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U.S.FISH AND WILDLIFE SERVICE
PARKER RIVER NATIONAL WILDLIFE REFUGE
ESSEX COUNTY,MASSACHUSETTS

PUBLIC USE MANAGEMENT
BIG GAME HUNTING

(REVISED 9/96)

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HUNTING PLAN

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PARKER RIVER NATIONAL WILDLIFE REFUGE

NEWBURYPORT, MASSACHUSETTS

HUNTING PLAN

Section I.

A. Introduction

Parker River National Wildlife Refuge was originally established in 1942 to protect and preserve migratory waterfowl, especially black ducks and Canada geese. Over time this objective has expanded to include all wildlife species indigenous to the area. Today, refuge wildlife management focuses on protection of all species and preservation of existing coastal barrier island-salt marsh habitat.

In addition to its primary emphasis, public use of the refuge is permitted in accord with Fish and Wildlife Service policy. The Parker River Refuge's diverse habitat, natural beauty, and it's proximity to urban centers make the Refuge regionally important as a wildlife observation and recreation area.

B. Physical Features

Parker River National Wildlife Refuge is located on the coast, 35 miles northeast of Boston, Massachusetts. The 4,665 acre refuge includes the southern two-thirds of Plum Island. The island topography ranges from barrier beach dunes to depressions or "kettles" that support cranberry bogs and swamps, to four glacial drumlin deposits of rock and clay that support typical coastal barrier beach upland vegetation. The 820 acre barrier beach dune complex protects another 2,995 acres of salt marsh and mud flats that fall within refuge boundaries to the west.

Also located on the Plum Island portion of the refuge are three major impoundments totaling 265 acres of marsh ranging from brackish to freshwater. These impoundments provide diverse habitat for wildlife, particularly black ducks, mallards, Canada geese and marsh and wading birds.

The remaining 585 acres consists of 88 acres of maintained grasslands; 86 acres of building sites, roads, and parking lots; and 411 acres of shrub thickets and shrub forests.

A more detailed description of the refuge's vegetation and wildlife can be found in the "Environmental Assessement - Public Deer Hunting on Parker River National Wildlife Refuge", December 1986 (revised September 1996.)

Section II.

Conformance with Statuatory Authorities

The National Wildlife Refuge Act of 1966 as amended (16 U.S.C. 668dd), and the Refuge Recreation Act of 1962 (16 U.S.C. 460k), governs the administration and public use of National Wildlife Refuges.

Specifically, section 4(d), (1)(A) of the Refuge System Administrarion Act authorizes the Secretary of the Interior to permit the use of any area within the System for any purpose, including hunting and public recreation, when he determines that such uses are compatible with the major purposes for which such areas were established. In addition, the Refuge Recreation Act also requires the Secretary to determine that funds are available for the development, operation, and maintenance of recreational programs.

Section III.

Statement of Objectives

A. Refuge Objectives:

1. Achieve the maximum number of migratory bird species indigenous to the refuge biotype, consistant with other important management needs and habitat limitations.

2. Contribute to the Migratory Bird Program goals for wintering black duck populations. National goals are based on a three-year moving average of winter surveys.

3. Achieve a duck breeding population at or above the 1975-80 average, based on five key species: mallard, black duck, gadwall, green-winged teal, and blue-winged teal.

4. Maintain a resident Canada goose population that does not exceed the 1975-80 average population of 200-300 birds.

5. Protect and enhance breeding and maintenance habitat for non-game birds, especially those with decreasing populations.

6. Manage refuge lands for a diversity of mammal and non-migratory species at optimum population levels by providing a wide range of habitats at various successional stages.

7. Manage, preserve, and maintain the existing Research Natural Area.

8. Promote environmental education and interpretive programs to broaden public awareness of and appreciation for the natural and managed environments of the refuge.

9. Provide visitors with a safe and enjoyable recreational experience without conflicting with the basic refuge purpose.

B. Hunt Program Objectives:
(not in priority order)

* to provide a wildlife-dependent recreational opportunity for the hunting public to harvest a surplus renewable resource.

* to maintain deer on the refuge at a level commensurate with the avaiable habitat.

* to minimize the threat of Lyme Disease in the interest of the health and safety of the visiting public by reducing the number of deer (an intermediate host of the deer tick, Ixodes scapularis, which carries the disease agent.)

C. Summary

This hunt plan initiates the effort to manage the refuge's white-tailed deer population at a level commensurate with the habitat. This action will provide a wildlife-dependent recreational opportunity for the hunting public to harvest surplus animals. As deer numbers are lowered, the potential threat to public and employee health and safety from Lyme Disease will diminish. The hunt program has been deemed compatible with the purposes of the refuge, and will only have minimal impact on other existing uses. The implementation of a deer hunting program on portions of the refuge will increase the opportunities for the visiting public. Currently the refuge provides programs for birdwatching, beach-use, hiking (trails), bicycling, guided tour groups, fishing, and outdoor education.

Section IV.

Assessment

A detailed assessment of the refuge deer population, impacts of the hunting program on the resource, and the relationship of hunting to other refuge programs is covered in the January 1986, "Environmental Assessment - Public Deer Hunting on Parker River National Wildlife Refuge"(revised September 1996.)

Section V.

Description of the Annual Program

A. General

White-tailed deer are evenly distributed throughout the Plum Island and Grape Island portion of the Refuge with the exception of the extreme north end of the refuge in the vicinity of parking lot #1. Deer have also been observed crossing from Plum Island to Grape Island and are considered part of the same population. The area of the Refuge to be open to deer hunting is the Plum Island portion from beach access trail #1 south to Sandy Point State Reservation including Grape Island. The east and west boundaries will be from the ocean west to the adjacent salt marsh fringe.

B. The Program

The logistics of the hunt program may vary from year to year based on the biological data (indices) collected by the Refuge. The hunt will generally be conducted within the limits of both State and Federal law, but Refuge regulations may be more restrictive as deemed necessary. The Refuge will develop an annual program that will include the number of hunt days; the number of hunters per day; and the number of deer hunting permits to be issued.

Permit conditions are as follows:

1. Only shotguns (10-20 gauge) loaded with slugs are permitted (buckshot loads are prohibited.)
2. Hunters must attend an orientation session conducted by the Refuge. (Date,times and location to be determined annually.)
3. All hunters must check-in and check-out daily at the Refuge entance gate.
4. Successful hunters must check deer at the Refuge Sub-Headquarters.
5. Successful hunters are required to bag all entrails for Refuge data collection.
6. All applicable State laws apply.

(The 1995 Annual Program is attached as a sample.)

Annual funding requirements are estimated based on a 2-day hunt program as follows:

* salaries/7 staff @ 8hrs/day	$2,440
* Vehicles/equipment operating costs	$ 50
* Material/Supplies (check station)	$ 15
* Hunter Orientation/Safety Session	$ 190
* Hunter Selection/Lottery	$ 107
* Hunter notification/mailings etc	$ 42
* Permits/Regulations/forms	$ 10
* Signs/prep of parking areas/check station	$ 212
* Take down signs/close check station etc	$ 2125
* Annual Program planning/preparation	$ 268
* Total Estimated cost/2-day program	$5,671
* Less 30% of $20 permit revenues	$ 565
* Total Estimated Hunt Cost	$5,106

The total cost of conducting a hunt will be fixed costs plus other production costs tied to the actual on-the-ground preparation for, and supervision of the hunt. These production costs may vary annually with changes in the hunting program. A non-refundable $20 permit fee is charged, with 80% returned to the Refuge to help defray hunt costs.

C. Media Selection for Announcing and Publicizing the Hunt

A news release will be issued annually announcing the Refuge deer hunting program and permit application procedures.

D. Anticipated public Reaction to the Hunt

Some degree of negative public reaction to the deer hunting program is expected. The EA prepared in 1986, has been revised and updated including provision for additional public comment. The proposed rulemaking for the opening of the Parker River National Wildlife Refuge to the hunting of big game was published in the Federal Register in 1986. Public comments on the EA were accepted during a 30-day period in 1986, and again in 1996.

E. Special Hunter Requirements and Refuge Regulations

Special hunter requirements and refuge regulations for hunting deer on Parker River NWR are as follows:

1. Seasons: hunt dates determined annually will fall within the state season which opens the first Monday in December and continues for ten days (excluding Sundays.)

2. Hunting Hours: one half hour before sunrise until sunset.

3. Hunting Equipment: Shotguns - .20 gauge or larger loaded with slugs only.

4. Rules for the hunt lottery are as follows:

   a) Hunter information packets, which will include a hunt application, will be made available to the public during early September.

   b) All applications must be received by October. (Exact date determined annually.)

   c) All applications will be placed in one of two pools, one-half of the applicants will be selected from an antlered (bucks only) pool and one-half from an antlerless (doe permit) pool.

   d) A lottery open to the public will be held at the refuge headquarters.

   e) Only successful applicants will be notified and those persons submitting more than one application will be disqualified.

   f) Hunters selected from the lottery will be assigned in the sequence drawn for the first day and any subsequent hunt days. Alternates will be drawn after the initial permits have been awarded.

   g) All applications must be filled out completely.

   h) Successful applicants will be allowed to scout the area prior to the hunt.

5. All hunters must check in and out of the refuge.

6. All successful hunters must bring their deer and bagged entrails to the refuge sub-headquarters check station.

7. All hunters and alternates must attend a hunt orientation prior to the hunt. Failure to attend will disqualify an applicant from the hunt.

8. At check-in, each hunter must present a selection notice. Each hunter will be registered on the hunting roster and issued a refuge permit.

9. The entrance gate will be opened at 0400 hours with access permitted until 0530 hours. At that time alternate hunters will be allowed to fill vacant slots based on the sequence drawn at the lottery. No further access will be permitted after 0600 hours.

10. The route to Grape Island will be flagged for ease of access.

11. Hunters, will be issued pieces of plastic flagging to mark the trail of any wounded deer. If a hunter has wounded a deer and there is no blood trail, the hunter must contact Refuge staff for assistance.

12. A 100 yard safety zone around the sub-headquarters check station, lot #1 area and gatehouse, and the Goodwin Camp on Stage Island will be flagged with orange tape/signs. Hunting is prohibited within these zones.

G. Coordination with Sandy Point State Reservation Deer Hunt

The refuge will coordinate hunt activities with State DEM - Division of Forests and Parks personnel. Hunter access, by agreement with the State DEM, will be limited in accord with Refuge procedures during Refuge hunt days only.

During days when the Refuge is not conducting a hunt, the SPSR will be open in accord with DEM and MDF&W regulations.

Section VI. Measures taken to avoid conflicts with other management objectives.

A. Biological Conflicts

The following threatened or endangered species are found on the refuge: pregrine falcon, bald eagle, and piping plover. Peregrine falcons and bald eagles frequently pass over the refuge during spring and fall migration. Piping plovers nest on the refuge beaches during spring and summer. Because of the migratory nature of these species, no conflict, either direct or indirect, is expected as the hunt will take place during the first week of December. The hunting program should have no effect on their use. A "Section 7 Evaluation Form" regarding these species is attached as an appendix to the Environmental Assessment portion of this plan.

The proposed hunt will have only minor impacts on waterfowl use as the hunt will be limited to the upland portion of the refuge. Some disturbance to waterfowl is unavoidable while hunters are walking around the refuge and discharging firearms. It is expected that waterfowl in the immediate vicinity of the hunting area only will decrease slightly during hunting. The deer hunt period coincides with the Massachusetts waterfowl seasons, and though temporary displacements will occur, indirect mortalities, by pushing birds out to hunters, will be minimal.

B. Public Use Conflicts

The public hunt will be limited to the area starting at parking lot #2 southward to the Reservation boundary. During hunt days, there will be no other public uses permitted on the Refuge except for commercial clamming. Clammers will be checked in and will park only in designated areas. All clamming activity takes place in the salt marsh mud flats; there should be no safety problem with this use. Hunters going to the State Reservation will be checked through the entrance. When the State parking lot is full, vehicles will be allowed in on a "one out, one in" basis until the end of the refuge hunt. This will prevent a potential safety problem by limiting the number of hunters on the southern refuge boundary.

Visiters who desire to view wildlife within the hunt area will be negatively impacted. Approximately 1,800 use days will be eliminated during the hunt. This impact is unavoidable. Grape Island is not open for public use at anytime.

C. Administrative Conflicts

Adequate staff and funds exist to administer the hunt program. Administrative conflicts with other programs will be minimized by (temprarily) scheduling these programs around hunting dates.

ANNUAL BIG GAME HUNTING PROGRAM

Parker River National Wildlife Refuge

1995

A. BIOLOGICAL SOUNDNESS

A Refuge management hunt for white-tailed deer is deemed necessary for the following reasons: a hunt program will maintain the population at a level comensurate with the available habitat; an annual hunt is a necessary component of a long-term habitat management study initiated in December of 1994; and a hunt will reduce the deer population minimizing the potential for the transmission of Lyme disease to humans. Deer are a recognized intermediate host of the deer tick which carries this potentially debilitating disease.

In past years, overpopulation resulted in habitat damage from overbrowsing. Subsequently, a hunt program was implemented from 1987 through 1990. During that time, the herd was successfully culled to a manageable size based on a carrying capacity range established during the Refuge Master Planning process (April 1986.) A hunt program was not held in 1991 and 1992, based on the population indicators (Fall spotlight counts and Winter aerial count) conducted annually. In 1993, the count indicators revealed that the population had again increased (to a range of 75 to 100 deer.) Past experience had shown that a population this high could result in significant habitat damage, thus a management program was conducted in the fall of 1993.

Upon consultation with agency Biologists, it was recommended that the Refuge should conduct a long-term habitat management study, in order to assess the impact of deer overbrowsing. Fifteen exclosures were erected on the Refuge in December of 1994 as part of the study. A consistent annual hunt program was also deemed to be a necessary component of the study.

B. ECONOMIC FEASIBILITY

The estimated cost of a two day hunt is approximately $3,260.The FY 1995 Refuge budget allocation totals $604,521. Based on a review of the budget allocated for recreational use management, I certify that funding is adequate to ensure compatibility and to administer and manage the 1995 Hunting Program.

In accordance with Region 5 (and Department of Interior) guidance, a non-refundable permit fee of $20 will be charged each successful applicant, with 30% of such revenues returned to the refuge to help off-set the cost of the program.

C. RELATIONSHIP WITH OTHER PROGRAMS AND RECREATIONAL OPPORTUNITY

The Refuge will be closed for a period of three days in order to carry out the controlled deer hunt. The general public will be excluded during this time. The exclusion will involve three consecutive week days (two hunt days and one administrative day.) The Refuge experiences a decrease in public use during this time because of often marginal weather conditions, thus the loss of recreational opportunities for the general public will be minimal.

The 1995 hunt program will afford the sporting public an opportunity to engage in approximately 990 act/hours of hunting.

The 1995 deer hunt program will not impact endangered species, as the hunt is conducted when endangered species are not present on the Refuge.

The Refuge deer hunt will not take place in close proximity to designated Refuge waterfowl hunting areas; therefore, impacts will be minimal, if any. Access to waterfowl hunting areas will not be affected by the Refuge closure.

