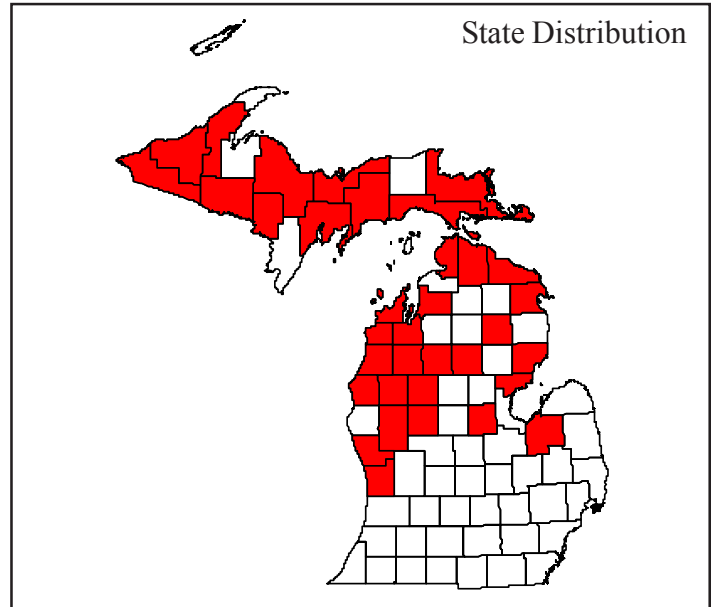
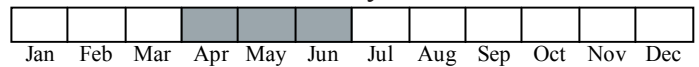




Photo by Isidor Jeklin



Best Survey Period



Status: State special concern

Global and state rank: G4/S3

Family: Accipitridae (hawk family)

Range: The goshawk breeds from western and central Alaska, northern Yukon, eastern and southern Mackenzie, southern Keewatin, northeastern Manitoba, northern Ontario, eastern Quebec, Labrador, and Newfoundland. Its range extends along the west coast into central California, southern Nevada, southeastern Arizona, and southern New Mexico. In the mid-west it is found from northern Minnesota to central Michigan and eastern populations are found from Pennsylvania and New Jersey northward. Populations extend south along the Appalachian Mountains to Tennessee and North Carolina (Johnsgard 1990).

State distribution: Little is known about the historical distribution of the goshawk in Michigan.

Early accounts indicate that it was found occasionally in the summer and was more common in the north (Gibbs 1879, Cook 1893, Barrows 1912, Brewer et al. 1991). During the 1940s breeding records were documented from 7 counties and it was noted that the bird was a local breeder from Roscommon County northward (Brewer et al. 1991). During the 1980s, Breeding Bird Atlas (BBA) surveyors confirmed 73 breeding records documented among 35 counties, mostly in the northern Lower Peninsula (NLP) and Upper Peninsula (UP). Fourteen probable breeding records and 77 possible records were also documented during BBA surveys, most of which were in the NLP and UP (Brewer et al. 1991).

Recognition: The goshawk is a large forest bird with long broad wings and a long tail which is rounded on the end. Females tend to be larger than males. Upperparts of the adult are brown-gray to slate gray. The head has a **black cap** with a pronounced **white eyeline**. Underparts are light gray with fine horizontal vermiculations and vertical streaks. **Undertail coverts are white, showy, and quite fluffy**, especially during the breeding season. **The tail is gray above with numerous broad black bands (3-5)**. **The end of the tail has a rounded tip** which may contain a thin white terminal band. Females look similar to males but are browner above and more coarsely marked below. Immature birds are heavily streaked below and the undertail coverts are spotted. Further, the back on immature birds is heavily mottled, which results in a tawny or buffy appearance. The goshawk may also be identified by its call which is a sharp and **repetitive ki ki or kak kak kak**. Also, goshawks disturbed during the nesting stage are very aggressive and have been known to attack humans. Similar species include the cooper's hawk (*Accipiter cooperii*), and the sharp-shinned hawk (*Accipiter striatus*). Both of these species can be distinguished from the goshawk due to their smaller size and lack of a conspicuous white eyeline (Johnsgard 1990).

Best survey time: The best time to survey for active goshawk nests is from late March to early May. The reason this time period is optimal is because nests are more easily observed prior to leaf emergence and pairs become vocal during this time period. A standard survey methodology for this species is to broadcast a goshawk call with a tape recorder in suitable habitat during the breeding season. However, this survey methodology is not always effective.



