Migratory Game Birds
By Larry Hindman, Bill Harvey, and Donald Webster

INTRODUCTION

Maryland's migratory game birds include 25 waterfowl species, mourning doves, woodcock, rails, and snipe. The Maryland Department of Natural Resources (DNR) conducts two general types of migratory game bird studies: surveys of abundance and distribution and surveys of harvest and mortality. The DNR integrates this biological survey information, research findings, and social considerations into annual hunting regulation proposals.

SETTING WATERFOWL AND OTHER MIGRATORY GAME BIRD HUNTING REGULATIONS

Establishment and approval of hunting seasons for waterfowl and other migratory birds is the responsibility of the U.S. Fish and Wildlife Service (USFWS). Each year in late July, the population status of waterfowl is reviewed by the USFWS, Canadian Wildlife Service (CWS), and the Atlantic Flyway Council (AFC), a group of 23 states and provinces that act in an advisory capacity to the USFWS. Atlantic Flyway Council recommendations, along with written comments by individual hunters, are considered by the USFWS before Federal waterfowl hunting season frameworks are announced in early August.

The DNR reviews waterfowl population status and develops waterfowl hunting season proposals based upon Federal frameworks. States may be more restrictive than the Federal frameworks, but no more liberal.

After the DNR has evaluated all of the comments received during the public comment period, the DNR formulates the final hunting season dates and bag limits, and present these to the Migratory Game Bird Advisory Committee and Wildlife Advisory Commission for consideration and approval. The DNR Secretary makes final decision on seasons and bag limits.

Hunting Season Priorities

Working with waterfowl hunters, the DNR has identified the following priorities for setting waterfowl hunting regulations in Maryland:

- Meet the biological needs of the waterfowl resource;
- Simplify regulations where possible;
- Maximize waterfowl hunting opportunity, especially for junior hunters, by ensuring season dates encompass maximum bird numbers and abundant species and ensuring dates maximize Saturdays and holidays.

WATERFOWL HARVEST

Duck populations on the mid-continent prairie and parkland region nearly doubled between the early 1990s and recent years. Increases were largely due to higher levels of precipitation that improved breeding habitat conditions. In response, the USFWS expanded hunting opportunity by increasing the duck season length and daily limit.

The 2005-06 Maryland duck harvest was estimated at about 152,500 (down from 195,500 in 2004-05) and consisted of primarily mallards (50,700), scoters (15,200), green-winged teal (13,400), black ducks (11,400), wood ducks (10,600), lesser scaup (9,700), and wood ducks (12,000). Most of Maryland's mallard, black duck, and wood duck harvest is locally produced. Other species important to Maryland hunters, such as green-winged teal, canvasbacks, lesser scaup, scoters, and bufflehead are produced primarily in Canada. Northern Ontario, Quebec, and the Maritime regions of Canada where wetland habitats are less productive, but more stable, than the highly productive mid-continent Prairie Pothole and Parkland Regions.

The 2005-06 Maryland Canada goose harvest was 170,000 birds and includes primarily Resident Population (RP) Canada geese and migrant Atlantic Population (AP) Canada geese. During the 2005 September season hunters bagged an estimated 10,400 Canada geese, down from the 18,600 taken the previous year. Greater snow geese (5,800), Atlantic brant (1,700), and to a minor extent lesser snow geese and migrant Canada geese from the Southern James Bay Population (SJBP) and the North Atlantic Population (NAP) made up a minor component of the State's 2005-06 harvest. By beginning the RP Canada goose season in early September, managers have been able to shift harvest to RP geese and to avoid harvest of migrant Canada populations. A regular, 70-day RP season with liberal bag limits has been in place since 2002 in the central and western counties of the State to place additional harvest pressure on overabundant RP Canada geese.

Additonal information on waterfowl harvest can be found at
http://www.dnr.state.md.us/wildlife/2004-2005_wf_harvest.asp

2005 MARYLAND DUCK HUNTER SURVEY

In Fall 2005, the National Flyway Council and the Wildlife Management Institute conducted a mail survey of duck hunters in 49 U.S. states. A random sample of 29,862 duck hunters was contacted using names drawn from the Harvest Information Program (HIP) database. The sample frame consisted of legally-licensed, resident migratory bird hunters who stated that they harvested at least one duck during the 2003 season.

The Maryland DNR opted to sample at a higher rate and sampled 1,301 duck hunters to collect baseline, state-level information. Of the 1301 Maryland duck hunter contacted, 420 responded (35% response); but 13 indicated they hunted most in another state over the past 5 years. However, an additional 5 hunters sampled in other states indicated they hunted most in Maryland over the past 5 years, yielding a total Maryland sample of 388 (sampling tolerances of +-3 to 6 percentage points on the state estimates).

The objective of the survey was to provide clues and insights about duck hunters': (1) Opinions of and satisfactions with recent seasons and bags; (2) Perceptions of duck populations, possible influences on duck numbers, and duck management priorities; (3) Preferences for selected regulatory options; and (4) Past involvement and current interest in duck hunting, and hunter background.

The National Duck Hunter Survey was conceived by the National Flyway Council and the Wildlife Management Institute and funded through the four flyway councils. The National Flyway Council hired D.J. Case & Associates, Inc. to coordinate development, implementation and analysis of the survey.

Here are some of the key findings revealed from the 2005 Maryland Duck Hunter Survey:

* About four-fifths (82%) of Maryland duck hunters said duck hunting was "one of their most important" (68%) or "most important" (14%) recreational activities.

* Over two-thirds (70%) spent over $250 each year on duck hunting; 29% spent over $1,000 each year.

* Forty-seven percent of duck hunters spent 10 days or less hunting ducks each year over the last 5 years; 32% spent 11 to 20 days; 13% spent 21 to 30 days; and 8% spent more than 30 days.

* A plurality of Maryland duck hunters (41%) said they were hunting the "same number" of days now compared to 5 years ago; 28% said they were hunting "more days," and 27% said "fewer days." Four percent were "new" duck hunters, having just joined duck hunter ranks over the last 5 years.

* Forty-nine percent said that the duck season length (number of days in the season) in Maryland over the last 5 years was "about right," though 45% said the season was "too short," and 1%, "too long."

* About three-quarters (76%) said that the total daily duck bag limit in Maryland over the last 5 years was "about right." Thirteen percent said it was "too low," and 5%, "too high."

* Maryland duck hunters said that, over the last 5 years, the overall quality of duck hunting had gotten "a little worse" (30%) or "much worse" (10%). Thirty-six percent indicated that overall quality had "stayed the same," while 15% said "a little better," and 6%, "much better."

* Over the last 5 years, a majority of Maryland duck hunters achieved actual levels of duck harvest that met their perceptions of what constituted satisfactory season harvest - in other words, most were satisfied with their duck harvest.

* When asked how often they used a motorized spinning wing decoys, 10% of Maryland duck hunters said they used them all the time; 49% used them sometimes, and 42% said they never used spinning wing decoys. About 63% supported the legal use of motorized spinning wing decoys; 13% said they should be banned for duck hunting.

To view the complete 2005 Maryland Duck Hunter Survey Report go to http://www.ducksurvey.com/report/ducksurvey_maryland.pdf

2006 WATRFOWL POPULATION STATUS

Duck Breeding Habitat Conditions

Each May and June the Canadian Wildlife Service and the USFWS survey the principal duck breeding habitats in North America. The Waterfowl Breeding Ground Population and Habitat Survey, the largest and most comprehensive survey of its kind in the world, samples 1.3 million square miles.

Habitat conditions in eastern Canada are generally very good. Conditions are more varied in western Canada. The survey indicated an increase in the quality of waterfowl breeding habitat in the United States and Canada from 2005. Improvements in Canadian and U.S. prairie habitats were primarily due to average to above-average precipitation, warm spring temperatures and the good summer conditions of 2005. The higher number of ponds counted in Prairie Canada this year relative to last are a strong indicator of the improved habitat conditions. One of the most important elements in duck-breeding success is the amount of water present on the prairie breeding grounds. When the survey was conducted in May, total pond counts for the United States and Canada combined showed 6.1 million ponds, a 13 percent increase from last year's estimate, and 26 percent higher than the long-term (1955-2005) average (LTA). Overall, the breeding season should be a little more productive than last year.

Duck Breeding Pair Survey Results

Overall, duck breeding populations increased 14 percent since last year with an estimated 36.2 million breeding ducks on the prairies.

2006 Breeding Ducks By Species (in millions)

Species	2005	2006	% Change from 2005	% Change from Long Term Avg.
Mallard	6.755	7.277	+8	-3
Gadwall	2.179	2.825	+30	+67
American wigeon	2.225	2.171	-2	-17
Green-winged teal	2.157	2.587	+20	+39
Blue-winged teal	4.586	5.860	+28	+30
Northern shoveler	3.591	3.680	+2	+69
Northern pintail	2.561	3.386	+32	-18
Redhead	0.592	0.916	+55	+47
Canvasback	0.521	0.691	+33	+23
Scaup	3.387	3.247	-4	-37

Mallard populations showed a smaller than expected 8 percent increase in numbers, with an estimated 7.3 million mallards on the prairies this spring, compared to last year's estimate of 6.8 million birds. They are 3 percent below the LTA (Table 1).

Perhaps the best news coming out of the survey this year is that pintail numbers are up 32 percent. However, pintails are still 18 percent below the long-term average.

Most other species increased this year as well. Blue-winged teal jumped 28 percent from last year, with an estimated 5.9 million birds (30 percent above their LTA). Green-winged teal also increased 20 percent with 2.6 million birds (39 percent above the LTA). There were an estimated 2.8 million breeding gadwall on the prairies, which boosts their population by 30 percent since last year, bringing it to 67 percent above the LTA. Redheads also increased 55 percent since 2005 with 916,000 birds, 47 percent above the LTA. Canvasbacks increased 33 percent since last year, with an estimated 691,000 breeding birds on the prairies, a healthy 23 percent above their LTA. Northern shovelers also multiplied. With 3.7 million shovelers on the prairies, their numbers are 69 percent above the LTA.

Wigeon numbers were 17 percent below their LTA with 2.2 million birds, and most disappointing were the scaup numbers. Scaup went down by 4 percent since last year, continuing a long-term pattern that has persisted for the last twenty years. They are now 37 percent below their LTA. For additional information on population status see: http://www.fws.gov/migratorybirds/reports/status06/final_status_06.pdf

Duck hunting regulations in the Atlantic Flyway are driven by the abundance of the eastern mallard population. With 1.05 million Eastern mallards in 2006, a liberal regulation for duck hunting seasons was prescribed for the Atlantic Flyway this year. For more information on the setting of duck hunting regulations see: (http://www.fws.gov/migratorybirds/mgmt/AHM/AHM-intro.htm).

