



## THE 2015 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 87 nesting loon pairs and 112 territorial pairs statewide. Of the 87 pairs that attempted nesting, 65 successfully hatched 103 eggs, with 69 chicks surviving through August (chick survival rate 67%, 0.62 chicks surviving per territorial pair). Three new nesting pairs and 3 new potential territorial pair were identified. Fifteen pairs that have nested in recent years did not nest in 2015. Of 27 pairs whose first nest attempts failed, 8 re-nested, and 4 were successful. Causes of nest failure included flooding (11 nests) and depredation (3 nests). The remaining failed nests were abandoned for unknown reasons with predators and disruption from intruder loons being the most likely causes. The causes of mortality of most chicks were unknown. At least 3 chicks disappeared after interactions with intruder loons, 1 was hit by a motorboat, 1 was found dead after the lake froze, and another might have drowned after being iced in. Nine adult and 1 subadult loon mortalities were documented. One bird died after flying into a moving vehicle and two others likely died from trauma during fights with other loons. Five were sent to Tufts University for necropsies. Four adult loons were successfully rescued after ingesting fishing line (Island, Maidstone), being grounded at an airport (Berlin), and landing on a pond too small to allow take-off (Mt. Holly). One 6 week-old chick was rescued after going overland from a small breeding pond to a larger nearby pond and being found on a paved road. We monitored several other loons reported in distress or caught in fishing line. About 200 volunteers surveyed lakes throughout Vermont on 18 July as part of the LoonWatch program, an annual statewide loon count. Loons were observed on 116 of 162 surveyed lakes, where observers counted 298 adults, 63 chicks, and 9 subadult loons. The total number of adult loons was similar to 2013 and 2014. To provide a historical perspective, volunteers counted 179 and 225 adult loons in 2003 and 2008, respectively. Twenty-five of the 87 breeding pairs nested on nesting rafts, 29 on islands, 23 in marshes, and 10 on shorelines. Thirty-seven nesting rafts were placed on known or potential nesting waterbodies. Warning sign buoys were placed around 47 of the 87 nests. About 80 nest warning signs were replaced this year with easier-to-read lettering and updated information. Volunteers provided technical assistance through the placement and maintenance of nest warning signs and/or nesting rafts on 43 lakes as part of the adopt-a-lake program. Interviews with the VLCPP coordinator were aired on WCAX Across the Fence television show. Eleven loon conservation programs were presented to over 440 people statewide. We continued to distribute 2 informational brochures on loon conservation and conservation of lakeshores. Loon conservation brochures were available in self-serve boxes at over 40 boat access areas.

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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 breeding 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 over the subsequent 20 years to 87 in 2015. The VLCP is a program of the Vermont Center for Ecostudies (VCE) and the Vermont Fish and Wildlife Department (VFWD).

A major accomplishment was reached in 2005 with the removal of the Common Loon from the Vermont Endangered and Threatened Species list. Thirty-six years of Common Loon conservation and education 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 2011-2015 was 78 with 15 territorial pairs in the southern half of the state.

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.

## METHODS

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

The VLCP biologist, a VLCP 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 190 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 in April by VFWD staff. 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.

Thirty-seven artificial nesting rafts were placed on 31 lakes. 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. Rafts were placed on some lakes with presumed territorial loon pairs, but where natural habitat is lacking (e.g., no suitable islands and/or marshes, highly developed shorelines). 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. A new raft was placed on Fairfield Pond for 2016 after determining that even minor rain events can cause flooding of nests including the past 2 years. Adopt-a-lake volunteers maintained or helped with 21 rafts. Four rafts were replaced this year.

Warning sign buoys were placed around 47 of the 87 active nest sites to discourage human intrusion close to nests. These signs were also placed around 4 other nest sites where loons ultimately did not nest in 2015. Sign buoys were used in areas where repeated human disturbance was likely to occur. In 2014, we received funding from the Vermont Watershed Grant Program and individual donors and lake associations to replace about 100 loon nest warning signs. For 2015-16, we received a grant from the Canaday Foundation to replace another 160 signs. The new signs contain updated loon information and are easier to read from a distance.

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, caught in ice, other).

### *Education*

Public education continued to be a vital part of loon management efforts. The VLCP biologist contacted landowners of new nesting sites as soon as nesting was suspected or observed. Eleven slide lectures, discussions, and workshops on loon biology, conservation, and research were presented to audiences at lake associations, youth groups, and other organizations (conservation groups, Road Scholar). Approximately 440 people attended these programs. 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. Biologists, staff educators, and the project's volunteer network regularly informed camp owners and other lake users about loon conservation measures.

Two brochures directed at 1) boaters and 2) lakeshore owners were distributed at programs. "The Common Loon – a guide for boaters" containing information about loon conservation and natural history was available at over 40 boat access areas in self-serve boxes and at state parks with loon lakes. A second 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. VCE mailed the *Loon Caller* newsletter to over 800 loon volunteers, donors, and other loon program contacts. The newsletter and brochures were distributed at all programs.

### *Contaminant sampling*

Abandoned eggs were collected and delivered to BioDiversity Research Institute (BRI, 19 Flagg Meadow Road, Gorham, ME 04038-1203) for methylmercury (MeHg) analysis (Evers et al. 1999). Twelve eggs were collected in 2015. Currently BRI is archiving egg samples until funding is allocated for more mercury

analysis. 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 2015*

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 through much of the summer.

### *Distribution of territorial and nesting pairs*

There were 112 known and potential territorial loon pairs, 87 of which were confirmed to nest on 76 lakes (Fig. 1, Table 1). Three new nesting pairs were identified, including Dog P. (abandoned), Long P.-Greensboro (likely depredated), and Ticklenaked P. (flooded 1<sup>st</sup> nest, abandoned re-nest). Three new potential territorial pairs were identified on Mollys P., L. Morey, and Chittenden Res.-NW.

