THE 2009 BREEDING STATUS OF COMMON LOONS IN VERMONT

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ABSTRACT: Vermont's Common Loon population continued to increase in 2009, 4 years after the Vermont Agency of Natural Resources removed the species from the state Endangered and Threatened Species list. The Vermont Loon Recovery Project, a program of the Vermont Center for Ecostudies and the Vermont Fish and Wildlife Department, documented a record high 66 loon nesting pairs and 90 territorial pairs statewide. Of the 66 pairs that attempted nesting, 53 successfully hatched 83 eggs, with 74 chicks surviving through August (chick survival rate 89%, 0.82 chicks surviving per territorial pair). The number of chicks lost (9) was low in 2009 compared to 2008 (20) and 2007 (15). Six new nesting pairs and 3 new potential territorial pairs were identified. Fourteen pairs that have nested in recent years did not nest in 2009 because of intruder loon activity, high water, or lack of suitable nest sites. Of 14 pairs whose first nest attempts failed, 2 re-nested, and 1 of these was successful. Causes of nest failure included possible human disturbance (1 nest) and flooding (3 nests). The remaining failed nests were abandoned for unknown reasons. The causes of mortality of most chicks were unknown. One chick disappeared after interactions with intruder loons. Seven adult loons were entangled in or ingested fishing line. One died, 2 were rescued and released, 3 likely freed themselves, and the 1 bird's fate was unknown. Another adult died after fights with other loons, and 2 died for unknown reasons, although both died within occupied loon territories in the spring. About 185 volunteers surveyed lakes throughout Vermont on 18 July as part of the Loonwatch program, an annual statewide loon count. Loons were observed on 89 of 129 surveyed lakes (occupancy rate of 69%), where observers counted 228 adults, 65 chicks, and 6 subadults, an increase in the number of adults from previous years. To provide a historical perspective, volunteers counted 127 and 184 adult loons in 1999 and 2004, respectively. Twenty-four of the 66 breeding pairs nested on nesting rafts, 20 on islands, and 22 on shorelines. Thirty-eight nesting rafts were placed on known or potential nesting waterbodies. Warning sign buoys were placed around 35 of the 66 nests. Volunteers provided technical assistance through the placement and maintenance of nest warning signs and/or nesting rafts on 40 lakes as part of the adopt-a-lake program. Eleven loon conservation programs were presented to over 280 adults and 140 children statewide.

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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 15 years to 66 in 2009. 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-two years of Common Loon conservation and education by many groups and individuals enabled the achievement of this milestone. Through the guidance of VCE and the VFWD Nongame and Natural Heritage Program (NNHP), 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. The removal of the loon from the Vermont Endangered Species list provides a new challenge of how to responsibly manage a species once it is delisted. The VFWD, with the help of the VCE and the SAG on Birds, has drafted a post-delisting monitoring and management plan to address the continued threats to loons in Vermont and the species' current dependence on the VLRP's management and educational efforts.

Current monitoring efforts have included locating territorial and breeding pairs, documenting nesting chronology and nest-site locations, recording numbers of eggs hatched and chicks surviving through August, and identifying potential nesting habitat on lakes where non-breeding loons were frequently observed. On the third Saturday of July, volunteers surveyed most lakes and ponds considered suitable for loons as part of the on-going Loonwatch day, providing an annual statewide population estimate.

Public education efforts have included presenting slide lectures and discussions, distributing loon conservation fact sheets, educating and training volunteers, and placing signage about loon conservation at lake access areas. Over the past 11 years, extra efforts have been made to educate anglers about the threats of lead fishing gear and to encourage people to use non-lead alternatives. A ban on the sale and use of lead sinkers ½ ounce or less took effect in Vermont in 2006 and 2007, respectively. On most breeding and territorial lakes, adopt-a-lake volunteer observers have provided technical assistance by actively monitoring loon activity, assisting with management programs, and educating lake-users about appropriate boating behavior when near breeding loons.

Management efforts to increase loon nesting success have included enhancement of loon nesting habitat through placement of artificial nesting rafts, placement of warning sign buoys to reduce human disturbance around nest sites, coordination with hydroelectric companies and other agencies to stabilize water levels during the nesting period, capture and rescue of injured loons or loons in distress, and law enforcement presence by state game wardens.

Since the mid-1980's, the VLRP has been a joint program between VCE and VFWD/NNHP. The Nongame Wildlife Fund has been the primary funding source for the VLRP (40-70% 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

Collection of field data began in late April. The VLRP biologist, VFWD biologists and game wardens, or 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). This represents an increase from 100-115 lakes over the past several years. Monitoring included recording data on loon behavior, nest-site location, water level, boating activity, and observation of other wildlife and human activity relevant to loon habitat or reproductive success. All observations were conducted with binoculars from a kayak, canoe, motorboat, or the shoreline. Observers collected information on standardized data forms, and regularly updated the VLRP biologist through phone calls, postcards, or e-mail. Over 120 adopt-a-lake volunteers participated in this intensive monitoring effort. New volunteers were sent detailed written instructions on conducting surveys. Nests were located by investigating traditional nest sites and carefully observing behavior of loons on the water. We categorized known territorial loon pairs as those non-nesting pairs present on a given lake in every year since the last documented breeding attempt on that lake. Potential territorial pairs were those that exhibited territorial behavior (e.g., observed together, acting defensively towards a third adult loon, nest searching, copulation) for at least a 6-week period on lakes that lacked a history of recent nesting or regular occupancy. A new "casual lake survey" program was initiated in 2009 to promote surveys of lakes without nesting activity at any time from May through August.

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 7 hydroelectric companies and 3 agencies that regulate water levels on lakes where loons have historically nested were contacted in April by a VFWD biologist. A system of communication was established such that the VCE biologist informed the company when nesting had commenced and terminated. 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. Not all companies were able to stabilize water levels either because of hydroelectric needs or the inability to regulate water levels during large rain events.

Thirty-eight 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 will also be considered on lakes where natural nests have failed 3 consecutive times, and the VLRP deems that rafts might prove beneficial. Six rafts have been removed since 2005 (Bald Hill, Brownington, Greenwood, Little Hosmer, Memphremagog, Newark), because natural nest sites were available. Adopt-a-lake volunteers maintained or helped with 26 rafts. Placement of rafts was completed as soon after ice-out as possible, because loons may begin visiting nest sites shortly after returning from their wintering grounds.

Warning sign buoys were placed around 35 of the 66 active nest sites to discourage human intrusion close to nests. These signs were also placed around 5 other nest sites where loons ultimately did not nest in 2009. Sign buoys were used in areas where repeated human disturbance was likely to occur. The signs informed boaters that they were close to a loon nest site and that intrusion could contribute to nest failure. Buoys were typically placed 50 – 100 meters away from the nest site. Most incubating loons showed signs of being aware of a boater's presence at this distance, but did not crouch excessively or flush from the nest. Thus, stress on incubating loons was minimized, as was restriction of lake use by boaters and anglers. On several lakes, sign placement was determined by lake configuration and nest location. For example, if there was a large expanse of water around the nest, signs were placed up to 150 meters away. If the nest was in a channel, signs were placed as close as 5 meters. For pairs that used a traditional nest site, most signs were placed prior to nesting in early May. For loon pairs that often changed nest sites, sign buoys were not placed until nesting had begun. For pairs that did not nest, signs were removed by early July.

In responding to loon emergency calls, a communication protocol was established so that state police barracks and VFWD personnel initially contacted the VLRP biologist about injured, sick, or dead loons. If the biologist was unavailable, VFWD game wardens and biologists were contacted next to assess the reported incident. The St. Johnsbury Animal Hospital, the Lamoille Valley Veterinary Service, the Mad River Veterinary Service, the Country Animal Hospital in Bethel, Shelburne Veterinary Services, and the VT/NH Veterinary Clinic offered their services to conduct initial exams of sick or injured loons, in addition to the Vermont Institute of Natural Science (VINS) Wildlife Services Department. A written protocol for assessing and handling loons was sent to all participating veterinarians and VFWD game wardens.

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. This communication has proven vital for successful nesting, especially on highly developed lakes. Eleven slide lectures and discussions on loon biology, conservation, and research were presented to audiences at lake associations, school groups, state parks, and other organizations (libraries, conservation groups, elderhostel, youth camps, and a resort). A new documentary, *the Dark Side of the Loon*, about wintering loons and loon mortality was shown at 3 of these events. Gail Osherenko, from Wolcott, Vermont, filmed and produced the movie. Approximately 280 adults and 140 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 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 mailed to volunteers and distributed at all programs.

In May 2004, Vermont passed a law banning the sale and use of lead sinkers ½ oz. or less beginning in 2006 and 2007, respectively. Lead jigs were not included in this law. In conjunction with VFWD, efforts to educate the public about the dangers of lead sinkers and jigs continued in 2009. The VFWD led efforts to educate anglers about the new lead fishing gear ban through posters, their website, and other outreach materials.

VLRP conservation efforts received exposure in state and regional newspapers and on Vermont Public Television.

Vermont Loonwatch Day

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. Observers on lakes larger than 300 acres were allowed a longer survey period. Data were recorded on standardized forms and

returned to the VLRP biologist for summarization via standard mail, e-mail, or on-line through VT ebird. 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.

C*ontaminant sampling*

Abandoned eggs were collected and delivered to BioDiversity Research Institute (BRI) for methylmercury (MeHg) analysis (Evers et al. 1999). The contaminant data from eggs provide an indicator of mercury levels in Vermont lakes. The developmental stage of the embryos was also assessed. This research was part of a regional assessment of mercury throughout New England. 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

Distribution of territorial and nesting pairs

Seventy-six lakes supported 90 known and potential territorial loon pairs, 66 of which were confirmed to nest on 61 lakes (Fig. 1, Table 1). The highest concentration of breeding and territorial pairs occurred in north-central and northeastern Vermont. Nesting was recorded for the first time on 6 new territories, including Daniels/Rodgers Pond, Great Hosmer Pond, Kent Pond, Little Averill Lake-North, Sunset Lake (Marlboro), and Wantastiquet Pond. Nests were successful for the first time on Chandler Pond and Shadow Lake (Concord). Three new potential territories were identified in 2008 (Greenwood, Joe's-2nd pond, and Somerset-NE).

Population levels and breeding success

The number of nesting and territorial pairs increased in 2009. Of the 66 pairs that attempted nesting, 53 successfully hatched 83 eggs, with 74 chicks surviving through August, all record highs (Fig. 2, Table 2). There were 80 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. Fourteen pairs that have nested in at least 1 year from 2002-2007 did not nest, possibly because of intraspecific competition, water fluctuation, or lack of suitable nesting sites.

Of 14 pairs whose first nest attempts failed, 2 re-nested, and 1 of these was successful. Causes of nest failure included flooding (Green River – NW, Holland – N, Memphremagog – John's River) and possible human disturbance (Kent). The Holland Pond – N and Lake Memphremagog – John's River loon pairs were both likely disturbed by people as well prior to flooding. Several pairs incubated their eggs beyond the expected hatch date and then abandoned their nests (Bourn, Kent, Zack Woods). The remaining failed nests were abandoned for unknown reasons.