Survey routes can be established by utilizing existing roads and trails. Calling stations should be placed at least every 0.5 mi. throughout suitable habitat (Mosher et al. 1990). At each calling station the following sequence can be replicated three times: broadcast goshawk call for 10 seconds in each of the four cardinal directions, followed by 30 seconds of listening (Kennedy et al. 1993).

Productivity surveys (i.e., nestling counts) can be conducted from early to mid-June. A simple method to determine if young were produced by a nesting pair is to re-visit nests during June.

Young can often be viewed from the ground (Kockert 1986) or white wash (i.e., droppings from the young) may be observed below the nest structure, which is evidence that young are present or were recently present in a nest (Postupalsky personal communication 1999).

Habitat: Goshawks prefer large tracts of forest with an intermediate amount of canopy closure, small forest openings for foraging, and an open understory. This species can be found in a variety of forest types such as coniferous stands, deciduous stands, riverine forests, and cultivated conifer stands.

Biology: In Michigan, goshawks are apparently residential but evidently the young will move south in the fall. The goshawk is a highly territorial bird that is thought to maintain pair bonds for life. Typically, goshawks exhibit strong nest site fidelity and may use a nesting area for decades (Ottawa National Forest 1995). Goshawks typically select large deciduous trees to nest in and they usually place nests on horizontal limbs against or quite near the trunk (Johnsgard 1990). Nests are usually placed 40-50 ft. high in a tree with a significant protective canopy above the nest. They construct nests of twigs and sticks and usually decorate the nest with green sprigs. Nest tree species are variable however, birch, maple, and conifers are frequently used (Ottawa National Forest 1995). Nests are usually near a water source and plucking posts (i.e., perches used to pluck feathers or fur from prey) are usually within 50 m of the nest site (Johnsgard 1990).

Eggs are laid in late March or April and the majority of the eggs hatch in May. Goshawks typically produce 2-3 eggs and incubation often lasts for 4-5 weeks. The female is solely responsible for incubation and is fed by the male. Young may fledge from mid-June to mid-July (approximately 35-36 days of age) and remain dependent on their parents until 70-80 days of age (Brewer et al. 1991). The diet of the goshawk is primarily composed of moderate sized birds and mammals. Primary prey items in the Great Lakes Region include ruffed grouse (*Bonasa umbellus*), snow-shoe hare (*Lepus americana*), and the red squirrel (*Tamiasciurus hudsonicus*).

This species hunts primarily by two methods. One is the perch-and-watch technique and the other is searching flights through the forest. They may also make use of

vegetation as cover during low ground hunting-flights in order to surprise prey (Johnsgard 1990). Nest productivity and the abundance of active nests has been correlated to prey abundance. Goshawks tend to be more abundant and nests more productive when snowshoe hare and ruffed grouse populations are high. This typically results in ten year population cycles Erdman et al. 1997).

Conservation/management: The primary threat to this species in Michigan is habitat alteration and destruction due to timber harvest (Brewer et al. 1991), road construction (Ottawa National Forest 1995), and residential development. Habitat manipulation directly impacts the species by alteration of suitable structure around the nest site and indirectly by influencing the abundance, distribution, and vulnerability of prey species. Fragmentation of mature forest stands and the creation of larger openings favor the immigration of nest competitors and predators such as the red-tailed hawk (*Buteo jamaicensis*) and great-horned owl (*Bubo virginianus*) (Brewer et al. 1991). These species can either displace a nesting pair or directly depredate young and/or adults from a nest site. Management practices that maintain moderate canopy closure, preserve large trees for nesting, and conserve large contiguous blocks of hardwoods or mixed forest stands should benefit this species. Currently management has focused on maintaining the critical components of individual home ranges such as the nest area, post fledgling area, and foraging area. However, a more proactive and ecologically sound practice, in order to ensure conservation of the species on a long term scale, is to manage large tracts of forest as ecological units. Ecological units should be analyzed and managed across vegetation types and land ownership pattern in order to maintain the array of ecological processes needed for this species (Graham et al. 1994).

Research needs: Numerous research needs exists for the goshawk. In Michigan very little systematic inventory has been completed throughout the state. Inventory is needed to get a sense of distribution patterns across the state. Information is lacking on the productivity and reproductive success of the goshawk and its variability throughout the state. Also, more quantitative research is needed to assess the impacts of forest practices on the birds' abundance and productivity. Other research needs include the impacts of predation and competitors on nesting success, landscape-level analysis of habitat, and analysis of micro-habitat features of the various components of the goshawks home range.

Related abstracts: mesic northern forest, dry-mesic northern forest, red-shouldered hawk, woodland vole, American marten, false violet, ginseng, pine-drops, showy orchis.

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Funding for abstract provided by Michigan Department of Natural Resources - Forest Management Division and Wildlife Division, Non-Game Program.

9-99/jlc

