1954

Duck Nesting Survey Report, Raymond Fleetwood

PRELIMINARY NESTING REPORT
(Final Report Will Follow)

During the period June 4 - July 14, 1954, the writer was engaged in Duck Nesting Studies and Predation on the Monte Vista Refuge. Most of the time was spent on those units that were used extensively as nesting sites last year. Not much time was spent on the Berry tract as it did not have sufficient nesting vegetation due to the fact that it was heavily grazed last winter. During this period 256 duck nests of five species were found. Seventy three of these nests contained 542 eggs with an average of 7.4 eggs per nest. Of the 73 nests that contained eggs when found, 28 or 39 per cent hatched a total of 209 eggs. Thirty two of the 73 nests or 44 per cent were destroyed with a loss of 212 eggs.

Predators had destroyed 136 nests with 580 eggs prior to their discovery by the writer, so during the study a total of 168 nests containing 792 eggs were destroyed by predators. In other words 65% of all the nests found were destroyed with a loss of 792 eggs. Last year 77.5% of the nests were destroyed. Apparently better nesting cover resulting from the exclusion of stock and the pre-nesting season trapping were factors in reducing the losses from predators.

Sixty six nests found by the writer had either hatched prior to finding or after discovery. In other words the eggs in 25 3/4% of all the nests found hatched a total of 489 eggs but this does not mean that 489 ducklings were produced, as a number

of duchlings died in the nests. A potential of 1402 eggs were produced and 56½% were destroyed by predators, 34 7/8% hatched and 5% deserted.

On the Spring Creek area or Unit #1 30 duck nests were found during the survey. Of this number 32 or 64% of the nests were found destroyed or were destroyed by predators after they were located. There was sufficient evidence at 22 of the nests to warrant the naming of the predator, in this case the skunk. Only 14 or 28% of the nests hatched on this unit. Two nests were deserted.

Pre-nesting season trapping operations were carried out on this unit this year and by comparing nesting success with the nesting success on all the other units as a whole, these trapping operations had something to do with the hatching success on this unit.

A total of 206 duck nests were found on units exclusive of Unit #1. Out of this number, 139 or 67½% of the nests were destroyed, and there was sufficient evidence at 125 nests to place the blame on the skunk. Hatching success of 52 nests or 25½% was lower than on Unit #1 where trapping was done. Predation was greater on these units that did not have trapping this spring.

The ring-necked pheasant has increased on the Refuge as 46 nests were found. Of course several of the nests had been destroyed.

Although there has been a slight decrease in the loss of duck nests from predators, there still is too much predation on the Refuge. There are a number of animals on the refuge that can be classed as predators on duck eggs and ducklings, namely fox, coyote, badger, weasel, ground squirrel, snakes, magpie, crow, dogs, house cats and marsh hawk.

Last winter a poisoning program was conducted in the valley for the control of magpies and this species was noticeably scarcer this summer and it was not frequently seen on the areas where the nests were concentrated. Egg shells along the fence bordering the Empire Canal may have been carried there by magpies.

Two coyotes were seen in a cattail marsh on Unit 12 and no doubt a few nests were destroyed by this species.

Since only the garter snake and an occasional rattler occur on the refuge this group could not be responsible for the heavy losses.

The weasel and mink may destroy some ducklings but none were observed during the study.

Last year the writer was inclined to believe that the Saguache meadow vole Microtus pennsylvanicus modestus could have been responsible for some of the losses, as shells were found in the runways. However, this species is now considered of little importance in the losses, as eggs placed in the runways were not eaten. Neither is the ground squirrel considered an important destroyer of duck nests as a half dozen hen eggs were placed around

some feed where at least 15 individuals were known to feed. The eggs remained there two weeks without a single egg being eaten.

A number of dummy nests of hen and duck eggs were made along ditches where skunk dens were located. Traps were placed near these nests and 5 skunks were trapped and in most cases the eggs had been eaten before the animals stepped into the trap. These shells were collected and used for comparison purposes. One skunk was caught without being injured so it was placed in a pen, watered and fed hen and deserted duck eggs for a period of 2 weeks. The shells were removed each morning and a series of shells was accumulated. By comparing many of the eggs found in destroyed nests there is not any doubt about the predator that is doing the greatest damage. Out of 168 nests that were destroyed, 147 or 87% can definitely be attributed to the work of skunks.