The chick survival rate through August was 89% with 0.82 chicks surviving per territorial pair in 2009 compared to 73% chick survival and 0.64 chicks per territorial pair in 2008. The causes of mortality of most of the 9 lost chicks were unknown. One chick disappeared after interactions with intruder loons (Forest). Four adult loons were found dead. One died after fights with the territorial pair (Forest), and another died from complications with fishing line (Champlain – South Hero). The Forest Lake loon had been color-banded in 2005 after being rescued from snagging a fishing lure. The other two died for unknown reasons, although both died within occupied loon territories in the spring (Maidstone, Stiles). The Stiles Pond loon had been banded as a chick on Azischohos Res. in Maine in 1994 and is one the longest documented dispersals by a chick from its natal lake (85 km).

Appendix 1 provides an assessment of loon activity for every breeding lake from 1978 to the present.

Productivity Assessment of New vs. Established Nesting Pairs

When comparing new nesting pairs from 2005-2008 to established pairs over the same time period, the new pairs had a nesting success rate of 59% compared to 80% for established pairs. The overall chick productivity rate was 0.39 chicks per territorial pair for new pairs compared to 0.82 chicks per territorial pair for established pairs. See Discussion – Population Assessment section on p. 22 below for details.

Territory Size Assessment

The size of 80 loon territories varied from 9 to161 ha (23-397 acres) with an average size of 62 ha (162 acres). For multiple territorial lakes, territory size was determined by dividing the lake size by the number of territories. For lakes greater than 400 acres, a default territory size of 300 acres was used. When assessing only single territorial lakes less than 400 acres, the average territory size was 51 ha (126 acres).

Loon Rescues

The VLRP biologist, VFWD game wardens, or professional wildlife rehabilitators assisted and/or monitored 10 loons in distress in 2009. One loon was successfully captured on a small farm pond in Cabot, Vermont, from which the loon could not take off. An intruder loon was monitored for a week after fights with a territorial pair; it was not observed for 2 weeks before being found dead. Two loons were successfully captured and released after snagging fishing line on Neal Pond and Lake Willoughby. One loon on Lake Champlain died after becoming entangled in fishing line; it was observed two weeks earlier but was not catchable. Four other loons either freed themselves from fishing line or disappeared and died. A loon was monitored on a small, dammed section of the Winooski River for several weeks before likely finding a way to take off.

The VLRP biologist spent over 60 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.

Natural nesting sites and artificial nesting rafts

Of the 66 known nests, 22 (33%) were on shorelines, 20 (30%) were on natural islands, and 24 (36%) were on artificial nesting rafts. Ten established pairs built nests in new locations more than 100 m from their past nesting locations. Nine other pairs had minor changes in nest locations. Five of the 6 new nesting pairs built nests in natural locations.

Of the 38 artificial nesting rafts placed in 2008, 14 were not used for nesting. Five new rafts were placed in 2009, 1 of which was utilized on Norton Pond – North. New rafts were placed on Harvey's and Shadow lakes because of repeated nest failures and on Caspian and Rescue lakes because of lack of habitat and several years of pair-like activity. The Shadow Lake loon pair had a successful shoreline nest for the first time, but did not use the nesting raft. The Harvey's Lake pair did not attempt to nest. Of the other rafts not utilized in 2009, 1 was located on a reservoir where loons nested on a natural site (Thurman Dix), and 5 were located on lakes with known territorial pairs that had used rafts in past years (Echo, Little Averill-W., McConnell, No. 10, Somerset-N. Islands). Six rafts were located in areas where loon pair activity was observed, but not often enough to determine territorial status (Caspian, Moore – Roaring Brook, Morey, Salem, Rescue, Seymour-West).

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 40 of the 57 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. Volunteers or other citizens aware of the loon program detected 5 of 6 of the new nesting pairs and all 3 new potential territorial pairs.

Vermont Loonwatch Day

Vermont Loonwatch day was conducted on 18 July, with 129 lakes (excluding Lake Champlain) surveyed by 185 volunteers. Several large lakes were divided into sections and surveyed by multiple observers. Loons were observed on 89 of 129 surveyed lakes (occupancy rate of 69%), where observers counted 228 adult loons, 65 chicks, and 6 subadults (Table 2, Fig. 3). High counts of adult loons in 2009 were obtained on Lake Memphremagog and Norton Pond (11 adults), and Somerset and Green River reservoirs (6 adults). Loons were still incubating at 2 sites during the survey.

Sampling for contaminants

Whole egg analysis

Unhatched eggs in nests were collected from 1997-2009. Fourteen eggs were collected in 2009. Analysis of 37 eggs collected from 2005-7 indicated low to moderate levels of methylmercury (MeHg) on most lakes except for the 4 eggs collected from Shadow Lake (Concord), which had 3 high readings. In past years, eggs from Holland (1997) and McConnell (1998) ponds and Green River (1998), Moore (1998), and Somerset reservoirs (2003) had MeHg levels that were considered high or very high. The Holland Pond eggs from 1998 and the Green River Reservoir egg from 2000, however, had moderate concentrations of MeHg.

Description of loon activity on individual lakes in 2009

Lake and loon activity descriptions are provided for nesting pairs, known territorial pairs, and potential territorial pairs. Lakes with high levels of loon activity are listed. Management level refers to the need for warning sign buoys to be placed around nest locations because of the potential risk of human disturbance causing nest failure. Sign buoys may be helpful, but are not essential for moderate management lakes, and warning signs are not needed for low management lakes. Education of lake users about appropriate boating behavior near nests and around chicks, and contact with lakeshore owners, are important for high management lakes. With warning signs present, lake residents can more effectively inform boaters about staying away from nest sites.

Status of nesting pairs in 2009

Baker Pond (Glover): Nesting confirmed: not obs. Chicks observed: 13 June
Number chicks: 2 Number through Aug.: 2
Comments: The loons nested at the traditional north marsh site.
Management level: low. Sign buoys were not used; recreational use is light.

Bald Hill Pond (Westmore): Nesting confirmed: 24 June Chicks observed: 14 July
Number chicks: 1 Number through Aug.: 1
Comments: The pair nested at a natural site on the north shoreline for the second time. A nesting raft had been used since 1998, but was removed in 2007 to promote the use of natural sites. A loon was observed on the nest 3 June, but it might have been nest building. A second egg was left in the nest.
Management level: moderate. Sign buoys were not placed. 4 sign buoys have been placed in the past. The pond receives moderate use by anglers and boaters.

Bean Pond (Sutton): Nesting confirmed: not obs. Chicks observed: 6 August
Number chicks: 1 Number through Aug.: 1
Comments: The loons nested in a new location along the northeast shoreline, but the nest was not located until after the hatch. A second egg was left in the nest.
Management level: low. Sign buoys were not used; recreational use is light.

Beaver Pond (Holland): Nesting confirmed: 4 July Chicks observed: 17 July
Number chicks: 2 Number through Aug.: 2
Comments: The loons nested on the traditional nest island.
Management level: low. Sign buoys were not used; recreational use is light.

Berlin Pond (Berlin): Nesting confirmed: 5 June Chicks observed: 8 July
Number chicks: 1 Number through Aug.: 1
Comments: The loons nested at a new location along the north shoreline at the west end. Several surveys may be required to confirm the absence or presence of adult loons and/or chicks because of limited observation points.
Management level: low. No public access is allowed on the pond, as it Montpelier's public water supply.

Bourn Pond (Sunderland): Nesting confirmed: 31 May Nest failure confirmed: late June
Number chicks: 1 Number through Aug.: 1
Comments: The loons nested on the traditional island site. The pair was off the nest during the first site visit, and there was 1 egg in the nest.
Management level: low. The pond has a hiking trail and campsites along its southern and western shores but is accessible only by a 3-mile hike from the nearest road.

Brownington Pond: Nesting confirmed: 23 May Chicks observed: 14 June
(Brownington) Number chicks: 1 Number through Aug.: 1
Comments: The pair nested along the marsh shoreline in the northwest section of the pond. Several loon nests have flooded in the past. The pair used a nesting raft for several years, but nesting success was minimal on this as well, thus the raft was removed because of the extensive marsh habitat. This was the first successful nest since 2003.
Management level: moderate. 3 sign buoys were placed. The lake is infested by Eurasian milfoil (*Myriophyllum spicatum)*.

Bruce Pond (Sheffield): Nesting confirmed: 27 June Nest failure confirmed: 12 July
Comments: The pair nested for the first time in 2007; the nest failed. The 2009 nest was possibly flooded during the early season rains. The pond is small, thus it is likely the loons spend time on nearby lakes and ponds.
Management level: low. The pond is undeveloped and is only accessible by a ½-mile long logging road.

Chandler Pond (Wheelock): Nesting confirmed: not obs. Chicks observed: 24 July
Number chicks: 1 Number through Aug.: 1
Comments: This was the first successful nest recorded. The nesting location was unknown. The pair abandoned their first nest in 2007.
Management level: low. The pond is undeveloped and is accessible by a field road to the dam.

Chittenden Reservoir: Nesting confirmed: 5 June Chicks observed: 5 July
(Chittenden) Number chicks: 2 Number through Aug.: 2
Comments: The loons nested on a raft on the eastern shore.
Management level: high. 8 sign buoys were placed. The reservoir is heavily used by kayakers, canoeists, and anglers. There is a 5 mph speed limit on the reservoir. The large watershed and steep hillsides cause water levels to rise quickly with relatively small amounts of rain.

Coles Pond (Walden): Nesting confirmed: 24 May Chicks observed: 20 June
Number chicks: 2 Number through Aug.: 2
Comments: The loon pair nested on the small bog-mat island in the western cove.

Management level: moderate. 3 sign buoys were placed; boat traffic is light to moderate.

Daniels/Rodgers Pond: Nesting confirmed: 13 June Chicks observed: 24 June
(Glover) Number chicks: 2 Number through Aug.: 1

Comments: The pair nested on Rodgers Pond, a 10-15 acre beaver pond. The chicks were present until 30 June; the following day, the loon volunteer on Daniels Pond, located 600 m away, reported 2 chicks. We did not observe typical pair activity on Daniels Pond in May and June and no nest was found, thus we suspect the adult loons moved the chicks from Rodgers Pond to Daniels Pond. However, there is a chance there were 2 nesting pairs. We will monitor both lakes more closely in 2010. One chick disappeared in early July. A Bald Eagle (*Haliaeetus leucocephalus*) was observed harassing the loons in August. This was the first recorded nest since monitoring began in 1978.

Management: low to moderate. Daniels Pond has some small boat activity.

Derby Pond (Derby): Nesting confirmed: 22 May Nest failure confirmed: 16 June

Comments: The loon pair nested in a marsh in the southeast part of the pond and abandoned the nest for unknown reasons.

Management level: moderate. No sign buoys were placed; boat traffic is moderate.

Lake Dunmore/Mud Pond: Nesting confirmed: not obs. Chicks observed: 5 July
(Leicester/Salisbury) Number chicks: 2 Number through Aug.: 1

Comments: The loon pair switched nesting sites from the island on Lake Dunmore to the marsh shoreline on Mud Pond, located 600 m to the southwest of Lake Dunmore. One adult usually flew to Lake Dunmore, while the other remained on the nest or with the chick. The chick flew to Lake Dunmore in early September, where the adults continued to care for it. One additional adult occupied Lake Dunmore.

Management level: high for Lake Dunmore nest site; low for Mud Pond. 8 sign buoys were placed around the island on Lake Dunmore. Boat traffic is heavy, and the island is a popular picnic, fishing, and swimming spot.

East Long Pond: Nesting confirmed: 7 June Chicks observed: 17 June
(Woodbury) Number chicks: 2 Number through Aug.: 2

Comments: The pair nested in a new location on the small island that was not easily visible from the water. Nesting was suspected based on the presence of a single adult. The pair last nested successfully in 2005.