### *Population levels and breeding success*

The number of nesting pairs and territorial pairs increased from 2014. Of the 87 pairs that attempted nesting, 65 successfully hatched 103 eggs, with 69 chicks surviving through August (Fig. 2, Table 2). There were 102 known territorial pairs on water bodies where nesting had occurred within the last 3 years, and 10 potential territorial pairs, each of which was observed consistently for 6 weeks or more. Fifteen pairs that have nested in recent years did not nest in 2015, thus 85 percent of the known territorial pairs nested. This represents a high rate of pairs nesting compared to recent years. Of 27 pairs whose first nest attempts failed, 8 re-nested, and 4 was successful. Known causes of nest failure included flooding (11 nests) and depredation (3 nests). The number of flooded nests was a record high; in early June the north central region of Vermont received over 7 inches of rain in less than 10 days. The remaining failed nests were abandoned for unknown reasons, with depredation and disruption from intruder loons being the most likely causes.

The chick survival rate through August was 67% with 0.62 chicks surviving per territorial pair in 2015. Since 1979, the average chick survival rate is 81% with 0.70 chicks per territorial pair. The causes of mortality of most chicks were unknown. At least 5 chicks likely disappeared after interactions with intruder loons, 1 was killed from a boat hit on Lake Dunmore, and another was found dead after the lake froze on Spectacle Pond. Tufts veterinarians noted that a boat hit likely killed the chick retrieved on Lake Groton, as well as an adult on Shadow L. in Concord. Nine adult and one subadult loon mortalities were documented. One bird died after flying into a moving vehicle and two others likely died from trauma during fights with other loons. Six loons were sent to Tufts University for necropsies.

In 2014 and 2015, we observed higher nest failure and chick mortality rates compared to recent years potentially indicating that some of the breeding range may be reaching a certain level of carrying capacity. Availability of quality habitat may be becoming limited, as well as competition for available habitat may be increasing. A higher number of flooded nests contributed to the high nest failure rate in 2015. Loon pairs nesting in marginal habitat tend to nest less often and are less successful (e.g., small ponds, shoreline nests).

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

Of the 87 known nests, 25 were on artificial nesting rafts (92% successful), 29 on islands (72% successful), 23 in marshes (74% successful), and 10 were on shorelines (40% successful). Nests with warning sign buoys had a 78% success rate compared to 71% for nests without signs.

### *Vermont LoonWatch Day*

Vermont LoonWatch day was conducted on 18 July when over 200 volunteers counted 298 adult loons, 63 chicks, and 9 subadults (Table 2, Fig. 3). Loons were observed on 116 of the 162 lakes surveyed, which is the highest number of occupied lakes recorded. The total number of adult loons was similar to 2013 and 2014. Fifty one of 298 adult loons counted were located in southern and central Vermont, an increase from 39 in both 2013 and 2014. High counts of adult loons in 2015 were obtained on Caspian Lake (14 adults), Peacham Pond (11 adults), Somerset Reservoir (10 adults), and Lake Memphremagog (9 adults and 2 subadults). Many observations were conducted outside the designated survey period due to statewide thunderstorm activity during the morning hours.

### *Loon Rescues*

Four adult loons were successfully rescued after ingesting fishing line (Island, Maidstone), being grounded at an airport (Berlin), and landing on a pond too small to allow take-off (Mt. Holly). One 6 week-old chick was rescued after going overland from a small breeding pond (Beecher) to a larger nearby pond (Spectacle) and being found on a paved road. We were unable to find the parent loons and determine if they were trying to draw the chick to a nearby larger pond. Spectacle Pond already had a breeding pair with a chick present. We released the chick on Island Pond at a point nearest to Beecher Pond, where a single adult was present. This adult commenced to attack the chick so we captured the chick again and brought it to wildlife rehabilitation centers in Maine where it was taken care of until release in early October (Kappy Sprenger, Avian Haven). We monitored several other loons reported in distress, caught in fishing line, and iced-in swimming in small areas of open water. The VLCP biologist spent over 80 hours in 2015 conducting capture attempts and coordinating monitoring efforts with volunteers and game wardens. The biologist has spent 52-83 hours annually dealing with loons in distress in recent years. Volunteers were instrumental in the monitoring and capture attempts of all these birds.

Several color-marked banded loons were re-observed in several locations this year. All of these loons were rescued from various situations in previous years. A loon that had been entangled in fishing line on Lake Eden in 2006 has occupied the Green River Res. –NW territory. A loon that had ingested fishing line on Lake Fairlee in 2013 nested on Post Pond in Lyme, NH. On Lake Willoughby, a loon that had been wrapped in ice-fishing line in 2011, returned to the same region of the lake for the fourth year.

### *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 43 of the 64 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.

Table 1. Summary of Common Loon breeding activity in Vermont, 2015

Nesting pairs: 87 Known territorial pairs: 102 Potential territorial pairs: 10 Total territorials pairs: 112  
 Chicks hatched: 103 Chicks surviving through August: 70  
 Lake list divided into sections: 1) nesting pairs, 2) known and potential territorial pairs, and 3) loon active lakes.  
 Loonwatch Count 18 July 2015: Adult loons - 298 New nesting pairs: 3 New territorial pairs: 3

