SOCIAL ORGANIZATION, REPRODUCTIVE BEHAVIOR, AND PUP DEVELOPMENT IN A COASTAL POPULATION OF OTTERS [Lontra (=Lutra) canadensis]

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1. Introduction

I am currently conducting a longitudinal study of the behavior of a coastal population of the Nearctic otter, *Lontra (=Lutra) canadensis*. A primary focus of my study has been to chronicle the day-to-day behavioral development of wild otter pups: a process not documented previously. Since 1986, I have recorded more than 5000 otter-hours of direct observations, and followed the development of 4 litters of pups. My study area is Trinidad Bay (41°3'N, 124°8'W) on the far-northern seacoast of California. These abstracts constitute a brief summary of my findings and publications in preparation.

2. Social Organization

The otter population at Trinidad Bay is composed of 2 distinct social groups. There is a single "Family", currently comprising a mother, her dependent pups, and the mother's 2 adult daughters of 1986. The other social group is a conspicuously gregarious and communal "Clan" of 6-8 adult males. A consistent pattern in the social structure of this population is that the adult members of a social group will usually avoid direct interaction with adult members of the other social group. Because all adult females are members of the Family, and all adult males are members of the Clan, their mutual avoidance results in a social segregation of the sexes. Thus, sexual segregation is a fundamental feature of the social organization of the otter population at Trinidad Bay. Consort and familial relationships are the only known exceptions to this system of sexual segregation. Although adults of the Family and Clan avoid each other, they do not appear to be territorial in the strict sense, as these social groups usually occupy the same home range concurrently, and do not defend separate areas of exclusive use within that home range. Infrequent episodes of fighting between members of the Family and Clan have been interpreted as attempts to reinforce mutual avoidance. Among the adult males, I have seen no evidence of territoriality. Even during mating season, the males continue to be communal, although they may fight briefly over an estrous female. Between females, however, there is some indirect evidence for territorial exclusion of familially-unrelated individuals, as I have never observed a female at Trinidad Bay that was not a daughter of the resident mother otter.

Concerning social rank, adult females are usually dominant over adult males, and the mother otter is the alpha-individual of this population. Within the male Clan, no obvious dominance hierarchy has been observed. The proximate causes and adaptive significance of this population's most consistent and visible social patterns (i.e. sexual segregation and male gregariousness) continue to be subjects of consideration and study.

3. Reproductive Behavior

The otter population at Trinidad Bay currently employs a mating system that most closely resembles "scramble competition polygyny", but evidence for monogamy has also been obtained. The adult females have an annual estrus, and mating takes place during the first 2 weeks of April. The 2 females born in 1986 had their first estrus at 24 months, but they were still nulliparous at 40 months, indicating that a form of reproductive suppression has occurred in these subordinate females (only the dominant mother otter produces pups in this population). Also, although the females of 1986 are of pup-producing age, they have not dispersed from their natal home range, and have remained with their mother and her subsequent pups. Additionally, these "older sisters" have demonstrated a simple form of alloparenting by assisting the mother with some aspects of the care and protection of her offspring.

4. Pup Development

At Trinidad Bay, the mother otter has 1 litter of pups every Spring, and gives birth around the first of April. In 1988, the 3 pups (1 female, 2 male) left the natal nest when they were approximately 70 days old. Pups were first seen chasing fishes during Week 13. The pups achieved efficient coordination of their basic swimming movements by Week 15, and they also appeared to have captured their first fish fingerling by the end of Week 15. During the next week, the mother began to take the pups on foraging trips out of the core area. With the appearance of sustained deep-diving during Week 18, the pups possessed the complete adult repertoire of

swimming behaviors. Fish captures continued to be very infrequent, however. Even at 6 months, the pups were noticeably inefficient foragers, and the mother still provided most of the pups' food. The pups attained self sufficiency during Weeks 38-42, and the mother abandoned her offspring when they were 48 weeks old. All 3 pups of 1988 survived to independence, but 2 died within 2 months thereafter. The surviving male joined the Clan.

The determination of the age at which otter pups attain self sufficiency has direct implications for the conservation and management of otters. Although otter pups may possess adult-like swimming behaviors as early as 8 weeks after leaving the natal nest, the acquisition of successful, energetically-optimized foraging skills requires a much longer period of learning. Even at Trinidad Bay (where food is plentiful at all seasons), otter pups do not attain self sufficiency in food procurement until they are 9 months old. Whereas prey-capture techniques appear to be learned primarily by individual trial and error, the crucial logistics of foraging and habitat utilization are learned almost exclusively from the experience of the mother. Consequently, removal of the mother before the pups have attained self sufficiency would have a significant negative effect on pup survival. I recommend that conservation or management practices be avoided that would remove a mother otter from her pups before the pups are 9 months old. Such practices include Fall trapping seasons, and captures for translocation or telemetry implant surgery.

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