



## Snow Goose

The snow goose, *Anser caerulescens*, is one of the world's most abundant waterfowl species. Snow geese breed in the arctic and subarctic regions of North America and Russia during spring and summer, then migrate south to spend the winter in inland and coastal areas, including Pennsylvania. They feed voraciously on vegetation, and recent population increases have led to serious damage of the species' habitat, mainly on its breeding range but also in some wintering areas.

### Biology

A medium-size goose, the snow goose is 27 to 33 inches long, with a wingspread of about 54 inches. It has a chunky body and weighs from 3.5 to 7 pounds, with males slightly heavier than females.

*Anser caerulescens* has two distinct subspecies, the greater snow goose and the lesser snow goose. The lesser snow goose is dimorphic, which means it comes in two different color phases, a white phase and a blue phase. The white phase is all white with the exception of black primary wing feathers. On the blue phase, the head and front of the neck are white, and the body is gray-brown, with white or gray underparts. Intermediate color forms also occur. Juvenile snow geese often have gray feathers rather than white. On all snow geese, a black patch on the edges of the bill suggests a grin or smile when viewed from the side. The eyes are dark, the bill is pink, and the legs are dark pink. White individuals sometimes show rust-colored stains on the head and neck, caused by the birds' grubbing for food in muddy ground.

Greater snow geese are the primary subspecies wintering within Pennsylvania and historically were the only subspecies wintering in Pennsylvania. The lesser snow goose's U.S. wintering range has traditionally been a column sweeping from north to south through the Midwest part of the country and not reaching as far east at Pennsylvania. However, the range of the lesser snow goose continues to expand and blue phase geese are being seen more frequently on Pennsylvania wintering grounds. Recent estimates suggest as many as 20 to 30 percent of the snow geese now wintering in Pennsylvania are lesser snow geese.

Snow geese are good swimmers. They do not normally dive to find food but can submerge to evade predators. They walk



readily on land and run swiftly. They sleep floating on the water, or on land, sitting down or standing on one leg; the head is held low or tucked partway beneath one wing. Strong fliers, snow geese can reach air speeds of 50 miles per hour. Snow geese are extremely vocal. Individuals sound a *whouk* or *kowk*, given repeatedly in flight and on the ground and resembling the shrill barking of a dog. When feeding, snow geese make quieter *gah* notes. Parent birds utter *uh-uh-uh* vocalizations to their goslings.

Snow geese feed in shallow water and on the ground, typically in saturated soil. On their breeding grounds they eat leafy parts of grasses, sedges, rushes, and other aquatic plants, and grub out the roots and tubers of a variety of land plants and shrubs. En route to and on the southern wintering grounds, they dine on aquatic grasses, sedges, and rushes; berries; corn, wheat, barley, and other grains gleaned from harvested

fields; and pasture grasses and leafy stems of crops such as winter wheat and rice. In winter, snow geese feed from two to more than seven hours per day. In spring, when building up fat reserves for migration, they may feed more than 12 hours daily.

Males and females mate for life but will find a new mate if their mate is lost or dies. Most snow geese choose mates having the same color as the family in which they themselves were reared. Individuals pair up during their second winter or on their second northward migration, when they are almost two years old. Generally they first breed successfully at age three. During courtship, the male puffs up his body and stands in an exaggeratedly straight and tall posture. Males and females display to each other by raising the head and neck, calling vociferously, and flapping their wings. Mating takes place in shallow water and on land.

Snow geese nest on arctic tundra near river mouths and on islands in lakes and rivers, usually within five miles of the coast. They gather in colonies that vary greatly in the numbers and densities of pairs. A pair defends an area around their nest, where both partners feed heavily. The female builds a

shallow nest out of plant material and down plucked from her body; she may reuse her last year's nest. Nests are often sited on low ridges or hummocks offering good visibility over the surrounding terrain. A female typically lays three to five creamy white eggs, sometimes as many as seven. Incubation is by the female alone, with the male remaining close to the nest. Sometimes one pair may trespass in another pair's territory; while the resident male is occupied in driving off the intruding male, the intruding female tries to lay an egg in or near the resident female's nest. Because unattended eggs attract predators, a female will usually roll a deserted egg into her own nest, which can lead to her rearing another female's young. Biologists describe this phenomenon as "nest parasitism."

Key nest predators are arctic and red foxes, herring and glaucous gulls, and parasitic jaegers. Polar bears, black bears, gray wolves, and ravens also take some eggs. Snow goose eggs hatch after 22 to 23 days of incubation. The goslings emerge wet, but they dry out within four hours beneath the brooding female. Goslings are able to walk, swim, dive, and feed as soon as they leave the nest, usually within a few hours of hatching.



Both parents help raise the young. In shifting about between food sources, a family may walk more than 2 miles per day and up to 45 miles during the course of the brood-rearing season. Goslings graze on vegetation, and they also eat some insects. They grow rapidly, gaining around 5.5 ounces per day. Goslings are taken by gulls, foxes, and snowy owls; adults are occasionally preyed on by foxes, wolves, bears, and bald and golden eagles.

The young begin to fly 42 to 50 days after hatching. They stay with their parents while migrating south for their first winter. The family remains intact through the winter and during the migratory journey north again in spring. After arriving on the breeding grounds, the family breaks up and the adults begin rearing another brood.

During migration, snow geese fly both by day and night often traveling in large flocks. Usually they migrate along fairly narrow corridors, with traditional stopping points along the way. Migrating snow geese take advantage of following winds, good visibility, and periods of no precipitation. They fly in long, diagonal lines and in V-formations, at altitudes of up to 7,500 feet. When preparing to land, they may tumble to lose height in what has been described as a "maple-leaf" maneuver.

The species' breeding range extends from Russia east to western Greenland. Population delineation across the range is continually being refined as new research and monitoring data is accumulated and management actions are developed through the cooperative flyway council process. The western population breeds in Russia, Alaska and Canada's Yukon, Northwest, and Nunavut territories and winters from Oregon south to Mexico, with concentrations in the Central Valley of California. The midcontinent population breeds from Nunavut Territory east to Hudson Bay and winters in the U.S. Midwest south to Louisiana and Texas, with concentrations in Arkansas, Kansas, Louisiana, Missouri, and Texas. The eastern population breeds on islands in the High Arctic, including Ellesmere and Baffin. The eastern population winters along the Atlantic Coast from Massachusetts to North Carolina, with concentrations in southeastern Pennsylvania, New Jersey, Delaware, Maryland, Virginia, and North Carolina. In winter, snow geese are highly gregarious and often feed in flocks numbering thousands of individuals.

