WILDLIFE NOTES

Volume 1

BIRDS

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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.

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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 colors 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.

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Tundra Swan

The tundra swan (*Cygnus columbianus*), formerly known as the whistling swan, breeds in northern Alaska and Canada and migrates south to spend the winter along and near the Pacific and Atlantic coasts. Tundra swans fly across Pennsylvania in spring and fall, and some individuals winter in the southeastern part of the state. Two other types of swans may be seen in Pennsylvania: the trumpeter swan (*Cygnus buccinator*), a native migratory species that has been reintroduced in the upper Midwest and Ontario; and the non-native mute swan (*Cygnus olor*), imported from Europe. Swans seen nesting in Pennsylvania are mute swans.

Biology

The tundra swan is four to five feet long and has a wingspan of about 66 inches. It is markedly smaller than both the trumpeter swan and the feral mute swan. Adult tundra swans weigh approximately 10 to 18 pounds, with males somewhat larger than females. The plumage is white, and the sexes look alike. The bill and the front portion of the face are black (trumpeter swans are similar in this respect, while the mute swan has an orange bill with black knobs at the base). Most adult tundra swans have a yellow spot in front of the eye; trumpeters lack this feature. The legs are black. The neck is held straight up most of the time (the mute swan, in contrast, usually keeps its neck in a curved position).

Whether taking off from water or land, before a tundra swan can become airborne it must take many running steps. Individuals can fly up to 50 miles per hour. The flight call consists of one to three syllables, usually described as variations of the sounds *ou, oh,* and *oo*. The voice of a tundra swan sounds fairly similar to that of a Canada goose. Parents and young make softer *kuk kuk* sounds to communicate at close range.

Tundra swans are good swimmers, propelling themselves with their webbed feet. They can dive beneath the water if necessary.

As their name implies, tundra swans breed in the treeless tundra of northern Alaska and Canada's Northwest Territories, Nunavut, northeastern Manitoba, northern Ontario, and northwestern Quebec. The highest breeding concentrations occur in the river deltas of Alaska and the Northwest Territories. Swans that breed east of Point Hope in northern Alaska winter on the Atlantic coast, while birds breeding from Point Hope south winter along the Pacific. Tundra swans are managed as two separate populations – eastern and western – based on their wintering ground affiliations.

On their northern breeding range, tundra swans eat a variety of plants, including sedges, pondweed, pendant grass, arrowleaf, and algae. They consume seeds, stems, roots, and tubers. They also eat a few invertebrates. While floating on the water, tundra swans feed by dabbling with their bills. They also tip their tails upward, submerge their heads, and extend their necks to nip off vegetation as deep as 3 feet below the surface.

Males and females mate for life, forming a monogamous bond. On the breeding range, a pair maintains a territory in which they feed, nest, and rear young. The territory usually includes part of a large body of water, used for feeding and escaping from predators. A typical territory covers an area of about half a square mile. Young pairs may establish home areas a year or more before breeding. Each year, a pair will use the same territory, defending it against other tundra swans and waterfowl including Canada geese, white-fronted geese, snow geese, and long-tailed ducks. When it encounters a competitor, a swan may hiss, stare, raise its wings, and, use the wrist portion of its wings to deliver blows to the intruder's head and body.

The male and the female jointly build a nest out of grasses, sedges, lichens, and mosses. The nest is located on the ground, usually on an island or a low ridge or some other spot providing good visibility. The mound-shaped nest is one to two feet across, with a depression in the center. A pair may reuse the same nest in successive years. Tundra swans court by facing each other, spreading and quivering their wings, and calling loudly. Mating takes place in the water. The female lays three to five (rarely as many as seven) creamy white eggs. She broods her clutch the majority of the time; the male broods only when she is absent. After 31 to 32 days, the eggs hatch. Pairs produce only one clutch per season. If the nest fails, no second clutch is laid.

Young swans, called cygnets, are light gray in color. Their eyes are open when they pip the shell. Their downy feathers dry out a few hours after hatching, and they begin walking about near the nest. Around 12 hours after the last egg hatches, the parents lead the cygnets to water. With the young swimming along behind, the adults use their feet to kick loose and churn up plants on which the cygnets feed. For about a week after hatching, the parents may brood the young. Tundra swans sleep almost exclusively on land during the breeding season; they stand or sit and may rest their head on their back or tuck it partway under a wing.

On the breeding grounds arctic foxes, red foxes, brown bears, wolves, golden eagles, jaegers, gulls, and ravens prey on eggs and cygnets. Parents defend their eggs and young against smaller predators. Swans usually flee their nest when a large predator, such as a bear or a human, is still several hundred yards away. This strategy may make the nest harder to find. Adults molt their flight feathers during late summer. While molting, they cannot fly. If threatened by a predator, a swan will walk or run to the nearest large pond or lake and swim out to the center.

Cygnets are able to fly after two to three months. As the northern summer dwindles, family groups vacate their home territories and fly to staging areas, mainly along brackish shores of river deltas, which remain free of ice longer than other arctic wetlands. In late September, flocks begin heading south. Flocks are composed of multiple family groups and can number more than 100 individuals. The swans fly in V-formations at altitudes of 1,800 to 4,500 feet and higher.

Flocks follow traditional inland migratory routes. The eastern wintering population arrives in early October in the Devils Lake area of North Dakota and the upper Mississippi River in Minnesota. Later, flying by day and night, they make a nonstop migration of almost a thousand miles to wintering areas in coastal New Jersey, the Susquehanna River Valley in southern Pennsylvania, the Chesapeake Bay region, and coastal North Carolina. Some birds winter in the Great Lakes region. Tundra swans arrive at the wintering grounds from mid-November to mid-December. Banding studies indicate that individuals often return to the same wintering area year after year.

Tundra swans winter on shallow tidal estuaries and on freshwater lakes, ponds, and rivers. In the past, tundra swans fed largely on submerged aquatic vegetation, as well as a small amount of animal matter, including clams. As aquatic plants have dwindled due to the destruction of wetlands, wintering swans have shifted to feeding on land. They forage mainly in farm fields, picking up waste corn and soybeans left after the harvest, and eating crops such as winter wheat, rye, and barley. In winter, tundra swans spend the night floating and sleeping on the water. During the full moon, flocks may feed at night. They fly back and forth between resting and feeding areas.

Individual birds tend to lose weight over winter. Studies have shown that adult males may lose 14.5 percent and adult females 18.7 percent of their body weight. When they fly north in the spring, they are at their lowest body weight for the year. Flocks typically leave wintering areas between late February and mid-March and head north by stages. As much as 25 percent of the eastern population stops in the Susquehanna River Valley, where they feed heavily and accumulate energy reserves for migration and later breeding. They depart from the area later in March and move on to the next staging area in southern Ontario. They migrate through Wisconsin, Minnesota, and North Dakota in April, and usually arrive on the arctic breeding grounds by mid-May. Although family groups depart from wintering areas together, parent birds arrive on the breeding grounds unaccompanied by their young.

Tundra swans are long-lived. The oldest known individual was a banded bird that lived at least 23 years. Scientists estimate that 92 percent of adults, 81 percent of juvenile males, and 52 percent of juvenile females survive each year. One study found a 52 percent survival rate for young eastern tundra swans during their first migration.

Habitat

During spring and fall migrations, tundra swans stop to rest and feed in estuaries, shallow ponds, lakes, and marshes fringing rivers. They also set down in harvested fields and fields in which winter grains are growing. The Arctic breeding habitat includes many lakes, ponds, pools, and wetlands.

Wildlife biologists believe that migratory staging areas are important late winter and early spring habitats in which

swans feed heavily and accumulate energy reserves for the coming breeding season. In Pennsylvania, most tundra swans winter along the lower Susquehanna River and at the Game Commission's Middle Creek Wildlife Management Area in northern Lancaster County. Many birds in the species' eastern wintering population stage in these areas. Some tundra swans also may winter along the Lake Erie shore near Presque Isle State Park.

Population

During the late 1800s, the tundra swan population was at an ebb, probably because of unregulated shooting by market hunters. Following the 1918 Migratory Bird Treaty, swan numbers increased. *Cygnus columbianus* was thought to have been extirpated from breeding areas in the southern Hudson Bay region, but the species has recently begun nesting there again, along the coasts of Manitoba, Ontario, and Quebec.

Since the late 1960s, as aquatic plants have declined and mute swans (which compete with tundra swans for preferred habitats) have increased in number in the Chesapeake Bay, the number of tundra swans wintering on the Chesapeake has fallen. A greater percentage of the population now winters in North Carolina, where flocks feed extensively in agricultural fields.

Since 1984, some states have allowed a limited hunting season on tundra swans. In the East, Delaware, North Carolina, and Virginia issue hunting permits for swans. Tundra swans may not be legally hunted in Pennsylvania. The North American Waterfowl Management Plan, a guidance document for waterfowl conservation efforts across the continent, includes target population sizes of 80,000 tundra swans in the East and 60,000 in the West. Today both populations of *Cygnus columbianus* exceed these targets and are considered stable.

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Diving Ducks

Pennsylvania ducks may be grouped into two types: diving ducks and dabbling or puddle ducks. Diving ducks often spend much more of their time farther out from shore than puddle ducks. Both groups can be found on streams, rivers, lakes and marshes. This note covers 15 species commonly called diving ducks.

Diving ducks eat seeds and other parts of aquatic plants, fish, insects, mollusks, crustaceans and other invertebrates. They dive underwater to obtain much of their food. They have large broad feet, fully webbed and with strongly lobed hind toes, that act as paddles. Their legs are spaced widely apart and located well back on the body, improving diving efficiency but limiting agility on land. Their bodies are compact, and their wings have relatively small surface areas; noticeably more narrow than puddle ducks. While this arrangement helps their diving and swimming, it hinders their ability to become airborne. Instead of springing straight out of the water into flight, as puddle ducks are able to do, diving ducks must run across the water to build up speed before taking off.

Diving ducks, puddle ducks, geese and swans begin migrating north through Pennsylvania in late February. Each year there is a peak in migration, when wetlands across the state are crowded with waterfowl. While this period varies from year to year, it often follows heavy nighttime rains in March to early April.

Diving ducks nest in New England, Canada, midwestern and prairie states, the Pacific Northwest and Alaska. Several species inhabit both the Eastern and Western hemispheres. Two species of mergansers, common and hooded (which, though taxonomically distinct from other diving ducks, are usually grouped with them due to similar ecology) breed in Pennsylvania.

Although variable among species, diving ducks are generally less likely than dabbling ducks to breed at one year of age; divers typically breed for the first time when 2 to 3 years old. Beginning in winter and before heading north, and into spring, males in their brightly-colored breeding plumage vie for females. Courtship may include ritualized drinking and preening movements, posturing and calling. Copulation takes place in the water. Males and females form monogamous pairs that last until the female begins incubating eggs; then,

redhead

the male leaves the area and usually joins a band of other males.

Nesting habits and habitats vary from species to species. Generally, female diving ducks lay 5 to 15 eggs in vegetation, tree cavities, or rock crevices over or near the water. Because females do not start incubating a clutch until they lay their last egg, young develop simultaneously and all hatch at about the same time.

Ducklings are covered with down, patterned with shades of yellow or brown to break up their body outlines. Their eyes are open, and they can swim and feed themselves soon after hatching. The group, called a brood, remains together until the ducklings can fly, usually 8 to 10 weeks after hatching.

Adults undergo a post-breeding molt, growing a new set of feathers. Males molt first; in all species, the male's bright nuptial plumage is replaced by drabber, less-conspicuous feathering. While their flight feathers are growing, ducks cannot fly; they keep quiet and stay hidden during this period of vulnerability.

Ducks are preyed upon by raccoons, foxes, mink, hawks and owls; young are also taken by snapping turtles and predatory fish. Crows, raccoons and skunks eat the eggs.

In Pennsylvania, the fall migration of waterfowl begins in late August, peaks in October through November, and ends in late December to early January. Some ducks winter in our state, but most go farther south. Diving ducks winter along the Atlantic and Pacific coasts, across the southern states and in Mexico and Central America.

Habitat is of prime importance to ducks. Wetlands originally covered some 127 million acres in the U.S., but today more

than half of those acres have been drained and converted to farmland, or developed for housing and industry. Drought periodically dries up parts of remaining wetlands, affecting duck reproduction. Ducks are vulnerable to oil spills on coastlines where they winter or breed. Pollution such as siltation, herbicides, pesticides, heavy metals and other industrial contaminants also harm them, either through direct toxicity, accumulation through the food chain, or by killing important food plants or animals.

The Prairie pothole region or "duck factory" in North and South Dakota and the Canadian prairie provinces—Manitoba, Saskatchewan and Alberta—forms the single largest breeding habitat for many duck species. Alaskan and Canadian arctic wetlands are also crucial to geese, swans and ducks. Pennsylvania's southern coastal states form important wintering grounds.

By the early 1900s, unregulated market killing had decimated duck populations along the Atlantic seaboard. Today, most waterfowl populations in the region are stable, thanks to modern law enforcement, scientific management of harvest, and habitat management and preservation. The U.S. Fish and Wildlife Service monitors continental waterfowl numbers. The Service divides the United States into four administrative units called flyways (they correspond to four major migration corridors for waterfowl) and gives states within the flyways guidelines for setting hunting seasons and bag limits. Pennsylvania is part of the Atlantic Flyway.

Duck hunting is a challenging, rewarding sport. To pursue waterfowl, today's hunter is required to buy a federal duck stamp and a Pennsylvania migratory game bird license. Revenues are used to monitor waterfowl populations through surveys and to acquire wetland habitat. Many people other than hunters also enjoy waterfowl, observing and photographing these colorful, diverse birds.

Canvasback - Also called a "can." Length 20 to 21 inches; weight, 2½ to 2¾ pounds. Plumage is black and white; male has a red head, female, brown. Both sexes exhibit a distinctive long, sloping profile from the tip of the bill to the top of the head. Flight is swift (up to 70 mph in calm skies, faster with a tail wind), with little dipping and weaving; flocks number 5 to 30. Canvasbacks eat seeds and other parts of pondweeds, wild celery, eelgrass, widgeon grass, other aquatic plants, mollusks and crustaceans. In Pennsylvania, the canvasback is an uncommon spring and fall migrant. It breeds in the prairie states, Rocky Mountains, Canada and Alaska. In the Atlantic Flyway, wintering canvasbacks are concentrated on the Chesapeake Bay. Hazards on the breeding range include drought (the canvasback does not adapt as readily to drought-related habitat changes as do other ducks); and loss of nesting habitat. The canvasback population, once greatly reduced by market killing and consequently given periodic closed-season protection, has rebounded and is annually hunted.

Redhead - Length, 19 to 20 inches; weight, 2 to 2½ pounds. Plumage is black and gray; male has a red head, female, brown. Flies in singles, pairs and in flocks of 5 to 15. Redheads feed in shallower water than do other diving ducks, eating the seeds, tubers and leaves of plants, along with insect larvae and snails. In Pennsylvania, redheads are uncommon migrants in spring and fall. They breed mainly in the northern United States and southwestern Canada, and winter across the southern United States and in Mexico. Females often lay eggs in the nests of other ducks, and leave them to be incubated by the nest owners. They also desert their nests more readily than do hens of other species.

Ring-necked Duck - Also called a ''ring-bill." Length 16 to 17 inches; weight, 1¼ to 2 pounds. Plumage is black and white for the male, brown and white for the female. The male has a faint brown ring around the neck (not easily seen in the field), and both sexes have a pale ring near the tip of the bill. They fly swiftly in flocks of up to 20. They feed in shallow waters on seeds and vegetative parts of pondweeds and other water plants, and on insects, mollusks and other aquatic animals. Common migrants through Pennsylvania during spring and fall, ring-necked ducks breed across southern Canada and the northern United States. Some occasionally winter in Pennsylvania, but most go to the coasts, the southern states and Mexico.

Greater and Lesser Scaup - These two nearly identical species are 16½ to 18 inches in length, and weigh 1½ to 2½ pounds. They are also called "broadbills" and "bluebills."

canvasback

ring-necked duck

greater and lesser scaup

long-tailed duck

bufflehead

ruddy duck

Males are black and white, females, brownish and white. The bill is blue for both species. Greater scaup inhabit large bays, sounds and inlets of both coasts, and the Great Lakes. The lesser scaup is the one normally seen in Pennsylvania. It frequents Presque Isle Bay and the larger bodies of inland waters. Scaup eat mollusks, insects, crustaceans and aquatic plants. Common spring and fall migrants through Pennsylvania, they breed across Canada into Alaska. They winter along the coasts.

Long-tailed Duck - Also called "oldsquaw." Length, 16 to 20 inches; weight, 1¾ to 2 pounds. Plumage, a striking mix of black and white, shows much seasonal variation when found in the state. Males have a long, pointed tail. Food: crustaceans, mollusks, insects and fish. Long-tailed ducks are likely the deepest divers of any duck – they may dive to 100 feet or more when foraging. They are uncommon spring and fall migrants through Pennsylvania. Occasionally they winter in the state, but more often along the coasts and on the Great Lakes. They breed in Canada and Alaska and are the most common breeding duck in the high Arctic region.

Bufflehead - Also called a "butterball." Length, 13 to 15 inches; weight, about 1 pound. Plumage is mostly black and white on the male, and brown and white on the female. The male has a large white patch on its head. Buffleheads are fast fliers with rapid wing-beats. They eat aquatic insects, snails, fish and other animal foods. Buffleheads are common spring and fall migrants, breeding in northern Canada and Alaska, and wintering along the coasts and in the southern states.

Common Goldeneye - Also called a "whistler'' for the sound of its wing-beats. Length, 17 to 19 inches; weight, about 2 pounds. Plumage is black and white on the male, brown and white on the female. Goldeneyes dive for crustaceans, insects, mollusks and fish. Common spring and fall migrants, they breed across Canada and in Alaska, and winter on larger rivers in Pennsylvania and coastal bays and across the continental United States.

Ruddy Duck - Length, about 15 inches; weight, about 1 pound. Small and stubby, the ruddy duck has a short, thick neck, an upturned tail, and white cheek patches under a dark cap. It prefers to dive—rather than fly away—from danger. In flight, ruddy ducks skim low over the water in compact flocks. Food is primarily vegetation (widgeon grass, pondweeds, bulrush seeds), midge larvae and mollusks. Juveniles eat a larger proportion of energy-rich animal food than do adults. Ruddy ducks are common spring-fall migrants across Pennsylvania. They breed mainly in Canadian prairies, and winter along the United States coasts and in Mexico.

Hooded, Red-breasted, and Common Mergansers - Mergansers are known as "sawbills'' and "fish ducks." Hooded mergansers average 16 to 18 inches in length, while the red-breasted and common merganser are 20 to 25 inches. Weight, about 1½ pounds for the hooded, and 2½ to 4 pounds for the red-breasted, and common. The species have distinctive, colorful plumage. They fly fast and low over the water. Food: fish and their eggs and other aquatic animals. Hooded and common mergansers commonly breed in Pennsylvania, with an expanding range. Breeding habitats are lakes, beaver ponds and streams for hoodeds and rivers and streams for

common goldeneye

commons. Hooded and common mergansers usually nest in tree cavities. Eggs: 6 to 17. Incubation is by the female and takes about four weeks. Red-breasteds have a more northerly breeding range, across Canada, and they nest on the ground rather than in cavities. Hooded and red-breasted mergansers primarily winter along the coasts and in the southern United States: the common merganser winters in Pennsylvania, on the Great Lakes, and across the continent where the water remains open.

Black, Surf and White-winged Scoters - Length, 18½ to 22 inches; weight, 2 to 3½ pounds. All three scoter species are basically black, with varying amounts of white in the plumage. These sea ducks fly in long, undulating lines, in irregular groups, or in V-shaped flocks. They eat mollusks, crustaceans, aquatic insects and plants. They are rare to uncommon migrants over Pennsylvania, passing through the state in March and April, and again in October through December. Scoters breed in Canada and Alaska. They winter on the Great Lakes and along the Atlantic and Pacific coasts.

black, surf, and white-winged scoters

hooded merganser

common merganser

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Puddle Ducks

Puddle ducks, also called dabbling ducks, are the largest and most widespread group of waterfowl in the world. They include the wild ducks most familiar to people. This note covers seven species commonly found in Pennsylvania (American black duck, gadwall, northern pintail, green – and blue-winged teal, wigeon, and northern shoveler); the mallard and wood duck are also puddle ducks, but they are featured individually in other Wildlife Notes because they are by far the Commonwealth's most abundant breeding ducks, and together typically comprise about 70 percent of Pennsylvania's duck harvest. The two major duck groups, puddle and diving ducks, differ in several ways. Divers inhabit deeper (usually greater than 3 feet deep) ponds, lakes, rivers, bays and inlets; while puddle ducks tend to stick to the shallows (less than 1 foot deep) of freshwater lakes, rivers and marshes, although they will use saltwater, especially for migration and wintering habitat. Diving ducks are, as their name implies, adept at diving and obtain most of their food this way. Puddle ducks prefer to feed on the surface or close to it. Often, they stretch their heads underwater, feeding upended with their tails in the air. As a group, they are not accomplished divers, but adults dive occasionally and ducklings do so frequently.

Puddle ducks feed in the water along the fringes of islands and shorelines, and on dry land. Their diet is a mixture of vegetable matter—seeds, grasses, leaves and stems of underwater plants, agricultural crops, nuts—along with mollusks, insects and fish.

These shallow-water ducks ride higher in the water than their diving cousins, and launch themselves directly upward when taking off; they do not need to run across the water to build up speed for takeoff as diving ducks do. Puddle ducks are excellent swimmers, sure-footed on land, and swift agile fliers. On the wing, they often display a speculum, or wing patch, which is a bright, iridescent panel of feathering close to the body on the trailing edge of each wing. Speculum color varies from species to species and may function as a flashing signal to help keep a flock together. To the human observer, the speculum is often a telltale field mark.

Within the species, males (called drakes) have bright, colorful plumage, while the females (hens) are drab. In fall, winter and spring, drakes are feathered in their normal bright coloration; in summer to early fall, after breeding season, they molt into a drab "eclipse" plumage and resemble the hens for several months.

American black duck

North American puddle ducks breed across the northern part of the continent; some species—mallards, black duck, blue-winged teal and wood ducks—nesting in Pennsylvania. They generally mate for the first time when a year old. During courtship, drakes chase the hens and engage in fighting, ritualized movements, posturing and calling. After mating, the drake leaves immediately, or he stays with the hen while she is laying and then departs soon afterward. Pair bonds are weak, and a different mate will be courted each year. The hen lays a large clutch of eggs (7 to 13, depending on the species) in a nest built of grasses, leaves and reeds, hidden among vegetation. She incubates and cares for the brood by herself.

Ducklings are covered with down. They are a pale brownish color, streaked with darker lines to disguise their body outlines. Minutes after hatching, they can swim and feed themselves. They first fly at about two months of age.

In autumn, puddle ducks fly south, along with other waterfowl (diving ducks, geese and swans). Waterfowl start migrating through Pennsylvania in late August. Migration peaks from late October through Thanksgiving and typically ends in late December or early January. Puddle ducks occasionally winter in Pennsylvania, but most spend the cold months across the southern United States and in Central America.

Raccoons, foxes, minks, hawks and owls prey upon ducks. Raccoons, skunks and crows eat the eggs; snapping turtles and fish take the young.

Taxonomists group puddle ducks in family Anatidae, subfamily Anatinae. The Anatinae form the largest and most diverse of the commonly recognized waterfowl subfamilies, with more than 40 species worldwide. Pennsylvania puddle ducks all belong to genus Anas.

American Black Duck

Length, 21 to 26 inches; average weight, 2.4 to 2.8 pounds. Also called “black mallard” or “red leg.” Plumage is a dark, mottled brown with white underwings and a violet-blue speculum. When visibility is good, the contrast between the light-brown head and the brown-black body is noticeable. This is Pennsylvania’s only puddle duck in which the plumages of both sexes are almost identical. The drake in nuptial plumage has a bright yellow bill, contrasting with the female’s olive-green bill. The voice of the hen is a loud *quack;* of the drake, a lower-pitched *kwek-kwek*.

Black ducks eat a variety of vegetable foods, including eelgrass, widgeon grass, and the seeds of sedges, bulrushes, wild rice, pondweeds, smartweeds and millets. On land they feed on acorns and waste corn, willingly flying up to 25 miles to a reliable source of the latter. Animal foods, more important in late winter and spring, include periwinkles, mussels and snails.

Black ducks breed in Pennsylvania, nesting in marshes, bogs, and lake and stream margins, and often in wooded uplands. They nest on the ground, on stumps and dead snags, and occasionally in tree cavities. They lay 8 to 10 eggs which hatch in about four weeks.

Once considered the number one duck in the waterfowl hunter’s bag, the black duck has dropped to third or fourth place, behind the mallard, wood duck and green-winged teal. Pennsylvania’s breeding black duck population declined steadily from the 1960s to present due to habitat loss/degradation and competition and hybridization with mallards. Black ducks remain abundant in eastern Canada, and rangewide populations appear to have stabilized, albeit at well below historic numbers, since harvest restrictions were implemented in 1982.

Gadwall

Length, 19 to 23 inches; average weight, 1.8 to 2.2 pounds. Sometimes called “gray duck.” Males in breeding plumage have brown heads, gray bodies and black tails. The female is similar, but more brown in color. The legs are yellow. This is the only puddle duck with white in its speculum. The drake whistles and sounds a *kack-kock*; the hen quacks like a mallard, but more rapidly and higher pitched.

Food is basically aquatic plants. On brackish or freshwater estuaries where they often winter, gadwalls concentrate on vegetation such as widgeon grass, eelgrass, muskgrass and pondweeds. In Pennsylvania, gadwalls are most common in late October through mid-November, though usually not numerous. They are considered non-breeding residents,

gadwall

although they have nested in Crawford and Butler counties. They breed mainly in the western United States, Canada and Alaska. Hens seek dense, dry weed cover, hiding the nest from above and all sides. They lay about 10 eggs, which hatch in 26 days.

Gadwall are most plentiful in the Dakotas and Canada’s prairie provinces, less common on the Atlantic Flyway. They are often seen with pintails and wigeons, but they rarely congregate in large flocks. The gadwall dives for submerged vegetation more often than other puddle ducks.

Northern Pintail

Length, 20 to 29 inches; average weight, 1.9 to 2.3 pounds; slender and trim. Also called “sprig.” Among the most beautifully marked of Pennsylvania’s ducks, a pintail male in breeding plumage has a brown head, white neck and breast, and a gray back and sides. Females are grayish brown. The speculum is metallic greenish-brown with a white rear border, but far more noticeable in flight is the male’s long, slender, pointed tail. Pintails are extremely graceful and fast fliers, fond of zigzagging from great heights before leveling off to land. Voice: the drake has a flute-like whistle, the hen a soft *quack*.

In summer and fall, pintails feed largely on seeds and vegetative parts of pondweeds and widgeon grass, and on the seeds of bulrushes and smartweeds. Nesting females eat more aquatic insects. Sometimes pintails land in harvested fields to glean waste grain. They breed mainly across Canada, northwestern United States and in Alaska, also in the Eastern Hemisphere in Asia; in Pennsylvania, nests have

historically been reported in Crawford County and the Tinicum wildlife refuge near Philadelphia. Pintails often nest in dead herbaceous cover of the past year's growth, which may offer little concealment. The nest site is usually within 100 yards of water, but may be up to a mile away. Females lay about 9 eggs; they hatch following a fairly short incubation period, 21 days. A few pintails winter in Pennsylvania, but most fly to the southern United States, the Central Valley of California, and Central America.

Green-winged Teal

Length, 13 to 16 inches; average weight, ½ to 1 pound; the smallest of North American ducks, about the size of a pigeon. The male is beautifully colored with a dark, reddish-brown head, a green streak over the eye, and a vertical white stripe on the side. The female is primarily brown. The speculum shows green in both sexes. Green-winged teal fly swiftly, often in small, tight flocks. Drakes whistle and have a tittering call; hens sound a faint *quack*.

Green-winged teal prefer small and shallow, but permanent, freshwater ponds, with thick cover nearby. They feed on mudflats or in shallow marshes on small seeds of grasses, bulrushes and smartweeds, and on the stems and leaves of pondweeds. They also eat tiny mollusks, snails and other crustaceans.

A few green-winged teal may be found nesting in northern Pennsylvania, although the duck's primary breeding range is farther north, across Canada, the northwestern United States, and Alaska. Courting birds engage in much whistling and posturing. Females hide their nests in dense patches of shrubs and weeds, or in tall grass at the edge of a lake or slough. They lay 8 to 10 eggs and incubate those 21 to 23 days;

green-winged teal

they vigorously defend their nest. Some green-winged teal occasionally winter in Pennsylvania, but most go farther south.

Blue-winged Teal

Length, 14 to 16 inches; average weight, ¾ to 1 pound. The drake has a brown body and a slate-gray head; in front of the eyes is a distinctive white crescent. The hen is primarily brown. Both sexes have a blue patch on the fore-wing and a green speculum, but patches are more prominent on the males. Blue-winged teal are shy, common waterfowl, found on ponds, marshes and protected bays, often with other puddle ducks. Their small, compact flocks fly swiftly, often low over the marsh, twisting and dodging around trees and bushes. The birds sound a twittering flight call. Additional calls: drakes have a whistling *tseet tseet tseet*, and hens a soft *quack*.

northern pintail

blue-winged teal

Blue-wings are among Pennsylvania's earliest migrants in the fall, and the latest in the spring. They head south in late August and September and usually do not arrive back on the breeding grounds in large numbers until late April or early May.

Food includes seeds and vegetation of aquatic plants, especially pondweeds, widgeon grass, duckweed and millet. They often feed near green-winged teal, the blue-wings consuming more animal matter.

Blue-winged teal occasionally nest in Pennsylvania, in borders of freshwater sloughs, swamps, ponds, and marshes. They lay 10 to 13 eggs in a basket-like nest built on dry ground. Surrounding vegetation usually arches over the nest, concealing it. Incubation is 23 to 24 days.

The blue-winged teal is a familiar, common duck of inland North America, although nesting populations near the Great Lakes have been reduced through grassland habitat loss and change. Populations in its primary breeding range, the prairie pothole region in mid North America, are strong.

American Wigeon

Length, 18 to 23 inches; average weight, 1½ to 2 pounds. Also called "baldpate." The male has a gray neck and head, with a white stripe from the forehead to the middle of the crown and an iridescent green patch coming back from the eye; the body is pinkish-brown, the speculum blackish with a hint of green. The female's coloration is similar, but duller. The species can best be identified in flight by the white belly and fore-wings. Wigeons are wary birds, quickly reacting to potential threats and disturbances; they fly swiftly in compact flocks, wheeling and turning in unison. Males have a three-syllable whistle with the middle note the loudest; hens utter a loud *koow* and a lower *qua-awk*.

Wigeons feed primarily on submerged aquatic plants, sometimes coming ashore for shoots of grains and grasses. They breed in the northwestern United States, Canada and Alaska, nesting in dry, sedge-lined meadows around lakes and sloughs. The 7 to 9 eggs are incubated about 23 days. Wigeons migrate through Pennsylvania in October and November.

Some occasionally winter in Pennsylvania, but most go to the southern states and farther south.

Northern Shoveler

Length, 17 to 22 inches; weight, about 1½ pounds; size similar than the mallard, for which it is often mistaken. Also called "spoonbill" for its long, broad bill. The male has a green head, white breast and chestnut sides. The female is a mottled brown. The best field marks are the outsize bill, held downward as the bird rides in the water; and, in flight, blue upper-wing and white under-wing coloration. Females have a typical *quacking* call, males a *took-took*. Shovelers usually travel in small flocks of 5 to 10 birds.

Food: invertebrates (caddis fly larvae, dragonfly nymphs, beetles, bugs), duckweeds, and seeds of pondweeds and bulrushes. In deep water, shovelers apparently feed on surface plankton, taking in a steady stream of water at the tip of the bill and expelling it at the base, straining out microscopic plants.

Shovelers breed in the northwestern United States, Canada and Alaska. Females nest in grassy cover, sometimes well away from water. The 10 eggs hatch in three to four weeks. Shovelers pass through Pennsylvania in March and April, and again in September through November. They winter along the southern United States coast and in western states and Central America.

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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.

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Wood Duck

The wood duck is Pennsylvania's most brilliantly colored duck. Its scientific name, *Aix sponsa*, can be loosely translated as "a waterfowl in wedding dress." This somewhat-secretive bird is home in brushy swamps and bottomland streams surrounded by woodlands. Nicknames include Carolina duck, squealer, summer duck and woodie. Most authorities place the species with the dabbling ducks, a group distinguished by its habit of feeding on and near the surface of shallow waters, rather than diving for food.

The primary range for wood ducks is deciduous forest habitats from the eastern Great Plains east to the Atlantic coast, and from the northern Great Lakes Region south to the Gulf of Mexico. Most of them winter from the Carolinas south to the Gulf and west to eastern Texas. A small population of wood ducks also inhabits the Pacific Northwest. In Pennsylvania, woodies are common migrants in March and April; summer breeding residents; common migrants in September, October, and early November; and occasional winter residents in the southeast and southwest corners of the state.

Biology

An adult wood duck is 18 to 20 inches long, has a 26- to 28-inch wingspan, and weighs between 1 and 1¾ pounds. The male is called a drake, the female a hen. The drake's coloration is nothing short of exotic. His head is iridescent green, shading into blue and purple, with a slicked-back crest of feathers and a white chin-bib. His eyes are bright red, his bill reddish-orange, his legs yellow. His chest, a rich chestnut, is separated from his golden-yellow sides by vertical bars of white and black. The hen's plumage is drab, a combination of gray, white, and brown. She has a small head crest and a circle of white surrounding each eye.

Wood ducks do not quack. The hen, more vocal and louder than her mate, squeals a shrill warning call, *hoo-eek hoo-eek*. The drake whistles an ascending, finch-like *twee twee*. Wood ducks are excellent swimmers and fast, agile fliers. Above open terrain they can wing along at up to 45 to 50 mph. In woodlands they twist and turn between the trees, moving their heads almost constantly in flight.

The wood duck feeds in thick marshes, brushy swamps and along woodland streams. A dabbler, it tips its head into shallow water and probes the bottom for vegetative parts and seeds of arrow arum, various grasses and sedges, smartweeds, burreed, pondweeds, duckweed and wild rice. It also eats grapes, berries, and nuts–acorns in particular—which are swallowed whole and crushed, inside the gizzard, into digestible bits. High-protein animal foods such as mollusks, insects and spiders comprise an important portion of the diet for egg-laying hens and young ducklings. In winter, wood ducks may turn to waste corn if natural foods are scarce.

Breeding occurs in late March and April, extending into July in the north. Most pairs form on the wintering range, following an intense courtship. The male preens behind his wings, spreading them to show off their iridescent sheen, he tucks in his chin, erects his crest, and fans his tail. He swims at the hen then circles her

When the birds migrate north, the hen homes in on last year's nest tree, or, if she is a yearling, on the same general locale in which she was hatched. The male sets up no actual territorial boundaries but will defend his mate from the attentions of other males. Several breeding pairs may share the same wetland. Nesting concentrations are largely determined by the availability of nest sites. The mated hen seeks out a cavity in a tree. The male follows her on these search flights, but the hen apparently picks the exact spot. Wood ducks prefer to nest in trees standing over water, but sometimes will settle for sites up to a mile away. They normally use natural cavities with entrances too small for raccoons to enter, often choosing excavations made by pileated woodpeckers. They also nest readily in man-made boxes.

The hen lays 8 to 15 eggs (one per day) in the bottom of the cavity, on accumulated wood chips covered with down from her breast. The eggs are light beige in color and unmarked. Incubation, by the female alone, starts with the last egg and takes about a month. Unlike most other male ducks, the drake woody stays with his mate well into her incubation. He has usually left the scene, though, by the time the eggs hatch.

All the eggs hatch on the same day. The hen usually keeps her brood in the nest overnight, and then in the morning she flies out and lands on the ground or water below where she begins calling softly. The day-old ducklings leap out of the nest to join her. They tumble down perhaps 60 feet, sailing like cotton puffs and usually land unharmed. The hen leads them to safety in thick marsh or swamp cover.

If a raccoon, snake, or squirrel destroys her first clutch, the female may lay a second. A few hens raise two broods in southern U.S. breeding range, but the vast majority raise only one.

Ducklings, and some adults, are preyed upon by mink, otters, raccoons, herons, hawks, owls, snapping turtles and predatory fish such as pike, bass and bowfin. In Maryland, scientists found that half of the young were killed in their first month. The brood begins to break up after six weeks or so, and the young can fly when two months old.

After leaving his incubating mate, the drake woodie joins other male wood ducks in the dense cover of a swamp or wooded pond. Here he molts into eclipse plumage: dull feathers resembling the drab plumage of a hen. Like all waterfowl, during part of the annual summer molt, wood ducks, both drakes and, later, hens, lose their wing flight feathers and cannot fly for a period of approximately one month. In late summer or early fall, a second molt begins, restoring the breeding or nuptial plumages.

Wood ducks migrate south for the winter. Some seek out common roosting and feeding sites, grouping in flocks of less than a hundred to several thousand. Pennsylvania band recoveries show homegrown woodies winter primarily in the Carolinas, and also along the Gulf Coast from Louisiana to Florida.

Population

In the early 1900s, the wood duck was nearing extinction. Many woodland swamps, the species' favorite habitat, had been drained. Widespread logging had removed the mature trees needed for nesting. And for years the woodie had been hunted hard for its flavorful flesh.

In 1913, wood duck hunting was banned for five years by the U.S. Department of Agriculture to spur a population recovery. That effort was followed by the ratification of the Migratory Bird Treaty Act between the United States and Canada, which established the framework needed to manage waterfowl on a broader scale than with inconsistent state plans. The wood duck was also aided by Pennsylvania's beaver reintroduction program, which began in 1917, and the construction and placement of thousands of wood duck nest boxes by conservation organizations.

The wood duck population grew steadily. In 1941, hunting was again permitted. In 1976, waterfowl scientist Frank Bellrose reviewed many local studies and concluded that the adult population of wood ducks was about 1 million before each year's breeding. By the early 1990's he estimated the annual post breeding population at over 6 million. Population trends have steadily increased since that time.

Today, the wood duck has reclaimed its historical range and populations are healthy. The wood duck is the first or second most common duck species harvested in the Atlantic and Mississippi Flyways.

Habitat

Wood ducks inhabit slow-moving creeks, vernal woodland ponds, lakes, swamps, marshes, and beaver ponds. They rest in thick growths of buttonbush, swamp rose, alder, swamp loosestrife, water lilies, arrow arum, smartweeds, and other emergent plants; hens hide their ducklings in vegetation, under overhanging banks, and among fallen, partly submerged trees.

Wood ducks nest in cavities of mature sycamore, maple, oak, basswood, elm, and gum trees. Where big trees are scarce, they will use man-made nest houses. Artificial nests should be made predator-proof, as they attract raccoons, squirrels and other predators looking for a meal. Ideally, nest boxes should be placed on poles near or over water; attach metal predator barriers or shields partway up the poles, and make sure the boxes' entrances are small enough to exclude raccoons. Studies in Pennsylvania show that hens and broods having to travel more than a mile from their nest box to brood-rearing wetlands experience the highest mortality. Consequently, it is a good idea to place nest boxes over suitable wetlands. Wood duck boxes also provide nesting space for American kestrels, common screech owls, mergansers, squirrels and occasionally, wrens and tree swallows.

The Game Commission offers pre-assembled nest boxes for sale, as well as free wildlife home plans for do-it-yourself woodworkers.

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Ring-necked Pheasant

When we import creatures to lands where they don't naturally exist, we often brew trouble. Consider the impact and spread of the rabbit in Australia, the red deer in New Zealand, and the English sparrow and starling in the United States. The ring-necked pheasant is an import, too, but unlike the species mentioned above, it hasn't become a pest. In fact, this Asian native has proven to be a fine member of North America's wildlife community. The ring-necked pheasant is the hunter's bird – imported, stocked and transferred to suitable habitat throughout the nation by wildlife departments. Today, the ring-necked pheasant benefits us all, providing in-the-field enjoyment to hunters, birdwatchers and nature lovers of all types.

The species is found throughout the United States, except in the Southeast, parts of the Southwest, and the far North. Good populations exist in farming regions of the Midwest. The ring-necked pheasant was once a common resident in Pennsylvania's agricultural areas. Now most ring-necked pheasants hunted in Pennsylvania are raised on

game farms by private individuals or the Pennsylvania Game Commission, then released for “put and take” hunting.

Pen-raised birds lack the survival skills to establish self-perpetuating populations in the wild, and therefore annual stocking is required to maintain hunting opportunity. The loss of sustainable populations of ring-necked pheasants in Pennsylvania is attributed to habitat loss, caused by multiple factors in the farmland landscape where they lived.

The ring-necked’s scientific name is Phasianus colchicus, and it is a member of the Phasianidae, or pheasant, family. Closely related to quails and partridges, the ring-necked pheasant belongs to the order Galliformes, which also includes turkeys, quail, grouse, ptarmigan and prairie chickens.

Biology

An adult male weighs 2 ½ to 3 ½ pounds, an adult female weighs 2 pounds. Males are called roosters, cocks or cockbirds; females are hens. The standing height of a rooster is about 1 foot, and its length, from beak to tail tip, averages 36 inches. Hens are slightly smaller. A pheasant is long-legged and rangy through the body, with a long, pointed tail (20 to 23 inches) and short, rounded wings.

A hen’s plumage is a subtle, camouflaging mixture of brown, black, and gray. In contrast, a rooster’s feathers are a beautiful mix of reds, browns, golds and black. A rooster has scarlet cheek patches, a white neck ring usually interrupted in the front, an iridescent greenish-black head, golden-brown breast, and a greenish-gray or bluish rump and lower back. Tail feathers of both sexes are brown with black bars.

The crowing of a rooster is distinctive: A loud double squawk followed by rapid muffled wingbeats that might or might not be audible, depending on distance. Males crow most often during mating season, especially at sunrise and sunset; they might also emit a loud cackle when flushed into flight. Hens are normally silent.

Pheasants eat weed seeds (ragweed, smartweed, foxtails, etc.), grains (corn, wheat, barley, oats, beans and buckwheat), fruits and berries (raspberries, dewberries, strawberries, thornapples and barberry), shoots, leaves, grasses, rose hips and insects. They find a lot of their food by scratching through ground litter.

Like most birds, pheasants have sharp senses of hearing and sight. Extremely wary in autumn, they stick to dense cover when hunted heavily. During spring and summer they can be seen strutting across freshly mowed fields and along roadsides. When pursued, pheasants would rather run than fly, dodging nimbly into heavy cover — brambles, honeysuckle or multiflora rose. When cornered or surprised, they take to the air. Strong fliers over short distances, they attain a maximum speed of 45 mph in the open. Outside of breeding season (when roosters stake out individual territories) and brood-raising periods, pheasants are relatively gregarious, roosting in groups. In Pennsylvania, pheasants often roost in trees. The average pheasant ranges within 1 square mile.

Roosters claim individual breeding territories each spring. A rooster’s courtship display includes spreading his tail and wings and strutting; his red cheek patches are swollen, his head is held low, and his neck feathers are ruffled. With luck and persistence, he will collect a harem of hens. Breeding begins in late March or early April and might extend into August. The male does not help incubate eggs.

Nesting occurs from April to August. A hen selects a nest site on the ground in a hayfield, a weedy field, an overgrown pasture or a brushy fencerow. A natural hollow (or one scraped out by the hen) is lined with weeds, grasses and leaves. Surrounding vegetation helps conceal both the nest and the laying or brooding bird.

The female lays six to 15 eggs (an average of 10 to 12) over a two-week period. Eggs measure about 1 ⅓ by 1 ⅔ inches and are light tan to pale olive green in color. Incubation is usually postponed until the last egg is laid, so all eggs receive equal incubation time and hatch on the same day. If eggs are destroyed by farm operations, predators, fires, or floods, hens might renest, with some even making up to three attempts.

The eggs hatch after 23 or 24 days of incubation. Most clutches hatch by early July. Like the young of other gallinaceous species, pheasant chicks are precocial – covered with down, their eyes open and able to run about and eat as soon as their down dries.

Chicks depend on the hen to shelter them from cold and rain. She does this by brooding, or sitting on top of them. Hens brood at night until young are able to roost in trees. Instinctively, chicks squat and remain motionless at a signal given by the hen; their coloration, tan with darker brown streaking, conceals them well. Foxes, raccoons, crows, weasels, house cats, dogs and hawks prey on the young.

The hen guides her chicks in food-finding. Insects, plentiful and high in protein, are a good early food. By 2 weeks of age, chicks can fly short distances; after 6 weeks, their adult plumage starts to come in; and by autumn, birds of the year look like adults. Young roosters can be told from older males by the length and hardness of their spurs, appendages growing out from the backs of their legs. In young birds, the spurs are relatively soft, blunt, and short (a quarter-inch or less). Older roosters have hard, sharp spurs up to an inch in length from spur tip to the front of the leg.

In winter, pheasants form flocks. During inclement weather, they stick to thick protective cover of conifers, brushy sloughs or forests overgrown with vegetation. While not commonly occurring, the following diseases afflict pheasants: coccidiosis, blackhead and pullorum. Flukes, tapeworms and roundworms parasitize some individuals. In sustainable wild pheasant populations, annual hen survival is 30 to 40 percent. Studies in Pennsylvania have determined that the annual removal rate for roosters can be as high as 90 percent without hurting the population.

Habitat

Prime pheasant habitat is farmland with a regular occurrence of undisturbed grass fields during the nesting season; blackberry, sumac and honeysuckle patches; swamp edges and marshy depressions grown up in cattails, grass and sedge; and overgrown drainage ditches. Clean-farming practices, where every bit of ground is put into production, can reduce the diversity of food and cover pheasants prefer.

Winter food and cover are important to local pheasant populations. Good foods are thornapples, apples, rose hips, skunk cabbage, ragweed, burdock, grapes, grasses, and green vegetation; these, along with grain (especially waste corn left by mechanical harvesters) help birds overwinter. Pheasants locate food in areas melted or blown free of snow, or by scratching. Pines provide excellent cover for roosting and daytime resting. Pheasants also seek out densely vegetated marsh or creek-side areas during bitter weather. Farm fields planted in native grasses – such as switchgrass, which stays thick and upright in winter – also are used by pheasants for winter cover. Given adequate food and protective cover, pheasants can pull through rough winters. They are hardy birds and, like all wildlife, have keen survival instincts.

Where the overall landscape is suitable, individual farms can be managed to produce more pheasants. Strips of corn may be left unharvested (five to 10 rows next to cover are adequate); unpicked soybeans make good summer, fall, and winter cover, and the beans are eaten from fall to spring. To reduce nesting losses, farmers can delay their first hay cutting until the end of June. Forest edges can be cut to increase low, brushy growth, which makes good cover. Native shrub and pine plantings also improve cover. However, applying these techniques on a small scale will not increase the pheasant population if surrounding landscapes are inhospitable. Thousands of acres of safe nesting cover, combined with brood-rearing cover, food and winter cover, all in close proximity to one another, are needed to support a population of wild pheasants.

Hen ring-necked pheasant with chicks

Population

The first successful pheasant introduction to North America was a release of about 30 birds in Oregon's Willamette Valley in 1881. Many of America's ring-necked pheasants have descended from those 30, hybridizing with other imported strains. The Pennsylvania Game Commission began stocking pheasants in 1915.

Since Pennsylvania's ring-necked pheasant population peaked in the early 1970s, the annual pheasant harvest has declined from 1.3 million to about 110,000 birds. During its heyday, wild pheasants numbered in the millions and accounted for a majority of the harvest. As the '70s progressed, however, the pheasant population declined and, today, pheasant hunting is largely sustained by stocked birds.

Wildlife managers have long contended that habitat loss and land-use changes have caused the ring-necked's plunge. In recent years, thousands of farmland acres have been lost to industrial complexes, shopping malls, suburban developments and urban sprawl. On areas still being farmed, smaller fields have been consolidated into bigger ones to accommodate larger farm equipment, causing a loss of fencerows and other areas where pheasants once found food and shelter. Changing farming practices also include an increased use of pesticides and herbicides, which kill the insects and weedy cover vital to pheasants.

Nowadays hay is mowed earlier and more frequently, giving hens little or no time to raise a brood. Fencerows and windbreaks have vanished. Even cornfields, always a popular hangout for pheasants, are chopped into silage leaving little cover for wildlife.

In the '70s, pheasant chicks, for the first few weeks of life, could find all the food and cover they required without leaving the hayfield they were hatched in. Now, if a hen is able to hatch her brood before the hay is cut, she and her young usually must range farther to obtain adequate food and cover, greatly increasing their exposure to predators, cars and other dangers.

History demonstrates a strong link between the existence of wild pheasant populations and the availability of U.S. Department of Agriculture conservation programs – which help farmers and rural landowners return some of the missing habitat components needed by pheasants in farmland landscapes, such as grass fields that will not be mowed during the nesting season, and winter cover including switchgrass fields and stream buffers. Where sufficient acreages have been established to meet minimum habitat conditions for pheasants, the Pennsylvania Game Commission has partnered with Pheasants Forever, a leading wildlife habitat conservation group, to attempt restoration of wild pheasant populations. Propagation programs and wild pheasant efforts both require significant commitments of resources, but they provide important benefits to pheasant hunters and other wildlife enthusiasts.

Male ring-necked pheasant

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Ruffed Grouse

The ruffed grouse has been Pennsylvania's official state bird since 1931, and its beauty is admired by hunter and non-hunter alike. Grouse are gallinaceous birds and are related to quail, turkeys, pheasants and ptarmigan. The ruffed grouse is found throughout much of the northern part of North America in areas of suitable habitat. Wherever brushy conditions can be found in a wooded landscape, there is a good possibility the 'king of the gamebirds' can be found.

Biology

The weight of a grouse is about 1 ½ pounds, their body length is 15 ½ to 19 inches, and their wingspread is 22 to 25 inches. The bird's plumage is rich brown sprinkled with white and black above, and white with horizontal dark brown bars on the breast and undersides. The tail is brown and has a wide, black band between two narrower grayish bands. The name "ruffed" comes from a ruff of iridescent black feathers that almost completely encircles the neck. Two interesting color phases occur. Gray phase or "silver tailed" birds have gray in place of brown in the tail; "red ruffs" have rust-colored feathers with a chocolate brown— rather than black—tail band.

Males (cocks) differ from females (hens) in several ways. Males weigh a little more than females, and they have more prominent ruffs which are erected during courtship display. The hen has a shorter tail, and her black tail band is generally broken in the center, while the cock's band is usually continuous. Adult grouse molt once each year from July into September. During this time, grouse may be hard to find as they seek thick protective cover. Flight feathers are replaced gradually in order to maintain flight, though the long tail feathers may be dropped all at once.

Grouse are found throughout Pennsylvania in suitable habitat and are year-round residents. Adults in good habitat rarely range more than a few hundred yards a day unless pressed by predators or hunters; in fact, the same bird may be flushed from the same area in the woods several days in a row. Poor habitat forces grouse to range further afield in search of food, which increases their predation risk.

Grouse eat many types of food. In the summer, they consume insects (which are rich in protein), blackberries, blueberries and other wild fruits. In fall, when insects are scarce, they feed almost exclusively on acorns, beechnuts, cherries, wild grapes, crabapples, hawthorn and dogwood fruits, and various buds and leaves. Buds form the basis of the grouse's winter diet: aspen, birch, beech, maple, cherry and apple buds are favored. Throughout winter and early spring, ferns, green leaves and other evergreen food are eaten until other foods become plentiful. Grouse do well in areas without visible water sources, obtaining moisture from their diet.

Like most birds, grouse have keen eyesight and hearing. At one time, they were not nearly as wary as they are today; early settlers killed them with sticks and stones. Today you may surprise a grouse bathing in the dust on a back road, in a sandy spot of earth, or in the debris around a rotting stump. Dust bathing may stimulate feather growth in young grouse, maintain adult plumage or rid birds of external parasites.

Grouse shelter beneath conifers during stormy weather and roost in conifers and hardwoods. They may spend winter nights in a 'snow roost' hidden beneath the surface, sometimes flying directly into a soft snowbank at dusk. Grouse are usually loners, although groups of birds are sometimes found together in the fall and winter. In winter, grouse feet develop a comb-like fringe along the edge of each toe that give them snowshoe-like properties.

Grouse walk more than they fly. Although a grouse flush is thunderous and powerful, they cannot fly long distances. Top flight speed is 20-35 mph. After this rapid take-off, it then locks its wings and glides to safer territory, usually traveling less than 100 yards. During mating season--March and April--male grouse attract females by drumming. With tail fanned, the male stands on a large, prominent log or rock and beats the air sharply with his wings. The rush of air created by his wingbeats sounds much like drumming. The drumming starts slowly and increases in speed, until the individual thudding beats merge into a fast, steady whir. Males also fight and display for females; displaying males fan their tails, erect their ruffs to encircle their heads, then hiss and drag their wingtips along the ground.

A mated hen picks a secluded nesting site, usually at the base of a tree or under a bush, and lays 6-16 white or buff eggs in a leaf-lined depression in the ground. The hen may re-nest if nest destruction occurs. The incubation period is approximately 24 days. The male does not help the female incubate eggs or brood young.

Chicks are precocial and the hen will usually lead them away from the nest within 24 hours of hatching. Chicks develop rapidly. Within their first week, chicks are capable of low buzzy flight. At three weeks, they can fly well. By autumn they look and act like adults. In early fall, birds of the year may exhibit a strange period of restlessness known as the "fall shuffle" or "crazy flight." During this time, young grouse take off in undirected flight and may be killed when they crash into trees, fences, windows and walls. The fall shuffle may serve to scatter broods and disperse the population. Juvenile mortality is high. Studies indicate more than three quarters of all chicks die within 35 days of hatching – the majority die from predation or exposure within the first week. Among adults, annual survival is roughly 50 percent, and relatively few live to be two years of age.

Population

Many factors affect the size of the ruffed grouse population, including winter food supply and spring weather conditions. A cold, wet spring following a winter with limited hard mast supplies can result in lower numbers of successful hatches. Female grouse body condition in the spring may suffer during years with limited hard mast, and chick survival is low during periods of cold, drenching rains. Grouse can contract a variety of diseases and parasites which may kill or weaken them. Predation is the most significant mortality factor for adult ruffed grouse. Grouse are vulnerable to both avian and mammal predators. Providing high-quality habitat is one way that managers strive to limit the effects of grouse mortality factors.

Hunters harvest only what biologists term "surplus" grouse, birds that would die of other causes before the next breeding season. Recent studies indicate that hunters can safely harvest 20-30 percent of birds present at the beginning of hunting season without endangering the next year's breeding stock. Season and bag limits are managed to ensure that over-harvest does not occur.