D. REFUGE-SPECIFIC REGULATIONS

Limited white-tailed deer hunting will be allowed on Parker River Refuge (Refuge) by permit only within the established Massachusetts (MA) shotgun deer season. All applicable MA regulations apply in addition to the following:

License/Permit Requirements:
1) MA deer hunting license.
2) Refuge deer hunting permit.

Hunter Selection: Refer to Rules and Procedures for Hunter Selection.

Orientation/Safety Meeting: Attendance is mandatory, including standbys. DATE: Saturday, November 4, 1995; LOCATION: PITA Hall (on Plum Island)

Season: Hunting will be permitted on Monday, November 27th and Tuesday, November 28th during the MA deer (shotgun) season. Each hunter will be assigned a single hunt-day.

Hunt Hours: One half hour before sunrise until one half hour after sunset. All hunting will cease one half hour after sunset; hunters must unload their shotgun and return to their vehicle within 30 minutes. Hunters will have an additional 30 minutes to check out at the Refuge check station and exit the Refuge. All hunters must be off the Refuge within one hour after legal shooting time ends. Hunters will be required to report any wounded deer they were tracking and to use the plastic flagging provided to mark a trail.

Hunters will not be allowed to travel on the Refuge road from the beginning of legal shooting time until 9:30am, for safety reasons. From 9:30am to 2:00pm, travel is permitted. Hunters may exit/access the Refuge until 2:00pm (at which time the entrance gate will be closed and no access permitted). After 2:00pm, hunters may check out and exit the Refuge at any time.

Hunt Check-In Procedures: Hunters must check in at the Refuge entrance gate between 5:00am and 5:45am on assigned hunt days. Standby hunters, if space is available, will be allowed access at 5:47am. Upon completion of checking in all hunters, the Refuge road will be closed for hunter access until 9:30am. Hunters must display their MA hunting license and Refuge permit when checking in.

Hunt Zones: There will be one hunt zone (Plum Island portion of the Refuge) with a safety buffer around the sub-headquarters/check station area and the north end of the Refuge (abutting the Town beach.)

Parking: Hunters may only park in lots/areas designated by "deer hunt parking" signs.

Bag Limit: One deer per day. Hunters must check-in the first deer to receive a second deer tag at the Refuge Check Station. Antlerless deer may only be taken by a hunter possessing a MA Zone #10 (antlerless) permit.

Hunt Equipment: 1) Shotgun - .20 gauge or larger loaded with slugs only. 2) Portable, non-damaging tree stands are permitted.

Deer Check Station: All deer taken, as well as entrails, must be checked in at the Refuge Check Station located at Sub-HQ. Hunters will be asked to field dress deer at the check station if at all possible; or to carefully remove entrails (in their entirety) and bring to the Check Station for biological analysis. The Refuge will provide plastic bags for this purpose. All deer will be tagged and biological information will be taken. The Refuge is a State approved deer check station.

Hunter Check-out: All hunters, successful or not, must check out at the Refuge Check Station no later than one hour after sunset prior to leaving for the day.

E. COMPATIBILITY

Parker River National Wildlife Refuge was established by the Migratory Bird Conservation Commission under provisions of the Migratory Bird Conservation Act,[16 U.S.C. 715-715r] and the Refuge Recreation Act, [16 U.S.C.460k-460k-4] for the following purposes;

- "....for use as an inviolate sanctuary, or for any other managment purpose, for migratory birds."[16 USC 715d]

- "....suitable for - (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species...."[16 USC 460k-1]

The hunting of white-tailed deer has been determined to be compatible with the purposes of the refuge and will not detract from such purposes.

Big game hunting will be allowed on approximately 1,400 acres of the the 4,662 acre refuge. The hunting program will be conducted to manage the white-tailed deer population and will occur at times and places that will not significantly impact habitat and cause only temporary, minimal disturbance to other Refuge wildlife. Big game hunting will be managed as an integral part of a comprehensive Refuge wildlife management program.

RULES AND PROCEDURES FOR HUNTER SELECTION

1. Hunter information will be available starting August 7, 1995.

2. All applications for a Refuge permit must be postmarked by October 2 and received prior to the drawing. The application should be on a 3"x5" postcard that contains the person's name, address, and daytime phone number; the application should also note their MA hunting license number and if they have applied for a Zone 10 Antlerless Permit from the State. A self-addressed stamped envelope must also be included with the hunter's postcard.

3. Applicants possessing a valid Massachusetts antlerless deer permit for Zone #10 will be given priority in hunter selections; however, an antlerless permit is not required. (NOTE: Check with the State for the date when applications for the State Zone #10 antlerless deer permit must be sent to the State; in the past, the applications were due by mid-August).

4. A total of 90 hunters and 20 standbys will be selected by a random computer or hand-drawn lottery for the two days of the hunt. If the lottery is by hand-drawn, a non-Refuge employee will draw the names for the hunters and standbys.

5. A maximum of 45 hunters per day will be accommodated.

6. There will be a total of two hunt days: Monday, November 27 and Tuesday, November 28.

7. A total of 20 standbys will be selected to fill any spaces available if any permit holder does not attend the mandatory orientation, or if a selected hunter is not able to participate in the Refuge hunt.

8. A lottery, open to the public, will be held at the Refuge Headquarters on October 19, 1995 at 3:30 p.m. All applicants will be notified by mail; however, a self-addressed stamped envelope is required by each applicant.

9. A hunter permit fee of $20.00 will be charged to successful applicants. A permit fee of $10.00 will be charged to successful applicants who are 62 years or older or are legally disabled. The fee will be collected at the Hunter Orientation session on November 4, 1995. The fee from stand-by hunters will be collected on the day of the hunt.

10. Hunter safety and orientation will be conducted on Saturday, November 4th. Attendance is mandatory.

STATE AND REFUGE REGULATIONS:

You are responsible for knowing and complying with all State and Refuge regulations governing the hunt. Highlights follow:

State:

1. Only one deer per day may be taken.

2. State license must must be displayed on outer garment.

3. To harvest an anterless deer, you must possess a state antlerless Deer Permit for zone #10.

4. You must wear 500 square inches (minimum) of blaze-orange material; includes the chest, head, and back.

5. Recorded calls, baiting, revolvers, rifles, or the use of dogs are prohibited.

6. Only shotguns, no larger than 10 guage, may be used. Rifled slugs are permitted, but rifled barrels are prohibited.

7. Antlerless deer, as defined by the state, have antlers of less than 3 inches in length measured from the center of the anterior base of the antler burr to the tip. If in doubt, do not shoot - unless, you have the proper permit.

Refuge:

1. If you have an Antlerless Permit, you may harvest either sex. Upon check-in, you will receive your second deer tag.

2. All hunters must have a valid State hunting license and the Refuge permit letter in possession while hunting.

3. All hunters must check in at the Refuge entrance gate, and check out at the Sub-HQ check station, even if unsuccessful.

4. Hunting from Refuge observation towers is prohibited.

5. Hunting hours are from 1/2 hour before sunrise to 1/2 hour after sunset.

6. Road travel is prohibited from the beginning of legal hunting hours to 9:30am and from 2:00pm to the end of legal hours on each hunt day. No Refuge access will be permitted after 2:00pm.

7. Hunters must park in designated spaces/lots (see map on reverse for parking locations.)

8. Possession of alcoholic beverages is prohibited.

9. All vehicles are subject to inspection.

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ENVIRONMENTAL ASSESSMENT
(FONSI)

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UNITED STATES FISH AND WILDLIFE SERVICE

ENVIRONMENTAL ACTION MEMORANDUM

Within the spirit and intent of the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act (NEPA) and other statutes, orders, and policies that protect fish and wildlife resources, I have established the following administrative record and have determined that the action of;

conducting a review, update, and revision of the 1986 Environmental Assessment - Controlled Public Deer Hunting on the Parker River National Wildlife Refuge,

-is a categorical exclusion as provided by 516 DM 6 Appendix 1. No further documentation will be made.

X-is found not to have significant environmental effects as determined by the attached Environmental Assessment and Finding of No Significant Impact

-is found to have special environmental conditions as described in the attached Environmental Assessment. The attached Finding of No Significant Impact will not be final nor any actions taken pending a 30-day period for public review (40 CFR 1501.4(e)(2).

-is found to have significant effects, and therefore a "Notice of Intent" will be published in the Federal Register to prepare an Environmental Impact Statement before the project is considered further.

-is denied because of environmental damage, Service policy, or mandate.

-is an emergency situation. Only those actions necessary to control the immediate impacts of the emergency will be taken. Other related actions remain subject to NEPA review.

Other supporting documents (list): none

(1) John L. Fellis — Initiator — 9/23/96 Date

(2) Janith D. Taylor — ~~Zone~~ Biol/~~North~~th — 10/10/96 Date

(3) Ralph W. Abell — Regl Env.Coord. — 10/16/96 Date

(4) [signature] — GARD [redacted]N — 10.18.96 Date

Cathy Short — Regional Director — 10/22/96 Date

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UNITED STATES FISH AND WILDLIFE SERVICE

FINDING OF NO SIGNIFICANT IMPACT

Based on a review of and evaluation of the information contained in the supporting reference noted below, I have determined that a review, update, and revision of the 1986 Environmental Assessment - Controlled Public Deer Hunting on the Parker River National Wildlife Refuge is not a major Federal action which would significantly affect the quality of the human environment within the meaning and intent of Section 102-(2)-(c) of the National Environmental Policy Act of 1969.

Attachment:

Environmental Assessment - Public Deer Hunting on the Parker River National Wildlife Refuge (Revised 9/96)

Accordingly, preparation of an environmental impact statement is not required. A copy of the final revised Environmental Assessment is attached to this finding.

Cathy Short 10/22/96

Ronald E. Lambertson
Regional Director
Region 5 USFWS

Date

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ENVIRONMENTAL ASSESSMENT

PUBLIC DEER HUNTING
ON
THE
PARKER RIVER NATIONAL WILDLIFE REFUGE

Prepared by:

FISH AND WILDLIFE SERVICE
U.S. Department of Interior
Parker River National Wildlife Refuge
Newburyport, Massachusetts
December, 1986

(Revised - September 1996)

Foreword

Revisions, supplements, or updates to Final Environmental Impact Statements (FEIS) or Environmental Assessments (EA) may be prepared at any time in order to further the purposes of the National Environmental Policy Act or other wise facilitate accomplishment of the Fish and Wildlife Service mission. The purpose of this process is to provide further clarification of information, and/or to incorporate new information. This document represents an update of the original EA prepared and finalized in December of 1986.

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ENVIRONMENTAL ASSESSMENT

PARKER RIVER NATIONAL WILDLIFE REFUGE

I. PURPOSE AND NEED FOR ACTION

The U.S. Fish and Wildlife Service/Parker River National Wildlife Refuge conducts a Controlled Public Deer Hunting program on the Plum Island and Grape Island portion of the Refuge. The purposes of the deer hunting program are:

- -to provide a wildlife-dependent recreational opportunity for the hunting public to harvest a surplus renewable resource.
- -to maintain deer on the refuge at a level commensurate with the available habitat.
- -to maintain floral and faunal diversity (e.g. neotropical and resident bird species.)
- -to minimize the threat of Lyme Disease in the interest of the health and safety of the visiting public by reducing the number of deer (an intermediate host of the deer tick, Ixodes scapularis, which carries the disease agent.)

The need for this action stems from:

- -The potential for an increase of deer above the level that the habitat can sustain without long-term damage (to the habitat and ultimately, deer and other wildlife.)
- -The threat to the health and welfare of the visiting public and refuge employees from Lyme Disease, and other tick-related diseases. There is a direct correlation between high white-tailed deer and tick densities.
- -The mission of the Fish and Wildlife Service to provide a wide array of wildlife-dependent recreational opportunities for the benefit of the visiting public.

Background

White-tailed deer have been present on Plum Island since before Refuge establishment in 1942. An aerial survey in 1948 revealed at least 15 deer wintering on the island portion of the refuge. Deer numbers increased and peaked at an estimated 38 animals in the mid 1950's. At that time, the refuge biologist stated "the herd is approaching the critical state of the carrying capacity" for the refuge. During January and February, 1956, refuge personnel noted that, "extensive damage to the limited browse is now evident." Deer were browsing twigs of pitch pine (Pinus rigida) up to 3/8" in diameter and were damaging the two-year-old Austrian pine (Pinus nigra) plantation. In 1957, an archery hunt

for deer was initiated and continued for five years. Thirty-five deer were removed during this five year period. For the next 16 years, the number of deer on the refuge appeared to remain somewhat stable, at about 12 animals.

Deer numbers began to increase rapidly in the mid 70's. By 1982 "numerous" deer were being seen at all times of the year on the refuge, especially in late summer, feeding in the mowed fields. In 1983, an effort was initiated to monitor the trend and nutritional status of Plum Island deer.

Night spotlight counts and aerial surveys were conducted to determine the status (or trend) of the number of deer using the Refuge in the winter. The result of those surveys indicated that deer numbers had continued to increase and that the wintering population from 1984 to 1987 had increased by approximately 90%.

It has been estimated that the refuge habitat can support in the range of 15-35 animals during the critical winter months when deer are under the greatest environmental stress and green browse such as grasses and forbes are not available. The Master Plan for Parker River National Wildlife Refuge, U.S. Fish and Wildlife Service, April 1986, page 44, identifies 16 acres of optimum quality, 806 acres of acceptable quality, and 1,237 acres of minimum quality deer habitat on the refuge. From this data it was calculated that 15-20 (with a peak of 35) healthy deer could be maintained on the refuge without causing damage to the habitat - habitat which supports many other species of wildlife as well as deer.

Indicators of the nutritional status of deer include fawn/doe ratios, fat content, yearling antler beam diameter, and the types of vegetation being used for food. Spotlight counts and fetal counts from samples of breeding age does (collected from the refuge under State permit) indicated that the fawn/doe ratio had been decreasing during the period 1983 to 1986. In 1986 it was approximately 0.50 fawns produced per doe. Research literature indicates that healthy does in good habitat will average 1.7 fawns or higher; those in poor nutritional condition (poor habitat) will average less than 1.0 fawn.

The fat content of deer studied at the refuge during the period (1983-86) was considered too low to maintain the animals in good condition through the cold winter months. Normally, fat reserves built up during the summer and fall will last throughout the winter giving deer a source of energy when food is not plentiful and the weather is cold over extended periods of time. Deer were browsing heavily on conifer needles and twigs which they eat normally as a last resort. The net energy gained by eating conifers is relatively small and research indicates that such browse is only used by deer under stress conditions (low availablility of "preferred" browse species.)

Distinct browse lines were evident on eastern red cedar (Juniperus virginiana) and heavy browsing was present on pitch and Austrian pine. Conditions widely recognized, in research, as indicators of excessive deer numbers.

A January 1986 aerial survey indicated that at least 100 deer were using the refuge. A theoretical projection to the fall of 1986 resulted in an estimated potential of 100-125 animals in the pre-winter population.

Lyme Disease is a bacterial infection transmitted to humans by the bite of an infected tick. The carrier of the disease, the "deer tick", (Ixodes scapularis) has been identified from specimens collected from Plum Island deer. In 1986 a refuge employee was diagnosed as having the disease suspected to have been transmitted when the employee was bitten by a tick contacted on the refuge. The Crane's Beach Reservation, which is separated from Plum Island by approximately ½ mile of water, received much attention in the early 1980s due to the high incidence of Lyme Disease diagnosed in residents living nearby. Efforts were undertaken at Crane's Beach for several years to reduce the deer population which is seen as the "weak link" in the tick's lifecycle, (although additional research needs to be done to further clarify this relationship.)