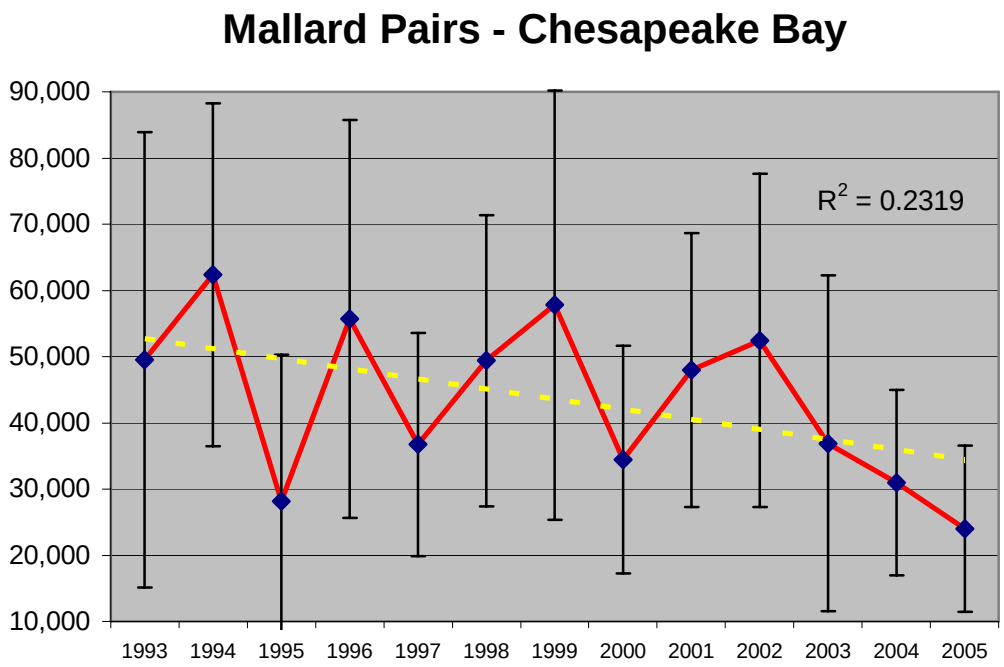
Maryland Waterfowl Populations

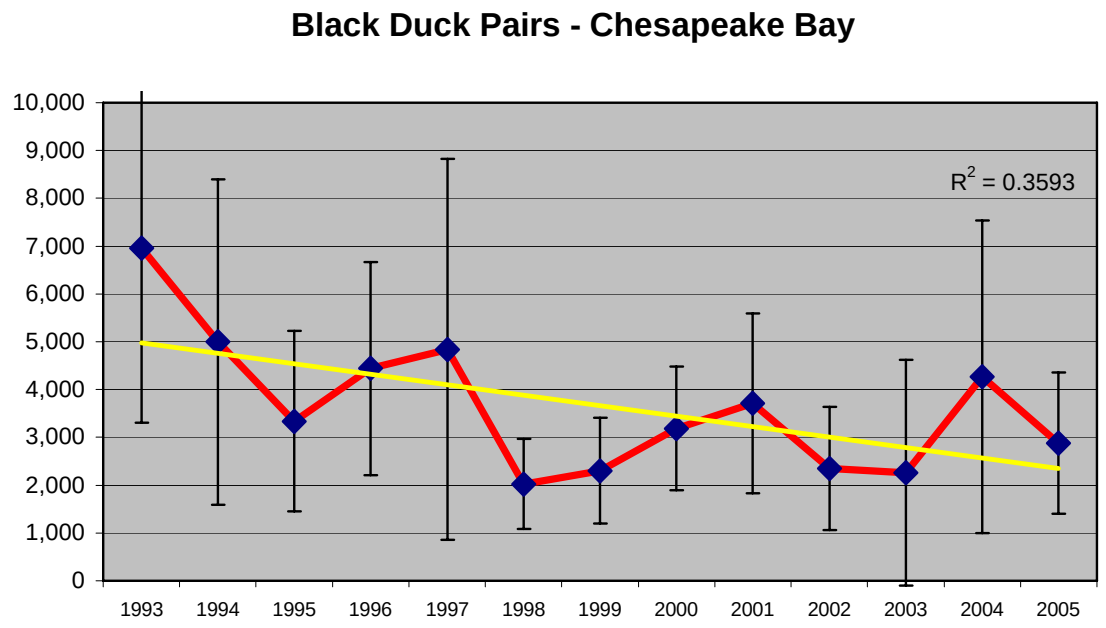
Trends of Maryland duck populations are monitored through the annual Midwinter Waterfowl Survey and spring breeding population and habitat surveys conducted in major breeding areas in North America. Since 1989, spring surveys of breeding ducks

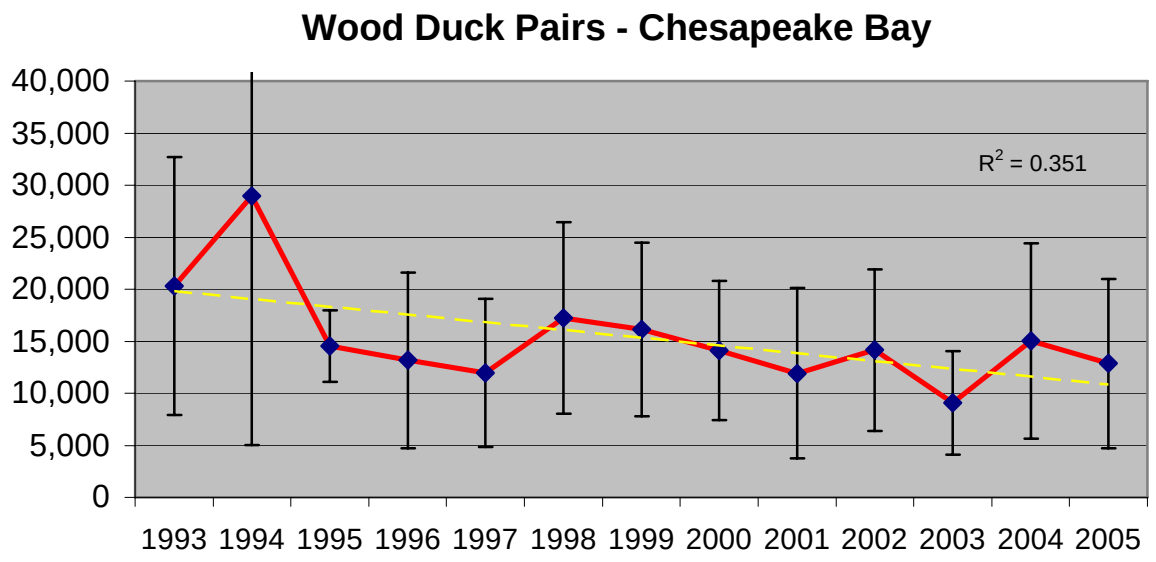
have been conducted in Atlantic Flyway states from Virginia northward to Vermont. Additional surveys are conducted in Maine, Ontario, Quebec, and the Canadian Maritime provinces. These spring surveys provide a sound database for managing black ducks, eastern mallards, and other ducks originating from eastern production areas. These population data are used by the USFWS and the AFC in the development of duck hunting regulations for the Atlantic Flyway. Population data from the mid-continent region of the U.S. and Canada are used for developing species-specific (e.g., canvasback, pintail, blue-winged teal) hunting season regulations.

Each year Maryland DNR staff survey 100 square-kilometer plots to determine the distribution and density of breeding waterfowl throughout the State. Breeding population indices in 2006 for principle duck breeding populations in Maryland were: mallards 50,700, wood ducks 20,700, and black ducks 4,200. Small numbers of gadwall, blue-winged teal, and hooded mergansers also nest in the state. The 2006 estimate for mute swans was 1,900.

Over the past 40 years there have been general increases in Mallards, Wood Ducks, and Resident Canada geese in Chesapeake Bay (see figures below). However, recent trends show that mallards and wood ducks have either stabilized or have decreased in the last 13 years. Resident Canada geese in Chesapeake Bay are still increasing but the population growth has slowed in response to increase harvest. There has been a gradual decline in breeding Black ducks numbers over the long term.



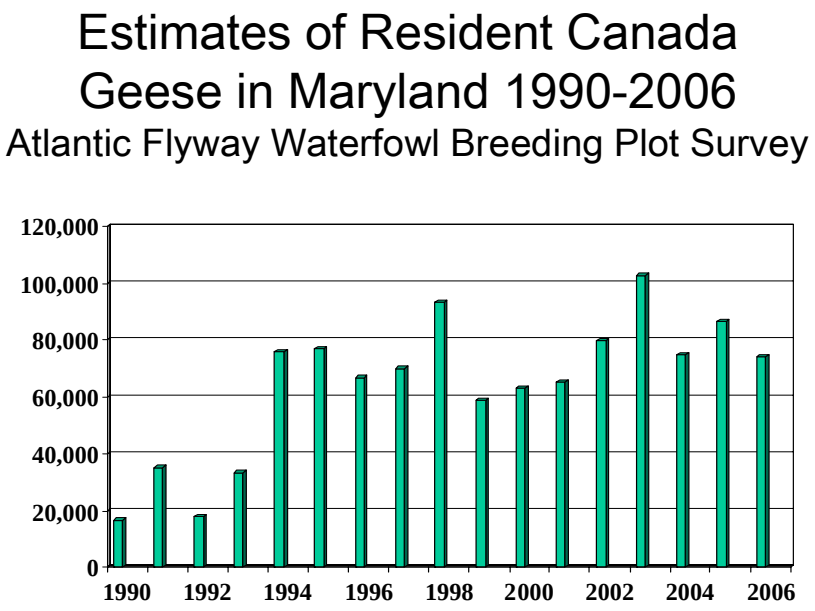




Resident Canada geese breeding in Maryland are also monitored by the spring breeding waterfowl plot survey. Maryland's local population of resident Canada geese has increased from about 16,800 in 1990 to about 73,900 in 2006. The DNR has established a population objective of 30,000 RP Canada geese. Thus, the current population estimate is more than three times higher than the population objective. Since 1994, the Maryland DNR has implemented special hunting seasons to provide additional goose hunting opportunities for RP geese. However, the level of harvest has been insufficient to reduce the population and reduce nuisance and depredation complaints.

The number of RP Canada geese in portions of the Atlantic Flyway have stabilized at about 1 million birds due to liberalization of RP goose hunting regulations. However, the RP remains well above the target population objective of 650K (AF Resident Canada

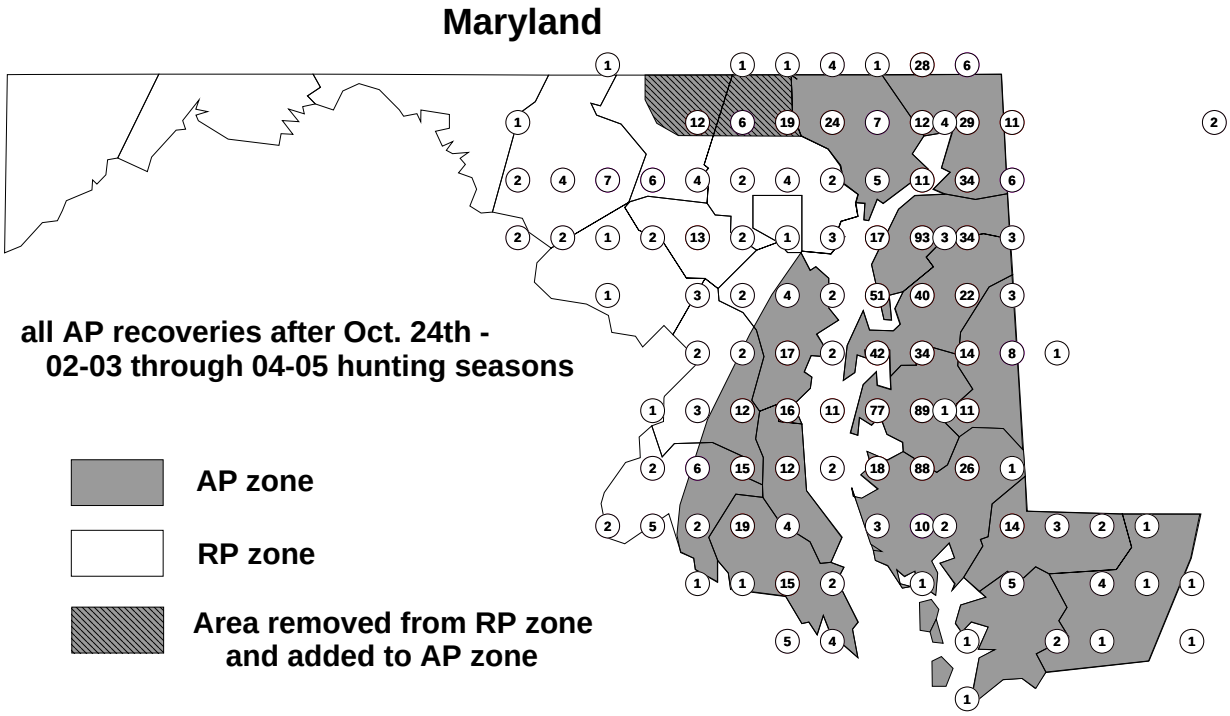
Goose Management Plan).



In 2002, the Maryland DNR initiated a regular RP Canada goose season with liberal seasons length (70 days) and limits (5/day). These changes provided greater opportunities to harvest overabundant RP geese to help resolve agricultural and ecological damage, nuisance problems, and human health and safety conflicts created by too many geese.

