

Loon Caller

Summer 2010



Vermont Loon Recovery Project

A program of
the Vermont Center for Ecostudies and
Vermont Fish and Wildlife Department



VLRP View: Oil Spills, Loons, and Us



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Our society's dependence on oil has many costs, oil spills being just one. Many *Loon Caller* readers may not even have heard about two other recent New England oil spills

that could have wiped out Vermont's loon population: the North Cape and Buzzards Bay spills where over 200 loons were found dead in each incident (see related article on page 5). The Deepwater Horizon oil spill stands out as a single, massive catastrophe, and its impact on loons may be occurring right now to young loons spending the summer in the Gulf of Mexico; however, the full impacts will not known for some time. The effect of this spill has yet to be determined for wintering loons that migrate down from the Midwest. In my effort to move towards more sustainable energy use, VLRP is encouraging volunteers to take charge of all things loons on or near the lakes where they live. Thanks to volunteer help, I have reduced my

own travel by almost half since I began this job 13 years ago, despite tripling the number of lakes that VLRP monitors closely. If everyone reduced their driving by half, that's a lot of oil not needed to be pumped or shipped, and possibly one less oil spill.

*** Eric Hanson



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The Effects of Developed Lakeshores on Littoral Biotope (habitat)

By Kellie Merrell, Eric A. Howe, and Susan Warren (VT Department of Environmental Conservation)

Why study lake shorelines?

The littoral zone is the area of a lake where light penetrates to the bottom, usually in the near-shore shallow water environment. These shallow waters function as a nursery ground for a variety of species and as primary habitat for aquatic plants. It serves as a



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Development leaving most shoreline vegetation and trees in place.

critical interface between the aquatic and terrestrial environment for the transport of nutrients, sediment, woody substrate, organic matter, and species that utilize both lake and land.

Since the mid-1980s there has been substantial shoreline redevelopment on lakes. The transformation of lakeshores from their natural forested and wetland cover to newly developed lawn and sandy beaches, and the conversion of summer cottages to residential homes is a stressor to littoral zones in lakes. In the early 1990s, the US Environmental Protection Agency and US

Fish and Wildlife Service concluded from a study of 345 Northeast lakes that **the stress from shoreline alteration was a more widespread problem than eutrophication and acidification.**

In Vermont, removal of vegetated lakeshore buffer habitat is not prohibited by state law; approximately 9% of



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What does the loss of shoreline vegetation and trees mean for our lakes? The base of the food chain is being degraded, and habitat for insects and fish is lost. This will affect water quality, fish life, and eventually, loons.

our towns provide for shoreland vegetation protection in their zoning laws. The University of Vermont's Spatial Analysis Laboratory mapped shorelines within 25 feet of the water's edge

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The Vermont Loon Recovery Project is a joint program of the Vermont Center for Ecostudies (VCE) and Vermont Fish and Wildlife Department (VFWD). The VLRP's mission is to restore and maintain Vermont's Common Loon population through monitoring, management, education, and research.



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The Vermont Center for Ecostudies (VCE) is a non-profit organization whose mission is to advance wildlife conservation through research, monitoring and citizen engagement. With a reach extending from New England through the Caribbean to South America, our work unites people and science for conservation.

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The *Loon Caller* and VCE's *Field Notes* are free to citizen scientists, donors, and partners.

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Volunteer information and VLRP publications are available on VCE's website. Communications about the VLRP and the *Loon Caller* may be addressed to:

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(Continued from page 1)

for 74 lakes in the Northern Forest of Vermont. The results indicated that, as of 2003, lakeshore development had impacted the vegetated buffer on up to 74% of a given lake's shoreline. From 2005-2008, the Vermont Department of Environmental Conservation conducted a study to measure what, if any, effects unbuffered development has on littoral aquatic habitat.



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What do we mean by "littoral biotope"?

Biotope can be defined as the sum of the physical, chemical, and biological components present in an area, which collectively provide living space for a distinct, recurring community of species. Literally translated, biotope means the area where life lives. Hence, to avoid confusion, we will use "biotope", a term used as a synonym for "habitat" in this article.