Migrants follow all four major North American flyways. Migration north from wintering areas takes place from February to May. In autumn, snow geese depart from the northern breeding areas in September and arrive in wintering habitats in November and December. In Pennsylvania, snow geese are seen more frequently in spring than in fall. They pass through the state from mid-February to late March, with a peak in late February or early March; an excellent place to view migrating snow geese is the Game Commission's Middle Creek Wildlife Management Area in Lancaster County. Peak numbers have been recorded as high as 200,000 birds. In autumn, the greatest numbers of snow geese pass through Pennsylvania in November. Each year, weather conditions and food availability influence migration dates.

Snow geese can live more than 26 years. Individuals perish from avian cholera, hitting power lines in flight, hunting and predation. Potential predators on the wintering range include coyotes, foxes, and eagles.

## Habitat

In summer, snow geese nest along braided river mouths, on lake and river islands and in sections of arctic tundra studded with ponds. Many of the greater snow geese that winter in Pennsylvania nest in the eastern high arctic with Baffin and Bylot islands containing the largest colonies. They favor areas that become clear of snow early in the year and do not flood during the spring thaw. Parents lead their goslings to food-rich areas including damp meadows, edges of freshwater lakes and ponds, and tidal marshes. During spring and fall migrations, snow geese frequent freshwater and brackish marshes, slow-moving rivers, lakes, ponds and farm fields. Winter habitats include coastal marshes, wet grasslands and agricultural fields. Pennsylvania is attractive to snow geese because of the large number of agricultural fields. Waste grains left after harvesting allow birds to recharge fat reserves needed for spring migration and nesting and thus has been implicated in increasing survival rates of snow geese. At times, snow geese can be destructive feeders, pulling stems and roots of plants out of the ground. This grubbing behavior is largely responsible for extensive habitat damage of marsh habitats on both breeding and wintering areas.

## Population

Around 1900, the population of snow geese had ebbed to only 2,000 to 3,000 birds. During the twentieth century and into the twenty-first century, the population has burgeoned as snow geese have begun taking advantage of farm crops, including waste grain, along migration routes and in wintering areas. In some areas, populations have increased as much as 9 percent per year. Biologists estimate that there are now 10 to 20 million snow geese in North America, a population that may be too large to be environmentally sustainable.

Each year, wintering populations vary in abundance, depending on nesting conditions in the arctic (cold, wet weather may drastically lower breeding success); the availability of food on breeding grounds, staging areas, and stopover points along migration corridors; and hunting pressure. Harvest estimates since 1998 indicate that from 1 million to 1.5 million birds are harvested annually. Recent conservation hunts implemented in Canada and the US have been successful in doubling the harvest rates of snow geese and bringing down the populations of both lesser and greater snow geese. When snow geese populations are too large, the birds' feeding can destroy their own habitat, which is also used by other species.



## Canada Goose

The lines and vees of geese come south from the tundra. The birds pass over Pennsylvania each fall, some traveling by day others winging across night skies. Their flight can be high — so high that their incessant calls do not reach earth — or low enough that the honking carries clear as church bells on a frosty morning. The lines and vees may be long and undulating, or tight, strong and symmetrical. They are following long established migratory highways to their wintering grounds — an ancient rite of autumn that will be reversed in spring.

### Biology

The Canada goose (*Branta canadensis*) is a member of Order Anseriformes, Family Anatidae, a large group comprising all North American waterfowl. Waterfowl are further divided into seven subfamilies, one each for swans and geese, and five for ducks.

Canada geese belong to subfamily Anserinae. They are closely related to emperor, snow, blue, Ross's and white-fronted geese, and brants. There are two species of Canada geese — the small, tundra-breeding cackling Canada goose, *Branta hutchinsii*, and the larger-bodied *Branta canadensis*, which has seven recognized subspecies. As a group, Canada geese are often referred to as "honkers."



Three distinct Canada goose subspecies occur in Pennsylvania. Two are migrants that breed in Canada; the third breeds here. The migrants comprise geese from the Southern James Bay population (*B. c. interior*), which fly over western-most Pennsylvania, and the Atlantic population (*B. c. canadensis*), which migrate over eastern Pennsylvania. Our resident geese are giant Canada geese (*B. c. maxima*). Resident geese are largely non-migratory; they nest and winter here. The growth of this population has been phenomenal. Prior to 1935, no Canada geese nested anywhere in Pennsylvania. Today they are found in every county.

Geese are large, plump birds with long necks, short wings, a broad, round-tipped bill and short legs. Their legs are set farther forward than those of ducks or swans; this adaptation permits them to walk and graze on dry land. The feet are webbed between the three front toes. Adult males or ganders of the interior race average 36 inches in length and weigh approximately 9 pounds. Females and immatures are a bit smaller and lighter.

Both sexes of Canada geese look alike. The bill, head, neck, legs, feet and tail are black. There is a broad white cheek-and-chin patch; the upper body is gray-brown. Flanks and underwings are a lighter gray, as are the breast and belly, which are also faintly barred. Geese have large amounts of down — fluffy feathers close to the body which create insulating dead air space — to keep them warm in cold weather.

Grazing birds, geese feed on wild and cultivated plants. They eat rhizomes, roots, shoots, stems, blades and seeds. Foods include widgeon grass, pondweed, eelgrass, spike rush, American bulrush, cordgrass, glasswort, algae, grass, clover, wheat, millet, corn, barley and rye. They can damage cultivated crops, particularly young shoots of fall-planted wheat. Animal matter isn't a major part of their diet, although they sometimes eat insects, crustaceans and snails.

When feeding in shallow water, geese tip their bodies, dip their heads under and pull up vegetation. On land, they feed in groups — and at least one member of the party always has its head up, looking for danger. Geese generally move in patterns to feed. Each day at about dawn, they leave the water — river, pond, lake, impoundment, or other body of water — fly to feeding areas, and feed for two or three hours. Then they return to the water, rest and fly out to feed again in the evening. On such forays they fly distances of as little as a few hundred yards to more than 20 miles, depending on availability of food.

Geese are intelligent and wary. Their vision is sharp and their hearing keen. These senses are multiplied when the birds are in flocks. In regions where they are hunted, they quickly learn locations and boundaries of refuges where they are protected.

A honker usually runs along the surface of the water or ground to gain lift for takeoff, though when surprised it can jump into flight as puddle ducks do. Once aloft, its flight may appear slow and labored — perhaps because of the bird's slow, deep wingbeats and large size — but actually it can reach 45 to 60 mph. In flight, geese sound their distinctive "honking" calls. When feeding, they make a gabbling sound and, when angry, they hiss.

In spring, honkers are among the first waterfowl to breed. Unmated males fight for females. The males approach each other with necks lowered and extended, hissing loudly, pecking and flailing with their powerful wings. Individuals of both sexes usually mate for the first time in their second or third year. The pair stays together as long as both are alive and healthy; if either dies, the other usually looks for a new mate.

