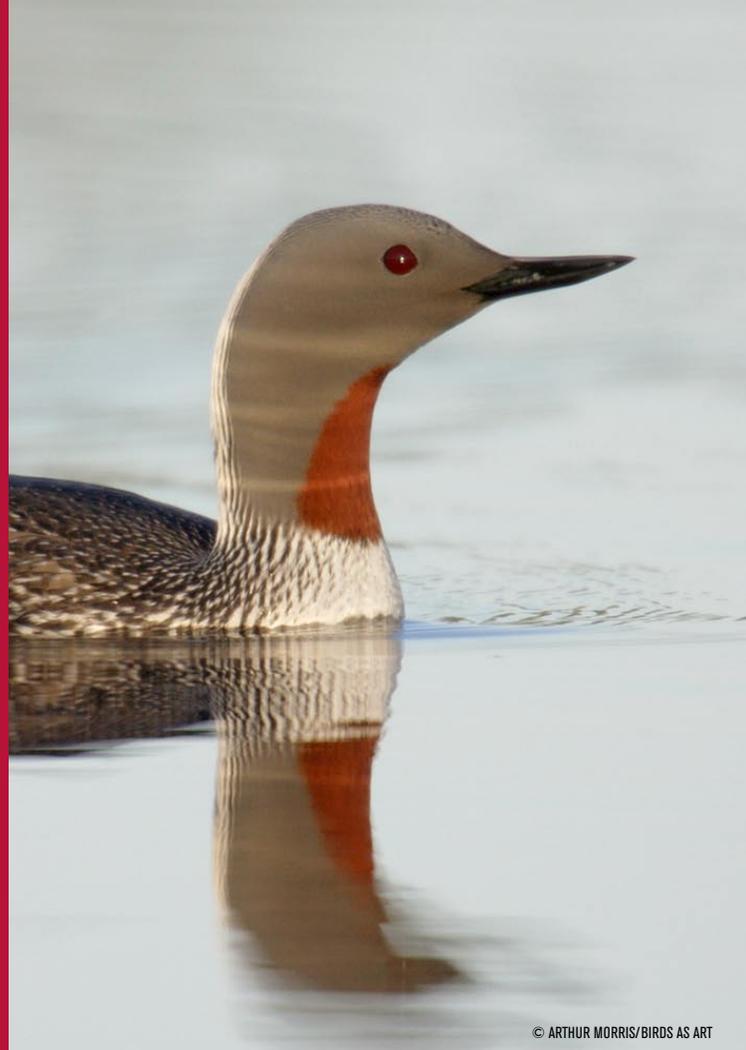




WILDLIFE AND GLOBAL WARMING

Navigating the Arctic Meltdown



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RED-THROATED LOONS

Disappearing ponds and rattled food chains may sound crazy, but for the red-throated loon they are emerging threats in a warming world. As temperatures increase, the small Arctic ponds where this loon breeds are indeed drying up and disappearing. Its maritime wintering populations also appear to be feeling the heat, leaving scientists to wonder if a marine food web altered by climbing ocean temperatures is making it more difficult for the red-throated loon to find the fatty fish it needs to survive.

While populations of other loon species have remained stable in recent years, winter populations of the red-throated loon—a species that receives less attention than the common loon—have collapsed. In Alaska, its numbers declined by 53 percent from the 1970s to the 1990s. Off the Atlantic coast of the eastern United States, Christmas bird counts also hint at a downward trend. Populations outside North America may not be safe either. In Sweden, for example, red-throated loon tallies have fallen 50 percent in the last 40 to 50 years.

Although these declines are not yet fully explained, the red-throated loon's special niche leaves it highly vulnerable to the loss of small bodies of water, which are most likely to

disappear in a warming climate. During the nesting season, these lesser-known members of the loon family need wetlands small enough to reduce competition from larger loons but close enough to more sizable lakes or the ocean, where they can catch fish for themselves and their young.

With fossil evidence of loonlike birds dating back to the time of the dinosaurs, loons are one of the oldest bird families. Today there are five species, including the red-throated loon. These fish-eating waterbirds are well-adapted to swimming and diving in both fresh and salt water, with thick, insulating plumage and denser bones than many other birds. Their legs are set far back on the body, which helps propel them through the water but makes them unbalanced



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A red-throated loon surfaces with its catch, an Arctic char. Loons dive to capture small fish in their bills—never stabbing or spearing them.

on land. Some say it is this awkwardness that earned this family its name; others say it is the singularly weird call of their most well-known member, the common loon.

Like other loons, the red-throated loon has a distinct profile: a large pointed bill, short neck and long body. Roughly the size of a mallard, it is smaller than most of its relatives. In summer plumage, its rusty red throat gives it its common name and distinguishes it from other loons.

