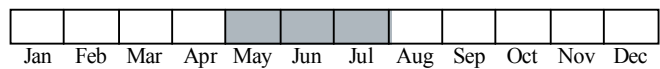


Best Survey Period



**Status:** State special concern

**Global and state rank:** G5/S3

**Family:** Accipitridae (hawk family)

**Total range:** The northern harrier is a holarctic breeding species divided into two recognized subspecies. *C. c. hudsonius* is found in North America and *C. c. cyaneus* (hen harrier) is the Eurasian counterpart. In North America, northern harriers breed south of the tundra in Alaska and throughout Canada, south to southern California east to southern Texas and across to northern Virginia (Hands et al. 1989). The winter range extends from southwestern Canada east to southern New England, south to California, Central America and the Caribbean. The southern range limit is Panama and they are rarely seen in northern South America (Bent 1937).

**State distribution:** In Michigan, the northern harrier breeds throughout the state where appropriate habitat is found. Nesting records exist for 32 counties in Michigan (Brewer et al. 1991, Michigan Natural Features Inventory 2001). The Michigan Breeding Bird Atlas suggests four areas in the state with high occurrence rates. These areas include: 1) the Gladwin-Midland county area in the central Lower Peninsula; 2) Dickinson, Menominee, and Delta counties in the south-

central Upper Peninsula; 3) Schoolcraft, Mackinac, and Chippewa counties in the eastern Upper Peninsula; and 4) the Tuscola-Sanilac county area in the thumb region (Brewer et al. 1991).

**Recognition:** Northern harriers are **slim bodied, long-legged and long-tailed** hawks. Average harrier length is 17-23 inches and the wingspan averages 38-48 inches. They are a sexually dimorphic species in respect to both size and color. Females are about 50% heavier and 12.5% larger than males (MacWhirter and Bildstein 1996). The **female is brown above and buff-colored with brown streaks below**. The **male is pale gray above and white below with black outer primary feathers**. The **white patch at the base of the tail is distinctive** for adults and juveniles of both sexes. Also, the presence of an **owl-like facial disk is a unique characteristic** of the species. This facial feature provides excellent auditory capabilities and aids in prey capture. Juvenile birds resemble females but are cinnamon colored below and only streaked on the belly. In flight, harriers usually fly just above the ground with only periodic heavy wing beats, banking and gliding slowly over open habitats. Vocalizations include an alarm or excited call usually described as *ke-ke-ke* or *chek-ek-chek-ek* (Brown and Amadon 1968).

**Best survey time:** Northern harriers can be seen in Michigan from mid March to early November. The best



survey time for northern harriers begins in early April and continues through late October. Survey time for breeding birds is best between early May and late July. Surveys should be performed in suitable habitat for nesting harriers. Survey methods include observations of a food pass from the male to the female, which often indicates an active nest. Also, observation of a hunting female requires searching near the area of observation, as they stay close to the nest site while hunting. Lastly, presence of young birds in close proximity may indicate a nest site.

**Habitat:** The northern harrier utilizes many types of open habitats including meadows, inland marshes, old fields, prairies, and even cultivated areas. However, populations in the Midwest and northeast prefer wet habitats for nesting. These habitats are usually large, undisturbed wet meadows and grasslands with a tall and often dense vegetation presence (Apfelbaum and Seelbach 1983). Vegetation types vary greatly and can include grasses, sedges, forbs, goldenrod, and low shrubs. Northern harrier habitat must also be of suitable size. In Washtenaw County, Michigan, territories averaged about 640 acres (Craighead and Craighead 1969). Northern harrier hunting habitat is determined by several factors including proximity to the nest site and prey abundance and location. Female harriers tend to hunt adjacent to the nest site, where males extend their hunting ranges farther from the nest and may enter into different habitat types (Martin 1987). Since voles and other small mammals are primary prey items, harrier habitats are closely associated with prey habitats (Schipper et al. 1975).

**Biology:** The northern harrier winters in much of the United States as well as Central America and the Caribbean. Therefore, spring migration can vary greatly from very short to long distance. Winter territories and communal roosts are usually abandoned by late February to early March (MacWhirter and Bildstein 1996). During spring migration, adult harriers precede juveniles and males precede females to the breeding grounds (Hamerstrom 1969). Migrating harriers begin arriving in Michigan in mid March. At Whitefish Point, in Chippewa Co. Michigan, spring migration peaks by mid April to mid May (Berkelman et al. 1989).

Courtship in northern harriers is often termed a “sky dance.” This ritual is usually accomplished by the male

and involves sharp dives and circular rolls (Bent 1937). Although pairs can mate in successive years, northern harriers do not mate for life. In fact, polygyny (one male mating with more than one female in a breeding season) is well documented in the species. The frequency of polygyny is related to sex ratios on the breeding grounds (England 1989) and especially to abundance of prey (Simmons et al. 1986). The female initiates copulation. Nest building begins with both sexes bringing nest material, but the female completes most of the actual building (Toland 1985). Nests are built in dense vegetation on the ground and are comprised of dead grasses, small twigs, and feathers as lining. The average clutch size for northern harriers is 4.4 eggs (MacWhirter and Bildstein 1996). One clutch per breeding season is standard, although renesting is possible if the original nest is damaged or lost (Duebber and Lokemoen 1977). Incubation begins with the first egg laid. During this time, the female alone incubates the eggs. She is rarely away from the nest and is usually fed at the nest by the male. Incubation lasts 26-32 days (Breckenridge 1935). Young are brooded by the female and the male continues to provide food for both the female and chicks. Young harriers remain in or near the nest for another 30-35 days until flight is achieved (Hammond and Henry 1949).

