

DRIZZLE LAKE 1981

"Loons at Drizzle Lake"

Research File

MS For Nature Canada

T.E. Remchen 1981.

In the calm water at the east end of the lake, two dark oval shapes float in the reflection of the early morning sun. Red-throated loons, sleeping. One bird lifts an elegant long neck, bill tipping towards the sky; the loon begins to preen, arching its neck to stroke a brick red throat patch, occasionally flashing a brilliant white belly as it rolls sideways. The partner wakes and follows the same ritual, until, simultaneously, they slip into a dive, emerging and rising on the surface to a vigorous stretch. In unison, they face the centre of the lake. The take-off is laboured but rapid as the two jet across the surface for about 10 meters and lift off. Quacking continuously, they circle over the shallows at the south end of the lake before heading to the ocean. As the eastern shore brightens with the rising sun, other red-throats repeat this ceremony, until by mid-morning, all 17 have departed.

Since dawn, we've been watching the familiar morning rhythm of Drizzle Lake. Our observation blind perches, half-hidden in cedar and hemlock forest, on a mossy promontory that we call Loon Point. We're well equipped for the morning's work, with spotting scope, camera and telescopic lens, stop-watch, tape recorder and a thermos of hot coffee. From this vantage point, we've kept vigil on the lake's avian visitors for the most part of four years. For its size, about 2 kilometers long and half as wide, Drizzle Lake is rich in birdlife. With the Pacific Ocean only 5 kilometers away, the lake is excellent overnight shelter for mallards, geese, teal and mergansers. It's a popular feeding ground as well. Although aquatic plants

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are sparse in the shallows, the waters nurture an abundance of fish, the ubiquitous three-spine stickleback attracting grebes, loons, cormorants and kingfishers.

Twelve common loons raft off the far beach. The northwest wind begins to ripple the water and within the hour the white chequered backs of the loons are disguised among small whitecaps moving across the lake. It's a day typical of mid-July. A high pressure system in the north Pacific pushes gusty winds south onto the Queen Charlotte Islands, bringing clear skies with just a slight chill of the ocean. The time of year, the time of day and the look of the sky is right. We wait.

Our patience over the next two hours is rewarded: in flocks of 2 to 12, the common loons arrive. As they clear the forested shore in flight, one or more cackles out a call -- quick, melodious phrases that can only be described as "laughter". From full flight, they freeze their wings V-shaped above the body and rapidly volplane to the surface, landing breast first and casting a narrow wake for 15 meters before they glide to a stop. Intense preening, punctuated by short dives and wing-stretching, seem necessary after this impressive descent. The birds join other groups in the the northwest and centre of the lake. They're here to forage and they spend much of the morning diving just offshore.

By ~~the~~<sup>late</sup> morning, the water is choppy and 51 common loons have converged into a loose group 5 meters off Loon Point. The observers have become the observed, and we two humans standing on the shore are the object of the loons' attention. We've

allowed ourselves a close look at the birds by leaving the blind and attracting them with loon-like calls. At such close range, the brilliant red of their eyes is visible, and we can distinguish a brownish tinge and incomplete patterning in the plumage of the younger birds. But most of them seem replicates of each other: the uniformity of the speckled back and narrow-lined necklace give few clues to the individuality of any of the loons. The birds weave slowly in and out of the group, occasionally head-dipping and flashing attentive glances in our direction. We're tempted to prolong the close experience, but today we're intent on observing. We step back into the blind and they gradually disperse.

In small groups now, in the north and centre of the lake, the common loons forage, seemingly oblivious to a pair of ravens cackling overhead in flight. But when a large bird-shape appears over the pines, there's no doubt that it is more than a harmless raven. Before we recognize the huge wing-span and the white head and tail as a bald eagle, a single far-reaching wail rises from a common loon in the northern corner of the lake. Instantly, loons from all parts of the lake begin laughing, and, as the eagle alights on a cedar snag edging out over the shore, the laughter reverberates against the circle of forested hills. In small groups, the loons swim to the eagle: within 10 minutes all 45 have converged into a tight group just offshore of its perch. They're silent now, rafting at what seems a dangerous, but strangely

purposeful, distance from the raptor. The eagle rises and soars <sup>half a km</sup> a-quarter mile down the shore: laughter erupts and the loons follow, swimming, to congregate again in front of the predator. Any movement of the eagle is monitored in this unusual way, until, after a few hours, the bald eagle soars inland and out of sight.

In the early afternoon, a group of 10 common loons diligently preen and then take flight. As they circle the lake once, they repeatedly laugh and disappear over the shore to the northwest. As the hour passes, others make surface preparations and depart, some towards the ocean and others in the direction of large lakes to the east and south. By 3 o'clock, there are no common loons left, and only a pair of ravens interrupts the sound of waves lapping across the shore.

