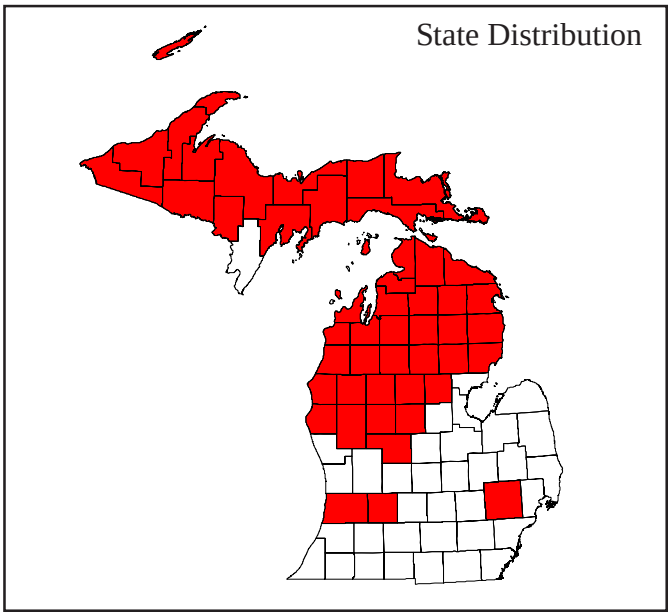
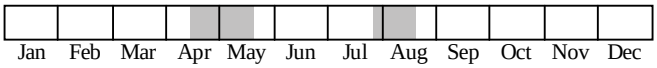
Gavia immer Brünnich — Common Loon

Credit: U. S. Fish and Wildlife Service



Best Survey Period



Status: State threatened

Global and Sate Ranks: G5/S3S4

Family: Gaviidae

Total Range: The Common Loon (*Gavia immer*) breeds throughout boreal North America, including most of Canada and Alaska and portions of Greenland and Iceland (McIntyre 1988; McIntyre & Barr 1997). In the continental United States the breeding range is concentrated in the upper Midwest and the northeast, with significantly lower numbers in the northern Rocky Mountains and the Pacific Northwest (McIntyre & Barr 1997; Evers 2004). The winter range of the Common Loon is primarily along the Atlantic and the Gulf Coast, with approximately 30% along the Pacific Coast (McIntyre 1988; Evers 2004).

State Distribution: Michigan Breeding Bird Atlas (MBBA) records collected from 1983-1988 documented 550 atlas "blocks" (each block = nine square miles) containing Common Loons (Brewer et al. 1991). Although the southern limit of these occurrences primarily stretched across the central Lower Peninsula (LP), breeding loons were also recorded in the southwestern portion of the state. Isle Royale and the southwestern Upper Peninsula (UP) supported the highest densities of loons, while moderate densities were observed in the western-central UP and in the northeastern LP. More recently, extensive surveying and monitoring of loons by the non-profit group Common Coast Research & Conservation (CCRC) has delineated loon occupancy across most of the UP and has identified five particularly important areas harboring sizable breeding populations: Isle Royale National Park, the Ottawa National Forest region (Gogebic, Ontonagon and Iron counties), the Huron Highlands region (Baraga and Marquette counties), the Munising Moraine region (Alger, Schoolcraft and Luce counties) and the Seney National Wildlife Refuge region (Schoolcraft, Mackinac and Luce counties) (Kaplan et al. 2002; CCRC unpublished data). Additionally, the Michigan Loon Preservation Association (MLPA), who utilizes local volunteers known as "Loon Rangers," charts loon occupancy and productivity primarily on lakes with some degree of human development. MLPA reports, and recent survey data for the second edition of the Breeding Bird Atlas suggest that the southern limit of breeding Common Loons in Michigan has remained relatively stable over the last twenty years (MBBA unpublished data). However, except for two sites in Barry County, the small outlying population in southern Lower Michigan now appears to be extirpated (Ray Adams personal communication). Figure 1 shows Michigan counties with recent and historic confirmed breeding.