From trapping, location of dens, sign and animals seen, there is a heavy concentration of these animals on the refuge. Signs left by the animals as they rooted around for insects and rodent food was plentiful on some of the units where nests were concentrated. Naturally any nest whether duck, pheasant, short-eared owl, bittern or marsh hawk found by marauding skunks was destroyed.

Usually the eggs of a destroyed nest were more or less spherical with a hole in the end or side. Frequently shells contained a small hole or two made by teeth. The edges usually were broken and pushed in, and the contents were licked clean. Generally the shells were in the nest or within 5 feet of the nest. Occasionally shells would be carried away upward of thirty feet and dropped

in runs or openings. Frequently these scattered shells led to the discovery of a nest nearby.

The fox predation is the result of the escape of perhaps 6 silver fox from Pearsall's Fish Hatchery. One silver fox was shot in Unit #1 while the duck nesting studies were being made. Fresh tracks left in the unit after a light drizzle indicate that at least another animal is present. It is assumed that a number of nests in Unit #1 were destroyed by these animals.

In conclusion it can be stated that the refuge was used as a nesting place by a greater number of ducks and pheasants than last year. Hatching success was better than last year, in spite of the predator population. By experiments and observations there is no doubt in the writer's mind about the skunk being the principal predator on duck nests on the Monte Vista Refuge. The writer is of the opinion that the skunk population on the refuge will build up more rapidly since grazing has been eliminated and recommends that a trapping or poisoning program be conducted before the next nesting season.

A more complete report will be submitted on the duck nesting studies at an early date.

Raymond J. Fleetwood

STANDARD FORM NO. 64

Office Memorandum • UNITED STATES GOVERNMENT

TO : Refuge Manager, Monte Vista Refuge, Monte Vista, Colorado DATE: July 7, 1954

FROM : Regional Director, Albuquerque, New Mexico 2-R

SUBJECT: Predation on Waterfowl Nests - Monte Vista Refuge

For your information we are enclosing a copy of Mr. Krummes's memorandum of June 30, requesting data concerning the heavy predation on nesting waterfowl on the Monte Vista Refuge.

Like Mr. Krummes, we also are concerned over the cause of this predation. After two years of study by Mr. Fleetwood, it seems that the cause should be apparent.

Has a dummy nest been made and traps set to determine whether this predation is caused by birds or animals? What is the apparent cause of this?

John C. Gatlin
Regional Director

BY: George E. Barclay
George E. Barclay
Regional Supervisor
Branch of Wildlife Refuges

Encl.

cc: Mr. Fleetwood
Monte Vista Refuge

Jack R. Grieb, Wildlife Statistician, Room 245 - July 14, 1954
Forestry Building, Colo. A&M College, Fort Collins, Colo.

Refuge Manager, Monte Vista National Wildlife Refuge
P. O. Box 566, Monte Vista, Colorado

Nesting Survey

Reference is made to your letter of July 8, 1954, regarding the nesting situation here in the San Luis Valley. As you know the Valley has been extremely dry and this has somewhat affected the nesting situation this year although our nesting populations on the refuge proper is up somewhat above last year's populations.

As of this date the total of 256 nests have been found with 170 of them being destroyed by predators. These figures show that 66% of the nests found were destroyed before hatching, but taking the total eggs found which was 1402 it was found that 34% hatched.

For the Valley as a whole we are unable to say as to the nesting situation but in most areas the nesting success was probably no better than that had on the refuge.

Mr. Fleetwood will wind up his nesting survey here in the very near future and you will be forwarded a copy of this.

We hope that together with our figures and your figures on nesting pairs observed earlier in the Valley that you may come up with some information regarding the overall situation here.

If at any time we can be of any help to you please advise.

Charles R. Bryant
Refuge Manager

CRB:vfp

Regional Director, Fish and Wildlife Service
P. O. Box 1306, Albuquerque, New Mexico

July 15, 1954

Refuge Manager, Monte Vista National Wildlife Refuge
P. O. Box 566, Monte Vista, Colorado

Predation on Waterfowl Nests - Monte Vista Refuge

Reference is made to Mr. Barclay's memorandum of July 7, and Mr. Krummes letter of June 30, regarding Predation on Waterfowl Nests on the Monte Vista Refuge.

