallard adaptive harvest management. Research conducted on black duck habitat ecology has contributed to the management and conservation of eastern wetlands that are used by a variety of wetland dependent species.

STRUCTURE OF THE BLACK DUCK JOINT VENTURE

The BDJV is a voluntary partnership comprised of organizations responsible for or interested in the conservation and management of black ducks and other waterfowl species that share its range. Black Duck Joint Venture partners include the Canadian and U.S. Federal wildlife management agencies, State and Provincial wildlife management agencies, and non-government organizations ([Table 1](#)). The BDJV consists of two bodies: a Management Board and a Technical Committee. The purpose of the BDJV Management Board is to provide leadership and program coordination, some financial resources, and logistical support for BDJV activities. The Management Board is co-chaired by representatives from Environment Canada's Canadian Wildlife Service (CWS) and the U.S. Fish and Wildlife Service.

The Technical Committee works with the BDJV Science Coordinator to advise the Management Board about black duck research and management needs and is responsible for development of

annual work plans, project implementation, and progress evaluation. To maximize the Technical Committee's efficiency and productivity, members are organized into working groups representing each BDJV program (i.e., population monitoring, research, communications, and evaluation). This structure permits members to focus on a subset of issues while allowing the entire membership to provide constructive review and input on all BDJV activities. The Technical Committee is co-chaired by representatives from the CWS and the USFWS. Science Coordinators for the Eastern Habitat Joint Venture (EHJV) and Atlantic Coast Joint Venture (ACJV) serve on the BDJV Technical Committee to ensure communication and integration of scientific planning and project implementation across joint ventures. The BDJV Science Coordinator (a USFWS Employee) serves as the BDJV representative to the NAWMP National Science Support Team, the Black Duck Adaptive Harvest Management Working Group, the Adaptive Harvest Management Working Group, and the ACJV Waterfowl Technical Committee. The BDJV Coordinator (a CWS employee) is responsible for administrative support to the Management Board and Technical Committee.

The BDJV engages the waterfowl community to promote and facilitate black duck conservation through four program areas: 1) Population Monitoring, 2) Research, 3) Communications, and 4) Evaluation. The goal of the BDJV Population Monitoring Program is to develop and test monitoring protocols (e.g., Breeding Population Survey, Banding Programs) for black ducks and other eastern waterfowl species. The goals of the Research Program are to identify and prioritize research and information needs; facilitate the exchange of ideas and data among cooperators and stakeholders; coordinate and support research, and serve as a 1-stop clearinghouse of current scientific knowledge of black duck ecology and management. The goals of the Communication Program are to share information among existing partners, provide management recommendations, and raise awareness and support for black duck conservation among stakeholders and policy-makers. The goal of the BDJV evaluation program is to conduct regular assessments of BDJV programs, projects, results, and products to continually improve the effectiveness and efficiency of the BDJV.

BDJV PROGRESS AND FUTURE PRIORITIES

The BDJV responses to the Continental Assessment Letter are organized into five categories based on a “self-assessment” tool recently developed by Joint Venture Coordinators ([Table 2a-f](#)). The five categories are: 1) Organizational Performance, 2) Biological Planning, 3) Monitoring, 4) Research and Knowledge Acquisition, and 5) Communications and Outreach. These categories encompass the recommended reporting topics provided by NSST including: 1) Progress toward biological goals (i.e., Biological Planning), 2) Progress in adaptive management (i.e., Monitoring, Research, and Communications), 3) Cooperating outside joint venture boundaries (i.e., Organizational Performance), and 4) State of Joint Venture Partnership (i.e., Organizational Performance). We have linked each concern/recommendation identified by the authors of the 2007 BDJV Continental Assessment Letter (Authors) into the most appropriate category and provide a short summary of our responses (completed, on-going, or planned). We also provide a current assessment of the joint venture and identify our immediate priorities. Specific recommendations from the Authors and BDJV responses are detailed in [Appendix A](#).

Organizational Performance -. The BDJV has met the comprehensive content for both the Coordination/Partnership and Technical Expectations identified for Joint Venture Organizational Performance (Tables 2 [a](#), [b](#)). The BDJV has a full time science coordinator, a part-time coordinator, and a part-time communication officer. Together, these staff ensure the BDJV is capable of fulfilling its administrative and coordinating tasks. Members of the BDJV Management Board and Technical Committee are engaged in shaping the direction of the BDJV and ensuring progress is made.

