Fuller, W.A.
Aerial beaver surveys Mackenzie District 1955. [Fort Smith? 1955]

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AERIAL BEAVER SURVEYS, MACKENZIE DISTRICT 1955.

BY;

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AERIAL BEAVER SURVEYS, MACKENZIE DISTRICT, 1955

W. A. Fuller

Introduction

In accordance with established policy, several thousand miles of beaver transects were flown in the Mackenzie District in late September and early October, 1955. This was divided approximately evenly between revisits to areas previously surveyed, and the breaking of new ground. The Fort Smith district was surveyed for the third time since 1949; the Ramparts River area and parts of the Rae and Fort Franklin districts for the second time; and new transects were established in parts of the Good Hope, Norman, and Franklin districts. With the exception of relatively small areas, all the beaver habitat in the Mackenzie District has now been sampled at least once and much of it has been revisited once. We are satisfied that this method gives sufficiently precise results for use in management. As the data accumulate their usefulness in this regard can be expected to increase in something like a geometric progression.

Besides the regular transects, one day was spent checking the sites in the Rae district where beaver were introduced last summer.

Methods

The methods followed have not changed appreciably since they were developed by Kelsall in 1949 and modified by Fuller and Flook in 1951. The course is planned to follow rivers and creeks wherever possible so that the majority of the flight is over areas of potential beaver habitat. All beaver signs are recorded and a record is kept of the time of each observation. The time is also recorded each time a check point is passed on the course.

In analysing the results, the number of colonies on each river, or in each area of similar habitat, is determined, and a density figure (colonies per minute) is derived by dividing the time spent in

surveying by the number of colonies seen. This permits comparison of one watershed or habitat type with another.

Results

The results of the survey are summarized in Table 1. The numbers assigned to each segment of habitat surveyed agree with the numbers shown on the accompanying map.

No.	Description of Transect	Minutes	Colonies Active	Colonies Abandoned	Colonies/ Minute
	Rae District				
1	Rae to height of land west of Windflower Lake.	76	8	1	0.10
2.	Tributary of Willowlake River from 63°N. 119°28'W. to height of land.	33	16	0	0.48
3	Height of land to Johnny Hoe River.	22	13	2	0.59
	Total for Rae District	131	37	3	0.28
	Franklin District				
4	Johnny Hoe River to Johnny Hoe River.	14	10	3	0.71
5.	Tributary of Johnny Hoe from West.	15	4	1	0.27
6	River flowing to Lac Ste. Therese from West.	21	13	4	0.62
7	River flowing to Lac Ste. Therese from East.	13	14	4	1.08
8	Next river north, from canyon to head.	7	8	0	1.14
9	River flowing to bottom of Mac-Vicar Arm from head to north fork.	3	5	0	1.67
10	East shore of MacVicar Arm.	20	0	0	0.00
11	Grizzly Bear Mountain (mainly over summit).	17	3	0	0.18
12	Franklin to St. Charles River	15	1	1	0.07
	Subtotals	125	58	13	

No.	Description of Transect	Minutes	Colonies Active	Colonies Abandoned	Colonies/ Minute
	Franklin District Cont. Fwd.	125	58	13	
13	Height of land south of Mahony Lake to Bydand Bay, Great Bear Lake.	31	18	2	0.58
14	Bydand Bay to Deerpass Bay.	36	22	4	0.61
15	Two large lakes near Deerpass Bay to Franklin.	34	14	1	0.41
	Total for Franklin District	226	112	20	0.50
	Norman District				
16	St. Charles River.	9	7		0.78
17	Mt. St. Charles to Brackett River.	14	11	2	0.79
18	Fort Norman to Norman Wells parallel to Mackenzie River.	20	15	4	0.75
19	Norman Wells to Oscar Creek.	10	14	2	1.40
20	Oscar Creek.	7	6	2	0.86
21	Kelly Lake to height of land.	13	4	0	0.31
22	Height of land to Brackett Lake.	28	10	1	0.36
23	Brackett Lake to height of land south of Mahony Lake.	3	0	0	0.00
	Total for Norman District	104	67	11	0.64
	Good Hope District				
24	Hanna River	30	18	8	0.60
25	Mackenzie River to Chick Lake (mainly Donnelly River).	14	9	4	0.64
26	Chick Lake to Chick Lake (course uncertain).	41	39	10	0.95
27	Chick Lake to Jacques Lake	7	1	2	0.14
28	Tsintu River	26	20	5	0.72
	Total for Good Hope District (exclusive of Ramparts #29)	118	87	29	0.74

