

Northern Harrier, *Circus cyaneus*

Status: *State:* Endangered *Federal:* Migratory Nongame Bird of Management Concern

Identification

Often seen conspicuously hunting low over the open coastal marshes of New Jersey, the northern harrier is a medium- to large-sized hawk. A white "rump patch," low buoyant flight, and the position of its wings in a shallow "V" dihedral characterize the airborne northern harrier. It also has an owl-like facial disk that aids it in detecting prey in tall grass or low-light conditions by concentrating sound towards the ears.



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Adult northern harriers are sexually dimorphic in both plumage and size. The smaller males are slate gray above and white below with contrasting black wingtips and a black trailing edge to the wing. The male's white breast has varying amounts of light rufous (rusty) spotting. The larger female harriers are brown above and buff colored below with brown vertical streaking on the chest and belly. Unlike that of the male, the underwing of the female is dark and the black wingtips are obscured. On all harriers, white uppertail coverts that form the white rump patch are a key in-flight field mark. Adult harriers of both sexes have lemon yellow eyes. On all ages, the legs are long and yellow, the cere--the fleshy area behind the base of the bill--is yellow, and the bill is black.

Juvenile northern harriers are extremely similar in appearance to adult females. Juveniles are brown above, although slightly darker than adult females, and have a cinnamon wash to the underside that is faintly streaked. As this reddish hue fades during their first winter, juveniles tend to appear much more like adult females. Juvenile males are born with grayish eyes that turn to an adult-like lemon-yellow by their first winter. Juvenile females have dark brown eyes that take at least two years to appear yellow.

Northern harriers employ several different calls. A chirp-like call between male and female is given during food exchange or on the ground during copulation. This call is also exchanged between females and nestlings. Harriers reiterate an alarm call consisting of a series of kaks when a predator or intruder disturbs the nesting area. A high-pitched, gull-like whine is emitted, most often by the male, during courtship and territorial display flights.

A northern harrier hunting low over a marsh is one of the most distinctive raptors in flight. Reminiscent of a turkey vulture (Cathartes aura), the harrier holds its wings in a dihedral and rocks from side to side. The harrier is a slim, buoyant hawk with narrow wings and a long, slender tail, providing it with maneuverability and agility. On migration, harriers can appear significantly different in flight. When soaring, the harrier looks slender-bodied and cross-shaped and soars on flat wings. In a glide posture, the

wings are pulled up into a modified dihedral as the hands are leveled out for maximum lift. The northern harrier flaps with deep, floppy wing beats, whereas most other hawks' wing beats appear stiff and shallow.

Habitat

Formerly known as the “marsh hawk,” the northern harrier inhabits open country such as tidal marshes, emergent wetlands, fallow fields, grasslands, meadows, airports, and agricultural areas. Many nests in the state occur in brackish or saline marshes, particularly along the Delaware Bay shore. Within these areas, harriers nest in the drier areas of high marsh that are dominated by salt hay (*Spartina patens*), marsh elder (*Iva frutescens*) or reed grass (*Phragmites communis*). Harriers may also nest in freshwater tidal marshes that contain *Phragmites*, sedges (*Carex spp.*), or other emergent wetland plants. Inland breeding sites may be located in managed, fallow, or low-intensity agricultural fields that contain tall grasses and herbaceous vegetation.

Northern harriers forage over marshes, fields, bushes, and edges that contain low vegetation, often only 1 to 2 m (3 to 6 ft.) high. Although phragmites may be used for nesting, it offers poor foraging habitat for harriers because it forms dense, impenetrable stands.

Because they differ in size, male and female harriers exhibit sexual variation in diet and foraging habitat. During the nesting season, females typically hunt within the marsh itself, while males, in addition to foraging in the marsh, often seek prey along upland edges or fields. Males may fly considerable distances during hunting excursions and consequently have larger home ranges than females. In New Brunswick, Canada, breeding male harriers maintained territories 10 times greater in size than those of females (Simmons 1983). Territory size also varies depending on the season and prey availability, with individuals occupying larger territories during the non-breeding season and when food is scarce.

Northern harriers occupy similar habitats throughout the year. Communal winter roosts of harriers are located on the ground within drier portions of marshes or in grasslands. Roost sites can be readily recognized, as they are littered with pellets, feathers, and excrement.

Status and Conservation

Prior to the early 1900s, the northern harrier was a common breeding species and winter resident within suitable habitat in the northeastern United States. Historic winter roosts in Hunterdon County, New Jersey, contained over 100 harriers. In the early 20th century, northern harriers, as well as most other raptors, were commonly shot because of suspected predation on chickens, game birds, and waterfowl. Declines of breeding harriers in New Jersey were noted as early as the 1920s and continued into the 1940s. The loss of open areas resulting from reforestation and draining and filling of coastal marshes greatly reduced habitat for harriers. Harrier declines detected on Christmas Bird Counts from 1952 to 1971 coincide with the extensive dredging and filling of coastal wetlands in New Jersey from the mid-1950s to the mid-1970s. The Breeding Bird Survey

has also detected a declining trend of northern harriers in the northeast from 1966 to 1999 (Sauer et al. 2000).

During the 1950s and 1960s, harriers exhibited reproductive failure resulting from contamination with the pesticide DDT. DDT, which biomagnifies at each trophic (food chain) level, accumulates in top-level carnivores, such as raptors. DDT contamination inhibits calcium metabolism, resulting in eggs with abnormally thin shells. During incubation, these weakened eggshells break under the weight of the adult. Following the federal ban of DDT in 1972, harrier populations began to gradually recover. However, DDE, a residual component of DDT, may continue to impact this species. Although current contaminant levels in northern harriers remain unknown, elevated levels of DDE have been documented in other raptors, including peregrine falcons and ospreys, nesting in marshes along the Delaware Bay coast.

Due to population declines and habitat loss, the northern harrier was listed as a threatened breeding species in New Jersey in 1979. In 1984, the harrier was reclassified as an endangered species because of limited population size, restricted range, sensitivity to disturbance, and continued loss of suitable nesting habitat. The New Jersey Natural Heritage Program considers the northern harrier to be “demonstrably secure globally,” yet “imperiled in New Jersey because of rarity” (Office of Natural Lands Management 1992). This species has suffered a similar fate in other northeastern states and is consequently listed as endangered in Rhode Island and Connecticut and threatened in New Hampshire, Massachusetts, and New York. Due to population declines and reliance on threatened wetland habitats, the northern harrier has been listed as a Migratory Nongame Bird of Management Concern by the U.S. Fish and Wildlife Service’s Office of Migratory Bird Management since 1982. In addition, the northern harrier was included on the National Audubon Society’s Blue List of Imperiled Species from 1972 to 1986, the final year of the list.

In New Jersey, wintering populations of harriers are stable and the breeding population, although endangered, appears stable, provided that suitable habitat remains. During the 1980s, the breeding population in New Jersey was estimated at 40 to 50 pairs statewide, with 20 to 30 pairs in the Delaware Bay estuary (Dunne 1995, Serrentino and England 1988). The New Jersey Breeding Bird Atlas documented confirmed or probable breeding pairs in 34 blocks within the state, over 50 percent of which occurred in the outer coastal plain (Walsh et al. 1999).