

THE 2012 BREEDING STATUS OF COMMON LOONS IN VERMONT

Eric W. Hanson^{1,2} and John Buck³

ABSTRACT: The Vermont Loon Recovery Project, a program of the Vermont Center for Ecostudies and the Vermont Fish and Wildlife Department, documented 70 nesting loon pairs and 103 territorial pairs statewide. Of the 70 pairs that attempted nesting, 50 successfully hatched 87 eggs, with 66 chicks surviving through August (chick survival rate 76%, 0.64 chicks surviving per territorial pair). Four new nesting pairs and 6 new potential territorial pair were identified. However, 6 other potential territorial pairs from 2011 were not observed consistently this year. Twenty-two pairs that have nested in recent years did not nest in 2012 because of intruder loon activity, high water, or lack of suitable nest sites. Of 22 pairs whose first nest attempts failed, 5 re-nested, and 2 were successful. Causes of nest failure included flooding (1 nest), depredation (raven 1 nest), and disturbance (1 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 1 chick disappeared after interactions with intruder loons (and likely more), and 1 was killed from sibling rivalry. Seven adult loon mortalities were documented. Causes included 2 from monofilament and 1 from lead fishing gear. Several failed rescue attempts were made for an adult loon that was missing most of its primary feathers on one wing; this bird was depredated by a coyote after the ice froze. Several rescues and/or searches were made for 4 other loons caught in fishing line or other thread material. Two loons were not found, one attempt was successful, and one loon was not rescued after 4 attempts. About 200 volunteers surveyed lakes throughout Vermont on 21 July as part of the Loonwatch program, an annual statewide loon count. Loons were observed on 98 of 150 surveyed lakes, where observers counted 280 adults, 63 chicks, and 9 subadult loons. The total number of adult loons increased slightly from 2011. To provide a historical perspective, volunteers counted 135 and 191 adult loons in 2000 and 2005, respectively. Twenty-six of the 70 breeding pairs nested on nesting rafts, 25 on islands, and 19 on shorelines. Thirty-nine nesting rafts were placed on known or potential nesting waterbodies. Warning sign buoys were placed around 44 of the 70 nests. Volunteers provided technical assistance through the placement and maintenance of nest warning signs and/or nesting rafts on 35 lakes as part of the adopt-a-lake program. Fourteen loon conservation programs were presented to over 600 people statewide.

¹ Vermont Center for Ecostudies, P.O. Box 420, Norwich, VT 05055; 802-649-1431

² Vermont Loon Recovery Project Coordinator, P.O. Box 22, Craftsbury, VT 05826; 802-586-8064

³ Vermont Fish and Wildlife Department, McFarland State Office Building, 5 Perry St. Suite 40, Barre, VT 05641; 802-476-0196

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 17 years to 70 in 2012. 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.

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 2006, the VFWD began utilizing federal State Wildlife Grant funding for the VLRP through a nongame bird project grant. 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.

Thirty-nine artificial nesting rafts were placed on 35 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 22 rafts.

Warning sign buoys were placed around 44 of the 70 active nest sites to discourage human intrusion close to nests. These signs were also placed around 6 other nest sites where loons ultimately did not nest in 2012. 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. Fourteen 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 605 adults and 28 children 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. The *Loon Caller* newsletter and a loon fact sheet were distributed at all programs. New brochures directed at 1) boaters and 2) lakeshore owners were developed in 2012, and we began broad distribution of the fact sheets through self-serve boxes at boat access areas.

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). Four eggs were collected in 2012. 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 2012

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. Territorial pairs have nested in recent years and were present during most surveys. Lakes where 2 adult loons were observed through much of the summer but had no recent history of nesting were considered potential territories.

Distribution of territorial and nesting pairs

There were 103 known and potential territorial loon pairs, 70 of which were confirmed to nest on 63 lakes (Fig. 1, Table 1). Four new nesting pairs were identified, including L. Elmore, Long P. (Belvidere), Metcalf P, and Mollys Falls R. - island. All but the Mollys Falls pair had failed nests. The Long and Metcalf pairs are the first nesting loon pairs identified in Franklin County in northwest Vermont since monitoring began in 1978. Six new potential territorial pair were identified on Fairfield P., Green River Res. – Big Island, Long P. (Greensboro), McConnell P., Neal P., and Noyes P. However, loons were not consistently observed on 6 potential territories from 2011 (Crystal L., Curtis P., L. Dunmore – north, Lowell L., Mollys P., and L. Willoughby).

