

## River Otter

*Lontra canadensis* (formerly *Lutra canadensis*)

### DESCRIPTION

The river otter is a large, aquatically-adapted member of the weasel family. This shy and secretive animal is a strong and graceful swimmer, with an ability to dive to depths of about 60 ft. Like other members of its family, the river otter has a long body, short legs, and a long neck. The head is broad and flattened and its muscular, tapering tail typically equals about one third of its total body length. The pelage is dark brown above and lighter below. The lips, cheeks, chin, and throat also are a lighter brown (Whitaker and Hamilton 1998).

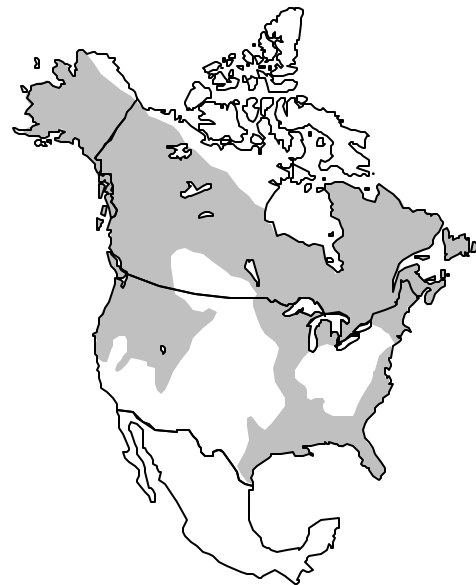
### BODY SIZE

River otters display sexual dimorphism in body size, with adult males reported to be about 17% heavier and significantly longer than adult females. Average measurements of four adult males from Idaho (Whitaker and Hamilton 1998) were: total length 117.7 cm (range = 115.0 – 120.1, SE 1.05); tail 46.3 cm (range = 44.5 – 47.9, SE 0.77); and hind foot 13.3 cm (range = 12.8 – 13.7, SE 0.19). Six adult females from the same study area had the following average measurements: total length 111.1 cm (range = 107 – 113.2, SE 0.91); tail length 43.7 cm (range = 42.4 – 45.2, SE 0.37); and hind foot 12.7 cm (11.9 – 13.4, SE .26).

The adult males in the Idaho study area had an average body weight of 9.2 kg (range = 8.0 – 11.0, SE = 0.6), while the body weight of adult females averaged 7.9 kg (range = 7.5 – 8.0, SE = 0.2). These measurements fall within the ranges of river otters from the eastern U.S. as reported by Whitaker and Hamilton (1998). Interestingly, the weight of adult females may decrease after they reach four years of age (Stephenson 1977 as cited in Melquist and Hornocker 1983).

### DISTRIBUTION

The current range of the river otter in North America is shown in Figure 1 (from Whitaker and



**Figure 1.** Range of the river otter in North America

Hamilton 1998). Historically, the river otter occurred throughout much of the U.S. and Canada excluding the drier Southwestern states and the northern tundra of Alaska and Canada (Melquist and Hornocker 1983). Beginning in the 19<sup>th</sup> century or earlier, river otter numbers and distribution declined significantly (Organ 1989). A 1976 study suggested that river otter were believed to be present in 44 states and 11 Canadian provinces and territories (Deems and Pursley 1978, as cited in Melquist and Hornocker 1983). Whitaker and Hamilton (1998), however, indicate that habitat loss, over-harvesting, and pollution

have reduced the otter's range to a third of its original distribution and caused its extirpation from portions of the mid-Atlantic and central U.S. Recent protection and re-introduction efforts in Ohio, Illinois, Indiana, and Pennsylvania have allowed the species to make a comeback in those areas. In 1977, the river otter was included in Appendix II of the *Convention on International Trade in Endangered Species of Wild Fauna and Flora* (CITES), which limited trade of otter pelts. Some states have prohibited harvesting of the river otter to provide additional protection for this species (Melquist and Hornocker 1983).

### MIGRATION

The river otter is non-migratory, but will travel between different foraging locations throughout the course of the year. In Idaho, conservative estimates of average daily distance traveled by otters (including family groups) ranged from 0.4 to 3.1 miles (Melquist and Hornocker 1983). During dispersal and exploration of their home ranges, river otters will travel much greater distances in a single day (i.e., up to 26 miles).