Habitat

Habitat is the most important factor affecting the size of Pennsylvania's grouse population. In the early 1900s, much of Pennsylvania provided excellent grouse habitat in brushy, recently-logged forest areas. Since then, our rapidly maturing forests and large deer herd have combined to reduce forest undergrowth, or grouse cover. High deer numbers can influence grouse habitat when heavy browsing reduces low growth and prevents shrubs and trees from developing on the forest floor. Managing deer numbers in balance with forest habitat benefits grouse and many other species by allowing a thick and diverse understory to develop.

Grouse are shy birds that do not adapt well to civilization. Their range in Pennsylvania shrunk as forests were converted to other uses, and large forest parcels have been broken into smaller pieces. Populations are highest in regions that remain largely forested. Private forestlands are extremely important to future efforts to recover grouse populations, since more than 75 percent of Pennsylvania is privately owned. Much of the timber on these lands is 100 years old or greater and is now economically valuable. The sale of timber can create young forest habitats, which are critical habitats largely missing from Pennsylvania's landscape. At the same time, the sale of timber can finance further improvements in wildlife habitat such as native shrub planting, deer fencing, liming and fertilizing.

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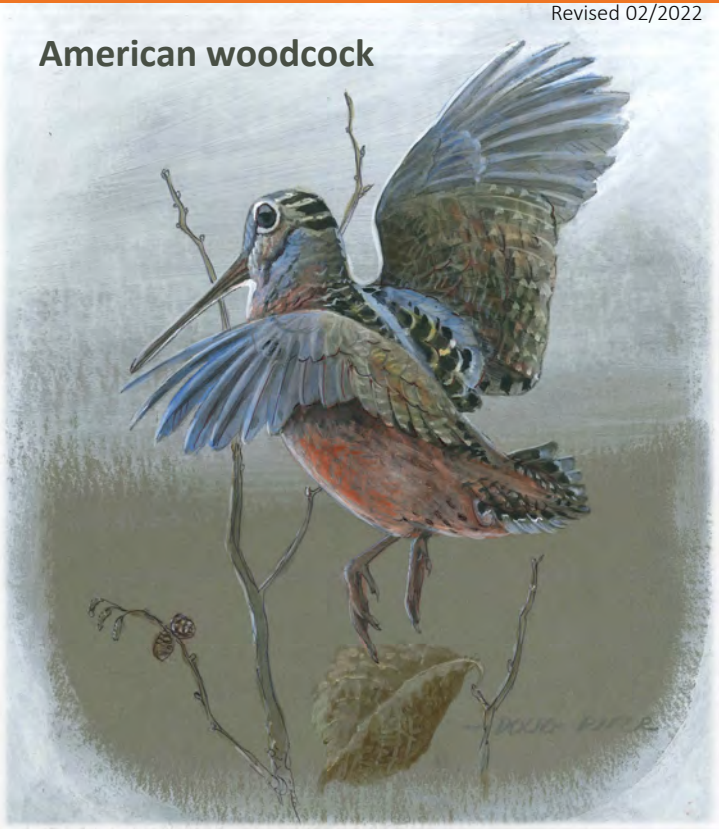
Woodcock and Wilson's Snipe



The American woodcock (*Scolopax minor)* is known by a host of folk names: timberdoodle, night partridge, big-eye, bogsucker and mudsnipe. It has big eyes and a bill that looks too long for its body. Most active at dusk and dawn, a woodcock uses its bill to probe rich moist soil for earthworms.

Taxonomically, the species is placed in Order Charadriiformes, which includes gulls, oystercatchers, plovers and others. Within the order, the woodcock belongs to Family Scolopacidae, a group of snipe and sandpipers with more than 80 species distributed over most of the world.

The American woodcock is closely related to the European woodcock (*Scolopax rusticola*). The Old World bird resembles its American counterpart and has a similar life history, but it is larger and almost twice as heavy.

Biology

A woodcock's plumage is an overall mottled russet and brown. The beige breast, back and sides are overlaid with black and browns; the forehead and crown are ashy gray to black, and barred with gold. The short tail is a combination of brick-red and black, tipped with gray. Feet and toes are bare and gray to flesh-colored.

A woodcock is 10 to 12 inches in length (a little longer than a bobwhite quail), has a standing height of about 5 inches and a wingspread of 16 to 19 inches. Body conformation is "chunky"—short and heavy, with a short, thick neck and a large head. Wings are short and bluntly rounded. Sexes look alike, although females generally average a bit heavier than males (6.2 vs. 5.6 ounces). Weights for both sexes vary according to time of year.

A woodcock's bill is long and thin. A female's bill measures 2¾ inches or slightly longer, while a male's is usually less than 2½ inches. Sensitive nerve endings in the lower third of the bill help a woodcock locate earthworms. A special bone-muscle arrangement lets the bird open the tip of its upper bill, or mandible, while it is underground. The long tongue and the underside of the mandible are both rough-surfaced to grasp and pull slippery prey out of the ground.

Eyes are large and set well back and high on the sides of a woodcock's head. This positioning lets the bird look all around—behind, above and to the sides, as well as ahead—while it probes for food. Nostrils are set high on the bill, close to the skull. A woodcock's ears are ahead of the eyes, between the base of the bill and the eye sockets. Hearing and sight are acute.

The woodcock's brain is unique among birds. Its cerebellum is located below the rest of the brain and above the spinal column. (In most birds, the cerebellum occupies the rear of the skull.) One theory suggests that as the woodcock evolved into a ground-probing lifestyle, the eyes moved back in the skull, the bill lengthened, and the nostrils approached the base of the bill—forcing the brain to change its position within the skull. The woodcock of today, in essence, has an upside-down brain.

When woodcock flush from the ground, air passing through their rapidly beating wing primary feathers produces a whistling sound. The birds usually flutter up out of cover, level

off and fly from 10 to several hundred yards before setting down. Being migratory birds, they are capable of sustained flight.

Earthworms, high in fat and protein, make up more than 60 percent of a woodcock's diet. The remainder of the diet is comprised largely of insect larvae, caterpillars, other invertebrates, and less often, plant seeds. Use of insects, larvae and seeds is especially pronounced during late summer dry periods when earthworms have gone deep into the soil. Timberdoodles do most of their feeding in the early evening and just before dawn. Digestion is rapid; an adult may eat half its body weight or more each day.

Woodcock are quite vocal, with at least four recognized calls used by males in courtship. During the mating season, a male woodcock on the ground will sound a nasal, buzzing, insect-like note usually described as *peent*. Preceding each *peent* is a two-syllable gurgling note, *tuko*. While the *peent* carries several hundred yards, the much softer *tuko* is audible only within about 15 feet of the bird.

The flight song—a series of liquid, gurgling *chirps*—is sounded on the wing by a male trying to attract a mate. A male defending breeding territory against another male makes a menacing cackle, *cac-cac-cac-cac*, as he flies toward his rival. A female will squeal and often feign a broken wing to lure intruders away from her young. Other calls express alarm or provide communication between hens and offspring.

In spring, males establish territories known as "singing grounds." These are woodland clearings spotted with low brush, or open fields next to brush or woods; they vary in size, but a quarter-acre seems big enough. While on the ground, the males *peent* to attract females. A male will take off and fly upward 200 to 300 feet on twittering wings; then he'll spiral or zigzag back to earth, sounding a liquid, warbling song as he descends. Courtship occurs for short periods at dawn and dusk; courtship displays are most active when temperatures are above freezing and winds are calm.

Females seek out males on the singing grounds. Males may mate with several females. In Pennsylvania, most breeding

American woodcock

takes place from early March to mid-May. Hens usually nest within 150 yards of the singing grounds where they mated; males play no role in nest selection, incubation or rearing of young. Favored nesting habitat includes damp woods near water, hillsides above moist bottomlands, old fields with low ground cover, briar patches, or 10 to 12-year-old shrub thickets and the edges of young conifer stands. There may be little overhead cover (old fields) or up to 25 feet of vegetation (young hardwood stands). The average cover height is 12 feet.

A typical woodcock nest is a slight depression on the ground in dead leaves. Some nests are rimmed with twigs or lined with pine needles. An egg-laying or incubating hen is difficult to spot, as her mottled, brown plumage usually blends in with the background.

In Pennsylvania, woodcock nest from late March into June. Located near nesting sites are feeding areas of open woods, abandoned fields, brushy areas, and mixed forests, where incubating hens feed. Although they are solitary nesters, hens may share feeding grounds with other woodcocks. A female lays one egg a day until she completes the normal clutch of four. Eggs are oval, 1½ by 1 inch, which are large for the bird's size. The shells are smooth, with a slight gloss, colored pinkish-buff to cinnamon and covered with light brown blotches overlaid with darker speckling.

Incubation takes 19 to 22 days. It begins after the last egg is laid, so all eggs receive equal incubation and hatch at about the same time. If a hen is disturbed early in the incubation period, she may abandon the nest. The longer she sits on the eggs, however, the less likely she will desert them. Nest predators include domestic cats, raccoons, skunks and snakes. Nests also fail due to desertion when an incubating hen is disturbed by humans and dogs. This is especially damaging during the early portion of incubation, so many bird dog trainers refrain from allowing their dogs to enter woodcock habitats during March and April. Hens losing their first clutch may re-nest, often laying only three eggs. Eggs hatch from early April until mid-June, with 70 percent of hatching occurring in the last two weeks of April and the first week of May.

Eggs split lengthwise (unique among birds) as the woodcock chicks emerge. Chicks are precocial, able to leave the nest a few hours after hatching. They are covered with fine down, pale brownish to buff with brown spots and stripes above, and rufous below; a dark line runs from the bill back to the eye. From the day of hatching, chicks "freeze" when threatened or in response to the hen's alarm call. During the first few days, the hen broods her chicks frequently, especially during rain, snow or cold. At first she finds worms for them, but after a few days, they are probing for and capturing worms by themselves.

Chicks grow rapidly. After two weeks they can fly short distances, and at the end of four weeks they are almost fully grown, fly strongly and look like adults. The family breaks up when juveniles are 6 to 8 weeks old.

As days grow shorter and temperatures drop, woodcocks begin to head south. Woodcock migrate at low altitudes (about 50 feet), flying at night and resting and feeding in secluded thickets during the day. They typically travel alone, though conducive weather conditions can result in 'flights' of many birds arriving in a location at once. Birds from farther north may start to pass through Pennsylvania in October; the migration peaks in late October and early November, with stragglers up until the end of November. Heavy northwest winds and cold nights may start large numbers of woodcock winging south. Woodcock winter in the Carolinas, Georgia, and northern Florida west to eastern Texas and Arkansas, concentrating in Louisiana and southwestern Mississippi. During an exceptionally mild season, some birds remain in Pennsylvania throughout the winter.

Wildlife biologists believe that woodcock have several migration routes. Most woodcock nesting east of the Appalachian Mountains, appear to winter mainly in the south Atlantic states. Woodcock breeding west of the Appalachians are thought to winter in the Gulf States. In late winter and early spring, woodcock reverse direction and return north. Like many migratory birds, woodcock home strongly to the areas where they hatched. Migrating woodcock have turned up in Pennsylvania as early as February 25, with most birds arriving in March. Migration is largely complete by mid-April.

Woodcock are hardy and seem able to recover from injuries that would kill most other birds. If a woodcock reaches adulthood, its life expectancy is about two years. Wild woodcock have been known to live eight years, and one wild bird banded in Pennsylvania was recovered six years after banding. Mortality factors include predators; collisions with human structures during night flight; hunting; disease; parasites, and bad weather. Woodcock heading north too early in spring may be caught by late-season snows or hard freezes, which seal off their food supply and can lead to starvation.

As migratory birds, woodcock fall under the jurisdiction of the U.S. Fish & Wildlife Service. This agency works in cooperation with the states comprising the woodcock's range to monitor the species' population and set the framework for hunting seasons and bag limits.

Population

Compared to most other game birds, woodcock have low reproductive potential. A female raises only one brood each year, and each brood consists of four (and sometimes only three) young. Fortunately, the species has a high nesting success rate—60 to 75 percent—and low juvenile mortality.

Population densities vary in any one locale. Woodcock may be scattered, concentrated, or absent, depending on time of year, weather conditions, or habitat. In autumn, concentrated groups of woodcock may not reflect the carrying capacity of land on which they are found, as they may just be passing through. The overall population can fluctuate greatly over the years.

From 1968 to 2012 (when this note was updated), woodcock populations have experienced a one percent average annual decline throughout their range. Most biologists attribute this decline to loss of habitat quantity and quality. In Pennsylvania, intensive logging, farm abandonment and wildfires that create new and young forests—highly desirable woodcock habitat—are relatively rare today. Development also destroys or fragments existing woodcock habitat. This long term decline has made the woodcock a conservation priority species for state and federal partners. Fortunately, populations in the eastern region have largely stabilized over the past ten years, perhaps due to this renewed conservation attention. Expanding human development into farmlands and woodlands and the steady maturation of Pennsylvania forests remain long-term threats.

Habitat

Habitat requirements for woodcock change throughout the year. In spring, they need areas for courtship displays and nesting; in summer, for brood-rearing; during fall and spring migrations, for feeding and resting; and they require wintering habitat in the southern states. Food must be available during all seasons.

Woodcock are attracted to moist young forestland and shrublands. They tend to use edges rather than interiors of big, even-aged thickets. The following plants are closely-associated with woodcock: alder, aspen, hawthorn, gray dogwood, crab apple, blue beech (hornbeam) and gray birch. These species can be planted, or, if they already grow in a given area, encouraged by cutting down large trees which may be shading them and stunting their growth. For courtship, males need singing grounds: clearings a quarter-acre or larger with a straight, unimpeded take-off strip 15 to 20 yards long. As trees and shrubs in the clearing grow larger, woodcock will seek out other areas. To keep a singing ground functioning, it must be cleared periodically. Larger clearings (five acres or more) also are used as nocturnal roosting habitat for much of the year; it is believed night predation risk is lower in these more open areas.

Females nest and raise broods near breeding grounds. Good cover includes edges of thickets, young conifer plantations and old, brushy fields. The best feeding areas are shrub patches near streams, springs, or marshy ground. Resting cover often is on high, drier ground. Feeding and resting cover is used by woodcock of all ages and sexes during the breeding season and migration.

The life of good woodcock cover is about 20 to 25 years in Pennsylvania. As the cover matures, different tree species take over, and it grows less suitable. Removing tree species as they invade shrub thickets will prolong the life of a woodcock covert. Over-mature shrubs, aspen and alder can be cut or burned and the resulting shoot growth will restore good habitat.

Wilson's Snipe *(Gallinago delicata)*

The Wilson's snipe is a small, stocky shorebird (and game bird) that can be easily confused with a woodcock. Snipe are slightly smaller in size than woodcock with adults measuring 10 to 12 inches in length with a 16 – to 17-inch wingspan. Like woodcock, the body is mottled brown on top. However, snipe can be distinguished by their dark vertical stripes running longitudinally over the head and body and their pale undersides. They have a dark stripe through the eye, with light stripes above and below it. The wings are pointed.

Snipe forage in soft mud, probing or picking up food by sight. They may eat insects, earthworms and plant material. This well-camouflaged bird is usually shy and conceals itself within vegetation. They flush only when approached closely, flying off in a series of aerial zigzags with a harsh *scaipe* call. Pennsylvania habitats tend to be more open than the forested areas preferred by woodcock and include marshes, wet meadows and pastures. Snipe in the East migrate to the southern United States and to northern South America. The male performs a "winnowing" display during courtship and in defense of territory, flying high in circles and then taking shallow dives to produce a distinctive sound made by the wind rushing over modified tail feathers with each wingbeat. Snipe nest in a well-hidden location on the ground. The clutch size is almost always four eggs. The male snipe leaves the nest with the first two chicks to hatch. The female takes the last two and cares for them. Apparently the parents have no contact after that point. Like woodcock, populations of this once-popular game bird have been reduced by habitat loss as wet pastures and meadows were drained for development or allowed to grow into forests.

Revised 02/2021

Wild Turkey

The wild turkey is a shy, permanent resident of Pennsylvania's woods and mountains. Infiltrating a flock of these big birds is no easy feat, and when the hunter or naturalist is finally discovered, he's treated to a spectacle as the flock breaks up. Turkeys flap upward on loud wings, some run full tilt, heads extended on serpentine necks. Others sneak along through the understory. Eventually, quiet returns to the woods. And, with time the first tentative calls of regrouping birds break the silence.

Turkeys have long been important to humans in North America. Native Americans hunted them for food, and some natives even domesticated the big birds. Later, the wild turkey became a steady food source for settlers. It earned a symbolic role as the main course of the Thanksgiving meal, which epitomized the successful harvest. Benjamin Franklin so admired the big bronze bird that he wanted it for our national emblem. Comparing it to the bald eagle, he said: "The turkey is a much more respectable bird, and withal a true original Native of America."

Several theories explain how the bird got its name. Early naturalists might have confused it with a species of Old World guinea fowl found in Turkey. Or the word might describe one of the bird's calls, which sounds a bit like *turk*, *turk*, *turk*. Still a third explanation is that the word sprang from a Native American name for the bird, "firkee."

Whatever the source of its name, the fact remains that this big bird was nearly exterminated by the ax, the plow and the gun.

As our nation grew, settlers cleared wooded habitat for farms. And they shot turkeys for food. By 1800, market hunters were selling the birds for as little as 6 cents each. By the early 1900s — when eastern forests had been lumbered and periodic fires hampered their regeneration — the turkey was in trouble.

Fortunately, here in Pennsylvania, the newly formed Game Commission stepped in. Through seasons and bag limits, the agency succeeded in safeguarding what remained of the state's once-thriving population, which by that time could be found only in the rugged mountains of the state's southcentral counties. Over time, the agency experimented with ways to return turkeys to the rest of Penn's Woods. Turkey farms were tried. So was placing hen turkeys in holding pens for wild gobblers to breed. But neither enterprise fared well. What turkeys needed was habitat improvements. In the 1950s, as the state's forests began to mature, turkeys began to naturally expand their range. Expansion was furthered through a Game Commission wild turkey trap-and-transfer program that would become a model for every state interested in turkey restoration. Today, after thousands of wild turkeys were transferred

throughout the state, and provided to other states, turkeys are found in every county, and this wily bird has developed quite a following among hunters and naturalists.

Biology

The wild turkey, native only to the North American continent, belongs to the single and highly variable species *Meleagris gallopovo*. Taxonomists recognize at least five subspecies; the variety found in Pennsylvania is known as the eastern wild turkey. Turkeys are gallinaceous — "chicken-like" — birds (order Galliformes), related to grouse, quail, pheasants and chickens.

Adult males, also called gobblers or toms, stand 2½ to 3 feet tall and are 3 to 4 feet long. Females, or hens, are about one-third shorter and weigh about half as much. Gobblers weigh up to 25 pounds, averaging 16. Adult hens weigh 9 to 10 pounds, and 6-month-old birds, 6 to 13 pounds.

The wild turkey looks much like the domesticated subspecies, except the wild bird is slimmer, has a smaller head, a longer neck, longer, rangier legs, and smaller fleshy head and neck adornments. Tail feathers and tail coverts are tipped chestnut brown on wild birds, white on domesticated ones.

Plumage is an overall rich brown. In shadows, turkeys appear black; in bright sunlight, their feathers gleam with copper, blue, green and mahogany highlights. A hen's plumage is duller and not quite as iridescent, and her breast feathers end in a brown or buff band, while those of a gobbler are tipped with black.

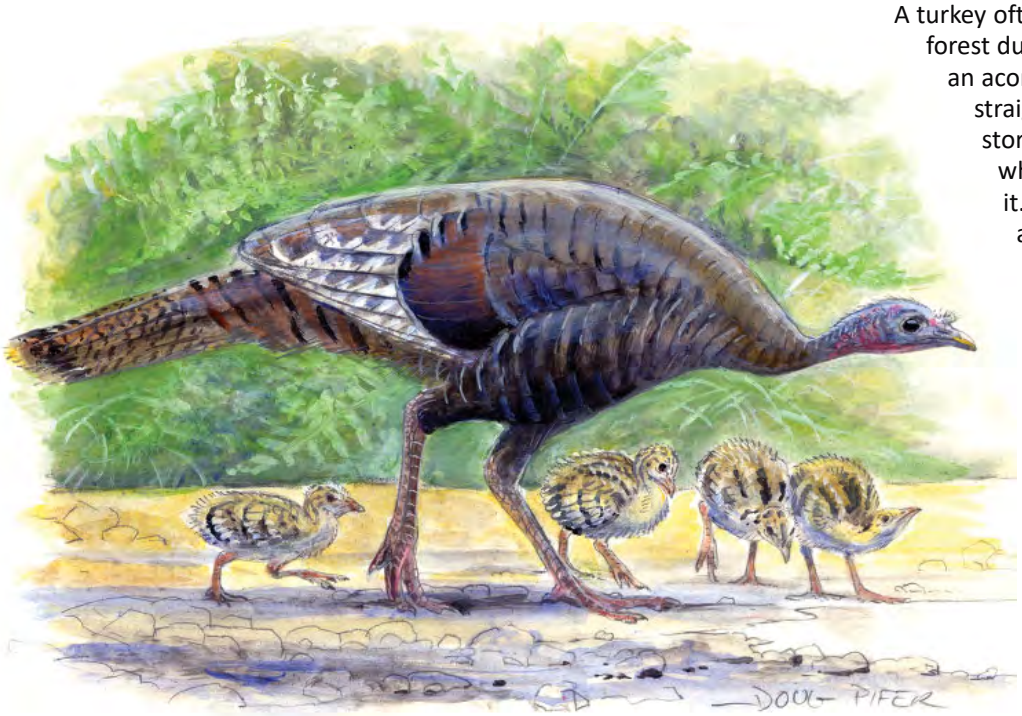
Gobblers have spurs — sharp, bony spikes on the backs of their legs that are used in fighting — and rough, black "beards," growths of rudimentary, hair-like feathers called mesofiloplumes, which protrude from their breasts. These beards grow quickly for their first few years, then more slowly, until they're about 12 inches long. The ends may break off, though, so beard length isn't a reliable indicator of age. Usually, hens have neither spurs nor beards.

A gobbler's head is practically bare, while the hen has fine feathers on the back of its neck and head. A fleshy, pencil-like appendage called a caruncle, or snood, dangles from between the gobbler's eyes. The heads of hens are bluish-gray, and their necks may appear somewhat pinkish, whereas gobblers' heads are pink to red. During mating season, a gobbler's head and neck are more red; during courtship display, his snood may become long and swollen, and the color of his head and neck changes quickly from red to blue, purple and white.

Food

In spring, turkeys eat tender greens, shoots, tubers, leftover nuts and early insects. As the weather warms up, they eat more insects, including grasshoppers, walking-sticks, beetles, weevils, dragonflies, ants and larvae. They also consume spiders, harvestmen, ticks, millipedes, centipedes, snails and slugs. But even in summer, a majority of the diet (perhaps 90 percent) is vegetable. A wide variety of plant species are eaten, as well as a number of plant parts, including fruits, seeds, seedheads, tubers, roots, bulbs, stems, leaves, flowers and buds.

In fall, turkeys eat mast (beechnuts, acorns); fruits (dogwood, grape, cherry, gum, thornapple); and seeds (grasses and sedges, ash, corn, oats, weeds). During winter, they rely on seeds, nuts and fruits left over from autumn, and on green plants, crustaceans and insect larvae found in and around spring seeps where groundwater emerges along a hillside or in a flat. Temperature of this water is above freezing, so the seeps remain open all winter, providing food for turkeys and other wildlife.



A turkey often scratches for its food, kicking forest duff and leaves behind. If the bird finds an acorn, it picks up the nut in its beak, straightens its neck, and swallows. The nut is stored in the bird's crop, a flexible "bag" in which juices and body heat work to soften it. Then the nut passes into the gizzard, an enlarged, thick-walled section of the food canal that contains small stones and gravel called grit. Strong muscles use the grit to grind down the acorn.

Turkeys can range up to several miles a day in search of food and water, sometimes establishing regular feeding areas if left undisturbed. In autumn, hunters "read" the turkeys' scratchings to determine when a flock passed by, what size the flock was, and which way the birds were headed.

Physical Properties, Behavior

Like most birds, turkeys have keen eyesight and hearing. They hide cleverly, fly an estimated 40 to 55 mph, cover more than a mile while airborne and swim with ease. But turkeys usually rely on their feet to escape danger. The strides of chased gobblers have been measured at 4 feet and their top running speeds are estimated at 18 mph. Tracks vary somewhat by the age of the bird (a young tom, for example, might have a shorter print than an adult hen) but any track larger than 4¼ inches, from the back of the heel pad to the tip of middle toe, was probably made by a male.

Each evening, turkeys fly into trees to spend the night. A flock of six to 40 birds might roost in the same tree or in adjacent trees. They prefer the shelter of conifers during inclement weather. In early morning, the birds glide to the ground, call, and regroup for feeding.

Turkeys make a wide range of sounds. The best known is the male's gobble (described *ill-obble-obble-obble*), used in spring to attract females and proclaim territory. Other calls include yelps (*keouk*, *keouk*, *keouk*), made by both sexes; the cluck (*kut*), an assembly note; the whistle, or "kee-kee run" of a young bird (*kee*, *kee*, *kee*); and the alarm note (*putt*). Gregarious birds, turkeys call when separated from the flock. By imitating such calls, hunters attract birds.

Reproduction

Toward the end of March, a male turkey changes physically. His fleshy crown swells and turns pale, his wattles redden and hang from his head, and he develops a thick, spongy breast layer containing oils and fats to help sustain him over breeding season. Toms gobble loudly in early morning and sometimes in late evening. Blowing a car horn, beating a tin pan, or making almost any loud noises might provoke lusty gobbles.

If hens are present, a gobbler will display by fanning his tail, erecting his feathers, and tucking his head back against his body. He will strut back and forth, hissing and dragging his wing tips on the ground. Rival males fight: each grasps the other's head or neck in his bill and tries to shove or pull his foe off balance. The first bird to let go or lose balance gets thrashed with wing and spur.

Year-old birds are sexually mature; hens often mate during their first spring, but young males usually can't compete with mature gobblers. A dominant male may collect a harem of eight to 12, or even more hens. Males are polygamous: a gobbler mates with several hens and plays no part in nest site choice, brooding eggs or rearing young.

In late April, mated females slip away from the flock. They choose nesting spots in wooded or brushy areas, near water sources and usually close to forest clearings or old fields. The nests are leaf-lined depressions in the ground and might be located under the curves of fallen logs, concealed by vegetation or fallen branches or built at the bases of trees.

The gobbler's sperm is stored in the hen's oviduct, so that fertilized eggs can be laid up to four weeks after mating. One mating is usually sufficient to fertilize an entire clutch as well as a renesting attempt, if needed. A hen lays an egg nearly every day until her nest contains eight to 15 eggs. Clutches average 12 eggs, but are smaller for younger birds. Hens begin incubating constantly after all eggs are laid.

Eggs are oval and pointed markedly at one end. The smooth, dull shells are colored pale buff and are evenly marked with reddish-brown spots or fine dots. Foxes, bobcats and great horned owls prey on nesting hens; eggs are eaten by the aforementioned predators plus minks, raccoons, opossums, black snakes, skunks, crows, red squirrels and even house cats.

Incubation takes about 28 days. After young hatch, the hen broods them until they're dry and then, if the weather is mild, leads them away from the nest.

Poults

Young turkeys are called poults. They're covered with a fine, brownish fuzz and even at hatching have a wild turkey's distinctive long neck and legs. Easy game for predators, their main defense is to hide. They scatter and freeze at the hen's warning call, remaining motionless until she sounds the all-clear. A hen might feign injury to lure intruders away from her young.

Poults need high-protein food to grow quickly, and the hen soon leads them to open areas where insects abound. Poults eat beetles, leafhoppers, crickets, other insects and larvae, tender greens and fruits. The hen broods them nightly for at least two weeks, until their wings develop and they can roost in trees. When poults are about 3 weeks old, several family groups might merge to form a flock of hens and poults.

Six-week-old juveniles are fairly strong fliers, and by autumn they're practically self-sufficient. Birds of the year can be identified by their middle tail feathers, which are longer than the others, as these adult feathers have already molted in. In adults, the edge of the fanned tail forms an unbroken curved line.

In autumn, flocks often contain several old hens and their young, and occasionally hens that have not raised broods, for a total of 40 or more birds. Old toms usually remain apart, in pairs or trios. During early winter, family groups disperse and form new flocks by sex and age: hens, young toms and old toms.

Although susceptible to diseases, turkeys are hardy animals. Periodically, a harsh winter might lead to starvation, especially if there is deep, powdery snow, which makes it difficult for birds to become airborne. Disease outbreaks have been verified in the past, but none has had a substantial population impact over large areas. The most common disease to wild turkeys is a virus called avian pox, which is caused by bites from mosquitoes or other blood-feeding arthropods. Another

disease, lymphoproliferative disease virus, or LPDV, first was identified in wild turkeys in North America in 2009. Previously, LPDV was known to affect domestic turkeys in the United Kingdom and the Middle East. LPDV signs include some similar to avian pox, such as brown, crusty lesions on the head. But with LPDV, lesions also are common on the legs and feet.

Population

In 1900, few turkeys were left in the eastern United States, largely because widespread logging had destroyed their woodland habitat. An estimated 3,500 to 5,000 birds remained in Pennsylvania — a far cry from the large, healthy population that had existed here a century earlier, mainly in southcentral Pennsylvania's oak and American chestnut forests.

Restoration of the species involved several steps. First, refuges were established and new game laws strictly enforced to protect remaining local populations. Half-wild turkeys were bred on the Game Commission's wild turkey farm, beginning in 1930. These birds proved to be nearly useless. As cut-over forests began to regrow, existing wild flocks began to move into new areas on their own. In addition, wild birds were trapped in areas where they were abundant and transferred to suitable, but unoccupied, habitat to speed up the dispersal that was naturally occurring. The superiority of this approach over game-farm turkey releases has been obvious. Today, turkeys are found throughout the state and are abundant in areas where, in the past, continual releases of game-farm turkeys failed to establish even limited self-sustaining populations.

The Game Commission also works to improve turkey habitat, especially brood and winter-range habitat, which tend to be limiting factors for populations. Wild turkeys can be found in every county within Pennsylvania.

What are a turkey's chances of survival, from egg to adult? The following statistics are from *The Wild Turkey — Biology and Management*, edited by James G. Dickson and published in 1992 by Stackpole Books: (a) nesting success of the turkey is 31 to 45 percent, about normal for a ground-nesting species; (b) 53 to 76 percent of poults perish, mostly within two weeks of hatching; (c) life expectancy of a turkey surviving its first two weeks of life is still less than 1½ years, although a few have been known to survive more than 10 years in the wild; (d) annual turkey survival generally ranges from 54 to 62 percent; (e) predation is generally the most common cause of wild turkey mortality; and (f) hunting-related turkey mortality is highly variable, depending largely on varying hunting season regulations, but can range from less than 5 percent to more than 50 percent of all losses.

Habitat

Turkeys have shown more tolerance for fragmented habitat (woodlots) and human disturbance than previously believed, but they still depend on forested habitats and do best with limited human activity. Habitat diversity — varying habitat types and differing ages — is the key to good turkey habitat. Turkeys seem to do best with a mix of forested, actively farmed and reverting-farmland habitat types.

A turkey flock uses an extensive area — several thousand acres — during a year to meet its needs, so a small landowner shouldn't expect to maintain a resident flock. However, anyone with forested land can do something to benefit turkeys, especially if neighboring landowners will cooperate.

Trees such as oaks, beech and cherries are most beneficial to turkeys when producing the maximum mast; this occurs when trees are 50 to 100 years old. Landowners can manage their woodlands for saw-timber by conventional even- or uneven-age silvicultural approaches and by "pushing" young hardwood stands to maturity by culling out less-vigorous and non-mast-producing trees. Some woodland cuttings — which aren't economical in terms of timber management — can be made to allow more sunlight to reach grape, dogwood, greenbrier, hawthorn, viburnum and other food-producing understory species. Planting shrubs such as crabapple, serviceberries, high-bush cranberry and Washington hawthorn, or allowing clumps of brush such as blackberries and raspberries to grow will provide abundant and persistent winter foods. Discourage exotics such as Russian olive, autumn olive, and multiflora rose, which tend to overtake native shrubs.

Forest clearings are especially used by hens and poults. Here, sunlight penetrates the tree canopy and allows grasses and forbs to spring up. Increased plant life gives rise to increased insect life, and insects form a key part of a young turkey's diet. Thus, forest openings resulting from cleared timberlands, old logging roads and log landings, power line rights of way and old beaver meadows should be preserved, or planted with a grass-legume mixture if needed. Spring seeps also are important, as they provide insect and vegetable food over winter.

Free water (streams, lakes, ponds, springs, seeps and rainwater in shallow depressions) has never been demonstrated to be lacking for wild turkeys in the eastern United States. Artificial feeding? Turkeys don't generally need it, especially if they live in good habitat. Such feeding might actually pose a hazard by unnaturally concentrating a local population, thus increasing the danger of poaching and disease transmission, and giving predators an unnatural advantage.

Pennsylvanians can be proud of the wild turkey's restoration to this state. With enough concern for meeting all the birds' needs, we can enjoy them well into the future.

Revised 02/2021

Bobwhite Quail

The bobwhite quail, *Colinus virginianus*, was a year-round resident of Pennsylvania. The species is found throughout the East, Midwest, Southwest and South, ranging as far west as Kansas and south into Texas and Mexico. Quail belong to the family Phasianidae, which contains 177 species, including pheasants, European partridges, chickens and peacocks.

Biology

An adult bobwhite weighs about 7 ounces, has an 8-inch body length and a standing height of about 6 inches. A bobwhite is stout and chunky through the body, with a small head, short wings, and a short, rounded tail.

Plumage is mostly chestnut brown, white, and black, with the brown graying toward the tail. The sides are streaked with orange-brown, and the underparts are white or creamy, barred lightly with black. The plumage of a male (cock) differs from that of a female (hen). The male has a white throat and eye line separated by a dark brown band, while the female has a buffy throat/eye line and a light brown dividing band.

The species is easily identified by its call, a whistled *bob-bob-white*. Bobwhites also make subdued clucking tones, and birds from a scattered covey, or group, will sing *purr-leer, purr-leer*, an assembly call.

Bobwhites eat large amounts of weed seeds (ragweed, poke, beggarweed, foxtail, partridge pea, pigweed and others); insects (Japanese, June, potato and other beetles, mosquitoes, grasshoppers, crickets, aphids, etc.); and waste grains (corn, wheat, grain sorghum and other small grains). Seasonal foods include young greens in spring; insects in summer; nuts, berries, small wild fruits and green plants in fall; and weed seeds in winter. Quail also savor the pulp of acorns and hickory nuts discarded by squirrels, woodpeckers and blue jays. Most food is found by scratching through litter covering the ground.

Bobwhites are social birds. Depending on the time of year, a covey will contain 10 to 30 quail. The birds range up to a quarter-mile daily and live on 10 to more than 100 acres. A covey functions as a unit: birds forage in the same area, loaf together in the same cover, and roost together at night. When roosting, bobwhites form a circle, their tails together and their heads pointing outward like spokes from a wheel hub. Group roosting helps each individual maintain body heat while keeping a wary eye out for predators during the night. If disturbed, the birds flush in all directions.

In spring, males begin courtship display. They sing, bow low, elevate their fanned-out tails, spread their wings, puff out their body plumage, strut and fight. Bobwhites have several reproductive strategies. Sometimes monogamous, males and females can also be polygamous with a single male breeding several females or a female breeding with several males. Quail will nest in high grass or weeds along a fence-row, roadside, or stream bank although their preferred nesting habitat is in warm season grass stands. The female simply scratches a

depression in the soil beneath the base of a grass clump and lines it with dead grass. Grass and weeds may grow over the nest and conceal it.

The breeding season stretches from May to August, and two broods may be raised. Nest mortality factors: cold, wet weather and early mowing are the most destructive; skunks, opossums, raccoons and snakes eat eggs and may kill brooding birds. If early nesting attempts fail, most birds renest (up to four times).

The female lays 10 to 20 eggs (typically 14 to 16) at a rate of about one per day. Eggs are pointed at one end—shaped like a top—smooth, glossy, creamy white and unmarked. Incubation is by both sexes but mostly by the female, beginning after the last egg is laid. (That way, all eggs will hatch on the same day.) If threatened, a brooding bird may flutter along the ground, feigning a broken wing and trying to lure the intruder away from the nest. Should one member of a pair die after eggs are laid, its mate will brood the clutch and rear the young.

After 23 days, chicks hatch. They're precocial, able to run about and feed themselves soon after they dry, and they usually leave the nest the day they hatch. Chicks are bumblebee-sized, fuzzy, buff beneath and mottled chestnut brown above, with a dark streak extending back from each eye. The parents brood their young, sitting on top of them at night and during heavy rain. Chicks instinctively squat and remain still at a danger signal given by an adult. Their brown natal down is good camouflage. Foxes, weasels, hawks and stray cats take their toll, but hard, driving rain and cold weather are probably more serious threats during the first few days.

Young birds develop rapidly. When they are two weeks old, they can fly short distances, and by 10 weeks of age they have most of the speed and agility of their parents. After feathers grow in, 4-month-old birds are nearly identical to adults in size and plumage. Young of the year have pale tips on their outer primary coverts, or wing feathers, while the same feather is uniformly gray on an adult.

Parents and young stay together all summer. They can sometimes be spotted taking "dust baths" or pecking grit for their crops on dirt roads and along field edges. In autumn, the

families usually break up. Later, bobwhites regroup into winter coveys, which contain up to 30 birds.

Winter is a harsh season for quail. Food is scarce, especially when snow crusts over ground and plants. Mortality can be high, and winter weather certainly takes more bobwhites in the Northeast than do predators or hunters. The quail population is at its lowest in March and April. The average life expectancy of an individual bobwhite is less than a year, with an estimated 75 percent of the population replaced annually by young of the year.

Bobwhite quail have tremendous sporting qualities: explosive flight and a strong inclination to hold for a bird dog. Along with grouse and woodcock, they are considered a classic quarry by dyed-in-the-wool bird hunters, who love to hunt behind pointers and setters. But hunters are not the only folks who appreciate the gentle beauty of this bird—farmers, naturalists and those who just like to get out and walk in the country all love to hear the pure, whistled *bob-bob-white* of this native quail.

Population

Pennsylvania is on the northern fringe of the bobwhite's historical range. Two factors affect quail populations: habitat and climate. Without adequate food and cover (habitat), the population will not flourish; and when winters are hard and long, bobwhite numbers plummet. In fact, the northern limit of *Colinus virginianus'* breeding range fluctuates with the weather: hard winters cause widespread mortality, while several mild years allow the population to expand northward.

Bobwhite quail are not forest dwellers, so they do not prosper in Penn's Woods. Historically, Pennsylvania's most consistent quail-producing areas were some of the southern counties—Franklin, Chester, Adams and York. The rich farms of the Ridge and Valley region (southcentral to central Pennsylvania) used to produce quail hot spots. At one time quail were established within all 67 counties following the deforestation of the state in the early 1800s, but as settlers abandoned their land and succession occurred, quail soon shrank back to the southern tier and western edge by the early 1900s. The mid-1900s saw a quail revival with quail being one of the most popular game birds in the state. Unfortunately, with the advent of 'clean' farming practices, many of the small unkempt farms found in the first half of the century were replaced with large unbroken tracts of fields managed closely with herbicides and pesticides removing not only overhead cover, but all food availability for quail and any other species that relied on this habitat. Quail slowly disappeared throughout their historic range in Pennsylvania and with two years of surveys conducted in 2013 and 2014 they were deemed extirpated.

In the past, the Game Commission stocked quail in attempts to bolster local populations. But in most instances these pen-reared birds failed to adapt to the wild, and such releases are no longer performed. Providing good habitat is the best and only way to successfully support quail. Restoring this native bird species to Pennsylvania should be a priority for future wildlife managers.

Habitat

The bobwhite does well in brushy and abandoned fields, open pinelands and farms. In fact, it has been labeled a bird of farmland and early successional stages. Ideal quail habitat consists of three primary cover types. The first is forbs or annual weeds. These act as both a crucial year-round food source and low overhead cover. During the spring and summer, forbs attract insects down to ground level for both chicks and adults to eat. Throughout the fall and winter these same plants drop their seeds and provide an important food source during some difficult periods of weather. The second cover type is grasses and more specifically warm season grass. The structure of these grass species provides both nesting cover and low overhead cover. Little blue stem is a good species of grass when considering quail management. The third important cover type is shrubs. Quail need shrubby habitat with high stem density at ground level which provides protection from avian predators from above and mammalian predators from below. Shrub thickets, fencerows, and brush piles can all serve to protect quail from not only predators but also the harsh winter weather. In Pennsylvania, species such as blackberry/raspberry, greenbrier, plum, and dogwood often provide the necessary structure needed by quail. Probably the most important things to remember however alongside these needed habitat types is the importance of both bare ground and the mosaic effect. With young quail being so small, built up thatch or thick grasses impede their ability to move through cover and feed or escape predators. Using management techniques such as discing or controlled burns on a 3-year rotation is an effective way to provide needed bare ground. Managing all three cover types as a mosaic of small units is much more beneficial than having larger monocultures of any one specific habitat type.

Farmers can manage their land with an eye toward quail protection and propagation. Sorghum and grape thickets provide both food and cover during severe weather. Strips of millet, soybeans, lespedeza and buckwheat (all good food producers) can be planted near the cover of forb fields, brush piles or fencerows. Also, portions of grain crops can be left unharvested. Light discing and controlled burning disturb the soil, stimulate weed growth, and provide seed food. Discing and burning should be completed in late winter, before nesting begins.

Many of the above techniques are used on State Game Lands because they benefit a tremendous variety of wildlife—pheasants, cottontail rabbits, songbirds, predators and others. Persons interested in improving land for wildlife can contact the Game Commission for more detailed information. Under certain programs, the Game Commission provides landowners with plantings and/or labor to improve areas for wildlife. To prosper, birds and mammals that call the farmlands home need good habitat and plenty of it.

Revised 07/2021

Herons

Have you ever hiked along the edge of a quiet stream or marsh and startled a big, long-legged bird that flapped slowly out of the water, leaving only a widening ripple? Chances are good that the bird was a heron.

There are about 60 species of herons distributed throughout most of the world, except in the extreme northern and southern regions. Herons are most common in the tropics. Herons, bitterns and egrets are closely related, belonging to the family Ardeidae of the order Pelecaniformes. The term "heron" is used sometimes to embrace the family group. Other close avian relatives include ibises and spoonbills. Herons are wading birds with long, slender legs, long necks and long, heavy bills tapering to a sharp point. Their wings are broad and rounded, their tails short. Most herons, especially the larger ones, are graceful in form and movement.

Herons are predators, feeding on animal life (fish, frogs, crayfish, snakes, insects, invertebrates and small rodents) found in shallow water and along the shoreline. Herons swallow food whole and later regurgitate pellets of indigestible matter. They inhabit both freshwater and saltwater areas. In Pennsylvania, they are found on lakes, reservoirs, ponds, rivers, wooded streams, bogs, marshes and swamps, where they typically stand at the water's edge or walk slowly through the shallows. Herons sometimes forage in open, grassy fields and meadows. They may also perch in trees near or over water.

Herons are shy birds. When approached by humans, they usually take off in slow flight, with head and neck drawn back in an S-shape and legs held straight to the rear. Most herons are strong fliers, propelling themselves with deep, pumping wing strokes.

Certain adaptations help a heron wade about and catch prey in shallow water. The most obvious is its legs, which elevate the bird above the water's surface. The toes are long and flexible for walking or standing on soft ground. The bill is sharp-tipped, and is used mostly for grasping, but is sometimes used to impale prey. The long, muscular neck delivers a lightning-quick blow, with plenty of force to penetrate the water and seize a fish.

Herons have well-developed "powder down," areas of feathers with tips that continually disintegrate into powder. Preening

great blue heron

helps distribute this powder, which absorbs and removes fish oil, scum and slime, thus keeping the rest of the plumage clean and dry. Herons preen with a serrated middle claw.

Males are aggressive and defend small territories in breeding season. They fight (although rarely causing physical damage); sound harsh calls; go through elaborate, instinctive motions such as raising their wings, stretching their necks, fluffing their feathers, or erecting their crests. Some also put on spectacular flight routines. In most species, during breeding season the plumage color becomes richer and bright colors appear on the bill, legs or in the bare skin around the eyes.

Often the male begins building a nest to attract a mate; then the female takes over construction and the male brings sticks and twigs. Mated herons defend a zone immediately around their nest against intrusion of other birds. Some species nest in colonies (sometimes called heron rookeries), while others are solitary nesters. Herons may nest in mixed colonies (great blue, black – and yellow-crowned night-herons building nests in the same grove of trees). Or, in certain parts of their range, they may nest with cormorants, pelicans and ibises.

After breeding, three to six unmarked bluish, greenish, or brownish eggs are laid in a nest of sticks in a tree (herons and egrets) or a nest of grasses on the ground (bitterns). The eggs are incubated by both parents for 2½ to 4 weeks, depending on the species. Some herons begin incubating immediately after the first egg is laid, so that young hatch at intervals and differ in size.

At first, parents regurgitate pre-digested liquid food to their nestlings. Later, they bring partly digested food, and finally whole fish, frogs, snakes and other items. A growing heron or bittern will grasp the base of its parent's bill in a scissors-grip and wrestle with it. This triggers an impulse in the adult either to drop or regurgitate the food.

The following herons and allies, which breed in Pennsylvania, are covered in this Wildlife Note: American bittern, least bittern, great blue heron, great egret, green heron, black-crowned night-heron, yellow-crowned night-heron. For more detailed information about these listed species, please see the agency's endangered species web page. All of these herons are migratory, generally breeding in northern areas and migrating south in autumn. Some species migrate in flocks, some in small bands, and some individually.

Wading birds are part of the complex web of life in the marshes and along the water's edge. Their presence is an expression of the health of the watersheds and wetlands they inhabit. When several species of herons inhabit a waterway, lake or swamp, specialized feeding patterns often differentiate these species. The great blue heron usually wades in deeper water, looking for small fish. Great egrets hunt the shallow water often closer to shore. The green heron waits motionless for its prey near a log or bank. Bitterns snatch frogs and tadpoles among the reeds. On dry ground, egrets forage for grasshoppers and other insects stirred up by livestock, while the black – and yellow-crowned night herons patrol shallow waters in the late evening and at night.

Although mainly predators, herons are also prey for some species, including foxes, minks, hawks and especially raccoons. Crows, hawks, and tree-climbing snakes may rob unguarded nests. Few predators dare tackle an adult heron, especially one of the larger species that have a big awl-like bill that can inflict great damage with lightning-fast quickness.

At one time herons were killed for their plumage, which was used to decorate women's hats and other clothing. Today, habitat loss is the primary human-influenced threat to herons, especially loss of wetland, riparian and coastal habitats. Degraded and acidic rivers also negatively affect heron populations. All migratory birds are protected under the federal Migratory Bird Treaty Act of 1918.

Herons, and many other species of wildlife, benefit from Pennsylvania Game Commission waterfowl projects and habitat preservation and enhancement work on State Game Lands. Wildlife Management Areas such as Pymatuning, Middle Creek and Shohola Lake (SGL 180) provide many acres of excellent marsh and habitat. Propagation areas within these waterfowl management areas restrict public access which provides greater protection to waterfowl, herons and other wildlife, especially during the breeding season. These protected spaces are critical to many bird species, particularly endangered species and species of conservation concern, which are most sensitive during nesting, brooding and raising young. Also, the Game Commission owns and manages some of the largest wetlands in the state which are critical nesting and foraging areas for herons and other birds that require that habitat. Several of these wetlands and larger heron colonies have been selected as state Important Bird Areas. Heron nesting colonies are especially important to protect because they concentrate a population into a small area. Herons literally put all their eggs in one basket, so it is important to protect each "basket." Therefore, heron colonies are protected through the Natural Heritage Program and the Environmental Review process. These colonies are monitored through the Game Commission's colonial waterbird program. The American bittern, least bittern, and great egret are considered endangered in the state due to their rarity and the vulnerability of their colonies.

American Bittern (*Botaurus lentiginosus*)

In Pennsylvania, the American bittern is listed as a state endangered species and protected under the Game and Wildlife Code. It was once more numerous in the state and even common in places like Pymatuning Swamp and Conneaut Marsh but was listed as threatened in 1979 and since downgraded to endangered. It is not listed at the federal level but is a species of high conservation concern in the Upper Mississippi Valley/Great Lakes Region of the North American Waterbird Conservation Plan. It is also a U. S. Fish and Wildlife Service migratory bird of conservation concern in the Northeast. This is one of the wetland species that is undergoing an alarming decline and range reduction.

The American bittern is 23 to 24 inches long, has a 50-inch wingspread, and a 1½ foot standing height. Plumage is dappled dark and light brown, with a black streak on each side of the upper neck, brown and white streaks running from its throat down its underside, and yellow legs. Its plumage colors and patterns blend in with the dried stalks and reeds of its surroundings, and it is especially camouflaged when standing upright, bill pointed skyward. In flight, which is slow and deliberate, the black flight feathers are distinctive.

This shy, elusive bird, inhabits the tall vegetation of freshwater marshes. Most active at dusk and at night, it preys on fish, crustaceans, amphibians, reptiles and small mammals. It also eats insects such as dragonflies, grasshoppers and water beetles. An individual hunts by standing motionless and waiting for prey to pass. Like the least bittern, the American bittern hides by freezing with its bill pointed up. On breeding grounds, it makes a hollow croaking or pumping sound, *oong-ka-choonk*, from which it earned the colloquial name "thunder pumper." It can be heard for up to a mile across a marsh and is the best indicator of its presence. The species does not flock.

The favored habitats of the American bittern are freshwater marshes, bogs and swamps, especially where cattails

and bulrushes grow. Solitary nesters, in dense emergent vegetation, bitterns build 10 – to 16-inch platforms of dried cattails, reeds or grasses just inches over shallow water and less commonly on dry ground among tall vegetation. Females have clutches of three to seven eggs, usually four to five, with one laid daily, that are well-camouflaged buffy brown to olive-buff and unmarked. Incubation, mainly by the female, lasts 24 to 28 days, beginning with the first egg.

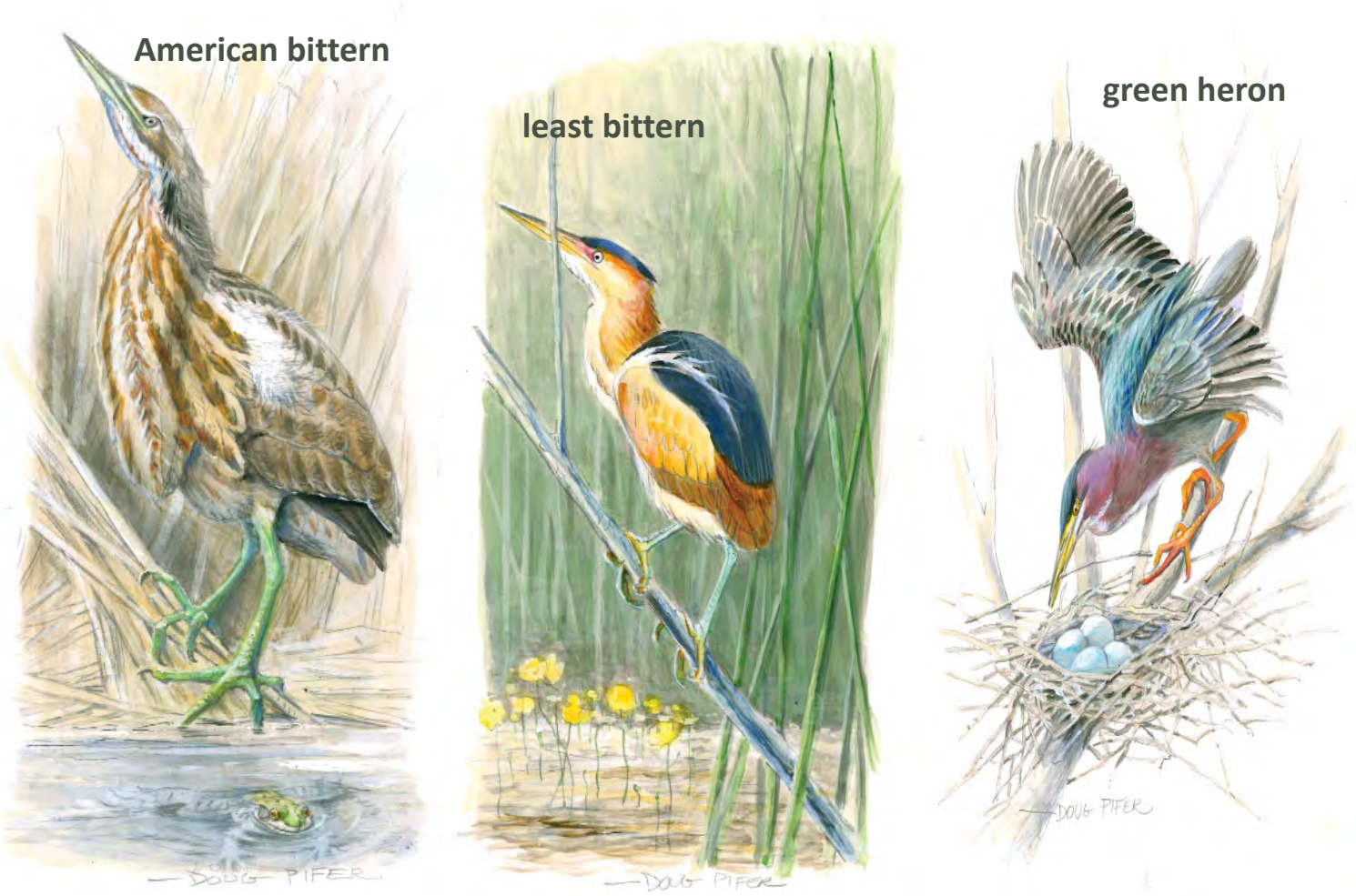
In spring, American bitterns are uncommon to rare migrants from early April to mid-May. They can be spotted in many more locations than where they nest, sometimes stopping at small ponds and wetlands. In summer, they are breeding residents, nesting across mid-United States and much of Canada. In Pennsylvania, they are regular breeding residents in the large wetlands of Crawford County, especially Geneva Marsh, SGL 213. *The Second Atlas of Breeding Birds* (2004-2008) includes two confirmed breeding records (Centre County and Tioga County), which is three less than reported during the first *Atlas of Breeding Birds* (1983-1989). The Marsh Creek wetlands in Tioga County (State Game Lands 313), known locally as "the Muck," supports a good population of this species and other wetland birds and is designated as an Important Bird Area (IBA). The distinctive *oong-ka-choonk* sound of the American bittern has been heard in Quakertown Swamp in Bucks County as well, another Pennsylvania IBA.