In July 2005, the AFC examined band recovery data from the past three hunting seasons (2002-204) as part of a scheduled evaluation of the regular RP seasons. The evaluation was done to determine if changes hunt area boundaries were necessary to protect migrant geese and if other aspects of the RP regulations met the season criteria agreed to between the AFC and the USFWS.

The band recovery analysis identified a “hot spot” of AP goose band recoveries in the northern portions of Baltimore and Carroll Counties. This “hot spot” was subsequently removed from the regular RP zone. This area was added to the AP zone that lies to the east and the AP zone to the north in Pennsylvania. This change is zone boundaries should prevent AP geese from being exposed to the liberal RP regulations. Further, this will ensure that the modified RP zone will meet the AFC criteria and enable the DNR to continue the regular RP season.



Additional strategies are being considered to increase the harvest of RP Canada geese, ease the burden of obtaining federal permits, and address ecological, agricultural, and health and safety concerns. One of the regulatory changes the DNR may propose in the future includes opening the RP goose season on August 1. New hunting methods are also being considered for the early RP season (August and September only). They include: (1) no daily bag or possessions limits, (2) allow the use of unplugged shotguns, (3) extending shooting hours to one-half hour after sunset, and (4) allow the use of electronic calls. Such regulation changes can be expected to increase the harvest of RP geese.

MIDWINTER WATERFOWL SURVEY

The Midwinter Waterfowl Survey was first conducted in 1935 and is the oldest operational waterfowl survey still being conducted annually. The survey served as the principal source of information for regulations-development each year until 1955, when operational breeding ground surveys were initiated in the major waterfowl breeding areas of North America. The mid-winter survey is conducted nationwide in early January when waterfowl are concentrated on wintering areas. The survey provides information on long-term trends in waterfowl populations. It is the only source of population estimates for important species such as Atlantic brant and tundra swans. The survey also provides critical information used in the management of black ducks. The survey also provides supplementary information on other waterfowl species for which annual breeding population and harvest information is available.

2006 Survey Results

The Maryland Department of Natural Resources (DNR) 2006 Midwinter Waterfowl Survey counted 577,100 waterfowl this past winter, a decrease of about 32 percent compared to 889,900 tallied in 2005. Unseasonably mild weather caused waterfowl to be widely dispersed as inland ponds, reservoirs, shallow impoundments and the upper reaches of creeks and marshes remained ice-free. Thus, fewer birds were concentrated along the shorelines of the larger rivers and bays where aerial survey teams typically focus their effort.

Survey teams representing the U.S. Fish and Wildlife Service and DNR's Natural Resources Police Aviation Section and Wildlife and Heritage Service conducted this aerial survey Jan. 4-13. Airspace restrictions, especially along the Potomac and Patuxent Rivers and around military installations on the upper western shore, limited aerial coverage of the 2006 survey.

Total dabbling ducks in the 2006 survey were estimated at 50,300, a decrease from 82,800 in 2005. Mallards this year decreased to 32,500, down from the 52,800 counted in 2005. The largest concentrations of mallards were observed in the lower Chester River, downriver of Chestertown. Black ducks also showed a substantial decrease: 13,300 in 2006 versus 23,600 in 2005. The survey also showed lower numbers for American widgeon (300), and green-winged teal (400).

Divers in Chesapeake Bay were less abundant this winter. Total diving ducks in the 2006 survey were 140,200 compared to 300,600 last winter. The 2006 survey included 33,800 canvasback versus 39,400 last year and 79,400 scaup versus 189,800 in 2005. Large numbers of scaup were observed on the lower Chester River, Langford Creek, and the mouth of the Northeast River on the Eastern Shore. Bufflehead numbers were also lower: 11,800 compared to 22,000 in 2005. The total number of all ducks in the 2006 survey was 208,400, 52% lower than last year's count of 433,200.

Canada geese this year numbered 305,400, 20 percent lower than the 383,400 geese observed in 2005. Mild weather contributed to Canada geese and other waterfowl being located inland from the Bay on freshwater ponds, unlike survey conditions in 2005 when ponds were frozen and geese were concentrated along rivers and Chesapeake Bay. Inland areas in Cecil, Kent, and Queen Anne's Counties that contain substantial numbers of wintering geese are no longer surveyed. Because midwinter estimates reflect a mix of resident and migrant Canada goose stocks, these survey estimates are no longer used to guide hunting regulations. Regulations change in accord with the population status of Atlantic and Resident Populations of Canada geese, which are tracked using breeding population and productivity surveys conducted each spring.

Snow geese in the 2006 survey numbered 49,200, similar to the 2005 count of 54,900. A more reliable estimate of the greater snow goose population is made in May using aerial photography, when the entire population gathers on the St. Lawrence River estuary in southern Quebec before moving north to Arctic nesting areas. Another Arctic breeding species, the tundra swan, showed lower numbers in Maryland in 2006: 10,400 versus

13,200 in 2005. This decrease in swan numbers may be caused by tundra swans spending less time in the Bay and continuing southward to winter in North Carolina.

Species	**2002**	**2003**	**2004**	**2005**	**2006**
Mallard	36,700	39,000	48,200	52,800	32,500
Black Duck	22,400	22,500	31,700	23,600	13,300
Gadwall	3,200	3,700	2,500	1,400	1,200
Widgeon	2,900	800	6,000	2,000	300
G-W Teal	1,800	1,000	1,200	1,000	400
Shoveler	0	0	100	100	
Pintail	1,800	1,300	4,600	1,900	2,500
Total Dabblers	**68,800**	**68,400**	**94,300**	**82,800**	**50,300**
Redhead	9,300	5,100	6,100	9,300	1,800
Canvasback	32,900	40,000	30,800	39,400	33,800
Scaup	163,400	66,600	106,300	189,800	79,500
Ring-neck	3,900	300	200	1,000	500
Goldeneye	4,800	2,100	1,000	3,000	700
Bufflehead	16,500	13,100	9,800	22,000	11,800
Ruddy Duck	79,200	42,700	34,000	36,100	12,100
Total Divers	**310,000**	**169,900**	**188,200**	**300,600**	**140,200**
Scoters	400	2,300	8,100	40,600	10,000
Long-tailed Duck	200	100	400	4,100	700
Mergansers	11,000	6,500	18,700	5,100	7,000
Total Ducks	**390,400**	**247,300**	**215,400**	**433,200**	**208,400**
Brant	500	1,500	1,300	1,700	2,400
Snow Goose	79,200	75,600	93,900	54,900	49,200
Canada Goose	426,900	452,900	355,200	383,400	305,400
Tundra Swan	16,600	15,100	17,900	13,200	10,400
Total Waterfowl	**919,000**	**798,000**	**781,300**	**889,900**	**577,100**

2006 ATLANTIC POPULATION CANADA GOOSE STATUS

Spring Breeding Population Survey

The survey to estimate the number of breeding pairs of Canada geese on the Ungava Peninsula of northern Quebec was conducted June 13-18, 2006. Breeding areas were largely snow-free by early May. The estimated number of breeding pairs was 160,000 in

2006 compared to 162,400 in 2005 (Fig. 1). The proportion of indicated pairs observed as single geese (62%) was the highest recorded in the 14 years of the survey, indicating an excellent nesting effort.

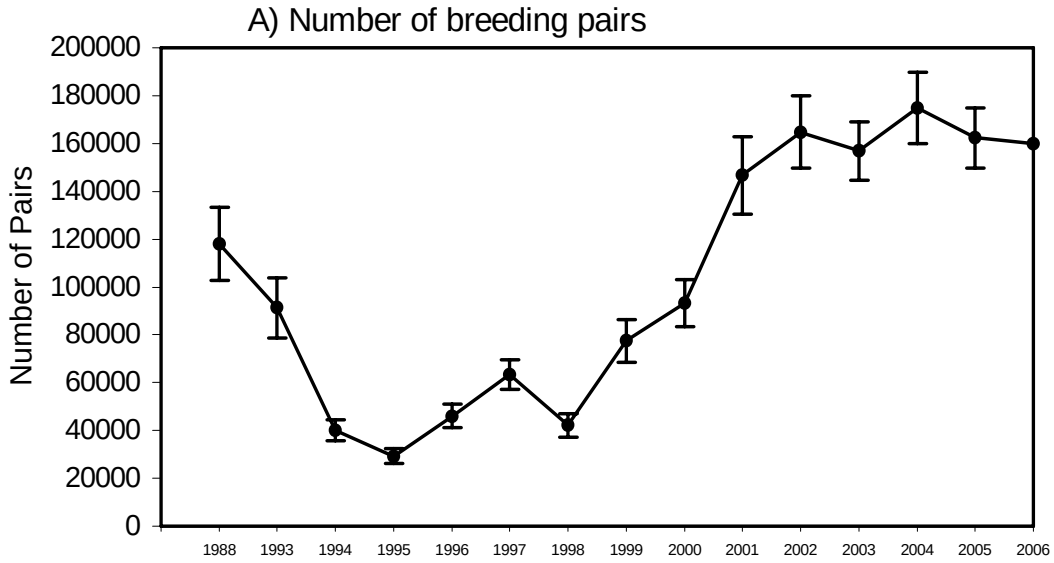


Fig. 1. Estimated Number of AP Canada Goose Breeding Pairs in the Ungava Region of northern Quebec 1988-2006

Nest Survey Results

On the Ungava Peninsula, snow melt was relatively early in 2006, and at the time of the annual nest survey most nests were in mid-incubation. The mean nest initiation date (average of all 6 sites at Ungava Bay) in 2006 was 21 May, which is 3 days earlier than last year and 5 days earlier than the long-term average (LTA) (1997-2006). The total number of nests found and the mean clutch size for all 6 sites are 126 and 4.03, respectively. Clutch size in 2006 was slightly higher than the long-term yearly average of 3.97 (Fig. 2). Nest density in 2006 was also higher than the long-term average, 34.1 nests/km^2 (in 2006) vs 32.0 (LTA). Overall gosling production is expected to be average to good. A fall flight larger than 2005 containing a higher proportion of young is expected.