Loons feed primarily on fish, which they hunt visually. Propelled by their strong legs, they dive for their prey, a habit that inspired the British to call them “divers” rather than loons. They dive to catch small fish, most commonly capelin, brook trout, stickleback, sculpin, herring, sprat, cod, gobies and Arctic char. Loons also eat some leeches, crustaceans, mollusks and aquatic insects. Red-throated loons forage only in very large lakes and rivers, and in tidal estuaries and along coastlines. According to one study of feeding behavior, they mainly forage in water three feet deep or less.

A LOON APART

The red-throated loon occupies a niche apart from other loons in Arctic wetlands. The larger loon species require a water-surface “runway” about the length of a football field to take flight. If they land in a small pond or on a wet roadway, they can get stuck. In contrast, red-throated loons can launch into flight directly from land and require far less distance to take off on water. As a result, they can use much smaller ponds and lakes where they do not have to compete with larger loon species for nesting territory.

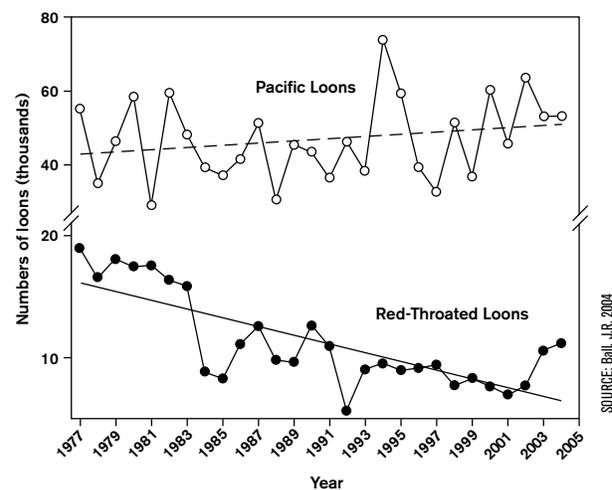
In these small, shallow ponds and lakes, red-throated loons nest on islands ranging from three square feet to one-tenth of an acre and covered with emergent grasses or sedges. A small pond generally supports a single nest, but up to four or five pairs may share larger ponds of 190 acres or more. The male and female build the nest together. From moss, grass, mud or other vegetation they fashion a structure

15 to 20 inches across, located close to water’s edge and up to six inches above its surface. Clutch size is typically two eggs, which are incubated for 24 to 27 days.

Like ducks and geese, loons are active right after hatching. Most chicks can swim within 12 to 24 hours and dive within two or three days. Adults generally travel two to 12 miles to forage for marine and deep-water lake fish to bring back to the nest. The two chicks vie for food, with the older chick often receiving more fish. Major sources of chick mortality include flooding or freezing of nesting ponds and predation from Arctic foxes, gulls and other birds. Chicks fledge at around 43 days, in time to migrate south for the winter.

Red-throated loons potentially have a very long lifespan (the oldest banded red-throated loon recovered was 23 years

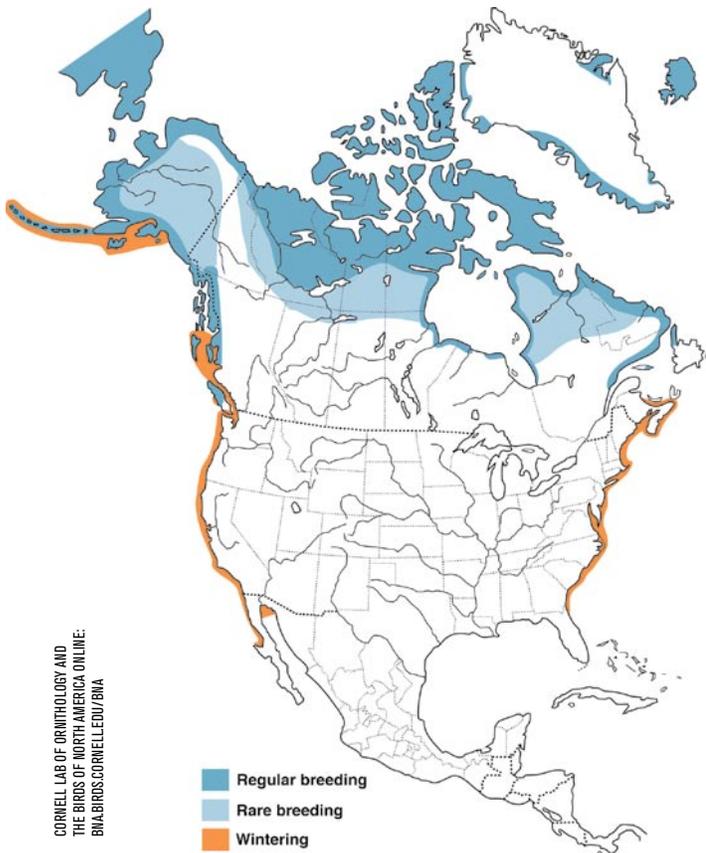
Loon Populations in Alaska (1977-2005)



SOURCE: Ball, JR. 2004

Red-throated loons in Alaska have declined while Pacific loons increased or remained stable. Researchers believe global warming is drying up the ponds where red-throated loons nest and changing the quality of the food available on their feeding grounds.

