



## THE 2021 BREEDING STATUS OF COMMON LOONS IN VERMONT

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**ABSTRACT:** The Vermont Loon Conservation Project, a program of the Vermont Center for Ecostudies and the Vermont Fish and Wildlife Department, documented a record 109 nesting loon pairs and 137 territorial pairs statewide. Of the 109 pairs that attempted nesting, 77 successfully hatched 125 eggs, with 84 chicks surviving through August (chick survival rate 67%, 0.61 chicks surviving per territorial pair). The increased nesting rate in 2021 can be explained by six new nesting pairs and a high percent of known territorial pairs nesting (85%). The 67% chick survival rate was lower than 20 year-average 77%. One new pair started nest building but never laid eggs (Great Averill-south). Eight pairs were downlisted to potential territories or loon active because less consistent pair activity was observed (Beecher, Mitchell, Neal, Norford, Peacham-SW, Sugar Hill, Warden, Wolcott). Nineteen pairs that have nested in recent years did not nest in 2021 compared to 33 known territorial pairs not nesting in 2020. Of 37 pairs whose first nest attempts failed, 10 re-nested, and 5 were successful. Known causes of nest failure included depredation (9 nests), flooded (1 nest), and loon disturbance (3 nests). The remaining failed nests were abandoned for unknown reasons with depredation and disruption from intruder loons being the most likely causes. Nine adult mortalities were documented. A loon on L. Raponda ingested a lead sinker, and the Sunset L. (Marlboro) loon had a sinker in it but it needs to be tested on whether it was lead. A loon on L. Morey died from wounds from a fishhook. Two likely died as a result of attacks by other loons (No. 10, Woodbury). A bald eagle was observed killing an adult loon on Somerseset Res. but it is unknown if there were other reasons that made the loon susceptible. Three chicks were necropsied (Maidstone-SE – attack by another loon, Greenwood – attack by another loon, Joe’s - infection). Two initially successful rescue and rehabilitation efforts were made on a loon from L. Eden entangled in fishing line and hook and for loon from L. St. Catherine whose feet were pierced by a large lure. The L. Eden loon was found dead 2 months after release on the Maine coast. Three loons were rescued after crash-landings, and two were rescued after being iced-in (Maidstone L. 1/21, No. 10 P. 12/21). Five loons were reportedly entangled in fishing gear, but were not observed during follow-up surveys.

About 200 volunteers surveyed lakes throughout Vermont on 17 July as part of the Loonwatch program, an annual statewide loon count. Loons were observed on 124 of 167 surveyed lakes, where observers counted 349 adults, 86 chicks, and 1 subadult loon. The number of adult loons counted since 2018 has been similar ranging from 337 to 358. These counts are higher than the 2013-17 timeframe when 297 to 308 loons were counted each year. To provide a historical perspective, volunteers counted 179 and 225 adult loons in 2003 and 2008, respectively.

Thirty-two of the 109 breeding pairs nested on nesting rafts, (88% successful), 34 were on islands (62% successful), 29 were in marshes (72% successful), and 14 were on shorelines (50% successful). Forty-nine nesting rafts were placed on known or potential nesting waterbodies. Warning sign buoys were placed around 53 of the 109 nests. Volunteers provided technical assistance through the placement and maintenance of nest warning signs and/or nesting rafts on 53 lakes as part of the adopt-a-lake program. Nine loon conservation webinars and programs were presented. Volunteers helped distribute informational brochures on loon conservation and conservation of lakeshores to 5 additional lake associations, and two lake associations expanded their website outreach on loon conservation.

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## INTRODUCTION

In 1977, the Vermont Loon Conservation Project (VLCP) was initiated to assess the status of Common Loons (*Gavia immer*) in Vermont and found that the breeding population had significantly declined (Laughlin 1977). As a result, the VLCP began a loon monitoring and management program in 1978. Numbers of nesting pairs peaked at 19 in 1982, and then dropped sharply to 7 pairs in 1983 for unknown reasons. From 1983 to 1989, Vermont's breeding loon population gradually increased at an average rate of 1 pair per year, stabilized between 1989 and 1994 at 14-16 breeding pairs, and then experienced a marked increase since the mid-1990s to 109 nest attempts in 2021. The VLCP is a program of the Vermont Center for Ecostudies (VCE) and the Vermont Fish and Wildlife Department (VFWD).

In 2005, the Common Loon was removed from the Vermont Endangered and Threatened Species list. Conservation and educational efforts by many groups and individuals enabled the achievement of this milestone. Through the guidance of VCE and VFWD, monitoring and management programs were implemented throughout the 1980s and 1990s. In 1998, the Vermont Loon Recovery Plan (Borden and Rimmer 1998) was recommended for approval by the Vermont Scientific Advisory Group (SAG) on Birds and the Vermont Endangered Species Committee (ESC), and approved by the Vermont Agency of Natural Resources (ANR). The recovery plan recommended actions on management, monitoring, research, and education programs to promote the recovery of the species. The Common Loon was designated a state endangered species in 1987 following documentation of its population decline in the early 1980's. The target level to de-list as written in the Vermont Loon Recovery Plan was "40 nesting pairs averaged over 5 consecutive years", with a minimum of 5 nesting pairs in "2 geographically discrete areas. From 2000-2004, the average number of nesting loon pairs was 41, and 6 pairs nested in the southern half of Vermont. Today, the average number of nesting pairs from 2017-2021 was 99 with 24 nesting pairs in the southern half of the state in 2021.

Since the mid-1980's, the VLCP has been a joint program between VCE and VFWD. The Nongame Wildlife Fund has been the primary funding source for the VLCP (35-40% of budget) for many years, and VFWD has provided technical, law enforcement, and logistical support. Starting in 2013, the VFWD began utilizing the federal Pittman-Robertson Fund for the VLCP. VCE annually hires the VLCP biologist, provides staff support, and raises the remaining VLCP budget through donations and grants.

In June 2021, the U.S. Fish and Wildlife Service (USFWS) awarded the Vermont Center for Ecostudies (VCE) a five-year \$446,393 grant to support the Vermont Loon Conservation Project (VLCP). VCE was one of six organizations in New England and New York selected through a competitive grant process to receive funding. The grant is part of a larger settlement from the *Bouchard B-120* oil spill that killed over 500 wintering loons off the Rhode Island and Massachusetts coasts in 2003. VCE will work to improve loon populations impacted by the *Bouchard* oil spill across Vermont with the ultimate goals of increasing nesting success and reducing mortality. One approach will focus on established management activities, such as nest warning signs and nesting rafts, on particularly vulnerable areas. These include both territories with low productivity and high-risk sites where we have found management highly effective in reducing the negative effects of flooding and human disturbance. VCE will also use funds to improve rescue and rehabilitation of distressed loons, implement a lead tackle buy-back and monofilament collection program, and enhance outreach and involvement of volunteers, community stakeholders, and the general public.

## METHODS

### *Monitoring of lakes with breeding and territorial loons*

The VLCP biologist, a VCE seasonal biologist, and volunteers surveyed approximately 135 lakes with known histories of loon nesting, occupancy by territorial pairs, or high levels of loon activity on a regular basis (weekly to monthly). Over 200 adopt-a-lake volunteers provided technical assistance in this intensive monitoring effort.

Vermont Loonwatch day was initiated in 1983 to provide a mid-summer estimate of the statewide loon population. On the third Saturday in July each year, volunteers survey assigned lakes, ponds, and reservoirs from 8:00 to 9:00 a.m., recording the number of adult loons, subadult loons (1-2 year olds), and loon chicks on the water body, as well as relevant human and wildlife activity. The information has provided an annual statewide population estimate, an estimate of the number of non-breeding loons, and a check on lakes with previously undetected breeding pairs.

### *Management*

Loon management practices included: 1) stabilization of water levels during the nesting period through cooperation with hydroelectric companies and others who control water levels; 2) placement of artificial nesting rafts in appropriate sites; 3) placement of warning sign buoys to discourage human intrusion at nest sites; 4) responding to all reports of distressed or dead loons, and 5) providing technical assistance to regulatory agencies. Volunteers provided important technical support for the first 4 of these practices.

The 8 hydroelectric companies and 3 agencies that regulate water levels on lakes where loons have historically nested were contacted when loons began nesting. Each company was requested to stabilize water levels during the nesting period so that nests would not be flooded by rising water levels or left stranded by water drawdowns.

Forty-nine artificial nesting rafts were placed statewide. These rafts provided an alternative nest site to natural sites where predation from terrestrial mammals and/or fluctuating water levels had caused nests to fail in previous years. In cases where a potential pair is present and natural nest sites exist, rafts will not be considered unless the pair fails to nest after 4 or 5 consecutive years of occupancy. Rafts are considered on lakes where natural nests have failed 3 consecutive times, and the VLCP deems that rafts might prove beneficial. We also consider using rafts when natural nests are located in very close proximity to active cottages and other human activities to reduce potential disturbance. Adopt-a-lake volunteers maintained or helped with 23 rafts. The raft on Sugar Hill Reservoir was not placed because of very low water levels for dam repairs. Only a single loon was reported on this reservoir during most surveys.

Warning sign buoys were placed around 53 of the 109 active nest sites to discourage human intrusion close to nests. These signs were also placed around 3 other nest sites where loons ultimately did not nest in 2021. Sign buoys were used in areas where repeated human disturbance was likely to occur. In most locations, people respect the presence of the signs.

The VLCP biologist coordinated responses to loons in distress with volunteers, VFWD game wardens, wildlife rehab personnel, and veterinarians (e.g., caught in monofilament, injured, road crashes, landed on ponds too small to fly from, iced-in, other). The VLCP biologist has also begun assisting with necropsies and will take on a larger role in this process in the future to be able to analyze fresh loons instead of frozen ones. Bren Lundborg from the Vermont Institute of Natural Science (VINS) has taken on a primary role in conducting necropsies of Vermont's loons. Tufts University Wildlife Clinic was not conducting necropsies in 2020-21 because of the COVID-19 pandemic, and will likely conduct fewer of them in the future. For certain loons, VINS will send tissue samples to the University of New Hampshire Veterinary Diagnostic Lab working with Dr. Inga Sidor.

### *Education*

Public education continued to be a vital part of loon management efforts. Nine loon conservation webinars and live-programs were presented. We continued to distribute 2 informational brochures on loon conservation and conservation of lakeshores. A sign informing boaters and anglers how to help nesting loons was placed at lake access areas. Another sign cautioning boaters to be alert for loon chicks and to watch loons from a distance was also placed at some access areas.

Communication with volunteers is a major component of the program. This informal education is on-going and creates highly knowledgeable people in and around the lakes and ponds in Vermont. The biologist answers all inquiries from the public. Biologists, staff educators, and the project's volunteer network regularly informed camp owners and other lake users about loon conservation measures. The VLCP biologist contacted landowners of new nesting sites as soon as nesting was suspected or observed. Landowners and lake associations were both consulted before new nesting rafts were placed.

Two brochures directed at 1) boaters and 2) lakeshore owners were distributed. A brochure "the Common Loon – a guide for lakeshore owners" contained information about the importance of riparian habitat for the health of a lake and was distributed to several lake associations (Fairlee, Harveys, Parker, Raponda, Sunset [Benson]). The L. Fairlee and L. Raponda associations expanded their loon conservation outreach on their websites. VCE mailed the *Loon Caller* newsletter to over 800 loon volunteers, donors, and other loon program contacts.

### *Contaminant sampling*

Abandoned eggs were collected and delivered to Biodiversity Research Institute (276 Canco Rd., Portland, ME 04103) for methylmercury (MeHg) analysis (Evers et al. 1999). Sixteen eggs were collected in 2021. Results from 2017 indicated that the eggs collected Curtis Pond and Chandler Pond had high mercury levels. Both are shallow ponds with extensive

muddy bottoms which might promote the methylation of inorganic mercury. Loon pairs on both ponds have successfully fledged numerous chicks. BRI has archived egg samples from most of the previous 10 years. Cooperators on this research include the U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, BRI, the Vermont Department of Environmental Conservation, and several other state agencies, private organizations, and universities.