Mr. Fleetwood completed his nesting survey on July 14, and preliminary findings of this years nesting studies are enclosed. We feel that this preliminary report answers questions which were asked by Mr. Krummes in his letter of June 30, 1954.

During the early part of the nesting season we removed approximately 30 skunks from the upper Sheridan tract which is Unit 1. We thought that this removal would show a decided decrease in nests destroyed by predators but is not reflected too much in the nesting survey. Apparently we failed to take enough of the predators which are present in Unit 1.

As Mr. Fleetwood shows a heavy loss due to skunks on the refuge we would like to have approval to start a poisoning and trapping program during the early part of the fall and next spring before the nesting season. This trapping and poisoning would be carried on by refuge personnel and supervised by local Predator and Rodent Control office. If we have approval to do this over a period of t time we feel that refuge personnel can handle the job without additional hiring of L. A. employees or outside personnel.

Charles R. Bryant
Refuge Manager

CRB:vfp

STATE OF COLORADO

GAME AND FISH COMMISSION

DENVER, COLORADO

THOMAS L. KIMBALL
EXECUTIVE DIRECTOR

Rm. 245-Forestry Bldg.
Colorado A & M College
Fort Collins, Colorado

July 8, 1954

Mr. Charles R. Bryant
Refuge Manager
Monte Vista National Wildlife Refuge
Box 566
Monte Vista, Colorado

Dear Pete:

Apparently my schedule will not permit me to come into the Valley this month as I had planned, due to brood surveys in other areas. Therefore, would you please send me a general resume of how production is coming down there. I do not know if Mr. Fleetwood had intended to send up the results of his nesting study in time for the Central Flyway Meeting at the end of this month, and that is why I am asking you for a brief summary.

Conditions in the South Platte Valley, which is the area in which we are now in, looks extremely bad due to drouth. I would estimate that we may be down thirty or more per cent in production this year from last even though breeding populations were very similar between the two years. I do not know about the other areas in the State, for we have not worked them as yet.

I will send you a copy of our report which is due in Albuquerque the later part of this month.

Thanks a lot.

Very truly yours,

Jack R. Grieb (ll)

Jack R. Grieb
Wildlife Statistician

JRG:lt

The Director, Washington, D. C. July 21, 1954

2-R

Regional Director, Albuquerque, New Mexico

Waterfowl Nest Predation - Monte Vista Refuge

Your memorandum of June 30, signed by Mr. Krummes, requested information relating to waterfowl nesting losses at Monte Vista Refuge during the current season.

We have recently received a preliminary report written by Mr. Fleetwood covering the 1955 nesting season, which we believe you will find interesting. We are also transmitting a copy of Mr. Bryant's memorandum of July 15 on the same subject.

An effort was made early this spring to remove by trapping a number of skunks from some of the more concentrated nesting areas. You will recall we were requested in Mr. Salyer's memorandum of April 19 to attempt to control these animals by methods other than poisoning before taking further steps. Both Mr. Bryant and Mr. Fleetwood are now convinced that most of the damage can be attributed to skunks and it is quite apparent from this year's results that more stringent methods than trapping will be necessary. It is also quite apparent that the Monte Vista Refuge supports a large population of these animals.

We concur in Mr. Bryant's recommendation that a strong effort be made during the early fall and spring of 1955 and 1956 to remove as many skunks as possible, utilizing both trapping and poisoning methods.

John C. Gatlin
Regional Director

Charles A. Bryant
July 21, 1954

Attachments

cc: Monte Vista Refuge

Regional Director, FWS. Albuquerque, N.Mex. July 26, 1954

Biologist, Bosque del Apache Refuge, San Antonio, N. Mex.

Duck Nesting Report - Monte Vista Refuge

Enclosed is the original and two copies of the Duck Nesting Report prepared from data collected on the Monte Vista Wildlife Refuge June 30 July 15, 1954.

I have forwarded Mr. Jack R. Grieb of Fort Collins, Colorado a copy of this report.

Retain a copy for your files, forward a copy to Chas. R. Bryant, Box 566, Monte Vista and the other copy goes to the Central Office.

