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efuge Manager	Parker River NWR	6/23/87

ubject Animal Control Plan - Parker River NWR

Attached find subject plan submitted for your review/approval.

3-1908 (Rev.6/63) (Attach securely to material to be transmitted & mail through regular channels)

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ANIMAL CONTROL PLAN

PARKER RIVER NATIONAL WILDLIFE REFUGE
NEWBURYPORT, MASSACHUSETTS

Submitted: John L. Ellis _____ Date: June 23, 1987
Refuge Manager

Reviewed: _____ Date: _____
Refuge Supervisor

Reviewed: _____ Date: _____

Reviewed: _____ Date: _____

Approved: _____ Date: _____

MANAGEMENT PLAN PARKER RIVER NWR

ANIMAL CONTROL PLAN

INTRODUCTION

The Parker River National Wildlife Refuge was established in 1942 as part of the National Wildlife Refuge System and is managed specifically for protection of wildlife and wildlife habitat. It is located on 4,662 acres of salt marsh, fresh-water marsh, beaches and dunes in Essex County, Massachusetts. The refuge includes the southern two-thirds of Plum Island and is one of the few natural barrier beach-dune-salt marsh complex-es left on the Northeast Coast.

A number of ground nesting bird species inhabit the refuge, in-cluding least (Sterna antillarum) and common (Sterna hirundo) terns, piping plovers (Charadrius melodus), and black ducks (Anas rubripes). Table 3 contains a list of ground nesting bird species that have been found on the refuge within the past 5 years. Some of these species are of particular import-ance because of their status (Table 1).

Predation is always an important concern for the management of ground nesting birds. Management becomes more important when predator populations become excessively large, when a high level of predation is observed, or when predation is observed on threatened and endangered species.

Over the last ten years, the red fox (Vulpes vulpes) popula-tion on the refuge has fluctuated dramatically. In 1975, the population suffered a complete or near complete die-off due to sarcoptic mange. By 1977 the foxes had recovered to an esti-mated fifteen individuals. In November of 1978 a fox with sarcoptic mange was destroyed. In late winter/early spring of 1978/79, more sightings of fox exhibiting symptoms of mange were made, and several dead fox were found. No fox were seen until the fall of 1980 and numbers remained low through 1982. The population has steadily increased since then. In 1986 and 1987, fourteen and five fox were counted respectively by heli-copter during a daylight deer (Odocoileus virginianus) survey.

Opossums (Didelphis virginianus) first appeared on the refuge around 1984 and are still relatively uncommon. Raccoons (Procyon lotor) are relatively uncommon on the refuge but have been found sleeping in duck nest boxes during the winter. Striped skunks (Mephitis mephitis) have been and still remain

abundant on the refuge, particularly in and around buildings and other structures. Nest predation by skunks has probably reduced least tern production significantly on the refuge in the last two decades (see Appendix 1), and foxes and skunks used the tern nesting colony sites extensively in 1985. In all probability, they used plover areas with equal frequency (R. Secatore, Piping Plover Management Plan).

Muskrats (Ondatra zibethicus) are abundant residents of the freshwater marshes on the refuge. Approximately 55 lodges were counted from the air in January 1985. Since then, the population seems to have declined somewhat. Beaver (Castor canadensis) have resided on the refuge intermittently and have alternately been released on, and removed from, the refuge. An active lodge was abandoned in the spring of 1985 and reactivated in 1986. Otter (Lutra canadensis) dens, slides and other signs have been seen occasionally on the refuge but these furbearers remain relatively rare. Woodchucks (Marmota monax) are abundant on the upland areas of the refuge.

Snapping turtles (Chelydra serpentina) are occasionally sighted crossing upland areas of the refuge and are fairly abundant in North, Stage Island Pools and possibly South Pool.

CONFORMANCE WITH STATUTORY AUTHORITIES

Compatibility

When population levels of certain wildlife species or behavior patterns of specific individuals reach the point where they conflict with the objectives described below, they will be considered incompatible with the purpose for which the refuge was established.

Cost

The cost of implementation of this plan will be minimal as action will be conducted in conjunction with, and incidental to, other refuge activities. Equipment and material on hand will be utilized. These include: pickup truck, canoe, hip boots and traps. Part of the cost of construction and implementation labor and materials will be assessed to the YCC budget.

Approximate costs of equipment are as follows:

Material:

Item	Quantity	Cost
Gas cartridges	100 canisters	$ 50.00
Traps		
Turtle traps (wire, net)	6 traps	$ 25.00
Havahart-Raccoon	2	$100.00
Snap traps (rat/mouse)	6 each	$ 25.00
Pickup truck use	100 miles	$ 75.00

Labor:

Prorated overhead	annual	$ 20.00
Subsequent labor		$140.00
Replacement traps		$ 25.00

Objectives

The objectives of animal control on the Parker River Refuge are:

1. To contribute to the widest possible natural diversity of indigenous fish and wildlife and habitat types (7 RM 1.1), and to provide the public with quality wildlife-oriented recreational experiences.

2. To maintain population levels of wildlife species which: a) ensure a minimal amount of destruction to refuge and surrounding habitat, b) are compatible with refuge objectives including those which may involve habitat manipulation, c) are at a level where nest or chick predation will not be excessive.

3. To contribute to the attainment of national migratory bird (7 RM 3), mammal, and non-migratory bird (7 RM 4) and endangered species (7 RM 2) goals or objectives.