## RESULTS AND DISCUSSION

### *Description of loon activity on individual lakes in 2021*

Lake and loon activity descriptions are provided for nesting pairs, known and potential territorial pairs, and lakes with high levels of loon activity in Table 1. Nesting pairs nested this year, territorial pairs have nested in recent years, and potential territorial pairs have no recent history of nesting but 2 adult loons were observed throughout much of the summer.

### *Distribution of territorial and nesting pairs*

There were 137 known and potential territorial loon pairs, 109 of which were confirmed to nest on 94 lakes (Fig. 1, Table 1). Six new nesting pairs were identified, including Clyde River – Buck Flats (1 chick), Glen L. (depredation), Long P. – Sheffield (chicks disappeared), Norton P. - Crescent Isl. (1 chick), Sunset L. –Benson (depredation), and Turtle P. (1 chick). One new pair on Great Averill – South started building a nest but no eggs were confirmed. Eight pairs were downlisted to potential territories or loon active as less consistent or no pair activity was observed (Beecher, Mitchell, Neal, Norford, Peacham-SW, Sugar Hill, Warden, Wolcott).

### *Population levels and breeding success*

The number of nesting pairs increased from 101 in 2019 and 96 in 2020 to a record 109 in 2021 (Fig. 2, Table 2). We identified 137 territorial pairs statewide. Of the 109 pairs that attempted nesting, 77 successfully hatched 125 eggs, with 84 chicks surviving through August (chick survival rate 67%, 0.61 chicks surviving per territorial pair). There were 128 known territorial pairs on water bodies where nesting or nest building had occurred within the last 3 years, and 9 potential territorial pairs, each of which was observed consistently for 6 weeks or more. The increased nesting rate in 2021 can be explained by six new nesting pairs and a high percent of known territorial pairs nesting. Nineteen pairs that have nested in recent years did not nest in 2021, thus 85 percent of the known territorial pairs nested compared to 74% in 2020.

The nest success rate was 71%, which is below the 20-year average of 76%. Of 37 pairs whose first nest attempts failed, 10 re-nested, and 5 were successful. Known causes of nest failure included depredation (9 nests), flooded (1 nest), and loon disturbance (3 nests). The remaining failed nests were abandoned for unknown reasons with depredation and disruption from intruder loons being the most likely causes. For depredation cases, eggshells were found outside the nest bowl. There is a chance some of these eggs were depredated after the nest was abandoned for other reasons. Details are provided in Table 1.

The chick survival rate through August was 67% with 0.61 chicks surviving per territorial pair (ch/tp) in 2021. From 2001-2020, the 20-year average chick survival rate was 77% with 0.68 ch/tp. The estimate for a stable and sustainable population is 0.48 ch/tp (Evers 2006). Three chicks were necropsied (Maidstone-SE – attack by another loon, Greenwood – attack by another loon, Joe’s – infection). The chick necropsied from Joe’s Pond likely flew onto the pond in October as the chicks hatched on the pond both disappeared by mid-August. This bird had an enlarged spleen indicating an infection. At least 3 more chicks disappeared after interactions with intruder loons. Two were likely taken by a Bald Eagle (Miller P.-2) and 2 more by snapping turtles (Fosters, Parker). One chick died after becoming entangled in fishing line (Lowell L.).

Nine adult mortalities were documented. The loon on L. Raponda ingested a lead sinker, and the Sunset L. (Marlboro) loon had a sinker in it but it needs to be tested on whether it was lead. A loon on L. Morey died from wounds from a fishhook. Two likely died as a result of attacks by other loons (No. 10, Woodbury). A bald eagle was observed killing an adult loon on Somerseset Res. but it is unknown if there were other reasons that made the loon susceptible. The cause of mortality for the loons from Thurman Dix Res. and Pigeon Pond were unknown. The Thurman Dix loon showed possible signs of infection and tissues will likely be sent to the University of New Hampshire pathology lab for further testing, along with tissues samples from the chick from Joe’s Pond. One adult loon on Hardwick L. was not retrieved because of decomposition.

### *Management Results: artificial nesting rafts and nest warning sign buoys*

Of the 109 known nests, 32 nests were located on artificial nesting rafts (88% successful), 34 were on islands (62% successful), 29 were in marshes (72% successful), and 14 were on shorelines (50% successful). The raft success rate has typically been above 85 percent in recent years. Nests with warning sign buoys (n=56) had a 66% success rate compared to 75% for nests without signs (n=53). Most nest failures can be attributed to predation, and not human disturbance. Signs are used more frequently for raft and island sites, which are often more exposed to boaters, but also tend to be more successful being away from shoreline predators. This year, however, the island nest success rate was substantially below the typical success rate of about 80%. A few larger islands likely have seen an increase in raccoon activity. Shoreline nests are more likely to be depredated. We have begun placing “goose guards” on several artificial nesting rafts in April and early May to prevent Canada geese from nesting on the rafts. Geese used the Little Averill – west raft as nest and perch, likely preventing the loons from nesting at this location.

### *Vermont Loonwatch Day*

Vermont Loonwatch day was conducted on 17 July when over 200 volunteers counted 349 adult loons, 86 chicks, and 1 subadult (Table 2, Fig. 3). Loons were observed on 124 of the 167 lakes surveyed. The number of adult loons counted since 2018 has been similar ranging from 337 to 358. The total number of adult loons over the 2018-2021 period is higher than the 2013-17 timeframe when 297 to 308 loons were counted each year. To provide a historical perspective, volunteers counted 179 and 225 adult loons in 2003 and 2008, respectively. Survey conditions in 2021 were rainy in central and southern Vermont. The number of territorial loons has increased from 123 pairs to 137 since 2018 but the annual Loonwatch count has not reflected this increase. Reasons for this lack of increase in Loonwatch counts could be that a higher percent of the loon population are part of territories, but error due weather, volunteers, or other reasons could be factors.

Seventy-two of 349 adult loons counted were located in southern and central Vermont, which is slightly lower than the 77 counted in 2020, but is still an increase from the 46 to 68 loons counted annually between 2015 and 2019. West central Vermont has observed the largest percentage increase in loons during the past 5 years increasing from 25 adults in 2016 to 46 in 2020, but only 34 were counted in 2021. North central Vermont has the largest concentrated population with about 150 adults over each of the past 4 years. Volunteers counted the most loons on Somerset Res. (13 adults), L. Memphremagog (12 adults), Norton P. (11 adults), and Lake Seymour (10 adults).

### *Loon Rescues*

We made 12 rescue attempts on 10 loons in 2021 of which eight attempts were successful. Seven of these loons were released, but one was found dead two months later. A loon from L. Eden entangled in fishing line and hook was rescued, banded, and released but the bird began beaching again. The loon was recaptured and brought to Avian Haven in Freedom, Maine. The bird was treated for intestinal parasites and released near Belfast, Maine two weeks later. Unfortunately, the loon was found dead two months later. A second major rescue and rehabilitation effort was made for a loon from L. St. Catherine whose feet were pierced multiple times by the hooks on a large lure. Vermont Institute of Natural Science (VINS) assisted with the removal of the hooks and initial veterinary treatments. Avian Haven oversaw the surgery to remove broken toe bones and necrotic tissue and several weeks of rehabilitation before the loon was released on coast. Three loons were rescued after crash-landings (Guilford, Newark P., L. Champlain) and released. Two loons were rescued after being iced-in on Maidstone L (Jan. 2021) and No. 10 P (Dec. 2021). Five loons were reportedly entangled in fishing gear, but were not observed during follow-up surveys. There was a failed rescue attempt for a loon that landed on a small pond in Cabot. After a week, the loon managed to take-off successfully on its own. The diameter of the pond was about 200 feet with a low berm on one side and open fields beyond this. VFWD game wardens assisted with several of these efforts.

The VLCP biologist spent over 130 hours in 2021 conducting capture attempts, and coordinating monitoring efforts with volunteers, game wardens, VINS, and Avian Haven. An additional 30 hours were spent processing loon mortalities and conducting necropsies. The biologist has spent 40-90 hours annually dealing with loons in distress in recent years. Volunteers were instrumental in the monitoring and capture attempts of all these birds with volunteer time exceeding 50-100 hours per year.

### *Banded Loon Recoveries and Re-observations*

From 1998 to 2003, VCE and Biodiversity Research Institute (BRI) banded 29 adult loons and 3 chicks as part of a U.S. Environmental Protection Agency regional mercury study. Since 2005, we have banded 13 additional adult loons that

were rescued and released. Two loons banded in New Hampshire and Maine were recovered in Vermont. Most of the loons that were banded and released for the mercury study were observed back on their territories in the years immediately after banding. Table 3 lists 21 loons that were recovered (9 found dead), re-observed either on a different lake and/or territory (9 loons), or re-observed more than 10 years on the same lake the bird was originally banded (3 loons). We have observed several other banded loons over the years but if the color-combination could not be confirmed or did not match any records, they were not included.

#### Winter Migration

Three loons originally banded in Vermont were found dead along the southern New England coast at the east end of Long Island, Martha's Vineyard, and Cape Cod. These findings align with region-wide band recoveries and satellite telemetry tracking showing that most northeast loons spend the winter along the Atlantic coast from Long Island Sound to Maine. Two of these loons were found two years after banding, and one was found 15 years after banding.

#### Summer dispersal and site fidelity

Most loons banded during the 1998-2003 period returned to their territories in subsequent years. About 70-85% of pairs return to the same territory with higher turnover rates on large lakes (Evers 2006). Three of the banded loons in table 3 were observed on the same territory, two of which were observed over 16 years later (Moore Res., Newark P.). The Newark Pond male was banded in 1998 and was still present in 2020.

Thirteen banded loons have been observed on different lakes all within 12 miles of the lake that the loon was originally banded. Five of these loons found spots in existing territories replacing another territorial loon. Four of the birds founded new territories that had not existed before (Fosters, Maidstone – North, Shadow-Concord, Somerset – North Islands). This demonstrates that new territories are often created by “experienced” loons who left their original territories for various reason including territorial takeovers. These new territories were located within 1-4 miles of the previous territory. Two loons banded as chicks in Maine and New Hampshire were part of territories in Vermont both 15 years after the hatch year. These were long-distance dispersals from their natal lakes (Aziscohos Res. Maine to Stiles Res. Vermont - 85 miles)(Massabesic Lake New Hampshire to Sunset L. Marlboro Vermont - 80 miles). It is unknown how long these loons had been present in Vermont.

#### *Volunteer Effort*

Volunteers provided important technical assistance for loon conservation efforts in Vermont. The efforts of adopt-a-lake volunteers, who helped monitor over 70 lakes statewide, varied from a few surveys over the summer to daily observations. Volunteers assisted with either loon nest warning signs and/or nesting rafts on 53 of the 74 lakes where these management tools were used. Volunteers were critical in helping to inform the VLCP biologist about lakes and ponds with increased loon activity, potential territorial pair development, and loons in distress. Volunteers or other citizens aware of the loon program helped determine the status of most of the potential territorial pairs through repeated surveys.

#### *Threats to Vermont's loons*

Vermont's loons continue to face many short- and long-term threats to their viability, including: (1) water level fluctuations on lakes where water levels are regulated; (2) shoreline development and human disturbance; (3) mortality through lead poisoning, entanglement with monofilament fishing line, and fishing gear ingestion; (4) environmental background of bio-accumulating mercury and methyl-mercury, (5) oil spills in wintering coastal areas, and (6) disease such as aspergillosis and botulism. There have been recent region-wide population declines in Wisconsin and parts of Ontario. Although the specific reasons for the decline are not known, tens of thousands have died due to botulism poisoning on the Great Lakes over the past 20 years, and it is possible that the effects of these mortalities are only now being observed. After several years of fewer botulism cases, there was an increase in loon mortality in 2021. Two natural sources of mortality include predation of eggs and chicks and intraspecific competition between breeding pairs and extraterritorial (rogue/intruder) loons. See the mortality assessment in the 2021 annual report. Background and historic information on these threats are provided in the Vermont Common Loon Recovery Plan (Borden and Rimmer 1998, pp. 5-10) and the VLCP 2000 and 2009 annual reports.