Raymond J. Fleetwood

CC Monte Vista Refuge

Aug. 24, Abstract

The Director, Washington 25, D. C. July 30, 1954

Regional Director, Albuquerque, New Mexico 2-R

Waterfowl Nest Predation - Monte Vista Refuge

Reference is made to Mr. Krummes' memorandum of June 30 and subsequent correspondence relating to duck nesting on the Monte Vista Refuge.

We are enclosing a final report prepared by Mr. Fleetwood on duck nesting and predation studies on the Monte Vista Refuge for the period June 4 to July 15. Mr. Fleetwood has done an excellent job on these studies this year. We believe that he has put forth excellent recommendations relative to the management of this area.

It is our recommendation that a very active program of trapping and poisoning of skunks be undertaken next winter and spring in order to reduce the predation on nesting birds. Authorization is requested to carry on this program in accordance with Mr. Fleetwood's recommendations.

John C. Gatlin
Regional Director

BY:
H. O. Crowley
Acting Regional Director

Encl.

cc: Monte Vista Refuge w/cc report

August 29, 59

To Monte Vista Refuge

DUCK NESTING AND PREDATION STUDIES ON THE MONTE VISTA NAT,L. WILDLIFE REFUGE JUNE 4-July 15, 1954

During the period June 4 - July 15, 1954, the writer was assigned to the Monte Vista Wildlife Refuge to continue the nesting and predation studies initiated last summer.

The techniques used in searching for nests were the same as those employed last year, namely; the method of walking back and forth through the area under search attempting to flush hens off the nests. Usually a long stick was carried to cover a wider strip and to explore tufts of grass that might conceal nests. A second method used this year, thanks to the kind assistance of my wife, was the dragging of a 100 foot length of quarter inch rope, which allowed approximately a hundred foot strip to be covered at one time. Usually every brooding hen on the nests would flush. The strips covered by the rope were then walked over in order to find nests that been destroyed or had hatched. A couple of days the rope was used by the writer working alone. One of the rope was tied to an iron stake, and the end farthest from the rope was driven into the ground. With the loose end of the rope in hand, the rope was dragged over a circular area approximately one hundred feet in diameter. Each circular area was then walked over to discover nests that had hatched, been destroyed and to flush any hen that failed to move when the rope passed over the nests.

The scattered shells of eggs eaten by predators often served as clues to destroyed nests. Almost invariably, a thorough search would reveal a destroyed nest within a radius of twenty feet. The empty shell were easily as most of the shells taken from nests by predators, were dropped in shallow pools, most of which were dry at the time of the field work. Short stakes were located near each nest that was found to prevent duplication and to mark the sites for revisits. Pertinent data was written on the stakes.

Last year's Studies revealed that certain units were more heavily used by ducks for nesting sites, than other units. Consequently, those units were given particular attention this year . The favorite units were nos. 14, 10, 1, 9, 12, 13 and 7. Not much time was spent on the Berry tract as adequate nesting cover was lacking, due to heavy grazing last winter and early spring. One field of the Berry tract would have been a favorable site for nests had it not been for a drove of horses grasing on the area this summer. Fortunately the horses were removed July 1 . Ditches, fences, roads, canal banks and streams were covered where the cover appeared ample. Naturally predation was heavy on these features due to the fact, that predators travelled commonly along them. Some time was spent in serching for nests in hay fields but so few nests were found, that it is believed that the time could be spent to better advantage elsewhere. Only 2 nests were found in hay fields, one was found by a mower, the other by the writer before the hay was cut. The nest was marked adequately but the permittee cut the grass so close to the nest that the hen deserted the nest. Seems strange how valuable a little vegetation around a duck nest becomes to a permittee when the field is being mowed, then to look over the field at the loose cured hay that is left in the field. It would seem that better cleanup of the field would more than pay for any hay that would be sacrificed by leaving larger unmowed patches around marked duck nests. Another thing that should be mentioned in haying permits is the distance that the operator is to stay from fences and ditches as nests are frequently placed along these features. A strip five feet wide along each side would be adequate.

