The Life and Travels of Ring-billed Gulls

by Ken MacKenzie

An ongoing research project, conducted primarily to determine if water supply contamination can be reduced, has revealed much about a common species of gull that does not nest in Massachusetts, yet lives, feeds, and defecates here in great numbers.

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In the early 1990s, the Department of Conservation and Recreation (DCR) recognized a strong correlation between increasing numbers of gulls and other waterfowl at Wachusett and Quabbin reservoirs and an increase in fecal coliform concentrations in water samples taken at each intake structure. As a result, the Division of Water Supply Protection (DWSP) implemented a bird harassment program in 1993. Since then, the harassment program has been effective in maintaining source water quality standards by excluding gulls from roosting in critical areas around the intake structures. The program has successfully excluded roosting birds; however, it has its limitations. It requires a substantial investment of time and resources, is conducted during the fall and winter months under sometimes hazardous conditions, and does not exclude gulls from roosting on other parts of the reservoir.

Ring-billed Gulls are extremely adept at finding and exploiting both natural and artificial food resources. They are commonly found in parking lots near malls, restaurants, and department stores, where discarded fast food or handouts are readily available. In addition, Ring-billed Gulls can also be observed feeding on worms in large recreational fields, foraging in recently plowed agricultural fields, feeding at wastewater treatment plants, and eating garbage and discarded food in landfills. They have also been documented using obscure, temporary feeding sites such as pig farms where piles of expired bread are offered to the livestock, and at large composting facilities where all manner of exotic foodstuffs can be found in various stages of decomposition.

Ring-billed Gulls are predominately inland nesters. There are currently no known nesting sites in Massachusetts, but a small colony (<20 pairs) did attempt to establish a nesting colony on an island at Wachusett Reservoir during the summer of 1997. Approximately 10 nests containing 16 eggs in total were discovered on Cunningham Ledge in that year. The colony was quickly controlled, and no further nesting attempts were made. Currently, most breeding occurs in the northern Maritime Provinces of Canada, the Great Lakes, and Lake Champlain.

Given the potential impacts of these gulls on water quality, plus the expense and difficulties involved in the exclusion of roosting flocks, we decided to launch a study to gather more information on

these birds and perhaps discover better ways to reduce their impacts on the largest water supply system in the Commonwealth. Initially, the study was focused on the three species of gulls known to utilize the reservoirs: Ring-billed, Herring, and Greater Black-backed. As the study progressed, it became clear that Ring-billed Gulls were the most prevalent gull in central Massachusetts and the most common gull utilizing the reservoirs. According to weekly roost counts during the fall and winter of 2007 and early spring months of 2008, Ring-billed Gulls made up over 80% of the Wachusett Reservoir roost.

In order to answer some of the research questions about Ring-billed Gulls, biologists need to understand their movements. The best way to do this is to track individual gulls over time. In order to do that, gulls first had to be captured and then marked in a way that would make them easily identifiable.

Gulls were captured with a self-contained net launcher, powered with a blank .308 charge. Various kinds of these "rocket nets" are routinely used in wildlife studies to capture a variety of animals, including deer, turkey, and waterfowl. The capture method is extremely safe

An immature Ring-bill has a mottled look and lacks the distinctive bill ring of an adult. Other species of gulls also roost on DCR reservoirs, but Ring-bills outnumber them by more than 4 to 1.

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Gulls are adept at taking advantage of many food resources provided intentionally or unintentionally by people. Here a group of Ring-billed Gulls (including two juveniles) glom a handout of cheese crackers in a shopping mall parking lot. The provision of such artificial resources, however well intentioned, encourages the birds to remain and congregate on local waters when they would otherwise disperse.

