Loon Translocation

A Summary of Methods and Strategies for the Translocation of Common Loons

bri

2020

Introduction/Background

The Common Loon is an important bioindicator of environmental health. If loons are healthy and reproducing, the lakes where they breed are also likely healthy.

Until the late 19th century, breeding populations of loons could be found in lake habitats throughout Canada, south to Pennsylvania, Indiana, Illinois, Iowa, and west to California. In the Northeast, breeding loons could be found throughout New York and all New England states except Rhode Island.

However, human activities such as sport hunting practices and shoreline development caused loon populations to suffer serious declines. Over the course of a century, their southern range was greatly reduced. In some areas, including Massachusetts, loons disappeared completely by the late 1800s.

In 2013, biologists from Biodiversity Research Institute (BRI) began one of the largest loon studies ever conducted. The initial five-year scientific initiative, named *Restore the Call*, aimed to strengthen and restore Common Loon populations within their existing and former range. Research efforts originally focused on three U.S. breeding populations from the western mountains to the Atlantic seaboard; these efforts included translocation, moving individual loon chicks from one area to repopulate another area. While translocating bird species to recolonize their former range is an accepted conservation practice, this project was the first to be conducted for a loon species.

The study area encompassed national parks and other public lands in the West (Wyoming, Montana, and Idaho), private lakes in the Midwest (Minnesota); and protected areas of the Northeast (Maine, Massachusetts, and New York). The three-pronged approach for the *Restore the Call* initiative included:

- **Loon Population Assessments** — Beyond documenting regional populations, these surveys helped identify sources of ecological stressors that may contribute to declines.
- **Conservation and Outreach** — Building strong collaborative partnerships with state and federal agencies is key in loon monitoring and banding efforts, and in the development of management plans and public outreach programs that help ensure long-term reproductive success.
- **Research and Restoration** — BRI's research team developed reliable and safe methods to translocate loons to target areas.

Translocation work continues in Massachusetts and Minnesota.

Sport and game hunting of loons was common prior to the Migratory Bird Treaty Act of 1918. Such sport shooting was linked to regional population declines across New England and New York.

The loon has long been an important bioindicator species; researchers from BRI have been studying loons and testing them for contaminants for nearly three decades.

Timeline for Translocating Loon Chicks

2014-16: Translocation Pilot Study within Minnesota
In cooperation with the Minnesota Department of Natural Resources (DNR), BRI began its pilot study in Minnesota, where robust Common Loon populations in the north and abundant lake habitats throughout the state proved an ideal testing ground for developing translocation techniques and methods. During the 2014, 2015, and 2016 breeding seasons, researchers successfully translocated a total of 17 loon chicks to unoccupied lakes south of the Twin Cities.

2015-17: Translocation Pilot Study within Massachusetts
In 2015, in collaboration with the New York State Department of Environmental Conservation and the Massachusetts Division of Fisheries & Wildlife, BRI successfully moved seven chicks from New York's Adirondack Park to a lake in the Assawompsett Pond Complex (APC) in southeastern Massachusetts. In 2016, BRI translocated nine chicks to the APC (four from New York; five from Maine) with assistance from the Maine Department of Inland Fisheries & Wildlife. In 2017, eight chicks were translocated from Maine to Massachusetts (Figure 1). Overall, 24 chicks were successfully translocated to Massachusetts.

2017-19: Identification of Returning Loons
Six adult loons returned to the lake area in Massachusetts to which they were translocated and captive-reared, and then from which they fledged (see page 7). Their return marks a major milestone in the efforts to translocate Common Loons.

2020-2021: Translocation Study in Massachusetts (Round 2)
BRI is proposing to translocate up to 24 more loon chicks from Maine.

Translocation Protocols and Practices: 2013-17

Translocation involves multiple teams conducting source population surveys, capture and transport, and the difficult task of safely rearing the chicks, with numerous steps and processes in between. Below we outline the seven major steps to develop a viable translocation and restoration process: 1) identify the restoration site and source populations; 2) safe capture and transport of loon chicks; 3) develop plans and equipment for captive rearing; 4) release chicks once they are ready to feed on their own; 5) monitor chicks until they fledge; 6) monitor for returning adult loons; and 7) plan for restoration.

