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THE WOLVES OF CORONATION ISLAND

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Introduction

On October 27, 1960, four timber wolves (Canis lupus ligoni), all approximately 19 months old, were released on Coronation Island in Southeast Alaska. At the time of the transplant deer were present on the Island, but there was no knowledge of prior occupancy by wolves. The wolves were taken from a den on Kuiu Island when about one month old and were held in captivity until their subsequent release.

Wolves are indigenous to most of Southeast Alaska with the exception of Admiralty, Baranof and Chichagof Islands. The Sitka black-tailed deer (Odocoileus hemionus sitkensis) is present in varying degrees of abundance throughout Southeast Alaska and normally is the major food item for wolves. In areas where deer and wolves co-exist wolves must influence deer populations, but the importance of this relationship has not been demonstrated. Deer populations in this northern region fluctuate greatly depending on the severity of the winter. Many people feel wolves should be controlled to provide more deer for hunters, and a bounty system initiated by the Territorial Legislature in 1915 is still in effect.

The objectives of the project are to determine the impact of wolves on a deer population, factors which control wolf numbers, and changes in the habitat induced by the introduction of a predator species.

Transplant Site

Coronation Island is situated at the outer edge of the Alexander Archipelago in Southeast Alaska, approximately 80 miles southwest of the town of Petersburg (55°53' North latitude, 134°15' West longitude). It is about ten miles long by three and one-half miles wide containing an area of 30 square miles. The shore line is irregular, indented by several bays and exposed on the west and south to the sweep of the Pacific Ocean. The ground formation is predominantly limestone and the highest point on the island

is 1,960 feet. About 80% of the island is forested, 11% muskegs, 6% subalpine and the remainder alpine, rock, alder slide and water. Forest cover is primarily Sitka spruce and western hemlock with smaller amounts of yellow cedar present. The influence of the marine climate results in milder winters with less snow accumulation than in most other areas of Southeast Alaska.

Pre-wolf Conditions

In 1959 when the author first visited the island, deer densities were not high compared to many other areas of Southeast Alaska. However, because of mild winters the deer population had probably remained stable for many years. In spite of the low deer density, utilization of food species was so great that available forest understory was almost completely removed. The more palatable food species such as Vaccinium parvifolium, V. ovalifolium, Ribes bracteosum, Sambucus racemosa, Lysichitum americanum, Cornus canadensis and Fauria cristi-galli, were present only in locations inaccessible to deer. Even unpalatable species such as Menziesia ferruginea, Polysticum munitum, Oplopanax horridus and hemlock and spruce reproduction were missing from the forest floor.

Klein (1) demonstrated that deer on Coronation Island prior to the wolf introduction (especially males) were about 20% smaller than deer of equivalent age on better ranges of Southeast Alaska. He also showed the nitrogen content of rumen samples from Coronation Island deer was significantly less (4.47 compared to 6.42 for gross sample) than from Woronkofski Island, one of the better deer ranges which also supported a wolf population.

Remains of deer carcasses within the beach fringe evidenced some annual losses, and examination of bone marrow indicated that they were probably from malnutrition.

Post-wolf Conditions

In October, 1960 two male and two female wolves were placed on the Island. At least one pup was born in the spring of 1961. In July, 1961 both of the original females were killed by a fisherman; only one was lactating. In June, 1962 positive evidence of only two wolves was found. In April, 1963 an additional adult female was placed on the Island. In August, 1963 a family group of three pups and two adults was seen. Tracks indicated the presence of two additional adult wolves. In July, 1964 a family group of four adults and two pups, two groups of three adults each,

and a single adult were seen. Some of these sightings may have been duplications; however, there are at least seven adults and two pups on the Island at the present time. In July, 1964 fresh wolf tracks were encountered on all beaches. A well-defined wolf trail was present in the beach fringe along the entire northern shore of the Island and trails were also present on the Island proper.

Wolf scats have been collected and analyzed each year since the transplant. Table 1 lists the food items identified.

Table 1. Food Items Contained in Wolf Scats from Coronation Island.

		Frequency in Scats (% of total collected)		
Year	No. Scats	Deer	Harbor Seal	Other
1961	146	78	43	2
1962	18	89	(checked only for deer)	
1963	45	89	53	27
1964	77	95	32	14

The primary food item of the wolves has generally been deer. The incidence of deer remains in scats has increased from 78% in 1961 to 95% in 1964. Harbor seal (Phoca vitulina) is the second most important food item. It is not known whether these animals are actually killed or are carcasses which wash up on the beaches. Seals are common in the area and have been observed hauled out on gravel beaches at least 100 feet from the water's edge. Under these circumstances wolves could probably kill them. Most scats contained some wolf hair and other miscellaneous food items including mink, land otter, mice, birds and crabs. A large number of freshly broken cockle clam shells (Clinocardium spp.) were noted in the timber immediately adjacent to the beach. Tooth marks indicated that wolves had broken and probably eaten the clams. These clams are usually only a few inches below the surface in sandy intertidal areas and could easily be dug by wolves.

