

Degree of Association and Use of a Helper by Coastal River Otters, *Lutra canadensis*, in Prince William Sound, Alaska

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Nine (6 males and 3 females) River Otters, *Lutra canadensis*, from the Esther Passage area in Prince William Sound, Alaska, were implanted with radio transmitters during the summers of 1990 and 1991. Two females frequently occurred in association with one another (8 of 20 radio locations in 1991; 40 of 72 radio locations in 1990) and had degrees of association of 0.80 and 0.71 for each year, respectively. The average degree of association was only 0.36 for male otters in this same population. In August of both years, these two female otters were observed with pups, and both females fed, carried, and played with the pups, despite one female being a subadult in 1990. Helping with the care of young by subadults is known to exist in only a few species of mammals, but our observations suggest that this behavior exists in marine populations of River Otters.

Key Words: River Otter, *Lutra canadensis*, helping, Prince William Sound, Alaska.

Helping is defined as parent-like behavior toward young that are not offspring of the helper (Lott 1991). Although helping exists in over 200 species of birds, this type of behavior is rare among mammals (Brown 1975). Reproductive altruism among mammals often occurs among carnivores, where hunting efforts are cooperative and food can be brought to the young (Trivers 1985), although such behavior has been reported in other mammalian orders (Emlen 1991). Helpers are hypothesized to increase the number of surviving offspring from parents they help by increasing the rate of prey capture or by defending either food resources or young (Trivers 1985). If related, helpers may benefit from these interactions by increasing their inclusive fitness (Lott 1991). Additionally, subadult helpers may accrue benefits such as the protection afforded by remaining in the established territory of the adults or group being helped, or helpers may learn appropriate parental behavior via their helping experience that may increase their fitness in the long run (Emlen 1991). In some cases, helping may become an obligate behavior because of circumstances such as poor availability of food, greater adult survivorship, or saturated territories (Trivers 1985).

Study Area

Research was conducted in the Esther Passage area in the northwest corner of Prince William Sound, Alaska (61°30'N, 147°40'W) as part of a larger study on River Otters (Bowyer et al. *in press*^a, *in press*^b; Duffy et al. 1993, 1994a, 1994b; Testa et al.

in press). Prince William Sound is a mosaic of islands in the Gulf of Alaska, with abundant freshwater streams and lakes. Terrestrial habitats include old-growth forest and muskeg. The forest overstory is dominated by conifers (*Picea* sp. and *Tsuga* sp.), and the understory contains Salmonberries (*Rubus spectabilis*), blueberries (*Vaccinium* sp.), alders (*Alnus* sp.), Rusty Menziesia (*Menziesia ferruginea*), and various mosses, mushrooms, and fungi.

Coastal populations of Alaskan River Otters inhabit a narrow strip of thick coastal forest and forage primarily in nearshore waters and rocky intertidal habitats, although freshwater streams and lakes are utilized occasionally, particularly during salmon spawning (Bowyer et al. *in press*^a, *in press*^b; Larsen 1984). The most heavily used onshore areas are latrine sites that are identified by the presence of numerous otter feces, discolored and trampled vegetation, lack of many understory mosses and forbs, numerous burrows, and trail systems (Bowyer et al. *in press*^a, *in press*^b).

Methods

In summer 1990, we live-trapped River Otters in the Esther Passage area of Prince William Sound, Alaska, using Hancock traps (Hancock Trap Company, Hot Springs, SD) from May to the end of June (Duffy et al. 1993). All captured otters were implanted with radio-transmitters (Telonics, Mesa, Arizona) by a licensed veterinarian and released in the area near their capture sites. All procedures used in this study were approved by an independent

Animal Welfare Committee at the University of Alaska Fairbanks.

Throughout summer 1990, all radio-implanted otters near Esther Island were located almost daily from small skiffs outfitted with H-antennas and scanning radio receivers. Once located, the position of an otter was plotted on a United States Geographical Survey topographical map (scale 1:63500) and data on time of day, otter activity, and signal quality were recorded. If the otter was located visually, and was not disturbed, we attempted to follow the otter with the skiff and record its behavior and movements.

In 1991, our efforts focused on the behavior of these otters. Groups of otters were located opportunistically as we maneuvered the skiff along the shoreline, scanning for radio-implanted otters. Once a group was located visually, we followed their progress along the coastline in our skiff from a distance >10 m, and recorded behavioral activity by scan sampling (Altmann 1974) every 10 min.