### HABITAT

River otters use both freshwater and brackish habitats. They occur in lacustrine (i.e., lake) and riverine waterbodies, as well as their associated wetland habitats (Whitaker and Hamilton 1998). Prey availability appears to be the primary factor affecting habitat selection (Melquist and Hornocker 1983). Also of importance is the presence of adequate shelter and limited human activity. Habitat use varies during the course of the year based on accessibility and food availability. For example, mudflats and open marshes in Idaho were often used during the summer, but rarely during the winter when snow and ice limited accessibility. In Florida, river otter will move from temporarily flooded marshes to cypress swamps that include permanent ponds. These swamps represent the little remaining aquatic habitat for both the otter and fish, which are the otter's primary prey, during the driest part of the year (Humphrey and Zinn 1982).

In New England, river otters will preferentially

select riverine and lacustrine systems, but will also use estuaries, salt marshes, and most palustrine wetlands. They may also be present in a variety of forest cover types provided a waterbody is nearby (DeGraaf and Yamasaki 2001). In coastal Maine, river otters select habitat associated with beaver flowages, which provided abundant food, stable water levels, escape cover, and resting and dens sites. These areas also are relatively free from human disturbance. Habitat use by river otter in Maine is positively correlated with the length of the stream and the average shoreline diversity (e.g., the amount of shallow habitat available for foraging). River otters in coastal Maine avoid watersheds within mixed hardwood-softwood communities, which are typically less productive, headwater streams (Dubuc *et al.* 1990).

In Massachusetts, river otters use a variety of palustrine, riverine and lacustrine wetland systems with no particular preference for any one community type (Newman and Griffin 1994). In Idaho, river otters use a variety of habitats throughout the course of the year, including mudflats, open marshes, forest streams, swamps and backwater sloughs, large lakes and reservoirs, and smaller ponds. Idaho river otters preferred stream-associated habitats to lakes, reservoirs, and ponds (Melquist and Hornocker 1983).

Within any given habitat, river otters select locations referred to as latrines, where they leave the water to defecate, urinate, scent mark, and groom (Newman and Griffin 1994). Habitat characteristics specifically associated with otter latrines include the presence of rock formations, backwater sloughs, fallen logs, vertical banks, large conifers, points of land, beaver bank dens and lodges, isthmuses, and the mouths of permanent streams (Newman and Griffin 1994, Swimley *et al.* 1998).

River otters also have numerous den and resting sites within their home range that they use over the course of a year. These sites provide river otters with protection as well as isolation (Melquist and Hornocker 1983). Den and resting sites may be located in logjams, riparian vegetation, snow or ice cavities, rip-rap, talus rock, boulders, brush and log

piles, undercut banks, boat docks, abandoned dam spillways, and dens constructed by other animals (e.g., beaver, muskrat, woodchuck, fox, or coyote) (Liers 1951, Melquist and Hornocker 1983). Melquist and Hornocker (1983) found that river otters used active and abandoned beaver bank dens and lodges more often than any other den or resting site, probably because they provide shelter as well as underwater egress.

**In the Primary Study Area:** River otter signs were observed at only three locations in the primary study area during the 1998, 1999, and 2000 field surveys. Each of these observations was adjacent to the main stem of the Housatonic River. One in the northern portion of the study area was an apparent latrine site at a section of the river bank with a possible den site offering water access. That site was located at the edge of a floodplain forest. The second observation was in the central portion of the study area, consisting of a scat found at one of the study's scent post stations within a wet meadow at the river edge. The third observation was also a scat, located in an open shrub swamp near the river (refer to Figure 2 below). Table 1 contains a summary of the literature review and observational data on the use

by river otters of the natural community types found within the primary study area.

**HIBERNATION**

River otters do not hibernate. They remain active throughout the year and actually show an increase in activity level during the winter. Although activity levels generally increase during the winter, travel may be restricted by snow and ice cover. During much of the year river otters are primarily nocturnal, with peak activity occurring around midnight and just before dawn. During the winter, however, river otters appear to be more diurnal (Melquist and Hornocker 1983).

**HOME RANGE AND TERRITORIALITY**

Home range for the river otter is often expressed in linear measurements because they typically occur along rivers and lake shores. Melquist and Hornocker (1983) reported home ranges from 5 – 50 linear miles for a population in Idaho. Area home ranges have been estimated from 448 – 14,080 acres (0.7 – 22 sq. mi.) (Melquist and Dronkert 1987, as cited in DeGraaf and Yamasaki 2001). Male river otters typically occupy larger home ranges than females (DeGraaf and Yamasaki

