PARKER RIVER NATIONAL WILDLIFE REFUGE
PLUM ISLAND
NEWBURYPORT, MASSACHUSETTS 01950

(POND ISLAND, THACHER'S ISLAND REFUGES)

ANNUAL NARRATIVE REPORT

Calendar Year 1989

U. S. Department of the Interior
Fish and Wildlife Service
NATIONAL WILDLIFE REFUGE SYSTEM

REVIEW AND APPROVALS

PARKER RIVER NATIONAL WILDLIFE REFUGE

Newburyport, Massachusetts

ANNUAL NARRATIVE REPORT

Calender Year 1989

4/13/90		4-18-90	
Refuge Manager	Date	Associate Manager Review	Date

4-18-90

Regional Office Approval — Date

INTRODUCTION

Parker River National Wildlife Refuge is located in the northeast corner of Massachusetts, 38 miles north of Boston and 20 miles south of Portsmouth, New Hampshire.

The refuge comprises almost all of the southern two-thirds of Plum Island, and extensive salt marshes between the island and the mainland to the west. The 80 acres at the southern tip of Plum Island are owned by the Massachusetts Department of Environmental Management, Division of Forests and Parks. The two-acre headquarters/residence area is located at the densely inhabited northern tip of the island, next to an operational (but unmanned) Coast Guard lighthouse.

The refuge portion of Plum Island is one of the few natural barrier island complexes remaining in New England. The 4,662 acres of Parker River Refuge are comprised of 2,994 acres of salt marsh, 1,229 acres of barrier beach/dune, 265 acres of freshwater pools, 88 acres of grasslands, and 86 acres of administrative lands. The refuge was established in 1942 as a migratory waterfowl management area. Two miles of man-made dikes impound three rainfall-dependent freshwater areas which create a diverse and intensively used habitat for numerous wildlife species.

Visitor use is high, as over 4 million people live within a fifty-mile radius of the refuge. Wildlife-oriented recreation, both consumptive and non-consumptive, occurs throughout the year. In the summer, wildlife-oriented recreation decreases dramatically as the use of six miles of "unspoiled" barrier beach increases. In order to lessen the human impacts as much as possible, the number of vehicles allowed on the refuge is limited to 350. From May through September, this capacity is reached virtually every weekend, and most weekdays, and the entrance gate is closed until mid-afternoon.

Rachel Carson National Wildlife Refuge in southern Maine is under the administration of Parker River NWR, but has operated under its own budget since FY 1983.

Unstaffed satellite refuges administered by Parker River are:

Pond Island NWR, Maine
Thacher's Island NWR, Massachusetts

A reorganization in August transferred the following satellites to Great Meadows NWR (Massachusetts):

Massasoit NWR, Massachusetts
Monomoy NWR, Chatham, Massachusetts
Nantucket NWR, Nantucket Island, Massachusetts
Noman's Land Island NWR, Massachusetts

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H. PUBLIC USE

I. EQUIPMENT AND FACILITIES

8. Other - Nothing to Report.

J. OTHER ITEMS

K. FEEDBACK - Nothing to Report.

A. HIGHLIGHTS

Piping Plover Gain - A total of 4 chicks fledged in 1989 vs. no production in 1988.

Controlled Public Deer Hunt - In an attempt to more rapidly reduce the deer population; a "does" only hunt was conducted with very discouraging results.

Camp Sea Haven - The proposal to remove Camp Sea Haven continues as a "smouldering fire" - we'll fan the flames soon!

"Short Staff" - We started 1989 with 10 PFT staff plus one PFT Trainee. After resignations, transfers, and retirements - we ended up with 5 permanent people. Can't say we "sailed" through the year but at least the boat didn't sink.

Hazardous Waste Site - Our 12-acre "promised land"(new headquarters site-someday!) turned into a hazardous waste site in only 4 months.

Raoul "Woody" DeSerres retired from the position of Refuge Maintenance Mechanic after 30 years. Woody was a first class professional with a great temperament and sense of humor! The refuge won't ever be the same without Woody!

Woody DeSerres and wife, Pauline, at his retirement party. Refuge co-workers and friends presented Woody with a wildlife print by local artist Hank Walker.

10/89 - Manning

B. CLIMATIC CONDITIONS

The 1989 winter was known as the "winter that never was" because from January through March (as opposed to the mean snowfall of 34.4 inches for the same period) there were only 11 inches of snow all winter and the average high temperatures were in the 40's and 50's. We had a record-high of 76 degrees on 3/28 and 3/29. Spring temperatures and rainfall were similar to the 18-year average. Rainfall amounts in August and September were approximately twice the average rainfall. We paid for the unusually warm beginning of the year by having the end of the year unusually cold. For example, based on the 18-year average, the highest temperature for November and December is 75 and 56 respectively. The highest temperature in 1989 during those two months were 46 and 34 respectively.

Weather data is detailed below. All data was recorded on the refuge at sub-headquarters.

Month	1989 Temp. (F) (Max/Min)	Mean * Temp.(F) (Max/Min)	1989 Rainfall (Inches)	1989 Snowfall (Inches)	Mean * Rainfall (Inches)	Mean * Snowfall (Inches)
January	54/4	49/-3	0.42	2.0	1.60	15.5
February	64/6	51/0	1.98	8.0	2.07	11.6
March	76/10	63/11	2.79	1.0	3.12	7.3
April	60/28	78/25	3.59	0.0	3.80	1.7
May	84/40	87/36	3.15	0.0	3.74	0.0
June	92/48	91/43	3.73	0.0	3.76	0.0
July	94/58	94/50	4.04	0.0	3.32	0.0
August	90/50	92/48	7.53	0.0	3.14	0.0
September	88/37	86/38	3.99	0.0	3.20	0.0
October	76/34	75/28	.16	0.0	3.95	0.0
November	46/15	67/20	2.54	4.0	4.29	2.5
December	34/-5	56/4	0.0	5.2	5.54	11.2

C. LAND ACQUISITION

1. Fee Title - No land acquisition occurred during 1989. The refuge continues as a 4,662 acre refuge.

D. PLANNING

4. Compliance with environmental and cultural resources mandates.

An Archeological/Historical resources inventory of the refuge was planned during 1989 but was cancelled due to lack of funding. The inventory will be rescheduled(on-site) in the future. A records check was conducted during the year by the Regional Archeologist.