The Authors of the Continental Assessment emphasized the BDJV had weak and limited linkages with the larger waterfowl community, and particularly with associated habitat joint ventures (ACJV, EHJV, and Upper Mississippi River & Great Lakes Region Joint Venture [UMR&GLRJV]). This message was received clearly and we have taken several steps to improve our linkages.

Our first step in addressing this concern was to strengthen our linkages with the ACJV and EHJV by appointing their respective Science Coordinators to our Technical Committee. Their

participation has helped to elevate the BDJV's emphasis on addressing black duck habitat needs and ensured synchronized efforts between the joint ventures in terms of habitat planning and delivery.

The second step was to hire a full-time Science Coordinator in October 2006. A primary role of the Science Coordinator is to maintain communication and improve linkages between the BDJV, its partners (e.g., habitat joint ventures, Atlantic and Mississippi Flyway Councils, etc.), and the larger waterfowl and migratory bird conservation community. The BDJV Science Coordinator is a member of the ACJV Waterfowl Technical Committee and actively participates in appropriate EHJV functions (e.g., biological planning meetings, conference calls, etc.). The BDJV Science Coordinator also maintains communication with the UMR&GLRJV to ensure cooperation on issues and projects of common interest. For example, after consultation between the UMR&GLRJV Science Coordinator and the BDJV Science Coordinator, both joint ventures elected to fund a two-year study on black duck migration ecology which started in winter 2008. This project will address a priority information need for both joint ventures, specifically understanding black duck habitat use during migration.

The Science Coordinator is also actively engaged with the AFC and MFC and participates in annual technical section meetings of each flyway and attends appropriate committee meetings such as the MF Black Duck Subcommittee, AF Black Duck Committee, AF Banding Committee, and AF Mallard Committee. The Science Coordinator also attends the AF and MF Council meetings held in conjunction with the North American Wildlife and Natural Resources Conference. Participation by the BDJV Science Coordinator at these conferences facilitates the sharing of information needs and identification of opportunities for collaboration and synergy of conservation efforts.

The BDJV Science Coordinator is an active member of the NAWMP National Science Support Team and the Joint Venture Coordinators, the Adaptive Harvest Management Working Group, and the Black Duck Adaptive Harvest Management Working Group. His participation with these groups facilitates communications and improves the linkages between the BDJV and the larger waterfowl community. For example, the Joint Venture Coordinators are currently

pursuing opportunities to improve the individual and collective ability of joint ventures to assess and respond to the impacts of global climate change on migratory birds.

Biological Planning -. The BDJV has met the comprehensive content for Coordination/Partnership (Table 2 [a](#)). With the completion of the Board approved 2008–2013 Strategic Plan the BDJV has achieved comprehensive content for one of three Technical Expectations and have made significant progress in the remaining two (Table 2 [c](#)). The Strategic Plan identifies the mission and goals of the BDJV and outlines the direction of the joint venture over the next five years. Included with the Strategic Plan are individual Program Specific Implementation Plans (i.e., Population Monitoring Implementation Plan, Research Implementation Plan, Communications Plan, and Evaluation Plan). These plans identify short- (i.e., annual) and mid-term (i.e., 3–5 year) objectives and tasks to be completed by the BDJV to ensure progress toward NAWMP goals. The implementation plans are designed to be updated annually or as needed to reflect changing conditions, needs, and priorities of the joint venture.

The most important concern identified by the Authors was the lack of a “...*path or prescription that will turn around the population decline. This lack of certainty contributes to the inertia and indecisiveness on the part of key partners involved in black duck management.*” Though the BDJV has not produced a specific prescription for the black duck population, we have contributed to the development of the infrastructure (e.g., monitoring programs, adaptive biological models [Conroy et al. 2002]) necessary for the scientific management and restoration of black ducks. These and on-going efforts form the foundation for sustainable management and restoration of black ducks in eastern North America.

