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# Canada Geese in the Mississippi Flyway

## *A Guide for Goose Hunters and Goose Watchers*

By Timothy J. Moser, Scott R. Craven and Brian K. Miller

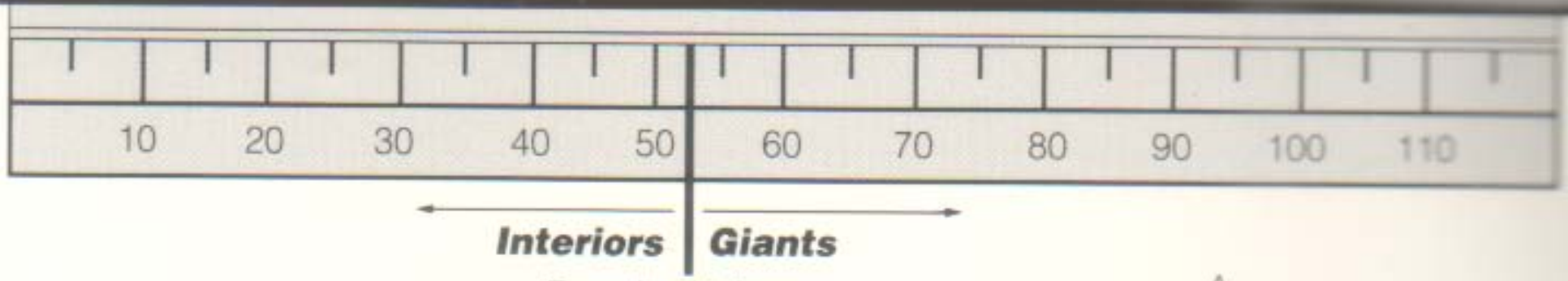
# Contents



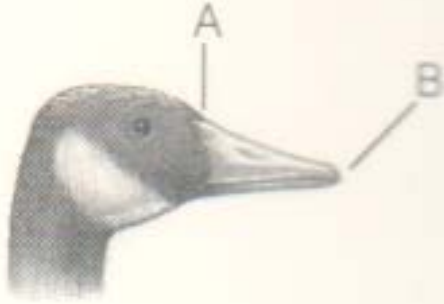

In cooperation with the United States Fish and Wildlife Service, Office of Extension and Publications, Washington D.C.; the Indiana Department of Natural Resources, Indianapolis, Indiana; the Arkansas Game and Fish Commission, Little Rock, Arkansas; University of Wisconsin Extension-Cooperative Extension, Madison, Wisconsin; and the Purdue University Cooperative Extension Service, West Lafayette, Indiana.


Cover illustration: *Golden Bounty-Canada Geese* by David A. Maass
Courtesy of Wild Wings, Lake City, Minnesota

# Canada Geese In the Mississippi Flyw

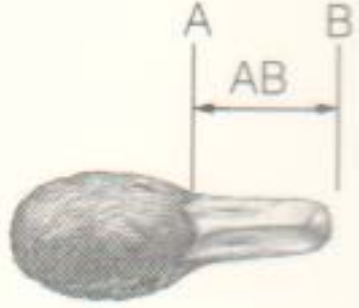



Female 53.0 mm

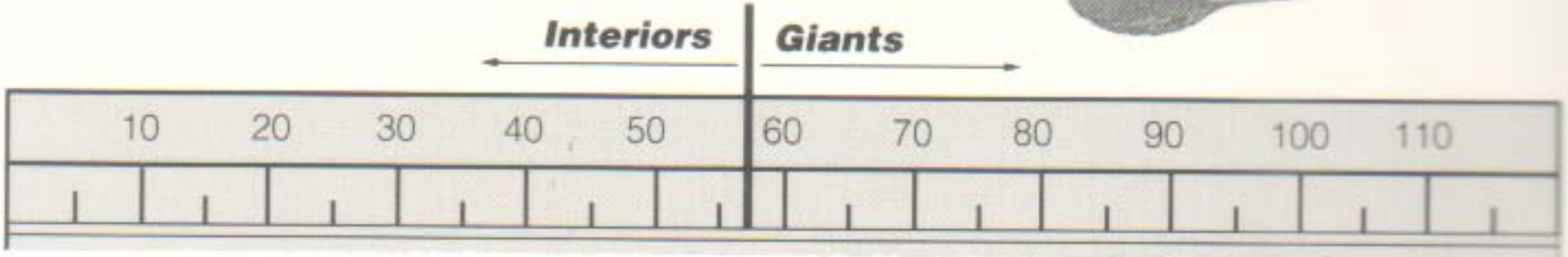



# To Determine Subspecies

After you determine the bird's sex, use the calibrated edge of the card to measure the culmen as shown.




Male 56.8 mm



# To Determine Age

*Note: Number of feathers reduced for clarity*

**Juvenile**
*note notch at the tip of each tail feather*

**Juvenile**
*note two new adult tail feathers*

**Adult**
*note dark feathers with no notches*

**Juvenile**
*pointed, worn primary feathers*

**Adult**
*rounded, dark primary feathers*

**Juvenile**
*indistinct color break at base of neck*

**Adult**
*sharp color break*

# To Determine Sex

Roll open the cloaca with "down and out" pressure of the thumbs. The opened cloaca will reveal the sex of the goose.

Adult male

Adult female

The cloaca of a juvenile goose will appear much like that of an adult female. A male will have a small, dark, fleshy projection in the 8 o'clock position.

See text for other useful characteristics such as wing spurs and size.