No.	Description of Transect	Minutes	Colonies Active	Colonies Abandoned	Colonies/ Minute
	Fort Smith-Rocher River District				
30	Smith to Hill Island Lake.	82	53	8	0.65
31	Hill Island Lake to Loche Lake.	62	17	4	0.27
32	Loche Lake to Methleka Lake.	39	32	9	0.82
33	Methleka Lake to 111°30'.	26	18	2	0.69
34	111°30' to junction Powell and Kenneth Creeks.	44	49	22	1.11
35	Junction Powell and Kenneth Creeks to mouth Konth River.	22	37	12	1.68
36	Resdelta to Deskenatlata Lake.	20	18	6	0.90
37	Deskenatlata Lake to Taltson River.	12	22	5	1.83
38	Taltson River to O'Connor Lake.	16	15	0	0.94
39	O'Connor Lake to Thubun Lake.	41	18	7	0.44
40	Thubun Lake to Thubun River.	31	19	2	0.61
41	Thubun River to Snuff Channel.	25	9	3	0.36
42	Ruis Pierrot.	12	8	1	0.67
	Total for Fort Smith-Rocher River District.	432	315	81	0.73

Table 1 - Summary of Beaver Observations, September and October, 1955.

The results of the recheck of the lakes stocked with beaver in 1954 in the Rae District are as follows: Eight lodges with feed beds were seen in the 29 sites examined. At least three others showed some sign, possibly attributable to beavers, such as roiled water or trails up the banks, but no lodge or feed pile was located. The sites showing definite evidence of beaver occupancy are marked with a "plus" sign on the map.

This seems like a rather low return for the effort expended. Only 16 beaver are necessary to account for the eight colonies observed. Altogether 119 beavers left Waskesiu and 97 were released alive. It is quite likely, however, that other survivors were overlooked, particularly

if they established themselves elsewhere than in the lake in which they were liberated.

The eight known active colonies are well distributed in the available beaver habitat, and, provided they receive adequate protection will eventually repopulate the entire district.

Discussion

1. Comparison with earlier surveys

(a) Rae District - In 1952 Flook and Kelsall followed essentially the same course in the Rae district west of Lac la Martre. They extended their survey north and east of the lake as well, which was not done this year.

In 1952 only three abandoned lodges were seen between Rae and the height of land west of Windflower Lake. This year eight active colonies were reported, mostly in the upper James River. This is not a very big numerical gain, as yet, but it is a sufficient nucleus to ensure the population of this whole drainage in a few years. Protection of this nucleus should be guaranteed for at least three more years.

On the next river, which is a tributary to the Willowlake River, 12 colonies were seen this year in place of six colonies seen in 1952. The beaver have spread both up and down the creek from the small nucleus due west of Clive Lake.

Over the height of land, in a stream emptying into the Johnny Hoe drainage, there is evidence of a fair beaver population (0.6 colonies per minute). All of these results are favourable and therefore encouraging. The Rae district as a whole is still greatly underpopulated, but at least there are definite signs of slow recovery. A few years of complete legal protection should ensure recovery at the fastest possible rate.

(b) Franklin District - The first survey of the Franklin District, in 1852, was recognized as inadequate and it was recommended that new transects be selected for the area south of Great Bear Lake.