**Table 1.** Habitat use by river otter in the primary study area

Habitat Codes and Natural Community Classifications																					
Wetland Habitats								Terrestrial Habitats													
ROW	ROW & PAB	SHO		PFO			PSS	PEM	WM	VP	SW	MW	HW		OF	AGR	RES				
Medium-gradient stream	Low-gradient stream	Riverine pointbar and beach	Mud flat	Red maple swamp	Black ash-red maple-tamarack calcareous seepage swamp	Transitional floodplain forest	High-terrace floodplain forest	Shrub swamp	Deep emergent marsh	Shallow emergent marsh	Wet meadow	Woodland vernal pool	Spruce-fir-northern hardwood forest	Northern hardwoods-hemlock-white pine forest	Successional northern hardwood forest	Red oak-sugar maple transitional forest	Rich mesic forest	Cultural grassland	Agricultural cropland	Residential development	
Y	Y	Y	Y		Y			Y	Y	Y	Y										

ROW = Riverine Open Water  
 SHO = Shorelines  
 PFO = Palustrine Forested  
 PSS = Palustrine Scrub-Shrub  
 PEM = Palustrine Emergent  
 WM = Wet Meadow  
 PAB = Palustrine Aquatic Bed  
 VP = Vernal Pool  
 SW = Softwood Forests  
 MW = Mixed Forests  
 HW = Hardwood Forests  
 OF = Open Fields  
 AGR = Agricultural Croplands  
 RES = Residential  
 Season of Use  
 B = Breeding  
 M = Migration  
 W = Wintering  
 Y = Year-round  
 Shading = observed in study area

2001). River otter display a high degree of individual and seasonal variation in home range size. Home range size in Idaho was somewhat influenced by the age, sex, and social status (i.e., solitary versus family group), although no clear association was evident. Adult females with pups are generally restricted to the area around the natal dens in the spring while pups are young.

Home ranges include activity centers, where a river otter spends at least 10% of its time during a given season. Activity centers are located in areas with both an abundant prey base and sufficient shelter (Melquist and Hornocker 1983). Activity centers vary during the course of the year with changing prey availability, which may affect seasonal home range size. For example, Melquist and Hornocker (1983) found that individual home range lengths typically increased during the winter in their Idaho study area.

Other than family groups, otters are generally solitary. They will, however, form temporary associations that may consist of related or unrelated individuals. Home ranges in this species have been shown to overlap extensively, with some otters sharing essentially the same home range. Separation appears to occur at the activity centers, with individuals or family groups using different activity centers within the home range or using the same activity centers, but at different times throughout the day (Melquist and Hornocker 1983). When a food source is abundant and concentrated, such as during a spawning run of fish, river otters may use the same activity center at the same time. River otters do not appear to defend a defined area within their home range that would represent a territory, but rather will defend an area surrounding their immediate physical location (Melquist and Hornocker 1983). Animals using overlapping home ranges or activity centers prevent confrontation through mutual avoidance.

## BREEDING

River otters are polygamous; males mate with more than one female during a breeding season. River otters mate shortly after the young are born. Breeding in the northern part of the range occurs

between March and April with estrus beginning soon after parturition and lasting 42 to 46 days (Hamilton and Eadie 1964, Melquist and Hornocker 1983, DeGraaf and Yamasaki 2001). Implantation in this species is delayed for approximately 8 to 9.5 months. Implantation of the embryo occurs approximately in February in New York, earlier in the south (Whitaker and Hamilton 1998). Gestation has been estimated to range from 11 to 12 months, with actual embryonic development lasting 61 to 63 days (Hamilton and Eadie 1964; Melquist and Hornocker 1983). Typically the young are born between February and April, although the timing of birth varies with geographic location (range: November through May). Litter sizes range from 1 – 6 pups, with an average of 2 – 3 pups (mean = 2.6 based on embryo counts) (Hamilton and Eadie 1964, Chilelli *et al.* 1996). Studies in Georgia and Alabama have shown a 50% pregnancy rate in some areas, suggesting that females may breed only every other year there (Whitaker and Hamilton 1998).

## GROWTH AND DEVELOPMENT

Pups weigh about 275 g at birth. They are fully furred, but their eyes are closed and they are toothless. Their eyes open when the pups are about 35 days old and pups are weaned at about five months of age (Liers 1951, Whitaker and Hamilton 1998). They forage with the mother at about 10 to 11 weeks. Pups may remain with their mother until they disperse at 12 to 13 months of age, usually in the fall or winter. Juveniles do not reach adult length until they are three to four years of age even though they may breed at two years (Melquist and Hornocker 1983, Whitaker and Hamilton 1998).