What we surveyed in Vermont lakes and ponds

In this study, we compared littoral biotopes subjected to little or no anthropogenic shoreline alterations to unbuffered developed lakeshore sites. The undeveloped sites were considered high quality and are referred to as reference sites. Our study contains results from surveys conducted on 40 lakes across Vermont. We divided the lakes by trophic class (oligotrophic, mesotrophic, and dystrophic) and size (< and >200 acres). We avoided artificial lakes and lakes with significant drawdowns. We attempted to pair every developed site with a reference site. At each site we placed a 10-m floating transect at the 0.5-m depth contour and ran it parallel to the shore. Snorkelers estimated the percent cover of a number of physical and biological parameters within plots along the transect.

Biotopes Variable	Unbuffered Developed	Reference Undeveloped
Shoreline % tree cover	2.7	55
Shading 1 m	7.2	15.1
Large woody count	3.1	8.1
% fine woody cover	3.5	14.9
% medium woody cover	0.6	5.0
% leaf litter	2.3	5.3
% sand	59.4	32.9
% embeddedness	58.0	38.4
% Aufwuchs cover (micro plant and animal life)	22.2	31.2
Dragonfly/damselfly exuvia count	1.6	9.1
% aquatic plant cover	9.5	14.1

There are many important physical properties that control what life exists in the littoral zone. The physical factors we measured are listed in the table and chart. We also measured several biological components of the littoral biotope. "Aufwuchs" is the term that describes the community of small plants and animals that form biofilms on rocks, woody substrate, and aquatic plants. Aufwuchs is an impor-

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Highly developed shoreline resulting in reduced physical structures, more siltation, less biological productivity, and warmer temperatures.

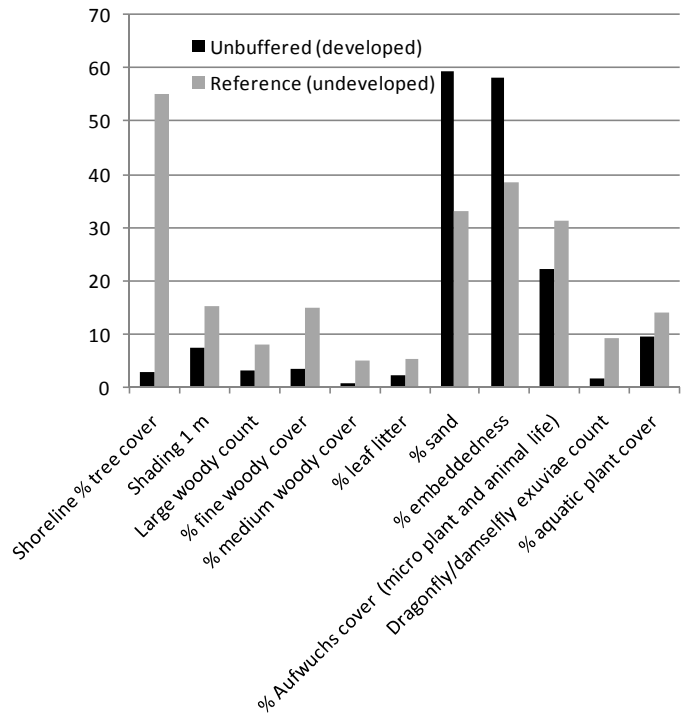
tant food base for fish and macroinvertebrates. Dragonflies and damselflies are another important biological component, as they feed on aufwuchs, and become prey for fish and other vertebrates. We collected all dragonfly and damselfly exuviae (skins left behind) from along the 10 m shoreline transect and 2m inland at each site.

Is there an observed biotope change between reference and unbuffered, developed sites?

Differences in all of the biotope components between the undeveloped reference sites and unbuffered developed sites were substantial. There was 182% less shoreline tree cover at unbuffered developed sites. This factor explains the majority of the observed differences for all of the other parameters evaluated in this study. There was 71% less shading of the water, which means warmer water temperatures and more exposure to predation from visual avian and terrestrial predators. There was 90% less large woody structure, 159% less medium woody structure, and 124% less fine woody structure in the littoral zone at unbuffered developed sites. This reduction translates to less cover for fish and less vertical substrate available to which amphibians and fish can attach their eggs so they will remain well-oxygenated above the lake bottom. Less large woody structure also means fewer basking sites for turtles to safeguard them from terrestrial predators (basking helps reptiles regulate their body temperature and save energy for reproduction). Fine woody structure is important to macroinvertebrates; it serves as cover from predation, provides material from which caddisflies make their casings, and creates substrate for microorganisms that form the foundation of the food chain. There was 80% less deciduous leaf litter in the shallow littoral zone of unbuffered developed sites, further reducing the available substrate for macroinvertebrates and microorganisms. The



Woody structure provides important habitat for fish, aquatic insects, aufwuchs (microorganism growth), birds, and turtles, increases shading, and reduces erosion and run-off.



sediment structure was altered off of unbuffered developed sites as well, with the addition of 57% more sand and 41% more sediment embeddedness of rocks and woody material.

