A Food Utilization Study of Pacific Coast Beaver (Castor canadensis pacificus - Rhoads)

by

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Introduction

The Fish and Game Department of Oregon State College, on the second of July, 1939, established a beaver planting on Oak Creek in the McDonald Forest. The purpose of my research was to determine the species of food fed upon by these Pacific Coast Beaver (Castor canadensis pacificus-Rhoads) and the relative amount of each species they consumed.

As there are no records of any work of this type having been carried out for this species of beaver, it is my hope that the results of this project will be of value when future beaver plantings are made. The results will also have value for anyone interested in the question of beaver culture as and economic or financial undertaking.

History of the Planting

A brief history of the planting is necessary to show the conditions under which this project was established. On the second of July, 1939, the beaver were planted on Oak Creek (N.W.¼, Sec.17, T.11 S., R.5 E., WM.). The stock consisted of six animals; two males, two females, and two kits. One male, a female, and a kit were taken from one colony and the other three from another. The stock was obtained from near Crabtree, Oregon. A bank house had been constructed for them and they were placed within this and the door closed at around nine in the morning. It was opened later that day when the workers left. The workers had also created a pool by constructing a dam about ten feet below the entrance to the beaver house.

On the thirty-first of the month, beaver cuttings were reported up to four hundred feet above the planting site but

none were noticed below.

The beaver house was opened on the thirtieth of August to determine if it was occupied. They found that there had been no occupants in the quarters for some time; however considerable material had been packed in for bedding, including a quantity of shredded sticks. Evidence at this time seemed to indicate that at least several beaver were remaining near the original planting site.

Fresh cuttings were found about three hundred feet above the forks of the creek on the right hand fork. (Fig. 1) The largest quantity of cuttings at this time was found about a half mile below the original planting site; however the freshest cuttings were approximately a mile below. Here, in addition to numerous small cuttings, they had cut two willows approximately four inches in diameter and the tops were lying at the edge of the road.

The owner of the land adjacent to the McDonald Forest was contacted and he promised to give the beaver all the protection possible. The land adjoining this belongs to Mr. E. E. Wilson, of the State Game Commission, who stated that there had been a great deal of trapping in that vicinity the past year, also considerable game poaching.

Procedure

The above summarizes the situation of the beaver at the first of September, 1939. From then until the winter rains made live trapping impossible, two seniors of the School of Fish and Game Management spent a great deal of time in trying

to locate and trap the wandering beaver and return them closer to their original planting site. When the high water caused a discontinuance of their trapping, they had caught two of the animals, a female and a kit, and had definitely located two others. There were enough traces of the remaining animals to suspect their presence in the vicinity. The beaver that were retrapped were placed in the original house, but soon vacated this.

On the twenty-sixth of November a co-worker and myself made a preliminary survey of the area to determine the best plan to obtain the needed data. It was decided to make a hundred percent cruise of the area and record all species cut by one-quarter inch diameter classes. The distance was measured with a surveyor's chain. Throughout the area, samples of the heights and age of food species were taken. This was accomplished with the use of an abney and chain. The data were compiled in a table which gives the amount of food that six beaver consumed in a six month period. All material was segregated into that i which was totally used, partially used, and completely wasted[1/]. From this data it is possible to determine the exact amount of cover needed for such a planting in different localities. The amount of wastage would vary with the density of the brush and overstory; in dense growth the tendency would be for small or medium sized material to hang up in the neighboring material, thereby necessitating a larger amount of cutting. Particular notice was taken of the variety of vegetative species from which they were able to chose their food. In line with the

1/ This was the method of classification used by Shaler E. Aldows in his food utilization study. Journal of Wildlife Management, v.2, no.4, Oct. 1938, pp. 215-222.

above, measurements were taken to see how far the beaver would go from the creek to obtain different species of trees and shrubs.