During this investigation, the writer found 256 duck nests or 109 more than were found last year., mainly on units #1, 14, 10, and 9. Seventy-nine nests or 30.9 % contained clutches of one to twelve eggs which indicated that the hen was in the process of laying or brooding. Last year 53 nests were found with eggs intact and of this number 27 or 50.9% were later destroyed by predators. Of the 256 nests found this year, 138 or 53.9% had been destroyed by predators before the writer found them. Last year 87 or 59.1% of the nests had been destroyed by predators prior to the writer's discovery of the nests.

Of the 79 nests found with eggs intact this year, 38 or 48% were destroyed either at the time of discovery or later. Last year for nests of the same status 50.9% were destroyed. Twenty-eight nests out of the 79 nests hatched wholly or in part. This year the total number of nests that hatched wholly or in part numbered 66 or 26.1%. This is better than last year's hatch of 18.4% of the 147 nests that were found. See Tables 1, 6 & 8.

Nesting in Relation to Cover

This year 193 or 75.7% of the nests were located in rush "wire-grass" Juncus ater whereas only 55.7% of the nests, found last year were in this cover type. Sedges were next in importance as 34 or 13.3% were found in this cover type, a slight drop from the 19.9% of last year. Grass was third with 17 Or 6.6% of the nests in this cover type, a slight increse over the 5.7% of last year. Greasewood is another cover type that was not used for nesting sites, as much, as last year . Last year 13 or 9.2% of the nests were in or under bushes of this species. The other cover types, namely; cattail, round-stem bulrush, rabbit bush, spikerush were used about the same as last year. Mention should be made of two other unusual nesting sites - a haystack and trees. Two nests selected by mallard hens were placed in old magpie nests located in willow trees on unit #14. One nest contained 1 egg when the nest was found, later destroyed. The other nest contained 5 eggs when it was found June 7 and the hen was still brooding July 13. The eggs appeared to be infertile. See Table 3.

In the course of these Studies note was made of the nature and degree of concealment of each nest found as it might be viewed by avian or mamm-alian predators. This appraisal through human eyes and according to human ideas of visibility, may not reflect conditions as viewed by wild creatures. Anyway the degree of concealment was indicated by the designations, "poor", "fair", "good", and "excellent". One would expect that the least predation would be borne by those nests in "excellent" cover by human appraisal. This Study showed that this is not the case on the Monte Vista refuge as 68.6% of the nests located in the "excellent" cover category were destroyed by predators. Compare this with the 61.9% loss for nests adjudged to have been located in"poor" cover. Nests in cover classed as "fair and "good" had losses of 76.3% and 71.3% respectively. Of the 240 nests that terminated in hatching, the highest degree of success (38%) was had by the group adjudged to have had poor concealment. See Table #6.

From these Studies, the writer is of the opinion, that further attention should be given to cover on the Monte Vista refuge. Certain areas that had a good number of nests last year were nearly forsaken this year, even though stock had been prohibited a year or more. One area in particular, was the area between Spring Creek and the long greasewood strip directly north of the Johnson house. The western end of the area is chiefly grass while rush Juncus ater is the chief constituent in the cover on the east end.

The thick grass on the west end especially after it had been beaten down by snow, does not seem suitable for nesting sites this year. This may be due to the resistance that the grass has against ducks attempting to make nests. Rush or "wiregrass Juncus ater appears to be affected in the same manner. The area on the Johnson tract west of the new well looked as though it should have many nests, however only a few nests were found on the area and all of these with the exception of one nest had been destroyed by predators. It is believed that such dense cover would be a formidable obstacle to ducklings in getting to water. Investigations made by other workers in several states show that cover can become too dense for maximum use as nesting sites. These investigators have found also, that predation losses tend to increase when the vegetation becomes to thick and rank, mainly through the exclusion of cattle.

The various sedges Carex diandra, Carex lanuginosa, Carex simulata and Carex nebraskensis were not used as extensively, as they were last year. This may be to the rather late and cool spring which retarded the growth of the sedges which did not afford suitable cover until the last of June. Pheasants as well as ducks showed a preference for rush "wiregrass" as nesting cover since 39 out of 46 nests were in this cover type. See Table#5.

