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Musk-rat data from
Tule Lake, Ore.

1. Muskrat Trapping

The 1939-1940 trapping season was the most successful in the history of the Tule Lake Refuge. In 1931 the first muskrat was observed at Tule Lake. Then some stock from the Great Lakes region was introduced. In 1933 trappers began to take muskrats from Tule Lake. The furbearers rapidly increased in numbers and the crop in importance until the past season when the value of the pelts taken exceeded \$35,000.00 for the season.

The policy has been for the Bureau of Reclamation to issue trapping permits to a limited number of trappers to operate on the Tule Lake and Upper Klamath Refuges. The permits are free and each trapper is assigned to ~~an~~ an exclusive territory and is allowed to use only 150 traps.

The burning of about one-half of Tule Lake marsh, which was accomplished in January, 1940, caused the muskrats to make local migrations to the unburned marsh area, according to the trappers.

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February, March, and April, 1941

D. Fur-Bearing Animals, Predators, Rodents, Etc.

1. Population and Behavior

(a) Muskrat House Count and General Survey

The muskrat house count and general survey, after the 1940-41 trapping season, was made on March 20 and 21. The survey parties consisted of two boats, each manned by a trapping inspector and a trapper.

A ladder was tied in the bow of the boat, thus enabling the house counter clear vision above the rushes. An accurate house count was impossible in many localities due to the dense vegetative growths, but a general idea of population concentrations was gained. This information helped us to re-map the trapping units for the next season, and also to see if the muskrat population had been over-trapped in any areas. The feeder houses were not counted. Only large houses where fresh signs were noted apply. A concentration of muskrats was found in units 1, 2, 11, 12, and 13. These areas all had 200 or more houses. Trapping units 3, 4, and 5 fell in the 100 house bracket, and units 6, 7, 8, 9, 10, and 14 were below 100.

Summary of Muskrat House Count

<u>Trapping Unit</u>	<u>House Count</u>
1	265
2	250
3	165
4	108
5	102
6	89
7	81
8	35
9	40
10	14
11	402
12	200
13	295
14	15 - Large number of bank muskrats

(b) Fluctuation During Trapping Season

During the period from February 1 to 6, a sharp increase in the trappers' catches was recorded. This was the period that the bulk of the ice melted, allowing the muskrats freer movement, and the trappers were able to cover their territories more completely. The heavier catches of muskrats were first reported on the south end of the Refuge. Approximately three days later the catches increased on the north side of the Refuge. From then on through the balance of

the season the catch gradually decreased.

Bredator and Rodent Control

During this quarter Refuge personnel spent considerable time in attempting to control mice on the peninsula and headquarters plots where they are doing considerable damage to lawns, trees, and shrubs. It appears as though the high water level of the lake and the winter flooding of the leased farm lands have concentrated the rodents on higher ground, which probably accounts for the increased activities of these rodents.

On March 3 a citizen trapper reported that he had caught 15 coyotes and 9 bobcats adjacent to the west boundary of the Refuge.

20 house cats were killed within the Refuge boundaries by Refuge personnel.

3. Fur Taken by Refuge Personnel

4 muskrats were taken on the Tule Lake Refuge when it was found that they were causing damage to the dyke on the Cox lease. These muskrats were skinned and the pelts saved.

4. Fur Taken by Other Trappers

The muskrat season on the Tule Lake National Wildlife Refuge terminated March 15, 1941. 26,834 muskrats were taken from the 14 trapping units on the sump. On a 50-50 share-crop basis, the Government and the trappers each received 13,417 muskrat skins.

The total income realized by the trappers was \$21,265.98 for their share of the muskrat skins taken during the 1940-1941 season. Therefore, this industry, offered by the Government, is a valuable asset to the community.