Area and Vegetation

Oak Creek is typical of many of the small creeks on the edge of the foothills in the Willamette Valley. It averages approximately six to eight feet wide at this place and is characterized by small eroded pockets and swift stretches of water. The bank is steep on the upper portion of the creek and quite level through the center and lower parts. It is covered with native brush and assorted trees (Table I); this cover varies in width from a few feet to a maximum average distance of forty feet on each side of the creek. This excludes the upper portion of the area which is in the forest proper.

Observations

Beginning at the planting site, a survey was made up stream to determine the exact amount of food the beaver had cut during their habitation of the area. This was simplified to a certain extent due to their tendency to cut only near the water. Seven hundred feet above the starting point the creek forks, the right branch going off to the north-east and the other continuing on north-west. At two hundred and sixty feet up the left fork, the beaver stopped cutting; and it was not continued for another two hundred and seventy yards. Here was found a three inch Oregon ash stub which testified to the presence of beaver at that point at one time. We continued up the creek for another eighth mile but were unable to find further traces of the animals. The stream at this point was becoming quite steep and rocky and

was not suitable for a beaver settlement.

The eastern branch proved more satisfactory for our work. The beaver have been doing considerable cutting, new as well as old. On continuing up this branch we encountered quite a quantity of work in a swampy area where the creek divides; however the important cutting did not progress more than approximately two hundred and twenty yards above the creek branch. The last two hundred and fifty yards revealed no cuttings whatsoever. At one place I tallied about two hundred stalks of horsetail (Equisetum arvense) which seemed to have been cut by the beaver. A few stocks of this plant were in the water but I was unable definately to determine if the beaver had eaten it or if it was consumed by some other animal; however the conditions pointed to the beaver as the consuming agent.

The area from the planting site on down the creek proved to be a little more open and not quite as steep as that above. The beaver had been doing some cutting equally throughout the area and had buildt several small dams. The first of these structures was a quarter of a mile below the beaver house, the second was forty yards below the first; both of these were loosely constructed of leaves, mud, and of small twigs. At three-quarter of a mile down, they had constructed their largest dam and had created a small pond. This dam was rather interesting in that it was constructed of old twigs, leaves, mud, and quite a quantity of small broken boards which had been obtained from the remains of a old building a short distance above this point. No new material was used. One mile below their house they had constructed a dam of freshly cut twigs, leaves, etc.

This vicinity seemed to be occupied. A short distance below the county bridge, which is one and one-eighth mile below the planting site, the beaver had gone out beyond the fence and had cut some willow at the side of the road. They had eaten the smaller twigs of the bushes and had dragged a large percentage of the larger material to the creek. There was plenty of willow nearer the water which could have been cut more readily than the bushes near the fence. It is probable that the open grown material had more or better twigs than that in the the creek and this is what they were after. The distance of this cutting from the creek bank was one hundred feet. This was the farthest from the creek of any of their cuttings.

Findings

The data on the species eaten, as well as other data collected, is given in the charts and graphs which follow in the appendix. The number of stems cut is for a six month period. By doubling this, a person will have the quantity of material for one year. From all observations it appeared that this sub-species does not store food for the winter. It is true that there was some storage, but not in sufficient quantities to indicate that it was for winter use. As the winters in this part of the state are mild there is no need for storage.

Recommendations

It should be understood that this project is only the beginning of the work necessary for the collection of complete data in this line. To accomplish the project it would be necessary to make similar studies throughout the range of the species. These studies are particularly important in those areas

dominated by different cover types.

When data is obtained to cover all places and conditions, it will be possible accurately to estimate the carrying capacity of any creek. This is the first step necessary in a sustained yield management plan for beaver by the state or national agency responsible for such a program.

APPENDIX

Table I

Important Species Constituting Cover Type Upon the Area

Tree List

Red Alder (Alnus rubra)

Willow (Salix spp.)

