

PROGRESS REPORT

Beaver Food Investigation of Isle Royale National Park

May 2 - 26, 1948

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INTRODUCTION

During the period, May 8 to June 6, 1946, Robert H. Gensch of our Service made a preliminary survey of the beaver food resource of Isle Royale and based his findings on the observations made at 57 different colony locations. He also prepared the initial progress report on this subject which has provided the working basis for the present investigation. Since the research was done in conjunction with the moose browse investigation, the primary objective of the field trip, a total of only 28 colonies were studied. However, a good portion of the colonies examined were located in key areas such as the 1936 burn in the center section of the island. This portion of the island was not sampled by Mr. Gensch when he conducted his investigation.

Transportation between Grand Marais, Minnesota and Isle Royale was obtained on the H. Christenson and Sons Fisheries boat, the "Detroit". The survey party left Grand Marais on May 2 and returned on May 26 after spending 25 days on the island. Personnel of the party consisted of the following biologists: Laurits W. Krefting, Forrest B. Lee and Eric K. Clarke. Camp locations were established at Mott Island for the northeastern section; at Crow Point for the center section; and at Windigo and Camp Siskiwit for the southwestern section.

PROCEDURE

In preparing the plans for this investigation, the principal objective of which was to obtain information on the food resource of the island for beaver, considerable difficulty was encountered since no survey method had been devised for securing the information. Gensch made an appraisal of the food use and resources available at each colony location by means of a rating system which he developed for paper birch and aspen. However, the use of such a rating system rather than an actual quantitative method of sampling introduces a certain amount of error. It was not used for that reason.

For the present investigation, plans were formulated for making detailed studies of widely scattered samples of beaver range such as a stream or series of ponds and lakes rather than on an individual beaver colony basis. Under this layout and design, samples were to be taken in each of the three sections of the island, namely, the northeastern section, the center section and the southwestern section which have already been described in the moose

report. Within each section, the field investigator was to spend a designated number of man days studying the food situation in several parts of the section. Along a designated water course, the forest cover types important to beaver would be mapped for a distance of 200 feet from each bank. Beaver food trees such as aspen, willow and paper birch would also be tallied on sample plots within each beaver food type both at the colony location as well as between colonies. By tallying the trees already cut down as well as those still standing, it should be possible to determine quite accurately how much the food has been depleted and also what food resource remains.

Specific Findings by Colonies

Two and one half miles of the Tobin Creek water shed in the northeastern section as well as about a mile of shore line along the west end of Siskiwit Lake in the center section were type mapped and also sampled in the manner previously described. However, due to a shortage of time it was not possible to type map the remaining beaver range visited and the practice followed was either to take notes on the food resource at each colony or to tally the food trees on sample plots. In view of this situation, the findings will be discussed first on an individual colony basis by number.

Colony No. 1:

This colony, which has been designated as Tobin Creek No. 1 Study, was set up for intensive investigation by Gensch in 1946. This was done, since it was easily accessible by the Mt. Ojibway trail and because Park Service officials reported it to have been established in the fall of 1944. When the study was initiated Gensch marked, tallied, and plotted the location on a map of all sixty aspen trees that had been cut down. To get the best view of its development he established photo points at eight different locations. At the time he also reported the colony to consist of one lodge, two large ponds and several smaller ones spread over a quarter of a mile of stream.

Although only two years have elapsed since Gensch initiated the study, some interesting and important changes have taken place. This colony has shifted down stream a little and constructed a new lodge as well as a series of new ponds and dams (Figure 1 and 2). The old lodge appears to be abandoned and the larger ponds have very little water in them. In addition to the 60 cut trees and 11 partially cut standing trees recorded in 1946, there are now 62 additional fallen aspen trees and 4 partially cut standing aspen trees around the new colony location. While no trees were cut previously in the range covered by any of the eight photo points, at the present time there are several trees appearing in one photograph that have been cut quite recently (Figure 3).

On the basis of this case history, it appears that beaver colonies shift either up or downstream as the food supply becomes depleted. In the area surrounding this colony, there are very few standing aspen left although there is a great deal of paper birch, a second rate food. Between this colony and the next one downstream about a fourth of a mile, there is also a scattering of aspen. After these trees have been utilized, the beaver will have to resort to paper birch if they intend to remain.