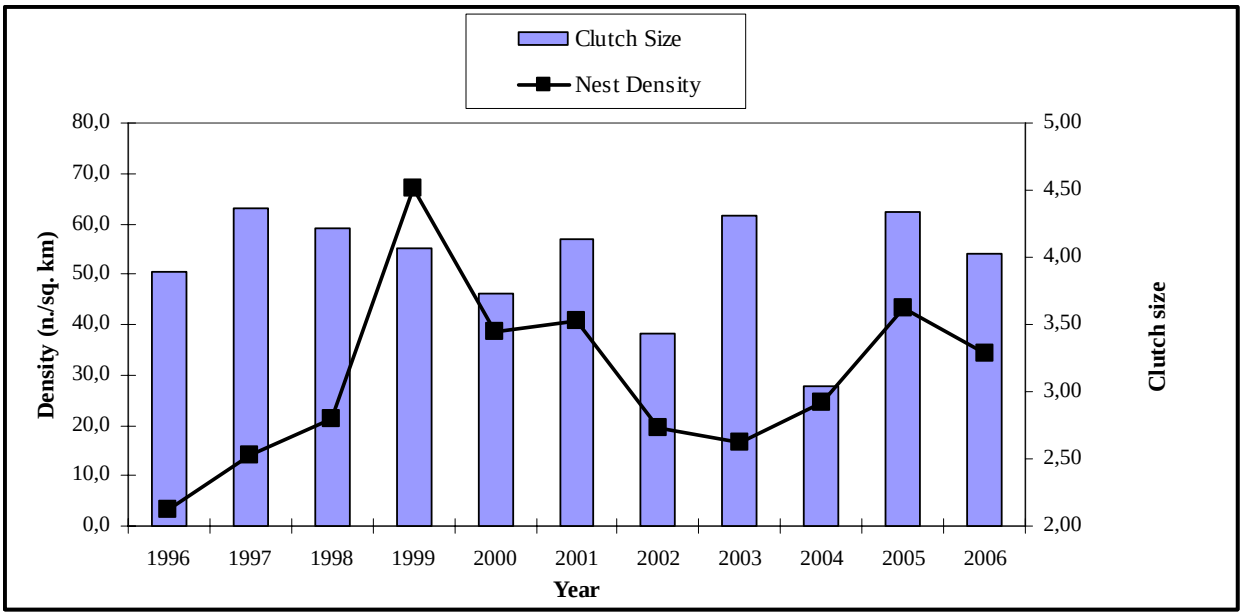
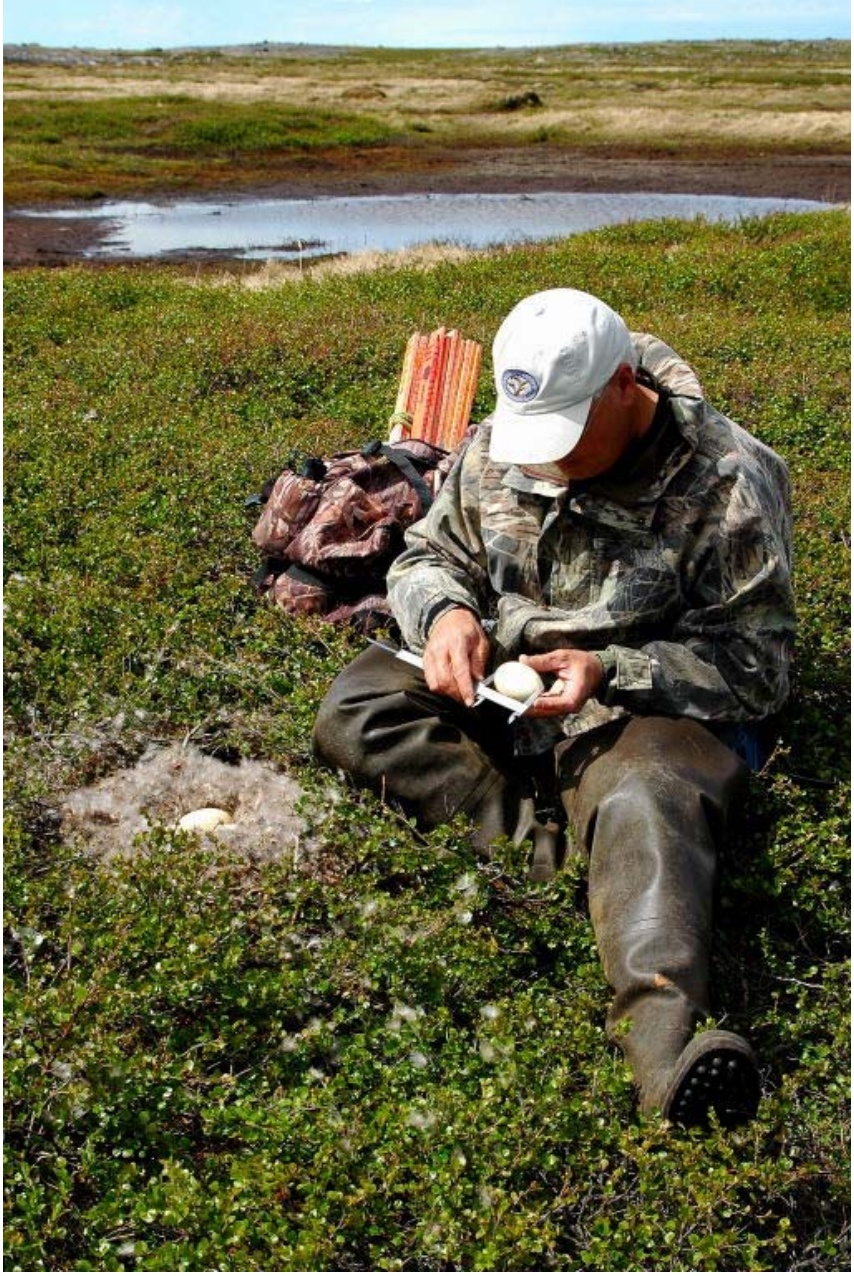


Fig. 2. Annual mean nest density and clutch size of AP Canada Geese in the Ungava Bay Region, 1996-2006.



Maryland DNR Waterfowl Project Manager, Larry Hindman, measures eggs from Canada goose nest along the Hudson Bay Coast, June 2005

Atlantic Population Canada goose incubating eggs on the Ungava Peninsula, Quebec, June 2005

AP Goose Hunting Regulations

An interim harvest strategy for managing AP Canada geese has been adopted by the Atlantic Flyway Council that (1) establishes a target population objective of 250,000 pairs in the Ungava Region of northern Quebec; and (2) provide thresholds for harvest regulations packages (e.g., closed season, restrictive, moderate, and liberal regulations). This harvest strategy will guide the setting of AP harvest regulations until the Atlantic Flyway Council adopts a new AP goose management plan. This strategy recognizes the importance of cooperation between Aboriginal peoples, USFWS, CWS, Atlantic Flyway states and provinces, and affected public interests to conserve and manage AP Canada

geese.

This harvest strategy may be modified as managers gain reliable measures of harvest rates and experience with harvest regulation packages. Based on the status of AP Canada geese, and in recognition that these birds are a shared international resource, the following harvest guidelines will apply:

1. Harvest management should promote maintenance of a population objective of a spring breeding pair index of 250,000 in the Ungava Region of northern Quebec.
2. When the 3-year average breeding pair index is at or above 60,000, restrictive harvest regulations may be considered that would target a projected harvest rate of breeding adults not to exceed 5%.
3. When the 3-year average breeding pair index is at or above 150,000, moderate harvest regulations may be considered that would target a projected harvest rate of breeding adults not to exceed 10%.
4. When the breeding pair index is above 250,000, liberal harvest regulations may be considered that would target a projected harvest rate of breeding adults not to exceed 15%.
5. When the breeding pair index drops below 60,000 and has been trending downward for 3 years, consideration will be given to suspending sport hunting in AP goose harvest areas.
6. The timing of hunting seasons should, to the extent possible, facilitate the southern migration of the AP and Southern James Bay Populations enabling them to reach wintering areas in the southern portion of the Atlantic Flyway. Consideration will be given to varying framework dates and season length among regions based upon different AP harvest potential among regions.

With the stabilization of breeding pairs of AP Canada geese, the AFC and USFWS made no major changes in hunting regulations in 2006 and continue to prescribe a 45-day season in AP goose wintering states. This will allow mangers to measure the harvest rate of adult geese for a second consecutive year under moderate regulations (e.g., 45 days). This information will be especially useful in the future development of harvest regulation packages (restrictive, moderate, and liberal) using the adaptive management approach for AP Canada geese.

In high harvest areas of Maryland and Delaware the daily bag limit is two geese. In Pennsylvania, New Jersey, New York, and the New England states, the daily bag limit is three birds. A higher daily bag limit is currently allowed in these more northern states where AP harvest rates are lower and the Canada goose harvest includes a high proportion of resident, or Resident Population (RP) Canada geese. These regulations are expected to achieve a harvest rate of about 10% for adult geese. Population modeling indicates that the AP will continue to grow under adult harvest rates of 10%-15%.

MANAGEMENT OF OVERABUNDANT GREATER SNOW GEESE

The rapid growth of most snow goose populations is of great concern. Improved nutrition from agricultural food resources and safety in private and federal refuges has resulted in increased survival and reproductive rates of snow geese. Efforts have been directed at increasing the mortality rate of snow geese to reduce population size to a level consistent with the carrying capacity of the breeding, staging, and wintering habitats.

With the implementation of liberal hunting regulations in the U.S. portion of the Atlantic Flyway and special conservation measures in southern Quebec, Canada, the population growth of the greater snow goose population has been stabilized at a spring, pre-breeding population of 800,000 geese. Beginning in 1999, an amendment to the Canadian Migratory Bird regulations created special conservation measures during which hunters were encouraged to take overabundant species for conservation reasons and, in some cases and subject to specific controls, to use special methods and equipment such as electronic calls and bait.

These special conservation measures appear to have been successful in increasing harvest rates for Greater Snow Geese. The estimated harvest rates for adults ranged from 10-15% in each year since 1998/99. These are much higher that the rates achieved during 1985-1997(average harvest rate of 6%), a period of rapid population growth, and similar to harvest rates during 1975-1984 (11%) when the population was relatively small and stable.

The continental greater snow goose population is surveyed by vertical aerial photography each spring on the St. Lawrence River, where the population stages before moving north to Arctic breeding grounds. The photographic inventory methodology was changed beginning in 2004 to get a more accurate estimate in the face of the expanding spring staging distribution of greater snow geese. The 2006 survey was conducted on April 30. As in past years, a few small flocks of geese were observed from the aircraft but could not be photographed; visual estimates of their numbers were added to the estimates obtained from the photo-counts. The preliminary estimate of the size of the 2006 spring population, counted during staging in southern Québec, was 1,016,900, an increase of 25% from the 2005 estimate. This estimate of the spring population should be viewed as very preliminary until the Canadian Wildlife Service has had more time to look into possible sources of bias.

The North American Waterfowl Management Plan population objective for greater snow geese is 500,000. To increase harvest rates further to affect a decrease in the greater snow goose population will require an increase in harvest within the Atlantic Flyway states. This can only be accomplished with the implementation of special methods outlined in the Draft Environmental Impact Statement for Managing Light Goose Populations. These new hunting methods would be permitted at places and time when other waterfowl seasons are not open. They include: (1) the use of electronic calls; (2) the use of unplugged shotguns; (3) and shooting hours extended to one-half hour after sunset; and (4) spring hunting. Atlantic Flyway states are awaiting the publishing of the

Final EIS to initiate these additional harvest measures.

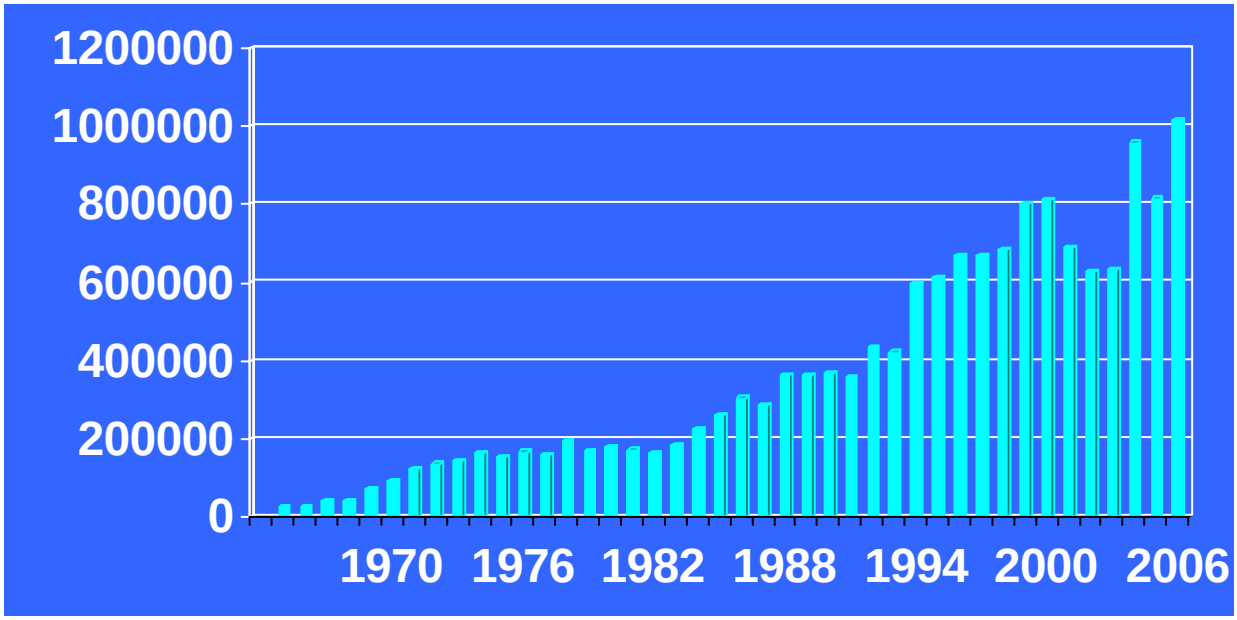


Figure - Greater Snow Goose May Photo Count - St. Lawrence River Valley

SCAUP STATUS AND PROBLEMS PLAGUING THEIR RECOVERY

Chesapeake Bay albeit renowned for the world's greatest Canada goose hunting, has some of the best diver duck hunting in the U.S. More than 100,000 scaup find their way to the Bay each autumn. "Scaup" are comprised of two closely related diving ducks, greater and lesser scaup. Greater and lesser scaup are counted together on breeding ground surveys, although lessers are much more abundant. About 85% of the continental population is made up of lessers. Greaters are most numerous in Alaska, whereas lesser scaup breed from the prairies into the boreal forest, and in northern river deltas.