However, this species has suffered greatly from the loss of wetland habitat, especially in southeastern Pennsylvania where many marshes once used by breeding bitterns have been filled or reduced in size for development or choked by sedimentation. Overall, Pennsylvania has lost over 50 percent of its wetlands in the past two centuries. Former breeding populations have disappeared over the last few decades. Substantial population declines are occurring elsewhere across its range because of loss and degradation of habitat.

Little is known about the timing of fall migration as it is difficult to distinguish resident birds lingering after the breeding season from those passing through on migration. Some birds winter in Pennsylvania, but the majority migrate to the southern United States, through Mexico and into Central America.

Least Bittern (*Ixobrychus exilis*)

The least bittern is an endangered species in Pennsylvania. It was first listed as threatened in 1979 but later downgraded to an endangered species in 1997. It is the smallest of Pennsylvania's herons, 11 to 14 inches long with a 16 – to 18-inch wingspread. It has large buffy wing patches; a blackish-green crown, tail and back; and yellow legs. Females are paler than males. Its underparts are white with tan streaks



and a tan neck and sides. This shy bird is not often observed, because it is predominantly nocturnal and inhabits dense vegetation within marsh habitats. It prefers large wetlands with tall emergent vegetation and usually hides in cattails, tall grasses and sedges when disturbed. A weak flier, the least bittern would rather run when alarmed, burrowing through dense stalks, or "freeze" by standing motionless with its long, tapered bill pointed upward sometimes even swaying in the breeze to simulate the surrounding vegetation (thus blending into the marsh background like a stick or reed). Its diet consists of insects, crayfish, salamanders, small fish, frogs and tadpoles. The least bittern has the unique hunting technique of grasping a clump of plant stalks in each foot, aided by its long toes and curved claws. From this elevated, straddled position it strikes prey that swims by in the water below, water deeper than it could stalk through. It is also known to forage from small platforms it builds out of plant material. Their call is three or four low, soft *coos*, somewhat like the calls of cuckoos.

Least bitterns prefer larger wetland complexes with a diversity of vegetation. They are locally uncommon breeders in the John Heinz National Wildlife Refuge (Tinicum) in Philadelphia and Delaware counties; at Presque Isle State Park in Erie County; in the extensive Marsh Creek wetland known at "the Muck" partially in SGL 313, Tioga County; and in larger emergent wetlands in the state's northwestern counties, especially Conneaut and Geneva marshes, mostly in SGL 213, in Crawford County. They are very rare in suitable habitat elsewhere in the state. Only four confirmed breeding sites statewide were identified in the *Second Atlas of Breeding Birds in Pennsylvania* (2004-2008). The species is declining in Pennsylvania and throughout much of its breeding range. The reason for its decline is the continuing loss of suitable habitat. Wetlands are lost with impoundments, drained wetlands, certain agriculture practices, land development and invasive plants.

Least bitterns nest on the ground in marshes, bogs or brackish water areas. Nests are 6 – to 10-inch wide platforms of dead plant material interwoven with living plants, often built in thick cattails, tall grass or under bushes one to eight feet from the water. The female lays four to five pale bluish-green, unmarked eggs. During incubation (17 to 20 days), adults do not fly directly to their nest: they land nearby and approach quietly through the ground cover.

Least bitterns are rare April through May spring migrants, arriving after new marsh vegetation grows high enough to provide protection. In summer, they are rare breeding residents. The least bittern occurs from southern Canada south to Central America and South America. In North America the species is found mostly in the eastern half of the United States, though absent from much of the Appalachian Mountain section. It can also be found at scattered locations in the western half of the country but only in a few states. In fall, they are rare August through September migrants. They winter principally in southern Florida, the Gulf Coast of Texas and Mexico and through Central America.

Great Blue Heron (*Ardea herodias*)

This bird probably comes to mind most when the word "heron" is mentioned. Many people mistakenly call this species a "crane" or "blue crane" but cranes are in a different family and fly with their necks extended rather than tucked in like herons. The great blue heron is the largest of the dark herons, approximately 38 to 53 inches long (as seen in the field) and with a 70-inch wingspread. A great blue heron's head is largely white (with a thick black stripe over the eye and feathery black crest), the underparts are dark gray, and the back and wings are grayish-blue. The legs are dark.

When hunting, a great blue walks slowly through the shallows or stands in wait, head hunched on its shoulders. Great blue herons eat mainly fish but are opportunistic and will eat nearly any food item they can successfully strike. Favorite foods include fish (up to a foot in length), water snakes, frogs, crayfish, mice, shrews, and insects such as dragonflies, grasshoppers and aquatic insects. They sometimes stalk across fields and prey on small rodents. Individuals are generally solitary except in breeding season. Although small groups may be seen foraging an area that has an abundant food source. The most commonly given call is a loud series of three or four hoarse *squawks*. Great blue herons will forage at night, especially in the moonlight, and let out a loud *squawk.*

Great blue herons inhabit saltwater or freshwater areas near trees suitable for nesting. They often nest in remote and inaccessible places. They may travel far (more than 10 miles in some cases) to forage, and sometimes choose foraging sites close to human activity, such as urban waterways or the marshy drain-field adjacent to a shopping mall. Great blue herons can nest either singly or in colonies, but usually in colonies and sometimes among the nests of other herons. Multiple nests may be found in the same tree. The nest is a platform of large sticks lined with fine twigs and leaves and built in a sturdy crotch or on a limb. Herons occasionally nest on the ground, on a bush or on a human structure. The outside diameter of a nest can be anywhere from 20 inches to up to four feet across; a larger nest is the result of the nest being refurbished from year to year. The male brings nesting material to the female, which does most of the actual building. Colonies sometimes persist for several years or decades, then disappear for unknown reasons (perhaps due to changed food availability).

The female lays three to six (usually four) pale bluish-green, unmarked eggs. Incubation is by both sexes and takes roughly 28 days. Both parents feed the young, which are ready to leave the nest at about seven to eleven weeks.

In spring, the great blue heron is a common migrant from mid-March to late May; in summer, a breeding resident across nearly all of Pennsylvania with the exception of areas along the Appalachian Plateaus Province, possibly because of polluted rivers and streams in the region as a result of coal mine operations and acid precipitation. The species generally breeds across the northern United States, through much of Canada to Alaska and south to northern South America.

Fall migration is gradual and not well defined as heron numbers seem to thin with fall and dwindle by the onset of winter. Some remain as winter residents, hanging out along waterways and other open water until the water is iced over or fish populations are depleted in smaller waterways. The species winters principally along the Atlantic coast, the southern states and Central and South America.

Great Egret (*Ardea alba*)

The great egret – which also has been called the common or American egret — was nearly gone from the United States by the early twentieth century. For years the birds had been killed for their long, white body plumes, used to feather women's hats. This fashion trend sustained a flourishing international trade and drove market hunting demands which decimated great egret populations as well as other wading bird species across North America. The near loss of egrets and other birds at the turn of the twentieth century launched wildlife conservation organizations and initiated the creation of federal laws protecting bird species. The Lacey Act of 1900 and later the Migratory Bird Treaty Act of 1918 offered legal protection for migratory, breeding and rare birds. This legal protection from the plume trade enabled great egret populations to rebound.

Between 1957 and 1989, the great egret established three nesting colonies in Pennsylvania but was listed as threatened in 1990 after the Rookery Island colony along the Susquehanna River in Lancaster County was abandoned. In 1999 the species was elevated to state endangered and now nests at only two known sites regularly: the Susquehanna River's Wade Island, Dauphin County and Kiwanis Lake in York County. Nesting great egrets are vulnerable to disturbance and direct persecution.

The main threats to great egrets include habitat loss (flooding of shallow feeding areas as a result of dams or with changes in precipitation as occurs with climate change, for example); competition with a growing population of double-crested cormorants for nest sites; the loss of nesting trees which often occurs with erosion and with the presence of nesting cormorants whose acidic droppings are known to kill nesting trees. Also, water quality with an abundance of small fish, crayfish and tadpoles are imperative in the vicinity of colonies and throughout the river valley as many egrets tend to wander the Susquehanna River and its tributaries to feed following nesting.

A great egret's plumage is pure white, the bill yellow, and the legs and feet glossy black. It's the largest white heron likely to be observed in Pennsylvania, with about a 40-inch length from tip of bill to tip of tail, a 55-inch wingspread, and a standing height of about three feet. The great egret also is a more robust-looking bird than any of the egrets that visit the state, but not as bulky as a great blue heron. It eats mainly small fish and crustaceans, and will eat reptiles, small mammals, amphibians, and insects.

Egrets inhabit swamps, brushy lake borders, ponds, Susquehanna River shallows, islands and mudflats. Nests are in colonies, sometimes with other heron species, usually 10 to 50 feet up in trees. In forests with large trees, egret nests

may be 80 feet in the air, along with the nests of great blue herons. Nests are made of sticks and twigs, up to three feet in diameter, sometimes lined with leaves, moss and grass. Eggs: three to four oval, blue or greenish-blue, unmarked. Incubation is performed by both adults, lasting 23 to 24 days.

Breeding resident egrets arrive in March. Post-breeding dispersal occurs from July to October. During this period, great egrets range far north and upstream from any known colony and visit many kinds of waterbodies including small ponds and streams far from any large river. Migrants also pass through the state at this time. Egrets are rare winter residents, sometimes staying on the John Heinz National Wildlife Refuge in Delaware and Philadelphia counties.

Green Heron (*Butorides virescens*)

This small, chunky crow-sized heron is found around ponds and lake edges, along wooded streams and rivers and in marshes and swampy thickets. Its length is 16 to 18 inches, its wingspread 25 inches. The bluish-green back and wings give the bird its name; underparts are dark, while the neck and head are reddish-brown, and the crown is black. This bird may appear all dark from a distance, especially on a cloudy day. Immatures resemble American bitterns although green herons are smaller with a much shorter wingspan. For awhile, this species was combined with the striated heron (*Butorides striata*) and the combination was called the "green-backed heron."

A green heron flies with deep wingbeats. Its call is a sharp, descending *skeow*, sometimes given in flight. The green heron feeds on small fish, frogs, insects, worms, lizards and salamanders, hunting early in the morning and late in the afternoon. Herons employ some 36 feeding behaviors and the green heron is one of the few birds to use tools among its hunting techniques. While foraging, it may lure prey in by dropping a twig, feather, worm, insect or other bait onto the surface of the water. It then waits motionless, with head and neck retracted and ready to strike, until fish or other prey comes to the bait. This heron also slowly stalks shallow water and stream banks; nudges prey into a more favorable position with its feet; waits perfectly still in ambush; and dives into water from an overhanging perch.

Green herons usually nest in shrubs or trees overhanging the water, but sometimes in orchards and groves away from any water source. A pair may nest by itself or in a loose colony of other herons (the green is not as gregarious as the great blue). The nest is a platform of twigs and sticks lined with finer material. Some nests are so shallow and flimsy that the eggs can be seen through the bottom. The male selects the nesting site and starts building, and the female finishes the task. Outside nest diameter is 10 to 12 inches. Four to six oval, pale blue or green unmarked eggs are laid, which both sexes incubate for 19 to 21 days. Pairs typically raise one brood.

In spring, green herons are common April through May migrants. In summer, they are breeding residents (the species breeds throughout the eastern United States north to southern Canada and south to the Caribbean and northern South America. Also along coastal areas of Central America and the western United States); in fall, they are common September migrants, with stragglers into November. Green herons rarely winter as far north as Pennsylvania.

Black-crowned Night-heron (*Nycticorax nycticorax*)

The night-herons are so-called because of their nocturnal habits. They often are overlooked, even around homes, because of their night activities. Night-herons have stocky bodies and short, thick necks. In Pennsylvania, the black-crowned night-heron is a state endangered species and protected under the Game and Wildlife Code. This species was listed mainly because of a decline in numbers and size of Pennsylvania colonies. The black-crowned night-heron is about 22 inches in length, with a 45-inch wingspread. Adults have glossy greenish-black backs, pale gray or white undersides, and yellow-orange legs; three white, 6-inch plumes extend back from the black crown. Immatures are heavily streaked with brown and lack the red eye of the adult.

In flight, black-crowned night herons resemble slow, light-colored crows. They fly in loose flocks and often roost communally. Usually inactive during the day, they typically hunt at night and at dusk and dawn. Black-crowned night-herons forage mainly on fish, some eaten as carrion; also dragonflies, other insects, crayfish, worms and small rodents. The call is a single, startling, *kwawk*, most often given at night.

These herons adapt to extremely varied wetland and riparian habitats: fresh, salt and brackish waters, forests, thickets and even city parks. They nest close together in small to large colonies—sometimes with other species—in trees, shrubs or on the ground in cattail stands. In Pennsylvania, black-crowned night-herons are found primarily in the Piedmont Province. They nest at two main colonies: Wade Island (a mixed-species colony) on the Susquehanna River and Kiwanis Park in the city of York. Small colonies also exist in Lancaster County and Berks County. This species formerly nested in several other counties further north.

Nests are built of sticks, twigs or reeds, and sometimes lined with finer material. Both sexes contribute to nest building (construction takes two to five days). On average, pairs hatch three pale blue or green unmarked eggs, which hatch in 24 to 26 days. Typically, 80 percent of nestlings survive to the fledgling stage.

In spring, black-crowned night-herons occupy nest colonies in April. In summer, they are breeding residents. The onset of fall migration is not clearly defined but from mid-August to late October black-crowned night-herons are found away from breeding sites. In winter, they are very uncommon residents in the southeast coastal plain area at John Heinz National Wildlife Refuge and occasionally at a few other sites. Almost all individuals, however, go farther south.

Yellow-crowned Night-heron (*Nyctanassa violacea*)

An endangered species in Pennsylvania, this bird is similar in size and body configuration to the closely related black-crowned night-heron, except that the yellow-crowned night heron is slimmer and has slightly longer legs (standing height about 1½ feet). The black-crowned night-heron has a stockier profile. The yellow-crowned night-heron has a yellow patch on its head, a gray body, and a black and white face. The call, a strident *kwawk*, is slightly higher-pitched than that of the black-crowned.

Yellow-crowned night-herons hunt mainly at night but also at times during the day. They are reputed to be a crustacean specialist, but they also eat frogs, fish, salamanders, lizards, worms, and insects. Along the Susquehanna and its tributaries, catching crayfish is their specialty, but they also will forage on worms in yards. Pennsylvania is at the northern edge of this species' breeding range and it is one of the state's rarest nesting birds. Currently, the only known breeding site is in an urban setting in Dauphin County. Nests were once also found along Conestoga and Little Conestoga creeks in Lancaster County; Conodoquinet Creek in Cumberland County; Bellevue Park in Dauphin County (as recently as 2011); and Kiwanis Lake in York. They nest singly and in small loose colonies, typically in single-species groups but sometimes with other herons. The stick nest is built in a tree or shrub and sometimes lined with fine twigs, rootlets or leaves. Nest building is part of the pair-bonding process and both sexes take part in building a nest, which takes about 11 days. A pair often re-uses a nest tree for several years, even decades, adding new sticks to the nest each April. This species is more secretive in its nesting habits than other herons, with the exception of bitterns, but seems tolerant of human activity as it has been known to nest and feed in neighborhoods with a park-like setting. Eggs: three to four smooth, pale bluish-green, unmarked. Incubation is by both sexes.

In spring, yellow-crowned night herons appear in early to mid April into late May. In summer, they are breeding residents in the Piedmont region. In fall, they are rare August through September migrants and will disperse far away from nesting areas, but have been recorded into October; and they winter principally along the Atlantic coast from South Carolina south and west along the Gulf Coast. They are found year round in parts of Central and South America.

There are other herons that visit Pennsylvania including the following four species that breed farther south or along the Atlantic coast. The snowy egret (*Egretta thula*), which is white, with black legs and bright yellow feet, is seen in spring and late summer. The snowy egret is an elegant, dainty-looking small egret that looks like it has "yellow slippers" on its feet. The little blue heron (*Egretta caerulea*) is a migrant occasionally spotted in April, but more often in July and August and even September. This heron is a common visitor in the Piedmont and Coastal Plain along the Delaware and Susquehanna rivers and is occasionally found in other areas of the state. Little blues are 22 inches in length, with brownish heads and bluish-gray bodies. Juvenile little blue herons are white-plumaged, making them easy to confuse with the herons that are named "egret." The tricolored heron (*Egretta tricolor*), a handsomely plumaged heron of the Atlantic and Gulf coasts, is a rare but regular visitor to the state's Coastal Plain and Piedmont regions, mostly in the post-breeding dispersal period. The cattle egret (*Bubulcus ibis*) was first observed in Pennsylvania in 1956 and became common in some areas, establishing a breeding colony on a Susquehanna River island in Lancaster County during the 1970s. During the 1980s the cattle egret population experienced a dramatic decline. Today the cattle egret visits Pennsylvania less frequently and in smaller numbers. Its plumage is white, with brownish plumes on the back, lower breast, and crown. It has a reddish bill and legs. The cattle egret has a decidedly shorter-necked and stockier appearance than other egrets found in Pennsylvania. Snowy and cattle egrets nested in Pennsylvania during the 1970s and '80s. Their colony on the Susquehanna River's Rookery Island in Lancaster County was abandoned in 1989.

black-crowned night-heron

yellow-crowned night-heron

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Vultures

Vultures, also mistakenly called buzzards, are large, blackish birds with broad wingspans, often seen soaring in wide circles in the sky. They are active in the daytime, when they search for carrion to eat. As scavengers, vultures have an important role in the ecosystem by hastening the decomposition of dead animals, consequently helping to prevent certain diseases that may be harmful to other animals and humans. Sometimes they perch in trees or stand on the ground, usually near a dead animal. Although graceful in flight, they are clumsy on the ground.

Seven species of vultures inhabit the Americas, including the endangered California condor. Pennsylvania has two species: the black vulture (*Coragyps atratus*) and the turkey vulture (*Cathartes aura*). The turkey vulture is the more common and widespread vulture in Pennsylvania. The turkey vulture is found statewide, while the black vulture, is found mostly in the southern counties. Both of these vultures have increased in recent decades with the black vulture especially expanding its breeding range northward. Both of these vultures are tolerant of human activities, enabling them to coexist in close proximity to people. Both are protected by game laws.

Black Vulture *(Coragyps atratus)*

The black vulture, between 24 and 27 inches in length, with a wingspan less than 5 feet, is smaller than the turkey vulture. The black has a short, squared tail and gray to black featherless head. Because its wings form less sail area, it is not as efficient at soaring as the turkey vulture and must fly using several rapid wing flaps followed by a short sail.

Airborne, the black vulture shows distinctive white patches on the undersides of the wings near the tips. The black holds its wings more horizontally than does the turkey vulture. In both species, their naked heads look so small for the size of the bird that from a distance they sometimes appear almost headless. This small head in relation to body size is a good field mark to help distinguish a soaring black vulture from other large birds such as the golden eagle and bald eagle. The white wing patches are also good field marks.

The black vulture has expanded its range in the Northeast and is commonly found in southeastern Pennsylvania. Breeding Bird Surveys indicate a 10% annual increase between 1966 and 2009 in the state. Its breeding range now extends from the southern edge of Canada to southern South America and it is found year round over much of this range except for birds in more northern latitudes, which migrate southward in fall.

Black vultures are found in open habitats such as farmland and open woodland. They roost in large trees in woodlands but forage in open spaces. Unlike turkey vultures, black vultures are unable to locate food by scent alone and must rely on sight or by taking advantage of an existing feeding opportunity. Black vultures may detect, sometimes from great distances, and follow a descending vulture to a carcass. In this

black vulture

way, turkey vultures often inadvertently lead black vultures to a food source, much to the disadvantage of the turkey vulture, as aggressive black vultures feed in larger groups and may displace a turkey vulture from carrion that it found.

Black vultures are adaptable and can thrive in human-influenced environments. Living in close proximity with humans, they regularly forage at landfills and garbage dumps, sewers and the refuse pits of poultry and cattle farms. Vulture-related conflicts sometimes occur in agriculture areas as black vultures occasionally prey on newborn livestock. They are much more aggressive than the more common and widespread turkey vulture.

These highly social birds gather in large communal roosts that help foster their strong social bonds and provide a meeting point for foraging groups.

The nest site choices of these two vultures are similar. Black vultures may nest in a rock pile, cave, rock cavity, hollow tree or the isolated recesses of human structures such as abandoned buildings. They do not build a nest; instead the female lays her eggs on the bare surface of the nest site. Eggs, usually two per clutch, are similar in size to turkey vulture eggs, but are grayish-green to blue-white with brown or lavender blotches and spots. Both sexes participate in incubation, which takes 28 to 39 days.

Turkey Vulture *(Cathartes aura)*

The turkey vulture is the chief avian scavenger of the United States including Pennsylvania where it is a common sight. The turkey vulture specializes in foraging for small food items, mostly mammals, and regularly consumes road-killed wild animals. Adults are about 30 inches in length, with wingspans up to 6 feet. Their bodies are covered with blackish-brown feathers, and sexes are colored alike. Seen from below, a turkey vulture's wings appear two-toned, the flight feathers lighter-colored than the rest of the feathering. Turkey vultures soar with wings held above the horizontal, forming a pronounced V-shape or dihedral. The birds rock and tilt unsteadily in the air, sometimes very low to the ground, soaring with few wing beats. Their V-shaped flight profile and rocking flight habit make them easy to tell apart from eagles or large hawks like the red-tailed hawk.

The turkey vulture was named because of the resemblance of its naked head to that of a wild turkey. To probe deeply into carrion without becoming overly messy, the head and neck are unfeathered "like the bare arms of a butcher" wrote an early naturalist. Adults have a pinkish to bright red head and neck; in young birds, these skin areas are blackish. The turkey vulture's pale, heavy bill has a sharp hook at the end for tearing. Its toes are equipped with strong, curved talons.

Vultures are essentially voiceless; lacking a syrinx, or vocal organ, all they can do is hiss, whine and grunt. They have keen vision and a sharp sense of smell and use both to locate carrion. Their olfactory organs are large and well supplied with nerve endings. This highly developed sense of smell enables turkey vultures to find carrion under the cover of a dense forest canopy.

Vultures are efficient soarers, their long, broad wings holding them aloft like kites. In a rising current of air, a vulture can maintain or even increase altitude without flapping its wings. Since they don't use their wings as much as most birds, vultures have relatively small breast muscles. Like many hawks and falcons, vultures like to migrate along mountain ridges, using thermal updrafts to help keep airborne. They may remain on their roosts for several days when rainy weather makes soaring difficult.

Observations from gliders show that the turkey vulture has a lower sinking speed than the black vulture. Vultures eat all kinds of carrion, including fish, snakes, winter- and highway-killed wild animals, domestic animals, and slaughterhouse refuse. Unlike black vultures, turkey vultures almost never attack live prey, but will occasionally take a small snake or mammal.

Favored breeding habitat includes most areas of Pennsylvania where an ample supply of carrion is available. They are found

in open environments and inhabit the fringes of urban and suburban developments, farmland and forested areas. They nest in sheltered, inaccessible areas that are undisturbed such as caves and rock crevices, ledges of steep cliffs, hollow trees and logs, dense thickets, abandoned hawk nests and heron nests and abandoned or seldom used buildings.

Vultures make little or no nest, depositing their eggs on the ground, in gravel on cliff ledges, or on rotted sawdust or chips in logs and stumps.

The female lays one to three eggs, typically two. Eggs are 2¾ to 3 inches long by 1¾ to 2 inches wide, elliptical or long-oval. Their shells are smooth to slightly grainy, dull or creamy white, overlain with irregular spots and blotches of pale and bright brown.

Both parents share incubating duties. After 30 to 40 days, the eggs hatch into altricial young that remain in the nest for 8 to 11 weeks. The young birds eat carrion regurgitated to them by their parents. Careful concealment of an inaccessible nest is important at this time, as the carrion's stench may attract potential predators.

Vultures are gregarious; groups of 8 to 25 or more adults and juveniles may wheel in the sky or roost together in trees. Although turkey vultures like to nest in caves, they apparently rarely enter them at other times of the year and do not use them for winter shelter. Both young birds and adults molt once each year. This gradual molt occurs from late winter or early spring until early fall.

The turkey vulture is a year-round resident of Pennsylvania, but individuals migrate south even if for short distances. It is a common migrant in late February and March. In summer, it breeds throughout the state, expanding from its former range of only the southern counties to statewide occurrence. In northern parts of its range, turkey vultures make a southward migration. In fall, it passes through from late August to late November with a peak from mid-October to mid-November. Wintering turkey vultures are most abundant in southeastern counties. Pennsylvania's breeding population winters as far as southern Florida. The turkey vulture resides in eastern United States south to southern North America, Central America, and South America.

turkey vulture

Revised 02/2021

Eagles & Osprey

Large, striking and charismatic birds of prey, the bald eagle, golden eagle and osprey seem to embody power and majesty. All regularly occur in Pennsylvania, but only the bald eagle and osprey nest here. The golden eagle migrates through the state on a pathway connecting its breeding and wintering territories.

In the not so distant past, direct persecution and environmental contaminants drove eagle and osprey populations to catastrophically low levels. Protection at both state and federal levels, tremendous conservation efforts and improved waterway quality enabled them to rebound in Pennsylvania and elsewhere.

While persecution and environmental contaminants continue to impact these large raptors, today's primary threats include loss of habitat due to land-use changes and declining habitat quality.

Taxonomists place bald and golden eagles in the same family as hawks, kites, harriers and Old World vultures – the family Accipitridae. The osprey is the only species of the family Pandionidae.

Bald Eagle

The bald eagle's scientific name, Haliaeetus leucocephalus, means "white-headed sea eagle." The word "bald" is a misnomer. The mature eagle's head is covered with gleaming white feathers. Its body is dark brown, its tail white. Immatures are brown, mottled with white on their wings and body. Full adult plumage is attained in the fifth year. Both adults and immature bald eagles have yellow bills and feet, and their legs are feathered halfway down.

Bald eagles were listed as a federally endangered species until 1995, when their status was upgraded to "threatened." In 2007, following a remarkable population recovery, the bald eagle was removed from the federal List of Endangered and Threatened Wildlife in the lower 48 states. Although no longer listed at the federal level, the bald eagle remains protected under the federal Bald and Golden Eagle Protection Act, the Lacey Act and the Migratory Bird Protection Treaty Act. In Pennsylvania, the bald eagle is given additional protections under the state Game and Wildlife Code.

Adult bald eagles are 30 to 40 inches in length and weigh 8 to 14 pounds. Their wingspans are 6 to 8 feet, and they stand about 2 feet tall. As with other birds of prey, the female is larger than the male.

Bald eagles fly with strong, deep strokes, or soar on flattened wings. Their eyesight is among the keenest in the animal world, five or six times sharper than a human's. A bald eagle's call is a rapid, harsh cackle, kweek-kik-ik-ik-ik-ik, or a lower kak-kokkak.

Fish, either caught live or scavenged as carrion, make up 60 to 90 percent of a bald eagle's diet. Bald eagles also eat birds, small mammals, reptiles, amphibians and invertebrates. Eagles soar above the water or sit on a perch, and when they spot a fish near the water's surface, they swoop down and snatch it in their talons. They use their talons for killing, and their heavy bills for tearing prey apart for eating. Sometimes an eagle will go after an osprey or another fish-eating bird, forcing it to drop a captured fish, which the eagle grabs in midair. This behavior is known as "pirating" prey.

Generally, bald eagles mate for life, although when one partner dies, the other quickly finds a new mate if one is available. Nesting is preceded by a spectacular aerial courtship, with the birds locking talons, diving and somersaulting in the sky.

An eagle's nest is called an eyrie. The big raptors choose large, sturdy trees with good views of their surroundings. Nest sites are near lakes, rivers, reservoirs, and seashores.

A new nest is about 5 feet wide and 2 feet high, with an inside depression 4 to 5 inches deep and 20 inches in diameter. Often a pair returns to the same nest year after year, repairing damage and adding a new layer of sticks, branches and cornstalks, plus a lining of grass, moss, twigs and weeds. Enlarged annually, some nests grow so big and heavy that they break the branches or tree supporting them. Unlike ospreys, bald eagles are not likely to build on artificial structures, although a few have done so in Pennsylvania.

The female lays two eggs (sometimes only one and occasionally three) during the span from February through April. Eggs are about 2¾ by 2½ inches, dull white and unmarked. Both parents incubate, with the pair taking turns at the nest.

If all goes well, the eggs begin hatching after about 35 days. Young birds (eaglets) are fed by their parents. Because eggs hatch over several days, age and size differences among hatchlings often gives the first hatchling a head start and a competitive advantage at feeding time. A large, healthy eaglet might kill a smaller, weaker one or out-compete it for food.

Eaglets develop most of their feathers by 3 to 4 weeks, walk in the nest at 6 to 7 weeks, and begin to fly at about 3 months. Young separate from their parents in autumn.

Factors affecting nest success are many. Bald eagle nests and young eagles are easily disturbed and nest failure can occur when people get too close to an active nesting area. Adults might abandon a nest site altogether or leave eggs or hatchlings exposed to sun, cold temperatures, severe weather and predators. Also, when growing eaglets are disturbed before their first flight, they may fledge prematurely which makes them vulnerable to terrestrial predators and inclement weather. To protect eagles, people should keep their distance from active nests, roost sites or feeding areas, and avoid approaching a nest directly. Federal regulations prohibit any intrusion within 660 feet of the nest.

Eagles do not breed until 4 or 5 years of age. Their natural reproduction rate is slow. High water quality, riparian forest and wetland habitat are vital for Pennsylvania's breeding eagles. Breeding habitat – tall, sturdy trees near bodies of water in protected areas—continues to dwindle. Toxic chemicals introduced into the environment cause repeated nest failures.

Bald eagles are now fairly widespread in Pennsylvania, and may show up here in all seasons, and particularly along major river systems. Nesting pairs might remain in their territories year-round. Many eagles migrate through the state, some from the north and others from southern parts of the United States. In fall, bald eagles are among the earliest raptors to pass through, soaring on thermals over mountain ridges and along large streams. Many of the early migrants are southern bald eagles that have wandered north into Pennsylvania and other northeastern states following nesting and are returning south again. During winter, bald eagles are seen around water bodies across the state. During colder winters, when open water is rare, eagles congregate in areas where water remains unfrozen and they can forage. Bald eagles congregate at several locations in winter, including sites along the lower Susquehanna River, upper Delaware River, Raystown Lake, and the reservoirs and wetlands of northwestern Pennsylvania. In order to record wintering eagle populations and to get a preview of nesting behavior, the Game Commission each year coordinates a mid-winter bald eagle survey in cooperation with volunteer eagle-watchers and the U. S. Army Corps of Engineers.

A bald eagle's head feathers change as it matures.

While bald eagles today appear in Pennsylvania in good numbers, not so very long ago, the future for the state's eagles looked bleak. In 1983, when the Game Commission launched what would be a seven-year restoration program, only three pairs of nesting eagles remained in the state—all of them located in Crawford County, in northwestern Pennsylvania along the Ohio border.

As part of a federal restoration initiative, the Game Commission sent employees to the Canadian province of Saskatchewan to obtain eaglets from wild nests. From 1983 to 1989, 88 eaglets were brought to Pennsylvania, where they were raised in specially constructed towers and released into the wild through a process known as "hacking." Hacking is a falconer's term for maintaining a young bird in a semi-wild condition, providing food until it can fend for itself. Pennsylvania's reintroduction effort jump-started a remarkable recovery.

By 1998, Pennsylvania was home to 25 pairs of nesting bald eagles. Within the next three years, the number of nesting pairs doubled. By 2006, more than 100 nests were confirmed statewide. And the number of nests topped 250 in 2013, with

bald eagles nesting in all but a handful of the state's counties. The nesting population continues to grow in size and expand in geographical range, and a lot of good habitat remains.

Bald eagles can live 32 years or longer in the wild. They have few natural enemies and mortality is often directly or indirectly related to humans. They are sometimes killed by motor vehicles, occasionally shot and some get lead poisoning from ingesting contaminated prey. Eagles are sometimes electrocuted when they land on powerlines, and are at risk of colliding with wind turbines on ridgetops during migration.

The bald eagle was chosen the United States' national symbol in 1782. At that time, an estimated 100,000 lived in what is now the lower 48 states. In 2007, the U.S. Fish and Wildlife Service estimated that at least 9,789 nesting pairs populated the contiguous United States.

Golden Eagle

The golden eagle, *Aquila chrysaetos* is a magnificent predator of remote, mountainous areas. The species occurs in Europe, Asia, northern Africa and North America, where it's most common in the western United States, Canada and Alaska.

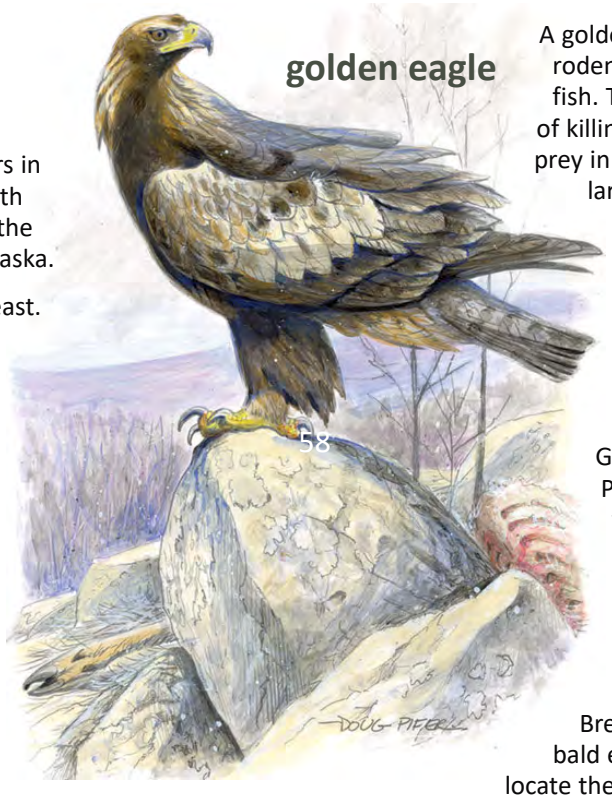
The golden eagle is rare in the Northeast. A small population exists in eastern North America. This geographically isolated population breeds in northeastern Canada in the northern forests of Quebec, Labrador and northern Ontario.

The eastern golden eagle is closely linked to the Appalachian Mountains where it travels the mountain ridgelines during southbound and northbound migrations and spends the winter on the steep forested ridges of the central and southern Appalachians, primarily in Virginia and West Virginia. Pennsylvania hosts its share of migrating and wintering golden eagles, mainly in the Ridge and Valley Province between the Allegheny Front and the Kittatinny Ridge.

Pennsylvania's Wildlife Action Plan designates the golden eagle as a vulnerable species, and as a top predator, it is an indicator of habitat quality.

Like the bald eagle, the golden eagle is federally protected under the Bald and Golden Eagle Protection Act, the Migratory Bird Treaty Act and the Lacey Act. The golden eagle generally prefers open country on its breeding range, but on migration and during winter it favors the Appalachian's forest ridges and small openings along those ridges.

Adults and immatures have rich, dark-brown body plumage, with gold-tipped feathers on the back of the head and neck.



The golden eagle is in a subfamily of "booted" eagles and its legs are feathered to the toes. Adults resemble immature bald eagles, but goldens are darker with fewer splotches of white. Immatures have white wing patches and, for their first several years, a broad, white band at the base of the tail. In flight the eagle's tail protrudes noticeably more than its small-looking head protrudes. It also holds its wings in a slight "V" as compared to the bald eagle's flat plane, the so-called "flying plank" of hawk watches.

Golden eagles are shaped like buteo hawks, with long, rounded wings. They flap less and soar more than bald eagles. Body length is 28 to 40 inches; wingspan is 6 to more than 7 feet, and standing height is about 2 feet. Their calls are a series of rapid, sharp chirps or yelps, although they are most often silent. Neither eagle calls as much as the more common red-tailed hawk.

A golden eagle's prey includes small rodents, hares, rabbits, birds, reptiles and fish. They also eat carrion and are capable of killing large animals. Golden eagles crush prey in their sharp talons, and use their large, hooked beaks to rip it apart for eating. In Pennsylvania, golden eagles are regular migrants in mid-October through early December. Northbound migrations occur in late winter and spring with most sightings at hawk-watch sites in March and April.

Golden eagles do not breed in Pennsylvania. Some occasionally winter here in rugged, remote forest terrain, remaining out of site most of the time. Most golden eagles breed across central Canada, in the western United States, Alaska and mountainous parts of Mexico.

Breeding habits are similar to those of bald eagles, except golden eagles often locate their nests on cliffs. After fledging, young remain in the nest area during summer, then wander away from the site with their parents. They do not breed until 5 years of age.

A recent four-year survey (2006 to 2009) conducted by the U.S. Fish and Wildlife Service suggests there may be 30,000 golden eagles across the United States. The eastern golden eagle population is believed to be fewer than 2,000. The golden eagle is not on the federal threatened or endangered list, but has disappeared from most of the northeastern states.

Osprey

The osprey, Pandion haliaetus, is a large, eagle-like hawk found throughout North America and in the Eastern Hemisphere. It inhabits seacoasts and the areas near large rivers and lakes. In Pennsylvania, it shows up along the major rivers and their tributaries and around lakes, ponds, reservoirs

and wetlands. The osprey prefers shallow water and requires an abundant supply of fish within a reasonable distance from its nest. Nests are usually nearby food sources, but occasionally up to about 12 miles away. Ospreys are not as likely as bald eagles to nest near flowing fresh water. Ospreys also are more likely to nest in clusters at a lake or reservoir, and usually on an artificial structure.

Osprey plumage is dark brown above and white below. Adults and juveniles are colored similarly except juveniles show buffy-white spots on their backs, a buffy shading on their necks and chests and reddish-orange eyes. Adults have yellow eyes. The osprey's head is largely white, with a black patch across each cheek. A conspicuous crook to the wings, creating a characteristic "M" shape, and black "wrist" marks are good field identifiers.

Except when migrating, ospreys flap more than they sail. Wingbeats are slow and deep. Ospreys hover 50 to 150 feet in the air and then plunge to the water for their fish prey, sometimes going all the way under.

Ospreys are 21 to 24 inches from bill to tail. Their wings span 4 ½ to 6 feet. They stand about 1 ½ feet tall. Ospreys are quite vocal and use several different calls to communicate with one another. Their call is a series of loud whistles, cheep, cheep, etc.

Ospreys typically migrate south in winter and return to Pennsylvania in late March and early April to nest. They can be seen migrating south along the mountain ridges in August, September and October, with peak migration occurring around the middle of September. During fall, many migrating ospreys are also observed along Pennsylvania's rivers. Ospreys migrate to southern wintering grounds along the Gulf Coast and in southern Florida south through Central America and South America.

Like eagles, ospreys build bulky nests of sticks and twigs, lined with inner bark, sod or grasses. Sometimes they add debris (rope, fishnet fragments, cans, seashells, etc.). Nests are in living or dead trees, on the ground, or on manmade structures – cell towers, utility poles, fishing shacks, billboards, channel buoys, light standards, chimneys and platform-topped poles or towers erected specifically for osprey nesting. In Pennsylvania, most known osprey nests are on manmade structures. Since ospreys add to nests year after year, the nests can become huge and conspicuous.

The nests usually include three eggs, sometimes two and rarely four. Eggs are 2⅜ by 1¾ inches, and white or pinkish-white with brown spots and blotches. The female incubates 36 to 42 days, and young leave the nest when they are 51 to 59 days old.

Dr. Larry Rymon of East Stroudsburg University in 1980 began reintroducing ospreys to the state's northeastern counties. The first Pennsylvania-hacked osprey returned in 1983, and two years later the state documented its first nesting pair since 1910. An osprey has strong ties to the area where it was hatched, and usually returns in the same area to breed. Between 1980 and 1996, 265 young ospreys were released into Pennsylvania at three different locations: the Poconos in northeastern Pennsylvania, the Tioga County reservoirs in northcentral Pennsylvania and Moraine State Park in western Pennsylvania. These nestling birds were obtained from the Chesapeake Bay, which has the largest nesting population of ospreys in the world. A total of five reintroduction projects between 1980 and 2007 helped fuel the osprey's recovery in Pennsylvania. The recent Second Breeding Bird Atlas (2004-08) documents the osprey's recovery with confirmed nests reported in at least 90 atlas blocks, a tenfold increase compared to the nine blocks confirming nests during the first atlas period (1984-89). Most recently, osprey nest surveys in 2010 reported 115 osprey nests in 21 counties with more found since that year. The osprey is a state threatened species and protected under the Game and Wildlife Code. Although not listed at the federal level, all migratory birds are protected under the Migratory Bird Treaty Act.

osprey

Raptor Reproduction

Reproductive failure is a problem for bald eagles and ospreys. Much of the problem stems from man's use of now-banned toxic chemicals. DDT, dieldrin, and other chlorinated hydrocarbons sprayed to kill insects, which contaminates water and prey species in the food chain. Bald eagles eat a lot of fish, and accumulate the chemicals in their bodies. Other pollutants such as PCBs and heavy metals may also affect their reproduction.

The chemicals cause birds to lay infertile or thin-shelled eggs, which break under the weight of an incubating bird. Although environmental regulations have banned the use of "hard" pesticides, some chemicals remain in our natural food chains because they do not break down rapidly and some harmful chemicals banned in the United States continue to be used in other parts of the world. Many birds are still exposed to these toxins during migration and on wintering territories. Monitoring bald eagle nests helps the agency follow the recovery process and determine their population status. It also allows biologists to detect environmental problems that may be occurring both locally and statewide.

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Hawks and Falcons

When the night sky brightens in the east, owls retire to hollow trees and shady thickets. Then enter the hawks; during the day, these fascinating birds continue nature's winnowing process—predation.

This wildlife note covers 11 Pennsylvania diurnal raptors which include hawks and falcons. The hawks are northern harrier (*Circus cyaneus*), sharp-shinned hawk (*Accipiter striatus*), Cooper's hawk (*Accipiter cooperii*), northern goshawk (*Accipiter gentilis*), red-shouldered hawk (*Buteo lineatus*), broad-winged hawk (*Buteo platypterus*), red-tailed hawk (*Buteo jamaicensis*), and rough-legged hawk (*Buteo lagopus*), and the falcons include American kestrel (*Falco sparverius*), merlin (*Falco columbarius*), and peregrine falcon (*Falco peregrinus*).

Hawks are quick, efficient predators. They have sharp talons and strong hooked beaks. Bills and feet vary in size and shape according to the species' prey preferences. Eyesight of some hawks is as sharp as that of a human looking through eight-power binoculars. The eyes of hawks are located in the front of the head; this gives the birds binocular vision and enables them to judge distance, important for successfully pursuing prey. Their hearing is acute, but their sense of smell—if they have one—is poor.

While hunting, hawks may soar high, sit and watch from a perch or strike their prey in midair. When a hawk drops to attack, tendons spread its feet; upon impact, the toes automatically clench and drive the talons deep. A snap from the hooked bill can crush a prey's skull or break its back but prey is usually dispatched with the talons. Hawks sometimes "mantle" prey after killing, crouching and spreading their wings to form a shield that hides it from other predators. The bird may eat on the ground or carry its kill to a feeding spot, often a fencepost or tree limb, where it plucks its prey and tears the meat apart with its beak. Smaller prey may be eaten whole. Hours after eating, a hawk will regurgitate a pellet of indigestible material, containing any feathers, fur or small bones swallowed during its meal.

Identifying hawks can be difficult and requires study and practice. Fortunately, Pennsylvania provides many

sharp-shinned hawk

opportunities to study hawks at its several hawk watch sites. While males and females of the same species are generally of similar colors, individual variation often occurs within the species. Juveniles are especially hard to identify. Adult females are generally larger than their mates—in some cases, nearly twice as heavy. All Pennsylvania hawks have yellow feet and a yellow cere (waxy membrane at the base of the bill).

Many hawks mate for life. They nest high above the ground on sturdy limbs, in the crotches of trees or on rock ledges. Generally, nests are loosely built of sticks and twigs; some are lined with feathers and down plumules. A mated pair will either remodel an old nest or build a new one, occasionally starting on top of a squirrel or crow nest. The female may begin incubation before the last egg is laid, resulting in young of different sizes in the same brood. The female does most of the incubating and is supplied with food by the male. Two of Pennsylvania falcons, the American kestrel and peregrine falcon, do not build stick nests but use simpler scrape nests instead.

Newly-hatched hawks and falcons are altricial—helpless, unfeathered and covered with down, but they grow rapidly. After about two weeks, when the young no longer require constant brooding, the female joins the male in hunting to feed them. The young soon learn to tear meat apart and feed themselves. After five or six weeks, when flight feathers grow in, they begin taking short flights; several weeks later, the fledglings start to hunt.

Raptors help control insect, rodent and small bird populations. Prey species need to have good sight and hearing, be very alert, and react with speed to avoid these predators. Raptors also are environmental indicators, a gauge measuring habitat quality and pollution. If pollutants accumulate in natural food chains, avian predators are often the wild species to show ill effects most noticeably: failure to reproduce, thin eggshells and nesting failure, or outright mortality through poisoning. Heavy metals and chlorine-based pesticides such as DDT (now banned in the U.S. but continues to be used in countries where some hawks and falcons migrate through or spend the winter), aldrin, dieldrin and heptachlor drastically reduced hawks numbers during the middle of the twentieth century. These pollutants continue to alter ecosystems.

Many hawks and falcons fly south each autumn. The species migrating in greatest numbers are often those that cannot find adequate food supplies in winter. Some hawks breeding in Pennsylvania winter as far south as Peru. During migration, a hawk can cover several hundred miles daily, depending on weather and wind conditions. In Pennsylvania, many migrating birds follow ridges paralleling the Allegheny Plateau, climbing high on thermals that rise along these ridges. Hawk Mountain Sanctuary, near Kempton in southeastern Pennsylvania, is a famous spot to observe migrating hawks. There are additional hawk watching sites along the Kittatinny Ridge and elsewhere in the state; Bake Oven Knob, Waggoner's Gap, Allegheny Front and Tussey Mountain are just a few of the sites with excellent opportunities to observe raptor migration.

Until recently, birds of prey were often labeled "chicken hawks" and shot, trapped or poisoned indiscriminately. Research has shown that while predators do kill some poultry and game, they more often keep dominant populations of rodents and other prey in balance. Today, many people enjoy observing hawks. In Pennsylvania, hawks are protected by both federal and state laws.

The 11 birds of prey covered in this note fall into two families, the Accipitridae which are generally called "hawks" and the Falconidae that includes the falcons. The hawks are further divided into three basic types: harriers, accipiters, and buteos. The northern harrier, formerly known as marsh hawk, is the only harrier regularly found in North America. It is long-legged, with long narrow wings and a long tail. It soars with wing-tips held perceptibly above the horizontal, much like a turkey vulture, quartering open country in search of prey.

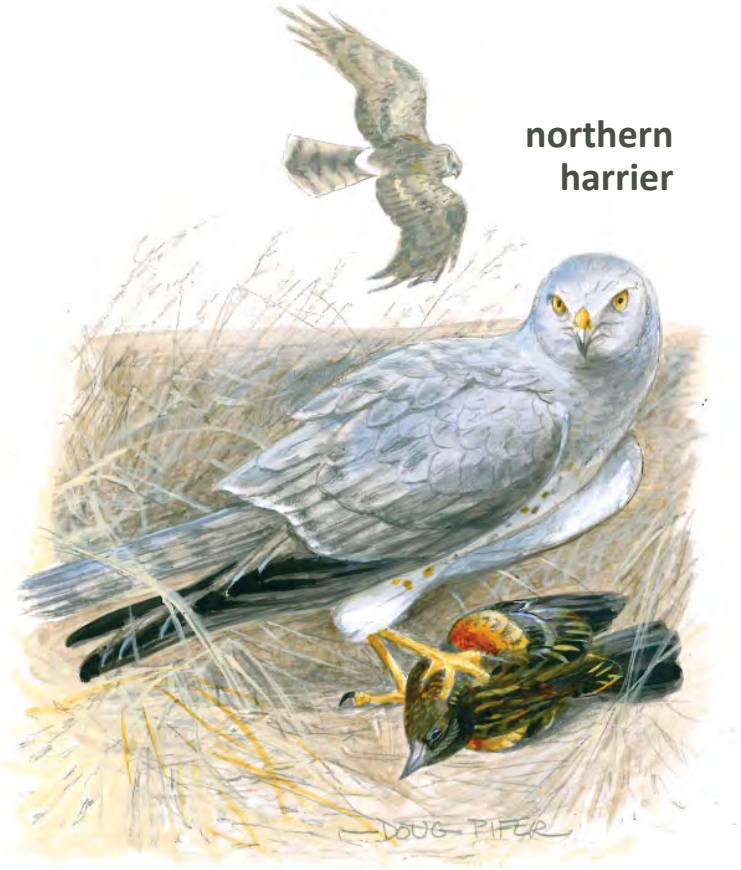
Accipiters (northern goshawk, sharp-shinned hawk, Cooper's hawk) have small heads, long tails and short well-rounded wings. They fly with rapid wingbeats followed by a long glide. Extremely maneuverable, they are well-suited to the thick forest areas they inhabit. Accipiters feed largely on other birds but will also take small mammals.

Buteos (red-tailed, red-shouldered, broad-winged and rough-legged hawks) have stocky bodies, broad rounded wings, and short fanned tails. Most are brown in color; young are similar to adults, but in most cases are streaked lengthwise below, rather than barred. Some buteos perch in open country or soar in wide circles when hunting; small mammals are their main prey.

Falcons (peregrine, merlin, kestrel) have large heads, broad shoulders, long pointed wings and a long tail. They are streamlined and built for speed, flying in a direct path with deep rapid wingbeats. They do not usually soar, although the kestrel sometimes hovers with rapid wing strokes. In hunting, the peregrine falcon and merlin often fly above smaller birds and then dive to the attack, striking prey while in full flight.

Northern Harrier *(Circus cyaneus)*

Length, 18 to 24 inches; wingspread, 40 to 47 inches; weight, 12 to 26 ounces. The northern harrier is an open-country and marshland bird. Northern harriers, formerly known as marsh hawks, have a white rump patch and a ruff of feathers around the face, much like the facial disks of owls. Males are pale bluish-gray above, white below; the tail, gray with dark bands. Females are brown above, light brown with dark streaks below; tail is barred with black and buff. Immatures resemble females. Harriers inhabit fresh or saltwater marshes, wet meadows, bogs and flat open grassland, and farmland.



They use extensive foraging areas where they prey on mice, voles, insects, frogs, reptiles, small birds and rabbits. The northern harrier hunts on the wing by cruising low over fields, at times hovering over one spot, and then diving onto its prey in an aerial ambush. The harrier uses its acute sense of vision to locate prey but also relies on its hearing, which is enhanced by the facial disk and specialized feathers on its face. The species tends to congregate in winter. Its voice is a weak nasal *pee, pee, pee*. Northern harriers nest on or near the ground, usually in open fields or meadows in dense clumps of vegetation and occasionally on a branch over the water. Nests are made of sticks, straw, grasses and are lined with feathers. Eggs: four to six, usually five, oval, dull white to pale blue. Incubation is mostly by the female and takes about 28 to 36 days. Northern harrier populations have declined in Pennsylvania with a 43 percent decrease in the number of blocks reporting observations between the first breeding birds of Pennsylvania atlas period (1983-89) and the second atlas period (2004-09). Because it is at risk of becoming endangered if losses continue, the Pennsylvania Game Commission has categorized the northern harrier as threatened. It is listed as a species of "high level concern" in the state's Wildlife Action Plan because of its small, localized and vulnerable populations that are scattered in pockets of open wetland, grassland or farmland habitat.

Sharp-shinned Hawk *(Accipiter striatus)*

Length, 10 to 14 inches; wingspread, 20 to 27 inches; weight, 3 to 8 ounces. Identification of this species is often difficult, as large female sharp-shins are nearly the size of small male Cooper's hawks, which they closely resemble. While the two species are forest-dwelling hawks, the sharp-shinned is more exclusive of conifer and dense forest habitat and less likely to frequent open habitats and wooded parks and neighborhoods, except during winter when it may take advantage of the hunting opportunities presented around bird feeding stations. Sharp-shinned hawks also have a visibly smaller head as seen when perched and in flight compared to the Cooper's hawk. Adults have red eyes and are blue-gray above, with light rufous barring on the breast. Immatures are brown above, heavily streaked below. These are small hawks with short rounded wings and a long square-tipped tail. Sharp-shins feed almost exclusively on small birds such as sparrows, warblers, vireos, etc. They fly and sail rapidly through the woods or hunt from a perch. Favored habitat is large tracts of forest, and forest edges. Sharp-shins breed throughout much of North America and are found across Canada and parts of western United States south to Mexico. Sharp-shins breed throughout the eastern United States, from New England south through the Appalachian Mountains to Alabama. They prefer to nest in conifers, about 30 to 35 feet up near the top of a tree under dense cover, usually building a new nest each year. The broods include four to five white or bluish eggs with brown blotches. Incubation is by both sexes, mostly by the female, and takes 21 to 35 days with eggs hatching at one- to two-day intervals. Around the nest, adults make a *kek kek kek* sound; in flight a shrill scream. Because of its dependency on conifer trees and large tracts of forest, the sharp-shinned hawk is listed as a species of Maintenance Concern in Pennsylvania's Wildlife Action Plan (PGC-PFBC 2005).

Cooper's Hawk *(Accipiter cooperii)*

Length, 14 to nearly 20 inches; wingspread, 27 to 36 inches; weight, 8 to 20 ounces (slightly smaller than a crow).
The Cooper's hawk is a medium-sized accipiter found in Pennsylvania and the one most likely to be found around town. Adults look like large sharp-shinned hawks—red eyes, blue-gray back and a rusty breast, except the Cooper's have rounded tails and the sharp-shins have square-tipped tails. Male Cooper's hawks are significantly smaller than females, enough that they get confused with large female sharp-shinned hawks. Cooper's hawks tend to have a slightly crested appearance while sharp-shinned hawks invariably look round-headed. Named in 1828 after William Cooper, a New York naturalist, Cooper's hawks prey mainly on birds the size of robins and jays. Other common prey species include European starling, northern flicker, mourning dove, rock pigeon, ruffed grouse, and blackbirds. While hunting, they prefer to perch and wait for prey. Favored habitat is forest and woodland but they have adapted to human environments where they

Cooper's hawk

are common residents of wooded suburbs, urban woodlots and city parks. As illustrated by the second Pennsylvania breeding bird atlas, Cooper's hawks have expanded their range in southern Pennsylvania to include the urbanized landscapes around Pittsburgh and Philadelphia. Although seemingly adaptable, a Cooper's hawk inhabiting an urban center faces greater survival challenges, especially from fatal window strikes, collisions with cars, electrocution, and other predators. Between the first atlas period (1983-89) and second atlas period (2004-09) there was an annual population increase of about 5 percent statewide. Unlike many forest-related species, the Cooper's hawk has reacted well to the fragmentation of forest in the southern corners of the state. Cooper's hawks breed throughout most of southern Canada and the United States. They nest in trees 20 to 60 feet above the ground, often about two-thirds of the way to the tree top. They usually have broods of four to five white eggs, that are incubated by both sexes but mainly by the female for 30 to 36 days. Woods where Cooper's hawks nest may remain heavily populated with songbirds, as these hawks hunt away from their nest area. Call is similar to that of the sharp-shinned hawk only with a much lower pitch, a string of repeated *kac-kac-kac* given in vicinity of the nest. They are usually silent outside of the breeding season.