In 1986 the appropriate documents were prepared and submitted for the opening of the Parker River National Wildlife to the hunting of big game. An Environmental Assessment was prepared as part of this documentation and public comment was soliciited and received in compliance with the National Environmental Policy Act of 1969 (NEPA) and in accord with CFR 1500.6 and 1507.3 of the Council on Environmental Quality regulations of the Act. A "Finding of No Significant Impact" (FONSI) was issued on January 30, 1987.

A Section 7 Formal Consultation was also conducted under terms of the Endangered Species Act of 1973 as amended, and was included in the documentation.

The documentation (Sport Hunting Decision Document Package for the Parker River National Wildlife Refuge) legally and administratively "opened" the Parker River Refuge to the hunting of big game (white-tailed deer) effective January 30, 1987.

The "opening" documents did not impose any conditions for the implementation of hunting programs; thus annual programs have ranged from a 6-day hunt (1988) to no hunt (1991,1992 and 1994).

Hunting on National Wildlife Refuges is authorized by the National Wildlife Refuge System Administration Act of 1966, as amended, and the Refuge Recreation Act of 1962. The U.S.Fish and Wildlife Service has long recognized hunting as an acceptable, traditional form of wildlife-dependent recreation that can be, and is sometimes used as, a tool to effectively manage wildlife.

The initial application of an annual Controlled Public Deer Hunting program was conducted in response to the increase in the population. Programs were conducted periodically to respond to the increased population, in an effort to relieve the pressure on the habitat. Annual programs ranged from no hunt to a six day effort. During those years when a hunt was not conducted, the population again continued to increase.

In late 1994 and early 1995, Refuge staff in consultation with other Service and State biologists, concluded that a consistent (annual) effort was required to maintain the deer population at a level that would preclude serious impacts to the habitat. An integrated approach was developed to measure the impact of deer browsing on the habitat; determine what other species depend on the habitat, and gather data (indicators) that could be reliable when compared on an annual basis and that would more accurately reflect both the status of deer and the habitat. Thus, a study: , "Research/Management Program for White-tailed Deer on the Parker River National Wildlife Refuge" was prepared and implemented. (Appendix A)

The concept of "carrying capacity" was also extensively discussed and although the concept remains sound, the current thinking within the field of wildlife management is toward a more comprehensive approach using various indices to display the correlation between deer and the habitat.

Thus, the Refuge has adopted the methodology employed by many agencies and organizations involved in the management of white-tailed deer populations. This methodology involves the use of indices such as fawn/doe ratios, kidney fat content, antler beam diameter, age/sex ratios, and body weight measurements as a means of monitoring the health and physical condition of deer, which in turn reflects the condition of the habitat. In addition to these parameters, the Refuge also employs an annual aerial survey as an index of the population trend. Collectively, this approach also provides an accurate and reliable indication of the population trend. Generally, healthy well-nourished deer are a reflection of a healthy habitat and conversely, a decline in the health and well-being of the deer themselves will reflect a habitat under stress.

The indices used at the Refuge are as follows; age (proportion of different age classes within the population), weight (average field dressed weight in each age class), antler beam diameter (measured according to accepted protocols), sex ratio (the number of bucks per doe), fawn/doe ratio (the average number of fawns produced per doe), kidney fat, aerial helicopter survey, and fall road counts. A brief explanation and clarification of each index follows.

1. Age - this index tracks the proportion of the different age classes (0.5, 1.5, 2.5, 3.5 and 3.5+ years) within the population. The proportion of the different age classes to some degree reflects the status of the population in that a wild population under natural conditions of predation, disease, etc. can be expected to exhibit a lower number of 0.5 and 3.5 aged animals. These two age classes generally exhibit a higer degree of susceptibility to predation, for example.

2. Weight - this index is a record of the average dressed weight within the different age classes. The index reflects the well being of individuals as logically, under-weight deer within an age class would be indicative of a poor food source (habitat.)

3. Antler-beam diameter - research data has shown a direct correlation between the diameter of antlers and the quality of the habitat. A well-nourished male (1.5 year age class) in good habitat will display antlers with a larger beam diameter than a buck in poor habitat.

4. Sex ratio - the ratio of males to females (buck:doe ratio) is also an indicator of the habitat as a healthy well-nourished population would be expected to have a relatively even ratio of bucks to does, under natural conditions.

5. Fawn:doe ratio - the number (average) of fawns produced per doe is also a reflection of the habitat; as well-nourished does produce a higher percentage of multiple births (twins, triplets) than does in poor habitat.

6. Kidney fat (KFI)- this index is a relative measurement of the perirenal fat found attached to the kidney and is a reflection of the quality and quantity of the food source (habitat.) A low kidney fat index (measured in the fall of the year) indicates little if any fat reserve build-up which is not a normal finding in deer found in good habitat. If the trend in this data is downward, this may very well lead to the conclusion that the habitat is insufficient. The KFI must be viewed in the proper context as there may be some variation between individuals in the same population. Thus the reliability of this index can only be confirmed with considerable data collected over an extended number of years.

7. Aerial survey - the number of deer observed annually following a consistent methodology will provide a reliable indication of the population trend over the years. Deer are highly visible from an aircraft (helicopter) against the white background of snow covering the ground. This survey is conducted when the snow cover is at least 4 inches deep over 100% of the Plum Island/Grape Island portion of the refuge. The same aerial routes are flown each year with consistent recording procedures. Annual comparisons of the aerial survey data will reflect a trend

in the population (either increasing, decreasing or remaining stable in number.)

8. Fall road counts - Surveys are conducted in the fall along a prescribed route of travel (vehicular) using a high-powered spotlight to observe and record deer sightings. The survey crew consists of a driver, a recorder, and an observer. These surveys provide another indicator of the population, particularly in the fall rutting (mating) season. An accumulation of survey results over a period of years will provide an index to the population trend.

The reader must use caution in the interpretation of the data (indices) when making comparisons. The data collected at the Refuge will be useful only when compared on an annual basis with data obtained in subsequent years on the Refuge, and not with data collected elsewhere. There are many variables that can alter the results of comparing indices from different types of habitat. For example, coastal deer usually exhibit lower average body weights than inland deer; and age (via tooth wear) is skewed by the suspected affects of the abrasiveness of different soil types, such as a barrier beach environment.

Currently, the data collected at the refuge is of limited value for annual comparisons, in that only one year of full data (all indices) has been collected (1995.) The value of the data will be cumulative, as the data is collected each year; and over time annual comparisons will increase in accuracy and reliability as a reflection of the condition of the population and consequently, the condition of the habitat. (See Appendix B - Background Data)

II. ALTERNATIVES

To accomplish the objectives of deer management, the following alternatives were considered:

A. No Action
B. Annual Program
C. Open Hunt
D. Reduction by Refuge Staff
E. Trap and Transplant (Relocate)
F. Introduction of Predators
G. Supplemental feeding
H. Reproductive inhibitors
I. Reduction by Sharpshooters

A. No Action Alternative

This alternative would preclude any active management program. Without natural predators or some means of control, the number of deer using the Refuge would continue to increase, further exceeding the habitat, until such time that the habitat could no

longer support such a high number of animals. This alternative also is contrary to the mission of the Fish and Wildlife Service; and management and professional objectives - which strive to maintain populations (of all species) at levels comensurate with the available supporting habitat.

Habitat degradation, will increase in direct correlation to the number of deer using the habitat and other species of wildlife dependent on the same habitat will decline as the habitat is degraded.

The floral and faunal diversity of the Refuge will be negatively impacted by a decrease in the capability of the habitat to support a wide array of dependent species. Deer would ultimately be regulated by disease and eventually starvation.

Severe overbrowsing by large herbivores such as deer, can and most often results in long term habitat damage which requires many years to regenerate. The negative effects of such habitat degradation, extending over many years, will jeopardize populations of other species of wildlife that use the Refuge.

B. Annual Program

The Plum Island/Grape Island portion of the refuge (Appendix C,) consisting of approximately 1,357 acres or 29 percent of the Refuge will continue to be open for big game hunting as it has been since 1987, with Controlled Public Deer Hunting programs held on an annual basis. The number of hunters per day, number of hunt days, and other Refuge specific regulations and logistics will remain fairly consistent with adjustments made based on an annual evaluation of the trend data (indices.)

The program is also intended to simulate "natural mortality", as closely as possible in order to preclude major fluctuations in the population, and minimize the impacts of an unnaturally high number of deer (the degradation of the habitat.)

The annual program will continue to be conducted in accord with and within the framework of applicable State and Federal regulations.

An important aspect of the management of a deer population is the timing of efforts as they relate to the trend data (indices). The "control" aspect of a management program involving big game such as deer, is most effective when employed before the indices reflect a degrading habitat. Thus, close annual monitoring of the trend data is important in order to implement the necessary management actions in a timely fashion - at that point in time that would prevent serious habitat damage. Generally, management efforts are best applied when the indices reflect a healthy well-nourished, slightly increasing population.

Additionally, from a Refuge (Service) perspective there is (management) value in the ability to pre-plan and schedule limited resources (staff and funds) in advance of conducting programs. The allocation of the resources needed to implement a hunting program, as well as all other Refuge operations, is an integral aspect of the annual refuge planning process.

C. Open Hunt

This alternative would allow for an "open" program which would follow State regulations and policy similar to deer hunting elsewhere within Massachusetts. Typically, State owned areas are available for deer hunting with accessibility limited by the available parking. Privately owned lands open for deer hunting are similarly regulated. Individuals possessing a valid hunting license are permitted to hunt in accord with regulations issued by the Commonwealth of Massachusetts, Division of Fisheries and Wildlife (MDFW). The season for shotgun hunting for deer generally consists of nine days, beginning on the first Monday after the Thanksgiving holiday. Archery, primitive weapons (black powder or muzzle loader) seasons are also permitted within regulations as promulgated by the Commonwealth. Seasons and bag limits vary with the type of weapon permitted.

This alternative was deleted from any further consideration based on the length of the season; the extended disruption of other visitor activities; and the cost and staff requirements. The current program, while more restrictive, is preferred due to the size of the area (Plum Island portion of the Refuge); the type and degree of other recreational opportunities to be considered (Service policy generally separates consumptive uses from non-consumptive uses); the fragile nature of the area; and the suitability of the area for a controlled program, which allows for access limits and ease of data collection.

D. Reduction by the Refuge Staff

This alternative would require that refuge personnel undertake all the actions necessary to annually reduce the number of deer using the refuge.

The following points were considered:

* The staff time necessary to remove a sufficient number of deer to have the desired impact. For comparison, hunter effort in 1993 was 43 hours/deer harvested; and in 1995, 28 hours/deer harvested. It is anticipated that considerable staff time would be needed to effectively implement such a program. MDFW permits would be required.

* With a limited staff, the "lost time" from other Refuge programs and activities must be considered. (Current staff

level at 10-11 positions/with only 4 individuals available for a deer reduction activity.)

* Closure of the refuge to the general public would be necessary during the program for public safety reasons, and may extend over a considerable period of time depending on the rate of removal that could be achieved.

* Deer control under this alternative would eliminate any public participation and recreational value attributed to public hunting. This alternative could provide for some degree of selectivity e.g. remove only antlerless (or female) deer, however this could also be achieved during public hunting programs.

* Use (for human consumption) or disposal of carcasses. Programs that provide venison for human consumption include an inherent liability due to the consideration of the health aspects e.g. product would have to be processed, packaged, and inspected to insure a safe food source for human consumption. A disposal process would most likely be by burial at local landfills (if permitted.)

* This alternative is contrary to the basic philosophy of the Service "to coordinate and cooperate with the states in promulgating and implementing hunting programs which reflect positive measures to assure the welfare of the resource while providing the broadest range of benefits for the using public" (ref. Final Environmental Statement, Operation of the National Wildlife Refuge System, November 1976).

This alternative was deleted from any further consideration based on the preceding discussion.

E. Trap and Transplant (Relocate)

This alternative was dismissed from further consideration because suitable deer habitats elsewhere within the Commonwealth of Massachusetts (as well as the New England states) are already well populated. Trapping and relocating is expensive and has been documented as causing a high degree of animal mortality due to the stress of being trapped, handled, and transported. Research also indicates a high degree of mortlity as relocated animals have difficulty acclimating to new unfamiliar habitat.

Inherent in such a program is the potential for the spread of diseased animals into areas free of disease. Individual animals would have to be examined and the appropriate tests conducted to ensure disease free status. This process would involve additional handling and processing of each animal, increasing stress and perhaps resulting in a higher level of mortality.

The deer tick which is the species of tick that carries the Lyme Disease spirochete, has been identified on deer from Plum Island by the Harvard School of Public Health. Relocation of tick infested deer would be reasonably expected to result in the relocation of ticks, and the introduction or spread of Lyme disease as well as the increased threat of potential contact by individuals handling trapped deer.

The cost of annually trapping, handling, and transporting deer in numbers sufficient to control a population would be excessive.

This alternative would eliminate any opportunities for that segment of the public that wishes to participate in the more traditional form of hunting.

F. Introduction of Predators

The introduction of predators was dismissed due to the proximity of a dense human population (Essex County and Greater Boston area) and the lack of sufficient open habitat. Larger carnivores, capable of taking deer, normally are wide roaming species and their ranges greatly exceed the acreage of the refuge. It would not be possible to maintain an effective number of such predators totally within the boundaries of the refuge.

G. Supplemental Feeding

This alternative would involve establishment of a feeding program to supplement naturally occurring foods, especially during the critical winter season. This action would serve to compound the present deer problem by artificially increasing the number of deer; which in turn would necessitate an increase in supplemental feeding to maintain the expanding population.

Artificial feeding programs are also not consistent with the management policy and philosophy of the Service to use the least intensive management measure required to attain the desired objectives (ref. USFWS, Refuge Manual - Chapter 6 RM 1.3/ Exhibit 1,May 1986).

This alternative was eliminated from further consideration.

H. Reproductive Inhibitors (Immuno-contraception)

Chemical reproductive inhibitors are currently being investigated but have not yet been proven to be effective on free-roaming unconfined populations of deer. Such agents are also yet to be approved and registered by the U.S. Department of Agriculture. Thus, for other than research or experimental applications, chemical reproductive inhibitors are not available for use in field situations.

Fertility control agents, including synthetic hormones (progestins and estrogens) and natural vaccines (porcine zona pellucida) are currently under investigation by Federal and private agencies (U.S. Department of Agriculture; Deaconess Research Institute) and have been employed on deer under controlled conditions. While the research has experienced some success, there are numerous complex issues that remain unresolved;

* Logistically, it is difficult to vaccinate and monitor individual animals within a free-roaming, unconfined, wild population. Current vaccination agents studied, have not proven to extend immunocontraception beyond a single breeding season.

* Lack of a proven effective delivery system that must be administered each year (or more frequently on individual animals) in order to maintain effectiveness.

* Biologically there are unknown impacts on the behavior, social organization, and physiology of deer resulting from the use of reproductive inhibitors. These impacts will have to be identified before widespread use can be accepted.

