

THE 2013 BREEDING STATUS OF COMMON LOONS IN VERMONT

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ABSTRACT: The Vermont Loon Recovery Project, a program of the Vermont Center for Ecostudies and the Vermont Fish and Wildlife Department, documented 81 nesting loon pairs and 106 territorial pairs statewide. Of the 81 pairs that attempted nesting, 62 successfully hatched 97 eggs, with 71 chicks surviving through August (chick survival rate 73%, 0.67 chicks surviving per territorial pair). Four new nesting pairs and 3 new potential territorial pair were identified. Twelve pairs that have nested in recent years did not nest in 2013 because of intruder loon activity, high water, or lack of suitable nest sites. Of 22 pairs whose first nest attempts failed, 4 re-nested, and 3 were successful. Causes of nest failure included flooding (6 nests), depredation (3 nests), and disturbance (2 nest). 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, 2 were depredated, and 1 was killed from a boat hit. Two adult loon mortalities were documented from a crash landing and trauma from a fight with another loon. Four adult loons were successfully rescued after ingesting fishing line (Bald Hill, Fairlee), being found on roads (Greenwood, Smugglers Notch). One 14 week chick was rescued after landing on a small pond from which it could not take off. Several rescues and/or searches were made for 3 other loons caught in fishing line or reported in distress. Two loons were not found and one loon was not rescued after 3 attempts. About 200 volunteers surveyed lakes throughout Vermont on 20 July as part of the Loonwatch program, an annual statewide loon count. Loons were observed on 106 of 162 surveyed lakes, where observers counted 297 adults, 69 chicks, and 3 subadult loons. The total number of adult loons increased slightly from 2012. To provide a historical perspective, volunteers counted 179 and 225 adult loons in 2003 and 2008, respectively. Twenty-eight of the 81 breeding pairs nested on nesting rafts, 29 on islands, 19 in marshes, and 5 on shorelines. Forty-one nesting rafts were placed on known or potential nesting waterbodies. Warning sign buoys were placed around 48 of the 81 nests. 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. Nine loon conservation programs were presented to over 275 people statewide. Two new informational brochures on loon conservation and conservation of lakeshores were distributed to nearly 600 lakeshore owners through 13 lake associations and were mailed to over 800 loon volunteers, donors, and other contacts. 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 Recovery Project (VLRP) 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 VLRP 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 18 years to 81 in 2013. The VLRP 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-five 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 2009-2013 was 72 with 14 active nesting pairs in the southern half of the state.

Since the mid-1980's, the VLRP has been a joint program between VCE and VFWD. The Nongame Wildlife Fund has been the primary funding source for the VLRP (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 VLRP. VCE annually hires the VLRP biologist, provides staff support, and raises the remaining VLRP budget through donations and grants.

METHODS

Monitoring of lakes with breeding and territorial loons

The VLRP biologist, a VLRP intern, VFWD biologists and game wardens, 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.

Forty-one artificial nesting rafts were placed on 34 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 VLRP deems that rafts might prove beneficial. Adopt-a-lake volunteers maintained or helped with 20 rafts.

Warning sign buoys were placed around 48 of the 81 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 2013. Sign buoys were used in areas where repeated human disturbance was likely to occur.

The VLRP 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 VLRP biologist contacted landowners of new nesting sites as soon as nesting was suspected or observed. Nine slide lectures, discussions, and outings on loon biology, conservation, and research were presented to audiences at lake associations, school groups, state parks, and other organizations (libraries, conservation groups, Road Scholar). Approximately 275 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.

New brochures directed at 1) boaters and 2) lakeshore owners were developed in 2012 and 2013. "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. Thirteen lake associations assisted with the distribution of both brochures to over 580 lakeshore owners. VCE mailed both brochures and 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 Flaggy Meadow Road, Gorham, ME 04038-1203) for methylmercury (MeHg) analysis (Evers et al. 1999). Fourteen eggs were collected in 2013. We are waiting for results of mercury sampling on eggs collected over the past several 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 2013

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 106 known and potential territorial loon pairs, 81 of which were confirmed to nest on 72 lakes (Fig. 1, Table 1). Four new nesting pairs were identified, including Center P., Coits P., Green River Res. – Big Island, and Miller P. Three of the new pairs from 2012 had successful nests for the first time in 2013 (L. Elmore, Long P.-Belvidere, Metcalf P). Three new potential territorial pairs were identified on Curtis P, L. Morey, and L. Seymour-West.

Population levels and breeding success

The number of nesting pairs and territorial pairs increased from 2012. Of the 81 pairs that attempted nesting, 62 successfully hatched 97 eggs, with 71 chicks surviving through August (Fig. 2, Table 2). There were 93 known territorial pairs on water bodies where nesting had occurred within the last 3 years, and 13 potential territorial pairs, each of which was observed consistently for 6 weeks or more. Twelve pairs that have nested in recent years did not nest in 2013 because of intruder loon activity, high water, or lack of suitable nest sites. A major reason for the increase in nesting pairs was that a higher percent of known territorial pairs nested this year compared to previous years (87% in 2013, 76% in 2012). Of 22 pairs whose first nest attempts failed, 4 re-nested, and 3 were successful. Causes of nest failure included flooding (6 nest), depredation (3 nests), and disturbance (2 nests). The remaining failed nests were abandoned for unknown reasons with predators and disruption from intruder loons being the most likely causes.