In Michigan, fledging usually occurs by mid July. Fall migration for northern harriers is protracted, beginning in mid August and continuing through late October. Stragglers can be found into early November. Juveniles migrate before adults and females precede males (Bildstein et al. 1984). Interestingly, small populations of northern harriers may overwinter in the extreme southern counties of the state (Craighead and Craighead 1969). The Maple River State Game Area, the Allegan State Game Area, and the Pt. Mouille State Game Area are three important overwintering sites for northern harriers in Michigan (Cuthrell, D., pers. comm.).

**Conservation/management:** Occurring in marshes and open landscapes, the northern harrier was once described as one of Michigan’s “commonest and best known birds” (Barrow 1912). However, their numbers have declined since the 1960’s. This decline is most noticeable in the southern counties of the state where grassland and wetland loss has been the most rapid (Adams et al. 1988). The species was on the National Audubon Society’s *Blue List* from 1972 to 1986 (Tate



1986). The U.S. Fish and Wildlife Service has identified the northern harrier as a *migratory nongame bird of management concern* for Region 3, which includes Michigan (U.S. Fish and Wildlife Service 1987).

Northern harriers are now listed as endangered or threatened in 12 northcentral and northeastern states and listed as a special concern species in another three, including Michigan.

The major factor affecting northern harrier populations is habitat loss both on breeding and wintering grounds. Fifty-four percent of wetland area in the U.S. has been lost since European settlement (Tiner 1984). In Michigan, approximately 70% of wetlands have been lost (Comer 1996). The practices of draining wetlands for agricultural fields and filling wetlands for residential uses help to explain this dramatic loss. Since the harrier prefers to breed in shallow, freshwater wetlands, this reduction in potential habitat is a serious threat.

Conversion of open grassland habitats to monotypic farming also contributes to shrinking of suitable breeding habitat (Duebber and Lokemoen 1977). Loss and degradation of fresh and saltwater marshes, grasslands and open floodplains have also reduced habitat throughout the species wintering range. Other factors exist and are contributing to decreasing populations of northern harriers. Pesticides and other contaminants have serious effects on harrier populations. Studies have shown negative impacts by organochlorides (Hamerstrom 1969) and other chemicals such as DDT, DDE and PCB's (Anderson and Hickey 1972). Human disturbance is another factor affecting northern harriers. For much of the 20<sup>th</sup> Century, harriers were targeted and shot. Until the early 1930's, 3,000-5,000 birds were recreationally shot yearly in the Kittatinny Ridge area of Pennsylvania (Broun 1935). Even today, northern harriers are under pressure on wintering and communal roost locations in areas of the U.S. Harriers also are sensitive to human and agricultural activity. Human presence near the nest sites may cause birds to desert. Even research activities such as trapping and banding (Hamerstrom 1969) and placing observation blinds (Simmons 1983) can have deleterious effects on nesting harriers. Agricultural practices such as repeated mowing or heavy grazing can destroy nests and cause birds to abandon otherwise suitable habitat.

With habitat loss the major threat to northern harrier populations, habitats used on the nesting and wintering

grounds need to be preserved. The focus of this preservation should be where large tracts of suitable habitat already exist. Conservation easements, continuation in the Conservation Reserve Program of the 1985 Farm Bill, purchases of new acreage, and law enforcement are important tools to aid in preservation of harrier habitat. In wetland habitats, management of water levels is very important. Levels should be kept low (<6 in.) during the nesting season to prevent nest inundation (Hands et al. 1989) and elimination of the prey base. Another management option for grassland habitats is periodic burning. Burning every 2-5 years helps to prevent succession and encroachment of woody vegetation (Duebber and Lokemoen 1977). Lastly, nest visitations and disturbances should be avoided. In areas where human disturbances could potentially threaten nesting northern harriers, the creation of buffer zones surrounding nest sites is a possible solution (Serrentino 1992).

**Research needs:** Monitoring of northern harrier occurrences on existing public and private managed areas is a high priority. Training of land managers to identify the species as well as recognize suitable habitat for northern harriers is also necessary. Identification of important overwintering sites in southern Michigan is also important. Implementation of standardized and accurate survey methods would assist in determining trends of northern harrier populations in Michigan. Additional studies during the breeding season are necessary to determine the causes of mortality and breeding failure, and the occurrence and frequency of polygyny. Studies involving the size of hunting ranges at sites with varying densities of habitat types and individuals are also required. Information regarding food habits, hunting habitat selection, prey abundance and breeding success relationships (Serrentino 1992) is needed. Lastly, determining the types and levels of disturbance harriers will tolerate in Michigan's three important overwintering sites is essential to northern harrier success in the state.

**Related Abstracts:** southern wet meadow, lakeplain wet-mesic prairie, Henslow's sparrow, grasshopper sparrow, dickcissel, short-eared owl



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#### Abstract citation:

Currier, C. 2001. Special animal abstract for *Circus cyaneus* (northern harrier). Michigan Natural Features Inventory. Lansing, MI 5 pp.

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