

**Final Report to the Black Duck Joint Venture Technical Committee
October 8, 2008**

Project Title:

Aerial Survey Waterfowl Identification Training Aid

Principal Investigators:

David Fronczak, US Fish and Wildlife Service, Division of Migratory Bird Management
Robert Raftovich, US Fish and Wildlife Service, Division of Migratory Bird Management

Duration:

Dates of Operation: 28-30 April and 31 May, 2006
Dates of Video and DVD Processing: December 2007 through July 2008

Partners:

Helicopter Service and Video Camera:

Doug Holtby, Helicopter Pilot, Ontario Ministry of Natural Resources
Larry D'Andrea, Air Maintenance Engineer, Ontario Ministry of Natural Resources

Video and DVD Processing:

JJ Higgins, Associate Professor, Art Department, University of Missouri
Derek Andes, Art Department, University of Missouri

Issue Addressed and Objective: There are few waterfowl-identification training aids to use in preparing new observers or enhancing skills of returning observers for aerial waterfowl surveys. Accuracy in identifying waterfowl is an important component in obtaining accurate population estimates for waterfowl, which are used in establishing waterfowl hunting regulations. We addressed the need for a better waterfowl-identification training aid by obtaining video footage and digital still images from a helicopter which simulated the fixed-wing crew's perspective during the aerial surveys. These images were incorporated into a training DVD that focuses on detection and waterfowl identification exercises.

Project Area: The Muskoka Region of southeastern Ontario's Boreal Shield, near Bracebridge, Ontario and eastern Quebec's Taiga Shield, near Wabush, Newfoundland (Appendix A).

Project Description and Methods:

Digital Still Photograph and Video Collection:

Equipment used:

Helicopter: Bell 206L-1 Long Ranger

Video camera: Sony high-definition video (HDV) HVR-Z1U digital video recorder and a RAM™ segmented mounting system

Still camera: Kodak DSC Professional single-lens reflex digital camera (13.5 megapixel resolution) and Canon 70-200 mm L series image stabilized zoom lens

Initial discussions with Doug Holtby, Ontario Ministry of Natural Resource (OMNR), Aviation Services, established that the ONMR would provide a high-definition digital video recorder and that Doug would set the dates of the flight based on the phenology of the area of flight prior to the 2006 Waterfowl Breeding Population Survey (WBPS). Flight areas were agreed to be conducted within the Muskoka region of Ontario (areas near the town of Bracebridge and the Georgian Bay, approximately 23 miles south-southwest of Bracebridge) and a Ducks Unlimited project area near Bancroft, Ontario, approximately 53 miles east of Bracebridge (Appendix 1).

On 25 April, Dave Fronczak and Bob Raftovich traveled to the Muskoka Airbase, Bracebridge, Ontario and met with Doug to discuss flight logistics. For the next two days, Doug fabricated a mount for the video camera that would attach to the foot peg mount for either side of the helicopter. During this time, supplies were purchased and a compatible software, to display video output onto a laptop, was located. Fabrication of the camera mount (Figure 1) was finished on 27 April. However, approval from the OMNR Quality Assurance Section could not be obtained within the project's time frame. The solution was to build a camera mount from a RAM™ segmented mounting system connected to a section of 3/4" wood (Figure 1) which would fit between the camera operator's legs. This configuration allowed the camera to be semi-hand-held while providing full control of the camera's functions.

An initial test flight was conducted near the Muskoka Airbase on 28 April. The left-hand doors of the helicopter were removed to increase available field of view for video taping and photographing. Dave sat harnessed in the front left seat with the video camera connected to the modified RAM™ mount. Bob sat harnessed in the rear seat with the hand-held digital still camera. A lake near the airbase was used to determine workable settings and procedures for both the video and digital still cameras in relation to airspeed and altitude of the helicopter operations.

During the operational portion of the project, lakes were selected from higher altitudes in order to spot waterfowl, establish suitable scenarios for filming, and decrease bird disturbance. Runs were made on long, narrow, continuous lakes at a variety of airspeeds and low level altitudes in order to mimic standard aerial survey conditions for video recording. Flight paths generally followed wetlands or open water rather than straight-lined "transects", in order to maximize the chances of encountering waterfowl.