Management level: moderate. Sign buoys were not placed. There is no public access on this pond. Hardwick Electric maintains the dam, but water levels are not adjusted.

Lake Eden (Eden): Nesting confirmed: 23 May Chicks observed: 17 June
Number chicks: 2 Number through Aug.: 1

Comments: The pair nested on a raft in the north end near the boat access. One chick disappeared in July. There was a report of an adult loon being hit by a boat in late July, but the pair and the chick were present a few days later.

Management level: high. 1 sign buoy was placed. The lake is highly developed and receives motorboat, water skier, canoe, and kayak traffic. A Boy Scout camp is also located on the lake.

Lake Eligo (Greensboro): Nesting confirmed: 23 May Chicks observed: 21 June
Number chicks: 2 Number through Aug.: 2

Comments: The loon pair nested on the large island for the second time. This site appears to be used at higher water levels. The pair nested in the north marsh in 2008 at lower water levels.

Management level: moderate/high. 6 signs buoys were placed around the island site. Anglers and waterskiers frequent the lake and go very near the islands. The islands need to be monitored

thoroughly prior to each weekend in May and June since both islands have camps, and the owners will need to know whether the loons are nesting. The lake is infested by Eurasian milfoil.

Forest Lake (Averill): Nesting confirmed: 31 May Chicks observed: 16 June
Number chicks: 2 Number through Aug.: 1

Comments: The pair used the nesting raft in the southern part of the lake. One chick disappeared after fights with an intruder loon in early July. The intruder loon was observed on shore several times before volunteers thought they observed it fly from the lake. However, an adult loon was found dead 2 weeks later; the loon was likely the intruder. The adult had been banded on Wallace Pond in 2005 when a lure was removed.

Management level: moderate. No sign buoys were placed. Anglers occasionally use the lake, and a resort is located on the southwestern shore, adjacent to the nest site.

Foster's Pond (Peacham): Nesting confirmed: 25 May Chicks observed: 1 July
Number chicks: 2 Number through Aug.: 2

Comments: The pair used the nesting raft in the southern part of the lake.

Management level: low. Anglers occasionally use the pond. There is only 1 camp on the pond, and it belongs to the loon volunteer.

Great Averill Lake - North (Averill): Nesting confirmed: 13 June Chicks observed: 18 July
Number chicks: 2 Number through Aug.: 2

Comments: The loons nested on the raft at the northwest end.

Management level: moderate to high. 2 sign buoys were placed. Boat traffic can be high but usually only for short periods of time on weekends. Coaticook River Water Company controls the water level during the nesting season.

Great Hosmer Pond (Albany/Craftsbury): Nesting confirmed: 20 May Chicks observed: 16 June
Number chicks: 1 Number through Aug.: 1

Comments: The nest was located on an island marsh site across from the boat access. This was the first recorded nest since monitoring began in 1978.

Management level: high. 5 sign buoys were placed. Recreational pressure is moderate to high with a rowing camp on the lake, and the nest is located near the boat access and cottages.

Green River Reservoir - NW (Hyde Park): Nesting confirmed: 4 June Nest failure confirmed: early July

Comments: The nest was located on the traditional nest island in the northwest bay. The nest was likely flooded after a major rain event. A raft was placed for several years in the early 2000s, but the loons continued to use the island site despite several flooding events.

Management level: high. 6 sign buoys were placed around the nesting island. Non-motorized boat traffic is high, and overnight camping is popular. Morrisville Water and Light attempted to stabilize the water level during the nesting season.

Lake Groton (Groton): Nesting confirmed: 18 May Chicks observed: 16 June
Number chicks: 1 Number through Aug.: 1

Comments: The loon pair nested on a raft placed on the eastern shore of the south bay. A potential second pair was observed at the north end of the lake for the second year. An adult Bald Eagle was observed harassing the loon family several times during the summer. A second egg was left in the nest.

Management level: high. 5 sign buoys were placed. Lake Groton is one of the busiest boating lakes in the region, with 2 state parks at the north end and much of the remaining shoreline developed with cottages. Kayakers and boaters frequently pursued and disturbed the loon family.

Hardwick Lake (Hardwick): Nesting confirmed: 29 May Chicks observed: not obs.
Number chicks: 1 Number through Aug.: 0

Comments: The loon pair nested on a nesting raft in the north end of the pond. The presence of egg shells on 28 June indicated that there was a hatch, but the chick likely disappeared soon after hatch.

Management: low. Boaters infrequently use the pond. Water levels can rise rapidly after major rain events and can drop dramatically during drought periods. The reservoir is drawn down each fall as part of a flood management program for the town of Hardwick. If loons are present after 1 November, they should be monitored closely during sub-freezing periods when the water surface could quickly turn to ice.

Holland Pond – North (Holland): Nesting confirmed: 31 May Nest failure confirmed: early July

Comments: The loon pair nested for only the second time in a new location on a small island adjacent to a cottage along the northwest side. The nest likely flooded, but there is a chance that human disturbance was also a factor. A nesting raft should be considered for 2010, because of the proximity of the nest to nearby cottages. The nest was flooded during the pair's first nest attempt in 2006.

Management level: moderate to high. Sign buoys should be considered in future years.

Holland Pond – South (Holland) Nesting confirmed: 30 May Chicks observed: 1 July
Number chicks: 2 Number through Aug.: 2

Comments: The pair nested on the nesting raft at the south end. A Bald Eagle was occasionally observed on the pond.

Management level: moderate to high. 6 sign buoys were placed. Boat traffic can be heavy. The raft was placed because moderate rain events have flooded loon nests in previous years.

Island Pond (Brighton): Nesting confirmed: 3 June Chicks observed: 23 June
Number chicks: 1 Number through Aug.: 1

Comments: The loon pair nested on the traditional island on the northeast side in a new location.

Management level: high. 6 sign buoys were placed. 2 additional signs could be placed along the shorelines if necessary. Signs will only be placed when nesting is confirmed, because the loons usually nest in a different location annually over a 600-meter area. The island is posted, which keeps most people off. Boat traffic is high.

Joe's Pond – Inlet (Cabot): Nesting confirmed: 25 May Chicks observed: 15 June
Number chicks: 2 Number through Aug.: 2

Comments: The loon pair nested on the raft near the northwest inlet. People reported a loon caught by an angler; the loon broke free from the line or was released. Volunteers did not find any loon in distress during several follow-up surveys. A second loon pair was observed during the summer in the southeast part of the pond, an area called "2nd pond."

Management level: high. 3 sign buoys were placed along the edge of the boat channel. A 2 x 4 foot sign was installed at the entrance to the channel asking boaters to move slowly past the artificial nesting raft without stopping.

Keiser Pond (Danville / Peacham): Nesting confirmed: 30 May Chicks observed: 28 June
Number chicks: 1 Number through Aug.: 1

Comments: The pair nested on the eastern shore in marsh habitat. A second egg was left in the nest.

Management level: moderate. 3 sign buoys were placed. Canoeists and kayakers often circle this small pond.

Kent Pond (Killington): Nesting confirmed: 12 June Nest failure confirmed: 18 July
Comments: The pair nested on the small island, and incubated beyond the expected hatch date. It is possible human disturbance kept the pair off the nest too often, since many people did not understand or obey the nest warning signs. This was the first documented nest since monitoring began in 1978.
Management level: high. 6 sign buoys were placed. Canoeists and kayakers frequent this pond.

Kettle Pond (Groton): Nesting confirmed: 17 June Chicks observed: 18 July
Number chicks: 1 Number through Aug.: 1
Comments: The pair nested on the raft after a year of not nesting in 2008 and a failed shoreline nest in 2007. The pair has used the nesting raft since the mid-1990s.
Management level: moderate. Sign buoys have not been placed in the past several years at the raft site or the 2007 shoreline site. Signage about breeding loons should be maintained at the two access points.

Little Averill Lake - North: Nesting confirmed: 13 June Nest failure confirmed: 13 June
(Averill):
Comments: The pair nested on a small peninsula at the entrance to the boat access bay. The nest was flooded after a rain event, and 1 egg was found underwater. This was the first documented nest in this region of the lake since monitoring began in 1978. A new nesting raft will be placed along a less-developed section of shoreline in 2010, since this nest was located within 10 m of an active beach and by the main boat channel. In June, the traditional pair was observed at the West end, but volunteers reported only seeing 3 adult loons on the entire lake during much of July and August.
Management level: high. Sign buoys should be placed in future years. Boat traffic is moderate. Coaticook River Water Company controlled water levels during the nesting season.

Little Hosmer Pond: Nesting confirmed: 1 June Chicks observed: 30 June
(Craftsbury) Number chicks: 1 Number through Aug.: 1
Comments: The loon pair nested on the small, northeast island.
Management level: moderate. 4 sign buoys should be placed if either of the 2 larger islands is used. No sign buoys are necessary if the smaller, northeast island is used. Boat traffic is moderate.

Long Pond (Westmore): Nesting confirmed: 20 June Chicks observed: 10 July
Number chicks: 2 Number through Aug.: 2
Comments: The loon pair nested on the south shore of the island.
Management level: high. 8 signs were placed on (2) and around (6) the nesting island. Anglers and canoeists regularly use this pond.

Lower Symes Pond: Nesting confirmed: not obs. Chicks observed: 18 July
(Ryegate) Number chicks: 1 Number through Aug.: 1
Comments: One chick was first observed on Loonwatch day. The marsh nest was located in a bay on the east side of the pond.
Management level: low. Sign buoys were not placed. Small boats use the pond occasionally, and the nest is at the far end of a small bay out of the way of most boat traffic.

Maidstone Lake – North Nesting confirmed: 30 May Chicks observed: 1 July
(Maidstone) Number chicks: 1 Number through Aug.: 1
Comments: The loon pair nested at the 2007 site on a spit of land between the boat access and a house.
Management level: high. 3 sign buoys were placed. The site was highly exposed within 200 m of the boat access and several camps across the channel.

Maidstone Lake - South: Nesting confirmed: not obs. Chicks observed: 21 July
(Maidstone) Number chicks: 2 Number through Aug.: 2

Comments: The nest was located on the traditional southwest "loon island," but was not found until after the eggs hatched. A highly decomposed adult loon was found on shore in July. The carcass was sent to Tufts University for a necropsy.
Management level: high. 4 sign buoys were placed, 1 of which was needed in front of the boat landing of a popular picnic spot. 2 additional signs were placed on trees on the east side of the island opposite the nest site to keep picnickers off. Recreational pressure is high from Maidstone State Park visitors, lakeshore owners, and other lake users.

Maidstone Lake - SE: (Maidstone) Nesting confirmed: 30 May Chicks observed: 24 June
Number chicks: 2 Number through Aug.: 2
Comments: The pair nested on the small island with a cottage on it in the southeast part of the lake for the second time. The island was used by the traditional south pair once in the 1990s.
Management level: high. No sign buoys were placed at the request of the landowners. The loons habituated to the presence of the landowners. Recreational pressure is high from Maidstone State Park visitors, lakeshore owners, and other lake users.

Martin's Pond (Peacham): Nesting confirmed: 7 June Chicks observed: 3 July
Number chicks: 2 Number through Aug.: 2
Comments: The loon pair nested on the raft in the central cove on the pond's north side. Intruder loons frequented the pond.
Management level: high. 3 sign buoys were placed. Canoeists, anglers, and large motorboats frequent this small pond.