* Vaccines under study represent a long term methodology, which will require long term study to determine the efficacy of the control agents. Current research is of relatively short duration.

* The economics of such a methodology e.g. cost in dollars and time have yet to be thoroughly researched and quantified. The delivery of vaccines to individual animals involves a great deal of personnel time and effort.

* The ethical aspects of disrupting the complex behavior of deer adapted through evolution, that keep individuals and populations fit and competitive has not yet been studied. The disruption of these mechanisms and the impacts of immunocontraception are unknown.

* This methodology is long term in its anticipated results and does not alleviate the immediate need to reduce population levels. For example, an excessive population will persist until deer die from natural causes. Without predation, this rate may be very low as deer can attain ages of 10+ years in the wild. Thus, the habitat degradation may continue for many years even if reproduction is substantially reduced or eliminated and no new deer immigrate to the Refuge from adjacent areas.

* This alternative would eliminate wildlife-related recreational opportunities for that segment of the public

that wishes to participate in the traditional form of hunting.

* This alternative would eliminate revenues gained under permit hunting programs, used to off-set the cost of the program.

Based on the preceding, this alternative is dismissed from any further consideration.

I. Reduction by Sharpshooters

This approach would involve the use of "sharpshooters" to reduce the number of deer using the refuge by shooting. This alternative was dismissed from further consideration based on the following points:

* The disposition of harvested animals must be considered. Unprocessed, un-inspected wild game is not routinely given away as a form of human food due to the liability incurred by any agency that officially undertakes such a program. Venison may have to be processed and inspected subject to all existing FDA/State laws and regulations governing purity and safety in order to protect the health and welfare of consumers. Handling, processing, packing, and inspecting would be considered necessary in order to protect the public health.

* "Professional" hunters/sharpshooters employed in animal control programs in the western states during the 1930's and 1940's were commonly paid a set fee per animal harvested. It is anticipated that this would also apply today.

* The current hunting program at the Refuge involves a permit fee which helps off-set the cost of conducting a hunt. This fee would not be available under a "sharpshooter" program, thus eliminating any revenues to help cover program costs.

* Qualifications have not been established to define what a "sharpshooter" is, or the skills and abilities necessary to qualify as a "sharpshooter".

* A Sharpshooter program would require that participants obtain the appropriate permits from the Massachusetts Division of Fisheries and Wildlife. Any program activity, outside State hunting regulations would also have to be approved by the State.

* A "sharpshooter" program would eliminate wildlife-dependent recreational opportunities for that segment of the public wishing to participate in traditional forms of hunting.

III. AFFECTED ENVIRONMENT

The refuge is comprised of approximately 4,662 acres consisting of barrier beach, sand dunes, fresh and brackish marsh, salt marsh, and upland shrub thickets and forests.

A. Objectives

Parker River National Wildlife Refuge's primary function is to protect and preserve migratory waterfowl habitat, especially for black ducks; other migratory birds; and wildlife species indigenous to the area.

The following are objectives developed during the Master Plan process in the early 1980s and do not necessarily reflect the current biological knowledge and direction of the Fish and Wildlife Service. These objectives are currently planned for a review and will be revised in the near future.

- Achieve the maximum number of migratory bird species indigenous to the refuge biotype, consistent with other important management needs and habitat limitations.

- Contribute to the Migratory Bird Program goals for wintering black duck populations. National goals are based on a three-year moving average of winter surveys.

- Achieve a duck breeding population at or above the 1975-80 average, based on five key species: mallard, black duck, gadwall, green-winged teal, and blue-winged teal.

- Maintain a resident Canada goose population that does not exceed the 1975-80 average population of 200-300 birds.

- Protect and enhance breeding and maintenance habitat for non-game birds, especially those with decreasing populations.

- Manage refuge lands for a diversity of mammal and non-migratory species at optimum population levels by providing a wide range of habitats at various successional stages.

- Manage, preserve, and maintain the existing Research Natural Area.

- Promote environmental education and interpretive programs to broaden public awareness of and appreciation for the natural and managed environments of the refuge.

- Provide visitors with a variety of safe and enjoyable recreational experiences without conflicting with the basic refuge mission.

B. Physical Features

The Parker River NWR portion of Plum Island contains approximately six and one-half miles of barrier beach island located at the southern tip of the Gulf of Maine in Essex County, Massachusetts. Plum Island is bordered on the north by the mouth of the Merrimack River and on the south by Ipswich Bay. The refuge includes the southern two-thirds of Plum Island, except for the extreme southern tip which is the Sandy Point State Reservation. Plum Island is one of the largest permanently protected barrier beach islands north of Cape Cod, Massachusetts. The barrier beach has a north-south orientation and east to west transects across the island portion of the refuge reveal major vegetation and physiographic changes.

Rising sharply just behind the beach strip is the foredune. This ridge of dunes receives the initial impact of storms from the northeast and is the least stable and least vegetated area of the dune system. Behind the foredune and running sometimes as far west as the main refuge road is the interdune area. Within this zone are a number of relatively deep, moist depressions or "kettles" which provide a unique microhabitat for a wide variety of vegetation and animal species. The backdune zone is vegetatively the most diverse and extends westward to the salt marsh. The predominant vegetation in this zone is a mixture of shrub thickets and shrub forests. There is also a pine forest behind the backdune ridge half-way down the refuge, composed of Austrian pine and pitch pine.

The 88 acres of fields on the refuge are maintained by annual mowing and are located on Stage Island, Cross Farm Hill, and along the east edges of the Bill Forward Pool and North Pool. Various grass and herbaceous species are found in these fields and provide food for Canada geese and deer, and nesting habitat for grassland birds.

The freshwater impoundments on the refuge cover approximately 265 acres. The major impoundments are the North, Bill Forward, and Stage Island Pools. The salt marsh edge on the west side of Plum Island totals approximately 1,700 acres.

C. Biological Features

1. Vegetation

The refuge contains vegetation typical of a New England barrier island: sparse open beach vegetation; foredune ground covers; and interdune and backdune shrub thickets and forests. Several floral cover types are scattered throughout the dunes. Communities of beach grass (Ammophila breviligulata), beach pea (Lathrus japonicus), dusty miller (Artemisia candata), and seaside goldenrod (Solidago sempervirens) are found in the dune areas.

Occasionally the dunes are covered by dense growths of false heather (Hudsonia tomentosa). Communities of beach plum (Prunus maritima), bayberry or myrtle (Myrica pennsylvanica), and poison ivy (Rhus radicans) are characteristic dune flora. Low inter-dune areas and old blowouts which retain standing water support a well-developed swamp woodland. Chief components of the swamp woodlands are red maple (Acer rubrum), shadbush (Amelanchier canadensis), winterberry (Ilex verticillata), and pussy willow (Salix discolor). A few low areas within the dunes are seasonally below ground water level and support marsh, shrub swamp, or bog-like vegetation. These wet areas often include cranberry. Upland wooded areas in the backdunes are found in the most protected environments well back from the beach. These forests consist of scattered black oaks (Quercus velutina), red maple, and black cherry (Prunus serotina). Also included are trembling aspen (Populus tremuloides), shadbush, eastern red cedar, and sassafras (Sassafras albidum).

Pure stands of pitch pine, a fire subclimax forest type, occur on the island. Stands of Austrian black pine have been planted in various locations for erosion control.

In non-forested areas dense stands of shrubs occupy the older dunes. These sites are well protected, and the communities are in early stages of forest succession. Included are staghorn sumac (Rhus typhina) trembling aspen, and young oaks (Quercus spp.). Typical shrub species common to the dunes and forests include beach plum, chokecherry (Prunus virginiana), bayberry, and blueberry (Vaccinium atrococcum).

2. Wildlife Resources

As pointed out in the objectives, Parker River NWR is primarily a migratory bird refuge. Situated along an important migration route, the refuge provides valuable nesting, resting, feeding, and wintering habitat for migratory waterfowl, marsh and shorebirds, and many passerine species.

The largest concentrations of waterfowl occur during the spring and fall migrations. Common fall waterfowl species include American black ducks (Anas rubripes), Canada geese (Branta canadensis), blue-winged teal (Anas discors), green-winged teal (Anas crecca), and mallards (Anas platyrhynchos). Some of these species nest within the vegetation around the freshwater wetlands and salt marsh.

The Refuge is identified as an essential stopover area for wading birds and shorebirds during migration, where they forage to replenish fat reserves and rest. The diverse wetland habitats that exist, including beach, fresh and salt marsh, provide moist soil for foraging and vegetation for cover. The peak shorebird migration occurs mid-August with abundance in the thousands for

over 20 species, including sandpipers (semi-palmated-Calidris pusilla, western-C. mauri, white-rumped-C. fuscicollis, and spotted-Actitis macularia), plovers (semi-palmated-Charadrius semipalmatus, black-bellied-Pluvialis squatarola), lesser (Tringa melanoleuca) and greater yellowlegs(T. flavipes), dunlin (C. alpina), killdeer(C. vociferus), and willet (Catoptrophorus semipalmatus). Of the two species which nest on the Refuge (killdeer and willet), the latter nests within the salt marsh habitat.

Neotropical migratory songbirds are a group of species which breed in North America and winter in the tropics or subtropics. Population declines of many of these species due to habitat loss and degradation, have become of national and international concern. The Refuge's diverse assemblage of habitats is host to migrant and nesting songbirds, many of which are declining in population in the eastern region of the United States. Coastal zones, especially barrier islands, possess higher densities of migratory songbirds than in equivalent areas farther away from the coast. The largest concentrations of migratory songbirds occurs during the spring migration when numerous warbler species are common, for example magnolia warbler (Dendroica magnolia), blackpoll warbler (D. striata), yellow-rumped warbler (D. coronata), black-throated blue warbler (D. caerulescens), Canada warbler (Wilsonia canadensis), black and white warbler (Mniotilta varia), northern parula (Parula americana), and other songbird species, including ruby-crowned kinglet (Regulus calendula), northern flicker (Colaptus auratus) and seaside sparrow (Ammodramus maritimus).

Numerous songbird species are distributed throughout the Refuge within species-specific habitats to nest. Most neotropical migrants build nests on or close to the ground within upland (particularly scrub-shrub), marsh, and grassland habitats. Species which nest in shrub habitat on the Refuge include (but not inclusive): yellow warbler (Dendroica petechia), yellow-throated warbler (D. dominica), American redstart (Setophaga ruticilla), black-billed cuckoo (Coccyzus erythropthalmus), purple finch (Carpodacus purpureus), and song sparrow (Melospiza melodia). Open marsh, meadows, and grassland nesting species are common throughout the Refuge and include some species such as marsh wren (Cistothorus palustris), red-winged blackbird (Agelaius phoeniceus), field sparrow (Spizella pusilla), savannah sparrow (Passerculus sandwichensis), and bobolink (Dolichonyx oryzivorus).

Migratory songbird occurence on the Refuge during both migration and nesting, is dependent upon the availability of suitable habitat which fulfills a songbird's specific requirements. This includes the availability of food resources, which consists primarily of insects and berries. The maintenance of a diverse assemblage of vegetative species is essential for migratory

songbirds that have been declining in population due to habitat degradation, and undergo extreme physiological stress from migration and nesting, and is critical to the maintenance of viable populations.

The refuge also serves as a home for a variety of resident wildlife species. Typical species include ring-necked pheasant (Phasianus colchicus), white-tailed deer (Odocoileus virginianus), eastern cottontails (Sylvilagus floridanus), striped skunks (Mephitis mephitis), red foxes (Vulpes fulva), and woodchucks (Marmota monax).

Generally refuge wildlife populations are diverse; with over 300 species of birds, 38 species of mammals, and 20 species of reptiles and amphibians occurring within the refuge area.

Threatened or endangered species found on the refuge are the piping plover (Charadrius melodus), peregrine flacon (Falco peregrinus), and bald eagle (Haliaetus leucocephalus). Peregrine falcons are found on the refuge during the raptor migration in early and mid-fall, usually before the end of October. Bald eagles occasionally pass over the refuge during spring and fall migration. Occasionally a few bald eagles will winter near the mouth of the Merrimack River in the Newburyport area.

D. Public Use

The refuge lies 35 miles northeast of Boston, Massachusetts and has over six and one-half miles of Atlantic Ocean beach available to the public. Major public uses include birdwatching, beach use, surf fishing, and waterfowl hunting. Public vehicular use (off road/on beach) is restricted to surf fishermen holding refuge beach access permits.

Other public recreation activities include wildlife observation, photography, environmental interpretation and education, hiking, and biking. Most of these activities take place on the refuge trails, roads, and the beach.

IV. ENVIRONMENTAL CONSEQUENCES

A. No Action

Failure to reduce the number of deer using the Plum Island portion of the Refuge will have a serious impact on deer and the supporting habitat. If the number of deer is allowed to increase, starvation and/or disease would be the likely outcome. The nutritional status of the fawn age class, the first to show the effects of a stressed habitat (reduced food source) will decrease. The fawn/doe ratio will continue to drop and probably stabilize at approximately 0.5 fawns per doe. This ratio is indicative of the nutritional status of the doe and directly

relates to condition of the habitat. Healthy adult does in good habitat will average 1.7 fawns or higher; those in poor nutritional condition will average 1.0 or fewer fawns. This ratio serves as an index to the relationship between deer and the quality and quantity of the habitat.

Deer will continue to (winter) browse on low nutritional value plant species such as Austrian and pitch pine and will become dependent on such plants earlier in the fall. The nutrition available, both in quality and quantity, will continue to decrease as the number of deer increases.

Deer of all age classes in poor nutritional condition are more apt to become conditioned to feeding by refuge visitors. Most of the "food materials" provided by visitors cannot be properly utilized by the animals as stomach bacteria are unable to react to such foods. Thus, nutritional status of deer will continue to decline as their number increases and the habitat is further degraded.

If left uncontrolled, deer numbers would continue to increase at the expense of other wildlife species on the refuge - a situation contrary to Fish and Wildlife Service policy. An expanding deer population on the refuge would continue to reduce food and cover for nearly all species using the vegetation zone from 0 to 5 feet above ground. Species adversely affected would include ground and low shrub nesting birds, small mammals which use ground vegetation for food and cover, and predators which feed on those small mammals and birds. Habitat damage from over-browsing by deer is slow to recover , thus negatively impacting all species that depend on the habitat over extended periods of time.

The potential for people to contract Lyme Disease (and other tick borne diseases) could increase. The visiting public would be negatively impacted if the incidence of Lyme Disease on Plum Island increased.

B. Annual Program

The environmental effects of a controlled public deer hunt on Parker River National Wildlife Refuge will be confined to the 1,357 acres of the refuge open for big game hunting (Appendix C.)

Impacts to wildlife would include the harvest (removal) of a number of deer annually.

An annual reduction in the deer utilizing the Refuge would result in improved nutritional condition (fewer deer browsing the available food source); less impact on the supporting habitat to the benefit of all species dependent on the habitat; less drastic fluctuations in deer numbers over time and subsequently, a more stable supporting habitat.

The condition of deer would improve, as fewer deer browsing the habitat will reduce the competition between individual animals; allow remaining deer a greater share of available browse; and minimize the impact of browsing on the vigor and regeneration of the vegetation.