Differences in the biological components measured were also striking. There was, on average, a 34% reduction in aufwuchs at the unbuffered developed sites compared to the reference sites, meaning less food is available for fish, snails, and macroinvertebrates. There were 139% fewer insect odonate exuviae skins at unbuffered developed sites. This represents an additional reduction in prey for fish and a reduction in the number of emerging dragonflies and damselflies into the terrestrial ecosystem.

In summary, conversion of treed shorelines to open lawn or beach may seem benign to humans, but the chemical, physical, and biological components of the littoral biotope are radically changed by this activity. The natural community of aquatic and terrestrial organisms that has evolved to grow, reproduce, and survive there will change or disappear as the biotope transforms to a site with substantially diminished habitat quality. Minimizing the extent of shoreline conversion from forested land to lawns or beaches within the buffer zone and maximizing the extent of naturally buffered shores will help ensure that the natural community of lacustrine species endures.

Nesting on Highly Developed Lakes

The “potential” loon pair at the north end of Lake Groton has finally nested. Would you nest here? The arrow in the photograph below depicts the nest location sandwiched between a large mowed yard next to the stream and about 50-60 feet from the porch where I took the photo. Lake Groton is a well-developed lake with two state parks. There has been a successful south pair now for over 10 years, nesting in a much less developed part of the lake. The north pair was first noticed



© Eric Hanson

in 2008, was present in 2009, and finally chose a nesting spot this June. The VLRP has monitored many loon pairs on highly developed, busy lakes, and many of these have never tried to nest. I was almost hoping this pair would continue to just hang out.

When pairs nest right in the middle of camps, docks, and shoreline activity, I view the nest as “experimental.” That might not be the correct word to use, but the chances of success are not very high. A loon pair will habituate to nearby activity to an extent, but those busy weekends where everyone shows up, the curiosity-seekers come in close, a dog roams the beach, and the raccoon comes down the stream when the loons are off the nest, can spell disaster for the eggs. Most camp owners in these situations have been wonderfully helpful and will change their

regular activity to give the loons a bit more quiet space. On Lake Groton, I’ve already gone door to door to all the neighboring camps, spoken with the immediate neighbors, talked to state park staff, and placed nest warning signs to try to keep the small boats from getting too close to the nest site.

But it’s difficult to reduce all activity near this nest, and the loons will likely spook and leave the nest occasionally (hopefully not often). By responding to the situation within a few days, the VLRP has given this pair its best chance at success under these challenging circumstances.



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Nest failure is not all bad, however, as a failed pair will more likely look for a more secure spot to nest next spring. We have an active loon volunteer family at Lake Groton’s north end, and they would be happy to help locate a nesting raft in a location further from human activity. There are not many quiet places here, but we’ll likely try if the nest fails. With a few vocal loon non-enthusiasts on Lake Groton, I felt that it was important to not encourage nesting by placing a raft ahead of time; let the loons decide if they are going to try. Now that the loon pair has nested, and will likely continue to try (at least in the near future), I feel the VLRP can step in and help manage this pair as best we can. It would be great if every lake in Vermont had several ½-mile sections of undeveloped marsh and island habitat, but people have been building on Vermont’s lakeshores for hundreds of years, and increased development since the 1980s has put extra pressure on our lakes. Over half the loon nests in Vermont are located in moderate-high to very high risk locations. The VLRP is essential in maintaining a statewide volunteer corps who is ready to act when new loon pairs finally nest or traditional pairs shift sites. We can then develop landowner contacts and implement management plans when necessary (e.g., nest warning signs, rafts, annual contact with landowners, outreach to neighbors). *** Eric Hanson

(News flash: 1 chick just hatched from this site July 13)