Colony No. 2:

In an effort to measure the food resource at this colony and also above and below it, trees were tallied on four sample plots $\frac{1}{2}$ x 5 chains in size. On one plot tallied adjacent to the colony, the count showed that out of a total of 27 aspen, 14 had already been cut, while 13 were still standing. Unfortunately the paper birch were not tallied, although they were abundant on the plot. A second plot at the colony location showed no aspen, 88 paper birch and 2 black ash but none had been cut by beavers.

A short distance upstream from this colony a tally of the trees on a single plot revealed 11 aspen and 37 paper birch while another downstream plot revealed 12 aspen, 80 paper birch and 2 cherry. None of the trees had been cut on the two plots and they indicate the density of the food supply for future beaver range. Although they indicate a scattered food supply provided the beaver shift locations, there is every reason to believe that this supply will be exhausted at a rapid rate with the present over population.

Colony No. 3

Like Colony No. 1, this one has also shifted downstream somewhat and now occupies a stretch of Tobin's Creek approximately a half mile in length. Five plots were tallied along the worked out section as well as on the active portion while one was taken a short distance upstream in the unused range. In the area adjacent to the colony proper, the tally showed the following: aspen, 86 cut and 31 left standing; paper birch, 13 cut and 126 standing; cherry, 2 standing and mountain ash with 4 uncut. On the other hand, the plot upstream showed 14 aspen and 38 paper birch with none of them utilized by beaver. While it is a bit encouraging that some aspen still remains, the fact that the beaver have also been forced to subsist on birch for some time is not a good sign. Apparently the colony shifted downstream when it became worked out (Figure 4).

Colony No. 4

This colony is located about a mile southwest of the Daisy Farm along the north shore of Rock Harbor. Since it was located in connection with the moose browse survey, there was not sufficient time to locate the lodge or thoroughly study the food situation. In an area of the shoreline a little less than a quarter of a mile long, a tally was made which showed 30 aspen cut by beavers. These trees were also barked by moose. Within the territory of the colony there was still some scattered aspen but the majority of the standing trees are birch.

Colony No. 5

This colony, which is located at the west end of Rock Harbor, was investigated and found to have most of the food supply already utilized. Along the shoreline in the vicinity of the lodge, a total of 71 aspen were tallied that had been cut down and most of them were recent. At present few standing aspen are left so the beavers will soon have to resort to birch or move elsewhere.

Colony No. 6:

This colony is located on the east end of Lake Richie on the outlet stream which flows into Rock Harbor. The trees utilized were tallied and out of a total of nine aspen, four were old cuttings and five were recent. Four of them had the bark chewed off while one was stripped by moose. Here again the beavers will have to resort to birch or move elsewhere after the scattered aspen have been cut down.

Colony No. 7:

This colony is located on Hidden Lake near Tobins Harbor at the beginning of the trail to Lookout Louise. A beaver dam forms the outlet on the Tobins Harbor side while the lodge is nearby on the lake (Figure 5 and 6). A quick appraisal of the food situation revealed that it was rather poor since there was no aspen left and paper birch was the only food species present. Along the shore of the lake a total of 12 birch were tallied that had been cut by beaver and most of these were recent cuttings. Most of them were 12 inches in diameter and larger.

Colony No. 8:

Numerous aspen were found cut along the north shore of Pickeral Cove and also around the west end of the cove. The food reserve is now made up almost entirely of birch.

Colony No. 9:

This colony is located in a small bay near the west end of Siskiwit Lake. It consists of a large lodge and a feeding range which is approximately a mile in length along the lake shore. In the vicinity of the lodge, the forest cover was type mapped and four 1/5 acre plots were taken at varied locations to sample the amount of cutting done. An average for the four plots showed the following: Aspen, 75.2 percent cut and 24.8 percent standing; paper birch, 4.5 percent cut and 95.5 percent uncut; and willow 10 percent cut and 90 percent standing. On the basis of these findings it is clear that the bulk of the food reserve is paper birch, a second rate food, and willow which is very important and abundant in some localities. While approximately one fourth of the aspen is uncut, it is being utilized at a very rapid rate.

Colony No. 10:

This colony represents the first one visited in the 1936 barn and is located approximately a half a mile north of Siskiwit Lake between sections 19 and 24. It was in a swampy area with white cedar and very little aspen nearby. No recent cuttings were noted and there was reason to believe that few beaver were present. From all appearances these beaver were having a difficult time to locate sufficient food.

