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RECEIVED
JUN 23 1980
HILLSIDE NWR

June 19, 1980

Mr. Herb Bell, Manager
Hillside National Wildlife Refuge
U.S. Fish and Wildlife Service
Yazoo City, MS 39194

Dear Herb:

Here is a copy of our annual report on the nutria project. We appreciate your help. The project will be continued for at least another year.

Sincerely,

Jim Wolfe

James L. Wolfe
Professor

JLW:fq

Enclosure

ANNUAL PERFORMANCE REPORT

State: Mississippi

Project Number: W-48-28
Study Number: IX
Job Number: IX-2

Study Title:

Nutria Investigation: Status of Ecology of Nutria in Mississippi

Period Covered: July 1, 1979 - June 30, 1980

Job Objective:

To describe the population, ecology and economic status of nutria in Mississippi.

A. Activity

During this first year, our efforts have been concentrated on one population. This research provided some useful information on movements, and a beginning into reproductive, food habits, and population stucies. More importantly, it allowed us to acquire a "feel" for working with this animal and perfect methodologies that are applicable. Some of these include:

1. The testing of drugs for tranquilizing trapped animals to permit handling. We discovered, with the assistance of personnel in the College of Veterinary Medicine, that ketamine hydrochloride is an excellent drug for this purpose. We tested the compound both on captive animals and in the field with no indication of adverse effects.
2. Development of live-trapping techniques. We adapted methodologies previously used in Louisiana to our habitats and equipment. This involves the use of large floating platforms and prebaiting with carrots or sweet potatoes. Using this method, we have had up to 70% trap success during some periods.

3. Collection of reference material for food habits research. Dozens of plant species from nutria habitats have been collected and their macerated tissues prepared as slides for comparison to stomach and scat samples.

4. Radiotracking. During the course of the first year's work, we became quite proficient at radiotracking and can use this technique to answer specific questions about movements in the future.

B. Target Dates

We have proposed a five-year schedule for accomplishing the objectives of this study. Accomplishments during the first year were according to schedule.

C. Significant Deviations

None.

D. Remarks

The nature of our data generally requires collection over a minimum of three years to be meaningful. Detailed analyses of fragmentary data are worth little and are not attempted. However, some questions of a more limited nature can be addressed over a shorter period. For example, during the past year, we accumulated enough data on the nutria population on Hillside NWR for a crude estimate of population levels and of home ranges of individuals on the area. A brief manuscript dealing with these has been submitted for publication.

E. Recommendations

Continue study as planned for four additional years. Expand research efforts to other geographic areas, especially coastal counties.

F. Cost

| Personnel | Cost | Man-days |
|---|---|---|
| James L. Wolfe | $3000.00 | 24 |
| Technician | 6000.00 | 120 |
| Fringe Benefits | 1530.00 | |
| Travel | 1020.00 | |
| Supplies | 700.00 | |
| Federal Share | 12250.00 | |
| State Share | 4083.33 | |
| Total Budget | $16333.33 | |

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[illegible]

Movement Patterns [illegible] ion Density
of Nutria in [illegible]

The nutria (Myocastor coyp[illegible]), [illegible] large aquatic rodent from South America, is [illegible] the southeastern [illegible] States. Populations h[illegible] becom[illegible] [illegible]ablished in [illegible] waterways along the Gulf Coast [illegible]) after their introduction into Louisiana [illegible] source in the [illegible]. Nutria are prolific [illegible] and [illegible] of abundant food supply, population densities may [illegible] (Brown 1975). [illegible] agricultural damage is well docu[illegible] and much effort has been put into control programs ([illegible] 1970). Living in loosely construct[illegible] colonies (Wa[illegible] 1968), nutria occupy home ranges but are not highly t[illegible]itorial since they do not defend clearly defined areas (Ry[illegible] 1956). Studies of their activity pa[illegible] present [illegible] results. [illegible] (1[illegible]2) state that nutri[illegible] [illegible] tunnel. Norri[illegible] (1[illegible]7) report[illegible] th[illegible] [illegible] urred [illegible] hours before [illegible].

From June [illegible] the [illegible] density, daily act[illegible] [illegible] [illegible] telemet[illegible] [illegible] nutria population in [illegible] Mississ[illegible].

[illegible]

[illegible] the Hillside National [illegible], [illegible] County, [illegible]. The dominant

vegetation of the study area [illegible] (*[illegible] philoxeroides*), which major [illegible] vegetation [illegible] (*Scirpus* sp., *Juncus* [illegible]) and [illegible] (*Eleocharis* [illegible]). Two-thirds of one side of the [illegible] bordered by a [illegible] field and the remaining third [illegible] vegetation. The other side of the pond was bo[illegible] levee.

