

A NON-INVASIVE APPROACH TO RIVER OTTER
(*LONTRA CANADENSIS*) MONITORING IN THE FINGER LAKES
REGION OF NEW YORK.

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Progress Report 1

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PROJECT GOALS AND ACCOMPLISHMENTS

Summary of Proposed Work

River otters were once abundant in central and western New York, but were nearly extirpated in the 20th century due to unregulated trapping and habitat loss. Between 1995 and 2001, the River Otter Project and the New York State Department of Environmental Conservation (DEC) translocated approximately 300 otters to western New York and the Finger Lakes region. Though the reintroduction was generally accepted as successful, there have been few published reports or systematic efforts documenting otter population status since the translocation.

The goal of my research is to improve conventional otter monitoring methods using non-invasive techniques, and to contribute to a better understanding of the newly established otter population in the Finger Lakes. Specific research objectives are to: 1) establish individual genotypes and estimate abundance of river otters in the Finger Lakes using non-invasive molecular techniques, and 2) assess and quantify seasonal variation in group size, visitation rates, and temporal patterns of latrine site visitations using camera traps. Successful completion of objective 1 will depend upon genotyping efficacy. If objective 1 cannot be met using genetic analyses, I will explore the estimation of site-occupancy using camera trap data as an alternative to estimating abundance.

Abundance estimates will be established via DNA “finger printing” methods using non-invasive sampling of feces and mucosal secretions deposited at latrine sites. In addition, latrine sites will be monitored with camera traps to identify periods of increased visitation so that future monitoring efforts may be targeted during these periods of high latrine activity.

Work Completed

Between May and July 2013, latrine site surveys were conducted in wetland complexes associated with the eleven Finger Lakes (Figure 1). All undeveloped wetland communities were searched by boat, canoe, or on foot. A total of 366 km of shoreline was surveyed in 32 days. Otters were detected in wetlands associated with Honeoye, Canandaigua, Lamoka, Cayuga, and Skaneateles Lakes and a total of 39 latrine sites was located and monitored throughout the summer (with the exception of Lamoka Lake where permission was not granted).

Scat and jelly samples were collected from 38 latrines four consecutive mornings each week from 8 July to 16 August 2013. Only fresh scat and jelly samples (determined visually by moistness and odor) were collected to assure samples were deposited within the previous 24 hours. Scat and jellies were placed into a sterile stool tube container with 95% ethanol and stored at 4.4°C until extraction. DNA extractions were conducted at the Muller Field Station in an isolated room free of concentrated DNA.

Nineteen of 39 latrine sites were monitored using Reconyx® PC800 cameras. Cameras were placed on trees and artificial posts adjacent to latrines approximately 2.5 m from the ground. Four of the 19 cameras have been deployed since June 2012 and additional cameras were deployed in May 2013. All cameras were checked and maintained weekly. Eleven cameras are currently active and will be checked every 3 weeks.

PRELIMINARY RESULTS

Otter Presence in the Finger Lakes

Otters were detected in five lakes: Honeoye, Canandaigua, Cayuga, Lamoka, and Bear Swamp State Forest adjacent to Skaneateles Lake (Figure 2). During the restoration effort, otters were released at 6 locations in the Finger Lakes Region (Figure 3). Otters were detected in all release sites except for Hemlock Lake.

Genotyping

Ninety-five fecal samples were collected from June to August, 2013 (Table 1). All samples were stored in 95% ethanol and have been extracted using QIAmp® DNA Stool Mini Kits. Ninety-seven of the 130 samples collected in 2012 have been extracted and 20 samples have been amplified via polymerase chain reaction (PCR). Preliminary results from PCR have shown successful amplification of the eight microsatellite loci used for genotyping (RIO01, RIO02, RIO06, RIO07, RIO11, RIO12, RIO 18, RIO19; Figure 4).

Activity Pattern Monitoring at Latrines

Camera traps were deployed for a total of 3082 camera-nights. Over 230,000 images have been collected since June 2012 and all otter detections have been sorted by site. Preliminary analyses on visitation data were conducted using camera trap analysis programs designed by Sanderson (2012). Visitation frequency appears highest in winter (December, January, and February) at 0.42 and lowest in summer (June, July, and August) at 0.27. Daily otter activity at latrine sites appears to peak at 1:00AM and again from 3:00AM to 9:00AM suggesting that otters display both nocturnal and crepuscular activity patterns (Figure 5). Visitation data from the summer season in 2013 has not yet been incorporated into these analyses.