Northern Goshawk *(Accipiter gentilis)*

Length, 20 to 26 inches; wingspread, 40 to 47 inches; weight, approximately 1.5 to 3 pounds. Both immatures and adults have a prominent white line over each eye; the eyes of adults are bright red. In Pennsylvania, the northern goshawk is one of those species most closely associated with large tracts of wild forest. Adults are blue-gray above and white below, with light barring on the breast. Immatures are brown above and creamy white below, with heavily streaked undersides. The largest of Pennsylvania's accipiters, northern goshawks are rare but regular nesting birds, passage migrants, and winter visitors. In some years, populations are irruptive, when food scarcities force many goshawks south. The northern goshawk is listed as Near Threatened by the Pennsylvania Biological Survey and Vulnerable in Pennsylvania's Wildlife Action Plan (PGC-PFBC 2005). Between the first atlas period (1983-89) and second atlas period (2004-09) there was a 28 percent decline in the number of survey blocks with goshawks detected. Statewide, it is a rare breeding bird and restricted to heavily forested sections of central and northern Pennsylvania, particularly the Allegheny National Forest and other large forest tracts of northern Pennsylvania. Goshawks are swift, maneuverable and relentless, sometimes pursuing prey—birds and small mammals—through thick underbrush on foot. Goshawks breed in conifer, deciduous or mixed forest, preferring mature forest with large trees, often with an open understory. They nest up to 75 feet above the ground in trees, building bulky nests (3 to 4 feet in diameter). A pair often uses the same nest year after year or builds nests near previously occupied ones. They usually have a clutch of three to four off-white eggs that are usually unmarked, incubated 36 to 38 days by the female. Goshawks are highly territorial and defend their nests fiercely, sometimes attacking other animals or people that approach the nesting area; voice is a harsh *ca ca ca ca* around the nest. They are usually very secretive and tend to stay far away from human habitation.

northern goshawk

red-shouldered hawk

Red-shouldered Hawk *(Buteo lineatus)*

Length, 17 to 24 inches; wingspread, 33 to 50 inches, weight 1 to 2 pounds. Adults are colorful birds: dark brown above with chestnut-red shoulders, rich reddish-brown and white below tail strongly barred with black and white. Many diurnal raptors are attractive birds, but the red-shouldered hawk is a particularly strikingly marked and handsome hawk. Many individuals have a translucent area or "window" near the wingtips, visible when they are airborne. These buteos are shy and hard to approach. They favor mature mixed deciduous—coniferous forest, especially damp woods, river bottomlands and woodland swamps. They hunt from an exposed perch, below the canopy, offering a wide field of view or by circling high overhead, and prey on rodents, birds, frogs and snakes. Their voice is a piercing whistled *kee-yer*, which blue jays often mimic. red-shouldered hawks nest 20 to 60 feet above the ground in trees, often in a crotch near the trunk. Eggs: two to four, usually three dull white with brown markings; incubation is by both sexes and takes 32 to 40 days. With its reliance on riparian forest, the red-shouldered hawk is an indicator of high-quality and large scale forest and therefore is designated as a species of Maintenance Concern in Pennsylvania's Wildlife Action Plan (PGC-PFBC 2005).

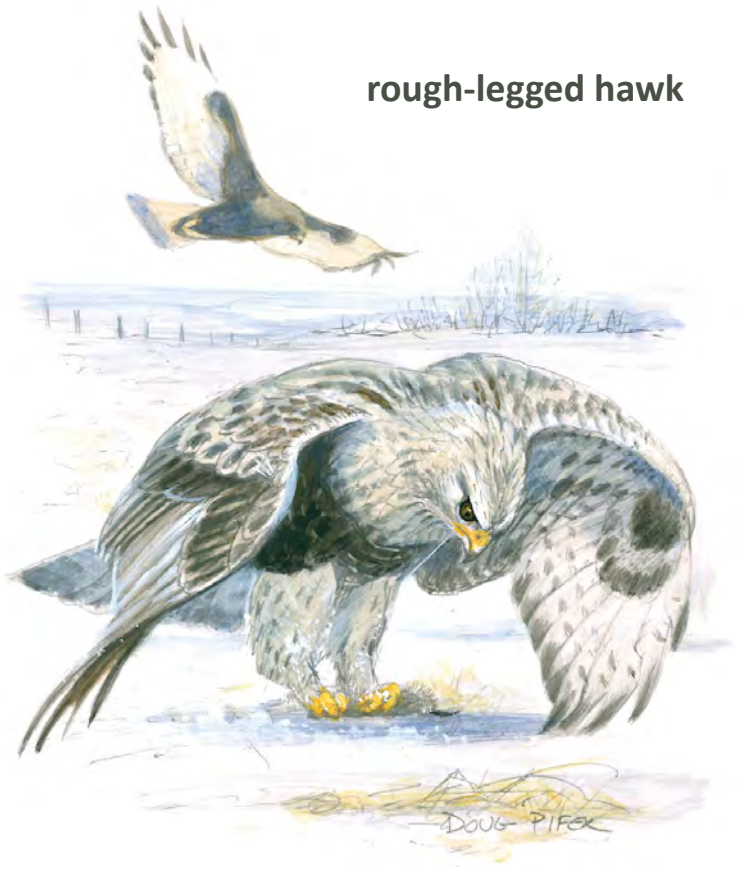
Broad-winged Hawk *(Buteo platypterus)*

Length, 13 to 17 inches; wingspread, 32 to 39 inches; weight, 9 to 20 ounces. This small buteo is easily recognized by its heavily-banded tail, with two dark and two light bands. Upper plumage is dark gray-brown; underparts are white, heavily streaked with brown. The broad-winged is a hawk of continuous deciduous or mixed deciduous forests, preying on snakes, amphibians, insects and small mammals. It is Pennsylvania's most common forest hawk, fairly unwary and approachable. In Pennsylvania, it is a species of high responsibility because of its association with large, contiguous forests for breeding, as designated in the state Wildlife Action Plan (PGC-PFBC 2005). During migration, broad-wings congregate in "kettles" of rising air, which they use to gain height. Large flocks, sometimes reaching thousands of individual broad-wings, may be seen from hawk watch sites during peak migration in September. This long-distance migrant may travel more than 4,000 miles, to reach tropical forests of South America where they spend the winter. The broad-winged hawk's most common vocalization is a high whistled *p-we-e-e-e-e*. Broad-wings breed mainly in large, deciduous forests and construct their small nests 24 to 40 feet up in trees. Their clutches include one to five eggs, usually two to three, that are dull creamy white with brown markings. Incubation (about 30 days) is mostly by the female while the male brings food to her.

Red-tailed Hawk *(Buteo jamaicensis)*

Length, 17 to 25 inches; wingspread, 44 to 52 inches; weight, 2 to 3 pounds. The red-tailed hawk is a common and widespread buteo of open country and woodlots. Its upper plumage is dark brown, and the light undersides have a belly band of dark streaking. In adults, the upper side of the tail is rusty red; in young, dark gray. Red-tails inhabit a wide variety of open habitats in Pennsylvania and, along with an ample food source, scattered large trees for perching appears to be the habitat component they require. They occur in woodlots and patchy forests, farmland with tree-lines or fencerows, grasslands bordered by trees, highway corridors and cities and towns with light poles, trees or other elevated perches. Primarily soaring birds, they prey on mostly rodents and other small animals such as rats, mice, snakes, birds, rabbits, red and gray squirrels, chipmunks. This species is very adaptable and also can pursue prey in woods as well as open fields where they are more easily seen perching and hunting. The voice is a rasping *keer-r-r-r*, slurring downward. This wild sound is quite familiar and often used in mass media. Red-tails breed throughout North America. Their range extends across Canada south throughout the United States and into Mexico and Central America. They nest in trees 35 to 90 feet up, usually at the crown of a large tree with a panoramic view of the area, both sexes helping to build a stick-and-twig nest lined with bark or green sprigs. They often refurbish a previously used nest. Eggs: one to five, often two, white and unmarked or with brown splotches. Both parents incubate, although the female

red-tailed hawk



rough-legged hawk

may spend more time on eggs while the male brings food to her. Eggs are incubated 28 to 35 days and nestlings fledge at about 45 days old. It seems as if many pairs occupy their territories year-round while other red-tailed hawks migrate through the state or spend the winter south of their nesting ground north of the state.

Rough-legged Hawk *(Buteo lagopus)*

Length, 19 to 24 inches; wingspread, 50 to 56 inches; weight, about 2 pounds. Rough-legged hawks are birds of open country in far northern latitudes. They do not breed in Pennsylvania but may be seen on migration and during winter. This species exhibits two color phases with wide individual variation in-between. Light phase: upper side light buff to white, streaked with brown; underparts white, with a brown "wrist mark" partway out the wing and a brown band across the abdomen. Dark phase: black or sooty brown, with white at the base of the underside of the tail. Feet are feathered to the toes, hence the name "rough-legged." This large buteo often hovers over fields, beating its broad wings in short rapid strokes much like a kingfisher or a kestrel. Its small sharp-taloned feet are adapted to kill rodents— meadow mice, voles, gophers. For such a large raptor, this species has remarkably small feet that are well-suited for taking small rodents. So, they often perch precariously on twigs and small branches on treetops and bushes. Rough-legged hawks often hunt at dusk. They nest in the Arctic tundra and subarctic regions of Alaska and northern Canada; like goshawks, most rough-leggeds come to Pennsylvania in the winter, when deep snow covers rodents on the northern feeding grounds

and other prey birds have migrated south. In Pennsylvania, they dwell mainly in open country, in large open fields and marshes, feeding mainly on voles and mice.

American Kestrel *(Falco sparverius)*

Length, 9 to 12 inches; wingspread, 20 to 24 inches; weight, about 3 ounces to nearly 6 ounces (males are robin size and females about 10 percent heavier). American kestrels, formerly known as sparrow hawks, have rusty red head caps, backs and tails, and a black and white face pattern. Males have blue-gray wings, females brown wings. The kestrel is one of Pennsylvania's smallest raptors and the most common falcon. Its flight is erratic and buoyant, and it often perches on utility poles or hovers in one spot on rapidly beating wings. Like other falcons, the kestrel is an expert aerial predator. With quick powerful wing beats, it is known to fly at 40 mph and may reach 60 mph when diving for prey. Its diet varies, although individual kestrels may focus their hunting effort on one type of prey, usually a locally abundant prey species. Insects and other invertebrates make up the bulk of their diet, particularly grasshoppers, moths, dragonflies, cicadas, butterflies and beetles. They also prey on small rodents, particularly meadow voles, and birds and occasionally frogs, lizards and small snakes. Voice is a shrill *killy killy killy*. The American kestrel is a grassland-dependent bird species which benefits from grassland preservation and restoration projects. It is a common resident of Pennsylvania's agriculture areas and inhabits open and semi-open landscapes with short ground covering vegetation, natural or man-made perch sites and available cavities for nesting, usually in the form of

American kestrel

merlin

standing dead trees. It is often seen in meadows, pastures, fields, open woodlots, forest edges, riparian woodlands, grassy medians along highways and urban areas with parks or vacant lots. Kestrels nest in existing tree cavities, such as abandoned woodpecker holes and natural hollows. They may also nest in the recesses or niches found on buildings and other structures and they readily accept nest boxes like those intended for the barn owl which has a similar habitat choice and diet of small rodents. The clutch includes three to five whitish eggs that are dotted with brown; the female incubates them for 26 to 32 days. Although it is the most abundant falcon in North America, American kestrel populations have declined in some areas, including Pennsylvania. Kestrels may be vulnerable to multiple environmental influences but research suggests loss of habitat is the primary reason for declines, specifically the conversion of farmland to development, but there may be other factors at play including use of pesticides.

Merlin *(Falco columbarius)*

Length, 10 to 13 inches; wingspread, 24 to 26 inches; weight, 6 to 8 ounces (size of a blue jay). Merlins look like miniature peregrines, with males blue-gray above and banded black on the tail. Females and young birds are dusky brown above, white below. The old name "pigeon hawk" comes from this falcon's resemblance to a pigeon in both flight and posture.

Voice is a high-pitched rasping chatter *Ki-ki-ki-kek-kek-kek* call, frequently heard around the nesting area. Merlins prey mainly on small to medium-sized birds, regularly hunting the most abundant species in their foraging area, but also take small mammals and insects, especially grasshoppers and dragonflies. In falcon style, merlins usually hunt on the wing but sometimes ambush prey from a shrub- or tree-perch. They favor a mix of open country for hunting (such as found in cemeteries, parks and regenerating clearings) and heavy cover for nesting, particularly conifer woods and plantings. They usually nest high in a conifer tree, often near water, and prefer using an old stick nest of a crow or hawk. Eggs: four to six whitish, almost covered by fine brown marks. Incubation takes 28 to 32 days and is by the female. Merlins breed in northern latitudes and began nesting in Pennsylvania only recently. Since the 1980s, the merlin has gradually expanded its breeding range south into parts of New England and the Midwest. In 2006, during the second breeding bird atlas period, atlas volunteers discovered the first-known Pennsylvania merlin nest in McKean County. A total of six breeding sites across northern Pennsylvania were confirmed during the second atlas period (2004-09). Northern Pennsylvania is now the southern limit of the merlin's current breeding distribution in eastern North America, but this species is spreading south at a steady pace. In Pennsylvania merlins have nested in areas close to human activity with confirmed nests found in residential areas. Most merlins seen in the state are in migration as they travel south from the boreal forest over the state's forests and ridges when they often fly low and undetected.

Peregrine Falcon *(Falco peregrinus)*

Length, 15 to 22 inches; wingspread, 38 to 46 inches; weight, 1.5 to 2 pounds. A magnificent and charismatic bird of prey, the peregrine falcon has received a great deal of management protection in Pennsylvania and other states. The name "peregrine" hints of its wandering habits. They range hundreds of miles from where they hatched. Peregrines, formerly known as duck hawks, are slate blue, barred darkly above, with a black cap and "mustache" mark below the eye. Young birds are browner and heavily streaked below. Peregrines have long pointed wings and fly with quick rowing wingbeats similar to those of a pigeon. In attacking prey—ducks, pigeons, blue jays, flickers and other birds, a peregrine folds its wings close to its body and dives at speeds sometimes more than 200 mph; it strikes with its large knobbed feet, usually breaking the victim's back and killing it outright. In North America, the peregrine falcon has been known to prey on at least 429 different species of birds and several species of bats and other mammals. When the prey falls to the ground, the falcon nips it in the neck, picks it up, and carries it to a convenient perch to be eaten. The peregrine falcon was near extinction, extirpated over most of eastern North America, and listed as federally endangered by the U.S. Fish and Wildlife Service in 1972. Following a ban on DDT use, extensive conservation efforts aided the peregrine's recovery enough to be removed from the federal list in August 1999. In Pennsylvania, the peregrine remains listed as endangered and

is protected under the Game and Wildlife Code. All migratory birds are protected under the federal Migratory Bird Treaty Act of 1918. Peregrines typically breed in open landscapes with suitable rock cliffs for nest sites. In Pennsylvania they historically nested on rock ledges and crevices along the Delaware and Susquehanna Rivers and tributaries. They now nest on city buildings and bridges in Pennsylvania cities including Philadelphia, Pittsburgh, Wilkes-Barre, Williamsport, and Harrisburg. They have also nested on power plant smokestacks and on natural cliffs along the Delaware River as well as the main and west branch of the Susquehanna River. Peregrines are widespread and are one of the most cosmopolitan bird species, occurring on all continents except Antarctica. In North America, their breeding range includes Arctic areas of Alaska and northern Canada, western areas of Canada and parts of western and eastern United States and portions of Mexico. The clutch includes two to four creamy white eggs with rich brown markings. There is a 29- to 32-day incubation period. Voice is a repeated *we-hew* or a rapid rasping *cack cack cack*. Peregrines have one of the longest migrations of all North American birds. A peregrine falcon nesting in the Arctic tundra may travel to wintering grounds in South America, a round-trip covering over 15,000 miles. Pennsylvania peregrine falcon pairs usually remain in the area year-round; some spend the winter within their nesting territory. Evidence from banding indicates that peregrines are crossing many state boundaries to find new mates and nesting sites. The eastern peregrine falcon population is slowly expanding and well-mixed.

Revised 04/2022

yellow rail

Rails, Moorhen, and Coot

Sneak a canoe down a twisting marsh channel, and you may glimpse one of the five kinds of rails that migrate through Pennsylvania or breed here. In areas of deeper water, look for common moorhens or American coots. The best times to see these wetland birds are during their spring and fall migrations. Rails, moorhens, and coots all belong to Family Rallidae.

Rails

Highly secretive, rails creep about through thick marsh vegetation. Many are more active at night than during the day and often are heard rather than seen; when a hiker or duck hunter does stumble upon a rail, it will usually run away through the grass rather than take to the air. Rails' narrow bodies let them slip between dense cattails and sedges. They search for food by walking about on their long-toed feet, often clambering over lily pads and other emergent or submerged vegetation. Some of the rails swim readily; flanges of skin on each toe push against the water to provide propulsion, then fold backwards on the return stroke to reduce resistance.

Most rails are omnivorous feeders. Some species concentrate on plants (mainly seeds, leaves, and roots of aquatic plants), while others dine on insects, spiders, snails, crayfish, and other invertebrates. The shapes of rails' bills vary with their feeding habits: the king rail has a sharp bill like a heron's, for snatching prey, while the black rail uses its shorter, more generalized bill for picking up seeds of bulrushes and other marsh plants as well as for catching insects and crustaceans.

Rails nest among dense vegetation, either on the ground or in reeds or shrubs above shallow water. Most lay five to twelve cryptically colored eggs and incubate them for three to four weeks. The downy chicks leave the nest soon after hatching. Both parents are thought to feed the young.

Yellow rail – Ornithologists frequently describe the yellow rail (*Coturnicons noveboracensis*) as one of the most secretive birds in North America. This yellowish species breeds mainly in southern and central Canada and winters along the Atlantic and Gulf coasts. In Pennsylvania the yellow rail is a rare migrant, passing through in late April and early May and again in September and early October. The species eats a variety of insects as well as many seeds.

The **black rail** (*Laterallus jamaicensis*) is a slate-colored, sparrow size bird. It breeds in tidal marshes from New Jersey to Florida, and in inland marshes south of the Great Lakes; most authorities doubt that it nests in Pennsylvania. Marsh visiting birdwatchers sometimes glimpse black rails during the spring and fall migration. The species winters in the southern United States, Central America, and the Caribbean Islands.

The **king rail** (*Rallus eleuans*) is one of Pennsylvania's rarest breeding birds and has been designated a state endangered species. Its breeding range is centered on the southeastern and midwestern states. The king rail is reddish in color and about the size of a chicken. The largest of the North American rails, it can prey on frogs and small fish, as well as many aquatic insects.

black rail

king rail

The **sora** (*Porzana Carolina*) is the most widespread and abundant of the North American rails. It breeds across Canada and the northern United States, including Pennsylvania, and winters in the southern states and Central and South America. With its short bill, the sora eats primarily seeds. The species' song has been described as "an explosive, descending musical whinny".

The **Virginia rail** (*Rallus limicola*) breeds in wetlands with sedges and cattails in scattered locations across Pennsylvania. Mainly nocturnal, it eats insects and their larvae, including beetles, flies, and dragonflies. Virginia rails build a nest on a platform of cattails, grasses, and reeds, in a dry zone of the marsh, where living vegetation may form a canopy overhead.

sora

Virginia rail

moorhen

The common moorhen (*Gallinula chloropus*) was formerly called the common or Florida gallinule. It sounds an assortment of cackles, clucks, croaks, and squawks that help make the marsh a magical, spooky place at night. Moorhens are mainly dark gray, with red bills. While swimming they make pumping motions with their heads. They favor deeper water than the rails and often swim among water lilies and pondweeds. Moorhens feed on buds, leaves, and seeds of water plants, fruits and berries of dry land plants, and a variety of insects and other invertebrates. They nest mainly in thick cattails. In Pennsylvania, moorhens nest around Pymatuning Reservoir and Conneaut Marsh and in scattered wetlands elsewhere in the state. Moorhens migrate in spring and fall to wintering areas from coastal North Carolina southward.

Coot

The American coot *(Fulica Americana*) is an uncommon breeder in Pennsylvania but a common to abundant migrant. The American coot is dark gray with a bone white bill. Noisy and gregarious, coots often form flocks. They eat mainly plant foods but also take insects, fish, tadpoles, snails, crayfish, and the eggs of other birds. They feed like ducks, upending in shallow water; dive to get at plants; and graze on land. To take off from the water they must first run along on the surface to build up speed. Coots need extensive marshlands for breeding. In Pennsylvania they nest mainly in the northwest around Pymatuning Reservoir and in other wetland areas. During mild winters when lakes and rivers don't freeze over, many coots may winter in Pennsylvania.

Revised 02/2021

Mourning Dove

In August, mourning doves seem to be everywhere. Their slim, gray-brown forms are seen on telephone lines, in back yards, farm fields and weedy flats along highways. By late September, their swift, direct flight takes them overhead on whistling wings. They flash south in bands of 10 and 20, belly plumage catching the fading gold of late summer sunlight. When the great masses of doves begin to depart, autumn is on its way.

The mourning dove is a member of the family Columbidae and is the most abundant and widely-distributed migratory game bird in North America. Doves breed across the southern and western edges of Canada, throughout all of the lower 48 United States, and in much of Mexico, Central America and the Caribbean. They winter from Massachusetts, southern Michigan, Nebraska, and California south to Panama. Colloquial names are turtle dove, wild pigeon, wild dove, and rain dove.

Biology

An adult mourning dove, *Zenaida macroura*, weighs 3½ to 5 ounces and is 10 to 13 inches in length from beak to tail tip. A dove is smaller and more streamlined than the closely related pigeon, with a long, pointed tail and tapering wings that spread 17 to 19 inches. The neck is long, the head small, and the bill slender, short and black.

A dove's wings are gray, and its back, rump, and middle tail feathers are grayish olive-brown. The lateral tail feathers are bluish-gray, with black crossbars and white tips which flash when the bird is flying. Juvenile doves are covered in buffy-tipped, brownish feathers. Adult females exhibit olive to brown coloration across their body, while adult males maintain olive on their backs with a rosy breast and slate-gray nape and crown. Adult males will often have an iridescence spot on the neck. And both sexes could have a small black spot beneath the eye on their cheek.

The species' call is distinctive and earns the "mourning" half of this bird's name. The call is a hollow, plaintive *ooah, cooo, coo, coo*. Depending on distance, only the last three notes may be audible. This call is made by males trying to attract females. After mating, it serves to bond the pair and ward off other males. While females may coo in response, their calls are weak and scarcely audible. Another distinctive sound identifies the mourning dove: a whistling produced by the wings of a bird in flight.

Doves are beneficial in that they eat seeds of pest plants and generally do not damage crops. Foods are weed seeds and waste grains (these two items together may make up 98 percent of a dove's diet), a few insects, snails and slugs. Doves don't cling to stalks or scratch for food—they pick seeds off the ground. Favored weeds are croton, foxtail, smartweed, ragweed and seeds of various grasses and sedges. Grains eaten include corn, wheat, oats, barley, rye and buckwheat left on the ground by mechanical harvesting methods. They are readily attracted to backyard bird feeders where they consume a variety of seeds.

Seeds of plants such as croton and foxtail grass are very small, and single doves have been found with literally thousands

(7,500 croton, 6,400 foxtail grass) in their crops. Grit aids in grinding up food, and it may be taken in the form of gravel, cinders, glass or any other small, hard material. Doves seen along roadsides often are picking up grit. In addition to food and grit, doves need water every day. Ordinarily they fly to a stream, creek or pond early in the morning and again in the evening.

Small flocks of doves begin to return to Pennsylvania in early March, with arrivals peaking from mid-March through April. Some doves also winter in Pennsylvania. Banding studies indicate that birds returning to Pennsylvania to breed may have wintered along the southeastern coast—in North and South Carolina, Georgia and Florida.

The male selects a nesting territory and defends it by flying at and pecking other males. He coos to attract a female and performs a nuptial flight in a large oval pattern. The pair mate and select a nest site. Together they build a nest over the next 4 to 6 days, sometimes using a vacant catbird, robin or grackle nest as a platform. Dove nests are built of sticks, with little if any lining material. Eggs may be visible from the ground through the loosely woven twigs, but the nests are surprisingly strong for their frail appearance. They are built as high up as 50 feet (usually 10 to 25 feet) in the crotch of a branch, typically in conifers; or they may be constructed in tangles of shrubs or vines, or even on the ground. Doves have also adapted to using human made structures for nesting and will often be seen underneath a porch or deck.

Two or three days after the nest is finished, the female lays her first egg. A second egg comes two days later, and incubation begins at once. (On rare occasions, a third egg is laid.) Eggs are oval to elliptical, glossy, white and unmarked. Incubation and brooding duties are shared. The male sits on the eggs during the day, the female at night. The eggs hatch, after 14 to 15 days. The nestlings, also called squabs, are altricial: naked, blind and completely dependent on their parents.

For the first few days, squabs are fed a mixture of small seeds and a nutritious liquid called “pigeon’s milk,” which is secreted by the lining of the adult’s crop (the crop is the upper portion of the digestive tract). This “milk” is a chalky white nutrient rich fluid made up of antioxidants and immune-enhancing proteins. Both parents feed it to the young by regurgitation. Gradually, seeds begin to compose the bulk of the developing squabs’ diet. At 14 days, squabs are fully feathered, fledged and on their own—and the adults are ready to produce another brood.

The nesting cycle—egg-laying, incubation and care of squabs until they leave the nest—takes a little more than a month. Adults may make up to five nesting attempts over the summer. March through August comprises the typical nesting period, although doves in Pennsylvania have been observed nest-building as early as late February and incubating as late as the first week of October. About half of the nestlings succeed, resulting in an average of 4 to 6 young produced by each adult pair.

Weather can be an important mortality factor. Spring and summer storms with high winds blow nests, eggs and young out of trees; heavy rains and hail may kill adults as well as nestlings. Nest predators include blue jays, starlings, crows, squirrels, snakes, and house cats among others. Adults are preyed on by hawks and owls. Disease and accidents cut dove numbers further.

Approximately 70 to 80 percent of all newly-hatched doves do not live one year (i.e., for every 100 hatched in a summer, only 20 to 30 will live to breed the following summer). If a juvenile survives its first year, the attrition slows somewhat. Adults have a 60 percent mortality rate.

Juveniles complete their feather development in about two weeks after leaving the nest. Then, they gather into small flocks to feed and roost. Migration of all ages is in full swing by mid-September or early October. Flocks of a few to 20 or more birds travel together, flying in the morning, resting and feeding at noon, flying in the afternoon, feeding in the evening, and roosting at night. If winter weather is not too severe, some birds spend the entire year in Pennsylvania. This proportion of the population appears to have risen over time, likely due in part to increased bird feeding activity by humans.

Because the mourning dove is a migratory bird, it falls under federal regulations. As with waterfowl, the states set hunting seasons and bag limits within a framework determined by the U.S. Fish and Wildlife Service. Doves have been hunted in Pennsylvania since 1945.

Population

Mourning doves adapt well to man and his activities. In the last 200 years, the dove population has increased greatly—probably as a result of intensified agriculture and expanding suburbs which provide much shrubby nesting habitat. Landscaping practices which decrease the amount or diversity of shrubs and trees, however, may affect doves adversely. Although long-term population declines in the western United States are of some concern, mourning dove numbers in the East appear stable to increasing. Mourning doves were among the top 10 species for both occurrence and abundance in the recently-completed second Breeding Bird Atlas of Pennsylvania. Doves occur in all but the most-heavily forested landscapes in Pennsylvania, and Atlas point count data provided an estimate of about 1.55 million singing males statewide.

The U.S. Fish & Wildlife Service monitors dove breeding populations by conducting call-count surveys. In Pennsylvania, the dove population peaks in August and September when adults and locally produced young are joined by migrants from farther north. They migrate leisurely, averaging about 15 to 30 miles per day.

As with any heavily preyed-upon species, the mourning dove has an extremely high reproductive rate (small, but multiple broods); in essence, parent doves don’t put all their eggs in the same basket. While dove numbers fluctuate from year to year, there’s no evidence that the population is cyclical.

Habitat

The mourning dove is a bird of open woodland edges. Favored habitat includes farmland with scattered trees and shrubs, open woods, evergreen stands, orchards, roadside trees and suburban gardens. Doves usually avoid dense forests.

Food is not normally a limiting factor, because doves can subsist on a tremendous variety of seeds and can fly to places where food is adequate. Because they are so mobile and adaptable, there is little need to manage habitat specifically for them. Shelterbelts can be planted for nesting cover (red pine, long-leaf pine, Norway spruce, and locust trees are suitable), benefiting doves and other wildlife such as songbirds, pheasants, rabbits, quail, etc. Also, millet overseeded in corn provides extra food.

In general, doves concentrate in areas with plentiful weed seeds or waste grain, near trees for roosting and nesting, and within easy flight of a water source. As long as such habitat exists—and right now it is abundant—the mourning dove will continue to be one of Pennsylvania's most plentiful and conspicuous game birds and a much-loved occupant of backyards.

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Owls

Owls are birds of prey, occupying by night the hunting and feeding niches which the hawks hold by day. Superb, specialized predators, owls are adapted to find, catch and kill prey quickly and efficiently. They've been doing it for ages; owl fossils found in the midwestern United States in rocks of the Eocene period date back about 60 million years. Eight species of owls either nest or regularly visit Pennsylvania in winter. Some species like the great horned owl, barred owl, and eastern screech-owl are permanent residents. Barn owls, long-eared owls, short-eared owls, and northern saw-whet owls nest in the state but are migratory. Some individuals apparently nest where they spent the winter. Snowy owls are winter visitors, varying each year in the extent of their visitation to the state. Migrant owl populations seem to reflect the abundance of prey populations, so they vary greatly from year to year. In general, the populations of owls are not well-known because of their nocturnal habits. As such, these are among Pennsylvania's most mysterious birds and deserve more research and monitoring efforts.

Taxonomists divide owls (order Strigiformes) into two families, Tytonidae—barn owls—and Strigidae, a family to which all other Pennsylvania owls belong. The barn owl ranges over most of the world, with related species in South America, Europe, Africa, Asia, New Zealand, and Australia. Strigidae have near-worldwide distribution, including most Pacific islands and the arctic.

The plumage of owls is dense and soft, making them look heavier than they actually are. Their earth-toned feather colors are broken into mottled patterns which blend into the background of shaded daytime roosts and the darkness of night. The feathers on owls' legs provide insulation and protect against bites by prey. Both sexes are colored essentially alike, but females are usually larger and heavier than males of the same species.

Some unusual and highly effective adaptations help owls survive. Extremely large eyes and large retinas packed with a high number of light-gathering cells called rods make their vision 35 to 100 times more efficient than human sight at distinguishing small objects in low light. An owl cannot distinguish colors well, but it possesses binocular vision: each eye views the same scene from a slightly different angle, thus improving depth perception. Eyes are fixed in the skull; to look

eastern screech-owl

to the side, an owl moves its head, and some species can twist their necks over 270 degrees—almost all the way around.

An owl's head is large and broad to accommodate two widely spaced and highly developed ears. The facial disc and facial ruff, which consists of paired layers of densely packed feathers behind the ear openings, work together to funnel and intensify sounds. Owls hear sounds well below the threshold of human hearing. Even in complete darkness, a barn owl can detect and catch prey by using its hearing alone. Several owl species have asymmetrically positioned ears for a greater ability to pinpoint prey. This highly developed sense of hearing allows some species to detect and capture unseen voles and mice under snow pack or dense ground cover. The conspicuous "ears" or "horns" of great horned, long-eared and screech owls are really tufts of feathers that have little effect on their hearing.

Owls are silent hunters that take their prey by stealth. The leading parts of a night hunter's wings—which cut the air when the bird flies—have soft, serrated edges. Turbulence and noise is further reduced by soft fringes on the trailing edge of primary and secondary feathers and a downy covering on primaries, secondaries and wing coverts. These specialized feathers, lightweight wings and a large wing surface area let an owl fly and glide nearly silently. As its flight is virtually noiseless, an owl easily hears other sounds while hunting. It descends to its target in a silent, mothlike glide.

An owl grips and kills prey with its talons. Even the grip of a small owl is amazingly strong. Two of these strong, sharp claws branch off the front toes of the foot, and two off the back toes. If the prey is small enough, the owl swallows it whole; otherwise it holds the kill with its talons, tears the carcass apart with its hooked beak and bolts the pieces. The owl's stomach absorbs nutritious portions and forms indigestible matter (hair, feathers, bones, claws, insect chitin) into round pellets that are regurgitated about seven hours later.

Pellets, also called castings, can be found under daytime roosts or nighttime feeding stations. Generally, the larger the owl, the larger its pellets. Pellets can be broken apart and the hard bony parts separated from the fur and feathers. Close examination of the hard items gives insight into the owl's diet. These pellets are great educational tools for people, especially children, to see first-hand what an owl eats. It is surprising to many that most owls primarily eat small rodents and the smaller owls eat a lot of insects.

Most owls call to attract members of the opposite sex during mating season and to announce individual territory. They also call softly for short-range communication between mates or between parents and offspring. When cornered or frightened, owls hiss or make clicking noises by snapping their mandibles (upper and lower parts of the bill).

Owls do not build nests, preferring to take over abandoned crow or hawk nests or use cavities in trees or holes in banks. They may add lining material to existing nests. Owls are early nesters, some even lay eggs in late winter. By the time nestlings need fed and fledglings leave the nest, offspring of other wildlife abound and are fairly easy prey for the adults to provision the young or for the inexperienced young owls to prey upon.

Owl eggs, usually three to five, are rounded, white and undecorated. Incubation is generally the female's responsibility, while the male hunts and brings food to the female. After the eggs hatch, both parents feed the young.

Nestlings have thick white or light gray down. Young found in the same nest are invariably of different sizes, because incubation starts as soon as the female lays the first egg (unlike many other birds, which begin incubating only after all eggs are laid), and therefore this egg hatches first. As much as two weeks may pass between the laying and hatching of the first and last eggs. Young hatched latest will die if the parents cannot find enough food in the area, as the youngest nestlings cannot compete with the larger, older nestlings. This natural check balances predator population with food supply and ensures that surviving fledglings are strong.

The sounds made by owls are among the most familiar nighttime natural sounds. The stereotype is that owls hoot, but several owls make no such sound and screech, whinny, or bark instead. Even the "hoot owls" have wide repertoires and make many different kinds of sounds, especially in their more intimate family relationships. They also make non-vocal noises by snapping their bills when disturbed or clapping their wings during courtship flights.

During the day, most owls stay in hollow trees or dark, dense stands of vegetation, often the dense cover of conifer trees. They hunt mainly at night—occasionally at dusk or on cloudy days—quartering the ground in silent flight or scanning it from a convenient perch.

Owls generally kill whatever is easiest to catch or find. As with many natural predators, they are often blamed for killing more game species and poultry than they actually kill. Owls are beneficial birds of prey that help keep rodent populations in check, including pest species that may be more active at night. Mice, rats and voles form a major part of the owls' diets; smaller owls prey heavily on small animals, including mice, small birds, frogs and invertebrates, such as large insects, worms and crayfish. All Pennsylvania owls are federally protected under the Migratory Bird Treaty Act of 1918.

Barn Owl *(Tyto alba)*

The barn owl is a long-legged, light-colored bird with a white, heart-shaped face. It is sometimes called the monkey-faced owl. A barn owl is a medium-sized owl, 14 to 20 inches in length with a 44-inch wingspan; females weigh about 24 ounces, males up to 20 ounces. Both sexes have whitish or pale cinnamon underparts and buffy or rusty upper plumage.

A barn owl has neither of two characteristics often associated with owls: "horns" or hooting-type calls. Its calls include a long, drawn-out whistle, loud raspy hisses and snores.

Barn owls nest in barns, church towers, hollow trees, cliff ledges and rock crevices, old buildings, silos, ventilation shafts, and clay embankments. Although barn owls generally do not build a nest, the female may shred her own regurgitated pellets to form a simple nest on which to lay her eggs. They usually nest in March, April or May and lay from 2 to 18 eggs (generally four to seven) at two- to three-day intervals. Incubation takes about 33 days. Some pairs will initiate nesting in fall months. During nesting, barn owls may catch dozens of mice and voles and store them at the nest site until the eggs begin hatching.

After the eggs hatch, both parents feed the young. Nestling barn owls can eat their weight in food every night. Young leave the nest 7 to 10 weeks after hatching, after flight feathers have developed.

Barn owls hunt open fields, flying low over the ground in search of prey. Ornithologists studied 200 disgorged pellets from a pair of barn owls that nested in a tower of the

barn owl

Smithsonian Institution Building in Washington, D.C. The pellets contained 444 skulls, including those of 225 meadow mice, 179 house mice, 20 rats and 20 shrews—all caught in the city. Other studies have confirmed mice and shrews as this owl's main prey items. Small birds, insects, flying squirrels and rabbits occasionally are taken.

The Pennsylvania Game Commission has been working with private landowners to protect barn owl nesting sites and study these charismatic birds. Recent studies have revealed that Pennsylvania owls migrate to other states sometimes hundreds of miles away.

Eastern Screech-owl *(Megascops asio)*

The screech-owl is the only small Pennsylvania owl with ear tufts. It is under 10 inches long and males may be as small as 6.5 inches long, with a 19-inch to 24-inch wingspan and a 5 to 7 ounce body weight. The species is dichromatic, i.e. exhibiting two color phases—gray and red—independent of age or sex, consistent from first plumage to old age and frequently found in a single brood. Gray phase birds are a dappled brownish-gray; red phase individuals are chestnut-red, also dappled. The pale breast and belly are streaked with dark gray or chestnut, depending on the color phase. In Pennsylvania, the gray phase is more common than the red phase.

A screech-owl's call is termed a "quavering whistle," "mournful wail" or "long, descending whinny with tremolo, repeated at irregular intervals" (*huhuhuhuhu*, etc.). This can be heard in spring and then again in late summer after the young leave the nest.

Screech-owls nest in unlined cavities of hollow trees, in abandoned holes of flickers and pileated woodpeckers and even in larger birdhouses. In March or April, the female lays four to five eggs; incubation takes about 30 days. After hatching, young remain in the nest for one month.

The screech-owl's diet is quite varied, perhaps the most varied of any North American owl, and includes many kinds of small animals. Large insects such as grasshoppers, katydids, moths and beetles, mice, shrews, rats, squirrels, rabbits, small birds and medium-sized birds like blue jays and northern flickers, crayfish, frogs and flying squirrels form the screech-owl's diet; most non-insect food is taken during winter. Screech-owls hunt from a branch using a sit and wait strategy, pouncing on prey from above. It sometimes catches its meal on the wing and is capable of snatching aquatic prey, like tadpoles, from the surface of shallow water. Common in Pennsylvania, they live in a variety of wooded habitats where tree cavities are available, although it is less common, even rare, in large, contiguous blocks of mature forest. The eastern screech-owl inhabits farm woodlots, orchards, wooded cemeteries and city parks, stream edges and wooded residential areas of towns and cities. Some screech-owls live in wooded backyards especially where there is a large birdhouse provided. Breeding Bird Surveys have indicated a statewide population decline of 20 percent between the first *Atlas of Breeding Birds in Pennsylvania* period (1983- 1989) and the second atlas period (2004-2009). West Nile Virus may have contributed to the steep drop in screech-owl numbers in Pennsylvania since the accidental introduction of the virus in 1999. This disease is a significant mortality factor for this owl, and it remains to be seen how well the species develops resistance.

Great Horned Owl *(Bubo virginianus)*

This large owl is sometimes called the tiger of the air. It is an adept aerial predator with powerful talons capable of crushing the spinal column of prey larger than itself. The great horned owl weighs up to 3.5 pounds, is 19 to 24 inches in length and has a wingspan range of 3 feet to nearly 5 feet. Females are slightly larger than males. A great horned owl has soft brown plumage above, mottled with grayish-white; undersides of light gray barred with dark; a "collar" of white feathers on the upper breast; a rust-colored face; and prominent ear tufts, the so-called horns, up to 2 inches long. Great horned owls are often mobbed by crows and other birds because of their predatory habits. The great horned owl is the night-time equivalent of the red-tailed hawk (*Buteo jamai*).

The great horned is known as the "hoot owl" for its call, three to eight (usually five) deep, booming, uninflected hoots: *hoo-hoohoo hoo*, given in a pattern somewhat like a Morse code message and has great carrying power. The hoot of the larger female is higher pitched than that of the male due to her smaller syrinx. These owls hoot to stake out territory and as part of the species' mating activity. The courtship of great horned owls extends from fall into early winter, providing many nights of hooting serenades with pairs dueting in synchronized hooting sessions. In Pennsylvania, nesting females are on eggs in February and early March and occasionally as early as late January. After fledging, the young owls beg from their parents with a high-pitched call that sounds somewhat like a barn owl's call, but less raspy. These night-time barking calls are sometimes given from prominent posts like tree tops and utility poles.

Great horned owls are believed to mate for life. They nest in abandoned squirrel, crow, heron or hawk nests, tree cavities

great horned owl

or hollow stumps and are the earliest nesters of all owls. A mated pair cleans debris from an appropriated nest, and the female then partly lines a central hollow with feathers. She lays two or three eggs at several-day intervals, usually in February, and may temporarily get covered with snow while incubating.

Great horned owls, especially incubating or brooding pairs, defend nests and young viciously and have even attacked humans who got too close. Great horned owls are intolerant of other owls near their nests or inside their territories. Eggs hatch in about a month; nestlings are downy-white and helpless. The young cannot fly until they are almost three months old and contour feathers have grown.

Great horned owls prey on opossums, rabbits, rats, mice, voles, geese, herons, domestic poultry, grouse, squirrels, other owls and hawks, foxes, skunks (this species' defensive spray apparently does not deter the great horned owl), domestic cats, weasels and muskrats. It is able to tear meat with its hooked beak. Generally, they are "perch and pounce" hunters that sit in a tree or prominent post and attack prey from above. They occasionally scavenge on carcasses.

The great horned owl is more commonly found across the state than any other owl. This species has a very wide tolerance for climatic conditions, living in habitats ranging from boreal forests to dry grasslands and deserts. In Pennsylvania, it is found in a variety of habitats from urban parks and cemeteries to large forest tracts. It prefers forest edges, open mature woods and agriculture land with woodlots. The species ranges over most of North America, south into Central America and portions of South America. There has been a perceived drop in its population in recent years as measured by Christmas Bird Counts and Breeding Bird Atlases. This owl is susceptible to West Nile Virus and may have suffered a set-back due to this disease.

Snowy Owl *(Bubo scandiacus)*

Rare and irregular visitors to Pennsylvania, snowy owls show up mainly from November to January in response to food availability on the arctic tundra. Prey abundance, namely, a large lemming population during the breeding season, allows snowy owls to rear higher numbers of young in some years. Scientists believe that as this primary food source decreases, large numbers of snowy owls irrupt south in winter to southern Canada and northern United States seeking areas with abundant prey. Population crashes of lemmings and hares, and the accompanying owl irruptive events, usually occur at 4- or 5-year intervals. Immatures, which are darker in color, go farther south than the adults.

Plumage of the snowy owl is white barred with grayish-brown; its feet and legs are heavily feathered. Full, soft feathering keeps the bird warm during periods of inactivity between winter hunting forays.

snowy owl

The snowy owl is as large as the great horned owl, with a 24-inch body length, 60-inch wingspan and body weight up to 5 pounds (by weight, the largest owl in North America). It is a bird of wide open, treeless, spaces which resemble its tundra home. In Pennsylvania, it may be found on an elevated perch overlooking open fields, airfields, reclaimed strip mines, the shorelines of open rivers and lakes or along broad highway corridors, and beaches. It often perches on a fencepost, raised hill, hay bale, silo, grain elevator, or building to look for its primary prey of small mammals such as mice, voles, rabbits and rats, but also will take birds and fish as opportunity presents itself. Unlike most owls the snowy owl is diurnal, hunting throughout the long summer days on its Arctic breeding grounds. In Pennsylvania, the snowy owl continues these habits and hunts during the day. It does not call south of its arctic breeding grounds.

Barred Owl *(Strix varia)*

The barred owl is a large bird of the deep woods which includes forest swamps, riparian forests as well as upland forest habitat. It has a rounded head, no horns and brown eyes (it is the only brown-eyed Pennsylvania owl except the barn owl; all others have yellow eyes). The barred owl ranges over the eastern United States but has expanded north and west into the boreal forests of western Canada and south to northern California. The barred owl is closely associated with large unfragmented forest tracts, particularly mature forests with large trees for nesting cavities. It prefers to nest in mixed deciduous and conifer woodlands and is strongly associated with eastern hemlock. It often occurs in the same high-quality and large-scale contiguous forests as the red-shouldered hawk (*Buteo lineatus*).

A barred owl weighs up to 2 pounds, with a 44-inch wingspan and body length up to 20 inches. It has gray-brown plumage with white spots on the back; whitish or grayish underparts are barred with buff or deep brown, the barring crosswise on the breast and lengthwise on the belly.

The barred is the most vocal of Pennsylvania's owls. Its hoots are more emphatic than those of the great horned owl,

barred owl

long-eared owl

but not as deep or booming. The barred owl's call is eight accented hoots, in two groups of four hoots: *hoohoo-hoohoo ...hoo-hoo-hoohooaw* (described as "Who cooks for you, who cooks for you all?"). It usually calls early in the night, at dawn, and occasionally on cloudy days.

Barred owls almost always nest in hollow trees, laying anywhere from one to five eggs that hatch in 28 to 33 days. Pairs may show strong attachment to the same nest area, returning year after year. They are generally permanent residents where they nest.

Long-eared Owl *(Asio otus)*

The long-eared is one of the most efficient mouse-catchers of the Pennsylvania owls. It is also one of the rarest breeding birds in the state and listed as threatened in the state. The State Wildlife Action Plan considers the long-eared owl a "High Level Concern" species and its population trends appear to be declining as it was found in less than one percent of the

total number of blocks surveyed during Breeding Bird Atlas projects. This slender, crow-sized owl has long wings which make it appear larger in flight than it actually is; a long-eared owl has about a 15-inch body length, up to 40-inch wingspan and weighs about 11 ounces. This secretive and uncommon Pennsylvania resident gets its name from two prominent ear tufts.

While it looks a bit like a small version of the great horned owl, the long-eared can be told from its larger relative by a streaked belly—rather than barred—and closer-set ears. The long-eared owl is only about one-fifth the bulk of a great horned owl. Conversely, the long-eared owl is much larger and has a slimmer profile than the other "eared owl," the eastern screech-owl. Like the great horned owl, the long-eared owl has a rusty face and grayish-brown plumage. However, the long-eared owl also has streaks continuing down its belly while the great horned owl lacks these streaks and the short-eared owl's streaks are confined to the chest. The long-eared owl's call is a low, moaning, dove-like *hoo, hoo, hoo* repeated every three seconds or so. They also have many other sounds including whistles, whines, shrieks, and bill snaps.

Long-eared owls usually are associated with a curious blend of habitats. Paradoxically, they nest in wooded areas but usually forage in open country. Their home is a mix of woodland, fields, and wetlands. Long-eared owls generally nest in dense evergreen conifers, frequently in old crow or hawk nests. They forage in fields, meadows, open woods, wetlands, and edges nearby. This also is true in winter when they roost in dense conifer tree groves, often communally. Females lay three to eight (normally four to five) eggs. Only the female incubates; incubation period is 26 to 28 days, and the oldest owlet may be 8 to 10 days old when the last egg hatches.

Long-eared owls feed mainly on mice, voles and shrews, occasionally taking birds, insects and frogs. They are more strictly nocturnal than Pennsylvania's other owls. Prime habitat is a mix of woodland, fields and wetland; dense vegetation or dense groves of conifers for nesting and roosting adjacent to open woodland, fields, meadows or wetlands for foraging. They may also be found in extensive forests with areas of open understory and short ground cover for foraging. This species often will "freeze" in a cryptic pose right next to a tree trunk to avoid detection. Long-eared owls are sensitive to disturbance at their nests and winter roosts. It is best to view these nesting owls at a distance so as not to disturb them.

Short-eared Owl *(Asio flammeus)*

Also called the marsh owl, the short-eared owl visits Pennsylvania mainly in winter and is a rare breeding bird that is considered endangered in the state. It is a crow-size owl (body length 13 to 17 inches, weight 15 ounces) with long wings (up to a 42-inch wingspan). Its upper plumage is streaked and buff-brown, with large buffy areas on the upper wing surfaces; the breast is pale, boldly streaked with brown. The short-eared owl's ear tufts are small and hard to see, but its ear openings are large and its hearing excellent.

The short-eared hunts during the day and at night and is especially active at dusk and dawn in winter. It hunts over open country, and its irregular, flopping and floating flight resembles that of a nighthawk or large moth. The short-eared owl is a fairly silent owl but occasionally sounds an emphatic, sneezy bark, *keaw, keaw,* or a hooting call described as b*oo, boo, boo*. Their courtship flight is a spectacular sky dance with the male diving, looping, and swooping while calling in sight of a prominently perched female.

At winter's end, most short-eared owls leave Pennsylvania and head north. Pennsylvania is at the southern edge of the owl's North American breeding range. Some remain in Pennsylvania to breed in extensive grassy areas scattered throughout the state. In recent years they have been found nesting on reclaimed strip mines in western and central Pennsylvania. Short-eared owls nest on the ground, sometimes in colonial groups. The female excavates a slight bowl-shaped depression in the earth or sand. The nest is sparsely lined with grasses, weed stalks and feathers. Bushes or clumps of weeds often hide the nest. The female typically lays four to seven eggs and incubates them about 21 days until they hatch.

Small mammals, especially voles and mice, are the primary prey of the short-eared owl. It also preys on shrews, rats and small birds. This owl may utilize an elevated perch where available but mainly hunts by flying low over the ground, sometimes hovering, and then pouncing on its prey. They seem to take "the night shift" in the same areas where northern harriers hunt during the daylight hours, sometimes skirmishing with these hawks or other owls. The short-eared owl depends mainly on its sense of hearing to locate prey and is able to catch its quarry unseen under snow cover and grass. This owl is found in open country and inhabits reclaimed strip mines, uncut grassy fields, large meadows, the grass margins of airports, and marshes and bogs. They generally roost in trees, sometimes in large groups and occasionally with long-eared owls.

Northern Saw-whet Owl *(Aegolius acadicus)*

The tiny saw-whet owl is one of the state's most charismatic birds. With a body length of 7 to 8 inches and an 18-inch wingspan, the saw-whet is the smallest Pennsylvania owl. Its plumage is dull chocolate-brown above, spotted with white, and its undersides are white spotted with dark reddish-brown. Juveniles are a rich chocolate-brown over most of their bodies. This species has no ear tufts.

The saw-whet's call is a mellow, whistled note repeated mechanically, often between 100 and 130 times a minute: t*oo, too, too, too, too*, etc. This sound suggests the rasping made when sharpening a saw—hence the bird's name. The saw-whet is nocturnal and seldom seen. By day, it roosts in young, dense hemlocks, junipers, or other dense vegetation.

Saw-whet owls are believed to breed in March and April; they nest in natural cavities or deserted woodpecker and squirrel holes, hollow trees or stumps and nesting boxes. Females typically lay four to six eggs that hatch after 21 to 28 days. Immatures leave the nest after about a month. The saw-whet's primary food is woodland mice, particularly deer mice and white-footed mice. Saw-whets also will feed on insects, voles, shrews, and small birds. In turn, they are preyed upon by larger owls like great horned owls and barred owls. Saw-whets tend to stay fairly low in the forest, approaching any human visitor from a low elevation where they are difficult to spot in the dense foliage.

In Pennsylvania, the northern saw-whet owl is found in highland deciduous and mixed forests and is most abundant in coniferous forests and mixed forests with a thick understory such as those with blueberry, mountain laurel, and rhododendron stands. This species nests primarily in the northern part of the state, but also in mountainous forests near the Mason-Dixon line. Winter roost sites are often in dense stands of junipers (red cedars) or other tightly vegetated evergreen conifers and vine tangles. Breeding season surveys (called "toot routes") have revealed that the saw-whet is fairly widely distributed in the mountain forests of the state. There is on-going research on its migration into and through the state by bird banders (called "owl-netters").

northern saw-whet owl

Revised 03/2022

Common Nighthawk and Eastern Whip-poor-will

common nighthawk

The common nighthawk and the eastern whip-poor-will belong to Family Caprimulgidae, a group of nocturnal and crepuscular birds also known as the nightjars. About 90 species around the world are included in the nightjar and nighthawk family. Nightjars have large heads and eyes and exceedingly wide mouths, used as scoops for catching insects in midair. Their broad wings and large tails contribute to a buoyant, maneuverable flight. Their legs are short, and their feet are small and weak. Most spend the day resting on the ground or roosting in trees, perched lengthwise on limbs, signs, or gates. "Nightjar" seemingly refers to the birds' nocturnal habits and the jarring or grating aspect of their vocalizing. Members of this family characteristically have cryptic plumage that allows them to elude detection when roosting or nesting. Some are quite vocal in the nesting season, but otherwise difficult to detect. The nightjars are also known as "goatsuckers," from an erroneous belief that the birds use their expansive maws to steal milk from goats and other livestock.

Common Nighthawk (*Chordeiles minor*)

The name "nighthawk" is a misnomer, since the bird is not related to the hawks and it flies mainly at dawn and dusk rather than at night. It is a crepuscular bird rather than a true night bird. A nighthawk is about 9 inches long, with a wingspread of almost 2 feet. Individuals weigh from 2.5 to 3.5 ounces. The flight pattern is bouncy, erratic, full of twists and turns. During warm summer evenings many people see flocks of nighthawks flying high above towns and farmland, but few have gotten a close look at the birds. The plumage is a mix of dark gray and brown. The long wings have a crook about halfway out and then taper to a point. Nighthawks have a white band on the tail; white chin and throat; and a broad white wingbar that is clearly visible from below, marking the flight feathers on each wing.

