

Common Loon Natural History
(adapted from Species Profile of the Common Loon in New Hampshire)

Scientific Name: *Gavia immer*
Common name: Common Loon
Order: Gaviiformes
Family: Gaviidae
Genus: *Gavia*

Species Description: The Common Loon (*Gavia immer*) is distinguished by its large size and heavy weight. Average body mass ranges from 2.7 to 7.5 kg (5.95 to 16.5 lbs) and average wingspan ranges from 136 to 166 cm (52 to 65 inches). Males are typically larger than females. On average, New Hampshire male loons are 28% larger than females. Body mass in males range from 5.5 to 6.4 kg (n=286) and 4.3 to 5.0 (n=285) in females. There are no differences in plumage between the sexes.

Adult Breeding: In alternate (breeding) plumage, adult loons have black bills and red eyes. The head and nape are black and can appear iridescent green or purple in certain light conditions. A distinctive band of vertical black and white striations is found at the nape. A similar, though smaller collar exists under the neck. Scapulars and wing coverts above are characterized by large, white rectangular patterns at the feather's distal end. White speckling occurs across the remiges and retrices. Breast, belly and wing lining are white year-round.



Photo by John Rockwood

Adult Winter and Immature: The first of two body molts occurs between late August and October. Non-breeding adults can begin this process as early as mid-July. The molt is initiated at the base of the bill across the head, nape and contour feathers replacing the black and white alternative plumage to the gray-brown of basic (winter) plumage. Some of the black and white body contour feathers may be retained into or throughout the winter. Remiges are molted between late December and early April leaving loons flightless for approximately 2-3 weeks. Wintering loons are gray (basic) plumage, though breast, belly and wing lining remain white and eyes retain their red color.



Photo by Daniel Poleschook and Ginger Gumm

Chicks: Loon chicks have black-brown down, white bellies and brown eyes at the time of hatch. After approximately two weeks, this plumage is replaced by brown downy feathers. Contour feathers emerge after 7 weeks and appear grayish-white. At 10 weeks, loon chicks are in their full juvenile plumage. At 10-11 weeks, flight feathers are fully molted.

Life History/Annual Cycle

Arrival and Territorial Establishment: Loon arrival in the spring coincides with ice-out. Chronology of return is based primarily on age and sex. In New Hampshire, males typically return first, followed by females within 1-2 days. In the northern cline, pairs return together and often congregate with other adults on available open water awaiting full ice-out. In New Hampshire, Lake Winnepesaukee, Connecticut River, Magalloway River and Androscoggin River are the primary sites of these pre-ice-out staging areas. Territorial establishment occurs immediately upon arrival. The lower limit of territory size of Common Loons in New Hampshire is 4.5 ha (11 acres), but the smallest waterbody on which nesting has been documented is 6.5 ha (16 acres). Larger waterbodies can hold multiple pairs with territories often defined by topographic features such as coves and inlets, and include areas of deep water not defended by territorial pairs. The smallest documented lakes holding two territorial pairs and two nesting pairs are 113 ha (280 acres) and 125 ha (309 acres) respectively. Squam Lake (2,738 ha, 6,762 acres) typically holds 18 territorial pairs.

Copulation and Nesting: In New Hampshire, initiation of nesting begins in early May and extends through late June, peaking between the first week of June. Second nests (renests) are put down mid-June through late July, peaking from 18th June to 8th July. Courtship rituals are minimal and include simultaneous swimming, some posturing, and soft mewling vocalizations, especially before copulation. McIntyre suggests that high fidelity rates in loon pairs reduce the need for elaborate courtship displays. Copulation events occur on land, lasting for 3-10 minutes each. Copulation sites do not always dictate nest sites. Both members of the pair participate in nest building and reuse of nest sites is common.

Clutch Size and Incubation: First nest attempts will usually have two eggs, while renests generally produce only a single egg. Three-egg nests are rare and likely not from the same female. Incubation periods last from 26-30 (mean 28) days with sitting commitment steady following second egg deposition. Loons are more readily flushed from nests during the early stages of incubation, becoming more invested as incubation progresses. Loons have, however, been observed to leave the nest for short periods during

hot days during all stages of incubation. All incubation responsibilities are shared. Eggs hatch asynchronously, usually within 24 hours of each other.