4. To maintain healthy populations of ground nesting bird species and thus prevent any resident or migratory species from becoming threatened, and to protect threatened species from further decline.

5. To ensure that conflicts between endangered/threatened species and other wildlife management or public use programs are resolved in favor of the endangered/threatened species (7 RM 2.2). Considerations will also be given to the protection of species identified by the State as endangered or threatened (7 RM 2.1).

6. To minimize wildlife damage to physical facilities (e.g. dikes and water control structures) and to facilitate safe operation of farm equipment and vehicles (7 RM 14).

7. To minimize the occurrence of high population densities of wildlife species which have the potential to transmit contagious diseases to humans, among other mammals, or to domestic animals (7 RM 14.2) (includes control of small rodent populations in refuge facilities and buildings).

Assessment

The following is a description of the problems or potential problems related to individual wildlife species considered in this plan.

Striped Skunk

The striped skunk is a known predator of ground nesting birds, particularly pheasants (Phasianus colchicus), least terns, piping plovers and waterfowl. Predation on piping plovers has been recorded in the past. Parker River NWR has supported anywhere from 2-5 pairs of nesting plovers over the last 5 years. As a result of the increased emphasis on this species due to its recent Federal listing as a threatened species, a dummy nest experiment was conducted on the refuge in 1986. Nest scrapes containing quail (Coturina spp.) eggs were created to simulate nests of piping plovers. Of the fifteen nests, over half were destroyed; at least four by skunks. Results appear in Table 2. The refuge skunk population has been consistently high. Refuge law enforcement officers who frequently patrol at night (during the period when skunks are most active) report them as abundant. During their winter denning period skunks tend to concentrate

around buildings and man-made structures (particularly Camp Sea Haven). During summer and fall they spread out over the island. At night they frequently travel along the dune edges and tide wrack in search of food. A high incidence of skunk tracks and sightings on the beach, and the disproportionate level of skunk predation on dummy nests suggest an imminent threat to piping plovers and other beach nesting birds. The abnormally high skunk population on the refuge represents a continuous threat to all other ground nesting birds, including waterfowl. Skunks are also known to carry canine distemper and rabies. The spread of these diseases is usually facilitated by high vector populations. Rabies can be transmitted to both domestic animals and humans.

Red Fox

The refuge fox population has steadily increased recently. In 1986, as many as 14 individuals were seen from a helicopter during daylight hours. Foxes have been known to prey on piping plover and least tern eggs on the refuge, and are significant predators of nesting waterfowl (7 RM 3 Ex.2). Black duck remains have been found outside the fox dens on the refuge. They also prey on pheasants and other ground nesting birds. Because it is a barrier island, the topography of Parker River Refuge serves to confine the foxes' food source to a smaller area, facilitating easier capture and location of prey. Refuge personnel banding waterfowl reported as many as 18 ducks killed in traps by foxes and raccoons in one year. The fox population is not at the level of the skunk population but their mobility and location in the food chain, make them equally important threats to ground nesting birds. Fox also carry distemper, rabies and mange.

Raccoons

Raccoons, although considerably less abundant than foxes and skunks, are also present on the refuge. They are most likely at first attracted to the island by the garbage and refuse associated with human inhabitation. Eventually they find their way onto the refuge. Raccoons are known predators of ground nesting birds, especially waterfowl, and have also been recorded preying on trapped waterfowl. Raccoons carry rabies and distemper.

Opossums are relatively new residents of the refuge. The refuge population is still small but could grow in time if unchecked. Like the above-mentioned carnivores, opossums are predators of ground nesting birds.

Woodchuck

The woodchuck's propensity for burrowing has made him an undesirable species. Parker River Refuge supports a substantial population of chucks. Burrows in upland areas are a hazard to the operation of farm equipment, and can cause structural damage to dikes.

Beaver

Beaver have the potential to cause more damage or alteration to refuge habitat than almost any other mammal. Occasional flooding, damming and felling of trees have been observed . When these activities disrupt, alter, or interfere with specific objectives of the refuge, the beaver will be removed. Beaver can also carry Giardiasis (Giardia lamblia), a parasitic infection which can be transmitted to humans.

Muskrat

Muskrats can cause considerable habitat destruction when population levels become excessive. Cattail (Typha spp.) marshes can be completely wiped out during "eat outs". Muskrat populations are usually naturally controlled by density dependent factors. Although the refuge population has not yet reached critical levels, the potential remains. Muskrats frequently cause damage by burrowing into dikes. It is still uncertain, but muskrats are also suspected of being carriers of Giardia.

White-tailed Deer

The deer population on Parker River Refuge is extremely high. Helicopter surveys for the past 3 years are as follows:

	1985	1986	1987
Survey 1	119	100	129
Survey 2	104	94	110

The recommended winter population range for deer on the refuge is 15-30 animals. Excessively high populations often result in an overall reduction in the health of individuals, higher relative mortality, and the threat of a population crash. Deer struggling through the winter can also cause extensive habitat destruction by overbrowsing. When deer begin feeding on plant foods with little or no nutritive value, as has been observed on Parker River Refuge, it is obvious that preferred food sources have been exhausted. Preferred plant species for deer are also important foods for other wildlife and extensive overbrowsing has resulted in a reduction in available food and cover, as well as an overall degradation of the habitat quality and variety.