*Canada Geese:* for many of us, the name conjures visions of crisp fall days and bright spring mornings, when the V-shaped flocks and honking calls of these great birds fill the air. The travels and habits of Canada geese have stirred the emotions and curiosity of humans for ages. In "A Sand County Almanac," Aldo Leopold wrote:

> *My notes tell me I have seen a thousand geese this fall. Every one of these in the course of their epic journey from the arctic to the gulf has on one occasion or another probably served man in some equivalent of paid entertainment. One flock perhaps has thrilled a score of school boys, and sent them scurrying home with tales of high adventure. Another, passing overhead on a dark night, has serenaded a whole city with goose music, and awakened who knows what questionings and memories and hopes. A third perhaps has given pause to some farmer at his plow, and brought new thoughts of far lands and journeyings and peoples, where before was only drudgery...*

Sightings of Canada geese were indeed noteworthy when Leopold penned those sentiments in the 1940s. Since then, numbers of Canada geese in North America have increased dramatically — most spectacularly in the states of the Mississippi Flyway. Current Canada goose populations offer outstanding opportunities for outdoor enthusiasts to hunt, observe, and enjoy this magnificent species.

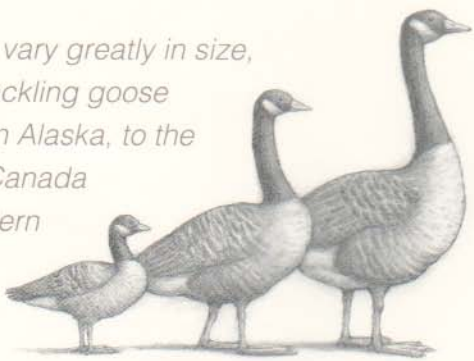
The abundance of Canada geese has not diminished their mystique or intrigue. We still wonder about their destinations and origins, and many other topics. Which goose leads the flock? Why do geese honk? Can you distinguish males from females? Young from old? This publication was created to answer questions about Canada geese and to promote increased enjoyment of this bountiful resource.

## *Canada Geese*

Canada geese are native only to North America, and occur widely throughout the continent. All Canada geese have a conspicuous white cheek patch on the otherwise black head and neck, but they vary greatly in size, and subtly in shades of body color. The casual observer may consider one Canada goose the same as the next, but wildlife scientists recognize several different subspecies. Individuals of each subspecies breed in different areas of North America and exhibit differences in size, color, or body proportion that set them apart from other subspecies. Despite these differences, the classification of Canada geese has long been controversial. Although biologists have suggested that up to 130 subspecies occur (Harold Hanson, personal communication), most researchers today recognize 11 subspecies (Bellrose, 1980).

There are four subspecies of Canada geese in the Mississippi Flyway: giants (*Branta canadensis maxima*), interiors (*B. c. interior*), lesser (*B. c. parvipes*) and Richardson's Canada geese (*B. c. hutchinsii*). We will focus on the giant and interior subspecies because they comprise more than 99 percent of the Canada geese wintering in the Mississippi Flyway

*Canada goose subspecies vary greatly in size, from the tiny 2 to 4 pound cackling goose* (B. c. minima), *which nests in Alaska, to the huge 8 to 16+ pound giant Canada goose, which resides in eastern and central portions of North America.*



*B. c. hutchinsii* *B. c. interior* *B. c. maxima*

***Sizes of Canada goose subspecies in the Mississippi Flyway.***

| | *Giant* | *Interior* | *Lesser* | *Richardson's* |
|---|---|---|---|---|
| | **Winter Weight** (lbs) | | | |
| ***Female*** | | | | |
| *ave.* | 11.1[a] | 7.7[b] | 5.4[c] | 4.0[d] |
| *range* | 7.3-13.8 | 5.7-10.8 | 4.3-7.3 | 3.5-5.5 |
| ***Male*** | | | | |
| *ave.* | 12.5 | 9.2 | 6.1 | 4.5 |
| *range* | 8.3-16.5 | 6.1-12.2 | 4.3-7.9 | 3.7-5.7 |
| | **Culmen Length***(mm) | | | |
| ***Female*** | | | | |
| ave. | 56.9[e] | 49.1[e] | 38.5[d] | 35.6[d] |
| range | 47.9-65.9 | 41.3-56.9 | 33.0-45.1 | 31.7-39.3 |
| ***Male*** | | | | |
| ave. | 60.6 | 52.9 | 40.4 | 37.4 |
| range | 51.0-70.2 | 43.0-62.8 | 33.7-47.0 | 32.3-43.8 |

[a]Data from Hanson 1965.
[b]Data from Raveling 1968.
[c]Data from Grieb 1970.
[d]Data from Palmer 1976.
[e]Data from Moser and Rolley (1990).

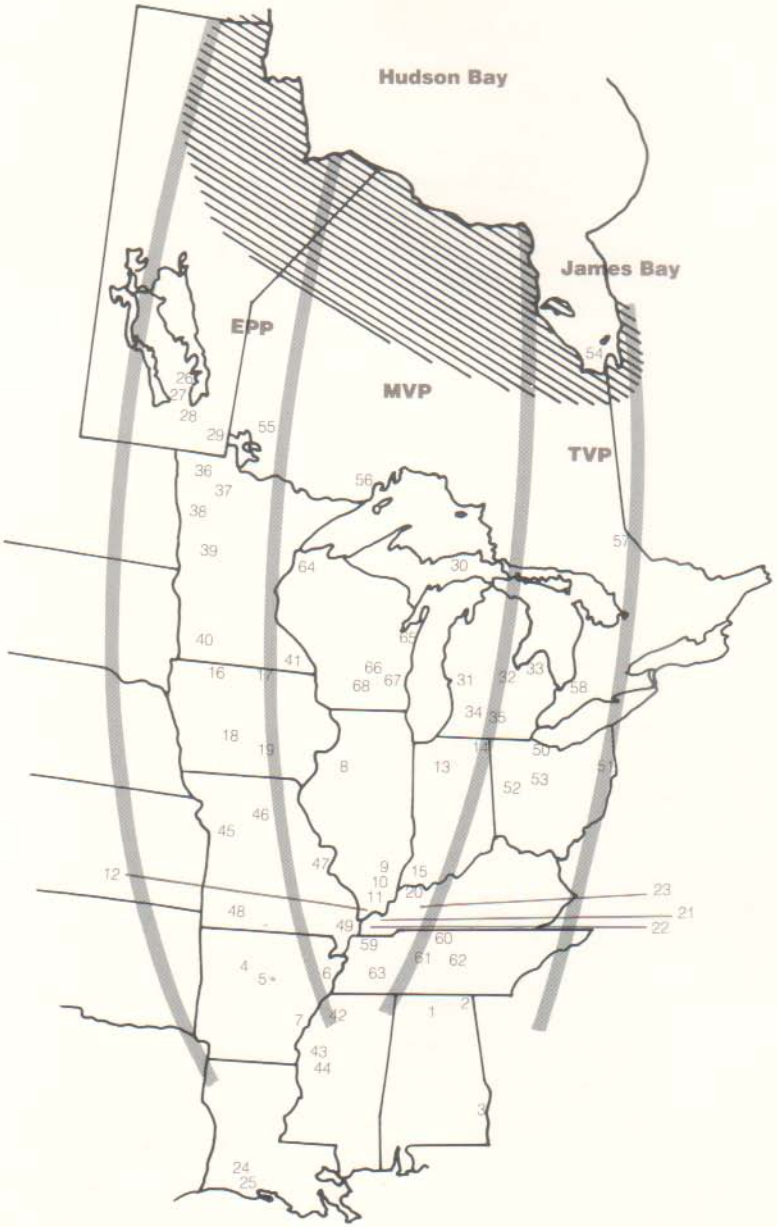
*Culmen length is an important measurement of the upper bill length (see p. 13)