Memphremagog – John's River: (Newport): Nesting confirmed: 17 June Nest failure confirmed: 23 June
Comments: The pair nested up the John's River about 400 m from the lake. The nest was likely flooded, but there is a chance that human disturbance was also a factor. There is a boat access further up the river, thus boaters had to travel within a few meters of the nest to get by it. A nesting raft might be placed near the entrance to the river in 2010.
Management level: high. 3 sign buoys were placed.

Miles Pond (Concord): Nesting confirmed: 30 May Chicks observed: 25 June
Number chicks: 1 Number through Aug.: 1
Comments: The pair nested on the raft located on the east side of the island.
Management level: high. 5 sign buoys were placed. Boat traffic is often heavy. Rising water levels have flooded past nests.

Mollys Falls Reservoir: (Cabot) Nesting confirmed: 5 June Chicks observed: 21 June
Number chicks: 1 Number through Aug.: 1
Comments: The loons nested on the raft among the boulders at the "elbow" off the west shore.
Management level: high. 4 sign buoys were placed.

Newark Pond (Newark): Nesting confirmed: 1 June Chick observed: 15 June
Number chicks: 2 Number through Aug.: 2
Comments: The pair nested on the west side of the island.
Management level: high. 7 sign buoys were placed around the island.

Nichol's Pond (Woodbury): Nesting confirmed: 7 June Chicks observed: 30 June
Number chicks: 1 Number through Aug.: 1
Comments: The pair nested on the raft in the south cove. The pond water levels were low in May and slowly returned to normal levels over the summer. The dam was repaired in 2008.

Management level: high. 5 sign buoys were placed. Canoe and motorboat traffic is moderate, and the island is frequented by people.

Lake Ninevah (Mt. Holly): Nesting confirmed: 27 May Chicks observed: 22 June
Number chicks: 2 Number through Aug.: 2
Comments: The loon pair nested on the traditional island nest site in the northwest part of the lake.
Management level: high. 3 sign buoys were placed. Boat traffic is high. The lake is infested by Eurasian watermilfoil.

Norton Pond – Island (Norton): Nesting confirmed: 8 June Nest failure confirmed: 5 July
Comments: The pair nested on the raft, and was frequently observed off the nest.
Management level: high. 7 sign buoys were placed. Canoeists and anglers frequent the pond. Coaticook River Water Company stabilized the water level during the nesting season.

Norton Pond – North (Norton): Nesting confirmed: 12 June Nest failure confirmed: 14 July
Comments: The pair successfully switched to the nesting raft after a depredated shoreline nest in 2008, but incubated beyond the expected hatch date. The raft became waterlogged, despite being new, and the eggs might have gotten wet.
Management: moderate. 3 sign buoys were placed.

Norton Pond - South Cove: (Norton) Nesting confirmed: 3 June Chicks observed: 26 June
Number chicks: 1 Number through Aug.: 1
Comments: The pair nested on the raft in the southeast cove.
Management level: moderate. No sign buoys were placed.

Peacham Pond – North Cove: (Peacham) Nesting confirmed: 14 May Nest failure confirmed: 21 May
Re-nest observed: 2 June Nest failure confirmed: 13 June
Re-nest observed: 28 June Nest failure confirmed: 12 July
Comments: The pair used the traditional nest site on the south side of a small island in the north cove. It is unknown why any of the 3 nesting attempts failed. Four eggs were collected after being found in the water. This is only the second time that 3 nest attempts have been documented in Vermont.
Management level: moderate. 5 sign buoys were placed. In 2007, 4 no wake signs were added after reports of waterskiers and motorboats coming within 50 m of the nest island. Green Mountain Power stabilized the water level during the nesting season.

Peacham Pond - Southwest: (Peacham) Nesting confirmed: 25 May Nest failure confirmed: mid June
Comments: Nesting occurred in the traditional marsh area in the southwest cove. The pair was observed consistently in mid-June, thus nest failure was assumed. The nest site was concealed such that observation of the incubating bird was impossible without risk of flushing. Nesting was assumed based on behavior of the sentry bird and observations of presumed nest exchanges. In November, a lake resident reported 2 chicks hatching late in the season, but the sighting has not been confirmed as of December 2009. Results will be modified if the sighting can be verified.
Management level: moderate. No sign buoys were placed. More canoe and kayak traffic has been observed in the marsh since 2002.

Pensioner Pond (Charleston): Nesting confirmed: 10 July Chicks observed: 24 July
Number chicks: 2 Number through Aug.: 2
Comments: The pair used the nesting raft for the first time. Nest searching was observed at 2 shoreline locations in late May and June, but no nests were built.

Management: moderate: No sign buoys were placed. The nest is near several camps at the outlet but is somewhat concealed. A nesting raft was placed in 2008, because the pond is prone to flooding after moderate rain events.

Ricker Pond (Groton): Nesting confirmed: 19 May Chicks observed: 17 June
Number chicks: 2 Number through Aug.: 2
Comments: The pair nested on the nesting raft in the northeast cove between 2 camps.
Management level: high. 3 sign buoys were placed. The pond is small and frequented by small boats. Ricker State Park occupies the eastern shore. Water levels can vary by 6-12 inches during rain events.

Seymour Lake – Winape (Morgan) Nesting confirmed: 27 May Chicks observed: 23 June
Number chicks: 1 Number through Aug.: 1
Comments: A loon pair nested on the raft in the south part of the lake.
Management level: high. 5 sign buoys were placed. Boat traffic on the lake is high.

Shadow Lake (Concord) Nesting confirmed: 13 June Chicks observed: 3 July
Number chicks: 1 Number through Aug.: 1
Comments: A loon pair nested in a new location at the east end of the lake. This was the first successful nest in 4 attempts over the past 3 years.
Management level: high. 4 sign buoys were placed. Boat traffic on the lake is moderate, and much of the shoreline is developed. A nesting raft was placed 100 m from the 2007 first nest site, but it was not used.

Somerset Reservoir: Dandeneau Bay (Somerset) Nesting confirmed: 11 June Chicks observed: 9 July
Number chicks: 2 Number through Aug.: 2
Comments: The breeding pair nested in its traditional territory in the western cove in the northern half of the reservoir.
Management level: moderate. Boat traffic can be moderate on weekends. The water level was stabilized during the nesting season by Trans Canada Hydro.

South Pond (Eden): Nesting confirmed: 24 May Chicks observed: 15 June
Number chicks: 2 Number through Aug.: 2
Comments: The pair used the nesting raft at the south end of the pond.
Management level: moderate. 2 sign buoys were placed. The pond has no public access but has many private camps.

Spectacle Pond (Brighton): Nesting confirmed: 20 May Chicks observed: 16 June
Number chicks: 1 Number through Aug.: 1
Comments: The pair nested on a raft that was placed next to the traditional nest island. A second egg was left in the nest.
Management level: high. 7 sign buoys were placed around the raft and traditional nesting island. The pond receives heavy recreational use. Brighton State Park staff made an intensive effort to educate park visitors to stay away from the island.

Spring Lake (Shrewsbury): Nesting confirmed: 28 May Chicks observed: 28 June
Number chicks: 1 Number through Aug.: 1
Comments: The pair nested on a raft placed in the west end of the lake. An aerial guard was placed on the raft this year as a Bald Eagle was observed harassing the loons in 2008 during nesting. A second egg was left in the nest.

Management level: moderate. No sign buoys were placed this year. In past years, 1 sign had been placed. The lake association closed a campsite and hiking trail near the western cove during nesting.

Sunset Lake (Marlboro): Nesting confirmed: 12 June Chicks observed: 10 July
Number chicks: 2 Number through Aug.: 2
Comments: The pair nested on the west side of the island. This was the first documented nest since monitoring began in 1978.
Management level: moderate-high. 6 sign buoys were placed. This is one of the few ponds in southern Vermont, and canoeists and kayakers frequent the lake. The pond is a drinking water source for Brattleboro, thus no motors are allowed on the lake.

Thurman Dix Reservoir: Nesting confirmed: 31 May Chicks observed: 23 June
(Orange) Number chicks: 1 Number through Aug.: 1
Comments: The pair nested on the large island.
Management level: low. The reservoir is not open to recreational use. The town of Barre stabilized the water level during the nesting season.

Wallingford Pond: Nesting confirmed: 17 June Chicks observed: 18 July
(Wallingford) Number chicks: 2 Number through Aug.: 2
Comments: The loon pair nested at an unknown location. Only 1 loon was observed on 17 June, thus nesting had likely commenced.
Management level: low to moderate. Anglers and canoeists infrequently use the pond.

Wantastiquet Pond (Weston): Nesting confirmed: early June Chick lost: mid-June
Re-nest confirmed 20 June Chicks observed: 10 July
Number chicks: 1 Number through Aug.: 1
Comments: The pair nested on the east side of the island. A chick hatched out in early June, but disappeared within a few days. The pair re-nested successfully. This was the first recorded nest since monitoring began in 1978.
Management level: low. The pond is a private trout pond, and there is no public access.

West Mountain Pond: Nesting confirmed: 10 June Chicks observed: 18 July
(Maidstone) Number chicks: 1 Number through Aug.: 1
Comments: The nest was located on the traditional site on vegetation growing on a large fallen tree extending from shore. This was the first successful chick fledged since 2004.
Management level: low. There is no public access on this pond and few camps.

Wolcott Pond (Wolcott): Nesting confirmed: 30 May Chicks observed: 21 June
Number chicks: 1 Number through Aug.: 1
Comments: The pair nested in a new location near the boat access.
Management level: low to high. If loons nest near the boat access site, 3 to 4 sign buoys should possibly be placed. If necessary, a hand-written sign should be posted at the boat ramp asking boaters to stay in the designated channel.

Woodbury Lake (Sabin Pond) Nesting confirmed: 28 May Chicks observed: 13 June
(Woodbury) Number chicks: 1 Number through Aug.: 0
Comments: The loons nested on the raft at the south end of the lake. The chick disappeared 1-2 days after hatching out. An osprey (*Pandion haliaetus*) was observed diving at the nesting raft at the time of hatching, but it is unknown whether it was the cause of the chick disappearing.
Management level: moderate-high. 2 nest warning signs were placed. The lake is highly developed with heavy boat traffic, however, the nesting cove is in the quietest part of the lake.

Zack Woods Pond (Hyde Park): Nesting confirmed: 23 May Nest failure confirmed: 12 July

Comments: The loons nested on the island, but incubated beyond the expected hatch date eventually abandoning the nest.

Management level: high. 7 sign buoys were placed on the pond, and 3 additional "loon nesting" signs were placed at the access areas adjacent to the nest site and at the trailhead along the main road. Heavy recreational use occurs, especially on weekends.

Known territorial, non-breeding loon pairs in 2009

Loon pairs on these lakes have either nested or have been observed nest building in at least one year since 2006, in addition to a pair being present during most surveys.

Buck Lake (Woodbury): A loon pair was present all summer. Loons last nested in 2003, but nest building was observed at the south end of the lake this year.

Management level: moderate. 4 sign buoys have been placed in the past. A hiking trail is located along the entire western shore.

Echo Lake (Charleston): The pair was present, and might not have nested because extraterritorial loon activity. There is a chance a second pair was forming on the lake.

Management level: high. 6 sign buoys are placed if nesting occurs. The nest site was located near many camps. Annual communication with the landowner nearest the nest site will be helpful. Boat traffic is high. Great Bay Hydro maintains the dam, but water levels are not adjusted.

Ewell Pond (Peacham): The pair was present all summer. Nesting habitat is minimal on this pond with no extensive hummock marshes and no islands.

Management level: moderate. 3 sign buoys were placed in 2006 when the pair last nested. It might be possible to forego use of warning signs on this pond.

