

Beaver census on the Erie Wildlife Refuge

Project number:

Craig Malagise, fall '94


E.W.R. liaison - Janet Marvin

Faculty advisor - Dr. Scott Wissinger

Objectives

The objective of this study was to determine an approximate population number for beaver (*castor canadensis*) on the Sugar Lake division of the Erie Wildlife Refuge. A secondary objective is to demonstrate, through my findings in research and in the field, the most feasible method of censusing the beaver at the E.N.W.R.

Justification

The beaver is a valuable resident in many areas because of their carpenter-like behavior that creates a habitat that is suitable for a wider variety of wildlife than was present before their arrival. Dams built by beaver create watersheds that provide beautiful habitat for waterfowl, fish, amphibians, other mammals such as muskrats, and many insects. Aside from benefits to creatures, these dams help to control erosion and they also provide an excellent medium for plant growth.

However, without regulation beaver can become a nuisance problem. They frequently block drainage flows and water-control structures, and render waterways impassible. Through determining a beaver population number in a given area, management strategies can be implemented to find a suitable population number and determine how to regulate that number.

Procedure

Materials and Methods: Due to the estimated time requirement for this type of study, I implemented a plan to start the censusing study at the lowest portion of the Refuge and work north so as to leave a boundary where the study could be continued at a later date. A literature search has provided only a few techniques for censusing beaver. The technique that seems most practical is a lodge and cache survey (Swenson, 1983;

Broschart, 1989; Hammond, 1943) . This technique requires the researcher to locate active lodges and/or food caches and estimate the number of beaver by judgment of colony size. Other beavers such as land-lodging beavers must be located and accounted for also. Other evidence of beaver activity can be used as population indicators, such as dams and trails. This technique is most suitable for the time limitation and the amount of area to be studied by one person, because it only requires the researcher to locate structure and evidence of activity - not the actual beaver itself . Other techniques included the mark and recapture, aerial censusing (Payne, 1981), and identity marking several beaver in each area.

For this area, I had determined the best method to be the lodge/cache count technique. There will be no physical markers to be concerned with. All information was kept on record in a log book and map system. Guidelines for this technique are: small lodge - 2-6 beaver; medium lodge - 6-10 beaver; large lodge - 10-14 beaver; one colony per cache with a size of cache judgement. Land beaver and dam estimations require the experimenter to be familiar with beaver activity. For example, an area with ten large active beaver dams is run by 10 different clans of beaver. In general beaver will only maintain one large dam per clan: a clan consisting of anywhere from 4 to 14 beaver. The final population number will be an estimate with an uncertainty to be summed for all individual estimations.

Another valuable tool in this study is a knowledge of beaver habitat and use (Atwater, 1940). Beaver feed preferably on Aspen and other hardwood species. Capacity of the area can be determined by the use of the resources available. For example, an area can be determined to be at capacity in regards to the beaver population when all of the resources are at threshold. Likewise, an area can be determined over capacity when there

is evidence of beaver cutting older trees and using them as strip-caches - they fell a large tree and return to feed on it as a cache.

The materials for this project are as follows: Hip waders size 11, binoculars, log book, map of Sugar Lake division, and a canoe with accessories.

Results

The results of this study appear in Table #1 as number of caches, lodges, and an estimation of the beaver population for each of the trapping areas as designated by the E.N.W.R. on Figure #1. The population estimate for the portions of the Refuge other than area B is 270 +/- 80 beaver. By my judgement the population is more likely around 300 beaver.

Interpretation

For the interpretation of this study, I would like to recommend areas that need to be trapped because of high populations. I would then like to propose future work on this project:

Trapping area A has one of the highest beaver populations on the refuge. There are already many nuisance problems in this area as well as foresight into future problems. On the East shore of Mill Run there is evidence that the population is nearing threshold as the beaver are feeding on less desirable foods and have a few large tree caches. These large tree caches are trees cut down and used as a cache source. This indicates that the beaver have all but exhausted the younger and more tender trees in the area. This area needs heavily trapped to reduce the population to a stable number that can sustain a healthy population. If this area is not trapped, the beaver will drive themselves out.