Lake Name	Town	2015 Status	Nest Type	Nest Outcome	Nest Warning Sign Buoys	Chicks hatched out	Chicks through August	Chick Mortality Cause	Rescues/ Mortality	Date	Age	Mortality and Rescue Cause	Comments	# years nested	# years nest success	total # surviving chicks
Baker P.	Barton	nesting	marsh			1 ch	0 ch	Unknown - disappeared early						11	9	13
Bald Hill P.	Westmore	nesting	shoreline	Abandoned - no eggs										14	8	8
Bean P.	Sutton	nesting	island			1 ch	1 ch							11	11	14
Beaver P.	Holland	nesting	island			1 ch	0 ch	Unknown	Mortality	7/13/2015	Adult	Unknown - trauma from fight with intruder loon possible	7/17 Found leg of adult. Possibly killed by intruder; pair in flux. Chick - Did not find.	33	28	34
Beecher P.	Brighton	nesting	marsh			1 ch	1 ch		Rescue	8/19/2015	Chick		Left nesting pond for larger lake; found on highway; no sign of parents. Moved from Spectacle to Island P. Then brought to rehabbers. Released in October	2	1	1
Berlin P.	Berlin	nesting	marsh		signs	2 ch	1 ch	Unknown	Rescue	3/30/2015	Adult	Road-crash	Found at Berlin airport. Abrasions, not emaciated; evaluated by VINS and released on CT River	12	11	14
Bourn P.	Sunderland	nesting	island			1 ch	1 ch							14	13	14
Brownington P.	Brownington	nesting	raft	Abandoned - no eggs	signs									14	6	9
Buck L.	Woodbury	nesting	marsh			1 ch	1 ch							8	4	5
Center P.	Newark	nesting	shoreline	Abandoned - no eggs	signs									2	0	
Chandler P.	Wheelock	nesting	marsh			2 ch	1 ch	Unknown						8	5	5
Chittendon Res. - B	Chittenden	nesting	raft		signs	1 ch	1 ch							11	8	10
Coits P.	Cabot	nesting	marsh		signs	1 ch	1 ch							3	3	2
Coles P.	Walden	nesting	marsh	Abandoned - no eggs										16	13	19
Derby P.	Derby	nesting	marsh			2 ch	1 ch	Unknown - disappeared early						7	5	5
Dog Pond	Woodbury	nesting	shoreline	Abandoned - no eggs									1st ever recorded nest	1	0	
Dunmore L. / Mud P.	Leicester/ Salisbury	nesting	island		signs	2 ch	1 ch	Trauma - boat hit	Mortality	8/3/2015	Chick	Trauma - boat hit	Brought to VINS; euthanized	9	8	9
East Long P.	Woodbury	nesting	island			1 ch	1 ch							35	27	31
Eden L.	Eden	nesting	raft		signs	1 ch	1 ch							12	10	13
Elligo L.	Greensboro	nesting	island		signs	1 ch	1 ch							14	12	14
Elmore L.	Elmore	nesting	marsh	Abandoned - egg in water	signs									4	1	1
Ewell P.	Peacham	nesting	marsh		signs	2 ch	1 ch	Unknown	Mortality	8/26/2015	Chick	Unknown	Found dead floating in water; just died as limp; emaciated. Sent to Tufts	7	7	6
Fairfield	Fairfield	nesting	island	Flooded	signs									2	0	
Forest L.	Averill	nesting	raft			2 ch	1 ch	Unknown						22	19	25
Fosters P.	Peacham	nesting	raft			2 ch	2 ch							13	13	19
Great Averill L. - North	Averill	nesting	raft			2 ch	0 ch	Unknown - disappeared early						21	12	13

**Table 1 - continued. Summary of Common Loon breeding activity in Vermont, 2015**

Lake Name	Town	2015 Status	Nest Type	Nest Outcome	Nest Warning Sign Buoy	Chicks hatched out	Chicks through August	Chick Mortality Cause	Rescues/ Mortality	Date	Age	Mortality and Rescue Cause	Comments	# years nested	# years nest success	total # surviving chicks
Great Averill L. - South	Averill	nesting	raft			1 ch	0 ch	Unknown						6	5	5
Great Hosmer P.	Albany/ Craftsbury	nesting	marsh		signs	2 ch	2 ch		Monitor	4/24/2015	Adult	Landed on small pond	Observed on private pond on South Albancy Rd. (Bob's Pond). Landed on tiny pond when ice still on surrounding lakes. Flew successfully	5	5	8
Green River Res. Access Bay	Hyde Park	nesting	island		signs	2 ch	2 ch		Monitor	1/7/2016	Chick	Iced in - flew	Unkown if chicks from GRR or flew in from elsewhere	8	7	8
Green River Res. NW	Hyde Park	nesting	raft		signs	1 ch	1 ch							37	28	40
Green River Res. SW	Hyde Park	nesting	island	Flooded; re-nest abandoned - no eggs	signs									2	1	1
Greenwood L.	Woodbury	nesting	raft		signs	2 ch	2 ch							5	4	4
Groton L. - North	Groton	nesting	raft		signs	2 ch	1 ch	Unknown						6	3	4
Groton L. - South	Groton	nesting	marsh			1 ch	1 ch							14	12	15
Hardwick L.	Hardwick	nesting	island	Flooded; Flooded										12	11	17
Harveys L.	Barnet	nesting	marsh	Flooded; re-nest	signs	1 ch	1 ch		Mortality	6/14/2015	Adult	Unknown	Highly decomposed; found along shoreline; disposed	7	5	5
Holland P. - South	Holland	nesting	raft		signs	1 ch	1 ch							20	13	16
Island P.	Brighton	nesting	island	Abandoned - no eggs; re-nest		2 ch	1 ch	Unknown	Rescue	6/26/2015	Adult	Fishing gear - entanglement	Hook embedded in face; cut flush to skin. Loon released	15	13	15
Jobs P.	Westmore	nesting	shoreline			2 ch	2 ch							8	5	5
Joe's P. - inlet	Cabot/ Danville	nesting	island		signs	2 ch	2 ch							16	16	22
Joe's P. - 1st Pond	Cabot/ Danville	nesting	shoreline	Abandoned - no eggs										6	4	3
Keiser P.	Peacham	nesting	marsh	Abandoned - no eggs										11	9	9
Kent P.	Killington	nesting	island		signs	2 ch	2 ch							6	4	5
Little Averill L. - North	Averill	nesting	raft			2 ch	0 ch	Unknown - disappeared early						6	4	1
Little Hosmer P.	Craftsbury	nesting	island		signs	2 ch	1 ch	Unknown - disappeared early						15	8	7
Long P. (Eden)	Eden	nesting	marsh			1 ch	0 ch	Unknown - disappeared early						4	2	2
Long P. (Greensboro)	Greensboro	nesting	shoreline	Predation									1st ever recorded nest	1	0	
Long P. (Westmore)	Westmore	nesting	island	Abandoned - no eggs; re-nest	signs	2 ch	0 ch	Unknown - intruders likely						17	14	18
Lower Symes P.	Ryegate	nesting	marsh			2 ch	2 ch							12	11	16
Lyford P.	Walden	nesting	marsh			2 ch	1 ch	Unknown						6	5	5
Maidstone L. - SE	Maidstone	nesting	island	Abandoned - egg(s)					Mortality	6/20/2015	Adult	Unknown	Found on shore. Disposed by warden	5	2	3
Maidstone L. -SW	Maidstone	nesting	island		signs	2 ch	2 ch							33	30	36
Martins P.	Peacham	nesting	raft		signs	2 ch	0 ch	Unknown - disappeared early						19	19	27
May P.	Barton	nesting	marsh	Flooded										20	17	24
Miles P.	Concord	nesting	island	Predation	signs									22	16	22
Miller P.	Stratford	nesting	marsh		signs	2 ch	2 ch							3	3	5
Molly's Falls Res. Island	Cabot	nesting	raft	Flooded	signs	2 ch	2 ch							4	3	5

