BEAVER FOOD CACHE SURVEY
YUKON FLATS NATIONAL WILDLIFE REFUGE
ALASKA

YFNWR
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INTRODUCTION

In Alaska, beaver (Castor canadensis) is an important commercial and subsistence wildlife resource. Public Law 96-487, Alaska National Interest Lands Conservation Act (ANILCA) establishes management objectives for the Yukon Flats NWR (Title III, Sec. 302. (9)) which include conserving fish and wildlife populations and habitats in their natural diversity including furbearers. The majority of existing available data are from studies initiated in the early 1960's in response to the Ramparts Dam Project; most furbearer data collected was preliminary and generalized.

The objective of the annual beaver food cache survey is to determine trends in the relative abundance of beaver in representative drainages within the Yukon Flats NWR. Eventually, estimates of beaver populations will be used to evaluate annual beaver harvest in terms of, 1) how closely harvest approaches optimum sustained yield, 2) whether or not optimum aged beaver are harvested, and 3) whether or not particular areas may be over harvested and beaver populations need to be protected or restored.

Data collection was accomplished by Dr. Steven Buskirk (University of Alaska) and Steve Harrington (Biological Technician) for the years 1983 and 1984, respectively.

METHODS AND MATERIALS

Beaver food cache surveys are conducted on an annual basis in accordance to techniques outlined by Hay (1958), Murray (1961), Koontz (1968), Boyce (1974), Gipson (1982), and Swenson, et al. (1983).

Five study areas of about 60-70 square miles (155-180 sq km) have been established in representative areas within the refuge. Representative areas sample habitat diversity where potential exists for beaver occurrence. Areas sampled include Beaver Creek (on the Flats), White Mountains foothills, Dall River, and the Yukon Flats proper (Figure 1).

Food cache surveys were conducted late September/early October after leaf fall and before ice formation obscured observation. A Piper PA-18 (Super Cub) was flown between 100 and 200 meters AGL at a speed of about 100 km/hour. All waterbodies within each study area were searched. All beaver lodges were located and marked on 1:63,360 scale quadrangle maps. A series of symbols for each lodge located were used to denote the presence of a food cache, open water (in case of a thin layer of ice), and tracks (in case of a light snowfall). Surveys were conducted during daylight hours. Optimum weather conditions for surveys occur after a light freeze and a light snow, when beaver activity and the food cache can be easily observed.

RESULTS & DISCUSSION

Results from the two previous beaver food cache surveys should be considered preliminary and incomplete. Since the initial establishment of the survey areas, the number of waterbodies surveyed within the study areas has increased from 537 in 1983 to 763 in 1984. The number of beaver lodges located also increased somewhat proportionally to the increased number of waterbodies surveyed (98-1983, 156-1984). These increased numbers probably reflect an observer bias related to a more intense search effort conducted in 1984. However, some of the changes within different survey areas can not be entirely explained by the increased survey effort alone.

The overall lodge/waterbody ratio and food cache-activity/lodge ratio increased slightly for all survey areas combined (Table 1). The lodge/waterbody ratio gives a general indication of beaver colony density distribution within a given area. The food cache-activity/lodge ratio is an indicator of existing colony activity at a lodge in relation to all known lodges available for use in a survey area by beaver groups. These ratios will be used as general preliminary indicators of beaver population trend status.

Table 1

Beaver Lodges Surveyed in Study Areas
Yukon Flats NWR

1983

	Beaver Creek	Big Creek	Old Lost Creek	Sussaymin Lakes	Tulebaugh Lake	Total
Lodges	41	19	18	9	11	98
Active	20	8	13	7	8	56
Waterbodies Surveyed	121	71	141	34	170	537
Lodge/Waterbody Ratio	34:100	27:100	13:100	27:100	7:100	18:100
Food-cache Activity/Lodge Ratio	49:100	42:100	72:100	78:100	73:100	57:100

1984

	Beaver Creek	Big Creek	Old Lost Creek	Sussaymin Lakes	Tulebaugh Lake	Total
Lodges	50	34	30	24	18	156
Active	30	13	19	21	15	98
Waterbodies Surveyed	158	93	262	56	194	763
Lodge/Waterbodys Ratio	32:100	37:100	12:100	43:100	9:100	20:100
Food-cache Activity/Lodge Ratio	60:100	38:100	63:100	88:100	83:100	63:100

The 1984 beaver food cache survey relocated 95% or 53 of 56 of the active beaver lodges Found in 1983. Three active lodges surveyed in 1983 were missed. Twenty seven or 48% of the active lodges found in 1983 were active again in 1984; thirteen inactive lodges were active in 1984. Almost half (46%) of the active lodges surveyed in 1983 were inactive in 1984. An additional 58 active beaver lodges were located in 1984. Although the increase in the overall number of lodges may reflect a bias related to increased survey intensity, the analysis may suggest redistribution of beaver colonies or decline of colony numbers from unknown mortality factors, as indicated by the decreased number of active lodges resurveyed in 1984.