Trapping area B was not studied by the end of the semester. This area can be

studied in the future by myself or others.

Trapping area C has an average population size, meaning the beaver appear to be at a stable population with ample food supply.

Trapping area D is another one of the most heavily populated areas on the Refuge. This area is almost equally active from top to bottom. Most activity is occurring in the northern section above Beuchoit (unsure of the spelling) Marsh at the tributaries. Other heavy activity is present between the North Trillium pond and B. Marsh. Heavy activity continues all around pool 7 and on down to route 27 where activity is again very heavy. This area is very rugged terrain but is another area of severe need for trapping.

Trapping area E and F are again very heavily active, but only in the northern sections south of route 27. These areas were very thoroughly studied and observed. During the course of the study, several beaver moved out of a large lodge and repaired and older inactive lodge for use. This indicates how fast the population is growing in this area.

Trapping area G has normal activity aside from some heavy activity on the most eastern portion of this area. The beaver are damming the streams in this area and are quickly exhausting their resources. It appears that this area is in need of some trapping, again, most concentrated in the eastern portion.

Trapping area H has some very heavy and dense activity between pool 10 and Meyers pond. The outflow of pool 9 and Meyers outflow are heavily active but in isolated places. Trapping in this area is recommended but not immediately necessary.

Trapping areas I & J held normal to low populations of beaver. J is the least active on refuge. I is close behind. These areas have a few pockets of heavy activity but nothing of great concern.

Recommendations: For the future of these studies, it would be more productive to employ two internship volunteers to complete a task as large as this. The time, effort and sweat put into this project was almost too much for me to handle. This is a very exhausting study and it takes a highly motivated worker that enjoys the outdoors and marsh habitat wildlife such as waterfowl, birds of prey and deer. I was able to enjoy seeing three different bear, an eagle, an albino weasel and other interesting species on my journeys.

↑
? probably only an ermine
Cooperators and responsibility

Allegheny College Biology / Environmental Science departments

Prof. Scott Wissinger - faculty advisor

Janet Marvin - E.W.R. liaison

Mike Piccirilli - assistance with orientation of area and help throughout the study with
locating and accessing areas with beaver.

Table #1: Lodge, cache and beaver count by trapping area.

<u>Trapping area</u>	<u>caches</u>	<u>lodges</u>	<u># of beaver / uncertainty value</u>
A	7+	3+	70 +/-20
C	3	2	22 +/-6
D	5+	4+	42 +/-12
E&F	10+	5+	75 +/-25
G	2	1+	16 +/-4
H	3+	2+	25 +/- 8
I &J	3	3	20 +/-5
Totals	27+	20+	270 +/-80

ERIE N.W.R.

SUGAR LAKE DIVISION

LEGEND

- Ⓐ Beaver Run Trail
- Ⓑ Tsuga Nature Trail
- Ⓒ Wooded Drive
- Ⓓ Deer Run Overlook
- Ⓔ Deer Run Trail
- Ⓕ Observation Blind