STEP 1 Identify Restoration Sites

Loons have high site fidelity—about 80 percent return to the same territory each summer. Some adults return to the same lakes, but, depending on the size of the lake, may move to a new cove after losing a territory; others may move to a neighboring lake. Rarely do adult loons venture more than two or three miles from their former breeding territories (juveniles may disperse an average of eight miles). This limited dispersal tendency limits the loons' natural ability to recolonize new areas.

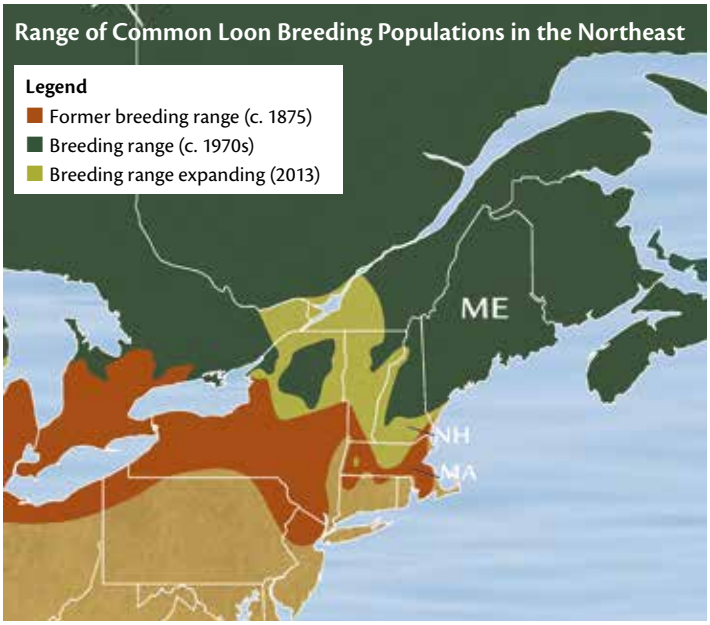
The last known breeding pair in Massachusetts was documented in 1872. Loons were officially declared extirpated in 1925. In 1975, a pair of breeding loons was identified on Quabbin Reservoir. Since then, loons have begun to repopulate parts of their former range in Massachusetts. However, due to their limited dispersal tendencies, coupled with a relatively low number of young produced (on average one territorial pair fledges one chick every other year), recolonization is naturally slow. Currently, breeding loons in Massachusetts number about 40 pairs (primarily in the Quabbin and Wachusett Reservoir area), however, they have yet to reoccupy many other parts of the state.

Southeastern Massachusetts has an abundance of lake habitat, however the lack of habitat connecting it with the Quabbin area, coupled with the loon's limited dispersal tendency, prohibits natural recolonization. The APC, a large network of lakes and ponds of varying sizes located in the southeastern part of the state, was an optimal place to begin translocation work in this state. Designated as an "Important Bird Area" by the Massachusetts Audubon Society, the APC conservation land totals about 10,000 acres of oak-conifer transitional forest, lakes, ponds, and wooded swamps.

Translocation: Expanding the Range of Common Loons in Massachusetts

In 1974, New Hampshire marked the southern edge of the range for Common Loons, and at the time that range was retracting. Recovery efforts carried out by loon conservation groups in New Hampshire and Vermont helped restore loon populations in those states.

In Massachusetts, extirpation has made recovery in that state much slower. Currently, loon recovery in Massachusetts is still dependent on breeding success in northern New England and New York. BRI's translocation research being carried out in Massachusetts provides an example of how a population at the edge of its range can be restored.



The last known breeding pair in Massachusetts was documented in 1872. Loons were officially declared extirpated in 1925; it would be another five decades before loons were again observed breeding in Massachusetts.

STEP 2 Identify Source Populations

In 2015, BRI compiled a list of potential source lakes in the Northeast and ranked these based on lake access, boating restrictions, and presence of private residences. In collaboration with the New York State Department of Environmental Conservation, BRI biologists identified source lakes in New York based on long-term loon surveys conducted by the Adirondack Center for Loon Conservation. Source lakes in Maine were identified based on ongoing loon monitoring efforts conducted by BRI and Maine Audubon Society, under the guidance of the Maine Department of Inland Fisheries & Wildlife.