Colony No. 11:

This colony represents the second one visited in the burn area north of Siskiwit Lake although signs indicated it to be inactive. It was located on the line between sections 22 and 23 about a mile south of Hatchet Lake. The pond itself was below a burned out white cedar swamp and the dam, although still holding water, was overgrown with grass and a variety of other herbaceous plants. No aspen were found in the area, scattered willows were present and birch and speckled alder were the principal woody plants. From all appearances this colony has been inactive for many years, possibly since the 1936 fire burned the area. Because there is an insufficient food supply in the area, it is fortunate that no beaver have established themselves at this location.

Colony No. 12:

This colony is located a mile east of number 11 on the same drainage and has been inactive for many years. Alder and birch were the main food plants in the area although there was a small amount of willow. Like the previous colony it apparently has been inactive since the 1936 burn. Like Colony 11 there were no aspen so the future for beaver in the area is not good.

Colony No. 13:

This colony is located approximately 3/4 of a mile east of Siskiwit Falls between Siskiwit Lake and Lake Superior.

It is outside of the 1936 burn although the general area has been subjected to many fires in past history. Signs indicated recent occupation and the house and dam were constructed on a rather high hill. No aspen were found close to the colony although there were some aspen cuttings a considerable distance away, indicating that food was scarce near the dam. Close by, birch was the only food remaining.

Colony No. 14:

Cut and standing trees and shrubs were tallied on three sample plots in the vicinity of this colony which is located in the 1936 burn area approximately a mile from Ishpeming Point (Figure 7). The count of all the trees on the plots including both standing and cut trees showed the following species composition: red maple .8 percent, alder 7.0 percent, aspen 11.1 percent, birch 25.9 percent and willow 55.2 percent (Figure 8). Although there was reason to believe that the burn would provide much aspen, the number one food, these findings and also observations elsewhere in the burn indicate that this is not the case (Figure 9). Paper birch is the dominant species in the burn while aspen and willow occur in about the same abundance.

Colony No. 15:

The beaver in this colony on Wrights Island are subsisting on birch, mountain ash and mountain maple. In some sections of the island the mountain maple previously cut by beaver is suckering back ~~back~~ and furnishing more food for both the beaver and the moose. Many large birch have been cut down and the bark utilized for food while in some instances the trees have been girdled. In one instance a large standing birch was girdled from the ground line to a height of four feet. Another unusual case of birch barking was pointed out by Mr. E. Holte, a fisherman. When he neglected to saw up one of his birch logs into stove length wood, the beaver peeled off the bark while it laid next to the power saw rig (Figure 10). Some mountain ash is left and when this species is utilized the beaver will be forced to resort to mountain maple and birch, both second rate foods.

Colony No. 16:

This colony is located on Siskiwit Lake a short distance west of the trail connecting with the main lake. The forest cover types were mapped along the lake shore and two sample plots, one half by 4 chains in size, were taken to measure utilization. An average for the two plots showed the following: aspen (70 trees) 81.4 percent cut and 18.6 per cent standing; paper birch (187 trees) 2.7 percent cut and 97.3 percent standing; willow (19 trees) 36.9 percent utilized and 63.1 percent remaining; alder (51 stems) 19.7 percent cut and 80.3 percent standing; cherry and mountain ash with 7 and 2 trees standing. Here again the bulk of the food reserve is paper birch, a second rate food. Some aspen and willow still remain although they are being consumed at a rapid rate (Figure 11 and 12).

Colony No. 17:

This colony, which consists of a lodge only, is located on a small island near the east end of Siskiwit Lake. On the island twelve birch trees were tallied that had been cut and bark peeled. On the main shore, a short distance away, one sample plot showed the following: aspen (19 trees) 92.8 percent cut and 7.2 percent standing; and paper birch with all 5 trees standing. When the remaining scattered aspen are utilized the beaver will be forced to resort to feed on paper birch bark.

Colony No. 18:

Colony number 18 is located a short distance east of number 17 in a small bay in the southeast corner of Siskiwit Lake. From all appearances the lodge has been inactive for several years although fresh recent cuttings on the lodge indicated recent occupancy. No aspen were found in the area and the remaining birch trees were scattered. One sample plot $\frac{1}{2}$ x 2 chains showed 6 uncut birch and 1 utilized.

