Depredation of Sea Otter Pups by Bald Eagles at Amchitka Island, Alaska

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The Niger striped squirrel was often observed foraging along the Mekrou River among vines and on the ground near the base of trees. Most activity was recorded in the early morning and late afternoon hours.

Four specimens of *Funisciurus anerythrus nigrensis* were obtained. A male obtained on 14 October 1971 and a second shot on 8 May 1972 had scrotal testes measuring 30 by 15 and 25 by 15 millimeters (mm), respectively. Two females acquired on 16 and 17 October 1971 were pregnant and carried two embryos each, averaging 12 mm in length. Cranial and body measurements for the specimens collected are presented in Table 1. The specimens have been deposited in the United States National Museum and museums at Texas A&M University and the University of Colorado.

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DEPREDATION OF SEA OTTER PUPS BY BALD EAGLES AT AMCHITKA ISLAND, ALASKA

The sea otter (*Enhydra lutris*) and the bald eagle (*Haliaeetus leucocephalus*) coexist at Amchitka Island at high population densities. No form of predation, other than by man, has been considered important in sea otter population dynamics (Kenyon, 1969). However, the presence of sea otter remains in the nests of bald eagles has been discussed by several investigators.

Murie (1940) reported 7 percent of the prey remains from bald eagle nests throughout the Aleutian Islands to be mammalian, none of which were sea otter. He did mention that natives reported finding sea otter remains in some nests. Krog (1953) found 21 percent of the food remains in Amchitka eagle nests to be mammalian, one-half of which were sea otter. Kenyon (1961; 1969) also found sea otter remains in eagle nests. White *et al.* (1971) reported 28 percent of the prey remains in eagle nests at Amchitka to be mammalian, one-half of which were sea otter. Both Murie (1940) and Kenyon (1969) concluded that eagle predation on living sea otters rarely if ever occurs, and that instead the otters are picked up as carrion. Krog (1953) suggested that predation may occasionally occur. White *et al.* (1971) did not discuss predation by eagles on otters.

Direct observations of eagle predation at Amchitka are rare. This is true even for predation on birds and fish which together form the bulk (70 to 90 percent) of the eagle's diet (Sherrod *et al.*, in preparation). We are aware of three observations of eagles which actually had live sea otter pups in their talons. The first was made by R. D. Jones in 1961 and is described by Kenyon (1969). The second observation was made by Ted Kincannon (personal communication) on 17 May 1971 at Amchitka Island. While watching an adult female otter and her pup which were about 10 meters offshore, he also saw an eagle fly from a nearby cliff. The adult female otter dove. After she had been submerged for several seconds, the eagle glided over the sea about 1 meter above the water, grabbed the pup, and flew back to a cliff. The mother surfaced, looked around, and then dove again. She surfaced nearby and repeated the behavior. After a few more dives, she swam out to sea. The final observation was made by White on 2 June 1974 while censusing eagles from a helicopter. As he passed near one nest, he saw an adult eagle rising from near the surface of the water with a sea otter pup in its talons. The pup appeared to be only a few days old and was still struggling. As White pursued the eagle, it evaded the helicopter by flying low near the water. When the eagle was re-

TABLE 1.—*Sea otter remains collected from bald eagle nests at Amchitka Island, Alaska, during 1969 through 1973.*

Prey data	1969	1970	1971	1972	1973
Number of active nests	57	56	68	71	Unknown
Number of nests checked for prey remains	15	16	44	34	5
Total number of prey remains collected	65	50	219	261	44
Percent mammalian prey remains (by number)	18.46	18.00	15.98	29.12	25.00
Total number of sea otters found in nests	6	6	24	56	8
Sea otter remains as percent of total prey remains (by numbers)	9.23	12.24	10.96	21.46	18.18

located, it was sitting on a hillside biting at the back of the otter. The pup was apparently dead at that time.