Eagles Bring New Challenges to Loons

John Cooley, NH Loon Preservation Committee Biologist, and Eric Hanson

“Suddenly the eagle dove, snagged a loon chick, and flapped off!” recounts an astonished observer. Stories like this inspire a certain horrified fascination in even the most casual loon enthusiast, let alone reverential fans. Before the modern [20th century] decline of both eagles and loons in New Hampshire and Vermont, such incidents must have been commonplace; they appear to be on the rise again. Holland Pond volunteer Tom Fetter recalls seeing an immature eagle grab and carry a 5-week old chick before dropping it; the traumatized chick survived. In late June of this year, both chicks from the Norton Pond—South nest disappeared after an eagle was observed harassing the family. Eagle predation of loon eggs and nests is less frequently reported (or observed) than attacks on chicks. In 2009, an eagle was sitting on a rock 20



© Mike Korkuc

feet from the nesting raft on Mollys Falls Reservoir with both loons off the nest making a lot of noise. The eagle flew off and the nest was successful a week later. A NH Fish and Game biologist observed a bald eagle devouring what appeared to be loon eggs on Pontook Reservoir. Biologists in Wisconsin reported the dramatic attack by a bald eagle on a nesting loon.

As eagles reoccupy their rightful role in triggering loons’ innate response to yodel, an old battle for territory and prey is resuming.



© Phil Etter

The anecdotes will pile up and thrill-seeking loon, eagle, and wildlife watchers (quasi-religious or not) will have a fresh alternative to the high-stakes drama on reruns of “Animal Kingdom”.

Impacts of Oil Spills on Loons

North Cape, Rhode Island - 1996

On January 19, 1996 the vessel North Cape grounded just off the Rhode Island coast, releasing 828,000 gallons of no. 2 fuel oil. The oil spread throughout Block Island Sound and coastal salt ponds, and heavy wave action drove oil into sediments and mixed it into water column. Effects of the spill included the estimated loss of 9 million lobsters, 364,000 kg of other shellfish, 1 million kg of benthic macrofauna, 111,000 kg of fish, 2,100 seabirds, 5-10 piping plover chicks, 3,300 lost party-charter boat trips, and numerous fishing closures. About 200 loons were found dead, but the estimate of actual mortality was upward of 1,000. As part of the settlement, the Responsible Party agreed to pay \$3 million to purchase and protect loon nesting habitat. The money was combined with other land conservation and easement projects to protect 1.5 million acres of land in Maine, encompassing 125 loon nesting pairs and their habitat. This was the first time compensation money has been used outside the immediate area of an oil spill.



North Cape Oil Spill
off the Rhode Island coast 1996

Buzzards Bay, Massachusetts - 2003

On April 27, 2003, the tank barge Bouchard No. 120 struck rocks south of Westport, MA, when it passed on the wrong side of a navigational marker at the entrance to Buzzards Bay. The resulting 12-foot gash on the bottom of the hull released an estimated 98,000 Number 6 fuel oil in Buzzards Bay. The vessel was on route to deliver oil at the Mirant electricity generation facility located on the Cape Cod Canal. Because of shifting winds and rough seas in the days following the spill, oil continued to wash ashore for more than two weeks, eventually making landfall on more than 90 miles of shoreline. The spill impacted a variety of natural resources, including 500 waterbirds found dead (> 200 loons), salt marshes, rocky shorelines, recreational beaches, and shellfish beds, which were closed for many months after the spill in some areas to protect human health. Seven years later, the damages and compensation that the Responsible Party will have to pay are still under negotiation.

BP Gulf of Mexico - 2010

Unless the oil spill comes around Florida and up the eastern U.S. coast, it is unlikely Vermont loons will be affected, since our loons tend to stay off the Northeast coast during the winter months (see VCE *Field Notes* Spring 2010 article on loon migration). However, there is great concern about loons that nest in the Midwest, as well as the subadults and young adults that spend the summer on the Gulf of Mexico.

According to wildlife biologists in the Midwest and Gulf regions, loons, ducks, wading birds, and shorebirds will be most at risk.