Green River Reservoir – SE (Hyde Park): The loon pair was observed nest searching in early June, but no nesting was observed.

Management level: high. 4 sign buoys were placed around the nesting island. Non-motorized boat traffic is high, and overnight camping is popular. Morrisville Water and Light stabilized the water level during the nesting season. A nesting raft should be considered for this pair because of flooding concerns and the vulnerability of disturbance at the 2008 nest site.

Harveys Lake (Barnet): The pair was present all summer, and had failed nests in 2006 and 2008. A nest raft was placed in the only wind-protected and undeveloped cove at the south end but was not used. The raft was located over a mile from the outlet nest location, which likely reduced the chance of it being used.

Management level: high. A public beach and a private campground are located within ¼ mile of the outlet nest site, but the nest site itself was well-concealed in the marsh.

Little Averill Lake-West (Averill): The pair last nested in 2008. A second pair nested unsuccessfully in the north part of the lake. Two pairs were observed in June, but volunteers reported seeing only 3 loons in July and August.

Management level: high. 3 sign buoys were placed. The inlet has sand beaches on either side, making it a popular destination. Coaticook River Water Company controlled water levels during the nesting season.

May Pond (Barton): The pair was present, but no nesting activity was confirmed. Intraspecific competition likely prevented nesting for the second year as 1 to 3 extra loons were frequently observed on the pond. The pair last nested in 2007.
Management level: moderate. 3 sign buoys were placed across the entrance to the nesting cove. Non-motorized boats and anglers frequently use this pond.

McConnell Pond (Brighton): The pair was present throughout the summer. The pair last nested in 2007 in a new unknown location, but had used a nesting raft in previous years.
Management level: low. No public access is present on the pond.

No. 10 Pond (Mirror Lake)(Calais): The pair was present throughout the summer. At least 1 fight occurred with intruder loons mid-summer.
Management level: moderate. 3 signs buoys were placed. Boaters and anglers frequent the pond. There is a 5 mph speed limit for motorized boats.

Osmore Pond (Peacham): The pair was observed during most surveys. Loons nested for the first time in 2007 (failed nest) since a previous nest in 1980.
Management level: moderate. There are no islands or extensive marshes on the pond, thus nesting habitat is minimal.

Peacham Pond – Southeast (Peacham): The loon pair was observed in the nesting cove occasionally, but no nesting was observed. The pair has only nested twice in 2006 and 2007, and both nests failed.
Management level: moderate-high. 2 sign buoys were placed after 2 years of repeated nest failure, and the chance that kayakers might have caused the loons to leave the nest.

Somerset Reservoir - North Islands (Somerset): The pair was present all summer. A new potential pair of loons was observed to the south and east of this pair.
Management level: moderate. 2 sign buoys have been placed when nesting occurs. Boat traffic can be moderate on weekends. A nesting raft was placed in 2007, because water levels can rise during large rain events.

Stiles Reservoir (Waterford): The pair was present all summer. A decomposed adult loon was found on shore in June; the bird had been banded in 1994 on Azischohos Reservoir in Maine, about 85 km away. An unidentified banded loon has been observed on Stiles Reservoir for the past 4 years, thus it is possible that this loon has been present for many years. This represents one the longest documented dispersal distances of a chick from its natal lake (D. Evers, pers. comm.). The carcass was sent to Tufts University for a necropsy.
Management level: low. The reservoir is not open to recreational use, because it is the drinking water supply for St. Johnsbury.

Woodward Reservoir (Plymouth): The pair was present all summer. The previously used nest site was not accessible because a large floating bog mat had shifted its location. Because of the movement of the bog mat and lack of other habitat on the reservoir, a nesting raft should be considered in future years.
Management level: high. 4 sign buoys would be placed in the cove. Communication should be maintained with both the camp's main office and the Barn Day Camp program. Heavy recreational use occurs.

<u>Potential territorial, non-breeding loon pairs in 2009</u>

These lakes supported 2 adult loons through much of the summer but either had no recent history of nesting or had less consistent activity by pairs that previously nested. Repeated observation of 2 loons

together over an extended period is a strong indication that a territorial pair is forming. From 2002-2009, volunteers and VLRP staff successfully located loon pairs prior to nesting on 27 water bodies. Identification of these pairs allowed for appropriate protective management measures to be initiated.

Curtis Pond (Calais): Two loons were reported during much of the summer, but not during all surveys.

Lake Elmore (Elmore): A pair of loons was observed throughout much of the summer. There is marsh habitat at the south end of this highly developed lake.

Flagg Pond (Wheelock): Two adult loons were observed nest searching in June. There was a report of loon chicks in 2008, but the sighting was not confirmed.

Great Averill Lake - Inlet (Averill): Two adult loons were observed regularly in the southern half of the lake and inlet region. The VLRP biologist found a natural nest in the southwest inlet cove in 2005. This site was underwater from 2006 to 2008. A nest was observed at the south end of the lake in 2007, but it was unknown whether this pair or the traditional north pair made the attempt. A raft will placed in 2010 because of water level fluctuations and the continual presence of this pair.

Greenwood Lake (Woodbury): NEW. A pair was observed more consistently this year. A pair did have a successful nest in 2002, but activity became less consistent in the mid-2000s.

Lake Groton – North (Groton): A second pair was observed at the north end of Lake Groton for the third year. There is limited to no nesting habitat in this highly developed part of the lake with cottages and 2 state parks.

Joes's Pond – 2nd Pond (Danville): NEW. A potential second pair was observed at the southeast section of Joe's Pond for the first time. There is limited to no nesting habitat in this highly developed part of the lake.

Noyes Pond (Groton): Two loons were often observed on this small pond.

Somerset Res. – NE (Somerset): NEW. Two loons were observed consistently near the entrance or within the northeast bay.

Wallace Pond (Canaan): Residents on the pond reported seeing a pair of loons many times in 2008. The best nesting habitat is a marsh located on the Canadian side of the lake.

Lakes and regions of lakes with high levels of loon activity in 2009

Forty lakes or regions of lakes were identified as having moderate to high levels of loon use in 2009. An asterisk (*) indicates that some pair activity was observed, but either too few surveys were conducted or pair sightings were too infrequent to determine if a potential territory was forming.

*Lake Carmi (Franklin)	Hartwell Pond (Albany)	Lake Salem (Derby)
*Caspian Lake (Greensboro)	*Jobs Pond (Westmore)	*Seymour Lake (Morgan)
*Center Pond (Newark)	*Lyford Pond (Walden)	*Shadow Lake (Glover)
*Crystal Lake (Barton)	*Lake Memphremagog -	Silver Lake (Barnard)
Lake Champlain	Holbrook Bay (Newport)	Silver Lake (Leicester)
Comerford Reservoir	Miller Pond (Strafford)	Stratton Pond (Stratton)
(Waterford)	Mollys Pond (Cabot)	Sugar Hill Res. (Goshen)
Dog [Valley] Pond	*Moore Reservoir (Concord/	Ticklenaked (Ryegate)
(Woodbury)	Waterford)	Turtle Pond (Holland)
*Echo Lake (Plymouth)	*Lake Morey (Fairlee)	Wapanacki Pond (Wolcott)
Lake Fairlee (Fairlee)	*Neal Pond (Lunenberg)	*Warden Pond (Barnet)
Gale Meadows (Winhall)	*Nelson Pond (Woodbury)	*Waterbury Res. (Waterbury)
*Grout Pond (Stratton)	*Lake Parker (Glover)	Wheeler Pond (Brunswick)
Halls Pond (Newbury)	*Pigeon Pond	*Lake Willoughby (Westmore)
Hardwood Pond (Elmore)	*Lake Rescue (Ludlow)	

DISCUSSION

Population Assessment

The number of Common Loon nesting and territorial pairs continued its recent increase in 2009. The percentage of chicks surviving through August was at a near record-high rate (89%) after a relatively low survivorship year in 2008 (73%). As a result, the rate of chicks surviving per territorial pair rebounded to a high of 0.82. This rate was much higher than the North America average of 0.53 (Evers 2006). A contributing factor to the high chick productivity was the number of successful nests and the number of 2-chick territories. Several pairs that have experienced many nest failures in recent years successfully produced chicks in 2009 (Brownington, Chandler, Pensioner, Shadow, West Mountain). Although extraterritorial loon activity continued to be common, fewer nest failures and chick losses resulted from this activity than in previous years. One outcome of higher population levels and increased interactions with intruder loons can be lower productivity rates, which have been documented in New Hampshire (K. Taylor, pers. comm.). Vermont's loon population has not undergone declines in overall productivity rates with the current population increase.

Productivity of New Loon Pairs Compared to Established Pairs

A comparison of nesting success among the 22 new nesting pairs from 2005 to 2008 versus the 50 established pairs during this period reveals that established pairs had higher rates of both nesting success and chick productivity.

New Nesting Loon Pair Data	**New Pairs (2005-8, n=55 nest attempts)**	**Established Pairs (2005-8, n=719 nest attempts)**
% years with nest attempt	56%	80%
% successful nests (egg[s] hatched)	59%	80%
Mean # chicks surviving per territorial pair annually (includes yrs pair present and no nesting)	0.38 (i.e., about 4 chicks in 10 year period)	0.82 (i.e., about 8 chicks in 10 year period)
Nest Location	Shoreline 56% Island/Raft 44%	Shoreline 16% Island/Raft 84%

Possible explanations for this discrepancy include (1) new pairs are inexperienced at both nesting and chick rearing, (2) it takes time to find a successful nest location, and (3) most high quality loon territories are already occupied. The latter observation is supported with 84% of the nesting attempts by established pairs occurring on rafts or islands compared to only 44% for new pairs. Overall nesting success rates on rafts, islands, and shorelines has been 88, 80, and 67%, respectively from 2004-8. Many of these new pairs are nesting on lakes less than 60 acres (Baker, Bean, Bruce, Chandler, Ewell, Keiser, Osmore) and/or lakes without good nesting sites, especially islands. Some of the new pairs are on highly developed lakes with little or no nesting habitat left (Dunmore, Echo-Charleston, Harveys, Maidstone – N, Peacham – SE , Seymour-W, Shadow-Concord), or water levels fluctuate (Chittenden, Holland-North, Little Averill, Norton – N). Newer loon pairs are often present but are nesting less frequently than established pairs. However, the 6 new nesting pairs documented in 2009 indicate that loon pairs are continuing to find locations to colonize despite some limiting factors.

Loonwatch Survey

On Loonwatch day, over 20 more lakes had loons reported on them in 2006-9 than in 2004 and 2005. The 2009 occupancy rate (69%) was higher than in 2007-8 (57%), because many smaller lakes were not surveyed this year. In 2006-8, the increase in adult loon numbers can be attributed to more

loons on larger lakes (e.g., 6-8 lakes with 6-15 loons counted). In 2009, only 4 lakes had 6 or more loons counted on them, and instead there were more lakes with 3-5 loons, especially in the Northeast Kingdom.

Territory Size Assessment

Loon territory sizes in Vermont are similar to those in other regions of North America. A study of 420 loon territories in Ontario found that the average size was 70.4 ha (range 7-200) compared to Vermont's average of 62 ha (range 9-161; McIntyre and Barr 1997). In Nova Scotia, the smallest territory size was greater than 20 ha, a possible indication of resource limitations on smaller lakes. On lakes smaller than 20-30 ha, adult loons might utilize nearby lakes for feeding and even defend multiple lakes (Miller and Dring 1988). Vermont likely had its first documented multiple lake territories when loons nested on Rodgers Pond in Glover and moved the chicks to larger Daniels Pond. Another pair nested on Mud Pond in Leicester and continued using nearby Lake Dunmore. In September, the single chick flew to Lake Dunmore, where the adults continued to provide parental care. The areas that loons defend often shift, especially on large lakes, making exact determination of territory size difficult. Even on single territory lakes, loon pairs typically defend only a defined area as lake size increases beyond 100-120 ha. As result, territory size estimates will likely err on the large size if lakes greater than 100 ha are included (E. Hanson, pers. obs).