Vine Maple (Acer circinatum)

Black Cottonwood (Populus trichocarpa)

Oregon Ash (Fraxinus oregona)

Oregon White Oak (Quercus garryana)

Bigleaf Maple (Acer macrophyllum)

Creek Dogwood (Cornus occidentalis)

Douglas Fir (Pseudotsuga taxifolia)

Black Haw (Crataegus douglasii)

Blue Elderberry (Sambucus coerulea)

Shrub List

Hazel (Corylus californica)

Arrowwood (Holodiscus discolor)

Ninebark (Opulaster opulifolius)

Indian Peach (Osmaronia cerasiformis)

Syringa (Philadelphus gordonianus)

Wild Rose (Rosa rubiginosa)

Sweet Brier (Rosa gymnocarpa)

Thimbleberry (Rubus parviflorus)

Salmonberry (Rubus spectabilis)

Snowberry (Symphoricarpos albus)

Table II

Summary Sheet of Beaver Cuttings

for Six Month Period

Diam. Class Inches	Species & No. Cut Willow	No. of Waste	Percent of Waste by inch Classes	Species & No. Cut Alder	No. of Waste & Percent
1/4	162			4	
1/2	179	1		4	
3/4	171		(0.45)	8	
1	156	2		12	
1-1/4	125	1		2	
1-1/2	83	6-1/2		2	
1-3/4	49	3-1/2	(5.16)	1	
2	33	4		3	
2-1/4	25	3		2	
2-1/2	27	4		4	1-1/2
2-3/4	5	1/2	(13.9)	0	(16.7)
3	15	2-1/2		3	
3-1/4	6	1/2		0	
3-1/2	10	4		0	
3-3/4	6	2	(37.4)	0	(50.0)
4	5	2		2	1
4-1/4	2				
4-1/2	3	1-1/2			
4-3/4	0		(42.9)		
5	2	1-1/2			
5-1/4	0				
5-1/2	2	2			
5-3/4	0		(71.5)		
6	5	3			
6-1/2	0				
7	1		(0.00)		
7-1/2	2	2			
8	2	1/2	(62.5)		
Total	1076	47		47	2-1/2

Table III

Summary Sheet of Beaver Cuttings

for Six Month Period

Diam. Class	Species & No. Cut			Species & No. Cut	No. of Waste & Percent
Inches	Cottonwood	Hazel	Dogwood	Ash	
1/4		2	3	1	
1/2		3	3		
3/4	1	6	1	2	
1		4	2		
1-1/4		2	1	1	
1-1/2				3	1 (16.7)
1-3/4		4		1	
2				1	
2-1/4	1				
3-1/2	1				
7-1/2				2	1-1/2 (75)
Total	3	21	10	11	

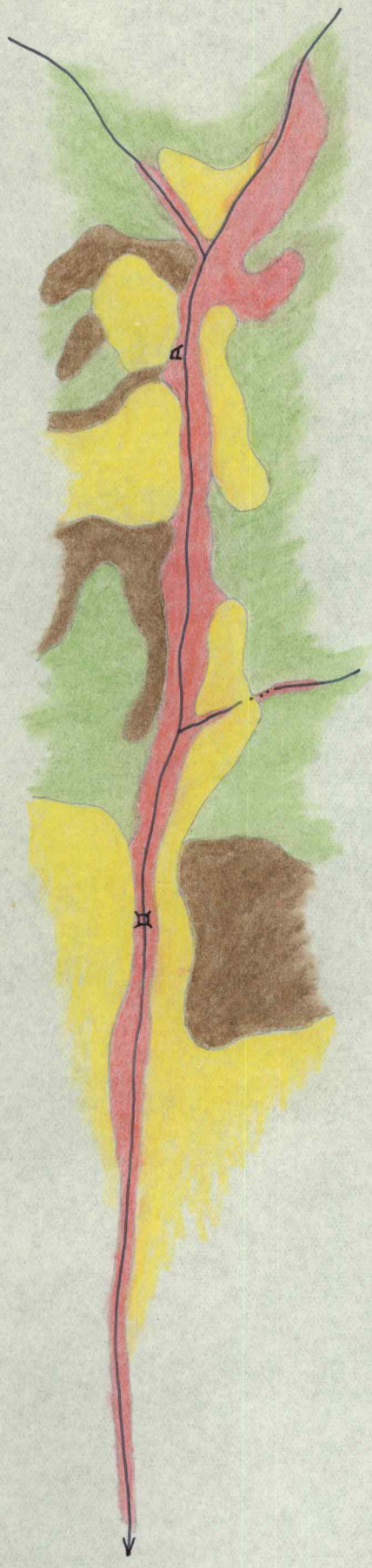
Inches	Sweet Brier	Vine Maple	Thimbleberry
1/4			100
1/2	2		
3/4			
1		1	