## *Interior Canada Geese*

Interior Canada geese are the most abundant subspecies in the flyway. Observers have counted an average of more than 1 million interiors annually between 1984 and 1990. Interiors, more than any other subspecies, have marked the changing of the seasons on their spectacular semiannual migrations. Because interior Canada geese are so numerous and because their life history typifies most Canada geese, let's follow this subspecies through the year.

***Spring:*** Interior Canada geese nest near Hudson and James Bays in north-central Canada (Fig. 1). Time for nesting is short; these areas may be free of snow for as little as four months a year. Geese arrive on these breeding grounds in April, often before snow cover is completely gone. As snow melts, females and their ganders (males) quickly begin searching for nest sites on islands, pond shorelines, or small mounds of vegetation.

***Fig. 1**. Each fall, hundreds of thousands of interior Canada geese leave their north-central Canadian breeding areas (slashed area) and concentrate on state/provincial wildlife areas, national wildlife refuges (NWR), and other areas throughout the Mississippi Flyway. There, interiors often mix with southerly-nesting giant Canada geese and with other subspecies. The approximate boundaries of the Eastern Prairie Population (EPP), Mississippi Valley Population (MVP), and Tennessee Valley Population (TVP) are shown.*



## Main concentration areas in each state/province and months of major concentrations

### Alabama

| | | |
|---|---|---|
| 1) | Wheeler NWR | *Jan - Feb* |
| 2) | Jackson Co. | *Jan - Feb* |
| 3) | Eufaula NWR | *All year ** |

### Arkansas

| | | |
|---|---|---|
| 4) | Lake Dardanelle area | *All year ** |
| 5) | Holla Bend NWR | *Jan - Feb* |
| 6) | Wapanocca NWR | *Jan - Feb* |
| 7) | White River NWR | *Jan - Feb* |

### Illinois

| | | |
|---|---|---|
| 8) | Fulton & Knox Co. | *All year ** |
| 9) | Rend Lake | *Nov - Feb* |
| 10) | Crab Orchard NWR | *Nov - Feb* |
| 11) | Union Co. | *Nov - Feb* |
| 12) | Horseshoe Lake | *Nov - Feb* |

### Indiana

| | | |
|---|---|---|
| 13) | Jasper-Pulaski | *All year ** |
| 14) | Pigeon River | *Nov - Dec* |
| 15) | Hovey Lake | *Dec - Feb* |

### Iowa

| | | |
|---|---|---|
| 16) | Ingham - High Lake | *All year ** |
| 17) | Rice Lake | *All year ** |
| 18) | Bays Branch | *All year ** |
| 19) | Rathbun | *Nov - Dec* |

### Kentucky

| | | |
|---|---|---|
| 20) | Henderson/Sloughs | *Dec - Feb* |
| 21) | Ballard County | *Dec - Feb* |
| 22) | Reelfoot NWR | *Dec - Feb* |
| 23) | Muhlenberg Co. | *All year ** |

### Lousiana

| | | |
|---|---|---|
| 24) | Jennings area | *Jan - Feb* |
| 25) | Rockefeller | *All year ** |

### Manitoba

| | | |
|---|---|---|
| 26) | Hecla Island | *Apr - Oct ** |
| 27) | Oak Hammock Marsh | *Sep - Oct* |
| 28) | Fort Whyte | *Sep - Oct* |
| 29) | Alf Hole | *Apr - Oct ** |

### Michigan

| | | |
|---|---|---|
| 30) | Seney NWR | *Mar - Nov ** |
| 31) | Muskegon | *Oct - Dec* |
| 32) | Shiawassee WA/NWR | *Sep - Jan ** |
| 33) | Fish Point | *Sep - Nov* |
| 34) | Allegan | *Oct - Mar* |
| 35) | Kellogg Sanctuary | *All year ** |

### Minnesota

| | | |
|---|---|---|
| 36) | Roseau River | *Sep - Oct* |
| 37) | Thief Lake | *Sep - Oct* |
| 38) | Agassiz NWR | *Sep - Oct* |
| 39) | Fergus Falls area | *All year ** |
| 40) | Lac qui Parle | *Oct - Nov* |
| 41) | Rochester | *Nov - Feb ** |

### Mississippi

| | | |
|---|---|---|
| 42) | Sardis NWR | *Jan - Feb* |
| 43) | Hillside NWR | *Jan - Feb* |
| 44) | Yazoo NWR | *Jan - Feb* |