Chick Selection Criteria

The criteria used to select loon chicks for translocation included: two-chick families; ease of lake access; and support from shoreline residents. Researchers monitored the ages and survivorship of chicks within the target regions in order to select viable broods and to determine appropriate timing for translocation. Chicks at least five weeks of age were chosen for translocation, as they are then capable of independent foraging and are hardier than younger birds. Chicks eight weeks and older are more challenging to capture, but when available represent an opportunity for direct release.

Methodology: Capture, Transport, Captive Rearing, and Release

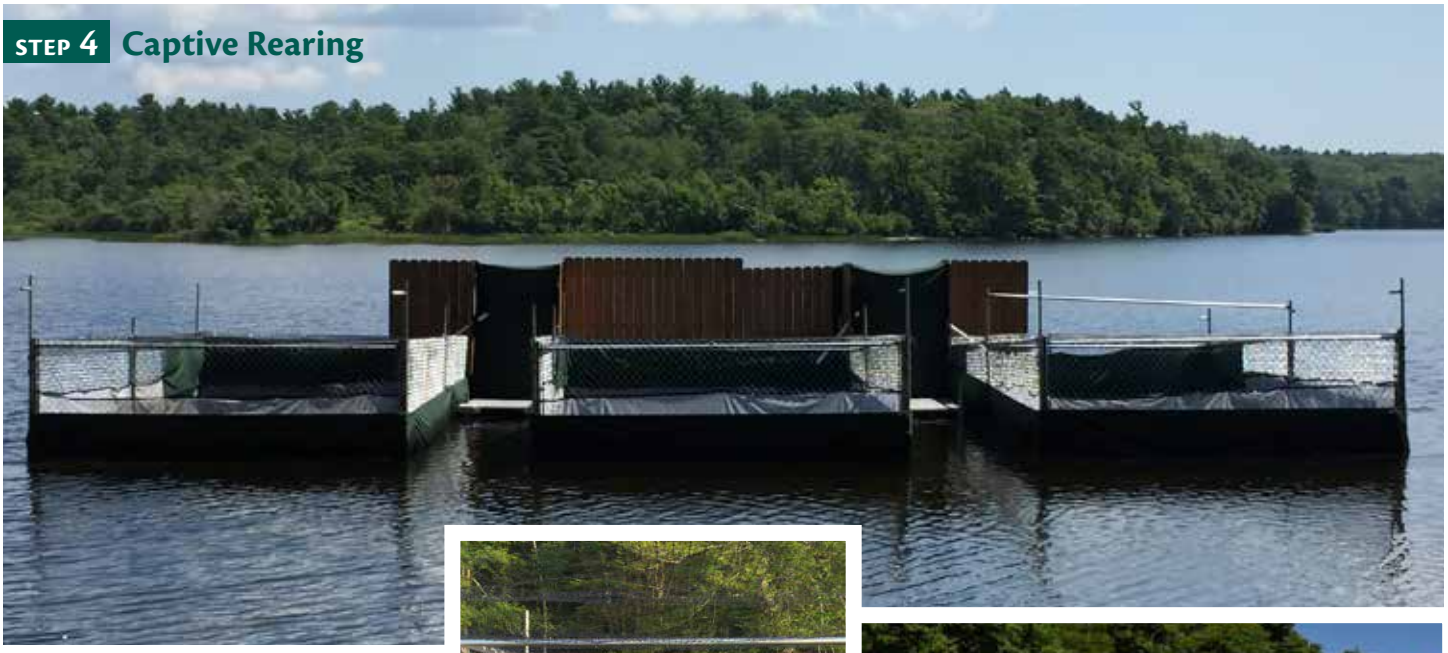
STEP 3 Capture and Transport

Using traditional nighttime techniques, BRI researchers captured chicks 5-8 weeks old from source lakes. Once chicks are in hand, a BRI attending veterinarian performs a physical examination and administers fluids to prevent dehydration during transport.