Table 2

Comparison of Active/Inactive Lodges for 1983-84
by Area

Lodges Surveyed	Beaver Creek	Big Creek	Old Lost Creek	Sussaymin Lake	Tulebaugh Lake	Total
83 Active 84/Active	(10)	(0)	(7)	(5)	(5)	(27)
83 Inactive 84/Active	(9)	(2)	(1)	(-)	(1)	(13)
83 Active 84/Inactive	(8)	(8)	(6)	(2)	(2)	(26)
83 Inactive 84/Inactive	(11)	(9)	(4)	(1)	(1)	(26)
84 New Active	(11)	(11)	(11)	(16)	(9)	(58)
84 New Inactive	(1)	(4)	(1)	(-)	(-)	(6)
Missed 83 Active	[2]	-	-	-	[1]	[3]
Missed 83 Inactive	[1]	-	-	[1]	[1]	[3]

Comparison of both surveys within each survey area shows some variation of beaver activity not entirely attributable to the increase in survey intensity.

The Beaver Creek Survey Area, encompassing about 76 square miles (196.8 sq km), was first surveyed in 1982 under poor survey conditions. Data analysis was subsequently not reported. In 1984, the number of waterbodies surveyed increased from 121 in 1983 to 158. Two active lodges and one inactive lodge located in 1983 were missed during the 1984 survey. Of the remaining 18 active lodges surveyed in 1983, ten were still active in 1984 and nine inactive lodges in 1983 were active in 1984. Eleven active lodges were located for the first time in 1984. The increased number of active lodges is probably due to the additional number of waterbodies surveyed.

The Big Creek Survey Area encompasses about 72 square miles (186.5 sq km). Ninety three waterbodies were surveyed for beaver lodges and food caches in 1984 compared to 71 in 1983. Although the number of waterbodies surveyed increased, the food cache-activity/lodge ratio decreased from 42:100 in 1983 to 38:100 in 1984. All eight active lodges surveyed in 1983 were inactive in 1984. Two inactive lodges in 1983 became active in 1984 with an additional 11 active lodges located. The changes from 1983 to 1984 numbers, with only a small increase in the number of waterbodies surveyed, may indicate a possible redistribution of beaver colonies to new waterbodies or a possible decline in colonies.

Old Lost Creek Survey Area, approximately 97 square miles (251.2 sq km) in size, had nearly double the number of waterbodies surveyed in 1984 compared to 1983, with little change in the lodge/waterbody ratio. The number of waterbodies surveyed in 1984 increased from 141 in 1983 to 262. The lodge/waterbody ratio remained nearly constant at 12:100 and 13:100 in 1983 and 1984, respectively. The number of active lodges per total lodges declined from 72:100 in 1983 to 63:100 in 1984, possibly related to nearly half of the active lodges in 1983 becoming inactive in 1984. Eleven new lodges located in 1984 contributed to the increase in total number of lodges observed compared to 1983, but this increase was not in proportion to the increased number of waterbodies surveyed. The decline in the food cache-activity/lodge ratio may indicate a decline in numbers of colonies or possibly a redistribution of beaver to other waterbodies, i.e., those new waterbodies located in 1984.

The Sussaymin Lakes Survey Area encompasses about 36 square miles (93.2 sq km). A total of 56 waterbodies were surveyed in 1984 compared to 34 in 1983. The lodge/waterbody ratio increased from 27:100 in 1983 to 43:100 in 1984. All seven active lodges surveyed in 1983 were relocated; five were again active. A total of 16 new active lodges were observed in 1984. This increase probably relates directly to the increased number of waterbodies surveyed.

The Tulebaugh Lake Survey Area encompasses approximately 66 square miles (170.9 sq km). The number of lodges per waterbody remained relatively stable for the survey area with only a small increase in the number of waterbodies surveyed in 1984 (170-1983, 194-1984). There was only a small downward change in the number of active lodges. One inactive lodge in 1983 became active in 1984. The location of nine new active lodges accounted for the increase in the food cache-activity/lodge ratio. This may reflect the increase in waterbodies surveyed, an increase in the number of colonies being established, or a redistribution of colonies.

Previous workers used beaver food cache counts in conjunction with estimates of average colony size, which allowed estimates of beaver populations within given areas. Swenson, et al. (1983) demonstrated that food cache surveys in Montana do not accurately reflect variations in colony size, thus limiting their usefulness in population estimates. Methods to sample colony size within representative habitats on the refuge will need to provide area specific averages that will prove meaningful in use with food cache counts to estimate populations.

Until more work is completed to obtain an accurate estimate of colony size, the food cache surveys will continue to provide a trend of beaver activity by area through enumeration of the number of active beaver colonies in sampled areas. Future efforts will be directed toward determining relationships between colony size and food cache size to aid population estimates. Habitat classification will be required to describe relationships between beaver population status and distribution. Sampling age and sex structure and reproductive activity by age class needs to be conducted periodically.

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