If a first nest attempt fails, a second nest attempt can occur 1-3 weeks after the first nest failure. Evers found that the incidence of mate-switching peaks following a nest failure. If the original female is displaced, only 17% of pairs attempt a second nest while 60% of pairs with a new male will re-nest. In New Hampshire, 17% of the nesting pairs re-nested after their first nest failed.

Chick Rearing and Fledging: Loon chicks are semiprecocial. In general, care of young between pair members is equal. Back-riding by chicks occurs the first 7-10 days and may aid in temperature regulation as well as provide comfort and safety. Chick survivorship is influenced by weather, predation and anthropogenic factors. Sibling rivalry also impacts survivorship when food availability is limited, as well as adult conspecifics in areas of high loon density. Northern Lake Winnepesaukee and Squam Lake in central New Hampshire have high loon densities and experience higher rates of chick mortality due to intruding adult loons than other New Hampshire lakes. Loon chicks are able to fully feed themselves between 8 and 10 weeks of age and are capable of flight as early as 11 weeks. Parental care of chicks usually extends into the late summer, but chicks are left alone for progressively greater periods of time. In 2012, overall breeding success was 0.48 (chicks surviving/territorial pair) which is the average needed to maintain a viable population.

Foraging Habitat

Breeding: Loons prefer foraging in clear waters of littoral zones; they tend to avoid deeper parts of lakes. Foraging by breeding adults and their young are generally in relatively shallow areas < 5 m in depth and within 50 to 150 m from the shoreline.

Loons are obligate fish-eaters. They are opportunistic predators but favor fish that have an erratic swimming behavior or fusiform shape. Yellow perch (*Perca flavescens*) and Centrarchid species such as pumpkinseed (*Lepomis gibbosus*) and bluegill (*Lepomis macrochirus*) are favored for these reasons. Adult loons in Ontario have a daily fish uptake of approximately 960 g and a family of loons with two chicks can consume upwards of 423 kg in one breeding cycle.

Loons forage on many other species of prey and frequently rely on the temporary abundance of a prey item. Because loons capture and swallow small prey items underwater it is difficult to substantiate their entire prey base. Loons regularly feed on salmonids, but their straight-lined escape method make them harder for the loon to capture. Loons foraging on lakes inhabited by perch and salmonids likely focus on perch. However, lakes that are recently stocked with salmonids are a rich prey source for loons.

Other Habitat Requirements

Breeding and Nesting Habitat: Loons prefer lakes > 24 ha (60 acres) with clear water, numerous small islands, and an irregular shoreline that creates coves; however, they are found in a wide variety of freshwater aquatic habitats. Lake size and configuration are important determinates for loon density.

Loons nest in close proximity to the water's edge and prefer the lee (sheltered) side of small islands, floating bog mats, and hummocks in marshes. Islands can provide the widest range of visibility on the territory, and afford better protection from mammalian predators. Marsh and mainland sites are of lower preference and most likely occur in response to shoreline development and high conspecific densities.

Nest sites generally are within 1 m from the shoreline. Available submergent and emergent vegetation are used for nest structures. Extent of the nest bowl diameter varies (27 – 38 cm), and use of depressions, or

“scrape” bowls is common. Mainland nest sites are more likely to be constructed as opposed to scrapes or hummocks. Others have reported a preference for nest sites with steep drop-offs that allow for underwater approaches and exits, however Sutcliffe and Valley did not find this to be a predictor of site location. Strong found between-year reuse of nest sites by Common Loons to be 78-88%. Changes in nest locations were more frequent after nest failures, and reuse in subsequent years occurred more often after successful nests.

Chick Rearing Habitat: Chick rearing areas or nurseries share many of the same attributes as foraging areas. They are typically in shallow water close to shore, with prey size classes suitable for feeding young. These areas experience less prevailing wind and waves that can separate chicks from adults. Chicks have been observed to hide among shoreline vegetation in response to threats or when left unattended.