Management Assessment

More than half of the 66 nesting pairs in 2009 directly benefited from management activities. Several of the new breeding and potential territorial pairs utilized lakes that were highly developed, indicating that management and education activities will continue to play a vital role for breeding loons.

Artificial nesting rafts: Artificial nesting rafts continue to enhance habitat for loon nesting in Vermont. The VLRP's raft placement policy is to promote natural nest sites. Rafts were removed in the past 3 years on Bald Hill, Brownington, Little Hosmer, and Newark ponds. All pairs have subsequently nested in natural locations. Twenty-six of the 29 new nesting pairs from 2005-2009 nested in natural locations.

In 2008-9, nesting rafts were placed in several territories that have experienced repeated flooding and/or mammalian predation (Echo [Charleston], Harveys, Norton – North, Pensioner, Shadow [Concord]) and on 2 lakes where pair activity has been observed but shorelines are mostly developed (Caspian, Rescue). Loons nested on 3 of these rafts. We will consider placing nesting rafts in several other territories for similar reasons in the coming years (Carmi, Great Averill – Inlet, Green River – SE, Holland – North, Little Averill – North, Memphremagog – John's River, Morey, Wallace, Woodward).

Warning sign buoys: The placement of warning sign buoys around nest sites has likely enhanced breeding success for at least 35 loon pairs. On each water body, natural nest sites are located in areas that receive high levels of boat traffic, and/or the ponds themselves are small, so that even moderate boating activity potentially disturbs nesting loons. On other successful breeding lakes or ponds, sign buoys likely reduced the frequency of disturbances to the nesting pair.

Loon nests near cottages: Eleven pairs have nested near camps or developed areas in 2007-9 (Echo, Eligo, Great Hosmer, Green River – SE, Joe's, Little Averill – North, Maidstone - North, Maidstone – SE, Martins, Peacham – SE, Shadow). On water bodies like these, volunteer cooperation by landowners has been essential. Our approach to communicate with landowners and provide them with information on how to promote successful nesting appears to be effective. All final decisions on how to deal with the nest site were left to the landowners. Although this approach required significant time and effort by the VLRP, most responses from landowners were positive. Detection of nesting sites and nest start dates is critical if management and education efforts are to be effective. In the future, we will consider loon nests next to cottages as "experimental", in that they may or may not be successful. The loons may simply select a different, and more appropriate, nest location if they experience a failed nest. The placement of a nesting raft could offer a viable alternative if landowners cannot maintain an undisturbed area near the

nest site. The VLRP has placed relatively few rafts on highly developed lakes with possible territorial activity and limited areas for raft placement (Caspian, Harveys, Joe's, Martins, Seymour). VLRP cooperators must continue to discuss how to approach situations like this in the future, especially on lakes such as Caspian, Groton, Joe's, Maidstone, Salem, Seymour, Willoughby, Memphremagog, and possibly even Champlain.

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; and (4) possible contamination of Vermont waters (e.g., effects of acid precipitation and MeHg accumulation). 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 annual report (Hanson et al. 2000). A list of loon mortalities was provided in the VLRP 2008 annual report (Hanson et al. 2008).

Water level issues: Hydroelectric companies and others who control water levels continue to promote successful loon breeding by stabilizing levels. This was especially critical on water bodies where loons nested on natural sites (Green River, Norton, Peacham, and Somerset). Hydroelectric companies do not or have difficulty stabilizing water levels on several water bodies (Chittenden, Great Averill, Hardwick, Little Averill, Mollys Falls, Norton) for several reasons, thus rafts may be a required management tool for successful loon nesting on these water bodies. Three rafts have recently been placed on Great Averill Lake, Little Averill Lake, and Norton Pond.

Shoreline development and human disturbance: Although no direct observation of human disturbance causing nest failure was reported in 2009, several new nests were located in highly vulnerable locations, where disturbance might have been a factor in nest failures (Holland – North, Kent, Memphremagog – John's River). The Kent Pond pair incubated beyond the expected hatch date indicating the eggs had died during development, a possible result of being off the nest too long.

Rafts have been used by loons on several ponds that appear to have marginal natural nesting habitat (Echo, Fosters, Hardwick, Joe's, Martins, Nichols, No. 10, Ricker, and Seymour – West and Winape). However, from 2002-2008, loons nested on natural sites on several moderate to highly developed lakes (Dunmore, Echo, Eden, Great Averill – North, Greenwood, Harveys, Memphremagog – Bell Island, Maidstone – North and SE, Shadow), utilizing some of the last remaining undeveloped or suitable shoreline. Potential loon pairs were observed in 2009 on several other lakes where shorelines are highly developed (Elmore, Groton-North, Joe's – 2nd pond, Wallace). These lakes provide good feeding habitat for non-breeders, have limited natural nest sites available, and, in most cases, would require major educational and cooperative efforts with landowners in order to place nesting rafts.

Lead Poisoning, Monofilament Fishing Line Entanglement, and Fishing Gear Ingestion: Since 1984, 20 of 54 (37%) adult loons found dead in Vermont have died from lead poisoning and 10 of 54 (19%) from complications with fishing hooks, line, or nets. In 2008, 2 of 3 adult loons sent to Tufts University had ingested lead fishing gear, and in 2009, at least 1 loon died after becoming entangled in fishing line. Fishing gear will likely persist as a problem for Vermont's loon population, annually affecting a small number of birds.

VFWD, VCE, VINS, USFWS, Audubon Vermont, and other organizations will continue to collaboratively promote public awareness about the dangers of lead sinkers to loons and other waterbirds and to encourage the use of non-toxic alternatives. The VLRP will also continue to educate people about the threats caused by monofilament fishing line and fishhooks, by asking anglers to reel-in when loons are

nearby and to properly dispose of fishing line. Mark Scott of the VFWD coordinated outreach efforts about the lead fishing gear ban.

Environmental Contaminants: We have documented MeHg levels in Vermont's loons and associated water bodies through the capture/banding program and analysis of abandoned eggs. From 1997-2009, various loon tissues (blood, feathers, and eggs) have been collected from 51 Vermont lakes and ponds.

Researchers from BRI and USFWS estimate that 13% of Vermont's loons are at a high or extra high risk of MeHg exposure (Evers 2003). Specific water bodies of concern include Bald Hill, Island, McConnell, and Wolcott ponds, and Mollys Falls and Somerset reservoirs, where adult loons had moderate MeHg feather and/or blood concentrations. MeHg concentrations in feathers indicate chronic body burdens; elevated levels indicate a steady accumulation over time. Other water bodies of concern include Green River and Moore reservoirs, Holland Pond, and Shadow Lake (Concord), where MeHg levels in recovered eggs were high in some years. Egg MeHg is more difficult to interpret since it may reflect the female's body burden and not necessarily the Hg uptake from prey on the nesting lake for that year. For a more complete discussion of mercury contamination see the 2000 and 2006 annual reports.

Predation: Predation is a probable cause of egg and chick loss. Likelihood of egg or chick predation may be increased by human disturbance and intraspecific competition, which can keep adult loons off the nest or away from chicks. Six nests had evidence of predation from 2007-9. Without visible evidence of nest predation, however, the cause of egg loss must be considered unknown. Eggs disappeared from 10 nests in 2007 and 8 in both 2008 and 2009. In 2009, lake residents observed an osprey diving at the nest during the time of egg hatching; the chick was observed the following day but disappeared shortly thereafter.

Intraspecific Competition: It is likely that extraterritorial loons interact with most breeding pairs at some time. Although extraterritorial loons were reported on most breeding lakes in 2009, few nest failures or chick losses were directly attributable to this factor.

Disease: Botulism continues to be an increasing source of waterbird mortality, including loons, on Lake Erie and Lake Ontario during fall migration. In 2006 and 2007, loons were found dead from botulism on Lake Michigan and Lake Huron. Thousands of loons have been found dead since the late 1990s. Biologists and toxicologists from Canada and the United States are trying to understand why the outbreaks have been so severe. To date, no botulism outbreaks have been documented in Vermont, on Lake Champlain, or in eastern New York. However, there have been localized population declines on Squam Lake and Lake Umbagog in New Hampshire, the ultimate causes of which are unknown.

RECOMMENDATIONS

Increases in the total loon population and numbers of nesting pairs since the mid-1990s provide evidence that conservation efforts have aided the loon recovery process in Vermont, in spite of persistent threats such as MeHg contamination and lead fishing gear. 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.

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 of time and money 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 the program. 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. A better understanding of Vermont's loon population dynamics would be gained by more closely examining the annual Loonwatch data, including creation of a database for all loon survey data.

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

Major contributors: We thank the VFWD for ongoing, core financial support through the federal State Wildlife Grant program and the Nongame Wildlife Fund. We also thank contributors to VLRP fundraising efforts, including local businesses and many individual donors.

Professional assistance: 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 Henry Dandeneau and Mary Alice Fisher from Trans Canada Hydro, Simon Morin from Coaticook River Water Power Company, John Sutter from Green Mountain Power, Eric Werner from Hardwick Electric Department, Scott Corse and John Pilton of Morrisville Water and Light, Bill Rogers from Great Bay Hydro, Mike Scarzello from Central Vermont Public Service, and Reg Abare from the Barre Public Works Department for their efforts to ensure stable water levels during the nesting season. VFWD biologists and staff at Brighton, Maidstone, New Discovery, Ricker, and Stillwater State Parks helped with both monitoring and management. Special thanks go to Doug Blodgett for helping with surveys on Wallingford Pond. Craig Newman of Outreach for Earth Stewardship, Dr. Scott MacLachlan, and Allison Stark of VINS Wildlife Services assisted loons in distress this past year. Thanks also go to Dr. Mark Pokras of Tufts University

Wildlife Veterinary Clinic, John Cooley and Harry Vogel of the LPC, and. David Evers, Lucas Savoy, and Chris DeSorbo 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. Julie Hart, Kent McFarland, and Patrick Johnson of VCE helped to create the VLRP section on the VCE website, ***www.vtecostudies.org***, and prepare Figure 1. Chris Rimmer and Melissa MacKenzie of VCE assisted in VLRP fundraising and administration.

Volunteer assistance: We extend special thanks to the more than 200 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 and State Park staff helped distribute loon conservation fact sheets. Volunteers and staff spent hundreds of hours monitoring and attempting to catch loons in distress over the past several years (e.g., those caught in fishing line/lures/hooks, landing on too-small ponds, or found dead).