Population levels and breeding success

The number of nesting pairs declined slightly and the number of territorial pairs increased from 2010 and 2011. Of the 70 pairs that attempted nesting, 50 successfully hatched 87 eggs, with 66 chicks surviving through August (Fig. 2, Table 2). There were 92 known territorial pairs on water bodies where nesting had occurred within the last 3 years, and 11 potential

territorial pairs, each of which was observed consistently for 6 weeks or more. Twenty-two pairs that have nested in recent years did not nest in 2012 because of intruder loon activity, high water, or lack of suitable nest sites. Of 22 pairs whose first nest attempts failed, 5 re-nested, and 2 were successful. Causes of nest failure included flooding (1 nest), depredation (raven 1 nest), and disturbance (1 nest). 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 76% with 0.64 chicks surviving per territorial pair in 2012. Since 1979, the average chick survival rate is 83% with 0.71 chicks per territorial pair. The causes of mortality of most chicks were unknown. At least 1 chick disappeared after interactions with intruder loons (and likely more), and 1 was killed from sibling rivalry. Seven adult loon mortalities were documented. Causes included 2 from monofilament and 1 likely from lead fishing gear (awaiting complete necropsy report). Several failed rescue attempts were made for an adult loon that was missing most of its primary feathers on one wing; this bird was depredated by a coyote after the ice froze.

Management Results: artificial nesting rafts and nest warning sign buoys

Of the 70 known nests, 26 were on artificial nesting rafts (85% successful), 25 on islands (76% successful), and 19 were on shorelines (47% successful). Nests with warning sign buoys had a 75% success rate compared to 65% 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 21 July when over 200 volunteers counted 280 adult loons, 63 chicks, and 9 subadults (Table 2, Fig. 3). Loons were observed on 98 of the 150 lakes surveyed. The total number of adult loons increased slightly from 2011. Thirty eight of 280 adult loons counted were located in southern and central Vermont. High counts of adult loons in 2012 were obtained on Peacham Pond (11 adults), Green River Reservoir, Lake Memphremagog, and Lake Seymour (9 adults), and Miles and Norton ponds (8 adults).

Loon Rescues

Several failed rescue attempts were made for an adult loon that was missing most of its primary feathers on one wing on Long Pond (Westmore); this bird was depredated by a coyote after the ice froze. Several rescues and/or searches were made for 4 other loons caught in fishing line or other thread material. Two loons were not found (Daniels, Moore), one attempt was successful (Seymour), and one loon was not rescued after 4 attempts (Echo – Ludlow). The loon on Echo L. was healthy enough to fly with the fishing line and was not reported later in the fall. Several other loons were monitored or searched for after reports of the loons being beached, having an injury, or appearing weak. A loon on Zack Woods Pond was rescued after being in territorial fights; it was released on nearby Mud Pond but died a few days later as result of lead poisoning. It is likely the lead poisoning was making the loon weak and thus an easy target for the territorial loons. The VLRP biologist spent over 83 hours 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 39 of the 59 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 all 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, 2012

Nesting pairs: 70 Known territorial pairs: 92 Potential territorial pairs: 11 **Total territorials pairs: 103**

Chicks hatched: 87 Chicks surviving through August: 66

Lake list divided into sections: 1) nesting pairs, 2) known and potential territorial pairs, and 3) loon active lakes.

Loonwatch Count 21 July 2012: Adult loons - 280 New nesting pairs: 4 New territorial pairs: 4

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	successful		2 ch	0 ch	unknow n: 1 disappeared early			8	8	13
Bald Hill P.	Westmore	nesting	raft	abandoned							12	8	8
Bean P.	Sutton	nesting	marsh	successful		2 ch	2 ch				8	8	11
Bourn P.	Sunderland	nesting	island	successful		2 ch	2 ch				11	10	10
Brownington P.	Brownington	nesting	marsh	abandoned - eggs disappeared	signs						11	4	6
Bruce P.	Sheffield	nesting	marsh	abandoned							5	0	
Chandler P.	Wheelock	nesting	marsh	abandoned - eggs disappeared							5	3	3
Chittendon Res.	Chittenden	nesting	raft	successful	signs	2 ch	2 ch				8	6	7
Derby P.	Derby	nesting	marsh	successful	signs	2 ch	2 ch				5	3	4
Dunmore L. / Mud P.	Leicester/ Salisbury	nesting	island	successful	signs	2 ch	2 ch				6	5	7
East Long P.	Woodbury	nesting	island	successful		1 ch	1 ch				32	24	28
Eden L.	Eden	nesting	raft	successful	signs	2 ch	2 ch				9	8	10
Elligo L.	Greensboro	nesting	island	successful	signs	1 ch	1 ch				11	9	11
Elmore L.	Elmore	nesting	marsh	abandoned - eggs disappeared	signs					First nest ever recorded	1	0	
Ewell P.	Peacham	nesting	island	successful	signs	2 ch	1 ch	unknow n: disappeared early			4	4	3
Flagg P.	Wheelock	nesting	island	successful		2 ch	2 ch				2	1	2
Forest L.	Averill	nesting	raft	successful		2 ch	0 ch	unknow n: eagles present			19	16	22
Fosters P.	Peacham	nesting	raft	successful		2 ch	2 ch				10	10	14
Great Averill L. - South	Averill	nesting	raft	successful		2 ch	2 ch				3	2	3
Green River Res. - Access Bay	Hyde Park	nesting	island	successful	signs	2 ch	0 ch	unknow n			5	4	4
Green River Res. - NW	Hyde Park	nesting	island	successful	signs	1 ch	1 ch				34	26	39
Greenwood L.	Woodbury	nesting	raft	abandoned - eggs disappeared	signs						2	1	1
Groton L. - North	Groton	nesting	raft	depredated - raven; re-nest abandoned	signs						3	2	3
Groton L. - South	Groton	nesting	raft	abandoned - eggs disappeared	signs						13	11	14
Hardwick L.	Hardwick	nesting	raft	successful		2 ch	2 ch				10	10	15
Harveys L.	Barnet	nesting	marsh	successful	signs	1 ch	1 ch		Fishing gear 6/3/12	5/25 Ad in line; Fishing gear 1 adult 6/3 dead	4	2	2
Holland P. - South	Holland	nesting	raft	successful	signs	2 ch	2 ch		unknow n 8-5-2; non-breeder		18	11	15
Island P.	Brighton	nesting	island	successful		2 ch	1 ch	unknow n			12	10	12
Joe's P - inlet	Cabot/ Danville	nesting	island	successful	signs	2 ch	2 ch				13	13	17
Joe's P. - 1st Pond	Cabot/ Danville	nesting	island	successful	signs	2 ch	0 ch	1st sibling rivalry early; 2nd unknow n			3	2	1
Keiser P.	Danville/ Peacham	nesting	marsh	successful		2 ch	1 ch	unknow n: disappeared early			8	8	9
Kettle P.	Groton/ Marshfield	nesting	raft	successful	signs	1 ch	1 ch				23	15	20

