The Natural Recolonization of Long Island, New York
by the
North American River Otter (*Lontra canadensis*)

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River otters photographed on the Nissequogue River.
The one on the right is “periscoping,” a behavior characteristic of this semi-aquatic species. (Joe Kelly photo)

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This report is dedicated to John de Cuevas
(October 6, 1930 – November 29, 2018)

An ardent and thoughtful conservationist who supported and encouraged several generations of farmers and environmentalists on eastern Long Island.

It was an honor to know him as a friend, neighbor and colleague.
ABSTRACT

In 2018, an otter latrine survey was conducted to determine changes, if any, in the distribution of river otters (*Lontra canadensis*) on Long Island, New York, in the decade since the previous survey was completed in 2008, when the natural recolonization of the island by otters was first documented. The 2018 survey documented 77 otter latrines in 26 subwatersheds, up from 22 latrines found in seven subwatersheds in 2008. Seven of the new sites documented in 2018 were also surveyed several times in 2008, with no sign noted in 2008, providing additional evidence that Long Island’s river otter population has expanded over the decade 2008 - 2018. The 2018 survey project included hosting a series of public workshops designed to train interested volunteers to assist in the fieldwork. Volunteers were instrumental in documenting nine of the new latrine sites representing six new subwatersheds. Using the latrine locations in 2008 and 2018 and the lower estimate of otters’ linear home range size in coastal areas (20 km based on the published 20 – 40 linear km range), maps of otters’ range on Long Island were approximated for 2008 and 2018. Otters have now occupied most of the island’s north shore east of New York City and a significant portion of the Peconic River and Peconic Estuary on the east end. Although otters have expanded their range on Long Island between 2008 and 2018, no otter sign was found on the island’s south shore watersheds, where much suitable habitat exists.

INTRODUCTION

The river otter (*Lontra canadensis*) once inhabited the rivers, lakes and estuaries throughout North America. Several factors (unregulated trapping, water pollution and habitat loss) caused a dramatic decline in otter populations in many areas and local extirpations in others, including Long Island, New York. We have no detailed description of the distribution of otters on the island at the time of its settlement by English and Dutch colonists in the 1600s, other than a brief mention that they were here (Denton, 1670). By the early 1800s, they were considered extirpated from Long Island (DeKay, 1842) and by 1900 they were considered extirpated from most of New York State outside of the Adirondacks (New York State Department of Environmental Conservation (a), undated).

Conservation laws enacted in the early 1900s enabled remnant otter populations to expand and re-colonize former habitat, and otter reintroduction programs helped accelerate that process. In New York State, a moratorium was placed on hunting and trapping otters for nine years (1936-1945). By the mid 1990s, although its status was secure in New York State as a whole, the otter was still missing from a large area of former range in west-central New York, and its status on Long Island was unknown (New York State Department of Environmental Conservation, 2005). Although they were slowly recolonizing west-central New York from healthy populations in the Adirondacks and Catskills, a reintroduction project (the New York State River Otter Project) was established in 1995 to accelerate this process by several decades. Over the years 1995 – 2000, 279 otters trapped elsewhere in the state were released at sites in west-central New York (Fig. 1). Initial monitoring results indicate that the project was a success (American Museum of Natural History, undated).
The last survey of river otters on Long Island was done by Paul Connor as part of a general survey of Long Island’s mammals over the years 1960-1963. No otters or otter sign were encountered at that time, although in his report Connor noted, “Many otter reports, especially certain recent ones and those from western Long Island, can perhaps best be explained as individuals which have come across Long Island Sound from Connecticut, where the species has been increasing in numbers.” (Connor, 1971).

A semi-aquatic mammal and excellent swimmer capable of making long, open water crossings, river otters generally forage in shallow water and do not venture far offshore. A radio-telemetry study in Alaska documented maximum open water crossings of 6.5 km (4 miles) in length (Blundell et. al., 2002). This greatly limits their potential to disperse from nearby established populations on the mainland and reach suitable habitat on Long Island.