Deer are intermediate hosts of Lyme disease. This parasitic infection can be debilitating to humans. The incidence of transmission increases exponentially as the deer population increases. In the neighboring Crane Reservation, Lyme disease has already reached epidemic proportions and it is known that deer from the Reservation and the Refuge do intermingle. As food becomes scarce, deer begin to lose some of their natural fear of humans and accept food handouts. Gradually they become accustomed to humans and this leads to a higher level of deer/human interaction. This could lead to a greater chance of injury; especially during the rut, when deer are more aggressive. In 1986, a woman was bitten on the hand while feeding a deer. More deer also means more deer ticks (Ixodes dammini) and a greater potential for incidence of Lyme disease.

A higher incidence of deer poaching, correlated with the increase in deer numbers, has also been observed on the refuge. This could pose considerable problems for refuge law enforcement as well as public safety in the future.

Rabbit

The cottontail rabbit (Sylvilagus fontinalis) population on Parker River Refuge has fluctuated dramatically over the years, indirectly correlated with the fox population. Their recent fierce competition for food with the overpopulated deer herd has resulted in an unnaturally high level of habitat destruction. In general, the rabbit population tends to be controlled by natural cycles of predation and competition.

Rodents

Small rodents (Mus spp.) (Peramyscus spp.) tend to be more of a nuisance, but could potentially cause considerable damage to refuge property and buildings if not controlled. There is also the possibility of transmission of disease to humans with increased human/rodent interaction.

Reptiles

Snapping turtles are abundant in the freshwater impoundments on Parker River Refuge. Due to the low numbers of fish in these pools, turtles rely more heavily on young waterfowl for food. A high turtle population could seriously impact waterfowl production on the refuge. The stomach of one turtle trapped in 1986 was found to contain 2 ducklings, a red-winged blackbird (Agelaius phoeniceus) and muskrat parts.

Feral and Domestic Animals

The presence of feral and free-roaming domestic animals poses a serious threat to wildlife species on the refuge. Dogs and cats are predators of ground nesting birds, small mammals and deer. Their presence on the refuge is inconsistent with general and specific refuge objectives and goals, and they should be removed whenever possible.

Action

A. Inventory

Wildlife species will be inventoried in accordance with this station's Wildlife Inventory Plan. Additional inventory procedures will be as follows:

-Continue dummy nest experiment conducted in 1986 according to guidelines in Appendix 1.

-Conduct a scent post index according to specific guidelines in Appendix 2.

-Conduct annual aerial counts of red foxes and muskrat lodges in conjunction with aerial deer survey (Procedure 9, Wildlife Inventory Plan).

-Conduct red fox, striped skunk and raccoon counts in conjunction with Nighttime Spotlight Deer Survey (Procedure 8, Wildlife Inventory Plan).

-Conduct nocturnal counts of red fox, skunk and raccoons in conjunction with routine law enforcement patrols.

-Locate active red fox dens in conjunction with dead deer survey.

B. Control Methods

All control work will be conducted in accordance with State laws and regulations. Parker River Refuge currently has a valid depredation permit for the taking of red fox, striped skunk, raccoon and opossum by means of live-trapping, shooting and asphyxiation.

The most effective way to control the spread of mange, distemper and rabies is to keep vector or host animal populations at healthy levels. These diseases usually exist in populations at certain low levels but become epidemic as a result of increased contact, interaction and stress, and decreased fitness due to overcrowding (interspecific aggression).

When population levels are determined to be excessive, the following actions will be taken:

Striped Skunk

The most effective and efficient method for trapping and removing skunks is the use of live traps. Traps will be placed in and around buildings and other areas of concentration. Trapped skunks will be removed to western upland portions of the refuge. The most effective way of removing skunks from other areas, particularly beach areas where they pose a definite threat to threatened/endangered and other ground nesting birds, is by the discreet and judicious use of small caliber firearms. Discretion will be up to refuge personnel in terms of times, specific methods and locations. These two methods combined can only be expected to hold down the skunk population at or near acceptable levels.

Red Fox

The refuge currently has a valid depredation permit for taking red foxes. By far the most effective method for removing red foxes is the use of leghold traps. As this method conflicts with State regulations, alternative methods must be used unless it is deemed necessary to seek exemption under special permit regulations. The methods proposed are: 1) the use of predator calls and shooting during hours when the refuge is closed to public use, and during the breeding season (February and March); 2) the use of gas cartridges in dens during the denning season (April and May); and 3) live-trapping and removal. These methods combined, (without the use of leg-hold traps), cannot be expected to control foxes at an acceptable level. They are also time intensive and require a certain level of skill. Recent research efforts conducted by Tufts University on Sandy Neck in Barnstable have shown that foxes tend to be very individualistic in their feeding techniques (P. Auger pers. comm.). Predator control for plover protection will concentrate on removing foxes and skunks found feeding on beach areas. This will be more efficient in removing offending individuals.

Raccoon

Due to the relatively low raccoon population, and the nature of the species, live trapping and (in a limited number of cases) removal with small caliber firearms, will be the most effective method. When pest individuals are located, or evidence of wildlife destruction is recorded, action will be taken to remove the offending animal.

Opossum

The two most effective methods of removing opossums are live-trapping and shooting. Opossums, alone, do not currently pose a serious threat to ground nesting birds but in combination with the other carnivores their presence can be serious. Any individuals found in sensitive areas (areas occupied by ground nesting birds) will be removed.

Woodchucks

Woodchucks seen in areas where burrows are detrimental to the safe operation of equipment and to dikes, will be removed by discreet and judicious use of small caliber firearms. Burrows located in these areas will be periodically gassed.

