

# LOON CALLER

VERMONT CENTER FOR ECOSTUDIES



Vermont Loon Conservation Project

## Monitoring Loon Mortality

BY ERIC HANSON

*Studying why loons die provides invaluable, yet heart-wrenching, lessons.*

Every one of the 124 dead adult loons we have documented in Vermont since 1989 has a story. Some were free-swimming and had to be captured because they were entangled in fishing gear. Others were found washed up along shorelines by kayakers or homeowners. Some were monitored over days and weeks only to succumb to whatever ailment afflicted them. I've had up to eight loons at a time in my home freezer queued up to be packaged and shipped (or driven) to Tufts University Wildlife Vet Clinic for necropsies. To date, we've sent 104 of the 124 dead loons to Dr. Mark Pokras and his colleagues to determine the cause of death of each bird; 20 were not analyzed because they could not be retrieved, or were too decomposed for analysis. Incredibly, Dr. Pokras and his staff determined the cause of death for 102 of the 104 loons necropsied!

While it is impossible to capture the enormous amount of time, effort, and money expended for >100 necropsies in a few simple graphs, the data speak volumes, and have (*continued on page 2*)

*Fishing gear is the leading cause of loon mortality.*



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Loon parents tending to their eggs.  
Right: Loon egg in nest.

© JOE ZIGMONT, INSET: BOB MALBON

## Egg Laying and Re-nesting: How Does It All Work? BY ERIC HANSON

In Vermont, most loons initiate nesting between May 20 and June 10. Some females lay eggs earlier, some later, and some much later if there is a failed first nest and a subsequent re-nest attempt. What factors affect nest-building and the timing of egg-laying?

Surprisingly, day length is key. The cycle of daylight hours is the same from year to year, keeping overall timing for egg laying consistent. Loons don't literally tell time, so how does this work? Photoreceptors in a loon's brain trigger the hypothalamus to release hormones that activate its reproductive organs. Other external factors likely contribute to the exact timing of nesting, including strength of the pair bond, amount of intruder loon activity, nest site readiness, and probably most importantly, female health and fitness (body condition).

Dr. Walter Piper of Chapman University, who has studied loon behavior for almost 30 years, noted that body condition is strongly determined by how a loon fared over the previous winter. This would explain why during late ice-out years—when loons may arrive weeks later than usual—healthy, more vigorous individuals can quickly come into breeding condition and be ready to nest on the same schedule as in an early ice-out year.

Another factor that may delay timing of breeding is that if the previous year's nest is submerged, a pair might wait for the water level to drop, or build a nest in a new location. Further, Dr. James Paruk of the Biodiversity Research Institute's Loon Center for Conservation observed that long-term pairs may nest (*continued on page 3*)



# LOON CALLER

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The Vermont Center for Ecostudies (VCE) is a nonprofit organization whose mission is to advance the conservation of wildlife across the Americas through research, monitoring, and citizen engagement.

The Vermont Loon Conservation Project (VLCP) is a joint program of VCE and the Vermont Fish & Wildlife Department (VFWD).

The VLCP's mission is to restore and maintain Vermont's Common Loon population through monitoring, management, education, and research.

Volunteer information and VLCP publications are available on the VCE website: [vtecostudies.org](http://vtecostudies.org)

Communications about the VLCP and the *Loon Caller* may be addressed to:

**ERIC HANSON,**  
VLCP Coordinator  
[ehanson@vtecostudies.org](mailto:ehanson@vtecostudies.org)  
(802) 586-8065



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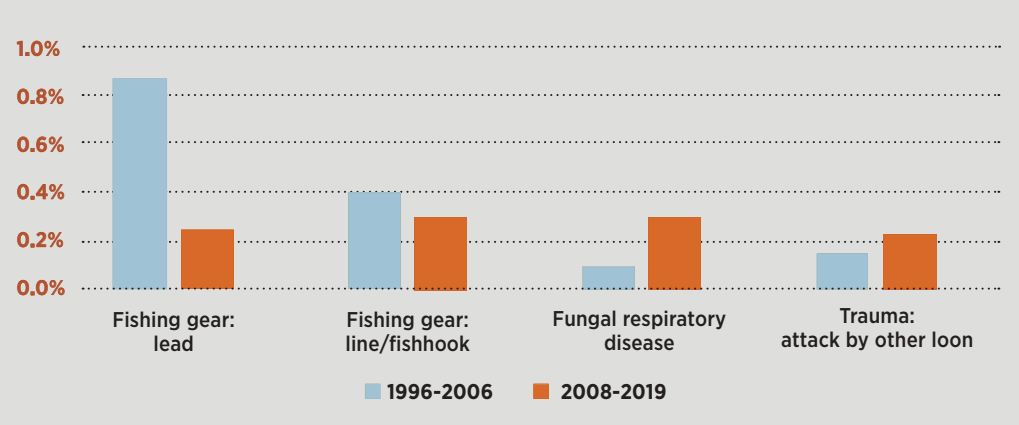
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## Loon Mortality *continued from page 1*

FIGURE 1

### Average Annual Mortality Before and After Lead Fishing Gear Ban in 2007 % of Adult Loon Population



helped guide our conservation efforts. First and foremost, necropsies elucidated the devastating number of loons that died from ingesting lead fishing gear—a solvable problem. The Vermont legislature banned the sale and use of half-inch or less lead sinkers in 2006 and 2007, respectively. The number of loons killed by lead poisoning has dropped by ~60%, comparing the 13 years before and after 2007 (Fig. 1). Overall that's very good news, although six loons were known to have died from ingested fishing gear between 2014-19.