Underground storage tanks were removed at the Subheadquarters maintenance facility under contract. Both gasoline and diesel fuel tanks exceeded the 25-year-old status and they were required to be removed.

10/89 - Manning

The heating fuel tank (UST) at headquarters was tested for leakage and found to be intact. A dip-stick reading record is now maintained in order to monitor for any fuel loss.

Contractor installing monitoring well; part of a process to ensure groundwater at refuge headquarters is not contaminated by leaking gasoline tank.

5/89 - Manning

E. ADMINISTRATION.

1. Personnel

Staffing in 1989 was as follows:

1. John L. Fillio, Refuge Manager, GM-13 PFT - EOD 9/18/83
2. Patricia L. Martinkovic, Assistant Refuge Manager, GS-12 PFT - EOD 10/9/88
3. Eric N. Smith, Assistant Refuge Manager, GS-9 PFT - EOD 10/11/87; transferred to D'Arbonne NWR effective 7/2/89
4. Janet M. Kennedy, Outdoor Recreation Planner, GS-9 PFT-EOD 1/29/89; transferred to Great Meadow NWR effective 12/3/89
5. Deborah A. Melvin, Assistant Refuge Manager (Trainee), GS-7 PFT - EOD 10/25/87; transferred to Chincoteaque NWR effective 6/30/89
6. Carl F. Ferguson, Wildlife Biologist, GS-9 PFT - EOD 10/25/87; transferred to Migratory Bird Management Office effective 9/26/89
7. Ross J. Lane, Refuge Law Enforcement Officer, GS-7 PTF-EOD 11/22/87
8. Patricia Perley, Refuge Law Enforcement Officer, GS-5 TFT; resigned 10/29/89
9. Barbara A. Carson, Refuge Law Enforcement Officer, GS-4 TFT; resigned 9/4/89
10. Timothy A. Rainey, Refuge Law Enforcement Officer, GS-5 TFT; resigned 7/2/89
11. Raoul J. DeSerres, Maintenance Mechanic, WG-10 PFT-EOD 6/3/54; retired 10/31/89
12. Clifford E. Lundblad, Maintenance Worker, WG-7 PFT-EOD 9/1/87
13. Clara V. Bell, Secretary, GS-5 PFT-EOD 1/10/74
14. Jeffrey Beck, Laborer, WG-3 Temporary - EOD 7/3/88; resigned 3/11/89
15. Alice M. Beck, Secretary, GS-4 PFT - EOD 6/18/87; resigned 4/8/89
16. Paul Accomando, Park Ranger (Leader), GS-3/4 Temporary; resigned 7/26/89
17. Robin K. Lang, Park Ranger, GS-3 Temporary; resigned 7/1/89
18. Robert Porter, Refuge Law Enforcement Officer, GS-4 Temporary;EOD 5/22/88
19. Brian Roderick, Park Ranger GS-3, Temporary EOD 6/5/88
20. Julia N. Haack, Park Ranger GS-3, Temporary EOD 5/25/89; resigned 12/30/89
21. John Manning, III, Park Ranger GS-3, Temporary EOD 10/8/89
22. James Napoli, Park Ranger GS-3, Temporary EOD 10/8/89
23. Michael DiMare, Park Ranger GS-3, Temporary EOD 7/31/88; resigned 8/27/89

Youth Conservation Corps

1. Malcom Fraser, Group Leader, GS-5
2. Sally Heafitz (Youth Leader)
3. Christopher Carr, Enrollee
4. Stacey Gillis, Enrollee
5. Jonathan Remley, Enrollee
6. Michael Ryan, Enrollee
7. Shannon Tribble, Enrollee

2. Youth Programs

This year's Y.C.C. crew was a handy little "six pack". An enrollee group of three females and three males included one high school graduate as a Youth Leader. There were eighteen applications from throughout the Massachusetts Northshore and Southern New Hampshire for the six enrollee

positions. For the last ten years, Mal Fraser, a local teacher, has served as the YCC Group Leader.

The challenge was again made to assist the refuge in achieving work that was desperately needed. The enrollees focused on replacing rotted/broken boardwalk on the Hellcat Trail by constructing 3,372 square feet (843 linear feet) of elevated boardwalk. The crew completed the connection from the Hellcat parking area to the wooden observation blind. The new section of the trail provided the public with greater safety, visibility, and some pleasantries. Also, as in every year since 1971 (the year of Parker River's first Y.C.C. program), a brushed trail meant fewer ticks and wet inconveniences for visitors. Environmental awareness topics included vegetative succession, stabilization, protected species, waterfowl management, and the public's impact on the refuge resources.

Assisting with brood counts, goose drive, a turtle survey and duck banding, the enrollees acquired some new skills and developed a better understanding of what a biologist/refuge manager does. The diversity in work projects increased overall productivity with these young students. The crew remained committed, admirably braving the intense summer heat, greenhead flies, and mosquitoes!

YCC enrollees assisted refuge staff with pre-season banding.

8/89 - Manning

This year's program was an activity which can be looked upon with great pride. Teamwork-- enrollees and refuge staff -- paved the way for a group of teens to grow as productive young Americans, leaving their mark for others to enjoy our national environment.

3. Other Manpower Programs

A six-person crew from the Harbor School (Newbury, MA) spent approximately two weeks in August putting up split rail fencing.

4. Volunteer Program

In FY 89 a total of 70 volunteers donated 3,468 hours toward the achievement of Refuge objectives. This was up from 53 volunteers donating 3,072 hours in 1988. The single project involving the most volunteers was the Tern Warden program. Twenty-nine volunteers posted at either end of the beach closure provided information on the Piping Plover and the Least Tern to Refuge visitors from April through August.

Two volunteers, Bonnie Manning and Sarah Webb, donated a combined total of over 994 hours to the Plover and Tern Monitoring program. They made daily patrols of the beach and studied pre-nesting, nesting, hatching and fledging activities of the birds. They kept records and attended state-wide meetings. The plovers had their most successful season on the Refuge yet. Bonnie and Sarah have both been nominated for National Take Pride in America Awards. Sarah received a 500 hour pin and Bonnie received a 1,000 hour pin this year!