The study area was divided [illegible] quadrangles (15-62 m x 83 m), and a plywood [illegible] platform (1 x [illegible]) was anchored in each quadrangle [illegible] the nearness to east and west shorelines alte[illegible] between blocks. One platform was placed near the [illegible] in the middle of each of the 16 blocks. Live traps [illegible] carrots were placed on the floating platforms in [illegible] afternoon and [illegible] shortly after dawn. Captured [illegible] were immobilized with intramuscular injections of [illegible] (*[illegible] hydrochloride*), sexed, weighed, marked by ear [illegible] ear tags, and released where captured. Nutr[illegible] difficult to mark and the longevity of these tagging [illegible] was not known (Evans et al. 1972). Sixteen traps were [illegible] for 10 nights.

Two adults of each sex were fitted with radio transmitter packs attached onto collars of nylon-covered rubber hose. The flexible antenna was threaded through the hose.

Portable receiving equipment was used to determine locations of each animal. Triangulations from the levee were made about every 2 h for four [illegible] periods. Trapping was stopped during the tracking se[illegible] avoid disturbing the radio-tagged animal[illegible].

The term "home range" [illegible] contained within the borders [illegible] the outermost [illegible] points determined by triangulation. [illegible] burrows and foraging [illegible] shoreline.

Population density was [illegible] with the Peterson Index from the mark-[illegible] ture [illegible] nonparametric Kolmogorov goodness-of-fit ([illegible]) was used to test for independence of nutria capture [illegible] the number of triangulated location points a[illegible] the 16 blocks. A [illegible] contingency table test [illegible] for [illegible] shorelines and a Chi-[illegible] ratio other than 1:1.

## Results and [illegible]

Forty-two per cent of the [illegible] were made near the east and 58% near the west shore [illegible]. The contingency table did not indicate one shoreline [illegible] favored over the other ($t=1.218$, $p>.25$), and the Kolmogorov test indicated no differential trapping results among the 16 blocks ($t_{16}=.219$, $p>$[illegible]). However, the same test for independence of triangulated locations showed a significant difference among the blocks ($t_{15}=2.0$, $p<.01$). A comparison was [illegible] made between the number of nutria captured and the number of triangulations in each of the 16 blocks (Fig. [illegible]). Forty-one per cent of all triangulated locations were [illegible] the center of the pond (between blocks 5 and 11) [illegible] animals triangulated in the extreme north and south [illegible]. Examination of the

shoreline showed that the bank [illegible] thick with burrows while the [illegible] north and [illegible] ends of the pond were relatively [illegible]. [illegible] of triangulations in the pond [illegible] probably indicated [illegible] diurnal triangulations were [illegible].

I estimated a population [illegible] 24 animals/ha). Brown (1975) [illegible] a polluted 5-acre pond (24.7 [illegible]) [illegible] about [illegible] nutria/ha in a similar unpolluted [illegible]. He suggested that agricultural pollution encourages growth of water hyacinths (Eichhornia crassipes) which [illegible] favored nutria food. Willner et al. (1979) and Rysk[illegible] (1966) reported densities of 0.5 to 21.4 and 10.4 nutria/ha respectively. Human activity may have affected these data. Commercial trapping was present at Willner's site and Ryszkowski enclosed his animals for 2 of 4 winters. Because my study was in a national wildlife area, human predation was probably not a significant factor. Theoretically, the nutria population was limited solely by natural restraints.

More males were caught [illegible]. The Chi-square test indicated the difference [illegible] non significant ($t=3.76$, $p=.054$). Willner et al. [illegible], Norris (19[illegible]) and Adams (1956) also reported [illegible] favoring [illegible],

the differences were not always [illegible] significant.

The mean computed [illegible] radio-[illegible] was 2.31 ha of water ([illegible] females [illegible] computed home range bo[illegible] (Fig. 2). [illegible] moved almost entirely [illegible] small area near the [illegible] since the study area [illegible] forced to move across the paths [illegible] found that nutria have [illegible] range and [illegible] nesting sites. Although I did [illegible] an overt [illegible] encounters, sounds of fighting [illegible] "mooing", gnashing of teeth and loud vigorous splashing were often heard during late night hours. Warkentin (196[illegible]) described "mooing" as a threat signal and attacks aimed [illegible] opponent's incisors occurring during actual fighting.

Two of the animals made long distance movements out of the study area (Fig. 2). During [illegible] 19[illegible]9, a female was relocated 1 km north of the study [illegible] an adjoining marsh. On 27 July, she was again found in the marsh at 2100 h [illegible] returned to the study area of [illegible] 3 h later. Subsequent monitoring [illegible] not [illegible] return to the marsh, and it was not included in the [illegible] estimate. [illegible] was located within the study area [illegible] through August but from 22 September - [illegible] October [illegible] found .8 km [illegible] the study site. Movement to this [illegible] included considerable distance over land. This nutria [illegible] return to the study

area. Norris (1967) has sugg[illegible] that those nutria [illegible] .8-11.2 km from the original c[illegible] may have been [illegible] on the move when captured. It [illegible] that this [illegible] was an immigrant because [illegible] the study area for over 3 months. Ryszk[illegible] (1[illegible]) [illegible] suggested that [illegible] disperse to new areas [illegible] The male may have migrat[illegible] such pressure.