**Table 1. Summary of Common Loon breeding activity in Vermont, 2021**

Nesting pairs: 109    Known territorial pairs: 128    Potential territorial pairs: 9    Total territorials pairs: 137 Chicks hatched out: 125    Chicks surviving through August: 84 Lake list divided into sections: 1) nesting pairs and known and potential territorial pairs, and 2) loon active lakes. Loonwatch Count on 17 July 2021: Adult loons - 349    New nesting pairs: 6    New territorial pairs: 1 Territories listed first followed by loon active lakes.																	
Rescues / Mortality / Monitor Situations																	
Lake	Town	2021 status	Nest Type (current/past)	Nest Outcome	Nest Warning Sign Buys	Chicks hatched out	Chicks through August	Chick Mortality Cause	Situation: Resc./Mort./Monitor	Mortality and Rescue Cause	Date	Age	Comments	# years nested	# years nest success	total # surviving chicks	mean annual # surviving chicks per territory yrs.
Baker P.	Barton	nesting	marsh	Successful		2 Ch	2 Ch							17	15	22	1.29
Bald Hill P.	Westmore	territory	shoreline	last nested 2020									Water levels in May and June were high (beaver activity?) making the shoreline nest used in recent years wet.	18	11	13	0.54
Bean P.	Sutton	nesting	marsh	Abandoned - no eggs										16	15	16	0.94
Beaver P.	Holland	nesting	island	Successful		2 Ch	1 Ch	Unknown - disappeared early						38	33	39	0.95
Beecher P.	Brighton	territory		last nested 2019									0 or 1 loons observed during few surveys.	5	4	4	0.57
Berlin P. - north	Berlin	nesting	marsh	Successful	signs	1 Ch	0 Ch	Unknown					Nest site shifted south a few 100 m.	18	16	16	0.67
Bourn P.	Sunderland	territory	island	Successful		2 Ch	0 Ch	Unknown - disappeared early					Nest not observed; 2 chicks reported late June but gone by LW day. Possible chick reported in Sept. but not confirmed.	20	18	19	0.83
Branch P.	Sunderland	nesting	marsh	Successful		2 Ch	1 Ch	Unknown					Shifted nest location	4	4	4	0.80
Brownington P.	Brownington	nesting	marsh	Abandoned - no eggs	signs									17	7	9	0.39
Bruce P. / Clark P.	Sheffield	nesting	marsh	Successful		2 Ch	1 Ch	Unknown - disappeared early					1st successful nest recorded after 14 years of pair presence	10	1	1	0.07
Buck L.	Woodbury	nesting	marsh	Abandoned - egg(s)										14	8	8	0.33
Caspian L.	Greensboro	nesting	raft	Abandoned - egg(s)	signs								Extra loons frequent	7	4	6	0.40
Center P.	Newark	nesting	shoreline	Abandoned - egg(s)										5	0	0	0.00
Chandler P.	Wheelock	nesting	raft	Successful		2 Ch	1 Ch	Unknown - disappeared early					During the past 2 years, the chick was often alone in later August and Sept.	14	11	11	0.69
Chittendon Res. - East	Chittenden	nesting	raft	Successful	signs	2 Ch	0 Ch	Trauma - attack by other loon (both)						17	14	17	1.00
Chittendon Res. - North	Chittenden	nesting	raft	Abandoned - no eggs; Re-nest successful	signs	2 Ch	2 Ch							6	5	8	1.14
Clyde Res.	Newport	nesting	marsh	Successful		2 Ch	1 Ch	Unknown						2	1	1	0.25
Clyde River - Buck Flats	Charleston	nesting	marsh	Successful		2 Ch	1 Ch	Unknown - eagles present					First nest attempt ever recorded. Territory located on slow moving section of the Clyde River. Nest site unknown.	1	1	1	1.00
Coles P.	Walden	nesting	marsh	Successful	signs	2 Ch	1 Ch	Unknown - disappeared early						22	19	27	1.00
Collins P.	Hyde Park	territory	marsh	last nested 2020									Very small pond; birds flying to and from Green River Res. often.	1	0	0	0.00
Curtis P.	Calais	nesting	marsh	Successful	signs	2 Ch	2 Ch							6	4	5	0.36
Daniels /Daniels West P.	Glover	territory	marsh	Abandoned									Nest site with egg found in August.	8	6	5	0.38
Derby P.	Derby	territory		last nested 2019									Possible nest attempt or nest building based on behavior but no nest confirmed.	10	5	5	0.33
Dog P.	Woodbury	nesting	shoreline	Depredation - mammalian	signs									5	1	2	0.29
Dunmore L.	Leicester/ Sali	nesting	island	Depredation - mammalian; Re-nest abandoned - no eggs	signs								Predator (raccoon?) on the large island.	15	10	12	0.80
East Long P.	Woodbury	nesting	island	Successful		1 Ch	1 Ch						Loon observed with green and either white or silver band on right leg in June. Confirmed both breeding adults unbanded in Sept.	40	32	38	0.84

Table 1 continued.										Rescues / Mortality / Monitor Situations							
Lake	Town	2021 status	Nest Type (current/past)	Nest Outcome	Nest Warning Sign Buoy	Chicks hatched out	Chicks through August	Chick Mortality Cause	Situation: Resc./Mort./Monitor	Mortality and Rescue Cause	Date	Age	Comments	# years nested	# years nest success	total # surviving chicks	mean annual # surviving chicks per territory yrs.
Echo L. (Charleston)	Charleston	nesting	raft	Successful	signs	2 Ch	2 Ch							11	6	7	0.41
Eden L.	Eden	nesting	raft	Abandoned - no eggs	signs				Rescue	Fishing gear - m	7/31/2021	Adult	7/26 loon snagged angler's line; 7/29 warden tried catching, failed; 7/31 beaching, caught, removed line and hook, released. Beached again, caught; 8/1 delivered to Avian Haven. Parasites found and treated. 8/12 released coastal ME. 10/12 Found dead on Islesboro, a Penobscot Bay island maybe 10 miles from where the bird was released in Belfast on August 12. Not counting as successful release.	17	12	16	0.76
Elligo L.	Greensboro	nesting	island	Successful	signs	2 Ch	1 Ch	Unknown						20	17	21	1.05
Elmore L.	Elmore	nesting	raft	Successful	signs	2 Ch	2 Ch							9	4	5	0.31
Ewell P.	Peacham	nesting	marsh	Depredation - mammalian; Re-nest successful		1 Ch	1 Ch							13	11	12	0.55
Fairfield P.	Fairfield	nesting	raft	Successful	signs	2 Ch	2 Ch						1st successful nest after 10 years of pair being present and 5 previous nest attempts. Raft moved to SE end.	6	1	2	0.20
Fairlee L.	Fairlee	nesting	shoreline	Successful	signs	1 Ch	1 Ch							6	5	6	0.67
Flagg P.	Wheelock	nesting	island	Successful		1 Ch	1 Ch							8	6	8	0.67
Forest L.	Averill	nesting	marsh	Successful		2 Ch	1 Ch	Unknown - disappeared early					Nest site shifted to marsh from raft; geese had used raft	28	25	30	1.00
Fosters P.	Peacham	nesting	raft	Successful		1 Ch	0 Ch	Predation - possible snapping turtle					Chicks possibly taken by snapping turtle	19	19	28	1.47
Glen P.	Castleton	nesting	shoreline	Depredation - mammalian	signs								New nest. Raft had been placed nearby but was not used.	1			
Great Averill L. - North	Averill	nesting	raft	Successful		1 Ch	1 Ch							27	15	17	0.59
Great Averill L. - South	Averill	territory											Nest building on shoreline; likely did not lay eggs unless predator took them within a day of sitting.				
Great Averill L. - SW inlet	Averill	nesting	island	Successful	signs	2 Ch	2 Ch						Nest shifted to mudflat island	11	7	8	0.50
Great Hosmer P. - North	Albany/ Craftst	nesting	shoreline	Successful		1 Ch	1 Ch		Monitor	Fishing gear	7/7/2021	Adult	1st successful nest after 6 years of pair being present and 3rd nest attempt. An adult had grass or line in mouth. 2 Ad and 1 ch clean; some visiting loons.	3	1	1	0.17
Great Hosmer P. - South	Albany/ Craftst	nesting	marsh	Successful		1 Ch	1 Ch							11	10	12	0.86
Green River Res. - Access Bay	Hyde Park	nesting	island	Abandoned - egg(s)	signs								Possible drought and low water levels made access to nest site too difficult.	14	11	14	0.93
Green River Res. - Merganser inlet	Hyde Park	nesting	island	Abandoned - no eggs; Re-nest abandoned - no eggs	signs								One of pair banded - Right leg: white with black stripe over Silver; left leg: Orange over Yellow. Bird originally banded on L. Eden in 2006 after fishing line incident.	6	2	2	0.18
Green River Res. - NW	Hyde Park	nesting	island	Abandoned - no eggs; Re-nest abandoned - no eggs	signs									43	31	44	1.00
Green River Res. - South	Hyde Park	territory	island	last nested 2019										5	3	3	0.38
Greenwood L.	Woodbury	nesting	raft	Successful	signs	2 Ch	1 Ch	Trauma - attack by other loon	Mortality	Trauma - attack by other loon	7/7/2021	Chick	7/6 chick found dead floating in water. Open wounds. Hole in sternum indicating attack by other loon.	11	8	6	0.33