ORP Kennedy gave an orientation to volunteers on the Tern Warden Program.

In April the Massachusetts Beach Buggy Association held a beach clean-up. Also in April volunteers assisted the biologists with lead shot sampling at the Stage Island pool and the annual breeding pair survey. Brood counts were done in June with lots of help from the volunteers. And at the annual Goose Drive in June, volunteers joined YCC enrollees to round up and band Canada geese. It's billed as a wet, muddy, and mosquito-ey job, and never fails to draw many of the most dedicated volunteers.

The Massachusetts Beach Buggy Association and local scout groups joined forces to help refuge staff conduct the annual spring beach clean-up.

4/89-Manning

Thirteen Girl Scouts from Troop #423 in Newbury spent an afternoon in June rehabilitating the Pines Trail. They trimmed excess vegetation, obliterated unneeded trails, and generally "spruced" it up.

Scout groups continue to lend an enthusiastic hand on wildlife/ wildlands projects.

6/89 - Manning

Volunteers were pressed into service to construct, move, and lift the beach closure this summer, and help with other maintenance projects. Their help was especially appreciated due to a shortage of maintenance staff at several critical times this summer.

Bill and Phyllis Drew, accompanied on occasion by Skip Charette, Alden Clayton, and Herman Weissberg, all Brookline Bird Club members, conducted the Refuge's weekly waterfowl, shorebird and birds of prey surveys throughout the year. The Drew Crew can also be counted upon to put up the Purple Martin houses each spring and take them down and clean them each fall. Lesley Rowse monitored them over the summer, as did Bill Drew.

Volunteers assisted refuge staff on numerous wildlife related projects throughout the year.

4/89 - Manning

The success of the pre-season duck banding program was due largely to the efforts of the volunteers. Without their help the Refuge quota of banding 200 black ducks probably never would have been reached due to staff shortage. Bonnie, Sarah, and Roger Gaumont were out there almost daily banding mallards, black ducks, pintails, and even an occasional teal.

Due to staff shortages, the success of the pre-season duck banding was due largely to the efforts of Volunteers Manning, Webb and Gaumont.

9/89 - Manning

The Volunteer Appreciation Day was held November 5, 1989. This year we had a "field day" of activities for the volunteers to participate in. About 40 people attended. George Gauvutis came up from the Regional Office to operate the airboat and give the volunteers a ride on the Plum Island River. Refuge staff took turns driving a beach tour for those volunteers who, as Tern Wardens, never got to go inside the closed area. We were able to get the keys to the lighthouse from the Coast Guard and let people climb to the top for that very rare opportunity. Bonnie Manning prepared and presented a slide show which was full of her beautiful photos of the Refuge and which highlighted the Volunteer Program for 1989. The day was topped off with a spaghetti dinner and an awards ceremony. The weather cooperated, and a good time was had by all.

Regional Biologist Gavutis gave airboat rides to volunteers during the Volunteer Appreciation Day Program. "What a Thrill!" was the most often heard comment from the volunteers.

11/89 - Manning

5. Funding:

	FY 1989
1261	$370,390
1262	$143,000
8610	$ 7,162 ^
4960	$ 53,528 *
TOTAL	$574,080

* Figure represents FY 88 carryover as well as 1989 receipts(30%) from entrance fees.
^ Intial funding total for FY 89 = $520,552.

6. Safety

Two lost-time accidents occurred during the year. Refuge Officer Lane sprained his leg while assisting visitors when their boat was beached, resulting in two lost days of work and three days of work restricted to light office duty. Refuge Officer Perley fell on the boardwalk while pursuing two individuals entering a closed area and lost ten days of work due to bruised ribs.

Accidents involving the general public included:

There were two minor accidents involving the general public this year. A school bus pulling out of a parking lot scraped the side of a parked car. The second accident was again a parked car being scraped by a vehicle pulling into a parking space. There were no injuries in either accident.

Monthly safety meetings were held during which the staff was updated on various topics. Other activities during the year included:

-- all staff successfully completed CPR training.

-- a refuge safety inspection and inspection of the YCC program was conducted by Regional Safety Officer Suich.

-- refuge staff attended an orientation/explanation of the nuclear emergency evacuation plan for the Seabrook Station (New Hampshire Yankee Nuclear Power Plant). Parker River lies within the 10-mile safety zone of the plant.

-- refuge staff, YCC enrollees, and two volunteers had pre-season blood tests for Lyme Diesease. Everyone tested negative.

8. Other Items

The Region 5 Biological Review Team conducted a wetland inspection of the refuge in March.

Manager Fillio continued to meet throughout the year with the following groups: Sandy Point State Advisory Group, Plum Island Surfcasters, Wells National Estuarine Research Reserve Advisory Committee, Massachusetts Beach Buggy Association, and Congressional Representatives.

Regional Safety Officer Suich conducted a Safety inspection of the refuge and the YCC program in August.

Camp Sea Haven - 1989 CY

During CY 1988 due to insufficient funding and staffing; Cerebral Palsy of Greater Boston did not operate the Camp. It appeared that the organization was substantially reduced in its' ability to raise funds and find people willing to operate it. The refuge received calls from other organizations that would be interested in operating the camp. This was the basis for believing that Cerebral Palsy of Greater Boston was looking for a way out.

In August of 1988 a fire of somewhat suspicious origin destroyed the main administration building. The decision was made then to discontinue this type of non-conforming use and remove the facilities.

During 1989 the political "flak" hit the fan - in that no one would of course support the closing of Camp Sea Haven.

The Service agreed to forestall any demolition of the facilities until another local organization Turning Point, Inc. of Newburyport could investigate their ability to open /rehab and operate the camp.

To date, no further action has taken place regarding any plans to renovate and reopen the camp. One suspects that this "sleeping dog" has taken another nap.

Numerous meetings, tours, and inspections of the facilities were conducted in our effort by the Refuge/Service to allow all interested parties to see firsthand the deteriorated condition of the camp. Beyond deterioration, the buildings do not meet any standards for handicapped access, health and safety, fire, and sanitation. Complete and proper rehabilitation would be expensive.