Geese nest in a wide variety of habitats. They like sites that afford an open view. These include islands in rivers and lakes, the tops of muskrat houses in large marshes, rocky cliffs, abandoned osprey and heron nests, artificial nesting structures and grassy fields near water. The female usually selects the site and builds the nest. Nests are typically ground depressions lined with sticks, cattails, reeds and grasses. A central cup may be lined with down, which the female plucks from her breast. Outside dimensions of nests vary from 17 to 48 inches, with 25 inches the average. Inside diameter of the central cup is 9 to 11 inches, and the nest may be 3 to 6 inches deep.

The female lays four to 10 eggs (usually five or six). Geese nesting for the first time generally lay fewer eggs than older birds. The eggs are creamy white and unmarked at first, and are either smooth or have a slightly rough texture. As time passes, they become stained. Incubation averages about 28 days. The gander does not sit on the eggs, but always is nearby, guarding and defending the nest and surrounding territory. To avoid detection on the nest, a goose will crouch, extend her neck, and remain still. Although geese are gregarious from late summer through winter, nesting adults dislike crowding.

Goslings are precocial. Their eyes are open, they are covered with a fine, brown fuzz, and they're able to walk and swim soon after they hatch. They leave the nest within 24 hours after hatching. Both parents stay with the goslings, and the female broods them nightly for about a week, and then less often.

Canada geese are highly successful in raising broods, but those nesting in northern Canada are highly susceptible to weather conditions. Late spring snowstorms and cold weather can severely impact nesting and brood-raising. Flooding and predation can also cause nest failure. In Pennsylvania, crows, bald eagles, coyotes, raccoons, opossums and skunks destroy eggs; coyotes, foxes, bald eagles and owls prey on goslings. In northern Canada, red and arctic fox and large gulls are the most important predators of nests and goslings.

Because they're big, strong and aggressive, adult geese are less subject to predation than most other waterfowl with coyotes, bald eagles and large owls removing unhealthy individuals from the population. Disease, parasites and accidents also take their toll.

When young are half-grown, their parents begin to molt. Adults lose their flight feathers and are grounded for about 3 weeks. During this time, the goslings grow their own flight feathers, so parents and young are able to fly at about the same time.

As autumn approaches, geese prepare to migrate. Family groups gather in small flocks, leave their subarctic breeding grounds and fly leisurely to staging areas along the route south. Migrating geese travel by day or night, flying until tired and then landing to feed and rest.

Honkers fly in vees or occasionally in single, diagonal lines. A trailing goose encounters less air resistance, thus uses less energy, because of the turbulence set up by the bird flying just ahead.

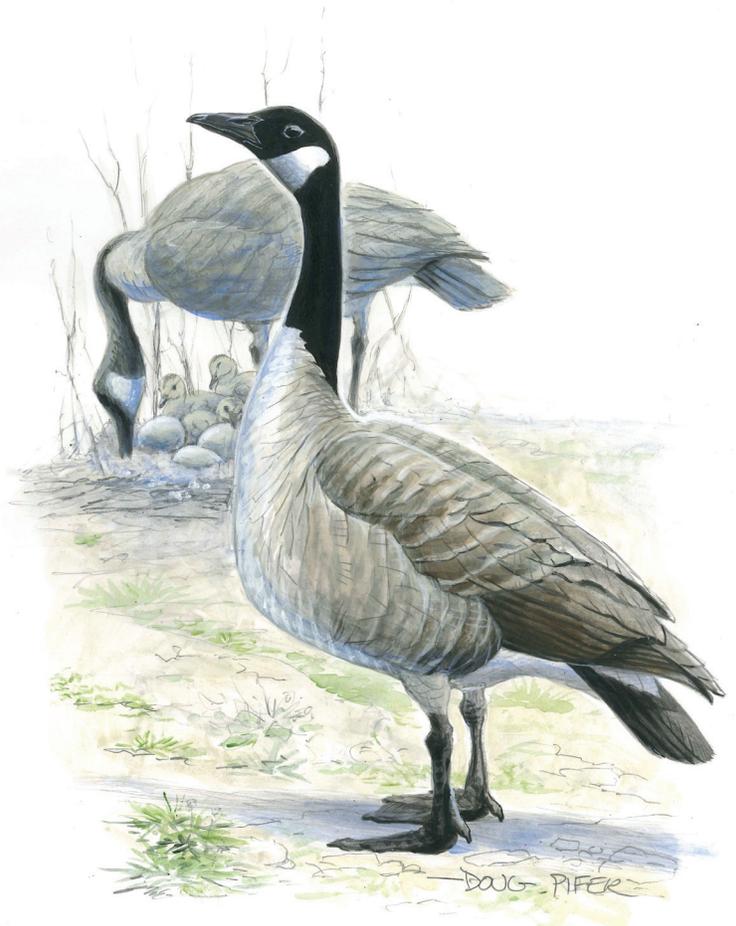
Flight altitudes vary with weather conditions, distance to be flown and time of year. In heavy overcast, honkers might fly only a few hundred feet off the ground. Under fair skies, they tower up almost a mile. An average derived from airplane pilots' reports is 2,000 feet, with 64 percent flying between 750 and 3,500 feet (this is for fall migration; during spring, altitudes average a bit lower). Geese fly high over long distances, lower for short hops.

## Population

The range of the Canada goose blankets the United States and most of Canada. There probably are more honkers on the continent today than when the Pilgrims landed; like certain other wildlife species — blackbirds, crows, woodchucks, and white-tailed deer — honkers have benefited from increased agricultural production. Geese feed abundantly on grains and cereal crops on their migration and wintering grounds. Geese on the Atlantic Flyway now rely more on crops than on aquatic plants.

Early during the 20th century, the Canada goose population had dropped dangerously as a result of unrestricted market hunting on the species' wintering grounds and migration routes. Fortunately, strict law enforcement, wildlife-management practices and increased farming have reversed this trend. The resulting increase in the goose population rivals the comebacks of the wild turkey and white-tailed deer.

Geese are migratory birds and fall under the jurisdiction of the federal government's U.S. Fish



& Wildlife Service. This agency cooperatively manages all waterfowl with the states and Canadian provinces. This work includes monitoring populations and habitat, conducting research and setting annual seasons and bag limits.

## Habitat

Landowners interested in attracting migrating geese can leave portions of crops unharvested. Good foods are oats, barley, wheat, rye, grasses and corn. In feeding studies, fields of corn and small grains attracted most geese. Geese generally will not land close to fencerows, woodlots, houses or barns. Strips of corn alternating with wide grass fields often will draw flights.

Geese are quite mobile — willing and able to fly great distances to find food and resting areas. Grazing birds, they generally are more land-based than ducks, especially when goslings are growing.

Breeding habitat is tremendously variable; they do well in open fields near water, and on islands, rocky cliffs, and other locations. Artificial nesting structures — tubs secured to trees, old tractor tires placed on islands, or platforms built over water — often attract resident honkers. Geese raise

families in city parks, reservoirs and farm ponds, although the vast majority of them breed in the far north.