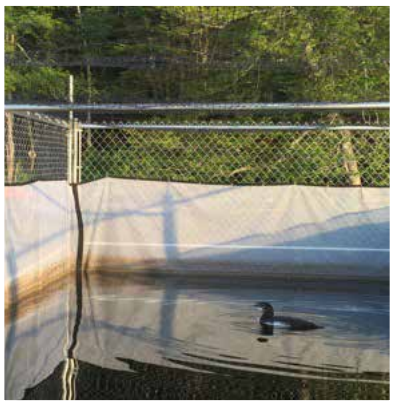
To keep chicks calm and healthy enroute to the relocation site, BRI staff designed vented containers fitted with suspended mesh netting to protect the loon's keel and feet and to allow excrement to fall through (see photo at right). These transport carriers reduce the risk of injury during long trips and help preserve feather quality. Cold packs beneath the mesh help chicks from overheating.

Specially designed carriers protect chicks during transport.

STEP 4 Captive Rearing



Translocated loon chicks are raised in specially designed aquatic pens until they are old enough to feed on their own (9-10 weeks old). The BRI team devised an innovative technique to monitor and feed the loons without being seen, which ensures that the chicks do not become habituated to humans during the rearing process.



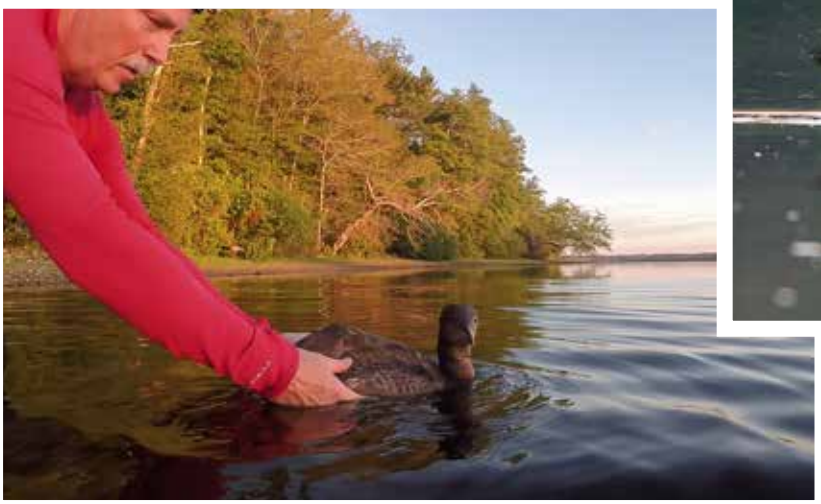
Aquatic pens protect chicks until they acclimate to their new lake environment. Chicks are monitored throughout the day by on site staff and periodic video recordings.

During captive rearing, live fish are dropped through a PVC pipe to mimic how adult loons teach their chicks to catch fish in the wild. The splash of the fish hitting the water stimulates the chicks to dive for their meal.

STEP 5 Release and Monitoring

Chicks are reared for various lengths of time depending on age and how well they acclimate to the pen. Prior to release to the wild, chicks are given a full health assessment, and banded with a unique color and number combination.

Once released, chicks adapt quickly, foraging on their own almost immediately. BRI biologists monitor the chicks daily when first released, then weekly until they fledge.



BRI biologists work before dawn to extract a loon chick from the rearing pen in preparation for release; each loon is thoroughly examined, banded, then gently released. Loon chicks acclimate quickly to the wild.