The chick survival rate through August was 73% with 0.67 chicks surviving per territorial pair in 2013. Since 1979, the average chick survival rate is 82% with 0.71 chicks per territorial pair. The causes of mortality of most chicks were unknown. At least 3 chicks disappeared after interactions with intruder loons, 2 were depredated, and 1 was killed from a boat hit. Two adult loon mortalities were documented from a crash landing and trauma from a fight with another loon.

Management Results: artificial nesting rafts and nest warning sign buoys

Of the 81 known nests, 28 were on artificial nesting rafts (89% successful), 29 on islands (72% successful), 19 in marshes (74% successful), and 5 were on shorelines (40% successful). Nests with warning sign buoys had a 81% success rate compared to 70% for nests without signs. However, warning sign buoys are more frequently used for islands and rafts which tend to have higher success rates than shoreline nests where fewer signs are used.

Vermont Loonwatch Day

Vermont Loonwatch day was conducted on 20 July when over 200 volunteers counted 297 adult loons, 69 chicks, and 3 subadults (Table 2, Fig. 3) Loons were observed on 106 of the 162 lakes surveyed. The total number of adult loons increased slightly from 2012. Thirty nine of 297 adult loons counted were located in southern and central Vermont. High counts of adult loons in 2013 were obtained on Peacham Pond (14 adults), Green River Reservoir and Norton Pond (11 adults), Lake Seymour (10 adults), and Little Averill Lake (9 adults).

Loon Rescues

Several rescues and/or searches were made for 6 loons caught in fishing or in distress. Two adult loons were successfully captured and the fishing line was cut free (Bald Hill, Fairlee). The loon on Bald Hill P. was observed a month later. Three unsuccessful attempts were made to capture a loon entangled in fishing line on Green River Res., but after a month the loon was no longer being observed indicating that the line either fell off or the loon died. Two adult loons were successfully retrieved and released after being found along roads in Smuggler's Notch and near Greenwood Lake. A 14 week old chick from Great Hosmer P. was captured after landing on a small pond from which it could not take off. We could not catch the chick during a night capture attempt using spotlights but were successful using a gill net stretched across the pond a few days later. Two loons reported in distress were not found (Maidstone, Somerset). The VLRP biologist spent over 83 hours in 2012 and 65 hours in 2013 conducting capture attempts and coordinating monitoring efforts with volunteers and game wardens. Volunteers were instrumental in the monitoring and capture attempts of all these birds.

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 42 of the 62 lakes where these management tools were used. Volunteers were critical in helping to inform the VLRP biologist about lakes and ponds with increased loon activity, potential territorial pair development, and loons in distress and identifying 3 of the 4 of the new nesting pairs. 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, 2013

Nesting pairs: 81 Known territorial pairs: 93 Potential territorial pairs: 13 Total territorial pairs: 106
 Chicks hatched: 97 Chicks surviving through August: 71
 Lake list divided into sections: 1) nesting pairs, 2) known and potential territorial pairs, and 3) loon active lakes.
 Loonwatch Count 20 July 2012: Adult loons - 297 New nesting pairs: 4 New territorial pairs: 3

Lake Name	Town	Status	Nest Type	Nest Outcome	Nest Warning Sign Buoys	Chicks hatched out	Chicks through August	Chick Mortality Cause	Adult Mortality	Comments	# years nested	# years nest success	total # surviving chicks
Baker P.	Barton	nesting	marsh	abandoned - eggs present							9	8	13
Bald Hill P.	Westmore	nesting	shoreline	depredation - mammalian						7/11/13 Adult ingested fishing gear; captured and line cut; re-observed 8/25/13	13	8	8
Bean P.	Sutton	nesting	marsh	successful		2 Ch	2 Ch				9	9	13
Beaver P.	Holland	nesting	island	depredation - mammalian							31	26	33
Berlin P.	Berlin	nesting	marsh	successful	signs	1 Ch	1 Ch				10	9	12
Bourn P.	Sunderland	nesting	island	successful		2 Ch	2 Ch				12	11	12
Brownington P.	Brownington	nesting	marsh	successful	signs	2 Ch	2 Ch			Nested on raft placed by volunteers	12	5	8
Bruce P.	Sheffield	nesting	marsh	abandoned - no eggs						Nest has never been successful in 6 attempts	6	0	
Center P.	Newark	nesting	shoreline	depredation - mammalian	signs					1st nest attempt recorded; used 1/2 submerged old raft on shore	1	0	
Chittendon Res. - East	Chittenden	nesting	raft	successful	signs	2 Ch	2 Ch			Occasionally 2 other adults observed in west and north ends	9	7	9
Coits P.	Cabot	nesting	marsh	successful	signs	2 Ch	0 Ch	Unknown		1st nest recorded; 1 ch disappeared early; other at about 6 weeks	1	1	0
Coles P.	Walden	nesting	marsh	successful		1 Ch	1 Ch				14	13	19
Daniels /Daniels W.	Glover	nesting	marsh	successful		2 Ch	0 Ch	Unknown		3-4 day old chicks lost in move from West Daniels to Daniels P.	4	2	2
Derby P.	Derby	nesting	marsh	successful	signs	1 Ch	0 Ch	Unknown			6	4	4
Dunmore L. / Mud P.	Leicester/ Salisbury	nesting	island	successful	signs	1 Ch	0 Ch	Unknown		Egg shells in nest indicated a hatch; chick never observed	7	6	7
East Long P.	Woodbury	nesting	island	successful		1 Ch	1 Ch				33	25	29
Echo L. - North	Charleston	nesting	shoreline	human disturbance						Boat wake possibly washed out nest as eggs found out of the nest but not depredated	5	2	2
Eden L.	Eden	nesting	raft	abandoned - no eggs	signs						10	8	10
Elligo L.	Greensboro	nesting	island	successful	signs	1 Ch	1 Ch				12	10	12
Elmore L.	Elmore	nesting	marsh	successful	signs	1 Ch	1 Ch				2	1	1
Ewell P.	Peacham	nesting	island	successful		2 Ch	2 Ch				5	5	5
Flagg P.	Wheelock	nesting	island	successful		2 Ch	2 Ch				3	2	4
Forest L.	Averill	nesting	raft	successful		1 Ch	1 Ch				20	17	23
Fosters P.	Peacham	nesting	raft	1st nest abandoned after snowstorm; re-nest successful		1 Ch	1 Ch				11	11	15
Great Averill L. - North	Averill	nesting	raft	successful		1 Ch	0 Ch	Unknown			19	11	12
Great Averill L. - South	Averill	nesting	raft	successful		1 Ch	1 Ch				4	3	4
Great Hosmer P.	Albany/ Craftsbury	nesting	marsh	successful	signs	2 Ch	2 Ch			10/23/13 14 week chick rescued from pond too small to take off from	4	4	6
Green River - Big Island	Hyde Park	nesting	island	abandoned - no eggs	signs					1st recorded nest	1	0	
Green River Res. - Access Bay	Hyde Park	nesting	island	successful	signs	2 Ch	1 Ch	Unknown		2 additional loons observed in south end in June	6	5	5