Colony No. 19:

This colony, which is located on the stream connecting the east end of Siskiwit Lake and Intermediate Lake, was inactive when visited in May. From all appearances it was worked out and abandoned, possibly since the 1936 burn. (Figure 13). Since the burn pretty well surrounds the colony, the vegetation around the edge of the pond is growing up to birch with scattered aspen (Figure 14). This is another example which indicates that the future of the beaver in the 1936 burn area is not very good from the food production standpoint.

Colony No. 20:

Cut and standing trees were tallied on two sample plots in the vicinity of this colony which is located on Little Siskiwit River near the mouth. All of the aspen cuttings were very old and the same was true of many of the birch. Some of the birch cuttings were quite recent. Very recent feeding was also noted on two partially cut black ash. A summary of the plot data showed the following: aspen (39 trees), 87.1 percent cut and 12.9 percent standing; birch (150 trees), 40 percent cut and 60 percent uncut; and alder and balsam poplar with 1 and 4 uncut specimens. These findings indicate that food resource has already been depleted adjacent to this colony and that paper birch is the principal food left.

Colony No. 21:

A second beaver colony, about a half mile up the stream from the previous one was examined and found to be worked out and unoccupied. A single food resource plot ($\frac{1}{2}$ x 2 chains) revealed the following information: aspen (49 trees), all trees cut on the plot and paper birch (3 trees), with 1 cut and 2 left standing. All of the aspen were very old cuttings while the remaining food reserve was birch.

Colony No. 22:

A third colony on Little Siskiwit River was visited and found to be very much alive. Although no sample plots were taken, four old aspen cuttings were tallied along with 12 birch which had been cut down but not barked. Standing aspen was very scarce and the remaining food reserve was made up of birch.

Colony No. 23:

This colony is located in the 1936 burn area near the Feldtman Lookout Tower. Like other parts of the burn area, the future food resource is

poor (Figure 15). One sample plot ($\frac{1}{2}$ x 2 chains) showed the following: aspen, none; birch (20 trees), 65 percent cut and 35 percent standing; willow (26 trees), all cut; alder (11), 63.6 percent cut and 36.4 percent standing; cherry (12 trees), 16.7 percent cut and 83.3 percent uncut.

Colony No. 24:

This colony is located in a small swamp in the 1936 burn about a half mile west of Camp Siskiwit on the Feldtman Tower Road (Figure 16). Since the colony is merely a low wet place that has been dammed up to hold a rather shallow pond, it is difficult to understand how the beaver are able to survive, especially in winter. One sample tally was made and the findings showed the following: aspen, none; willow, none; birch (12 trees), all cut; alder (40), all cut; black ash (10), all cut; mountain maple (4), all cut and cherry (3), all cut. Although all of the woody plants on the sample plot were utilized, other places around the colony had dense stands of alder and scattered black ash partially cut down (Figure 17). In the face of a depleted food supply, it is quite likely that these beaver will be unable to remain at their present location much longer.

Colony No. 25:

This colony is located on Beaver Island in Washington Harbor. No sample plots were taken although approximately two dozen fresh aspen cuttings were noted. At present the beaver are cutting the last remaining aspen and after they are gone the beaver will be forced to resort to birch.

Colony No. 26:

This colony is located on a small stream near Feldtman Lake which connects this lake with Lake Superior. Very few aspen grow in the area so the beaver have had to subsist on the bark of paper birch (Figure 18 and 19). One sample plot ($\frac{1}{2}$ x 2 chains) gave the following information: birch (26 trees) 61.5 percent cut and 38.5 percent uncut.

Colony No. 27:

This colony is located along the south shore of a small cove in Washington Harbor approximately $1\frac{1}{2}$ miles west of Beaver Island. Standing and cut trees were tallied on one long sample plot ($\frac{1}{2}$ x 6 chains) which revealed that out of a total of 36 birch, 63.8 percent had been cut while 36.2 percent were still standing. Since no aspen grow in the area the future food resource will have to be birch.

Colony No. 28:

This colony is located on Barnums Island in Washington Harbor and has been a source of nuisance ever since it was established. Residents on the island, as well as fishermen on nearby Washington Island, have objected to cutting

activities of the beavers and as a result, the Park Service and the Fish and Wildlife Service have live-trapped four beavers, three in May 1946 and one in May 1948 (Figure 20). This action has provided a small amount of relief although it has not been very lasting. In the opinion of the writers, the beavers will continue to be a nuisance to the fishermen and summer residents in this portion of the park until the population has been reduced at all of the colonies, in the Washington Harbor Area. The objective could be accomplished by live-trapping although this operation would have to be repeated about every three years. At the present time, this would mean a reduction of the population at approximately 15 colonies and a total of 30 to 50 beavers. Such a program would help the nuisance situation locally and at the same time provide beaver for restocking protected areas such as on the Grand Portage Indian Reservation.