Pheasant Nesting

While ther may be some doubt about the success of the nesting ducks, there is no cause for doubt about the success of the nesting pheasants. Last year the writer found 16 pheasant nests, only 2 of which had hatched wholly or in part. This year 46 pheasant nests were found and of this number 20 or 50% contained 180 eggs (51.7%) that hatched. Twenty nests were destroyed by predators or deserted. Six nests were being brooded when the Studies terminated. Predators, and foremost among these, must be placed the skunk accounted for 95% of the nest failures and for 89.3% of the egg losses. Four broods of young were seen on the refuge and 2 hens were found dead after having suffered the loss of both feet in mowers.

The writer attributes 19 pheasant nests lost, to predators and one to desertion. By comparing eaten pheasant eggs taken from destroyed nest, with eaten duck eggs from the field, eaten hen, duck, pheasant and marsh hawk eggs eaten by an adult female skunk while confined in a pen, the writer is convinced that the skunk is the principal destroyer of pheasant and duck nests on the refuge. Why the nest success of the pheasant is higher than it is for the ducks is not clear unless the pheasant hen sits "tight" when an enemy approaches. On two occasions the writer sliped his hand under brooding pheasant hens before they flushed. Ducks do not take chances so they flush while the enemy is some distance away, leaving the eggs in full view of an enemy. One pheasant nest located along a wire fence in "fair" cover and approximately 200 feet from trees that contained magpie nests hatched successfully. No doubt a few nests are destroyed by magpies especially when the nests happen to be in brushy areas or along brushy fences that are frequented by magpies. Magpies have the habit of taking eggs out of the nests and taking them to fence posts or other perches where the eggs are eaten. During the Studies on the refuge no appreciable number of pheasant or duck shells were found along fences, in fact, the only shell (3) were found along the fence on the west side of the Empire canal on the Berry tract, here to, magpies were common and it was not unusual to count 25 or more flying ahead of the car while driving along the canal.

Miscellaneous Nesting Birds

During the field work, nine marsh hawk nests containing either eggs or young were found. Last year five nests were found. Two nests were destroyed by predators, the seven other nests produced 20 young. Eighteen of these were banded. Marsh hawks and ducks nested 14 paces apart.

Six short-eared owl nests were found during the investigations and two of the nests were destroyed by predators. Eighteen young were banded. The nesting population this year is the same as last year, however, it would be advantegeous to build up the population if possible because the Saguache meadow mouse, an abundant rodent on the refuge, is the principal item in their diet. The kangaroo rat Perodipus montanus montanus also is eaten as a partly eaten carcass was found at a short-eared owl's nest.

Only one American bittern nest was found this summer. The nest contained four young when found. One young bittern was found dead near the nest two days later. Several pairs of common snipe, Wilson's phalarope and avocets nested on the refuge but no nests were found, although several young phalaropes were seen in mown hay fields.

Predation and Predators

On the Spring creek area or unit #1, 50 duck nests were found during the Survey. Of this number 32 or 64% of the nests found, were destroyed by predators. Only 14 or 28% of the nests hatched on this unit. Two nests were deserted.

A total of 206 duck nests were found on units exclusive of unit #1. One hundred and five of these were on unit #14; 40 on unit #10 and the remaining 61 nests were on units #7,9, 12, 13 and the Berry tract. Sixty-three of the 105 nests or 60% on unit #14 were destroyed by predators and predation was heaviest in areas with tall and tick cover. Of the 206 nests on units exclusive of unit #1, 139 or 67.5% of the nests were destroyed and there was sufficient evidence at most of the nests to place the blame on the skunk. Nest success of 52 nests or 25½% was lower than on unit #1 where pre-season trapping was done.

Although there has been a slight decrease in the loss of duck nest by predators, there is still too much predation on the refuge and much must be done before the 60% nesting success, a figure which Mr. Kalmbach considered normal on large areas studied by him. Pre-nesting trapping was done on unit #1 and by comparing the nest success on this unit with nest success on the other units, we see that the trapping was factor in the higher nest success on unit #1.

There are a number of animals on the refuge that can be classed as probable predators of pheasant and duck eggs and young, namely, fox, coyote, badger, weasel, mink, snakes, magpie, crow, dogs, house cats, thirteen-striped ground squirrel, raven and marsh hawk.