To obtain still images of species for identification purposes, birds were again located from a relatively high altitude and then captured during a rapid descent upon their location. In addition, many of the images were acquired by a "chase" method after being flushed during our approach and at opportunistic times during filming runs.



Figure 1. Foot-peg and operator-held video camera mounts built by OMNR-Muskoka staff.

From 28 to 30 April, 7.9 hours of helicopter time were used for capturing both video and digital still images. Total helicopter time used for filming included 1 hour near the Muskoka airbase, 3.8 hours between Bracebridge and Georgian Bay, Ontario, and another 3 hours used to survey a Ducks Unlimited project east of Bancroft, Ontario. During the WBPS, an additional 1.5 hours of helicopter time were used east of Wabush, Newfoundland.

Post Processing:

Bob categorized and processed the digital still photographs and produced a waterfowl identification aide in Microsoft PowerPoint. Photos of species were classified into categories of dabblers, divers, and sea ducks with key features added for identification purposes. The presentation was reviewed by current and retired U.S. Fish and Wildlife (USFWS), Division of Migratory Bird Management staff who had varying degrees of experience in aerial waterfowl observation. Reviewer comments resulted in revisions to the presentation before final production.

Dave started the preliminary review and classification of video footage. After completing the review, a framework for content to be included within the training DVD was created based on usable material recorded during field work (Appendix B). The content of the training DVD was developed for 3 categories: 1) detection exercises, 2) waterfowl identification, and 3) review.

The detection exercise included 3 lessons. The first lesson depicted long scenes of habitat, incorporated animation (focus circles and fading), and written text which together guides a new observer through an introduction to detecting waterfowl from the air (focusing on certain areas, reviewing survey distances, etc...). The second lesson challenged viewers through 6 different series to spot a number of animated circles, representing waterfowl, within scenes of habitat. The final exercise showed a montage of live birds, within specific habitat, performing actions as the helicopter passed. The waterfowl identification portion displayed the Microsoft PowerPoint presentation identification aide and included a video montage for individual species. The review portion showed a timed series of digital stills that were not part of the identification lessons and challenged the viewer to identify the waterfowl.

JJ Higgins, Associate Professor, at the University of Missouri's Art Department was contacted about the feasibility of placing animation within the video footage. After reviewing the DVD framework proposal, JJ agreed to work on the project. Derek Andes, a student at the University of Missouri, provided assistance with the much of the video work on the project.

High-definition video tape footage was transferred to a computer using Apple iMovie HD. Footage was then categorized into species-specific segments for use in the identification montages, habitat segments for use in detection exercise animations, and segments of various birds for use in the survey montage as indicated by the DVD framework. Species-specific and montage segments were edited in Final Cut, adding Fade In/Out and transitional effects between clips. Segments were then exported using the Apple Intermediate Codec for use in the DVD Studio Pro project. Prior to exporting segments, the original sound was removed and replaced with an alternate recording sound of an airplane. In addition, within the species-specific

segments, viewing speeds for certain species were altered between 70% to 50% of the original speed.

In the “Introduction to Detection” exercise, Adobe After Effects CS3 was used to create the title segment. An animated layer mask, using keyframes, was used to create a “spotlight” effect which highlighted specific areas. The same highlight effect was also incorporated into the American green-winged teal identification segments. Text was then added and segments were exported using the Apple Intermediate Codec for use in DVD Studio Pro.

Apple Motion’s movement tracking capabilities were used to place and track points within the detection animation exercises. This technique would also be used to place animated “dots” within the footage representing birds sitting on the water. Once dots were in place within the frame, keyframe animation paths were used to simulate the birds’ movements (such as swimming or flying). Additional animation was also added to simulate a bird flying. This effect was produced by oscillating the dot’s scale as it moved across the screen. Additional adjustments to the scale were used to represent different size species and distance from the viewer. Finally, color was added to the dots as an indicator for a bird diving (turns blue) or a bird which was outside of range (turns red).

Once animation was integrated into the detection lessons, scenes were exported and edited in Final Cut Pro. Fade-in and fade-out transitions and additional text (to indicate the number of birds in the particular segment) were added before being exported in their final version using the Apple Intermediate Codec. Apple Motion was also used for some titles, including the DVD introduction and acknowledgements.