## FOOD HABITS AND DIET

The river otter is a carnivorous and piscivorous feeder that occupies an upper trophic level. Fish typically represent the primary prey item in the diet, with crayfish, amphibians, insects, birds, reptiles, and mammals also consumed (Sheldon and Toll 1964, Knudsen and Hale 1968, Toweill 1974, Melquist and Hornocker 1983). In two studies, fish remains were found in 92 – 100% of the analyzed scat (Sheldon and Toll 1964, Melquist and Hornocker 1983). One study in Massachusetts

found that otters also consume blueberries when they are available (Sheldon and Toll 1964).

The diet of the river otter varies during the course of the year with changing prey availability. For example, in areas where spawning runs of fish occur, river otters will shift their hunting efforts to these concentrated prey items when they are available (Melquist and Hornocker 1983). Because prey availability also varies with geographic location, the diet of the river otter does differ throughout its range. Crayfish form an important part of the river otter's diet in much of its range, but because crayfish do not occur in the upper Payette River drainage in Idaho, they were not present in the diet there (Melquist and Hornocker 1983). Analyses of stomach contents indicate that some insects present in stomach were the result of direct consumption by river otter, whereas other insects were most likely the result of secondary ingestion (i.e., insects initially consumed by fish) (Toweill 1974, Melquist and Hornocker 1983).

River otters consume a wide range of fish including: Cyprinidae (minnows, carp, northern squawfish), Centrarchidae (smallmouth bass and sunfish), Percidae (yellow perch, darters), Cyprinodontidae (killifish), Catostomidae (e.g., white sucker, largescale sucker), Ictaluridae (bullheads, catfish), Salmonidae (salmon, trout, whitefish, Arctic grayling), Petromyzontidae (lampreys), Gadidae (burbot), Cottidae (sculpins), Gasterosteidae (sticklebacks), Umbridae (mudminnows), and Esocidae (northern pike and pickerel) (Hamilton 1961, Sheldon and Toll 1964, Knudsen and Hale 1968, Toweill 1974, Gilbert and Nancekivell 1982, Melquist and Hornocker 1983).

Prey selection by river otters seems to be dependent upon the species most vulnerable to predation, a function of the prey species' abundance, size, and swimming ability (Melquist and Hornocker 1983). In general, river otters preferentially prey upon slower-moving and schooling species of fish, which are easier to catch, and focus their effort upon the more prevalent and less agile species (Ryder 1955 as cited in Toweill 1974, Whitaker and Hamilton

1998). Sheldon and Toll (1964) also reported that habitat selection, time of day, fish spawning periods, and environmental conditions such as ice cover and water temperature may affect prey selection by river otter. River otters consume fish ranging in size from 2.0 – 50.0 cm. The length of the three predominant prey species in an Idaho study being greater than 30 cm long (Hamilton 1961, Melquist and Hornocker 1983).

Other components of the river otter's diet include: crustaceans (crayfish, crabs, shrimp, pillbugs), mollusks (clams, periwinkles, freshwater mussels), amphibians (adult and larval frogs, salamanders, newts), reptiles (turtles, snakes), insects (Coleoptera, Plecoptera, Diptera, Neuroptera, Tricoptera, Odonata), mammals (*Sorex fumeus*, *Microtus pennsylvanicus*, *Clethrionomys gapperi*, *Peromyscus maniculatis*, *Thomomys talpoides*, *Tamiasciurus hudsonicus*, *Ondatra zibethicus*, *Castor canadensis*, *Synaptomys borealis*, *Lepus americanus*, *Odocoileus* sp., *Zapus* sp., *Mustela vison*), and birds (Gaviformes, Anseriformes, Ciconiformes, Gruiformes, Passeriformes, and Charadriiformes) (Liers 1951, Hamilton 1961, Gilbert and Nancekivell 1982, Melquist and Hornocker 1983).

## ENERGETICS AND METABOLISM

Sample and Suter (1999) report the estimated food ingestion rate for river otters to be 0.9 kg/d (fresh weight of fish or aquatic prey) and the water ingestion rate to be 0.64 L/d.

## POPULATIONS AND DEMOGRAPHY

**Population Densities:** Population densities have been reported from 1 otter per 2.3 miles of waterway to 1 otter per 6 – 11 miles of waterway (Melquist and Hornocker 1983, Melquist and Dronkert 1987 as cited in DeGraaf and Yamasaki 2001).

**Age at Maturity and Life Span:** Both males and females reach sexual maturity by two years of age although males may not successfully breed until they are much older (Liers 1951, Melquist and Hornocker 1983). Some studies indicate that females actually may breed during their first year

based on the presence of corpora lutea within the ovaries. Once reaching sexual maturity, females are capable of producing one litter per year and litter size may increase significantly with the age of the female (Docktor *et al.* 1987). The literature provides little information on the life expectancy of river otter in the wild, although Melquist and Hornocker (1983) did report one female that was 10 years old.