Last winter a poisoning program was conducted against the magpie in the valley. Evidently it accomplished its purpose, as the birds were noticeably scarcer on and adjacent to the refuge. Seldom were they seen on the units where the nests were concentrated and when they were seen, all were in brushy areas or along fences. A few shells along fences may have been dropped by magpies, especially along the Empire canal. A mallard nest containing 5 eggs was located in an old magpie's nest in a tree, on unit #14. The clump of trees in which the nest was loc-

ated is approximately 200 yards from the refuge boundary and is a conspicuous landmark for magpies, yet magpies had not destroyed the nest when the Studies terminated.

No weasels or minks were observed during the survey but they are known to occur on the refuge.

Last year the writer was inclined to blame the Saguache meadow mouse Microtus pennsylvanicus modestus for some of the egg losses as shells were found in their runways. These shells were probably carried and dropped by the mice after larger predators had eaten the contents. The species now is considered of little importance as a destroyer of eggs, as eggs placed in the runways were not eaten over a period of two weeks. Neither is the ground squirrel considered as an important destroyer of eggs as a half dozen hen eggs were placed among bags of feed where at least 15 individuals were known to feed. The eggs remained there two weeks without a single egg being eaten.

A number of dummy nests of hen and duck eggs (deserted) were made along ditches where skunk dens were located. Traps were placed near these nests and 6 skunks were cught, in most cases the eggs had been eaten before the traps were thrown. The shells were collected and used for comparison purposes. One female skunk was caught without being injured so it was placed in a pen, watered and fed hen, abandoned duck, pheasant and marsh hawk eggs for nearly tree weeks. The empty shells were removed each morning and a series of shells was accumulated. By comparing many of the eggs found in destroyed nests there is not any doubt of the predator that is doing the greatest damage. Out of 168 nests destroyed by predator, 147 or 87% can definitely be attributed to the work of skunks.

From trapping, location of dens, sign and animals seen and killed, there is a heavy concentration of these animals on the refuge. Sign left by the animals as they rooted around for insects and rodent food was plentiful on some of the units where nests were concentrated. Naturally, any nest, whether duck, pheasant, short-eared owl, marsh hawk or bittern found by marauding skunks was destroyed. Generally the nest structure and down of destroyed nests was dragged out into the paths that led to the nests. The eaten eggs were more or less spherical with a hole in the end or side. Frequently shells contained one or two small holes made by teeth. The edges usually broken and pushed in and the contents were licked clean, the bottom of the nest was generally sticky. Occasionally shells were carried upwards of thirty feet and dropped in runs and openings. Frequently these scattered shells led to the discovery of nests in the vicinity.

The fox predation is the result of the escape, a few years ago, of perhaps 6 silver fox from Pearsall's fish hatchery. One silver fox was shot in unit #1 while the nesting studies were being made. Fresh tracks observed in unit #1 after a light drizzle indicate that at least animal is present. Two nests on this unit did not contain eaten shells so it is believed that fox destroyed these.

In conclusion it can be stated that the refuge was used as a nesting place by a greater number of ducks and pheasants than last year. Hatching success was better than last year, spite of the predator population. experiments and observations there is no doubt in the writer's mind about the skunk being the principal predator on duck and pheasant nests on the refuge. The writer is of the opinion that the skunk population on the refuge will build up more rapidly since grazing has been eliminated and recommends that a trapping or poisoning program be conducted before the next nesting season. Due to a sheet of notes being mislaid, the figures used in connection with nests and eggs in my Prelinary Report and this report do not agree so those in this report are to be accepted.

Vegetation

Due to the cool weather and late frost the first week of June vegetation on the refuge was not as luxuriant as last year, in fact the late frost killed the tips of round-stem bulrumsh and other food producing plants. Spikerush and the sedges appeared to have fared better than round-stem bulrush. Most of the ditches had a good growth of pondweed Potamogeton and arrowhead Sagitteria . Horned pomweed is not as abundant as pondweed. Stable water levels on Spring Creek has increased the pondweed in several pools. Mention should be made of the New Mexican checkermallow Sidalcea neomexicana a very abundant plant growing on the boggy soils of unit #1 and on similar soil on otherunits. In so far as known it does not have any food value for wildlife but does afford nesting cover. Certain areas especilly around wells had good stands of white and Alsike clovers. A clover believed to be sub clover Trifolium subterraneum was collected and will be sent away for identification. A dozen or more plants were collected and will be identified.