### Missouri

| | | |
|---|---|---|
| 45) | James A. Reed | *All year ** |
| 46) | Swan Lake NWR & Fountain Grove WA | *Nov - Feb* |
| 47) | August A. Busch | *All year ** |
| 48) | Schell-Osage | *Dec - Jan* |
| 49) | Duck Creek & Mingo NWR | *Dec - Jan* |

### Ohio

| | | |
|---|---|---|
| 50) | Magee Marsh WA & Ottawa NWR | *Oct - Mar* |
| 51) | Mosquito Creek | *Oct - Mar* |
| 52) | Mercer | *All year ** |
| 53) | Killdeer Plains | *Nov - Feb* |

### Ontario

| | | |
|---|---|---|
| 54) | James Bay Coast | *Aug - Sep* |
| 55) | Lake of the Woods | *Apr - Nov ** |
| 56) | Thunder Bay area | *Apr - Oct ** |
| 57) | Lake Timiskaming | *Sep - Oct* |
| 58) | Lake St. Clair | *Apr - Nov ** |

### Tennessee

| | | |
|---|---|---|
| 59) | Reelfoot NWR | *Jan - Feb* |
| 60) | Cross Creeks NWR | *Jan - Feb* |
| 61) | Tennessee NWR | *Jan - Feb* |
| 62) | Old Hickory, J. Percy Priest Reservoirs | *All year ** |
| 63) | Hatchie NWR | *Jan - Feb* |

### Wisconsin

| | | |
|---|---|---|
| 64) | Crex Meadows | *Apr - Nov ** |
| 65) | Collins Marsh | *Oct - Dec* |
| 66) | Grand River | *Oct - Dec* |
| 67) | Horicon NWR | *Oct - Dec* |
| 68) | Pine Island | *Oct - Dec* |

**Important area for giant Canada geese.*

*During the nesting period, the parents effectively protect their eggs from predators such as arctic fox and gulls, but these predators sometimes steal eggs when both geese are away feeding. Arctic wolves and polar bears constitute more formidable threats for nesting geese, occasionally eating eggs, goslings, or even adults.*

Females select their nest sites, which are often the same sites they used the year before and usually near the site where they hatched. In late April or early May, depending on weather and location, females scrape out shallow depressions in the soil and line them with nearby vegetation. Each female then visits her nest on consecutive days to lay a single egg untill the clutch totals one to seven (usually four). As laying progresses, the female pulls down feathers from her breast to cushion and insulate the eggs. Incubation begins only after all eggs are laid so all goslings hatch within a few hours of one another. The female incubates the eggs nearly constantly while the gander closely guards his mate. Only rarely does the pair leave the nest site to feed.

If all goes well, goslings hatch after 28 days of incubation, usually in June. Goslings break their shells and emerge without parental help. Within 24 hours, the down-covered goslings can run and feed themselves, and the parents lead them to nearby feeding areas.

***Summer:*** Two to three weeks after goslings hatch, parents begin the annual process of molting — replacing old feathers with new ones. The large flight feathers of the wing fall out, rendering adults as flightless as their goslings. During this vulnerable period after hatch, geese are secretive, call infrequently, and seek safety by congregating with other geese. Many families may gather in lush feeding areas near ponds and lakes that provide safety when predators approach.

Adults and their young feed voraciously on new growth of grasses during the nearly continuous daylight of the arctic summer. Quality food and abundant time to feed are important to ensure that gosling growth, adult weight gain, and feather development are sufficient for migration before winter returns to the breeding grounds. Goslings can fly when they are about 63 days old; adults can fly again about 32 days after losing feathers (Hanson, 1965).

Geese too young to nest, and pairs whose nests failed to hatch, leave the breeding areas at about the time other nests are hatching. These geese migrate north to even more remote areas to molt and feed.

***Fall:*** Groups of families usually leave the Canadian breeding grounds in early September and often gather at traditional staging areas during

migration. Canada geese concentrate at several areas in Manitoba, Minnesota, Wisconsin and Michigan in October and November before they move on to their major wintering areas in central Missouri, southern Illinois, and the Tennessee River valley (Fig. 1). Families stay together during the fall, as young geese learn efficient feeding behaviors and other survival skills from adults.

Instinct, tradition and opportunity affect the migration patterns of Canada geese. Some geese migrate to traditional areas well before harsh weather forces them to leave an area. Other flocks leave northern areas only if roosting areas (ponds, lakes) freeze or deep snow covers food. In mild winters some interiors stay as far north as Wisconsin; in harsh winters some may migrate nearly to the Gulf of Mexico. Weather conditions such as strong tailwinds or approaching fronts tend to trigger migration.

Geese also continue the molting process during the fall, gradually losing and replacing worn body feathers with new ones. The molt process makes juvenile geese appear more like adults as the fall proceeds.

*Canada geese are very strong fliers and may travel more than 1,400 miles between wintering and breeding areas, and as much as 650 miles without stopping (Raveling and Lumsden, 1977). Average migration speed is estimated at about 40 miles per hour but geese have been clocked at more than 90 mph when aided by tailwinds. Geese migrate at altitudes ranging from a few hundred feet to over 8,000 feet, depending on visibility and the location of the most favorable winds (Owen, 1980).*

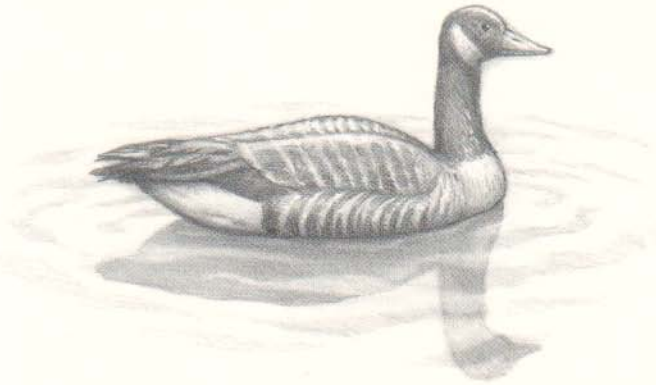
***Winter:*** The major activities for geese in winter are eating, resting, and attempting to maintain good condition during the sometimes harsh weather. Canada geese commonly concentrate on established wildlife refuges where they find food, water, and safety from hunting disturbance. Usually geese make two foraging trips a day from their roosting areas; once in the morning and again in late afternoon. The morning trip is triggered by light intensity, so feeding flights on cloudy days generally are later than on clear days. Extreme cold also may delay or eliminate the morning flight. Sometimes geese feed during the night and skip daytime trips, especially when moonlight and snow cover provide good visibility. As winter progresses local food resources often become depleted, forcing geese to travel up to 15 miles from the roosting area to feed.