Table IV

Availability of Different Species and the Number Cut

Species	Availability	No. of Cuttings
Willow	plentiful supply and very thick in places.	1076
Alder	plentiful supply of two to ten inch material.	47
Hazel	quite plentiful in places.	21
Dogwood	scattered throughout the area.	10
Ash	scattered throughout the area, not too plentiful.	11
Vine Maple	very little in the immediate vicinity.	3
Cottonwood	only a few scattered large trees.	3
Sweet Brier	found intermingled with the other brush.	2
Thimbleberry	found in bunches along the creek bank.	100
	Total------	1273

In addition to the above vegetation, the beaver have eaten a considerable quantity of rushes and water plants. This was particularly noticeable at the planting site.



Type Map of Beaver-Inhabited Area

Scale: 4 inches = 1 mile

Legend

- Alder - Willow and other food species
- Scrub Oak
- Conifers
- Grass & Weeds

Table V

Height and Age of Food Species*

Willow			Alder	Ash
Diam. in Inches	Height in Feet	Age	Height	Height
1/4	1-3', 7-4', 3-5' 1-6', 4-7', 2-8' 1-9', 1-10'	2-1 yr. 4-2 yr.		
1/2	1-2', 1-8', 1-9' 2-11', 1-12' 1-14'	2-2 yr. 2-3 yr. 1-4 yr.		
3/4	1-10', 3-13' 1-14', 3-15'	2-3 yr. 2-4 yr. 1-5 yr.	1-12'	
1	1-12', 2-14' 1-16'	2-5 yr. 1-6 yr. 1-9 yr.		
1-1/4	1-14'	2-6 yr. 1-10 yr. 2-13 yr.		
1-1/2	1-19'	1-5 yr. 1-7 yr. 1-20 yr.		
1-3/4	1-24'	2-8 yr. 1-12 yr. 1-19 yr.		1-8' 3-10' 2-14' 2-16'
2	1-27', 1-30'	2-10 yr. 1-12 yr.	1-18'	
2-1/4	1-33'	1-10 yr.	1-22'	
2-1/2	1-28'	2-11 yr.	1-20' 3-15'	
2-3/4			1-21' 5-23'	
3	1-22', 1-30'	1-10 yr.	2-22'	
3-1/4			1-24'	

Note - 1-23' denotes that there was one sample 23 feet tall.

Table V

Willow			Alder	Ash	
Diam. in Inches	Height in Feet	Age in Years	Height in Feet	Height in Feet	Age in Years
3-1/2	1-24' 1-32'	1-10 yr. 1-16 yr.			
4	1-36'	1-11 yr.	1-20'		
4-1/4	1-27'		1-27'	1-40'	
5	1-26'	1-11 yr.	1-26'	2-34' 1-45'	1-15 yr. 1-25 yr.
5-1/2			1-32'		
6			1-33'		
7	1-52'			2-46'	
7-3/4		1-22 yr.			

*The lack of close correlation between the age and size of these fast growing, beaver utilized species, caused a discontinuance of further study in this field.