Russell Lake

A couple of hours were spent at Russell Lake July 4 in search of birds and nests. Two black-crowned nightherons and 22 young snowy egrets were banded. A glossy ibis, a young bird was seen but it escaped in the tall and thick round stem bulrush. A pair of adults was seen and there may have been others, as it was nearly impossible to get through the vegetation. Many western grebes including young and a 100 or more ducks were present.

July 26, 1954

Respectfully Submitted

Raymond J. Fleetwood

TABLE I

Final data for 253 duck nests are known; the remainder of the 256 nests were still incubating when last visited July 14. Table I shows the fate of these 253 nests and 1414 eggs they contained, cause and failure to hatch in 187 nests.

Table I. Fate of duck nests and eggs: Final data, 253 nests; Cause of failure to hatch, 187 nests.

	Final Data			Causes of Failure to Hatch				
Nests and Eggs	Hatched	Failed to Hatch	Total	Predators	Deserted	Haying Operations	Infertile	Stock
No. Nests	66	187	253	162	10	2	12	1
%	26.1	73.9	100	86.6	5.3	1.0	6.4	0.7
No. Eggs	489	1305	1794	1242	40	14	16	3
%	27.3	72.7	100	95.2	3.0	1.0	1.2	0.2

An average brood of 7.4 young was obtained for the 66 nests known to have hatched wholly or in part. This compares favorably with the average clutch of 8.15 obtained for the 60 nests having complete clutches. On the other hand, considering all the nests that are believed to have complete clutches of 6 or more eggs (140 nests), the average number of eggs per hen attempting to nest is 7.52. This compares favorably with the average of 7.4 eggs per clutch obtained for the 66 nests known to have hatched. There were 116 nests that contained under 6 eggs when destroyed, deserted or at the last visit. See Table II.

TABLE II. Clutch size of all duck nests
(Average Clutch of 140 Completed Clutches - 7.52)

Nests and Eggs	Complete Clutches of Known Size							Under 6 eggs when destroyed Hatched or Deserted	Hatched before Found Clutches Estimate
No. Eggs	6	7	8	9	10	11	12		
No. Nests	36	38	44	9	6	6	1	116	58

TABLE III. Number of nests by species and cover types
Monte Vista Nat'l. Wildlife Refuge, June 4 - July 15, 1954

Species	Cultural Rush obects		Juncus		Tree		Sedge: Carex diandra, C. lanuginosa, C. simulata, C. Nebraskensis		Weeds		Grass: Deschampsia caespitosa, Calamagrostis inexpansa		Rabbit Grese-bush		wood		Cattail		Total	
	No.	%	No.	%	No.	%	No.		%		No.	%	No.	%	No.	%	No.	%	No.	%
Mallard	1	0.4	167	78.9	2	0.7	20	9.4	3	1.4	16	7.5	2	0.7	2	0.7	3	1.4	213	83.1
Pintail			12	70.6			5	29.4											17	6.7
Gadwall			7	53.8			4	30.8	1	7.7	1	7.7							13	5.1
Cin. teal			4	4444			5	55.5											9	3.9
Shoveler			3	100.0															3	1.2
5 species	1	0.3	193	75.72	2	0.8	34	13.3	4	1.5	17	6.6	2	0.8	2	0.8	3	1.0	255	100.0

TABLE IV. NUMBER OF PHEASANT NESTS AND COVER TYPES
Monte Vista Refuge, June 4- July 15, 1954

Pheasant			39	84.8			3	6.5	1	2.2	2	4.3							46	100.0

TABLE V. Fate of Pheasant Nests and Eggs: Final Data, 46 Nests:
Cause of Failure to Hatch, 20 Nests.

Nests and Eggs	Final Data: Hatched	Final Data: Failed to Hatch	Total	Causes of Failure to Hatch: Predators	Deserted	Infertile	Being Incubated on last visit
No. Nests	20	20	40	19	1	5	6
%	50.0	50.0	100.0	95.0	5.0		100
No. Eggs	170	159	329	142	5	12	44
%	51.7	48.3	100.0	89.3	3.1	7.6	100