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Keith H. Miller, Governor

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Wallace H. Noerenberg, Commissioner

DIVISION OF GAME
James A. Harper, Director

BEAVER REPORT

by
Richard H. Bishop

Volume X
Annual Project Segment Report
Federal Aid in Wildlife Restoration
Project W-17-2, Jobs 7.1R, 7.2R, and 7.3R

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JOB PROGRESS REPORT (RESEARCH)

State: Alaska

Cooperators: Richard H. Bishop

Project No.: W-17-2 Project Title: Small Game and Furbearer
Investigations

Job No.: 7.1R Job Title: Beaver Life History Study

Job No.: 7.2R Job Title: Beaver Population Status
Techniques

Job No.: 7.3R Job Title: Exploitation, Sex and Age
Structure of Beaver
Populations

Period Covered: July 1, 1969 to June 30, 1970

SUMMARY

The results of beaver house counts in the Holitna River drainage indicate a declining beaver population on the Holitna River, a rising population on Titnuk Creek, and a marked increase on the Hoholitna River. Similar counts indicate a rising population in the Takotna River drainage. Trapping techniques appear to be the major influence on beaver populations in these drainages. Age composition, reproduction, and habitat are being investigated to see if basic ecological differences exist between the Holitna and Takotna drainages. Reports of natural catastrophes are being recorded and investigated to determine their impact on beaver population levels.

Expanded beaver house counts, closure of part of the Holitna River to beaver trapping, and more intensive study of trapping patterns, or techniques were recommended.

CONTENTS

Summary	1
Background.	1
Objectives.	2
Procedures.	2
Findings.	3
Beaver House Surveys	3
Trapping Pressure and Harvest, 1969 and 1970	7
Population Composition and Reproduction.	8
Transportation, Fur Prices, Trapping Techniques and Miscellaneous Factors	8
Discussion	12
Recomendations.	13
Literature Cited.	13

BACKGROUND

Regulation of beaver harvesting has taken many forms during the history of Alaska as a Territory and as a State. The intent of these regulations has generally been to improve conservation and management of beaver and to improve the estimates of harvests.

Sealing beaver pelts with individual tags or seals began in 1923 (Burris, 1966) and is still required. Beaver sealing assures a reasonably accurate estimate of the annual harvest and discourages traffic in illegally taken beaver skins. Considerable work on the life history, population ecology and management of beaver was done by personnel of the Alaska Cooperative Wildlife Research Unit in the early 1950's.

It was found that a fairly consistent relationship between the stretched pelt size and the age of the beaver existed (Buckley and Libby, 1955). As a result, from 1955 on, all beaver skins were measured when they were sealed. It was felt that if the proportion of kits (beaver 1 yr. old or less) in the harvest from a drainage or management area exceeded 20 percent, exploitation was too great to allow a sustained annual yield (Libby, 1955, 1957). These conclusions remain an integral part of current beaver management policy. In Game Management Units 17, 18, 19, and 21 reductions in bag limits and seasons have been made or proposed in response to finding that kits composed more than 20 percent of the harvest. Because of changing social and economic conditions and trapping patterns, the results of these restrictions are not always clear. While the beaver harvest and the number of trappers has continued to decline in most Game Management Units, in some Units the proportion of kits remains higher than is considered desirable. Apparently a direct relationship between harvest size and age composition of the catch does not necessarily exist on a Unit-wide or even on a drainage basis (Rausch, 1965, Burris, 1966, 1968, 1969). It became clear that more information was needed to fully utilize the beaver affidavit information and to develop a plan that could deal with the dynamic beaver management situation. Burris(1968) commenced beaver surveys in problem drainages

in Units 19 and 21, where surveys had been done in the mid 1950's, and also on the Chena River where beaver trapping was increasing. He also combed the present fur dealer and fur export reports to determine their value, and initiated several other avenues of investigation and action to find solutions to the whole complex of the beaver management situation.