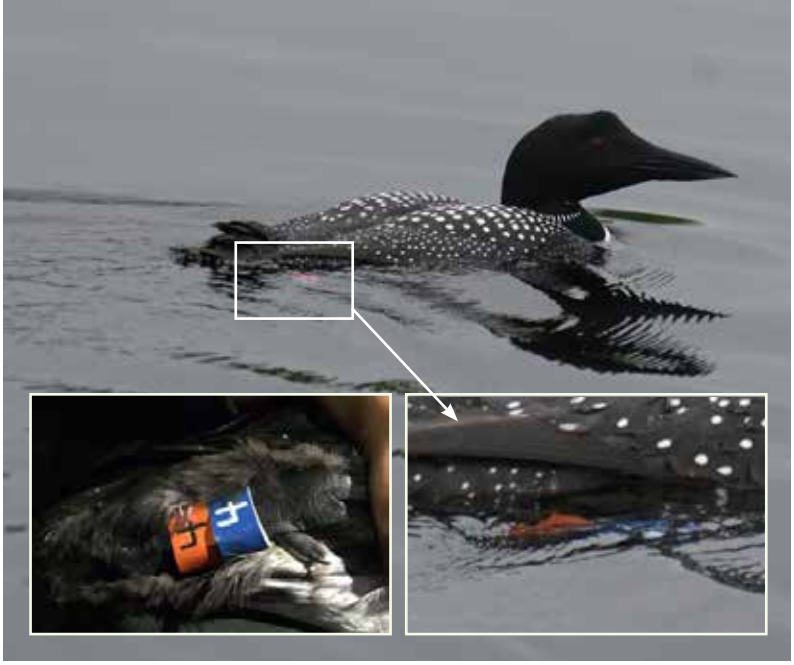
STEP 6 Monitoring for Returning Adults

A total of 24 Common Loon chicks were successfully moved from New York and Maine to southeastern Massachusetts as part of BRI's Massachusetts loon translocation project conducted from 2015-2017 (Table 1).

The Adirondack Park Region of New York was the source for 11 chicks; 13 chicks arrived from southern and northwestern Maine. Of the 24 translocated chicks, 15 were reared in aquatic enclosures before being released onto Pocksha, Assawompset, or Little Quittacas Ponds (see map opposite). Nine older chicks were directly released after being transported.

In 2017, an immature loon chick translocated the previous year was re-confirmed on the APC, marking the first record of a loon chick returning to the release site after its release year.

As of spring 2020, nine adult loons returned to the lakes in Massachusetts to which they were translocated and captive-reared, and then from which they fledged. Their return marks a major milestone in the efforts to translocate Common Loons.



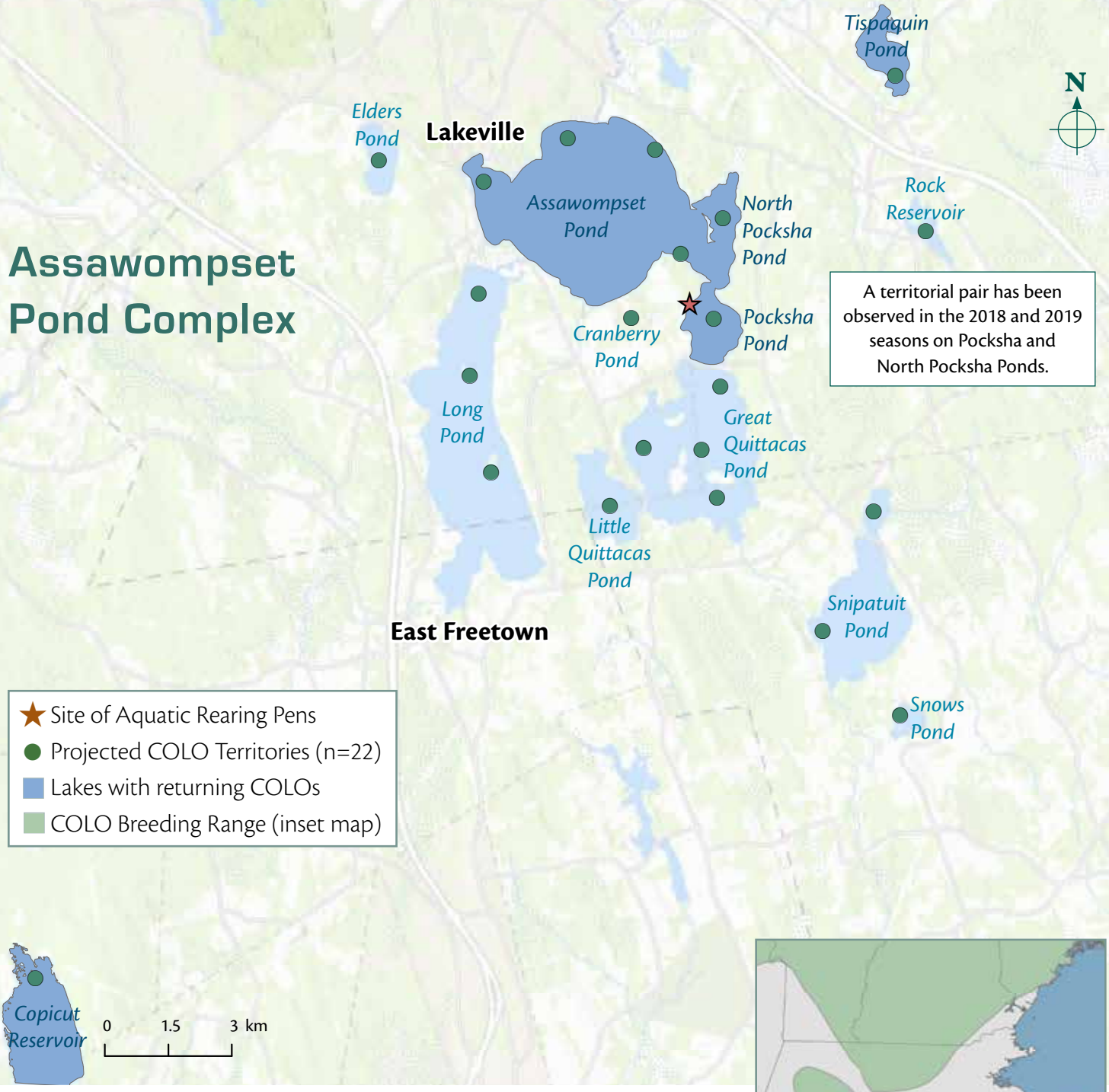
Leg bands confirm that translocated chicks return to the area. Left photo inset: Bands taken when the chick was released in 2015. Right photo inset: Close-up of leg bands on adult loon identified as Chick #4-2015.