Migratory geese of the Atlantic Flyway winter primarily in Chesapeake Bay and Delmarva region. Smaller numbers winter from as far north as New York and coastal New England to southeastern Pennsylvania and New Jersey.

In spring, honkers retrace their routes to ancestral breeding grounds. Migrating flocks are composed of several family units, parents and offspring of the previous year, but the yearlings leave their parents shortly after arrival. Adults usually nest in the same locale year after year, some even using the same nest foundation.

In Pennsylvania, geese are common spring migrants in late February, March and early April, with stragglers into May. In spring, resident flocks breed here. Strong concentrations exist within the Game Commission waterfowl areas such as Pymatuning and Middle Creek, as well as other suitable habitat in the state. In fall, honkers are common September-December migrants. If the winter is mild, some stop in the southeastern portion of the state, although most go farther south.



## Mallard

The mallard, *Anas platyrhynchos*, is the most common duck in the United States, North America and the Northern Hemisphere. It is among the best known and most widely recognized of all wildlife. The species possesses the largest breeding range of any bird on the continent, nesting across Canada and Alaska south to California, New Mexico, Kansas, Ohio and Virginia. Taxonomists recognize seven races. The mallard may have been the first domesticated bird, and from it have sprung all domestic duck breeds except the barnyard muscovy.

The mallard is known as a “puddle” or “dabbling” duck. It frequents shallow, marshy habitats, where it obtains plant and animal food on and near the water’s surface, feeding by dabbling with its bill in the shallows and by hoisting its tail in the air and stretching its neck and head underwater. Like all puddle ducks, the mallard can spring directly into the air when taking off. It does not need to run across the water’s surface to build up speed as diving ducks must.

### Biology

An adult male mallard is about 24½ inches long and 2¾ pounds. An adult female is about 23 inches long and 2½ pounds. The male, or drake, has a dark green head, narrow white ring around the neck, and dark chestnut breast. Its rump is black with white outer tail feathers. Its underparts are whitish, its sides are gray, and its back is brownish. The female, or hen, has a buff-colored head and a straw-brown body streaked or mottled with many shades of brown. The speculum (a brightly colored patch of feathers on the trailing edge of the wing and close to the body) is violet-blue bordered with white stripes on both edges. The male has a yellow bill and orange-red



legs and feet. The female has orange feet and an orange bill with dark spots.

Mallards are among the most vocal of waterfowl. The hen makes a variety of quacks. The drake utters reedy quacking sounds and, during mating season, a sharp single or double-noted whistle. Mallards fly in small groups or in V- or U-shaped flocks, usually with 10 to 20 members, but sometimes with as many as several hundred. The mallard’s broad wings and relatively short tail may create the impression that the wings are set farther back than on most ducks. Mallards are swift fliers and excellent swimmers. They may feed and rest in the company of other puddle ducks, including northern pintails and black ducks.

Mallards eat a variety of natural and human-produced foods including: seeds of bulrushes, pondweeds, millet, sedges, smartweed and wild rice; stems, leaves and tubers of many aquatic plants; and acorns. Egg-laying hens and ducklings feed heavily on aquatic invertebrates such as insects, crustaceans and mollusks in addition to plant parts. The mallard’s bill has a serrated edge. The

duck picks up food in the bill, forces water out through the serrations, and ends up with a mouthful of edibles and grit.

When natural foods are plentiful and available, mallards prefer them, but when ice closes up marshes, lakes and ponds, they head for dry land and corn. Perhaps more than any other duck, however, mallards are notorious for feeding in farm fields where they search for grain in the remaining stubble of corn and sorghum fields. Mallards travel up to 25 miles for food. Often, they make two feeding flights per day, one at dawn and the other in the late afternoon.

Mallards mature sexually in their first year. A period of social display begins in mid-fall and continues through winter into spring. Males grunt and whistle, swim, pump their heads, and preen in front of the females. The hens stimulate the courtship with calls and their own stylized body movements. Most pair-forming activities occur on the water, although chase flights in spring are prominent courtship rituals.

Most hens have chosen their future mates by the time mallards arrive on their breeding grounds in the spring. The male selects a home breeding range that he defends against other mallard pairs. The female selects the actual nest site. Mallards primarily nest around freshwater lakes, ponds, marshes and reservoirs across Pennsylvania, but it is not uncommon to find them nesting in agricultural fields and in residential areas.

The hen typically nests within 100 yards of water, on the ground in a depression lined with reeds, grasses and soft down added from her breast. She conceals the nest in tall grass, dead reeds, alfalfa or clover. A few individuals nest in stumps, tree cavities or in the crotches of shrubs and trees.

Eggs, from 6 to 15 but usually 8 to 12, are laid one per day. Shells are smooth and the color varies from light greenish, grayish buff or sometimes nearly white. A hen occasionally will lay eggs in the nests of other ducks. Only the hen participates in incubation. The male deserts his mate at this time. The hen begins incubating when the last egg is laid, so that all eggs hatch at about the same time. Incubation takes 23 to 29 days.

Within about 12 hours of their hatching, the hen leads her young to water. Mallards normally raise one brood per year, but if a skunk, crow, raccoon, opossum or other predator destroys the first clutch, a hen may try again. Re-nesting attempts average fewer eggs (six to eight). Nests are also lost to plowing, hay field mowing and flooding. In addition to the predators mentioned above, snakes, foxes, largemouth bass, muskellunge and



snapping turtles take ducklings. The young can fly after 7 to 8 weeks.

After the drakes leave their mates (May to June), they fly to more secluded areas where they undergo their annual eclipse molt. This replacing of feathers demands considerable energy, and the birds seek out areas rich in high-protein foods. Like other waterfowl, a complete, simultaneous wing molt leaves them temporarily flightless. At this time they are in a drab “eclipse” plumage, which resembles the female’s coloration and provides protection against predators. Hens undergo a similar molt after their ducklings mature. The wing feathers grow back in two to three weeks.

In fall and winter, mallards fly south when ice and snow cover their feeding and resting areas. Among puddle ducks, the mallard and the closely-related black duck are among the latest fall migrants, often remaining as far north as open water prevails. The mallard is one of the earliest ducks to return north in the spring. In Pennsylvania, mallards are common migrants in late February, March and early April.

Typically, the maximum life span of the mallard in the wild is seven to nine years, although rare individuals have been documented living more than 25 years. More than half die before they reach two years of age. Mortality sources include predation, accidents, hunting, and diseases such as botulism, fowl cholera, duck virus enteritis, aspergillosis and others.

## Habitat

Mallard breeding habitat combines shallow-water foraging sites and thick vegetation for nesting. The species prefers open country to woodlands. Ponds, edges of freshwater lakes, sloughs, reservoirs, beaver ponds and marshes are ideal. Mallards often use man-made nesting structures placed over water. They winter on marshes, bottomland swamps, lakes, and open waters of rivers and bays. They feed in these places and croplands.