Table 1 continued.										Rescues / Mortality / Monitor Situations							
Lake	Town	2021 status	Nest Type (current/past)	Nest Outcome	Nest Warning Sign Buoy	Chicks hatched out	Chicks through August	Chick Mortality Cause	Situation: Resc./Mort./Monitor	Mortality and Rescue Cause	Date	Age	Comments	# years nested	# years nest success	total # surviving chicks	mean annual # surviving chicks per territory yrs.
Groton L. - North	Groton	nesting	raft	Successful	signs	2 Ch	2 Ch							11	8	11	0.73
Groton L. - South	Groton	territory	shoreline	last nested 2020										17	13	16	0.70
Halls L.	Newbury	territory		nest building observed in 2019									Bald Eagle nest located near where built a nest in 2019.				
Hardwick L.	Hardwick	nesting	raft	Depredation - mammalian (island); Re-nest successful (raft)		1 Ch	0 Ch	Unknown - disappeared early	Mortality	Unknown - not analyzed	5/20/2021	Adult	Mortality case highly decomposed; not collected.	18	16	20	0.95
Hardwood P.	Elmore	nesting	island	Successful		1 Ch	1 Ch							13	12	15	0.71
Harveys L. - North	Barnet	nesting	marsh	Successful	signs	2 Ch	1 Ch	Unknown - disappeared early						13	9	8	0.50
Harveys L. - South	Barnet	nesting	raft	Successful		2 Ch	2 Ch						1st successful nest.	2	1	2	0.67
Holland P. - North	Holland	nesting	marsh	Abandoned - egg(s)									Nest site shifted south to Turtle Cove. Possible human disturbance; cove frequented by small boats.	7	2	2	0.13
Holland P. - South	Holland	nesting	island	Successful		2 Ch	1 Ch	Unknown - disappeared early						24	17	20	0.48
Hortonia L.	Hubbardton	potential territory											Potential pair consistently observed; raft placed for 2022.				
Iroquois L.	Hinesburg	nesting	raft	Successful	signs	2 Ch	1 Ch	Unknown						6	3	5	0.83
Island P.	Brighton	nesting	island	Depredation - mammalian										21	14	17	0.71
Jobs P.	Westmore	nesting	shoreline	Abandoned - egg(s); Re-nest successful		1 Ch	1 Ch						1st nest attempt in new location north of access on east shore. Re-nest located near past attempts south of access near 2nd lawn area.	13	7	8	0.35
Joe's P - inlet	Cabot/ Danville	nesting	raft	Abandoned - no eggs (raft); Re-nest successful (marsh)	signs	1 Ch	0 Ch	Unknown - disappeared early					Bald eagles and jet skis near family often; could be cause of chick loss	22	22	26	0.93
Joe's P. - 1st Pond	Cabot/ Danville	nesting	shoreline	Successful		1 Ch	0 Ch	Unknown - disappeared early	Mortality	Infection	10/15/2021	Chick	Loon found dead on shore; enlarged spleen indicating infection. Good body condition and muscle mass. Tissues sent to UNH for pathology tests. Not included in chick mortality # b/c unknown where chick came from.	12	7	4	0.31
Keiser P.	Danville/ Peac	nesting	shoreline	Depredation - mammalian										17	11	10	0.59
Kent P.	Killington	nesting	island	Successful	signs	1 Ch	1 Ch							12	9	12	0.92
Kettle P.	Groton/ Marsh	nesting	raft	Successful	signs	1 Ch	1 Ch							30	19	26	0.72
Knapp Brook P.	Reading	territory	island	last nested 2018									Nest building observed, but pair never nested.	3	2	2	0.33
Lewis P.	Lewis	nesting	shoreline	Successful		2 Ch	2 Ch						1st successful nest	2	1	2	0.67
Little Averill L. - North	Averill	nesting	raft	Successful		1 Ch	1 Ch							9	7	6	0.43
Little Averill L. - West	Averill	territory	raft	last nested 2020									Geese nested on raft nest to goose guard. Keep using as perch site which likely deterred nesting.	30	18	25	0.57
Little Hosmer P.	Craftsbury	nesting	marsh	Abandoned - no eggs									Nest site shifted to SW marsh-shoreline	20	11	9	0.36
Long P. (Eden)	Eden	nesting	marsh	Abandoned - no eggs										10	5	7	0.70
Long P. (Greensboro)	Greensboro	nesting	marsh	Successful		2 Ch	2 Ch							4	3	4	0.36
Long P. (Sheffield)	Sheffield	nesting	marsh	Successful		2 Ch	0 Ch	Unknown - disappeared early (both)					New nest. Very small pond.	1	1	0	0.00
Long P. (Westmore)	Westmore	nesting	island	Loon disturbance	signs								Raccoons likely occupy nest island and contributing to nest failure.	23	17	22	0.85

Table 1 continued.										Rescues / Mortality / Monitor Situations							
Lake	Town	2021 status	Nest Type (current/past)	Nest Outcome	Nest Warning Sign Buoys	Chicks hatched out	Chicks through August	Chick Mortality Cause	Situation: Resc./Mort./Monitor	Mortality and Rescue Cause	Date	Age	Comments	# years nested	# years nest success	total # surviving chicks	mean annual # surviving chicks per territory yrs.
Lowell L.	Londonderry	nesting	island	Successful	signs	1 Ch	0 Ch	Fishing gear - monofilament	Mortality	Fishing gear - monofilament	8/9/2021	Chick	Nest site shifted to NE side of island. 8/9 chick found dead floating in fishing line. Susan Eckrote found.	3	3	0	0.00
Lower Symes P.	Ryegate	territory	marsh	last nested 2020									Possible mate switch after major fight observed in 2020.	17	15	20	0.95
Lyford P.	Walden	nesting	marsh	Successful		2 Ch	1 Ch	Trauma - attack by other loon						12	10	12	1.00
Maidstone L. - North	Maidstone	nesting	shoreline	Depredation - mammalian					Rescue	Iced-in	1/29/2021	Adult	Observed on north end of Maidstone L. on the snow/ice on 1/28. Spent the night at -10F. Rescued from lake on 1/29. Called out, tried to get away, some vigor. Releases on L. Champlain 1/29. Dove, preened, called.	11	8	5	0.29
Maidstone L. - SE	Maidstone	nesting	island	Successful		2 Ch	1 Ch	Trauma - attack by other loon	Mortality	Trauma - attack by other loon	7/28/2021	Chick	Territorial chases observed prior to chick being killed by intruder loon; chick collected for necropsy. Widespread bruising on body and skull.	11	6	8	0.53
Maidstone L. - SW	Maidstone	nesting	island	Successful	signs	2 Ch	1 Ch	Unknown						39	36	41	0.93
Martins P.	Peacham	nesting	raft	Loon disturbance	signs									25	23	34	1.26
May P.	Barton	territory	marsh	last nested 2019									Pair present; many extra loons observed.	23	20	28	0.80
McConnell P.	Brighton	nesting	marsh	Successful		1 Ch	1 Ch						1st documented nest since 2007. Nest site unknown.	16	12	16	0.53
Metcalf P.	Fletcher	nesting	island	Successful	signs	1 Ch	1 Ch							9	4	6	0.60
Miles P.	Concord	nesting	island	Successful	signs	2 Ch	2 Ch		Monitor	Lethargic	7/5/2021	Chick	8/23 1 chick sluggish by itself. Joined family again a few days later.	26	20	26	0.70
Miller P.	Strafford	nesting	marsh	Successful	signs	2 Ch	0 Ch	Predation - Bald Eagle likely (both)					Nest site shifted to SW channel	7	6	7	0.88
Molly's Falls Res. - Island	Cabot	nesting	raft	Successful		2 Ch	2 Ch						Water levels low for 2nd year b/c of dam repairs. Rafts moved down to open water.	8	7	13	1.30
Molly's Falls Res. - North	Cabot	nesting	raft	Successful	signs	1 Ch	1 Ch						Raft moved down mudflats to open water.	27	25	34	0.94
Mollys P.	Cabot	nesting	marsh	Successful		2 Ch	2 Ch						Nest site unknown.	3	3	4	0.67
Morey L.	Fairlee	potential territory							Mortality	Fishing gear - hook	7/6/2021	Adult	VFWD game wardens captured a loon in fishing gear. Hook with barb pierced the lower mandible. Brought to VINS. Significant amount of tissue damage, bone exposure, and necrotic tissue. Bird was euthanized.				
Neal P.	Lunenburg	potential territory	marsh	last nested 2019									Single loon observed in May/early June; later 2 loons present.	3	0		0.00
Nelson P.	Woodbury	potential territory												1	0		0.00
Newark P.	Newark	nesting	island	Successful	signs	2 Ch	1 Ch	Unknown - disappeared early	Rescue	Trauma - crash landing	8/30/2021	Adult	8/30 Ad crash landed on field 1/3 mile up woods road from Newark Pond. Appeared healthy. Charged when attempted to capture. Brought to L. Willoughby since unknown what waterbody loon was from.	31	23	32	0.82
Nichols P.	Woodbury	nesting	raft	Successful	signs	1 Ch	1 Ch							21	19	21	0.84
Ninevah L.	Mount Holly	nesting	island	Successful	signs	2 Ch	1 Ch	Unknown - disappeared early	Monitor	Fishing gear	8/8/2021	Adult	Report of loon trailing fishing line; game warden monitored and all loons appeared healthy. Line fell off?	27	25	35	1.30

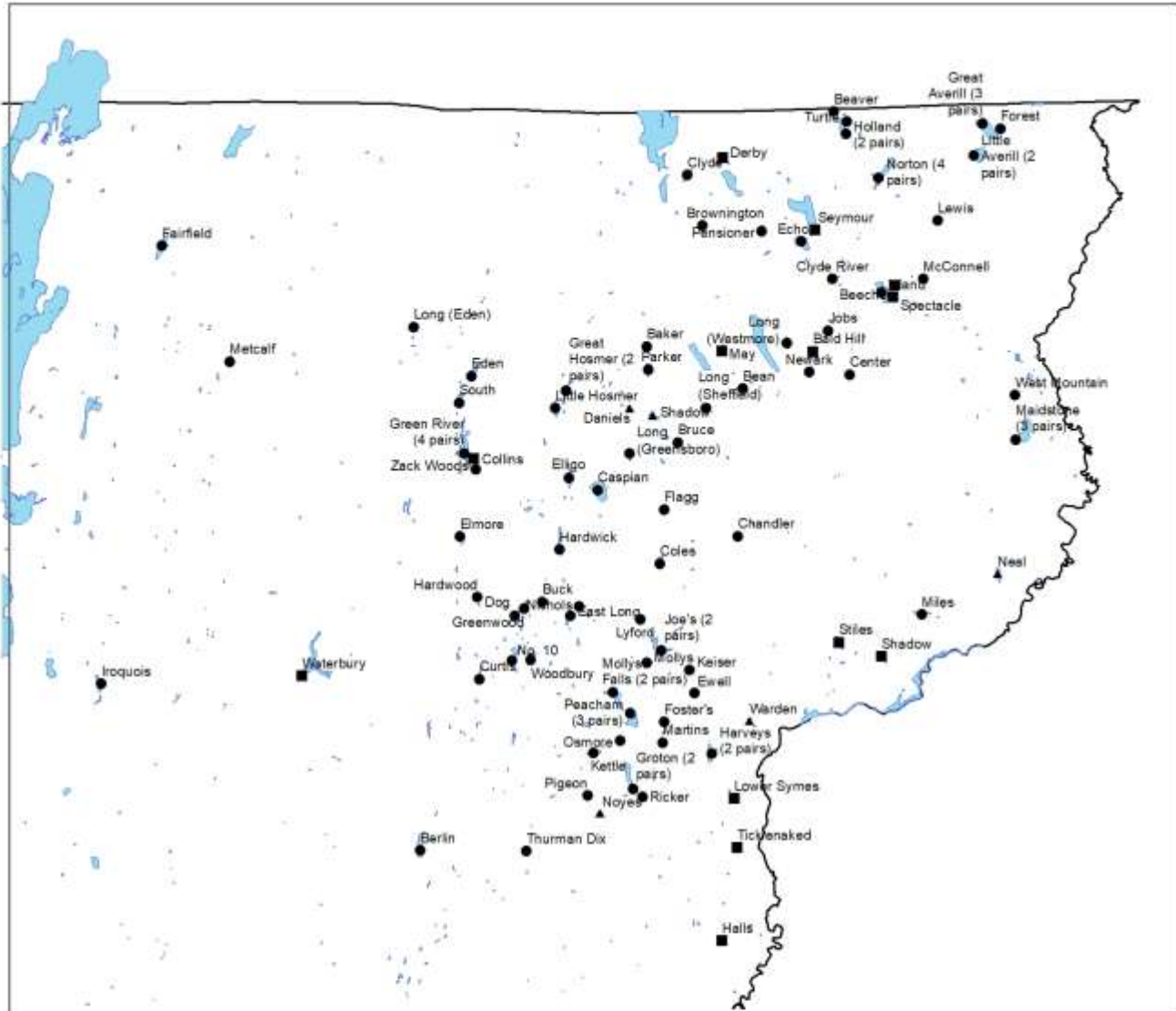
Table 1 continued.										Rescues / Mortality / Monitor Situations							
Lake	Town	2021 status	Nest Type (current/past)	Nest Outcome	Nest Warning Sign Buoy	Chicks hatched out	Chicks through August	Chick Mortality Cause	Situation: Resc./Mort./Monitor	Mortality and Rescue Cause	Date	Age	Comments	# years nested	# years nest success	total # surviving chicks	mean annual # surviving chicks per territory yrs.
No. 10 P. (Mirror L.)	Calais	nesting	raft	Loon disturbance; Re-nest abandoned - egg(s)	signs				Mortality; Rescue	Trauma - attack by other loon; Stranded -ice	5/25/2021; 12/20/2021	Adult; Chick	Territorial fight/chases on No. 10. This bird went over or around the dam to escape. Drowned in outtake pipe of mill dam pond a day later. Cause of death attributed to territorial chases. 12/20/2021 Loon in open hole surrounded by ice (chick of this year flew in from somewhere else). 12/23 ice too thin to walk out. 12/26 Eagle landed by hole, then left; loon tried taking off, failed, shuffled back to hole. Became airborne on 2nd attempt but crashed down at end of lake by road. Shuffled over road to outlet. Mike Scott, VFWD game warden, tracked and caught the loon. VCE released on L. Champlain.	14	12	15	0.65
Norton P. - Crescent Isl.	Norton	nesting	island	Successful		1 Ch	1 Ch						New nest. Nest site unknown but loons observed near Crescent Island. 4th pair presence not confirmed until August.	1	1	1	1.00
Norton P. - Island	Norton	nesting	raft	Successful	signs	1 Ch	1 Ch							40	33	42	0.95
Norton P. - North	Norton	nesting	raft	Successful	signs	2 Ch	1 Ch	Unknown						13	6	10	0.71
Norton P. - South	Norton	nesting	raft	Successful		2 Ch	1 Ch	Unknown						21	19	22	0.92
Noyes P.	Groton	potential territory												1	0	0	0.00
Old Marsh P.	Fair Haven	nesting	island	Successful		1 Ch	1 Ch						Chick alone at end of August. Gone a week later but a chick of similar age with an adult observed on nearby Inman P., thus chick likely flew to Inman but remote chance it crawled overland.	4	4	3	0.75
Osmore P.	Peacham	nesting	shoreline	Abandoned - egg(s)									Nest site shifted to north shore	13	8	10	0.45
Parker L.	Glover	nesting	marsh	Successful	signs	1 Ch	0 Ch	Predation - snapping turtle					1st successful nest but chick likely taken by snapping turtle based on residents observation.	2	1	0	0.00
Peacham P. - North	Peacham	nesting	island	Flooded	signs								Water down several feet because of dam repairs. Pair nested near water level and nest flooded.	43	34	38	0.86
Peacham P. - east	Peacham	territory	marsh	last nested 2019									Not surveyed regularly	7	2	3	0.20
Peacham P. - SW	Peacham	potential territory	marsh	last nested 2015									9/19/21: Loon with red / white bands observed (white could be silver)	27	19	23	0.62
Pensioner P.	Charleston	nesting	raft	Successful	signs	2 Ch	1 Ch	Unknown - disappeared early						14	12	14	0.82
Pigeon P.	Groton	nesting	raft	Successful		1 Ch	1 Ch		Mortality	Unknown	7/27/2021	Adult	Unknown cause of mortality; partially decomposed and scavenged. Healed-over puncture on sternum from loon fight.	7	5	7	0.39
Raponda L.	Wilmington	nesting	shoreline	Other - Male died from lead fishing gear; female over-incubated	signs				Mortality	Fishing gear - lead	6/8/2021	Adult	During incubation, male started beaching for a week before dying of likely lead poisoning from sinker. Sinker 0.109oz (suspected) lead.	5	2	2	0.29
Rescue L.	Ludlow	potential territory											Courtship/nest searching behavior observed late May and July. Pair not consistently present; two loons also being observed on nearby Amherst L, thus likely new pair flying back and forth.				
Ricker P.	Groton	nesting	raft	Successful	signs	2 Ch	1 Ch	Unknown						19	16	13	0.62
Seymour L. - Winape	Morgan	territory	raft	last nested 2020	signs								Pair tended to stay further north on lake.	21	15	20	0.69
Shadow L. - (Concord)	Concord	territory	marsh	last nested 2019										12	6	8	0.53