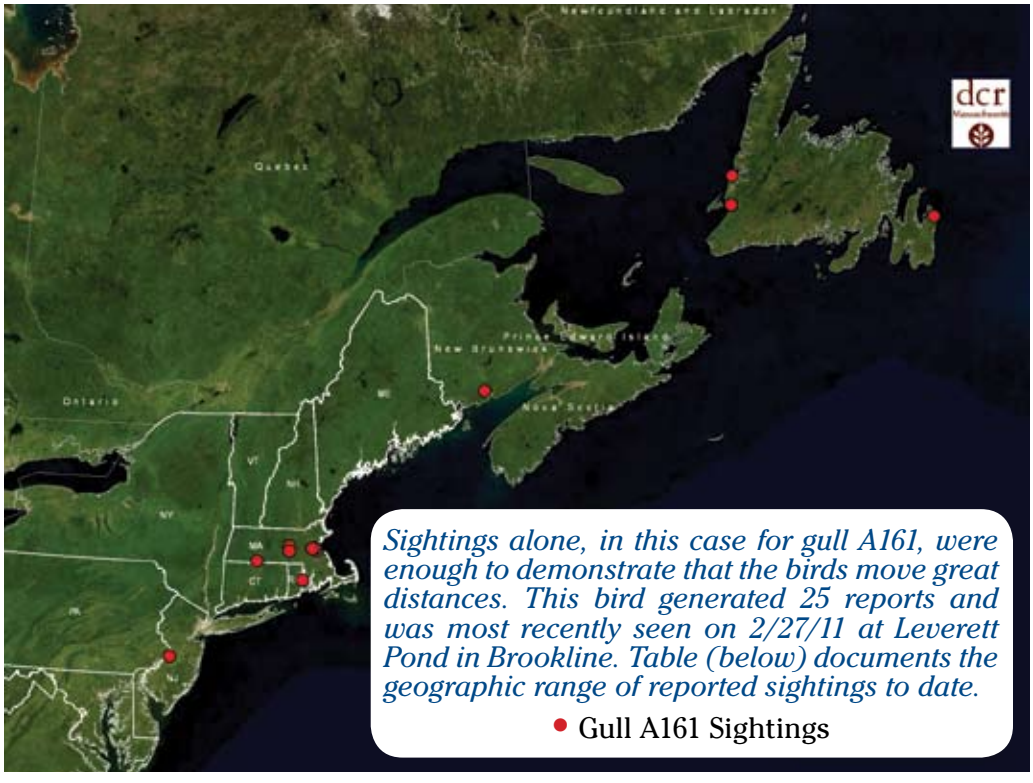
and efficient. Bait is placed in front of the folded net, and once the birds become accustomed to feeding near the net, it is armed and fired over the feeding flock. The advantage to this method is that many gulls can be captured at one time.

From January 2008 to February 2011, over 880 Ring-billed Gulls were captured (575 in the Wachusett area and 307 in the Quabbin area). Once captured, they were carefully removed from the net and then banded with an aluminum federal band with a unique number. These numbers are registered in a national database and can provide information on recovered birds. Additionally, a colored band was placed on the opposite leg. These bands are color-specific based on species and/or capture location (i.e., Quabbin, blue; Wachusett, red) and also include unique ID numbers.

Because gulls spend a lot of time resting and paddling around in the water, leg bands would be of limited use in identifying individuals: You can't read what you can't see. To overcome this disadvantage and increase the visibility of identifiable markings, we also equipped most captured birds with colored wing (patagial) tags. These tags are made of a lightweight vinyl material and are uniquely marked with a combination of letters and numbers (often referred to by wildlife researchers as "alphanumerics"). Individual birds so equipped could then be identified by noting the color of the tag and reading the number and letter combination on the tags (i.e., "A126") with the naked eye or with the help of binoculars or a spotting scope. This tagging method was an inexpensive and effective way to mark gulls that allowed them to be identified from a distance.

To the surprise of DCR, the number of reported wing-tag sightings has been remarkable. As of February 2011, folks have reported seeing 661 individual Ring-billed Gulls for a total of 3,077 sightings. These sightings have covered an extensive geographic area ranging from Canada to Florida (see facing page). In

Vinyl wing or "patagial" tags allow observers to identify individual marked birds even when their leg bands (in shadow here) are hidden by water or vegetation.