Stream



Impoundments



Headquarters

Road

Refuge Boundary

Refuge Boundary and Road Coincide

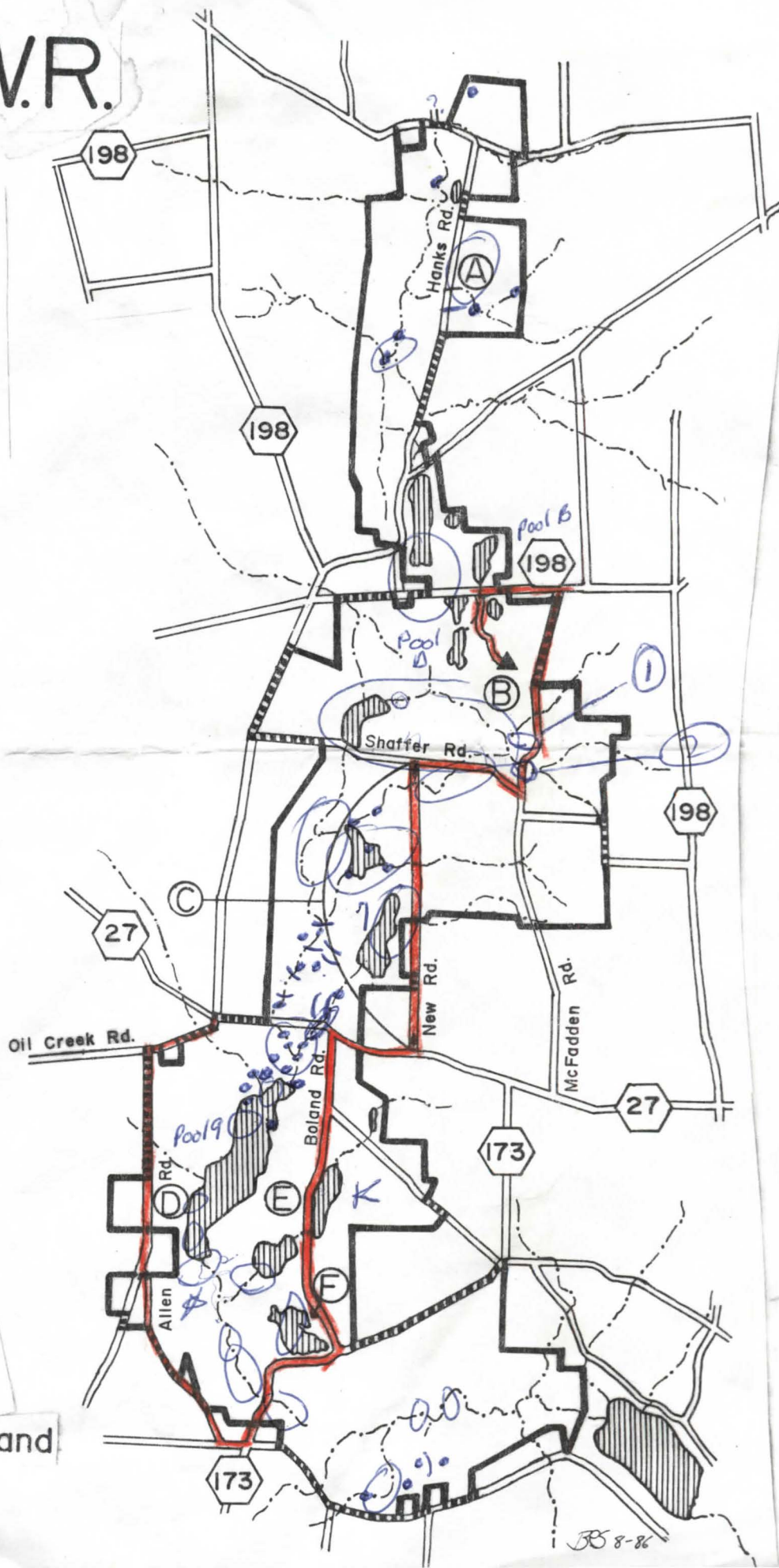


FIGURE 1

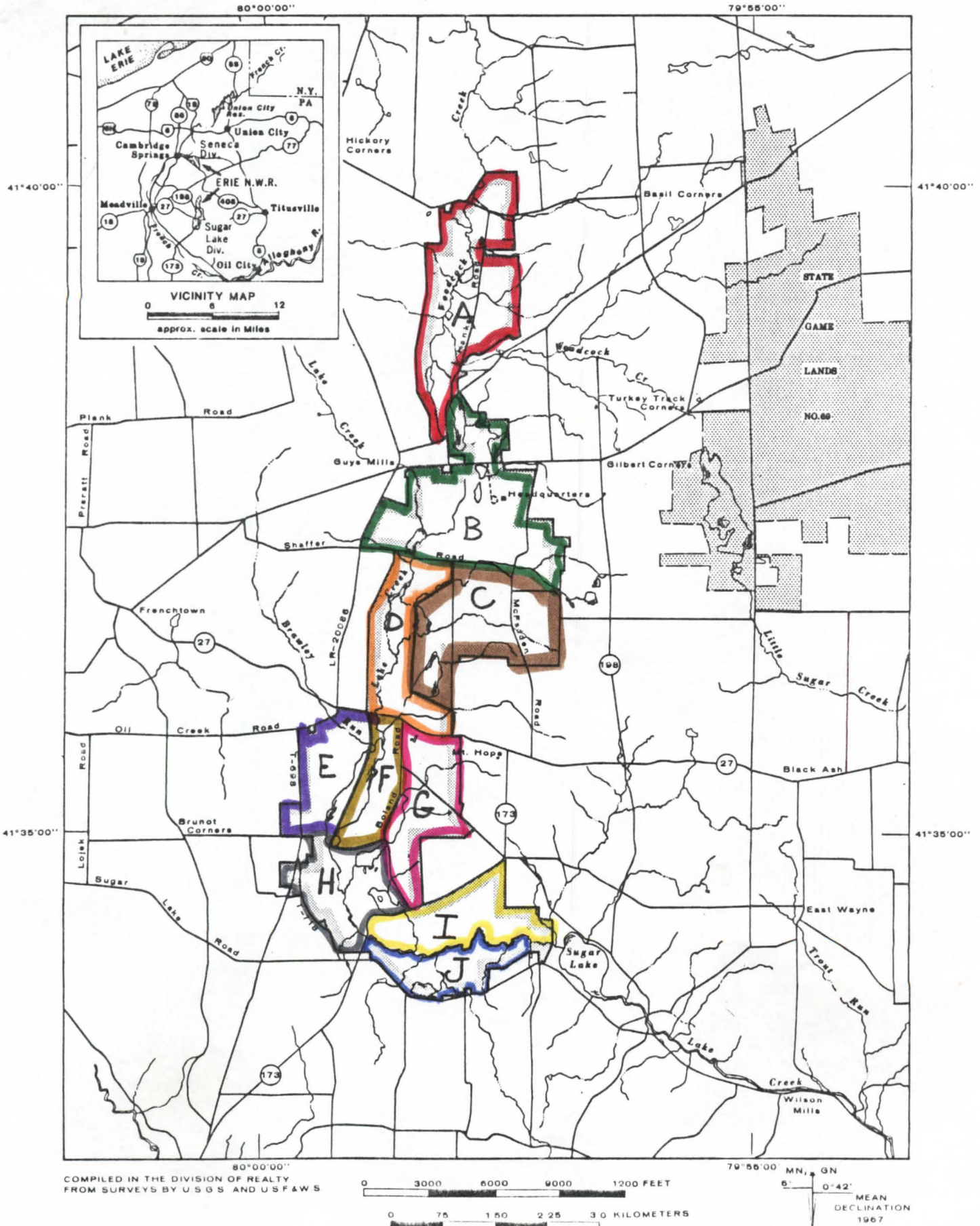
ATTACHMENT A
ERIE NATIONAL WILDLIFE REFUGE

TRAPPING UNITS
SUGAR LAKE DIV.

UNITED STATES
DEPARTMENT OF THE INTERIOR

CRAWFORD COUNTY, PENNSYLVANIA

UNITED STATES
FISH AND WILDLIFE SERVICE



References

- Atwater, M.M. (1940). South Fork (Montana) beaver survey. J. of Wildlife Management 4: 100-103.
- Broschart, M.R. et al. (1989). Predicting beaver colony density in boreal landscapes. J. of Wildlife Management 53 (94): 929-934
- Hammond, M.C. (1943). Beaver on the Lower Souris Refuge. J. of Wildlife Management 7(3): 316- 320.
- Marvin, J.A. (1982). Beaver Management at the Erie National Wildlife Refuge Allegheny College Senior Comprehensive.
- Payne, N.F. (1981). Accuracy of aerial censusing for beaver colonies-. J. of Wildlife Management 45(4): 1014-1016
- Swenson, J.E. et al. (1983). Reliability of aerial cache surveys to monitor beaver population-. J. of Wildlife Management 47(3): 697-703