**Table 1 - continued. Summary of Common Loon breeding activity in Vermont, 2015**

Lake Name	Town	2015 Status	Nest Type	Nest Outcome	Nest Warning Sign Buoy	Chicks hatched out	Chicks through August	Chick Mortality Cause	Rescues/Mortality	Date	Age	Mortality and Rescue Cause	Comments	# years nested	# years nest success	total # surviving chicks
Molly's Falls Res. North	Cabot	nesting	raft		signs	1 ch	1 ch		Mortality	6/10/2015	Adult	Trauma - hit by car	Loon flew into car on Rte. 2; died shortly after. Nearest lake Molly's Falls Res. Likely non-breeder; both pairs present. Sent to Tufts	21	20	28
Newark P.	Newark	nesting	island		signs	2 ch	2 ch							26	19	28
Nichols P.	Woodbury	nesting	raft		signs	1 ch	1 ch							16	14	14
Ninevah L.	Mount Holly	nesting	island		signs	2 ch	2 ch		Rescue	8/11/2015	Adult	Landed on small pond	Observed on private pond off Rte. 105. 8/13 failed rescue attempt. 8/18 found 300m away on highway, brought to VINS, released.	21	19	26
No. 10 P. (Mirror L.)	Calais	nesting	raft		signs	2 ch	2 ch	Unknown - disappeared early						9	9	11
Norton P. - Island	Norton	nesting	raft		signs	1 ch	0 ch							36	29	38
Norton P. - South	Norton	nesting	raft			1 ch	1 ch							15	13	15
Osmore P.	Peacham	nesting	island	Abandoned - no eggs										7	4	4
Peacham P. - North	Peacham	nesting	island		signs	2 ch	0 ch	Unknown - disappeared early						38	31	37
Peacham P. - SW	Peacham	nesting	marsh	Flooded										27	19	23
Pensioner P.	Charleston	nesting	raft		signs	2 ch	1 ch	Unknown - Unknown - intruders likely						8	7	9
Ricker P.	Groton	nesting	raft		signs	2 ch	0 ch							13	11	11
Seymour L. - Winape	Morgan	nesting	raft	Abandoned - no eggs	signs				Monitor	1/14/2016	Chick	Iced-in	Flew in from elsewhere	18	14	19
Shadow L. - (Concord)	Concord	nesting	shoreline	Flooded					Mortality	7/9/2015	Adult	Unknown - sent to Tufts for necropsy	Found on shore. Sent to Tufts	9	4	5
Silver L. (Leicester)	Leicester	nesting	shoreline			1 ch	1 ch							2	2	2
Somerset Res. - Dandeneau Cove	Somerset	nesting	island	Abandoned - no eggs	signs									34	24	30
Somerset Res. - North Islands	Somerset	nesting	island			2 ch	2 ch							8	6	8
South P. (Eden)	Eden	nesting	island	Flooded	signs									17	13	16
Spectacle P.	Brighton	nesting	raft		signs	2 ch	0 ch	Sibling rivalry; unknown					Second chick neglected. Another chick flew to pond in Nov. Both found dead after lake froze.	21	19	22
Spring L.	Shrewsbury	nesting	shoreline		signs	2 ch	1 ch	Unknown						13	9	12
Stiles Res.	Waterford	nesting	marsh			2 ch	2 ch							12	9	13
Sunset L.	Marlboro	nesting	island		signs	1 ch	1 ch						2nd egg left in nest	7	5	5
Thurman Dix Res.	Orange	nesting	island			1 ch	1 ch	Unknown - disappeared early						35	29	34
Ticklenaked		nesting	marsh	Flooded; Incubated too long	signs								Human disturbance likely kept loons off the nest too often. 1st ever recorded nest.	1	0	
Wallingford P.	Wallingford	nesting	marsh			1 ch	1 ch							16	12	19
Wantastiquet P.	Weston	nesting	island			1 ch	1 ch							7	6	8
West Mountain P.	Maidstone	nesting	shoreline			1 ch	0 ch	Unknown						16	10	6