A hundred kilometers of turbulent water separate the Queen Charlotte Islands from the <sup>northwest</sup> ~~north~~ coast of British Columbia. Wilderness graces much of the Islands, and natural interactions, such as those between eagles and loons, are episodes that have been repeated over the thousands of years of the Islands' history. In contrast to the central part of the Charlottes, where virgin systems of red cedar and sitka spruce have been devastated by clearcut logging, the northeast corner is an undisturbed expanse of bog and scrub coniferous forest. Protected from alteration by Provincial park, Ecological Reserve and its local reputation as a "soggy wasteland", the lowlands are a haven for loons, Canada geese, blue grouse and sandhill cranes, to name only a few of its inhabitants. The area around Drizzle Lake is typical

of the lowlands; peat bogs, lodgepole pine and tea-coloured pools, broken by ridges of hemlock and cedar forest, dominate the land. The naturally acidic lakes foster a narrow fringes of sedges, and the only common aquatic plant is the yellow water-lily, sometimes choking smaller tarns in the cycling succession of moss and water.

One of the merits of Drizzle Lake, other than its attractiveness to loons, is its pristine nature and geographic isolation. The 800 hectare watershed was established as an Ecological Reserve by the British Columbia government in 1973. Reserves are created primarily for scientific and educational purposes, and by limiting consumptive use, they encourage long-term monitoring of species and ecosystems. Since 1977, we've worked out of the Drizzle Lake field station, a rustic 70 year-old cabin at the edge of the Reserve, carrying out biological research in freshwater fish, aquatic birds and pollination ecology, as well as the most alluring of pursuits, the study of loons.

Loons breed throughout the far northern parts of the globe, and, during the nesting season, Canada is home to all four of the world's species, the common, yellow-billed, arctic and red-throated loon. Common loons are perhaps the most familiar; they nest all across the provinces and in southern Yukon, usually on large clearwater lakes where fish are abundant. The red-throated loon, a more reclusive bird, confines its nesting to small tarns close to the ocean, in northern Quebec, the Northwest Territories and Canadian arctic, and <sup>in</sup> coastal Alaska. On the west coast of Canada,

only the Queen Charlotte Islands, and in the past, parts of Vancouver Island, offer a "pocket" of suitable nesting habitat. Over most of Canada, the two loon species are mutually exclusive during the spring and summer. The Charlottes are one of the few areas where the two overlap, and at Drizzle, as well as other large bodies of freshwater on the Islands, one is fortunate in finding both on a single lake.

All of the Drizzle Lake loons are in adult "breeding" plumage, commons with their characteristic white necklace, ~~and~~ red-throats displaying fine pin-striping along the back of the neck and a velvety red throat-patch. Each year, a single pair of red-throats has nested on the lake itself and a maze of bog pools nearby hosts 2 or 3 more; we've never seen common loons nest here. Yet, with no apparent intention of setting up territories or raising young, up to 20 loons visit the lake each day from May to September. Biologists and birders alike seem to be drawn to the more spectacular parts of loons' lives, the courtship and territorial displays, the nurture of eggs and chicks, so that little is known about the activities of non-breeding loons. At Drizzle Lake, we have the opportunity to fill in some of these gaps in the life history of the two loons.

All species of birds follow a predictable yearly timetable, such that ardent observers can mark closely the week-by-week passage of the seasons by their activities. At Drizzle Lake, we learned that the loons had rhythms that were more finely tuned

even on a daily basis, than we ever suspected. Red-throated loons make their spring appearances in late March, after the risk of ice-cover has ended. From May until the end of August, an average of 15 birds visit the lake each night, flying in 2 to 3 hours before sunset. Here they preen, rest, and engage in a very vocal form of socialization until nightfall. They depart shortly after sunrise the next morning, their destination the ocean, where they spend most of the daylight hours.

Common loons do not keep such a strict diurnal schedule, but visit throughout May and June, arriving in late morning and departing after noon, usually to the ocean but sometimes to other lakes further east. After the solstice, there are sporadic surges of up to 20 birds on the lake. Then, with remarkable consistency, for one day only, and always in the last two weeks of July, Drizzle Lake celebrates common loons: in each of the four years, over 50 of the majestic dark birds have congregated on the lake to forage for a single day. What attracts so many loons for such a precise, and short, period? At this time of year, small stickleback from the egg clutches of spring form into large schools just offshore. The loons may be meshing their schedule with this abundance of prey, and foraging in large groups, as they do on this yearly occasion, seems an ideal way to capture schooling fish. Drizzle Lake is not the only place they visit in large numbers; we've seen the same event during the last week of July on a large lake to the south-east. These roving bands of birds are probably loons that have

yet to mate, and at this time of year, unsuccessful nesters could swell their numbers.