Plans for 1990 - include "waking this sleeping dog" and working toward the ultimate resolution of what will be done with Camp Sea Haven.

F. HABITAT MANAGEMENT

1. General

Habitat management efforts this year were directed towards the wetlands. Regional Biologist Gavutis, Division Biologist Atwell, and Migratory Bird Coodinator Haas conducted a wetlands inspection of the refuge. The highlights of their report included the following: 1) Clean out ditches in the impoundments; 2) Control pest plants via water level manipulations and the combined use of spraying and prescribed burning; 3) Create sub-impoundments; 4) Establish nesting islands; 5) Rehab nesting structures; 6) Remove lead shot pellets in Stage Island Pool; and 7) Restore salt pans.

Division Biologist Atwell and ARM Martinkovic conducted a vegetation survey of the North Pool and the Bill Forward Pool via a canoe (It was a dirty job, but someone had to do it!). Biologist Atwell then transferred the data onto a colored vegetation map.

Water level, salinity, and PH readings were initiated for each of the impoundments.

2. Wetlands

Salt Marsh - The salt marsh unit consists of approximately 3,000 acres of salt marsh grasses interspersed by ditches, creeks, mudflats, pools and pans, and is part of the largest salt marsh systems north of Long Island Sound. It is a valuable spawning and nusery area for many of the major marine food sources. Eight of the twelve fish species most important to commercial and sport fisheries are dependent on these tidal areas. Vertebrates dependent on tidal wetland of the salt marsh unit include fish, shorebirds, wading birds and waterfowl, while musskrat, mink, red fox, otter and white-tailed deer make occasional use of the area.

Management is primarily maintenance and preservation of the salt marsh ecosystem for nesting, resting and feeding waterfowl, as well as other organisms in the biological community. Public use is restricted to wildlife observation from the refuge road and clamming and waterfowl hunting by permit only.

To satisfy mitigation requirements related to the construction of the North Pool water control structure, approximately 100 "clumps" (for lack of a better term!) of salt marsh cordgrass (Spartina alterniflora) were transplanted (by hand) to the Nelson Island area of the refuge in 1988. EPA regards the transplant as successful but wants us to continue our monitoring of the site.

North Pool - This 100-acre unit, which is totally dependent on rainfall (as are the Forward and Stage Island Pools), is used by feeding and nesting waterfowl as well as shorebirds, wading birds, and other wildlife species. Due to a lack of effective water control structures over the years, and management, the pool is dominated by emergent vegetation, particularly two pest species: purple loosestrife and phragmites. After much delay construction of a water control structure was completed in 1988 having a direct outlet to the saltwater estuary to the North and Bill Forward Pools. The capability of saltwater flooding should prove an asset in controlling pest plants. Another Management option is to remove accumulated silt from ditches and channels and using the excavated material to construct nesting islands. Approximately only 20% of the pool is open water.

Bill Forward Pool - Sixty-two acres in size and separated from the North Pool by a small dike, the Forward Pool contains brackish waters and, therefore, lacks common freshwater vegetation. However, the pool edge is a valuable feeding area for migrating shorebirds. Waterfowl and wading birds also use the pool, and geese often nest on its fringes. The unit does not retain water adequately. Options for rehabilitation include dredging ditches and channels, and applying a seal along the borrow dike to enhance water conservation and water level management. Approximately 50% of the pool is open water.

Stage Island Pool - This 100-acre impoundment has a large amount of edge interspersed with several islands and peninsulas, both shallow and deep water, creating the most diverse habitats of the freshwater units. Vegetation is similar to that of the North Pool. Purple loosestrife is not yet dominant, however, phragmites encroachment has become a serious problem. Ducks, geese, and many other birds nest in the pool. Because of its proximity to the Sandy Point State Reservation hunting area, the Stage Island Pool has been associated with lead poisoning of the waterfowl. Each year water levels are lowered in the pool in an attempt to limit availability of lead shot to waterfowl. Waterfowl hunters are required to use steel shot; however the use of lead shot is still permitted for other game hunting. Several geese were removed this year that had succumbed to lead poisoning.

An old corrugated metal pipe water control structure was replaced by a larger, reinforced concrete structure in 1988, improving water management capabilities, including the use of saltwater flooding to control pest plants. The pool dike was also riprapped to halt bank erosion.

5. Grasslands - The upland fields at North, Forward, and Stage Pools are mowed to maintain them in mixed grasses and forbs for nesting cover and goose pasture. Two miles of dikes are also mowed to control invasion of trees and shrubs.

8. Haying - Under a special use permit one individual harvested approximately 50 acres of upland fields. Upland haying helps prevent encroachment of woody vegetation and provides excellent browse for Canada geese and white-tailed deer. All fields were fertilized and responded very well. Another permit was issued to a second individual to harvest approximately 22 acres of salt marsh.

G. WILDLIFE

1. Wildlife Diversity

The Stage Island impoundment was drawn down in late summer to dry out the shallow portion of the pool adjacent to the Commonwealth of Massachusetts Sandy Point Reservation, an area opened to public hunting. This action prevented feeding Canada geese from ingesting spent lead shot. The draw-down indirectly enhanced the migratory shorebird feeding potential by exposing additional acres of mudflats.

2. Endangered and Threatened Species

Piping plovers, a threatened species on the Atlantic Coast, breed on Plum Island. In the past, plovers have been sighted on the refuge but were not closely monitored until 1986. Since that time, 1989 was the first year that plovers had successfully fledged. Three miles of refuge beach were closed from April 1 through August 31 to protect nesting piping plovers and least terns from human related disturbances. Based on the plovers' mating and nesting behavior, the symbolic closure was moved on June 12 to one mile north of Camp Sea Haven down to Parking Lot #6. Volunteers worked as Plover Wardens and were stationed at each end of the closure. Piping plovers were first seen on the refuge on March 22. There were three pairs of plovers that nested on the refuge. Of the 11 eggs laid, four eggs hatched and four plovers were

fledged. Nest exclosures were put around each plover nest. The exclosures proved to be very successful except for one. It was invaded by an opossum that ate all the eggs. Volunteers conducted the plover survey on a daily basis from May 1 through August 18 when the young plovers had fledged. Details of the plover surveys are noted in a report in the files.