At some colony locations, it might be advisable to leave beavers which are serving a useful purpose, such as an attraction to tourists. Such a beaver is now living under the old boat dock at Windigo and can be observed in its make shift lodge by lifting off a board from the dock. At times it may also be observed sitting or swimming around in one of the old boat stalls (Figure 21).

DISCUSSION BY SECTIONS

Northeastern Section: Eight colonies of beavers were visited in this section of the island to determine what food plants had already been utilized and also what constituted the future reserve. Past utilization of the principal food species at these colonies was divided as follows: Three had consumed most of the aspen and were already feeding on birch; four had cut down all or most of the aspen but hadn't started to feed on birch to any extent; and one had been feeding entirely on birch. The future reserve at all eight colonies is birch although five of them still have a light stocking of aspen which is being consumed at a rapid rate. Two of them have fairly dense stands of birch while a third one has only a scattered amount of this species left. While it is encouraging to note that the beavers are still feeding on some aspen in this part of the island, it is also clear that this reserve will not hold out much longer. Just how the beaver will be able to survive on birch, a second rate food, is still a matter of conjecture.

Center Section: Prior to the present investigation, the writer and other investigators were of the opinion that this section of Isle Royale, especially the portion burned over in 1936, would determine the future of the beaver population on the island. Although aspen and willow occur in the burn area, birch constitutes the principal food species and for that reason the future food supply for beavers does not appear very encouraging. Eleven colonies were visited and of this number five were in the 1936 burn area and six were outside the burned over portion. Three of the burn colonies were "worked out" while one had been subsisting on birch and scattered aspen and another had been feeding on birch entirely. With the exception of scattered amounts of aspen, willow and alder, the bulk of the future beaver food supply at all of the colonies is birch. The six colonies outside the burn had been utilizing birch and scattered amounts of aspen, mountain ash and mountain maple. Here

again the future reserve is made up almost entirely of birch with only scattered amounts of aspen and willow and a small amount of mountain ash and mountain maple.

Southwestern Section: Nine colonies were visited in this section and of this number one was "worked out" and two were located in a portion of the 1936 burn area. The burn colonies have been subsisting on such species as birch, willow, black ash and alder to some extent while the future reserve is birch. At the "worked out" colony all of the aspen and much of the birch has been utilized and the food reserve consists only of a scattered amount of birch. The remaining six colonies have removed the small amount of standing aspen once present and have been doing their best to get along on a birch bark diet. The reserve of birch is also much less than either the center or northeastern sections.

SUMMARY AND CONCLUSIONS

1. There has been a marked increase in the beaver population in recent years, especially since the preliminary food resource survey was made by Gensch in May of 1946. This has resulted in some shifting around of "worked out" colonies and the establishment of new ones in practically every available location.
2. At present there is urgent need of up-to-date information on the beaver population of Isle Royale. No airplane colony counts have been made since the fall of 1945.
3. The present beaver food resource survey showed that the northeastern section has the largest reserve and that the reserve in both the center section and especially the southwestern section is at a low point. Aspen may still be found in scattered amounts in the northeastern section, while in the rest of the island it is absent or very rare at most colonies.
4. Although it was once felt that the food reserve in the 1936 burn area would determine the future of the beaver population on the island, the colonies visited showed this not to be the case. While both aspen and willow, first rate foods, were present the bulk of the supply is birch, a second rate species. Aspen is also subject to heavy browsing and barking by moose.
5. During the past three years a total of four nuisance beaver have been live-trapped from the colony on Burned Island near the Andrew residence. While this has provided some temporary relief, no real relief will be obtained until beavers are live-trapped from all of the colonies in the vicinity of Washington Harbor. To accomplish this objective the population would have to be reduced by 30 to 50 beavers at approximately 15 colony locations.
6. Future beaver work on Isle Royale should be centered along the following lines of investigation:
 - a. Make a much more complete survey of the beaver food resource of the island than has ever been attempted. This may be

accomplished by making intensive investigations of samples of beaver range in all three sections of the island. It should include a type map of the area along with sample plot tallies at the colony location as well as between locations.