Beaver

Individual beaver, found to be altering habitat in a detrimental way, will be removed with small caliber firearms or live-trapped with Hancock traps and relocated. All beaver killed or trapped should be tested for Giardia.

Muskrat

If muskrat populations reach a level where they become destructive to habitat, the refuge will consider implementing a trapping program consistent with State regulations, and Service policy.

White-tailed Deer

The refuge white-tailed deer population will be controlled by implementation of a public hunt described in detail in the Refuge Management Plan, Big Game Hunt.

Rodents

Live traps and snap traps will be set for rodents in buildings where damage or potential health hazards are observed.

Reptiles

Turtle traps will be set and tended in conjunction with the refuge YCC program. Due to the effectiveness of turtle traps, the size of the turtle population, and the potential impact of turtles on waterfowl production, trapping of snapping turtles should be conducted to the maximum possible level within manpower constraints.

Feral and Domestic Animals

Feral and free-roaming domestic animals will be removed from the refuge, the most effective method for controlling feral cats is live-trapping or shooting.

Reasonable efforts will be made to capture free-roaming dogs. In the case of licensed dogs, local Dog Control Officers will be contacted; animals impounded; and owners will then be held responsible. In accordance with 50 CFR 28.43, dogs and cats observed in the act of harassing wildlife may be destroyed. Non-lethal means will be exhausted. Unlicensed dogs, if captured, can be turned over to local or State agencies for disposal.

RESEARCH/MANAGEMENT STUDY PROPOSAL

PARKER RIVER NATIONAL WILDLIFE REFUGE
Newburyport, Massachusetts

1. TITLE: PREDATION ON BEACH NESTING BIRDS

2. PROJECT NUMBER: PKR-RMS-86-20

3. OBJECTIVES: QUANTIFY THE AMOUNT OF PREDATION ON NESTING BIRDS AT PARKER RIVER NATIONAL WILDLIFE REFUGE. OBTAIN DATA ON FEASABILITY OF ANIMAL CONTROL FOR PROTECTION OF NESTING BIRDS. IDENTIFY THE SPECIES MOST INVOLVED IN THE PREDATION OF NESTS.

4. JUSTIFICATION: THE PIPING PLOVER HAS BEEN PLACED ON THE SERVICE'S THREATENED SPECIES LIST. THIS BIRD NESTS ON THE BEACH AT PARKER RIVER NWR AND HAS EXPERIENCED SOME SUCCESS IN RAISING YOUNG. HOWEVER, THE POPULATIONS OF RED FOX AND STRIPED SKUNK HAVE BEEN ON THE INCREASE AND THEIR INCREASED PRESENCE ON THE BEACH HAS BEEN NOTED. IT IS BELIEVED THAT THESE SPECIES ARE IMPACTING THE NESTING PLOVERS AND OTHER THREATENED SPECIES. THIS STUDY WILL IDENTIFY THE AMOUNT OF PREDATION THAT MAY BE OCCURRING AND THE SPECIES MOST LIKELY RESPONSIBLE FOR THE PREDATION.

5. PROCEDURE:

A. Methods and Materials:

Dummy nest procedures: 15 nests, 50 yards apart, independent of habitat, but in Piping Plover characteristic habitat. Three different treatments; 1 treatment per 5 nests. Three to four eggs per scrape. Quail eggs will be used in this study.

TREATMENT 1- "Natural Nests": Apply to 5 nests. Place eggs in scrapes with extended pole- at least 15 feet away. "Do Not Handle Eggs with Ungloved Hands". Place eggs with narrow point inward, all narrow points together. Check nest every 3-4 days. Keep good record of visits. Never walk up to the nest, if possible, check for tracks with binoculars. If nest was preyed on, look for and note any tracks in area and distance from scrape. Describe tracks in detail!! Collect any eggs or egg-shell fragments and label them.

TREATMENT 2- "Intensively Visited Nests": Apply to 5 nests. Place eggs in scrape with hands in same position as #1 above. Visit scrapes as often as possible (min. once a day). Walk up to nests, simulate trapping one time per nest by placing trap over nest and then picking it back up. Walk up to nest and note any tracks or disturbance. Collect fragments and eggs as #1 above.

TREATMENT 3- "Control": Apply to five nests. Place eggs in nest with hands. Visit nests every 3-4 days. Simulate trapping once per nest. Note any tracks and disturbances as in #1 above.

Run treatment for 2 weeks or until scrapes are all destroyed- whichever comes first. If possible, repeat experiment with new eggs.

Scrapes will be placed in series, treatment 1 then 2 then 3, then repeated until all 15 scrapes are placed. Numbering system will be 1-1,1-2,1-3, etc.; 2-1,2-2,2-3, etc. All scrapes will be marked with a numbered blue flag at least 20 feet away from the eggs in the cardinal direction indicated on a map of the treatment area. Scrapes will be placed at 50 yard intervals.

If possible, any predation will be documented by photo as well as by collection of egg fragments and tracks in the area.

These procedures are the same as Laurie McIver uses in her study on Cape Cod and Monomy NWR.

B. Results: Data will be shown in tabular form and charts showing the loss of scrapes per treatment and loss over time. Where possible a table of predators per treatment and overall predator losses for the entire test area will be built.

C. Interpretation: If it is determined that a significant number of nests are being lost to predation, then an animal control program will need to be instituted to assist the nesting birds, i.e. Piping Plovers and Least Terns.