A three-mile beach closure for the piping plover paid off. For the first time, four plover chicks were fledged on the refuge!

8/89 - Manning

Predator exclosures were erected around each piping plover nest and significantly improved the hatching success rate.

7/89 - Manning

Piping plovers were first seen on Plum Island at the Sandy Point Reservation on March 25. The symbolic closure ranged from the west side of the lower State parking lot beach area to the west end of the beach area before the beach winds north. The first egg laid on the State end was on May 4 and was located at the west end of the symbolic closure. A predator exclosure was erected around the nest after a full clutch of four eggs were laid. Four young hatched from that nest on June 4 and two of the young fledged by late June.

The first Least Terns were observed on May 25 by Camp Sea Haven on the refuge, and the first nests were recorded on June 6. From June through early August, approximately 88 pairs of Least Terns were observed on the refuge and approximately eight pairs on the State end. The first tern chick was reportedly fledged on July 31. The Least Tern is a State species of concern. Predator exclosures were not used on the tern nests. An estimated 74 Least Tern chicks fledged on the refuge and one chick fledged on the State end.

Six bald eagles, one adult and five immatures, were seen by refuge staff adjacent to the refuge on the Merrimack River during the annual January eagle count.

Numerous peregrine falcon sightings during their spring and fall migration were made by refuge staff and Volunteer Bill Drew during his bi-monthly bird surveys.

3. Waterfowl

Snow geese and mute swans in January were uncommon waterfowl sighted on the refuge. The refuge was fortunate in obtaining the volunteer services of serveral members of the Brookline Bird Club to conduct bi-monthly waterfowl, shorebird, and gull censuses on the Plum Island portion of the refuge. The standardized route that was correlated with the tide change gave us consistent and accurate counts of these species on the refuge. Graph 1 shows the seasonal waterfowl numbers on the refuge counted during these surveys. On February 27 while doing an aerial deer count, approximately 1,400 black ducks were observed on the western edge of the island portion of the refuge.

In June, the annual Canada goose round-up was held and netted 52 birds. Refuge staff, volunteers, and YCC entrollees all worked together to complete the goose drive.

A waterfowl brood count was conducted on two days during the last week of June and the first week of July. A total of 40 duck broods were counted which consisted of:11 mallard broods of 53 ducklings; 16 gadwall broods of 122 ducklings; 6 black duck broods with 42 ducklings; 2 blue-winged teal with 1 duckling; 2 green-winged teal with 17 ducklings; 1 northern pintail with 4 ducklings; one northern shoveler with 1 duckling; and 1 wood duck with 7 ducklings. Twenty broods were observed at Stage Island, ten broods were observed at Bill Forward Pool. A total of 40 broods was a welcomed increase from the 14 broods counted in 1988. Two apparent reason for the increase were: 1) we held more water in each impoundment, therefore more brood habitat; and 2) we had more intense survey effort because we recruited more qualified observers and selected better placement of the observation platforms. Staff and volunteers used parked vehicles, elevated blinds,

ground blinds, and fixed ground observation points to cover channels and pools in the impoundments in locating broods.

Volunteers assisted refuge staff in conducting a survey of lead shot pellets in Stage Island Pool.

4/89 - Manning

The peak of the spring waterfowl migration is mid-March through mid-April, while the peak of the waterfowl migration is mid-September through mid-October. Some of the ducks that pass through the refuge during the migrations included: snow geese, brant, common and red-throated loons, American widgeon, ruddy duck, bufflehead, common goldeneye, oldsquaw, and common, hooded, and red-breasted mergansers.

Canada geese were on their nests by mid-April. By early May, broods of Canada geese could be seen in the subheadquarters field. There were 14 broods of geese observed.

5. Shorebirds and Gulls

The refuge provides an important migratory stopfor many species of shorebirds. These shorebirds utilize many portions of the refuge, but concentrate heavily in the Bill Forward and Stage Island Pools and the numerous salt pans in the Spartina marsh. Some uncommon species:marbled and Hudsonian godwits, lesser golden plovers, Wilson's phalarope, ruff and upland sandpiper were observed on the refuge. Common terns nested on the refuge with 88 pairs counted on high ground along Jericho, Pine Island, and Little Pine Island Creeks. On Woodbridge Island, which is off-refuge but nearby, 275 terns were counted in June. This island is free of mammalian predators. Both survey sites recorded a significant increase from 1987 observations.

6. Raptors

Large flights of sharp-shinned hawks, along with an occasional merlin and peregrine falcon, passed over the refuge during spring and fall migrations. Winter visitors at the refuge include snowy owls, red-tailed hawks, rough-legged hawks and occasional short-eared and long-eared owls. Northern harriers and kestrels are common year-round. A great horned owl nested again in the Hellcat Trail area.

7. Other Migratory Birds

Uncommon species spotted on the refuge during the year included a little egret, black tern, norther shrike, horned larks, snow buntings, and a and little stint. The little egret caused quite a stir because it is normally seen in Africa and the refuge sitting was the first recorded in North America! The little egret was first spotted in August by a local birder who is a retired ornithologist for the Massachusetts Audubon Society. The bird probably went undetected for several months because it is so similar in size and coloring to the common egret. The little egret left when the common egrets migrated south in September.

8. Games Mannals

An aerial survey was flown in January to count deer on the Plum Island portion of the refuge. A total of 38 deer were counted during the flight.

A helicopter is used to conduct the annual aerial deer count in January. . ."it's a dirty job, but someone has to do it!"

1/89 - Manning

Spotlight index counts during September and October indicated a 1:2 buck to doe ratio and a 1:2 fawn per doe ratio. The ratios this year are the same as last years.

During the three day controlled deer hunt, only 11 deer were harvested. The harvest was significantly lower this year and may be due to the following reasons: 1) only anterless deer could be taken, as opposed to does and bucks last year, 2) hunt days were reduced from six to three, 3) weather was alot coler and windier than last year, and 4) the deer population had been reduced due to the successful hunts in 1987 and 1988. Of the 11 deer harvested, 7 were fawns, 1 was 1 1/2 yrs, and three were 2 1/2 yrs plus.