JJ used Apple DVD Studio Pro to finalize the DVD. Final video segments, provided by Derek, were added and assembled into order according to the framework. Apple’s DVD software did not support Microsoft PowerPoint, so the original waterfowl identification Microsoft PowerPoint presentation was dismantled and reassembled using Studio Pro. Titles and hyperlinks were added in order to complete the DVD. Finalized segments, the final DVD Studio Pro file, and a master copy of the presentation were all burned onto DVD’s and duplicated. Project partners were sent DVD’s for review and asked to return any comments or suggestions to improve methodologies for future projects.

Results and Recommendations:

Digital Still Photographs:

Nearly 500 still photographs were taken, with approximately 370 usable for training purposes. Useable photographs were acquired for the following species: mallards, black ducks, Canada geese, ringed-necked ducks, blue-winged and green-winged teal, common mergansers, bufflehead, common goldeneye, swans (tundra and mute), great blue herons, double-crested cormorants, and gulls. In most cases, there are several photographs of the same bird or birds taken in rapid succession as the birds were encountered. Generally, this method provided photographs from a variety of viewpoints, which will allow users of the DVD to gain experience

in identifying waterfowl from different vantage points.

The photographs are suitable for training purposes, but do not really represent “artistic” work. Initially, it was difficult to keep the target bird or birds within the autofocus area of the still camera lens, and the lens often “hunted” for focus. This resulted in many out-of-focus images. This problem was overcome by using a fairly high light sensitivity (ISO), which allowed a large aperture and deep depth of field, turning off the lens’ autofocus function, and taping the focus ring at just under infinity. However, as workable settings were adjusted, photos improved and were able to show features important for correct identification. This is somewhat advantageous for aerial observers, especially in fixed-wing aircraft, because, seldom does an observer get that “perfect” view of birds.

Video Recordings:

Approximately 2.75 hours of video were captured. It was determined that the best approach was to start with a biased effort of spotting waterfowl at higher altitudes among elongated wetlands instead of randomly encountering birds following designated transects. After locating birds, footage was captured from approximately 120 feet above the ground at between 35-40 miles per hour. Slower speeds allowed clearer definition of birds and habitat for searching by the viewer. However, a trade off showed that the slower speeds and noise from the helicopter resulted in many birds flushing prematurely. Captured footage included flight paths that followed continuous bodies of water, short clips of individual species, and extended footage of habitat that simulated aerial survey conditions. Species included were mallards, black ducks, Canada geese, green-winged teal, northern pintail, wood duck, ringed-neck duck, scaup, hooded merganser, common merganser, scoter, and bufflehead.

Future Projects:

The review process of the DVD produced valuable comments for improvement of future training materials. For example, many of the species commonly seen in the prairie/prairie parkland and more northerly regions were not encountered. If the results of this work are deemed worthwhile, further work could be done in areas where these species are more commonly observed. In addition to the detection portion of the DVD framework, exercises introducing and practicing pond counting for prairie and prairie parkland regions should be incorporated.

Being a pilot project, sufficient funding for post processing video and final DVD production were not properly projected during the initial proposal stage. Originally, the USFWS, National Conservation Training Center’s (NCTC) Production Division was budgeted to do the post production. However, in order to stay within budget and complete the project, an alternate production source was solicited. Finally, Brett Billings, NCTC, was asked to review the project’s methodology, post processing, and final product. Overall, his comments were positive. However, he suggested that for future projects adequate funding be acquired in order to contract a professional filming and production team.