The slightly larger, greater scaup prefers the offshore marine waters of Chesapeake Bay with smaller numbers using the more saline waters of the Atlantic coastal bays. Lessers also gather in large flocks on the Bay and utilize the Bay's tributaries for shelter and feeding. However, lessers often frequent freshwater reservoirs where they mix with other ducks like ring-necked ducks. During sever winter weather lesser will even utilize ponds and medium size impoundments. During the blizzard of 1978, I can recall catching 200 lesser scaup in a duck trap set for dabblers on a small 1/2 acre pond near Trappe in the same trap where 150 mallards and black ducks were caught and banded two days earlier.

Maryland diving duck hunters prize scaup. During the 2005-06 hunting season, Maryland hunters took about 16,000 scaup, about two-thirds lessers. However, uncertainty about the status of scaup and possible changes in future scaup hunting regulations has diver hunters concerned. Their concern is well founded.

Scaup have declined from a continental average of over 6 million breeding birds in the 1970s to mid 1980s, to about 3.2 million in 2006. Most of this decline has occurred since the mid 1980s. But the overall decline in scaup seems to break down into two problem areas: the western Boreal Forest and the Canadian Prairies.

There are three main breeding populations. The most important is the western Boreal Forest, another is the open tundra along the Arctic Ocean coastal plain north of the forest, and the last is the Prairie Pothole Region. Breeding and wintering ground surveys suggest of these three, only the Boreal Forest is showing a decline. The Tundra population (usually considered to be greater scaup) is more or less stable while the Prairie Pothole Region population has increased. Unfortunately the Boreal Forest is, by far the most important region in terms of population numbers.

While it is not unusual for wildlife populations to fluctuate over time, the scaup decline is of particular concern because it occurred over a relatively short period of time, and when populations of most other waterfowl species in North America were increasing. Greater and lesser scaup are the only common species of North American ducks to show negative population trends since 1987.

Most waterfowl managers believe that hunter harvest has little to do with the decline witnessed in scaup. Scaup have the lowest harvest rate (the percentage of the over-all population that is harvested each year) of any major duck species. In other words, harvest is less of a factor with scaup than with any other species. Some waterfowl biologists also question the magnitude of the decline, pointing out that the May breeding waterfowl surveys are designed to track mallard population trends, and are conducted too early to portray an accurate picture for scaup. However, many biologists reflect what scaup hunters already know, that bluebills are not as abundant as they once were.

What is causing the scaup decline? Well know one knows for sure. Waterfowl scientists are currently investigating several theories as to why scaup have declined. These include changing prey availability, contaminants, expansion of predator populations in portions of the scaup breeding range, and composition or changes in breeding ground conditions.

Louisiana State University is leading one of the two principal avenues of research on the scaup decline. They have detected a dramatic decrease in “amphipods” or freshwater shrimp, used by scaup during spring migration on the southern prairies. Also, research from Minnesota shows that there has been a decrease in body condition (lower mean weight and reduced fat) of scaup hens returning to nest over the last 20 years. Loss, or degradation of migrating habitat is most likely the cause but no one really knows. Other food resources could become limiting with contamination of wintering habitats, particularly following the clean- up operations in the aftermath of recent hurricanes. These factors, coupled with direct risks from ingestion of contaminants, may put female scaup in poorer body condition for breeding, or introduce other impacts on reproduction.

Each year, hundreds of thousands of greater and lesser scaup stop to fuel up in the lower Great Lakes as they head north after wintering along the eastern seaboard and Gulf Coast. Here they feast on abundant zebra mussels. Before the zebra mussel showed up, these resting birds focused mainly on snails. Since the zebra mussel explosion, the number of scaup on Lake Erie around Long Point, Ontario, has increased by as much as tenfold. The zebra mussel is a non-native bivalve that was introduced to Lake St. Clair in 1986, probably through the dumping of ship ballast water.

Unfortunately, the fact that scaup like zebra mussels doesn't mean that a zebra-mussel diet is good for scaup. While this relatively new food source likely helps scaup restore their reserves for the long trip north to their breeding grounds, many scaup are, unwittingly, ingesting contaminants in possibly dangerous amounts. Colonies of zebra mussels filter huge quantities of water to strain out tiny plankton; in the process, they filter many other things out of the water, including pollutants. The process is known as bio-concentration. It was responsible for the problems bald eagles and peregrine falcons had with DDT in the 1950s and 1960s, and it may be contributing to the troubles scaup are having today.

One theory is that environmental contaminants acquired on staging and wintering areas may be having adverse effects on their reproduction or survival. For instance, when fed contaminated zebra mussels, the closely related tufted duck lays fewer and smaller eggs, with reduced hatchability and increased organochlorine levels. Smaller ducklings were also produced, and adult female mortality increased. Thus, it is plausible that consumption of large quantities of zebra mussels on the lower Great Lakes may be contributing to the continental scaup decline.

Dr. Scott Petrie's research team at the Long Point Waterfowl Research Foundation on the Canadian side of Lake Ontario has been investigating the effects of contaminates in scaup for several years. Their work indicates that levels of PCBs and DDT metabolites in the birds are relatively low and probably have little effect. The same can't be said of the element selenium. They have found elevated levels of selenium in both scaup species during the winter and spring migration on Lake Ontario. Scaup are accumulating selenium by feeding on zebra mussels. Although elevated levels of selenium can cause stress or death in waterfowl, it is unknown whether scaup visiting the Great Lakes are able to eliminate the element prior to arrival on the breeding grounds. Petrie’s team is investigating the impacts of selenium on breeding scaup in Alaska.

Selenium is a semi-metallic trace element occurring naturally in some soils and is also a byproduct of fossil fuel burning and other industrial activities. High selenium burdens in zebra mussels can be attributed to increased fossil fuel burning, as well as the high capacity of zebra mussels to concentrate this contaminant through their filter feeding activities. Although selenium is nutritionally required by birds in small amounts, it is highly toxic in slightly greater quantities. Selenium concentrations quickly accumulate in tissues when birds are introduced to a selenium-contaminated diet. Female scaup use the egg as a route of selenium excretion, and, as such, high selenium burdens can impair

reproduction. A decline in the proportion of juveniles and adult females in the lesser scaup population over the last two decades suggests that it might.

There are other possible explanations for the scaup decline. Poor nesting success in the Boreal Forest of Canada may be due to deteriorating habitat. We know that it's been an unusually warm 20 years in those latitudes. There is a "hot spot" of abnormally high temperatures in the western Boreal Forest that roughly correspond to the area where scaup productivity is worst. There is as yet no cause and effect relationship between them but it looks suspicious.

Another possibility is a change in predator abundance that may be related to changes in the Boreal Forest habitat. Several potential aspects of the breeding biology of scaup may explain the downward trend for this species in the Boreal Forest. Unlike overwater nesters like canvasbacks, scaup prefer nesting on land so they are more vulnerable to mammalian predators. Scaup hens often abandon their ducklings early, even at the downy stage. Scaup hens tend to concentrate their nests and newly- hatched young scaup often gather in large “gang- broods” like Canada geese, with few hens watching over them. Waterfowl expert, Dr. Robert Bailey, Delta Waterfowl Foundation, believes that this aspect of scaup breeding biology places scaup at greater risk to predation.

Here is why. There has been a huge continent- wide growth of gull populations, with marine species moving inland and others establishing larger colonies on inland waterways. Gulls prey on ducklings and coots on a daily basis in the western Boreal Forest. Native residents have commented on the new abundance of gulls. Herring gulls and ring- billed gulls are numerous in the lake and forest country, and they are highly efficient at capturing ducklings, particularly where guarding hens are absent, and the broods frequent open water. There is a possibility that changes in predator abundance in the forest may also be influencing scaup, and changes may also be occurring too quickly for scaup to adapt their nesting and brooding behavior.

In summary, waterfowl managers believe that the cause of the scaup decline is due to changes in the ecosystem. Presently, there is the belief that contaminants, lower female survival, and reduced recruitment due to changes in food resources or breeding-ground habitats are primary factors contributing to the decline. These factors are not mutually exclusive but likely interact across seasons. The selenium connection is probably the strongest lead wildlife scientists have. Because the factors limiting scaup population recovery are unknown, management actions to reverse declines are uncertain. Hopefully the cause(s) of the scaup decline can be unraveled and be addressed quickly. The future of diving duck hunting, as we know it, depends upon science and corrective actions.

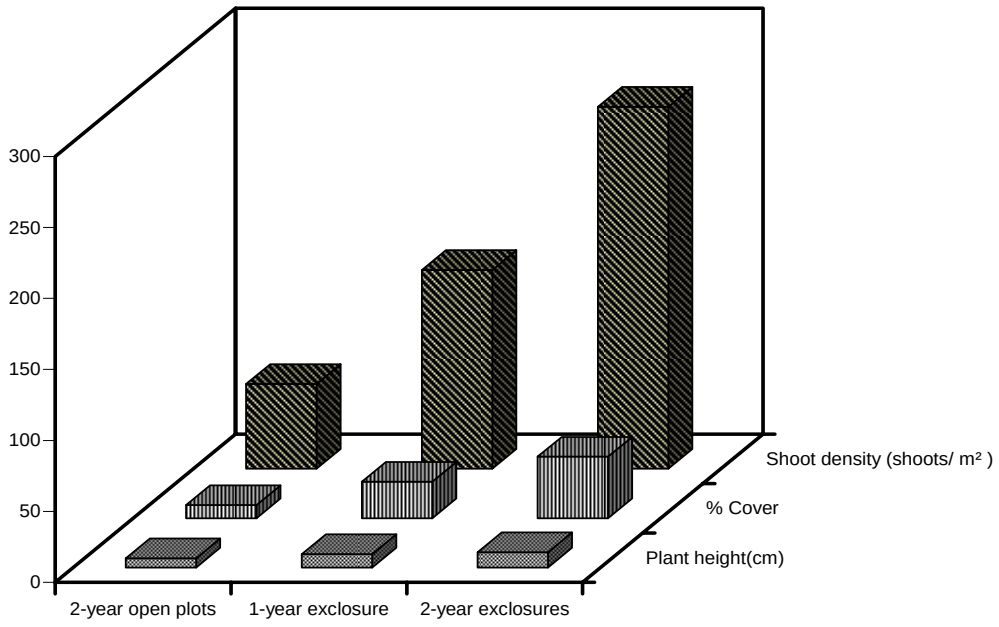
The decline of scaup to a new record low (3.4 million) in 2005 prompted the U.S. Fish and Wildlife Service to reduce the daily bag limit for scaup in all four flyways. The USFWS was seeking a 25% reduction in scaup harvest. The regulation change (e.g., bag limit reduction from 3 to 2 in the Atlantic and Mississippi Flyways) had little chance of achieving the desired result. Although scaup harvests declined last season, the decline (-13%) was about half of target reduction. Despite a second consecutive record low

breeding population estimate in 2006 (3.2 million, a decrease of about 4% from 2005), all four flyway councils and the U.S. Fish and Wildlife Service agreed to make no changes in scaup hunting regulation at this time. Waterfowl managers are developing an international scaup harvest strategy for use in decision-making in 2007. One thing is for sure - any further reduction in the daily bag limit (from 2/day to 1/day) will hurt the tradition of diver hunting.

MUTE SWAN RESEARCH

In cooperation with West Virginia University, activity patterns of the mute swan were studied from May to August 2003 and 2004 on Maryland's Eastern Shore of Chesapeake Bay. A total of 3,719 observations of five main activities (feeding, resting, swimming, self-maintenance and other miscellaneous) were recorded. Swans spent 43% of their time feeding and were observed primarily feeding on widgeon grass. Recent food habits research has shown that mute swans rely heavily upon widgeon grass in the mid-bay and eelgrass in more saline areas.