(continued) Table 1. Summary of Common Loon breeding activity in Vermont, 2012

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
Little Averill L. - North	Averill	nesting	raft	successful		2 ch	1 ch	unknown			3	1	1
Little Averill L. - West	Averill	nesting	shoreline	flooded	signs						26	16	24
Little Hosmer P.	Craftsbury	nesting	island	abandoned - eggs disappeared	signs						14	7	6
Long P. (Eden)	Eden	nesting	marsh	abandoned - eggs disappeared						First nest ever recorded	1	0	
Long P. (Westmore)	Westmore	nesting	island	successful	signs	2 ch	2 ch		Predation: breeding adult could not fly because of missing primaries; when pond froze, coyote depredated loon		14	12	18
Lyford P.	Walden	nesting	marsh	abandoned - eggs disappeared							3	2	2
Martins P.	Peacham	nesting	raft	successful	signs	2 ch	2 ch				16	16	23
Metcalf P.	Fletcher	nesting	island	eggs disappeared; re-nest abandoned	signs					First nest ever recorded	1	0	
Miles P.	Concord	nesting	raft	successful	signs	2 ch	2 ch				19	15	20
Molly's Falls Res. - Island		nesting	island	successful	signs	2 ch	2 ch			First nest ever recorded	1	1	2
Molly's Falls Res. - North	Cabot	nesting	raft	successful	signs	2 ch	2 ch				18	17	25
Newark P.	Newark	nesting	island	successful		2 ch	2 ch				23	16	23
Nichols P.	Woodbury	nesting	raft	successful	signs	1 ch	1 ch				13	11	11
Ninevah L.	Mount Holly	nesting	island	successful	signs	2 ch	2 ch				18	16	21
No. 10 P. (Mirror L.)	Calais	nesting	raft	successful	signs	1 ch	0 ch	Depredation - eagle likely			6	6	7
Norton P. - Island	Norton	nesting	raft	successful	signs	2 ch	2 ch				33	26	34
Norton P. - North	Norton	nesting	raft	successful	signs	2 ch	2 ch				5	1	2
Osmore P.	Peacham	nesting	island	successful	signs	2 ch	1 ch	unknown n: disappeared early			4	3	3
Peacham P. - North	Peacham	nesting	island	successful	signs	2 ch	1 ch	unknown n	unknown n 7-20-12; non-breeder		35	29	36
Peacham P. - SE	Peacham	nesting	marsh	abandoned - eggs disappeared							5	2	3
Peacham P. - SW	Peacham	nesting	marsh	successful		1 ch	0 ch	unknown n			26	19	23
Pensioner P.	Charleston	nesting	raft	successful	signs	2 ch	1 ch	unknown n: eagles present			6	5	7
Ricker P.	Groton	nesting	raft	successful	signs	2 ch	0 ch	1st intruder loons; 2nd unknown n, sent to Tufts			10	9	11
Seymour L. - Winape	Morgan	nesting	raft	successful	signs	2 ch	2 ch				15	13	19
Shadow L. - (Concord)	Concord	nesting	shoreline	eggs disappeared; re-nest abandoned							6	2	2
Somerset Res. - Dandeneau Cove	Somerset	nesting	island	disturbance	signs						31	23	28
South P.	Eden	nesting	island	abandoned - eggs disappeared	signs						14	11	13