Analysis of Government Furs Shipped to the Seattle Fur Exchange

A. Grading, correct according to reports received from the Seattle Fur Exchange:

13,417 Government muskrat hides were shipped to the Seattle Fur Exchange from the Tule Lake Refuge. Of this number 52.33% were classed as 'Extra Large Winters', and 1.94% as 'Extra Large Springs'. These figures correspond with our measurement study in that the majority of pelts measured were 14-plus inches in length, according to our measurements, thus placing the the muskrats in the 'Extra

Large' class. 28.60% of the pelts were graded as 'Large Winters', and 1.43% as 'Large Springs'. This places 84.26% of the Tule Lake Muskrats in the 'Extra Large' and 'Large' brackets. 3.97% were graded as 'Medium Winters'; .13% 'Medium Springs'; .97% 'Small Winters'; 8.18% 'Damaged Winters'; .74% 'Damaged Springs'; 1.50 1.50% 'Badly Damaged Winters'; and .21% 'Badly Damaged Springs'.

B. Estimated Value by Seattle Fur Exchange

On the above grading the total estimated value was placed at \$20,523.50. This does not mean that the skins will bring this price. This is the Seattle Fur Exchange grading price only, as all the Government skins have not been sold.

Fur Sales by Trappers

Two sales were held at the Refuge headquarters where most of the furs were sold. The first sale was on a sealed bid form. At this sale the fur buyers bid exceedingly high, probably in an effort to break the sales. I feel that one of them, at least, did not make a very large profit or probably lost on the sale. At the second sale that was held, the skins were placed on auction. The buyers were very cautious and a fair return was received.

March 10, 1941, marked the second fur sale held at Refuge headquarters by the Northern California Trappers Association, principally made up of Tule Lake Refuge trappers.

The Refuge trappers' sales were as follows: total number of hides offered 7481; total sold 5321; price per hide \$1.492; total price \$7929.54.

To our knowledge, the Tule Lake Refuge trappers received the highest average price per hide on record. \$1.429 was high for an all season average, and \$1.428 was low. The total average price for all 14 trappers was \$1.598.

With the trapper paying all of the trapping, skinning, and curing expenses, for both his share and the Government's share of the skins, it is estimated that the cost to the trapper for his 1,000 muskrats is approximately 50¢ each. The average selling price paid to the trappers for the 1940-1941 season was \$1.60 per skin. After deducting the cost of operation, 50¢, the trapper had a net of \$1.10.

Estimated Cost of Operation for Government

Estimating the Government's expense for supervision by trapping Inspectors, handling and shipping charges, cost of operation of equipment, and 5%
5%

commission for selling, as approximately 14¹/₂% for each muskrat skin that the Government received, and deducting this amount from the estimated selling price of \$1.529 (the price estimated by the Seattle Fur Exchange) the Government would have a net of \$1.384.

Percentage of Net Revenue Received by Trapper and Government

After determining the net revenue received by each the trapper and the Government, we find that the trapper received but 44.2% of the net revenue while the Government received 55.8%.

Sex Ratio

Starting in January and continuing through March 15, a sex ratio study was made of 1,000 muskrats per month, except in March when 463 specimens were examined. The sex ratio for the three months shows a definite trend toward an increased take of female muskrats at the approach of spring. For this information, an extended season into spring would decrease the female population for the next breeding season.

We believe there should be some selective trapping to increase the muskrats on a refuge and to reduce the number of fighting males. These males kill each other, a certain percent of the young, and also some females, and dominate an area which would otherwise support many more muskrats. For instance, as shown in the table that follows, 62% of the catch was males.

In trapping to reduce males, scent should be used, "Passion Seent" if possible. This trapping should not be done through the ice but should be done by using dry sets, such as the use of float boards, or bank sets. The traps should be kept away from the feeding places and houses. Muskrats are promiscuous in breeding habit, so a decrease in males should not be detrimental. We believe it beneficial.

Sex Ratio from January thru March 15, 1941

Month	Percent Male	Percent Female	Muskrats Examined
January	62%	38%	1,000
February	58.6%	41.4%	1,000
March	55.94%	44.06%	463

Breeding Data (Contd.)