The first step in providing a “prescription” to restore the black duck population is to establish an objective and science-based population goal that is accepted by our partners. The current population goal of 640,000 breeding black ducks was based on a statistical relationship between the MWI and the breeding population survey. However, there is a great deal of debate about the appropriateness and value of this goal because it was based on 1970’s MWI data. In partnership with members of the EHJV and ACJV, the BDJV is developing an integrated population/habitat model (Anderson et al. 2007) that will allow us to produce an objective, science based estimate

of carrying capacity and make recommendations for revising the NAWMP population goal (Tables 2 [c](#)). The revised population goal will be used by the EHJV, ACJV, and UMR&GLRJV to establish appropriate habitat goals.

Currently, the two federal agencies manage black duck harvest using an “interim” harvest strategy and expect to have a fully adaptive harvest management strategy in place in 2–4 years. The BDJV is providing financial support to develop the underlying adaptive model which will form the basis of black duck adaptive harvest management. The BDJV recognizes the need to coordinate the development and acceptance of an international management plan that focuses on habitat management needs and complements the international adaptive harvest strategy. We feel the first step is to develop integrated population/habitat models that will allow us to set an objective population goal and identify current limiting factors. Given previous efforts by the BDJV, including the implementation of the Integrated Eastern Survey, development of adaptive harvest management and integrate habitat and population dynamics models, we feel the BDJV is making meaningful progress towards identifying limiting factors and developing prescriptions for restoring the black duck population.

Population and Habitat Monitoring -. The BDJV has achieved comprehensive content for Coordination/Partnerships related to black duck monitoring (Table 2 [a](#)). The BDJV technical committee is comprised of members representing black duck management entities and possesses the quantitative and biological background necessary for developing scientific monitoring protocols. The BDJV has achieved comprehensive content two of three Technical Expectations, including development and implementation of breeding survey, and development and implementation of methodology to monitor harvest (Table 2 [d](#)).

The Authors identified the lack of a range-wide breeding population survey as a critical failure of the BDJV. The development of a statistically reliable and logistically feasible breeding population survey has been a priority for the BDJV for the past several years. The BDJV supported research efforts and pilot surveys to integrate breeding population abundance data collected by the CWS and the USFWS using two disparate monitoring platforms (i.e., helicopter and fixed-wing). These efforts resulted in the development of the Integrated Eastern Survey and

hierarchical population estimator of black duck and eastern waterfowl breeding populations. The survey methodology has been approved by the BDJV partners (i.e., CWS, USFWS, state and provincial agencies) and provides an 18-year time series of black duck breeding population in eastern Canada. Data from the Integrated Survey are used in setting harvest regulations and will be instrumental in the development of future population/habitat models.

Our priorities are to review and evaluate on-going and new methodologies to monitor vital rates, particularly productivity. Currently, several BDJV members are assessing the potential of a new hierarchical model to estimate productivity (i.e., fall age-ratios). If successful, this hierarchical model will allow researchers to test hypotheses related to black duck productivity and may provide a more accurate estimate than the current estimate based on harvest survey data. The BDJV is also supporting research to incorporate a spatial component to the Integrated Eastern Survey that will allow researchers to identify landscape features influencing black duck abundance (Table 2 [d](#)).

Science, Research, and Knowledge Acquisition -. The primary mission of the BDJV is to coordinate and support scientific research to inform black duck and waterfowl management in eastern North America. Reflective of this priority, the BDJV has achieved comprehensive content in terms of Coordination/Partnership (Table 2 [a](#)) and we are progressing towards comprehensive content for all three Technical Expectations (Table 2 [e](#)). The BDJV has invested a great deal of time and money to identify and understand the spatial and biological structure of the black duck population, estimate vital rates, and develop adaptive management models. These efforts have greatly improved our understanding of black duck ecology and management, but we have not definitively identified population limiting factors.

Our current priorities are to obtain contemporary estimates of vital rates and habitat requirements using spatially replicated studies (Table 2 [e](#)). Spatially replicated studies are necessary to fully identify and understanding what habitat features limit the continental population growth rate and to develop regional-specific habitat management recommendations to be implemented by the habitat joint ventures. Further, results from spatially replicated field studies will be critical to the development of integrated population/habitat models as recommended by the Joint Task Group

(Anderson et al. 2007). To address our information needs, the BDJV has renewed its emphasis on directed research and has set the goal of providing \$100,000 annually to support research through a competitive grant program.