With the assignment of a game biologist to McGrath, a more comprehensive study of beaver ecology and exploitation was begun in the Holitna drainage, one of the problem areas, and in the Takotna drainage as a control. The data forthcoming from this study should clarify some of the unknowns which have crippled management efforts to date.

OBJECTIVES

To gather data on density, productivity, and sex and age structure of beaver populations on selected study areas.

PROCEDURES

1. Relative abundance of beaver on portions of the Takotna, Holitna, and Innoko drainages were monitored through aerial counts of occupied and unoccupied beaver houses. Counts were made from a Super Cub airplane in September when food caches were obvious. The location of each house seen was plotted on 1:63,360 maps. The number of houses and percentage of occupied houses for each drainage were compared with data from previous years. Boat surveys were also made on the Takotna and Holitna count areas.

2. Trapping pressure and harvest on the Takotna and Holitna drainages were evaluated through interviews with trappers and charter aircraft operators, and through beaver sealing documents.

3. Specimens for age composition and reproduction data were obtained from trappers on the Takotna and Holitna drainages.

4. Data on means of transportation, fur prices, trapping attitudes and patterns, and historical information were gathered as an aid to interpreting the importance of trapping, weather, and disease to beaver population levels.

FINDINGS

Beaver House Surveys

Holitna Drainage: Extensive sections of the Holitna River, the Hoholitna River, and Titnuk Creek were surveyed by O. E. Burris from 1967 through 1969 (Burris, 1969). Similar counts of less extensive sections of the Holitna and Hoholitna Rivers were made from 1953 through 1957 by U. S. Fish and Wildlife Service personnel. These early counts provide background information, but due to variables such as technique, observer, and weather, Burris (1969) felt that meaningful comparisons were difficult. The data suggest a decline in the number of beaver during the 10-year period between 1957 and 1967 (Table 1). Information received from Mr. Nick Mellick, Jr. which seems to corroborate the suggested trend will be discussed below.

Beginning with the 1967 counts, Burris included much longer sectors of both the Holitna and Hoholitna Rivers in the count areas, and also added a third count area, Titnuk Creek, in the Holitna drainage (Burris, 1969). The same observer, pilot and area were used in these counts. The major variable that may have affected these counts over the three-year period is the increasing experience of the pilot and observer. However, the data on the number of occupied houses probably correctly reflect trends in beaver populations on these three major streams of the Holitna drainage (Table 2). Since house locations are marked on the map each year and checked the following year, the number of unoccupied houses tends to rise each year since deserted houses persist for years.

Beaver houses in ponds, sloughs, and tributaries adjacent to the main stream are also counted, therefore the number of houses does not indicate a given house-per-river-mile figure. A figure relating houses per unit area of river valley may be computed in the future. The data suggest that of the three areas surveyed, only in the Hoholitna drainage has the number of active beaver colonies, and presumably the beaver population, increased greatly. However, the population on the upper portion of Titnuk Creek seems to be increasing also.

Takotna Drainage: Beaver house counts were done on the Takotna River and the Nixon Fork in 1967 by Burris (Burris, 1969) and in 1969 by Bishop (Table 3). Part of the Takotna River area was surveyed in 1968, but the Nixon was not counted that year.

Considerably more houses were seen on the Takotna count area in 1969; however, about 35 percent more time was spent on the survey in 1969. The increase in the number of occupied houses seen is probably due to a combination of increased searching effort and an actual increase in the number of colonies. It is known that the number of colonies on some tributaries of the Takotna such as Fourth of July Creek has increased considerably in the last two years, even though these streams have not been surveyed.

Little trapping was done on the Takotna River above the Ophir Road in 1967-68 and 1968-69, but below the road the area has been trapped regularly over the past several years.

Table 1. Beaver house counts, Holitna and Hoholitna Rivers, 1953-1957, and 1967. Data from comparable areas for all years (Burris, 1969). Presence of cache indicates house is occupied.