*The body weight of Canada geese varies greatly throughout the year, especially for females. An average female that weighs 7.6 pounds during late winter may weigh more than 11 pounds just prior to nesting. By the end of incubation she is near the low point of the yearly cycle, about 6 pounds (Raveling and Lumsden, 1977).*

Before the advent of modern agriculture, geese fed primarily on the seeds, tubers, and leaves of wetland plants. Today, much of the fall and winter diet of Canada geese is waste corn, milo, soybeans, weed seeds, and green browse such as clover, winter wheat, and wild grasses. Although geese don't usually harm crops (grazing, and the addition of nutrients through defecation actually stimulate growth of vegetation), under certain conditions they do cause substantial damage to unharvested grain or sprouting crops.

Young Canada geese form their first pair bonds in the winter and spring. Although geese may pair when they are one or two years old, most females do not actually nest until they are three to five years of age. Geese begin nesting relatively late in life, but because they are long-lived (up to 24 years!), they have ample opportunity to reproduce. Generally, geese pair for life, but if one mate dies or in some other cases, new mates are chosen.

As spring approaches, geese begin to feed intensely to build up the fat and protein needed for migration and the nesting season. Geese begin their spring migration by following the retreating snowline northward. In contrast to the fall migration, spring migrants are widely dispersed, no longer in need of the sanctuary provided by refuges the previous fall. Pairs drive off last year's offspring and intensify courtship behaviors. During the final leg of migration, geese overfly snow-covered areas and unsuitable forested habitat in central Canada and reach their breeding grounds ready to nest.



## *Giant Canada Geese*

Giant Canada geese have wing spans of up to six feet, making them the largest of waterfowl except for the swans. Historically, this unique subspecies lived in the prairies of the United States and Canada. Rather than making long migrations twice each year like other subspecies, giants stayed in the same area year-round or made only short migrations. Unfortunately, giants had vanished from much of their former range by the mid-1900s due to uncontrolled shooting and wetland destruction in the late 1800s and early 1900s. In fact, the giant subspecies was believed extinct until 1962 when Harold Hanson of the Illinois Natural History Survey determined that Canada geese wintering at Rochester, Minnesota belonged to this subspecies. Subsequently, several remnant populations were found. After the rediscovery of giant Canada geese many states initiated or intensified efforts to reestablish resident flocks. Giants now nest from southern Canada to the Gulf of Mexico, and from 1985 to 1989, giants represented 18 percent of the Canada geese counted in the Mississippi Flyway!

The life history of giant Canada geese is similar to that of interiors, with a few exceptions. Giant Canada geese are not subjected to the short summers and extreme weather that influence northern-nesting subspecies. Although giants may also begin nesting before snow cover is completely gone (as early as February in some areas) the remainder of summer events are more leisurely than for their northern-nesting relatives. Giants lay more eggs (one to eight, five is average), at a slower rate (one egg per one and a half days), and incubate them slightly longer than interiors. Giants may even attempt a second nest should their first one be destroyed by coyotes, dogs, humans, or other predators. It also takes slightly longer for giant goslings to fledge (85 days) and adults to grow flight feathers (35 days) (Hanson, 1965).

Giants, like interiors, prefer to nest on islands or near water, but giants are not very choosy about location. Stock ponds or urban settings are quite satisfactory. Park-like settings with ponds and open areas of mown grass or pasture are very attractive to geese for raising young. Giant Canada

geese readily nest in man-made structures such as elevated or floating wash tubs and baskets. These structures have increased goose production in areas where suitable nesting areas are lacking or ground predators are too abundant.

Giants' food habits are also similar to interiors', but giants may be present in agricultural areas during the summer, and thus have more opportunity to damage crops during the growing season. Large flocks of Canada geese near urban parks, golf courses, or dwellings may annoy residents. Overgrazing, waste accumulation, noise, and interference with traffic have been problems in some cities. Urban geese are enjoyed by many city-dwellers, but as goose numbers increase they sometimes become too much of a good thing.

Most current populations of giant Canada geese stay near their nesting areas all year or migrate only short distances. However, some populations have very traditional movement patterns, such as the flock that nests in central Manitoba and winters in Rochester, Minnesota.

## *Lesser and Richardson's Canada Geese*

These subspecies nest on the mainland and islands of the Canadian arctic, even farther north than the interior subspecies. Their small size allows them to reduce the time required for breeding (by reducing the period needed to lay eggs, complete incubation, and for young to fledge). However, small size also makes them intolerant of the cold winter temperatures at northern latitudes.

Lesser and Richardson's Canada geese undergo the longest migration of any subspecies — up to 3,000 miles from Baffin Island to the Mexican coast. These subspecies usually spend little of their year in the Mississippi Flyway, more commonly migrating and wintering in the Central Flyway to our west. In all but a few areas, such as Manitoba and Louisiana, encountering these geese should be considered a real find.

