Winter habitat use by River Otters (*Lontra canadensis*) in the John Prince Research Forest, Fort St. James, British Columbia

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Abstract

River Otters (*Lontra canadensis* Shreber*)* were once one of the most widely distributed mammals in North America. Since European settlement, their numbers have declined substantially in many areas of their former range, especially in the American Mid-west and the southern regions of the Canadian prairie provinces. Although River Otters range throughout British Columbia and are a commonly trapped furbearer, there is little information available about their seasonal distribution and behaviour. During the winters of 2003 and 2004, we studied several aspects of River Otter ecology in the John Prince Research Forest near Fort St. James in north-central British Columbia. We recorded otter activity and collected baseline habitat measurements. We documented the occurrence of lake entry points that otters used during the winter months (spring upwellings, muskrat pushups, beaver lodges). Of these, spring upwellings comprised the majority of entry points used by otters. Upon classifying entry points into different water depth interval zones, we found that otters used lake habitats where water was no deeper than 6.5 m. We also found that otters were very active during the daylight hours in winter. Although proximity to shore, water depth and risk of predation may affect otter habitat selection in winter, it appears that the availability of spring upwelling entry points are important for otters in our study area regardless of distance from shore.

Introduction

River Otters (*Lontra canadensis*), along with Gray Wolves (*Canis lupus*) and American Beavers (*Castor canadensis*), were once the most widely distributed mammals in North America (Anderson 1977). Since European settlement, their numbers have declined substantially in many areas of their former range, especially in the American Mid-west and the southern Canadian prairie provinces (Melquist et al. 2003). Research and management activities throughout North America and Europe have shown that these animals, in their role as apex predators, are vulnerable to pollutants and toxins in their environment (Ben-David et al. 2001, 2002), and historically have been sensitive to over-trapping on a regional scale (Melquist et al. 2003). However, the most important threats to River Otters historically have been that of habitat loss as a result of human activities, particularly agricultural development (Melquist and Hornocker 1983, Melquist et al. 2003).

The ecology of the River Otter has been studied in a variety of regions of North America but is not well documented in British Columbia, particularly the freshwater habitats of northern British Columbia. Although River Otters range across the entire province and are a commonly trapped furbearer, there is little information available about their seasonal distribution and behaviour. As well, the Resource Inventory Committee of British Columbia has not yet developed guidelines for surveying and monitoring these animals, probably due to the complexity of necessary survey techniques (Melquist et al. 2003).

River Otters are reported to avoid large, open bodies of water in winter because ice cover restricts access to prey, primarily fish (St. Georges et al. 1995). St. Georges et al. (1995) also found that lake access is negatively associated with increasing latitude. Additionally, River Otters are reported to be primarily nocturnal animals but diurnal behaviour is common in some areas during winter (Melquist and Hornocker 1983). We describe behaviour and winter use of two large lake systems by River Otters in north-central British Columbia.

Study Area

Our study area is in the John Prince Research Forest (JPRF; 54º40’40” N and 124º26’15” W; Figure 1). The region is characterized by rolling topography with low mountains ranging between 700 and 1300 m above sea level. The area is located in the Sub-boreal Spruce Biogeoclimatic Zone. The John Prince Research Forest is situated between Tezzeron and Pinchi Lakes, which are 7807 ha and 5554 ha in surface area, respectively. The watersheds containing these lakes eventually flow into the Fraser River system via the Stuart and Nechako Rivers.

Methods

We collected baseline habitat measurements, as well as, three years of observational accounts. Reconnaissance track surveys were conducted during the winters of 2003-2005. River Otters were tracked to lake openings that were used as entry points. These lake openings were surveyed and classified as beaver lodges, Muskrat (*Ondatra zibethicus*) push-ups or spring upwellings. We recorded and mapped all locations of otter feeding, roll-out and latrine visits. Behaviour was observed from December 2003 to April 2004 by locating lake openings on Tezzeron and Yatzutzin Lakes. The openings were accessed via snowmobiles from the Cinnabar Research Station and were classified as active if otters were present, tracks appeared fresh, or secondary feeding on fish (by species such as Bald Eagle (*Haliaeetus leucocephalus*) and Common Raven (*Corvus corax*)) was visible at entry points. At active openings, we observed behaviour from various vantage points at distances of generally 50 - 100 m from the otters. Behaviour was categorized as: roll-out, resting/grooming, foraging, or latrine visits (Figure 2).