Table 1. List of loon chicks translocated to the APC. CR=captive reared; DR=direct release. *Represents a territorial pair observed.

Release Year	Band #	Color Band Combo		Source State	Sex	Method	Date Returned	Return Lake	Re-observation
		Left Leg	Right Leg						
2015	1118-15210	silver	blue vertical stripe	NY	M	CR	June 2018	Assaswompset Pond	
2015	1118-15202	silver	red 2/blue 2	NY	M	CR			
2015	1118-15208	silver	green 3/blue 3	NY	M	CR	April 2020	North Pocksha Pond	
2015*	1118-15977	silver	orange 4/blue 4	NY	M	CR	June 2018, 2019	North Pocksha	2019 Pocksha 2020 Copicut Res.
2015	1118-15203	silver	white 5/blue 5	NY	M	CR	May 2019	Copicut Reservoir	
2015	1118-15201	silver	yellow 6/blue 6	NY	M	CR			
2015	1118-15204	silver	blue 7/blue 7	NY	M	DR			
2016	1118-15838	green dot/silver	white/red dot	NY	F	CR			
2016	0938-78833	green dot/silver	red/red	NY	M	CR			
2016	1118-15836	green dot/silver	blue/orange	NY	M	CR			
2016	0938-44493	green dot/silver	green stripe/green	ME	F	CR	June 2018	North Pocksha	June 2020 North Pocksha
2016	0938-78835	green dot/silver	orange stripe/white	ME	M	CR			
2016	1118-15832	green dot/silver	white/white	ME	M	CR	June 2018	North Pocksha	
2016	0938-53072	green dot/silver	yellow stripe/yellow	ME	M	DR	Aug 2017	Assaswompset	June 2019 Tispaquin Pond
2016	0938-78827	green dot/silver	yellow dot/green stripe	ME	M	DR	June 2020	North Pocksha	
2016	1118-15837	green dot/silver	yellow/ blue	NY	F	DR			
2017	0938-44489	red/silver	green/yellow dot	ME	M	CR			
2017	0938-44486	red/silver	yellow/blue dot	ME	F	CR	May 2020	Sampson Pond	
2017	0938-61745	red/silver	green/white stripe	ME	M	CR			
2017	0938-03365	red/silver	orange dot/red	ME	M	DR			
2017	0938-44351	red/silver	blue/red	ME	M	DR			
2017	0938-03364	red/silver	orange/blue	ME	F	DR			
2017	0669-21906	white stripe/silver	orange stripe/red stripe	ME	M	DR			
2017	0938-61725	white stripe/silver	yellow stripe/orange stripe	ME	F	DR			

