

# Distribution of river otter (*Lontra canadensis*) within the Mississippi National River and Recreation Area: results from a two-year study of winter sign surveys

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## Introduction

Monitoring the abundance and distribution of wildlife populations is critical for successful management of natural resources. By monitoring key species such as the North American river otter (*Lontra canadensis*), water quality and ecosystem health can be more efficiently assessed and threats to wildlife populations can be more effectively prevented and mitigated (Frair, 2011; Roberts, 2008). An important apex predator of aquatic and riparian ecosystems, river otters are an invaluable link between aquatic and terrestrial habitats, an important economic furbearer, and an excellent symbol for environmental education and public outreach due to their playful, charismatic nature (Dekar 2010; Gorman, 2007).

River otters are indigenous to Minnesota and historically were common and widespread throughout aquatic habitats of North America. River otter populations declined severely in the early 20<sup>th</sup> century mainly due to anthropogenic factors such as water pollution, wetland degradation and over harvesting (Crimmins, 2009; DNR, 2011). In the early 1980s, local reintroduction efforts resulted in the release of over 20 individuals from native, in-state populations into suitable habitats within Minnesota (Reasly, 2001). Otter populations have greatly recovered in Minnesota since the 1980s as a result of improved habitat and water quality, harvest regulation, and successful reintroduction efforts (Gorman, 2008; Reasly, 2001).

In May 2009, a river otter sighting during BioBlitz (a public, 24-hour event to inventory as many species as possible) at Crosby Farm Park roused an interest to



**Figure 1**

**River otter observed at Coon Rapids Dam Regional Park, February 2009 (Photo: courtesy of CRD RP Staff).**

further the understanding of otter populations within the Mississippi National River and Recreation Area (MNRRA) and the Twin Cities Metro area as little scientific knowledge or research

existed for otter populations in this area. In August 2009 a pilot study was conducted by the National Park Service (NPS) to survey evidence of river otters on two-mile stretches of riparian habitat/shorelines, with nine survey locations selected based on prior live otter sightings. This pilot study confirmed the presence of otter populations in several sites along the Mississippi River between Coon Rapids and downtown St. Paul. The pilot study also improved logistics and field methods for river otter monitoring within varied habitats along the Mississippi River. Sign surveys were continued throughout the park the following two winters.

## Materials & Methods

Sign surveys are the most commonly used technique to monitor abundance and distribution of river otter due to their relatively low cost and few logistical constraints (Frair, 2011; Roberts, 2008). Although the efficiency to accurately estimate actual population numbers based on sign surveying alone is questionable, this method is effective in determining habitat use and distribution using a presence-absence based protocol (Breux, 2002). This technique has also been proven practical due to the rarity and elusive behavior of river otter, which makes them difficult to observe directly in the wild (Gallant, 2007; Sulkava, 2007). Sign surveys are especially effective in winter months. Fresh snowfall provides a homogenous substrate for sign detection, while surveying in warmer months provides difficulty in recognizing tracks and other sign on heterogeneous riverbank substrate (Gallant, 2007).

Presence-absence surveys were carried out in the winters of 2010 and 2011 to determine river otter distribution within MNRRA. The preliminary winter survey took place in March 2010, where two or more volunteers surveyed three sites on three separate days (two near the confluence of the Mississippi and Minnesota Rivers and one in Anoka County) by searching shorelines for snow tracks, feces, haul-outs, water access holes, and direct sightings using snowshoes. This preliminary investigation confirmed an overlap in positive sign detection in both summer and winter seasons, and also

provided important information for the improvement of field methods and data collection procedures.

The following winter in January 2011, groups of two or more people surveyed 500-meter transects of riparian and wetland habitat for signs of otter presence. We chose 500m transects based on commonly practiced procedures for presence-absence surveys (Breux, 2002; Crimmins, 2009; Frair, 2011; Gallant, 2008). Small transects allowed better comparison between survey years and between sites of different size or habitat characteristics. Snowshoes were the preferred mode of transportation, and with the aid of an iron ice chisel we were able to survey not only from the shoreline, but from the water's surface as well, allowing fewer logistical restraints when making observations.