This was done this year. Since many of the transects were new, very little direct comparison is possible. However, this year's routes are felt to be truly representative of some of the best beaver habitat in the Franklin district. In general, a fair beaver population (0.5 colonies per minute) was disclosed. This gives a much brighter overall picture than the 0.25 colonies per minute found in 1952.

Two routes flown in 1952 were reflown in 1955. A comparison of results here yields a less rosy picture. On the west tributary of the Johnny Hoe (No. 5 of the table) there was a decline from 0.4 colonies per minute to 0.27. This may not be too significant because there were two observers in 1952 and only one in 1955. The second observer usually searches lakes adjacent to the stream being followed and picks up a few colonies which would be missed by a single observer. Even when the colonies in the lakes are excluded, however, there were fewer colonies actually seen in 1955 than in 1952. North of Franklin (No. 15 in table) the decline was greater - from 0.8 colonies per minute in 1952 to 0.4 in 1955. Here again, lack of a second observer could account for some of the difference, but not for all.

(c) Ramparts Area - The present survey repeated as closely as possible the flight lines of the earlier one. J. E. Bryant acted as second observer in place of E. H. McEwen. The survey occupied 72 minutes this time opposed to 65 minutes before. The number of colonies seen increased from 92 to 128, and the colonies per minute index from 1.4 to 1.8. A gain of this magnitude probably reflects an actual population increase.

In the previous survey an attempt was made to use the proportion of lakes occupied as an index of abundance. In 1952, 25.4% of the lakes examined contained one or more colonies of beaver. In 1955 this figure was 26.0%. Thus, this index does not show the same proportionate increase as an index based on colonies seen per minute of survey. This index was adopted provisionally because it did away with

certain uncontrollable variables such as altitude and width of strip. It seems, however, that other variables have been added, chief among which are the individual differences between observers. Table 2 has been prepared to illustrate this.

Observer	Occupied Lakes	Unoccupied Lakes	Total Lakes	Per Cent of Lakes Occupied
Fuller 1952	59	136	195	43
	66	131	197	50
McEwen 1952	33	159	192	21
Bryant 1955	62	295	357	21

Table 2 - A comparison of results obtained by different observers in the Ramparts area.

Several peculiarities seem worthy of note. First, Fuller's observations were consistent from one survey to the next. Second, McEwen's total for lakes surveyed was very close to Fuller's although only half as many occupied lakes were seen. Bryant surveyed nearly twice as many lakes as Fuller and McEwen, but achieved the same ratio of occupied to unoccupied lakes as McEwen did. It would appear to be necessary to retain the same observers from one survey to the next if this type of analysis is to be employed.

(d) Fort Smith District - The 1952 survey in the Smith district was much less extensive than the present one. Also, the flight lines were broken up differently for purposes of analysis, therefore, exact comparisons cannot be made. The 1952 results are summarized in Table 5 of my 1952 report. Pertinent data from this table have been reproduced in Table 3 in order to have them readily available for comparison with the results of the 1955 survey.

Year	Flight	Minutes	Colonies	Colonies/Minute
1952	A & B	40	42	1.05
1955	33 & 34	70	67	0.96

Year	Flight	Minutes	Colonies	Colonies/Minute
1952	C,D,E	61	31	0.51
1955	32 & 39	80	50	0.63
1952	F	42	24	0.57
1955	40 & 41	56	36	0.64
1952	G (in part)	12	9	0.75
1955	42	12	8	0.67
1952	Total	155	106	0.68
1955	Total	218	161	0.74

Table 3 - Comparison of beaver densities on selected routes in Fort Smith district in 1952 and 1955.

No very large differences appear in the table, indicating that there have been no major population changes. Considering that the routes do not exactly coincide no great reliance can be placed on the overall increase. However, it seems safe to conclude that the population is holding its own in the face of the current trapping pressure.