Communication, Education, and Outreach -. The BDJV uses a variety of communication tools including, the [BDJV web page](#), annual reports, meetings, and symposia to inform JV partners, stakeholders, and the public about black duck conservation. Thus, we have fulfilled the minimum content for Coordination/Partnership (Table 2 *a*). However, to fulfill the Comprehensive Content we need to implement a process to obtain feedback from our target audiences regarding the quality and usefulness of our communication efforts. Our Technical Committee and Management Board meets twice annually (including 1 joint meeting) and maintain communications as needed via conference calls and emails. Thus, we have fulfilled the Comprehensive Content related to internal communication (Table 2 *f*).

The Authors expressed concern that many of our communications products, including the web page were out-dated. In response, we have revised our web page to more accurately reflect the mission and structure of the joint venture and to make it a more user-friendly web page. Our Communications Implementation Plan calls for up-dating the web page quarterly or more often as needed to provide partners and the public with the most current information possible. In addition to these up-dates, the BDJV has resumed the publication of an annual newsletter. The BDJV newsletter provides detailed information on all aspects of the joint venture from on-going research to a review of the annual budget.

The BDJV Communications Implementation Plan identifies priority activities and products to be completed over the next 5-years to inform the public about black duck conservation and transfer our current scientific knowledge and recommendations to the habitat joint ventures and natural resource agencies. The BDJV also maintains communication with the ACJV, EHJV via cross-representation on technical committees, and we communicate frequently with the UMR&GLRJV to share information needs and results.

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Table 1. Organizations represented on the Black Duck Joint Venture Management Board and Technical Committee.

Organization	Management Board	Technical Committee
Canadian Wildlife Service – National Headquarters	X	X
Canadian Wildlife Service – Atlantic, Quebec, and Ontario Regions	X	X
Ontario Ministry of Natural Resources	X	X
Québec Ministère des Ressources naturelle et de la Faune		X
Atlantic Canada Provincial Ministries of Natural Resources (Labrador & Newfoundland; Prince Edward Island; Nova Scotia; New Brunswick)	X	X
U.S. fish and Wildlife Service – Division of Migratory Bird Management	X	X
U.S. fish and Wildlife Service – Northeast Region	X	X
U.S. Geological Survey – Biological Resources Division	X	X
Mississippi Flyway Council	X	X
Atlantic Flyway Council	X	X
Ducks Unlimited Canada	X	X
Ducks Unlimited	X	X
Atlantic Coast Joint Venture		X
Eastern Habitat Joint Venture		X
Upper Mississippi River and Great Lakes Joint Venture		X

Table 2a. Desired “Coordination and Partnership” characteristics of Species Joint Ventures.

<i>Element</i>	Coordination/Partnerships	
	Minimal Content	Comprehensive Content
Organizational Performance	Joint venture partnership develops a vision for the JV's future; establishes and implements strategies to achieve that vision. Joint venture develops and maintains strategic regional alliances, consistent with the JV's mission. Joint Venture Office provides leadership to develop, with the Management Board, a strategic implementation plan to define and achieve the goals of the partnership.	Joint Venture Office and MB look to broaden the partnership; .JV maintains strong professional contacts and connections; JV Office identifies partner capabilities and works with partners to address any missing capabilities; The JV participates in development of common JV funding messages; One or more MB members regularly participate in the Association of Joint Venture Management Boards.
Biological Planning	Joint venture partnership leads a collaborative effort, often through a technical committee appointed by the Management Board, to build a biological foundation of bird conservation needs that is both based on, and informs, continental, national, or regional bird conservation initiatives	Joint venture partnership develops and implements strategies to utilize JV science products to better target and enhance conservation programs at the regional level to benefit migratory birds. Joint venture office and/or Management Board members build strong relations with decision makers in state and federal public institutions, private industry, and partner organizations to strengthen their understanding of the joint venture’s conservation activities and capabilities.
Monitoring	Coordinator works with technical team and stakeholders to identify biological monitoring needs, identify potential alternative methodologies, and prioritize development needs.	JV Coordinators, Management Board and Technical Team work with stakeholders to achieve consensus and implementation of appropriate and preferred monitoring methodologies.
Science and Research	Priority research needs are identified and distributed to JV partners and regional research institutions.	Joint Venture provides a structure and process that generates, attracts, leverages, and implements assumption-driven research activities in support of JV-established biological targets. Strong relationship with USGS and universities.
Communications	Mechanism exists to communicate between Management Board, JV office and broader JV partnership members. JV Office represents the JV to the conservation community, resource agencies, and elected officials, both regionally and nationally. The JV maintains an up-to-date website.	Develops effective communication, education, and outreach products and strategies to attract, engage and inform partners, raise awareness, change attitudes and increase willingness among landowners and resource managers to support bird conservation. JV comprehensively executes its communication, education and outreach plan. JV assesses various contributions partners can make to CEO, and has identified gaps in capabilities and fortified those gaps as appropriate.