Sightings alone, in this case for gull A161, were enough to demonstrate that the birds move great distances. This bird generated 25 reports and was most recently seen on 2/27/11 at Leverett Pond in Brookline. Table (below) documents the geographic range of reported sightings to date.

• Gull A161 Sightings

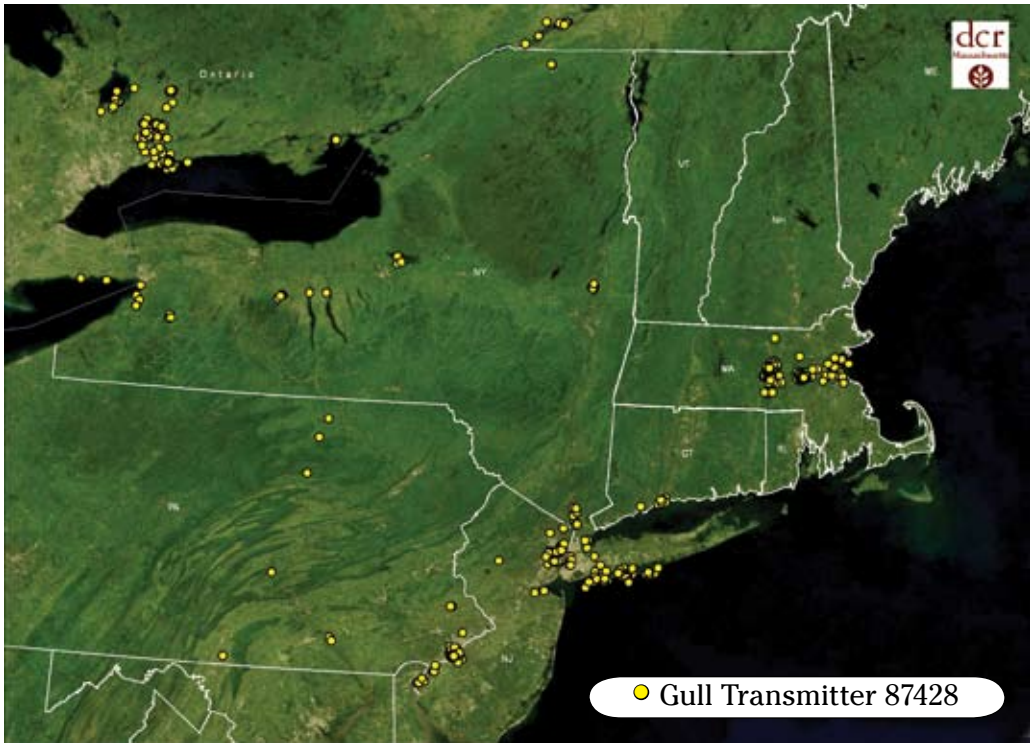
addition, several gulls have been sighted that have been tagged for 12+ months. Gull A125, which can regularly be seen in the Walmart parking lot on Route 9 on the Westborough/Northborough line, has been seen as many as 70 times since November 2008.

Leg-banding and wing-tagging allows biologists to identify individual gulls that are seen opportunistically, but accumulating the locational data depends heavily on public participation to report the sightings. The sighting reports provide "snapshots" of where a marked bird is located at a specific date and perhaps specific time, but, with few exceptions, these reports can provide only limited details about the daily movements or behavior of individual gulls. For our purposes, detailed movement data from different individuals would be crucial to our understanding of these birds, so we added another tracking method to the project.