Area	Year	No. of Houses	Cache			
			Present		Absent	
			No.	%	No.	%
Holitna River	1953	26	26	(100%)	Not Counted	
	1954	29	29	(100%)	"	"
	1956	59	51	(86%)	8	(14%)
	1957	55	39	(71%)	16	(29%)
	1967	19	17	(89%)	2	(11%)
Hoholitna River	1953	20	20	(100%)	Not Counted	
	1954	28	28	(100%)	"	"
	1956	35	25	(71%)	10	(29%)
	1957	31	23	(74%)	8	(26%)
	1967	19	15	(79%)	10	(29%)

Table 2. Beaver house counts, Holitna Drainage, 1967-1969. Areas comparable in all years. Presence of cache indicates house is occupied.

Area	Year	No. of Houses	Caches			
			Present		Absent	
			No.	%	No.	%
Holitna River 115 River Mi.	1967	35	30	86	5	14
	1968	48	23	48	25	52
	1969	58	27	47	31	53
Hoholitna River 119 River Mi.	1967	64	55	86	9	14
	1968	110	76	69	34	31
	1969	165	115	70	50	30
Titnuk Creek 95 River Mi.	1967	38	28	74	10	16
	1968	60	41	68	19	22
	1969	79	45	57	34	43

Table 3. Beaver house counts, Takotna Drainage, 1967, 1969. Areas comparable in both years. Presence of cache indicates house is occupied.

Area	Year	No. of Houses	Caches			
			Present*		Absent	
			No.	%	No.	%
Takotna River 116 River Mi.	1967	60	48	80	22	20
	1969	168	101	60	61	40
Nixon Fork 35 River Mi.	1967	31	15	48	16	52
	1969	44	25	57	18	43

* Takotna River, 1969 - Additional 6 houses probably occupied.
Nixon Fork, 1969 - Additional one house, status unknown.

The physiography of the Takotna River valley varies over the length of the count area. A tentative breakdown of the area into four sectors on the basis of observed valley and stream physiography was made. The relative abundance of active beaver houses in these sectors is being examined to see if a relationship exists between the observed physiography and colony abundance.

It is difficult to determine whether or not an absolute change in beaver abundance has occurred on the Nixon Fork. The data suggest a rise in the number of colonies. It was clear that due to low water levels many of the ponds along the Nixon Fork were uninhabitable for beaver. Most (13 of 16) of the unoccupied houses found were in ponds. Ponds along the Takotna were not severely affected by lower water; most of the active colonies were on the ponds and sloughs adjacent to the river.

The accuracy of the aerial counts was checked by floating down the count areas on the Holitna and Hoholitna (Burrís) and on part of the Takotna (Bishop). Active houses missed on the Holitna and Hoholitna were negligible. On the Takotna, four additional occupied houses were found, raising the total from seven to eleven for the particular sector checked. The error was probably disproportionately high in that sector compared to the other portions of the Takotna because it was the first sector done, and because many of the houses were off the stream which tended to distract the observer.

Trapping Pressure and Harvest, 1969 and 1970

The distribution of the beaver harvest and of trappers for the Holitna drainage in 1969 and 1970 is shown in Table 4. The 1969 harvest and trapper data are probably conservative because I made fewer personal contacts that year, considerably more distrust of my motives existed than in 1970, and I did not know the people nor circumstances well enough to determine who had trapped the beaver sealed by other local residents. The 1969 harvest was probably similar to that of 1970, however.

The spatial distribution of trappers changed from 1969 to 1970. There are three groups of trappers residing on the Holitna River, totaling 6 to 8 trappers. The rest of the trappers fly to trapping areas for the beaver season. The distribution of the latter group varies with the prospects for abundant beaver. In 1970 most of the mobile group of trappers shifted to the Hoholitna River, or in the case of two, to upper Titnuk Creek. The shift of trappers was due to the higher density of beaver colonies on the Hoholitna River. Trappers had found numerous active houses on the Hoholitna River in the fall while hunting, and they probably were aware of the large increase in the number of active beaver houses seen by Burrís in the fall of 1969. The number of trappers rose from two in 1969 to nine in 1970 on the Hoholitna River.