As numbers are reduced and maintained, the likelihood of starvation during future winter periods will decrease.

Susceptibility to disease would decrease as healthy well-nourished animals have an increased resistance and tolerance to disease agents.

The status of wildlife species adversely affected by the heavily browsed 0-5 foot vegetation layer, would be positively affected as the habitat regenerates.

The potential health hazard to visitors and employees from contracting Lyme's Disease would decrease as the number of intermediate hosts (deer) for the adult ticks decreases.

The hunt program would have minor negative impacts on waterfowl. Some disturbance of waterfowl would be unavoidable, but it is expected that waterfowl would only be temporarily disturbed (during hunt days.) Deer hunting would not take place in the salt marshes on the west side of Plum Island. Displaced waterfowl could find refuge in adjacent non-hunted areas.

Federally threatened or endangered species found on the refuge include the piping plover, peregrine falcon, and bald eagle. The Service has determined that this alternative would have little or no adverse impact on these species as the program is conducted during times when these species are not present on the Refuge.

The hunt program would be limited to Grape Island and that area of Plum Island southward from beach access trail #1 to the Sandy Point State Reservation boundary. The Plum Island portion of the Refuge will be closed on hunt days to all public use except clamming and waterfowl hunting area access (via lot #1 boat ramp), in the interest of safety. The remainder of the refuge (western areas) would remain open to the public. Public use of the Refuge is generally low at this time of year and thus results in minimal negative impacts to other refuge users.

Visitors would not be able to observe wildlife during the program. While daily visitor-use is quite variable, an estimated 125 visits/day could be impacted.

Approximately 52 staff hours/day would be required to conduct the hunt and an additional 32 staff hours for placement and removal of signs, flagging, and miscellaneous preparations. The total estimated cost will vary depending on the number of hunt days.

The preferred action would not conflict with wetland, wild or scenic rivers, wilderness, floodplain, navigable waterways, coastal zone management, or historical sites legislation. No prime or unique farmland exists on the proposed hunt area.

C. Open Hunt

This alternative, following State seasons, limits, procedures and regulations would increase impacts listed under the Annual Hunt alternative; including increased disturbance of wildlife, disruption of other visitors for a longer period of time, and increased cost and staff time.

V. CONSULTATION AND COORDINATION WITH OTHERS

Consultation and coordination was conducted with the Division of Fisheries and Wildlife, Commonwealth of Massachusetts in 1986. This supplement/revision will also be submitted for review and comment by the Division Deer Biologist (Westboro, MA.)

Public notice will be by issuance of a news release announcing the revision of the EA and its availability for public comment.

Copies of the draft (revised) "Environmental Assessment - Public Deer Hunting on the Parker River National Wildlife Refuge" will be available for review at the Refuge Headquarters on Plum Island and by mail request.

A summary of written comments will be prepared and attached to the final EA as Appendix F.

Public comments referencing research programs/papers should include the source and availability of reprints or copies of the documents referenced in order to be considered.

A public hearing will be held on July 29,1996 at the Plum Island Taxpayers Associates (PITA) hall at 7:00pm to 9:30pm to accept written and oral comments.

Additionally, written comments may be sent to the following address:

Refuge Manager
Parker River National Wildlife Refuge
261 Northern Boulevard, Plum Island
Newburyport, Massachusetts 01950

All comments received by August 12, 1996 will receive due consideration; the final EA may be modified to incorporate these comments.

APPENDICES

APPENDIX A

RESEARCH/MANAGEMENT PROGRAM FOR WHITE-TAILED DEER (*Odocoileus virginianus*) AT PARKER RIVER NATIONAL WILDLIFE REFUGE

PARKER RIVER NATIONAL WILDLIFE REFUGE
NEWBURYPORT, MASSACHUSETTS

October 1995

RESEARCH/MANAGEMENT PROGRAM

PARKER RIVER NATIONAL WILDLIFE REFUGE
NEWBURYPORT, MASSACHUSETTS

Title: White-Tailed Deer Management Program

Project Number: Project Number 53550-20

Parker River National Wildlife Refuge was established in 1942 under the National Wildlife System. The Refuge is located 35 miles northeast of Boston and three miles east of Newburyport, Massachusetts. It encompasses 4,662 acres consisting of the southern two-thirds of Plum Island, a barrier island, and the adjoining salt marsh. Within Refuge boundaries, the barrier island comprises a beach zone and a dune area of approximately 815 acres. West of the dunes is an extensive tidal salt marsh of 3,000 acres traversed by the Plum Island River and Broad Sound tidal waterways. Three major impoundments total 262 acres of brackish to freshwater marsh. Between the beach and salt marsh habitats is 88 acres of grasslands, 11 acres of forests, and 400 acres of brush thickets (scrub-shrub). Administrative buildings, the main Refuge road, and parking lots comprise approximately 86 acres.

The Refuge contains all the vegetation communities typical of a New England barrier island: sparse open beach vegetation; foredune ground cover, interdune and backdune shrub thickets (scrub shrub) and forests, freshwater wetlands, and an extensive salt marsh system. Several vegetation cover types are scattered throughout the dunes. Communities of beach grass (*Ammophila breviligulata*), beach pea (*Lathrus japonicus*), dusty·miller (*Artemisia candata*), and seaside goldenrod (*Solidago sempervirens*) are found primarily in the foredunes and interdunal areas. Other vegetation that is characteristic of dune flora include beach heather (*Hudsonia tomentosa*), beach plum (*Prunus maritima*), bayberry or myrtle (*Myrica pennsylvanica*), and poison ivy (*Rhus radicans*).

Low interdune areas scattered throughout the dune system, retain standing water, and support a well-developed swamp woodland consisting of red maple (*Acer rubrum*), black tupelo (*Nyssa sylvatica*), alders (*Alnus rugosa*), shadbush (*Amelanchier canadensis*), maleberry (*Lyonia ligustrina*), arrowwood (*Viburnum recognitum*), highbush blueberry (*Vaccinium corymbosum*), winterberry (*Ilex verticillata*), hoary willow (*Salix candida*), and pussy willow (*Salix discolor*). Other low areas which are seasonally below ground water level support marsh, shrub swamp, or bog-like vegetation: cranberry (*Vaccinium macrocarpon*) and baltic rush (*Juncus balticus*).

Upland wooded areas (forests) in the back dune consist of scattered black oak (*Quercus velutina*), red maple, black cherry (*Prunus serotina*), gray birch (*Betula poplifolia*), quaking aspen (*Populus tremuloides*), eastern red cedar (*Juniperus virginiana*), and shadbush (*Amelanchier canadensis*).

Much of the shrub communities are successional to the forest with sapling (young) staghorn and smooth sumac (*Rhus typhina* and *R. glabra*), gray birch, quaking aspen, and oaks. Other shrub species common to dunes and forests include beach plum, chokeberry (Pyrus melanocarpa), bayberry, and highbush blueberry.

Freshwater marshes formed when impoundment dikes were constructed in the 1950's: North, Bill Forward, and Stage Island Pools. These pools are dominated by *Phragmites australis*, purple loosestrife (*Lythrum salicaria*), cattail (*Typha*). Along the transition zone from the water to open fields, nut grass (*Cyperus spp.*) and spike rush (*Eleocharis parvula*) are abundant. The North and Bill Forward Pool fields possess a diversity of herbaceous vegetation such as timothy (*Phleum pratense*), bluegrass (*Poa spp.*), fescue (*Festuca spp.*), and clover (*Trifolium spp.*).

Some of the best examples of salt marshes in New England fringe the west side of Plum Island and contain vegetation typical of the habitat: salt marsh cordgrass (*Spartina alterniflora*) and rockweed (*Fucus vesiculosis*) within the low marsh; and salt meadow cordgrass (*S. patens*), salt grass (*Distichlis spicata*), and black rush (*Juncus gerardii*) within the high marsh. The transition zone from the salt marsh to upland is marked with seaside goldenrod, slough grass (*Spartina pectinata*), panic grass (*Panicum virgatum*), and young upland shrubs.

There are no known Federally listed endangered or threatened plants on the Refuge; however, four rare plant species now occur or have been known to occur within the Refuge: *Aristida tuberculosa* and *Rumex pallidus* are currently known to occur in the Refuge while *Eriocaulon parkeri* and *Isoetes eatonii* are historical records not recently verified.

Objectives:

This long term program incorporates different studies to investigate and monitor white-tailed deer occurring on Parker River NWR property over a 5-10 year period.

1. To refine and obtain relative indices that would identify the Refuge's threshold for sustaining a white-tailed deer herd.

2. Determine the relationship of the local white-tailed deer herd with scrub-shrub vegetation community and quantify the effects of browsing.

3. Identify neotropical and residant bird usage during the breeding and migration seasons and obtain relative bird indices in the scrub-shrub habitat.

4. To maintain a healthy population of white-tailed deer that is commensurate with the habitat.

5. To collect biological data from annual harvests to obtain relative indices indicating the health of the herd.

Justification:

Parker River NWR is one of the few natural barrier island complexes remaining in New England. Historically, white-tailed deer (*Odocoileus virginianus*) were native inhabitants of the Plum Island portion of Parker River NWR; however, in the mid to late 1950's their abundance on the island exceeded the capacity of the habitat such that overbrowsing of vegetation was prevalent. The potential impacts from an over-abundant deer herd can be detrimental to the individuals within the herd and to other wildlife species (floral and faunal). In the past, deer management has been reactive rather than preventive, such that degradation of habitat was the trigger for regulation of the herd. Thus, harvest of the deer herd occurred periodically (e.g., 1957-1961; 1987-1990; 1993). This type of management results in adverse affects on plant and animal communities and ultimately, may alter ecological diversity and succession. A review of the Refuge's biological data and current literature, indicated the need to regulate and maintain a healthy population of white-tailed deer that is compatible with the resources.

Predators (e.g., wolf, bear, coyote) were a natural regulatory agent of deer populations; however, with the extirpation of these efficient predators, deer populations can increase to a detrimental level. High deer densities will reduce the quality and/or abundance of food, the growth, fecundity, and survival of deer. When there is less food available, deer undergo nutritional stress/malnutrition and become more vulnerable to starvation and disease. Nutritional stress caused by inadequate forage quantity or quality can lead to significantly reduced reproductive rates (Klein 1970) such as that seen at Great Swamp NWR in New Jersey, Pennsylvania, and New York. Analyses of data from various areas in the United States support the hypothesis

that undernourished does tend to produce a surplus of males, whereas more females are born to mothers in good health at estrus (Verme 1983). In addition, malnutrition tends to result in slower growth and smaller body mass in deer, particularly males (Leberg and Smith 1993). Mortality in deer is a function of the habitat conditions and population size. In actuality, few deer die of old age; instead, older animals are vulnerable to predation, disease, and nutritional deficiencies.

Deer are a function of their habitat and conversely, the habitat is a function of the deer. Habitat type and quality directly influence deer foraging habits, nutrition, movements, and optimum density. Deer can also have an impact on the habitat, altering its structure, composition, and value to both deer and other wildlife species. High deer densities adversely affect the vegetation within the communities. Browsing can inhibit woody-plant regeneration and severely decrease the availability of preferred food plants. Additionally, heavy foraging pressure may lead to consumption of less preferred plants by deer, and stimulate growth of species which are less palatable and more competitive than preferred plants. When over-browsing occurs, the undergrowth (ground cover and shrub species) is eliminated and a browse line is evident on trees and shrubs at the maximum level deer can reach. Substantial damage to plants occurs well before the browse line is observed. If damage reaches this level it will take years for it to recover. This over-browsing may negatively impact fragile habitats and threatened/endangered vascular plants (Miller et al. 1992). In coastal areas, dune communities may be highly susceptible to overuse by deer. Overbrowsing may greatly reduce dune vegetation, resulting in destabilization of the dunes and increase vulnerability to wind erosion. The potential adverse impacts of high deer densities on vegetation promotes a thorough assessment of the effects of deer on the habitat which will dictate the desired deer densities.

The Refuge serves as a breeding site and migratory stopover for a diversity of neotropical landbirds (songbirds). The decline in abundance of these migrants throughout their range has been attributed, in part, from habitat loss on breeding, migrating, and wintering grounds (Robbins et al. 1989). These birds occur in large concentrations in upland habitats (primarily scrub-shrub) making their populations sensitive to changes within the habitat. Many species require similar habitat types when breeding and migrating along the Atlantic Flyway. In addition, landbirds tend to concentrate near the coast, especially on barrier islands where relative migrant abundance and species diversity is greater than on adjacent

mainland coasts (Mabey et al. 1993). The concentration of migrant landbirds on barrier islands may be related to the habitat features such as the extensive, undisturbed areas of dune woodland and interdune scrub vegetation. These areas offer an abundant food source (e.g., insects, fruit) and the dense vegetation provides cover from predators, adverse weather conditions, and breeding/nesting areas. Studies investigating the impact of ungulate (deer) abundance on songbirds indicate an adverse relationship between browsing pressure and songbird composition, abundance, and diversity (Casey and Hein 1983, deCalesta 1994). The significant concentration of landbirds along the coastal habitats suggests the importance of maintaining natural scrub-shrub habitats for breeding and migration.

Without the benefit of harvests and in the absence of predators, the potential exists for rapid population increases which can pose a severe threat to fragile habitats in coastal areas and unnatural alterations of associated plant and animal communities occurs. When one component of the ecosystem (e.g., deer) jeopardizes the other native plant and animal communities in an area, management actions are justified to ensure the natural functioning of all communities in the ecosystem. Deer harvests may prevent serious habitat depredation and reduces mortality due to other causes (e.g., winter stress and disease).

Additionally, tick-borne diseases (e.g., Lyme disease and babesiosis) may be particularly prevalent among coastal herds and thus constitute a threat to public health. Deer serve as hosts to these ticks, for transport, and transmittal to humans is common. The association between tick abundance and white-tailed deer abundance has not been studied intensively; however, initial studies indicate a decrease in tick abundance with a decrease from an over-populated deer herd to one that is compatible with the habitat over time (Wilson and Deblinger 1992, Deblinger et al, 1993, Ginsberg 1994). Thus, the potential may exist for the indirect decrease in tick abundance while maintaining a herd size.

Hunting on National Wildlife Refuges is a valid activity that is approved, as stated in the U.S. Fish and Wildlife Service hunting policy (8 RM 5.1): "...The Service may permit the hunting of wildlife on national wildlife refuges where hunting contributes to, or is not incompatible with the management objectives of the refuge...The Service recognizes hunting as an acceptable, traditional, and legitimate form of wildlife-oriented recreation. Regulated hunting can also be used as a management tool to effectively control wildlife population levels." In accordance with this hunting policy, Refuge's are not required to collect

intensive data to justify a hunt. At Parker River NWR management activities take into account an assemblage of habitats and species; therefore, detailed information on the deer herd and its association with the environment will continue to be collected.

Parker River NWR has designed a program that will investigate white-tail deer dynamics and its effect on the environment. The site-specific indices that are obtained for deer presence in winter (aerial surveys), vegetation monitoring (deer exclosures), neotropical bird use (point count surveys), and the biological data (harvests) will provide information on the herd status, health and the association between deer use and vegetative regeneration. The intricate relationship between deer, vegetation, and other faunal species warrants a study which analyzes these parameters. for this reason, Parker River NWR will not attempt to determine a total population number for the property; instead, the indices will be analyzed and evaluated to maintain a healthy deer herd and habitats. Adjustments to the program (e.g. deer harvest effort) will be made, as needed, to finely tune management objectives.