Table 1 continued.										Rescues / Mortality / Monitor Situations							
Lake	Town	2021 status	Nest Type (current/past)	Nest Outcome	Nest Warning Sign Buoys	Chicks hatched out	Chicks through August	Chick Mortality Cause	Situation: Resc./Mort./Monitor	Mortality and Rescue Cause	Date	Age	Comments	# years nested	# years nest success	total # surviving chicks	mean annual # surviving chicks per territory yrs.
Shadow L. (Glover)	Glover	potential territory							Monitor	Unknown	8/16/2021	Adult	8/10 Lots of distress calling at night and loon feathers found in the a.m. along shore. Unknown event.				
Silver L. (Leicester)	Leicester	nesting	raft	Successful		2 Ch	2 Ch							7	7	11	1.38
Somerset Res. - (NE) Streeter Isl.	Somerset	nesting	island	Abandoned - no eggs	signs									2	1	1	0.50
Somerset Res. - Dandeneau Cove	Somerset	nesting	island	Over-incubation	signs									39	27	34	0.79
Somerset Res. - Narrows	Somerset	territory	island	last nested 2020										8	4	3	0.23
Somerset Res. - North Isl.	Somerset	nesting	island	Successful	signs	2 Ch	1 Ch	Unknown - disappeared early	Mortality	Predation	9/1/2021	Adult	Predation by Bald Eagle observed in territory but not necessarily part of pair raising the chick.	14	10	13	0.65
South P. (Eden)	Eden	nesting	island	Successful	signs	2 Ch	1 Ch	Unknown - disappeared early						23	18	25	0.93
South P. (Marlboro)	Marlboro	nesting	marsh	Successful	signs	1 Ch	1 Ch		Monitor	Fishing gear	8/1/2021	Subadult; Adult	8/1 Ad swallowed fish with line (photo taken); 8/20 2A1C seem o.k; entire family healthy remainder of summer.	7	7	11	1.22
Spectacle P.	Brighton	territory	raft	last nested 2020	signs									26	24	27	0.77
Spring L.	Shrewsbury	nesting	raft	Successful	signs	2 Ch	2 Ch							19	14	20	1.00
Stiles Res.	Waterford	territory	marsh	last nested 2018										15	9	13	0.59
Sunset L. (Benson)	Benson	nesting	shoreline	Depredation - mammalian; Re-nest abandoned - egg(s) in water	signs									1			
Sunset L. (Marlboro)	Marlboro	nesting	island	Abandoned - no eggs	signs				Mortality	Fishing gear	7/21/2021	Adult	7/16 Found alive on downstream side of dam; returned to lake and swam off. Repeated 7/18. 7/20 2 Adults swimming. 7/21 found dead with 2nd adult nearby. Likely part of pair. Sinker found, mild aspergillosis. Loon was banded on Massabesic Lake, NH (near Manchester) in 2006 as a chick Left leg: 0938-44861. Sinker 0.034 oz (suspected) lead based on density but still needs official testing.	10	7	6	0.55
Thurman Dix Res.	Orange	nesting	island	Abandoned - egg(s)					Mortality	Unknown	8/5/2021	Adult	Unknown cause of mortality: pericardial edema, pale liver, dark spleen. Gross pathology apparently does resemble malaria cases somewhat: need histopathology follow up. Extra loons frequent.	41	33	38	0.90
Ticklenaked	Ryegate	territory	marsh	last nested 2020					Monitor	Trauma - unknown	8/2/2021	Adult	8/2 Loon with possible eye injury reported. 8/20 seems o.k.	6	4	2	0.29
Turtle P.	Holland	nesting	shoreline	Successful		1 Ch	1 Ch							3	1	1	0.33
Wallingford P.	Wallingford	nesting	marsh	Successful		2 Ch	2 Ch							21	16	27	1.23
Wantastiquet P.	Weston	nesting	island	Successful		2 Ch	1 Ch	Unknown - disappeared early						13	10	14	1.08
Warden P.	Barnet	potential territory	shoreline	last nested 2019										1	0		0.00
Waterbury Res.	Waterbury	territory	island	last nested 2019										4	1	1	0.11
West Mountain P.	Maidstone	nesting	island	Abandoned										18	11	7	0.29

Table 1 continued.										Rescues / Mortality / Monitor Situations							
Lake	Town	2021 status	Nest Type (current/past)	Nest Outcome	Nest Warning Sign Buoy	Chicks hatched out	Chicks through August	Chick Mortality Cause	Situation: Resc./ Mort./ Monitor	Mortality and Rescue Cause	Date	Age	Comments	# years nested	# years nest success	total # surviving chicks	mean annual # surviving chicks per territory yrs.
Woodbury L. (Sabin)	Woodbury	nesting	raft	Successful	signs	2 Ch	2 Ch		Mortality	Trauma - attack by other loon	7/12/21	Adult	7/12 mortality. Beaching 7/10 lethargic, weak swimming. 7/12 2Ad 2C, plus 3rd adult being pursued by one of pair. Necropsy: likely trauma from other loon. Many 3rd and 4th loon interactions with pair this summer. Mortality possible trauma-attack by other loon. Bruising on the inside of keel and maybe left body wall, superficial lesion on the ventriculus ; small abscess/necrotic area (?) around the intestines. No trauma externally. Small tan lesions throughout the liver (?liver flukes which can cause pathology). Emaciated. Female.	15	15	19	1.00
Woodward Res.	Plymouth	nesting	shoreline	Successful - 2 chicks and 3rd egg in nest	signs	2 Ch	1 Ch	Unknown						15	11	14	0.82
Zack Woods P.	Hyde Park	nesting	island	Abandoned - no eggs	signs									25	22	35	1.30
Amherst L.	Plymouth	loon active											A potential pair was observed on Lake Rescue courting/nest searching but the pair was not observed there consistently. The two loons might also have been visiting Amherst regularly.				
Berlin P. -South	Berlin	loon active															
Cabot farm pond	Cabot								Rescue	Small pond	5/21/2021	Adult	5/21 loon on small pond 1/2 mile north of Cabot village; 5/24 night rescue attempt failed; 5/30 loon flew from pond.				
Carmi L.	Franklin	loon active															
Champlain L.	Burlington	loon active							Rescue	Trauma - crash landing	6/25/2021	Adult	6/25 loon found in Lakeview cemetery 100 m from Lake Champlain near North Beach. Likely road-crash, possibly night before in rain event. Appeared lively and healthy, released.	2	0	0	0.00
Chittenden Res. - West	Chittenden	loon active											In May, two loons reported in the western side. Mainly single loons reported June-August in this region.				
Clark P./ Bruce multi-lake	Glover	loon active												1	0		0.00
Coits P.	Cabot	loon active	marsh	no pair; last nested 2014										3	3	2	0.50
Crystal L.	Barton	loon active															
Dunmore L.- North	Leicester/ Sal	loon active															
Gale Meadows Res.	Winhall	loon active												2	0	0	0.00
Grout P.	Stratton	loon active															
Guilford (town)	Guilford								Rescue	Trauma - crash landing	2/8/2021	Subadult	Found along driveway near Brattleboro. Brought to vets, o.k., released L. Champlain. 2/9/2021 How to i.d. location (South P. nearby)				
Harriman Res.	Wilmington	loon active															
Inman P.	Fair Haven	loon active															
Little Salem P.	Derby	loon active															
Marshfield P.	Marshfield	loon active															
Memphremagog L. - John's River	Derby	loon active							Monitor	Fishing gear - monofilament	7/7/2021	Adult	7/7 Fishing gear - monofilament and sinker on bill of loon (photo evidence) off Newport boardwalk. 7/10 Searched entire south end up to Horseneck - lighthouse for 3 hours. 6Ad observed, all clean.	4	2	1	0.08