Table 2b. Desired “Technical Expectations” related to Joint Venture organizational performance.

<i>Element</i>	Sub Element/Product	Technical Expectations				
		Minimal Content	Comprehensive Content	Are	Need to Be	Priorities
Organization Performance	Management Board	JV Office supports operations and administration of MB; MB has broad representation within the JV geographic region (Fed, State, Non-Profit, Private) and members regularly participate in meetings. Member organizations commit energy and resources to developing a shared vision of bird conservation for the JV and coordinate their otherwise independent.	MB members bring significant resources to the JV partnership, engage in current issues facing the JV, share responsibilities for JV progress; One or more MB members regularly participate in the Association of Joint Venture Management Boards.	Achieved minimum content and 99% of comprehensive content.	Greater promotion of JV priorities and activities within respective agencies; active participation on the Association of JV management boards.	Elect or appoint a representative to the Association of Joint Venture Management Boards.
	Technical Community	Technical expertise needs are identified. Joint venture has access to technical staff either directly or through partnership.	JV has science coordinator and technicians as appropriate. TC for specific science needs with full participation from partner organizations. TC is improving the science of the JV. TC represents the JV in outreach to the public.	Achieved comprehensive content.	n/a	n/a

Table 2b. Desired “Technical Expectations” related to Joint Venture organization performance, continued.

<i>Element</i>	Sub Element/Product	Technical Expectations				
		Minimal Content	Comprehensive Content	Are	Need to Be	Priorities
Organization Performance	Budget/Granting/ Admin/Funding	Financial management system is in place. Administrative support is available to the JV; Mechanisms exist to receive and expend federal funding; JV Office keeps the MB informed on the status of the JV's operations and finances; Maintains working knowledge of pertinent funding opportunities.	In addition to the minimal content, financial system is sophisticated enough to manage grant/contract funds as appropriate. Administrative personnel are on or available to JV staff. JV has grant-writing capacity available in staff and or partner organizations. JV develops and implements fundraising strategies for approaching and cultivating new sources of major support, including Congressional appropriations, foundation and corporate grant programs, and partner contributions. Working with the MB, JV Office directs the preparation of annual and long-range development planning.	Achieved minimum content and 99% of comprehensive content.	100% of comprehensive.	Diversify funding sources through grant writing and partner contributions.

Table 2c. Desired “Technical Expectations” related to Joint Venture biological planning.

<i>Element</i>	Sub Element/Product	Technical Expectations				
		Minimal Content	Comprehensive Content	Are	Need to Be	Priorities
Biological Planning	Development of Strategic Plan	Preliminary strategic plan completed	Board-approved strategic plan revised every 5 years.	Achieved comprehensive content.	Maintain updated "implementation plans" as needed or every 5-years.	Revise Strategic Plan and program-specific Implementation Plans every 5 years.
	Development of Population Objective(s)	Anticipated population objective variables (e.g., abundance, vital rates, etc.) identified. General description of the processes used to develop population objectives. Description of how those objectives will link to NAWMP goal.	Explicit set of population objectives for each taxa at a continental scale or for "functional population units" as justified by assessments of population delineation.	Achieved minimum content.	Revised population objective based on model based assessment of current abundance and carrying capacity.	Development of integrated population-habitat model with estimate of carrying capacity.
	Development of species conservation/management plans.	Information needs necessary for development of management plans are identified. Preliminary conservation plans exist for one or more species covered by the JV.	Prioritized list of information needs for each taxa and specific tasks to be accomplished to facilitate effective management. Conservation plans with specific management actions and goals are complete for all taxa. Plans incorporate considerations for habitat JVs to aid delivery of habitat conservation.	Achieved minimum content.	Development of conservation management plan.	Revised model based population objectives; identification of limiting factors; prioritized list of management recommendations.