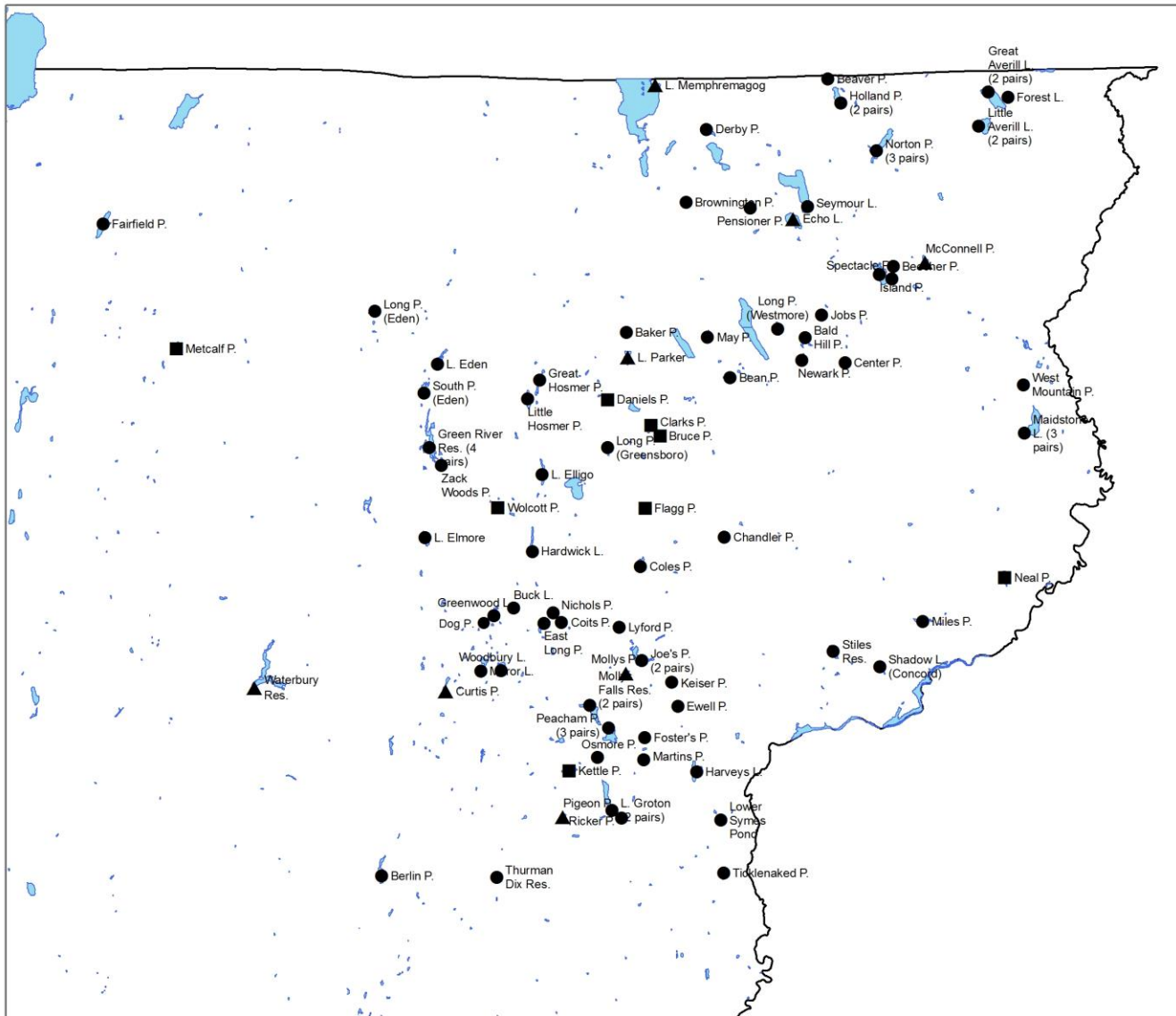
**Table 1 - continued. Summary of Common Loon breeding activity in Vermont, 2015**

Lake Name	Town	2015 Status	Nest Type	Nest Outcome	Nest Warning Sign Buoys	Chicks hatched out	Chicks through August	Chick Mortality Cause	Rescues/ Mortality	Date	Age	Mortality and Rescue Cause	Comments	# years nested	# years nest success	total # surviving chicks
Woodbury L. (Sabin)	Woodbury	nesting	raft		signs	1 ch	1 ch							9	9	9
Woodward Res.	Plymouth	nesting	island		signs	2 ch	1 ch	Unknown						9	6	7
Zack Woods P.	Hyde Park	nesting	island		signs	2 ch	2 ch							19	17	28
Bruce P.	Sheffield	territory	pair nested in Clark P 2014										Bruce and Clark ponds are multiple lake territory	6	0	
Clark P.	Glover	territory	last nested 2014										Bruce and Clark ponds are multiple lake territory	1	0	
Daniels /Daniels W.	Glover	territory	last nested 2014											5	4	4
Flagg P.	Wheelock	territory	last nested 2014											4	3	5
Green River - Big Island	Hyde Park	territory	last nested 2013						Mortality	7/2/2015	Adult	Unknown	Found in middle of reservoir. Sent to Tufts	1	0	
Holland P. - North	Holland	territory	last nested 2009											2	0	0
Kettle P.	Groton/ Marshfield	territory	last nested 2014		signs									25	16	21
Little Averill L. - West	Averill	territory	last nested 2014		signs									28	17	24
Maidstone L. - North	Maidstone	territory	last nested 2014						Rescue	8/21/2015	Adult	Fishing gear - ingestion	Lake residents caught and cut fishing line free. Line observed in mouth after release. All loons observed since appeared healthy thus likely survived.	6	5	3
Metcalf P.	Fletcher	territory			signs									3	2	4
Neal P.	Lunenburg	territory	marsh		signs									2	0	
Norton P. - North	Norton	territory	last nested 2014		signs									7	2	4
Peacham P. - SE	Peacham	territory	last nested 2014		signs									6	2	3
Somerset Res. - Narrows	Somerset	territory	last nested in 2014											4	1	1
South P. (Marlboro)	Marlboro	territory	last nested 2014		signs									1	1	2
Wolcott P.	Wolcott	territory	last nested 2014		signs									23	19	25
Chittendon Res. - North	Chittenden	potential territory														
Curtis P.	Calais	potential territory												0		
Echo L.	Charleston	potential territory	last nested 2013		signs									5	2	2
McConnell P.	Brighton	potential territory	last nested 2007											15	11	15
Memphremagog L. - John's River	Derby	potential territory	last nested 2009						Monitor	6/9/2015	Adult	Unknown - lethargic but not observed again	Beached. Started swimming again. 6/10 a.m. 1 ad and 1 SA swimming together nearby, possibly same adult	4	2	1
Mollys P.	Cabot	potential territory														
Morey L.	Fairlee	potential territory							Mortality	1/9/2016	Chick	Iced in - likely drowned	Juvenile had flown in; 2nd loon disappeared from hole in ice	0		
Parker L.	Glover	potential territory							Monitor	12/28/2015	Chick	Iced in - flew		0		
Pigeon P.	Groton	potential territory	last nested 2004											1	0	0
Waterbury Res.	Waterbury	potential territory												3	1	1
Branch P.	Sunderland	loon active												1	1	1