Satellite and GPS technology provides the most effective way to obtain detailed movement information over large areas. A subset of the gulls we captured were

Sightings by State/Province

State/Province	Sightings
Massachusetts	2053
Connectitcut	307
Maine	99
New York	89
Rhode Island	79
Quebec	73
Newfoundland	69
New Brunswick	50
New Jersey	43
New Hampshire	40
Vermont	26
Pennsylvania	19
Maryland	19
Ontario	19
Nova Scotia	17
Delaware	16
Prince Edward Island	14
Virginia	12
North Carolina	5
South Carolina	4
Georgia	3
Florida	3
Labrador	2
Manitoba	1
Bermuda	1



Satellite tracking revealed that gull 87428, a typical example, visited multiple states. It spent considerable time in parking lots during late fall and winter, fed on worms in fields in the early spring, and intermittently visited a host of other food procurement sites including wastewater treatment plants, landfills, and parks. For more detailed info and continuing updates on reports and movements of this and the other gulls being tracked, please visit: http://www.mass.gov/dcr/gullstudy.

therefore fitted with a backpack harness that carries a satellite transmitter (some transmitters have GPS capabilities). To date, the DCR has placed 25 transmitters on 14 Ring-billed Gulls, 10 Herring Gulls, and one Greater Black-backed Gull. Thirteen of those transmitters are still active, eight of them on Ring-billed Gulls.

Although most of the satellite data we have collected still needs to be categorized and processed, the travel history of one individual has been completed. Ring-billed gull 87428 was captured on 11/10/2008 at Searstown Mall in Leominster. Over 3,200 locations were received for this bird, and 1,042 (32%) were high-quality and reliable enough for use in analysis. Of the 1,042 locations, 41% were transmitted during the day (defined as between 7:00 AM and 8:00 PM) and 59% at night. The 1,042 locations represent data from 289 different days. The number of locations received on any given day ranged from one to nine.

Gull 87428 was located primarily in parking lots during the late fall and winter, while feeding on worms in fields was limited to the early spring. Similarly to what had been reported based on wing-tag sightings, this gull also utilized wastewater treatment plants, landfills, and parks as sources of food, although much less frequently than parking lots.

Within central Massachusetts, this gull utilized many of the same parking lots that were frequented by other wing-tagged gulls, including some parking lots in the Worcester area. Gull 87428 utilized a variety of locations for roosting, including both fresh- and saltwater locations. However, when in Massachusetts, this gull used only two freshwater roosting sites, and Wachusett Reservoir was used predominantly (65%), primarily from

October to December each year. The 119 locations on Wachusett Reservoir represented 46 different days the bird was present. In addition, the gull was documented loafing during the day at Wachusett on three different days.

Tracking gulls both spatially and temporally has enabled DCR biologists to acquire considerable knowledge from this 3-year study. Equipped with the ability to identify individual gulls (through wing tags and satellite tags), the DWSP has been able to gain tremendous insight into the movements, feeding behavior, reservoir use, and seasonal patterns of gulls found in central Massachusetts.

Specifically:

- The study has provided a tremendous amount of data related to Wachusett Reservoir and its use by gulls.
- Ring-billed Gulls are the main gull species utilizing the reservoir. On most nights, Ring-billed Gulls constitute at least 75% of the roost. While Herring and Greater Black-backed gulls can be found roosting on the reservoir, their numbers are much lower and their presence is much less consistent than that of Ring-billed Gulls.
- Ring-billed Gulls in central Massachusetts rely almost exclusively on human-derived sources of food, including parking lot handouts and wastewater treatment facilities (but not landfills).
- Not all parking lots are equal. Certain parking lots in central Massachusetts are used frequently by Ring-billed Gulls and consistently attract the largest number of gulls because of the type and amount of food available and the physical characteristics of the lot.
- Wastewater treatment plants within central Massachusetts are used by

Adult Ring-billed Gulls are easily recognized by their relatively small size (in comparison to Herring and Greater Black-backed gulls) and the complete black "ring" around their bills. The research has revealed that most of those tagged in Massachusetts move to more southern locations in winter, ranging from Rhode Island and Connecticut all the way to Florida. The species is apparently always present, however, thanks to more northerly birds that continually drift south into Massachusetts and beyond during the winter months.

Ring-billed (and some Herring) Gulls as a source of food. Gulls utilize these areas most often during the fall and early winter and will feed at various points within the plants (i.e., raw water inflow, settling ponds, etc.). Gulls utilizing these treatment plants will later roost on Wachusett Reservoir.