Table 1 (continued)

Lake Name	Town	Status	Nest Type	Nest Outcome	Nest Warning Sign Buoys	Chicks hatched out	Chicks through August	Chick Mortality Cause	Adult Mortality	Comments	# years nested	# years nest success	total # surviving chicks
Green River Res. - NW	Hyde Park	nesting	island	abandoned - no eggs	signs					5/20/13 Adult observed with fishing line; 3 attempts made to find and capture - unsuccessful. No loon reported with fishing line after late June	35	26	39
Greenwood L.	Woodbury	nesting	raft	successful	signs	1 Ch	0 Ch	Predation		Eagle observed picking up chick; Adult captured after being found on road 1/3 mile away from lake; released on Dog Pond	3	2	1
Groton L. - North	Groton	nesting	raft	human disturbance	signs					There is a chance firecrackers caused the pair to abandon the nest	4	2	3
Hardwick L.	Hardwick	nesting	raft	successful		2 Ch	2 Ch				11	11	17
Harveys L.	Barnet	nesting	marsh	successful	signs	1 Ch	1 Ch				5	3	3
Island P.	Brighton	nesting	island	successful		2 Ch	1 Ch	Predation		Eagle reported taking a chick by state park	13	11	13
Joe's P. - inlet	Cabot/Danville	nesting	island	successful	signs	2 Ch	2 Ch				14	14	19
Joe's P. - 1st Pond	Cabot/Danville	nesting	island	successful		2 Ch	1 Ch	Unknown			4	3	2
Keiser P.	Danville/Peacham	nesting	marsh	abandoned - no eggs							9	8	9
Kent P.	Killington	nesting	island	successful	signs	2 Ch	1 Ch	Unknown		Eagle present near the time 1 chick disappeared	4	2	2
Kettle P.	Groton/Marshfield	nesting	raft	successful	signs	1 Ch	1 Ch				24	16	21
Little Averill L. - North	Averill	nesting	raft	successful		1 Ch	0 Ch	Unknown		Egg shells in nest indicated a hatch; chick never observed	4	2	1
Little Averill L. - West	Averill	nesting	shoreline	successful	signs	1 Ch	0 Ch	Unknown		Egg shells in nest indicated a hatch; chick never observed	27	17	24
Long P. (Eden)	Eden	nesting	marsh	successful		2 Ch	2 Ch				2	1	2
Long P. (Westmore)	Westmore	nesting	island	successful	signs	2 Ch	0 Ch	Unknown		Breeding male died in Dec. 2012; replaced 2013	15	13	18
Lower Symes P.	Ryegate	nesting	marsh	successful		2 Ch	1 Ch	Unknown		2 additional loons in Upper Symes in May	10	9	13
Lyford P.	Walden	nesting	marsh	successful		2 Ch	1 Ch	Unknown			4	3	3
Maidstone L. - SW	Maidstone	nesting	island	abandoned - eggs present	signs					Report of fishing lure on a loon but likely a banded loon	31	28	33
Martins P.	Peacham	nesting	raft	successful	signs	2 Ch	2 Ch				17	17	25
Metcalf P.	Fletcher	nesting	island	1st nest flooded; re-nest successful	signs	2 Ch	2 Ch			Re-nest in new location on larger island with house on it	2	1	2
Miles P.	Concord	nesting	island	flooded	signs						20	15	20
Miller P.	Strafford	nesting	marsh	successful	signs	2 Ch	2 Ch			1st recorded nest	1	1	2
Molly's Falls Res. - Island	Cabot	nesting	island	successful	signs	1 Ch	1 Ch				2	2	3
Molly's Falls Res. - North	Cabot	nesting	raft	successful	signs	1 Ch	1 Ch				19	18	26
Neal P.	Lunenburg	nesting	marsh	flooded						1st recorded nest	1	0	
Newark P.	Newark	nesting	island	successful	signs	2 Ch	2 Ch				24	17	25
Nichols P.	Woodbury	nesting	raft	successful	signs	2 Ch	2 Ch				14	12	13
Ninevah L.	Mount Holly	nesting	island	successful	signs	1 Ch	1 Ch				19	17	22
No. 10 P. (Mirror L.)	Calais	nesting	raft	successful	signs	1 Ch	1 Ch				7	7	8
Norton P. - Island	Norton	nesting	raft	successful	signs	2 Ch	2 Ch				34	27	36
Norton P. - North	Norton	nesting	raft	successful	signs	2 Ch	2 Ch				6	2	4
Norton P. - South	Norton	nesting	raft	successful		1 Ch	0 Ch	Unknown		2nd egg found in nest cracked	13	12	14