2010 Vermont Loon Update (as of early July)

- ◆ 69 nests confirmed (66 nests in 2009, 14 in 1994).
- ◆ 44 successful hatches producing 64 chicks.
 - ◆ 2 chicks were taken by eagles, and 1 was lost to sibling rivalry
- ◆ 12 failed nests : 4 flooded, 3 depredated, 1 unknown.
- ◆ 13 pairs still incubating plus 2 re-nesting pairs.
- ◆ 3 new pairs: Groton—North (at least 1 chick), Joe's Pond—1st pond (1 of 2 chicks still with us), and Lyford Pond (2 chicks).
- ◆ 2 pairs nested for 1st time in 5 and 10 years: Ewell and Jobs ponds (depredated)
- ◆ Replaced over 40 old nest warning signs.
- ◆ Added 2 nesting rafts to Green River Res. after both nests flooded, but pairs re-nested on natural islands.
- ◆ # rescues and attempts: 4.
- ◆ # dead loons retrieved: 2 (both likely from fights).



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About 13 million ducks, including such species as Blue-winged Teal and Wood Ducks, winter on the Gulf along with as many as 1.5 million geese. There is special concern for the few Whooping Cranes that were trained to migrate to Florida behind an ultralight aircraft. There are now about 100 Whooping Cranes making this annual migration. Intervening and re-directing migrating birds is not really an option. Songbirds usually fly over the region in the fall, but in the spring, songbirds make longer stopovers along the coast. Richard Beilfuss, with the International Crane Foundation, has said a major concern is that the oil may contaminate the birds' food supply. "We mostly worry about food chain dynamics," he said. "Cranes eat crustaceans. The big concern is some kind of poisoning." Loons also feed on crabs through the winter. The entire food chain could be affected.

Stacy Craig, director of Wisconsin's Loon Watch program, said the spill and the fall migration could be a disaster waiting to happen for the state's loons. Their numbers are just beginning to show signs of growth, with increases of between 1-2 percent a year. Surveys of breeding loon populations in Wisconsin this year and next should provide some indication of whether the spill impacted wintering birds. Pam Perry, a Minnesota Department of Natural Resources wildlife biologist, said there has been discussion about placing satellite telemetry units on loons from the Midwest in hopes of gaining a clearer understanding of how the spill will affect wintering loons. Minnesota and Wisconsin have the largest loon populations in the lower 48 states, with ~15,000 adults total. *** Eric Hanson

(Much of the content of this article is from NOAA and USFWS websites and the Wisconsin State Journal June 29, 2010)

How Does the Yodel Function in the Assessment Strategies of Male Loons?

John N. Mager III, Charles Walcott, and Walter H. Piper, edited by Eric Hanson

A male's ability to breed and rear young depends not only on the quality of a territory he acquires but also on his ability to obtain a territory in the first place. Therefore, a prebreeder should pay attention to signals that reflect fighting ability and aggressive motivation of territorial males. We might expect, then, that territorial flyovers and intrusions, which can occur several times a day during the breeding season, would allow prebreeders to assess (1) territory quality, based on the presence or absence of chicks, and (2) fighting ability and motivation of territorial males, based upon the vocal responses of territory owners.

Collecting such information without direct contact with territory owners may reduce the risk of costly and dangerous visits to territories. (In June 2010 in Vermont, two adults were likely killed in territorial fights.) Our results suggest that the dominant frequency of the yodel is a measure of male body mass and condition. And body mass appears to be directly related to fighting ability, because heavier males hold their breeding territories for long periods and tend to occupy territories of historically higher reproductive success. Hence, a prebreeding male searching for a small, vulnerable territorial male might learn which territories he could take over by listening to the yodels of territorial owners. In this context, the yodel serves as a signal that permits assessment of male quality without actually having to directly confront a rival. The territorial yodel appears to be quite dynamic, in that it contains elements that communicate 1) identity, 2) aggressive motivation, and 3) male fighting ability (this study).

Smaller male loons

Preliminary observations indicate that smaller territorial resident males (with higher frequency yodels) are more reluctant to yodel than larger individuals are when other loons fly over and/or intrude upon their territories. When smaller male loons do yodel, they tend to give longer yodels that in turn are likely to reflect more aggressive motivational states. This raises the possibility that high-frequency yodelers (which tend to be smaller males) may recognize that yodeling at such frequencies might be disadvantageous, and consequently yodel when they must (i.e. when their motivation is high), but at the same time reveal information about their potentially weaker condition-dependent fighting abilities.