Breeding Data

A. Pregnancy

A pregnant muskrat was identified by an enlargement and darkening of the mammary scar on the under side of the skin turned 'fur-in' ready for shipment. The scar in most cases was two to three times larger than the normal size of a non-pregnant muskrat, and in every case the scar was dark color and some hides showed signs of breaking prime, noted by dark blotches on the skin.

Prior to February 24, very few pregnant muskrats were noted; however, from this date on, signs of pregnancy increased rapidly. From February 24 to 28, 20% of the female muskrats were determined pregnant. From March 1 to 15, 64.21% of the female muskrats were pregnant. This breeding season is probably early due to the open winter.

B. Average number of muskrats per embryo

An embryo study was started in March. 26 muskrats were opened and eleven were found to be pregnant, thus giving 42.3% pregnancy. Out of the 11 pregnant muskrats, each embryo averaged 7.54 unborn muskrats.

Mean Average Length by Arbitrary Origin

Endeavoring to check on the size of the cured muskrat skins from season to season, we have measured the length of the cured muskrat skins ready for shipment. The skins were measured from the tip of the nose to the square of the hips. The results show a definite decline in size from January muskrats to March muskrats. Therefore, we believe that during January larger muskrats are caught. The mean average length by arbitrary origin for February hides is 14.0015.

Muskrats Control Vegetation

The muskrats are reducing some of the dense stands of rushes on the Refuge by opening these areas, and they are making these areas more suitable for the ducks and geese. This is especially true on the northeast side of the Refuge in sections 4, 8, and 10. We plan on leaving a section closed to muskrat trapping, upon which there is a very dense growth of bulrush, in an effort to have this section opened up and make it more desirable habitat for the ducks and geese.

Furs Damaged by Birds

On February 8, a Tule Lake trapper observed a bald eagle feeding on a trapped muskrat. Upon investigation it was found that the fur was damaged beyond value.

D. Fur-Bearing Animals, Predators, Rodents, etc.

1. Muskrat Harvest

This year, for the first time at Tule Lake Refuge, the muskrat harvest was placed on the cooperative share basis with the permittees being required to turn over to the government 50% of the muskrat catch in the form of skinned, stretched, and dried furs ready for sale.

Tule Lake sump was divided into 14 trapping units and each trapper assigned a unit with exclusive trapping privileges thereon. Under present plans each trapper is to be limited to a total of 2,000 muskrats, or a total maximum take of 28,000 on Tule Lake Refuge for the year. The permittees were chosen by the Ass't Regional Director, Regional Refuge Inspector, and refuge personnel from applications submitted to the Fish and Wildlife Service.

Trapping is being conducted under the general Regulations for the Administration of National Wildlife Refuges and certain special regulations which are a part and condition of each trapping permit. Trapping operations are under the direct supervision of the refuge manager and two trapping inspectors who supervise the trapping, skinning, stretching and fleshing and who see that the furs are properly graded and that a fair division is made of the furs between the trapper and the government.

In past years muskrat trapping at Tule Lake commenced each year the latter part of November. Due to delays in approving the new procedure and issuing permits, trapping this year did not start until January 1, 1941. At the time the permits were received most of the lake was covered with ice and very few muskrats were caught until the 12th of January. By January 12th some open water was present in most of the trapping units but through the entire month of January ice was present in the denser marsh growth. During the colder weather many of the trappers tried to break the ice-covered channels with outboard boats but had little success. Unless the ice disappears from the lake within the first week of February it is very doubtful that all of the trappers will trap their quota of 2,000 muskrats.

The procedure followed by the trapping inspectors is to collect

furs from each trapper weekly on a scheduled day. The government share is then brought to refuge headquarters and immediately stamped with the symbol "US2". Dry furs are packed in bales of 300 and expressed to the Seattle Exchange. Each bale is composed of six piles of furs fifty deep, securely wrapped with sacking obtained by splitting open two grain sacks. This produces an easily-handled rectangular package with little chance of the furs becoming wrinkled in transit. A few of the hides received from the trappers are not thoroughly dry and these are hung by the nose and dried before shipping.