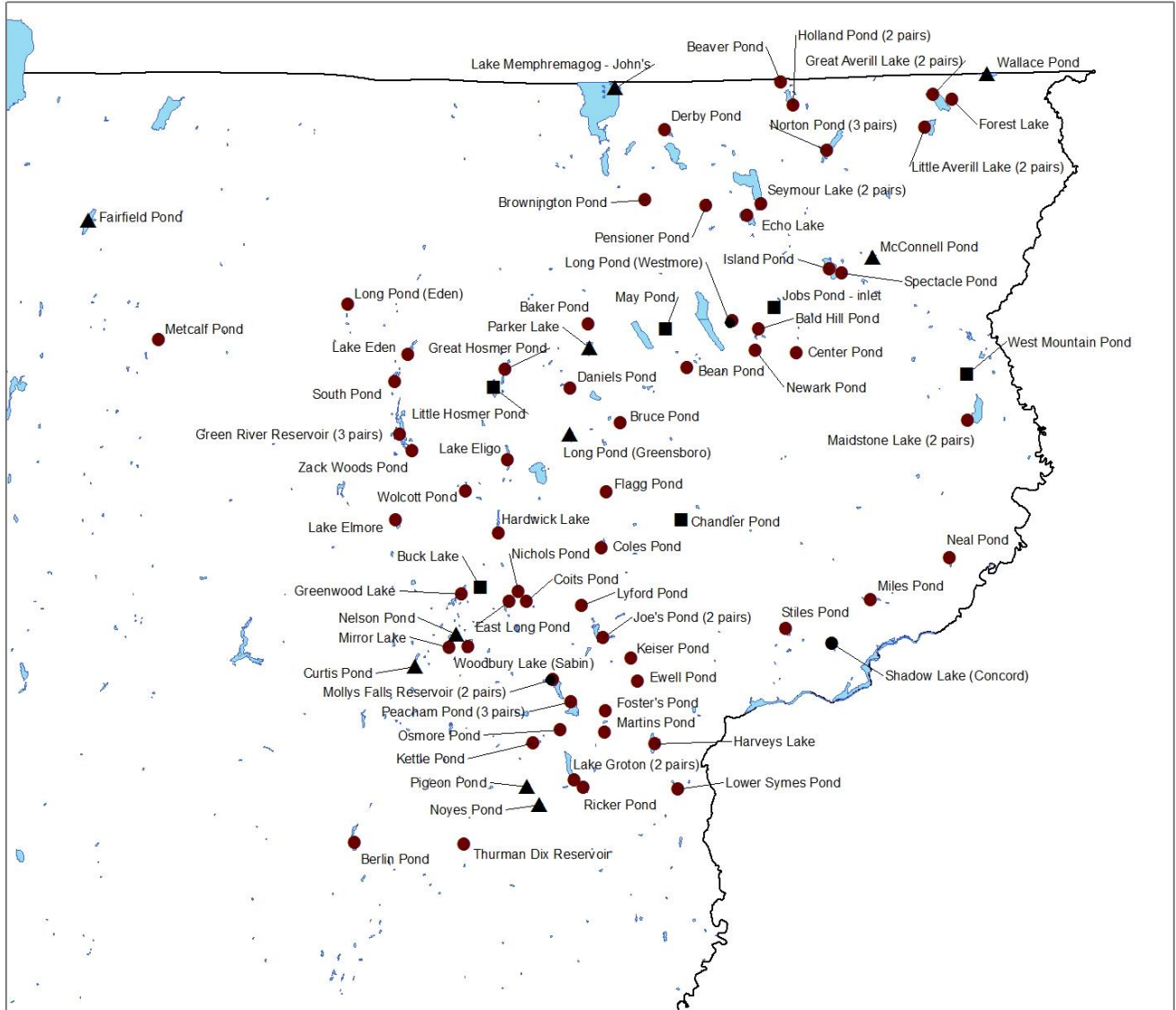
Table 1 (continued)