Threats

Human disturbance

Human lake use and shoreline development has been implicated in loon population declines and reduced breeding success. Kuhn, DeSorbo et al., and LPC have shown that loon abundance and breeding success are limited by human habitat alteration and lake disturbance in New Hampshire. Anecdotal evidence and some unpublished data suggest that loons occupying less disturbed lakes (e.g., in northern NH) are more sensitive to human impacts. Many loon disturbance studies, however, also report loons successfully breeding on waterbodies despite disturbance and adopting adaptive strategies in response to human activity. The limits of behavioral adaptation to human presence are unknown and are probably site-specific. The loon's ability to acclimate illustrates that efforts to ameliorate impacts from disturbance have a high potential for success.

Shoreline development: Habitat degradation and loss because of shoreline development have been cited as reasons for declines in local breeding populations and in reproductive success. Often sites favored by loons for nesting and chick-rearing, such as islands and quiet bays, are of prime development value. Furthermore, loon presence attracts potential property owners, and as such, lakes supporting loon pairs are at a premium. The quality of loon breeding habitat is impacted by shoreline development through vegetative modification or removal, by enhancing predator densities, and by human activity.

When shoreline vegetation is removed, erosion and water temperatures increase. Ensuing sedimentation and phosphorus enrichment of the lake contribute to excessive algae and aquatic weed growth, reducing water clarity and quality, and changing prey composition and patterns of vegetative growth. NH lakes are threatened by both point and non-point source pollution (e.g. storm water runoff).

Accompanying shoreline development are increases in some species of loon predators. Raccoons (*Procyon lotor*) are widely considered to be the most influential egg-predator of loons and their densities are generally correlated with increasing shoreline development. Other wildlife associated with increasing human habitation are various species of gulls and corvids. All of these species have acclimated to human habitation and benefit from increased food availability from inappropriate disposal of garbage.

Loons, particularly those breeding pairs that are unaccustomed to people, are likely to relocate nest and nursery sites distant from high human presence. Therefore, shoreline development in high quality loon breeding habitat, such as island habitats, can modify use of the most suitable areas by a territorial pair.

Recreational use

Motorboats: Motorboating may or may not be a threat to breeding loons depending on boater awareness and how acclimated loons are to boating. Recreational motorboating represents a greater disturbance and risk to loons in open water than those nesting and foraging in shallow water. Habituation to boating activity can dull response times in loons, making them more susceptible to collisions. Thirty-nine percent of all loon mortality in New England is from trauma, with boat impacts contributing 36% to that total. Christenson found that adults with young moved further distances away when boats were present. The energetic cost of this is unknown; however, movement in response to boating activity increases the likelihood of chicks being separated from adults and decreases the time spent feeding young.

Personal watercraft: Personal watercraft differ from conventional motorboats in their design, use and effects on wildlife and the environment. Personal watercraft can cause significant damage since they have a shallow draft and are able to closely approach nests and shorelines at high speeds. Washouts of loon nests and blunt trauma mortality to loons from this type of watercraft have been documented. Disruption of loons by personal watercraft is not limited to nest failure and direct mortality. Repeated travel in a localized area is a common mode of operation with this type of watercraft. The presence of a personal watercraft near nest sites or loon families for extended periods of time can disrupt incubation, expose eggs to predators or impede parental care of young.

Non-motorized watercraft: As with personal watercraft, non-motorized watercraft, such as canoes and kayaks, have the ability to access shallow water areas typical of loon nesting and brood sites. Additionally, canoeists and kayakers are more apt to use remote areas, and have a greater ability for stealth. This type of activity is most detrimental during nest initiation when egg investment is lowest, and as such, the likelihood of abandonment highest. Kelly found flushing distances decreased as incubation progressed (week 1 = 129 m, week 2 = 121 m, week 3 = 91 m, and week 4 = 64m). Though loons on lakes with high human use flush at shorter distances and less readily, any increase in activity near the nest site may serve to attract predators. Kelly found that the average time off-nest was significantly less for flushes related to natural causes (8 minutes) as opposed to those caused by human disturbance (24 minutes). Disturbance from sailboats and wind-surfing has not been documented, however anecdotal and behavioral evidence suggest a flapping sail can be perceived as a visual threat, and therefore has the potential to disrupt nesting and brooding activity, even in areas of high recreational use.