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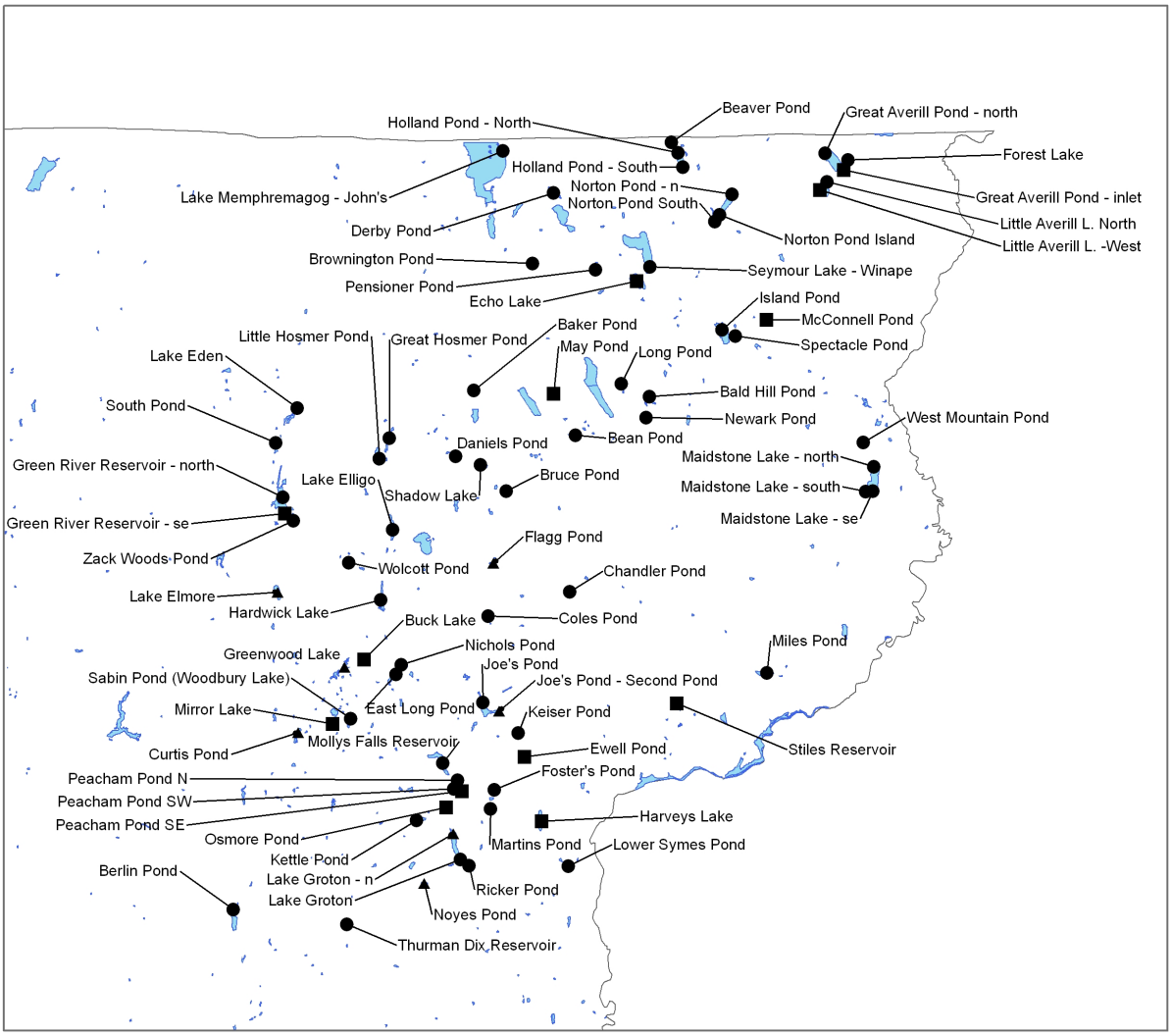
Figure 1a. Common Loon Nesting and Territorial Pairs in Vermont



2009 Locations of Loon Pairs

- ● nest
- ▲ possible territory
- ■ territory

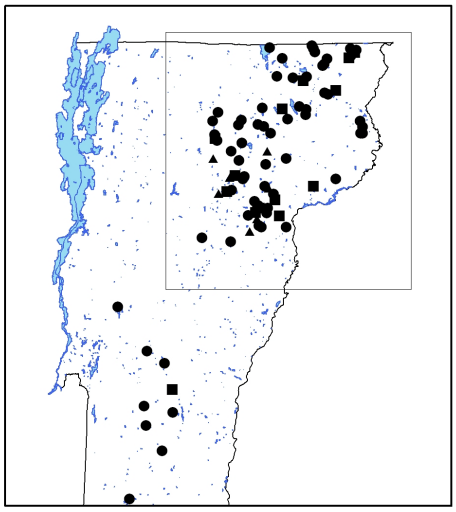
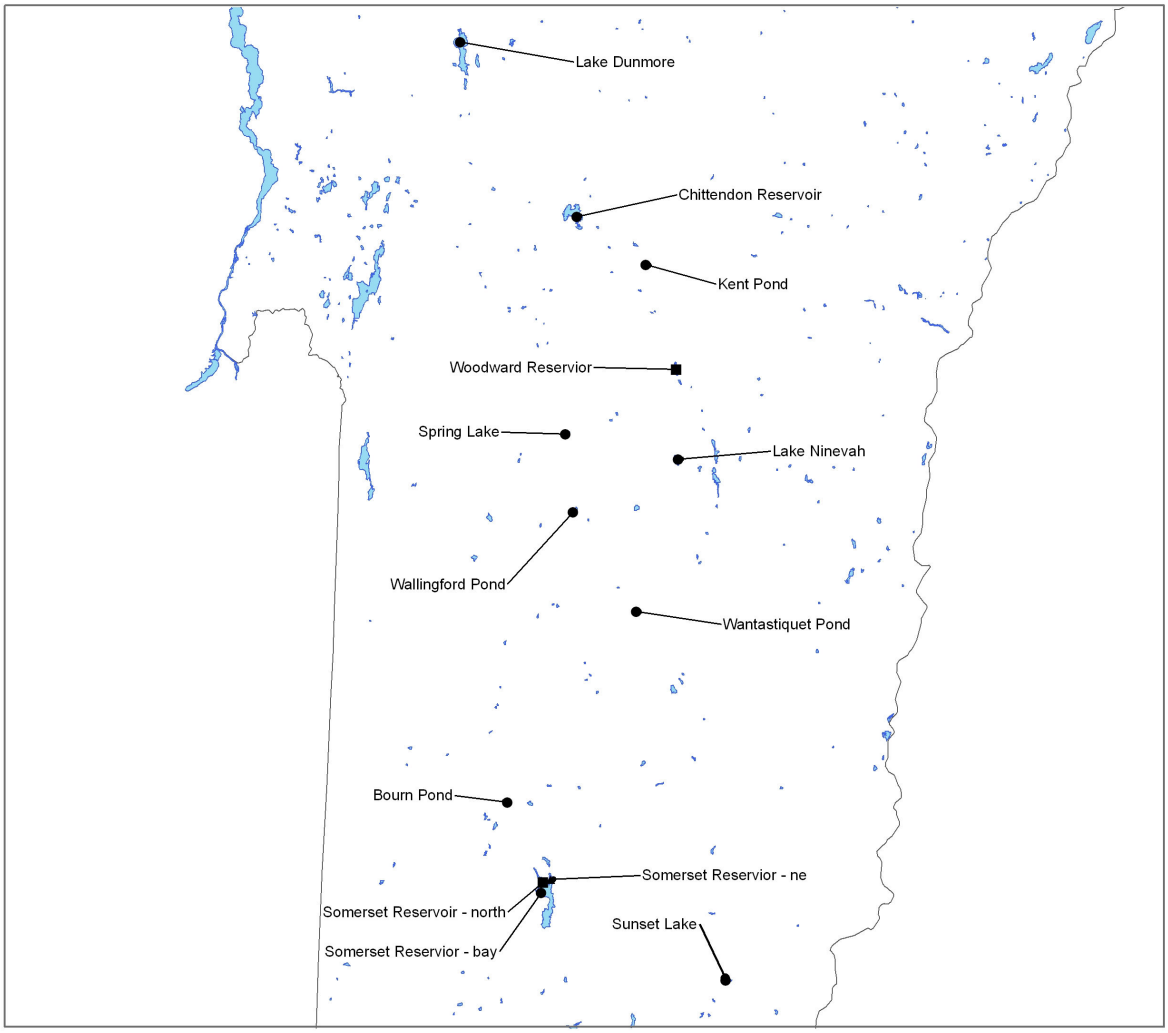


Figure 1 (b). Common Loon Nesting and Territorial Pairs in Vermont



Locations of Loon Pairs

2009

- nest
- possible territory
- territory

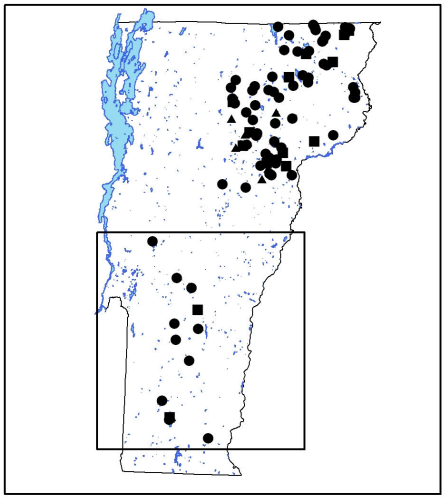


Figure 2. Summary of Common Loon breeding activity in Vermont, 1978-2009

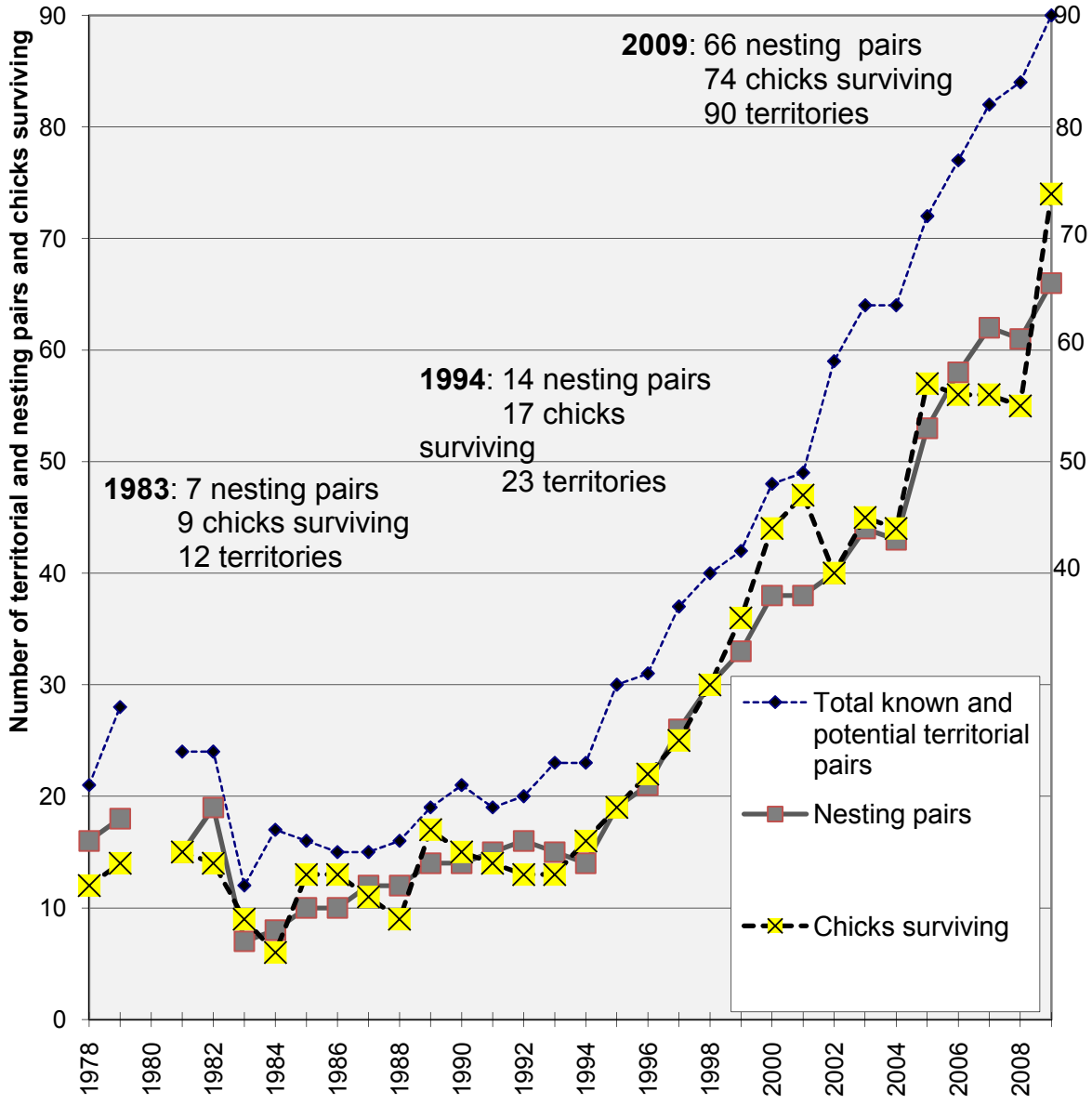


Figure 3. Vermont Loonwatch Results, 1983-2009

(an annual statewide loon census on the third Saturday of July)