FUTURE WORK

DNA extractions will be completed in September 2013 and PCR will continue at Finger Lakes Community College (FLCC) and SUNY Environmental Science and Forestry (SUNY ESF). All samples will be sent to the University of Rochester for sequencing and genotyping by November 1st. Depending upon genotyping success which is reported between 18-24% for scat and 70-80% for jelly (Brzeski 2010, Mowry et al. 2011, Guertin 2012), abundance estimates will be explored genetically and/or with an occupancy-based approach using camera trap data.

Ten cameras remain in the field at Honeoye Inlet. By monitoring each latrine within the wetland into the fall, we hope to gain perspective on river otter movements and habitat use. Data collected in summer 2013 will be incorporated into visitation analyses and seasonal variation in visitation and group size will be explored.

ANTICIPATED RESULTS

By employing an extensive sampling and monitoring scheme, I will be able to census river otters in the Finger Lakes and investigate the behavior of the species across relatively small spatial extents. I expect latrine use to vary seasonally and anticipate that the estimated number of otters in the wetland complex will correlate with standardized visitation rates. By establishing a correlation between latrine visitation and otter numbers, it is my hope that trail cameras can serve as abundance proxies without the added expense of DNA mark-recapture modeling. In combination, my research should be a solid first step in devising an otter population status monitoring system throughout the Finger Lakes region and western New York.

BENEFITS AND OUTREACH

This research project has been instrumental in establishing a collaboration between SUNY ESF and FLCC. A pathway for faculty, students, research scientists, and staff from both institutions has been opened allowing a wealth of ideas and experiences to be shared. Undergraduate students from both institutions were hired to assist in all aspects of the research including data collection and management, field surveys, and non-invasive monitoring of river otters in the field and in the lab. Students were provided with invaluable opportunities for training and professional development. I worked one-on-one with each student to ensure proficiency in shoreline survey techniques, trail camera deployment and maintenance, scat and jelly collection (with particular emphasis on avoiding contamination), and laboratory techniques for extractions. These students are now local experts on the natural history of river otters in New York State and have developed the skills and precision to successfully find and monitor this elusive carnivore in the field. Opportunities for student involvement will continue into the fall as assistance will be required with remaining extractions and downstream applications.

This project has been promoted in a number of ways to ensure the dissemination of information to communities of interest in an effort to enhance public understanding and increase interest in conservation efforts. Outreach initiatives have included presentations to the public at the Seneca Park Zoo (whose veterinary staff evaluated and micro-chipped project otters prior to their release) and Montezuma National Wildlife Refuge which served as a release site for 28 otters in 1995 and 1998. The Friends of the Montezuma Wetlands Complex also issues a newsletter which featured an article highlighting this research titled: "Return of the River Otter." The Department of Environmental Conservation (DEC) is an important stakeholder in this project and has received various reports, scientific posters (which have been used at the annual NYS Furbearer Meetings in 2012, 2013), and updates regarding observational data. This work was formally presented at the annual DEC furbearer management team meeting in February as well as the Annual Northeast Fish and Wildlife Conference in April, 2013.

TIMELINE

2013

September – December

Finish extraction and PCR of 2012 and 2013 samples; send all samples to University of Rochester for sequencing and genotyping; quantify and analyze camera observations; draft thesis.

2014

January – March

Finalize camera trap data and genotyping results; edit and finalize thesis.

April

Defend thesis

ACKNOWLEDGEMENTS

I am appreciative of my advisor Dr. Brian Underwood, committee members Dr. Jacqueline Frair and Dr. John VanNiel, and collaborators at Finger Lakes Community College for helping me make this past field season a success. This work would not be possible without the financial support of the American Wildlife Conservation Foundation, SUNY Potsdam Walker Fellowship, NSF#1118679, Edna Bailey Sussman Foundation, and River Otter Alliance. Special thanks to the Seneca Park Zoo, Department of Environmental Conservation, and the Fish and Wildlife Service for your contributions to the project.