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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
Spectacle P.	Brighton	nesting	raft	successful	signs	2 ch	1 ch	Unknown; disappeared early			18	16	21
Spring L.	Shrewsbury	nesting	raft	successful	signs	2 ch	2 ch				11	8	11
Sunset L.	Marlboro	nesting	island	abandoned - eggs disappeared	signs				unknown 7-7-13		4	3	4
Thurman Dix Res.	Orange	nesting	island	successful		1 ch	1 ch				32	27	31
Wallingford P.	Wallingford	nesting	marsh	successful		2 ch	0 ch	unknown			13	9	14
Wantastiquet P.	Weston	nesting	island	abandoned - eggs disappeared							4	3	3
West Mountain P.	Maidstone	nesting	shoreline	successful		1 ch	0 ch	unknown			14	8	6
Wolcott P.	Wolcott	nesting	shoreline	abandoned - eggs disappeared							21	19	25
Woodbury L. (Sabin)	Woodbury	nesting	raft	successful	signs	1 ch	1 ch				6	6	4
Woodward Res.	Plymouth	nesting	island	successful	signs	2 ch	2 ch				6	3	4
Zack Woods P.	Hyde Park	nesting	island	successful	signs	2 ch	2 ch		Lead fishing gear - need to confirm cause; non-breeder		16	14	23
Beaver P.	Holland	territory									30	26	33
Berlin P.	Berlin	territory									9	8	11
Buck L.	Woodbury	territory									6	3	4
Coles P.	Walden	territory									13	12	18
Daniels /Rodgers P.	Glover	territory								Beaver pond partially drained; loons only observed a few times on the pond	3	2	2
Echo L. - South	Charleston	territory									4	2	2
Fairfield		potential territory								new potential territory			
Fairlee L.	Fairlee	potential territory								potential pair observed several times in May and June			
Great Averill L. - North	Averill	territory									18	10	12
Great Hosmer P.	Albany/Craftsbury	territory								5-6 adult loons observed frequently; occasionally 2 loons observed at north and south end at the same time, thus possible new pair forming	3	3	4
Green River Res. - Big Island	Hyde Park	potential territory								Nest building observed			
Holland P. - North	Holland	territory									2	0	0
Jobs P.	Westmore	territory									6	4	3
Kent P.	Killington	territory								Water levels down because of hurricane Irene and dam repairs	3	1	1
Long P. (Greensboro)	Greensboro	potential territory								new potential territory			
Lower Symes P.	Ryegate	territory									9	8	12
Maidstone L. - North	Maidstone	territory									5	4	2
Maidstone L. - SE	Maidstone	territory								Landowners discourage pair from nesting on their island	3	2	3
Maidstone L. - South	Maidstone	territory									30	28	33
May P.	Barton	territory									19	17	24

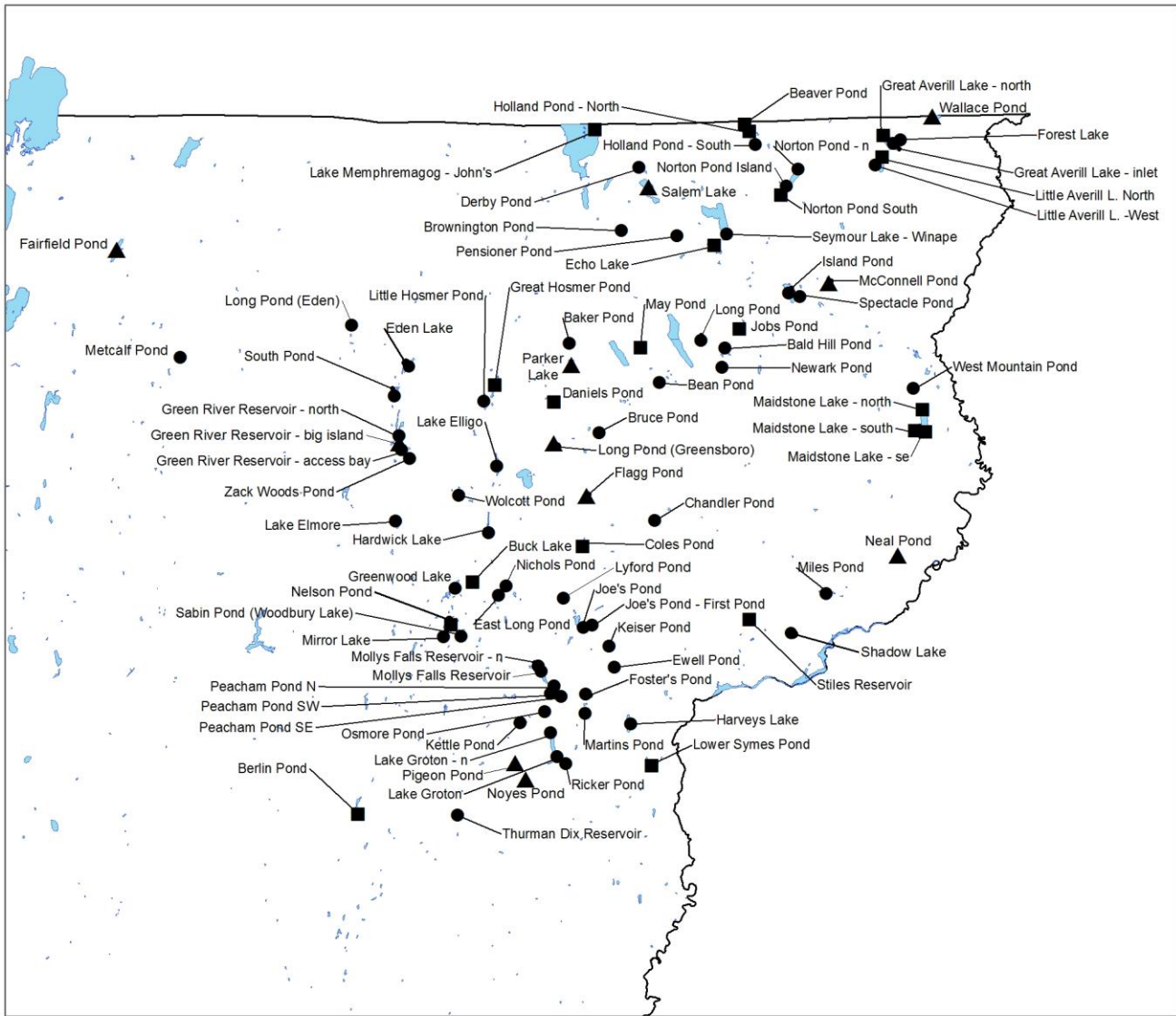
(continued) Table 1. Summary of Common Loon breeding activity in Vermont, 2012