**Table 1 - continued. Summary of Common Loon breeding activity in Vermont, 2015**

Lake Name	Town	2015 Status	Nest Type	Nest Outcome	Nest Warning Sign Buoys	Chicks hatched out	Chicks through August	Chick Mortality Cause	Rescues/Mortality	Date	Age	Mortality and Rescue Cause	Comments	# years nested	# years nest success	total # surviving chicks
Carmi L.	Franklin	loon active														
Caspian L.	Greensboro	loon active												1	0	0
Champlain L.	various	loon active												2	0	0
Crystal L.	Barton	loon active														
Dunmore L. - North	Leicester/ Salisbury	loon active							Monitor	7/7/2015	Adult	Fishing gear - entanglement	Observed by volunteers. Line likely fell off after a week.			
Fairlee L.	Fairlee	loon active												0		
Halls	Newbury	loon active												0		
Hortonia L.	Hubbardton	loon active														
Iroquois	Hinesburg	loon active														
Lowell L.	Londondery	loon active														
Mansfield		loon active							Mortality	8/4/2015	Adult	Unknown	Found dead along shore. Sent to Tufts.			
Marshfield P.	Marshfield	loon active												0		
Memphramagog L. - Holbrook Bay	Newport	loon active														
Moore Res. - Roaring Brook	Concord	loon active							Monitor	7/7/2015	Adult	Fishing gear - entanglement	Reported by boater, not observed again.	4	3	0
Mud (Hyde Park)		loon active							Mortality	5/10/2015	Adult	Unknown	Game warden disposed			
Nelson P.	Woodbury	loon active												1	0	
Notch P.	Ferdinand	loon active														
Noyes P.	Groton	loon active												1	0	0
Nulhegan	Brighton	loon active														
Raponda L.	Wilmington	loon active												0		
Rescue L.	Ludlow	loon active														
Salem L.	Derby	loon active														
Seymour L. - West	Morgan	loon active												1	1	2
Shadow L. (Glover)	Glover	loon active														
Somerset Res. - South	Somerset	loon active														
Stratton P.	Stratton	loon active														
Sugar Hill Res.		loon active												0		
Sunset L.	Benson	loon active														
Tiny P.	Plymouth	loon active														
Wallace P.	Canaan	loon active												0		
Wapanacki P.	Wolcott	loon active														
Warden P.	Barnet	loon active														
West Hill		loon active														
Willoughby L.	Westmore	loon active														

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



**Locations of Loon Pairs - 2015**

- nest
- ▲ potential territory
- territory

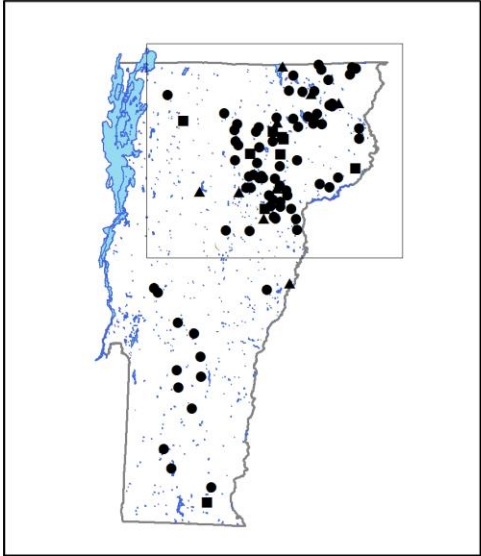
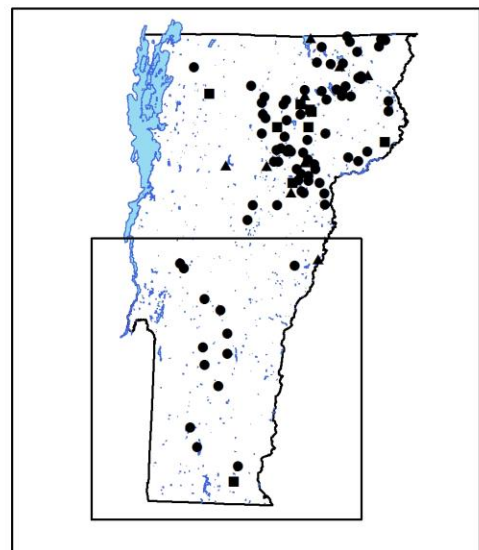
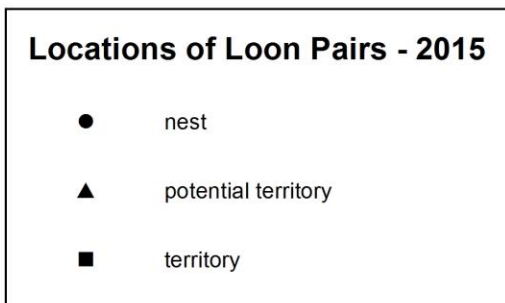
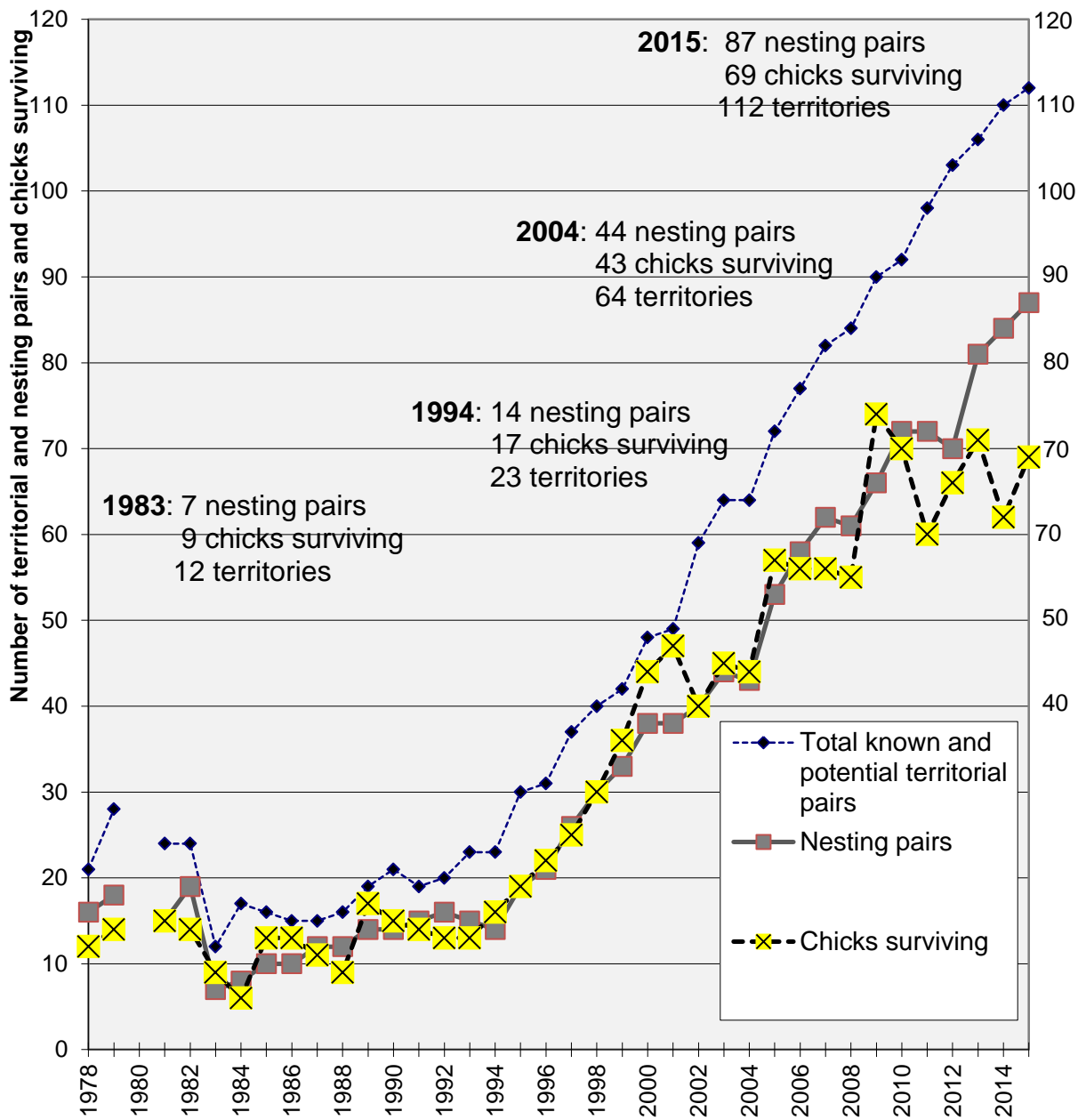