Complete article: *Male common loons, Gavia immer, communicate body mass and condition through dominant frequencies of territorial yodels. Animal Behavior, 2007, 73, 683e690.*



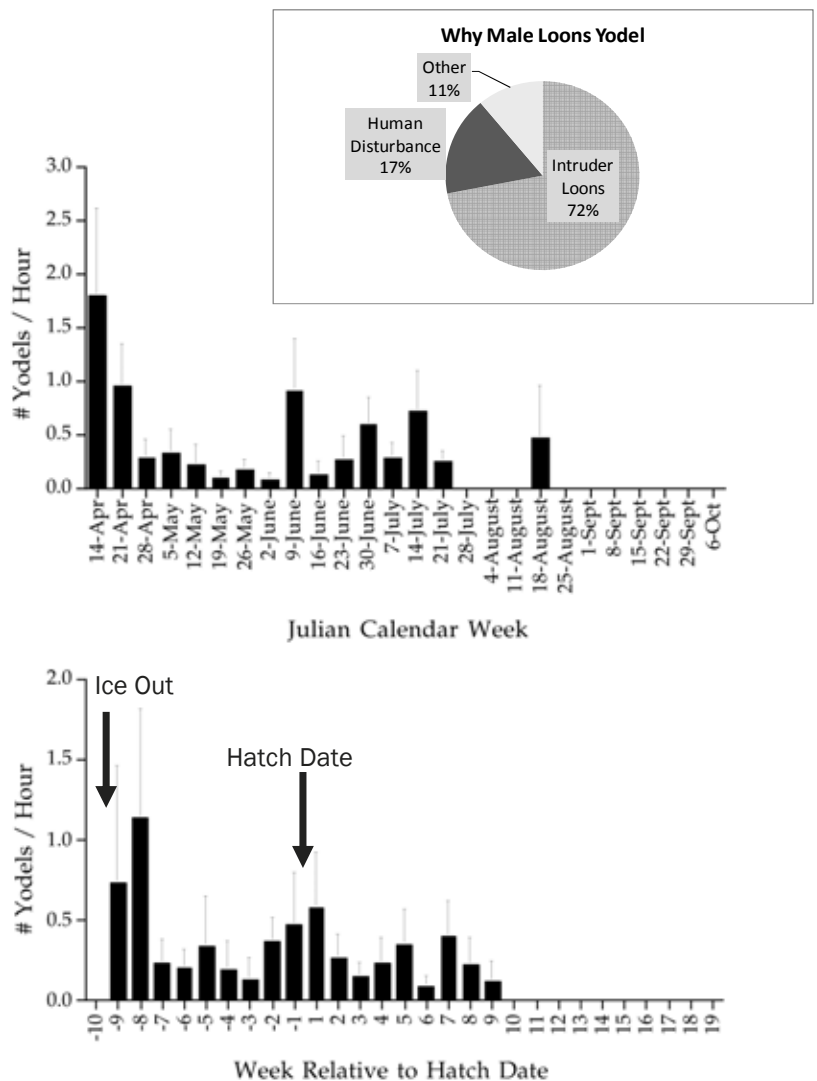
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Seasonal Timing of Yodels

John N. Mager III, edited by Eric Hanson

Male loons yodeled mainly between May and July, and rarely yodeled after their chicks were roughly 9 weeks old, when presumably chicks are fledging from parental care. The rate at which males yodeled peaked twice during 2002: (1) right after winter ice had melted from lakes, and (2) at the time of year chicks were hatching. Most of the yodels given were in response to other loons, and corresponded with times when loons either flew over or intruded upon the resident male's territory.

Complete article: *Structural and contextual characteristics of territorial "yodels" given by male Common Loons (Gavia immer) in northern Wisconsin. The Passenger Pigeon, Vol. 69, No. 3, 2007: 327-337.*



Volunteers of the Year and Lake Profiles: Coles and South Ponds

Like most lakes and ponds in Vermont, Coles Pond and South Pond did not have much loon activity through the 1980s. These were two of the first ponds to see recolonization in the early 1990s, but with most new pairs, it took several years before the nests were successful and/or chicks survived. Fortunately for these loon pairs, they nest under the watchful eyes of camp owners who have taken up the cause, devoting much time and energy to maximize their chances of survival. *The VLRP biologist has only had to visit each pond once or twice in the past decade!*

Coles Pond (Walden): Judy and Dana Dunnan

The loon pair first nested in 1997 after three years of regular activity on the pond. Their first chick did not survive until 1999, but since that time, the pair has produced surviving chicks in every year but one. The pair nests on or near shoreline that is part of the Steam Mill Brook Wildlife Management Area, about one-third of the pond's shoreline. The pair has shifted nest sites between a floating bog mat island and the marsh-hummock shoreline. The bog mat has deteriorated in recent years, thus we expect them to primarily use shoreline sites in the future, although a large island is located nearby.