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
McConnell P.	Brighton	potential territory									15	11	15
Memphremagog L. - John's River	Derby	territory									4	2	1
Neal P.	Lunenburg	potential territory								new potential pair			
Nelson P.	Woodbury	territory									1	0	
Norton P. - South	Norton	territory									12	11	14
Noyes P.	Groton	potential territory								new potential pair	1	0	0
Parker L.	Glover	potential territory								not many surveys reported			
Pigeon P.	Groton	potential territory								new potential territory	1	0	0
Salem L.	Derby	potential territory								not many surveys reported			
Somerset Res. - Narrows	Somerset	territory									2	0	
Somerset Res. - North Islands	Somerset	territory									7	5	6
Stiles Res.	Waterford	territory									10	8	11
Wallace P.	Canaan	potential territory								not many surveys reported			
Branch P.	Sunderland	loon active									1	1	1
Carmi L.	Franklin	loon active											
Caspian L.	Greensboro	loon active									1	0	0
Center P.	New ark	loon active											
Champlain L.	various	loon active									2	0	0
Crystal L.	Barton	loon active											
Curtis P.	Calais	loon active								change from pt to loon active			
Dunmore L.- North	Leicester/ Salisbury	loon active											
Echo L. - North	Charleston	loon active											
Fern L.		loon active											
Lewis P.	Lew is	loon active											
Lowell L.	Londonderry	loon active								change from pt to loon active			
Marshfield P.	Marshfield	loon active											
Memphramagog L. - Holbrook Bay	New port	loon active											
Miller P.	Strafford	loon active											
Mollis P.	Cabot	loon active								change from pt to loon active			
Moore Res. - Roaring Brook	Concord	loon active									4	3	0
Morey L.	Fairlee	loon active								change from pt to loon active			
Rescue L.	Ludlow	loon active											
Seymour L. - West	Morgan	loon active									1	1	2
Shadow L.	Glover	loon active											
Silver L.	Salisbury	loon active											
Somerset Res. - South	Somerset	loon active											
Stratton P.	Stratton	loon active											
Wapanacki P.	Wolcott	loon active											
Willoughby L.	Westmore	loon active											
Amherst	Plymouth	occasional sighting											
Echo L. (plymouth)	Plymouth	occasional sighting											
Gale Meadows	Winhall	occasional sighting									2	0	0
Grout P.	Stratton	occasional sighting											
Halls		occasional sighting											

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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
Hardwood P.	Elmore	occasional sighting									10	9	11
Harriman Res.	Wilmington	occasional sighting											
Notch P.	Ferdinand	occasional sighting											
Silver L. (barnard)	Barnard	occasional sighting											
South P.	Marlboro	occasional sighting											
St. Catherine L.	Poultney	occasional sighting											
Sugar Hill Res.	Ripton	occasional sighting											
Turtle P.	Holland	occasional sighting									2	0	0
Warden P.	Barnet	occasional sighting											
Waterbury Res.	Waterbury	occasional sighting									3	1	1
West Hill	Cabot	occasional sighting						Fishing line. Also had 3 steel pellets but not cause of death					