- Ring-billed Gulls will utilize other water bodies within central Massachusetts for both roosting and loafing. However, Wachusett Reservoir seems to be used by all gulls at some point during the non-breeding season.
- Most gulls that arrive in central Massachusetts during the non-breeding season do not stay in the area for the whole winter. Almost without exception, tagged individuals caught in central Massachusetts continued south at some point during the winter. Tagged individuals returning to the Commonwealth the following fall left the state again at some point during the winter. How far south each gull travelled varied greatly. Some individuals drifted to Connecticut and Rhode Island, while others traveled as far south as Florida. However, even though gulls continued to move south during winter, there were always gulls present in central Massachusetts. Gulls shifting south were mostly replaced by gulls from further north also shifting south. Gulls from the north drifted south into the Commonwealth throughout the winter.
- Gulls utilizing central Massachusetts during the non-breeding season were documented to travel to breeding colonies in the Great Lakes, Lake Champlain, or the St. Lawrence Seaway.
- While gulls moved extensively up and down the eastern seaboard, no gull travelled further west than the western edge of Lake Huron.

Photo © Bill Byrne

The DCR study revealed that Ring-billed Gulls make up approximately 75% of the birds that roost on Wachusett Reservoir. When thousands congregate on the water, their impact on water quality can be substantial.

Information gained from the wing-tagging program and satellite transmitters has enabled the DWSP to determine specific feeding locations and identify sources of food. This information is being used to develop a landscape-level management plan to try to reduce or eliminate the presence of gulls at each water supply reservoir by educating the gull-feeding public and controlling human-derived food sources in central Massachusetts. While such a goal is daunting, it is reasonable to believe that information gained through this research can be applied in the field with some expectation of success. The first step toward this goal was successfully implemented in October and November of 2010 when the DWSP worked with the Leominster Water Pollution Control Facility and the Upper Blackstone Wastewater Treatment Facility to exclude gulls from feeding in the primary settling tanks.

Wachusett Reservoir is the terminal water supply reservoir for 2.2 million people in the greater Boston area. The Department of Conservation and Recreations' Division of Water Supply Protection strives to protect water quality in its system. A great deal of funding goes towards maintaining source water quality standards by excluding gulls from roosting in critical areas around the water intake structures that bring water to more than 50 communities.

While the program has been successful, it does have its limitations. It requires a substantial investment of time and resources. The behavior of most wildlife is greatly influenced by the constant search for and consumption of food. Ring-billed Gulls in central Massachusetts display a very consistent pattern of movement and feeding locations. Human-provided food sources were used by the gulls throughout the fall and winter and were occasionally supplemented by natural foods (almost exclusively worms in fields). With respect to this study, DCR biologists have observed many feeding events and witnessed first hand that there are people who regularly feed gulls, either opportunistically (while eating lunch and dropping a few scraps), or purposefully (buying and bringing food to a parking lot on a regular basis).

Because gulls in central Massachusetts obtain the majority of their food from humans, it is possible to control this food source in order to protect the water quality of our reservoirs. Please DO NOT feed gulls any food. As long as people feed the birds, they will continue to come to parking lots. These gulls join *thousands* of others from the area to roost for the night on a reservoir. That volume of birds, spending 8-12 hours on the reservoir each day, can produce large amounts of bacteria-laden feces which contribute to significant water quality degradation.

These birds are very mobile and resourceful. Research has shown that they will move to new areas in search of food if their regular sources are no longer available. This study has documented that Ring-billed Gulls can move from Maine to Florida in just a couple of days. If there is no food available to them from parking lots near public water supplies, they will move on to other areas where food is available.

Ken MacKenzie is the Senior Wildlife Biologist for the Department of Conservation and Recreation's Division of Water Supply Protection. He and his colleagues conduct research on many wildlife species within the Wachusett, Ware River, and Quabbin watersheds, and also mitigate damage problems involving Canada geese, beaver, muskrat, and, of course, gulls. Ken lives with his wife and baby daughter in Marlborough.