I found nutria activity [illegible] the night [illegible] movement during other [illegible] was [illegible]. [illegible] (1[illegible]) [illegible] nocturnal locations found nutri[illegible], while [illegible] diurnal locations indic[illegible] mov[illegible] began moving about 2 h before sunset and mov[illegible] continued until sunrise. Chabreck (1962) reports nutria activity to be greatest during the night with a peak in movement just before sunrise. Nor[illegible] (1967) found greatest activity between [illegible] and sunset with limited movement at night. On [illegible], the radio-tagged animals in my study were found [illegible] moving [illegible] 3430 [illegible]. Other nutria were often observed swim[illegible], [illegible] and grooming on the trap platforms during the day. [illegible] not unusual [illegible] several animals swimming and/or [illegible] near the shore in even at noon. Ambient air temp[illegible] this time often exceeded 32 C. Chabreck (1962) [illegible] nutria moving [illegible] the day in times of food shorta[illegible] believed they were searching for food. Muskrats h[illegible] reported to [illegible]

their daily activit[illegible] [illegible] [illegible] Vegetation known to b[illegible] nutr[illegible] always [illegible] this study, so these [illegible] diurnal [illegible] to fulfill other need[illegible].

Acknowledgments - F[illegible] by the [illegible] Memorial Fund of The [illegible] Muse[illegible] History and [illegible] in Wildlife Restoration, [illegible] No. [illegible] wish to thank [illegible] Lohoefener for his continu[illegible] help [illegible] appreciate [illegible] of James L. Wolfe in the development [illegible] ject and editor[illegible] suggestions, and of Ron [illegible] review[illegible] manuscript. U.S. [illegible] Wildlife Service personnel [illegible] were extremely cooperat[illegible] and helpful.

## [illegible]terat[illegible]


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Fig. 1. Per cent of captures [illegible] to per cent of triangu[illegible] location poi[illegible] amo[illegible] [illegible] [illegible]ks.