Lake Name	Town	Status	Nest Type	Nest Outcome	Nest Warning Sign Buoys	Chicks hatched out	Chicks through August	Chick Mortality Cause	Adult Mortality	Comments	# years nested	# years nest success	total # surviving chicks
Osmore P.	Peacham	nesting	island	successful	signs	2 Ch	1 Ch	Unknown			5	4	4
Peacham P. - North	Peacham	nesting	island	abandoned - no eggs	signs						36	29	36
Pensioner P.	Charleston	nesting	raft	successful	signs	1 Ch	1 Ch				7	6	8
Ricker P.	Groton	nesting	raft	successful	signs	2 Ch	0 Ch	Trauma - boat hit; Trauma - attack by other loon			11	10	11
Seymour L. - Winape	Morgan	nesting	raft	successful	signs	1 Ch	0 Ch	Unknown			16	14	19
Shadow L. - (Concord)	Concord	nesting	shoreline	successful		1 Ch	1 Ch			New nest location along SE shore	7	3	3
Somerset Res. - Dandeneau Cove	Somerset	nesting	island	successful	signs	2 Ch	2 Ch			Loon reported in distress but not found again	32	24	30
Somerset Res. - Narrows	Somerset	nesting	island	flooded	signs						3	0	
South P.	Eden	nesting	island	successful	signs	1 Ch	1 Ch			Nested in new location on small island	15	12	14
Spectacle P.	Brighton	nesting	raft	successful	signs	1 Ch	0 Ch	Unknown			19	17	21
Spring L.	Shrewsbury	nesting	raft	abandoned - eggs							12	8	11
Stiles Res.	Waterford	nesting	marsh	flooded							11	8	11
Sunset L.	Marlboro	nesting	island	successful	signs	2 Ch	0 Ch	Trauma - attack by other loon			5	4	4
Thurman Dix Res.	Orange	nesting	raft	1st nest flooded; re-nest successful		2 Ch	2 Ch			VLRP moved 2nd nest onto raft because of dam repair work and expected drawdown	33	28	33
Wallingford P.	Wallingford	nesting	marsh	successful		2 Ch	2 Ch				14	10	16
Wantastiquet P.	Weston	nesting	island	successful		2 Ch	2 Ch				5	4	5
Wolcott P.	Wolcott	nesting	shoreline	1st nest abandoned - no eggs; re-nest over-incubation							22	19	25
Woodbury L. (Sabin)	Woodbury	nesting	raft	successful	signs	2 Ch	2 Ch				7	7	6
Woodward Res.	Plymouth	nesting	island	successful	signs	1 Ch	1 Ch				7	4	5
Zack Woods P.	Hyde Park	nesting	island	successful	signs	2 Ch	2 Ch				17	15	25
Buck L.	Woodbury	territory								Pair built nest bowl at water level; last nested in 2003	6	3	4
Chandler P.	Wheelock	territory									6	3	3
Groton L. - South	Groton	territory								Loons observed nest building	13	11	14
Holland P. - North	Holland	territory								Possible nest building in Turtle cove but not confirmed	2	0	0
Holland P. - South	Holland	territory									18	11	15
Jobs P.	Westmore	territory									6	4	3
Little Hosmer P.	Craftsbury	territory								Intruder loon often in May and June	14	7	6
Maidstone L. - SE	Maidstone	territory								Possible nest building	3	2	3
May P.	Barton	territory								Pair has not nested since 2007	19	17	24
Peacham P. - SE	Peacham	territory								Few surveys conducted	5	2	3
Peacham P. - SW	Peacham	territory								Only single loon reported in late May but no recent nest building activity found	26	19	23

Table 1 (continued)

Lake Name	Town	Status	Nest Type	Nest Outcome	Nest Warning Sign Buoys	Chicks hatched out	Chicks through August	Chick Mortality Cause	Adult Mortality	Comments	# years nested	# years nest success	total # surviving chicks
Somerset Res. - North Islands	Somerset	territory									7	5	6
West Mountain P.	Maidstone	territory									14	8	6
Curtis P.	Calais	potential territory								More consistent 2 loon activity after intermittent activity in 2012	0		
Fairfield P.	Fairfield	potential territory									0		
Fairlee L.	Fairlee	potential territory								8/10/13 Adult loon ingested fishing gear, captured and line cut	0		
Long P. (Greensboro)	Greensboro	potential territory								Consistent pair activity all summer	0		
McConnell P.	Brighton	potential territory								Few surveys conducted	15	11	15
Memphremagog L. - John's River	Derby	potential territory								Few surveys conducted	4	2	1
Morey L.	Fairlee	potential territory								2-4 adults observed several times	0		
Nelson P.	Woodbury	potential territory						5/28/13 Trauma - attack by other loon		Only 1 adult on the pond for several weeks after mortality then 2 occasionally observed	1	0	
Noyes P.	Groton	potential territory									1	0	0
Parker L.	Glover	potential territory											
Pigeon P.	Groton	potential territory									1	0	0
Seymour L. - West	Morgan	potential territory								2 adults reported several times	1	1	2
Wallace P.	Canaan	potential territory								Few surveys conducted	0		
Branch P.	Sunderland	loon active									1	1	1
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											
Green River - South	Hyde Park	loon active											
Halls	Newbury	loon active											
Hardwood P.	Elmore	loon active								Frequent sightings 1-2 adults May and June	10	9	11
Lewis P.	Lewis	loon active											
Lowell L.	Londonderry	loon active								Change from pt to loon active			
Maidstone L. - North	Maidstone	loon active								Status: change to loon active. Not enough surveys to know status	5	4	2
Marshfield P.	Marshfield	loon active											
Memphramagog L. - Holbrook Bay	Newport	loon active											
Mollys P.	Cabot	loon active								Change from pt to loon active			
Moore Res. - Roaring Brook	Concord	loon active									4	3	0
Rescue L.	Ludlow	loon active											
Salem L.	Derby	loon active								Few surveys conducted and no 2 adult sightings			
Shadow L. (Glover)	Glover	loon active											
Silver L.	Salisbury	loon active											
Somerset Res. - South	Somerset	loon active											
South P.	Marlboro	loon active											
Stratton P.	Stratton	loon active											
Upper Symes	Ryegate	loon active								Two adults acting pair-like in mid-May			
Wapanacki P.	Wolcott	loon active											
Willoughby L.	Westmore	loon active											