Unlike whip-poor-wills, which sit in wait and then sally forth to catch individual insects, nighthawks remain on the wing for extended periods, flapping, gliding, stalling, and swerving as they chase and catch prey. Their bat-like flight has earned them the nickname "bullbat." More than 50 insect species have been reported as prey, including flying ants, June bugs, mosquitoes, moths, mayflies, caddisflies, wasps, and grasshoppers. Nighthawks drink on the wing, skimming the surface of lakes and streams. They do not fly during heavy rain, strong winds, or cold weather. Nighthawks can be drawn to well-lit areas and will dive on insects attracted to bright lights.

The call is a loud, nasal *peent*, which, according to one source, resembles the word "beard" whispered loudly. As part of its breeding display the male also makes a booming sound, which is produced by air rushing through its primary wing feathers after a sudden downward flexing of the wings while diving. Nighthawks will "boom" not only during the nesting season, but also in migration. Nighthawks display over some remote canyons, grassland projects, and reclaimed strip mines,

suggesting local nesting populations far away from urban areas where they are normally found in Pennsylvania.

The common nighthawk has a large breeding range: from the Yukon Territory to Labrador and south to Florida, Texas, and Central America. The birds nest in open fields, gravel beaches, rock ledges, talus slopes, recently burned and recently logged forests, reclaimed strip mines, grasslands, and flat graveled roofs of buildings. A change in roof construction materials from gravel to rubberized surfaces has negatively impacted the common nighthawk in the eastern United States and may have contributed to their decline in recent years. Nighthawk nests may be especially vulnerable to aerial nest predators like crows and hawks. The female nighthawk does not build a nest; she lays her two eggs directly on the ground, often a surface of sand, bare rock, gravel, slag, or wood chips. Eggs are laid in late May through June. The laying period peaks around the first of June. Nighthawk eggs are creamy or pale gray, dotted with brown and gray. The female does most of the incubating. The eggs hatch after about 18 days. Females brood the nestlings as well. Nestlings are semi-precocial: their eyes are open, and they are able to move from side to side after hatching. Females may feign injury to draw predators away from the nest. Both parents feed the chicks by regurgitating insects. By around 18 days, young nighthawks make their first flights. They can fly capably by 30 days, and by 50 days they are fully developed. Nighthawks raise only one brood per year. They are among the earliest breeding birds to leave Pennsylvania, commencing their southward migration in August.

Common Nighthawks often form large flocks when migrating south, a spectacular sight. The nighthawk has one of the longest migrations of all North American birds. Nighthawks travel 2,500 to 6,800 miles to winter in South America, many as far as Argentina.

The average lifespan of a common nighthawk is estimated at four to five years. Banded birds as old as 9 to 10 years have been recovered. Since the 1960s, the number of breeding and migrating nighthawks has fallen significantly and has declined dramatically between the first and second *Atlas of Breeding Birds in Pennsylvania* reports, dropping 71 percent in number of blocks reporting nighthawks and 84 percent in confirmed records. This decline may stem from indiscriminate use of pesticides, increased predation, or changes in habitat either in the northern breeding range or in the southern wintering areas. In Pennsylvania most nesting takes place on building roofs in urban areas, with nighthawks seemingly abandoning traditional rural natural nesting sites.

Eastern Whip-poor-will (*Antrostomus vociferus*)

The eastern whip-poor-will lives in moist woods across the eastern and southern United States. It is about the size of a common nighthawk, but its wingspan is not as great and its wings are broader and more rounded. On each side of the bill, a vertical row of hair-like bristles flares toward the front: the bristles funnel insect prey into the generous mouth. The plumage is a mix of camouflaging browns. Both sexes have a white neck band, and the male has white outer tail feathers. Their cryptic plumage hides them well when they sit during the day on the leafy forest floor. Only recently has the eastern whip-poor-will been differentiated from the Mexican whip-poor-will (*Antrostomus arizonae*), which it greatly resembles.

Whip-poor-wills perch on branches or sit on the ground or along roadsides. They can be detected by the gleam of the birds' red or bright orange eyes in the glare of automobile headlights or a flashlight. This "eyeshine" is caused by a reflective layer at the back of the retina called the tapetum. The tapetum amplifies small amounts of light by passing them back through the retina a second time. Whip-poor-wills fly up to catch moths, mosquitoes, gnats, beetles (especially June bugs), and crane flies. Their sit-and-wait foraging strategy uses less energy than the common nighthawk's in-flight foraging and may be what allows whip-poor-wills to arrive earlier on northern breeding grounds and to survive periods of cold weather and low prey availability. Its soft feathering lets a whip-poor-will fly almost as quietly as an owl and helps the bird intercept moths, many of which can detect sounds of potential predators. Whip-poor-wills take sphinx moths, noctuid moths, and the big silk moths: cecropia, tuna, and polyphemus.

The whip-poor-will is named for the male's repetitive nocturnal calling. The *whip* is sharp, the *poor* falls away, and the *will*, the highest note in the sequence, is a bullwhip snapping in the night. The call carries about half a mile. Listeners close to the calling bird may hear a soft verbal knock sound before each repetition. In Pennsylvania whip-poor-wills start calling in late April or early May, when males arrive from the south. The calling continues through June and dwindles in July but can be heard on moonlit nights even late in the summer. Whip-poor-wills call mainly at dawn and dusk, and they go on and on. Many rural dwellers recall with affection the days when they were more commonly heard near homes.

The calling attracts females. Whip-poor-will courtship involves head bobbing, bowing, and sidling about on the ground. The female lays two eggs on the ground in dry open woods, often near the edge of a clearing. Most egg laying occurs between mid-May and mid-June but sometimes as late as July. The eggs are off-white and speckled with tan, brown, or lilac. The eggs blend in with the dead leaves, as does the adult who incubates them.

The reproduction of whip-poor-wills may correlate with the lunar cycle: males sing longer on moonlit nights, and hatching may occur when the moon is waxing. The increased moonlight makes foraging easier for the adults who must now feed nestlings as well as themselves. The eggs hatch after about three weeks of incubation. Parent birds feed their young by regurgitating insects. The fledglings first fly about 20 days after hatching. There is evidence that some whip-poor-wills have a second brood which follows the first by a lunar cycle.

Whip-poor-wills are difficult to detect after nesting season when calling ceases. Therefore, the start of migration is not

well known. Records suggest fall migration occurs during September and October. Some whip-poor-wills migrate to Central America but most winter in the southeastern states, in areas where the related chuck-will's-widow (*Antrostomus carolinensis*) breeds in summer. The chuck-will's-widow withdraws to Central American and South America in winter.

Whip-poor-wills require large forest tracts and are found in barrens, open woodlands, and second growth forest with scattered clearings or old fields. Whip-poor-wills are often clustered so if you hear one you may hear several at a location on any night they are vocalizing. They often can be found in gaps in the forest canopy, sometimes locally abundant where there has been some disturbance, including timbering or other vegetation management. They frequently sit right on rural dirt or grassy roads with little traffic. Sometimes they will sit on top of a gate's crossing bar a few feet off of the ground. Night bird surveys have uncovered some local populations in abandoned strip mines with regenerating vegetation. Other clusters of whip-poor-wills have been found in remote parts of game lands and state forests.

The eastern whip-poor-will has been declining for the last several decades. Although populations have been declining since the 1930s, Breeding Bird Surveys show a steep decline of 42 percent between the first Atlas and the second Atlas periods (1980s vs. 2010s). In Pennsylvania, the population remains strongest in the Ridge and Valley province and in the central portion of the state including Centre and Clinton counties. The whip-poor-will does not adapt well to urbanization. The growth of suburbs and cities has eliminated this species from much of southeastern Pennsylvania. Whip-poor-wills also cease breeding in areas where woods become too mature. They have declined over much of the East during the last four decades. They are also vulnerable to nest predators such as opossums, skunks, foxes, coyotes, and feral cats.

The decline in Pennsylvania's nighthawk and whip-poor-will populations is part of a pattern of decline of aerial insectivores in North America including many swallows and swifts. Bird conservationists are growing increasingly concerned about the fate of nighthawks, whip-poor-wills, and other aerial insectivores. Perhaps these two charismatic nightjars will inspire more conservation efforts on behalf of the entire group.

eastern whip-poor-will

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Chimney Swift, Purple Martin and Swallows

chimney swift

Swifts, martins, and swallows are built for life in the air. They have long tapering wings and lightweight bodies. Their short, wide bills open to expose gaping mouths for scooping up insect prey on the wing. The chimney swift belongs to Family Apodidae, with more than 90 species worldwide. The purple martin and the swallows are in Family Hirundinidae, also with about 90 species around the globe. The chimney swift has tiny, vestigial feet with four clawed toes facing forward, letting it cling to upright surfaces; the feet of the purple martin and the swallows have three toes forward and one to the rear, for perching on branches and wires. As a group, aerial insectivores have been declining in numbers so conservationists are concerned for these species and seeking the reasons for these declines and solutions to prevent further losses. Common traits of the declining species are very long migration distances to Central and South American wintering grounds and the perceived decline of flying insects in areas of higher air pollution and calcium-depletion on their nesting grounds.

Many of these birds are social and breed in colonies. Purple martins usually nest in artificial boxes with multiple chambers, put up by folks wanting to attract these insect eaters; the other swallows build or occupy different sorts of nests, depending on their species. Most swallows do not defend territories. The males sing mainly to attract mates and to communicate with them. Both parents usually share in incubating eggs and feeding young. Swifts, martins, and swallows often forage in groups, soaring above forests, farms and urban areas to take advantage of locally available flying insect prey. During wet weather they hunt at lower altitudes, where insects fly under damp conditions. These birds undertake long migrations. The seven species that breed in Pennsylvania winter in the Gulf states, Mexico, Central America, and South America.

Chimney Swift (*Chaetura pelagica*)

The common name comes from the bird's favorite nesting habitat and the speed of its flight. A chimney swift is sooty gray, about five inches long, and has a one-foot wingspan; the body looks stubby between the long, narrow wings. The bird spends most of the daytime hours in the air and like other swifts is among the most aerial of birds; its flight is bat-like, with shallow wingbeats and erratic stalls and turns as the bird singles out insects or sweeps through clouds of prey. Since they have a slim profile and short tail, they often have been described as a "cigar on wings" by birders. A loud clicking call is uttered in flight. Chimney swifts eat flies, leafhoppers, flying ants, mayflies, stoneflies, beetles, leaf bugs, and other flying insects. They take spiders, mainly small ones floating on strands of silk borne aloft by air currents. Chimney swifts drink on the wing, skimming low over ponds, and they even gather materials for their nests while in flight, using their feet to break tips off dead branches and carry them back to the nest

purple martin

site. Swifts do not perch on branches, but instead cling to the surface of human-made structures and tree trunks.

Chimney swifts are thought to be monogamous and to mate for life. Pairs sometimes glide in tandem with their wings raised in a V. In the past, chimney swifts nested in hollow trees and caverns more frequently than today and can still be found nesting in older forests where large hollowed tree trunks provide nesting habitat. Today they use human-made structures almost exclusively: factory and house chimneys, silos, air shafts and old wells, where they are protected from storms and predators. The nest is shaped like a half-saucer and cemented to a vertical surface, the twigs held together by the adults' glutinous saliva, which solidifies and binds as it dries. Females lay three to six eggs (four or five are usual), which are white and unmarked. Both sexes participate in the 18 to 21 day incubation. The newly hatched young are altricial and are fed regurgitated insects. Sometimes a third "parent," probably a yearling offspring of the adults, helps to feed and brood nestlings. The young fledge a month after hatching and join feeding flocks. In late summer swifts gather in the evening before flying into large factory chimneys, where they roost by the thousands.

Chimney swifts are not common in the densely wooded parts of Pennsylvania, where trees may not be mature enough to offer cavities for nesting and roosting. They are particularly common in urban areas in river valleys. Swifts arrive in the Northeast in late April and early May, raise a single brood in June and July, and head south in August and September. Large flocks or "tornadoes" of thousands of swifts will funnel into chimneys to roost overnight during their migration. These large swirls of swifts are an amazing sight. They winter mainly in the Amazon Basin of South America. The average lifespan is four to five years, but individuals have lived as long as 15 years. Declines in swift populations are prompting concerns for roost sites, nesting habitat, winter ground habitat, and insect populations that support this species. There now are tower designs for artificial swift nest and roosts that have proven to be successful measures for enhancing swift habitat.

Purple Martin (*Progne subis*)

At eight inches in length, the martin is the largest North American swallow. Adult males are a glistening blue-black; females and yearlings are grayish with pale bellies. Both sexes have a notched tail. Martins, less maneuverable than other swallows, glide in circles punctuated with short periods of flapping flight. Before Europeans came to the New World, native Americans were hanging gourds around their villages to attract purple martins, which also nested in caves and hollow trees. In Pennsylvania today, the vast majority of martins nest colonially in compartmented boxes that people put up for them. This species may be the most intensely managed migratory songbird in the nation, being almost entirely dependent on artificial structures for housing. The

tree swallow

loss of artificial nest sites is probably the most important cause for the decline of the species in population size and nesting distribution in the state. Fortunately, this popular bird responds well to new martin housing initiatives. Martins inhabit open areas near water, meadows, and farmland. They feed on winged ants, wasps, bees, flies, dragonflies, beetles, moths, and butterflies. Males arrive first in the spring, followed by females. The call is a throaty, gurgling *tchew-wew*. One male may mate with more than one female. The four or five eggs are white and unmarked, laid on a nest of grass, twigs, and leaves inside the nest chamber. The female incubates them for 15 to 18 days. Flocks of martins gather by the thousands in August and September prior to migration. The species winters in South America as far as southern Brazil. Declines in this species are greater than others in the swallow family, prompting more conservationists to propose that it is especially needful of management initiatives.

Tree Swallow (*Tachycineta bicolor*)

Tree swallows nest across Canada and most of the northern United States. They are five to six inches long, an iridescent green-black or blue-black above and bright white below. They nest in tree cavities, woodpecker holes, and bluebird houses put up by humans. The earliest of our swallows to return north, they arrive in mid-March in southern counties and late March and April in northern counties and at higher elevations; unlike the other species, tree swallows switch to eating berries and seeds to survive cold periods when insects become torpid. They often breed near the still waters of lakes, ponds and marshes, competing for nest cavities with bluebirds, starlings, house sparrows, and house wrens. Ornithologists believe that individuals choose new mates each year. Tree swallows are more aggressive than other swallow species and defend an area within a radius of about 15 yards from the nest. Bird box trails often include double boxes on a pole to allow both eastern bluebirds and tree swallows to nest on the same post.

The female lines the nest cavity with grass, weeds, rootlets, and pine needles; after the four to seven pinkish-white eggs are laid, she often adds feathers (usually white ones) from other birds. Incubation takes 14 to 15 days. The young fledge three weeks after hatching. Tree swallows migrate in flocks to wintering grounds in the Gulf states, Mexico, and Central America.

Northern Rough-winged Swallow (*Stelgidopteryx serripennis*)

This small nondescript brown and white swallow is named for slight serrations in its outermost (primary) wing feathers. The body length is about five inches. The species breeds across the United States, southern Canada, and in Central America. Rough-winged swallows often forage in flight above moving water. It is even more associated with water than other swallows. The call is a short, harsh *trit bit*. The birds nest in cavities near water using natural and man-made structures for nesting, including crevices found in rock faces, quarries, mines, gravel pits, and vertical stream banks; frequently nest in abandoned kingfisher and swallow burrows, quarries, bluffs, drainpipes, and culverts; they rarely excavate their own burrows. At the end of a one- to six-foot tunnel, the birds heap up twigs, bark, roots, and weeds, and line a central cup with fine grasses. The four to eight pure white eggs hatch after about 16 days of incubation. Rough-winged swallows nest throughout Pennsylvania, rarely in colonies like the similar bank swallow. They winter along the Gulf Coast and in Central America.

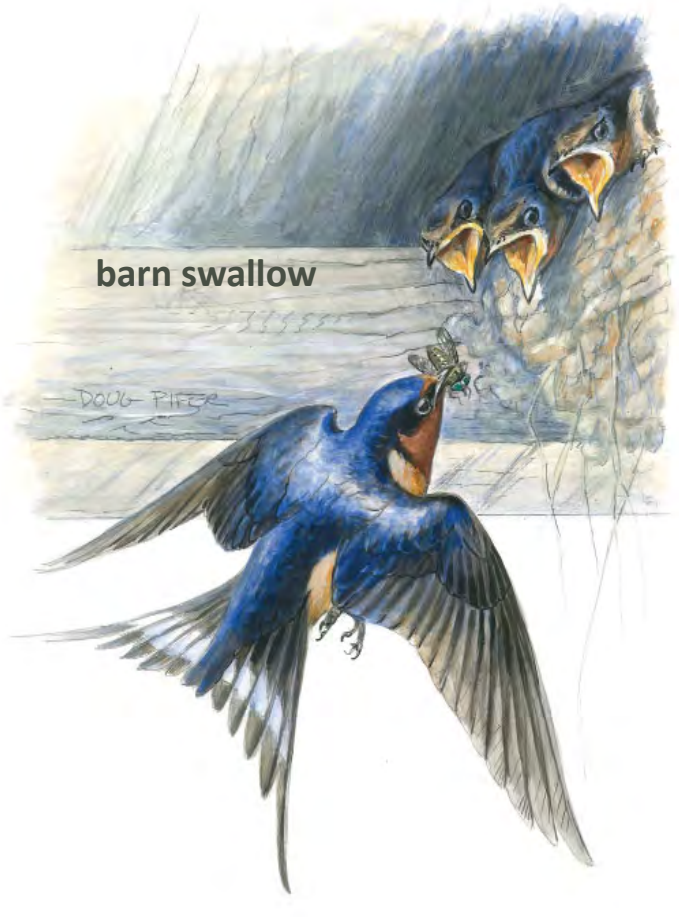
Bank Swallow (*Riparia riparia*)

About five and a half inches long, Pennsylvania's smallest swallow, this small brown-backed swallow has a dark band across its pale breast. Although they have small feet and tiny bills, bank swallows usually dig their own burrows, up to five feet deep in vertical banks and cliffs of dirt, sand, or

gravel as found in lake bluffs, river banks, and stream cuts or along roadcuts and in sand and gravel quarries. Nest entries of neighboring pairs may be only a foot apart. Colonies arise and die out as banks of suitable burrowing materials become available and then lose qualities that bank swallows require, such as steepness and height. Changes in the way that quarries are managed may be detrimental to continued occupancy of bank swallows and subsequent abandonment of former colonies. Extreme spring and summer flood events also have a negative effect on colony occupancy. Bank swallows forage over fields and wetlands and along rivers and ponds, taking flies, beetles, wasps, winged ants, dragonflies, stoneflies, moths, and other flying insects. They nest from May until early July. The clutch averages four or five eggs. In late summer, bank swallows may gather in large flocks before departing for wintering grounds in South America. The species also breeds in Europe and Asia, where it is known as the sand martin.

Cliff Swallow (*Petrochelidon pyrrhonota*)

Body length, five to six inches; a pale rusty or buff-colored rump distinguishes this species. From below, the tail looks squared-off. Cliff swallows eat flying beetles, flies, winged ants, bees, wasps, mayflies, lacewings, and many other insects. They build gourd-shaped nests out of pellets of mud attached to cliffs, bridge supports, dams, and walls of unpainted barns and derelict buildings under eaves that protect against rain. A typical nest takes one to two weeks to build and requires more than 1,000 mud pellets. Colonies can be dense: in one instance, 800 nests were clustered on the side of a barn and other large colonies have formed at power plants, dams, or bridges. The adults line the inside of the nest with grass, hair, and feathers. The three to six eggs are white spotted with brown. Both sexes incubate for about 15 days. A female cliff swallow will sometimes lay an egg in another swallow's nest, or carry an egg in her bill to a neighboring nest. Cliff swallows winter in South America as far south as Uruguay and Argentina. The overall population trend appears to be increasing but in Pennsylvania cliff swallow populations have steeply declined in northeast counties while increasing in the northwest region of the state according to Breeding Bird Surveys.



Barn Swallow (*Hirundo rustica*)

The flight of these sleek, long-tailed blue-and-buff swallows can look like an aerial ballet, with the birds sideslipping, stalling, twisting, and turning low over water or fields in pursuit of their prey: house flies, horse flies, beetles, wasps, bees, winged ants, and other flying insects. In bad weather, barn swallows may land and eat spiders, ants, and aphids. Pairs nest on their own, or near a few other pairs. Barn swallows are common, abundant breeding birds in Pennsylvania and throughout most of North America. However, they have been declining in recent decades. They build bowl-shaped nests out of mud and straw, fixing them to walls, beams, and eaves of barns and other outbuildings; in culverts and under bridges; and rarely on the cliff faces and caves, which were the species' original habitat before Europeans settled North America. Barn swallows often line their nests with poultry feathers. The adults scold human intruders and dive at them, zipping past their heads. Most females lay four or five eggs, which are white spotted with brown. During the day both male and female take turns incubating, switching about every 15 minutes. Young leave the nest about three weeks after hatching. Some pairs raise a second brood. Barn swallows from eastern North America winter in Panama, Puerto Rico, and throughout South America. *Hirundo rustica* is the most widely distributed swallow species in the world, breeding in North America, Europe, and Asia.

Revised 07/2021

Ruby-throated Hummingbird

The ruby-throated hummingbird, Archilochus colubris, is the only breeding hummingbird species east of the Great Plains. The hummingbirds (Family Trochilidae) occur only in the Western Hemisphere, with most of the 325-plus species inhabiting the tropics. Hummingbirds hover at flowers and feed on nectar. Many also consume insects and other arthropods. Although small and dainty looking, hummingbirds defend their territories very aggressively, and some species—including the ruby-throated—undertake long and strenuous migrations.

Biology: the ruby-throated hummingbird breeds from central Canada south to the Gulf Coast. Adults are about 3 inches long and weigh a tenth of an ounce, which is less than a penny. Both males and females have glistening green-bronze backs and pale bellies. The male sports a bright metallic-red gorge, or throat patch; on the female this area is grayish white. The bill is long and thin. The legs are short, and the feet are small, designed for perching rather than for walking or hopping.

The flight muscles of hummingbirds make up a higher percentage of their overall body weight as compared to other birds. They are unique in their ability to hover in place for extended periods, and to suddenly fly backwards, sideways, or up and down. In flight, a ruby-throated hummingbird beats its wings about 53 times per second, and as rapidly as 80 times per second when moving forward. Hummingbirds have flexible shoulder joints that let their wings move in a pattern like a figure eight laid on its side, with both forward and backward strokes generating lift. Minute changes in the angle of the wings let the bird control its speed and course. Scientists have calculated that hovering requires 204 calories per gram of body weight per hour, compared to 20.6 calories needed by the bird at rest. A hummingbird's heart beats more than 10 times per second during activity. The bird must eat almost constantly to fuel its high-speed metabolism.

Ruby-throats insert their bills into flowers, feed on nectar, and in the process act as pollinators for many plants. They are especially attracted to bright red and orange blossoms. Scientists believe that some plants, including a woodland vine known as the trumpet creeper, evolved red tubular-shaped flowers to attract hummingbirds. Ruby-throats take nectar from more than 30 species of flowers, including trumpet creeper, wild bergamot, beebalm, spotted jewelweed, honeysuckle, columbine, and cardinal flower. They also enjoy many garden flowers such as petunia, salvia, and scarlet runner beans. When the structure of a plant permits it, the bird may perch while feeding; otherwise, it hovers. A hummingbird does not suck in nectar but rather the hummingbird's tongue acts as a liquid-trapping device that allows the hummingbird to feed on nectar very efficiently. Hummingbirds will also take sap from trees, visiting the rows of small holes, or sap wells, that yellow-bellied sapsuckers excavate in birches and maples. Up to 60 percent of an individual's diet may be insects, including mosquitoes, gnats, fruit flies, and small bees. Ruby-throats pluck spiders and their prey out of their webs, and glean aphids, small caterpillars, and insect eggs from the leaves and bark of trees.

When sleeping, a hummingbird retracts its neck, points its bill slightly upward, and keeps its body feathers fluffed to reduce heat loss. At times it may enter a torpid state: its temperature drops, and its metabolism slows, letting the bird get through the night, or through a cold snap, without starving.

Ruby-throats arrive in Pennsylvania in late April and May, with males preceding females by a week or two. The timing of arrival seems to coincide with the blooming of wild columbine, but the availability of flying insects and flowing

sap are probably important also. Males stake out individual territories of about a quarter of an acre and defend them vigorously against other hummingbirds, both male and female. If food sources are abundant, only 50 feet may separate two males. Male ruby-throats give a string of chipping calls from a perch in the center of their territory. Hummingbirds are solitary, and males and females get together only for courtship and mating. When confronted by a female, the male does a series of U-shaped looping dives with an arc length of feet or more (these maneuvers may be part of the male's territorial defense). Once the female perches, the male's courtship display shifts to a series of side-to-side arcs in which he shows off his colorful throat patch. Most breeding occurs in late May and June, but second broods may occur into July. Individual males may mate with several females.

The female picks a nest site, usually in a deciduous tree in a forested area, usually 10 to 40 feet above ground. Near the tip of a downward-sloping branch she constructs a platform of thistle and dandelion down, attached to the branch with spider silk. The nest often overhangs a stream, a trail, or an unimproved road. She uses more plant down for the nest's side walls, holding the material together with spider webbing or pine resin and cementing bud scales and lichens to the outside. The finished nest is a soft, flexible cup about 2 inches wide and 1.5 inches high. Some females simply refurbish old nests. The males do not participate in nest-building or provisioning either the female or the young.

The female lays two white, oval eggs (occasionally one and rarely three), each about a half inch long by a third of an inch wide and weighing 0.02 ounces. Typically, egg laying in Pennsylvania runs from May to July. The female incubates her clutch for 12 to 16 days. The altricial young are naked and dark gray in color. Their mother feeds nectar and insects by inserting her bill into that of a young bird and pumping the food into its gullet.

She broods the nestlings almost constantly, except when foraging. Young ruby-throats' eyes open after nine days, and the female ceases brooding and starts bringing them whole insects clasped in her bill. The young fledge after 18 to 22 days. The female may continue to feed them for four to seven days as they learn to forage. She may mate again and raise a second brood.

After breeding, ruby-throats start building up body fat for their long migration. An individual's weight can double before it migrates, adding up to 10 percent of its weight per day. Males may begin leaving the breeding range in early August; females and juveniles (whose plumage matches the females') may stay until late August or early September, with occasional stragglers into October or later. Ruby-throats join many other birds in migrating along ridge tops. They can be seen in good numbers when a strong cold front ushers in a north wind. Ruby-throats winter in southern Florida, Louisiana, Texas, Mexico, and Central America south to Panama. Although migratory routes are poorly documented, it is known that some ruby-throats follow the coast and that others fly nonstop across the Gulf of Mexico, a flight of nearly 600 miles over open water.

Predation probably does not account for much hummingbird mortality. Hummingbirds are preyed on by free-roaming cats, small hawks and owls, and even frogs and bass; blue jays have been known to kill and eat nestlings. Some hummingbirds get caught in spider webs. But probably more hummingbirds succumb to accidents: crashing into windows, cars, and telecommunications towers. People can help avoid hummingbird window collisions by not placing nectar feeders near windows which increases the risk of fatal window strikes. Females have been documented to live for nine years and males for five years. Higher energy demands for males defending territories on breeding grounds followed by an arduous migration may contribute to a higher mortality rate for male ruby-throats.

Habitat: Ruby-throats inhabit eastern deciduous and mixed deciduous coniferous forest. They are found in open woods, woods edges, gardens, parks, thickets, wet meadows, along streams, and orchards. They are less common in large urban areas, in dense forest tracts without streams, and in extensive agricultural areas. An abundance of flowering plants, especially beebalm and spotted jewelweed, found in floodplain forests and areas along streams offer good nesting and feeding habitat. People who enjoy hummingbirds can enhance their properties by planting native wildflowers, especially those with tubular flowers, as well as small shrubs and trees, and by developing water gardens. In the wintering range, ruby-throated hummingbirds live in a variety of forests, scrubby habitat, citrus tree groves, and gardens, but especially along forest edges and near water where they feed on nectar and insects.

Population: In Pennsylvania, the ruby-throated hummingbird breeds statewide. The population seems to be stable, but urbanization is robbing the hummingbirds of habitat in Pennsylvania and elsewhere. There are hints that hummingbirds are heading northward earlier than they did decades ago, so they are more vulnerable to bad weather events and food shortages that might occur in mid-spring when they arrive. Creating and maintaining islands of wooded habitat in the urban and suburban sprawl that are attractive to this and other popular backyard, thicket, and forest birds is important. Gardening birdwatchers should be advised of what native plant species they can provide hummingbirds on their own property. The western hummingbird species such as the rufous hummingbird (Selasphorus rufus) is an occasional visitor to Pennsylvania and other eastern states in migration and winter.

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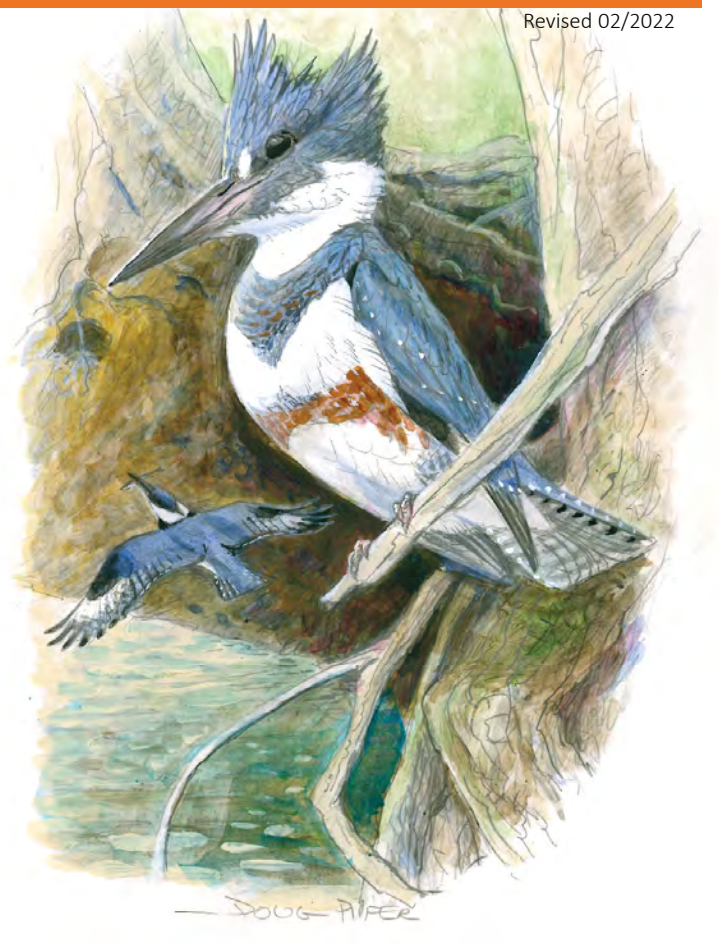
Belted Kingfisher



Boaters who paddle down streams are sometimes startled by a kingfisher. The bird takes off from its perch, sounding an alarm call that rattles down the creek's corridor. It flashes downstream, two or three strokes of its blue-gray wings, then a short glide, then more wing-pumping, sometimes skimming so low that its wingtips seem to brush the water's surface. When the bird reaches the end of its territory, it quietly loops around. The belted kingfisher, *Megaceryle alcyon*, belongs to Family Alcedinidae. Of the three kingfisher species occurring in North America, only the belted kingfisher lives north of southern Texas. Six species of kingfishers live in North and South America, and a total of 93 inhabit the globe. There are many more kinds of kingfishers in Asia, Africa, and Australia than the Americas. Australia's laughing kookaburra is a well-known member of the family. In North America, the belted kingfisher breeds from Alaska to Labrador and south to Florida, Texas, and California. Some belted kingfishers winter in the lower 48 states particularly in the South and where water remains available in northern regions. Other belted kingfisher migrate further south through Mexico, Central America, the Caribbean Islands, and northern South America.

Biology

A kingfisher has a stocky body and a large head with a ragged-looking double-pointed crest. The beak is sturdy and sharply pointed, the tail is short, and the feet appear to be absurdly small. Adults are 11 to 14 inches in length and weigh 5 to 6 ounces. The white neck ring and breast stand out against the blue-gray body plumage. The female has a belt of rusty feathers adorning her sides and breast, which the male lacks.

Kingfishers live along the banks of streams, rivers, and lakes, where they catch fish near the surface or in shallow water. They mainly take fish that are 4 or 5 inches long or shorter. Kingfishers hunt from perches—branches, utility wires, pilings, and bridge-supports—or hover above the water while scanning for prey. A kingfisher dives into the water with its eyes closed and uses its bill to grab its prey. After catching a fish, the bird flies back to its perch, stuns the fish by whacking it against the perch, and swallows it headfirst. Kingfishers take whatever types of fish inhabit a given waterway, from bullheads to sticklebacks to trout. When heavy rains make stream waters cloudy, kingfishers may turn to crayfish.

They also eat mollusks, insects, reptiles, amphibians, and the occasional small bird or mammal. After feeding, adult kingfishers regurgitate a small pellet composed of indigestible matter such as bones and fish scales. These expelled pellets may accumulate below a fishing or roosting perch.

People often hear these alert birds before seeing them. The rattle call is given freely, both as an alarm signal and during territorial disputes. Mated pairs use a softer version of the same call to communicate with each other. Kingfishers become active just before sunrise, when they forage and patrol their territories. They do most of their feeding between 7 a.m. and 10 a.m. and are less active during midday. At night they roost in trees. Kingfishers are solitary except when breeding. Both males and females defend individual territories, calling stridently and flying at and attacking intruding kingfishers. A territory may include 1,000 yards of stream or lake bank.

In spring, migrating kingfishers return to Pennsylvania as early as the first two weeks of March with a peak usually occurring from the first to third week of April (others may have stayed

through the winter, if streams did not freeze over). The male establishes and defends a breeding territory. Once a female is attracted and the two pair up, she also defends the territory. During courtship, the male feeds the female. After mating, the male, followed by the female, may soar and then dip close to the surface of the water. Most breeding activity occurs from early May to early June.

Kingfishers nest in burrows that they dig into steep earthen banks above streams, in road cuts, and in sand and gravel pits. Often the burrows are a few feet below the top of the bank, where topsoil gives way to sandier subsoil. Burrows are usually near or along the water, but occasionally they are a mile or farther away. Both birds excavate the burrow, a task that may take three days to two weeks. The tunnel is 3 to 4 inches in diameter, slopes upward, extends a yard or two into the bank, and ends in an unlined chamber 8 to 12 inches across and 6 to 7 inches high. Before entering, an adult will land on a convenient perch, give the rattle call, and fly straight into the burrow opening. To tell whether a burrow is in use, look for twin grooves on the outer lip made by the kingfishers' feet.

On the dirt floor of the nest chamber the female lays five to eight white eggs. Both sexes incubate the clutch, with the female incubating at night. The eggs hatch after about 24 days. The young are altricial; they have pink flesh, and their eyes are shut. The female broods them continuously for three to four days after hatching. The adults regurgitate fish to the young. As the hatchlings grow and strengthen, the adults begin bringing them whole fish as frequently as once every 20 minutes. After defecating, the young use their bills to peck or scratch at the nest chamber's walls, so that dirt covers their waste. When the young reach two weeks old, they crawl from the nest chamber into the burrow. They leave the nest four weeks after hatching; the parents hold fish in their bills, sit on a nearby perch, and coax the young into flying from the entry. The adults feed the fledglings for about three weeks as the young learn how to take crayfish, aquatic insects, and fish. Parents may teach their offspring to dive by dropping insects into the water beneath the fledgling's perch.

Skunks, minks, raccoons, and black rat snakes kill some young in the nest. After they fledge, juveniles are vulnerable to hawks. Kingfishers escape from predators by diving into the water. Individuals breed during their first year after hatching. In the northern parts of its range, belted kingfisher raise one brood per year. After the mating season, pairs break up and individuals settle on and defend smaller territories. Autumn migration is not clearly defined as many belted kingfisher remain in Pennsylvania into mid-December. Most birds in the Northeast are partial migrants, able to survive winter temperatures if streams stay unfrozen so that the birds can find fish. When migrating, kingfishers tend to follow rivers, lake shores, and coastlines.

Habitat

Kingfishers inhabit streams, rivers, ponds, lakes, and estuaries. Individual territories often center on stream riffles, which are good fishing spots. Kingfishers prefer open running water that is not turbid. On lakes they use sheltered coves and shallow bays. For nesting they require earthen banks where burrows can be excavated. During breeding, kingfishers are sensitive to disturbance by humans and may desert an area if bothered too frequently. In winter they resort to rocky coastlines, swamps, brackish lagoons, oxbows, bayous, and shores of rivers and reservoirs.

Population

Pennsylvania is veined with streams, and kingfishers are widely distributed across the state. Breeding Bird Atlas projects found kingfishers to be absent from places such as southern Clearfield County and the surrounding areas, where acid mine drainage has polluted long sections of waterways. Good quality riparian habitat is very important to the belted kingfisher. It also requires steep dirt banks for nesting. Flooding and erosion of embankments destroy valuable nest sites. Biologists believe that breeding densities reflect the availability of suitable nesting sites.

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Woodpeckers

A drumroll at dawn, a bird in undulating flight through the forest, wood chips littering the ground at the base of a tree—all of these signal the presence of a woodpecker, a highly specialized and important member of nature's complex world.

Woodpeckers have been around for a long time, their fossil remains date back 25 million years to the Lower Miocene and they're widely distributed, with 45 species in the U.S. and more than 200 worldwide. Seven breeding species occur in Pennsylvania and one, the black-backed woodpecker (*Picoides arcticus*) of northern boreal forests, is an occasional visitor in winter. The red-headed woodpecker (*Melanerpes erythrocephalus*), red-bellied woodpecker (*Melanerpes carolinus*), yellow-bellied sapsucker (*Sphyrapicus varius)*, downy woodpecker (*Picoides pubescens*), hairy woodpecker (*Picoides villosus*), northern flicker (*Colaptes auratus*) and pileated woodpecker (*Dryocopus pileatus*) are residents.

The woodpecker family, Picidae, fills a unique niche in the food-gathering chain. Woodpeckers drill into trees to uncover insect food, to create nesting shelters and to communicate with other woodpeckers. A number of body adaptations make this drilling possible.

A woodpecker has a sharp, stout bill with a chisel-like tip for chipping and digging into tree trunks and branches. In pecking out wood, the bird aims blows from alternating directions, much like a woodchopper does. Bones between the beak and the unusually thick skull are not as rigidly joined as they are in other birds. Spongy, shock-absorbing tissues connect these flexible joints; strong neck muscles provide force for drilling; and bristly feathers shield the nostrils from dust and wood chips. Eyes are also protected from flying debris by a thickened nictitating membrane which closes with each strike.

The tongue of most woodpecker species is elongated, covered in sticky saliva and rich in tactile cells. The tip is pointed and barbed. After chopping exposes a woodborer's cavity, the long, flexible tongue probes the crevice and grasps whatever insect or grub happens to be inside. The tongue is nearly twice as long as its bird's head and winds around the inside back of the skull when retracted.

yellow-bellied sapsucker

To grip trees, a woodpecker has short, muscular legs and sharply clawed feet. On most species, first and fourth toes are paired facing backward and second and third toes face forward. These zygodactyl feet are excellent for clinging to and climbing trunks of trees. Stiff, pointed tail feathers catch on the rough bark to brace the hammering body. During molt, the two middle tail feathers (the strongest ones) do not fall out until the other 10 have been replaced and can support the bird's weight.

A woodpecker's flight is undulating. The bird usually launches off the side of a tree, pumps its wings four or five strokes, and folds them against its body. During this short pause, the bird loses a few feet of altitude. Then more wing beats, another pause, and so on.

Woodpeckers feed mainly on wood-boring grubs, insects, insect eggs and pupae found in dead and living trees. They also consume sap, nuts, and fruits of some trees and shrubs. Hollow sounds that echo from the woodpecker's tapping probably signal the location of a wood borer's channel and the bird can drill up to 100 strokes per minute to uncover the morsel. Even in winter they have no trouble locating insects.

Most woodpeckers “drum” on resonant limbs and hollow tree trunks. They occasionally utilize drainpipes, garbage can lids or tin roofs for drumming. Drumming designates territory and can attract a mate. Soft tapping may be a type of communication between mates, or between parents and offspring.

Courtship and nesting habits are essentially alike in all woodpeckers. Much of the rivalry between males is confined to noisy, chattering pursuit. After pair formation, both sexes excavate a nest cavity in a branch or tree trunk. The female usually lays the white, unmarked eggs directly on wood chips left in the bottom of the cavity. Both sexes incubate, with the more aggressive male often staying on the eggs overnight. Young are altricial; for two to three weeks they remain in the nest and are fed predigested food by their parents. In southeastern states, woodpeckers may raise two broods.

Woodpeckers have definite economic importance. They do punch holes in trees, but rarely in healthy ones. By stripping the bark from a dead or dying tree and cleaning up the resident wood borers or carpenter ants, they prevent these pests from spreading to nearby healthy trees. Adversely, woodpeckers sometimes damage utility and other poles.

Woodpecker holes provide many cavity nesting bird species and other wildlife with nesting sites and den sites. Animals that benefit from woodpecker excavations include screech owls, eastern bluebirds, tree swallows, nuthatches, chickadees, American kestrels, red and gray squirrels and flying squirrels.

The Pennsylvania Game Commission manages state game land woodlots and forests to favor woodpeckers and other wildlife species. Game Commission foresters survey tracts scheduled for timber cutting and mark and leave a proportion of food-bearing trees and shrubs, as well as “wolf” trees (older trees, often dying, which do not make good lumber). Wolf trees have many limbs and cavities that provide shelter and nesting space for wildlife.

red-headed woodpecker

Red-headed Woodpecker *(Melanerpes erythrocephalus)* - Length, 8 to 9 inches; wingspread, 16 to 18 inches. The red-headed woodpecker is one of the most striking birds found in Pennsylvania. The head of an adult of this species is scarlet, and that of a juvenile, brown. Body plumage is strikingly patterned black and white, with white underparts, a black tail and mostly black wings with contrasting white secondary feathers and a white rump. This white area is especially conspicuous when the bird flies. Like the flicker, the red-headed woodpecker does a lot of feeding on the ground but is an expert flycatcher, snatching insects in flight. It eats beetles, cicadas, bees, ants, grasshoppers, caterpillars and other insects. The red-headed woodpecker is highly omnivorous with about two-thirds of its diet consisting of plant matter including acorns, beech nuts, corn, seeds, wild and cultivated fruits and berries. Redheads store food in tree cavities during winter. They wedge nuts, seeds or insects, including live grasshoppers, into cracks and crevices or under bark and are known to cover their cache with wood and bark pieces. They defend these food caches against squirrels and other birds and are highly dependent on a cached acorn supply during winter. Habitat is open forest and woodland with the important components of dead and dying trees and limbs, nut-producing trees and open areas to forage for flying insects. Red-headed woodpecker habitat can be found in farm woodlots, oak or beech groves, orchards, river bottoms, forest edges, beaver swamps, burned-over forests, towns, golf courses, hedgerows, and parks. This bird often perches in the open. Its habit of flying low from tree to tree may make it vulnerable to collisions with vehicles. Nest: 8 to 80 feet up, often in an oak and occasionally in a fencepost or utility pole. Eggs: 3 to 10, usually five, with a 12- to 14-day incubation period. In spring, the redhead is an uncommon migrant in late April and early May; in summer, a breeding resident; in fall, an uncommon migrant from September to early November: and a winter resident. Call is a raucous *tchur*.

The red-headed woodpecker has declined range-wide at an average of 2.7% per year between 1966 and 2010, as measured by Breeding Bird Surveys. It is designated as Vulnerable by the Pennsylvania Biological Survey and Near Threatened by the International Union for Conservation of Nature (IUCN). In Pennsylvania, there was a decline of 46% in the number of blocks recording red-headed woodpeckers between the first Breeding Bird Atlas (1983-89) and the second Atlas (2004-09). Its range contracted from the northern half of the state with the exception of the northwest counties. It is most abundant in southcentral counties near the Mason-Dixon Line.

Yellow-bellied Sapsucker *(Sphyrapicus varius)* - Length, 7 to 8 inches; wingspread, 14 inches. The plumage varies within the species, but the narrow longitudinal white wing stripes—visible when the bird is at rest—and the finely mottled back are good field marks. (The back coloration blends well with tree bark.) The belly is tinged a pale yellow, and the head has bold black and white marks with a red crown and throat; females lack the red throat. Sapsuckers drill parallel rows of holes in live trees (up to 30 holes per day) and return later to drink sap and catch small insects attracted to the sweet liquid. The bushy tongue of a sapsucker effectively soaks up sap. Other foods include beetles, ants, caterpillars, insect eggs, spiders; the cambium (layer beneath the bark) of maple, aspen, serviceberry, birch, fir, hickory, beech, pine, oak and other trees; fruits and seeds.

Sapsuckers inhabit second growth deciduous (particularly northern hardwood) and mixed conifer forests. They are found in open woodland, forest edges, orchards, and woodlots. In Pennsylvania, they occur across the northern tier and in scattered mountainous areas in the southern two-thirds of the state. This species has increased dramatically throughout the last few decades and now is the most common nesting woodpecker in many northern woods of the state. Nest: a gourd-shaped cavity excavated 8 to 40 feet up a tree; aspen, red maple and other softer woods and trees afflicted with tinder fungus are often chosen as nest sites, because the fungus creates a soft center that is easily dug out. Eggs: 4 to 7, usually five or six, with a 12- to 13-day incubation period. The sapsucker is the most migratory of Pennsylvania's woodpeckers. In spring, it is a common April migrant; in summer, a rare breeding resident (breeds mainly across the northern U.S. and southern Canada); in fall, a common migrant in September and October; and in winter a rare resident, as most individuals move further south. Immature sapsuckers are the most likely winter visitors, often found in Christmas Bird Counts or backyard surveys. Call is a jay-like mewing note. Also, sapsuckers tap in a distinctive rhythm, two or three series per minute, more of a tapping than the typical drumming of other species.

downy woodpecker

Downy Woodpecker *(Picoides pubescens)* - Length, 5 to 6 inches; wingspread, up to 11½ inches. The downy, the most common of the eastern woodpeckers and the smallest of North American woodpeckers, resembles a small hairy woodpecker, with a similar white back stripe and white breast. The male has a red patch on the back of his head, similar to that on the hairy. Bill length of the downy is less than the depth of its head, short and chisel-like, while that of the hairy is equal to or greater than the depth of its head with a much heavier appearance. The downy's outer tail feathers are barred with black (in the hairy woodpecker, these are solid white). Food: wood-boring larvae, moths, beetles, ants, aphids, spiders, poison ivy and dogwood fruits, berries, corn, apples, and acorns. The downy woodpecker forages trees and limbs but will also forage woody weeds and shrubs for insects. The habitat for this smallest of Pennsylvania's woodpeckers is open forests of mixed growth, orchards, suburbs, urban woodlots and parks. Nests are usually dug in rotting wood, 3 to 50 feet above the ground and often on the underside of an exposed limb. Eggs: 3 to 6, usually four or five, incubated 12 days. The downy woodpecker is a common resident in all seasons. In winter, it can often be found in fields with dried corn stalks or visiting suet feeders. Calls: a soft *pik* and a rattling sound that starts slowly and speeds up at the end, trailing off. The drumming sound is slower than the hairy woodpecker, slow enough to be able to count the taps.

Hairy Woodpecker *(Picoides villosus)* - Length, 7 to 10 inches; wingspread, 15 inches. The hairy woodpecker looks like a downy woodpecker on steroids, being about the size of a starling. This woodpecker has a vertical white stripe down the center of its back, black wings stippled with white on the upper sides, white feathers forming the outer edge of the tail, and white breast. Sexes are similar, but the female lacks the male's small red patch on the back of the head. Larger size and a proportionately longer, heavier bill distinguish it from the downy woodpecker. The hairy eats mostly insects and prefers wood-boring beetle larvae, ants, caterpillars, bark beetles and moth pupae. It also dines on spiders, caterpillars, bees, wasps and millipedes; also seeds and fruits and backyard suet and seed feeders. Primary habitat is forest land with a preference for large tracts of forest with mature trees, deciduous or conifer. It is more likely found in extensive mature forests than its smaller relative, the downy woodpecker. They may be found in wooded swamps and

hairy woodpecker

around beaver ponds, woodlots and wooded parks, suburbs and cemeteries. Nest: 5 to 30 feet up with an inch-and-a-half wide hole leading to an 8 to 12-inch deep cavity; the male may also dig a roosting cavity. Eggs: 3 to 6, commonly 4, with a 12-day incubation period. The hairy woodpecker is found throughout much of North America to northern Canada from Alaska to Newfoundland and south through parts of Mexico to Central America.; in Pennsylvania, it is a fairly common year-round resident. The contact call of a hairy woodpecker, a loud *keek*, is actually higher pitched than the downy woodpecker's call note, and its rattling call is a rolling series of notes on one pitch and does not trail off at the end as does the rattle call of its smaller relative.

Northern Flicker *(Colaptes auratus)* - Length, 11 to 12 inches; wingspread up to 20 inches (about the size of a blue jay). Flickers, also known as yellow hammers, have brown backs, no white on the wings, a prominent black band high on the breast, and bright red on the nape of the neck. This often is the bird reported by people who do not realize that it is a woodpecker because it does not have a black-and-white plumage like other woodpeckers. The eastern populations of northern flicker is known as "yellow-shafted" flicker because of the color of its wing feather shafts which translate into prominent yellow underwing markings. In flight, the white rump patch and yellow underwings are very prominent. The male has a black "mustache" mark extending from the bill back onto the throat. Flickers are often seen on the ground or on sidewalks eating ants, a preferred food. Their saliva neutralizes the formic acid which ants contain. They also eat beetles, grasshoppers, crickets, flies, moths, butterflies and snails. In fall and winter, they eat poison ivy fruits, dogwood berries, wild cherries, berries, corn, and staghorn sumac seeds. Favored habitat is open woodlands and forest edges, orchards, woodlots, and yards or fields with scattered trees. They can often be found in timbered areas where there are some snags and large trees remaining. The nest is a hole opening into a cavity, generally 6 to 15 feet up a tree, sometimes higher. The cavity takes up to two weeks to build. Flickers also will use nest boxes that are the same size those built for screech owls or wood ducks. Eggs: usually 5 to 8, with an 11- to 13-day incubation period. Aggressive European starlings *(Sturnus vulgaris)* may drive flickers out of their newly-dug cavities. According to Breeding Bird Surveys since the mid-1900s, the northern flicker is in significant decline in eastern North America including Pennsylvania. Researchers believe loss of habitat is a contributing factor for the declines, but there may be other unknown forces at play. Flickers are considered "partial migrants" because some persist in the winter and some may not migrate very far from their nesting grounds. In spring, flickers are common migrants from late March through April; in summer, breeding residents. They breed across North America from Alaska to Newfoundland south to the Gulf States and into areas of Mexico and Central America. In fall, flickers are common September or October migrants; and in winter, rare to locally common residents.

northern flicker

Flickers winter principally in the southern U.S. Call: a loud *flick* or *flicker*, 2 to 7 times per minute; also a shrill, descending *kee-oo*. The *flicker* or *wicka* call gives this woodpecker its name. Their drumming and calling can be particularly prominent because they often choose snags and trees out in the open for their displays and vocalizations.

Pileated Woodpecker *(Dryocopus pileatus)* - Length, 16 to 19 inches; wingspread, up to 29 inches; crow-size but with a long, slender neck. The pileated woodpecker is the largest American woodpecker next to the likely extinct and somewhat similar-looking ivory-billed woodpecker. It is a spectacular bird that is especially easy to notice in winter and early spring during its courtship. A pileated woodpecker has a solid black back and tail and a conspicuous red crest for which it is named (from the Latin word for cap, pilleus). The female is similar to the male but does not have red cheek patches and has less red in the crest. Flight is strong, with irregular wing flapping accompanied by white flashing of wing undersurfaces. Foods include primarily wood-dwelling ants and beetles, wood-boring larvae and wild nuts and fruits such as sassafras, sumac and dogwood berries, greenbriers, spicebush, blackberries and elderberries. Pileated woodpeckers inhabit mature deciduous forests or mixed deciduous-coniferous forest. Suitable forest habitat must include large trees for nesting cavities. In recent decades, it is increasingly more likely to see a pileated woodpecker flying across an open landscape to forage in a hedgerow or woodlot distant from a large forest block. Pairs stay on and defend the same territory year round. Nest: a new hole excavated each year in the same nest area, 15 to 70 feet high in a tree (average 45 feet). The entrance hole is usually oval, and the cavity is 10 to 24 inches deep. Eggs: 3 to 5, incubated 18 days. These birds are uncommon residents in all seasons. They do not migrate but breed throughout forested areas of the eastern U.S., in regions of the Midwest and western U.S. and across southern Canada. A pileated's powerful beak can break loose fist-sized chunks of wood; the bird twists its head and beak as it strikes to add leverage. Pileateds cut large rectangular holes in standing dead trees as well as fallen logs exposing the tunnels of insect prey. They drum loudly and rapidly, then more slowly, trailing off softly at the end. Call: *cuk-cuk-cuk-cuk-cuk*, in a series; also *wuk-wuk-wuk-wuk-wuk*.

Because of their large and extensive excavations, pileated woodpeckers provide nesting and roosting cavities for a host of species including owls, ducks, swifts, kestrels, squirrels, and bats.

pileated woodpecker

Revised 02/2022

Flycatchers

The tyrant flycatchers, Family Tyrannidae, are found only in the New World. The family name stems from the aggressive, almost tyrannical, behavior of some of the birds in this large group of more than 400 species, most of which live in the tropics. Pennsylvania has 10 regularly observed species. Flycatchers are often hard to identify, even for veteran birdwatchers; since the birds are often drab (the sexes are colored alike) and tend to stay among thick foliage, they are more easily distinguished by their vocalizations. Flycatchers are perching birds, members of Order Passeriformes, whose feet have three toes pointing forward and one toe pointing backward, letting them perch easily on branches.

Flycatchers catch and eat flies and many other insects, particularly flying ants, bees, and wasps. In forested areas large flycatchers may specialize in larger insects, medium-sized flycatchers may take slightly smaller prey, and small flycatchers may zero in on the smallest insects. Such feeding stratification reduces competition and lets several species use the same area. Flycatchers also forage somewhat differently, some hawking their insect prey mid-air while others glean their prey from vegetation. Also, different species prefer subtly different habitats, with varying amounts and densities of undergrowth and degrees of canopy shading.