The harvest on the Hoholitna rose from about 28 beaver in 1969 to 96 in 1970 as a result. All but two of the trappers on the Hoholitna reached the trapping area by airplane. Most used snowshoes in traveling, but in two cases dogs were transported to the campsite and were used for transportation on the trapline. The total catch for the Holitna drainage was probably about the same in 1969 and 1970, but the distribution of the

harvest shifted from primarily the Holitna to primarily the Hoholitna.

The distribution of the beaver harvest for the Takotna drainage in 1969 and 1970 is shown in Table 5. Data on the harvest and distribution of trappers are based on interviews and sealing certificates, and accurately reflect the true situation for both years. The 1970 catch was lower than the 1969 catch for several reasons. On the Takotna River between the mouth and the forks fewer active colonies were present which resulted in a reduction of the take of one trapper to half his 1969 harvest. His effort was lower also due to other commitments.

The trappers who usually trapped the area from the Forks to Mt. Joaquin did not trap. Only one woman from Takotna Village did some trapping in that sector. The harvest in that sector was reduced by a factor of ten. Two men trapped actively for part of the season around the confluence of the Takotna River and the Big Waldren Fork, where no one had trapped for several years. Their catch was limited by a late start and the close of the season.

On the lower Nixon Fork, few beaver remained in the ponds where they were accessible by airplane, so few were taken although a good population existed on the river itself. On the upper Nixon Fork less effort was expended than in 1969, with one trapper instead of two in the area. Thus the lower harvest in the Takotna drainage in 1970 was mainly the result of lower trapping effort.

Population Composition and Reproduction

Beaver carcasses were collected from the Takotna drainage and adjacent areas in 1969 when possible. Otherwise, heads and reproductive tracts were collected. A total of 63 skulls, five reproductive tracts and 97 skulls with reproductive tracts, and measurements of 70 beaver were collected. None of these specimens have been examined yet.

In 1970 specimen collections were smaller in the Takotna drainage. Thirty-five skulls, and 40 skulls and reproductive tracts were collected. These also await processing. Collections of skulls and reproductive tracts were also made from the Holitna drainage. Some difficulties were experienced in contacting trappers and in giving sufficient descriptions of the reproductive tracts. Still, 118 skulls and skulls with reproductive tracts were collected from the Holitna drainage. These also await processing. Part of the shop area at McGrath has been modified to provide a place to process these specimens.

Transportation, Fur Prices, Trapping Techniques, and Miscellaneous Factors

Holitna Drainage: In Table 4 the means of access used by beaver trappers in 1969 and 1970 are listed. On the Holitna River and Titnuk Creek, where there are resident families, dog teams are the most important means of transport to trapping areas. Snow machines are not likely to preempt the role of dog teams in Holitna drainage because the condition of the river ice varies daily and from area to area. Dog teams are safer under these conditions. Residents of the river have the advantage of not having to pay the cost of air transportation, but the disadvantage

Table 4. Distribution of beaver harvest and trappers, Holitna drainage 1969 and 1970. Harvest data taken from sealing records and interviews.

Year	Stream and Location	No. of Trappers	No. of Beaver Harvested	Means of Access	Remarks
1969	Holitna River				
	Shotgun Creek	2	30	Aircraft	
	Kashegelok	2	14	Dog Team	
	Kogruklu River (Middle Fork)	2	35	Aircraft	
	Caribou's	<u>2</u>	<u>35</u>	Dog Team	
		8	114		
	Hoholitna River	3	28	Aircraft	
	Titnuk Creek	<u>4</u>	<u>28</u>	Dog Team & Aircraft	
	Total, Holitna Drainage, 1969	17	170		
	1970	Holitna River			
Shotgun Creek		1	15	Aircraft	
Kogruklu River (Kashegelok)		2	20	Dog Team	
Caribou's (Kurethlok Creek)		3	35	Dog Team	
Nogamut		<u>2</u>	<u>7</u>	Aircraft	
		8 (Prob.)	77		
Lower Titnuk Creek		3	17	Dog Team	
Upper Titnuk Creek		<u>2</u>	<u>28</u>	Aircraft	
		5	45		
Hoholitna River					
South Fork		2	19	Aircraft	
Above Tom Kelly Camp		2	28	Aircraft	Dogs Used On Line
Tom Kelly Camp		2	29 (Min.)	Aircraft	" "
Big Diamond	1	10	Aircraft		
Lower Hoholitna	<u>2</u>	<u>10 (Min.)</u>	Dog Team		
	<u>9</u>	<u>96</u>			
Total, Holitna Drainage, 1970	22	218			