Since Connor’s survey, there have been occasional sightings of otters on Long Island and several reports of them being killed by motor vehicles and accidentally caught in trap gear. This information was collected from wildlife agency staff, park managers, local naturalists, and nuisance trappers, and compiled in anticipation of initiating the first island-wide survey to determine the status and distribution of otters on Long Island.
Using topographic and aerial maps, 143 potential otter latrine sites were surveyed in the field during the winter (January - March) of 2008. Twenty-four otter latrine sites were documented and mapped. All were located adjacent to freshwater. These sites were revisited several times later in the year to ensure that each was a maintained latrine reflecting an established home range, and not a single use latrine created by a transient otter while dispersing and in search of a suitable site to establish a home range (Bottini, 2009). Two sites did not meet this criterion and were not included in a map of otters’ 2008 home ranges (Fig. 3).

The 2008 study revealed that otter latrines were mainly clustered on the north shore of eastern Nassau County, where the largest latrine was located, and western Suffolk County. These sites were the closest suitable sites to the potential Long Island Sound crossing area (Fig. 2). There was an additional cluster approximately 40 miles to the east. It was speculated that the eastern sites may have been occupied by otters that reached eastern Long Island by way of the archipelago of islands extending southwest from Connecticut to Orient Point, including Fishers Island, Great and Little Gull Islands, and Plum Island (Bottini, 2009). This route has an open water crossing of 7.25 km (4.5 miles), which is very close to the published maximum open water crossing (6.5 km) listed for *Lontra canadensis* (Blundell et. al., 2002).

A subsequent remote camera study revealed that the eastern Long Island latrines were part of a home range occupied by a single otter, while the western latrines were visited regularly by groups of two to three otters. A 2013 survey of Fishers Island found that all available otter habitat on that small (10.6 square km) island was being utilized by otters, providing some evidence that the archipelago of islands (Fishers, Little Gull, Great Gull, Plum) may provide another conduit for recruitment of otters to Long Island (Bottini, 2013).

**STUDY AREA**

Long Island is located in the southeastern corner of New York State, stretching 190 km (118 miles) between New York Harbor at its western end and Montauk Point at its easternmost tip, and has a maximum width of 37 km (23 miles). It borders Long Island Sound to the north and the Atlantic Ocean to the south. At 3,630 km² (1,401 square miles) in size, it is the largest island in the contiguous United States.

The island’s coastline includes many bays and tidal creeks totaling several thousand linear miles of shoreline. These tidewaters are linked, as one moves inland, to freshwater creeks, ponds, marshes and swamps, including the island’s five major rivers: the Nissequogue River (flowing north into Long Island Sound), the Carll’s River, Carmans River and Connetquot River (all flowing south into the Great South Bay), and the island’s longest river, the Peconic River (flowing east into Peconic Bay). These waters and associated wetlands provide excellent habitat and abundant fish, crayfish and crab prey for river otters.
Figure 2. Map of the study area showing potential crossing location for otters dispersing from the mainland to L.I.

The island’s north shore has nine major bays that are all located on the western half of the island, and several long stretches (up to 13 km or 8 miles) of steep bluffs uninterrupted by tidal creeks or bays on the eastern half. The western two-thirds of the island’s south shore borders a series of shallow bays that, in turn, are separated from the Atlantic Ocean by barrier beach islands. The eastern third of the island is dominated by a shallow estuary (the Peconic Estuary) punctuated with small islands and flanked on the north and south by narrow isthmuses called the North and South Forks.

Long Island is a very fragmented landscape. Its western third includes two urbanized boroughs of New York City (Brooklyn and Queens) and the intensely developed suburbs of Nassau and western Suffolk Counties, with little protected open space. This combination of factors – being an island and having dense development where it is closest to the mainland – poses a significant challenge for many terrestrial and semi-aquatic wildlife species that might otherwise naturally recolonize the island from robust populations elsewhere.