The program will incorporate a variety of procedures to obtain baseline data on these variables. These procedures are preferred over others due to the funds, time, and personnel available. No one monitoring technique is useful on its own. Various indices need to be obtained to look at the relative differences on an annual basis. The study will be implemented over a period of 5-10 years so that any trends can be identified and compared.

Procedures:

A. Aerial Survey
(Appendix 1: Aerial Surveys)

Coastal habitats are typically suboptimal for deer due to the siliceous, sandy soils with poorly developed horizons and low fertility; low water retention and nutrient storage capacities; and harsh weather conditions with salt spray and high winds; however, despite these conditions/limitations, deer herds are present in many coastal areas. In these areas, the scrub-shrub and forest areas contain dense thickets; thus, limiting the techniques to accurately monitor the herd. The abundance of white-tailed deer in a given area is determined by using various techniques, including night spot-lighting (Gunson 1979, Fafarman and DeYoung 1986, Cypher and Cypher 1988) and aerial counts (Rice and Harder 1977, Floyd et al. 1979, Beasom et al. 1981, DeYoung 1985, Beasom et al. 1986, Cypher and Cypher 1988, DeYoung et al. 1989, White et al. 1989, Potvin et al.

1992). The accuracy and precision of each technique varies by site, depending on the vegetation cover type which dictates degree of visibility. In the past, the Refuge conducted night spotlighting to obtain sex ratios; however, much variability exists due to limited visibility and consistency in the counts (e.g., weather, mowing schedule in fields). For this reason, night spotlighting of deer to obtain sex ratios was deemed inadequate as an index, and will not be conducted on the Refuge.

Aerial surveys are a common technique used to determine the abundance of large mammals (e.g., cervids) in a given area. Numerous studies at other locations across the U.S. have used mark-recapture studies to supplement the aerial surveys and to assess the accuracy of the counts acquired from aerial surveys. This technique is site-specific due to observability of deer from the air; therefore, biases inhibit true counts for population estimates. If consistency in the methodology (e.g., transect lines), time of year, and degree of visibility are followed, the counts that are obtained can be a useful index when compared annually to determine if the deer herd is increasing, decreasing, or remaining relatively stable.

Aerial surveys have been conducted on the Refuge for the past 11 years. These surveys provide a relative index for the number of wintering white-tailed deer occurring on the Refuge. Annual comparisons of these data will be analyzed and, in conjunction with other indices and vegetation data, correlations between variables can be identified. The advantages to aerial surveys are that the counts consume relatively little time and only require two or three personnel. The disadvantages include the necessity of favorable snow cover, vegetation, weather conditions, and expense of aircraft rental.

B. Deer Exclosure Study
(Appendix 2: Deer Exclosures)

Various studies have been conducted to assess the value of habitats and the impacts by deer within these habitats. These studies were conducted in different locations to assess habitat types used (Gaudette and Stauffer 1988), identify preferred vegetation (Kay 1993; Prachar and Samuel 1988), and impacts on endangered and threatened vascular plants (Miller et al. 1992). The potential impacts to vegetation by deer and the close association between deer abundance and vegetation response are essential to monitor and maintain the integrity of the ecosystem. To do this, exclosures were erected to investigate the effects of deer browsing on the vegetation within a habitat (Laskowski unpubl., Healey pers. comm.). Exclosures were placed in

different and/or similar habitat types to compare non-use areas by deer to those areas outside, and available, to foraging deer.

This study was initiated in 1995 to monitor the effects of white-tailed deer browsing, specifically on the scrub-shrub habitat. The study design is exampled after the protocol established by the U.S. Fish and Wildlife Service (Region 5), South Zone Biologist Hal Laskowski. The data collected from this study includes: species composition, density of woody vegetation, herbaceous and annual plant growth, and amount of wildlife cover.

C. Landbird Monitoring (Appendix 3: Passerine, Baseline Breeding Survey)

The Refuge supports a diversity of wildlife species throughout the year: land and water birds (neotropical and resident) nesting during the spring/summer months, a stopover area for migrating birds, and wintering grounds for other avian species (e.g., waterfowl). These species coexist with white-tailed deer within various vegetation communities; to maintain these diverse communities, management should also include the animal populations that these communities support.

The increased attention to declining populations of neotropical species and their association with the habitat, and the importance of coastal habitats, instigated the neotropical landbird study at various Refuges in the region (including Parker River NWR) in 1994, based on study guidelines developed by U.S. Fish and Wildlife Regional Biologists. Data collected from the Landbird Monitoring Study will identify the species and abundance of passerines breeding specifically within scrub-shrub habitat on the Refuge. This study is correlated with the Deer Exclosure Study (Appendix 2) with similar exclosure plots and landbird point count locations. These data will be used to investigate the impacts of deer on specific migratory landbirds.

D. Annual Controlled Deer Harvest
(Appendix 4: Annual Deer Management Program).
(Appendix 5: Bibliography: Literature on "Deer Hunting as a Management Tool")

Refuge managers are confronted with regulating deer populations in the absence of natural predators that would maintain the herd at a level that does not negatively impact the habitat and associated wildlife. A variety of management techniques have been tried in the reduction of large mammals (e.g., white-tailed deer) including sharp-

shooters, immunocontraception and controlled hunts. Using sharp-shooters to control the deer herd has proven to be expensive and time consuming, and after review has not been included as a management option at this time.

In recent years, studies have been conducted to investigate the use of immunocontraception to regulate the numbers of large mammals. This research has been tested on wild horses (Kirkpatrick et al. 1990, Garrott et al. 1992) in Maryland and captive deer herds (Turner et al. 1992). The results indicate that the potential exists for the use of this technique in the future; however, there are many disadvantages and limitations that prevail and negate its use on a wide-scale basis. At this time, the technique is not approved by U.S. Food and Drug Administration and is in its testing stages only. The technique involves corralling the herd for individual inoculation, every year (if not twice a year with a secondary booster shot). Thus, due to the status of the test drug, the monetary expense, and intensive time consumption, (Robert Deblinger, Mass. Div. of Fish and Wildl., Daniel Thompson, USDA, Denver Wildl. Res. Ctr. CO, pers. commun.) The Refuge does not consider this technique as a means of controlling the white-tailed deer herd at this time.

The use of a controlled harvest of white-tailed deer has shown to be an effective technique to regulate and maintain a healthy herd and environment and is well documented in other studies (Appendix 5). The Refuge conducts the harvest primarily for biological/ecological reasons. The harvest of deer also provides a recreational activity, but at Parker River NWR it is a secondary activity. The annual harvest includes a lottery selection of hunters, a mandatory orientation prior to the harvest dates, and consistency in methodology (e.g., harvest days and hours, number of hunters per day, biological data collection).

Collection of biological data is essential in monitoring the health of the herd. The data collected are used as indices, which are relative and site-specific. The morphological characteristics of white-tailed deer vary between sites (e.g., northern deer are typically larger than those found in the south). Within a given area, deer are often smaller and lighter when occupying inferior or overcrowded habitats; thus, data collected during the harvest at Parker River NWR will provide site-specific indices on the health of the herd, for comparisons between years.

The number of deer harvested provides an index when hunting effort is consistent. In addition, sex, weight, and

age are general measurements collected from deer harvested. From this data, a fawn:adult ratio is obtained. This ratio provides information on the reproductive aspect of the herd and is an index to herd health. Age of the deer is best determined from tooth eruption and degree of wear on the molars. This index will be specific to the Refuge because tooth wear will vary from other areas due to the type of soils and vegetation of the habitat. In time, a large sample size (of deer teeth), will provide the Refuge with a consecutive age board to consistently determine the age of individual deer harvested.

Antler beam diameters are often used as indices to habitat conditions, particularly during spring and summer when a majority of antler growth occurs. This index serves only as a secondary source to investigate habitat conditions; by itself, there is much variability due to locality (e.g., different levels of minerals available such as calcium and phosphorus), and energy and protein intake which is site-specific. A more dependable and widely used method to examine health of animals and habitat conditions, is examining kidney fat. A kidney fat index is preferred because it takes into account the seasonal variation in habitat conditions and differences between individual animals. In addition, kidney fat indices are preferred over bone marrow fat because the former is utilized during intermediate stages of condition rather than when the animals is already in poor condition and is using its last resource (bone marrow fat). The data collected from controlled harvests will be compiled with the State of Massachusetts, Division of Fisheries and Wildlife, to provide a state-wide database for white-tailed deer herds.

Cooperators:

Cooperators for this program will include: the Trustees of Reservations (a private, non-profit conservation organization) to share flight costs of the winter aerial deer survey and communicate data information, and the Massachusetts Division of Fisheries and Wildlife for staff training and contribution of data from harvests in zone 10 and other zones with in Massachusetts.

Schedule:

Early Winter	(Dec-Jan)	Aerial Deer Survey (1-2 times/year)
Spring/Summer	(Apr-Aug)	Vegetation and browse assessment
	(June)	Neotropical bird census
Fall	(Nov-Dec)	Controlled harvest

Responsibility:

The service will provide all funding and personnel for this study, with the exception listed above.

Reports:

Draft summary reports will be completed at the conclusion of each study with in the white-tailed deer management program (aerial deer survey, vegetation monitoring, and controlled harvest). An comprehensive White-tailed Deer Management program report will be completed in February detailing the prior year's data.

Costs and man-days per fiscal year:

Fiscal Year	Study Element	Cost	Man-days
1995	Aerial Deer Survey	1,500	1
1995	Deer Exclosure	Initial $2,062	Initial 15 Monitoring 3
1995	Landbird Monitoring	On going Refuge program	4
1994	Controlled Hunt and Biological data collection	$3,260	7
	Totals	Initial $2,062 Operation $4,760	Initial 15 Operation 11

Prepared by: _____ Date: 10/27/95
Refuge Biologist

Reviewed by: _____ Date: 10/30/95
Refuge Manager

Reviewed by: _____ Date: 11/3/95
N-Zone Biologist

Reviewed by: _____ Date: 11-14-95
Geographic ARD

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BACKGROUND DATA
(1983-1995)

In 1983, Parker River National Wildlife Refuge initiated a management study for white-tailed deer to investigate a steadily increasing deer population. At that time, widely accepted methodology was compiled to obtain data on the number of deer using the Refuge during different seasons of the year, and general nutritional analyses. The methods established set protocol for collecting these data and consistency has been maintained throughout the years to allow analysis of the data in a biologically and statistically sound manner. These methods include fall spotlight surveys, winter aerial surveys, and the collection of individuals to obtain biological data, in the form of annual State permits and periodic controlled public hunts.

Fall spotlight surveys were conducted during the fall months beginning in 1983 (Table 1). The data provided a minimum number of deer occuring on the Refuge at that time and are confounded by factors that may vary from year to year, such as weather conditions, visibility along the designated driving route (e.g., mowed vs unmowed fields), and observer differences. The number of surveys conducted within one fall season differs due to weather conditions and staff availability. The high standard deviations from the mean indicate the differences in the number of deer recorded within one season (e.g., in 1983 the average was 27 deer with a standard deviation of 12 deer). The spotlight surveys indicate an increasing trend in deer abundance from 1983 to 1987, at which time a controlled public deer harvest was initiated.

Winter aerial surveys were initiated in 1984 and continued on an annual basis as a pertinent index for the white-tailed deer management program (Table 2). From 1984 to 1988, funding was available to conduct two surveys each year; however, limited available funding resulted in one survey each year from 1989 to the present. Data recorded during these surveys indicate an increasing trend in the abundance of white-tailed deer from January/February 1984 to January 1987 and from January 1991 to January 1993. Weather conditions during the winter are an essential criteria for conducting this survey and can negatively effect the accuracy of the data. For example, icy conditions with minimal snowfall in 1995 resulted in a late aerial survey (March 2) because the snow ground cover criteria was not present during January and February and the survey was conducted during less than optimal conditions (hard packed snow and ice as ground cover and heavily laden trees with ice). Limited visibility in the dense vegetation during this survey, resulted in only 17 deer recorded. In optimal conditions, visibility from the air is clear and serves as an effective index of the deer abundance at that time.

Table 1. Data recorded during fall spotlight surveys conducted at Parker River NWR from 1983-1995 (excluding 1986; no spotlight surveys were conducted).

Year	Dates	# Surveys	Range	Aver. No. Deer[a]
1983	09/15-11/09	8	9-41	27 ± 12
1984	09/16-12/12	12	24-74	45 ± 13
1985	10/06-11/06	4	36-62	49 ± 10
1987	10/20-12/09	6	26-57	39 ± 15
1988	09/09-11/17	12	23-44	34 ± 7
1989	09/28-11/02	5	12-33	25 ± 8
1990	10/15-11/14	4	18-36	29 ± 8
1991	09/03-11/20	10	1-24	10 ± 7
1992	09/10-11/19	10	5-41	24 ± 11
1993	09/02-11/18	11	11-59	35 ± 16
1994	09/08-11/16	10	2-27	16 ± 9
1995	11/30, 12/7	2	21, 34	22[b]

[a] Value indicates the average number of deer observed during the season and includes the deviation from this average (±).

[b] Pre-hunt surveys were not conducted; small sample size to obtain average.

Table 2. Data recorded during winter Aerial Deer Surveys at Parker River NWR from 1984-1995.

Year, Month	Number of Deer Recorded		
	Flight 1	Flight 2[a]	Average
1984 Jan/February	58	68	63
1985 January	119	103	111
1986 February	100	94	97
1987 January	110	129	120
1988 January	89	82	86
1989 January	38	--	38
1990 January	29	--	29
1991 January	26	--	26
1991(1992) December	31	--	31
1993 January	66	--	66
1994 January	36	--	36
1995 March	17	--	17

[a] Due to budget constraints, only one aerial survey was conducted from 1989 to present.

The objectives of the 1983 Management Study also included the collection of individual deer for necropsy and collection of biological data to investigate nutritional status. From 1984 to 1987, the Refuge received annual permits from the State of Massachusetts to collect deer to meet this objective. Based on Refuge records, the following observations and conclusions were made (Table 3):

A total of seven deer were collected for necropsies in 1984 (Table 3). Analysis of the stomach contents confirmed deer were browsing heavily on Austrian and pitch pines, which are marginal deer food, and less on other woody species. A 17-month old female that was collected in October, possessed little kidney and heart fat, and almost no intestinal fat. Refuge staff concluded that the deer herd occuring on the Refuge was over the capacity of the habitat to support them in a healthy condition.

In 1985, the animals collected (10 deer) for necropsy exhibited significant signs of physiological stress (e.g., reduced fat reserves and gelatinous bone marrow). The harvest's fawn:doe ratio reflected breeding does in poor nutritional condition; this progressive decline of the ratio is typical of a population subjected to increasingly greater nutritional stress. In addition, a majority of bucks on the refuge had reduced antler growth, indicating nutritional deficiencies. The oldest female that was collected possessed an ear tag which was from the Richard T. Crane, Jr. Wildlife Area (Crane's Beach), Ipswich, MA, confirming the movement of deer between Plum Island and the mainland.