- b. Continue periodic check-ups on the Tobin Creek Study Area and establish similar study areas elsewhere if time permits.
- c. If funds become available, continue the bark analysis work stated by Gensch to determine their nutritional values. In addition to aspen and birch willow, ^{and} mountain ash ~~and willow~~ should be included.

Respectfully submitted by:

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Fig. 1. Recently constructed beaver lodge. Tobin Creek Study Area. May, 1948.



Fig. 2. Recently constructed beaver dam. Tobin Creek Study Area. May, 1948.



Fig. 3. Aspen trees cut by beaver since the photo was taken in May, 1946. Tobin Creek Study Area. May, 1948.



Fig. 4. Worked out beaver colony. Gensch reported it to be active in May, 1946. Tobin Creek, May, 1948.



Fig. 5. Beaver lodge on Hidden Lake. Lookout Louise Trail, May, 1948.



Fig. 6. Beaver dam at outlet of Hidden Lake. Lookout Louise Trail, May, 1948.



Fig. 7. Beaver colony in 1936 burn
on trail to Ishpeming Point.
May, 1948.



Fig. 8. Beaver food reserve adjacent to colony
referred to in Fig. 7. May, 1948.



Fig. 9. Stream in 1936 burn north of Siskiwit Lake.
Note the scanty beaver food reserve. May, 1948.



Fig. 10. Birch log peeled by beaver before it could be sawed up for stove wood. Wright Island. May, 1948.



Fig. 11. Birch beaver food reserve at colony on Siskiwit Lake near Siskiwit Falls. May, 1948.



Fig. 12. Same beaver colony as referred to in Fig. 11. Viewed from the lake. May, 1948.



Fig. 13. Fire killed trees in abandoned beaver pond at inlet to east end of Siskiwit Lake. May, 1948.



Fig. 14. View of beaver food reserve of the colony referred to in Fig. 13. May, 1948.



Fig. 15. Beaver colony in 1936 burn area near Feldtman Lookout Tower. Note the alder in the pond and the absence of food around the edge. May, 1948.



Fig. 16. Beaver colony in swamp in 1936 burn area near Camp Siskiwit. Note abundance of alder and absence of important food species. May, 1948.



Fig. 17. Black ash, 16" in dia.) partially cut by beaver at colony referred to in Fig. 16. May, 1948.



Fig. 18. Barkling of birch by beaver. Feldtman Lake. May, 1948.



Fig. 19. Close-up of beaver utilization of birch. Note the teeth marks on the trunk and the bits of unconsumed bark on the ground. Feldman Lake, May, 1948.

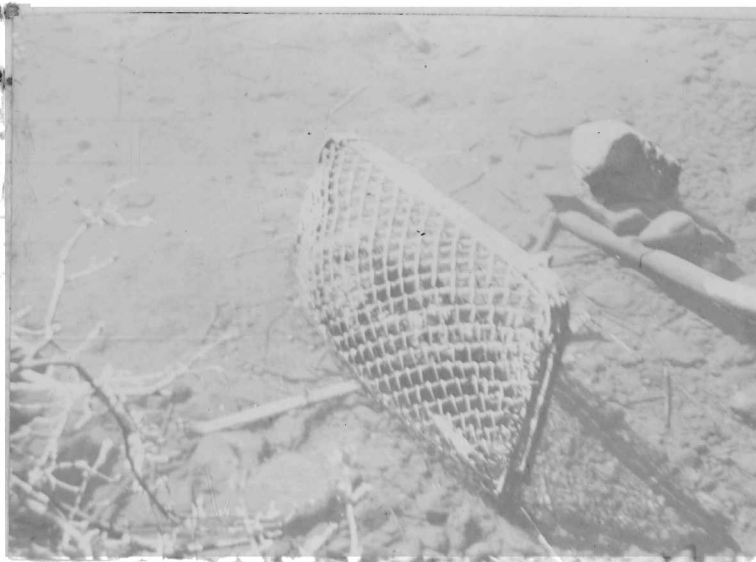


Fig. 20. Beaver caught in live-trap at nuisance colony on Barrens Island. May, 1948.



Fig. 21. Tame beaver which lives under the old boat dock at Windigo. May, 1948.