6. COOPERATORS: None

7. RESPONSIBILITY: USFWS, STAFF PARKER RIVER NWR, J.F. MILTON

8. COST: MATERIALS ON HAND
EQUIPMENT ON HAND
MAN YEARS FY86 .06 COST $1,000

9. SCHEDULE: 7 AUGUST 86 TO 20 AUGUST 86 FIELD WORK
21 AUGUST 86 TO 15 SEPTEMBER 86 WRITE UP
31 SEPTEMBER COMPLETION

10. REPORTS: AT END OF STUDY 31 SEPTEMBER 1986

11. PUBLICATIONS: NONE EXPECTED

SUBMITTED BY: J. F. Mitter DATE 8/7/86

Endorsement: _____ DATE _____

REFUGE MANAGER APPROVAL: John B. Ellis DATE 8/7/86

REGIONAL OFFICE CONCURRENCE/APPROVAL: Thomas J. McAndrews

DATE: 8-14-86

Regional Office Disposition:

CC: RF-WO
WR-WO
SE-RO
RF-N(B)

HOW TO RUN SCENT STATION SURVEY LINES

A scent station consists of a 3-foot circle of sifted dirt with a scented plaster disk placed at its center. A scent station line consists of 10 of these stations, located 0.3 mile apart, placed on a continuous route along a secondary road. Each line is thus 2.7 miles long (0.3 miles X 9 intervals between stations = 2.7 miles). A line is run by setting up the 10 stations one day, leaving them overnight, then reading animal tracks in the sifted dirt the next day.

SELECTING SURVEY LINE LOCATIONS. Survey lines should be spaced at least 2 miles apart; the farther the better. Lines should be placed in typical habitat through areas you feel contain average wildlife populations. Don't select areas containing very low or high numbers, since the purpose of the survey is to measure average levels of abundance. Try to locate lines on lands that aren't likely to change ownership or land use so that comparable lines can be repeated there in following years. Select your routes along unpaved secondary or ranch roads where animals would normally travel. If you trap in the area, don't use roads near your traps.

Once you select your routes, mark the exact locations on a county, topographic, or other detailed map, and show which is the starting end of each (station 1). Assign a name and sequence number to each line, and mark these on the map too. (If you're repeating a line from previous years, give it the same name as before.) With each kit is also a form to fill out giving information about the area where the line is run. When the survey is finished, send in the map and completed area information form along with the data form for each line.

SETTING UP THE SCENT STATIONS. Stations are numbered from 1 to 10 along the route. They should be alternated on either side of the road as the line is set up, with station 1 on the left side, station 2 on the right, station 3 on the left, etc. (If you're repeating a line from previous years, start numbering at the same end of the route as you did before.) Locate the 10 stations 0.3 mile apart; this is easy if you use your vehicle odometer to follow the mileage.

Place each station near the road but far enough off so that it won't be run over by vehicles. Pick a more or less flat spot and mark a circle on it 3 feet in diameter. Measure (don't estimate) the circle size; it helps to use a 3-foot hoop made of stiff wire or something similar. Clear the circle of rocks, clumps of grass, etc.; sometimes you'll need a hoe or shovel to scalp off the vegetation, lift rocks, or level the site. Then sift dirt evenly over the circle to a depth of about 1/4 inch. If conditions are right, you can use dirt present at the site. A wooden frame 12" to 18" on a side and a bottom of 1/8" hardware cloth makes a useful sifter. Where loose, dry dirt is available, a piece of window screen that can be laid over the hardware cloth will sift fine, dry dust, ideal for reading tracks. In some areas it will be hard to find suitable dirt at scent station sites and much time will be saved if you carry dirt with you. Results are best with fine dust, about the consistency of flour. Failing this, you can use coarser dirt if it's screened, or sand if it's fine enough. Once the circle is covered with sifted dirt, place a scented plaster disk in the center to complete the station. Before you leave the site, if you put a marker such as a large rock or stick near the road edge, it will help you find the station from your vehicle tomorrow.

HANDLING THE SCENT DISKS. Each kit includes a glass tube containing 11 scented disks (enough for one survey line, plus a spare). The tubes come with tight stoppers and shouldn't be opened until they're needed. To control odor, they should be stored in cold or cool conditions, preferably inside another container (glass is best, since the odor can seep through plastic). The scent disks are plaster disks soaked in a mixture of organic acids that not only smell bad but are corrosive. Contact with them can remove paint, dissolve some plastics, and cause chemical burns to skin, so they should be handled carefully. Each kit includes disposable gloves and tweezers to help get them out of the tube and onto the scent stations without letting them touch skin or other surfaces.

As tracks are read the next day, the disks should be picked up from the stations and then disposed of along with the used tubes, gloves, etc. (They can be buried, taken to a dump, or discarded with household garbage.) The success of the survey depends on the odor being new to the animals, so we ask that all disks left be destroyed, and not used for more surveys in the same area or for other purposes like trapping. However, if a disk gets carried off from a station, don't worry about leaving it, since it will dissolve with a few rains.

If the scent accidentally gets on something and won't come off, contact Wildlife Services, Inc. for odor removal products.

COMPLETING THE DATA FORM. Each kit contains a blank data form to record animal visits to each station, plus completed forms

as examples of how to fill one out. For each survey line, complete the information at the top of a blank form (using the same line name and number you used on the map and area information form), then take the form with you and fill in the data for each station as you stop to examine it. Don't try to do this from your vehicle; get out, circle around, and look closely.