Table 1 continued.										Rescues / Mortality / Monitor Situations							
Lake	Town	2021 status	Nest Type (current/past)	Nest Outcome	Nest Warning Sign Buys	Chicks hatched out	Chicks through August	Chick Mortality Cause	Situation: Resc./Mort./Monitor	Mortality and Rescue Cause	Date	Age	Comments	# years nested	# years nest success	total # surviving chicks	mean annual # surviving chicks per territory yrs.
Moore Res.	Waterford	loon active											Two loons observed in SW end several times.				
Moore Res. - Roa	Concord	loon active												4	3	0	0.00
Mud P. (Hyde Park)	Hyde Park	loon active															
Nulhegan	Brighton	loon active															
Rood P.	Williamstown	loon active															
Salem L.	Derby	loon active															
Seymour L. - Wes	Morgan	loon active												1	1	2	0.40
Silver L. (Barnard)	Barnard	loon active															
Silver L. (Georgia)	Georgia	loon active															
South Bay	Newport	loon active															
St. Catherine L.	Poultney	loon active							Rescue	Fishing gear - fishhook	10/13/2021	Adult	10/10/21 loon reported dragging milfoil behind it. 10/12/21 Lure observed; game wardens attempt day time capture but loon swimming too well. 10/13/21 Loon captured after it beaches. Lure with 5 barbs piercing foot webbing removed at VINS. 10/15 Loon brought to Avian Haven; surgery done to remove necrotic tissue and broken toe bones. Rehabilitation went well. Released 11/7.				
Stratton P.	Stratton	loon active															
Sugar Hill Res.	Goshen	loon active	raft	last nested 2019									Water drained from reservoir for dam repairs 2020-21.	4	4	5	0.83
Wallace P.	Canaan	loon active												0			
Wapanacki P.	Wolcott	loon active															
West Hill P.	Cabot	loon active															
Wiinooski River	Montpelier								Monitor	Small pond	8/10/2021	Adult	Adult observed on Winooski River in Montpelier (near Wrightsville Res.); observed for several days then gone. Likely flew.				
Willoughby L.	Westmore	loon active															
Wolcott P.	Wolcott	loon active	marsh	last nested 2020									Pair not present for 1st time since pair formed in 1980s. Single loon present in May/June; 2nd loon observed occasionally but not consistent.	28	24	25	0.76

Figure 1a. Common Loon Nesting and Territorial Pairs in Vermont 2021 – Northern Area



**Location of Loon Pairs - 2021**

- nesting
- ▲ potential territory
- territory

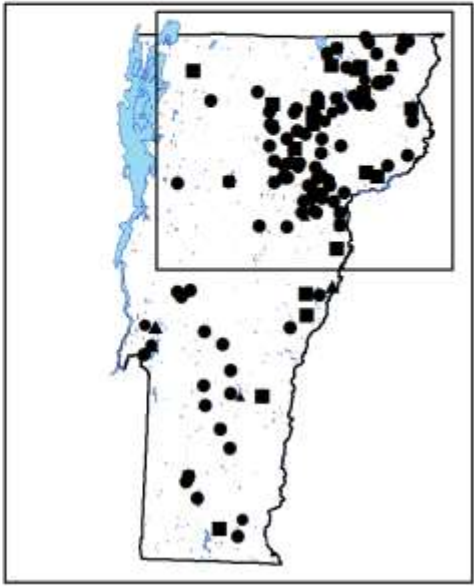
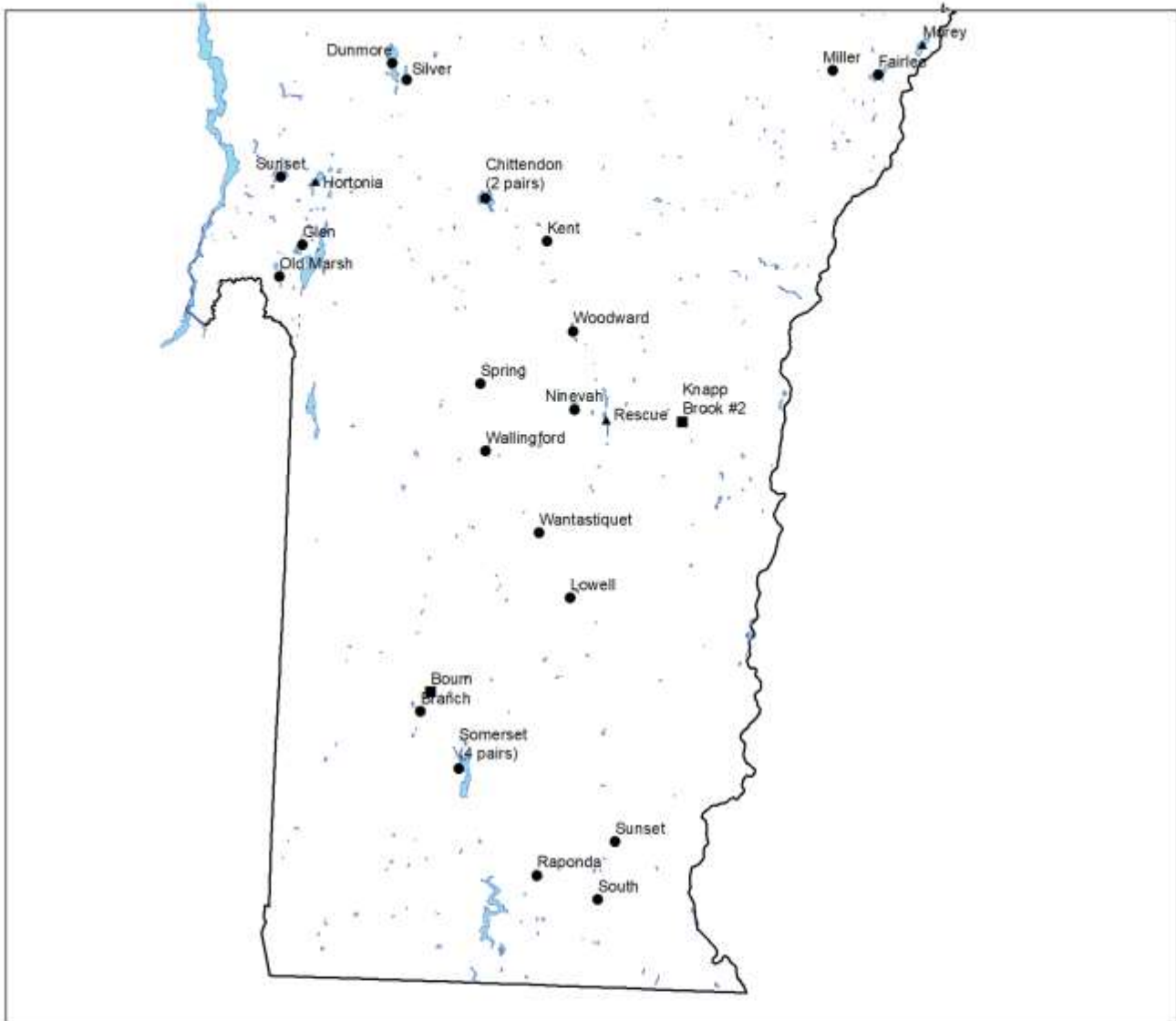
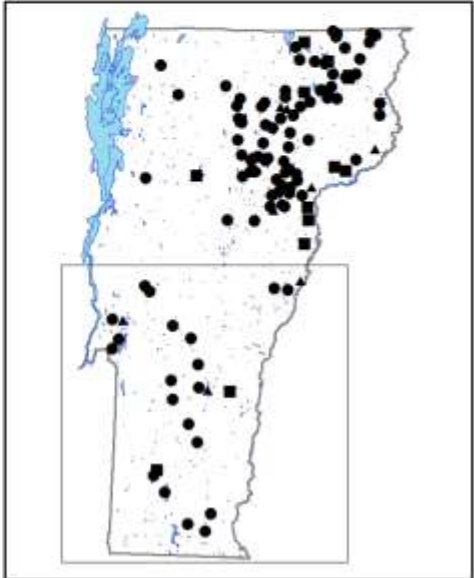


Figure 1b. Common Loon Nesting and Territorial Pairs in Vermont 2021 – Southern Area