## *Canada Geese in the Field*

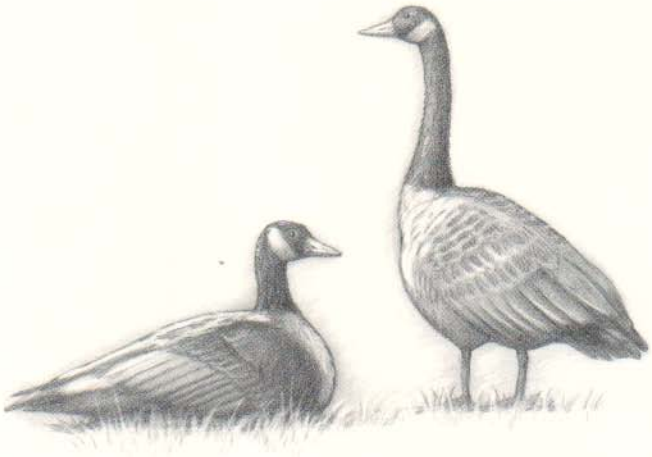
Although Canada geese of different sexes, ages, and subspecies appear similar, much can be determined by carefully observing geese in the field. Geese in a high V-shaped flock are probably on a long distance flight; for short hops, flocks are not as well organized. Giant Canada geese generally fly with slower, more deliberate wing beats, often fly lower, and are less wary than interiors. Some giants can be

distinguished from other subspecies by their larger size, more erect stance, and whiter breast plumage. The small size and high-pitched voice of the lesser and Richardson's subspecies are very apparent.

Just before a flock of geese lands, watch for small subgroups that split off and land close together. These subgroups likely are pairs, pairs with their young of the year, or even pairs with their young and one-year-olds that have rejoined their families.

Watch for aggression among individuals or families while geese feed during winter. The aggressors wave their necks erratically, gape their bills and hiss, and charge other geese while holding their outstretched necks parallel to the ground. Skirmishes may progress to in-flight chases, biting, and striking opponents with flailing wings. If the aggressors successfully displace the opponents, the victorious family members may perform a triumph ceremony, honking and rapidly moving their necks up, down, in, and out. Triumph ceremonies also occur in the spring as males protect their mates from other geese.

During spring, behavior often reveals the gender of paired geese. Before nesting, paired females spend most of the time feeding, while their ganders stand guard with alert head-up postures. If you repeatedly see a single goose standing or resting in the same area it may be the gander of a nesting pair. Scan the area for a nesting female on islands or any raised area near water. If undisturbed, she will be sitting upright, but when she perceives danger, she will freeze with her neck stretched low along the ground. Don't disturb nesting females — they may abandon their nests.



# Canada Geese in the Hand

If you are fortunate enough to shoot a Canada goose, take a moment to examine it. First check for legbands, neck collars, and radio transmitters.

Examine the tail feathers of your goose for notches near the midvein. These notches are produced when down feathers break off the tips of the gosling's first tail feathers. If notches are present your goose is less than 1 year old. If no notches are present the goose may be an adult, or a juvenile that has already replaced its first tail feathers with new ones. To verify the age, examine the ninth and tenth primary feathers (see card). The primaries of juveniles are pointed and those of adults are rounded. Other characteristics of juveniles are a streaked and ragged appearance of the upper breast, breast feathers with prominent shafts, and an indistinct division in color between the black neck and the gray breast. In contrast, adults have a sharp division between neck and breast color and uniformly gray breast feathers. Except for primary feathers, these characteristics disappear by midwinter as juvenile body feathers are replaced with adult-like feathers. Adult males often have enlarged bony spurs on the outermost joint of the wing. These are hardened areas, somewhat like a callus, caused by repeated injury during fights with other geese.

*Juvenile Tail*

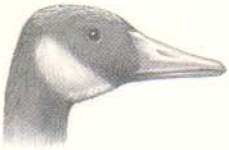
*Adult Tail*

*Tail in Molt*

*Juvenile Wing*

*Adult Wing*

*NOTE: Number of feathers reduced for clarity*



Side


Top

Juvenile
(Note indistinct color separation)

Adult

Technique for opening cloaca

*If you shoot a marked goose you have done nothing wrong, but you do possess valuable information You may keep the band but please report it. Write down the legband number, neck collar color and code (if present), and the date and location you shot the goose and mail to the Bird Banding Laboratory, Laurel, Maryland 20708; or "Bird Band - Washington, D.C.," as stamped on the legband. (The word "AVISE" on the legband is used because it is similar to the word "advise" in several languages.) By doing so, you will receive information on when and where your goose was banded, and contribute to effective management of Canada geese.*

The coloration of the cloaca can also assist you in age determination. The cloaca is light pink in juvenile birds, and becomes dark purple as the bird ages.

To determine the sex of your bird you will need to examine its cloaca. Waterfowl are rare among birds in that males possess a penis-like structure. To examine the cloaca, hold the goose belly up with the head toward you . Bend the tail downward with your index fingers and use your thumbs to press in and down on the cloaca's outside edges to expose the inside surface. This is not as easy as it sounds! The penis is located at the eight o'clock position in the cloaca. The penis of a juvenile is about the size and shape of the lead point of a pencil. An adult's penis is about 3/4" long and coiled. Females have a small flat protrusion (usually less than 1/16" long) at the six o'clock position in the cloaca. You can also check the sex by locating testes or the ovary within the body cavity, as described below.

*Adult Male*

*Female*

Once you have determined your goose's sex, try to determine its subspecies. Weight and bill length should readily identify one of the small subspecies (see page 3), but interior and giant Canada geese are easily confused because they overlap greatly in size. Use the enclosed card to measure the bill of your goose to determine the probable subspecies. This method will correctly separate giants from interiors about 85 percent of the time (Moser and Rolley, 1990).

Further examination can reveal several things about your goose. After plucking, examine the breast to determine your bird's physical condition. A hatchet-like cross-section indicates poor body condition; a rounded breast cross-section indicates good condition. Make a shallow cut in the abdomen and look for the abdominal fat depot, another indicator of body condition. This yellowish one-piece fat depot varies from absent to the size of a hockey puck.