*This male mated with an unbanded female and in June 2020 was observed with a chick.

Assawompset Pond Complex



Inset map shows the current loon breeding range (in green). The square shows the APC area where BRI's rearing pens and release site is located.

STEP 7 Restoration

Restoration using translocation methods helps jumpstart breeding loon populations in areas within their former range, such as the Assawompset Pond Complex (APC) in southeastern Massachusetts shown above. The APC, comprised of at least 11 lakes that are suitable for breeding loons, was historically an important breeding area for loons in the state.

Great Quittacas Pond was the site of one of the last known nesting loon pairs before their statewide extirpation in the early 20th century. Although breeding loons returned to Massachusetts in 1975, their recovery is primarily limited to the north-central part of the state.

Lakes and ponds in the APC and nearby areas fulfill the criteria for high quality loon breeding habitat including: clear, clean water; abundant populations of small fish for prey; and shoreline habitat with coves and islands to provide suitable nesting areas. For these reasons, we estimate that at least 20 nesting pairs could occupy the APC surrounding area lakes in around 30 years. This population would thereafter form the basis for further recovery in the southeastern part of the state.

Case Study: North Cape Loon Restoration

Oil spills are a widespread problem in the marine environment and can have extensive acute and chronic adverse impacts to resident and migratory biota. On January 19, 1996, the *North Cape* oil tanker (pictured above), carrying nearly 4 million gallons of home heating oil, caught fire and struck ground off the coast of Rhode Island. An estimated 828,000 gallons of oil were released into the coastal and offshore environments.

The incident resulted in the estimated death of nearly 2,300 birds, including a projected 402 Common Loons. Based on existing demographic data, a resource equivalency analysis (REA)—as described by the U.S. Fish and Wildlife Service's Natural Resource Damage Assessment and Restoration (NRDAR) framework—calculated that the total loss, as measured through dead adults and their foregone young over their expected lifetimes, was 2,835 discounted loon-years (Sperduto et al. 2003).

To generate compensatory loon years, it was estimated that 25 loon nesting pairs would need protection from development for 100 years. Following a $3 million settlement with the Parties responsible for the spill, BRI conducted surveys to identify the highest quality breeding loon habitat for protection in Maine. Nest protection was implemented in partnership with several significant pre-existing land protection projects, permitting the protection of 75 nests in total—three times more than the target number.

To evaluate restoration effectiveness, an updated REA was conducted using productivity data collected from active survey efforts. Results from the updated REA indicated that, were these site-specific-data available when the REA was originally generated, 60 nests would have been required to offset the lost loon-years. Two additional REAs were prepared using additional refinements of demographic variables. These REAs further improved confidence in restoration resolution and ultimately found that 70 nests would have been deemed necessary. Future REAs should incorporate site-specific productivity data (e.g., number of chicks raised) whenever possible to most accurately scale restoration to injury.

From Evers et al. (2019), ranking lake habitat quality further optimizes restoration effectiveness. Our results indicate breeding success was highest on lakes between 24 and 81 hectares (ha), or 10-33 acres. Based on our study lakes, an average of 4,530 ± 407 shoreline-meters was needed for protection of one territory, or 4,562 ± 479 shoreline-meters for the protection of one nest, or 3,209 ± 448 and 3,594 ± 542 shoreline meters (respectively, for raising one hatched chick or one fledged chick). The results from BRI's work with the *North Cape* oil spill NRDAR project demonstrate a need for customized site-specific restoration plans and knowledge of landscape variables (e.g., lake size) that play a role in overall reproductive success.

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