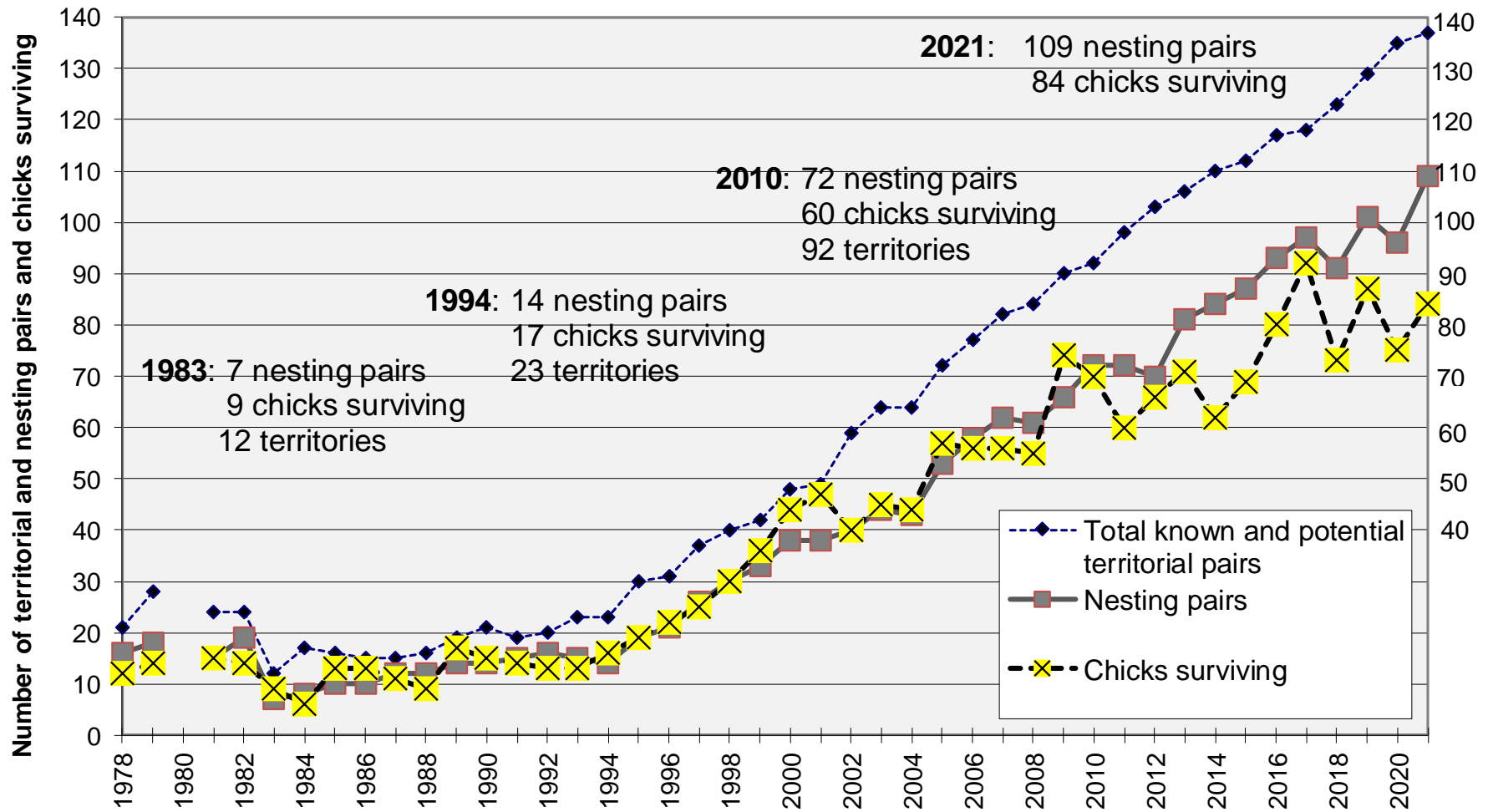
**Location of Loon Pairs - 2021**

- nesting
- ▲ potential territory
- territory





**Figure 2. Summary of Common Loon breeding activity in Vermont, 1978-2021**



**Table 2. Summary of population changes and reproductive success of Common Loons in Vermont, 1979-2021**

Year	'79	'80	'81	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91	'92	'93	'94	'95	'96	'97	'98	'99	'00
<b>TOTAL territorial pairs</b>	<u>28</u>	<u>0</u>	<u>24</u>	<u>24</u>	<u>12</u>	<u>17</u>	<u>16</u>	<u>15</u>	<u>15</u>	<u>16</u>	<u>19</u>	<u>21</u>	<u>19</u>	<u>20</u>	<u>23</u>	<u>23</u>	<u>30</u>	<u>31</u>	<u>37</u>	<u>40</u>	<u>42</u>	<u>48</u>
Known terr. prs.	21	--	18	19	9	12	11	11	12	13	16	17	16	18	17	21	22	24	29	34	39	44
Potential terr. prs.	7	--	6	5	3	5	5	4	3	3	3	4	3	2	6	2	8	7	8	6	3	4
<b>Nesting pairs</b>	<b>18</b>	<b>--</b>	<b>15</b>	<b>19</b>	<b>7</b>	<b>8</b>	<b>10</b>	<b>10</b>	<b>12</b>	<b>12</b>	<b>14</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>15</b>	<b>14</b>	<b>19</b>	<b>21</b>	<b>26</b>	<b>30</b>	<b>33</b>	<b>38</b>
<b>Successful pairs</b>	12	--	11	12	5	6	8	9	9	7	10	9	10	10	11	13	15	14	21	23	25	36
<b>Nest Success</b>	67%		73%	63%	71%	75%	80%	90%	75%	58%	71%	64%	67%	63%	73%	93%	79%	67%	81%	77%	76%	95%
<b>Chicks hatched</b>	--	--	--	--	10	7	--	16	12	11	19	18	16	15	18	20	21	25	32	37	41	56
<b>Chicks surviving through August</b>	14	--	15	14	9	6	13	13	11	9	17	15	14	13	13	17	19	22	25	30	36	44
<b>Chicks surviving per nesting pair</b>	0.78	--	1.00	0.74	1.29	0.75	1.30	1.30	0.92	0.75	1.21	1.07	0.93	0.81	0.87	1.21	1.00	1.05	0.96	1.00	1.09	1.16
<b>Chicks surviving per total territorial pair</b>	0.50	--	0.63	0.58	0.75	0.35	0.81	0.87	0.73	0.56	0.89	0.71	0.74	0.65	0.57	0.74	0.63	0.71	0.68	0.75	0.86	0.92
<b>% chick survival</b>	--	--	--	--	90%	86%	--	81%	92%	82%	89%	83%	88%	87%	72%	85%	90%	88%	78%	81%	88%	79%
<b>Lakes with nesting pairs</b>	17	--	14	19	7	8	10	10	11	11	13	13	14	15	14	14	18	21	25	29	32	36

**Loonwatch results**<sup>a,b</sup> (statewide annual survey)

<b>Number of adults</b>	--	--	--	--	29	30	37	50	45	41	47	79	74	86	71	83	97	79	99	106	127	126
<b>Number of chicks</b>	--	--	--	--	9	16	13	17	9	9	16	15	15	15	14	11	17	21	21	26	36	45
<b>Number of subadults</b>	8	--	11	6	7	1	0	5	15	9	9	33	18	23	11	14	10	9	2	6	6	10
<b>Number of lakes surveyed</b>																					150	107
<b>Number of lakes occupied</b>																						

<sup>a</sup> The number of lakes surveyed for Loonwatch increased in 1999. It is possible survey adult loon counts during the mid-1990s were slightly low.

<sup>b</sup> Over 10 known lakes with loon activity were missed in 2010.

(continued on next page)

Table 2 continued - Summary of population changes and reproductive success of Common Loons in Vermont

Year	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20	'21
<b>TOTAL territorial pairs</b>	<u>49</u>	<u>59</u>	<u>64</u>	<u>64</u>	<u>72</u>	<u>77</u>	<u>82</u>	<u>86</u>	<u>90</u>	<u>92</u>	<u>98</u>	<u>103</u>	<u>106</u>	<u>110</u>	<u>112</u>	<u>117</u>	<u>118</u>	<u>123</u>	<u>129</u>	<u>135</u>	<u>137</u>
Known terr. prs.	44	49	53	57	60	65	71	75	80	85	88	92	93	100	102	111	113	117	123	123	128
Potential terr. prs.	5	10	11	7	12	12	11	11	10	7	10	11	13	10	10	6	5	6	6	12	9
<b>Nesting pairs</b>	<b>38</b>	<b>40</b>	<b>44</b>	<b>43</b>	<b>53</b>	<b>58</b>	<b>62</b>	<b>61</b>	<b>66</b>	<b>72</b>	<b>72</b>	<b>70</b>	<b>81</b>	<b>84</b>	<b>87</b>	<b>93</b>	<b>97</b>	<b>91</b>	<b>101</b>	<b>96</b>	<b>109</b>
<b>Successful pairs</b>	34	34	38	34	47	44	47	49	53	57	52	50	62	57	65	65	74	66	75	65	77
<b>Nest Success</b>	89%	85%	86%	79%	89%	76%	76%	80%	80%	79%	72%	71%	77%	68%	75%	70%	76%	73%	74%	68%	71%
<b>Chicks hatched</b>	56	52	62	54	68	66	71	75	83	85	76	87	97	93	103	102	117	97	115	102	125
<b>Chicks surviving through August</b>	47	40	45	44	57	56	56	55	74	70	60	66	71	62	69	80	92	73	87	74	84
<b>Chicks surviving per nesting pair</b>	1.24	1.00	1.02	1.02	1.08	0.97	0.90	0.90	1.12	0.97	0.83	0.94	0.88	0.74	0.79	0.86	0.95	0.80	0.86	0.77	0.77
<b>Chicks surviving per total territorial pair</b>	0.96	0.68	0.70	0.69	0.79	0.73	0.68	0.64	0.82	0.76	0.61	0.64	0.67	0.56	0.62	0.68	0.78	0.59	0.67	0.55	0.61
<b>% chick survival</b>	84%	77%	73%	81%	84%	85%	79%	73%	89%	82%	79%	76%	73%	67%	67%	78%	79%	75%	76%	73%	67%
<b>Lakes with nesting pairs</b>	36	38	41	39	49	52	57	54	61	63	63	63	72	72	76	83	84	78	86	81	94

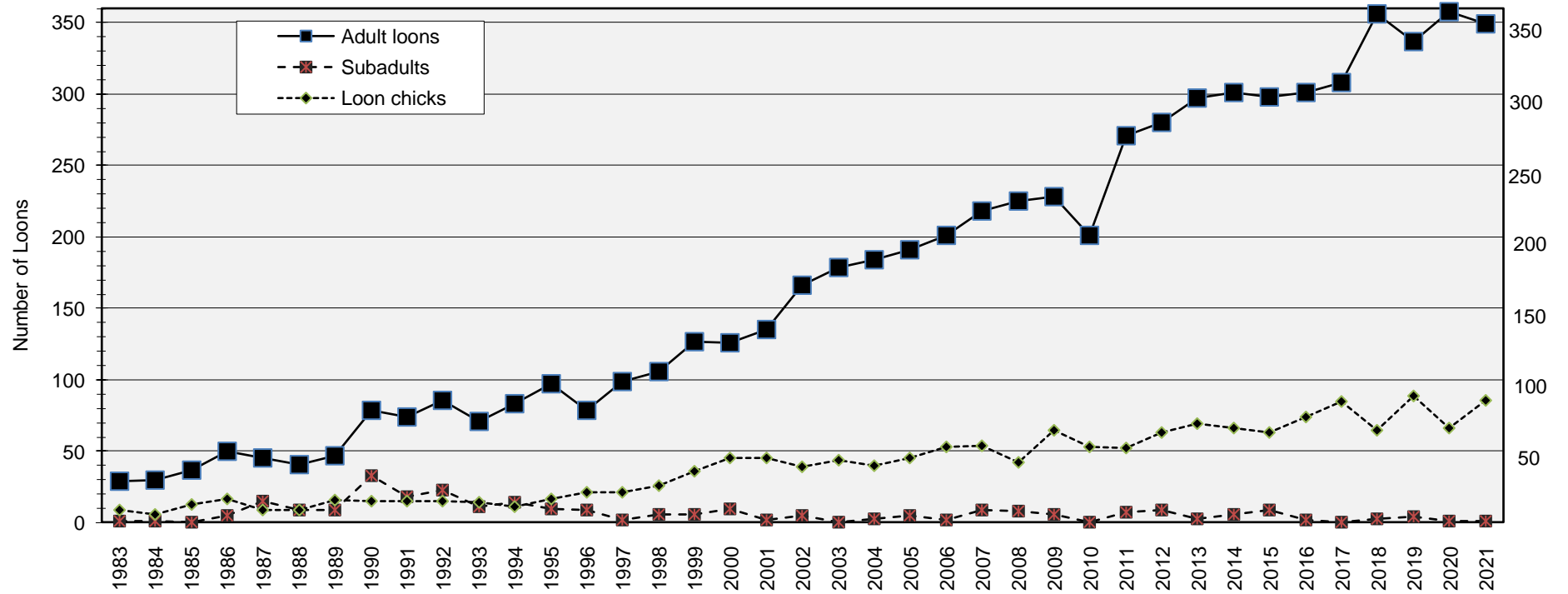
**Loonwatch results**<sup>a,b</sup> (statewide annual survey)

<b>Number of adults</b>	135	166	179	184	191	201	218	223	228	201 <sup>b</sup>	271	280	297	301	298	301	308	356	339	358	349
<b>Number of chicks</b>	45	39	44	40	45	53	54	42	65	53	52	63	69	66	63	74	85	65	89	66	86
<b>Number of subadults</b>	2	5	0	3	5	2	9	8	6	0	7	9	3	6	9	2	0	3	4	1	1
<b>Number of lakes surveyed</b>	131	133	123	98	122	133	148	148	129	129	162	150	162	161	162	153	161	174	175	171	167
<b>Number of lakes occupied</b>				68	69	84	86	84	89	76	102	98	106	103	116	112	111	132	121	125	124

<sup>a</sup> The number of lakes surveyed for Loonwatch increased in 1999. It is possible survey adult loon counts during the mid-1990s were slightly low.

<sup>b</sup> Over 10 known lakes with loon activity were missed in 2010.

**Figure 3. Vermont Loonwatch Results, 1983-2021**  
 (an annual statewide loon census on the third Saturday of July)



**Table 3. Common Loon Band Recoveries and Re-observations in Vermont**

**Winter Migration Movments**

Band_Num	Band Year	Site Banded	Age	Year re-observed	Location re-observed	Distance moved	Years between obs.	How observed	Rec_Comments	Left leg bands	Right leg bands
0938-06483	2000	Molly's Falls Res., Cabot, VT	Adult	2015	East Hampton, NY (Long Island)	300	15	Found dead	Migratory - entered as wintering bird. Unknown cause of death.	red / red	white stripe / silver
0898-09124	1998	Jobs P., Westmore, VT	Adult	2000	Chatham, MA (Cape Cod)	280	2	Found dead	Migratory - entered as wintering bird. Unknown cause of death.	red	yellow/silver
0938-06485	2000	Island P., Brighton, VT	Adult	2002	Martha's Vineyard, MA	300	2	Found dead	Migratory - entered as wintering bird. Unknown cause of death.	orange / orange	silver / blue dot
<b>Summer Dispersal</b>											
Band_Num	Band Year	Site Banded	Age	Year re-observed	Location re-observed	Distance moved	Years between obs.	How observed	Rec_Comments	Left leg bands	Right leg bands
not recorded or misplaced	1994	Aziscohos Res., Lincoln, ME	Chick	2009	Stiles Res., Waterford, VT	85	15	Found dead	Unknown cause of death. Likely part of territorial pair on Stiles Res. This is a long dispersal for a chick from it's natal lake.		
898-098-22	1999	Bald Hill P., Westmore, VT	Adult	2005	West Burke, VT	10	6	Rescued from small pond	Landed on farm pond where could not take off for about 4-5 days. Rescued. Replaced "faded" band with blue. Bird was originally banded on Bald Hill P. but we did not know at the time of rescue. Released onto L. Willoughby. 2 adults on Bald Hill 2 days later (one incubating). In mid-July, banded female confirmed with chick on Bald Hill P. 2007 - Found dead L. Willoughby 7/07 (cause unknown).	white/ white	silver/ yellow dot
0938-44468	2013	Bald Hill P., Westmore, VT	Adult	2015	Jobs P., Westmore, VT	2	2	Part of territorial pair	7/1/2013 Rescued from ingestion and entanglement of fishing line. Observed on Ball Hill P. 8/15/2013 looking healthy; unknown if part of Bald Hill Pond territorial pair. 6/4/2015 Part of pair on Jobs Pond. 6/19/2017 re-sight L. Willoughby (unknown if still occupying Jobs P).	orange/ orange	silver/ green
not recorded or misplaced	2006	Eden L., Eden, VT	Adult	2021	Green River Res.	8	15	Part of territorial pair	Resight on GRR summer 2007, 2012, 2015 with chick NW territory, 2016, 2019 moved to Merganser Inlet - part of pair, 2021 mid-reservoir - likely still part of MI pair. Yellow stripe now looking whitish (white w/ black stripe).	orange/ yellow	yellow stripe/ silver