The refuge's post hunting season numbers are estimated between 27 and 40 deer - still above the estimated carrying capacity of 15 to 30 deer.

9. Marine Mammals

Three harbor seal pups were picked up from the beach and turned over to the Boston Aquarium; two of the seal pups died.

10. Other Resident Wildlife

Red fox numbers seemed to have peaked this past year with numerous sightings of sarcoptic mange-affected foxes and reports of at least four carcasses seen on the refuge. The present estimated fox population is 8 - 12 animals. Eastern cottontail rabbit numbers appear to be still building after the spring population crash of 1984.

There are an estimated 3 - 5 beavers on the refuge in the North Pool. Otters used the southern, abandoned beaver house in the North Pool. The estimated otter population on the refuge is 2 - 5.

15. Animal Control

One nuisance beaver was removed from the North Pool after cutting down several of our limited number of trees for their winter foodbed.

16. Marking and Banding

Fifty-two Canada geese were banded during the annual goose drive in June.

The pre-season banding quota for the refuge was 200 black ducks. A total of 528 ducks were banded on the refuge. A breakdown of species is as follows:

Pre-season:	Black Duck	200
	Mallard	280
	Mallard x Bl.Duck	6
	Pintail	22
	Green-winged Teal	20
	Blue-winged Teal	1
	Total	528

A walk-in trap was used during the banding season and there was a trap located at the following sites: 1) banding site on the west side of North Pool, 2) On the east side of Bill Forward Pool, and 3) on a little "island" in Stage Island Pool. The banding program was the same as past years. The species banded were similar to last year. Only two ducks were lost during the banding efford. Based on the very pronounced breast bone of each duck, it appears that the birds were sick prior to entering the walk-in trap. Loss of waterfowl to predators was kept low by using an electric fence and completing our banding before the avian predators got too active for the day. During previous pre-season banding attempts, anywhere up to 17 ducks were lost to red fox and raccoon. The charging unit used for the electric fence was a modern, high energy, low impedance unit. We used fiberglass poles with insulators and used single strand wire, four strands high (24"), to cordon off the banding sites.

17 Disease Prevention and Control

Twenty-six Canada geese were collected on the refuge, primarily around the Stage Island Pool area, and sent to the Madison Wildlife Health Lab. The suspected cause of death was lead poisoning. Refuge staff, Division Biologist Atwell, and volunteers banded together to gather 200 soil samples in the Stage Island Pool. The soil sample survey conducted in 1984 to determine the degree of lead shot would "sink" over the years. Results showed that the lead shot had not significantly "sunk" further into the soil and therefore, continues to remain a problem for geese. Refuge staff will explore some ways to remove or "sink" the lead shot in FY '90.

Refuge staff removing a dead moose that apparently drifted ashore - a young bull.

10/89 - Manning

Refuge staff from Rachel Carson NWR assisted in disposing of avian cholera-infected bird carcasses from Pond Island NWR.

5/89 - DeSerres

H. PUBLIC USE

1. General

Visitation was 368,531 in FY 89, an increase of about 45,000 from CY 88. There was much less visitation in January and February of 1989 as compared to 1988, but from March throught October, except for the month of August, 1989 visitation was higher than in 1988. 22,000 school students visited the Refuge, double the number in 1988. This accounts for a significant portion of the May and June visitation. The summer temperatures were much more temperate than last year's record-breaking heat, which may account for more beach-going.

Located only 38 miles from Boston, and known nation-wide as prime birding area, the Refuge's undeveloped beach and prime wildlife habitat attracts thousands of visitors year-round. The Refuge receives its most dense visitation in August and September. The greenhead flies discourage a lot of would-be July visitors!

Entrance Station Fee Collection

See attached summary sheet of fee collection activity.

The Refuge utilizes two forms of entrance fee collection, a staffed entrance gate and a self-pay honor system. The gate is staffed daily from May 1 to September 30, and on weekends and most holidays the rest of the year. In addition to collecting entrance fees, gate attendants provide information, issue permits and entrance passports, and serve as radio dispatchers for the Refuge law enforcement officers.

The daily accounting, ensuring other gate attendants have adequate supplies, change, and other responsibilities is usually delegated to a Lead Park Ranger. The Lead Park Ranger resigned in mid-summer, so the daily responsibility of preparing remittences and the associated paperwork was assumed by the ORP.

Entrance Station fee collection activity in 1989 was fairly consistent with 1988. The cost of the Duck Stamp increased July 1, 1989 to $12.50 each, up from $10.00 in 1988. Over 7,000 visitors felt this was a bargain and bought it as a season pass. Still, the $5.00 single visit permit is most popular, particularly during the summer months, and by infrequent visitors.

2. Outdoor Classrooms - Students

More than 22,000 students and teachers participated in outdoor classroom activities on the Refuge this year, more than double last year's figure. There were 269 groups, about 25 fewer than in 1988, however the figures indicate group size is much larger. This may be due to transportation and fiscal restraints. Teachers are filling buses with students in order to make the most efficient use of limited resources. Refuge staff instructs teachers to separate their students into groups of 60 or less at each site to avoid resource damage. Over 18,000 of the students visited in the months of May and June.
The most popular environmental education sites continue to be the Hellcat Swamp Nature Trail, for wildlife observation and habitat study, and Emerson Rocks for tidepool study. The beach in the area of Lots 1 and 7 is also utilized.

3. Outdoor Classrooms - Teachers

ARM Martinkovic met with a group of area teachers in January at the Maritime Museum in Newburyport, Mass. The teachers were given information on the Refuge outdoor classrooms curricula and Fish and Wildlife Service program.

Sixteen teachers participated in a Teacher Workshop sponsored by the Massachusetts Audubon Society on the Refuge on May 10. ORP Kennedy gave a presentation on the history of Plum Island and on the mechanics of arranging a school visit. Cleti Cervoni and Widge Arms, of Mass. Audubon's Endicott Regional Center, instructed the other portions of the workshop.

ORP Kennedy and Assistant Manager Melvin met with a group of teachers in March and provided information and discussion on teaching materials, topics and sites for their upcoming outdoor classroom activities.