Anglers: Impacts from irresponsible angling practices can be considerable. Excessive angler use of the shallow, vegetated areas of lakes through wading and boating practices disturbs nesting and foraging activity. Improper disposal of monofilament and fishing tackle pose great risk to mortality from entanglement and lead poisoning (see "Lead"). The increased popularity of fishing tournaments offering substantial prizes can create an unfortunate incentive for improper practices. In New Hampshire and Maine, vulnerable nesting pairs are vigorously monitored during bass tournaments, as some participants regularly disregard posted and cordoned-off nest enclosures.

Marine oil spills: Marine oil spills are a major threat to Common Loons. The North Cape barge spill of 820,000 gallons of home heating oil in January 1996 killed an estimated 400 loons off the Rhode Island coast. Population models constructed using LPC's population and demographic data indicated approximately 3,900 loon-years were lost. Mitigation of this injury focused on the purchase of lake shoreline breeding habitat in Maine to enhance productivity.

Artificial Water Level Fluctuations: Water level fluctuations can negatively impact loon nesting success. Increasing water levels by more than six inches can inundate loon nests and decreasing water levels by a foot or more can isolate nests, increasing predation and the difficulty of incubation exchanges. For the past decade, the Federal Energy Regulatory Commission (FERC) has increasingly required hydrological

management schemes that minimize impacts to nesting loons. Most dam relicensing efforts now require either a steady water level throughout the nesting season (June and July) or mitigation of nest losses through a long-term artificial nest platform and monitoring program.

Airplanes: The impact of airplanes on breeding lakes is not quantified, however male loons actively yodel in response to airplanes flying over or into their territory. This suggests a possible perception of territorial threat. As with other human-related disturbances, loons can acclimate to regular airplane use and can even regularly fledge young.

Contaminants

Lead: **Lead (Pb) poisoning as a result of ingesting lead fishing sinkers and jigs remains the primary known cause of adult loon mortality in New Hampshire**, accounting for 49% of recorded adult loon mortalities from 1989 to 2011 (n=124). Lead affects nerve impulse transmission causing systemic paralysis and neurological dysfunction evidenced by head-shaking, gaping, wing and eye droop. Other diagnostic symptoms include green feces, disorientation, lethargy, increased occurrence in shallow waters and frequent bouts of beaching with progression of condition.

Lead mortality peaks in mid-summer coincident with peak tourism and angling pressure. The presence of swivels and hooks in close to half of the Pb-killed loons suggest that direct ingestion as a result of current fishing practices, rather than the reservoir of tackle on lake bottoms, is the major source of continuing mortality.

Predators

Adults: Predation on adult Common Loons on the breeding grounds is rare. Vlietstra and Paruk recorded a predation attempt by a Bald Eagle (*Haliaeetus leucocephalus*) on an incubating female loon in north-central Wisconsin. Similar strikes by eagles have been observed on Lake Umbagog in northern New Hampshire. Loons as a prey source may be a site-specific adaptation by an individual eagle.

Eggs: Eggs are susceptible to depredation when left unattended. Mammalian predators to eggs include raccoon (*Procyon lotor*), mink (*Mustela vison*), fisher (*Mustela pennati*) and striped skunk (*Mephitis mephitis*). Sutcliffe documented raccoons to be the most significant mammalian predator to loon eggs in New Hampshire. Avian predators to eggs include Herring Gull (*Larus argentatus*), American Crow (*Corvus brachyrhynchos*), Bald Eagle, and Common Raven (*Corvus corax*).

Chicks: During the first 4 weeks after hatch, loon chicks have limited ability to dive, maneuver underwater or swim long distances making them most vulnerable to predation during this period. Major predators to chicks include snapping turtles (*Chelydra serpentina*) and Bald Eagles (LPC unpubl. data). Other known predators include northern pike (*Esox lucius*), fisher, Herring Gull, Great black-backed Gull (*Larus marinus*) and Ring-billed Gull (*Larus delawarensis*).