Six deer were collected in 1986. Although winter had not been that severe, the first four females collected in January were in emaciated condition. In addition, two females collected in March showed obvious signs of physiological stress, low fat reserves, and gelatinous bone marrow.

Necropsies conducted on the six deer collected in 1987 showed deer were thin with very little body fat. For the first time, on record, a dead deer found in April documented winter starvation resulting in death.

Table 3. Data recorded from necropsies of deer collected by Refuge staff at Parker River NWR, based on conditions set forth in the State of Massachusetts' annual permit, 1984-1987. Reproductive status based on fetal counts.

Yr	Sex/Age	Dressed Weight	Fat[b]	Repro Status	Notes
	Male 3.5	132	31.5	--	minimal fat content
1	4.5	124	66.5	--	minimal abdominal fat
9	Fem 1.9	86	126.1	2	low fat around heart
8	2.9	95	85.2	1	
4	2.9	87	47.2	--	low fat around heart
	3.9	91	94.9	1	
	6.9	74	69.1	none	cyst on fimbria
	Male 1.5	112[a]	9/0	--	almost no body fat
	2.5	118	7.3/0	--	low internal fat
	2.5	102	16.2/9.1	--	low fat on body organs
1	2.5	89	12.3/0	--	minimal fat content
9	Fem 2.9	78	14.5/0	2	no fat around heart
8	3.5	95[a]	6.3/10.8	1	in fair condition
5	3.5	103	14/7	2	good fat reserves
	3.5	86	14.5/5	2	internal fat good
	3.5	93	--/0	2	extremely low fat
	8.9	85	10.5/0	2	no fat aro. intestine
1	Fem 2.8	114[a]	15/24	0	sparse fat abundance
9	2.8	132[a]	15/11	2	good condition
8	2.8	98	22/13	2	good condition
6	5.8	94	18/29	2	variable fat content
	Unk	84	16/0	1	sparse-no fat content
	Unk	96	7/7	2	sparse-no fat content
1	Fem 0.8	46	0/0	0	no fat; poor condition
9	0.8	52	trace/0	0	fair condition
8	2.5	78	16/0	--	fair-good overall cond
7	3.0	101[a]	2/0	2	sparse fat; poor cond
	3.5	90	21.3/0	--	fair-good overall cond
	5.0	91	2/0	3	no fat; poor condition

[a] Full weight of individual not dressed weight.
[b] Fat content: 1984 based on kidney fat index. 1985 based on brisket (3d rib)/rump (base of tail) in mm.

In 1986, an Environmental Assessment for Public Deer Hunting on Parker River NWR was documented and approved to be an effective management strategy to decrease the deer population occuring on the Refuge. As a result, deer were harvested by a controlled public hunt which was conducted from 1987 to 1990, 1993 and 1995.

Basic biological data was collected during these harvests, and included: sex, age class, fawn:doe ratio (Table 4), and weight (Table 5). Data to investigate the nutritional status of deer was collected, and included antler beam diameter and kidney fat; however, the methodology differed between the 1987 to 1990 period and harvests conducted in 1993 and 1995. Antler beam diameter was included in the data collection for all deer in 1995, and included in Table 6. During the period 1987 to 1990, kidney fat data was estimated by ocular estimation whereas in 1993 and 1995, kidney fat was measured quantitatively and used to determine a kidney fat index (Table 7). This index allows Refuge staff to analyze the data based on real numbers. Data collected during the harvests are consistent with the State of Massachusetts' requirements, and is used to evaluate and monitor the deer population occuring on the Refuge.

Table 4. Total number of deer harvested within each sex and age class for 1987-1990, 1993, and 1995. Fawn:doe ratio is based on the deer collected during each harvest.

Year	No. hunt days	Sex	No. deer harvested/age class			Total	Fawn:Doe Ratio
			0.5	1.5	2.5+		
1987	4	Male	4	4	27	35	
		Female	6	1	13	20	0.71:1
1988	6	Male	11	4	6	21	
		Female	12	6	19	37	0.92:1
1989	3	Male	4	1	0	5	
		Female	3	0	3	6	2.3:1
1990	3	Male	1	0	2	3	
		Female	6	1	3	10	1.75:1
1993	5	Male	6	3	9	18	
		Female	5	1	11	17	0.92:1
1995	2	Male	3	7	0	10	
		Female	5	2	5	12	1.14:1

Table 5. Average field dressed weights (lbs) with standard deviations of harvested deer, by age class, at Parker River NWR, 1987-1995.

Yr	Sex[a]	0.5	1.5	2.5 +
1987[a]	Male Female	52.3 ± 10.3 48.8 ± 5.5	98.8 ± 6.1 101.0	124.9 ± 19.4 94.0 ± 10.8
1988	Male Female	60.7 ± 11.1 61.3 ± 11.6	96.5 ± 3.0 90.0 ± 8.0	122.7 ± 31.8 108.4 ± 7.8
1989	Male Female	58.5 ± 6.6 53.0 ± 4.4	96.0 0	0 100.0 ± 6.9
1990	Male Female	64.0 58.0 ± 8.0	0 92.0	153.0 ± 25.5 113.0 ± 13.1
1993	Male Female	67.2 ± 5.9 57.8 ± 10.5	104.7 ± 9.2 95.0	127.3 ± 29.1 99.4 ± 12.1
1995	Male Female	55.3 ± 15.3[b] 55.0 ± ○ 4.7	120.0 ± 19.2 104.5 ± 13.4	0 104.2 ± 7.4

[a] In 1987, 13 harvested deer were not aged; therefore, they were not included within these calculations by age class.

[b] Male deer harvested at Sandy Point State Reservation is included in this average weight calculation.

Table 6. Average antler beam diameter (mm), standard deviation for left and right antlers, and average weight, 1995.

Year	Age Class	# Points (range)	Beam diameter (mm) ± SD		Aver. Weight (lbs)
			Left	Right	
1995	1.5	2-8	19.6 ± 5.3	18.8 ± 4.0	120.0 ± 19.2

Table 7. Averages and standard deviations for trimmed Kidney Fat Index (KFI) values (percentages) for harvested deer, categorized by sex and age, Parker River NWR, 1993 and 1995.

	0.5 year	1.5 years	2.5 years
1993			
Male	189.6 ± 12.5 (n=3)	206.1 ± 11.7 (n=2)	190.7 ± 25.2 (n=7)
Female	183.4 ± 68.2 (n=2)	0	246.8 ± 44.6 (n=6)
1995			
Male	150.0 ± 11.0 (n=2[a])	218.3 ± 54.6 (n=7)	0
Female	169.9 ± 13.8 (n=5)	208.3 ± 61.4 (n=2)	215.6 ± 51.9 (n=4[b])

[a] One male harvested at Sandy Point State Reservation is not included within this calculation because entrails were not delivered to check station.

[b] One female was found dead and kidneys were insufficient for analyses.

All surveys (spotlight and aerial) and harvest data are evaluated comprehensively to monitor the white-tailed deer herd occuring at Parker River NWR. It is not valid to rely entirely on one survey because each survey method (spotlight and aerial) has limitations (weather conditions, habitat management, and observer differences) which affect the results. For these same reasons, it is not possible to make inferences from one year's data; the most effective analyses is by identifying trends in the population based on various years' data (Figure 1).

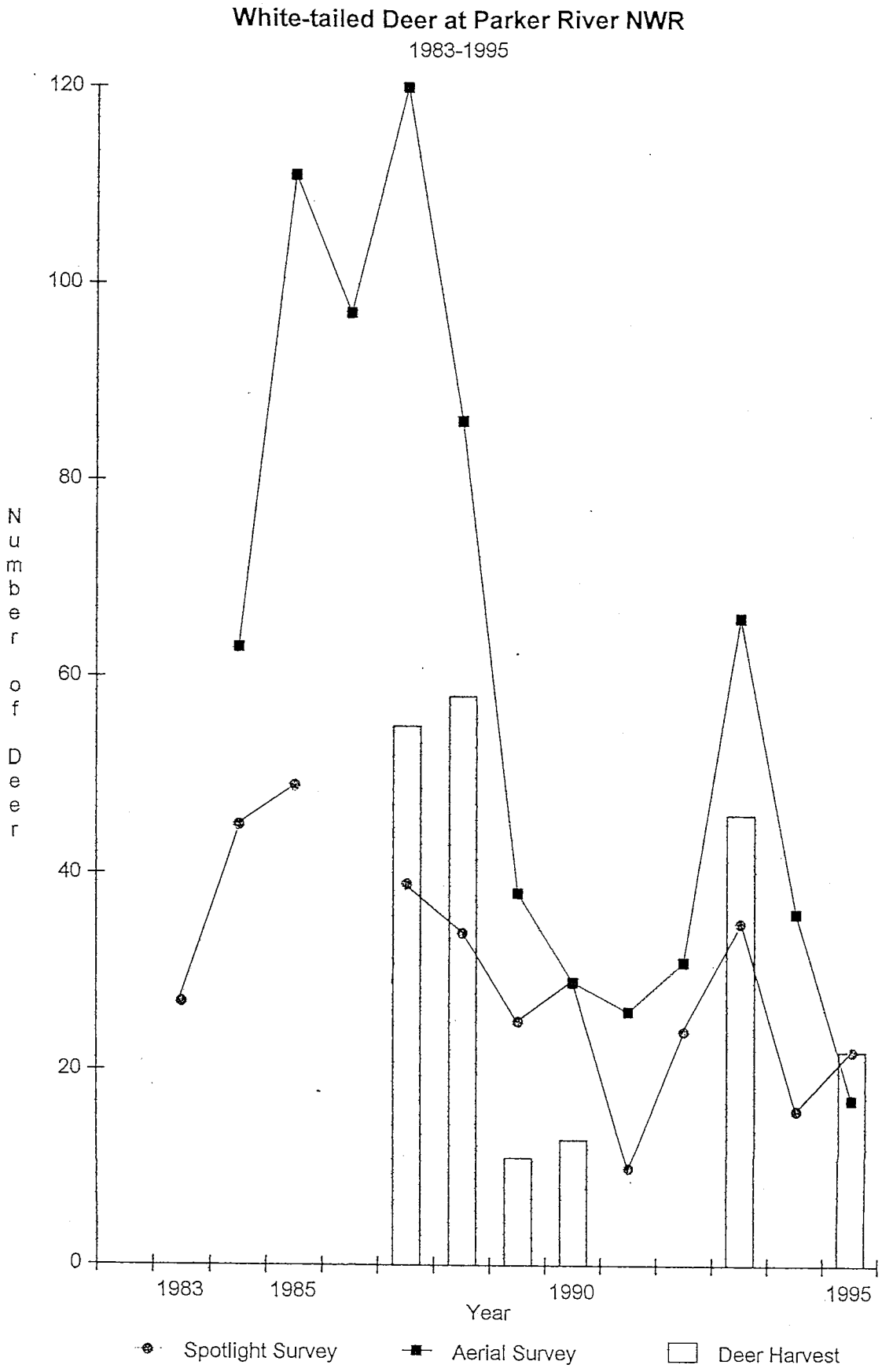
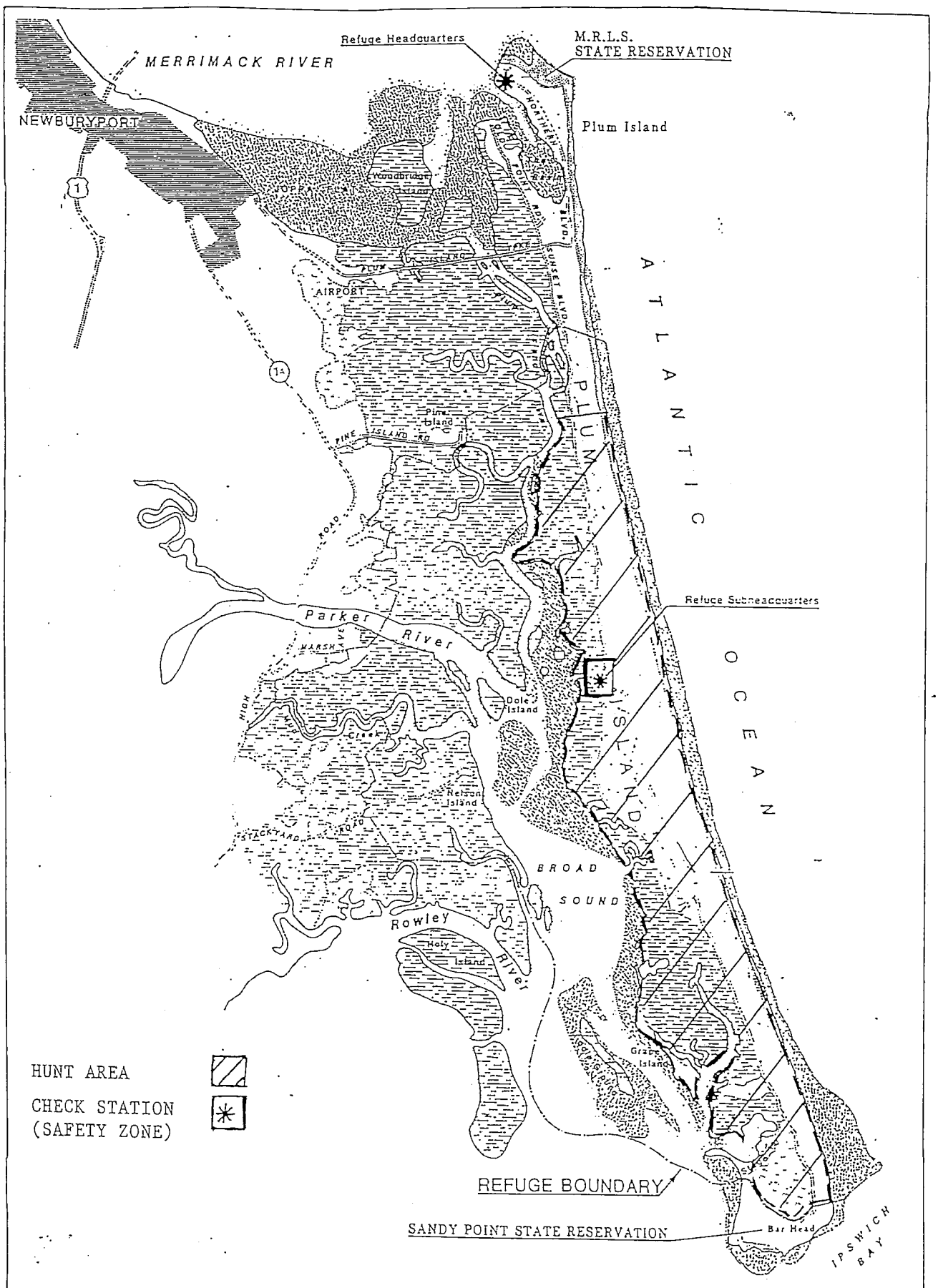


Figure 1. Number of deer recorded during evening spotlight surveys (Fall), winter aerial surveys, and harvests from 1987-1990, 1993, and 1995.