Unfortunately, loons are also susceptible to being hit by motorboats, although our records reveal a fairly low collision rate considering how busy Vermont lakes can get during the summer. Not surprisingly, chicks are more vulnerable (eight mortalities) compared to adults (two mortalities).

Of course, loons also die from a host of natural causes. Thirteen loons have died from fungal respiratory disease—aspergillosis—and notably, 11 cases have occurred since 2008. Fungal disease tends to affect weakened or immune-compromised birds. Is there a correlated stressor that has increased in the past decade, such as competition or climate change factors? In New Hampshire and Maine, several loons have recently died of malaria, which is potentially related to climate change. While these days we are receiving more reports of loon territorial chases and fights, if we look at the number of adult mortalities

caused by attacks between loons, the rate is about the same before and after 2007 (Fig. 1)—despite a near-doubling of the adult loon population. Since intruding adult loons will kill chicks during territorial disputes, we would expect to observe a higher rate of chick loss caused by competition and attacks as the overall population increases. However, such events are rarely witnessed. In 2019, a record nine chicks were reported to have disappeared after territorial interactions (32% of total chicks lost), but the average rate from 2015-2019 (16% of lost chicks) is actually lower than from 2000-2004 (34%). In any given year, we don't know the causes of loss for 60-95% of loon chicks that disappear, but predation and territorial disputes are likely two major reasons.

Here are some recent field observations to commemorate our lost birds.

#### COLBY POND 2019:

**Report:** Lethargic loon swimming with head down, occasional beaching. Loon trying to nab minnows in the shallows. No visible signs of fishing gear.

**Result:** VCE intern, Rose West, along with VCE's Susan Hindinger, monitored the bird for over a week and even put it back in the water to move it away from people at the boat access. We usually let these weak-bird situations play out since the only regional waterbird rehabber is in Maine, and rehabilitating loons is rarely successful. Sometimes a bird will recover on its



own, and we'd rather not interfere with that process. In this case, the bird died within the week. We sent it to Tufts for a necropsy, which revealed that the bird died from ingested lead fishing gear.

#### NELSON POND 2018:

**Report:** Lethargic loon with raspy breathing observed by vacationing veterinarian Ron Svec from Dummerston; the next day the loon beached itself and was subsequently brought to Dr. Hoppe in St. Johnsbury. An X-ray revealed one lung full of fluids (fungal respiratory disease) and a two-inch long metal object in body (dissolved fishing lure).

**Result:** Consulted Dr. Mark Pokras by phone at his home in Maine and sent x-ray scans via email for assessment. The bird was euthanized. A semi-digested fish-hook had poked thru the wall of its gizzard and lodged in the liver. The bird suffered blunt trauma very shortly before death. Likely scenario: the fish-hook weakened the bird allowing fungal disease to take hold, then the hapless bird was hit by a motorboat in its final day(s).

#### SPRING LAKE 2017:

**Report:** Loon observed on shore by residents after territorial chases in mid-May. Loon likely exhausted and went on land to avoid more chases. Eventually, it returned to the water.

**Result:** A week earlier, a pair was observed building a nest on the lake's nesting raft. Over several weeks, the pair was not seen near the raft but eventually nested at a shoreline site. This delay and change in nest sites seemed odd at the time. But then, in late June, a highly decomposed loon was found near shore. We surmise that there was a territorial takeover and a change in mates, and the loser was hurt enough that it eventually died. Life is not always kind.

#### WEST HILL/NICHOLS POND 2014:

**Report:** Fishing line around a loon's head. Successful night capture using spotlights. Cut the line going down the throat, banded the loon, released.

**Result:** We checked the pond three times over the next week and no loons were present. We hoped that the loon



flew off (other loons have survived after swallowing a hook—or line with hooks—when gizzard acids dissolved the hook allowing the line to pass through). A month later, a banded loon was observed in poor condition on nearby Nichols Pond. It turned out to be the West Hill Pond bird. The hook it swallowed caused complications, so with the help of Lamoille Valley Veterinarians, we euthanized the bird.