METHODS

River otters are elusive, difficult to observe in the wild, and have large home ranges, making them difficult to census. The most commonly used census techniques for river otters are trapper surveys and harvest records, track surveys and latrine surveys. Since trapping otters is prohibited on Long Island, trapper surveys and harvest records are not feasible. Reliable track surveys depend on consistent snow cover, which Long Island lacks. Therefore, latrine surveys were chosen as the method to census for the presence or absence of otters on Long Island.

Otter latrines are sites where otters leave their scent and visible sign in the form of scat and small areas cleared of leaf litter called scrapes. They occasionally leave a clear or yellow-white, jelly-like, anal secretion. Otter latrine sites have the following physical characteristics that are helpful in focusing survey effort:
1) They are located within a few meters of the shoreline;
2) They are often located on points of land that jut into a waterway, at the confluence of tributary streams, and on small islands (Swimley et al., 1998);
3) They are often located where otters must exit the water to get around a dam or other obstacle, and where otters exit one waterbody to travel overland to reach another, the exit point being on the shortest overland distance between the two waterbodies (Kulish, 1969);
4) Over time, otter scraping and rolling behavior at latrine sites denudes the vegetation, leaving an obvious scar that is often visible from quite a distance.

Areas selected for field surveys were determined based on the following:
1) Latrine sites documented in the 2008 survey;
2) Sites determined to have excellent latrine characteristics during the 2008 survey, but did not have otter sign at that time; and
3) Roadkill, sighting and photographic evidence of otters (scat, tracks and live otters) obtained since the 2008 survey from park managers, field biologists, nuisance trappers, local naturalists and the general public.

With regard to the latter areas, in order to best focus survey effort and save time, aerial photographs and topographic maps were reviewed to pinpoint nearby potential latrine sites based on the latrine characteristics described above.

Field surveys for evidence of otter latrine sign were conducted from January 18, 2018, through January 16, 2019, during every month with the exception of August and September. Surveys were done by foot and kayak. A series of seven otter survey training workshops was held across Long Island during the spring and fall, and attended by a total of 66 volunteers. Survey reports from volunteers indicating presence of otters were verified with photographs or by field inspection by a qualified biologist.

All sites surveyed, both those having otter sign and those not having any sign, were identified and referenced with UTM coordinates using a Garmin GPS map76Cx unit. Site vegetation, number of scrapes, approximate number of scats, maximum distance of scat from water, and whether the water was fresh, salt or brackish, were also described on survey forms. Sites having otter sign were visited at least twice during the year to eliminate the possibility of including latrines made by transient otters that did not represent an established home range.

Based on the minimum home range size published for otters in coastal habitats (20 linear km of shoreline), their approximate range on Long Island was extrapolated from latrine points and mapped.

RESULTS

172 potential latrine sites were surveyed between 1/18/2018 and 1/16/2019. Several sites, particularly dams, had more than one distinct latrine noted, but these were counted as one latrine site. 77 of the sites (45%) had otter sign. Sixty-six volunteers participated in seven otter survey workshops held in the field at various sites on Long Island and were instrumental in
documenting nine of the 77 (12%) new otter latrine sites in 2018. 54 (70%) latrines were found adjacent to freshwater, 13 (17%) were found on dams separating freshwater from tidal (brackish) water, and 10 (13%) were found adjacent to brackish water.

The number of latrines documented on the western half of the island more than doubled between 2008 and 2018 (from 10 to 23), and were found in six discrete subwatersheds, up from three in 2008. The eastern half of the island showed a more dramatic increase in the number of latrine sites (from 12 in 2008 to 54 in 2018) and a five-fold increase in the number of discrete subwatersheds occupied (from 4 to 20).

Figure 3. Location and number of otter latrines at each location, and estimated distribution of otters on Long Island, N.Y. in 2008. [Note: * represents transient otter latrine]

Figure 4. Location and number of otter latrines at each location, and estimated distribution of otters on Long Island, N.Y. in 2018.
The size of the largest latrines increased between 2008 and 2018 from a maximum of 30 scats to a maximum of 80 scats. Only one site had 30 scats in 2008, while in 2018 there were four sites with 30 or more individual scats. The largest latrines also shifted from western Long Island to eastern Long Island.