Table 3 (continued). Common Loon Band Recoveries and Re-observations

Summer Dispersal

Band_Num	Band Year	Site Banded	Age	Year re-observed	Location re-observed	Distance moved	Years between obs.	How observed	Rec_Comments	Left leg bands	Right leg bands
0938-44415	2013	Fairlee L., Fairlee, VT	Adult	2015	Post Pond, Lyme NH	12	8	Part of territorial pair	Loon was trapped by shifting ice sheets and crawled on ice, displaying both hind legs. NH loon org LPC confirmed colors. VCE: 2021 loon observed on Post Pond (Tig Tillinghast), thus likely still part of breeding pair.	green/ orange	silver/white
0938-44414	2013	Greenwood L., Woodbury, VT	Adult	2013	Curtis P., Calais, VT	7	same year	Observed on Curtis P.	8/6/2013 Found on road 800 m down marshy stream from lake. Possible reasons: getting away from territorial pair or crashed on nearby pond too small to fly from. Appeared healthy; released on non-territorial Valley L (Dog P). 9/1/2013 resight on Curtis P. in Calais, VT.	red/ blue	yellow/ silver
938-064-84	2000	Island P., Brighton, VT	Adult	2001	Island P., Brighton, VT	0	1	Found dead	Recaptured earlier in the summer in 2001; Found dead in Nov. Necropsy indicated loon died from lead poisoning from sinker.	red / yellow	silver / white stripe
938-064-57	2000	Maidstone L. - S., Maidstone, VT	Adult	2005	Maidstone L. - North, Maidstone, VT	2	5	Part of territorial pair	Moved to north part of Maidstone L. Founded new territorial pair.	red	silver / blue dot
938-064-58	2000	Martin's P., Peacham, VT	Adult	2005	Fosters P., Peacham, VT	1	5	Part of territorial pair	Moved to Fosters P (Peacham) 2005. Founded new territorial pair. First nest attempt in 2006.	orange / blue	silver / white stripe
0938-44861	2006	Massabesic L., Auburn, NH	Adult	2021	Sunset L., Marlboro, VT	80	15	Part of territorial pair; died	7/16 Found alive on downstream side of dam on Sunset L.; returned to lake and swam off. Repeated 7/18. 7/20 2 Adults swimming. 7/21 found dead with 2nd adult nearby. Likely part of pair. Sinker found, mild aspergillosis. Loon was banded on Massabesic Lake, NH (near Manchester) in 2006 as a chick Left leg: 0938-44861. Sinker 0.034 oz (suspected) lead based on density but still needs official testing.		
898-099-91	2001	Miles P., Concord, VT	Adult	2007	Shadlow L., Concord, VT	4	6	Part of territorial pair	Moved to Shadow L (Concord) 2007. Founded new territorial pair; failed nest.	white	silver
938-064-56	2000	Molly's Falls Res., Cabot, VT	Chick	2006	East Long P., Woodbury, VT	8	6	Found dead	Found dead East Long P 2006 (fishing line ingestion); unknown if part of breeding pair.	yellow / red	silver / blue dot
938-064-68	2000	Moore Res. - Walker's Pit, Concord, VT	Adult	2016	Moore Res., Waterford, VT	4	16	Non-breeder	Observed further west on the reservoir. NH LPC seasonal reported the sighting but had left leg color reversed IF this is the bird. No other matches in BRI database.	red / white	green dot / silver

Table 3 (continued). Common Loon Band Recoveries and Re-observations

Summer Dispersal

Band_Num	Band Year	Site Banded	Age	Year re-observed	Location re-observed	Distance moved	Years between obs.	How observed	Rec_Comments	Left leg bands	Right leg bands
898-09100	1998	Newark P., Newark, VT	Adult	2020	Newark P., Newark, VT	0	22	Part of territorial pair	Part of original territory. Possibly gone from territory for a few years but observations of banded bird minimal.	green/ orange	yellow/ silver
898-098-21	1999	Somerset Res.- Dandeneau Cove, Somerset, VT	Adult	2005	Somerset Res. - North Islands	2	6	Part of territorial pair	Likely left Dandeneau Cove territory and founded new territory 2 miles north	orange/ yellow	silver/green
0649-08823	2005	Wallace P., Canaan, VT	Adult	2009	Forest L., Averill, VT	6	4	Found dead	Possible territorial fight.	red/ yellow	yellow stripe/ silver
0938-15297	2001	Zack Woods P., Hyde Park, VT	Adult	2015	Hyde Park, VT	7	14	Foun dead. Illegally shot	They found the bird with a bullet hole in its neck, bird had likely died several days before.	white / white	silver / green stripe
938-152-19	2001	Zack Woods P., Hyde Park, VT	Chick	2014?	Wolcott P.	5	13	Part of territorial pair	Banded as a chick. Re-observed as part of territorial pair on Wolcott Pond. Need to confirm first year of sighting but present about 2014-2020. Not observed in 2021 and pair on Wolcott P. not present.	silver	yellow "A5"

## RECOMMENDATIONS

The total adult loon population and numbers of nesting pairs have steadily increased since the mid-1990s. These results suggest that conservation efforts have aided the loon recovery in Vermont, in spite of persistent threats identified above. Increasing numbers of territorial pairs and ponds with more consistent loon activity indicate a potential for further growth in the breeding population. The invaluable assistance of volunteer observers, cottage owners, VFWD biologists and game wardens, and Vermont State Park and Green Mountain National Forest staff have greatly enhanced the effectiveness of statewide loon conservation efforts. Monitoring and management efforts, participation of volunteers, education of lake-users, and water level management should continue to be the primary tools for ensuring success of Vermont's breeding loons.

Implementation of the comprehensive Vermont Loon Recovery Plan (Borden and Rimmer 1998) has been ongoing and has helped the VLCP realize its population recovery goals. The majority of the short-term, high priority goals have been implemented since the mid-1990s. The post-delisting monitoring and management plan addresses continued threats to loons in Vermont and the species' dependence on the VLCP's management and educational efforts. It should be emphasized that over 50% of the breeding loons in Vermont have directly benefited from VLCP management programs, and that many of these pairs would be less successful without such assistance. The Vermont Loon Recovery Plan will continue to guide loon conservation efforts in the future.

With most short-term goals of the Recovery Plan having been achieved, the VLCP must now address the Plan's long-term, medium priority actions while monitoring potential changes due to delisting and the lead sinker ban. Many of the actions and recommendations below have been in place for several years, but resources have limited their implementation. These include:

1. Development of a comprehensive database would allow us to better assess and summarize Vermont's loon population trends, share and compare data with New Hampshire, Maine, Massachusetts, and New York, develop a detailed population viability assessment for Vermont, and more efficiently coordinate volunteers.
2. We would like to provide more detailed training packets for adopt-a-lake volunteers.
3. Other future initiatives to consider should focus on improving the awareness of lake users on busy lakes. Actions could include (a) developing an information and set of management protocols for loon breeding lakes, especially those requiring intensive management and education, and (b) developing permanent displays at State Parks and at kiosks on busy lakes. The lake associations at Lake Fairlee and Lake Raconda designated space on their websites for loon conservation, which can serve as models to provide to other associations.
4. Improve outreach about lake water quality and shoreline conservation practices using loons as a focus for action.
5. Capture methods have improved over the past decade. It would be helpful to upgrade equipment for both summer and winter rescues. Loons caught in open water surrounded by ice continue to occur, and the public expects to attempt rescues. If the situation is safe, we will potentially attempt to conduct ice rescues. We need to invest in ice-rescue equipment to make these situations even more safe.
6. Further work should assess other means to protect nesting sites, including conservation easements. The Trust for Public Land has indicated an interest in prioritizing critical shorelines for protecting nesting areas.
7. Future research needs should be assessed and prioritized including the effects of climate change.



The VLCP will continue its involvement with the Northeast Loon Study Working Group (NELSWG), a coalition of state and federal agency representatives, universities, non-profit organizations, and other interested parties addressing the conservation problems of loons in eastern North America. This is a valuable partnership and forum for information exchange.

### **Acknowledgments**

**Major contributors:** We thank the VFWD and Great River Hydro (GRH) for ongoing, core financial support. VFWD provides funding through the federal State Wildlife Grant program and the Nongame Wildlife Fund. GRH's funding primarily supports monitoring and management at Somerset Reservoir. Individual donors provide critical support to maintain VLCP programs. In 2021, we received a grant administered by the U.S. Fish and Wildlife Service for mitigation of loons killed in the Bouchard 120 Oil Spill off the coast of Massachusetts and Rhode Island. This funding will be used over a five-year period to enhance loon management, outreach, and rescue programs.

**Professional assistance:** Eloise Girard provided support as a VCE seasonal biologist. VFWD biologist Doug Morin provided general support for the VLCP. We greatly appreciate ongoing support from VFWD game wardens who assisted with the project. We thank the hydroelectric companies and other groups that regulate water levels for their continuing stabilization efforts. We are especially grateful to Mathew Cole from Great River Hydro, Sylvain Breault from Coaticook River Water Power Company, John Sutter from Green Mountain Power, Hardwick Electric Department, Craig Myotte and John Pilton of Morrisville Water and Light, Mark Hinton of Gravity Renewables, and Reg Abare from the Barre Public Works Department for their efforts to ensure stable water levels during the nesting season. Vermont Parks and Recreation staff at Brighton, Maidstone, Mollys Falls, New Discovery, Ricker, and Stillwater state parks helped with outreach efforts. Craig Newman at Outreach for Earth Stewardship, veterinarians Dan Hament in Richmond, VT and Andrea Gilbert and Denise O'Connor at the Hardwick Veterinary Clinic, and Bren Lundborg at the Vermont Institute of Natural Science (VINS). Avian Haven (Freedom, Maine) assisted loons in distress over the past several years. Thanks also go to Dr. Mark Pokras of Tufts University Wildlife Medicine Program, John Cooley and Harry Vogel of the LPC, and Lucas Savoy and Alex Daulton of BRI. Chris Rimmer, Susan Hindinger, Ryan Rebozo, Steve Faccio, Mistie Boule, Kimberly Kemler, and Laura Prothero of VCE assisted in VLCP fundraising and administration.

**Volunteer assistance:** We extend special thanks to the more than 280 Loonwatch and adopt-a-lake volunteers who care so deeply about Vermont's loons. We received assistance from dozens of lakeshore owners in reporting loon sightings and allowing access to lakes. Numerous volunteers helped distribute loon conservation brochures and promote awareness about loon conservation. Volunteers and staff spent hundreds of hours monitoring and attempting to catch loons in distress over the past several years.

**Vermont Wildlife Action Plan:** The efforts of VFWD staff and many contributing partners resulted in the formal acceptance of the congressionally mandated Vermont Wildlife Action Plan in November 2005. The plan draws attention to the 323 Species of Greatest Conservation Need in Vermont, including the Common Loon. Now that the Common Loon has been removed from the Vermont Endangered and Threatened Species list due to many years of dedicated monitoring and management of this species, the Vermont Wildlife Action Plan provides for continued attention to our natural heritage. For more information, visit [http://www.vtfishandwildlife.com/SWG\\_home.cfm](http://www.vtfishandwildlife.com/SWG_home.cfm).

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