Since the birds spend so much of their time foraging, the impact on the fish population will be considerable. We've watched a single loon, fishing dawn-till-dusk in early spring, eat almost 300 stickleback a day. At that rate, the 50 or so common loons could consume about 5,000 of these small fish in one afternoon. This says something about the enormous number of stickleback that the lake supports. It also suggests how effective common loons must be as agents of natural selection. With such incredible pressure from predators, only those stickleback best able to escape will survive to pass their successful traits on to the next generation. After their peak abundance in July, the number of common loons gradually decreases; by September their season on the lake is over, except for a few birds who may go through moult on the lake.

*Why?*  
The two species of loons are generally found on different kinds of lakes, commons preferring deep, clear water and red-throats shallow, stained pools. At Drizzle Lake, the situation is strangely similar: the two loons rarely interact because they are separated, on a daily basis, in time and space. Their daily schedules work in syncopation, the commons taking the late morning and afternoon hours, and red-throats the time from sunset to dawn. As well, when their visits overlap, they prefer different parts of the lake, red-throats the shallows near boggy inlet creeks, and common loons



the deeper centre. On occasions when loons cross the unmarked boundaries, it is generally red-throats that surrender their places by swimming away, although they do so reluctantly when they're on home ground in shallow water.

Near sunset, some of the red-throated loons retreat to the nearshore, where we find them sleeping the following morning. Thus, when one particular pair of red-throats spent most of their time in a protected bay in the south end of the lake, it did not seem unusual. In late May we discovered the nest, two brown mottled eggs lying on an unobtrusive ridge of hair-cap moss at the edge of the water. The nest remained spartan throughout the 31 days of incubation, although after the chicks hatched, the adults took some care in plucking clean a narrow corridor from the nest to deeper water. Devoid of moss and grasses, this corridor was a smooth escape route when predators threatened. The two eggs hatched, within hours of each other, into two patches of grey fluff with wedge-shaped bills and enormous feet. Within 24 hours, one was dead. The other chick survived what seemed a perilous juvenile life on the lake to fly with the adults in early fall. For many of the 51 days it spent on the lake, we sat in a temporary, slightly cramped and always breezy blind, logging about 250 hours and many notebooks worth of observations.

One of the reasons, other than overwhelming curiosity, for so faithfully following the growth of the red-throated loon chick was to find out what and how much the chick ate. Since the major

part of research at Drizzle Lake is its unusual form of stickleback, we wanted to get some good figures on size selection and manipulation of prey and rate of predation on the fish. Yet from the time the chick was an hour old until it left the lake in full flight 7 weeks later, the parents fed it nothing but marine fish. They made regular trips to the ocean, as many as 12 a day, and brought back small fish such as sand-lances and herring to nurture their young one. It's a habit of red-throated loons, who often nest on pools too small to support fish, to obtain all the food for the young in the ocean or larger lakes. On Drizzle Lake, even though stickleback were abundant in the nest territory, the red-throated loons chose to duplicate this feeding strategy. The stickleback here are unusually large, and are armoured with sharp, stout spines. Adult loons can break or depress the spines, not without vigorous manipulation of the fish in their bill, but it's unlikely that a young bird could successfully swallow the prickly prey. As the chick grew and developed a larger bill, it foraged minimally on small stickleback, still depending on slender, smooth fish flown in from the ocean for the majority of its food.

With such a variety of birds frequenting the lake, interactions between the red-throated loons family and other birds were inevitable. We learned that the loons were very specific as to which species <sup>they considered</sup> ~~were~~ harmless and which were a threat. A raven lands on a snag behind the nest, where the parent shelters the chick under its wing. As the heavy black bird swoops to the ground 3 meters

from the loons, the red-throat wails and lays its neck and head close to the moss, in a classical loon protective pose. Later, the raven flies low over the two birds now rafting offshore; only a slight cock of the head indicates any concern from the adult. To parent and young on the water, this land-based scavenger is no threat, but an untended chick on the nest would be fair game for the hard beak of a raven. The bay where the loons nested had some excellent kingfisher perches, yet the noisy chattering and splashing of this fish-eating bird, even directly in front of the nest, was virtually ignored.