Acknowledgements

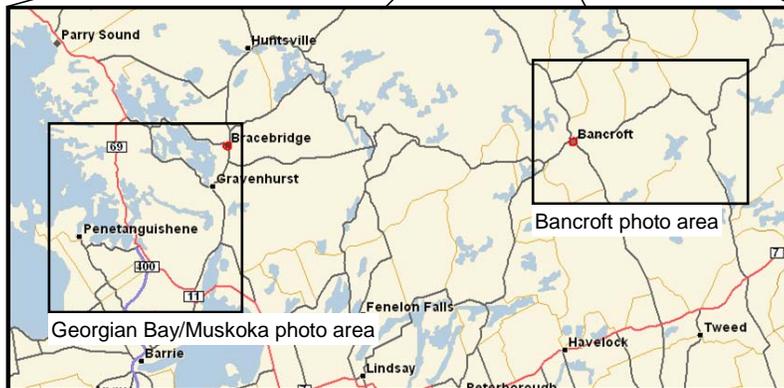
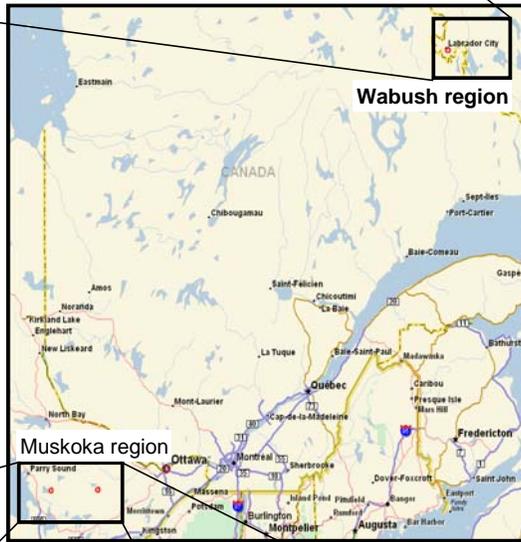
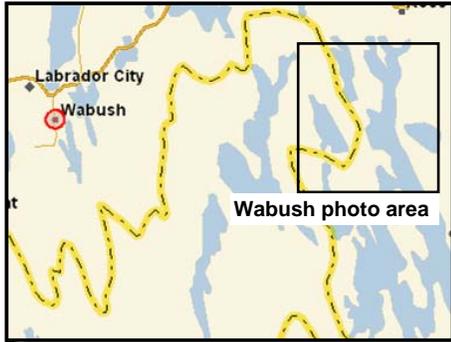
We thank the Black Duck Joint Venture for their financial support to get this project off the ground. We also extend our thanks to Doug for his fine piloting and suggestions during the flights. Much appreciation is given to Larry D'Andrea and other staff at the Ontario Ministry of Natural Resources Muskoka Airbase who constructed the final video camera mount and provided support during our time on the project. Our thanks go to Ken Gamble, Jerry Serie, Paul Padding, and Jim Kelley for allowing us to do this work as part of our normal duties with the Mississippi and Atlantic Flyway offices. Thank you to JJ Higgins and Derek Andes of the University of Missouri for their dedication towards the post productions. Finally, special thanks to Brett Billings, NCTC and to the Division of Migratory Bird Management staff who gave comments and suggestions throughout the project.

Table 1. Budgeted and actual expenditures for the Black Duck Joint Venture funded Aerial Waterfowl Identification project, as of 29 September, 2008.

Item	Budgeted		Actual	
	Quantity	Extension	Quantity	Extension
Video and digital image capture:				
Helicopter time, billed by OMNR	12 hrs	8,400.00	9 hrs	7,230.77
DMBM crew travel				
D. Fronczak				
Airfare, Baltimore, MD to Toronto, ON		500.00		221.05
Lodging	7 days	924.00	6 days	457.98
Meals & incidental expenses	7 days	686.00	1 day	78.75
			6 days	630.00
Hazardous duty	56 hrs	330.00	24 hrs	131.70
R. Raftovich				
Airfare, Baltimore, MD to Toronto, ON		500.00		170.22
Lodging	7 days	924.00	7 days	534.31
Meals & incidental expenses	7 days	686.00	1 day	78.75
			6 days	630.00
Hazardous duty	56 hrs	330.00	24 hrs	146.16
Rental car, 1 week + gas	1	200.00		416.31
Video Equipment				
Mini DV tape cassettes (120 minute)	5	175.00	6	179.98
Miscellaneous equipment (replacement cables, adapters, etc.)		50.00		35.12
Sub total		13,705.00		10,942.89
Video Editing				
Travel expense for crew (D. Fronczak)				
Travel to Columbia, MO from Minn., MN	7 days	1,000.00	8 days	734.78
Meals & incidental expenses	7 days		8 days	351.00
Subtotal		1,000.00		1085.75
Quote from University of Missouri Art Department				
Post Processing Service		4,072.00		4,072.00
Non-budgeted Cost for Post Processing				2,728.00
Subtotal		4,072.00		6,800.00
Total		18,777.00		18,828.64
Balance				-51.64

APPENDIX A

Photographing areas near Muskoka and Bancroft, Ontario and Wabush, Newfoundland



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APPENDIX B

Conceptual Flowchart of DVD Layout