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



Locations of Loon Pairs - 2013

- nest
- ▲ potential territory
- territory

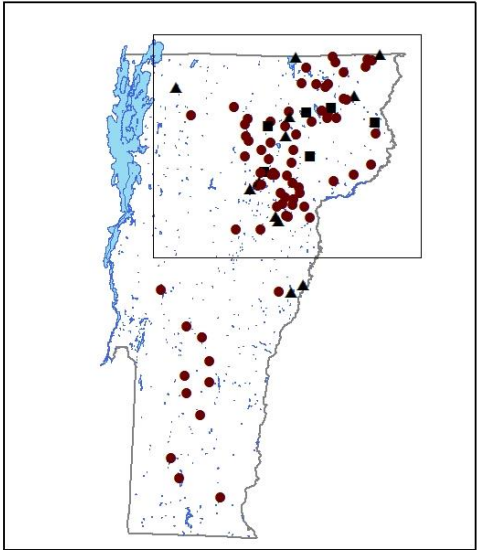


Figure 1b. Common Loon Nesting and Territorial Pairs in Vermont

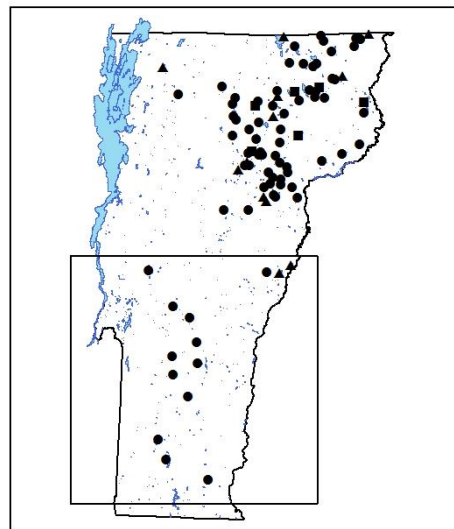
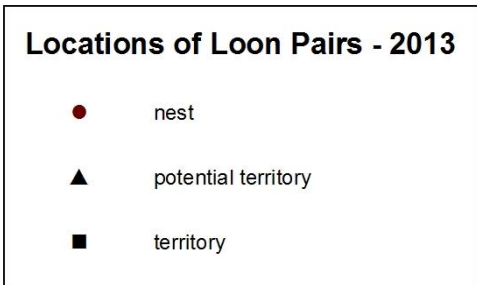
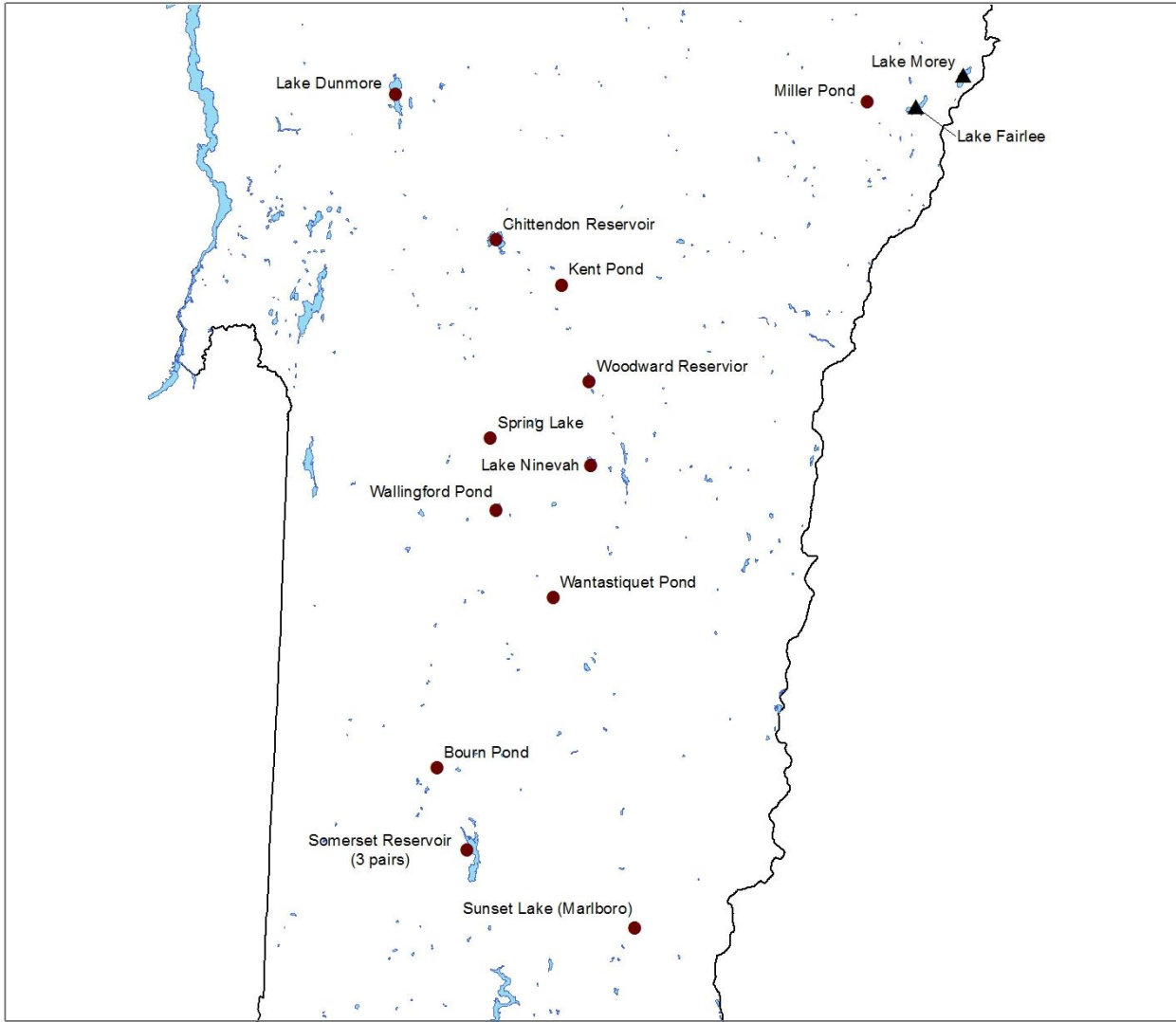