The degree of association was calculated according to Schaller (1972) for each otter we radio located, where

$$a = \frac{2N}{n_1 + n_2},$$

with n_1 representing the number of times otter 1 was observed, n_2 the number of times otter 2 was observed, and N the number of times they were observed together. A degree of association of 1.0 would indicate that a pair of animals had remained together during all observations.

Results

Although most of our captured otters were males (6 of 9 individuals), we captured an adult, lactating female (referred to hereafter as 1640) on the north-east end of Esther Island on 6 June 1990. On 12 June 1990, in the same vicinity, we captured an immature female River Otter (referred to hereafter as 1810). Frequently, the two females occurred together (40 of 72 radio locations in 1990, and 8 of 20 radio locations in 1991) near their capture site. Degrees of association of 0.71 and 0.80 were calculated according to Schaller (1972) for these two female otters in the summers of 1990 and 1991, respectively. This contrasts with an average degree of association of 0.36 for male otters in this same population.

On 2 August 1990, when we first observed these two females together, they were accompanied by three pups, which were presumed to be the offspring of 1640 because she was lactating when captured in June. This group of otters was initially observed in the intertidal area, but as we approached, each female grabbed a pup by the neck in the manner described by Harris (1968) and swam out of view. We considered this transport of a pup by the

subadult otter to be a helping behavior. We left this study area on 13 August 1990, and no further observations were made on these female-pup interactions that year.

On 12 August 1991, we once again observed otters 1640 and 1810 with a group of pups. One adult female was at the head of this group and the other adult female at the rear as they swam in a sheltered lagoon. (Due to their proximity, it was not possible to distinguish via radiotelemetry which female was in which position on this day). As one adult ushered the two pups into the forest cover, the second female emerged from a dive, dragging a Pink Salmon (*Oncorhynchus gorbuscha*) carcass to the area to which the other otters had retreated.

On 25 August 1991, we observed this same group of two pups and two females wrestling and pushing one another in a playful manner in a grassy, shallow, intertidal area. A few moments later, the otters tried to climb to a latrine site, where the pups had difficulty traversing the steep, inclining entrance. Otter 1640 ushered the pups to an alternate, more level entrance site. Later in the evening, 1640 led the pups to a nearby stream and caught pink salmon for the pups. She carried each struggling fish up to the stream bed and released her grip on them; the pups killed these salmon. She engaged in this behavior four times, and if the pups lost their grip on the fish, she would "bat" it back in their direction with her forepaw. Our assumption that the pups were the offspring of 1640 is based on these feeding observations. We left the Esther Passage field camp on 26 August 1991, so we are unsure how long these females and pups continued to associate with each other.

Discussion

Degrees of association for the two female River Otters were considerably higher than for males. Our observations of otter 1810 aiding in protecting, feeding, and playing with pups that were presumably those of otter 1640 suggests that helping behaviors exist in this population of River Otters. In the first year of study, this helper was a subadult, but by the second year she would have been an adult, capable of bearing young (Dockor et al. 1987).

These results are in contrast with Melquist and Hornocker (1983), who reported that female River Otters were solitary, raising their pups without help from the male or other females. Liers (1951) also reported that captive female River Otters actively kept male otters away from their young pups, and did not report long-term associations involving other females.

In a coastal population of River Otters on Baranof Island in southeast Alaska, however, Woolington (1984) observed groups (obtusively a family) of River Otters, and noted they typically contained an adult female, other adult-sized otters, and young-of-

the-year. Although one of his study groups contained a subadult male, Woolington (1984) was never able to confirm the presence of a second adult or subadult female in family groups. This is in contrast to our observations for Prince William Sound, where subadults were clearly members of social groups.

A similar type of group structure to that of River Otters in marine ecosystems has been reported in coastal populations of Cape Clawless Otters (*Aonyx capensis*), which occur in family groups that exclude adult males (Rowe-Rowe 1978). Giant River Otters (*Pteronura brasiliensis*) are also known to occur in family groups (Duplaix 1980).

We are uncertain what factors may promote helping behavior in River Otters or which sex and age classes are typically involved in helping. Additionally, it is unknown if the female helper we observed was related to the female that she helped, that 1640 was the mother of the pups both years, or that 1810 was the helper both years. Little information exists on dispersal mechanisms in these otters, and we do not know whether female pups typically remain in their natal home ranges following weaning. Nonetheless, this would explain the large groups we observed that contained more than one adult otter. All River Otters in our study area occurred in groups, ranging in size from 2 to 13 individuals, which may predispose them to developing a helper system.

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