Table 2d. Desired “Technical Expectations” related to Joint Venture population monitoring.

<i>Element</i>	Sub Element/Product	Technical Expectations				
		Minimal Content	Comprehensive Content	Are	Need to Be	Priorities
Population and Habitat Monitoring	Development and implementation of population monitoring.	Preliminary plan for development of appropriate survey techniques to monitor distribution, abundance, and trends.	JV provides technical assistance to partner(s) responsible for implementing monitoring program. Data provide a reliable basis for evaluating population trends at appropriate scales.	Achieved comprehensive content. Breeding population survey is operational.	Continue technical support to refine and improve accuracy of estimates.	Incorporate Northeast Breeding Plot data into composite estimate; complete technical development of spatially explicit component.
	Development and implementation of vital rate monitoring.	A preliminary list of which vital rates to monitor for all taxa.	JV provides technical assistance to partner(s) for implementing monitoring program. Data provide a reliable basis for evaluating vital rates over time and space.	Initial stages of prioritizing which vital rates need/can be monitored.	Complete a prioritized list of vital rates and potential monitoring methodologies.	Assess and evaluate current and potential methodologies for monitoring productivity.
	Development and implementation of taxa specific harvest monitoring.	A preliminary list of harvest characteristics to monitor over space and time.	JV provides technical assistance to partner(s) responsible for implementing monitoring program. Data provide a reliable basis for evaluating harvest over time and space.	Achieved minimal content.	Implementation of AHM based on BPOP data	Complete revision of AHM model by incorporating BPOP data; anticipate completion by December 2009.

Table 2e. Desired “Technical Expectations” related to Joint Venture science, research and knowledge acquisition.

<i>Element</i>	Sub Element/Product	Technical Expectations				
		Minimal Content	Comprehensive Content	Are	Need to Be	Priorities
Science, research, and knowledge acquisition	Population Delineation	Preliminary assessment of functional population units	Links among breeding, molting, and wintering areas adequately described for all taxa at range-wide level.	Completed minimum content.	Improved understanding of inter-seasonal linkages.	Assess sub-population structures of BPOP and identify linkages with wintering grounds.
	Population Dynamics	Conceptual model of limiting factors and vital rates critical to each taxa.	Vital rates identified as important are estimated and population models are developed for all taxa.	Completed minimum content.	Operational, adaptive model integrated seasonal survival rates and habitat characteristics.	Complete development of integrated models as recommended by JTG.
	Population Models	A list of potential factors limiting populations conceptual model identified for each taxa.	Sensitivity analysis identifies the most important limiting factors. Documented analytical process and model assumptions.	Developing preliminary list of seasonal limiting factors.	Fully operational integrated, adaptive model.	Complete literature review and list of limiting factors; develop conceptual models.
	Habitat Requirements and Modeling.	Species JVs work with associated habitat JVs to develop a list of potential habitat factors for each taxa.	Seasonal habitat use and key habitat areas are characterized. JV is coordinating with appropriate habitat JVs to develop habitat models and secure high priority habitats.	Developing preliminary list of seasonal limiting factors.	Fully operational integrated, adaptive model.	Complete literature review and list of limiting; develop conceptual models.

Table 2f. Desired “Technical Expectations” related to Joint Venture communications, outreach, and education.

<i>Element</i>	Sub Element/ Product	Technical Expectations				
		Minimal Content	Comprehensive Content	Are	Need to Be	Priorities
Communication, education, and outreach	Priority Audiences	JV has evaluated the efficacy and applicability of education and outreach to achieve its conservation objectives and has identified priority internal and external audiences and key messages.	A JV Communications Plan is guided to target communications geographically and to the highest priority need. JV has multiple means of communications. Each tactic has an associated evaluation plan.	Achieved minimum content and 50% of comprehensive content.	Need to develop evaluation tool and expand communications tools (i.e., site tours)	Maintain a current web page; Survey partners to guide development of communications tools.
	Audience Objectives	JV conducts basic audience objective setting to determine what are the desired levels of awareness, attitudes and changes in behaviors necessary to achieve bird conservation goals and objectives of the JV.	JV correlates audience objectives with bird conservation goals and objectives to determine how much and where increases in audience awareness, changes in attitudes/behaviors are necessary to help reach bird conservation objectives.	Not started	Comprehensive content	Identify levels of awareness, attitudes, and goals of each stakeholder.
	Audience Assessment	JV conducts informal assessment of priority audiences to determine their baseline level of awareness, attitudes, and behaviors affecting bird conservation in the JV.	JV conducts regular, formal assessments of priority audiences to measure change in awareness, attitudes and behaviors over time. The results of which are used to revise communications products to be more effective.	Not started	Comprehensive content	Need to develop survey tool to obtain necessary information.