Table 5. Distribution of beaver harvest and trappers, Takotna Drainage, 1969 and 1970.

Year	Stream And Location	No. of Trappers	No. of Beaver Harvested	Means of Access
1969	Takotna River			
	Mouth to Forks	1	23	Snowmachine
	Forks to Mt. Joaquin	<u>2</u>	<u>80</u>	Aircraft
	Total, Takotna, 1969	3	103	
	Nixon Fork			
	Lower Nixon Fork, Ponds	1	22	Aircraft
	Upper Nixon Fork, Ponds and River	2	42	Aircraft & Dog Team
	Total, Nixon Fork, 1969	<u>3</u>	<u>64</u>	
	Total, 1969, Takotna	6	167	
	1970	Takotna River		
Mouth to Forks		1	11	Snowmachine
Forks to Mt. Joaquin		1	8	Snowmachine
Waldren Fork Area		<u>2</u>	<u>44</u>	
Total, Takotna, 1970		4	64	
Nixon Fork				
Lower Nixon Fork, Ponds		1	5	Aircraft
Upper Nixon Fork, Ponds and Streams		1	33	Snowmachine
Total, Nixon Fork, 1970		<u>2</u>	<u>38</u>	
Total, 1970, Takotna Drainage		6	102	

of being committed to trapping in an area readily reached by dog team from their home or from an outlying camp. In either case their mobility is restricted. As a result, beaver colonies reached in a given year may be trapped until all or most of the beaver are caught, to maximize the returns on the effort expended. After several years the local population may become depressed.

By contrast the transient airborne trappers can select areas of high beaver densities in any given year. Once on the ground, however, they are more limited in mobility than the resident trapper who uses dogs, since they must travel on foot, or pay the extra cost to have a small dog team hauled in by airplane. Although they may be in a better trapping area, these trappers tend to trap all the beaver in colonies reached also. Since they do not have to use the same area the following year, there is no particular concern about removing all the beaver. On the Hoholitna River all but two of the trappers reached the trapping areas by airplane.

Access, distribution of trappers, and trapping patterns are generally different in the Takotna drainage. Aircraft were primarily used by trappers from McGrath and formerly Takotna to reach beaver colonies rather than to put out camps. One exception to this occurred in 1969, and one in 1970. Fewer trappers operate in the drainage and although it is a smaller drainage area, the density of trappers is lower. Although the bag limit is higher than in the Holitna drainage, trappers generally adhere to a policy of taking only two beaver per house. By informal agreement, and sometimes by purchase of improvements such as cabins, etc., the trapping areas are usually mutually exclusive. Provided some pretense of use is maintained, trapping areas are respected from year to year. There are overlaps between trapping areas, particularly where trappers using airplanes are involved, but conflicts are few and minor. In general the trapping situation is more stable in terms of numbers and distribution of trappers than in the Holitna drainage.

Habitat differences between the two drainages have not been investigated. There is some indication that more variable weather conditions in the Holitna drainage occasionally produces winter conditions unfavorable to beaver survival. For example, in 1963, breakup on the Holitna River occurred in January or February, causing extensive flooding. It may be that drowning or increased predation resulted. The river then refroze, and breakup occurred again in the spring.

On the Mosquito River in the headwaters of the Mulchatna River, excessive icing (overflow) reportedly drove beaver out of their lodges one year and "many" were killed or at least eaten by wolverines.