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Recognition: Common Loons are one of five species of loons, including the smaller Arctic Loon (*Gavia arctica*), Pacific Loon (*G. pacifica*), and Red-throated Loon (*G. stellata*), and the similar sized Yellow-billed Loon (*G. adamsii*) (Sibley 2000). The identical breeding plumage of male and female adult Common Loons includes a black head (which can assume a greenish gloss in direct sunlight), a black neck with both a "necklace" and "chin strap" of thin white vertical stripes, a white breast and underside, and a black back and wings with distinctive white checkered spots (Palmer 1962). Other distinguishing characteristics include red eyes and a relatively long, thick, dagger-like black bill (Sibley 2000). Non-breeding (winter plumage) adults and immature birds (through at least their second summer) are much drabber, with dark gray feathering on their head, wings, and back (Palmer 1962; McIntyre 1988; Sibley 2000).

Common Loons are equipped with dense bones which cause them to float low in water and small wings which force them to "run" upon the water's surface for a considerable distance to achieve lift-off (McIntyre 1988). Large webbed feet and powerful legs set to rear of the body enable loons to propel themselves rapidly underwater for prolonged durations. Due to physical adaptations for swimming and diving, loons seldom visit land except for shoreline copulation, nest-building and egg incubation (Bent 1919; Sibley 2000). McIntyre (1988) reports weights ranging from 2.7 kg (5.9 lbs) to over 6.3 kg (13.9 lbs). Males are typically 24-35% heavier than females (Evers 2004); Michigan males average 4.6 kg (10.1 lbs) and females average 3.7 kg (8.1 lbs) (CCRC unpublished data).

Among Michigan bird species, male Common Mergansers (*Mergus merganser*) are most frequently confused with Common Loons. Similarly they possess dark green heads and white breasts and undersides, however, mergansers have reddish bills, and lack white stripes on their necks and white checkering on their backs. Mergansers also typically produce 8-11 hatched chicks, far exceeding the absolute upper limit of three for loons (Robinson et al. 1993; Black & Kennedy 2003).

Common Loons produce at least six recognized vocalizations, most common of which are the yodel, wail, tremolo, and hoot (Barklow 1979; J. D. Kaplan personal communication). Of these, the yodel is the only sex-specific call and is an abrasive, oscillating bugle given by males to defend and delineate breeding territory (Barklow 1979; McIntyre & Barr 1997). Often identified as the "call of the loon", the wail is the most recognized of all Common Loon vocalizations and resembles the howl of a wolf. Among its numerous functions, the wail can serve to determine location and reduce distance between paired individuals (Barklow 1979; McIntyre & Barr 1997). The tremolo is the Common Loon's staccato distress call given in response to a threat within territory (such as a nest disturbance by a human intruder); it is also expressed in flight as a "sounding" announcement to loons on the water below (Barklow 1979; McIntyre & Barr 1997). Finally, the hoot is a soft, quick contact sound used by a parent as a beckoning "come here" to nearby young (D. L. McCormick personal communication), or given when approaching, or in the presence of other loons, including during migration (McIntyre & Barr 1983). Although the hoot is generally used diurnally, the yodel, wail and tremolo can be employed both diurnally and nocturnally (D. L. McCormick personal communication).

Best Survey Time: Kaplan et al. (2002) notes two optimal time periods to survey Common Loons in Michigan, including late spring between ice-off and the initiation of nesting (mid April to mid May) and late summer after egg incubation is likely finished (late July to mid August). Because pairs often stay within sight of one another during the pre-nesting period, positive identification of breeding pairs during this "early" survey window is high (D. L. McCormick personal communication). The "late" summer survey span affords a non-disruptive opportunity to assess seasonal nesting success or failure since juvenile loons cannot fly until at least eight weeks of age and will still be present on their natal lake through August (Alvo 1986; Kaplan et al. 2002; Kaplan 2003). Ideally, surveys of lakes should occur within both the early and late windows to accurately determine occupancy and productivity. Although surveys can be conducted during egg incubation, breeding pairs are exceedingly sensitive to human disturbance during this time (Titus & VanDruff 1981; Caron & Robinson 1994). In addition, the breeding adult not incubating eggs will often feed on nearby lakes; consequently this mate and an incubating loon in a well-concealed nest location may go undetected (Kaplan et al. 2002).