Figure 1. Distribution of the American black duck (Longcore et al. 2007).

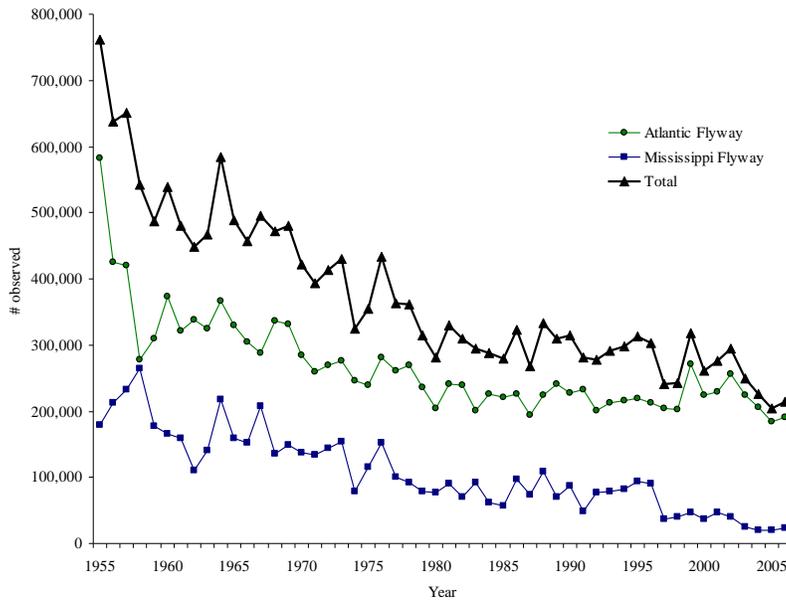


Figure 2. Estimates of American black duck abundance over time based on the Mid-Winter Inventory.

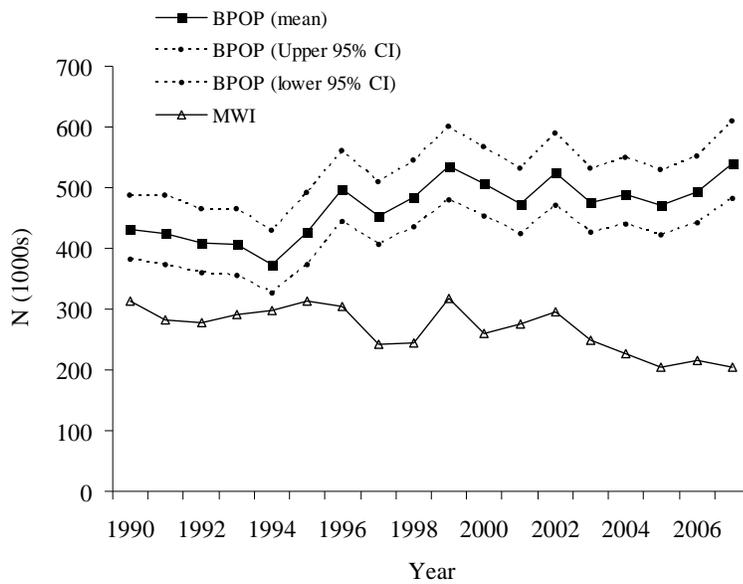


Figure 3. Indices of American black duck abundance based on the Mid-Winter Inventory (MWI) and breeding populatoin (BPOP) surveys between 1990 and 2007.