2. Previously Unsurveyed Areas

(a) Good Hope District, exclusive of Ramparts - In 1952 some flying to the north of Good Hope disclosed a rather scant beaver population. This year 118 minutes were flown to the southeast of the settlement (Table 1) and disclosed a surprisingly good population averaging 0.74 colonies per minute. Some exceptionally fine beaver habitat occurs in the vicinity of Chick Lake.

(b) Norman District - This survey covered only a small portion of the Norman district lying to the north and east of the Mackenzie and Great Bear Rivers. The average density (lines 16 to 23, Table 1) of 0.64 colonies per minutes is not indicative of the region as a whole. Between Kelly Lake and Brackett Lake, a low density, about 0.3 colonies per minute, was recorded, whereas, in the balance of the district much greater densities were found, averaging nearly a colony per mile.

The contrast is quite sharp as one crosses Brackett Lake. To the southeast there is a large group of lakes with a high beaver population. To the north is another group of lakes, equally favourable as beaver habitat, but almost devoid of beaver. The returns of operations for the trapping areas involved offer at least a partial explanation. The southern lakes are mostly on Area No. 460 from which 99 beaver have been removed in 5 years. The northern lakes are a part of Area No. 459 from which 218 beaver have been removed in the past 5 years.

3. Frequency and Significance of Abandoned Colonies

Flook, in his 1953 report, suggested that abandoned colonies might give a clue to the past history of the beaver population in the areas surveyed. With this in mind, notes have been kept on all abandoned colonies seen in subsequent years. In table 4, the ratio of abandoned colonies to active colonies is set forth.

District	Ratio abandoned/Active colonies
Rae	0.08
Norman	0.16
Franklin	0.18
Smith - Rocher River	0.26
Good Hope (except Ramparts)	0.33

Table 4 - Ratio of abandoned to active colonies in areas surveyed in 1955.

It seems logical to assume that the number of abandoned colonies would bear a positive relationship to the intensity of the beaver harvest. The figures for the harvest are not currently available at Fort Smith so this analysis can be carried no further.

Summary and Conclusions

1. Approximately 2000 miles of transects were flown in 1955, about half of which consisted of a resurvey of lines flown in previous years, and the remainder of transects flown for the first time.

2. The sites in the Rae area where beaver were introduced in 1954 were rechecked. Definite evidence of eight live colonies was found. The survival of the transplanted beaver is lower than was hoped, but should eventually result in repopulation of the district if given adequate protection. There should be no consideration whatever given to an open season in this area prior to 1959, and even then caution should be exercised, and quotas based on the results of a thorough biological survey.

3. There is conclusive evidence of an increase in beaver in the western and northwestern sections of the Rae District. This trend should be encouraged. I believe the entire beaver catch at Rae last winter amounted to only eight pelts. For such a small harvest is there any need or justification for an open season?

4. This survey was more representative of the Franklin area than the earlier one made in 1952. The increased coverage resulted in the finding of some good beaver populations in this district.

5. No significant change was observed in the Ramparts area. Comparison of this year's survey with the previous one disclosed a wide divergence in the methods of different observers. It seems obvious that a more detailed survey of this area, with more extensive coverage, is required.

6. Satisfactory populations were disclosed in parts of the Norman and Good Hope Districts not previously surveyed.

7. The survey revealed a slight overall increase in the beaver population in the Smith - Rocher River District. This is in spite of fairly heavy exploitation over the past four seasons, and tends to confirm that this population can stand a drain of one beaver per colony.

8. The survey disclosed no marked changes in the beaver population in any of the districts examined. There would not, therefore, appear to be any need to alter the beaver quotas or regulations at present.

9. As the information from aerial transects piles up it becomes

more obvious that these surveys are adequate to follow trends in the population, and that they are supplying information which is useful for management.

10. There is need for a general summary of all the beaver survey work done from 1949 to the present.

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