When foraging, a flycatcher sits upright on a perch, scanning its surroundings while waiting for an insect to approach. The bird darts out in swift, maneuverable flight, snatches an insect out of the air or from vegetation with its beak, and eats it on the spot or returns to a perch to eat the meal. Several adaptations help a flycatcher catch insects. Its drab plumage makes the waiting bird hard to see (not just by its prey, but also by hawks that hunt for flycatchers and other small birds). The bill is flat and wide, suggesting somewhat the bills of swallows and nightjars, although not nearly so compressed or gaping. Bristles at the corner of the mouth may function as "feelers," letting a flycatcher make last-second adjustments before snapping its bill shut on prey. Keen eyesight lets a flycatcher spot insects and judge distances accurately. In addition to catching insects on the wing, flycatchers sometimes hover near foliage and pick off insects and spiders clinging to the vegetation. Some species land and catch prey on the ground. Most of Pennsylvania's flycatchers occasionally eat berries and seeds.

Of the state's nine breeding species, most build open cup nests anchored to small branches of trees and shrubs. One, the yellow bellied flycatcher, builds an enclosed nest on the ground. The familiar eastern phoebe plasters its nest against a rock wall or on a building rafter. And the great crested flycatcher uses a tree cavity. In most cases, the female does

most or all of the incubating, while the male defends the nesting territory and helps feed the young.

Flycatchers advertise their home territories using their voices; some employ a special "dawn song" given just before sunrise and rarely sing later in the day. Because many flycatchers are so similar in appearance, individuals probably recognize their own species by sound. There is evidence that the distinctive vocalizations of each species are innate, unlike most other birds, which learn to sing by listening to adults of their kind.

As insect eaters, flycatchers must vacate northern breeding areas in winter. They migrate at night. The various species winter in open and forested habitats along the Gulf Coast, on the Caribbean Islands, and in Central and South America. In South America, an estimated 10 percent of all birds belong to the tyrant flycatcher family. In much of their wintering range, flycatchers are vulnerable to habitat loss and fragmentation as large forested tracts are logged or converted to agriculture.

Olive-sided Flycatcher *(Contopus cooperi)*

Although once fairly common in Pennsylvania, this species has not been confirmed nesting in the state for more than 80 years. Its white throat and breast contrast with dark olive sides. A fairly large (7 to 8 inches long), big-headed flycatcher, the olive-sided inhabits cool coniferous forests, generally near water. The male sounds a repetitive *pip-pip-pip*, plus a song that has been rendered as *hic-three-beers*. Individuals sit high in dead snags or branches, sally forth to catch prey (mainly wasps, winged ants, and bees) and return to the perch to eat. Olive-sided flycatchers place their cup-shaped nests in trees 5 to 70 feet above the ground, among dense twigs or needles; three young are usual. The main breeding range is in Canada. The species migrates north through Pennsylvania as late as mid-June and leaves again in mid-August, to winter in the rainforests of South America. This long-range migration, tendency to sit erectly in the open, and its assertive demeanor has earned it the nickname "peregrine of flycatchers."

eastern wood-pewee

Eastern Wood-pewee *(Contopus virens)*

The eastern wood-pewee breeds throughout eastern North America from southern Canada to the Gulf of Mexico. It is found in all counties in Pennsylvania. To locate this drab, olive-gray, sparrow-size bird, listen for the male's namesake call—*pee-o-wee*—which is given throughout the day but particularly at dawn and dusk. Pewees use almost every woodland habitat, including woodlots, woods edges, mature forests (both deciduous and mixed), parks, and urban areas with shade trees. They perch in one place for an extended period, flying out to snag passing insects; one study found an average perching height of 35 feet above the ground. Pewees eat flies, beetles, small wasps, and moths. They also consume elderberries, blackberries, and fruits of dogwood and pokeweed.

Males defend breeding territories of 2 to 6 acres. Pairs begin nesting in late May. The nest is a compact cup woven of plant matter, hairs, and spider silk; its outer surfaces studded with lichens; it looks like a larger version of the ruby throated hummingbird's nest. The three eggs are incubated by the female and hatch after 12 or 13 days. Both parents feed the young, who make their first flights at 14 to 18 days. Blue jays are major predators, taking both eggs and young. Most perching birds stop singing regularly in late summer, but male wood-pewees keep up their chanting until the autumn migration. The species departs from Penn's Woods in August and September, with a few individuals hanging on until October. Wood-pewees winter in the tropics from Panama to Bolivia, in shrubby woods and along forest edges.

Yellow-bellied, Acadian, Alder, Willow, and Least flycatchers

These small, feisty flycatchers (around 5 inches in length) have olive-colored backs and heads, pale breasts, and pale eye rings and wingbars. They spend much of the day hunting from a perch. When sitting, they occasionally flip their tails up and down. Unlike pewees and phoebes, *Empidonax* flycatchers generally catch their prey by sallying to vegetation and gleaning the insect from a branch or leaf. So, *Empidonax* flycatchers are associated with well-vegetated habitats. Extremely difficult to identify in the field, they are usually distinguished by voice and habitat.

Yellow-bellied Flycatcher *(Empidonax flaviventris)*

The yellow-bellied flycatcher lives in the deep shade of coniferous woods and cold bogs. A shy and extremely rare nesting bird in Pennsylvania, it inhabits remote conifer forests and wetlands in a scattering of Pennsylvania's northern counties. The male's advertising song is a brief *killik* or *che-bunk* while its contact call is a quiet, ascending *chu-wee*, similar to the calls of the eastern wood-pewee. The cup-shaped nest is built of roots and mosses and is hidden on or near the ground, in a cavity among the roots of a fallen tree,

in a hummock of sphagnum moss, or at the base of a conifer or fern clump. The species nests mainly in Canada, as far west as central Alaska, with all individuals apparently migrating through the East. Yellow-bellied flycatchers winter in the forests of Middle America from northeastern Mexico south into Panama.

The Acadian Flycatcher *(Empidonax virescens)*

The Acadian flycatcher nests mainly in the Southeast. Pennsylvania is near the northern limit of its range. The type, or first, example of the species was discovered near Philadelphia in 1807 by the Scottish-born ornithologist Alexander Wilson who is considered the father of American ornithology. The species is misnamed, since it does not inhabit Acadia, the former French colony centered on Nova Scotia. The Acadian flycatcher lives in moist woods near streams and requires large areas of contiguous forest. The male sounds a low, sharp *spit-chee!*

The Acadian often chooses a beech tree in which to build its frail, hammock-like nest. Stems and grasses dangle from the nest, giving it an unkempt appearance. In the northern part of their range, they are strongly associated with hemlock trees. Acadian flycatchers winter in the rainforests of Central America and northwestern South America, where they sometimes follow mass movements of army ants and prey on insects set to flight by the creeping columns.

Alder Flycatcher *(Empidonax alnorum)* & Willow Flycatcher *(Empidonax traillii)*

The alder flycatcher and the willow flycatcher were, until the 1970s, considered to be one species: Traill's flycatcher (named by John James Audubon for Dr. Thomas Traill, one of his supporters). However, the two species have different voices, use slightly different habitats, build different kinds of nests, and are reproductively isolated. The alder sings burry descending *fe-bay-o* and the willow sneezy, ascending *fitz-bew*. The call notes also are different with the alder flycatchers keeping contact with a low, flat *pip* call while willow flycatcher's contact call is a bright upslurred *wit*. Both species will sing and call after dusk. The alder builds a loose cup nest, usually within a few feet of the ground, while the willow flycatcher's nest is compact and woven of fine materials, and often built higher above ground. Both alder and willow flycatchers nest in thickets of willows, alders, and other shrubs, but the willow flycatcher tends to use drier, more open areas than the alder flycatcher. In Pennsylvania, alder flycatchers nest mainly in the north and at higher elevations, while willow flycatchers nest statewide, with the fewest records coming from the northcentral region. The willow flycatcher is often associated with old fields and riparian shrubs while alder flycatchers are more strongly associated with wetlands and timbered areas at higher elevations.

Least Flycatcher *(Empidonax minimus)*

The least flycatcher is the smallest of the eastern *Empidonax* flycatchers and probably the most common. It lives along woodland edges and often perches in the open. The male calls out an emphatic *chebeck!*, accented on the second syllable and repeated incessantly. The pair keeps contact with a *wit* call note. The least flycatcher eats small wasps, winged ants, midges, flies, beetles, caterpillars, grasshoppers, spiders, and berries. The species sometimes nests in loose colonies with many acres of good habitat surrounding the cluster unoccupied. The nest, a neat cup, is usually placed in a vertical fork of a branch in a small tree or sapling. The three to five eggs are incubated for 13 to 15 days. The least flycatcher's breeding range stretches from western Canada to Nova Scotia and south in the Appalachians to Tennessee and North Carolina. The least flycatcher is fairly common across much of Pennsylvania, except for the southeast, where it is absent. In autumn, adults migrate ahead of juveniles to wintering grounds in Mexico and Central America.

Eastern Phoebe *(Sayornis phoebe)*

In the old days, this familiar barnyard and yard bird was commonly called "bridge peewee" for one of its favorite haunts. Anyone who has spent time at a woodland cabin or farmhouse has probably come to know this jaunty medium size (6.5 to 7 inches) flycatcher. This gray-brown flycatcher is very plain in appearance with no coloring or plumage features like wingbars or eye-rings, but they make up for plain plumage with an engaging personality. They can be very familiar with humans, sitting close to homes and other buildings. Phoebes breed statewide in Pennsylvania, except in heavily urbanized

eastern phoebe

areas. They eat a variety of insects, including small wasps, bees, beetles, flies, and moths. They often take prey from vegetation and from the ground, and they eat seeds and berries. The female builds a nest out of mud, moss, leaves, grass, and hair, tucking the cup-shaped structure into a sheltered spot beneath a rock ledge, against a stone wall, on a bridge beam or barn or porch support. A pair may use the same nest several years in a row.

The eastern phoebe is the hardiest of Pennsylvania's tyrant flycatchers, arriving on their northern nesting ground in March. They are truly an appropriate harbinger of spring since they are entirely insectivorous, feeding almost exclusively on flying insects.

They announce themselves with repeated *fee-bee* calls and their characteristic up-and-down tail flicking.

The female lays four or five eggs and incubates them for around 16 days. Both parents feed the nestlings, which fledge some 16 days after hatching. Eastern phoebes typically rear two broods per summer. They often nest within a few feet of American robins, and each species tolerates the other's presence; perhaps there is little overlap in the foods they eat. In the Northeast, populations have risen since settlement, with phoebes taking advantage of nest sites created by human construction. The species winters in the Gulf states and Mexico with a few lingering in the North each winter in protected areas.

great crested flycatcher

Great Crested Flycatcher *(Myiarchus crinitis)*

Pennsylvania's largest (8 to 9 inches) flycatcher, the great crested, sports a yellow belly, a gray breast, and rusty red tail and wing feathers. When agitated, individuals erect a head crest. The species breeds in mature woods throughout Pennsylvania and eastern North America and can also be found in wooded suburbs, farm woodlots, and orchards. Great crested flycatchers feed among the treetops, hopping from limb to limb and snapping up caterpillars, katydids, crickets, beetles, and spiders, and by flapping out into openings and clearings to take moths, butterflies, beetles, bees, and wasps. In late summer and fall, many wild fruits are eaten.

The call is a loud, insistent *wheep!* Great crested flycatchers defend their territories against intrusions by squirrels and other birds. They nest in tree cavities, including old woodpecker holes, as well as hollow fenceposts and artificial nesting boxes. (One nest was even found in the barrel of a cannon in Gettysburg National Military Park.) Both male and female bring in grass, weeds, bark strips, rootlets, and feathers, often building up this cushion as high as the entry hole. They have the curious habit of placing a shed snakeskin or scrap of cellophane among the nest material; some ornithologists speculate that the crinkly foreign matter may deter nest predators. This cavity-nesting bird will use a nest box placed in a wooded area. Great crested flycatchers depart from Pennsylvania in September en route to wintering grounds in southern Florida and from Mexico to Colombia.

Eastern Kingbird *(Tyrannus tyrannus)*

This bold, aggressive flycatcher breeds in open country across North America. Look for kingbirds in scattered trees along roads and streams, orchards, fencerows, and forest clearings. The bird gets its name because it dominates other birds, including many larger than itself, driving them away from its territory. Of all the flycatchers, kingbirds are among the easiest to locate and observe. They are about 8 inches long and are dark gray and white, with a white-tipped tail and a small red streak on the head. Roger Tory Peterson describes the species' call as "a rapid sputter of nervous bickering notes." Kingbirds feed on beetles, wasps, bees, winged ants, grasshoppers, honeybees, and many other insects.

Kingbirds often attack crows, hawks, and owls, flying high in the air, getting above the larger birds, and diving at them repeatedly. After driving off an adversary, a kingbird may perform a display known as "tumble flight," in which it glides

back to the earth in stages, sometimes tumbling in midair. After mating, the female does not let the male help her build the nest and may actually drive him away until after the eggs hatch. The nest is a bulky cup 7 to 30 feet up in a shrub, tree, or snag. The two to five eggs hatch after 16 days. Both parents feed the nestlings, which can fly after around 17 days; they may be fed by their parents for a month after fledging, with family members sounding rapid *kitterkitter* calls back and forth. Kingbirds have a very different lifestyle on their wintering range in South America, where they coexist in flocks and switch to a diet of berries.

eastern kingbird

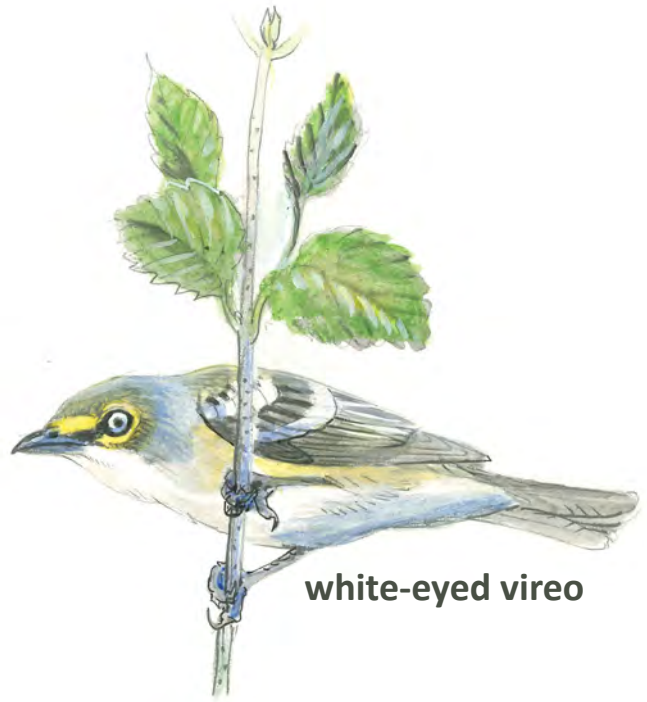
Revised 03/2022

Vireos

The more than 50 species of vireos (family Vireonidae) live only in the New World. Medium size (about 5 to 6 inches long) and olive or gray in color, they keep mainly to the treetops and are heard—thanks to the males' incessant singing—more frequently than they are seen. Five species breed in Pennsylvania, including the red-eyed vireo, perhaps the most abundant bird of mature hardwood forests in the Northeast. Another species, the Philadelphia vireo, migrates through Pennsylvania. The word vireo comes from Latin and means “green bird.” Although superficially closer in appearance to wood-warblers, vireos are actually more closely related to shrikes and crows. Vireos typically are stockier and more slowly moving than wood-warblers, pausing for periods while they forage in trees. They all have a heavy, slightly hooked bill.

Vireos feed mainly in the upper and mid-level canopies of mature trees and understory shrubs. They glean insect prey while walking along or hopping among branches, hovering near leaf surfaces, making short flights, and inspecting furrows. Vireos also eat berries, especially in fall and winter. The best time to look (and to listen) for them is in early spring, after migratory birds have arrived and before the leaves come out fully. During breeding season males sing throughout the day, even during hot noon hours, and they keep on singing into late summer after most other birds have quieted. Their nests are delicately woven pouches that hang from a fork of a horizontal limb.

Vireos breed in May, June, and July. Males perform stylized posturings in front of prospective mates. They may spread their tails and fluff up their feathers while weaving their bodies from side to side or up and down; both males and females may flutter their wings. Pairs are thought to be monogamous. They nest among the foliage of trees and shrubs. The typical nest is a cup made out of plant matter held together by spider or caterpillar silk, hanging hammock-like in the fork between two twigs. In most species, the sexes share in building the nest. Vireos' eggs are white to creamy-colored, marked with brown or black spots. The usual clutch is three to five, with an average of four eggs. Both parents share in incubating the eggs and bringing food to the nestlings. In Pennsylvania, most vireos rear one brood per summer. Brown-headed cowbirds heavily parasitize many vireos, which may be contributing to recent population declines. Fragmented forests in the Northeast may give cowbirds better access to vireos' nests. Several vireo species also face problems on their wintering ranges in Central and South America, where thousands of acres of tropical forest have been logged. Vireos are preyed on by accipiter hawks.



white-eyed vireo

White-eyed Vireo (*Vireo griseus*)

This smallish vireo sings *chick-oh-oerweeoh-chick*. The sharp notes at the couplet's beginning and end are distinctive among vireos. The bird has yellowish eye-rings and white eyes. The species inhabits woods edges, overgrown pastures, brushy swamps, swales, glades, and alder tangles. White-eyed vireos feed actively in the branches and foliage of low dense cover, taking moths, butterflies, caterpillars, beetles, wasps, ants, bees, flies, and many other insects, as well as spiders and snails. As summer wanes and during migration, they eat fruits and berries.

White-eyed vireos nest throughout the eastern United States. Pennsylvania is at the northern limit of the breeding range, with most nesting reported from the state's southwestern and southeastern corners, including suburbs of Philadelphia and Pittsburgh. The nest, usually 2 to 6 feet above the ground, is slightly cone-shaped (distinguishing it from the more rounded and cup-like nest of the red-eyed vireo). The nest consists of small pieces of soft wood and bark held together with spider

webbing, with an inner lining of dry grass and fine stems. The eggs are incubated for about two weeks, and the young fledge nine days after hatching. In some areas, brown-headed cowbirds parasitize nearly half of all nests; in parasitized nests, vireo offspring usually do not survive. White-eyed vireos winter in the southern United States, Mexico, and Central America.

Yellow-throated Vireo (*Vireo flavifrons*)

This is the most colorful of Pennsylvania's vireos, with a bright yellow throat and breast. The male's song is a string of short, buzzy robin-like phrases given 20 to 35 times per minute. It is a slower song than that of the more widespread red-eyed vireo. Yellow-throated vireos inhabit the edges of mature deciduous forests, especially wet bottomland and tree-lined rivers and streams, as well as open wooded areas such as orchards, parks, and shady areas in towns where there are tall trees with broad crowns. The species avoids coniferous woods and the unbroken forest interior and has less nesting success in small forest blocks. Nonetheless, they are associated with the tree canopy. The bill, typical for vireos, is sturdy, slightly curved, and has a hook at the tip, useful for nabbing and tearing apart caterpillars, the single food item most prevalent in this species' diet. Yellow-throated vireos also feed on many other insects and sometimes fruits of multiflora rose, sassafras, wild grape, pokeberry, and other plants. The nest, a thick-walled cup made of strips of inner bark and grasses, is generally 20 to 40 feet up in a tree within the tree canopy. Cowbirds frequently parasitize this species. The yellow-throated vireo breeds throughout the eastern half of the United States and in southern Canada, and winters in Mexico, Central America, and South America.

Blue-headed Vireo (*Vireo solitarius*)

Formerly called the solitary vireo, the blue-headed vireo has a blue-gray head and white eye-rings. This is a particularly

yellow-throated vireo

blue-headed vireo

handsomely marked vireo with its distinctive white "spectacles." It is Pennsylvania's earliest spring vireo, arriving in April and early May. The song, a series of short whistled phrases, has been judged the most mellifluous of all vireos' calls. The song has pauses in it as if the vireo is thinking about its next phrase or "talking to himself." The species thrives in a wide range of forested settings, particularly in open woods where pines or hemlocks predominate. In Pennsylvania most blue-headed vireos nest at elevations above 1,300 feet with very few below 650 feet above sea level. The species breeds widely in northern Pennsylvania and is absent from the state's southeastern and southwestern corners. In summer blue-headed vireos feed almost exclusively on insects and spiders, foraging among the leaves, branches, and twigs in the mid-story of the forest. It is one of the state's nesting species that is most strongly associated with large forest blocks and the forest interior. Increases in population and range seem to be a rebound from the logging era when most of the state was deforested and its habitat greatly reduced. The state's forests have been maturing in the last few decades with many typical forest species responding to the increased availability of the native forested habitat. The nest is an open cup made of grasses, inner bark, and other plant materials. The outside of the nest is adorned with lichens or papery scraps from old hornets' nests. It is usually placed less than 10 feet high in a shrub, sapling, or conifer, hanging slightly from a horizontal limb or fork. They often are associated with hemlock trees especially along cold water streams in the mountains. The vireo pairs will relocate between nesting attempts.

Warbling Vireo (*Vireo gilvus*)

This drab grayish-olive bird has a whitish breast and a faint pale stripe above the eye. Roger Tory Peterson terms the song "a single languid warble unlike the broken phraseology of the other vireos." Males sing from late April until mid-September. Warbling vireos feed on many caterpillars, as well as insects ranging in size from aphids to dragonflies. In late summer they turn to berries and small fruits of dogwood, pokeberry, sumac, elderberry, and others. Warbling vireos breed across much of North America in open, mixed, or deciduous woods, fence-row and roadside trees, shade trees in open country, and woodlot

warbling vireo

edges. It is strongly associated with riparian woodlands in the nesting season. Nests are built in trees, higher above the ground than those of most other vireos: 20 to 90 feet up. Both sexes build the neat cup out of bark strips, leaves, grasses, feathers, and plant down. Male warbling vireos are such persistent singers that they even give voice while helping to incubate eggs. They sing later in summer than most songbirds; some vocalize as late as Labor Day weekend. In Pennsylvania, the population of warbling vireos seems to be concentrated in the state's four corners and along the major river systems, especially the Susquehanna River Valley.

Philadelphia Vireo (*Vireo philadelphicus*)

Its name notwithstanding, the Philadelphia vireo does not nest in the vicinity of Philadelphia or anywhere else in Pennsylvania. (The type, or first, specimen of this bird was collected in Philadelphia while in migration). Experienced birdwatchers may spot this uncommon migrant in May and again in September and October as it passes through the Keystone State, shifting between its northern breeding grounds in the boreal forests, primarily New England and southern Canada, and its wintering range in southern Central America.

Red-eyed Vireo (*Vireo olivaceus*)

Although abundant and widespread in forested habitats throughout temperate North America, the red-eyed vireo is seen infrequently. Its greenish, leaf-matching coloration; counter-shading (the pale belly, when seen from below, blends with sun dappled foliage and sky); and treetop habits conspire to make this an unfamiliar bird to most Pennsylvanians. However, it is often heard because males sing incessantly during the nesting season long after other species have gone quiet. The species' song is a series of robin-like phrases (ornithologists have noted around forty of these locutions), often repeated for an hour or longer without cease. Red eyed vireos breed in every county in Pennsylvania. They use a variety of woods settings, including second growth forest, woodlots, mature deciduous or mixed woodlands, and shade trees in towns and cities. An ideal habitat is provided by an extensive stand of mature moist forest with an understory of shrubs and smaller trees.

Red-eyed vireos forage high in the canopy. They glean insects from foliage and sometimes hover to pick insects from leaves and flowers. They eat caterpillars—gypsy moth, tent caterpillars, fall webworms, and many others—plus other insects including beetles, bugs, flies, walking sticks, cicadas, and treehoppers. They also feed on fruits of Virginia creeper, dogwood, sumac, and other plants. In spring, males establish territories of from one to two acres. Unlike Pennsylvania's other vireos, the male red-eyed vireo does not help the female build the nest, which is a deep cup 2 to 60 feet (on average, 5 to 10 feet) above the forest floor. Chipmunks and red squirrels may eat eggs and nestlings. Hal Harrison, author of *A Field Guide to Birds' Nests*, found one red-eyed vireo female incubating four cowbird and no vireo eggs in its nest (the cowbird apparently having punctured or pitched out the vireo's eggs).

In unparasitized nests, three to five young hatch after 11 to 14 days incubation. Both parents feed them. The juveniles leave the nest when 10 to 12 days old. Their parents feed them for another several weeks. The adults quit defending a home territory and lead the young to food. The species winters in South America, including the Amazon River basin, where individuals feed mainly on fruit. Despite deforestation of tropical forests on its non-breeding range and fragmenting of forests in the northeastern breeding range, the red-eyed vireo seems to have an increasing population trend globally as well as statewide, perhaps because it has such a large range and can adapt to different wooded habitats.

red-eyed vireo

Revised 01/2022

Blue Jay

The blue jay, *Cyanocitta cristata*, belongs to Family Corvidae, the Corvids, which includes crows, ravens, jays, and magpies in North America, and jackdaws, choughs and rooks in the Old World. Corvids have the largest cerebrums, relative to body size, of all birds, and scientists believe them to be among the smartest. The members of this family are especially noted for their excellent spatial memory and problem-solving skills. Corvids are social birds, and many species live in flocks when not nesting. The bold, colorful blue jay breeds from southern Canada south to Florida and west to the Rocky Mountains. This species was first described scientifically by Alexander Wilson, a Pennsylvania resident and acknowledged "father of American ornithology."

Biology – The blue jay is 11 to 12 inches in length (larger than a robin) and has a blue back marked with black and white; its underparts are off-white, and it has a prominent blue crest on its head. The sturdy beak is straight and sharp, well suited for a variety of tasks including hammering, probing, seizing, and carrying. They often hold down objects with their feet against a limb and manipulate the food item, much like a parrot. To open an acorn, the bird grips the nut in one foot and hammers the shell apart with its bill.

Blue jays live in wooded and partly wooded areas, including extensive forests, farm woodlots, suburbs, and towns. About three-quarters of their diet is vegetable matter: acorns, beechnuts, various seeds (including sunflower seeds from feeding stations), corn, grain, fruits, and berries. The remaining 25% includes insects—ants, caterpillars, beetles, grasshoppers and others—along with spiders, snails, frogs, small rodents, carrion, and eggs and nestlings of other birds. They are quite opportunistic about feeding on the human landscape and will raid compost bins and garbage or any kind of bird feed including bread crumbs, suet, corn, and peanuts. In the spring, blue jays eat many kinds of caterpillars including those of the gypsy moth and the tent moth, major forest pests. Blue jays accomplish the difficult task of eating large, hairy caterpillars by skinning the caterpillar before eating it. In autumn, jays cache many seeds, especially acorns and beech nuts, under the leaf duff in forest clearings, plowed land, edges, and meadows. Confronted with abundant nuts and seeds, a jay may fill its expandable throat with several acorns or nuts; later, it will disgorge the food and cache or eat it. Some research on jays equipped with radio transmitters revealed that individuals cache thousands of seeds each autumn. They retrieve some of the nuts later, but since even jays are forgetful or do not survive the winter, many of these seeds sprout the following spring. This helps forests to regenerate, particularly on cut-over and burned lands. For this reason, blue jays provide a very important ecological service to the forests and the wildlife that live there. Since the trees have value as timber, erosion control, and wildlife home and food production, jays also have significant economic value.

Blue jays are quite vocal. They sound a raucous *jaay-jaay* to attract other jays and as an alarm call. A bell-like *toolool* is given during courtship, as is a *wheedelee* call, sometimes referred to as the "squeaky hinge" call. Blue jays are good mimics and often imitate the *kee-yer* calls of hawks as well as crows, cats, and some human sounds. Adults give these calls in the presence of their young who imitate them, a kind of cultural transmission of information.

Blue jays have an interesting social courtship. In early spring, from 3 to 10 males (thought to be yearling birds) shadow one female, bobbing their bodies up and down and sounding *toolool* calls. Aggressive displaying apparently scares off the competitors one by one until a single male is left as the female's mate. Ornithologists believe that older jays, ones that have bred in the past, pair up earlier and do not participate in courtship flocks. Some pairs remain partnered in multiple

years, occupying the same home range each year. Once paired, birds move about quietly, with the female giving *kueu kueu* calls to the male when he brings her food. Later the female, with help from her mate, assembles the breeding nest, often in a dense conifer or shrub, 5 to 50 feet above the ground. Jays are very cautious around their nest and seem to readily abandon a partially built nest if it is discovered by a potential predator. The nest is 7 to 8 inches across, built of twigs, bark, mosses and leaves, with a 4-inch central cup lined with rootlets and other fine plant materials including small flower clusters. In a survey of blue jay nests in Pennsylvania, 20 were in white pine, 18 in hemlock, 2 in red spruce, 2 in fir, 12 in white oak, 5 in alder, with others in sour gum, viburnum, pitch pine, and dogwood. Jays tend to build their nests on horizontal limbs that are well hidden but afford a good view of their surroundings. Female jays sit very tight on nests when intruders get close.

In May or June the female lays three to six eggs, pale olive or buff, spotted with brown or gray. Both sexes incubate. Blue jays are silent and furtive around the nest. Pairs can nest very close to a house without making many sounds or otherwise attracting attention to themselves. Many jay nests go undetected in neighborhoods. Blue jays strongly defend their nest against intruders, calling loudly and diving at and mobbing hawks, owls, crows, squirrels, cats, and ground predators. Yet they will allow other jays to land quite near the nest. In this way, blue jays do not defend classic exclusive nesting territories but rather a home range where they forage near the nest and tolerate some jays nearby. Pairs of jays nesting nearby often assist each other in defending against predators. The eggs hatch after 17 to 18 days. Both parents feed the young, bringing them insects, other invertebrates, and carrion. Adult blue jays sometimes raid the nests of smaller birds, including vireos, warblers, and sparrows, eating eggs and nestlings. Biologists believe that forest fragmentation is giving jays and other nest predators greater access to the nests of woodland birds. Although jays have the reputation of nest-robbers, there is a lack of evidence that this is a large part of their diet or that they are a significant contributor to declines of songbirds. Like other songbirds, jays have their own nest predators and need to defend their nests from chipmunks, squirrels, grackles, crows, hawks, owls, and snakes. Jays often drive off nest predators, inadvertently assisting the nest defense of other birds nearby.

The young leave the nest after 17 to 21 days. The family stays together for another month or two, with the fledglings clamoring for food and their parents obliging them, even when the juveniles are almost adult-size. In the North, blue jays raise one brood per summer; jays in the South may rear two broods. When the adults molt in July and August, their new plumage comes in a lustrous, beautiful blue. (In fact, the blue of the birds' plumage is not caused by pigmentation but by feather structure: small air pockets in the feathering do not absorb the blue part of the light spectrum and instead cause it to scatter, giving an appearance of blue. Grind up a jay's feather and all that is left is a blackish powder.)

In late summer and early fall, family groups merge into larger foraging flocks. As the weather grows colder these groups fragment again into smaller bands. Birds from Canada shift southward in September and October, and juveniles from the northern United States also drift to the south. In some years—perhaps when wild nuts or mast are scarce—blue jays move in large numbers. Accipiters, particularly sharp-shinned and Cooper's hawks, accompany the flocks, picking off unwary members. Blue jays are common migrants in Pennsylvania in April and early May. Jays commonly cross open areas very carefully in a single file. The longevity record for the species is 16 years in the wild, but a captive jay lived 26 years and three months. Among adults, the annual survival rate is estimated at 55%.

Habitat – Blue jays are fairly cosmopolitan, living in a wide variety of wooded habitats but avoid strictly coniferous forests and are less common in deep forests than in smaller woodlots. They thrive in areas with plentiful nut-bearing oak and beech trees. Although primarily forest birds, blue jays have adapted to breed in cities and towns, where they nest in parks, cemeteries, yards, and along tree-lined streets.

Population – The population in Pennsylvania and the Northeast is healthy. On a continental scale, the species is expanding northwest into Canada. Blue jays, like other members of the crow family, are susceptible to West Nile virus, but the population seems somewhat resilient despite this vulnerability. Biologists estimate there are two or three breeding pairs of blue jays per 100 acres of suitable habitat.

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Crows & Raven

Crows and ravens belong to the large family Corvidae, along with more than 200 other species including jays, nutcrackers and magpies. These less-than-melodious birds, you may be surprised to learn, are classified as songbirds.

raven

American Crow

Crows are some of the most conspicuous and best known of all birds. They are intelligent, wary and adapt well to human activity. As with most other wildlife species, crows are considered to have "good" points and "bad" ones—value judgements made strictly by humans. They are found in all 50 states and parts of Canada and Mexico.

Biology

Also known as the common crow, an adult American crow weighs about 20 ounces. Its body length is 15 to 18 inches and its wings span up to three feet. Both males and females are black from their beaks to the tips of their tails. Their feathers are iridescent, flashing highlights of blue, green and purple. Albinism occurs, producing pure or partial white coloration. The scientific species name *brachyrhynchos* means "short beak." A crow's beak is actually sturdy and quite large at about 2 ½ inches long. However, its beak is short compared to that of the closely-related raven.

Crows are found in Pennsylvania year-round. This does not mean the same individual birds remain in the state all the time. Crows are "partial migrants" which means that some stay the winter where they nest while some migrate south and others wander locally to forage and roost with other crows. Young crows are more likely to migrate while older crows tend to stay on their territory all year around. Some crows that breed in Pennsylvania migrate south starting in late September or early October and are replaced by birds from the north. Northern migrants remain in Pennsylvania over winter while some crows hatched in Pennsylvania fly as far south as the Gulf of Mexico.

Flocks of crows range widely for food. They can travel up to 30 miles a day in search of food in the winter. Foods include grasshoppers, caterpillars, grubs, worms, most insects, grain, fruit, the eggs and young of other birds, organic garbage and just about anything that they can find or overpower. Crows also feed on the carcasses of winter – and road-killed animals.

Crows have extremely keen senses of sight and hearing. They are wary and usually post sentries while they feed. Sentry birds watch for danger, ready to alert the feeding birds with a sharp alarm caw. Once aloft, crows fly at 25 to 30 mph. If a strong tail wind is present, they can hit 60 mph. These skillful fliers have a large repertoire of moves designed to throw off airborne predators.

Crows are relatively gregarious. Throughout most of the year, they flock in groups ranging from family units to several hundred birds. During winter, crows may gather by the tens of thousands in areas where food is plentiful. Later, these flocks break up as nesting season approaches.

Males vie for mates through fighting and spectacular flight routines. Once paired, the male and female search out a secluded woodlot to raise their brood. Both sexes share nest-building and egg-incubating duties. There is evidence that crows pair for multiple years and some mate for life.

A nest site is usually chosen away from those of other crows. Most often, nests are built in the crotch of a tree, 10 to 70 feet above ground, usually more than 25 feet. A typical crow's nest is a large, substantial basket, 22 to 26 inches across, built of twigs, sticks, bark and vines. The deep central cup is lined with moss, shredded bark, grass, deer hair, fur, feathers or similar material.

After mating, the female lays 3 to 8 eggs (usually 4 to 6) in April and May. Eggs are oval, bluish-green, and blotched and spotted with brown and gray. The young hatch following an 18-day incubation period. Ten days after they hatch, the young crows are almost fully feathered, and their eyes are open. They leave the nest at five weeks of age and look like small adults. Young birds follow, imitate and learn from their parents

all summer. Many times, the family group sticks together until the following spring. Young crows from the previous year's nest often assist their parents with rearing the young and defending the territory.

Crows are both predators and prey. As predators, they rob nests of songbirds and waterfowl, killing and eating newly hatched young, or cracking eggs. As prey, young crows and unhatched crow eggs are eaten by raccoons, opossums, and tree-climbing snakes. Hawks and owls kill nestling, fledgling, and adult crows. Crows are especially vulnerable to night attacks by great horned owls.

If crows locate an owl during the day, they will mob it—swooping low, calling excitedly and attracting other crows, and generally harassing the bigger, less-maneuverable bird. They also mob hawks. In turn, crows are mobbed by smaller birds, especially kingbirds and red-winged blackbirds.

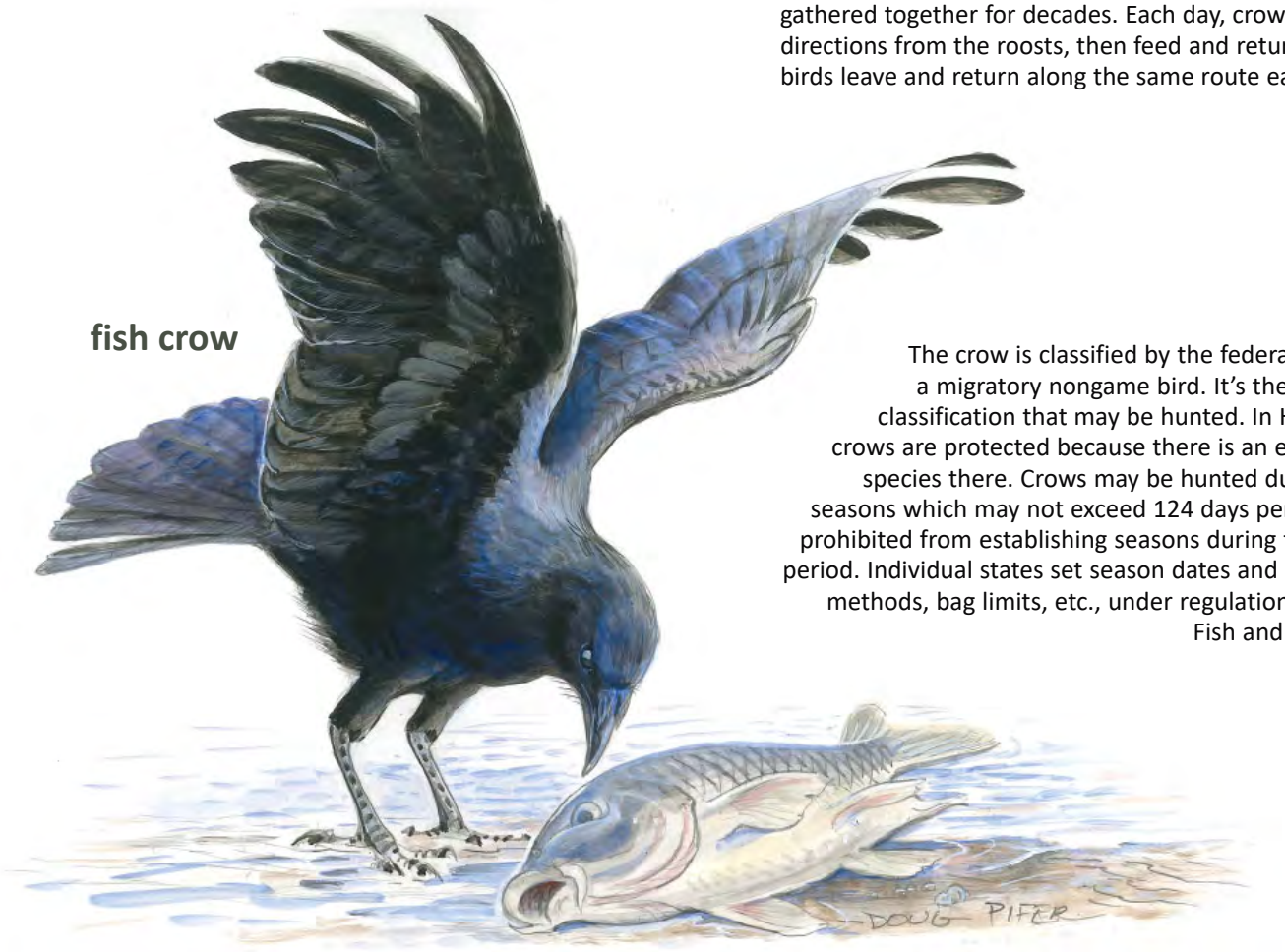
Crows are curious. Shiny objects fascinate them, and they have been known to fly off with bits of glass, rings, keys, etc. Crows exhibit their intelligence by imitating many sounds, including whistles, cats, machines and the human voice. Crows have a good vocabulary—a wide range of caws, crowing noises, coos, and other soft, melodious sounds they use to communicate with each other.

Population

Crows not only live alongside humans, they have survived in spite of them. Because of their habits of pulling up corn shoots and occasionally robbing game bird nests, crows have been persecuted. Today, however, humans also recognize that crows can be beneficial in helping to control harmful insects such as tent caterpillars, locusts and white grubs, in cleaning up dead road-killed birds and animals, and even in removing improperly disposed garbage.

Some estimates put the crow population at more than 30 million in North America. Their numbers may be affected by man-made substances such as aldrin, dieldrin, heptachlor and DDT that have been introduced into the environment (All are now banned). When these insecticides accumulate they cause local reproductive failure or thin eggshells in some bird species. However, it is speculative whether this is the case with crows. Crows and other members of *Corvidae* are particularly susceptible to West Nile Virus. Populations have declined since that disease has entered the country. This seems especially true in urban areas, but they are still common enough that the declines are not perceived by the casual observer.

Each year, many crows winter in southern Pennsylvania, where weather conditions are relatively mild, and food is abundant. Here, they may group into flocks of thousands that congregate nightly at roosts—spots where crows have sometimes gathered together for decades. Each day, crows fly in different directions from the roosts, then feed and return at night. Most birds leave and return along the same route each day.



fish crow

The crow is classified by the federal government as a migratory nongame bird. It's the only bird in this classification that may be hunted. In Hawaii, however, crows are protected because there is an endangered crow species there. Crows may be hunted during established seasons which may not exceed 124 days per year. States are prohibited from establishing seasons during the peak nesting period. Individual states set season dates and regulate hunting methods, bag limits, etc., under regulations set by the U.S. Fish and Wildlife Service.

Habitat

Crows thrive in varied habitats—from the semi-arid regions of the west to the big timber land of the north. They are found in farmland, parks, on wooded islands, in wooded areas on the fringes of towns and, increasingly, even in large cities.

Generally, crows are most numerous in agricultural districts with a great variety and plentiful supply of food. An adequate number of trees for cover and nesting in necessary. Farm woodlots are ideal. Nests built and abandoned by crows sometimes provide habitat for birds that, ironically, are one of their age-old enemies: the great horned owl. Increasingly, crows are becoming habituated to more urban environments.

Fish Crow

Corvus ossifragus, which means "bone breaker," never strays too far from the Atlantic and Gulf coasts and tributary rivers. In Pennsylvania, the fish crow inhabits riverine habitats and agricultural landscapes. Its Pennsylvania distribution centers in the southeast and along the Susquehanna River, including the West Branch to Clearfield County and up the Susquehanna's North Branch to the New York state line. Some fish crows now occur commonly in the Juniata River drainage and spottily in the Ohio River drainage as far west as Butler County. Where the fish crow occurs, it is fairly common, but it is sometimes confused with the American crow. If the two are seen together, the fish crow can be distinguished by its slightly smaller overall size, shorter legs, and smaller bill. The best identifier is its call, a short, nasal *car* or *cah-cuh*, as opposed to the distinct *caw* of the American crow. (A young American crow, however, may sound like a fish crow, so it is difficult to distinguish the two species in late spring and summer.)

As its name implies, this bird feeds on fish. However, it also eats a variety of other foods. Along the shore, it captures fish and small crabs, sometimes steals food from the smaller gulls and terns, and scavenges for whatever it can find. Inland, the fish and common crows often feed together, frequently in agricultural fields. Other songbirds' eggs and nestlings occasionally fall prey to the fish crow.

Nest and eggs are very similar to, though a bit smaller than, those of the common crow. Like their cousins, fish crows build their nest in trees.

Common Raven

The common raven, *Corvus corax*, is a less common Pennsylvania resident than the American crow, but is found in a wide variety of habitats especially the deep woods. Formerly they were found mainly in the mountainous northcentral region especially the Seven Mountains and Endless Mountains regions. They have returned to the common status that they had in the 18th and 19th centuries. Their numbers declined so much that by the late 19th century, some considered it to be possibly extirpated from Pennsylvania. Today, the raven population is recovering and expanding into many counties including agricultural areas. Ravens are abundant in Canada and the Rocky Mountains. Favored habitat is remote, heavily-forested wilderness, seacoasts and wooded islands.

Ravens are 20 to 25 inches in length, with a wingspread of about four feet. Their plumage is entirely black, with green and purple iridescence. Both sexes are colored alike; males are generally larger than females.

The raven is often confused with its close relative, the crow, but there are major differences between the two species that are especially apparent when crows and ravens are seen together. Common ravens are much larger than American crows, over double their one-pound size. They are about the size of a red-tailed hawk. Ravens are built for soaring and gliding with long, narrow wings and a broad wedge-shaped tail. Ravens also have a shaggy throat and a massive bill that allows them to tear into carcasses and kill small animals. Ravens eat rodents, insects, grain, fruit, bird eggs and refuse. They consume much carrion, especially in winter. In northern Pennsylvania, they are often seen along roads, where they feed on road-killed deer, raccoons, opossums, etc. Ravens also prey upon sick and injured animals.

A raven is every bit as alert as a crow and possesses sharp eyesight and hearing. Ravens are considered among the most intelligent of all birds. Like crows, they can learn to imitate a variety of sounds, including the human voice. In nature, their calls include guttural croaks, gurgling noises, and a sharp, metallic "*tock.*"

Ravens are skillful fliers. Their acrobatic courtship display flight is especially spectacular. After mating, a pair will seek out an isolated nesting spot, usually at least a mile away from any other ravens. Formerly they only nested on remote cliffs and large trees, but they are becoming more tolerant of people. Each year, more seem to be nesting in closer proximity to civilization and entering towns in winter to feed on litter and garbage. Some ravens now nest on large structures like transmission towers and football stadiums and forage in agricultural landscapes. Other ravens nest in deep woods where they rarely see humans. These, more typical nests are built on cliffs or near the tops of large trees. Of 17 raven nests found in a Pennsylvania study, 13 were on cliffs, three were in hemlocks (45 to 80 feet up), and one was 85 feet up in a white pine.

Ravens often build a new nest on top of the previous year's nest. Nests are constructed of large sticks, twigs and grapevines. The outside diameter is 2 to 4 feet; inside diameter, one foot. The 6-inch deep central hollow is lined with deer hair, moss, shredded bark and grass.

The female lays 3 to 6 (usually 4 to 5) oval eggs, which are greenish and covered with brown or olive markings. Eggshells are rough and dull-looking. Incubation, which is mainly by the female, lasts about three weeks. Young are altricial. They leave the nest about one month after hatching. Ravens may live as long as 35 years in the wild, but much less is normal.

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Chickadees, Nuthatches, Titmouse and Brown Creeper

These woodland birds are mainly year-round residents in their breeding areas. They become most apparent in fall and winter when all four types may occasionally be seen together, along with downy woodpeckers and kinglets, in mixed-species foraging flocks. In these groupings, the greater number of eyes may improve foraging efficiency and detect potential predators. Pennsylvania's two chickadee species and the tufted titmouse belong to Family Paridae—omnivorous feeders that cache excess seeds in holes or bark crevices, remember the locations, and return later to eat the food. The two nuthatch species are in Family Sittidae. They glean insect food from the trunks of trees and also eat nuts. Their common name derives from the way they "hack" nuts apart using their stout pointed bills. Taxonomists place the brown creeper in Family Certhiidae, a group that includes ten species, eight of which inhabit Europe and Asia and another India and Africa. The brown creeper is the only species of this family found in North America.

black-capped chickadee

Black-capped Chickadee (*Poecile atricapillus*) — A black cap and bib, buffy flanks, and a white belly mark this small (five inches long), spunky bird. Chickadees have short, sharp bills and strong legs that let them hop about in trees and cling to branches upside down while feeding. They fly in an undulating manner, with rapid wingbeats, rarely going farther than 50 feet at a time. The species ranges across northern North America, living in deciduous and mixed forests, forest edges, thickets, swamps, and wooded areas in cities and suburbs. Black-capped chickadees are common throughout Pennsylvania, except for the state's southern counties, where they are replaced by the similar Carolina chickadee.

In spring, summer and fall, the majority of a chickadee's diet consists of animal protein: moth and butterfly caterpillars (including early growth stages of gypsy moths and tent moths), other insects and their eggs and pupae, spiders, snails and other invertebrates. Chickadees also eat wild berries and the seeds of various plants including ragweed, goldenrod and staghorn sumac. Seeds and the eggs and larvae of insects are important winter staples. In the fall, chickadees begin storing food in bark crevices, curled leaves, clusters of pine needles, and knotholes. The birds rely on these hoards when other food becomes scarce. Chickadees also eat suet from feeding stations and fat and meat bits from dead animals.

In winter, chickadees live in flocks, generally comprised three to 12 birds made up of mated pairs as well as individuals. There is a social structure and hierarchy within these flocks with dominant pairs. Listen for the *chick-a-deedee-dee* calls that flock members use to keep in contact while foraging around a territory of 20 or more acres. A flock will defend its territory against other chickadee flocks. At night, chickadees roost individually in tree cavities or among dense boughs of conifers. A roosting bird tucks its head under a wing to conserve body heat. On cold nights, a chickadee's body temperature drops as much as 20 degrees, causing the

bird to enter a state of regulated hypothermia, which saves significant amounts of energy. Chickadees lose weight each night as their bodies slowly burn fat to stay alive. They must replace those fat stores by feeding the next day.

In spring, the winter flocks break up as pairs and claim nesting territories ranging from 3 to 10 acres in size. Chickadees nest in May and June. The usual site is a hole in a tree, excavated by both sexes. Birch is a favorite, because this tree's tough outer bark stays intact after the inner wood rots and becomes soft enough for chickadees to excavate.

Chickadees also clear out cavities in pine, aspen, alder, willow, and cherry trees, and use abandoned woodpecker holes. The cavity is usually 4 to 10 feet above the ground. The female assembles the nest by laying down a base of moss, then adding softer material such as animal fur or plant fiber. House wrens compete for nest cavities and may destroy chickadee eggs and broods. Raccoons, opossums and squirrels raid nests. Chickadees will renest if a first attempt fails. Only one brood is raised per year. Chickadees will use nest boxes with small entrance holes (a diameter of 1¼ inch is recommended).

The five to nine eggs are white with reddish brown dots. The female incubates them, and the male brings her food. The eggs hatch between 11 and 13 days. Juveniles beg loudly and are fed by both parents. Young fledge 12 to 16 days after hatching. Three to four weeks after fledging, the young suddenly disperse, moving off in random directions. As winter approaches, they join feeding flocks. Some become "floaters," moving between three or more flocks, ready to pair should another bird's mate die.

Chickadees are taken by many predators including sharp-shinned hawks, American kestrels, eastern screech owls, northern saw whet owls, and domestic and feral cats. Sometimes chickadees mob these enemies while sounding *zee-zee-zee* alarm calls. The average life span for a chickadee is roughly one and a half to two years, and the oldest known chickadee lived 12 years, five months. Every few years, long distance movements take place within the population. These "irruptions" may be launched by failure of seed crops or high reproductive success.

Carolina Chickadee (*Poecile carolinensis*) — Similar to the black-capped chickadee in appearance and life history, this species lives in milder climates across the southeastern United States. The Carolina chickadee breeds in southern Pennsylvania, but its range has been creeping northward in recent decades. The song and calls of the Carolina chickadee differ from the black-capped chickadee which helps distinguish the two where their ranges overlap. They are extremely similar in appearance with Carolina chickadees having less white on their wings and relatively shorter tails. These species interbreed and the resultant hybrid chickadees are difficult to tell apart from their parent species. The Carolina chickadee seems to be displacing black-capped chickadees as it moves northward.

Tufted Titmouse (*Baeolophus bicolor*) — This trim bird has gray and white plumage, a prominent head crest, and black "shoe button" eyes. The species ranges through eastern North America into southern New York and New England. It has steadily extended its range northward, perhaps because of climatic warming, changes in forest habitat, and an increase in bird feeding by humans. In the early 1900s the tufted titmouse was absent from northern Pennsylvania. Today, it breeds statewide. At higher elevations, it is more likely to be found near wetlands, streams or human habitations.

Titmice eat insects (caterpillars, wasps, bees, sawfly larvae, beetles and many others, as well as eggs and pupae), spiders, snails, seeds, nuts and berries. Like the chickadee, the titmouse forages by hopping about in tree branches, and often hangs upside down while inspecting the underside of a limb. To open a nut or seed, the bird holds the object with its feet and pounds with its bill. Titmice cache many seeds; with sunflower seeds, the birds usually remove the shell and hide the kernel within 120 feet of the feeding station, under loose bark, in cracks or furrows in bark, on the ground, or wedged into the end of a broken branch or twig.

Winter flocks are often made up of parents and their young of the previous year. Titmice are early breeders. Males start giving their *Peter Peter* territorial song in February. In Pennsylvania, pairs begin building nests in late March and early April. Titmice are believed not to excavate their own nest cavities; instead, they use natural cavities or abandoned woodpecker holes. Breeding territories average 10 acres. The female lays an average of five or six eggs, which are white with dark speckles, and incubates them for 12 to 17 days. The young fledge about 18 days after hatching. Occasionally a yearling bird may stay on its natal territory and help its parents rear the next year's brood.

White-breasted Nuthatch (*Sitta carolinensis*) — The white-breasted nuthatch has a slate gray back, a white breast and face, and a cap that is black in the male and ashy gray in the female. Nuthatches inhabit deciduous forests throughout Pennsylvania and the East. They climb around in trees, walking in a herky jerky manner up and down and around the trunks, along branches and the undersides of limbs. Both sexes sound a nasal *ank ank* call. Pairs live in home territories of 20 to 35

tufted titmouse

acres in wooded habitats with some large trees. A pair may occupy larger territories in semi-wooded habitat.

white-breasted nuthatch

White-breasted nuthatches feed on insects and spiders in summer and on nuts and seeds in winter. They relish suet at feeding stations and carry away sunflower seeds for caching. Sometimes they forage on the ground. Nuthatches wedge acorns and hickory nuts into tree bark and then hammer the shells off with blows from their awl-like beaks.

During courtship, the male bows to the female, spreading his tail and drooping his wings while swaying back and forth; he also feeds her morsels. Before building the nest, the birds rub or sweep crushed insects back and forth over the inside and outside of the nest cavity. Ornithologists speculate that this sweeping behavior leaves chemical secretions behind that may repel predators or nest competitors. The female builds a nest inside the cavity (commonly a rotted out branch stub or an abandoned squirrel or woodpecker hole) using twigs, bark fibers, grasses and hair. She lays five to nine white, brown spotted eggs and incubates them for 12 to 14 days while her mate brings her food. Both parents feed insects and spiders to the young, which fledge in about 26 days, usually in June.