CRAIG T. MALAGISSE

Beaver census

9/8/1994

Met with Janet Marvin @ 8:00 AM

- Beaver census
- Both Divisions?
- What method of survey ✓

- Library research done. Lodge count seems most practical. Prof. Ostrofsky agreed. ✓

9/13/94

Mike Piccirilli made appointment to show me around refuge on 20th. ✓

@ 8:00AM today I drove around refuge myself. Located a few trails and huts right next to road.

Refuge is too large to complete entirely. Sugar Lake Division only. ✓

9/20/94

Met Mike Piccirilli at 8:00
He helped me locate beaver
areas around Sugar Lake.
He agreed w/ observation
& identification of active
lodges and bank dens. Observ.
by foot, canoe, wading.

Need: Waders, canoe & accessories,
binoculars.

9/22/94

Observed pools ¹C & ²D. Rainy & cold
weather - no beavers sighted. Several
beaver structures.

Have decided to examine Southern
end of Division & work north.

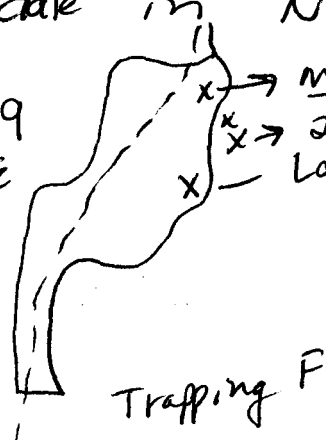
9/27/94

Mike unable to canoe
walked perimeter of pool in trapping
area J at Southern part. No
activity whatsoever around open
water. One lodge on west inflow
& J in east outwash. 4 cache
piles located 6-10 beaver/lodge
Going to areas H & I on the weekend

9/29/94

Observed at Pool 9 in trapping area F - Eastern part of Pool 9 middle in N/S direction.

upper-
29 ± 13
Pool 9
Trapping E



Trapping F

many tracks (20) ± 12 beaver (bank)
2 cache piles - plenty of aspen
large / medium hut
saw 4 beavers in water at once. Estimate 6-8 beaver.

need to canoe down from 27 and investigate lower & western pool 9

10/2/94 (sunday)

Observed in Trapping area B/C border on McFadden road.

16 ± 5
on west side of road (trapping B) a large beaver lodge - saw a few beaver. Estimate 8-10 beaver in lodge - 3-4 more bank beaver. on East side of McFadden - through wood & below cornfield - small impoundment & small cache - 2-4 beaver.

May be in Trapping B mostly - border unclear.

10/4/94

10/6/94

Walked along ~~the~~ west side of lake creek North of 27 in trapping area D.

Entire area swamp because of heavy beaver activity

Small/medium cache 50 yds off of 27 4-6 beavers.

Many dams & heavy trail activity coming ~~off~~ out of creek. Many beaver are lodging in swamp which is basically not accessible. Binoculars used to survey area. Estimation is all that can be done unless air survey can be done. Large dam at North end of creek. East side seems accessible also - will try there some other time. Found dead beaver on bank - decomposed seemed very large.

* Heaviest beaver activity yet.

5 caches seen

10/10/94

Hunted duck while observing East side of swamp area noted in 10/6 entry.

Southern part is trapping area D.

6 different dams - heavy trails - many beaver - 2 large cache piles. 30-35 beaver in southern (western) trapping area C

More heavy activity - 8-10 more dams

30±10

10/10 (cont'd) — plenty of aspen

many trees cut down 10+ more beaver
total for Trapping D - 300±10 beaver

10/11/94

Drove into Pool 7 on dike.