Figure 2. Summary of Common Loon breeding activity in Vermont, 1978-2013

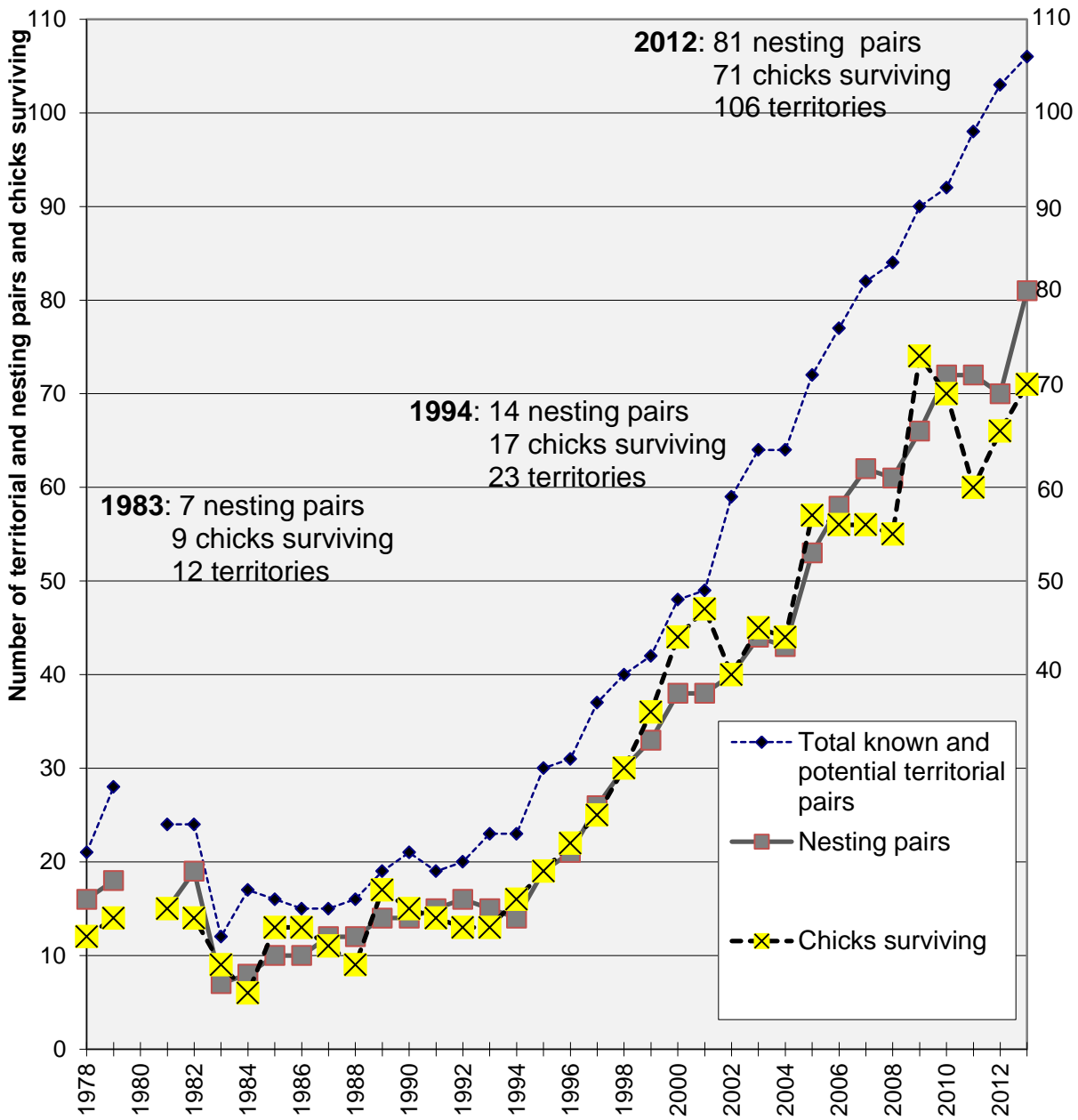


Table 2. Summary of population changes and reproductive success of Common Loons in Vermont, 1979-2013.