Figure 1b. Common Loon Nesting and Territorial Pairs in Vermont – Southern Area



**Figure 2. Summary of Common Loon breeding activity in Vermont, 1978-2015**



**Table 2. Summary of population changes and reproductive success of Common Loons in Vermont, 1979-2015.**

Year	'79	'80	'81	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91	'92	'93	'94	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15
<b>TOTAL territorial pairs</b>	28	0	24	24	12	17	16	15	15	16	19	21	19	20	23	23	30	31	37	40	42	48	49	59	64	64	72	77	82	86	90	92	98	103	106	110	112
Known terr. prs.	21	--	18	19	9	12	11	11	12	13	16	17	16	18	17	21	22	24	29	34	39	44	44	49	53	57	60	65	71	75	80	85	88	92	93	100	102
Potential terr. prs.	7	--	6	5	3	5	5	4	3	3	3	4	3	2	6	2	8	7	8	6	3	4	5	10	11	7	12	12	11	11	10	7	10	11	13	10	10
<b>Nesting pairs</b>	18	--	15	19	7	8	10	10	12	12	14	14	15	16	15	14	19	21	26	30	33	38	38	40	44	43	53	58	62	61	66	72	72	70	81	84	87
<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	34	34	38	34	47	44	47	49	53	57	52	50	62	57	65
<b>Chicks hatched</b>	--	--	--	--	10	7	--	16	12	11	19	18	16	15	18	20	21	25	32	37	41	56	56	52	62	54	68	66	71	75	83	85	76	87	97	93	103
<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	47	40	45	44	57	56	56	55	74	70	60	66	71	62	69
<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	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
<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	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
<b>% chick survival</b>	--	--	--	--	90%	86%	--	81%	92%	82%	89%	83%	88%	87%	72%	85%	90%	88%	78%	81%	88%	79%	84%	77%	73%	81%	84%	85%	79%	73%	89%	82%	79%	76%	73%	67%	67%
<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	36	38	41	39	49	52	57	54	61	63	63	63	72	72	76

**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	135	166	179	184	191	201	218	225	228	201 <sup>c</sup>	271	280	297	301	298		
<b>Number of chicks</b>	--	--	--	--	9	16	13	17	9	9	16	15	15	15	14	11	17	21	21	26	36	45	45	39	44	40	45	53	54	42	65	53	52	63	69	66	63		
<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	2	5	0	3	5	2	9	8	6	0	7	9	3	6	9		
<b>Number of lakes surveyed</b>																																							
<b>Number of lakes occupied</b>																																							