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



Locations of Loon Pairs - 2012

- nest
- ▲ possible territory
- territory

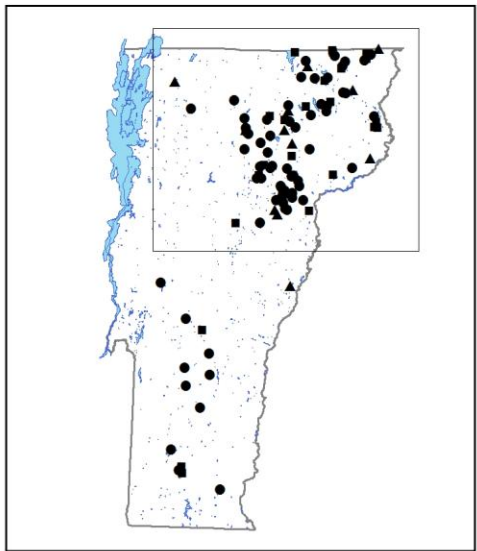
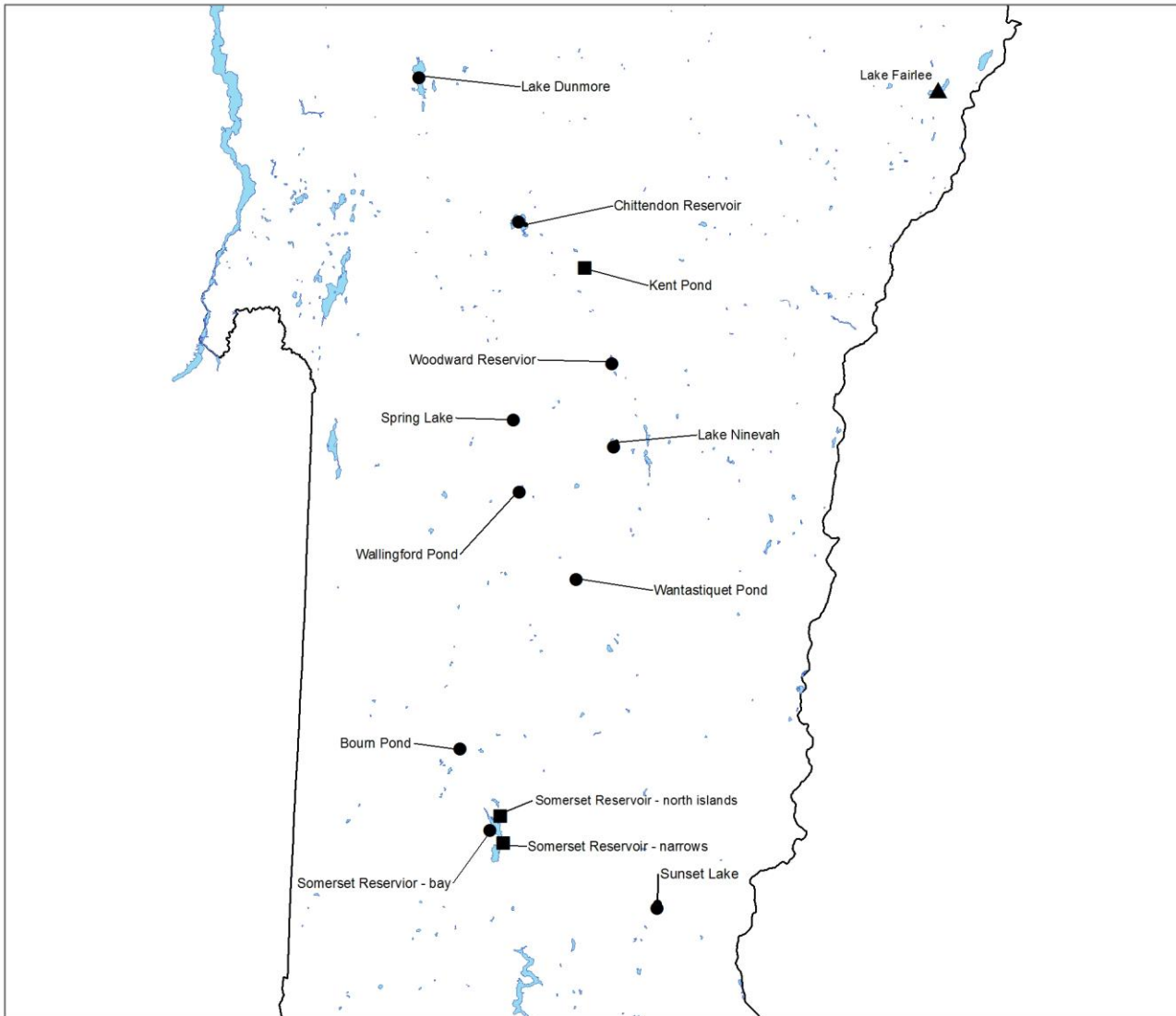