Most waterfowl species such as American black ducks move away from areas frequented by humans, and consequently have been driven from suitable habitat by expanding towns and cities, rural development and vacation homes. Mallards and Canada geese, less wary of humans, are occupying much of this altered habitat.

## Population

In North America, the densest population of mallards is in the northern prairies of the Great Plains (Montana, North Dakota and the Canadian provinces of Saskatchewan, Alberta and Manitoba), with nearly half of the continent's

mallards breeding there. Mallards winter throughout most of the United States, with heavy concentrations in Mississippi Flyway states of Arkansas, Missouri, Tennessee and Illinois. In the Atlantic Flyway they concentrate in the Chesapeake Bay region. They also winter in parts of Canada, Alaska, Mexico and Central America.

Compared to most species of wildlife, the mallard population has fared relatively well through the changes humans have made to the environment over the past century. Waste grain left by mechanical harvesting equipment provides important winter food, and the construction of many ponds and reservoirs has created a good interspersion of water and suitable land habitat. Mallards, more adaptive than other wild ducks, quickly exploit these chances, even in suburban areas.

In the Northeast U.S., the mallard was considered a rare migrant at the turn of the 20th century. Today it is the region's most common duck. In 1969, hunters for the first time bagged more mallards than black ducks in the Atlantic Flyway, a trend that continues today. The black duck, *Anas rubripes*, is a close relative of the mallard, and the two species hybridize readily.

Mallards annually comprise 50 percent of Pennsylvania's duck harvest. Banding studies have indicated nearly 80 percent of mallards harvested in the commonwealth during hunting seasons are present in the state during the summer. The remaining birds come mainly from Ontario, New York and Quebec.



## hooded warbler



# Wood Warblers

Like jewels strewn through the woods, Pennsylvania's native warblers appear in early spring, the males arrayed in gleaming colors. Twenty-seven warbler species breed commonly in Pennsylvania, another four are rare breeders, and seven migrate through Penn's Woods headed for breeding grounds farther north. In central Pennsylvania, the first species begin arriving in late March and early April. Louisiana waterthrush (*Parkesia motacilla*) and black-and-white warbler (*Mniotilta varia*) are among the earliest. The great mass of warblers passes through around mid-May, and then the migration trickles off until it ends in late May by which time the trees have leafed out, making it tough to spot canopy-dwelling species. In southern Pennsylvania, look for the migration to begin and end a few days to a week earlier; in northern Pennsylvania, it is somewhat later. As summer progresses and males stop singing on territory, warblers appear less often, making the onset of fall migration difficult to detect. Some species begin moving south as early as mid and late July. In August the majority of warblers start moving south again, with migration peaking in September and ending in October, although stragglers may still come through into November. But by now most species have molted into cryptic shades of olive and brown: the "confusing fall warblers" of field guides.

The wood warblers (family Parulidae) are found only in the New World. The group includes 116 species, with more than 50 found regularly in North America. Wood warblers are small lively birds that use a range of habitats. All of the North American species are migratory and spend only a small portion of their annual cycle on breeding territories in North America. Wintering grounds and migration routes are equally critical for wood warblers to exist. Almost certainly most warblers developed in the tropics and extended their ranges northward to exploit new breeding zones. The name "warbler" is a misnomer, because few species possess warbling voices, and many have thin, scratchy, unmusical songs. Males use two types of vocalization: a song to advertise territory, and a shorter call to attract a mate and to communicate with her.

Wood warblers breed in May and June in woods and brushland that may be dry, moist, or wet. A few are habitat generalists, but most warbler species are associated with specific habitat types and show a preference for specific

characteristics within a breeding habitat. They forage from ground level to the treetops and eat mainly small insects and insect larvae plus a few fruits; some warblers take flower nectar. When several species inhabit the same area, their feeding strategies are usually different enough that they do not compete directly with one another.

Nesting habits vary widely. The prothonotary warbler (*Protonotaria citrea*), a rare breeder in wetlands and bottomland forest in Pennsylvania, builds its nest in a tree cavity, often an old downy woodpecker hole. The Nashville warbler (*Oreothlypis ruficapilla*) is one of several species that nest on the ground. Some warblers, such as the pine warbler (*Setophaga pinus*), nest in conifers and are closely associated with eastern hemlock and pine forest; others use hardwood trees; and others such as the golden-winged warbler (*Vermivora chrysoptera*) occupy young forest and early successional habitats. The northern parula (*Setophaga americana*) is found in mature riparian forest with tall trees, usually with scattered conifers, often along steep slopes and weaves its nest into hanging clumps of lichens, twigs, or pine needles. Most species are thought to be monogamous. Generally the female builds the nest. The eggs, usually two

to five per clutch, are whitish with dark spots. Typically, the female does most or all of the incubating, and both parents feed the young.

Warblers are Neotropical birds that winter in the rainforests of Mexico, Central America and South America, where they forage in mixed flocks. These winter and stopover habitats are critical for the prolonged health of these species. There has been more emphasis in recent years for a “full life cycle stewardship” approach to bird conservation that addresses all phases of a bird’s migratory path. Wood warblers are found in a wide variety of woods, thickets, and wetlands in the Neotropical countries including mangroves, seaside scrub, forest edge, and mountain forests. A few cold-hardy species such as the yellow-rumped warbler, *Setophaga coronata*, stay in North America all year, wintering in the southern United States and Mexico. Warblers are small birds with limited fat reserves, and many perish from the rigors of migrating, particularly when suitable habitat is lost or degraded along migration routes. A route followed by many species in the spring requires a nonstop flight from the Yucatan Peninsula across the Gulf of Mexico to Louisiana, Mississippi, Alabama, and Florida, about a 600-mile flight. If migrating birds encounter headwinds, many exhaust their energy and fat reserves, fall into the ocean, and drown. Tremendous numbers of warblers and other night migrating birds die when they fly into communications towers, wind energy turbines and tall buildings, particularly on cloudy nights when migrating birds sometimes become disoriented and attracted to artificial lights on or near these structures. Many individuals are preyed upon by smaller hawks and owls and nests are vulnerable to a variety of predators including small and medium-sized mammals. Warblers have been documented to live for more than 12 years in the wild; most die before reaching that age.

Some wood warbler populations are stable. However, 13 warblers have been identified as priority species, designated as Birds of Conservation Concern in Pennsylvania’s Wildlife Action Plan (PGC-PFBC 2005). One species, the blackpoll warbler (*Setophaga striata*), is listed as state endangered. It is a warbler of northern boreal forests and a rare breeding bird in the state. Another warbler, the cerulean (*Setophaga cerulean*), which breeds in mature forests dominated by oaks, has declined significantly. This forest interior warbler is classified as a species of “High-level Concern” in Pennsylvania and has shown steep declines between the first breeding bird atlas period (1983-89) and the second atlas period (2004-09), losing an estimated 28 percent of the state population during that time. It is among the most seriously threatened songbirds of eastern North America with long-term declines exceeding 70 percent since Breeding Bird Surveys began in 1966. Approximately nine percent of the world’s cerulean warblers breed in Pennsylvania giving the state a high responsibility for this species.