In an effort to determine selection of lake habitat by otters, we divided the water depth of Tezzeron Lake into three categories based on distance intervals from shore. These interval categories were: 0-50 m, 51-200 m, and greater than 200 m. We overlaid the lake entry points on the distance from shore interval categories and on bathymetry charts. We calculated the percentage of area in these different zones that had greater than 6.5 m of water (deepest water level for entry sites). We then compared the percentage of interval categories with the percentage of entry points in each zone. We conducted this analysis for Tezzeron Lake only because no bathymetry data were available for other lakes for which we had recorded otter activity patterns.

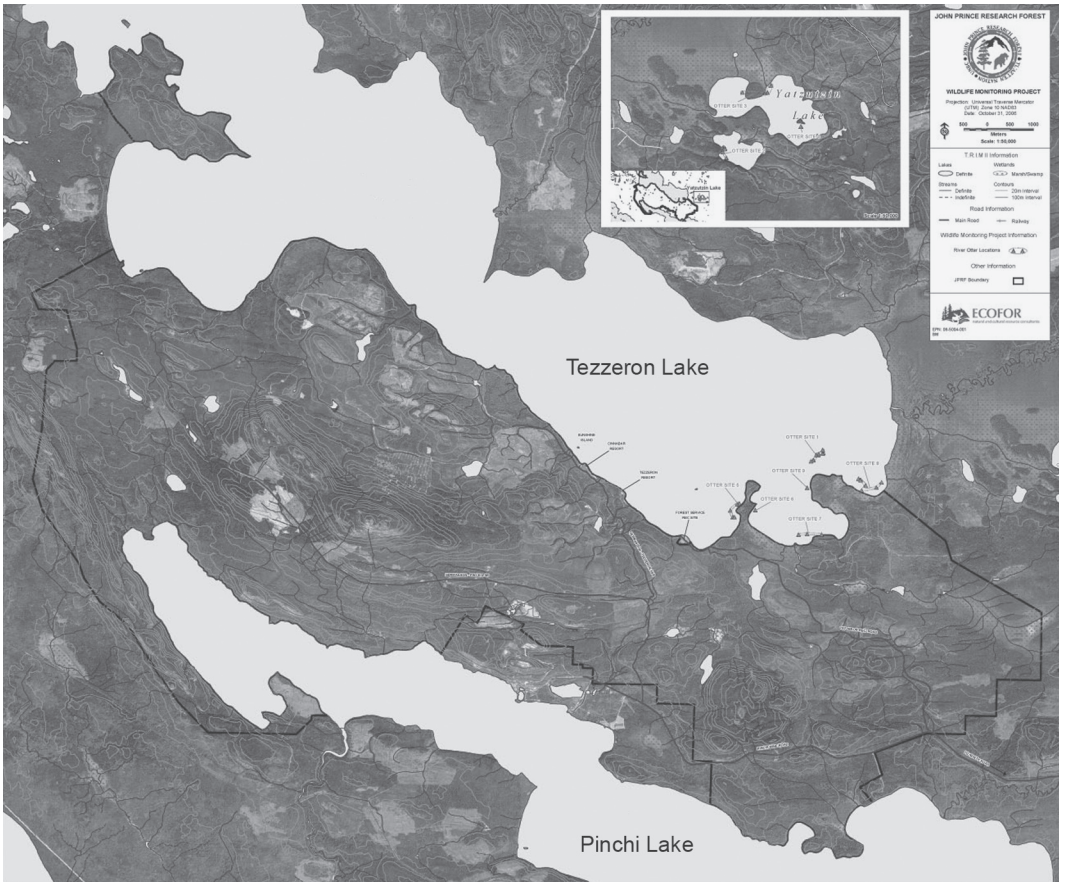

Figure 1. The John Prince Research Forest, located between Tezzeron (north) and Pinchi Lakes was the hub of the study area. Yatzutzin Lake (top right inset) is at the northeast end of the study area.

Results

All active lake openings that we observed were located in spring upwellings, near old beaver lodges or muskrat push-ups (Figure 3). Active lake openings were as far as 1700 m from shore, but were more commonly found at 50-200 m offshore. Despite the distance from shore, however, our data reveal that openings located in our study area did not occur at water depths greater than 6.5 m (Figure 4), even though bathymetry maps indicate water depths are greater over large areas of Tezzeron Lake. We found that the percentage of total area in these interval categories with greater than 6.5 m of water was 3.9%, 13.3%, and 85.6% for 0-50 m, 51-200 m and greater than 200 m, respectively. In comparison, lake entry points for River Otters were located in these same interval categories 21.2%, 36.4%, and 42.4% of the time, respectively.