Didn't locate much activity on right side (southern Pool 7) will need to walk perimeter. On left side of dike (outwash of pool 7) 2 medium cache piles 2 dams each 668 beaver. Saw 3 on bank on perimeter walk. Binocular scan of pool 7 - no lodges.

10/13/94

Tried to locate way to access North Trillium from new road. With not much time before baseball game - left after no luck.

10/18/94

Mike & I put in canoe south of 27 in pool 7 outwash in trapping area D. There is heavy beaver activity in this area. 5 cash piles seen & a dozen or more dams. ~~There are~~ Observations here plus observations from perimeter walk - Estimate ~~35±10 beaver in this area.~~

35±10 beaver

10/20/93

Went to Trapping area ~~E~~
again. Observed one medium lodge
to try to identify individual beaver.
Saw at least ~~at~~ 4 different beaver.
3 very large & one smaller. Could
hear them chewing on small
aspen on shore. This lodge size &
activity seems to be typical on
refuge. This one has what I
estimate to be 8 beaver.

Typical lodge - 8 beaver

10/25/94

Turned in finished proposal

10/27/94

Parked in Deer-^{-Run} overlook lot
and walked through woods to
west side of pool 9.

3055
~~3055~~
No beaver activity except
for furthest North portion where
pool 9 becomes swamp. Many
trails & cuttings 2 lodges of
typical size, 3 (one old) caches

There was one lodge by
water control structure on South
end but it does not appear
active. One midway up this side is active
and growing. It is new since the fall.

10/28/94 At this point I am becoming more confident that I am finding out where beaver are likely to colonize based on food sources (aspen) water, etc. I have investigated most of the southern half of the Sugar Lake Division with a few exceptions - the largest being trapping area H which I anticipate has a large number of beaver.

I will continue this census into cold weather (independent of weather actually) because I am basically looking for structure and activity evidence. Population Estimate is based on # of lodges & caches.

Literature Sights both as good estimators - so I am using both as a double check. Caches can make bank beaver # estimation easier.

11/3/94

Skipped ~~area~~ area B to go to A because of beaver complaints.

To the left of Hants road I walked into the pool called Mill Marsh. There is heavy beaver activity on both sides, probably from same colony that uses one lodge on the water. Does appear to be bank beaver at stream - furthest North on the marsh. 12 ± 3

11-8-94

Today I went in to Hemlock Island. Very heavy, active, and recent beaver sign. On North east portion there are 3 active dens. These beaver have almost cleared out all of the small trees on the bank. They appear to have a few large tree caches - this is where they have cut down a few large trees and know off the bark and wood little at a time. This is a good place to observe beaver early in the morning or late evening.

Further south on the marsh there are more lodges and 2 cache piles.

This area is overrun with beaver and is in serious need of trapping.

I will try to get to the west side of the marsh Thurs.

11-10-94

Today I went in to Mill Marsh on East side again along with my dad. He brought a 40x Spotting Scope which we used to scan the west bank. (I could see beaver trails with this scope!) There is activity over on the west side, but not as severe. Total for Mill Marsh is ~~100~~ ± 6 beaver
40

11-15 & 11-17-94

25 $\pm$ 10
On Tues & Today I made visits to the North & East portions of Area A. Again there is heavy activity everywhere. The beaver are damming water everywhere.

Trapping area A needs most trapping followed by D and F (Northern portion)

I did not get to go through area B, but I figured that this would be easiest for later observation by others. I would like to volunteer some of my free time over winter break and next semester. Also, I would be glad to help guide others that would continue my project.

For future reference, this type of internship is very time consuming and requires a person in good physical shape, and they must be willing to push through some rough territory.

Two people that can work well together would be better suited for the job.

12/1 comments from Scott

- 1) Do you take this out into the field? If so, you should write in pencil
- 2) Does time of day affect your sightings of animals?
- 3) This looks great - it is obvious that you are regularly working on the internships
- 4) I'd still like to accompany you some weekend - this Sunday?

Scott

Good Job A million Progress