The first column on the data form is for station condition, operable or inoperable. If something happened to the station so that it couldn't take tracks or all tracks were destroyed - for example, if it was washed out by rain or trampled by livestock - record it as "inoperable" by marking a minus in the Station Condition column. Don't record animal visits for any station marked as inoperable; if you can read even one track, mark the station as operable (plus) so the visit can be counted (you can note problems, such as partially operable stations, under Comments). If more than 4 stations on one survey line are inoperable, that run is considered a wipe-out (see below for what to do in that case).

The other columns on the form are for recording animal visits. All that's actually recorded is absence (no mark) or presence (a "1", regardless of the number or size of tracks of that species at that station). The most common species have been given their own columns, but you should list all visitors whose tracks you can identify. When you can, name the exact species that made the track (either because you can tell it by its track or because you know it's the only one like that in your area). However, DON'T GUESS on track identification. If you're not reasonably sure, don't mark a "1" in a column or list the name (at least, not without a question mark) in the Other Species list. Likewise, don't record tracks that fall completely outside the 3-foot circle. Even if you're experienced, it helps to take a good track book with you, such as Murie's "Field Guide to Animal Tracks" (Peterson Field Guide series). If you have a good, clear track you just can't identify, you may want to photograph it in case someone else can (put down a pencil or some such object nearby to show the size).

Below the columns on the form is a place for comments. If something unusual happened that might affect interpretation of the data, note it here.

When the survey is finished, promptly send the completed data forms, area information forms, and maps for all your survey lines back to your survey coordinator.

WIPE-OUTS. To be counted, survey lines must be read the day after they were set out and must show at least 6 stations operable. Lines that don't qualify are considered wipe-outs and should be run again. To repeat a line, you can reconstruct the original stations or, if necessary, relocate the route and start over. Scent disks can be reused if they seem serviceable.

A 1-week period in mid-September is designated each year for running the survey nationwide, but a 2-week grace period is allowed beyond the survey week for lines that have been delayed or have to be repeated. Therefore, if bad weather is threatening, it's usually better to wait rather than risk setting a line that may be wiped out.

If you need quick replacements for forms or kits to repeat wiped-out surveys, phone your survey coordinator or Wildlife Services, Inc.

THE KIT. Each kit consists of:

1 instruction sheet
1 sample sheet of completed area information and data forms
1 sample route map
1 blank area information form
1 blank data form
1 glass tube containing 11 scent disks
1 pair of disposable plastic gloves
1 pair of disposable tweezers

CHECK LIST. Things to take with you when setting out and reading scent station lines:

One kit for each line (be sure to bring the data forms)
Pencil/pen
Extra paper for notes
Measure for station circles: 3-foot wire hoop or yardstick
Sifter for dirt at the sites (with optional window screen insert)
Presifted dirt or fine sand for difficult sites
Shovel
Hoe, pick, or both
Track guide(s)
Camera
Water for washing

Wildlife Services, Inc.
P.O. Box 876
Fredericksburg, Texas 78624
(512) 997-4454

SCENT STATION SURVEY - DATA FORM

Route name_____ No._____ County_____ State_____

Observer_____ Observer's organization_____

Date stations were set:_____

Date stations were read:_____

Was this same route run here last year?_____

CONDITIONS LAST NIGHT (circle one of each):

WEATHER:
(1) Clear
(2) Cloudy (no rain)
(3) Showers
(4) Rain
(5) Snow

WIND:
(1) Calm
(2) Light wind
(3) Moderate wind
(4) Strong wind

BAROMETRIC PRESSURE:
(1) Rising
(2) Falling
(3) Steady

OVERNIGHT LOW TEMPERATURE:_____

Scent station number	Station condition	Visits by species							List other species visiting station
		Coyote	Raccoon	Skunk	Badger	Red fox	Gray fox	Dog	
1 (L)									
2 (R)									
3 (L)									
4 (R)									
5 (L)									
6 (R)									
7 (L)									
8 (R)									
9 (L)									
10 (R)									

Comments:_____

INSTRUCTIONS:

Station condition: + = Operable (Tracks, if present, could be read; disk present or absent.)
- = Inoperable (Surface so disturbed that no tracks could be made or read.)

Species visits: If station shows one or more tracks of listed species (coyote, raccon, etc.), mark "1" in appropriate column. At right, list all other species making identifiable tracks.

Comments: Note track ID problems or anything unusual that might affect data interpretation.

Immediately after the survey, attach this Data Form to its corresponding Area Information Form and forward both, along with the area map showing your route(s), to your Survey Coordinator.

Wildlife Services, Inc. — (512) 997-4454
P.O. Box 876, Fredericksburg, Texas 78624

SCENT STATION SURVEY - AREA INFORMATION FORM

Route name_____ No._____ County_____ State_____

Observer_____ Observer's organization_____

Date survey scheduled_____ Check here if map showing route is attached_____

Questions A-C refer to the area immediately surrounding the survey route, question E to the mor
general area, such as the county or part of the county:

A. LAND SURFACE (enter number): Primary_____ Secondary_____

1. Flat
2. Irregular or rolling
3. Hilly: foothills, buttes, mesas, etc.
4. Mountains
5. Canyons, badlands, breaks
6. Sand dunes, sand hills
7. River or stream bed
8. Shore of lake or ocean
9. Wetlands or marsh
10. Other_____