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2018</th>
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<tbody>
<tr>
<td># of sites surveyed</td>
<td>143</td>
<td>172</td>
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<tr>
<td># of latrine sites</td>
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<td>77</td>
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<tr>
<td># of subwatersheds with latrines</td>
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<td>26</td>
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<tr>
<td>Size of largest 3 latrines (# scats)</td>
<td>15 - 26 - 30</td>
<td>54 - 69 - 80</td>
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<tr>
<td>Latrines adjacent to freshwater</td>
<td>21 (95%)</td>
<td>54 (70%)</td>
</tr>
<tr>
<td>Latrines adjacent to brackish water</td>
<td>0</td>
<td>10 (13%)</td>
</tr>
<tr>
<td>Latrines on dams separating fresh and brackish water</td>
<td>1 (5%)</td>
<td>13 (17%)</td>
</tr>
<tr>
<td>Latrines on western Long Island</td>
<td>10 (45%)</td>
<td>23 (30%)</td>
</tr>
<tr>
<td>Latrines on eastern Long Island</td>
<td>12 (55%)</td>
<td>54 (70%)</td>
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Table 1: Comparisons of 2008 and 2018 survey results.

Seven sites representing seven discreet subwatersheds that had been surveyed several times each in 2008 with no otter sign noted, had otter scat in 2018.

Comparing the results from 2008 with that of 2018, the sizeable increase in the number of latrine sites, the number of subwatersheds occupied, and the number of scats noted, along with the seven sites surveyed in 2008 that did not have otter sign but did have otter sign in 2018, are all evidence that the Long Island river otter population has increased and expanded its distribution over the past decade.

Extrapolating minimum home range sizes for river otters in coastal areas (20 linear km of shoreline) from latrine points, it appears that all suitable otter habitat on Long Island’s north shore east of New York City (the borough of Queens) is occupied by otters. The Peconic River and portions of the Peconic Estuary on eastern Long Island are also occupied by otters. Much suitable habitat along the island’s south shore and on the south fork remain unoccupied by otters.

**DISCUSSION**

Despite a number of formidable obstacles, including the island’s highly fragmented and developed landscape, and its high potential for mortality from motor vehicle collisions, otters have shown a great degree of adaptability and resilience in recolonizing Long Island. Since their foothold on the north shores of Nassau County and western Suffolk documented in 2008, otters have recolonized most of the suitable habitat on Long Island’s north shore and approximately half of the suitable habitat in the Peconic Estuary on the east end. They have also exhibited a remarkable ability to locate and colonize small, isolated ponds and freshwater marshes separated from other otter-occupied watersheds by major roads and intensely developed landscapes.
The apparent eastward shift in the otter’s distribution on Long Island, as evident in the locations and sizes (number of estimated scats) of latrines in 2008 as compared to 2018, may be a function of the less developed landscape on the island’s east end.

The study found a disproportionate number of latrine sites adjacent to freshwater as compared to the much more abundant brackish creeks and bays where abundant food resources are found. This may reflect the fact that tidal influence on the latter in Long Island’s relatively flat landscape significantly restricts the number of suitable upland areas within close proximity (<4 m) of permanent water. At low tide, the upland area is often well beyond the otter latrine’s average one to three meter distance from the water’s edge. No otter latrines were found in the intertidal zone.

Dams accounted for 17% of the latrine sites. Only one of the fifteen dams had a paved road on top of it, and that road was part of a park complex and only open to authorized park vehicles. All the other dams were earthen berms. No latrine sites were found on dams with public roads traversing them.

Workshops to train interested citizens to assist in the survey effort were successful. Trainees are also interested in monitoring potential otter latrine sites in areas currently not occupied by otters, and their participation will be useful in tracking future expansion of the Long Island otter population. In this study as well as the 2008 survey, both natural resource staff and the general public provided valuable information that was very helpful in directing the survey effort. Workshops were also useful in educating the general public about otters through press coverage and requests for presentations about the project from schools and civic organizations.