Entry points were reused in multiple years and typically had more than one entrance hole. Prey taken by otters were primarily slow moving, bottom feeding fish (such as burbot (*Lota lota*) and suckers) as well as Muskrats. We observed considerable activity during daylight, particularly between sunrise and mid-afternoon. We were not in the field at night and, therefore, we do not have information regarding otter activity at night. However, lack of fresh signs during our early morning track surveys appears to

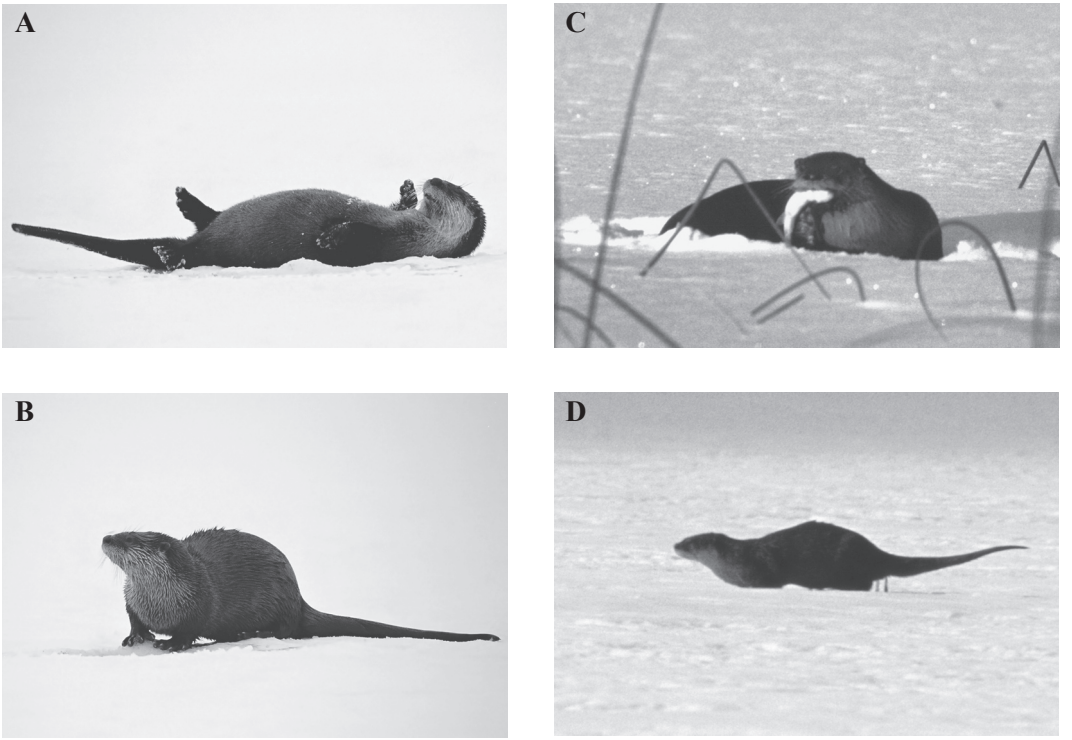

Figure 2. Images of some of the more common behaviours of River Otters observed on lake ice during the December 2003 – March 2004 field season on Tezzeron Lake, BC. 2A: Roll-out; 2B: resting/grooming; 2C: foraging; 2D: latrine visits. (Dexter P. Hodder).

suggest that otters were more active during the day than at night, particularly when temperatures dropped to -10ºC or lower.

Discussion

We observed otters regularly using lakes as winter habitat despite some literature suggesting that otters avoid lakes due to inadequate access to prey (St. Georges et al. 1995). The upwellings from locally abundant underwater springs appear to maintain thin ice conditions and allow otters to use large lakes in our region during winter. We found that 50% of the lake openings we surveyed were associated with spring upwellings, and that these provide otters with access to the water column during winter. These

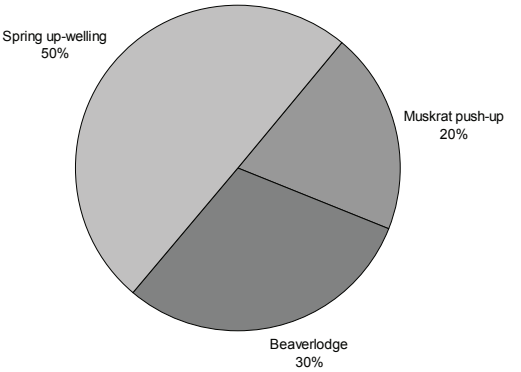

Figure 3. Percentages of lake opening types used by River Otters on Tezzeron and Yatzutzin Lakes, BC.