Judy Dunnan, a school teacher during the non-summer months, spends her entire summers on the pond with her husband, Dana, and they have had numerous close encounters with loons. Here are a few.

Fishhook chick: "In August, several campers noticed that one of our 8 week-old loon chicks was having difficulty moving about and feeding. It became obvious that the chick's head movement was restricted in some way, caught up in a fishing hook. Eric was away, so the task of trying to catch and treat this bird fell to Vermont Fish and Wildlife's Steve Parren. Steve, my husband Dana, and I paddled madly to try and catch the chick. We had been at this for quite a while, when Steve fell/dove into the water after it. I saw the chick swimming just under the water's surface right next to our canoe, reached into the water, and grabbed the loon chick's leg. Steve was then able to bring it on board, cover it, and take it to the veterinarian for treatment. Many days later, he returned to the lake with his daughters releasing the bird to join its sibling and parents." (*Editor's note: the chick was intentionally snagged by some adolescent anglers and did not survive. Charges were not pressed, since no one witnessed the actual event even though they were observed casting their lines at the loon family.*)

Intruder loons: "Throughout the early summer, the adults were frequently confronted by groups of visiting loons. Our loons were masterful at redirecting these visitors away from the nest, and once the chicks had hatched, away from their chicks. Just after the chicks had hatched, a group of 5 large loons landed on the



© Orah Moore

pond. I was paddling around in my kayak and watched. Just when I thought the chicks were done for, I noticed that one of our resident loons had moved towards the shore. I couldn't see the chicks anywhere. I continued to observe this saga as it unfolded wondering about the outcome. For 3 hours the two resident loons swam, fed, and moved about the pond with the larger group without incident. Eventually the visiting group left. I still couldn't see the chicks anywhere and wondered if something had happened to them out of my line of sight. I stepped out of my kayak and walked along the shoreline. Sure enough, in among a large patch of pond grasses were the two chicks 5 feet from where I was standing, hardly visible, and closely matching the combined color of mud, dark grasses, and sticks – a moment etched into my mind forever."



© Sarah Carline

South Pond (Eden): Madonna and Chandler Parker

Although no loons were observed during limited surveys throughout the 1980s, a pair formed quickly, and nested once in 1992, but then did not nest again until 1997 on a platform. Many newly-formed pairs nest only intermittently during the early years of their tenure. There is a good chance that the 1997 loons were not the same individuals as the 1992 birds, but we will never know for sure. A nesting raft has been placed on South Pond because of the dam and small drain pipe that cause fluctuating water levels during big rain events. Since 1997, the pair has nested in all but two years. One year the pair shifted to a natural island site but the nest failed, possibly because of minor flooding of the bottom of the nest bowl. Research on banded loons has shown that a change in the male often results in a shift to a new nest location. Was there a change in the male during this year?

Madonna and Chandler place and vegetate the nesting raft every year and put out 2 nest warning signs on this essentially private pond; there is no public access, but many camps fringe the shoreline. The raft is located in one of the least developed coves.

Madonna fondly remembers the year of the "challenged" chick and goose wars. One of the chicks was constantly wandering away from the adults, but also begged for food much longer than the other chick. It took an unusually long time for this chick to learn to fish on its own. That same year, the geese were bolder toward the loons than usual, until the adult male had had enough. He charged the geese with wings fully extended, hooting angrily at the top of his lungs. The geese panicked and bolted to shore for safety as fast as they could. Peace at last.

*** Eric Hanson

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Check out the VCE website for interesting tidbits from the field, updates on breaking conservation news, and other issues or findings relative to Vermont's wildlife. I've been "blogging" every week or two, providing further insights into the work of the VLRP and its volunteers, as well as updates on how our loons are doing. Enjoy. *Eric Hanson*

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