These observations demonstrate that eagles do in fact prey upon sea otters. Young sea otter pups are often left helplessly floating on the surface while the mother dives for food. We believe that during this period they present vulnerable targets.

Our belief that many of the pups are actually caught alive is substantiated by the following evidence. We found puncture wounds in the skin and/or body of nearly all of the carcasses discovered in eagle nests. These punctures could have been made when the eagle picked the pup up as carrion. However, most of the puncture wounds were surrounded by hematomas, and blood was found around the nostrils and within bronchial passages. Hematomas do not form in dead animals, and the blood associated with the respiratory tract likewise suggests live procurement of the pups. Furthermore, observations on captive sea otters indicate that newborn otter pups sink shortly after death (Schneider, personal communication) and are thus unavailable as a carrion food source for bald eagles.

The numbers of otter pups found in eagle nests examined on Amchitka between 1969 and 1973 are presented in Table 1. This table reflects only the prey items provided for young eaglets by nesting adults. Nesting adult eagles comprise somewhat less than 65 percent of the Amchitka population (Sherrod *et al.*, in preparation). We collected the greatest number of prey items in the years 1971 and 1972, during which period a helicopter was available. These years, therefore, are probably most representative of the extent to which otter pups are found in the diet of the nesting eagles at Amchitka (approxmiately 10 to 20 percent of items by number). Yearly variation in the percentage of sea otter remains in our nest sample is probably due to variable feeding behavior among nesting pairs of eagles. For example, whereas a minimum of nine pups were found in one nest within a four-week period, not a single otter was found in others during the entire nesting season. Because eagles frequently alternate nest sites on a yearly basis (some accessible and some inaccessible to the observer), it follows that the variation in prey preference of individual eagles will be reflected as yearly changes in food habits (particularly during those years when our sample size was small). We should further point out that Table 1 gives percentages *by number* of individual species. The percentage of otter biomass would be much higher because as a prey species in the eagle's diet, it is equalled in

weight only by some of the larger waterfowl, such as cormorants (*Phalacrocorax* spp.) and eider (*Somateria* sp.).

Most sea otter pups are born during late spring-summer in the western Aleutian Islands (Kenyon, 1969; Schneider, 1972). This is also the period when the eagles are nesting. Late winter-early spring is a period of increased sea otter mortality (Kenyon, 1969). Sea otter carcasses are commonly encountered on the beaches of Amchitka during this period. Many of them are heavily scavenged upon by eagles. Conversely, those few sea otters carcasses found during late spring-summer are less heavily scavenged upon by eagles. Apparently more abundant food resources during this period reduces scavenging behavior.

The sea otter population of Amchitka Island was recently estimated to number about 7000 animals (Estes and Smith, 1973). The magnitude of late winter-early spring die-offs of juvenile sea otters reflects generally the annual increment in sea otter numbers beyond the population equilibrium density (Kenyon, 1969). We believe that the loss of sea otter pups by bald eagle predation is not detrimental to the Amchitka sea otter population.

In conclusion, we agree with prior investigators that dead sea otter carcasses are often scavenged by eagles, and that live adult otters are probably never preyed upon. However our studies present evidence which suggests that otter pups are, in fact, quite regularly depredated by nesting adult bald eagles.

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AN ANALYSIS OF MULTIPLE CAPTURES IN SEVERAL RODENTS FROM DURANGO, MEXICO

There have been few reports dealing with the phenomenon of multiple captures in rodent population studies (Getz, 1961; 1972; Sheppe, 1967). Getz (1972) used multiple capture data to evaluate social structure and aggressive behavior in *Microtus pennsylvanicus*. The present study describes several aspects of multiple captures in rodents captured during a year-long (in 1967 and 1968) ecological study in mixed desert-shrub and mesquite-grassland in east-central Durango, México (see Petersen, 1970; 1973; for a detailed description of the study area). Rodents involved in multiple captures included *Baiomys*

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