B. VEGETATION (enter number): Primary_____ Secondary_____

1. Conifer forest
2. Broadleaf or deciduous forest
3. Mixed conifer/broadleaf forest
4. Shrubs or brush
5. Mixed forest/shrubs
6. Grassland
7. Mixed forest/grassland
8. Mixed shrubs/grassland
9. Wetland vegetation
10. Mixed wetland/forest
11. Mixed wetland/shrubs
12. Mixed wetland/grassland
13. Agricultural crops
14. Mixed crops/forest
15. Mixed crops/shrubs
16. Mixed crops/grassland
17. Sparse desert vegetation
18. Other_____

C. LAND USE (enter number): Primary_____ Secondary_____

1. Farming: mainly raising crops
2. Farming: mainly raising animals
3. Range: active livestock grazing
4. Occasional grazing or no use
5. Mining or quarrying
6. Public land/grazing (including BLM, National Grasslands, etc.)
7. Public land/timber production (including national & state forests)
8. Public land/recreation & preservation (including refuges, parks, wilderness, game preserves)
9. Military
10. Other_____

D. SURVEY ROAD (circle numbers that apply):

(1) Paved road
(2) Unpaved improved road
(3) Rough trail, usable by vehicles
(4) Foot path, game trail, etc.
(5) Full public access
(6) Controlled public access
(7) Little or no public access
(8) Heavy traffic
(9) Moderate traffic
(10) Little or no traffic

E. PREDATOR CONTROL IN GENERAL AREA (answer if you know):

Primary target species:_____

Primary methods used (circle numbers that apply):
(1) Aerial hunting (2) Shooting (3) Traps/snares (4) M-44's (5) Denning (6) Other_____

Amount of control achieved (circle one):
(1) Substantial (2) Moderate (3) Minor (4) Little or none

F. COMMENTS:_____

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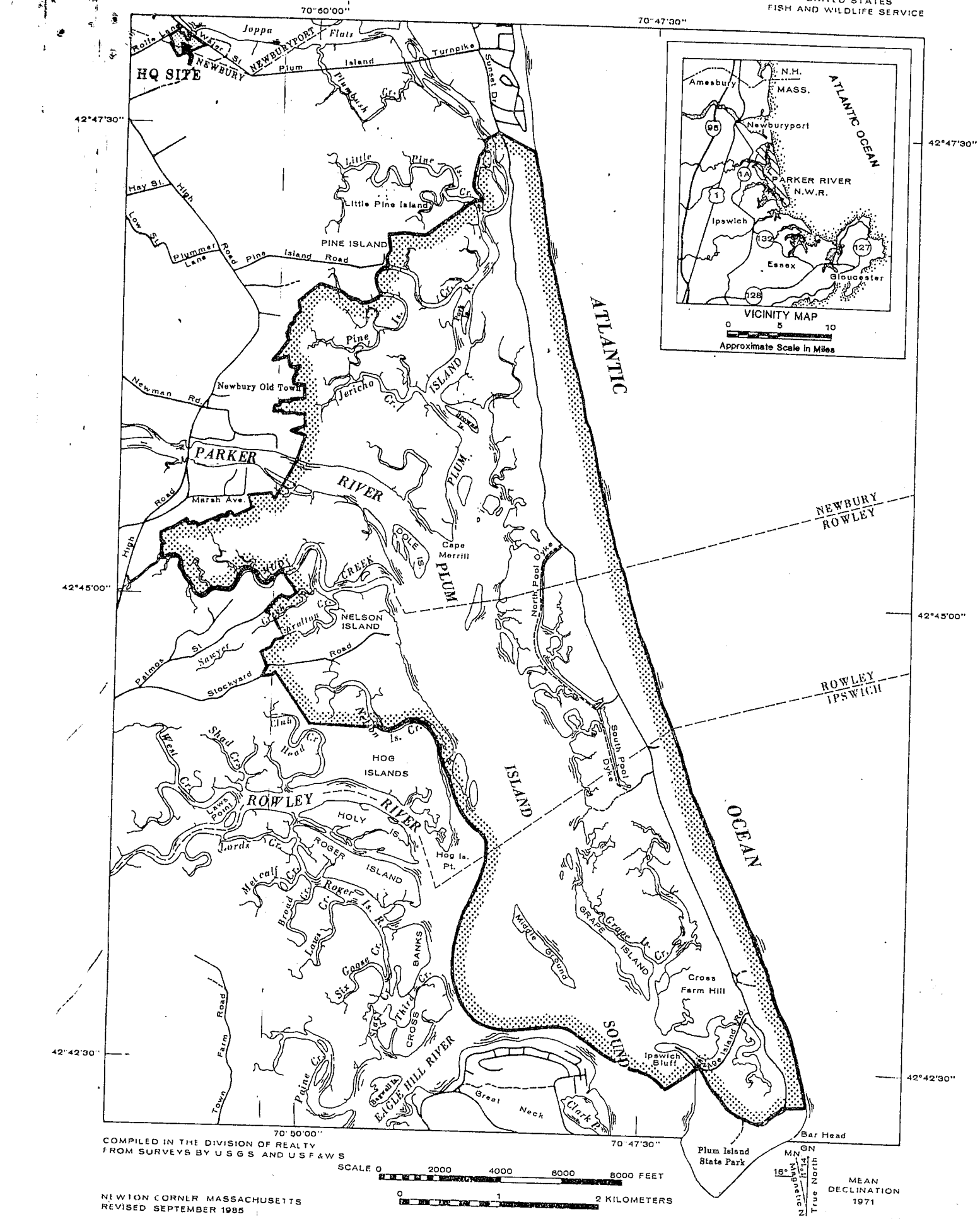
PARKER RIVER NATIONAL WILDLIFE REFUGE

APPENDIX 3

UNITED STATES
DEPARTMENT OF THE INTERIOR

ESSEX COUNTY, MASSACHUSETTS

UNITED STATES
FISH AND WILDLIFE SERVICE



5R MA 364

Table 1. Status of some ground nesting birds of Parker River NWR.