Figure 1b. Common Loon Nesting and Territorial Pairs in Vermont



Locations of Loon Pairs - 2012

- nest
- ▲ possible territory
- territory

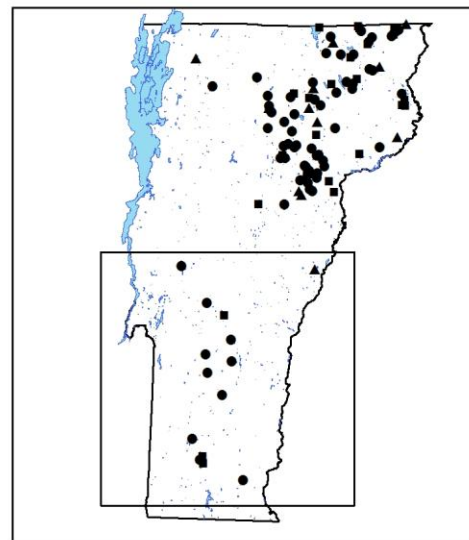


Figure 2. Summary of Common Loon breeding activity in Vermont, 1978-2012

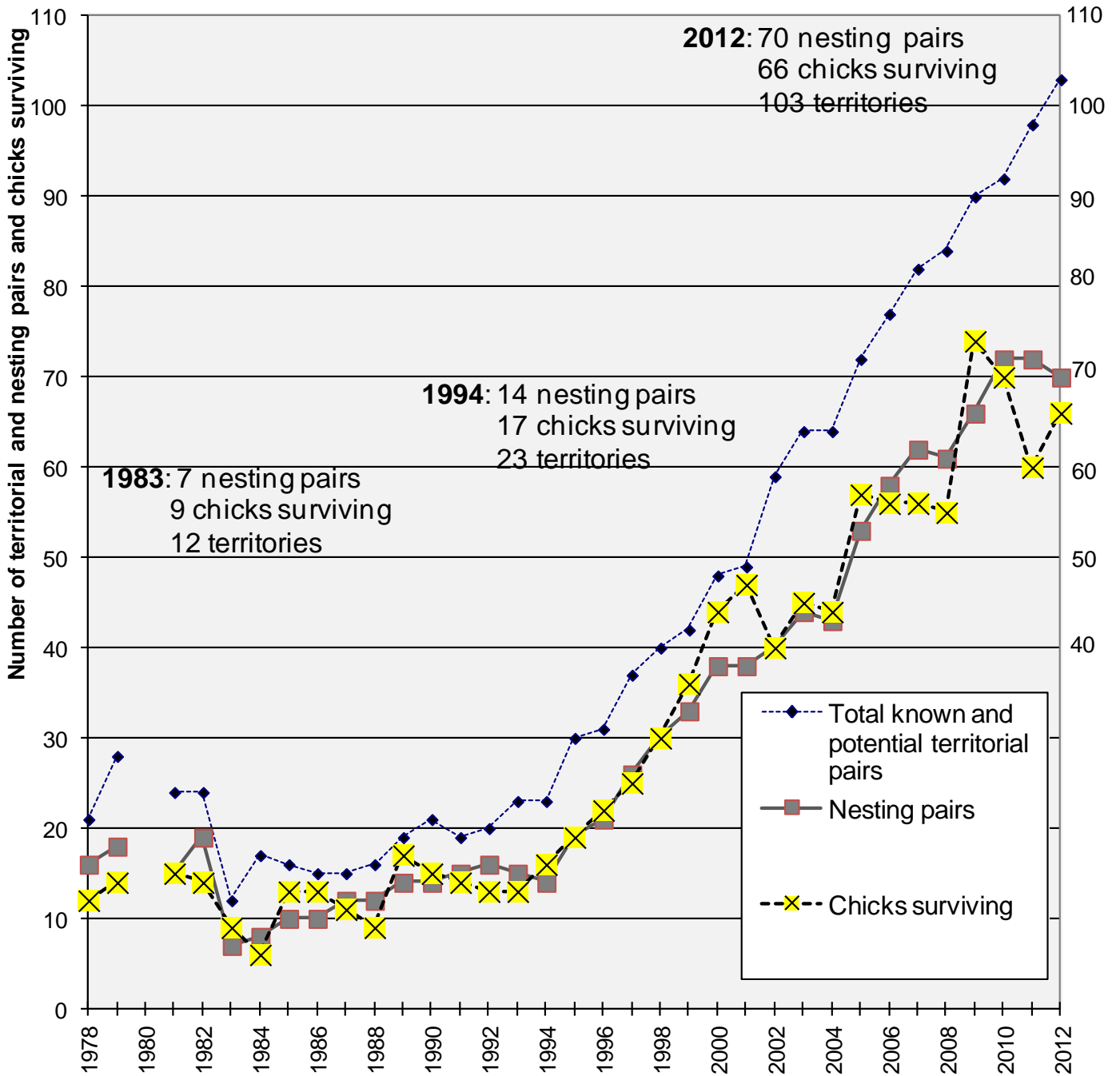


Table 2. Summary of population changes and reproductive success of Common Loons in Vermont, 1979-2012.