When northern woodlands are broken into smaller patches by logging, coal and natural gas extraction, wind energy projects or home development, warblers lose habitat. In fragmented woods, native birds and mammals, including blue jays,

raccoons, foxes, squirrels, and free-roaming house cats can prey more easily on warblers and their nests. Brown-headed cowbirds, which live in open areas, find greater access to warblers’ nests: the female cowbirds surreptitiously lay eggs in the nests, and when the young cowbirds hatch, they are raised by the host adults, whose own smaller, slower to develop young often do not survive. Another wood warbler sensitive to edge effects is the worm-eating warbler (*Helmitheros vermivorum*), a ground-nesting warbler of the understory. This warbler is strongly associated with Pennsylvania’s deciduous forest. It inhabits steep slopes and ravines with dense patches of understory (such as mountain laurel) and also thick shrubby woodland swamps. Approximately 10 percent of the global population of worm-eating warbler breeds in Pennsylvania giving the state a high stewardship responsibility.

The following is a closer look at some common wood warblers of Pennsylvania.

### Ovenbird (*Seiurus aurocapilla*)

This bird gets its name from the covered dome-shaped nest which it builds on the ground; early observers were reminded of a Dutch oven. An ovenbird looks like a little thrush, olive brown above and with a dark streaked (rather than a spotted) breast and an orange, black-rimmed stripe atop the head. Ovenbirds prefer dry mature deciduous woods, but they also inhabit other forest types including swamplands. As a forest interior species, they do best in extensive wooded tracts and are sensitive to forest fragmentation. Forest quality plays a strong role in the localized abundance of the ovenbird. When forests are degraded by invasive plants, deer overbrowsing and other factors, ovenbird populations experience declines in those areas. Acid atmospheric deposition degrades the soil and decreases forest quality for ovenbirds and other forest birds. Ovenbirds feed on the ground in the leaf litter, taking beetles, ants, caterpillars, bugs, worms, spiders, and snails. The song is an emphatic *Teacher! Teacher! Teacher!*, repeated about 10 times at increasing volume, three to four sessions per minute. The species nests statewide, although it is absent from heavily farmed and urbanized districts. The ornithologist Hal Harrison found cowbird eggs in six of seven Pennsylvania

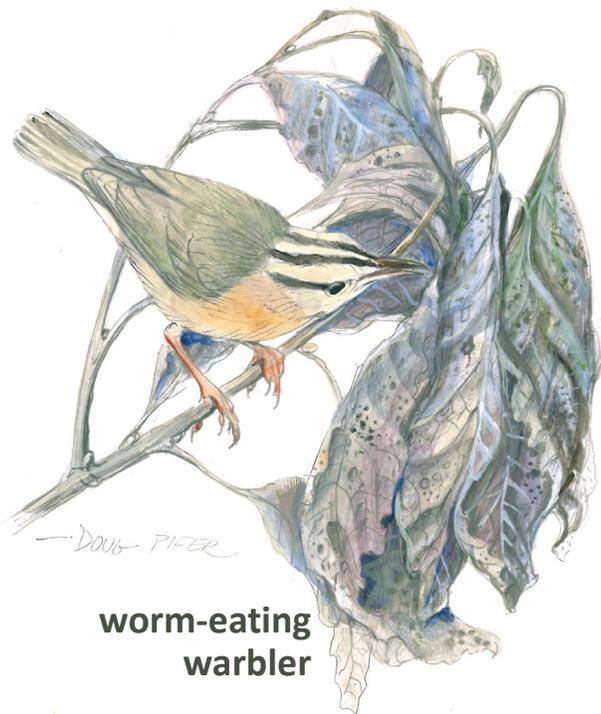


ovenbird

ovenbird nests that he monitored one summer, but research at Hawk Mountain Sanctuary found that few nests in deep forests contained those unwanted guests. Ovenbirds arrive in Pennsylvania in April and May, and depart in September and October. They winter in Mexico, Central America, Florida, and the Caribbean.

### Worm-eating Warbler (*Helmitheros vermivorum*)

The worm-eating warbler is surely one of the most poorly named birds because it eats caterpillars (previously called “worms”) rather than earthworms and does not warble. This is one of the most nondescript of Pennsylvania’s forest songbirds that blends in very well in the deciduous forests where it is found. The worm-eating warbler spends most of its time foraging the shrubs and saplings of the forest understory. It has olive-brown plumage with distinct black stripes on its crown and through its eyes. These head stripes are its best field mark on an otherwise unobtrusive little bird. The Appalachian Mountains are the core of its breeding range and Pennsylvania accounts for about 10 percent of its total nesting population, so it is critical that the state maintains healthy forests for the future of this and other forest birds. It is found primarily east of the Allegheny Front and can be common in the forests of the Ridge and Valley Province. It specializes in reaching into dead leaf clusters and finding arthropods with its long, slim bill. The worm-eating warbler’s song is a very dry, insect-like, trill, easily confused with a cricket, and is like a shortened version of the song of the more familiar chipping sparrow, but deep in the woods. Its song is generally less than two seconds long while a chipping sparrow’s song is usually over two seconds. In Pennsylvania, the worm-eating warbler may arrive back on breeding territory in late April; however, the peak of their return falls in the first two weeks of May. This warbler nests on the ground, typically at the



worm-eating warbler

base of a sapling and often on a slope near water. Against the trunk of a young deciduous tree, the female builds an open cup nest of leaves and lines it with moss and grass. While incubating her three to six eggs, the female blends well with the surrounding leaf litter. These ground nests are vulnerable to nest predators especially small snakes and rodents like chipmunks and shrews. Worm-eating warblers are among the forest birds that are especially vulnerable to fragmentation. They migrate south to their wintering grounds in Mexico and Central America where deforestation continues at an alarming rate.

### Louisiana Waterthrush

(*Parkesia motacilla*)

In April, anglers see this shy warbler walking on stones along the edges of streams, turning over wet leaves with its bill and flitting out over the water to catch prey. A Louisiana waterthrush looks like a thrush and acts like a sandpiper, teetering and dipping, elevated



Louisiana waterthrush

above slick rocks on its long legs, stabilized by large, long-toed feet. It is a warbler of mature riparian forest, a forest interior species that is strongly associated with rolling headwater streams that wind through forests especially where hemlocks line the stream banks. Waterthrushes eat bugs, beetles, adult and larval mayflies and stoneflies, dragonflies, crane fly larvae, ants, caterpillars, and other insects, plus centipedes, small crustaceans, salamanders, and snails. They breed from late April to June along rushing brooks, sluggish swamp streams, and moist hillsides, always in woods. A pair builds their nest in a hole in the stream bank, hidden by tree roots, weeds or grass. An estimated eight percent of the world’s population of this species breeds in the state. Its streamside presence during spring and summer is an indicator of excellent stream quality. Louisiana waterthrushes nest throughout the East. They winter in streamside forests in Mexico, Central America, the Bahamas and the Greater Antilles.