The pelts this season appear to be as large as usual although many furs did not reach prime due to the comparatively mild winter. General observation has shown that some of the animals are not fat and many of the skimmers report that the muskrats are poor this season. The skimmers also report that a few of the animals seem to be infected with small blisters and that this condition occurred last year but to a lesser extent. The skimmers have been requested to save carcasses from infected muskrats so that an autopsy can be made to determine the cause of the infection.

On January 10th approximately 500 muskrat carcasses were turned over to the Butte Falls Federal fish hatchery for the purpose of conducting a feeding experiment on fingerling steelhead trout to determine the food value of muskrat carcasses. An additional quantity of muskrat carcasses will be turned over to the Butte Falls hatchery before the trapping season ends. If these experiments are successful and if facilities are provided at Tule Lake Refuge for freezing and storing the carcasses the muskrat trapping operations here could provide large quantities of fish food at a very low cost.

With construction work under way on the Lower Klamath Refuge it is expected this refuge will within a few years approach the number caught at Tule Lake. At present unrestricted trapping takes place, principally on the Sheepy Lake area of Lower Klamath. When Lower Klamath is flooded, marsh growth established, and trapping restricted, it is expected the muskrat population will rapidly increase.

Upper Klamath Refuge has an annual harvest of muskrats but part of it is leased for muskrat trapping by the Bureau of Reclamation (this privilege is included in leases made by that Bureau). Under proper control it is believed the Upper Klamath Refuge would yield about 5,000 muskrats annually.

The deep water and lack of marsh growth at Clear Lake make that refuge unsuitable for muskrat production.

Muskrat Trappers' Fur Sale

On February 1, 1941, a muskrat fur sale was sponsored by the Tule Lake at Refuge trappers and took place at the refuge headquarters. The purpose of this sale was to enable the refuge trappers to obtain a better price by offering for sale a larger number of furs. That this idea was sound was substantiated by the large number of fur dealers at the sale.

The following fur houses were represented at the sale:

D. A. Holmes Co., Seattle, Washington
West Side Fur Co., West Salem, Oregon
Seattle Raw Fur, Seattle, Washington
Burns Raw Fur, Seattle, Washington
Arctic Fur Co., Seattle, Washington
Klamath Falls Junk Co., Klamath Falls, Oregon
Star Trading Co., Klamath Falls, Oregon

The fur sale was conducted in an efficient manner by the trappers. The only assistance given by refuge personnel was to temporarily remove motor vehicles from the garage stalls and clean up the garage stalls for the sale, and to guard the furs. Each trapper displayed his furs in a stall number which corresponded with his refuge trapping unit number.

The fur house representatives submitted sealed bids on each lot of furs. The supervisor of the sale read all bids and signified the highest bidder on each lot. A total of 4,095 furs were offered for sale by the refuge trappers. 3,885 furs were purchased by Hollis Noonchester who represented the D. A. Holmes Co. of Seattle, Washington. 210 furs were purchased by I. W. Thomas who represented the West Side Fur Co., of West Salem, Oregon. The highest bid submitted on any lot was \$1.96 per fur. The lowest accepted bid was \$1.70. The furs sold for an average of \$1.92 each for the entire lot or a total amount of \$7,877.84. To our knowledge this is an all-time high average price for furs taken from the

Tule Lake Refuge.

We were informed by Mr. D. A. Holmes that the Tule Lake muskrat furs which he purchased equaled or bettered any muskrat furs in the west. This was based on the uniform size, thickness of hides, grade of fur, and the excellent care given the furs by the skinners.

Mr. Holmes also stated that many of these furs would be used in the manufacture of aviators' uniforms to aid in our national defense.

In conducting the sale sealed bids were submitted by the fur byers. The form of the bids used is shown below:

Tule Lake, California

Date _____

Lot No. _____

No. of muskrat furs _____

Amount of bid \$ _____

Name of fur house _____

Name of representative making bid _____

It is expressly understood that the owner or seller of these furs reserves the right to reject any or all bids.

If bid accepted and sale made, trapper sign below.

(Trapper's Signature)