There is no evidence of otters on the island’s south shore, where much suitable habitat exists. Yet latrines mapped in 2018 near Lake Ronkonkoma in the center of Long Island are very close to (within three km of) the headwaters of one of the largest rivers on the island’s south shore. It is anticipated that otters will soon establish home ranges along the south shore’s estuaries and many freshwater creeks.

This study has shown that otter latrine surveys, assisted by roadkill and sighting locations, knowledge of otter latrine site characteristics, and topographic and aerial maps, are a useful and efficient tool for determining the presence and distribution of river otters. Replicated over a decade timespan, latrine surveys are also useful gauges of changes in distribution and relative population size. This methodology offers a general outlook on the status of otters in a given region, with increases in distribution an indication that the regional population is increasing, and decreases in distribution an indication that the regional population is decreasing. However, latrine surveys do not provide reliable estimates of population size to answer the most often asked question from the general public: how many otters are there on Long Island?
ACKNOWLEDGEMENTS

I could not have done this project alone. Many people assisted in the extensive fieldwork that surveying Long Island required, and the help came in many forms: reporting sightings, otter sign, roadkills, submitting photographs and videos, and contributing “dirt time” surveying for latrines.

Many thanks to surveyors Lillian Ball, Jonathon Belz, Phil Benvin, John Burnley, Kerri Dikun, Erin Gettler, Margaret Lauber, Liz Marcelus, Jennifer Murray, Victoria O’Neill, Gregory Senyszyn, John Sepenowski, Callie Velmachos, Sarah Walkley, Kevin Walsh, Marie Weiss and Byron Young. Nature Conservancy staff Mike Scheibel and Jeremy Samuelson provided a truck for my two 2018 surveys at Mashomack Preserve on Shelter Island, saving me lots of time and providing great company in the field.

Ron Afzelius, Carolyn Bunn, Leonard Carolan, Gilbert Gilmore, Cindy Goldman, Joe Kelly, Mike Rath, Derek Rogers, Robert Sendlein, Helene Starzee, Anthony Tierno and Kevin Walsh provided photographic evidence of otters in new locations, which led to mapping new otter latrine sites.

Danny Altieri, Mike Rath, Chris Burke, Janine Smith, Stephanie Sakson, Thomas Burke, David Moore, Steve Biasetti, Marybeth Ourlicht and Hap Barnes sent me excellent descriptions and locations of otter sightings that led to documenting and mapping new otter latrines.

Thanks to Melanie Kern-Favilla, Evon Hekkala, Jim Jones, Sean Keenan, Mike Rath, Charles Shearer and Helen Weinstein for reporting the locations of otter carcasses between 2012 and 2018. Most of these were roadkills. NYSDEC Region 1 staff collects and stores the carcasses for transport to wildlife pathologists where necropsies are performed and tissue samples are collected for future analyses. These unfortunate events can provide important information on the otters and their environment. Over the years, NYSDEC Region 1 staff Michele Gibbons, Kelly Hamilton, Josh Stiller and Leslie Lupo have been instrumental in collecting the carcasses. Dave Mayack, Joe Okoniewski and Tim Sinnott of the NYSDEC Wildlife Pathology Unit, and Veterinarian Gavin Hitchener of Cornell University’s Research Lab in Eastport, performed necropsies and ecotoxicology work. Special thanks to Dave Mayack for advice over the years, and Gavin Hitchener for allowing me to observe an otter necropsy.

Judy Chrstrup of The Nature Conservancy, Steve Biasetti of the Group for the East End, Sarah Walkley of Wild Otter Acoustics and Mark Gutzmer of East Hampton Town’s Natural Resources Department all offered excellent suggestions and edits that were incorporated into this final report.

They say a picture is worth a thousand words, and with that in mind I turned to Karen Leu, GIS Specialist with the Long Island Chapter of The Nature Conservancy, for help in creating several maps that best portrayed what this several thousand word document attempted to portray. Her maps did that just perfectly!
REFERENCES CITED