Red-breasted Nuthatch (*Sitta canadensis*)— In Pennsylvania, this species is found mainly in the northern part of the state; it ranges through New England and across Canada. Slightly smaller than the white-breasted nuthatch, the red-breasted has a rusty tinge to its breast and a prominent black eye stripe. The species lives primarily in coniferous forests including pine plantations but may also be found in mixed forests. Red breasted nuthatches feed mainly on insects during summer, feeding their young a diet of flies, spiders, beetles and caterpillars. During fall and winter they rely on seeds, particularly those of conifers. They excavate a nest cavity 5 to 40 feet above the ground, typically in a dead tree or decaying part of a tree. Red-breasted nuthatches nest in native conifer stands, but are opportunistic in their use of ornamental conifers, sometimes nesting in old Christmas tree plantations or other plantings. Five or six young are produced in a single annual brood. In some autumns, large numbers of red-breasted nuthatches show up south of their normal range; biologists believe that poor cone production in northern forests drives these movements. If there are abundant cone crops, they sometimes will stay to nest at locations at lower elevations or otherwise outside their normal nesting grounds.

Brown Creeper (*Certhia americana*) — Brown creepers are inconspicuous birds whose intricately patterned backs help blend them in with the tree bark that is their near perpetual home. Creepers blend into the forests where they live. Brown creepers breed across a huge range extending from Alaska east across southern Canada to Newfoundland and south through the United States to Nicaragua in Central America. They favor larger, closed-canopy forests with many large trees for foraging and nesting, especially trees with deeply furrowed, loose or flaking bark. Although uncommon and rare, the species is widely distributed in heavily forested regions of Pennsylvania. It is one of the birds that are considered "area-sensitive" forest species that live in unfragmented forest tracts. Breeding Bird Surveys show that their numbers are lower in the state's southeastern and southwestern corners. Braced by their long stiff tails, brown creepers climb slowly up tree trunks, following a spiral course. They inspect bark furrows and niches, using their decurved bills to tease out insects, pupae and eggs. They also eat spiders and seeds.

The call is a long, thin *seeee*; the male also voices a subtle and high-pitched, but beautiful breeding song. As part of their courtship, creepers do a spiraling chase flight around tree trunks. In some flights, they seem more like falling brown leaves than live birds. The species nests under peeling bark, often in a shagbark hickory or a dead or dying tree, less frequently in a cavity.

A hammock-like twig nest is built to fit the available space. The female lays four to eight eggs, which are whitish and dotted with reddish brown. Incubation takes 13 to 17 days, and young leave the nest 14 to 20 days after hatching. Brown creepers from the Northeast may migrate south to Florida and the Gulf Coast. In winter, brown creepers sometimes mix in with foraging flocks of chickadees; perhaps these are residents, or northern birds that have shifted southward.

brown creeper

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Wrens

Carolina wren

Wrens are small, active birds, basically brown in color, that often perch with their tails held straight up in the air. They forage on or just above the ground in thick brush, forest understory, or marsh vegetation. Wrens belong to the Troglodytidae family, with about 70 species in the New World, most of them in the tropics. Only one species lives in the Old World: the winter wren, which likely spread from North America to Eurasia spreading from Siberia to Britain and Iceland.

Some wrens nest in cavities, while others build roofed structures out of plant matter. The males of several species build "dummy" nests, preliminary nests placed in tree cavities, woodpecker holes, nest boxes and less frequently in odd enclosed spaces like tin cans, hats, boots, flower pots and drainpipes. Later, a female will choose one of the male's dummy nests, finish its construction, and lay eggs in it. Wrens often pester other birds and evict them from nest cavities, puncture their eggs, or peck their young to death. They destroy nests in cavities and in the open. They also wreck other wrens' nests. Why such belligerence? Perhaps, an abundance of empty nests discourages predators from looking further and finding an active wren's nest. Or perhaps killing its rivals' offspring reduces pressures on prey populations, making it easier for a wren to feed its own young.

Wrens mainly eat insects and spiders. A few species will also feed on berries and seeds. Owls, small hawks, foxes and house cats take adult wrens. Raccoons, opossums, mink, weasels, mice, squirrels, woodpeckers and snakes raid wrens' nests. Some wrens migrate southward in winter, while other species remain as permanent residents on their breeding range. Five species are found in Pennsylvania.

Carolina Wren (*Thryothorus ludovicianus*)

The Carolina wren inhabits the eastern United States stretching north into southern New England and southeast Ontario and south into eastern Mexico, Guatemala and Belize. It is a permanent resident wherever it breeds. At 5½ to 6 inches long, and weighing 0.7 ounces, it is the largest of the Pennsylvania wrens. Carolina wrens are colorful birds with rusty brown upper plumage, a buffy or cinnamon breast, and a white stripe above each eye. They also have "colorful" personalities that provide a lot of entertainment for human observers. They prefer moist or bottomland woods with moderate to dense shrubby or brushy cover. They also inhabit gardens and yards. Carolina wrens forage mainly on the ground, often near downed trees or brush piles, using their curved bills to lift up leaf litter and snatch prey. They can climb up tree trunks like creepers or nuthatches.

Carolina wrens eat mainly insects and spiders. They catch caterpillars, chinch bugs, beetles, leafhoppers, grasshoppers, crickets, katydids and many other insects. They may also eat seeds of poison ivy, sumac, smartweed, and other herbaceous plants, plus fruits and acorn mast. Carolina wrens will visit feeders, pecking at suet and picking raisins, mealworms or other offerings.

The Carolina wren is monogamous and mates for life. Pairs often forage together and defend a territory year round. The species has a clear, ringing song, *tea-kettle, tea-kettle*, *tea-kettle,* which it may give year-round. Carolina wrens nest in tree cavities, bird houses, crevices in stone walls, among exposed roots and in cracks in buildings. Carolina wrens can cause amusement or consternation of their human hosts by building nests in a variety of odd places like gutters, hanging plants, stored boats and canoes, clothes pin bags, cans of nails, open tool boxes and the nooks and crannies of sheds, porches, and garages. Using leaves, twigs, and other plant materials, both sexes build a dome shaped nest with a side entrance. The normal clutch is five or six eggs. Incubation is by the female and takes 12 to 16 days. The male feeds her on the nest. The young leave the nest about two weeks after hatching. Pairs usually raise two broods per year.

In the last century, the Carolina wren has been expanding northward. Pennsylvania is on the northern edge of the species' breeding range, which extends north after mild winters and ebbs south following harsh winters. Extended periods of ice and snow can devastate local populations.

Bewick's wren (*Thryomanes bewickii*) is a similar appearing species that bred in southern Pennsylvania until around 1976. Since then, it has disappeared. Bewick's wren is listed as an extirpated species in Pennsylvania.

House Wren (*Troglodytes aedon*)

The most common wren in Pennsylvania, this bird was named because it often lives around humans' dwellings. A house wren is five inches long and weighs a third of an ounce. Its overall color is gray brown. House wrens live in open shrubby woodlands, small woodlots, woods edges, towns, suburban backyards, and city parks. They feed on insects, spiders, millipedes, and snails. The species breeds across southern Canada and the United States. House wrens in the northern parts of their range migrate south to spend the winter in the southern United States and Mexico.

Males arrive on the breeding grounds in late April or early May. They establish territories of one half acre or larger and advertise for females with a rich, liquid song. Males build dummy nests out of twigs in tree cavities, nest boxes, or hollow fence posts; one male may construct up to seven such nests, defending them and the space around them. When building dummy nests, house wrens may destroy the nests and young of tree swallows, chickadees, bluebirds, and prothonotary warblers. House wrens often nest in boxes intended for bluebirds that are positioned close to shrubs or trees. Females either arrive later than the males or stay hidden in brush until they begin inspecting the males' territories. If a female finds a territory to her liking, she will finish one of the male's dummy nests by adding a lining of grass, plant fibers, rootlets, feathers, and animal hair.

In late May or early June, the female lays five to eight eggs, which are white and speckled with reddish brown. She incubates them for twelve to fifteen days. After the eggs hatch, the male helps with feeding the young, bringing grasshoppers, crickets, caterpillars, and spiders to the growing nestlings. About two weeks after hatching, the young leave the nest. Females typically produce one to two broods. A female may abandon her first brood soon after the young have fledged, leaving the male to rear them. He may then move to another male's territory, mate again, and lay a second clutch. A male house wren may mate with two or more females in his territory, although he will usually help only the primary female raise her young. A "floater" is an unmated male who enters an established territory and tries to drive away the resident male or mate with the female. If he succeeds in taking over a territory, he may destroy the female's eggs or young. At that point, she will usually renest.

Most house wrens leave the breeding range in September and early October. They migrate by night. Some are killed when they collide with communications towers. On their southern wintering grounds, they forage in thick brush. The oldest house wren on record lived nine years, but most individuals probably survive for only a year or two. Ornithologists believe the species has been expanding southward since European

settlement began. The house wren benefits from forest fragmentation and does well in towns and residential areas.

Winter Wren (*Troglodytes hiemalis*)

At just over four inches in length, the winter wren is Pennsylvania's smallest wren. Its plumage is dark brown, and its tail is stubby. Unlike the similar house wren, the winter wren is a bird of forests and not usually found near human habitations. The winter wren is strongly associated with hemlocks and is an indicator species for high quality forests. Look for this secretive bird in deep woods, particularly old growth conifers, where it forages in low shrubs, tangled roots of downed logs and shady ravines behaving "more like a mouse than a bird," notes ornithologist Kenn Kaufman. The male's song is a very loud and complex series of warbles and trills, one of the most remarkable of Pennsylvania bird songs. Foods include insects, spiders, small fish taken from stream shallows, and berries. In the East, winter wrens breed from Newfoundland south to Georgia in the Appalachians. They nest in cavities, and a brood of five to six young is the norm. Males may mate with more than one female. Populations in Pennsylvania have been growing in recent years according to breeding bird surveys with a more than twofold increase between the first and second atlas projects. Winter wrens head south in early fall, although some remain in the north and winter along streams and in swamps. Some are reported during Christmas Bird Counts in Pennsylvania.

winter wren

Sedge Wren (*Cistothorus platensis*)

This small (four and a half inches), shy wren inhabits moist upland sedge meadows with little or no standing water. It was formerly known as the short-billed marsh wren. Sedge wrens often breed in small colonies. They may occupy a suitable habitat for several years, then disappear. Some sedge wrens move into the state after nesting in the midwestern states, reacting to drought. Some have attempted to nest in wet hayfields as well as "proper" marshland and meadows. Males sing a dry, rattling song. They can form small "colonies" of nesting pairs. Hal Harrison once counted 35 to 40 singing males on a 10-acre site. The actual nest is a ball of dried or green sedges woven into growing vegetation two to three feet above the ground. The usual clutch is seven eggs. A female generally produces two broods per year, and males may mate with more than one female. Breeding bird studies have shown that the sedge wren is a rare and local breeder in Pennsylvania and declining in parts of the Northeast. The sedge wren is listed as an endangered species in Pennsylvania because of its extreme rarity as a nesting species.

sedge wren

Marsh Wren (*Cistothorus palustris*)

This is the typical wren of the cattail marsh. It is four and a half to five and a half inches long. Its brown plumage is marked with black and white stripes on the back and a white eye stripe. Marsh wrens arrive on the breeding range in late April or early May. The male's song is reedy and gurgling, lasts one to two seconds, and is given up to twenty times per minute, by day and at times by night. Not particularly musical, it reminded one naturalist of "air bubbles forcing their way through mud or boggy ground when trod upon."

The marsh wren forages on the marsh floor, flitting up and clinging to stalks and leaves of cattails, bulrushes, and other plants while searching for prey. It gleans aquatic insects and their larvae, other insects, spiders, and snails from vegetation and often nabs larvae from the surface of the water. Both males and females will peck and destroy the eggs of other birds in their territory. Red-winged blackbirds often attack marsh wrens on sight. Males typically build dummy nests ¬around six for each breeding nest used by a female. The female weaves an oblong nest out of cattails, reeds, and grasses, secured to standing vegetation. A short tunnel leads to a central cavity in which three to six eggs are laid. The female incubates the clutch for about two weeks. Fed by both parents, the young fledge after twelve to sixteen days. The adults care for them for another two weeks. One to two broods are produced each year. Male marsh wrens are polygamous. Up to half of all breeding males may mate with two or more females. Marsh wrens in the East winter along the Atlantic and Gulf coasts.

Marsh wren populations have sharply declined over several decades. They occupy fewer wetlands than in decades past, raising concern for their status in the state. The decrease in the size and quality of wetlands has had a negative impact on this small wetland bird and even more on larger wetland species like bitterns and rails. The marsh wren is listed as a species of High Level Concern in the state Wildlife Action Plan.

Revised 03/2021

Thrushes

Of the more than 120 species of thrushes (family Turdidae) worldwide, there are eight species that are regularly observed in Pennsylvania, six nesting species and two passage migrants. Thrushes are songbirds that have thin bills, plump bodies, and strong legs. They often forage on the ground, searching in leaf litter and on lawns for insects and other invertebrates such as spiders, earthworms, and snails. They eat berries in late summer, in fall, and (if they do not migrate south) in winter. Juveniles' spotted breasts help camouflage them. Thrushes are important dispersal agents for wild fruit- and berry-producing shrubs and trees. Hawks, falcons, owls, foxes, mink, and house cats prey on thrushes. Blue jays, grackles, crows, raccoons, weasels, squirrels, chipmunks, and snakes eat eggs and nestlings. Except for the eastern bluebird and the American robin, Pennsylvania thrushes are forest birds. Although often associated with human habitations, the American robin also lives in wooded habitats.

Many thrushes sing complex mellifluous songs that delight human listeners. Thrushes have the special adaptation of two voice boxes that allow individuals to vocalize two notes independently allowing simultaneous melodies in their songs. Many thrushes sing not only in the early morning, but also at dusk. These choruses can be memorable events to anyone visiting Penn's Woods in the evening. The spotted forest thrushes of the genus *Catharus* are sometimes called "nightingale-thrushes" because of their vocal abilities. Most thrushes build open cup-shaped nests secured to branches of low trees and shrubs. Some robins nest on building ledges and other flat surfaces; bluebirds choose tree cavities or artificial nesting boxes; and hermit thrushes and veeries often nest on the ground. Females do most of the actual nest construction. The typical clutch is four or five eggs. All of the species breeding in the Northeast lay pale blue or blue-green eggs. Females do most of the incubating, and both parents feed the young.

Eastern Bluebird (*Sialia sialis*)

This familiar species nests across much of the East and winters south to Nicaragua. A bluebird is six inches long and weighs about an ounce. Males have a vivid blue back and wings and a ruddy breast while the females have a more muted blue-gray back and less vividly colored breast. When not nesting,

eastern bluebird

bluebirds wander in small feeding flocks sometimes with house finches and other songbirds. They favor semi-open habitats: orchards, pastures, hayfields, fence lines, cut over or burned areas, forest clearings, open woodlots, and suburban gardens and parks. The song consists of three or more soft, melodious and mellow whistled notes ("*tury cherwee,cheye-ley*," as one observer has rendered it). Bluebirds eat crickets, grasshoppers, beetles, caterpillars, and many other insects, and they take spiders, centipedes, earthworms, and snails. Often they sit on a low perch, then flutter down to catch prey from vegetation or the ground. In fall and winter they turn to fruits, including those of sumac, dogwood, Virginia creeper, poison ivy, pokeweed, elderberry, wild cherry, bittersweet, honeysuckle, and wild grape. On sunny or warm winter days, they can turn back to insects for food if they are available.

The courting male sings to the female and flutters close to her with his wings and tail spread; he may pass food to her. Mated pairs preen each other's feathers. A study in New York found that bluebird territories used for mating, nesting, and feeding averaged over five acres. Bluebirds nest in abandoned woodpecker holes, tree cavities, hollow fence posts, and artificial boxes put up for them by humans. Bluebirds may face stiff competition for these sites from European starlings, house sparrows, tree swallows, and house wrens, all of which

have been known to kill adult bluebirds. Bluebirds tend to like more open situations for nesting than competing house wrens, informing us as to the better locations for nest box placement. The female builds a loose nest inside the cavity out of grasses and weed stalks, sometimes lining a central cup with feathers or animal hair. Early nesters, bluebirds lay first clutches by late March or early April and second clutches by early June. Some pairs will nest three times in a season. The three to six eggs (usually four or five) are pale blue and unmarked. The female incubates them for about two weeks. Both parents feed the nestlings. After about eighteen days, fledglings leave the nest. Second and third clutches will usually have one fewer egg than a first clutch produced by the same pair.

Bluebirds are permanent residents in the southern parts and lower elevations of their range. In winter, bluebirds from northern areas and higher elevations may shift southward and to the valleys. In mild winters you may see many bluebirds in the agricultural valleys of central Pennsylvania. If they ever left their nesting ground, bluebirds return to their breeding grounds in March and April, welcomed as harbingers of spring by winter weary rural folk. Bluebirds nest statewide in Pennsylvania, avoiding deep woods and wooded ridges. The population of *Sialia sialis* probably peaked around 1900, when farmland covered two thirds of the state. The number of bluebirds waned for many years thereafter as unprofitable acres were abandoned and grew back up in forest, but bluebird numbers have risen over the last several decades thanks to thousands of bluebird boxes put up by humans.

Veery (*Catharus fuscescens*)

Named for its call, this woodland thrush has a reddish brown head, back, and tail and a faintly spotted breast. It breeds in southern Canada and in the northern United States, south in the Appalachians to Georgia. In Pennsylvania, where it arrives in May, it is most common in the northern half of the state, especially on the Pocono Plateau. The veery favors damp deciduous forest with a dense undergrowth of shrubs and ferns. Veery pairs often nest in streamside shrubby woods and swampy areas. Where its range overlaps that of the wood thrush and hermit thrush, the veery will be found in wetter, younger woods. Its song is a delicate, flutelike *da vee ur, vee ur, veer, veer* that cascades down the musical scale. The beautiful song has an echoing quality that is described indelicately as sounding like somebody whistling into a sewer pipe. They sing not only in the morning but also at dusk. The veery has a distinctive "*veer*" or "*phew*." Mainly a ground forager, the veery feeds on insects (60 percent of its diet) and fruit (40 percent). In an Ontario study, individual territories averaged slightly more than half an acre.

The female builds a nest in a dense shrub near ground level or on the ground itself, often hiding it in vegetation at the base of a bush or small tree or in a brushpile. She lays three to five (usually four) pale blue eggs and incubates them for ten to 14 days. Brown-headed cowbirds lay eggs in the nests of veeries, they make no attempt to remove the eggs and raise the cowbird(s) along with their own young. Chipmunks sometimes prey on eggs and nestlings. The male helps to rear the brood, and the young leave the nest ten to twelve days after hatching. Veeries migrate at night. A recent study has clarified that veeries winter in central and southern Brazil, rather than a broader area in South America as previously suspected.

Gray-cheeked Thrush (*Catharus minimus*)

This shy, elusive bird breeds in spruce forests and in alder and willow thickets in northern Canada and Alaska. Gray-cheeked thrushes pass through Pennsylvania in May and again in September and October. They forage on the ground, usually in dense woods, and birdwatchers must be both stealthy and patient to catch a glimpse. They winter in South America.

The closely-related Bicknell's Thrush (*Catharus bicknelli*) has been separated as a distinct species from the more widespread gray-cheeked thrush. Nesting in mountain-tops of New York, New England and in Maritime Canada, it probably passes through the state annually but is rarely distinguished from the very similar gray-cheeked thrush. It nests as close as the Catskill Mountains of New York and winters in the West Indies, primarily the island of Hispaniola.

Swainson's Thrush (*Catharus ustulatus*)

A common migrant seen in woodlots and parks during spring and fall, this shy thrush nests regularly in Pennsylvania, in a scattering of northern tier counties. It breeds in New England, across Canada and Alaska, and in the U. S. Northwest. The Swainson's thrush (also called the olive-backed thrush) can be distinguished by bold buffy rings that surround its dark eyes. The melodious call features flute like phrases going up the scale. They also can be detected by their call notes that sound like dripping water or the call of a spring peeper. Swainson's thrushes inhabit coniferous woods, generally spruce but also hemlock, where it nests in shrubby trees two to ten feet above ground. Like the other thrushes, it feeds mainly on insects and berries but is more likely to engage in flycatching than other thrushes. Swainson's thrushes winter in tropical forests of Central and South America. Remarkably, the Swainson's thrushes that nest in Alaska and western Canada

veery

fly east across the North American continent before migrating south to South America wintering grounds. The species' name memorializes an English ornithologist.

Hermit Thrush (*Catharus guttatus*)

Many observers credit this thrush with the loveliest of all bird songs, described as *Oh, holy holy-ah, purity purity, eeh, sweetly sweetly*. The hermit thrush has a rufous tail and an olive head (in contrast with the wood thrush, which has an olive tail and a rufous head) and a spotted breast. When startled, a hermit thrush will usually fly to a perch and stare at an intruder while flicking its wings and slowly raising and lowering its tail. This behavior makes identification of hermit thrushes easier in the dark woods where they are seen.

The species' breeding range extends from Canada south into mountainous northern and central Pennsylvania. Hermit thrushes inhabit cool, damp mixed deciduous and coniferous woods. As quiet and unobtrusive as their name implies, they spend much time in the lower branches of undergrowth, and on the forest floor where they forage for insects (including beetles, caterpillars, bees, ants, wasps, flies, bugs) by hopping, then stopping, staring, and thrusting with the bill. Animal matter makes up ninety percent of the diet in spring, forty percent in winter. Hermit thrushes eat fruits of viburnum, elderberry, pokeberry, dogwood, greenbrier, juneberry, sumac, poison ivy, and other plants. Males arrive on the breeding range in April, in advance of females. Late snowstorms that cover up food sources may kill many early birds. Females usually build their nests on the ground (but also sometimes in trees two to eight feet above ground), hiding them beneath boughs, weaving together twigs, bark fibers, ferns, mosses, and grasses, and adding a soft lining of conifer needles, plant fibers, and rootlets. The three to four eggs are pale blue. The female incubates them for about twelve days and the young are able to fly after an additional twelve days. Some pairs raise two broods, continuing the nesting season into early August. Individuals have been known to survive more than eight years, but most do not live that long. The well-camouflaged female hermit thrushes are reluctant to leave their nests, sometimes not flushing until almost directly underfoot. The hermit thrush winters over much of the southern United States, south through Mexico to Guatemala. The only nightingale-thrush to winter in North America, the hermit thrush has not had its population harmed as badly as those of some other thrushes by the rampant cutting of tropical forests.

Wood Thrush (*Hylocichla mustelina*)

The song of the wood thrush has represented wildness since the days of Henry David Thoreau, perhaps even more so in the modern age when the loss of forest habitat has precipitated the loss of wildlife. The flutelike song is usually rendered as *ee o lay,* and it goes on increasingly through May, especially at dawn and dusk. Wood thrushes have reddish heads, olive backs and tails, and prominently spotted breasts. They are not as shy as other forest thrushes nor as bold as robins. Wood thrushes feed on beetles, caterpillars, crickets, ants, moths,

and sowbugs, plus spiders, earthworms, and snails. They also eat many fruits and berries. Wood thrushes nest throughout eastern North America. They are statewide in Pennsylvania in moist lowland woods, dry upland forest, wooded ravines, orchards, city parks, and wooded suburbs. Territories range in size from a quarter of an acre to two acres.

The female builds her nest on a branch or in a fork of a tree six to fifty feet above ground (on average, ten feet high), using grasses, moss, bark, and leaves cemented together with mud. An inner cup is lined with rootlets. The nest looks like a robin's nest but is smaller (a maximum of five and a half inches in diameter, compared to the robin's six and a half inches). Three to four eggs are usual for a first clutch, any later ones will have two to three eggs. The eggs are pale greenish blue. The young hatch after two weeks and leave the nest some twelve days later. Brown-headed cowbirds frequently parasitize wood thrush nests, although in some cases the foreign young may not affect the growth or success of the host's young. House cats, black rat snakes, flying squirrels, grackles, blue jays, weasels, chipmunks, and white-footed mice take eggs, nestlings, and young. In Delaware, a study of 378 wood thrush nests that did not fledge young found that 71 percent had been lost to predation.

Wood thrushes stop singing in late summer but continue to sound *bwubububub* contact notes and *bweebeebeebee* alarm calls. They head south in August and September to forests from southeastern Mexico to Panama, especially Honduras and Nicaragua.

Pennsylvania's forests are very important for the future of wood thrushes since it supports a high percentage of the wood thrush's total nesting population. It is estimated that 8 percent of the species nests in Pennsylvania. The wood thrush population has declined markedly since the 1980s, perhaps because fragmented forests in the Northeast make thrush nests more accessible to predators and to brown-headed cowbirds, that are nest parasites. Air pollution that

wood thrush

has reduced the availability of calcium in the soil may also have played a role in the loss of snails and other invertebrates on which thrushes feed. Wood thrushes have also lost crucial habitat through deforestation on their wintering range.

American Robin (*Turdus migratorius*)

This widespread, adaptable songbird is found in many different habitats, including towns, cities, farmland, cut over areas, woods edges, and deep woods. The American robin is the largest, most widespread, and common thrush of the United States. Early settlers named it after the European robin, which also has a red breast and is a familiar bird of gardens. The American species is about ten inches long and has dark upperparts and a brick red breast, both colors more intense in males than in females, plus a white eye ring. Juveniles have paler colors and spotted breasts. Only the males sing, a hearty *cheeriup, cheerily, cheeriup* given repeatedly. Robins feed on beetles and other insects, earthworms, and fruits, both wild and cultivated. Fruit makes up some sixty percent of the annual diet. Robins often hunt for prey on lawns; they take earthworms that surface after the soil has been soaked by rain. Robins locate their prey mainly by sight rather than by sound.

Robins arrive on their breeding territories in late March and early April. Individuals may have wintered far to the south, or close by in wooded or brushy swamps. Many robins also spend the winter in sheltered woods and thickets of Pennsylvania where they can find sufficient wild fruits and berries. These winter robins are probably migrants from places north of Pennsylvania where they also are common nesting birds. Males home strongly to areas where they were hatched. They begin to establish territories which, as the breeding season progresses, resolve themselves into about a third of an acre. The territories of several males may overlap along their edges. Males may roost communally at night, then resume defending their territories during the day. Ornithologists have not discerned any specific courtship behavior; pairs simply get together. The male brings nest material to the female, and she weaves together grasses, weedstalks, and string, plastering them with mud and repeatedly forming a central cup with her own body. Females often show a muddy band on the breast during nest building. The use of mud make these nests very sturdy (once dried) and distinguishes robin nests from the nests of other thrushes. The cup is lined with fine grasses. Nests may be built in trees (in conifers for first broods, before deciduous trees have put forth leaves), on porch supports, windowsills, sturdy shrubs, and bridge and barn beams; sometimes robins repair and reuse their nest from the previous year.

The female lays three to seven eggs (usually four), which are colored the distinctive “robin’s egg” blue. Unlike many other thrushes, robins discern and eject cowbird eggs. The female does all of the incubating and leaves the nest for about ten minutes per hour to feed herself. Male robins sing most vociferously just before broods hatch, some twelve to fourteen days after the eggs are laid. Both parents feed the young, mainly on insects and earthworms, and they leave the nest after about fourteen days. The male may take over feeding a first brood while his mate begins a second nesting. Pairs start breaking up and communal flocks begin forming in July and August. The flocks move around to find trees and shrubs that have good crops of berries, and in October most of the flocks fly south. Although some robins winter in the north, most migrate to the southern states, with some going as far as Guatemala. Robins may share winter roosts with European starlings, common grackles, and brown headed cowbirds. The adaptable American robin is one of the most abundant birds of the state.

American robin

Revised 02/2021

gray catbird

Gray Catbird, Northern Mockingbird, and Brown Thrasher

These three species are among the most vocal of our birds. All belong to Family Mimidae, the "mimic thrushes" or "mimids," and they often imitate the calls of other species, stringing these remembered vocalizations into long, variable songs. Family Mimidae has more than 30 species, which are found only in the New World, with most inhabiting the tropics. The mimids have long tails and short, rounded wings. The three species in the Northeast are solitary (living singly, in pairs, and in family groups rather than in flocks), feed mainly on the ground and in shrubs, and generally eat insects in summer and fruits in winter. The sexes look alike. Adults are preyed on by owls, hawks, foxes, and house cats, and their nests may be raided by snakes, blue jays, crows, grackles, raccoons, opossums, and squirrels.

Gray Catbird (*Dumetella carolinensis*)—The gray catbird is 8 to 9 inches long, smaller and slenderer than a robin, an overall dark gray with a black cap and chestnut around the vent. Individuals often jerk their tails up, down, and in circles. The species is named for its mewling call, although catbirds also deliver other sounds. They migrate between breeding grounds in the eastern two-thirds of North America and wintering areas in the coastal Southeast and Central America. Gray catbirds are abundant and statewide in Pennsylvania, inhabiting hedgerows, woods undergrowth, regenerating cut-over land, shrubby areas near water, woods edges, and suburban plantings. They shun dense forests.

Catbirds eat wild fruits and insects. In summer the diet is around 60% fruit, and in spring, 20% fruit. Beetles, ants, caterpillars, grasshoppers, crickets, and other insects are common foodstuffs. Catbirds often forage on the ground, using their bills to flick aside leaves and twigs while searching for insects.

Although not as talkative as the northern mockingbird, the catbird is still a versatile vocalizer. Its ability comes in part from the structure of its syrinx, or voice box, with two sides that can operate independently, letting the bird sing with two voices at the same time. A catbird calls out a rapid string of syllables—more than 100 types in some individuals—including squeaks, chitters, whistles, whines, and songs swiped from other birds. The babble, which lasts up to 10 minutes, is frequently punctuated by the familiar catlike *mew*.

Catbirds are monogamous. They nest from May into July and usually raise two broods per year. The nest, substantial and deeply cupped, is placed in a dense thicket, briar patch, vine tangle, or shrubby tree, 3 to 9 feet above the ground. The female lays three to five eggs, which are a dark greenish-blue and unmarked. Brown-headed cowbirds often lay their

northern mockingbird

eggs in catbird nests, but catbirds almost always recognize the parasitic eggs (which are pale and dotted with brown) and pitch them out of the nest. Catbirds destroy eggs and nestlings of other species, including wood-pewees, robins, and sparrows; biologists don't know whether this behavior represents an attack on competitors or a feeding strategy. Parents feed their own young mainly on insects and spiders. Incubation takes two weeks, and the young leave the nest ten or eleven days after hatching.

Northern Mockingbird (*Mimus polyqglottos*)—The slender, robin-size northern mockingbird has a gray back, a pale breast and conspicuous white patches on the tail and wings: when foraging, a mockingbird will often stop and flick its wings, opening them to expose the white patches. The species lives year-round on its range, which overlays most of the lower 48 states and includes southern Canada, the Caribbean islands and Mexico. Mockingbirds live in towns and cities, where they often forage on lawns and in thickets, road margins, woods edges, cut-over lands, and farms. They like a mix of low shrubs and open terrain. In Pennsylvania mockingbirds are most common in the southeast, the southcentral (although not in the mountains) and the southwestern regions.

About half of the diet consists of insects and half of native and cultivated fruits. When hunting for insects, a mockingbird will run along on the ground in short grass, stopping and lunging for its prey: beetles, ants, bees, wasps, grasshoppers, and others. Mockingbirds also eat spiders, earthworms, snails, and sowbugs. In fall and winter, berries and fruits make up most of the diet including grapes, apples, barberries, hawthorn, elderberries, and (a particular favorite) multiflora rose hips. Mockingbirds sometimes drive off cedar waxwings and other birds, with whom they compete for fruit. In winter mockingbirds may visit feeding stations for seeds and suet, pugnaciously chasing other birds away.

Both male and female mockingbirds sing, but the males are the true virtuosos. They mimic snatches of other birds' songs, calls of crickets and frogs, dogs barking and mechanical noises like squeaky hinges and squealing tires. A male's repertoire increases as the bird ages and may ultimately include more than 150 distinct song types. Usually an individual repeats one sound or song three to six or more times, then switches to another song, and so on, singing for minutes on end. (Brown thrashers usually repeat each song once, while catbirds do not repeat.) In the spring, male mockingbirds sing toto establish territories and attract mates, starting in around an hour before sunrise. They sing in flight, on the ground, from perches, when building nest foundations, during and after copulation, while foraging--even with food clutched in their bills. Unmated males may sing during the night, usually from a hidden perch. Mockingbirds sing from March to August (during the breeding season) and from late September into November (while establishing fall and winter feeding territories).

Mockingbirds are mainly monogamous. Courting males and females chase each other in flight. The nest is a bulky cup built in a dense shrub or a tree, usually three to 10 feet above the ground. The female lays three or four greenish to bluish gray eggs, blotched with brown. She incubates them 12 to 13 days. Both sexes feed the young, which fledge after 12 days, although they're not strong fliers for another week. At fledging, the male may continue to feed the young while the female lays and begins incubating the next clutch. This division of labor lets mockingbirds produce two and sometimes three broods (up to four in the South) during each breeding season. Mockingbirds aggressively defend their nests, driving away predators and attacking humans who venture too close.

Some mockingbirds spend the whole year as a pair on a single territory, while others, particularly in the northern part of the range, use different breeding and wintering territories. In the north, some individuals may migrate south in winter. Young disperse up to 200 miles from where they hatched. Ornithologists believe the spread of multiflora rose (an invasive species once planted widely for wildlife habitat) and the planting of ornamental shrubs (especially Pvracantha, or fire thorn) provided key winter food and shelter, aiding the mockingbird in a northward population expansion that has gone on for close to a century.

Brown Thrasher (*Toxostoma rufum*)—The largest of our three mimids, the brown thrasher has an 11- to 12-inch length, half of which is tail. Plumage is rich reddish brown above, heavily streaked below. The name "thrasher" may come

from the bird's habit of thrashing the ground litter, using its long, curved bill to sling aside leaves and dirt while foraging. Brown thrashers breed across the eastern two-thirds of North America, with a range similar to that of the gray catbird. The species nests statewide in Pennsylvania, although it's more common in the southern than the northern counties. Brown thrashers prefer brushy, thorny places, including hedgerows, thickets, forest margins and clearings and old fields overgrown with shrubs. Shyer than catbirds and mockingbirds, they are less likely to live around people, and they often flee into escape cover at the sight of a human.

Brown thrashers feed on insects (more than half the annual diet), berries, small fruits, seeds and nuts, including many acorns. Occasionally they take crayfish, lizards, and small frogs. The best time to observe brown thrashers is in April, before nest building has commenced, when males sing from high, exposed perches to attract mates. The song is full of improvisation and mimicry of other species, including flickers, titmice, cardinals and thrushes; observers have reported over 3,000 song types, the largest repertoire of any North American bird species. The alarm call is a crackling note that may sound like a loud, smacking kiss. After mating, males continue to sing but in a quieter tone. Territories are two to 10 acres.

The nest, hidden in dense, tangled cover, is built mainly of sticks and twigs lined with cleaned rootlets. Thrashers place their nests from one and a half to twenty feet above the ground and occasionally on the ground itself. The female lays four eggs, which are pale blue and freckled with reddish brown. Both parents incubate. The eggs hatch after eleven to fourteen days, and the young leave from the nest nine to thirteen days after hatching. They stay in the vicinity, and their parents bring them food. Two broods per year are usual; some thrashers switch mates between same-season broods. Nesting runs from early May to the end of July in Pennsylvania.

Brown thrashers in southern areas are permanent residents, but most of those breeding in the Northeast leave the region in September and October and take up residence in thickets in the Gulf states. Statewide, the brown thrasher population seems to have decreased by about four percent a year since the mid-1960s, perhaps because of cowbird parasitism, nest predation and the spread of human settlements the growth of old fields into mature woodlands.

brown thrasher

Revised 02/2021

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

hooded warbler

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 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 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.

worm-eating warbler

Louisiana Waterthrush

(Parkesia motacilla)

Louisiana waterthrush

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 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

black-and-white warbler

common yellowthroat

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 *weesee, weesee, weesee*, 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

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 nest 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, zzzeet!*

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 *(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

yellow warbler

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 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.

Revised 03/2021

Tanagers

Two tanager species migrate north from the Neotropics to breed in eastern North America. Pennsylvania's two "tanagers" are actually part of the Cardinal family, Cardinalidae, that also includes some grosbeaks, buntings, other tanagers, and cardinals. The word tanager comes from a South American Indian word denoting a small, brightly colored bird. In tropical forests, mixed feeding flocks may include over a dozen kinds of species in plumages of red, yellow, green, blue and purple. Each of these two tanagers actually spends more time in the rainforests of South America in winter than they spend on their northern nesting grounds. So, they truly offer a glimpse of the tropics in Pennsylvania.

Scarlet Tanager (*Piranga olivacea*)

Male scarlet tanagers are noted for their bright fluorescent red color. Males arrive on the breeding range (eastern North America from southern Canada to the Carolinas) in late April and early May, just as trees are beginning to leaf out. Their bodies are red, and their wings and tails are jet black. Females, which show up a few days later, are a greenish yellow that blends with the leaves in which they rest and feed. In winter, male tanagers look green like females, so their plumage can have a confusing mix of red, green, and yellow while they molt in early fall and in spring. Adults are about seven inches in length.

Scarlet tanagers favor dry, upland oak woods, especially more mature woods. They also inhabit mixed and coniferous forests and shade plantings in suburbs and parks. Males claim two- to six-acre territories by singing almost constantly from prominent perches and driving away competing males. The song sounds like *ieeveet ieeav ieeeoo ieeveer ieeveet*, five to nine slightly hoarse notes ("like a robin with a sore throat," said Roger Tory Peterson). The call note "*chip-berrr*" is one of the most commonly heard sounds of the Pennsylvania summer woods. Males whose territories adjoin sometimes perch along shared boundaries and countersing. Males return to previous years' territories, but it is thought that females lack this strong homing instinct, so that they rarely take the same mate in succeeding years.

scarlet tanager

Insects and fruits form the bulk of the diet. Females forage higher in the tree canopy than males. Both sexes work slowly and methodically, inspecting leaves, twigs and branches and picking at leaf clusters near the ends of twigs. Sometimes they make short flights to catch flying insects, particularly bees and wasps. They eat caterpillars, moths, adult and larval beetles, dragonflies, aphids, snails, spiders, worms and millipedes. During cold snaps they land on the ground and hunt for beetles, earthworms and other terrestrial prey. They also eat tender buds, wild fruits and berries, and cultivated fruits such as cherries.

Scarlet tanagers nest in late May and June. To rear a brood, a pair needs at least four wooded acres, with eight the optimum. During courtship the male flies to a perch below the female; he droops his wings and spreads his tail to show off his brilliant back. If the female strays outside his territory, he chases her back into it. Tanagers mate frequently, with the female crouching and calling to entice the male. She chooses the nest site and builds the nest herself, over three to seven days, while the male sings from perches at the mid-forest level. Tanagers nest lower than they forage; nests are eight to 75 feet up (usually 18 to 50 feet), often near the end of a horizontal branch in an oak, with a view of the ground and with clear flyways from nearby trees. The nest is flattish

and rather flimsy, made of twigs and rootlets and lined with grasses and stems. Some nests are so loosely woven that the eggs can be seen from beneath. The female lays two to five eggs, usually four. The eggs are pale blue-green marked with brown.

The female incubates them for about two weeks, with the male bringing food to her. Both parents feed insects and fruit to the young, which leave the nest after 9 to 12 days. The parents keep feeding them for two more weeks. Only one brood is produced each summer.

Fledglings are brown, with slight streaking. In late summer the adults molt, and for a while the male is a patchwork of red, yellow and green. He ends up looking like the female, but retains his black wings and tail. Scarlet tanagers leave Pennsylvania in September and early October.

They migrate mainly through the Caribbean lowlands of Middle America and spend most of the year east of the Andes in remote forests of Colombia, Ecuador, Peru and Bolivia. There they sometimes join mixed-species flocks and feed in the canopy (along with other tanagers) and in fruiting trees.

One scarlet tanager that had been banded lived for ten years; most, however, probably don't survive for half that long. They are preyed on by hawks, falcons and owls. Tanagers attack squirrels and blue jays, which nevertheless manage to rifle many nests. Crows also eat eggs and fledglings. Brown-headed cowbirds parasitize more than half of all tanager nests in some areas, particularly where the forest has been fragmented by logging or home development.

Scarlet tanagers nest statewide in Pennsylvania and are more common than many people think, though they are absent from treeless urban areas and intensively farmed lands. The highest populations occur in mature, extensive forests and are a fairly common species in the state's game lands. Pennsylvania's forests support ten percent of the world's population of scarlet tanagers. As a result, Pennsylvania has high stewardship responsibility for this species. For this reason, it is a high priority conservation species in the Wildlife Action Plan. It is important that the commonwealth manages its forests in such a way as to retain healthy populations of this beautiful and appealing songbird for the enjoyment of future generations.

Summer Tanager (*Piranga rubra*)

This tanager breeds mainly in the southeastern U.S., where it is called the "summer redbird." The summer tanager is slightly larger than the scarlet tanager and it has a much larger bill. The male has rosy red plumage all over while the females are a mustard yellow. Female scarlet tanagers have greener plumage. The song of the summer tanager is a lot like the sweet sound of an American robin, not hoarse like a scarlet tanager. The call note of summer tanager is a distinctive, insistent "*piti–tuck*".

Its range extends sporadically into southern Pennsylvania. It was formerly found regularly in Greene County and other southwestern counties, but this colorful songbird has declined from the northern part of its breeding range in recent years. It is now only rarely encountered in southern Pennsylvania counties. The summer tanager's future in Pennsylvania as a nesting species seems tenuous. Summer tanagers inhabit dry upland forests, with a preference for slightly open oak woods and edges. In summer they eat mainly insects: caterpillars, moths, beetles, cicadas, grasshoppers, flies and others; often they tear open wasp nests to feed on larvae, apparently without being stung. They also eat fruits and berries, especially in migration and on their wintering grounds. The summer tanager's breeding and nesting habits are similar to those of the scarlet tanager. In migration, they sometime overshoot their nesting range and wander north before returning south to their breeding territories. Summer tanagers fly south each fall, most crossing over the Gulf of Mexico to spend the majority of the year on a large range that extends from central Mexico to Bolivia and Brazil.

Revised 03/2022

Towhee, Junco and Sparrows

white-crowned sparrow

At first glance, sparrows (Family Emberizidae) may seem to be drab, ordinary birds. Because of their apparent sameness—as well as the dense or grassy cover in which most are found—beginning and casual birdwatchers may find it tough to identify the different species. In fact, the plumage of each is a distinctive, complex blending of shades and streakings of brown. The birds' habits and adaptations work in fascinating ways to let them take advantage of many habitats. The word "sparrow" comes from *spearwa*, an Anglo-Saxon word meaning "flutterer"; English settlers applied the name to New World sparrows. In England today, birds North Americans would call sparrows are referred to as buntings. More than 30 species are native to North America. Twelve breed in Pennsylvania, and five regularly migrate through the state. In all, approximately 27 species of sparrows have been reported in Pennsylvania.

Sparrows eat many hard seeds of grasses, weeds, and trees. They have short, thick bills well-suited for cracking seeds and grasping small caterpillars. Most forage on the ground, scratching with their feet to expose food in dense grass, weeds and low shrubs. Sometimes sparrows make short flights to catch flying insects that they have flushed from the ground. In summer, adults eat insects and nourish their young with this high protein fare. In late summer and fall, sparrows eat berries and fruits.

They keep in contact with mates or flock members by using short calls, often *chip* or *seep* sounds, which vary between species. Males defend territories mainly by singing from exposed perches, and their songs are often complicated and mellifluous. The males of some grassland sparrows perform flight and song displays. Males also chase away rivals. In most species, pairs nest in isolation or in loose colonies brought together less by social tendencies than by attraction to a special habitat. Sparrows usually nest in low bushes or on the ground. The typical nest is an open cup woven out of grass, weeds, and twigs, built mostly or entirely by the female. The eggs of the various northeastern sparrows are spotted or blotched with brown. These patterns make them difficult to see in the grassy and shrubby areas where nests are usually located. In most species, the female incubates the eggs and the male may bring food to her. Both parents share in feeding the young. Should a female begin a second brood, her mate may assume the care of first brood young that have fledged from the nest. Many of Pennsylvania's sparrows produce two broods per year.

Ornithologists believe that most sparrow pairs are monogamous, but the breeding biology of many species has not been studied carefully enough to allow definite conclusions. Savannah sparrow males may have two mates with staggered broods, so that the male can help first with one brood and then with the second. Some male swamp sparrows also have two mates.

Sparrows do not make long migrations compared to some of Pennsylvania's other songbirds. Most species winter in the southern United States and northern Mexico, and none go as far as the tropics. In winter, sparrows are often gregarious and travel in flocks when searching for food. In open country, flocks often contain individuals of only one species, but in brushy areas or along woods edges, which offer a more diverse suite of foods, mixed species flocks are the rule. The greatest threat to sparrows is the destruction of their habitat.

The drainage of swamps and conversion of fields to housing developments relentlessly cuts into the size and diversity of sparrow populations as well as harms many other kinds of wildlife. Even sparrows that are associated with open fields do not do well with intense agricultural activities. The use of certain chemicals has harmed the success of grassland birds.

A closer look at five common Pennsylvania sparrows follows.

Eastern Towhee (*Pipilo erythrophthalmus*)

Formerly called the rufous-sided towhee, this large (7 to 8 inches), long-tailed sparrow breeds statewide in Pennsylvania. Adults have rusty sides, white bellies, and solid-colored backs and heads that are black in the male and brown in the female. The eyes are red. Males sing a distinctive *drink your tea*, with the middle syllable low and the last syllable drawn out and quavering. Both sexes frequently give an emphatic *chewink* or *tow-hee* call. A way to locate the birds is to listen for the rustling they make while scratching for food in leaf litter. The eastern towhee is sometimes called the "chewink" for its call, and the "ground robin" for its foraging habits.

Eastern towhees are most common in thickets, shrublands, early successional forests, and forest edges. They are found in overgrown shrubby fields, woodlands, regenerating clearcuts, hedgerows, thickets, shrubby wetlands, and the dense understory of open deciduous woods. Rarely do they live in cities or intensively farmed areas. When seeking food, towhees energetically turn up leaves by hopping backwards and by scratching with both feet. Leaf litter is an important habitat component. They eat beetles, ants, bugs, spiders, millipedes, snails, caterpillars (including late stage gypsy moth larvae), moths (adult gypsy moths and others), seeds, small fruits, berries, and acorns.

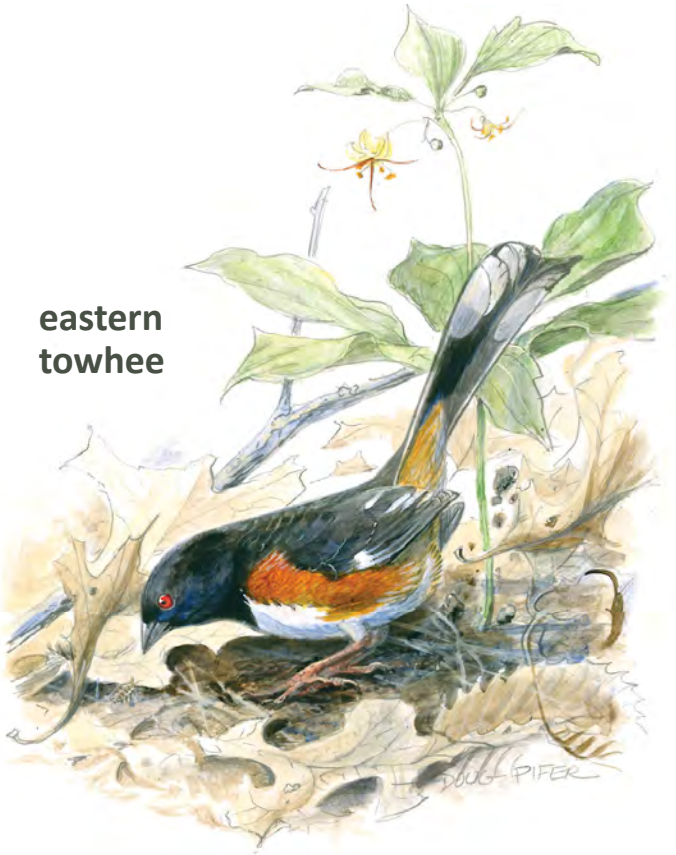
In April, males arrive in the north in small bands. They disperse and, singing from high perches, proclaim individual territories of one-half to two acres. Females show up about a week later. Males and females spread their wings and tails to each other, exhibiting their white patches. The female gathers materials for the nest, while the male sings nearby. She scuffs out a shallow depression in the ground and builds a bulky but well-camouflaged nest of leaves, bark strips, and other plant matter, lined with fine grasses and pine needles. Occasionally the nest is built in a bush, as high as 5 feet above the ground. This is especially true of the second nesting that occurs when plant growth is much more developed than in spring when they nest for the first time.

The female lays three or four eggs that are creamy white with brown spotting. She incubates them for 12 to 13 days. During the day, she sneaks off to feed about once every half hour. After the eggs hatch, the male brings food for the brooding female and the young. In about a week the female begins leaving the nest to help the male forage and feed the brood. Young leave the nest after 10 to 12 days, and their parents feed them for another month. Most females build a second nest, and most pairs produce two broods. In Pennsylvania, towhees nest from late April into August. After fledging, young birds flock together. Adults do not defend their territories against juveniles, even if not their own.

In winter, towhees shift southward into the southern states, where they forage in loose flocks averaging 15 to 25 members. Females go farther south than males. The estimated life span is four to six years. The clearing of the eastern deciduous forests around the turn of the twentieth century helped towhee populations to expand and reach high densities up until the early 1970s. As middle stage forests reverted to mature forests towhee populations declined from those peak numbers for nearly a decade, according to Breeding Bird Survey trends. Currently, the eastern towhee remains one of Pennsylvania's most numerous forest bird species, but there is a downward trend with this species, especially in the western counties.

Chipping Sparrow (*Spizella passerina*)

This small, slim sparrow is about 5 inches long and marked with a rusty-colored cap and a line of white above each eye. The *Second Pennsylvania Breeding Bird Atlas* survey found the chipping sparrow to be the third most widespread bird in the state; only the American crow, and American robin were observed more frequently. Chipping sparrows feed and breed in suburbia, urban parks, gardens, clearings around rural homes, pastures, orchards, shrubby fields, open woodland, woods edges and even in openings and road-sides within deep woods. On a continental scale they breed from Alaska to Nova Scotia and south to Nicaragua. They are not very shy



of humans. The song is a rattling or buzzing trill: a series of chips in one pitch. Chipping sparrows forage in trees and on the ground. Their diet in early summer may be 90 percent insects, including grasshoppers, caterpillars, beetles, and moths. They eat many seeds, especially in fall and winter, of chickweed, pigweed, ragweed, foxtail, and other grasses. Males arrive on the breeding range in April, ahead of females, and claim territories of one-half to one and a half acres. In early May, the females build nests, often in conifers, including suburban plantings, 3 to 10 or more feet above the ground. A female usually lines her nest with fine grasses or animal fur, including horse hair. The three or four eggs are a pale bluish green, marked with brown spots. The female incubates the eggs for 11 to 14 days. Young fledge from the nest 8 to 12 days after hatching. Chipping sparrows were long considered to be monogamous breeders, however, recent research found that males wander outside of their breeding territories looking for additional opportunities to mate. Incidents of extra pair copulations may be higher in some populations than in others. Most pairs raise two broods per summer.

In August and September, family flocks desert their home territories and wander while searching for food. In late September and October, most chipping sparrows leave the Northeast for wintering grounds in the Gulf Coast states. In the 1800s the chipping sparrow was the most common sparrow of American towns and cities, but the introduced house sparrow largely took over that role. Chipping sparrows are preyed on by blue jays, snakes, domestic cats, and small hawks and owls. Brown-headed cowbirds often parasitize first broods, but chipping sparrows frequently raise their second broods after the cowbirds' annual breeding period has ended.

Field Sparrow (*Spizella pusilla*)

Like the closely related chipping sparrow, the field sparrow has a chestnut-colored cap; however, it lacks a white facial stripe and has a noticeably pink or rusty-colored bill. The song is a bouncy series of sweet notes speeding up into a trill *swee-swee-swee-swee-wee-wee-wee-wee*. Field sparrows live in old fields with scattered brush and bramble and sumac clumps, woodland edges, thickets, fencerows, cuttings, and Christmas tree plantations. They avoid open meadows, cropland, urban areas, and deep woods. The species breeds in every Pennsylvania county but is absent from heavily developed areas around Lancaster, Philadelphia, and Pittsburgh. It ranges across the East and winters from southern Pennsylvania southward.

Field sparrows arrive in their breeding habitat from early to mid-April. Males' territories average two to three acres. Females build their nests on or near the ground for the season's first brood, then often select a small sapling or thick shrub, such as a hawthorn, for later nests when ground cover has increased in height. The three to four eggs hatch after about 11 days of incubation. Unlike chipping sparrows, field sparrows rarely nest near human dwellings. Like chipping sparrows, field sparrows permit people to come quite close.

Field sparrows are partial migrants and migration takes place in September and October. Individuals may remain on or near breeding grounds during winter or migrate farther south, as far as the Gulf Coast states. In Pennsylvania, most wintering field sparrows are found across the Piedmont and in river valleys of the Ridge and Valley region. *Spizella pusilla* was first described and named by Pennsylvania ornithologist Alexander Wilson on the basis of specimens collected within the state.

field sparrow

song sparrow

Song Sparrow (*Melospiza melodia*)

An accomplished songster, this shy sparrow has a heavily streaked breast with a dark central spot. When in the species' habitat of overgrown weedy areas, thickets, marshes or abandoned pasture land, listen for the melodious song: three or four repeated notes, *sweet sweet sweet sweet*, followed by a number of shorter variable notes and a trilled ending. Song sparrows breed across North America and winter in the lower 48 states. They breed statewide and abundantly in Pennsylvania. More song sparrows winter in the southern half of the state than in the northern half. Corn stubble and brushy thickets are prime wintering areas.

Song sparrows nest mainly on the ground in the shelter of grasses, sedges, cattails, or under shrubs, with later nests often located in trees or bushes up to 12 feet high. Prolific breeders, they may raise two, three, or even four broods per season, sometimes all in the same nest. A normal clutch is four eggs. The eggs of brown headed cowbirds look very similar to song sparrow eggs (greenish white, heavily dotted and blotched with reddish brown) except that cowbird eggs are larger. Brood parasitism by brown-headed cowbirds negatively impacts song sparrow populations. This species also is vulnerable to many predators of ground nests such as feral cats, snakes, foxes, skunks, opossums, raccoons, and many rodents. Although the song sparrow is the most numerous breeding bird species in Pennsylvania, Breeding Bird Survey data indicates a decline in the last three decades.

dark-eyed junco

Dark-eyed Junco (*Junco hyemalis*)

Juncos are familiar winter visitors. Many people are surprised to learn that juncos also breed in Pennsylvania. These birds have slate gray backs and heads, white bellies, pink bills, and white outer tail feathers. The springtime song is a slow musical trill similar to that of the chipping sparrow but less mechanical sounding; in the winter, the song is usually a string of twittering notes. Ground-loving birds, juncos scratch in the leaf duff, soil, and snow to expose their food. Although primarily seed-eaters, insects make up about half of the diet during the breeding season. Seeds of ragweed, foxtail, crabgrass, smartweed, pigweed, goldenrods, asters, and other grasses and weeds predominate in fall and winter. Juncos also eat springtails, the tiny "snow fleas" that pepper the snow on warm winter days.