Species	Status State	Federal	Potential Threats
Least tern	SC		
Common tern	SC		Fox, Skunk, Racoon, Opossum,
Northern harrier	T		Crow
Short-eared owl	E		
Least bittern	T		
American bittern	SC		
Pied-billed grebe	T		
Piping plover	T	T	
Black duck		sc	

SC- Species of Special Concern
T- Threatened
E- Endangered

Table 2. Results of Dummy Nest Study.

Nest #	Result
Treatment 1	
1	nest not found
2	nest destroyed-skunk
3	nest destroyed-skunk
4	nest destroyed-bird
5	nest destroyed-bird
Treatment 2	
1	nest covered by sand
2	2 eggs removed
3	nest destroyed-unknown
4	2 eggs destroyed unknown
5	still intact
Treatment 3	
1	nest destroyed-skunk
2	nest destroyed-skunk
3	nest not found
4	nest destroyed-human
5	still intact

Table 3 Ground Nesting Birds of Parker River NWR

Common Name	Relative Abundance
Pied-billed Grebe	uncommon
Green-backed Heron	uncommon
Black-crowned Night-heron	common
Least Bittern	uncommon
Canada Goose	common
Black Duck	common
Gadwall	common
Pintail	uncommon
Green-winged Teal	uncommon
Blue-winged Teal	common
Northern Shoveler	occasional
Wood Duck	uncommon
Ruddy Duck	uncommon
Bobwhite	occasional
Ring-necked Pheasant	uncommon
Virginia Rail	uncommon
King Rail	occasional
Common Moorhen	common
Piping Plover	uncommon
Killdeer	common
Spotted Sandpiper	uncommon
Common Tern	abundant
Least Tern	common
Herring Gull	abundant
Mourning Dove	common
Horned Lark	uncommon
Eastern Meadowlark	uncommon
Bobolink	common
Savannah Sparrow	uncommon
Sharp-tailed Sparrow	common
Seaside Sparrow	uncommon
Song Sparrow	abundant

Subpart D—Impoundment Procedures

§ 28.41 Impoundment of abandoned property.

Any property abandoned or left unattended without authority on any national wildlife refuge for a period in excess of 72 hours is subject to removal. The expense of the removal shall be borne by the person owning or claiming ownership of the property. Such property is subject to sale or other disposal after 3 months, in accordance with section 203m of the Federal Property and Administrative Services Act of 1959, as amended (40 U.S.C. 484m), and regulations issued thereunder. Former owners may apply within 3 years for reimbursement for such property, subject to disposal and storage costs and similar expenses, upon sufficient proof of ownership.

§ 28.42 Impounding of domestic animals.

(a) Any animal trespassing on the lands of any national wildlife refuge may be impounded and disposed of in accordance with State statutes insofar as they may be applicable. In the absence of such State statutes, the animals shall be disposed of in accordance with this section.

(b) If the owner is known, prompt written notice of the impounding will be served in person with written receipt obtained or delivery by certified mail with return receipt requested. In the event of his failure to remove the impounded animal within five (5) days from receipt of such notice, it will be sold or otherwise disposed of as prescribed in this section.

(c) If the owner is unknown, no disposition of the animal shall be made until at least fifteen (15) days have elapsed from the date of a legal notice of the impounding has been posted at the county courthouse and 15 days after the second notice published in a newspaper in general circulation in the county in which the trespass took place.

(d) The notice shall state when and where the animal was impounded and shall describe it by brand or earmark or distinguishing marks or by other reasonable identification. The notice shall specify the time and place the animal will be offered at public sale to the highest bidder, in the event it is not claimed or redeemed. The notice shall reserve the right of the official conducting the sale to reject any and all bids so received.

(e) Prior to such sale, the owner may redeem the animal by submitting proof of ownership and paying all expenses of the United States for, capturing, impounding, advertising, care, forage, and damage claims.

(f) If an animal impounded under this section is offered at public sale and no bid is received or if the highest bid received is an amount less than the claim of the United States, the animal may be sold at private sale for the highest amount obtainable, or be condemned and destroyed or converted to the use of the United States. Upon the sale of any animal in accordance with this section, the buyer shall be issued a certificate of sale.

(g) In determining the claim of the Federal Government in all livestock trespass cases on national wildlife refuges, the value of forage consumed shall be computed at the commercial unit rate prevailing in the locality for that class of livestock. In addition, the claim shall include damages to national wildlife refuge property injured or destroyed, and all the related expenses incurred in the impounding, caring for and disposing of the animal. The salary of Service employees for the time spent in and about the investigations, reports, and settlement or prosecution of the case shall be prorated in computing the expense. Payment of claims due the United States shall be made by certified check or postal money order payable to the U.S. Fish and Wildlife Service.

§ 28.43 Destruction of dogs and cats.

Dogs and cats running at large on a national wildlife refuge and observed by an authorized official in the act of killing, injuring, harassing or molesting humans or wildlife may be disposed of in the interest of public safety and protection of the wildlife.