APPENDIX C

Map of Hunting Area



U.S. DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
REGION FIVE
Newton Corner, Massachusetts

NOVEMBER 1963

N

SCALE
.5 0 1 Mile
2000 0 5000 Feet

PARKER RIVER
NATIONAL WILDLIFE REFUGE
Essex County, Massachusetts

SECTION 7 EVALUATION FORM

The following evaluation form was completed pursuant to the initial consultation required above. It may also be completed and kept on file, at the discretion of the Region, for actions where a "will not affect" determination has been made.

1. Region 5

2. Designation: Region 5, Parker River NWR-FY96

3. Program(s): Hunting

4. Listed Species or their Critical Habitat considered:
   a. Within the action area:
      Piping plover, peregrine falcon, bald eagle
   b. Adjacent to the action area:
      Piping plover, peregrine falcon, bald eagle

5. Name and description: Parker River National Wildlife Refuge Hunting Plan

6. Location (Attach map): See APPENDIX A

7. Objectives of the action:
   -to provide a wildlife-dependent recreational opportunity for the public through the harvest of a surplus renewable resource.
   -to maintain floral and faunal diversity (e.g. neotropical and resident species).
   -to reduce the number of deer on the refuge to a level compatible with the habitat.
   -to reduce the threat of Lyme Disease by reducing the number of deer using the refuge.

8. Explanation of impact of action on listed species or their Critical Habitat (attach supporting biological data): see Parker River NWR Hunting Plan and Hunting Plan Environmental Assessment.

9. Conclusion: (cross out one) A. ~~May affect~~ B. Will not affect

10. Recommendation (including action modification):
    Proceed with action as proposed.

Paul R Nickerson

Paul R. Nickerson
ENDANGERED SPECIES COORDINATOR

5/21/96
DATE

APPENDIX E

COMPATIBILITY DETERMINATION
(revised 9/96)

COMPATIBILITY DETERMINATION:

Station Name: Parker River National Wildlife Refuge

Date Established: 1942

Establishing Authority: Migratory Bird Conservation Act
(16 U.S.C. 715-715r)
Refuge Recreation Act
(16 U.S.C. 460k-460k-4)

Purpose(s) for which Established:
"....for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." 16 U.S.C. 715d
"....suitable for - (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species...." 16 U.S.C. 460k-1

Description of Proposed/Existing Use: Big-Game Hunting/Controlled Public Deer Hunt: Activity consists of a management program to provide wildlife-dependent recreational opportunities and to regulate the white-tailed deer population on the Refuge by means of a public hunt. 1983-1986 deer numbers approached or exceeded 100 animals (estimated.) Refuge carrying capacity as determined during the Master Plan process set at 15-20 with a peak of 35. Refuge was opened to hunting of big game (deer) in 1986.Hunts were conducted in 1987-1990, 1993 and again in 1995 in respond to fluctuations in the deer population. A limited number of permits are issued, with a fixed number of hunters per day. Hunt length varied from 6 days (1988) to 3 days (1989 & 1990), with no hunt conducted in 1991,1992, and 1994.

In 1995, the management approach was modified to employ the more current and reliable technique of utilizing indices (trend data) to monitor deer numbers in lieu of reacting to an estimated population as it compared to the outmoded "carrying capacity" concept.

The logistics of the annual hunt program are adjusted based on the population indices (age, weight, sex, fawn:doe ratio, antler beam diameter, kidney fat index, annual aerial survey and fall road counts) and the trend reflected by this data.

Anticipated Impacts on Refuge Purpose(s):
* Activity provides traditional wildlife-dependent recreation
* Activity serves to prevent over browsing of the habitat by excessive numbers of deer thus maintaining habitat diversity; species diversity; and resource protection.
* Activity does not detract materially nor conflict with migratory bird purpose of Refuge. Hunt occurs the first week of December, on island portion of Refuge.
* Human disturbance of wildlife minimal (3-6 days.)
* Individual deer are removed from the population.

Determination: This use is compatible.

The following stipulations are required to ensure compatibility:
1.) Continue to monitor the deer population (indices) and conduct an annual controlled public deer hunting program.
2.) Maintain regulatory controls to minimize human disturbance of other wildlife and other recreational programs.

Justification: Activity conducted as a managment approach to provide traditional wildlife-dependent recreation and regulate deer numbers to prevent over-browsing of the habitat.

Ref: FEIS-Master Plan
Master Plan
Big Game Hunting Plan (revised 1996)
Annual Deer Hunting Program

Prepared by: John L. Fillio Date: 9/23/96
John L. Fillio, Refuge Manager

Reviewed by: Thomas R. Comish Date: 10/15/96
Thomas R. Comish, Compatibility Coordinator

Approved by: Ralph Pisapia Date: 10.18.96
Ralph Pisapia, GARD-[redacted]/North

Revised 9/96

APPENDIX F

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APPENDIX G

SUMMARY OF PUBLIC COMMENTS:

No written information nor comments were received other than that hand-delivered at the July 29, 1996 public meeting.

Results of Public Hearing

A total of 8 individuals provided comments as follows;
1 in opposition to the Refuge hunting program
1 in opposition to hunting
5 in support of hunting and the Refuge program
1 in support of the process

The following documents, in addition to the reference materials already included in the draft revison of the EA, were provided by one commenter;

* _____. 1993 Current Developments in Immunocontraception Research. "PZP NEWS"/Humane Society of the U.S. I(1)

* Environemntal Assessment - "Alternatives for Managing the Size of the Feral Horse Population of Assateague Island National Seashore" U.S. Dept. of Interior/National Park Service (Jan/95)

* Correspondence dated 7/29/96 from the "Coalition to Protect Refuge Wildlife".

Parker River National Wildlife Refuge
Northern Boulevard, Plum Island
Newburyport, MA 01950

APPENDIX H

NEWS RELEASE July 1996

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Refuge Announces Availability of Environmental Assessment

The Parker River National Wildlife Refuge announced today that a draft update of the 1986 "Environmental Assessment-Public deer Hunting" is now available for public review and comment.

The Refuge was officially opened to the hunting of white-tailed deer in 1986. The annual program has since ranged from no hunt to a 6 day program, with the specifics of each annual program adjusted as necessary to maintain deer and other wildlife in balance with the available habitat.

"It has been ten years since the original Assessment was finalized and the Refuge now wishes to update pertinent information and once again offer the public an opportunity to comment," Refuge Manager Fillio stated. "This effort represents an ongoing attempt to maintain the accuracy and applicability of current research and information as it relates to the Refuge program."

Individuals wishing to review the draft and submit written comments, may obtain a copy by writing to the following address;

Refuge Manager
Parker River National Wildlife Refuge
261 Northern Boulevard, Plum Island
Newburyport, Massachusetts 01950.

Public comments referencing research programs, papers or other written documents should include a full title, and the source and availability of reprints of the documents referenced, in order for the refuge to obtain copies.

A public hearing will also be held on July 29, 1996 at the Plum Island Taxpayers Associates hall on Plum Island, from 7:00pm to 9:30pm. Written and oral comments will be accepted at this meeting.

All comments received by August 12, 1996 will be considered. A summary of all comments will be appended to the final document.

A final revision of the Environmental Assessment is expected to be completed in September.

For further information individuals may contact the Refuge at 508/465-5753, 8:00am to 4:30pm, Monday through Friday. During non-working hours, messages may be left on the Refuge voice mail system.

APPENDIX I

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DISTRIBUTION:

Geographic Assoc. Reg. Dir. - Refuges & Wildlife/North
Regional Environmental Coordinator
Regional Endangered Species Coordinator
Regional Solicitors Office
Zone Biologist/North (FWS)
Zone Biologist/South (FWS)
Massachusetts - DF&W Deer Biologist

Senator Kennedy (Wash & Boston office)
Senator Kerry (Wash & Boston Office)
Representative Torkildsen (Wash & Salem office)

State Senator Jajuga
State Rep. Cousins
State Rep. Stanley

Fund For Animals
Coalition to Protect Refuge Wildlife
Essex County League of Sportsmens Clubs
Outdoor Writers (8)

Newspapers:
- Merrimack Valley Sunday
- Haverhill Gazette
- Lawrence Eagle Tribune
- New England Out of Doors
- Boston Herald
- Lowell Sun
- Newburyport Daily News
- Portsmouth Herald
- The Boston Globe

Copies picked up at Refuge office - 2

A total of 31 copies of the Draft-Revision (EA) were distributed.

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SECTION 7 EVALUATION

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SECTION 7 EVALUATION FORM

The following evaluation form was completed pursuant to the initial consultation required above. It may also be completed and kept on file, at the discretion of the Region, for actions where a "will not affect" determination has been made.

1. Region 5

2. Designation: Region 5, Parker River NWR-FY96

3. Program(s): Hunting

4. Listed Species or their Critical Habitat considered:
   a. Within the action area:
      Piping plover, peregrine falcon, bald eagle
   b. Adjacent to the action area:
      Piping plover, peregrine falcon, bald eagle

5. Name and description: Parker River National Wildlife Refuge Hunting Plan

6. Location (Attach map): See APPENDIX A

7. Objectives of the action:
   -to provide a wildlife-dependent recreational opportunity for the public through the harvest of a surplus renewable resource.
   -to maintain floral and faunal diversity (e.g. neotropical and resident species).
   -to reduce the number of deer on the refuge to a level compatible with the habitat.
   -to reduce the threat of Lyme Disease by reducing the number of deer using the refuge.

8. Explanation of impact of action on listed species or their Critical Habitat (attach supporting biological data): see Parker River NWR Hunting Plan and Hunting Plan Environmental Assessment.

9. Conclusion: (cross out one) A. ~~May affect~~ B. Will not affect

10. Recommendation (including action modification):
    Proceed with action as proposed.

Paul R Nickerson
Paul R. Nickerson
ENDANGERED SPECIES COORDINATOR

5/21/96
DATE

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COMPATIBILITY STATEMENT

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COMPATIBILITY DETERMINATION:

Station Name: Parker River National Wildlife Refuge

Date Established: 1942

Establishing Authority: Migratory Bird Conservation Act
(16 U.S.C. 715-715r)
Refuge Recreation Act
(16 U.S.C. 460k-460k-4)

Purpose(s) for which Established:
"....for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." 16 U.S.C. 715d
"....suitable for - (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species...." 16 U.S.C. 460k-1

Description of Proposed/Existing Use: Big-Game Hunting/Controlled Public Deer Hunt: Activity consists of a management program to provide wildlife-dependent recreational opportunities and to regulate the white-tailed deer population on the Refuge by means of a public hunt. 1983-1986 deer numbers approached or exceeded 100 animals (estimated.) Refuge carrying capacity as determined during the Master Plan process set at 15-20 with a peak of 35. Refuge was opened to hunting of big game (deer) in 1986.Hunts were conducted in 1987-1990, 1993 and again in 1995 in respond to fluctuations in the deer population. A limited number of permits are issued, with a fixed number of hunters per day. Hunt length varied from 6 days (1988) to 3 days (1989 & 1990), with no hunt conducted in 1991,1992, and 1994.

In 1995, the management approach was modified to employ the more current and reliable technique of utilizing indices (trend data) to monitor deer numbers in lieu of reacting to an estimated population as it compared to the outmoded "carrying capacity" concept.

The logistics of the annual hunt program are adjusted based on the population indices (age, weight, sex, fawn:doe ratio, antler beam diameter, kidney fat index, annual aerial survey and fall road counts) and the trend reflected by this data.

Anticipated Impacts on Refuge Purpose(s):
* Activity provides traditional wildlife-dependent recreation
* Activity serves to prevent over browsing of the habitat by excessive numbers of deer thus maintaining habitat diversity; species diversity; and resource protection.
* Activity does not detract materially nor conflict with migratory bird purpose of Refuge. Hunt occurs the first week of December, on island portion of Refuge.
* Human disturbance of wildlife minimal (3-6 days.)
* Individual deer are removed from the population.

Determination: This use is compatible.

The following stipulations are required to ensure compatibility:
1.) Continue to monitor the deer population (indices) and conduct an annual controlled public deer hunting program.
2.) Maintain regulatory controls to minimize human disturbance of other wildlife and other recreational programs.

Justification: Activity conducted as a managment approach to provide traditional wildlife-dependent recreation and regulate deer numbers to prevent over-browsing of the habitat.

Ref: FEIS-Master Plan
Master Plan
Big Game Hunting Plan (revised 1996)
Annual Deer Hunting Program

Prepared by: John L. Fillio Date: 9/23/96
John L. Fillio, Refuge Manager

Reviewed by: Thomas R. Comish Date: 10/15/96
Thomas R. Comish, Compatibility Coordinator

Approved by: Ralph Pisapia Date: 10.18.96
Ralph Pisapia, GARD-[redacted]/North

Revised 9/96

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LETTER OF CONCURRENCE
MASSACHUSETTS DIVISION OF FISHERIES & WILDLIFE

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The Commonwealth of Massachusetts
Division of Fisheries and Wildlife
Leverett Saltonstall Building, Government Center
100 Cambridge Street, Boston 02202

DIRECTOR

January 14, 1987

RECEIVED
JAN 20
Parker River Refuge

Mr. John L. Fillio
Refuge Manager
Parker River National Wildlife Refuge
Northern Boulevard, Plum Island
Newburyport, MA 01950

RE: Environmental Assessment on Public Deer Hunting at Parker River NWR

Dear Mr. Filio:

The Massachusetts Division of Fisheries and Wildlife concurs with the proposal to manage the Parker River deer population by means of controlled public hunting. The data compiled by your staff clearly indicates that an overpopulation of deer currently exists.

Controlled hunting is the most practical and efficient means available to achieve the necessary reduction in the deer population. I thank you for sending us a copy of the Environmental Assessment for review and comment.

Sincerely,

Richard Cronin

Richard Cronin
Director

RC/mh

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REFUGE SPECIFIC REGULATIONS

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code of federal regulations

Wildlife and Fisheries

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PARTS 1 TO 199

Revised as of October 1, 1995

2. [Reserved]

B. Upland Game Hunting. Hunting of upland game birds and small game is permitted on designated areas of the refuge subject to the following conditions:

1. Shotguns only are permitted.

2. Vehicles are restricted to the designated parking area that is accessible from the Still River Depot Road. Entry by routes other than Still River Depot Road is not permitted.

C. Big Game Hunting. [Reserved]

D. Sport Fishing. [Reserved]

PARKER RIVER NATIONAL WILDLIFE REFUGE

A. Hunting of Migratory Game Birds. Hunting of waterfowl and coots is permitted on designated areas of the refuge subject to the following conditions:

1. Hunters may not use or possess more than 25 shells per day.

2. Hunters using Area B must set out a minimum of six waterfowl decoys and hunt within 50 yards of these decoys.

B. Upland Game Hunting. [Reserved]

C. Big Game Hunting. Hunting of deer is permitted on designated areas of the refuge subject to the following conditions: Hunting will be conducted in compliance with a refuge issued permit and State hunting regulations, as applicable.

D. Sport Fishing. Saltwater fishing is permitted on designated areas of the refuge subject to the following conditions:

1. Saltwater fishing is permitted on the ocean beach only.

2. A permit is required for night fishing and for the use of over-the-sand surf-fishing vehicles.

[58 FR 5064, Jan. 19, 1993, as amended at 58 FR 29075, May 18, 1993; 59 FR 6693, Feb. 11, 1994; 59 FR 55186, Nov. 3, 1994]