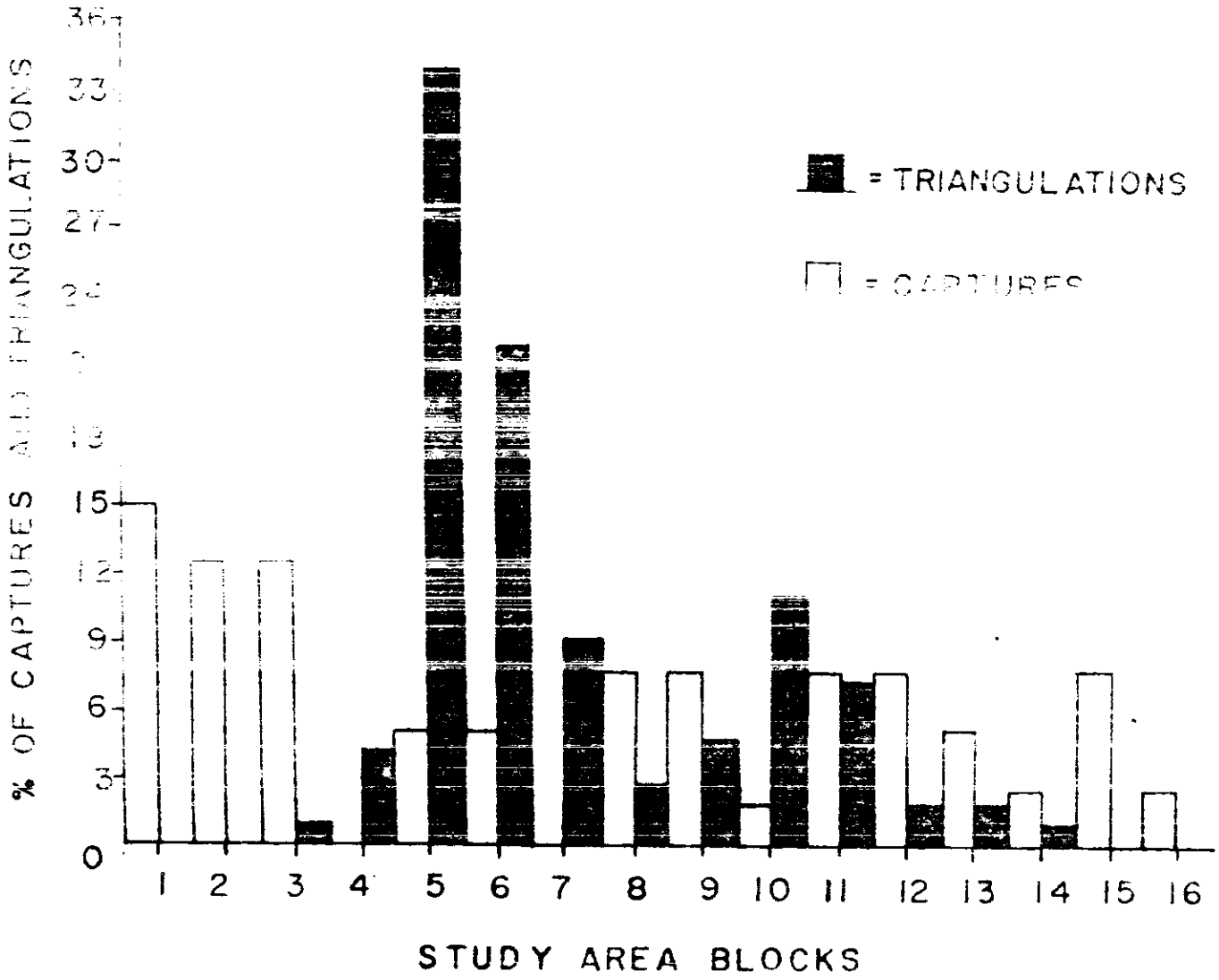
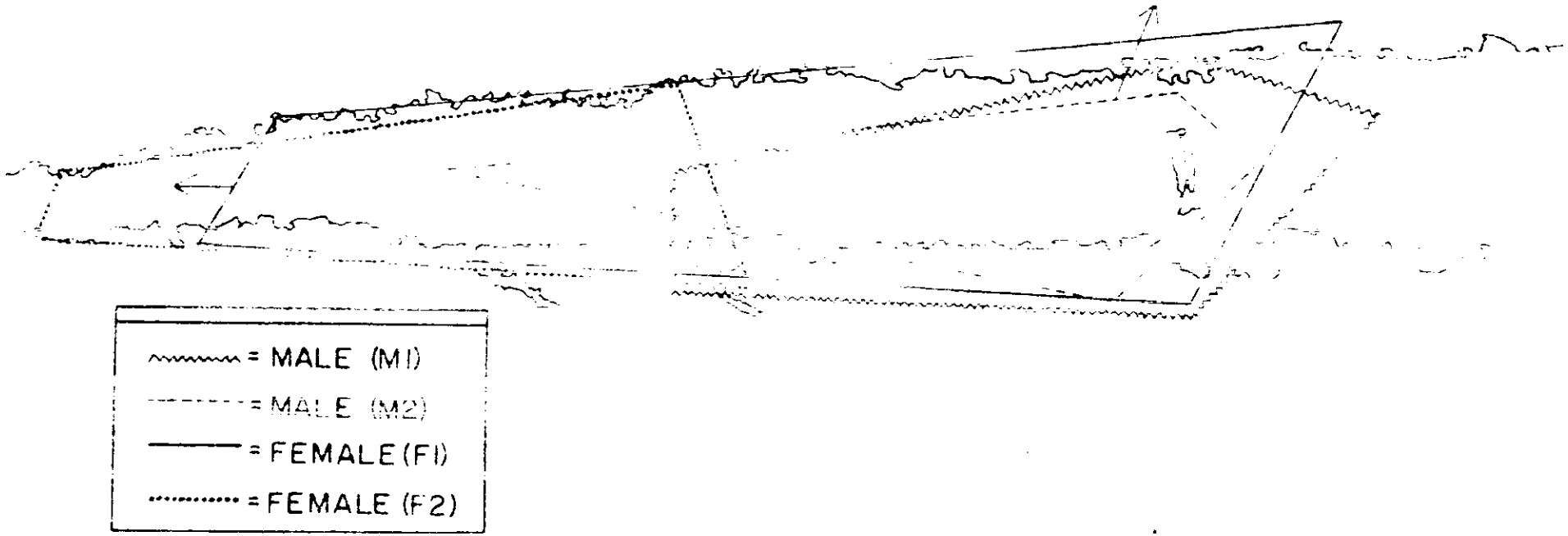

% OF CAPTURES AND TRIANGULATIONS
36
33
30
27
24
21
18
15
12
9
6
3
0
= TRIANGULATIONS
= CAPTURES
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
STUDY AREA BLOCKS

Fig. 2. Map of study area showing [illegible] ranges of [illegible] nutria. Arr[illegible] indic[illegible] [illegible]t out of the study [illegible]


= MALE (M1)
= MALE (M2)
= FEMALE (F1)
= FEMALE (F2)