### Northern Waterthrush

(*Parkesia noveboracensis*)

A close relative of the Louisiana waterthrush is the similar looking, northern waterthrush. It is a songbird of the north woods, a ground-dwelling warbler of wooded swamps, thickets, and bogs. Although their ranges overlap in Pennsylvania, the northern waterthrush has a much more limited distribution, occurring in the state’s higher-elevation forest wetlands primarily in the glaciated portions

## golden-winged warbler



of northern Pennsylvania, also in areas of the Ridge and Valley Province. The northern waterthrush prefers cool, dark woodland with standing water and slow moving streams and is found in thickets bordering streams, dense rhododendron swamps, shrub-scrub wetlands, woodland bogs and boreal conifer swamps.

### Golden-winged Warbler (*Vermivora chrysoptera*)

This is a species of early successional forest. The golden-winged warbler has experienced dramatic long-term declines across the northeastern United States and is a Species of Greatest Conservation Need in Pennsylvania. Habitat loss has played a role in this decline but hybridization with the blue-winged warbler is also a major factor. Golden-winged warblers nest in disturbed and young forests and thickets as well as scrub barrens and wooded wetlands. It spends winter in Central American and northern South American forests.

### Black-and-white Warbler (*Mniotilta varia*)

This common bird acts more like a nuthatch or a creeper than a warbler, foraging methodically in tree bark, circling trunks and limbs of trees while looking for insects and their eggs. An unusually long back toe and claw allow it to easily move about the bark's surface. Both males and females have zebra stripes on their back and crown. Next to the Louisiana waterthrush, the black-and-white warbler is the earliest spring migrant; individuals are easily observed before the leaves push out.

They often feed low in trees and usually nest on the ground in deciduous woods and show a preference for dense forest with a thick understory. The male sings a thin *weeseee, weeseee, weeseee*, repeating the phrase at least seven times. The female builds a nest out of dry, dead leaves and lines a central cup with grasses, strips of grapevine bark, rootlets, and weed fibers. The nest is built at the base of a tree or tucked partway under a log, stump, or rock. Cowbirds often heavily parasitize black-and-white warbler nests. Black-and-white warblers winter in Florida, the Gulf Coast states, the West Indies, and from Mexico south into South America.

The somewhat similar-looking blackpoll warbler (*Setophaga striata*) nests in very few boreal conifer forests and wetlands in the state, reaching the southern extent of its nesting grounds in Pennsylvania. More about this Pennsylvania Endangered Species can be found on the agency's website.

### Common Yellowthroat (*Geothlypis trichas*)

*Witchity, witchity, witchity* sings this olive-yellow bird with a gray back, black mask, yellow throat, and whitish belly. (Females lack the black mask). In Pennsylvania, yellowthroats nest in cattail marshes, alder swamps, shrubby bogs, wet meadows, forest edges and openings, utility corridors and old fields. They like thick briary cover and take advantage of small habitat patches with dense undergrowth: an ornithologist once found 17 nests in a half acre swamp in Illinois. As a result of this broad habitat use, they are the most widespread of the warblers. Nests are built on or near the ground, hidden

## black-and-white warbler



## common yellowthroat



in tussocks, weed stalks, and shrubs; they are bulky, made of dry leaves and coarse grasses lined with finer plant matter. Yellowthroats eat insects (grasshoppers, dragonflies, mayflies, beetles, moths, ants, aphids, and many others), spiders, and seeds. They nest statewide across Pennsylvania, except in major urban centers and their surrounding developments, and winter in southern United States, Mexico, and Central America. Draining and filling of wetlands, even very small ones, harms yellowthroats and many other forms of wildlife. Common yellowthroat nests are often parasitized by brown-headed cowbirds. This spunky, active bird is among the most numerous songbirds in Pennsylvania with a population of more than 1.2 million singing males as estimated during the Second Breeding Bird Atlas period (2004-09).

### American Redstart (*Setophaga ruticilla*)

Males are an eye-catching mix of black, orange, and white; orange patches show on the wings and tail, which the bird often flashes open and shut, flushing insects in this way. Redstarts flutter about in treetops, hovering among leaves, leaping up or darting out like a flycatcher to grab a passing insect: a redstart even has bristles framing its mouth to help it catch flying prey. The song is a variable series of high pitched, indistinct *tsee* notes. American redstarts inhabit moist second growth sapling woods, forested wetlands, river groves, forest edges, and tree-lined creek banks. A Wisconsin study found the species to be three times as common in woods of greater than 80 acres than in woodlots comprising less than 14 acres. In Pennsylvania the American redstart is common and widespread over much of the state, especially in forested areas of northern and central Pennsylvania. It is less common and more locally distributed in the highly agricultural areas of the southeast Piedmont region and in the area surrounding Pittsburgh. Redstarts eat insects, spiders, seeds and berries. The female builds a cup-shaped nest in a tree fork or shrub 4 to 70 feet above the ground. Some males breed with more than one female in their territories. Redstarts may begin to head south in late July and migration continues well into October with a peak during the first three weeks of September. They winter in the Gulf Coast states and from Mexico south to northern South America. The species is named after a European bird whose name means "red tail."

### Cerulean Warbler (*Setophaga cerulea*)

The male Cerulean warbler is said to wear the sky on its back, but that beautiful blue plumage is difficult to see in the treetops where it normally dwells. Penn's Woods are home to many Cerulean warblers, so Pennsylvania has a high stewardship responsibility for this species. Due to its declines and the state's high responsibility for it, the Cerulean warbler is considered a High Concern species in the Pennsylvania Wildlife Action Plan. The Cerulean warbler is a small warbler that forages in the tree canopy, usually associated with tall trees in mature forests. It returns to breeding grounds in Pennsylvania in May. Males begin to sing from high perches to establish and defend breeding territory. Their song is a fast buzzy series of notes that sound like *zee, zee, zizizizi, zzzet!*

## American redstart



## cerulean warbler



similar to the black-throated blue warbler but faster. Male cerulean warblers seem to prefer to sing from trees that leaf out later or have “airy” foliage such as bitternut hickory, black walnut, or sycamore trees. They often forage lower in the mid-story of the forest where there are vines and many other places to find insects and spiders. Within a day or two of arriving on territory, the female begins building a nest which is placed on a lateral limb of a deciduous tree 30 or more feet above ground. The nest often sits over an open space or gap in the forest. The female constructs the nest from bark fiber and grass stems held together with spider webbing. Nests are typically concealed by overhanging leaves or vines. Females lay and incubate one to five eggs but once hatched, both parents feed the nestlings. The Cerulean warbler can be found in ridgetop and mountainside deciduous forests, generally where oak trees dominate, and also riparian forests where there are tall sycamores and maples. They prefer large forests but often are found in small gaps within that forest including along hiking trails and near tree-falls. The Cerulean warbler spends the winter in the forests of the Andes Mountains, primarily the broad-leaved evergreen forests of the eastern foothills. This is among the forest species that benefits from shade-grown coffee plantations which offer better foraging opportunities than sun-grown coffee or cattle pastures that are so common in the mountains of Latin America.