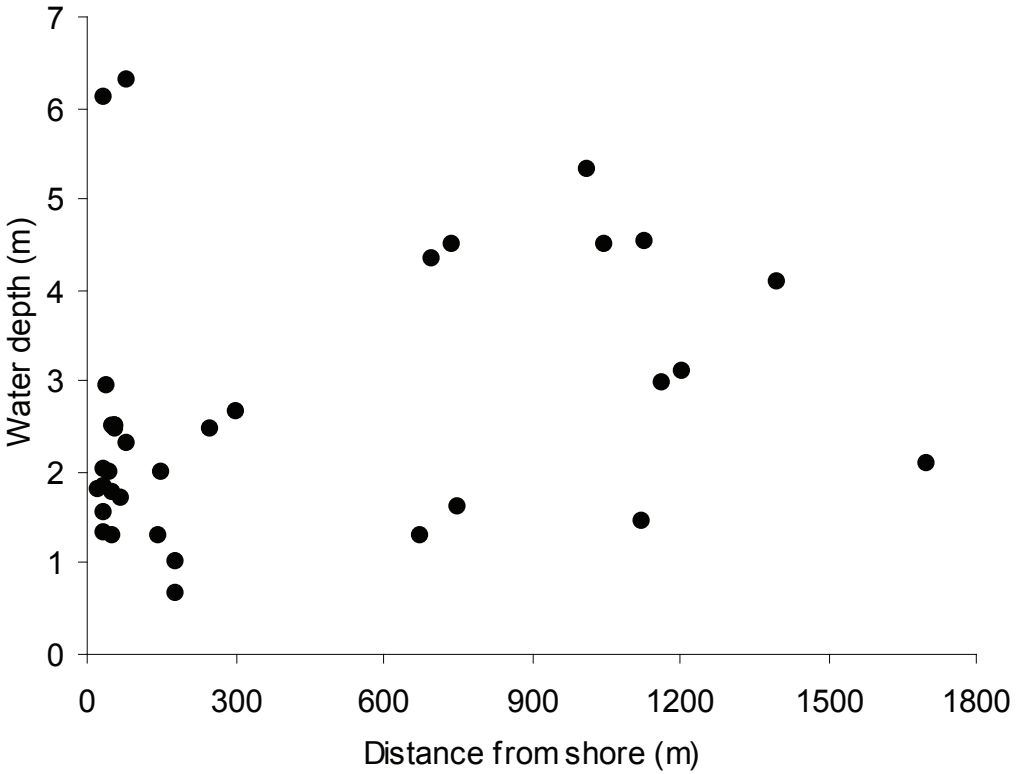

Figure 4. Relationship between distance from shore and water depth for active lake openings used by River Otters on Tezzeron and Yatzutzin Lakes, BC.

findings appear to vary from findings elsewhere that suggest beaver lodges and muskrat push-ups were used most frequently for lake access (Melquist and Hornocker 1983, Reid et al. 1994, Swimley et al. 1998). The presence of upwellings likely explains the anomalous winter use of large lakes by otters in our area and corroborates the findings of St. Georges et al. (1995) that ice cover is the major limiting factor for use of lakes by River Otters in winter. We contend that even though proximity to shore and water depth may affect habitat selection by River Otters in our study area, the presence of spring upwellings appears to be a critical feature required for otters to gain access to that habitat.

In addition to access to foraging opportunities, predation may be a factor that influences habitat suitability. River Otters are preyed upon by Bald Eagles, Gray Wolves, Coyotes (*Canis latrans*), Wolverine (*Gulo gulo*) and Cougar (*Puma concolor*) (Melquist et al. 2003), all of which occur in our study area. However, cases of predation seem to be infrequent and occur almost exclusively when otters are travelling out of the water (Melquist et al. 2003). We observed Bald Eagles stealing fish from otters, but saw no evidence of predation on otters. Despite such potential threats, we found that otters were using feeding sites up to 1700 m from shore. The availability of lake entry points far from shore may outweigh any increased risk of predation that continuous ice cover might otherwise pose.

More research is needed to determine if the winter habitat selection we observed in the John Prince Research Forest is locally specific behaviour, or if this is typical of otters throughout the region.

Our work reflects small sample sizes taken over three years and reports only baseline habitat measurements. Further work is necessary to increase our understanding of this understudied, but important inhabitant of freshwater ecosystems in northern British Columbia.

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Acknowledgements

We thank J. Black, J. Tom, and C. Stumpf for field assistance. We also thank Dr. A. Harestad for reviewing an earlier draft of this manuscript.

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Dexter is the Research Coordinator for the John Prince Research Forest based in Fort St. James, British Columbia. He co-teaches *Field Applications in Resource Management* and works on a variety of wildlife and habitat monitoring projects including species such as Moose, Mule Deer, Black Bears, and River Otters.

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