BEAVER SURVEYS IN THE WESTERN NWT, SEPTEMBER-OCTOBER 1989

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ABSTRACT

Beaver lodge surveys were conducted by Super Cub in late September and early October, 1989 on 14 blocks in the western Northwest Teritories (NWT), to examine long-term trends in beaver populations and identify areas where beaver trapping should be encouraged. A total of 2059 km^2 was surveyed. The number of active lodges ranged from 0-1.00 lodges/km^2 (mean of all blocks 0.26 lodges/km^2). These densities are similar to those found in northern boreal habitats elsewhere. Comparisons with surveys conducted in the western NWT over the past 25 years suggest that current densities are moderate to high, and that beaver trapping could be promoted and encouraged in most areas. In order to monitor long-term trends in this potentially valuable resource, the blocks should be resurveyed at 4-year intervals. The high density block east of Yellowknife (Dettah East) should be surveyed annually.

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INTRODUCTION

The NWT harvest of beaver (Castor canadensis) has declined in recent years, from an annual harvest of about 12,000 pelts during the late 1930s and early 1940s (Robinson and Robinson 1946), to 8770 pelts during the 1960s, and 3140 pelts during the 1980s. The 1988-89 harvest of 1982 pelts coincided with one of the lowest average pelt prices ($15.31) since the mid-1970s. This lowered harvest appears to be a result of decreased trapper effort because of low pelt price, rather than decreased population size. Prices have averaged $20 per beaver pelt for most of the 1980s, while pelt prices for other species have increased (marten [Martes americana] - decade average $53, lynx [Lynx canadensis] - $370). Beaver pelts are also somewhat more difficult to prepare compared to other species.

Beaver populations are readily censused, and can be easily managed to provide sustained harvests in productive areas. Aerial surveys for beaver colonies were conducted over many parts of the western NWT in the early 1950s (summarized in Boles 1975), and infrequently in selected areas in recent years (NWT Renewable Resources files). This study was conducted to assess beaver lodge density in selected areas of the western NWT, in order to 1) examine long-term trends in beaver populations, and 2) identify areas of moderate or high densities of beaver where trapping should be encouraged.

METHODS

Beaver lodge surveys were conducted in late September and early October 1989 near the following communities (number of blocks surveyed): Dettah (1), Yellowknife (1), Ft. Rae (1), Ft. Providence (2), Kakisa (1), Ft. Simpson (2), Ft. Liard (1), Trout Lake (2), Ft. Norman (1), Norman Wells (1), and Ft. Good Hope (1) (Fig. 1). Two proposed areas in and near the Mackenzie Delta were not surveyed because of poor weather and early freeze-up and snowfall. Survey areas were chosen after consultation with local Renewable Resources Officers and Hunters and Trappers Associations.

Block size varied from 17 km^2 to 345 km^2 (mean block size 147 km^2). Surveys were conducted in a Super Cub at 100-130 m above ground level and at 100-120 km/hr with one observer and the pilot. All smaller lakes and ponds and the shore line of larger lakes were examined, as were river drainages. The location of all lodges, active or abandoned, were plotted on 1:50,000 topographic maps. Active lodges were identified by the presence of a food cache (feed bed) within 150 m of the lodge, and fresh cuttings on or near the lodge (Fuller 1953, Hay 1958). The surveys were conducted relatively late in the autumn after leaf fall, when food caches were expected to be most visible.

One of the blocks surveyed by Super Cub was reexamined using a Bell 206B helicopter, to provide an indication of the accuracy of the fixed-wing survey. The helicopter surveys were conducted by