Distribution of the Red-throated Loon in North America



Red-throated loons breed throughout the Arctic, most commonly on the tundra near the coasts, but also in mountains up to 3,000 feet in elevation. Nearly all breeding range worldwide is above 60 degrees north latitude and in areas where the temperature in July remains below about 65 degrees Fahrenheit. In winter, red-throated loons are found in coastal waters where surface water temperatures remain below 62 degrees Fahrenheit.

and eight months old). However, with people in the picture they face numerous threats on their breeding grounds—even in remote tundra territories—and are in sharp decline in many areas. Recreation as seemingly low-impact as swimming can frighten loons from their nests, exposing the eggs and chicks to predation or the elements. Up to 73 percent of the nests on one Canadian island suffered egg predation as a result of close approach by humans. Native Arctic peoples hunt loons, although this subsistence harvest is a relatively small source of mortality. Oil exploration is more of a threat, with its potential to disturb nesting loons or to contaminate coastal foraging grounds. Acid rain poses another risk: Several important fish species in the loons' diet are sensitive to acidification in aquatic food webs.

Wintering habitat has its own set of dangers. Approximately 1 percent to 2.4 percent of the estimated 70,000 red-throated loons that winter from south of Cape May, New Jersey, to North Carolina drown in gillnets or wash ashore dead from unknown causes each year.

WARMING TRENDS

Climate change is affecting breeding and winter foraging habitats for red-throated loons. Although warming could boost breeding success in the short term by delaying early-autumn freezes that can kill fledglings, this boost will soon be eclipsed by the long-term threat of small wetlands drying out entirely. Higher temperatures mean fewer ice-jams on Arctic rivers to produce the earth dams that create river delta lakes. Warming also means increased melting of the permafrost and a longer growing season that evaporates more water, conditions that reduce the area and number of closed-basin ponds and lakes in the Arctic. Since the 1950s, the surface water area of ponds in Alaska decreased by as much as 31 percent, and the total number of ponds decreased as much as 54 percent. The inevitable result is far fewer nesting ponds for red-throated loons.

The climate-change link to winter declines is more difficult to pinpoint, but warming-related changes in the composition of the marine food web may explain part of the mystery. Because red-throated loons depend so heavily on marine fish, even during the breeding season, any reduction in the quality of this prey can reduce their reproductive success. Since the 1970s, the decline of several fish-eating birds and marine mammals in Alaska has coincided with temperature fluctuations that have altered the marine ecosystem. Researchers believe larger, less oily fish species are replacing the smaller, fatty, calorie-rich fish red-throated loons and other marine birds rely on during the critical pre-fledging period. Red-throated loons typically have less trouble finding enough food during winter than other loons, says loon specialist Dr. Paul Spitzer, "because they don't molt their flight feathers during this season, they don't get stuck in one place like common loons, and they can move to wherever the food happens to be." However, if the food is not nutritious, this is not much of an advantage.

PREPARING FOR THE MELTDOWN

To save the red-throated loon's Arctic habitat, we must act now to reduce the emission of greenhouse gases. In addition, we should take other important steps to help this small-pond-dependent bird navigate a looming bottleneck of complex threats posed by climate change.

- **Limit intrusive oil and gas development activities on sensitive red-throated loon breeding habitats on the Arctic coastal plain.** Red-throated loons are sensitive to disturbances on their breeding grounds. If adults leave the nest, predators may move in to take eggs or chicks. Birds may even abandon nesting sites entirely. The near-coastal plain, a band eight to 10 miles inland that includes places such as the National Petroleum Reserve and the Arctic National Wildlife Refuge, is an especially key area to protect.

- **Mitigate mortality from man-made structures.** Because their lifestyle involves so much commuting to feeding grounds, loons are highly vulnerable to stranding, injury and death if they are forced to land on anything other than open water. Collisions with buildings, transmission lines and communication towers are already on the increase near shorelines. Key coastal migration routes and wintering sites must also be adequately protected by carefully siting offshore wind turbines and other energy development designed to reduce greenhouse gas emissions.
- **Reduce mortality in fisheries by-catch.** Major recreational and commercial fisheries still legally use gillnets in areas along the eastern U.S. coast where red-throated loons winter in large numbers. The use of these nets

should be re-evaluated wherever drowning in gill nets is a significant cause of mortality for this species, which has been designated a “highest priority” marine bird in need of “immediate management” by Waterbird Conservation for the Americas, an independent, international consortium of waterbird experts and conservationists.

- **Accelerate research on red-throated loons.** This loon species has not received nearly as much attention as its larger cousin, the common loon. Although conservationists are concerned about the population status of the species, information needed to make informed management decisions is scant, fragmented and poorly disseminated. A top priority is identifying sensitive sites where red-throated loons concentrate during the autumn when they are molting and unable to fly.

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