Teacher packets provided by the National Wildlife Foundation were mailed to about 30 area elementary and high school for use during National Wildlife Week, March 19 through 25.

ORP Kennedy attended the Aquatic Project Wild Workshop at Great Meadows NWR in March, and materials from that workshop were made available to teachers.

4. Interpretive Foot Trails

The Hellcat Swamp Nature Trail continues to be a popular stop on a visit to the Refuge by first time as well as seasoned Parker River visitors. The trail consists of two loops, one through the freshwater marsh and the other through the dune habitat and a freshwater swamp, two miles total length and, thanks largely to the YCC, boardwalked throughout. YCC enrollees replaced and upgraded the boardwalk on portions of both the Marsh and the Dune Loops, a project they work on each year.

The trail leaflet was reprinted this year and distributed at the entrance gate, the Visitor Contact Station, and Headquarters.

The Dune Loop of the Hellcat Trail was closed for much of the summer as it is frequently used to illegally gain access to the beach. This was of particular concern when the beach opposite the Dune Loop was closed to protect the nesting Piping Plovers and Least Terns. The Marsh Loop remained open throughout the year.

The Pines Trail, near Lot 5, was rehabed by Girl Scout Troop #423 from Newbury in June. Lot #5 was closed during much of the summer when the beach opposite it was closed, effectively closing the Pines Trail to use except by bicyclists or those walking a long distance on the refuge road.

YCC enrollees constructed a new boardwalk from Lot #7 to the observation tower, providing a more direct and safer route.

5. Interpretive Tour Routes

No interpretive tour routes presently exist on the refuge, but an auto tour route is proposed in the Public Use Plan prepared in November 1989.

6. Interpretive Exhibits/Demonstrations

The Visitor Contact Station was staffed from 9 a.m. to 5:30 p.m. from May 27 through September, when personnel were available. This benefitted not only the refuge visitors, but was also a big help to the entrance gate staff, as VCS staff issued Golden Age and Golden Access Passports, inspected surf fishing vehicles and issued a variety of permits including surf fishing, birding, and clamming. Visitation to the Visitor Contact Station, like overall summertime visitation, was weather dependent. On the best of days a hundred or more visitors stopped in; particularly those with children who enjoyed looking at the mounted birds. Most questions had to do with bird sightings or identification, surf fishing, and recreational opportunities and regulations.

Ed Mair, of the Eastern Massachusetts Hawk Watch, placed a bulletin board display in the VCS hallway in April to provide information on hawk watching being conducted in April and May on the Refuge.

Fall was a busy time for interpretive exhibits in the community. On September 30, ORP Kennedy and Volunteer Bonnie Manning participated in Coastfest, sponsored by New Hampshire Yankee in Hampton, NH. The new airboat was on display and they provided information on duck banding and other wildlife management programs. Coastfest was part of Coastweeks, a nationwide recognition of the importance of our coastal resources. For Coastweeks, Parker River also exhibited a System 70 display on the National Wildlife Refuge system at the Science and Nature Center at New Hampshire Yankee.

Refuge staff and volunteers participated in Coastweeks, a nationwide recognition of the importance of our coastal resources.

9/89 - Manning

The Refuge was asked to respond to a letter from a representative of Citizens Within the 10-Mile Radius written to the Regional Director. The representative of the anti-nuclear group questioned our participation in this event sponsored by a nuclear power company.

A System 70 display and a "Waterfowl for the Future" display of the North American Waterfowl Management Plan was exhibited at the Topsfield Fair from October 3 through 10. Volunteers staffed the exhibit at peak visitation.

A North American Waterfowl Management Plan exhibit, received from the Regional Office, was displayed at the Joppa Arts Festival in Newburyport October 6 to 8 and was attended by Refuge staff.

7. Other Interpretive Programs

Throughout the year the Refuge provided interpretive programs on and off site upon request, and when staffing allowed. Off site programs this year included a slide program presented to the Newburyport Garden Club, a talk on wildlife and habitat to a Newbury Girl Scout Troop (who did trail work for us the next day!) and a program for the Happy Senior Citizens of Seabrook NH, who later made a donation of $50 to the Refuge.

Numerous on site programs were given to educational and special interest groups including classes from Antioch College, Phillips Exeter Academy, the University of New Hampshire, the School for International Training, and Berkshire Community College.

Tours of the Refuge were conducted by special request to professional groups, VIPs, and the media.

8. Hunting

Big Game

The third annual controlled public deer hunt was conducted on the Refuge. This year's hunt was a 3-day, antlerless only hunt. The Refuge was closed from sunset, November 25, through sunrise, December 2, for visitor safety.

A total of 262 people applied for permits and 99 were drawn by lottery and met all qualifications. Since hunters were required to have a valid Massachusetts anterless permit, and since the state's lottery for those permits was held after ours, we were left with a shortage of hunters. This was due to the state receiving significantly more applications than there were permits available, a situation that had not occurred in the several years prior. To compensate, we allowed unsuccessful hunters from Days 1 and 2 to return to hunt again on Day 3.

Due to staff shortages, everyone pitched in to help accomplish refuge projects.

9/89 - Manning

A total of 11 white tailed deer were harvested during the hunt.

Division Biologist Atwell and volunteers assisted the staff in operating a state-approved check station on the hunt days.

Waterfowl

The goose season was split this year: October 19 to October 28 and November 22 to January 20. The duck season was also split: November 22 to December 6 and December 18 to January 1. Over 1,000 refuge waterfowl permits had been issued before opening day of duck season, November 22. Opening day of duck season had a good turnout, despite cold temperatures and wind. There were no major law enforcement problems. The refuge officer was assisted by State Environmental Police Officers, FWS Special Agents, and officers from Rachel Carson Refuge. Parker River has a reputation among the local hunters for good law enforcement protection and most hunters respect both the state and the refuge regulations.

Sixteen youth hunters participated in the hunt on November 25. These new hunters killed a total of six black ducks and one Canada goose. There was one violation. A hunter hit two black ducks in the same flock, exceeding the bag limit of one black duck. The hunter immediately reported it, and turned in one duck. He received a verbal warning, and it was a good learning experience for the student and his instructor. This program benefits the Refuge and wildlife by ensuring well-trained, conscientious and safe hunters in the future.