LITERATURE CITED

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- Guertin, D. A. 2012. Fecal genotyping reveals demographic variation in river otters inhabiting a contaminated environment. *Journal of Wildlife Management* 76(8): 1540-1550.
- Mowry, R. A., M. E. Gompper, J. Beringer, and L. S. Eggert. 2011. River otter population size estimation using noninvasive latrine surveys. *Journal of Wildlife Management* 75(7):1625-1636.
- Sanderson, J. 2012. Camera trap data analysis programs and instructions. Website, <http://www.smallcats.org/CTA-executables.html>, accessed Feb 7 2013.

TABLES AND FIGURE

Table 1. Total number of river otter scat, jelly, and mixed scat with jelly samples collected in the Finger Lakes Region, New York from 8 June to 16 August, 2013. Samples from north to south were Honeoye Inlet (Hon), Canandaigua Inlet (Can), Montezuma Wetland Complex (MWC), and Bear Swamp State Forest (BWSF).

	Hon	Can	MWC	BWSF	Total
Scat	8	8	13	0	29
Jelly	20	7	9	0	36
Scat and Jelly	2	1	25	2	30
Total	30	16	47	2	95

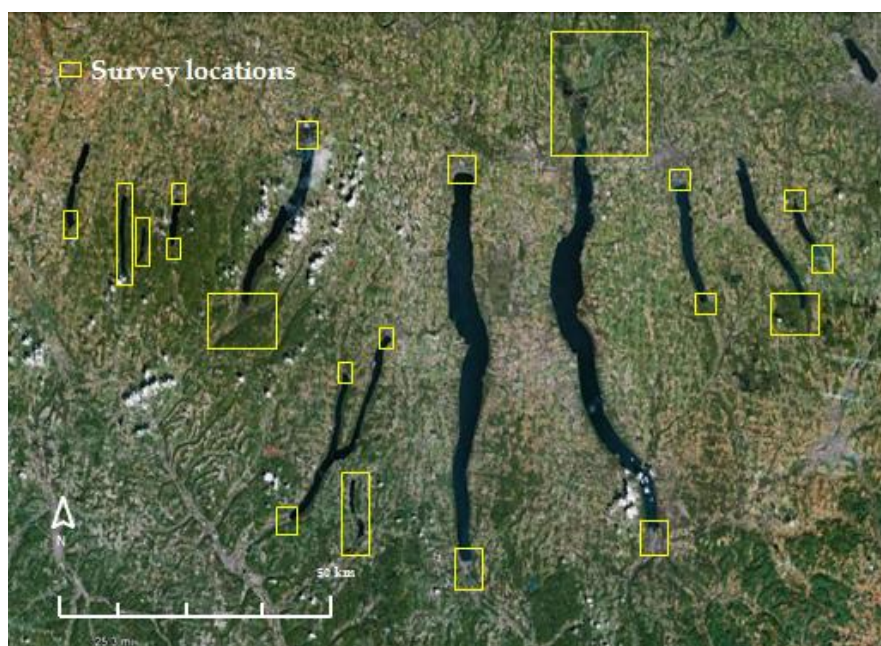


Figure 1. Latrine site survey locations in the Finger Lakes Region of New York from 14 May to 3 July, 2013.

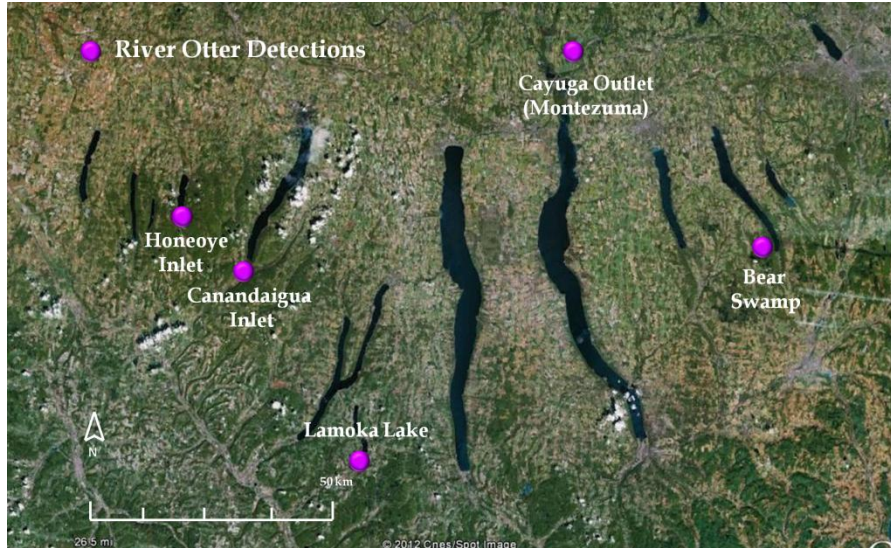


Figure 2. River otter detections in the Finger Lakes Region of New York, 2013.