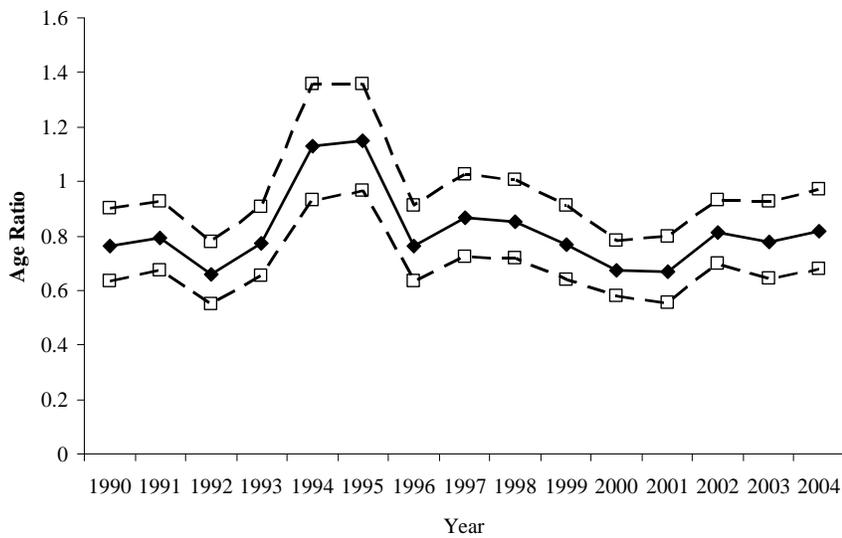


Figure 4. Estimates of black duck adjusted pre-season ratio, 1990-2004 (based on hierarchical model developed by W. Link, 2008).

APPENDIX A: SUMMARY OF THE CONTINENTAL ASSESSMENT OF AND RESPONSES BY THE BLACK DUCK JOINT VENTURE.

- 1) *Your JV needs to complete the design and implementation of a range-wide integrated survey, in order to precisely and accurately track population trends for decision-makers and provide important density information to habitat JVs.*
 - a) Response: The Integrated Eastern Survey is fully operational and provides an 18-year time series of black duck breeding population size. The BDJV continues to support research to improve the accuracy, inference, and usefulness of this survey.
- 2) *There is a need to host a black duck symposium in the near future.*
 - a) Response: The BDJV is currently planning to host a Black Duck Ecology and Management Symposium in 2010 or 2011. The timing of the symposium was selected to coincide with the completion of several on-going black duck projects currently supported by the BDJV. The symposium will be held in conjunction with an appropriate conference to maximize attendance by the black duck management community and waterfowl community in general.
- 3) *Connections between the BDJV and the Mississippi Flyway Council and Technical Section need to be strengthened and improved.*
 - a) The BDJV Management Board is working with the Mississippi Flyway Council to improve linkage and cooperation.
 - b) The BDJV Science Coordinator is actively participating in Mississippi Flyway Technical Section meetings.
 - c) The Mississippi Flyway Technical Section has appointed a representative (Rocky Pritchett) to the BDJV Technical Committee. Rocky is an active member to the Technical Committee.
- 4) *The BDJV needs to provide results and information concerning black duck harvest rates to aid in the development of a black duck harvest strategy.*
 - a) Several BDJV members, including the Science Coordinator, are active members of the Black Duck Adaptive Harvest Management Working Group. These representatives ensure information needs are being addressed by the joint venture and appropriate results

are relied to the harvest managers. However, the joint venture is not responsible for making harvest policy decisions.

5) *Roles and responsibilities between the BDJV and associated habitat joint ventures need to be clarified and should be complementary. The habitat joint ventures should take advantage of the current BDJV research program to conduct research on limiting factors.*

a) Communication and cooperation between the BDJV and habitat joint ventures has improved greatly over the past few years resulting in more cooperative efforts and synergy. For example, the BDJV and UMR&GLR identified a common need to understand black duck migration and habitat use and are currently funding a project to address the issue. The BDJV is working with the Eastern Habitat Joint Venture to develop integrated habitat/population models for black ducks in the Maritime Provinces. When completed these models will aid the EHJV in strategic habitat conservation throughout the region. Finally, the BDJV and ACJV are partnering to support research on black duck winter ecology and carrying capacity. Results from this study will aid the ACJV in determining their winter population goals, identify limiting factors, and inform strategic habitat conservation efforts.

6) *Key planning documents need to be updated.*

a) The BDJV Management Board approved the “Black Duck Joint Venture Strategic Plan, 2008–2013 at their most recent meeting held in March 2008.