Mute swans are believed to contribute to submerged aquatic vegetation (SAV) decline in the Chesapeake Bay at the local level. However, due to paucity of quantitative ecological assessments, data indicating SAV decline due to mute swan grazing in the Bay are limited. Therefore, a study was initiated in 2003 to assess whether or not SAV reduction occurs due to mute swan herbivory in different localities of Chesapeake Bay. Nineteen study sites with SAV beds were selected in Talbot and Dorchester Counties, Maryland. At each site, 9 plots (5 x 5 m) were established in SAV beds of similar relative density. Of these, 3 were exclosures, another 3 were open plots, and the remaining 3 were open in 2003 and were fenced in 2004. Mean percent cover of SAV was 79% higher in exclosures than in open plots grazed by swans. Density of SAV inside the exclosures was 46 % higher than SAV density in open plots. The results from this study provides further evidence that mute swan grazing causes reduction in SAV in the Chesapeake Bay at the local level.



Mean percent cover, mean shoot density, and mean canopy height of submerged aquatic vegetation in the control and treatment plots on the Chesapeake Bay, Maryland, 2003 and 2004

West Virginia University students install enclosure to prevent mute swans from grazing on bay grasses.

MIGRATORY BIRDS AND THE ASIAN H5N1 AVIAN INFLUENZA

Avian influenza, also known as bird flu or avian flu, is a common, naturally occurring virus in birds that has many forms or subtypes. Scientists believe all birds are susceptible to infection by some form of avian influenza. Some birds, like waterfowl, can be infected with the virus but develop no signs of illness. In addition, the potency (strength or virulence) varies greatly among subtypes of the avian influenza virus.

Virulence or strength is classified as either low pathogenic avian influenza or high pathogenic avian influenza. Most avian influenza subtypes are low pathogenic and cause little or no signs of illness in domestic or wild birds and pose no threat to human health. These subtypes are found every year in waterfowl and other birds. High pathogenic avian influenza viruses are associated with the H5 and H7 subtypes. Some strains of the H5 and H7 subtypes are extremely infectious and fatal to domestic poultry, sometimes posing a threat to human health.

The high pathogenic Asian strain of avian influenza (also known as the Asian strain H5N1 and referred by the media a bird flu) has been found in Asia, Europe and Africa. The virus has affected millions of domestic poultry and is receiving great attention within the medical community. It has infected more than 200 people and has resulting in more than 100 human deaths since 1997. Nearly all cases in humans have occurred in circumstances where domestic poultry and people were in close and frequent contact. There is no evidence of sustained human-to-human spread of this virus, but there have been at least three instances where the virus has been transferred from human to human among family members.

As of mid September 2006, the Asian H5N1 strain of avian influenza has not been detected anywhere in North America.

Role of Migratory Birds in Transmission of Avian Flu

Migratory birds, like waterfowl, are known to carry different subtypes of avian influenza. However, the role of migratory birds in the spread of high pathogenic Asian strain of avian influenza is unknown and is under investigation. Some waterfowl and shorebird species migrate between Alaska and Asia and between Europe and eastern Canada providing a possible transmission route into North America.

There is no evidence to suggest that migratory birds have transmitted the Asian strain of avian influenza to humans. Indeed, it is highly unusual for an avian influenza to be transmitted directly between different kinds of animals. This strain has been found in

pigs, cats, and a few other species, so this heightens the concern that it may also be transmittable to humans.

With rare exception, the avian influenza viruses found in wild birds have been low pathogenic forms and have rarely caused signs of illness. Low pathogenic forms of the virus have been detected in at least 105 species of wild birds, although birds of wetland and other aquatic habitats, particularly waterfowl (ducks, geese, and swans), shorebirds (wading birds), gulls, and terns constitute the major natural virus reservoir.

However, the highly pathogenic Asian virus, circulating in parts of Asia, Europe and Africa, is easily transmitted among birds. The Asian virus sometimes kills wild birds, including waterfowl, but most seem to survive exposure. These birds become carriers of the disease, e.g., they have the disease but do not show signs of illness and behave normally. These carriers can carry the transport the virus to other locations and affect other wild or domestic flocks. However, in almost every case where wild birds have died from the disease, the source has been traced to infected poultry flocks. There are a few cases, however, where the virus arrived in remote locations where it was more likely transported by wild birds. Although the Asian H5N1 virus can be lethal to wild waterfowl, only a few large die-offs have occurred in the wild.

A concern expressed by waterfowl hunters and waterfowl mangers is that some groups might advocate culling wild birds to prevent them from spreading the virus. This approach has been reviewed and opposed by international conservation organizations and by public health authorities around the world. Both the Canadian and U.S. Fish and Wildlife Service indicate that such action is out of the question.

What about waterfowl hunting seasons? A couple of countries in Europe and Asia closed their spring hunting season this year. However, if the Asian H5N! virus does show up in North America, not much is likely to change related to hunting seasons. The world's health experts continue to stress that the Asian virus has never been transmitted from wild birds to humans, so even if a hunter shoots and subsequently handles a bird infected with the Asian virus, transmission of the virus is not likely to occur. Even so hunters should take routine precautions when handling and cleaning game.

Furthermore, the U.S. Fish and Wildlife Service does not anticipate closing waterfowl hunting seasons based upon what is currently known about the Asian strain of avian influenza.

The overwhelming concern with wild birds is that they might transmit the Asian H5N1 virus to domestic poultry. The threat to domestic birds is huge with the potential for devastating economic and food supply implications. Wild waterfowl, however, are not a threat to human health. Wild birds have never been shown to transmit the virus to people, and health officials consider this type of transmission highly unlikely.

Monitoring Avian Flu in Migratory Birds in North America

As of this writing, the Asian H5N1 virus has not been detected in North America, and the probability of when and if it may arrive cannot be predicted. Surveillance of avian influenza in migratory birds will increase in 2006. Wild bird surveillance this year will focus on Alaska, because migratory bird populations using this geographic area are considered to have the highest risk of being exposed to the Asian virus. Alaska lies at the crossroads of several bird migration pathways that could potentially allow for movement of the virus from Asia to North America. The Canadian government is also monitoring wild birds in the eastern Arctic to target birds that are transatlantic migrants.

Surveillance in Alaska is already underway. The U.S. Fish and Wildlife Service and U.S. Geological Survey, working in conjunction with the Alaska Department of Fish and Game, will take up to 15,000 samples from 29 bird species in more than 50 locations throughout Alaska during 2006.

Sampling will be expanded to other areas in the lower U.S. and Canada in 2006. Wildlife biologists from several federal and state agencies, universities and non-governmental organizations plan to collect between 75,000 and 100,000 samples from live and hunter-harvested wild birds. They also plan to collect 50,000 water and/or fecal samples from high-risk waterfowl habitats across the nation. With surveillance efforts in place, there is a good probability the disease will be detected if wild waterfowl carry the Asian strain of bird flu to North America this year.

Monitoring Avian Flu in Migratory Birds in Maryland

Surveillance of avian influenza in migratory birds in Maryland began in July 2005. Since that time, the Maryland Department of Natural Resources (DNR) has sampled more than 800 waterfowl and waterbirds for avian influenza. The Asian H5N1 strain of avian influenza was not found in the sampling. However, low pathogenic strains of avian influenza were detected in small numbers of long-tailed ducks, scoters, greater snow geese, and mute swans. This was expected, as waterfowl are a reservoir for low pathogenic strains of avian influenza.

As part of the inter-agency surveillance effort to detect the Asian virus, the Maryland DNR and its partner, U.S. Department of Agriculture Wildlife Services, plan to sample more than 1,600 waterfowl during October 2006 through February 2007. Sampling will focus on species that are affiliated with Alaska and the eastern Arctic. Samples will be taken from live-captured tundra swans, scaup (greater and lesser), and canvasbacks as well as hunter-harvested long-tailed ducks, scaup, greater snow geese, and Atlantic brant. Waterfowl hunters, waterfowl outfitting services, and waterfowl processing businesses will be contacted to seek their cooperation in providing access to hunter-harvested birds for sampling by DNR biologists.

Handling Wild Birds

There is no indication that the Asian virus exists in North American wild birds, and therefore no reason to believe there is elevated risk at this time. Hunters should not be

overly concerned at the present time, but hunters are encouraged stay informed and educated on this issue. The Maryland DNR encourages hunters to take some common sense hygiene practices when handling harvested game birds. Hunters should wear plastic gloves when dressing birds; wash their hands after handling wild birds and before smoking or eating; clean and sanitize knives, other cleaning tools, and food preparation surfaces; and cook wild birds to the proper temperature (well done or 165 degrees).

Reporting Dead Birds

The Maryland DNR and its partner agencies will investigate reports of sick or dead wild birds to rapidly diagnose the cause of any suspected disease outbreak. Keep in mind other diseases of waterfowl routinely kill hundreds and sometimes thousands of migratory birds every year. However, if someone sees several dead birds in one area, it's worth reporting. If you find a group of dead wild birds (5 or more), particularly ducks, geese, swans and shorebirds – do not pick them up. Instead, **call USDA Wildlife Services, Annapolis 1-877-463-6497 (M-F 8-4:30).**

If you do inadvertently have contact with sick or dead wildlife, thoroughly wash your hands with soap and water, taking care to avoid rubbing your eyes, eating, drinking or smoking before washing. If hands are not visibly soiled, alcohol-based hand cleaning products may be used.

For More Information about Avian Influenza

http://www.dnr.state.md.us/dnrnews/infocus/ai_faq.asp. Maryland Department of Natural Resources
www.fws.gov/migratorybirds/issues/AvianFlu/WBAvianFlu.htm U.S. Fish and Wildlife Service
http://pandemicflu.gov/ U.S. government web site for information on pandemic flu and avian influenza

AVIAN INFLUENZA RISKS TO HUNTING DOGS

The highly pathogenic Asian avian influenza, referred in the media as bird flu, is not easily transmitted to animals other than birds. Wild ducks in Maryland have been found to have a low incidence of low pathogenic forms of avian influenza, so a normal-looking, normal-acting duck is not likely to carry the virus.

In a recent study in Thailand, researchers tested more than 600 stray dogs, many of which presumably had access to sick or dead poultry in areas where the bird flu is known to occur. Antibodies for the bird flu were fond in about 25 percent of those dogs, meaning that they had been exposed to the disease but their immune system prevented them from becoming ill or dying.

Bird Flu is most frequently passed to dogs from chewing on carcasses of dead wild birds or catching infected live wild birds or poultry. It is possible the disease might also be transmitted dog to dog. Currently, cats have been the greatest cause of concern. Both cats and dogs can be infected, but they appear much less susceptible to the disease than poultry. So far there is no evidence that hunting dogs used in normal wild game bird hunting are considered at risk of acquiring avian influenza, since there have been no documented cases of the Asian form of the H5N1 virus infecting dogs in North America. Nevertheless, prudent dog owners should prevent their dogs from having contact with game birds that are obviously sick or found dead in the field. Nor should hunters feed their dogs any raw meat from game birds. These are routine safety precautions that hunting dog owners should already be following. Owners of hunting dogs should keep well informed on this issue and should consult their veterinarian for more information about influenza in pets.

WATERFOWL BANDING

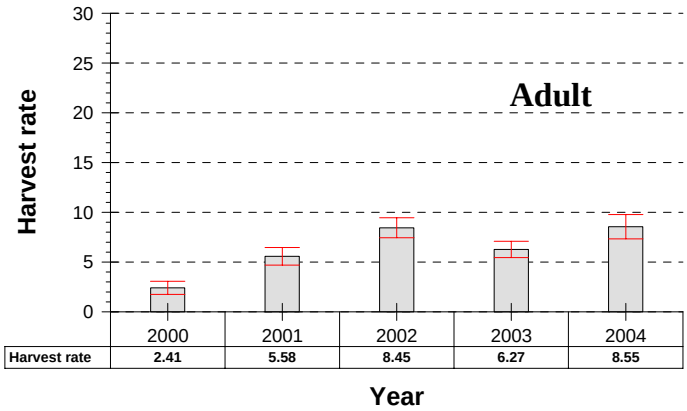
Bird banding (called 'ringing' in Europe) got its start many years ago with the Romans. The first scientific banding of birds in North America was done by Dr. Paul Bartsch, who banded about 100 black-crowned night herons in the District of Columbia in 1902-1903. Between then and 1949, the Austin Ornithological Research Station in Massachusetts and E. A. McIlhenny from Louisiana each placed about 200,000 bands on birds. Many other individuals and scientists were also banding birds in that period. While the banding operations themselves provided information, it was the returns of those bands, mostly by hunters, that provided the most data. Dr. Frederick C. Lincoln is credited with discovering "flyways" or migration routes using banding data. Since then, millions of leg bands have been placed on birds across North America.