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	
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	
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	
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	
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	
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	
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	
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	
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	
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	
% 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%	
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	
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	
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	
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	
Number of lakes surveyed																						150	107	131	133	123	98	122	133	148	148	129	129	162	150
Number of lakes occupied																											68	69	84	86	84	89	76	102	98

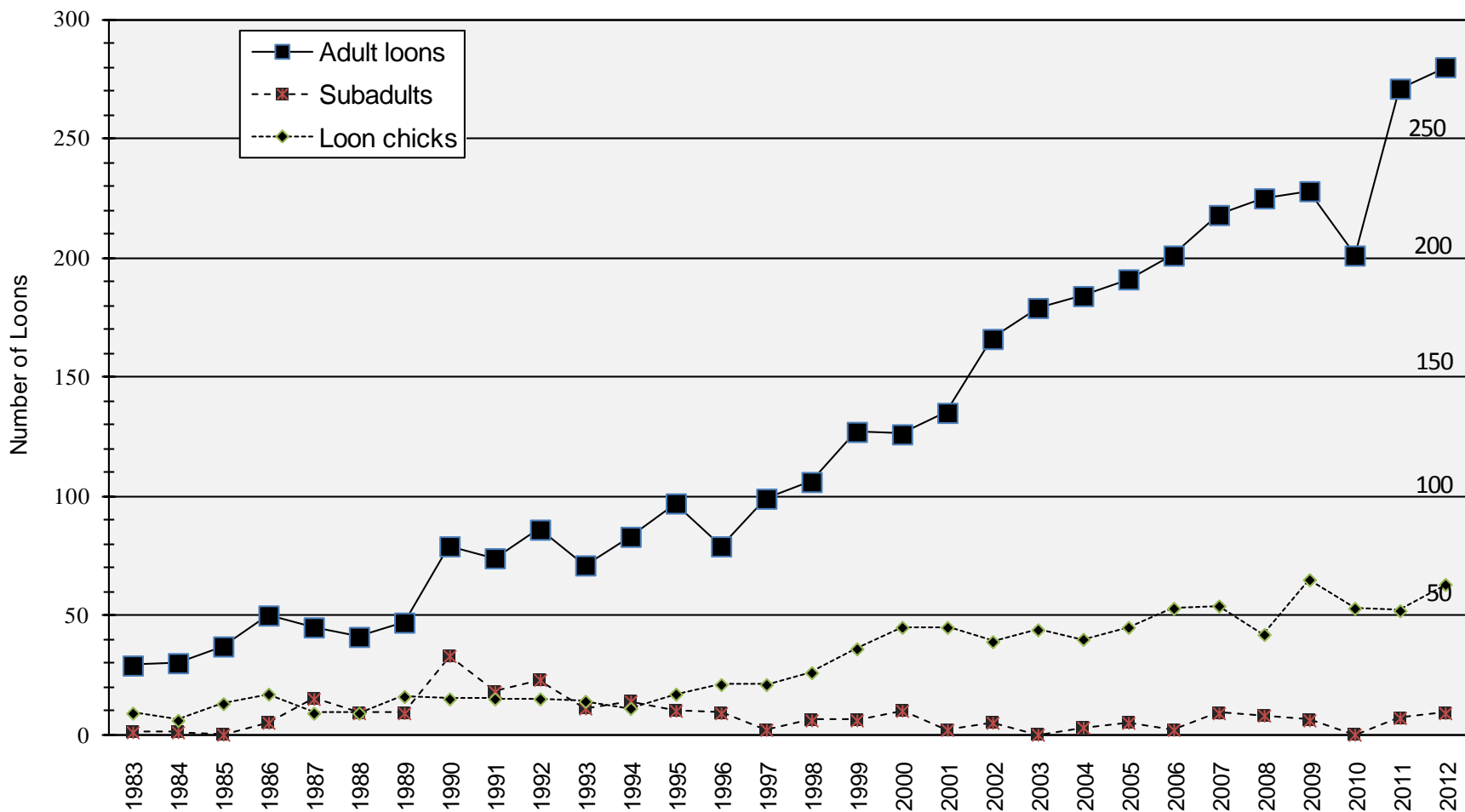
^a The number of lakes surveyed for Loonwatch increased in 1999. It is possible survey adult loon counts during the mid-1990s were slightly lower.

^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, 1983-2012
 (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, a new brochure aimed at lakeshore residents will be distributed door-to-door near loon nest sites. The goal of this brochure is to promote better stewardship of lakeshore habitat which will benefit both in-lake and riparian flora and fauna. In addition, the new brochure focused on boaters will be more widely distributed at programs and self-serve boxes at boat access kiosks.

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. In 2011, the Vermont River Conservancy approached the VLRP about trying to obtain a grant to promote awareness about conservation easements on lakeshores with a focus around loon nesting sites.

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.

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 fact sheets 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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