Next, locate and carefully remove the large muscular gizzard, proventriculus (part of the gut where food enters the gizzard), and intestine, and set them aside. Inside the body cavity, along the goose's backbone and near the top of the kidneys, look for the single ovary or paired testes. You may need to tear some of the thin membranes out of the way with your finger or knife. The ovary will look like a small bunch of grapes on the bird's left side. Each "grape" (follicle) is a potential egg. Follicles of juveniles'

ovaries are very small and of uniform size. Adults' ovaries will have follicles of various sizes, up to about 3/16" in diameter. The two testes of a male are yellowish bean-shaped bodies from 1/16" to 1/2" in length, one on each side. You may prefer to look for these organs as you remove the viscera.

To find out what your goose was eating, examine the proventriculus and gizzard . These organs chemically and mechanically break down food. Food items in the proventriculus will be more easily identifiable and may give you a clue on where to go on your next hunt. Cut the gizzard diagonally to separate the two grinding plates that break up food. Within you will find food remnants and grit — the small stones that aid in grinding food. Look carefully for shot pellets that geese mistakenly swallow as seeds or grit. You might find additional food in the esophagus as you finish cleaning your bird.

## *Canada Goose Management*

Canada geese represent one of North America's wildlife success stories. Increased migrant goose populations have greatly improved opportunities for observation and hunting, and increases in giant Canada geese have improved these opportunities even in areas rarely used by migrant geese. Numbers of geese counted and harvested document the recent success of Mississippi Flyway Canada geese. The estimated winter population in the Mississippi Flyway in 1943-44 was about 76,000. In 1989 the estimate was about 1,879,000 — nearly a 25-fold increase (Fig. 2). An average of 347,000 Canada geese were harvested annually in the Mississippi Flyway between 1985-1988, up from 118,000 during 1962-1965. However, future populations and harvests can change quickly, given the size of the populations and the unpredictability of weather and other factors.

Besides providing recreation for goose hunters and watchers, increased goose populations have created millions of dollars in revenues for providers of lodging, food, and outdoor supplies. At Wisconsin's Horicon National Wildlife Refuge, an estimated 120,000 to 140,000 goose watchers contributed about $2.1 million to the local economy during the fall and winter of 1986 (Heinrich, 1988). Goose hunters added about $1.5 million to that total.

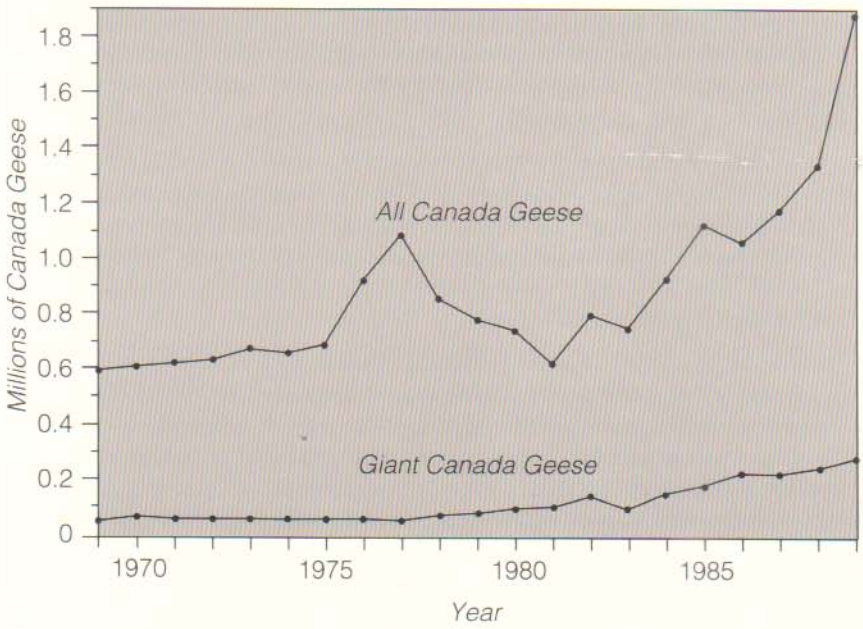
The recent increase in Canada goose populations is due, in part, to management and research programs conducted cooperatively by government agencies and universities. Through an extensive system of data collection and analysis, managers attempt to maintain population levels that maximize recreational opportunity and minimize crop depredation and nuisance problems. Goose hunters and watchers contribute much information to these programs.

Resource agencies annually mark thousands of Canada geese throughout the Mississippi Flyway with metal legbands and plastic neck collars. When

marked geese are shot or observed and reported to the U.S. Fish and Wildlife Service, a wealth of information is gained. For example, analysis of these encounters has enabled managers to subdivide interior Canada geese of the Mississippi Flyway into three "populations." Each population tends to breed, migrate, and winter in distinct geographic areas within the flyway (Fig. 1). The Mississippi Valley, Eastern Prairie, and Tennessee Valley Populations were named to reflect their wintering areas. Consideration of separate populations results in better management than a flyway-wide approach. Other analyses of banded geese help managers estimate total goose harvest, annual survival rates for different ages and sexes, and other aspects of natural and hunting-related mortality.

In addition to banding geese, biologists annually monitor goose breeding populations and reproductive success through ground and aerial surveys. Researchers have found that spring weather on the breeding grounds greatly affects annual gosling production. An early spring thaw results in a higher percentage of adult geese nesting, larger clutch sizes, and better nesting success. Thus, managers can reasonably predict annual changes in goose production by monitoring snow cover and weather on the breeding grounds. Successful breeding seasons lead to increased fall migra-

***Fig. 2.*** *Numbers of giant and of all subspecies of Canada geese counted during coordinated mid-December surveys in the Mississippi Flyway from 1969 to 1989.*



tions and allow liberal harvest regulations. In years of poor production, restrictive hunting regulations protect the breeding population for subsequent years. Fortunately for geese, their northern breeding grounds are much less vulnerable to drought and agricultural development than are major duck breeding areas in the prairie pothole region of central North America.