Disease among beavers was reported to have occurred in the mid 1950's by N. Mellick, Jr. of Sleetmute. Numerous dead beaver were found, especially on Taylor Creek. One was given to U. S. Fish and Wildlife Service personnel, but no word was received on the likely cause of death. There are clearly several factors which may operate to maintain a depressed beaver population in the Holitna drainage.

Although the value of beaver pelts was somewhat lower in 1970 than in 1969, this difference did not seem to affect trapping pressure.

DISCUSSION

Some 25 years ago the Holitna drainage was a prime beaver producing area. For several years following World War II the annual catch exceeded 500 animals. More trappers were in the area than in recent years. It appears that by the mid 1950's the population had declined, judging from the accounts of N. Mellick, Jr. of Sleetmute, and the aerial count data collected at that time. Trapping may well have been the major cause of the decline. Apparently there was fairly widespread mortality attributable to disease sometime in the mid 50's also. Whatever the cause, the population apparently declined noticeably.

Restrictions in the length of the season and the bag limit in the lower part of Unit 19 begun in 1963 have not altered the apparent downward trend of the Holitna River population.

Trapping patterns in the Holitna drainage may contribute to a depressed beaver population or to wide fluctuations in population over a period of years if enough trappers are operating. In the Holitna drainage where trappers are few, well dispersed, and restricted to the main streams and their immediate tributaries, it is difficult to see how they could be affecting the population. However, since the aerial beaver house count indicated a decline in the number of occupied houses on the Holitna River, trapping appeared to be a likely depressant. Therefore closure to beaver trapping of the Holitna River and its tributaries above Titnuk Creek in 1971 was recommended to and adopted by the Board of Fish and Game.

A comparison of the trends in the number of active beaver houses between the Holitna River and the Hoholitna River, which will remain open to trapping, may provide the evidence needed to properly evaluate the effect of trapping pressure and techniques on beaver population levels in this drainage.

The situation in the Takotna drainage provides a real contrast to that found in the Holitna drainage. Much of the drainage is readily accessible by air or snow machine. Ice conditions are generally good for traveling. Portions of the drainage have yielded large harvests either on an annual or bi-annual basis. Yet the population appears to be increasing.

The information to be gained from specimens collected may show that differences in productivity exist. The planned examination of habitat may also illuminate some basic differences in the beaver producing capabilities of the two areas. However, since the Holitna drainage was a good beaver producing area at one time, major differences seem unlikely.

As unconvincing as it may be, the present evidence suggests that trapping patterns and pressure are responsible for the depressed population on the Holitna River and lower Titnuk Creek, while more conservative trapping practices have allowed the Takotna drainage beaver population to flourish.

RECOMMENDATIONS

Beaver house surveys should be continued in the Holitna, Takotna and Innoko drainages where they have been done. Additional areas should be added in Unit 18, and possibly the northern part of Unit 21, in order to provide data on beaver population trends in those areas.

It has been recommended to and accepted by the Board of Fish and Game that part of the Holitna River be closed to beaver trapping. The closure probably should be maintained for three years to see if the beaver population will increase in the closed area.

Casual observation of trapping patterns, attitudes of rural residents, and changing socio-economic conditions suggest that while the harvest and the number of trappers is declining in the bush, the intensity of harvest may be increasing in the areas trapped. Beaver age composition data obtained from sealing certificates probably do not accurately reflect the population status of a drainage or Unit in many cases. More detailed data on trapping patterns are needed to evaluate the beaver sealing information more meaningfully.

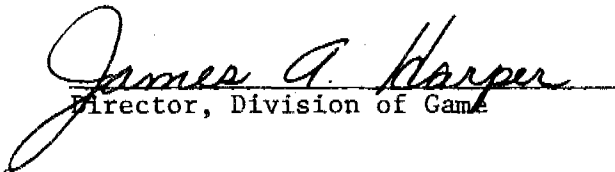
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PREPARED BY:

APPROVED BY:

Richard H. Bishop
Game Biologist


Director, Division of Game