Geographical coordinates were recorded for the start and end of each 500m transect, and for each positive otter sign found. For each sign observed we also recorded the type of sign (scat, tracks etc.), an estimate of freshness of the sign (greater or less than 24 hours old), as well as an estimate of the number of individuals if possible. Field data also included date, start and finish time of survey, temperature, cloud cover, relative humidity, wind speed, predominant vegetation cover, and environment and habitat notes. Field data was later mapped using ArcGIS/ArcMap software.

## Results & Conclusions

In March 2010, we surveyed three sites totaling 9.5 km or about 6 miles of shoreline between Anoka County and the confluence of the Minnesota and Mississippi Rivers. Of the 19 total 500-meter transects surveyed, 11 were positive for otter sign (57.9%) and 8 were absent of otter sign (42.1%). All three survey locations were positive for the presence of river otter activity.

In January 2011, we surveyed five sites, of which four were positive for otter presence and one was absent of observed otter activity. A total of 17, 500m transects were surveyed and covered 8.5 km or 5.3 miles of aquatic and riparian habitat between downtown St. Paul and the Lower Vermillion River (just southeast of Hastings). Ten of the 17 transects had at least one otter sign present (58.8% positive), while 7 were negative for

any observed sign (41.2% negative). Sites with little to no activity were usually areas with complete ice cover, or areas with no open water, meaning that otter activity and habitation is likely limited by the availability of open water for feeding (Martin, 2010; Sulkava, 2009).

Survey Date	Site Name	# of Sign	Total Transects	Percent positive transects
3/4/2010	Pickerel Lake	5	7	71
3/9/2010	Coon Rapids Dam	2	6	33
3/18/2010	Snelling Lake	9	6	66
1/11/2011	Mud Hen Lake	1	7	14
1/18/2011	Truedale Slough	11	6	100
1/25/2011	Pickerel Lake	3	2	100
1/25/2011	Crosby Farm Park	0	1	0
2/8/2011	River Lake	5	1	100

**Table 1: Survey results by site for 2010 and 2011 winter survey seasons. Total number of sign found at site; total number of 500 meter transects surveyed; Percentage of transects positive for river otter activity (with some sign observed) calculated by: (#positive transects)\*(100/#total transects).**

Only one survey site was shared between the two survey seasons, with both years of studies representing an array of habitats from the northernmost to the southernmost regions of MNRRA. These studies along with the pilot study in August, 2009 confirmed the presence of river otter throughout the entire length of the MNRRA corridor.

## Discussion

Winter surveys were found to be logistically practical, cost effective, and provided optimal visibility for otter sign surveying. Snowshoe was decidedly the most effective and practical mode of transport for winter surveys due to the accessibility to both terrestrial and aquatic habitats, and for the optimal visibility provided by this mode of transport. The previous two winter surveys found that January – February are ideal months for surveying, any later or earlier months do not provide favorable snow cover. For future surveys that take place in warmer months, we recommend using watercraft (preferably canoe or kayak) to access shorelines to be surveyed on foot. For statistical comparison between survey years, surveys should continue to follow the

methods of 2011 winter survey, using 500m transects and surveying areas of interest within the park. Site selection, depending on resources available, should at least continue to study the known “hot-spots” of river otter activity; and, if possible, expand to include new, unsurveyed areas. During winter months, areas of high activity will be likely be in areas with open water access for hunting.

Future field studies should aim to include enhanced photo documentation of all signs found as well as at least one photo of the shoreline of each site. Field notes should also include data for time elapsed since last snow fall for each survey. Future investigations within the study area would ideally focus on non-invasive genetic sampling with the goal of providing an estimate of population size within the MNRRA corridor.

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