*Each winter biologists throughout the Mississippi Flyway conduct coordinated aerial and ground surveys of Canada goose populations. Results from the mid-December survey show an increase of 219 percent for all Canada geese and a 460 percent increase for the giant subspecies since 1969.*

Managers also conduct periodic surveys on the wintering grounds. During extensive December Goose Surveys and Mid-Winter (January) Waterfowl Surveys, biologists use planes, cars, and boats to count wintering waterfowl. During the 1990 Mid-Winter Survey, biologists traveled more than 53,000 miles in the Mississippi Flyway. These surveys provide data on waterfowl distribution as well as a check on the estimates of population size and reproduction gathered on the breeding grounds.

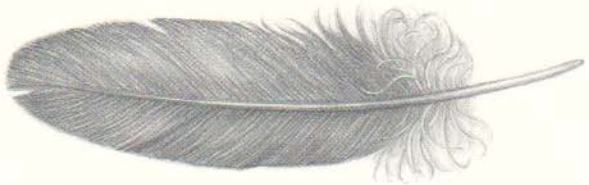
Waterfowl hunters provide information for goose management through the federal harvest questionnaire and "parts survey." A random sample of federal duck stamp buyers are asked to keep track of the waterfowl they shoot and answer a questionnaire after the season; the results provide an estimate of total waterfowl harvest. Some hunters are asked to send the tail feathers from each goose they harvest to the U.S. Fish and Wildlife Service for age determination. Analysis provides another estimate of the gosling production achieved the previous summer.

Twice each year, the Mississippi Flyway Council meets to develop waterfowl management programs. This group of biologists and administrators (representing each of the flyway's states, provinces, the U.S. and Canadian wildlife services, and other wildlife resource agencies) evaluates the data on goose populations and recommends future management practices, harvest objectives, and regulations. After further review, the U.S. Fish and Wildlife Service sets maximum bag limits, season lengths, season framework (earliest and latest that seasons can begin or end), and other regulations needed to maintain desired populations. States then set their own seasons within these guidelines to meet their specific needs and the desires of their goose hunters.

The outlook for geese in the Mississippi Flyway is bright, partly because major nesting areas are relatively free from human disturbance. However,

habitat destruction and the persistent drought of the 1980s ravaged many North American waterfowl populations. The North American Waterfowl Management Plan, signed in 1986, is a major step toward ensuring a brighter future for North American waterfowl. This landmark agreement between the United States and Canada establishes specific goals and procedures to safeguard North America's waterfowl and their habitats. Goals of the plan include increasing the number of wintering geese to over 6 million and the fall flight of ducks to more than 100 million.

While enjoying your goose dinner or marveling at the day's observations, consider the enjoyment you obtain from waterfowl. The North American Waterfowl Management Plan relies on renewed commitment and cooperation among federal and state governments and the private sector. Your support can help. Please contact your state natural-resource agency, your area chapter of Ducks Unlimited, or a National Wildlife Refuge for information on how you can help waterfowl and other wetland wildlife.



# *Frequently Asked Questions About Canada Geese:*

***Do geese mate for life?***

Generally, yes. Although if one of the pair dies, or in some other infrequent cases, new pairs will be formed. Family unity is also very strong; adults and their goslings migrate from the breeding grounds as a unit and may stay together throughout the winter. Some one-year-old birds rejoin their parents and newly hatched siblings during fall migration and winter.

***Why do geese honk?***

Voice is an important component of goose social life. One researcher identified distinct meanings of nearly two dozen different Canada goose calls such as alarm or feeding calls. Therefore, goose hunters should make sure their calls are sending the correct message. Apparently, voice recognition allows a temporarily lost goose to locate and rejoin family members among a flock of thousands.

***Why do geese fly in V formation?***

The answer is still a mystery. Theories include: to take aerodynamic advantage of the air eddies created by the wings of other geese; so geese on the ground can recognize the flock as their own species and join the migration; or to allow each bird an unobstructed view of the migration route.

***Which goose leads the flock during migration?***

Contrary to folklore the oldest and wisest goose does not always lead the flock. The lead changes frequently during migration and even juveniles lead at times.

***How do geese find the same nest site or wintering area year after year?***

The amazing capability of birds to navigate within miles or even yards of previously used areas is still only partially understood. Researchers have shown that birds navigate at times by following natural landmarks (rivers and mountains), or by using the sun, stars, or the Earth's magnetic fields. In a familiar locality, geese likely navigate much as humans do in their own neighborhood.

***How long do geese live?***

It is not uncommon to encounter banded geese older than 10 years, and the longevity record for a wild Canada goose is at least 24 years! Banding analyses have shown that about 60 percent of juvenile geese survive their first year. But annual survival in subsequent years averages about 80 percent, and may increase as geese age.

### *How can I encourage Canada geese to nest on my pond?*

Remember, only the giant subspecies will nest in southern areas; for interiors, the urge to migrate north is too strong. Secure nesting sites (i.e. islands or artificial structures over water), lack of disturbance around the potential nest site (especially from dogs, etc.), and open areas of short grass for grazing are most important. Contact your state natural-resource agency about nest structure plans and other ways to attract geese.

## *For More Information on Canada Geese See:*

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*— or contact the nearest natural-resource management agency or the Ducks Unlimited chapter in your area.*

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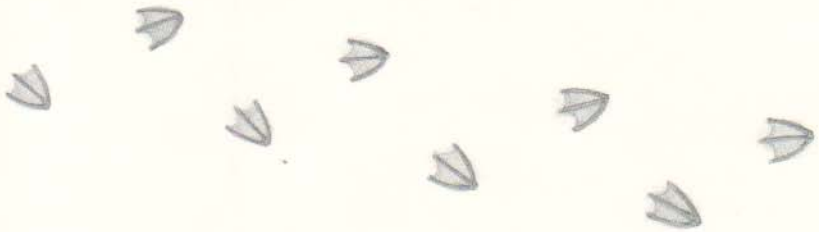

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*Field Notes*

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