Juncos breed across northern North America and south through the western United States. They are found in the east from New England south in the Appalachians to Georgia. In Pennsylvania, they nest on wooded ridgetops and in hemlock ravines across the forested northern third of the state and at higher elevations along the Ridge and Valley region. In spring, males stake out breeding territories of two to three acres, singing from tall trees. This is about the only time these birds ascend very far from the ground. Breeding season runs from March to August. Females build nests on the ground: on vegetated banks created by logging roads, stream banks, and hillsides. Nests are also tucked beneath exposed tree roots overhung by dirt or plants or embankments along streams, ditches, or roads. The three to six eggs are pale blue and profusely dotted with brown. Some pairs raise two broods. Juvenile birds are streaked with brown.

Juncos move south in flocks, mainly in October. The individuals that winter in Pennsylvania probably bred or were hatched farther to the north. Winter flocks tend to have same age, same sex members; each flock numbers around 15 to 30 birds that forage together on an area of 10 to 12 acres. They often forage with other sparrows in a mixed flock. In winter, juncos favor hedgerows, brush piles, thickets, weedy fields, and shrubbery around houses. At night, flock members roost together in a habitual site, usually in the dense boughs of a conifer.

Seven others breed in Pennsylvania.

The **vesper sparrow** (*Pooecetes gramineus*) is an open field and grassland species that breeds in scattered locales across the state, mostly in the grassy and cultivated crop fields associated with agriculture areas and the open grasslands of reclaimed mine sites. Its numbers have declined in the last 40 years. The vesper sparrow has a plaintive, whistled song heard in the evening when other birds have become quiet. The shy, inconspicuous **savannah sparrow** (*Passerculus sandwichensis*) nests on the ground in open grassy areas such as meadows, hayfields, and reclaimed surface mines. Another inconspicuous species inhabiting grasslands and meadows is the **grasshopper sparrow** (*Ammodramus savannarum*), so called because its song resembles the trill of a grasshopper. **Henslow's sparrow** (*Ammodramus henslowii*) breeds mainly in western Pennsylvania, in abandoned weedy fields, damp meadows, and reclaimed strip mines. Its weak, abrupt song is very difficult to hear so it is often overlooked. Pennsylvania hosts the largest population of this species in the Northeast. It is a high priority conservation species for the state. Although relatively rare, research has revealed high local densities of nesting pairs in some surface mine grasslands that need to be managed to maintain these populations

The **clay-colored sparrow** (*Spizella pallida*) is a close relative of chipping sparrow that has only recently established itself as a breeding species in the state. The clay-colored sparrow is very inconspicuous and might not be noticed except for its distinctive buzzy, insect-like song. It nests in brushy, regenerated surface mines, especially in the Northwest and Northcentral parts of the state. It has also been observed in brushy abandoned fields and Christmas tree plantations with small trees. There were no confirmed nesting records of this species before the 1990s. This species is slowly expanding its breeding range eastward including Pennsylvania. They often migrate with chipping sparrows, and are easily overlooked or mistaken for that similar species. The **swamp sparrow** (*Melospiza qeorgiana*) is found in Delaware River tidal marshes and in freshwater marshes in the state's northeastern and northwestern quadrants. It is closely associated with emergent wetlands and found elsewhere in bogs, swamps, and rank growth adjoining ponds and sluggish streams. It is unfortunate that this is one of the most elusive species, because the swamp sparrow is a particularly handsome sparrow with dark rufous wings and a reddish cap. Its song is said to sound like a chipping sparrow with wet lips, often heard in a cattail marsh or shrub wetland. The **white-throated sparrow** (*Zonotrichia albicollis*) breeds mainly in the north, often in or near forested wetlands, and its range extends south into Pennsylvania's northern tier. This chunky, colorful sparrow is also frequently seen during migration. Its plaintive song *Oh, Canada!* is a characteristic sound of boreal forests and bogs and its husky *chip* note is a common sound of Pennsylvania's shrubby habitats in spring, fall, and winter. This is a common passage migrant and wintering species in the Commonwealth, often visiting feeders or foraging in thickets, brushy fields, and woods.

Others pass through in spring and fall.

The **American tree sparrow** (*Spizella arborea*) is a common migrant and a winter resident. It is sometimes considered the "winter chippy" due to its superficial similarity to the chipping sparrow. The American tree sparrow has a reddish eye-line rather than a black eye-line that is easy to see on the face of a chipping sparrow. It also sports a distinctive pin spot on its breast and a bicolored bill. The large reddish brown **fox sparrow** (*Passerella iliaca*) is a regular migrant in the state, found especially in brushy areas. This big boreal sparrow looks like a giant red-colored song sparrow. They sometimes visit feeding stations with nearby cover. The **white-crowned sparrow** (*Zonotrichia leucophrys*) is also a regular migrant in Pennsylvania with some spending the winter in the state. This boreal species resembles the white-throated sparrow but it is smaller with a "pointy-headed" rather than a "round-headed" appearance. It has a pink-colored bill, and lacks the distinctive yellow lores of the white-throated sparrow. **Lincoln's sparrow** (*Melospiza lincolnii*) is a rare migrant through the state, most often spotted in brushy fields, wetlands, and river bottom forests. It looks somewhat like a smaller and more delicate version of a song sparrow, but with a finely streaked and buffy breast. The **Nelson's sparrow** (*Ammodramus nelsoni*) is the one remaining regularly observed sparrow, but it is difficult to find. Most reports of this migrating sparrow are from grassy islands in the lower Susquehanna River. It was formerly considered a sub-species of the sharp-tailed sparrow.

white-throated sparrow

fox sparrow

Revised 02/2021

Northern Cardinal, Grosbeaks, Indigo Bunting & Dickcissel

northern cardinal

Cardinals, grosbeaks, and indigo buntings are equipped with stout strong bills. The bills are used to crush seeds and tree buds. In addition to seeds, buds, and fruit (important fall, winter, and spring foods), these birds eat protein rich insects in summer and feed them to their young. They are attracted to thick cover including forests, woods edges, brushland, swamps, and ornamental plantings in suburbs and cities. The dickcissel is a related species that breeds mainly in the Midwest but also nests in grassy habitats in Pennsylvania. All of these species belong to the family Cardinalidae.

Northern Cardinal (*Cardinalis cardinalis*) - Adults are eight to nine inches long, slightly smaller than a robin. Both sexes have an orange red bill and a prominent head crest. Male and female cardinals have different plumages, a condition called sexual dimorphism. The male's plumage is an overall bright red; the female is yellowish brown with red tints on her wings, tail, and crest. The cardinal is found through much of central and eastern North America from southern Canada south into parts of Arizona, Mexico and Central America. Before 1900, the species was uncommon in Pennsylvania and observed primarily in southern regions of the state. During the last century cardinals have expanded northward and are now common throughout all of Pennsylvania except for heavily forested areas on the Allegheny High Plateau. Cardinals also breed across the Midwest and in Central America from Mexico to Guatemala. They are year round residents throughout their range.

Cardinals live in thickets, hedgerows, brushy fields, swamps, gardens, and towns and cities. They need dense shrubs for nesting; these can range from thick tangles sprawling between woodlots and fields, to hedges of privet and honeysuckle on shady streets. Hawthorns, lilac, gray dogwood, and dense conifers also provide nesting cover. Mated pairs of cardinals use territories of 3 to 10 acres. Cardinals eat caterpillars, grasshoppers, beetles, bugs, ants, flies, and many other insects; fruits of dogwood, sumac, pokeberry, cherry, mulberry, and wild grape; and seeds of smartweeds and sedges, grains scattered by harvesting equipment, and sunflower seeds at bird feeders. Cardinals have become tolerant of humans. In winter, cardinals forage on a variety of wild fruits and berries as well as seeds. Many people have experiences with cardinals landing nearby.

Male cardinals begin singing in February and March, especially on sunny days, signaling the onset of the breeding season.

Females also sing, probably as a way to convey information to the male on the need to provision the nest. Males and females both sing very well. Cardinals are known to sing more than 25 different songs, but their most commonly heard song is a series of clear whistled notes, *whoit whoit whoit whoit* (like a kid learning to whistle) or *wacheer wacheer*. Cardinals often countersing: males on adjacent territories, or pairs within their own territory, alternately match songs. As a part of courtship, the male will pick up a bit of food (such as a sunflower kernel at a feeder) in his bill and sidle up to his mate; the two touch beaks as she accepts the morsel.

Nests are placed one foot or up to 15 feet off the ground and are often concealed in the thickest, thorniest scrub on the pair's territory. It takes the female three to nine days to build the nest, a loose cup woven out of twigs, vines, leaves, bark strips, and rootlets, lined with fine grasses or hair.

The female lays two to five eggs (commonly three or four), which are whitish and marked with brown, lavender, and gray. She does most of the incubating, and the male brings her food. Young hatch after about 12 days. Their parents feed them regurgitated insects at first, then whole insects. The young fledge approximately ten days after hatching; the male may continue to feed them for a few days while the female builds another nest and begins a second clutch. Cardinals can produce up to four broods per year, however, a pair typically produces one or two broods. Nest predation is very high on both eggs and nestlings. Cardinals do not reuse their nests and the old nests may help keep predators away from the active nest. Nest predators include snakes, crows, blue jays, house wrens, squirrels, chipmunks, and domestic cats. Brown headed cowbirds parasitize cardinal nests, often removing cardinal eggs from the nest and replacing them with their own eggs. Cardinals often rear the cowbird nestlings. Cardinals compete with gray catbirds for food and nest sites; catbirds usually dominate in these interactions and may force cardinals to the fringe of usable habitat.

Cardinal pairs may stay together through winter and often join foraging flocks including dozens of cardinals. They also forage in mixed species flocks with tufted titmouse, dark-eyed juncos, white-throated sparrows and American goldfinches. In winter, white-footed mice sometimes move into old cardinal nests, stuff the cups with plant matter, and set up housekeeping. Cardinals are preyed on by hawks, owls, and foxes and other ground predators. The longevity record for wild-living cardinals is 15 years.

Cardinal populations have risen steadily in Pennsylvania through the twentieth century. Several factors may have helped *Cardinalis cardinalis* overspread the state during that period: an increase in edge habitats caused by sprawl and land use changes; a period of warm winters in the early 1900s; a similar warming trend in recent years; and an increase in backyard feeding stations dispensing high energy seeds that help cardinals and other birds survive frigid weather. People who enjoy cardinals can help their fate by promoting the growth of shrubs and brambles on their property. Cardinals nest in dense thickets of shrubs and forage not only on the insects that live in shrubs but also on the fruits they produce.

Rose-breasted Grosbeak *(Pheucticus ludovicianus)* - Some outdoor enthusiasts believe that no thrush can hold a candle to the rich singing of the rose-breasted grosbeak, and that the latter is perhaps the handsomest bird in the woods. The male of this species has a black head, a massive ivory-colored bill ("grosbeak" means "big beak"), white patches on black wings that flash like semaphore signals when the bird flies, and a triangular bright red patch on the white breast. The patch varies somewhat in size and shape from one individual to the next. The female looks like a gargantuan brown sparrow. The song, given by both sexes, is robin-like but quicker, mellower, and full of life. Adults are about eight inches long.

Rose-breasted grosbeaks breed from Nova Scotia to western Canada and south in the Appalachians to northern Georgia. The species is statewide in Pennsylvania: scarce in the developed and agricultural southeast, abundant across the northern tier and western half of the state. Grosbeaks favor second growth deciduous or mixed woods and can also be found in woodland edge thickets, old orchards, parklands, and suburban plantings. They eat insects (about half the diet in summer), seeds (easily crushed by that formidable bill), tree buds and flowers and fruits.

rose-breasted grosbeak

Males arrive on the breeding grounds in late April and May, about a week ahead of the females. Males sing to proclaim a two to three acre breeding territory and may attack other males who intrude. When courting a female, the male takes a low perch or lands on the ground, then droops quivers his wings, spreads and lowers his tail, and slowly rotates his body from side to side while singing. Rose-breasted grosbeaks often nest in thickets along the edges of roads, streams, or swamps or in regenerating old fields where small dogwood and other deciduous trees form a short canopy that they readily adopt. The nest, built mostly by the female, is loose, bulky, and made almost entirely of twigs. It is so loosely built that sometimes the eggs can be seen from below through the nest material. The nest is often built in the mid-story of the forest, usually 10 to 15 feet above the ground in a small tree or shrub such as flowering dogwood. Since a nesting pair often vocalizes in the vicinity of the nest, a melodious song of warbling notes or a characteristic metallic *chink* call, the nest is fairly easy to find. Oddly, males will even sing while sitting on a nest.

The one to five eggs (typically four) are pale greenish-blue, and blotched with reddish browns and purples. Both parents incubate the eggs, which hatch after about two weeks. Both parents also brood and feed the young, who leave the nest 9 to 12 days after hatching. Should a female start a second brood, she may leave the young while they are still nestlings; the male assumes care of the first offspring while the female starts building a second nest, often less than 30 feet away from the first. Adults molt in August, and the male's new plumage includes brown and black streaks on the head, neck, and back. In late August and September rose-breasted grosbeaks start the migratory trek southward to wintering grounds in Central America and northwestern South America.

Blue Grosbeak *(Passerina caerulea)* - Like the cardinal, this is a southern species that has expanded northward over the last century. The blue grosbeak nests in southern Pennsylvania, particularly in the southeast and southcentral portions of the state. Historic accounts along with the first and second Atlas records indicate that it is mainly found in the counties along the Mason-Dixon line from Adams to Chester counties, especially in Fulton and Lancaster counties. It is now found regularly across the Piedmont, including Delaware and Philadelphia counties at Tinicum National Environmental Center. This grosbeak has expanded north to Lehigh, Carbon and Northampton counties and west to include Bedford and Cambria counties. There have also been accounts of isolated nesting in the northcentral and western parts of the state.

The blue grosbeak looks like a bigger and more robust version of the more common Indigo Bunting. Males are a deep dusky blue; females are brown and sparrow-like. The female somewhat resembles a brown-headed cowbird, but it has a larger bill, two buffy wing-bars, and a splash of blue on the rump. Male blue grosbeaks sing from elevated perches including treetops and utility wires. Their song is a lovely warble that is reminiscent of the song of the purple finch or orchard oriole. Both sexes utter a distinctive, sharp "*chink*" call note.

blue grosbeak

Blue grosbeaks inhabit open areas with scattered trees, fence rows, roadside thickets, reverting fields, brush and forest edges. They occupy land restoration projects where surface mining and landfills have been reverted to grassland and shrubland habitat. These areas are often lost to development or mowing. Blue grosbeaks often feed on the ground and eat many insects as well as the seeds of weeds, grasses, and other plants. The female builds the nest, a compact open cup, 3 to 10 feet above the ground in a shrub, tree, or vine tangle. The usual brood is four. Cowbirds often parasitize the nests of this species. Blue grosbeaks winter mainly in Mexico and Central America.

Indigo Bunting *(Passerina cyanea)* - The indigo bunting breeds throughout the East and in parts of the Midwest and Southwest. The species is statewide and common in Pennsylvania. This is the little all-blue "bluebird" of roadsides and abandoned fields. Adults are about five and a half inches long, slightly smaller than a house sparrow. The male is bright blue, although he may look almost black in deep shade; the female is drab like a sparrow. Indigo buntings find food on the ground and in low bushes. They eat many insects, including beetles, caterpillars, and grasshoppers, supplemented with grass and weed seeds, grains, and wild fruits.

Males migrate north in late April and May, with older males preceding younger ones and returning to their territories of past years. The two to six acre territories are in brushy fields, abandoned fields, clearings in woods, woods edges, clearcuts,

blackberry thickets, food plots, and along weedy roadsides and power line corridors. They are often found in the same places that cottontail rabbits are common. Males make moth-like display flights along territorial boundaries, flying slowly with their wings fanned and tail and head held up, using rapid, shallow wingbeats while sounding a bubbly song. They also perch and broadcast a more complicated territorial/courtship song, a series of high, whistled notes described as *sweet sweet chew chew seer seer sweet*. Females, by contrast, are so shy and retiring that it's often hard to determine when they have arrived on the breeding range. Females also are well-camouflaged in their plain brown plumage that superficially resembles that of a sparrow.

The male spends much time singing from prominent places, and little time helping with brood rearing. The song is loud, lively, and bouncy, comprised of a series of double-notes. Both sexes utter a bright chip note that is good to know in order to find the well-camouflaged female or young. The female builds a neat cup-shaped nest out of leaves, dried grasses, bark strips, and other plant materials, one and a half to 10 feet up (usually no higher than three feet) in a dense shrub or a low tree, often an aspen. The nest is usually well-hidden from above by leaves, a good protection from aerial predators. She lays three to four eggs, which are white or bluish white and unmarked. She incubates the clutch for 11 to 14 days, until the eggs hatch over a one to two day period. Some observers report that the male helps feed nestlings, while others say that he does not or that he gives food to the female (away from the nest) who then carries it to the nest.

indigo bunting

Sometimes a male will have more than one mate nesting in his territory. Young indigo buntings leave the nest 8 to 14 days after hatching. In some cases, males take over the feeding of newly fledged young while females start a second brood. Males keep singing well into August. Most females have two broods, sometimes with different males in different territories. Brown-headed cowbirds often parasitize the nests, and various predators—particularly blue jay, foxes, opossums, raccoons, feral cats, and snakes—eat eggs and nestlings. Some researchers believe that only 30 to 50 percent of indigo bunting nests are successful.

The adults molt in August. The male in his winter plumage looks much like the female, but he still has blue streaks in his wings and tail. Buntings migrate south from late August through October. Many individuals cross the Gulf of Mexico, reversing their spring passage. Indigo buntings winter in loose flocks in southern Florida, Central America, and northern South America. The longevity record is 10 years.

Dickcissel *(Spiza americana)* - The Dickcissel is a bird of grasslands, overgrown fields, and prairies. Dickcissels are six to seven inches tall, slightly smaller than northern cardinals; their wing span is nine to 11 inches. Dickcissels have a grayish-brown back with dark streaks, yellow breast (very light on females), white throat with a large black bib, and a wide yellowish line over the eye. Mature males are larger and more distinctively marked than females; they resemble a "little meadowlark." They are difficult to confuse with any other grassland bird species. Female or immature dickcissels, however, closely resemble house sparrows (*Passer domesticus*), but are larger and stockier and usually have a trace of yellow in their eyestripe and on their chest. The male dickcissel has a loud and distinctive song that gave this species its name: *see-see-dick-dick-siss-siss-siss*. They often perch at a high point in order to project their song, so they can be easily detected by observers.

Dickcissel is a common resident of the central Great Plains and Midwest, its core breeding range, but is a rare breeding species in Pennsylvania except during years of invasions when it temporarily expands its breeding range north and east in response dry conditions. Historically, Dickcissels moved into Pennsylvania soon after the area around Philadelphia was cleared during the colonial period. It was locally common in the southeastern counties in the early nineteenth century, but declined as old farms were converted to urban areas and woods. The east coast population inexplicably declined and the dickcissel became rare in the state for several decades. In some years, dickcissels stage an invasion of the state in response to dry conditions in the main part of their breeding range. Such an invasion occurred and nest in locations where they have been absent most years. As an example, in 2012, dickcissels were recorded in 22 counties across the state. In most years, several southern counties sustain small breeding populations including Franklin, Fulton, Cumberland, Lancaster and Adams counties.

Dickcissels are an obligate grassland bird, but they also inhabit old field habitats with a variety of perennial and

annual herbaceous plants. Reclaimed surface mines, planted in grasses at early stages of succession, have hosted pairs and small colonies of dickcissel. They also inhabit a range of farmland and grassland landscapes. Unlike some of Pennsylvania's other grassland specialists, dickcissels do not need large blocks of habitat to survive. Although dickcissels will nest in small grassland patches, studies suggest large grasslands support more nesting birds and enable those birds to successfully fledge more young.

Nests are a bulky cup of grass that are well-concealed on the ground, or in a tree or shrub. Eggs are light blue and typically in clutches of four. Eggs hatch in 12 days; young leave the nest in about a week. Females alone construct the nest, incubate the eggs, and care for the young. Nests are often parasitized by brown-headed cowbirds.

This species is currently listed as threatened in Pennsylvania. A more complete species account is provided on the Pennsylvania Game Commission's endangered species webpage.

dickcissel

Revised 02/2022

Blackbirds, Orioles, Cowbird and Starling

brown-headed cowbird

Except for the European starling (*Sturnus vulgaris*), the birds described in this Wildlife Note belong to the family Icteridae, the blackbirds, a group found only in the Americas. The introduced starling is covered here because starlings often join feeding flocks containing several kinds of blackbirds. In the Northeast, blackbirds live mainly in open areas such as marshes, fields, and woods edges. Some blackbirds are drab, while others are brightly colored. Most species are social, living in flocks outside of the nesting season. Blackbird species often gather in great flocks during migration and at winter roost sites.

Blackbirds eat mainly insects in summer and seeds in winter. Orioles prefer caterpillars and berries to seeds; grackles eat a range of foods including the eggs and nestlings of other birds. Many blackbirds employ a feeding technique called marina, in which an individual probes its bill into a crevice, vegetation, or beneath a rock or a stick, then suddenly opens its mandibles to push aside or pry away a screening object to expose some edible item like an insect, spider or seed. Blackbirds exhibit a range of nesting habits. Some species place their nests on the ground, while others build them in marsh vegetation or trees, and the brown-headed cowbird does not build a nest, but lays its eggs in other birds' nests.

Bobolink *(Dolichonyx oryzivorus)*

The bubbling song of a male bobolink is one of the most welcome natural sounds of rural Pennsylvania. A visually striking songbird, the bobolink has lots of personality and energy, attracting attention even from people with a passing interest in birds. Bobolinks breed across southern Canada and the northern United States. Males are black, with white on the back and yellow on the nape of the neck; females look like large sparrows. The male's plumage looks like a tuxedo being worn backwards, giving it the nickname of "skunk blackbird."

A characteristic bird of hayfields and meadows, bobolinks feed on beetles, grasshoppers, caterpillars, ants, and other insects, millipedes, spiders, seeds of weeds and grasses, and grain. They nest on the ground in moist meadows and fields of hay, clover, alfalfa, or weeds. Males make themselves even more noticeable by flying over their territories slowly as they sing their babbling loud song. But they are more furtive when approaching the nest site. Adults land away from the hidden nest and walk to it. Most clutches contain five or six eggs. In Pennsylvania bobolinks nest most successfully in the northwest and northeast on farmland at high elevations where cool spring and early summer temperatures push back hay growth and delay cutting until after broods have fledged. They are found in suitable habitat in western parts of the state and have expanded to sites with reclaimed surface mine grasslands, as in Clearfield County and surrounding areas. In the southeast, they breed at various sites in agriculture areas. It is much more likely to be found on the plateaus of the state, which are at higher elevations. This species and others of hayfields and open fields can persist only where mowing is delayed after their nesting season. Bobolinks start their southward migration in August and September, settling into Pennsylvania fields and gathering into large flocks. En route

to their wintering grounds, large flocks may damage southern rice fields by feeding on that grain. Bobolinks may travel more than 12,000 miles round trip to and from wintering grounds in South America south of the equator, one of the longest migrations of any songbird. Most cross the Caribbean in flight to their wintering grounds in South America. Bobolinks inhabit grasslands as well as freshwater marshes, rice fields, and sorghum fields during migration and on wintering grounds.

Red-winged Blackbird *(Agelaius phoeniceus)*

The red-winged blackbird is one of the welcome harbingers of spring. The red epaulettes and loud song make the male red-winged blackbird a very conspicuous denizen of the state's farmlands and wetlands. The red-winged blackbird is estimated to be the third most populous bird species in North America, with only the American robin and dark-eyed junco ranking higher. Redwings breed across the continent from southern Alaska, coast to coast in central Canada and the U.S. and as far south as Costa Rica and the Caribbean islands. Adults are seven to nine inches long. The jet black male has on each shoulder a vivid red patch, or epaulet, bordered below by a stripe of yellow; females and juveniles lack the epaulets and are drab brown with darker streaks. The male's song is a bubbling "*conk-a-ree*", and both sexes sound a harsh *check* as an alarm note.

red-winged blackbird

Redwings begin arriving on the breeding grounds in late February and early March (earlier in mild winters) but the greatest numbers show up in March and April, with males preceding females by a week or two. They inhabit open habitats, particularly large freshwater marshes, but are found in a variety of wetland and agriculture areas including cattail marshes, shrub-swamps, wet meadows, brushy pastures, and uncut hayfields. Individuals may temporarily leave their home territories to feed in nearby fields. In summer, redwings eat dragonflies, mayflies, caddisflies, midges, mosquitoes, caterpillars, beetles, grasshoppers, cicadas, and many other insects. In fall and winter they turn to seeds, which make up about three quarters of the annual diet. They consume seeds of grasses and weeds, and waste grains dropped by farm machinery. Flocks of red-winged blackbirds may damage corn, wheat, oats, barley, rice, and sunflower crops.

Adults usually breed within 30 miles of where they were hatched. In spring the males perch prominently, displaying their epaulets and singing, almost constantly, to attract females and intimidate other males. When venturing across or into other territories to feed, males hide their epaulets by covering the red with adjoining black feathers, making it less likely that they will be attacked by resident males. Each male guards a breeding territory of ⅛ to ¼ of an acre; within this area, one to up to 15 nesting females have been observed within a male's territory. They are highly polygynous and one male may mate with several females, and a female may mate with more than one male. Females first breed at one year old. Yearling males do not often breed, although they continually try to take over older males' territories. Sometimes yearlings displace reigning males, but more often they fail and must wander about during summer or until a territory opens up after its owner is killed.

Red-wings nest in loose colonies. They aggressively attack crows and hawks to drive them out of the area. Males do not help with nest building. Females attach their open-cup nests to cattail stalks or other marsh vegetation, winding plant strips around several stems as a base, or place them in low trees near or over the water; in hayfields and upland sites, females hide their nests in dense vegetation such as grass, grain stalks, weeds, or shrubs. A female lays three or four pale bluish eggs, blotched with browns and purples. Incubation takes 10 days to two weeks. Both parents feed insects to the hatchlings, and the young leave the nest after about two weeks. In the Northeast most redwing females raise one brood per year, renesting if a predator destroys an early clutch. Nest predators include snakes, feral cats, crows, marsh wrens, raccoons, and minks. Their nests are also parasitized by brown-headed cowbirds.

In winter red-winged blackbirds often feed alongside grackles, cowbirds, starlings, and robins. Redwings usually fly between food sources in long, strung out flocks. At night, they roost

communally, males grouped separately from females. Most redwings winter in the southeastern United States, with huge concentrations in the lower Mississippi Valley. In times past, redwings were more limited to wetland areas; the population increased after the species began branching out and nesting in agricultural areas. The average life span is two to four years although the oldest red-winged black bird on record was 15 years and 9 months. Although still a common bird, this is one of the several birds of farmland and wetlands that have declined in the last few decades.

Eastern Meadowlark *(Sturnella magna)*

The eastern meadowlark is, perhaps, the most characteristic bird of larger grassland habitats in Pennsylvania. Both males and females have a brown streaked back and a bright yellow breast with a prominent black V; the outer tail feathers are white. As their name suggests, meadowlarks live in pastures, hayfields, fallow fields, and strip mines that have been replanted to grass. In summer they eat grasshoppers, crickets, beetles, ants, caterpillars, and many other insects; they also eat seeds, waste grains, and wild fruits. Males arrive in the spring two to four weeks before the females and stake out territories, which average seven acres. The males perch on phone poles, trees, and fenceposts, singing their sweet, slurred, whistling song. Sixty to 80 percent of males typically have two mates, rarely three. The female builds a ground nest in grass or weeds 10 to 20 inches high; the nest, usually in a slight depression, is made of dry grasses with a woven dome-shaped roof and a side entry.

Females lay eggs from late May through June. Early mowing of hayfields destroys many nests. The three to five eggs are white, heavily blotched with brown. The female incubates her clutch for about two weeks. After the young hatch, both parents feed them insects. Fledglings leave the nest after 10 to 12 days and are fed by their parents for another two to four weeks. Some females raise two broods over the summer. In August, meadowlarks abandon their breeding territories and forage in small flocks. In September and October most shift southward, migrating at night and feeding during the day. Some meadowlarks winter in eastern and western Pennsylvania, although most go farther south. The population has declined in the northeastern United States during the past 40 years as development has drastically reduced open grassland habitat and agricultural land and formerly farmed areas have grown up into brush and woods. A change in farming practices, namely a more frequent mowing of hayfields and more intensely grazed pastures, increased pesticide use, and possibly the density of planted grasses, may be contributing to their decline. Pennsylvania's Wildlife Action Plan lists the eastern meadowlark as a Species of Conservation Concern. According to Breeding Bird Survey data, the number of Atlas blocks with confirmed breeding has declined by 29 percent between the first (1983-89) and second (2004-09) Breeding Bird Atlas periods. Surveys have also indicated a shrinking breeding range, with an estimated range contraction of 15 percent between Atlas periods.

eastern meadowlark

Rusty Blackbird *(Euphagus carolinus)*

Probably the least known of the state's blackbirds, the rusty blackbird is a regular passage migrant and uncommon winter visitor in Pennsylvania. The males are black with a greenish gloss while females are buffy colored with a gray rump. Both sexes have thin, slightly decurved bills and a pale eye, compared to the dark eye of a red-winged blackbird. They are smaller and have shorter tails than common grackles. The rusty blackbird nests in the vast northern forests of New England, Canada, and Alaska and winters in southeastern United States, primarily in the swampy forests of the Atlantic Coast and Mississippi Valley. In between, they migrate through the Great Lakes region and Mid-Atlantic states including Pennsylvania. This species forages in wet fields, swamp edges, wet woods, and riverine habitats but will roost in different locations, mostly in wooded areas but sometimes open fields. They feed primarily in very shallow water where they pick up various invertebrates, berries, and mast including broken or soaked acorns. They wade in water, regularly turning over leaves with their beak under the water surface. Pennsylvania is at the northern extreme of the rusty blackbird's winter range, mostly in the southern counties. A bird of the difficult to access boreal forests and southern swamps, the rusty blackbird is tough to study and remains one of the most poorly understood birds of the continent. This swamp songbird may have the greatest decline of any North American bird of the last century. For that reason, the scientific

community is giving this species greater priority for research, monitoring, and conservation. The reasons for this decline are not well-understood, but habitat loss, blackbird control, and environmental toxins are among the possible causes. Due to an overlap in habitat preferences, its fate is tied to that of other better-known birds of the riparian forest and wetlands such as the wood duck, American black duck, and American woodcock.

Common Grackle *(Quiscalus quiscula)*

Grackles are sleek black birds with purple, green, and bronze highlights in their plumage. They are the largest members of the blackbird family in Pennsylvania. Adults are about one foot in length and have long wedge-shaped tails. Females are slightly smaller with duller colors. Grackles live well in human landscapes, thriving in agricultural areas, city parks, suburbs, towns, or cemeteries. In natural settings they prefer open woodland, forest edges, wetland marshes and swamps, riparian areas, grasslands, and farming areas. They are absent from large forest tracts. They forage mainly on the ground and eat mostly seeds, with a preference for cultivated grains. In agricultural areas it can be a significant pest species and foraging flocks often target corn crops. The grackle's diet includes insects (beetles, grubs, grasshoppers, caterpillars, and many others), millipedes, spiders, earthworms, crayfish, minnows, frogs, the eggs and young of other birds, and even small rodents. In spring, males display in front of females by raising their bills, fluffing out their feathers, spreading their tails, and singing a loud, ascending "*readle-eak*". Unlike many bird species, female common grackles also sing, although less often than males.

Unlike most other songbirds, grackles remain social throughout the year. Most nest in colonies of 10 to 30 pairs, usually in evergreen trees, where mated pairs defend only a small area right around their nest. These colonies may have a negative effect on other nesting birds in the neighborhood. Grackles are among the first spring arrivals and nest from April into June. The female builds a cup-shaped nest out of grasses and mud. The typical clutch has four or five eggs. Only the female incubates, and the eggs hatch after 12 to 14 days. Both parents feed the young, which fledge after 16 to 20 days. In the fall, grackles roost in large flocks along with starlings, red-winged blackbirds, and cowbirds. Most grackles winter to the south of Pennsylvania, but some remain in the state. The majority of those wintering in the state are found in the Piedmont region of southeastern Pennsylvania where mixed flocks may reach hundreds of thousands of birds.

common grackle

Brown-headed Cowbird *(Molothrus ater)*

The brown-headed cowbird is a bird of farms, fields, suburbs, and woods edges. Males have black bodies and brown heads; females are brownish gray. Seeds of grasses and weeds, plus waste grains, make up about half of the birds' diet in summer and more than 90 percent in winter. Cowbirds also eat insects, particularly grasshoppers, beetles, and caterpillars. In the past, cowbirds followed bison herds on the Great Plains, where they were known as "buffalo birds." They captured the insects that were disturbed by the grazing bison. Cowbirds may forage in pastures alongside cows and horses in this same manner.

In spring, the male cowbird displays for females by fluffing up his body feathers, spreading his wings and tail, and singing a bubbly "*glug glug gleee.*" The species builds no nest. The cowbird is a brood parasite: The female lays eggs in the nests of other birds, who, guided by their instincts, raise the young cowbirds as their own. Ornithologists believe that cowbirds did not live in forested Pennsylvania before European settlement, a theory bolstered by the fact that few of our native songbirds have evolved defense behaviors against its parasitism. Most species fail to recognize the parasitic egg. Today cowbirds are common breeders statewide, absent only from large contiguous tracts of forest. Fragmentation of these large forest blocks with land development and energy development may enable cowbirds to expand into this forest habitat in new places and negatively impact forest songbird species, many of which are of conservation concern. Cowbirds have been reported to parasitize more than 220 different species. In the Northeast, cowbirds particularly plague warblers, vireos, flycatchers, finches, thrushes, and sparrows.

A female cowbird will sneak into a nest that is temporarily unoccupied, quickly lay an egg, and fly off, sometimes after removing or eating one of the host's eggs. Cowbird eggs are whitish, with brown and gray spots. They typically hatch faster than the eggs of their host species. Young cowbirds, hatched and fed by the host parents, grow rapidly; they monopolize food and may even crowd the other young out of the nest. Juvenile cowbirds fledge 10 to 12 days after hatching. In one study, a successfully raised cowbird caused a reduction in the brood of a host pair by only one fledgling. Other ornithologists cite cowbird predation as a major factor along with habitat loss in declines of many species, including the wood thrush. A female cowbird may lay up to 40 eggs in one season. Cowbirds

migrate in large flocks in spring and fall. They are short-distance migrants and winter throughout their Pennsylvania breeding range, particularly in the Piedmont and Coastal Plain and in the southern states and in Central America. Often they share huge winter roosts with starlings and other blackbirds.

Orchard Oriole *(Icterus spurius)*

Although not as conspicuous or well-known as the Baltimore oriole, the orchard oriole is a strikingly handsome songbird that is being found in an increasing number of locations. It is the smallest oriole in North America. The adult male has a chestnut body and black back and wings while the female is olive and yellow. Second-year males are often overlooked or misidentified because they have a greenish-yellow plumage and a black-bib. Yet, they also will sing as loudly and vigorously as the adult-plumaged males. This nearly robin-size oriole inhabits open areas, including parks, old orchards, yards, farms, and shade groves, with scattered large trees. It has a preference for riparian habitats, lake shores, marshes and floodplains, but avoids deep woods. In Pennsylvania, the species breeds most commonly across the southern two-thirds of the state and has expanded north into northwest and center portions of the state as illustrated in the Second Breeding Bird Atlas. Orchard orioles feed on insects, berries, nectar, and flowers. They are especially likely to feed on weevils and caterpillars including those that are harmful to crops. They also are adept at taking nectar from tubular flowers like trumpet creepers. During migration, they eat a lot of mulberries and cherries. Pairs are thought to be monogamous. Males sing a very lively, loud warbling song, often from a prominent perch. Like Baltimore orioles, orchard orioles also chatter and call in scolding notes. The female builds a hanging basket-like nest among dense leaves in a fork of a tree branch, usually 10 to 20 feet above ground. Their nests are not as elongated as the Baltimore oriole's basket nests. The three to seven eggs are incubated for 12 to 15 days. Both parents feed the young, which leave the nest about two weeks after hatching. Brown headed cowbirds often parasitize Orchard oriole nests. Orchard orioles typically invest a short amount of time on breeding grounds, the majority arriving in late April and early May and some returning to wintering grounds as early as mid-July. Long distance migrants, orchard orioles winter in Mexico and Central America.

Baltimore Oriole *(Icterus galbula)*

The Baltimore oriole is one of the most dramatically colored and well-known songbirds of North America. This oriole not only lives in forest edge and riparian forests, but readily adopts park settings and yards with large trees. The male of this species has a brilliant orange body and a black head (black and orange were the heraldic colors of Lord Baltimore, an English colonist and founder of present day Maryland). The female and immature males have yellow orange breast and underparts with a grayish head and back. Baltimore orioles breed throughout eastern North America in open woods, residential areas, parks, fence rows, and tall trees along streams (often sycamores or willows; formerly elms

were a favorite before disease killed most American elms). In the west, it is replaced by the very closely related Bullock's oriole (*Icterus bullockii)*. These species hybridize and they have sometimes been combined into one species called the northern oriole, this name persisting in some books. Adults feed on insects, particularly caterpillars; spiders; snails; berries, including mulberries, serviceberries, and blackberries; cultivated fruits; and flowers. With their long pointed bills, Baltimore orioles are adept at consuming hairy and spiny caterpillars including pests such as tent caterpillars and webworms. So, orioles are not only attractive additions to a yard and garden, but they also have economic value to the property owner. Its diet varies with the seasons, Baltimore orioles visit feeding stations for sugar water and pieces of fruit, especially oranges and bananas.

The species is best known for its sack-like hanging nest, intricately woven by the female out of plant fibers, pieces of string, grapevine bark and grasses. A central chamber is lined with hair, fine grasses and soft plant matter. Nests are usually hung at the ends of pliant branches, probably to deter predators, including snakes, blue jays, and crows. Females lay three to six eggs that hatch after 12 to 14 days. The song of the Baltimore oriole is a series of rich whistled notes that are fairly easy to imitate. They also keep contact with a simple "*hulee*" note and make many rattling chatter notes. The nest can be located by the begging notes of young orioles. Both

Baltimore oriole

parents feed the nestlings, which leave the nest after two weeks. Flocks depart from the breeding range quite early, in July and August. The species winters in Florida, the Caribbean, Central America and northern South America, where the birds feed on insects and nectar.

European Starling *(Sturnus vulgaris)*

From 100 birds released in the 1890s in New York City's Central Park have descended more than 200 million starlings populating North America today. Starlings are chunky birds with short tails and long straight bills; airborne, they show a distinctly triangular shape. The plumage is black with iridescent highlights. Starlings are adaptable, hardy and wary and are closely associated with human environments. They inhabit farmland, suburbs, cities, and woods edges, and are least numerous in or are absent from marshes and extensive forests. They use open, grassy areas to forage and cavities in trees or buildings for nesting. Starlings eat almost equal amounts of animal and plant food, including beetles, grasshoppers, ants, flies, caterpillars (gypsy moth and tent caterpillars are frequent prey), earthworms, grains, cherries, and mulberries. When foraging on lawns in winter, starlings are usually gaping, probing their bills into the soil and prying apart grass roots to uncover beetle larvae.

Starlings begin defending nest cavities in late winter, preempting them before native cavity nesters start claiming territories. Starlings nest in woodpecker holes, crevices in trees and buildings, and bird houses. In April, males perch outside the cavities; when they see other starlings, they sing and windmill their wings to attract a mate. The male's song includes shrill squeals, squawks, and imitations of other birds' songs. The male fills the nest cavity with grasses, weed stems, twigs, old cloth, and dry leaves, and then lines a central cup with fine grasses and feathers. The female assists with nest building and arranges the finishing touches. She lays four to six eggs, which are an unmarked pale bluish green. Both parents incubate the eggs, and they hatch after about 12 days. The nestlings are fed by both parents and leave the nest three weeks after hatching. By now their droppings have so fouled the cavity that the adults go in search of another nest hole in which to rear a second brood: Often they drive native birds from their nests, including woodpeckers, nuthatches, great crested flycatchers, tree swallows, house wrens, and eastern bluebirds. European starlings aggressively compete for a cavity, often evicting other species, along with eggs or nestlings, from their nests.

Starlings feed in flocks and roost together at night. In late summer and fall, their roosts may contain thousands of birds. Some individuals shift southward for the winter, while others remain in the Northeast; many roost in cities, where buildings give off heat, and then fly out into the surrounding agricultural land to feed during the day. European starlings are long-lived and one documented bird lived 15 years 3 months in the wild.

European starling

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Finches and House Sparrow

Finches are small to medium-size songbirds with sturdy bills that let them crack open the tough hulls of seeds, their main food. Five species have been known to nest in Pennsylvania. One, the house finch, *(Haemorhous mexicanus)* is a western species liberated in the Northeast that has become quite common. Another, the red crossbill (*Loxia curvirostra*) is a rare nester here, mostly in conifer forests. Finches are sociable birds, and outside of the breeding season they gather in flocks. They feed mainly in trees but will forage on the ground, in tall weeds and in shrubs. Even during summer, when insect populations burgeon, many finches continue to eat seeds and even nourish their young with a pulp composed of regurgitated seeds. They will also eat insects, buds, and fruit. In winter, many of the birds in this group frequent bird feeders but also can be found in conifers and on deciduous trees with catkins such as birches, ashes, maples, and aspens.

Male finches sing to attract females and to maintain pair bonds. Finches tend to be sexually dimorphic with the male's plumage more colorful than the females. In most species, the female builds a cup-shape nest hidden in the thick foliage of a tree or shrub. Female finches do most or all of the incubating, and males and females team up to feed the young.

Purple Finch *(Haemorhous purpureus)*

Do not look for a purple bird when trying to pick out this species. The male purple finch is maroon-red, sometimes described as raspberry-colored, while the female is brown with darker streaks. The species breeds across the southern half of Canada and south into the Pacific Northwest, the Great Lakes states and the Appalachian Mountains in the Northeast where it is found as far south as West Virginia and Virginia. In Pennsylvania, purple finches nest mainly in the northern tier and at higher elevations in southern regions of the state. In winter, individuals from farther north overspread the state. Purple finches inhabit conifer plantations (including Christmas tree farms), spruce bogs, hillside pastures, woods edges and mixed and open woods. They are associated with larger forest tracts, but are often found at edges and in openings. In winter, they eat weed, grass and conifer seeds and other tree seeds (elm, ash, sycamore and tulip tree); in early spring, they consume buds and flowers of trees and shrubs; they take some insects in late spring; and they feed on fruits in summer.

The male has a melodious warbling song usually given from high in a tree but sometimes given mid-air, called "sky-larking." The female builds a nest at any height from 3 to 60 feet above the ground, on a horizontal branch, usually in a conifer; she weaves a compact open cup out of twigs, weeds, rootlets and strips of bark, and lines it with fine grasses or animal hair. The two to seven eggs are a pale greenish blue, dotted with black and brown. The female incubates them for around 13 days. Both parents feed the nestlings, mainly with seeds, and they fledge about two weeks after hatching. One to two broods may be raised per year. In winter, purple finches may join foraging flocks with American goldfinches, pine siskins and other species. At feeding stations, house finches and house sparrows dominate purple finches and often drive them away. Despite

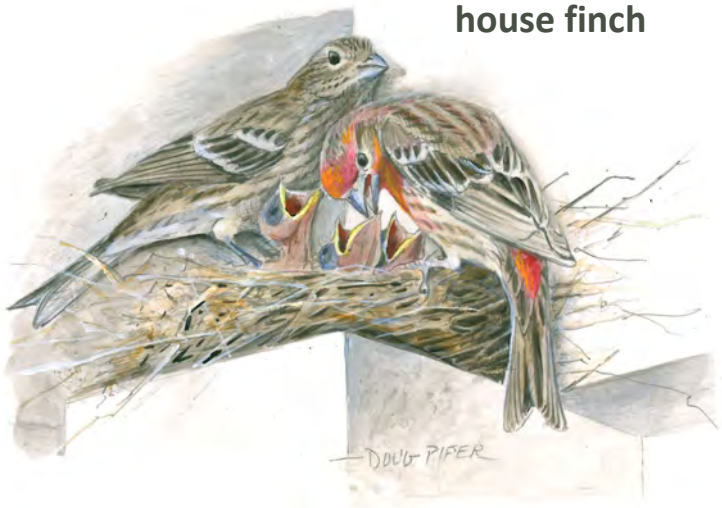
that, purple finches are more numerous than those species. Purple finches winter as far south as the Gulf states.

House Finch (*Haemorhous mexicanus*)

House finches in the eastern United States are descendents of birds released in New York City in 1940. The species is native to the U. S. Southwest; today *Haemorhous mexicanus* breeds from southern Canada, across most of the United States and south through most of Mexico. Females are sparrowlike, and males are similar to male purple finches, except that house finches show more streaking on the breast and flanks, are not quite as robust, and are a more bright or "strawberry" red. The red pigment in both species comes from beta-carotene found in many plants, particularly in red fruits; the red blush to the plumage varies with the pigments in the food that is consumed during molt. House finches inhabit urban, rural and suburban environments and have adapted to a wide range of human-associated habitats. In the east, they are often found near human dwellings where they readily visit feeding stations. They feed on seeds, flowers, buds, berries, small fruits and insects.

Pairs often form within flocks during winter. Males do not stake out territories but, instead, defend areas around their mates. House finches begin nesting as early as March and produce two or more broods per year, each with four or five young. Females nest in a variety of sites including conifers, ivy along walls, abandoned nests of other birds, above porch lamps and in hanging flower baskets. The population of this western species "exploded" until around the mid-1990s, when a highly contagious eye disease, Mycoplasmal conjunctivitis, caused a dramatic population decline in the East. The disease causes respiratory problems and swollen eyes in house finches. Infected finches often die as a result of starvation, predation or exposure. Some birds do not die and may transmit the disease to flocks in other areas. It is important to regularly clean feeding stations with soapy water to prevent the spread of this disease. Although numbers have declined from peak populations in the mid-1990s, the *Second Atlas of Breeding Birds in Pennsylvania* shows the house finch to be numerous in Pennsylvania.

house finch



pine siskin

Pine Siskin (*Spinus pinus*)

With their brown colors and streaked breasts, pine siskins look like sparrows; patches of yellow in the wings and tails are good field identifiers. Pine siskins nest in Alaska, across Canada, in northern parts of the United States including the upper Great Lakes and New England. They nest in western mountains south into Central America. In Pennsylvania, the pine siskin is a rare breeding bird in most years. It nests mainly in the northern tier in stands of hemlocks, pines, spruces and larches, and in ornamental conifers in backyards. These tame birds become much more visible when they flock to feeding stations in winter. As well as eating seeds, siskins consume the seeds of trees (alder, birch, spruce and others), weeds and grasses. They also eat buds, flower parts and some insects. They usually forage in flocks, even during the nesting season; in winter, they are often seen in the company of goldfinches. During some years, many siskins winter in the Keystone State in response to cone crop failures in northern forests, and in other years few show up.

American Goldfinch (*Spinus tristis*)

The male goldfinch in summer is one of Pennsylvania's most conspicuous birds: bright yellow, with black wings and a black forehead. The female is a dull olive-gray. In winter, both sexes look like the summer female. Goldfinches are gregarious and are often seen flying in groups. They have a characteristic bouncing or undulating flight pattern: bursts of wingbeats followed by short glides when the birds lose a few feet of height. While airborne, flock members sound a *perchickory* call.

American goldfinch

American goldfinches nest across much of North America from southern Canada south into the southern states in the east and across the west except for the southwest. In Pennsylvania, goldfinches are found statewide, absent only in small areas within major cities and portions within large contiguous blocks of forest. They forage in a variety of habitats including brushy areas, roadsides, open woods, woods edges and suburbs.

American goldfinches inhabit Pennsylvania year-round. Some winter in Pennsylvania. Others move in from the south in April and May, returning to breed in areas where they hatched, although they remain in flocks and do not set up territories until late June or early July. Goldfinches primarily eat seeds. In the spring, they forage for seeds, insects and insect eggs. In summer, they turn mainly to the seeds of thistles, dandelions, ragweeds, sunflowers and grasses. They eat elm seeds, birch and alder catkins, flower buds and berries. They clamber around in weeds and shrubs, picking out seeds. In winter, flocks may seem to roll across a field, as birds in the rear leapfrog over other flock members on the group's leading edge. This strategy gives each individual access to fresh foraging areas while requiring only short flights to get there.

Goldfinches start nesting later in the season than any other bird in the Northeast. Perhaps breeding occurs late so that young hatch when seeds mature on favored food plants, particularly thistles. Flocks break up as males claim territories, in loose colonies, up to a quarter acre in size. The male sings from a perch, voicing a clear canary-like song, and makes high, circling flights. The female builds a neat cup lined with thistle or cattail down, 4 to 14 feet up in a horizontal or upright fork of a small tree or shrub. Goldfinches often nest in thornapples, shrub willows and gray dogwood clumps. The nest is woven so tightly that it will hold water; flexible, it expands as the young increase in size. The female lays two to seven pale bluish eggs. She incubates the clutch, with the male bringing her food. The young hatch after 12 to 14 days, are fed mainly on seeds by their parents, and leave the nest after another 11 to 17 days. Some pairs raise a second brood, and fledglings have been found as late as September. Cowbirds sometimes parasitize the nests of goldfinches, but the young cowbirds often die because they don't get enough protein from the regurgitated seeds that goldfinch parents feed to nestlings.

House Sparrow (*Passer domesticus*)

Although named a "sparrow," this ubiquitous bird is not related to North American sparrows but is related to Old World sparrows. The house sparrow is native to Europe and Asia, and can now be found living with humankind around the globe. This invasive species was introduced into North America between 1850 and 1886 in an attempt to control insect pests, particularly the elm spanworm caterpillar. At first, the bird was called the "English sparrow," because most imports were brought from England. Male house sparrows have black chin and breast patches (the amount of black varies among individuals), white cheeks and a chestnut nape. Females are a dingy brown.

House sparrows live year-round throughout North America with the exception of northern Canada. Never far from humanity, they inhabit cities, suburbs, towns and farms. They eat primarily grains and seeds including weed and grass seeds, crop and waste grains and livestock feed. They also consume bird seed, food litter and garbage. In summer, they will eat insects and spiders (about 10 percent of the diet), fruit tree buds and flowers. They nest in protected places, including holes in trees and buildings, porch and barn rafters, behind shutters and awnings, in bluebird houses, and in thick growth of ivy on the sides of buildings. House Sparrows aggressively defend potential nest sites and often destroy the eggs and young of native cavity nesters. They regularly displace nesting bluebirds and tree swallows. House sparrows use their nests for shelter during most of the year, an advantage in spring when competition for nest sites begins. Both sexes work at lining the cavity with grass, weeds, feathers and trash. Pairs are monogamous; prolific breeders, they produce one to

four broods of three to seven young each. Recently-fledged juveniles form flocks in summer and are joined by adults after the breeding season ends in August and September. In late fall, pairs return to their nest cavities.

When house sparrows overran the United States in the early 20th century—ousting native breeders, fouling buildings with their droppings, and offending people with their aggressive, noisy habits—those who had championed the species' introduction were roundly castigated. The population peaked in the early 20th century. Since then, it has fallen. Several factors may be involved: tractors and automobiles have replaced horses, and farming operations have been sanitized, so that grain is no longer widely available in winter. Yet, dairy barns can host many house sparrows and still have large populations of this invasive species.

Winter Finches

In addition to Pennsylvania's breeding species, four other finches—white-winged crossbill (*Loxia leucoptera*), common redpoll (*Acanthis flammea*), evening grosbeak (*Coccothraustes vespertinus*), and pine grosbeak (*Pinicola enucleator*)—breed in the far north and visit the Northeast in winter, when they may descend on feeding stations in yards. In some years, "winter finches" invade our area; in other years, they stay in the north. Ornithologists believe that finches come south when key food sources, particularly the seeds of conifers, fail in their boreal habitat.

Red crossbills (*Loxia curvirostra*) and white-winged crossbills (*Loxia leucoptera*) have oddly shaped bills, the tips of whose mandibles cross. A bird will stick its bill between the scales of a spruce cone, then open the mandibles, prying apart the scales; the bird lifts out the exposed seed with its tongue. The male red crossbill is brick red in color, and the female is a mix of olive-gray and yellow. The white-winged crossbill has white wingbars in both sexes; the male is a rosy pink, and the female is colored much like the red crossbill female. Both types of crossbills eat the seeds of various conifers, and they also feed on buds and weed seeds. In the years when they winter in Pennsylvania, they may arrive with cold fronts in late October and November.

red crossbill

evening grosbeak

The common redpoll (*Carduelis flammea*) has a red forehead and a black chin. It is the size of a goldfinch. Redpolls feed actively in brushy and weedy fields and along woods edges, picking up seeds of trees, weeds and grasses. Often they forage in mixed flocks with pine siskins and goldfinches.

The evening grosbeak (*Coccothraustes vespertinus*) is a big, husky bird. The male is dull yellow with prominent white wing patches, and the female is yellowish gray; the massive bill is white in both sexes. Wintering flocks wander widely in search of food, although a feeding station frequently restocked with sunflower seeds will hold them in one area. Evening grosbeaks forage in mixed woodlands, coniferous forests, towns and suburbs. At bird feeders, they often displace one another, as well as the local birds, giving strident chirping calls and putting on aggressive displays while competing for food.

The pine grosbeak (*Pinicola enucleator*) is the largest of Pennsylvania's winter finches. It is a grayish bird with a plump chest and round head. The males are reddish-pink on their head, chest and back, while females and immature birds vary from orange to yellow. Their diet is almost exclusively plant-based (buds, seeds and fruits) generally from spruce, pine, juniper, birch, maple, poplars, and more. During winter, pine grosbeaks can be seen eating grit and salt along roadsides and visiting feeders with black oil sunflower seeds or suet.

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