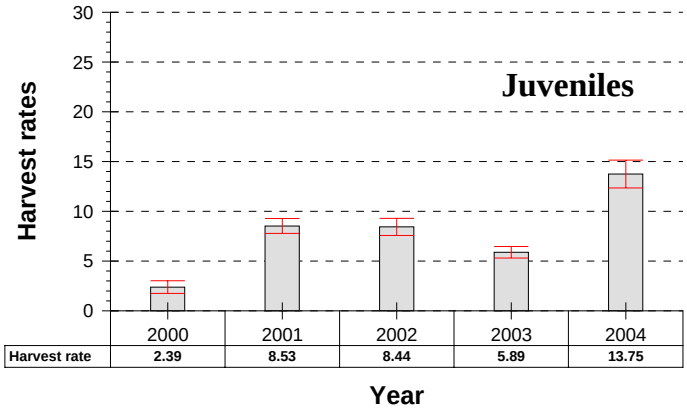
Today, banding is a key tool for waterfowl research and management in North America. The banding data only becomes valuable to waterfowl managers after a recovery of the band is made. This can occur by recapturing the bird at a later date but most often occurs when hunters take a banded bird. The next step is the critical one - the hunter must report the band, typically to the Bird Banding Laboratory (BBL) located in Laurel, Maryland. Prior to 1995, bands carried only a mailing address and hunters had to write the BBL. All birds banded since 1995, carry bands that include an 800, toll-free phone number for the hunter to call and report the band. This has increased the band reporting rate or percentage of banded birds taken and reported from about 33% to as high as 80% for ducks. This has significantly increased the efficiency of banding operations.

Bird banding is both useful in both research and management projects. Survival rates and how they change in response to hunting regulations can be estimated from banding information. For example, for Canada geese, where hunter harvest is an important mortality factor, survival rates decline as harvest goes from closed, to restrictive, to moderate hunting regulations, especially for juvenile geese. Current survival rates for AP Canada geese under moderate (45-day season) regulations are about 65% for adults and 30% for juveniles. Band recoveries provide a multitude of information including identifying migration routes, the distribution and derivation of harvest, correction factors

for the composition of the harvest and harvest rates. For example, band recovery data is used to estimate the proportion of resident and migrant Canada geese in the flyway or in some cases a State's Canada goose harvest. In the Atlantic Flyway, it is also used to closely monitor the harvest rate of AP geese as hunting regulations are relaxed since the season reopened in 1999.

Harvest rates of Atlantic Population Canada Geese





Band recovery information is also used by USFWS and Flwyay Councils to aid in determining annual duck hunting regulations. Individual identification of banded

waterfowl makes possible studies of dispersal and migration, behavior and social structure, lifespan, reproductive success, and population growth.

Migratory game birds in Maryland and elsewhere in North America are largely banded just prior to the opening of the hunting seasons. In Maryland, Wildlife and Heritage Service staff focuses their pre-hunting season banding samples of wood ducks, black ducks, and RP Canada geese. Occasionally other species are banded associated with specific research projects (e.g., tundra and mute swans and Atlantic brant). In the summer of 2005, about 300 wood ducks, 400 black ducks and 800 resident Canada geese were banded within Maryland. Maps showing band recoveries of wood ducks and black ducks are available at http://www.dnr.state.md.us/wildlife/BandRecoveries.pdf

Wood ducks and black ducks are typically captured with wire traps baited with corn or small grains. Resident Canada geese are captured during late June and early July when the birds become flightless during their annual feather molt. Goose trapping is done by hazing geese up onto land and surrounding them with five, portable 4x8-foot panels. Resident goose banding locations are distributed in proportions similar to breeding densities and total bandings representing about 1% of the estimated state population (e.g., 86,500).

When a game bird is banded, banders record the band number, the species of bird, its age and sex, and the place and date it was banded. Sometimes banders collect other information such as wing, tail and weight measurements, feather condition, and notes on external parasites or other details needed for a specific research project. Biological

samples (swabs and blood samples) are routinely taken from banded birds to monitor population health.

Lesser scaup being removed from a wire bait trap for satellite telemetry to study scaup movement.

As of 2004, approximately 60 million birds have been banded across the United States and Canada under the North American Banding Program. About 4 million of these bands have been recovered. On average, about 1.1 million birds are banded every year. Migratory game birds make up only 31% of birds banded, but account for 72% of band recoveries.

According to the Bird Banding Laboratory, number of game birds banded and recovered in 2001:

Game Bird	# banded	# bands recovered
Ducks	222,006	48,576
Geese (includes Brant)	132,295	39,766
Swans	1,063	555

Doves	4,329	156
Woodcock	934	94

How to report a band

As a hunter, you have a great opportunity to contribute to an important part of waterfowl management and research in North America. Banding improves our understanding of waterfowl biology and the relationship between hunting regulations and populations.

Reporting your band is very easy. All you need to do is telephone or submit an electronic submission to the Bird Banding Laboratory. **You get to keep the band!** You will need the following information to report your band:

1. Band number
2. How, when and where the bird was shot.

Toll-free phone: 1-800-327-BAND/1-800-327-2263 (US, Canada)
Electronic Submission: http://www.pwrc.usgs.gov/BBL/homepage/mailrecv.htm
After you report your band, the Bird Banding Laboratory will send you a Certificate of Appreciation. This certificate will tell you where and when your bird was originally banded.

Sources of information on bird banding in North America:
Bird Banding Laboratory
http://www.pwrc.usgs.gov/bbl/default.htm
Bird Banding Office
http://www.cws-scf.ec.gc.ca/nwrc-cnrf/migb/bbo_e.cfm

Webless Migratory Species
Harvest & Survey Information

Mourning Doves

Mourning doves are hunted statewide and are generally more abundant east of the mountains in Maryland. Mourning dove breeding populations are monitored by the Dove Call Count Survey and the Breeding Bird Survey (BBS). Both surveys are national efforts and coordinated by the U.S. Fish and Wildlife Service. In the Eastern Management Unit (eastern United States), dove populations have been generally stable since the 1960s when the surveys began. In the Central and Western Management Units, however, doves have undergone a long-term decline. In Maryland, the BBS indicates no change in dove numbers since the mid-1960s.

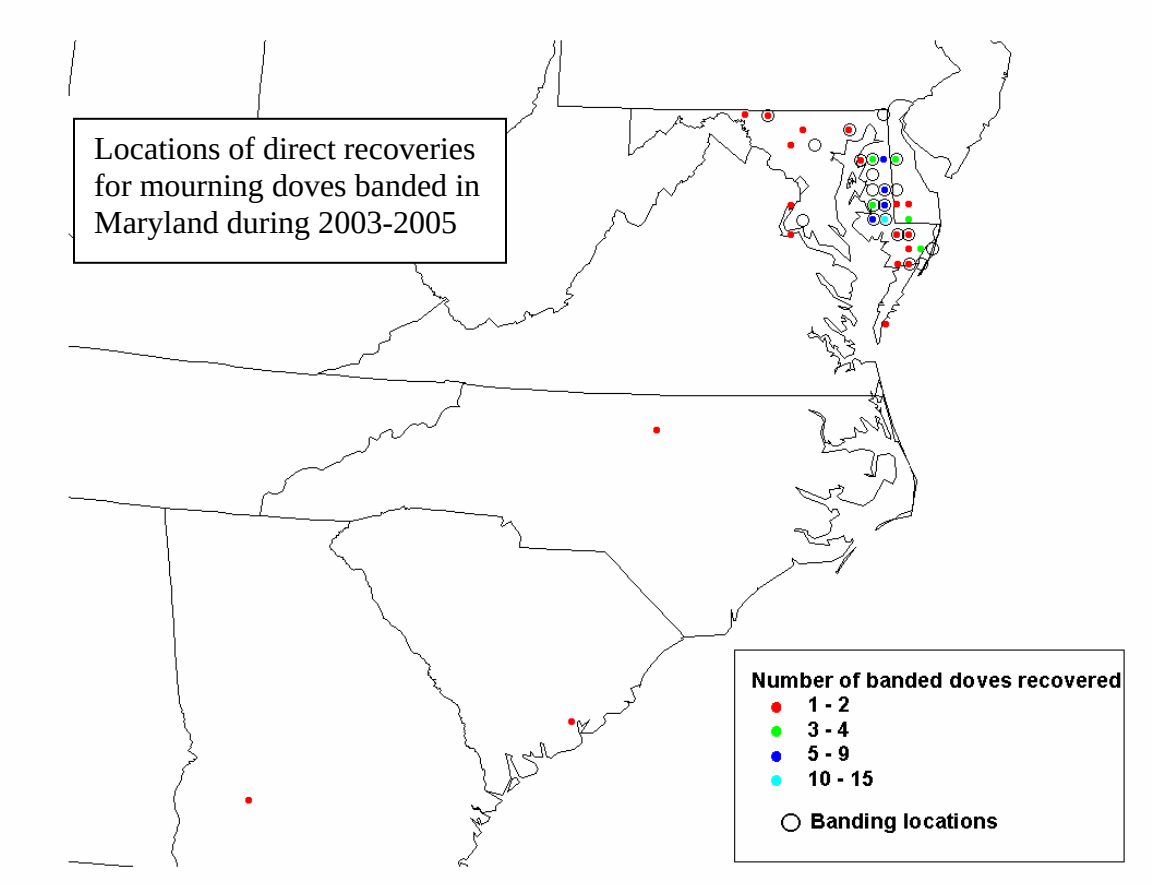
Mourning doves are hunted in 38 states. Nationally, more mourning doves are harvested (over 25 million) than all other migratory bird species combined. In Maryland, both the number of dove hunters and dove harvest has declined. In the mid-1970s, about 40,000 hunters harvested about 400,000 birds. Current levels of 10,000 to 15,000 hunters produce an annual harvest of about 200,000 birds. How doves are hunted has also changed. Most dove hunting now occurs on fields planted to sunflowers and managed for dove hunting. In the past, few people managed for doves. Hunters simply took advantage of concentrations of doves that occurred in areas like harvested silage fields.

Despite the importance of the mourning dove as a migratory game bird, the information on which management decisions are based has lagged far behind those of many other migratory game birds, especially waterfowl. For example, in addition to breeding ground surveys, waterfowl managers use annual banding (used to estimate harvest and survival rates) and recruitment surveys (where hunters submit wings and tails that give biologists a measure of how many young were produced that year). Neither source of information has been available for doves. However, that is changing. A major effort is underway to improve the information used to manage doves.