Habitat: High quality breeding habitat for Michigan Common Loons has been characterized as an inland lake of adequate size (usually >40 acres) with a stable water level and undeveloped shoreline, small islands, or bog mats for successful nesting (Jung 1987; Robinson et al.1993). Additionally, McIntyre (1988) cites the importance of clear, high-alkaline waters, affording loons sufficient water clarity and high prey densities for foraging. Recent atlasing across the Upper Peninsula (UP), however, has underscored the use of "sub-optimal" lakes of smaller size (10-40 acres) and/or marginal water quality (CCRC unpublished data). Pairs will often utilize larger, clearer nearby lakes (which may lack viable nesting habitat or are subject to high recreational use) for supplementary feeding, sometimes defending these water bodies as part of a "multi-lake" territory (McIntyre 1983). Very large inland lakes and the Great Lakes form important staging areas during spring and fall migration, and are frequently utilized by young adults (3-6 years) and non-breeding loons (D. L. McCormick personal communication; Robinson et al. 1993).

Biology: The spring return of adult loons on Michigan breeding grounds is correlated with ice melt on northern lakes, usually in late March and April (Robinson 1991), after which pair bonding behavior including head posturing, bill-dipping, short dives, and synchronous swimming is initiated (McIntyre 1988). Intrusions by unpaired male and female adults can occur during this time, often leading to short but violent bouts of aggression between territorial birds and their challengers (McIntyre 1988). Copulation takes place on land, followed by the creation of a near-shore nestcup on a small island, hummock, or bog area. Although the nest itself is commonly constructed from substantial masses of aquatic and/or terrestrial plant material, it can also consist of little more than a shallow scrape in sandy soil, or a poorly-defined depression on rocky substrate (Bent 1919; McIntrye 1988). Both sexes build the nest and incubate one or two (very rarely three) deep olive to light brown color eggs with smallish dark brown or black spots for 26-31 days (McIntrye 1988; McIntyre & Barr 1997). Common Loons are single brooded, but if nest failure occurs re-nesting may be attempted up to three times, but usually only two attempts are made in one season, often laying just one egg per re-nesting attempt (Bent 1919; McIntrye & Barr 1997; J. D. Kaplan personal communication). Semiprecocial young, tended by both sexes, typically leave the nest within 24 hours of hatching, swim with adults to nearby nursery areas, and spend much of their first two weeks of life carried on the adult's back or brooded under their wing (McIntrye 1983, 1988). Juveniles are fed exclusively by their parents until 6-7 weeks of age, after which they begin to forage for themselves; by 8-9 weeks, most are capable of dietary self-sufficiency (McIntyre 1988; D. L. McCormick personal communication). Fish constitute the bulk of both adult and juvenile diets, but frogs, crayfish, aquatic invertebrates, and plants may also be consumed (Bent 1919; McIntyre & Barr 1997). Fall migratory departure generally occurs first for unsuccessful pairs (separately), followed by successful pairs (also separately) and lastly by fledged juveniles, who do not leave their natal lake until well into their third month (CCRC unpublished data). Juveniles will not return as breeding adults until two (rarely) or three years of age, with successful breeding generally beginning at five years of age (McIntyre & Barr 1997; CCRC unpublished data).