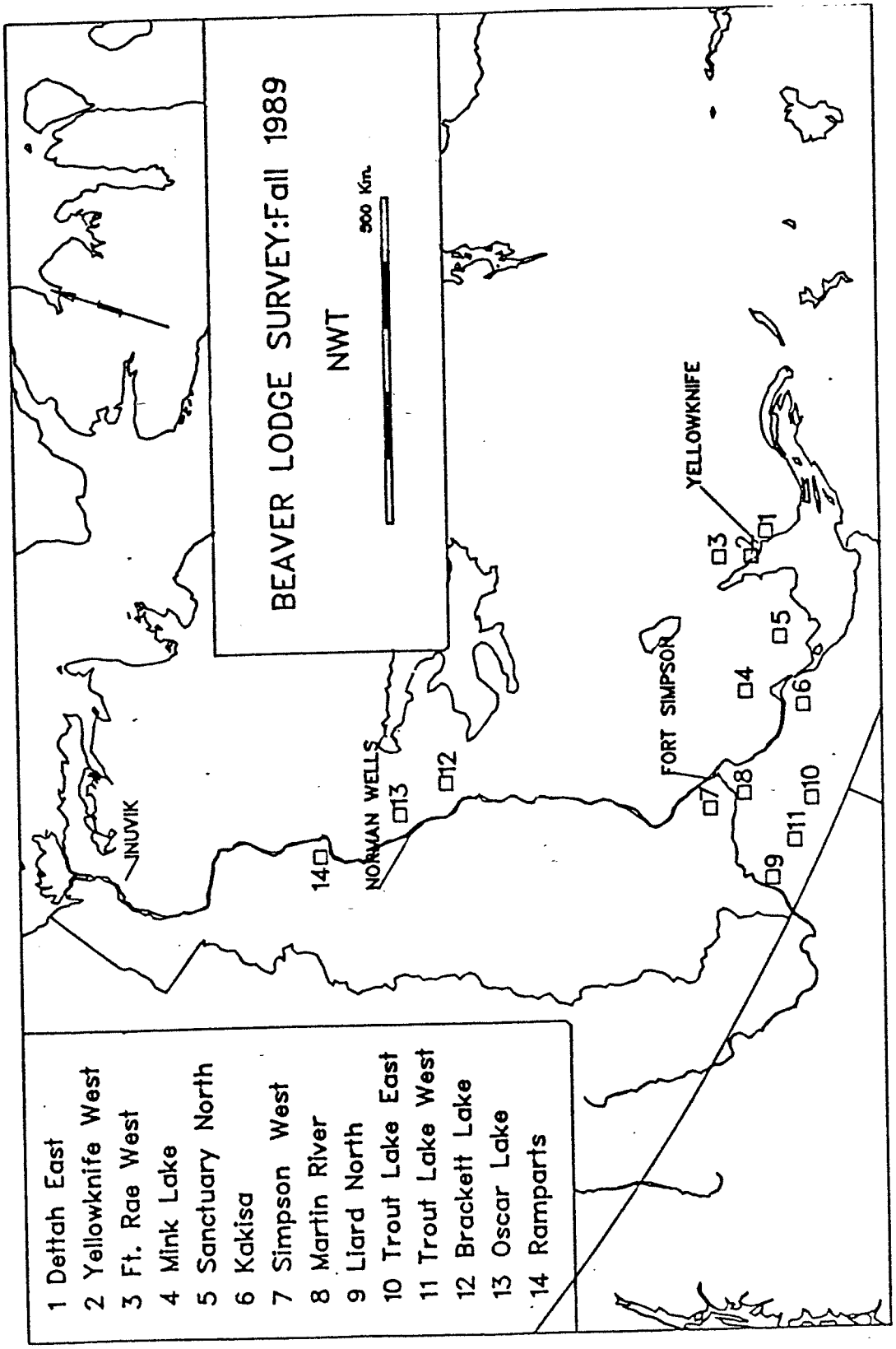

Fig. 1. Location of beaver lodge survey blocks, Fall 1989.

two observers. The efficiency of aerial beaver lodge surveys varies considerably, but some authors have reported efficiency ratings (number observed versus number present as verified by extensive ground survey) of over 90% (summarized in Novak 1987). Payne (1981) found helicopters missed less than half as many lodges as Super Cub surveys.

An attempt was made to survey the block east of Ft. Simpson using the Super Cub; however, the flat, uniform land made navigation impossible. This block (168 km^2) was later surveyed by helicopter, following flight lines oriented north-south at about 90 km/h. Flight lines were spaced one minute flying time apart.

RESULTS

A total of 2059 km^2 was surveyed in 14 blocks. Eighteen hours were expended on surveying blocks using a Super Cub, and 6.5 hours using a helicopter. Density of active beaver lodges varied considerably among blocks, and averaged 0.26 lodges/km^2 (Table 1). In several blocks, lodges were located along rivers and creeks, and are, therefore, reported also as a function of linear distance (Table 2).