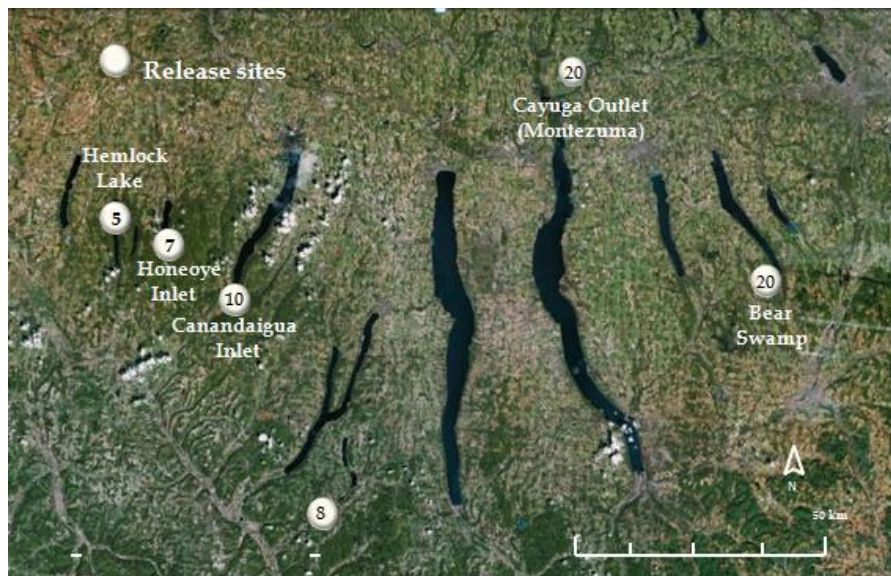


Figure 3. River otter release site locations and number of otters released in the Finger Lakes during the restoration project between 1995 to 2001.



Figure 4. Agarose gel showing results of polymerase chain reaction of eight microsatellite primers used to establish river otter genotypes. Six of the eight microsatellites show successful amplification as denoted by a light band. Wells from left to right (top): ladder or size standard in base pairs (L), RIO01 (1), RIO02 (2), RIO06, RIO07, RIO11, (bottom): ladder (L), RIO12, RIO18, RIO19, positive control (+), and negative control (-).

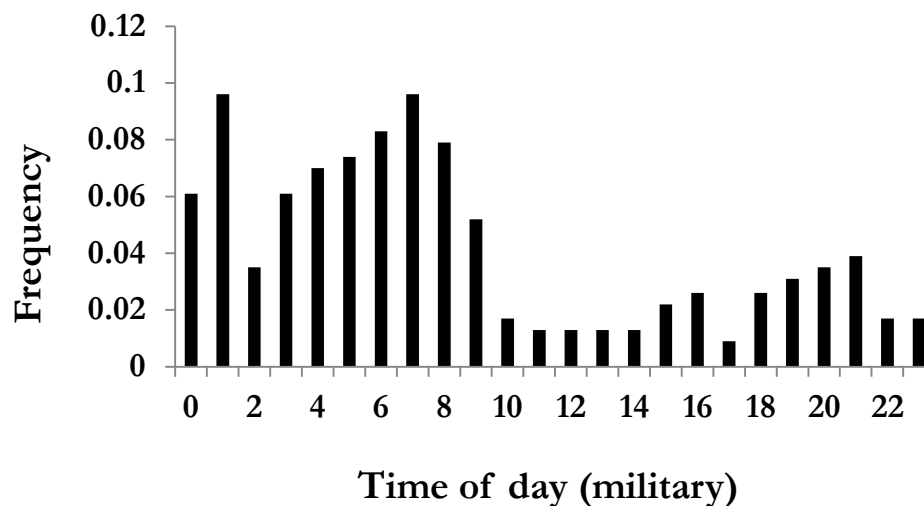


Figure 5. Time of visit for summer, fall, winter, and spring for river otters visiting latrine sites monitored with camera traps from June 2012 to May 2013 in the Finger Lakes Region of New York.