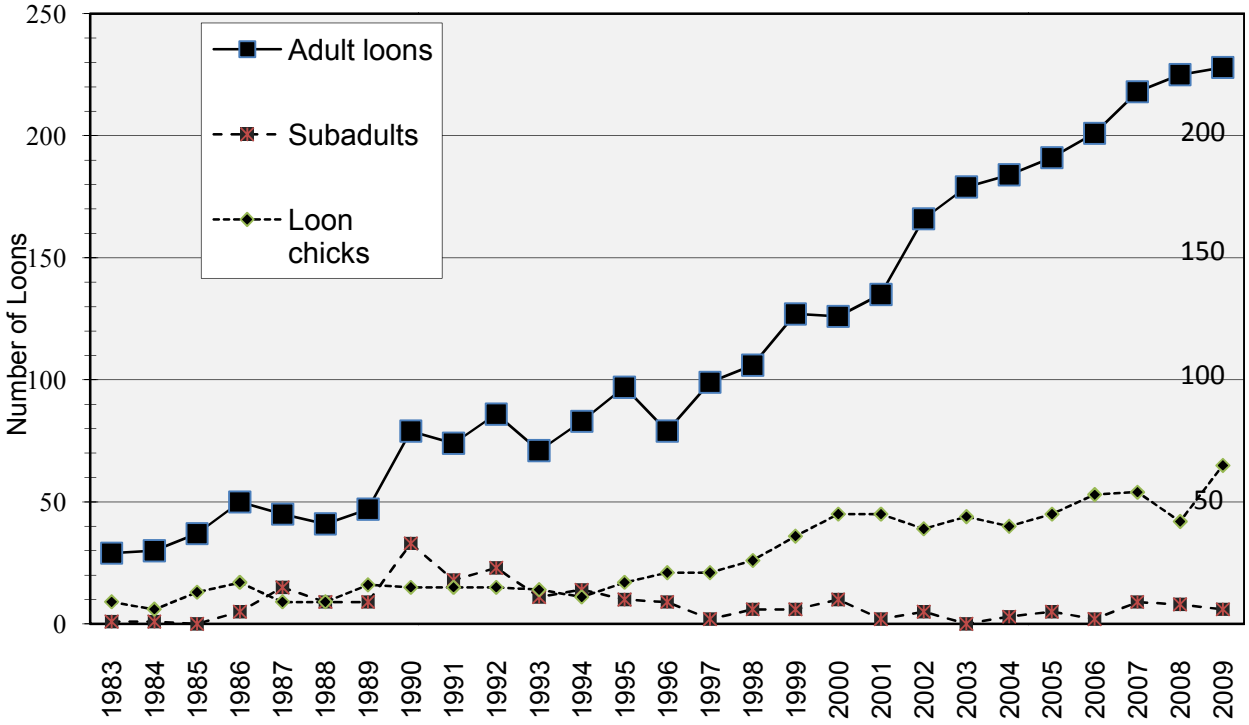


Table 1. Summary of Common Loon breeding activity in Vermont, 2009

Nesting pairs: 66 Known territorial pairs: 80 Potential territorial pairs: 10 **Total territorials pairs: 90**

Chicks hatched: 83 Chicks surviving through August: 74

Northeast Kingdom Region

Breeding Pairs

1	Bald Hill P.	1 chick from shoreline nest
2	Bean P.	1 chick from shoreline nest
3	Beaver P.	2 chicks from island nest
4	Brownington P.	1 chick from shoreline nest
5	Derby P.	Shoreline nest abandoned
6	Forest L.	2 chicks from nesting raft; 1 chick disappeared (intruder loon); intruder attacked and killed by territorial pair
7	Great Averill L.-North.	2 chicks from nesting raft
8	Holland P.-North.	Island nest flooded (possible disturbance)
9	Holland P.-South.	2 chicks from nesting raft
10	Island P.	1 chick from island nest
11	* Little Averill L.-North.	Shoreline nest flooded; 1st recorded nest
12	Long P.	2 chicks from island nest
13	Maidstone L.-North.	1 chick from shoreline nest
14	Maidstone L.-South.	2 chicks from island nest; adult found dead
15	Maidstone L.-SE.	2 chicks from island nest
16	L. Memphremagog-John's River	Shoreline nest likely flooded
17	Miles P.	1 chick from nesting raft
18	Newark P.	2 chicks from island nest
19	Norton P.-Island.	Nesting raft abandoned
20	Norton P.-North.	Nesting raft abandoned; 1st nest attempt on raft
21	Norton P.-South.	2 chicks from nesting raft
22	Pensioner P.	2 chicks from nesting raft; 1st nest attempt on raft
23	Seymour L.-Winape.	2 chicks from nesting raft; 1 chick disappeared
24	Shadow L. (Concord)	1 chick from shoreline nest; 1st successful nest
25	Spectacle P.	2 chicks from nesting raft
26	West Mountain P.	1 chick from log nest

Known Territorial Pairs - Northeast Kingdom (5)

	Echo L. (Charleston).	Pair present; nested in 2008
	Little Averill L.-West .	Pair present; nested in 2008
	May P.	Pair present; nested in 2007
	McConnell P.	Pair present; nested in 2007
	Stiles Res.	Pair present; nested in 2008; adult found dead

Potential Territorial Pairs - Northeast Kingdom (2)

	Great Averill L.-Inlet	Wallace P.

North Central Region

Breeding Pairs

27	Baker P.	2 chicks from marsh nest
28	Berlin P.	1 chick from shoreline nest
29	Bruce P.	Shoreline nest abandoned
30	Chandler P.	1 chick from unknown nest location; 1st successful nest
31	Coles P.	2 chicks from island nest
32	* Daniels P./Rodgers P	2 chicks from marsh nest; 1 chick disappeared; chicks likely moved from Rodgers P. to Daniels P.
33	East Long P.	2 chicks from island nest
34	L. Eden	2 chicks from nesting raft; 1 chick disappeared
35	L. Eligo	2 chicks from island nest
36	Fosters P.	2 chicks from nesting raft
37	* Great Hosmer P.	1 chick from island nest; 1st recorded nest
38	Green River Res.-NW.	Island nest likely flooded
39	L. Groton-South.	1 chick from nesting raft
40	Hardwick L.	1 chick from nesting raft; chick disappeared
41	Joe's P.	1 chick from nesting raft
42	Keiser P.	2 chicks from shoreline nest
43	Kettle P.	1 chick from nesting raft
44	Little Hosmer P.	1 chick from island nest
45	Lower Symes P.	1 chick from marsh nest
46	Martins P.	2 chicks from nesting raft
47	Molly's Falls Res.	1 chick from nesting raft
48	Nichols P.	1 chick from nesting raft

North Central Region (continued)

Breeding Pairs

49	Peacham P.-North.	Island nest and 2 re-nests abandoned
50	Peacham P.-SW	Marsh nest abandoned
51	Ricker P.	2 chicks from nesting raft
52	South P.	2 chicks from nesting raft
53	Thurman Dix Res.	1 chick from island nest
54	Wolcott P.	2 chicks from nesting raft; 1 chick disappeared
55	Woodbury L.	1 chick from nesting raft; chick disappeared
56	Zack Woods P.	Island nest abandoned

Known Territorial Pairs - North Central (7)

	Buck L.	Pair present; nested in 2003
	Ewell P.	Pair present; nested in 2006
	Green River Res.-SE.	Pair present; failed nest in 2008
	Harveys L.	Pair present; failed nest in 2008; adult loon caught in fishing line - outcome unknown
	No. 10 P. (Mirror L.)	Pair present; nested in 2008
	Osmore P.	Pair present; failed nest in 2007
	Peacham P.-SE.	Pair present; failed nest in 2007

Potential Territorial Pairs - North Central (7)

	Curtis P.	L. Groton-North
	L. Elmore	Joe's P.-2nd pond (new)
	Flagg P.	Noyes P.
	Greenwood L. (new)	

Central and Southern Regions

Breeding Pairs

57	Bourn P.	Island nest abandoned
58	Chittenden Res.	2 chicks from nesting raft
59	L. Dunmore/Mud P.	2 chicks from marsh nest on Mud P.; pair moved nest site from L. Dunmore; 1 chick disappeared; 2nd chick flew to Dunmore in Sept. with adults
60	* Kent P.	Island nest abandoned; 1st recorded nest; 1 adult caught in fishing line - likely freed itself
61	L. Ninevah.	2 chicks from island nest
62	Somerset Res.-Dandeneau Bay	2 chicks from large island nest
63	Spring L.	1 chick from nesting raft
64	* Sunset L. (Marlboro)	2 chicks from island nest; 1st recorded nest
65	Wallingford P.	2 chicks from shoreline nest
66	* Wantastiquet P.	1 chick from re-nest on island; 1st recorded nest

Known Territorial Pairs - Central/South (2)

	Somerset Res.-North Islands	Pair present; nested in 2008
	Woodward Res.	Pair present; nested in 2007

Potential Territorial Pairs - Central/South (1)

Somerset Res. - Northeast (new)	

* Indicates first recorded nest

Lakes to watch for future pair activity

Some pair activity observed, but either intermittant or too few surveys to determine if potential territory; # potential pairs observed in past.

L. Carmi	L. Memphremagog (Holbrook Bay)
# Caspian L.	# Moore Res.
Center P.	L. Morey
L. Champlain (adult found dead - fishing gear)	# Neal P. (adult in fishing line; caught and released)
Comerford Res.	Nelson P.
# Crystal L.	Pigeon P.
Dog P.	L. Rescue
Echo L. - N (Charleston)	Salem L.
Echo L. (Plymouth)	# Seymour L.-West
L. Fairlee	Shadow L. (Glover)
Grout P.	Silver L. (Leicester)/Sugar Hill Res.
Halls P.	Wapanacki
Hardwood P.	# Warden P.
Hartwell P.	Waterbury Res.
# Jobs P.	L. Willoughby (adult in fishing line; caught and released)

Table 2. Summary of population changes and reproductive success of Common Loons in Vermont, 1979-2009.

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

[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.