Surveys were conducted by both helicopter and fixed-wing aircraft on 180 km^2 of the Dettah East block, using separate crews of skilled observers. Time on block for both aircrafts was similar, approximately 2.5 - 2.7 hours. Observers in the helicopter noted 76% more active lodges (167 vs 95) and 11% fewer abandoned lodges (51 vs 57) than those in the Super Cub. Eighty-six active lodges were located by surveyors in both aircraft, 68 active lodges were noticed from the helicopter and not seen from the Super Cub, and 13 lodges listed as active from the helicopter were called abandoned by observers in the fixed-wing. The observers in the Super Cub noted eight active lodges not recorded from the helicopter, and one active lodge listed as abandoned.

Table 1. Number of active and abandoned beaver lodges located from a Super Cub, western NWT, September-October 1989.

Survey Block[a]	Area Covered (km^2)	Active Lodges No.	Active Lodges /km^2	Abandoned Lodges No.	Abandoned Lodges /km^2
1. Dettah East	261	119	0.46	75	0.29
2. Yellowknife West	102	38	0.37	39	0.38
3. Ft. Rae East	256	70	0.27	45	0.18
4. Mink Lake	193	31	0.16	4	0.02
5. Sanctuary North	146	0	0	0	0
6. Kakisa	17	17	1.00	0	0
7. Simpson West	168	29	0.17	11	0.07
8. Martin River[b]	59	34	0.58	1	0.02
9. Liard North	345	41	0.12	16	0.05
10. Trout East	139	23	0.17	9	0.06
11. Trout West	107	27	0.25	14	0.13
12. Brackett Lake	98	49	0.50	39	0.40
13. Oscar Lake	92	23	0.25	14	0.15
14. Ramparts	76	44	0.58	22	0.29
Total all blocks	2059	545		289	
Mean all blocks			0.26		0.14

[a] Numbers correspond to Fig. 1.
[b] Area surveyed by helicopter; see text.

Table 2. Number of active and abandoned beaver lodges located along rivers in selected survey blocks.

Survey Block[a]/ River	Length (km)	Active Lodges No.	Active Lodges /km	Abandoned Lodges No.	Abandoned Lodges /km
4. Mink Lake					
Horn River	29	13	0.45	2	0.07
Laferte River	13	4	0.31	2	0.15
Birch River	21	14	0.67	0	0
6. Kakisa					
Kakisa River	38	17	0.45	0	0
8. Martin River					
Martin River	75	34	0.45	1	0.01
9. Liard North					
Muskeg River	45	12	0.27	6	0.13
Total all rivers	221	94		11	
Mean all rivers			0.43		0.05

[a] Numbers correspond to Fig. 1.

DISCUSSION

The densities of active lodges located during the survey are similar to other published accounts for northern boreal habitat (Novak 1987:Tables 4,5). Bergerud and Miller (1977) found densities of 0.25 colonies/km^2 in the best habitat in Newfoundland in the early 1960s. In northern Alberta, Fuller and Keith (1980) found beaver lodge densities ranging from 0.10-0.38/km^2. In surveys along 945 km^2 of habitat from the Liard area to the Richardson Mountains in the western NWT, Dennington and Johnson (1974) found an average density of 0.17 active colonies/km^2, ranging as high as 0.40/km^2 (generally in the south and central blocks) to as low as 0.03/km^2 (in the Mackenzie Delta and surrounding areas).

Several of the areas surveyed in 1989 have been examined in the past by other researchers. All surveys used fix-wing aircraft, unless otherwise noted.

In September 1987, Rus Hall (pers. comm.) examined the Dettah East block and located 105 active lodges (0.40/km^2); the 1989 survey located 13% more active lodges. At the same time a 127 km^2 block which encompassed our Yellowknife West block contained 64 active lodges (0.47/km^2). When similar areas within the Yellowknife West block were compared, the number of active lodges declined from 46 in 1987 to 38 in 1989 (17% drop). Hall also examined a 250 km^2 block of more rocky Canadian Shield habitat 65

km east of Yellowknife, and located only 22 active lodges (0.09/km^2).

In September 1987, Joe Mackenzie (pers. comm.) surveyed portions of the Rae East block; when areas covered are compared to the 1989 survey the number of active lodges remained stable (30 vs 31) and the number of abandoned lodges increased (9 vs 15).

In 1951, Fuller (1953) surveyed 51 km of the Kakisa block (the river entering Kakisa Lake from the southeast), and found 15 feed beds (0.29/km of stream), considerably lower than that located in 1989. Sampling nine streams totalling 480 km in the Ft. Providence/Kakisa area, Fuller (1953) found 145 feed beds, an average of 0.30/km.