Witnessing the death of any loon is difficult, and unraveling causes poses a real challenge. However, like defending territories or becoming prey for an eagle or a mink, losses are an inevitable part of the cycle of life. That said, some human-caused deaths can be prevented. We've made big strides toward avoiding unnecessary loon mortality through lead fishing gear legislation and public education, but we can do more, starting with stepping up our loon disease and parasite monitoring program in the face of warming waters and global climate change. Rest assured, VCE and our partners will continue to monitor and analyze Vermont's loons (dead and alive) so we can stay abreast of emerging threats and protect the statewide loon population for generations to come.

earlier than newly-established pairs. However, if an aggressive intruder loon is present, a pair may spend more time establishing and defending territorial boundaries.

Copulation between male and female loons can take place multiple times during the spring. Females store sperm in a special chamber in the oviduct, so that once an egg is released, it can be fertilized. Dr. Paruk speculates that copulation might help stimulate nest building, along with other territorial behaviors.

Once a territory has been established and a nest mostly built, that is likely the time an egg is released. At ovulation, a yolked follicle breaks free and travels down the oviduct. If the egg is fertilized in the upper oviduct, it first develops a layer of egg white (albumin), after which the hard shell forms around the albumin. Remarkably, timing from ovulation to egg laying is only about 24 hours! It has all been worked out over millions of years, but I still find the creation of the perfect egg a magical process. A female loon will usually release two eggs over 24-48 hours, with the second egg effectively being an insurance policy in case one egg is sterile.

If a nest fails due to flooding or depredation early enough in the summer, the pair's hormones begin to flow, initiating the re-nesting process, which can occur in 10-14 days. Why wait two weeks before having another go? Females need to build up calcium reserves for egg production. Loon eggs produced during second attempts are invariably smaller, which is likely related to reduced female calcium levels.

In 2019, there were three loon pairs in Vermont that nested in early July and subsequently hatched chicks in late July/early August. Surprisingly, we believe only one of these late nests was a re-nest. What caused the pairs to nest so late? Was it competition, a change in mates, or something else? Loons, like most birds, are consistent overall in the timing of their nest-building and egg-laying, but they can also be adaptable when necessary.

## HOW YOU CAN HELP

Please support the Vermont Loon Conservation Project and Vermont's loons through a tax-deductible contribution to the Vermont Center for Ecostudies today.

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Constituents receive the *Loon Caller* and VCE's biannual *Field Notes*.

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VLCP would like to thank its many volunteers and contributors for their continued support.



## Hardwood, Wolcott, and Elmore

BY ERIC HANSON

Near the north end of the Worcester Range, where the Lamoille River cuts from east to west, lie three waterbodies that have hosted Vermont loons for decades: Hardwood Pond, Wolcott Pond, and Lake Elmore. Loons first nested on Hardwood Pond in the mid-1980s when there were fewer than 20 nesting pairs in the entire state. Hardwood Pond has no public access, and its shoreline is undeveloped. The pond's small size (49 acres) and shallow depths may be the reason why loons have had only intermittent nesting success there. One pair nested for four years (1985-1988) before taking the next six years off. The pair then enjoyed a few more years of success before disbanding from 2003-2017. In 2018, a pair returned and nested again in 2019. Hardwood Pond is a prime example of how territorial pairs on smaller ponds can come and go.

Wolcott Pond has some of the best marsh nesting habitat in Vermont; this has allowed its resident loons to nest in over a dozen different locations over the past 30 years. The pond is edged by a landscape of water-logged hummocks, providing protection from most shoreline predators. The loon pair on Wolcott was banded in 2000 as part of a New England mercury toxicology study. Interestingly, the study found that chicks had higher blood mercury levels than adults. However, the loons on Wolcott Pond have fledged 25 chicks to date, suggesting that mercury has not caused serious reproductive health problems there.

Around 2005-2006, a new male loon

took up residence on Wolcott Pond. This bird had been banded in 2001 as a chick on nearby Zack Woods Pond. Named by his followers, "Zack" still resides on Wolcott. Steve Young, Jan Roy, Gail Osherenko, and Cate Garvey annually keep close tabs on Zack, his mate, and their offspring. Gail has even made two loon documentaries: one chronicles chick-rearing on the pond, "Loon Chick's First Summer," ([www.loonchicksfirstsummer.com](http://www.loonchicksfirstsummer.com)), while the other—"The Dark Side of the Loon"—focuses on wintering loons and loon research.

Lake Elmore, at 219 acres the largest and most developed of these three lakes, is lined with cottages and filled with boaters, but provides suitable marsh habitat near its south end inlet. In 2006, a pair of loons occupied the lake, but they didn't attempt to nest until 2012. In the pair's first six years of nesting, only one attempt was successful, as depredation or flooding likely claimed most nests. Lake residents built a nesting raft in 2018, and the loon pair took advantage of these new digs, successfully nesting in 2019. A crew of volunteers helped with raft construction and monitoring, including Cindy Blackburn, Glenn Schwartz, Sue Cano, and Lisa Kelly, among other locals committed to helping "their" loons thrive.

While these three waterbodies lie within a 10-mile radius of one another as the loon flies, their unique characteristics provide a diversity of nesting habitats, which in turn contribute to their differing levels of nesting success and chick productivity.