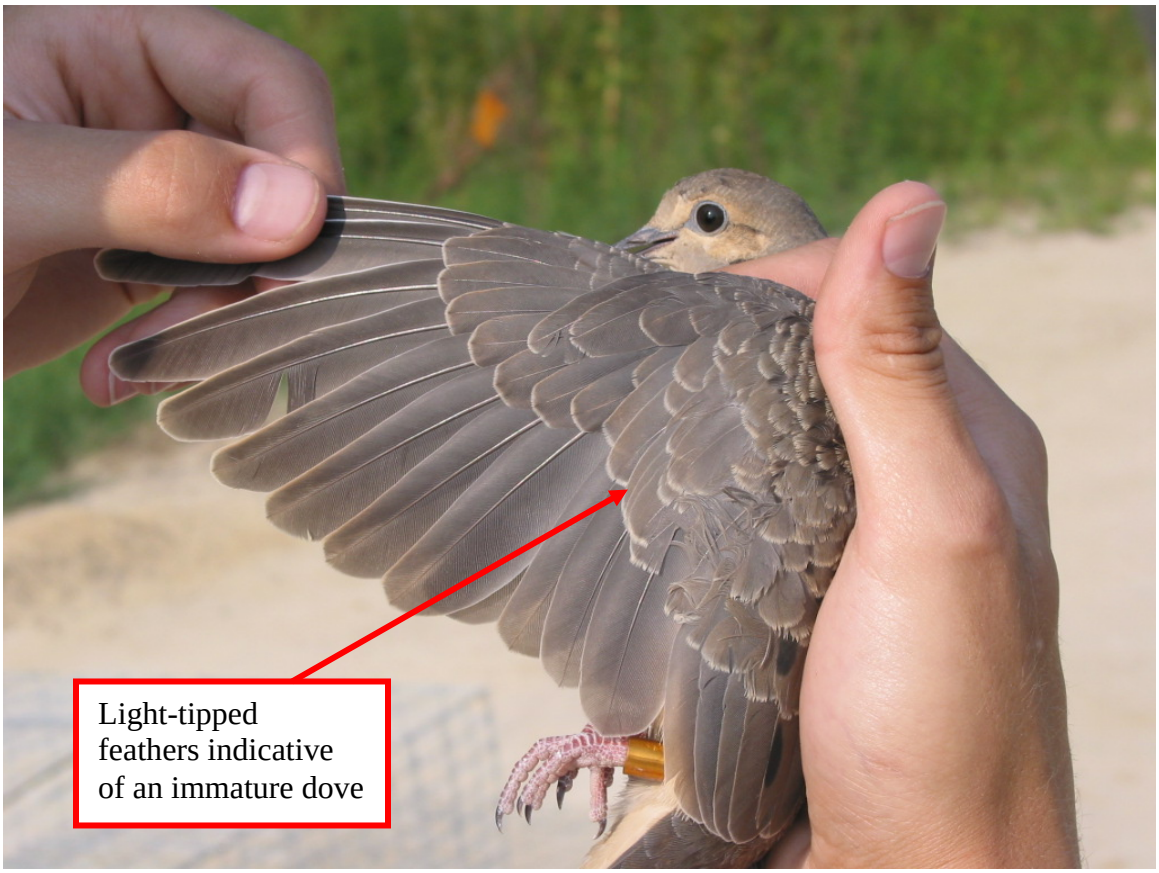
Since the summer of 2003, Maryland along with 27 other states has been banding mourning doves. The objectives of this study are to determine mourning dove harvest rates, estimate annual survival, and provide information on the geographical distribution of the harvest. Data on dove survival and harvest rates is key to understanding the effects of hunting regulations on mourning dove populations. Banding is one of the most important tools used to obtain this knowledge. Birds are marked with metal leg bands containing a unique identification number and a toll-free telephone number that hunters can use to report the band. Hunters reporting bands are asked to provide the harvest location and date.

During the 4 years of banding, nearly 120,000 doves have been banded across the country. Doves are captured in baited wire traps. Banding occurs from July1 – August 20. Maryland, Pennsylvania, and West Virginia form a subunit for the purposes of the project. Nearly 12,000 doves were banded in our subunit including 2,600 in Maryland. Of these, a little less than 4% were shot and reported by hunters (this is known as the direct recovery rate). In 2004, we estimated the reporting rate (i.e., the rate at which hunters who bag a banded dove report the band using the toll-free number). The reporting rate is needed to estimate the percentage of the dove population that is harvested by hunters. The reporting rate estimate for banded doves in our subunit was about 50%. That is, when a hunter killed a banded dove, about half of them called the 1-800 number to report the band. Using a reporting rate of 50%, the estimated harvest rate for doves in our subunit is about 8-10%.

A noteworthy result from the banding study has been the high percentage of banded doves that were harvested in the same state in which they were marked (i.e., they are locally produced). Even for southern states like Florida and Georgia, over 90% of the birds harvested were banded in the respective state. Locally produced doves provide the vast majority of doves harvested by hunters. This pattern holds for Maryland as well. During the hunting seasons of 2003-2005, 85 doves banded in Maryland were shot by hunters and reported in the year they were banded (called direct recoveries). Of these, only eleven were taken outside of the state and 8 of these were from adjacent states (1 in Virginia, 3 in Pennsylvania, 4 in Delaware). The few long distance recoveries included a bird banded on the Eastern Shore on July 29 and shot on September 17 in North Carolina, a bird banded on the Eastern Shore on August 10 and shot on December 21 in South Carolina, and a bird banded on the Eastern Shore on July 24 and shot in Georgia on January 6.



Mourning doves are a short-lived species with only about 35% of the adults surviving from one year to the next. As a result, the number of doves in a given year is determined largely by the production of young in that year. Doves can be highly productive, nesting over a long period and often producing more than one brood in a season. Years with extremely low numbers of young produced are rare and are usually associated with extended cold, wet weather throughout key periods of the nesting season. Unlike for waterfowl, there are no surveys to monitor changes in dove production from year to year. Maryland is among 20 states cooperating to develop a survey to measure annual productivity. Two techniques are being assessed. One method is to ask randomly selected hunters to submit a wing from each dove they harvest (this is analogous to the parts collection survey that exists for waterfowl). A second method is to collect large numbers of wings from specific hunts that occur on wildlife management areas of private land during the first few days of the season. Wings are examined by biologists to determine the age of the bird. The methods will be compared for cost and accuracy.



Woodcock

Even though woodcock are classified as a shorebirds, their habitat is primarily early succession forests. This is especially true of wet or damp wooded areas. Woodcock have been fairly common as nesting birds in western Maryland, on the Eastern Shore and in central Maryland. Population trends are measured each year by a survey that counts singing male woodcock along established routes. Throughout the range of the woodcock, population estimates have declined sharply (about 2% per year) over the last 30 years. In Maryland, the decline is even more dramatic (about 10% per year). Of 23 singing male routes in Maryland, woodcock are now regularly heard on only three. A positive

A In Maryland and throughout woodcock range, loss and degradation of habitat is thought to be the cause of the decline. Woodcock thrive in young forests interspersed with openings. Some areas have been lost to development. A larger problem, though, is the aging of forests and lack of timber harvest that maintains the type of habitat woodcock prefer. Restoration efforts for woodcock have focused on cooperative agreements with large land-holding entities, especially timber companies. Habitat management for woodcock usually entails small strip clearcuts to regenerate young trees and shrubs.

Hunting seasons for woodcock were cut sharply in the mid-1980s and again in the mid-1990s in response to the long-term population decline. These cuts occurred despite the fact that most biologists did not consider hunting a significant factor in the decline. Preliminary results of large-scale research projects using hundreds of radio-marked woodcock have detected no major differences in survival between woodcock using hunted and those using non-hunted areas.

Hunting for woodcock has declined in Maryland as well as throughout its range. In the mid-1970s, about 5,000 hunters pursued woodcock in Maryland. By the 1990s, the number of hunters was down to about 1,000. Likewise, harvest has declined from about

10,000 birds per year to about 2,000. However, woodcock remain a very important game bird for hunters who continue to keep and train bird dogs.

Rails and Snipe

Rails and snipe are marsh and wetland birds found in tidewater and other wetland areas across the state. Efforts to survey these species are hampered by their secretive nature and dense marsh habitats. King, clapper, and Virginia rails all breed in Maryland with Virginia rails the most abundant and widespread. Clapper rails are found mainly in salt marshes of the lower Eastern Shore. King rails are similar in size and behavior to clapper rails but inhabit fresh and brackish marshes. Concern is greatest for king rails, whose distribution in the state is much reduced from that of 20 years ago.

Sora rails nest mainly in the northern and central parts of the country, although there is an occasional nest recorded in Maryland. During the fall migration, many soras pass through the state, noted most frequently along the Patuxent River marshes. During the late 1800s and first part of the 1900s, rail hunting and especially sora rail hunting was extremely popular among Maryland's wealthy sportsmen. Today, only a handful of hunters pursue rails.

Snipe nest throughout the northern half of North America. Wintering and migrating snipe are found throughout Maryland's wetlands. Most snipe taken are shot by waterfowl hunters who happen to encounter them.

MARYLAND MIGRATORY GAME BIRD STAMP FUNDS AT WORK

Since the inception of the Maryland Migratory Waterfowl Stamp in 1974 (now called the Maryland Migratory Game Bird Stamp), in excess of three million dollars has been dedicated to improve waterfowl migration and wintering habitats on public lands. The stamps are now required of all migratory game bird hunters in Maryland. Funds collected from the sale of these stamps must be used on research and management for migratory game birds. Stamp revenues are often used with funds provided by partners (Ducks Unlimited, Inc., Waterfowl Festival Inc., Grand National Waterfowl Association, and other non-governmental organizations) to achieve maximum benefit for wildlife. Some of the more recent projects recommended by the nine-member DNR Migratory Game Bird Advisory Committee and approved for funding by the DNR include:

- Canada Goose Studies in northern Quebec - Maryland's contribution to Atlantic Flyway productivity studies and population surveys for migrant Canada geese in northern Quebec is supported by Stamp funds. These surveys and studies have provided key pieces of information for the recovery of migrant Canada geese.

- Wye Island Natural Resource Management Area – A 20 acres moist soil impoundment was constructed to provide high quality habitat for wintering puddle ducks and Canada geese.
- Geo-Boy Brush Cutting Machine – Funds from Quail Unlimited, National Wild Turkey Federation and the Migratory Game Bird Stamp Fund were used to partner with Blackwater National Wildlife Refuge to purchase this low ground pressure machine. It will be used to create and maintain openings and early succession habitat for a variety of species including woodcock.

Geo-Boy brush cutting machine

- Mourning Dove Banding Project - Through the summer of 2003, Maryland along with 26 other states began a 3-year project to band more then 90,000 mourning doves. The objectives of this study are to determine mourning dove harvest rates, estimate annual survival, provide information on the geographical distribution of the harvest.
- Dove Field Management - Over 200 acres of managed dove fields (e.g., sunflowers, wheat, etc.) are provided for public dove hunting on state lands throughout the state. A list of areas is available in August at most Wildlife and Heritage offices or at the DNR website (http://dnr.maryland.gov).

- Cooperative Duck Banding in Eastern Canada - Duck banding provides key information for management decisions. Each year, Atlantic Flyway states contribute funds for duck banding in eastern Canada. The banding focuses on black ducks in this area, where the majority of the population nests.
- Phragmites Control - Phragmites, or marsh cane, is a plant that invades and rapidly colonizes both tidal and freshwater marshes. It reduces habitat use by wetland dependent wildlife species like waterfowl, wading birds, and furbearers by out-competing most wetland plants. Control is accomplished with annual fall treatments by helicopter (see photo) using a gylphosate herbicide approved for use in wetlands. In areas where Phragmites is removed, valuable wetland plants such as smartweed and wild rice typically return. In 2005, $40,000 was used to control this invasive plant species on 500 acres of tidal marshes.

- An amphibious excavator was purchased in cooperation with the Campbell Foundation and DNR's Capitol Programs Section. This machine will be used in wetland restoration and creation projects around the state.

Other Habitat Programs for Maryland's Migratory Waterfowl

Wildlife Habitat Improvement Program (WHIP)

High quality foods for wintering Canada geese (500 acres of unharvested corn, winter wheat, and clover) were provided on 20 private sanctuary farms in Kent, Queen Anne's, Talbot, and Dorchester Counties. Nonresident hunting license revenues ($140,000) are dedicated to waterfowl habitat through this program. Many of the WHIP sanctuary farms are in their thirteenth year of existence, thus providing traditional wintering habitats for thousands of migratory Canada geese.

Conservation Reserve Enhancement Program (CREP)

Since 1997, the CREP federal funding has provided for over 2,500 acres of shallow water wetlands on both private and public lands throughout Maryland. These wetlands provide high quality habitat for many waterfowl species. As seasonally flooded habitats, these areas provide an abundance of waterfowl food in the form of plants and seeds such as, barnyard grass, smartweeds and fall panicum. This food source is

extremely important in fall and winter, but also provides energy and nutrients for spring migration and subsequent nesting.

In addition to wetlands, the CREP provides approximately 40,000 acres of forest and grass buffers next to farm ditches, Chesapeake Bay tributaries and forested wetlands. The reduction in sediments from farm related run-off improves conditions for SAV growth. SAV is a primary food source for wintering waterfowl in the Bay region.