Since the introduction of wolves, deer numbers have been re-

duced. In 1959 deer were not as abundant on Coronation Island as in most other areas of Southeast Alaska; however, evidence of deer was common. Table 2 lists deer observations per day before and after the wolf introduction. Deer sightings per man day in the field have declined from 8.2 per day in 1959 to 0.1 per day in 1964. Harassment by wolves may have caused increased wariness, but the habitat also shows indications of lessened deer use.

Table 2. Deer Observations on Coronation Island.

Year	No. Days	No. Deer	Deer Per Day
1959	6	49	8.2
1960	Wolf Introduction		
1961	9	32	3.6
1962	3	6	2.0
1963	8	1	0.1
1964	7	1	0.1

In 1959 well-defined deer trails were present. By 1964 these trails had grown over with vegetation and were difficult to locate. However, some evidence of deer was present throughout the Island and at least one fresh deer track was seen on each beach searched.

When the Island was first visited in 1959, carcasses of deer were common within the beach fringe. Examination of the bone marrow showed that death was usually from malnutrition. In 1964 the remains of 11 deer were found. Only fragments of bone and hair were usually present, but in all instances except one the marrow was white and solid.

The most dramatic change on the Island is the vegetative cover. Previously nearly every available plant was utilized by deer. The forest was open and park-like compared to the dense understory usually found in Southeast Alaskan forests. Species which are generally unpalatable showed heavy use. This is the only site in Southeast Alaska where the writer has seen Sitka spruce hedged by deer. Inaccessible sites, such as roots of overturned trees, supported lush growth of several species of vegetation which were absent from the forest floor. Some plants of Vaccinium ovalifolium, V. parvifolium and Menziesia ferruginea, which had at some time in the past become established and grown

too tall for deer to reach, had dense clumps of dead, browsed stubs about their bases.

In June, 1962 there were already signs of a decrease in utilization. Less palatable species such as Menziesia ferruginea, Oplopanax horridus, and the fern Polysticum munitum were beginning to appear. More desirable species such as Cornus canadensis and Blechnum spicant were also becoming apparent. Careful observation revealed many small shoots of Vaccinium ovalifolium and V. parvifolium springing from hidden root systems. By July, 1964 changes in the vegetation could not be mistaken. The forest floor supported dense mats of Cornus canadensis and large clumps of Polysticum munitum. In many places the ground was green with small plants of Menziesia ferruginea. Fauria crista-galli and Lysichitum americanum were present on the wetter sites and the old Menziesia and Vaccinium plants had lush green shoots which were less than four years old about their bases.

Conclusions

Wolves have now been present on Coronation Island for almost four years. They successfully adapted to wild conditions and produced pups at two years of age. At least one of the original males was still alive when four years old. Wolf litters usually average seven or eight pups. Assuming a 1:1 sex ratio at birth and taking into account the death of the two original females during their second year, the maximum theoretical population at the present date could be six adult males, five adult females, 40 year-old animals and 40 pups; a total of 91 wolves. The actual population does not approach this number. Observations indicate there are between 7 and 11 adult and yearling wolves and two pups on the 30 square mile Island at the present time. This is probably the highest wild wolf population per unit area in existence today. The presence of large amounts of wolf hair in some scats provides some evidence that intra-specific strife may account for the slow increase in wolf numbers. Although their reproductive potential is great, wolves may rarely attain it. We have knowledge of three separate litters born on Coronation Island since 1960; however, the maximum number of pups known in any one litter is three.

Compared to most other areas of Southeast Alaska the present deer population on Coronation Island is low, but in spite of extremely heavy predation wolves have not eliminated the deer and in fact are presently utilizing them more than earlier. Deer

numbers have been reduced; however, examination of bone marrow indicates that the remaining deer are in better condition than before wolves were present.

Changes in vegetative cover since the wolf introduction indicate that ranges in Southeast Alaska subject to heavy deer use recover rapidly when the pressure is released. Plants which appear to have been eliminated are quickly re-established.

References

1. D.R. Klein, Physiological Response Of Deer On Ranges Of Varying Quality. Ph. D. Thesis (Univ. of British Columbia, Vancouver, 1963).