Conservation/Management: Common Loons were documented in Michigan as early as 1857 (Kneeland 1857 in Robinson et al. 1993), and although 19th century accounts routinely described it as a common breeder throughout the state, reports from the early 20th century noted less abundant numbers in more settled portions of southern Lower Michigan (Barrows 1912). Bent (1919) observed a similar phenomenon across the broader Northern American range of Common Loons, and acknowledged several impacts to loon densities and distribution: the expansion of human settlement, egg collecting, and sport shooting. While statewide declines were previously noted in Michigan, systematic surveying of breeding loons was not initiated until the early 1980's, with only 200 estimated pairs. This was amended to nearly 300 pairs in the late 1980's, and prompted the inclusion of loons onto the state's Threatened Species list (Robinson et al. 1993). A Loon Recovery Plan was drafted in 1992 by several wildlife specialists; the document reviewed and characterized the status and decline of Michigan's breeding loon population and provided recommendations to aid in their recovery (Robinson et al. 1993). A primary goal set forth in the plan was the (re)establishment of at least 575 breeding pairs distributed across six "management zones," maintained for over five years (Robinson et al. 1993).

Surveys conducted in the 1990's estimated as many as 416 Common Loon pairs in Michigan (Schuette 1998). More recently, over 400 breeding pairs were verified in the UP alone (McCormick et al. 2006), with a significant proportion on Isle Royale (Kaplan et al. 2002). Extensive atlasing of the island dramatically increased the known number of breeding pairs (resulting from modified survey methodology, opposed to a sudden rise in the breeding population) (Kaplan et al. 2002). However, a recent population viability analysis (PVA) utilizing these and other Michigan loon data suggested that the island's population may actually not be sustainable over time. This report stressed that the long-lived nature of Common Loons render detection of population trends especially difficult over short time periods (Vucetich et al. 2004), and factors contributing to loon declines are numerous and varied.

Indeed several factors, both lethal and insidious, contribute to Common Loon declines; the latter category includes destruction of habitat, disease, heavy metals, and human recreation. Although the effect of human disturbance varies among individuals, impacts of some activities have been quantified. The Michigan Department of Natural Resources has estimated that 238 loons drowned per year in commercial fishing gill and trap nets (Robinson et al. 1993). Larger mesh trap nets were adopted that significantly reduced mortality without jeopardizing fish catches (Carey 1992). Effects of heavy metals, such as mercury poisoning, are more pervasive. Male loons may be directly affected because they eat larger fish which have accumulated more mercury, while females consume smaller fish, depositing mercury into their eggs, thus resulting in lower productivity and survival (McIntyre 1988; Schoch & Evers 2002). Unfortunately, mercury levels recently documented in UP loons approach the highest levels recorded across North America (McCormick et al. 2006).

Causing equally devastating impacts to Common Loons and other fish-eating birds is the Type C and Type E botulism toxin, which upon ingestion of infected fish, causes paralysis, followed by eventual drowning. In 1963, Type E botulism was first detected in dead loons on Lake Michigan, resulting in the estimated loss of over 3000 loons (Kaufmann & Fay 1964). The latest outbreak occurred in 2006 along the east coast of Lake Michigan, affecting an estimated 3000 fish-eating birds, including loons (K. Hyde personal communication). It is hypothesized zebra mussels, an invasive species, release waste, providing the needed anaerobic conditions for botulism to grow. These mussels then concentrate the toxin and are eaten by fish, including round goby, which sicken and rise to the surface to be consumed by a wide size class of fish-eating birds (K. Hyde personal communication). Lakes Erie, Huron, and Ontario have been losing Common Loons and other fish-eating birds from a similar phenomenon (Robinson 2004; Adams et al. 2005).

Research Needs: Comprehensive atlasing, including precise locations of actual and possible nesting locations is needed to quantify breeding status of loons and to identify situations where human disturbance is likely to occur. More importantly, lakes at risk of losing nesting habitat to development can be preferentially targeted for conservation efforts. Additionally, research establishing correlations between loon and fish mercury may prove useful, such that levels in loons could be used to supplement existing guidelines for human fish consumption advisories on individual Michigan Lakes.

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