## yellow warbler



### Yellow Warbler (*Setophaga petechia*)

This showy all yellow bird has a rufous-streaked breast. The male’s song is a lively *sweet-sweet-sweet-I’m-so-sweet*. One of the most widespread of all wood warblers, the species breeds statewide in Pennsylvania. Look for yellow warblers in low brush or shrubs, wet thickets, woods edges, field edges, orchards, parks, and gardens, along streams, near swamps, and in alder and dogwood stands. Caterpillars may make up two thirds of the diet. Yellow warblers also snatch up mayflies, moths, mosquitoes, beetles, damselflies, treehoppers, and other insects, plucking their prey from twigs and leaves, hovering to glean from the undersides of foliage, and making short flights. The nest is a neat open cup built of plant materials and lined with plant down or fur.

Yellow warblers are often parasitized by cowbirds. Foreign eggs cause some yellow warblers to desert their nests or to build a new nest on top of the cowbird eggs. Because of this brood parasite, yellow warbler nests may contain multiple tiers. Yellow warblers arrive in Pennsylvania in mid-April and early May and head south again as early as July or early August. They winter in Mexico, Central America and northern South America where they typically inhabit forest lowlands, mangrove forest, marshes and dry scrub habitat

### Chestnut-sided Warbler

(*Setophaga pennsylvanica*)

Given its scientific name, this is the only bird named after Pennsylvania. In spring, both sexes sport a yellow crown, black face markings, and chestnut streaks on their sides. The song is similar to the yellow warbler’s song and has been rendered

### chestnut-sided warbler

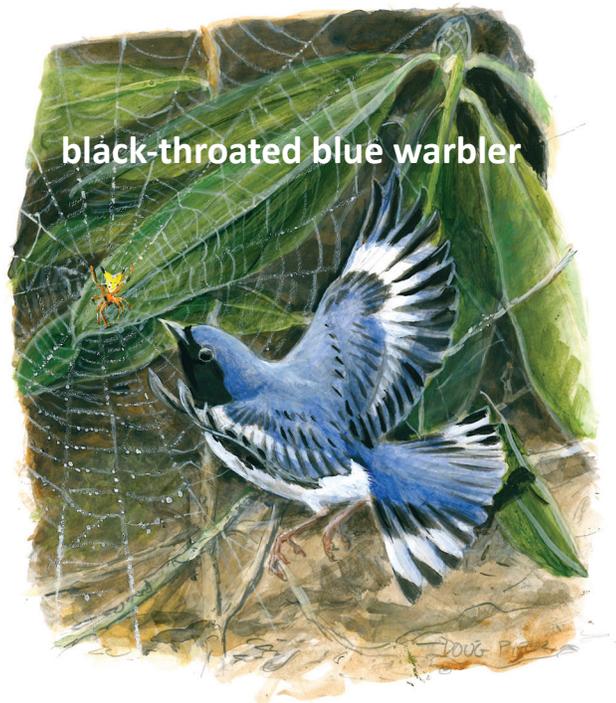


as *please please please ta meetcha*. This now common species increased its numbers after Pennsylvania's virgin forests were logged. Chestnut-sided warblers are a species of early successional deciduous forest. They inhabit brush and briars, slashings of cut over woods and reverting fields. It is also found in open forests with thick stands of mountain laurel. It is a common species in many state game and forest lands. They forage for insects by hopping from branch to branch searching the undersides of leaves for insect prey, darting out now and then to intercept prey in midair. The nest is built in low, dense shrubs or blackberry tangles and is woven out of strips of cedar or grapevine bark, weeds, grasses, and roots, with a soft lining. Immature birds and adults in autumn wear a dull greenish plumage which does not resemble their bright spring plumage. The winter range extends from Mexico through Panama.

## Black-throated Blue Warbler

(*Setophaga caerulescens*)

One of the handsomest birds in the forest, the male black-throated blue warbler is aptly described by its name. The slate blue is set off by a white breast. This forest interior species typically nests in deep woods, deciduous and mixed forest. They often nest in cove forests well-stocked with hemlocks and a bubbling stream with plenty of gnats, moths, crane flies, caterpillars, and other insects. The black-throated blue warbler prefers large contiguous forest tracts with varying levels of vegetation. It is an indicator species of high quality forest with good vertical vegetative structure and is designated a Species of Maintenance Concern in the Pennsylvania Wildlife Action Plan. It mostly forages at low and mid-levels of the forest. Males usually forage higher in the understory than do females; some black-throated blue warblers steal insects from spider webs. Males sing a buzzy, drawn out *zur, zur, zree*. The nest is a bulky cup hidden in a rhododendron, laurel, or



black-throated blue warbler

## black-throated green warbler



shrubby conifer. The species nests commonly in the heavily forested mountains (particularly above 1,650 feet in elevation) of central and northern Pennsylvania and north into Canada. It winters in tropical forest habitats in the Bahamas and Caribbean particularly in the Greater Antilles.

## Black-throated Green Warbler

(*Setophaga virens*)

The dreamy, buzzy song of the black-throated green warbler is one of the most frequently heard natural sounds of Penn's Woods. This is a common nesting bird of Pennsylvania's forests especially the northern hardwood and mixed forests of the mountains. They often are found near conifers and are especially associated with the state tree, the eastern hemlock (*Tsuga canadensis*) which is threatened by the hemlock woolly adelgid and other pests. They can achieve high population densities in conifer forests especially mature stands. Their nests are built fairly low on the forks of tree branches, usually far from the trunk. Their song is a lazy ascending *zee-zee-zoo-zoo-zee* or sometimes rendered *trees, trees, murmuring trees*. This common species has been increasing in range and population in the state over the last several years as the forests have become more mature, but it may be affected by loss of hemlocks and the effects of forest fragmentation. The black-throated green warbler spends the winter in Mexico and Central America.

The other Pennsylvania breeding warblers that were not described in detail include the blue-winged, Nashville, northern parula, magnolia, yellow-rumped, Blackburnian, pine, prairie, Kentucky, mourning, hooded, Canada, and yellow-breasted chat. Rare breeders include Brewster's, blackpoll, prothonotary and Swainson's warblers. Seven other warblers migrate through Pennsylvania and may be seen during spring and fall: Tennessee, orange-crowned, Cape May, bay-breasted, palm, Connecticut, and Wilson's.