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			
TOTAL territorial pairs	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			
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			
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			
Nesting pairs	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			
Successful pairs	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			
Chicks hatched	--	--	--	--	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			
Chicks surviving through August	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			
Chicks surviving per nesting pair	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			
Chicks surviving per total territorial pair	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			
% chick survival	--	--	--	--	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%			
Lakes with nesting pairs	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			
Loonwatch results ^{a,b} (statewide annual survey)																																						
Number of adults	--	--	--	--	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 ^c	271	280	297			
Number of chicks	--	--	--	--	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			
Number of subadults	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			
Number of lakes surveyed																						150	107	131	133	123	98	122	133	148	148	129	129	162	150	162		
Number of lakes occupied																										68	69	84	86	84	89	76	102	98	106			

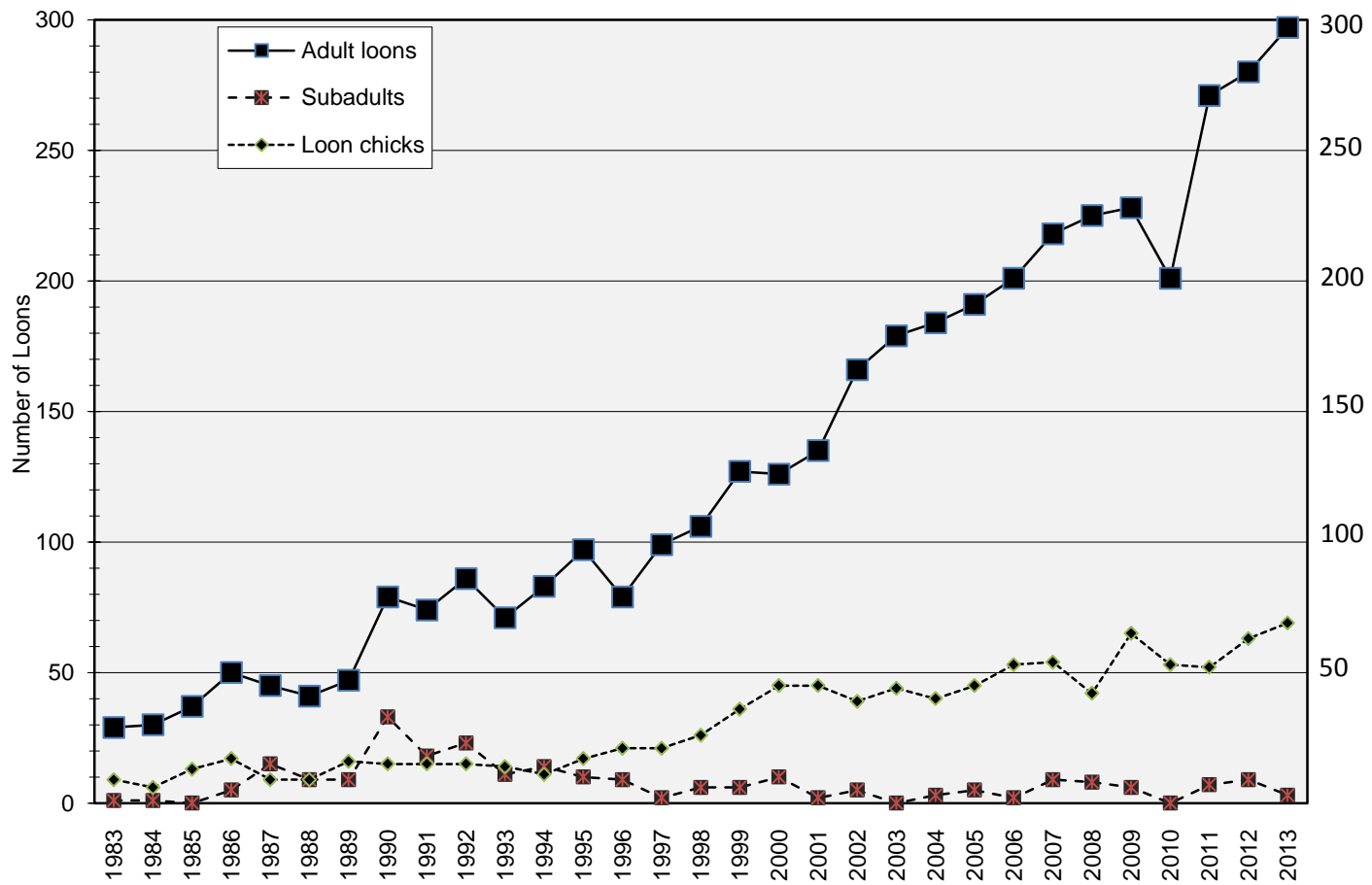
^a The number of lakes surveyed for Loonwatch increased in 1999. It is possible survey adult loon counts during the mid-1990s were slightly lower.

^b 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.

^c Over 10 known lakes with loon activity were missed in 2010.

Figure 3. Vermont Loonwatch Results, 1983-2013
 (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 VLRP 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, camp 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 VLRP 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 VLRP's management and educational efforts. It should be emphasized that over 50% of the breeding loons in Vermont have directly benefited from VLRP 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.

In 2013, the VLRP developed a new brochure promoting better stewardship of lakeshore habitat which will benefit both in-lake and riparian flora and fauna. The health of our lakes and ponds is critical for the long-term sustainability of Vermont's Common Loon population. In conjunction with the Dr. Theresa Donovan at the University of Vermont, a database is being developed for all the loon data collected since 1978. In 2014, we hope to begin inputting all new data as well as uploading past data.

With most short-term goals of the Recovery Plan having been achieved, the VLRP 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 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.
2. 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.

3. We would like to provide more detailed training packets for adopt-a-lake volunteers. Funding was turned down in two recent proposals.
4. 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.
5. 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.
6. Future research needs should be assessed and prioritized including the effects of climate change.

The VLRP 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

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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.

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