**Mortality:** Trapping has historically been one of the primary causes of mortality for the river otter. Direct trapping of river otters still occurs in some states, and some may be incidentally caught in beaver traps (Melquist and Hornocker 1983, Chilelli *et al.* 1996). In addition, river otters may be killed by hunters and in collisions with vehicles and watercraft (Melquist and Hornocker 1983). Because of their upper position in the food chain and their aquatic habits, river otter are susceptible to environmental contaminants, including dioxin, mercury, and polychlorinated biphenyls (PCBs) that are present in the lakes and rivers (Foley *et al.* 1988, Sloan and Brown 1988, Organ 1989, Sample and Suter 1999). Though relatively little is known about the specific effects of PCB contamination on river otter, PCBs have been found to impair reproduction and cause death in the closely-related mink (Platonow and Karstad 1973).

Organ (1989) compared PCB and mercury residues in river otters from 20 different Massachusetts watersheds. While variability was high in all watersheds, individuals from the Housatonic River watershed had the highest mean PCB residues. He also found a correlation between mercury residues in river otters and those in whole-body fish from the same watershed, and suggested that river otters could be used to assess the general background levels on a watershed basis. Mercury levels in adults were higher than those in juveniles, implying bioaccumulation over the animal's lifetime. Studies in Europe also report high levels of PCBs in river otters and suggest that population declines there are due to PCB accumulations in this species (Leonards *et al.* 1997, Traas *et al.* 2001). One study of Eurasian otters (Kruuk and Conroy 1996), however, found no evidence that PCBs accumulated in otters with age.

**Enemies:** Humans are probably the most important enemy of the river otter, affecting this species through direct (i.e., trapping) and indirect (habitat alteration, pollution) means. There appears to be very little published information on natural enemies of the river otter, although there are reports of predation by coyotes (*Canis latrans*) and domestic dogs (Melquist and Hornocker 1983).

## STATUS

**General:** In New England, the river otter is considered to be uncommon based on sightings and trapping data, but may be more common than this information suggests (DeGraaf and Yamasaki 2001). In some parts of Massachusetts, river otter populations have increased to nuisance levels (Whitaker and Hamilton 1998).

**In The Primary Study Area:** Despite thousands of person-hours of field surveys in the study area in all seasons from 1998 to 2000, river otter signs (i.e., scat and tracks) were seen on only four occasions in three locations within the study area (Figure 2). Interestingly, otter signs and a few individuals were observed in nearby reference areas on many occasions, often with very little effort. Reasons for the river otter's conspicuous absence from the primary study area are unknown.

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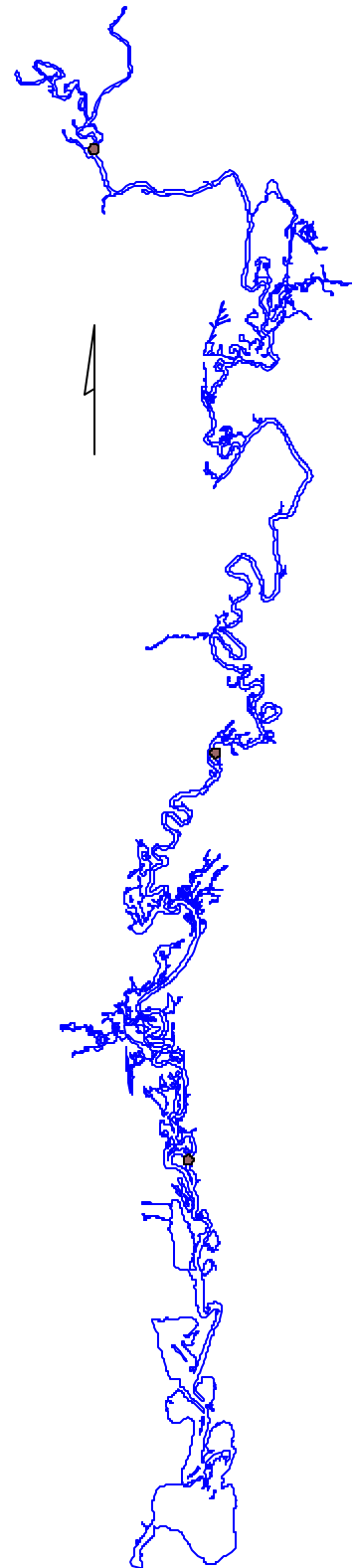


Figure 2. River otter sightings in the primary study area

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