The bald eagle produced the most dramatic response. In June, when the predator makes almost daily reconnaissance of the lake, we repeatedly witnessed the highly stereotyped interaction between red-throated loon and eagle. From the vantage point of the nest, adult and young watch the lake, only the head of the chick protruding from beneath the parent's wing. A bald eagle appears in flight 150 meters from the nest bay; the adult lunges into the water with the chick a rolling blur just inches behind. Several long dives carry the loons to deep water, and when the young attempts to follow, a screeching wail from the adult sends it, in short bobbing dives, directly to shore where it shelters in the sparse fringe of sedge. Against the gravels in shallow water, the uniformly grey chick is well camouflaged. When the eagle lands on a tall pine close to the nest, the loon dives again, surfaces further from its young and repeats the warning

call. The wind is picking up, splashing small waves against the beach, almost stranding the young above the water line. Occasionally, the chick pushes into the water, but the harsh calls of the parent keep it close to shore. Finally, the eagle takes flight, soaring westward over the lake and disappearing above the forest in the direction of the ocean. The wind buffets the chick against the shore and it begins to rain, but the parent remains offshore. An hour passes; the partner returns from the ocean with a sand-lance for the chick, yet on landing by its mate, swallows the fish himself and calls out a wail. Finally, four hours after first sight of the eagle, the red-throats slowly swim to the shallows and weave along the shore, cooing quietly. The chick bolts from its protection and skims across the water to rejoin the pair. As one of the loons takes off for the ocean, the adult and young return, still hesitantly, to the nest <sup>and</sup> the chick disappears under the broad wing of the parent.

Adult and chick have different ways to best evade the eagle. If the pair were discovered while still on the nest, it is unlikely that either would survive. Fleeing to deep water allows the adult easy escape from an aerial attack, as a loon can make long dives and surface at an unpredictable position. In contrast, the chick is too buoyant to escape for any length of time underwater: its safest move is to hide. The loons' reluctance to return to the nest is presumably a response to the great patience of this hunter, who may wait on a lakeshore perch for hours on end before choosing

the opportune moment to attack. Far from abandoning the chick, the adult is protecting both self and young.

The bald eagle produced a vastly different reaction in common loons, but again, there were very specific calls and movements associated with the response. A single wolf-like wail warns of the presence of the predator and loons call out their maniacal laughter as they swim towards the eagle's perch. The group swarms offshore, and follows, laughing, when the eagle moves to a new position. These strange habits in the face of such an important predator on the Islands seem foolhardy, but considering the hunting techniques of the eagle, the common loons' proximity may be remarkably safe behaviour. Since a diving escape is usually successful, the eagle is dependent on a surprise attack. With the predator as the focal point of the flock, the loons are able to monitor its movements closely and avoid that element of unpredictability. Laughing, in this case, turns out to be far from light-hearted. Rather, it's a call that promotes flocking in a threatening situation, where "safety in numbers" may be gained.

Common loons test out other potential threats on the lake as well; occasionally a deer appearing through the fringe of salal will attract a group of loons. Centuries of naturalists have commented on the "curiosity" of common loons as the birds congregate near humans intruding on the shore of a wilderness lake. During one summer, we spent many hours recording the calls of



calls are probably proclamations of territory. On larger lakes, like Drizzle, where most of the red-throats are non-breeders, the precise meaning of the communication remains elusive.

This is only one of the unanswered questions that persuade us to be audience to many more of the nightly choruses of loons.

Loons are a symbol of northern wilderness and solitude, of natural areas guided by internal balances rather than the often disruptive designs of man. This emotive symbol has its rational basis, and when loons vanish from their former haunts it's a sure sign that the wilderness has receded too. Expansion of cities, farmlands, resource extraction and outdoor recreational areas pushes back the breeding habitats available to loons each year. On the Queen Charlotte Islands, it's encouraging to see an enclave of common and red-throated loons protected by Provincial Park and Ecological Reserve, yet even natural sanctuaries like Drizzle Lake cannot guarantee a healthy loon population. Although these divers are usually identified with lakes, over half of their lives is spent on the ocean, where they depend on an abundance of small fish. Off the coasts of the Queen Charlotte Islands, prey fish and the habitats that support them are deteriorating. Thousands of tons of herring are netted each year by commercial fishermen, and next in line for market are the vast natural kelp beds, the nursing grounds for many small fish. Salmon stocks are on the decline, partly due to over-fishing and partly to degradation of spawning habitat from logging near productive streams. While loons obviously

do not eat large fish, a reduction in the number of fry produced will ultimately reflect in decreasing numbers of diving birds.

Direct threats to loons, such as oil spills and pollutants in the food chain, can be, with concentrated effort, averted. But, indirectly, loons compete with man for a gradually diminishing marine resource, and as such, can only be the losers. The abundance of loons is not simply a measure of our regard for wilderness, but is perhaps an indicator of how much we value our interdependence with wild species in the coastal food web.