Dennington and Johnson (1974) conducted beaver habitat studies in the Mackenzie Valley in 1973 along the proposed pipeline corridor. Three of their areas coincided closely with blocks we examined. Along 69 km of the Martin River near Ft. Simpson 25 active colonies were observed, 0.36 colonies/km, slightly less than the number we located. Near the Brackett Lake block, the authors found 19 colonies in 75 km^2 (0.25/km^2), half the number we located. Near the Oscar Lake block, densities averaged 0.37/km^2 (24 colonies/65 km^2), 50% more than we found nearby.

The final comparison involves examination of the Ft. Rae Transplant Area. In 1954, 90 beaver were transplanted from Prince Albert National Park to 21 lakes near Ft. Rae (Radvanyi 1954). The objective of the transplant was to restore beaver

numbers in the area to levels of economic importance. "Although beaver had once inhabited the area into which the designated transplant was intended to extend, evidence of only a very limited number of beavers could be found in recent years" (Radvanyi 1954). Portions of our Ft. Rae East block coincided with the area where beaver were released and were subsequently resurveyed in 1964 (Kuyt 1964). We surveyed eight lakes within the Transplant Area that had been designated to receive beaver (generally 4-6 animals in each lake), seven of which actually had been stocked in 1954. We also examined three areas between these stocked lakes, and a tract of country west of the stocked area, that had been surveyed by both Radvanyi and Kuyt. Beaver numbers have increased considerably over the past 25 years (Table 3).

Table 3. Number of beaver colonies observed in 1964 and 1989, Ft. Rae Beaver Transplant Area.

		No. of lodges (active/abandoned)	
	1954[a]	1964[b]	1989[c]
Eight lakes surveyed	7 lakes stocked	9/1	12/6
Area west of Lake 13	Not stocked	2/0	21/12

[a] Radvanyi 1954.
[b] Kuyt 1964.
[c] This study.

In most areas surveyed, the density of active beaver lodges appears as high or higher than has been recorded in the past.

These results would suggest that actual increases in the number of beaver have occurred. However, although aerial food cache surveys may show gross changes in beaver populations, variations in colony size may mask definitive population changes (Swenson et al. 1983). Nonetheless, the densities observed indicate beaver populations near or at the highest recorded for northern boreal habitats.

High densities of active beaver lodges were recorded near Yellowknife, notably in the Dettah East block. Given that little trapping of this area is occurring (NWT Renewable Resources files), a drop in population size soon may take place as a result of deteriorating food conditions brought about by beaver activity (Aleksiuk 1970). High population levels may also result in a die-off from tuleremia (Novak 1987). Increased trapping in this and other areas in the western NWT with moderate to high populations may reduce the likelihood of wild fluctuations in beaver densities.

The helicopter survey of the Dettah East block located considerably more active lodges than counted from the Super Cub. More observers, the ability to hover and search an area for an extended period of time, and the ability to turn quickly and recheck a stretch of water all likely contributed to the greater number of active lodges observed. In areas of lower densities of beaver lodges, the efficiency ratings of the rotary and fixed-wing aircraft may be considerably closer, such that the Super Cub locates most of the lodges actually present. Therefore, in an

effort to approximate "real" densities more closely, it would not be correct to apply a correction factor from the helicopter survey of one high density block (1.76) to all densities observed. Because of the lower charter cost of the Super Cub (currently $160/hr) compared with the helicopter ($600/hr), the Super Cub had a lower cost per active beaver lodge located ($3.65 vs $9.00).

In summary, beaver densities are moderate to high in most of the areas surveyed in the western NWT, and increased trapping should be encouraged. While many of the beaver taken in the NWT are shot in the spring, winter (mid-December to mid-March), under-ice trapping to attain top pelt value should be promoted. The demand in the fur industry is for sheared beaver; winter-caught beaver are currently averaging $45 with tops of $85-90 per pelt (1989-90 season). "Shedders" shot or trapped in the spring after open water has appeared command only $15-20 or less (D. Unger pers. comm.). Efforts should be made to teach under-ice trapping techniques so that higher pelt prices may be realized.

In order to monitor long-term trends in beaver populations in the western NWT, the blocks examined in this survey should be resurveyed using a Super Cub at 4 year intervals (next survey fall 1993). Given the high density of active lodges and close proximity to Yellowknnife, the Dettah East block should be surveyed on an annual basis (estimated cost $500-600 per year).

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