

## **BEHAVIORAL DEVELOPMENT OF OTTERS (*Lutra canadensis*) IN A MARINE COASTAL HABITAT**

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**Abstract:** The behavioral development of group of North American river otters is described. Proficiency in aquatic locomotion was attained within 20 weeks of birth, but proficiency in aquatic hunting required more than 20 additional weeks of trial-and-error learning. Young otters attained self sufficiency at 9.5 months, and independence at 11 months. Males continued to live in their home area long into adulthood. Females did not disperse unless they were forcibly expelled by an elder resident female.

### **INTRODUCTION**

Published accounts of the behavioral development of wild Lutrines have thus far been limited to studies of young sea otters (*Enhydra lutris*) (e.g. PAYNE and JAMESON, 1984). Some findings describing the behavioral development of river otters (*Lutra canadensis*) have been presented previously (SHANNON 1989, 1991a,b, 1992, 1994), but these data have remained preliminary in scope. This paper elaborates upon past findings, and presents new observations, which bring the author's study of otter behavioral development closer to comprehensive understanding.

### **STUDY AREA**

The study area is Trinidad Bay (41°3'N, 124°8'W), a small, shallow marine bight on the far-northern Pacific seacoast of California. The otters' home range comprises approx. 4 linear km of marine coastline that is dominated by thickly vegetated rocky shore cliffs. The otters at Trinidad Bay are exclusively marine in their habits. There are no streams or known bodies of standing fresh water within the otters' home range. The otters obtain their water by drinking from numerous springs and seeps, which flow year-round down the faces and crags of the shore cliffs.

### **MATERIALS AND METHODS**

Otter pups were studied by direct observation. The author's study of behavioral development began formally in May 1986, and continues to the present day. Observations were conducted during the two hours preceding sunset; daily whenever possible. During the first year of study, an ethogram was compiled. Categories included behavior associated with locomotion, foraging, socialization, grooming, play, and communication. To determine the period of ontogeny of a particular behavior, the first occasion a pup was seen to display that behavior was noted, and subsequently when all pups displayed it. Criteria for estimating the pups' date of birth were described in SHANNON (1989). The occurrence of self sufficiency was determined by the behavior of the mother, as the time when she stopped providing food specifically for her

young, and began punishing pups for taking food from her. A pup was declared independent of maternal care when it was not seen in the company of its mother after a period of one week.

## **RESULTS**

Since 1983, the author has documented the lives of 40 pups born in 16 litters from five mothers. During the study period, the author collected data on the behavioral development of six litters (22 pups) from "Old Mama"[F'2], two litters (5 pups) from F86A="Mama Junior"=[F'3], two litters (4 pups) from F86B="Scarnose"=[F'4], and four litters (5 pups) from F91A[F'3]="Little Mama"=[F'5]. Of the 36 pups born at Trinidad Bay since 1986, 17 were females, 13 were males, and six died before their gender could be determined. The juvenile mortality rate was 70%. Seventeen otters died as dependent pups; 19 young achieved independence but eight of these died as yearlings. Only 11 young (30%) survived to adulthood, and just three females lived to breed. Of the 22 pups born to F'2, five (23%) survived to adulthood. Of the five pups born to F'3, three (60%) survived to adulthood and remain alive as of February 1998. All of the young born to F'4 died as dependent pups. Of the five pups born to F'5, three (60%) survived to adulthood and also remain alive as of February 1998. All of the otters living at Trinidad Bay in February 1998 are the grandpups and great-grandpups of F'2.

The author estimated that otter pups in this population were born around 1 April (all results are  $\pm 10$  days). The pups were born in a natal den located outside the mother's usual home range. Pups became aquatic and were brought by their mother from the natal den to the main dens at Trinidad Head when they were approx. ten weeks old. The mother began providing fish fry to pups during week 11, and pups exhibited active fish-chasing behaviors from week 12 on. Otter pups first learned the skills of capturing and manipulating fish on land. Pups attained efficient coordination of all basic swimming movements by the end of week 14, and might be taken on their first fishing excursions out of the nursery area as early as week 15. Pups possessed the complete adult repertoire of swimming behaviors by 16 weeks of age, and could swim as proficiently as adults by the end of week 19.

The mother was the primary agent of socialization. However, multiparous mothers allowed their elder daughter(s) to return to live with her and her new pups after the process of weaning began in week 14 (suckling for comfort continued past week 22). After being accepted back by her mother, an elder daughter became a full-time, cohabiting member of the Family, and the pups' regular companion. Elder daughters provided socialization to pups, but these "big sisters" were not true alloparents/nest helpers, because they would not give food to a pup, nor would they assume parental care if the mother was absent. Encounters with adult males first took place when the pups were 16-18 weeks old. The males almost always behaved amicably toward pups that solicited social interaction, however, pup-male interactions typically remained infrequent until after the young became independent.

First fishes (sanddabs) were captured early during week 17. The first free-swimming fish fry were caught during week 19. Despite these early fish captures, the pups' overall foraging efficiency remained functionally nil for

three more months. At six months (26 weeks), the pups had become very active, agile fish chasers, but they were still inefficient at actually capturing fishes, and still depended entirely on food provided by the mother. During the pups' seventh month, however, multiple solo prey captures became daily occurrences. By the end of week 36, pups became noticeably efficient at capturing small fishes (< 25cm.), although the young still depended on the supplemental food provided by their mother. Pups attained basic self sufficiency during weeks 38-42 (ca. 9.5 months). The mother began not providing food for the exclusive use of pups during week 38. After week 42, a mother might bite a pup that took food from her. Following the attainment of self sufficiency, it became common to see pups foraging on their own. Although the young could satisfy their individual life requirements adequately by this time, they did not achieve optimality in food procurement and habitat utilization until after they were abandoned by their mother at 48 weeks (11 months).

No mother has forced her own independent young to disperse, and no yearling has dispersed from its home area voluntarily. After independence, yearlings spent approximately three months living and wandering solitarily. By the end of May (month 14), yearlings of both sexes usually joined the male Clan. Most subadult females were members of the male Clan from May-July of their second year. In her 16th month (July), a yearling female either returned to live with her neo-maternal mother, remained with the Clan, or was expelled aggressively (and permanently) from her home area by a territorial elder sister. Males continued to base their activities at their home area well into adulthood, and some remained residents at their birthplace their entire lives. M90[F'3] will be eight years old in spring 1998, and he is still a resident at Trinidad Bay. No male had ever remained a member of the Family group during his second year of life until 1997-1998, when yearling male M96 returned to live with his mother and elder sisters, rather than joining the society of his elder uncles. M96 attained adulthood in January 1998 at the age of 22 months. This was the first time the author could document an adult son living with his mother and elder sisters.

## **CONCLUSIONS AND RECOMMENDATIONS**

Otter pups become proficient swimmers nine weeks after leaving the natal nest, but spend most of their first year of life learning to become proficient hunters by a slow process of individual trial-and-error. Although the young essentially teach themselves the techniques of capturing aquatic prey, the experience and example of the mother is absolutely essential to their learning the logistics of optimal foraging and habitat utilization. A mother's knowledge of local sources of food and shelter would be especially important in habitats where such resources are widely dispersed or limited in availability. Logically, removal of a mother before her young have reached self sufficiency could only have a negative effect on pup survivorship and population recruitment. Therefore, conservation and management practices should be avoided that would remove a mother from her pups before they are 10 months of age.

**Acknowledgements** - Grateful thanks to my assistant, Sara Moore, for her many years of dedicated observations and all-around support. Thanks also to Daniel Lorey for his help in preparing this manuscript for publication.

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