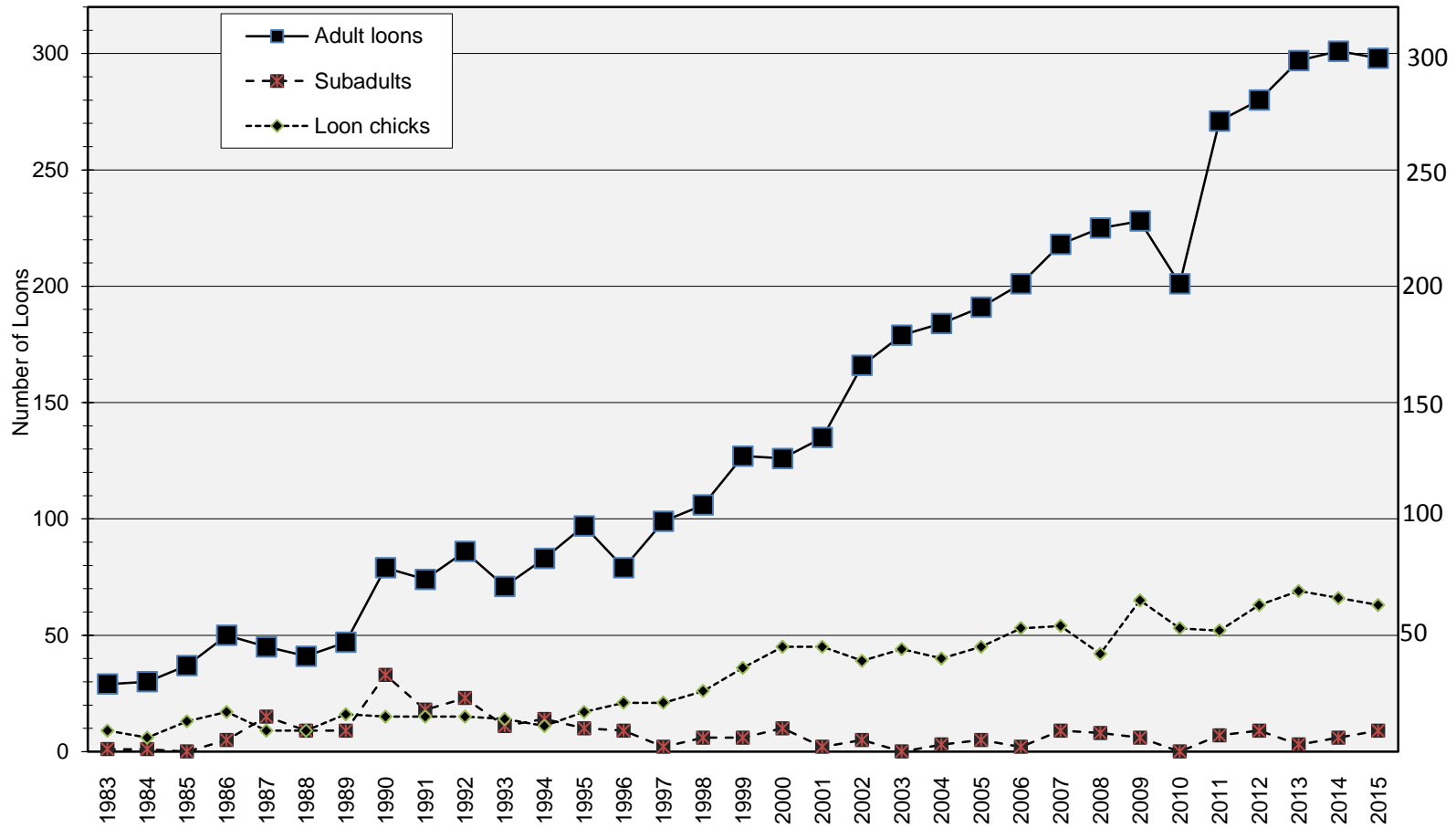
<sup>a</sup> The number of lakes surveyed for Loonwatch increased in 1999. It is possible survey adult loon counts during the mid-1990s were slightly lower.

<sup>b</sup> Data since 2002 do not include Lake Champlain survey results, because of the large-scale survey effort conducted in that year.

On July 19 and 20 in 2002, 28 adult and 18 subadult loons were counted in non-overlap regions on Lake Champlain.

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

**Figure 3. Vermont Loonwatch Results, 1983-2015**  
 (an annual statewide loon census on the third Saturday of July)



### *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. Two natural sources of mortality include predation and intraspecific competition between breeding pairs and extraterritorial (rogue/intruder) loons. 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.

## **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 likely fail 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. An initiative involved contacting the Trust for Public Land, the Vermont Land Trust, the Vermont Housing and Conservation Board, and the Vermont Nature Conservancy about the use of conservation easements and land acquisition to permanently protect nest sites. Once a protocol is developed for both the donation and purchase of conservation easements, landowners should be approached with information about various options. An explicit protocol for the acquisition and/or long-term conservation of nest sites should be developed, so that opportunities can be quickly acted upon.
2. We would like to provide more detailed training packets for adopt-a-lake volunteers.
3. Development of a comprehensive database in conjunction with the LPC in New Hampshire and BRI in Maine would allow us to better assess and summarize Vermont's loon population trends, share and compare data with New Hampshire and Maine, develop a detailed population viability assessment for Vermont, and more efficiently coordinate volunteers.



4. Other future initiatives to consider should focus on improving the awareness of lake users on busy lakes. Actions could include (a) developing an information sheet 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.
5. Capture methods have improved over the past decade. It would be helpful to upgrade equipment for both summer and winter rescues.
6. In 2016 and 2017, the VLCP might assist the BioDiversity Research Institute capture several loons in Vermont as part of a North America Common Loon health assessment.
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 for ongoing, core financial support through the federal State Wildlife Grant program and the Nongame Wildlife Fund and other contributors to VLCP fundraising efforts, including Trans Canada Hydro and many individual donors. The Canaday Trust and many individuals and lake associations provided support to replace loon nest warning signs.

**Professional assistance:** Isobel Curtis provided support as a VLCP intern. VFWD biologist John Buck 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 Trans Canada Hydro, Simon Morin from Coaticook River Water Power Company, Mike Scarzello and John Sutter from Green Mountain Power, Hardwick Electric Department, Craig Myotte and John Pilton of Morrisville Water and Light, Bill Rogers from Great Bay Hydro, 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, New Discovery, Ricker, and Stillwater state parks helped with outreach efforts. Kappy Sprenger and VINS Wildlife Services have 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 Jim Paruk of BRI. The Nature Conservancy's efforts to protect loon habitat continue to promote the success of this project, and we appreciate all the staff and members who contribute to those efforts. Steve Faccio of VCE helped to create the VLCP section on the VCE website, [www.vtecostudies.org](http://www.vtecostudies.org), and prepare Figure 1. Chris Rimmer, Susan Hindinger, and Melissa MacKenzie 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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