The joy of your first Youth Waterfowl Hunt.

11/89 - Manning

Ready for waterfowl hunting; a no wake zone, and no PFD on board.

10/89 - Manning

Youth Waterfowl Training Program

The annual Youth Waterfowl Training Program, sponsored by the Essex County League of Sportsmen, was conducted on the Refuge November 25. This year's program was streamlined as far as Refuge involvement, though much planning and coordination goes into it each year, beginning with planning sessions in June and August. ORP Kennedy attended these meetings and represented the Refuge. In years past, the Refuge has done much of the preparation, presentation at the seminar, and setting out of blinds. This year more of the responsibility fell back on the Fish and Game Clubs. The Seminar was held September 17, and ORP Kennedy provided training on several topics, as did a USFWS Wildlife Inspector, a Massachusetts Environmental Police Officer, and several Fish and Game Club members. All participants successfully completed the written exam. Participants and their instructors set up their blinds on November 19. In years past, Refuge staff marked the location for each blind and a trail out to it, a time and labor intensive job. This year only the starting point and some general guidelines were given, and the hunters were to choose their own site. A staff member oversaw the project to ensure safety. Having the hunters choose their sites freed up the limited staff for other work and added to the student hunters' educational experience.

A youth waterfowler set up and ready to go.

9. Fishing

A recreational user fee was begun this year for surf fishing permits. A total of 705 permits were issued, down significantly from previous years. The fees were $45 for a 72-hour drive-on permit, $25 for a 24-hour drive-on permit, and $5 for a 24-hour walk-on permit. The fee structure was arrived at after a survey of other beaches in the state and how much they charge and how many miles of beach are open to surf fishing. Our fees were generally in line with or less than similar areas.

A meeting was held with representatives of the Massachusetts Beach Buggy Association, the Plum Island Surfcasters, Salisbury Beach State Park and the Refuge staff in February to discuss the upcoming fee implementation. News releases were also issued to help spread the word to sportsmen who are not affiliated with any organization.The surf fishing public was generally receptive to the fee, feeling as management did, that this would discourage "joy riding" and "dune busting". The fee program was successful, though it did significantly increase the workload to the gate staff.

Surf fishing permits were issued from April 29 through Labor Day, and were valid through October 31. This was a change from past years when permits were issued up to the last day of the season. ORP Kennedy attended the Massachusetts Beach Buggy Association Spring Meet at Scusset Beach, Mass. on May 21 to provide information, inspect surf fishing vehicles and issue permits.

The beach closure to protect nesting piping Plovers and Least Terns was in effect from April 1 through August 29 and the location was changed in June to better protect the nesting sites the birds had chosen. The surf fishermen are generally very supportive of our efforts to protect these species and several of them are volunteer Tern Wardens.

Overall, it was a good year for surf fishing. Early in the season a new fisherman caught a 43-pound striped bass, a record which stood for most of the season. Even those who didn't catch a trophy size fish enjoyed hours of recreational fishing along the seven miles of undeveloped beach. There were a couple of fantastic bluefish runs. You could really see the food chain in action!

Surf Fishing Permits

	1986	1987	1988	1989
24-hour walk-on	595	627	417	268
24-hour drive-on	702	613	681	380
72-hour drive-on	51	51	63	57
TOTAL	1,348	1,291	1,161	705

These figures show a downward trend in the popularity of surf fishing on Plum Island. The 36% decrease from 1988 to 1989 is due largely to the implementation of a fee. The casual fisherman, or the non-fisherman just trying to take his vehicle onto the beach or stay in the Refuge after sunset, may be reluctant to spend the money for a permit as well as the entrance fee. However, the fishing resource is under great pressure and has been significantly depleted in recent years. This has been especially true for striped bass, a popular sport fish at Plum Island. The loss of saltmarsh along the east coast, the nursery habitat for striped bass fry, and the great fishing pressure including the illegal taking of short fish, have prevented many of the fish from successfully reproducing. In Massachusetts, the legal minimum size for striped bass was increased from 33 to 36 inches this year. It is hoped that increasing the size limit will allow the fish to reproduce for more years and increase overall numbers.

Clamming is another fishing activity that occurs on the refuge tidal flats. Much of the clam flats were closed this year due to temporary rainfall closures or occurrances of paralytic shellfish poisoning. Other than that...18 commercial clamming permits and 87 recreational clamming permits were issued.

11. Wildlife Observation

Wildlife observation is a nearly unavoidable activity on the refuge. Virtually every visitor observes some wildlife species, whether or not he is looking for it. Opportunities for wildlife observation exist throughout the Refuge including vehicle pull offs along the six mile Refuge road, the Salt Pans observation area, two observation towers, the two mile boardwalked Hellcat Swamp Nature Trail, the Pines Trail, and six miles of Refuge beach.

Formal wildlife observation activities include the annual hawk watch, walks led by Mass. Audubon, Brookline Bird Club or other birder groups, and outdoor classrooms. Most wildlife observation occurs informally. Parker River Refuge and all of Plum Island is well known by birders nationwide as a hot spot for bird observation.

There was a buzz of activity in mid-August when a local ornithologist identified a Little Egret in the Refuge's salt pans. The bird is native to Asia and Africa,and is an extremely rare migrant to North America. While there have been only a few reports in Canada and the Carribbean, this was the first recorded sighting in the United States. Word reached the Brookline Bird Club's Rare Bird Alert Hotline and spread like wildfire. Birders from all over began to make travel plans to Parker River to catch a glimpse of the egret.

For the novice birdwatcher, the Black Swan that took up residence in the salt pans was one that was easy to identify. It is likely that this bird escaped from a private pond or zoo.

	1986	1987	1988	1989
Birding Permits Issued:	331	629	333	383

12. Other Wildlife Oriented Recreation

Shell collecting and beachcombing is a popular activity along the Refuge's seven miles of undeveloped beach. Visitors are permitted to gather an unlimited quantity of shells, provided there are no living residents. Visitors frequently want to gather lobstering gear, including the colorful buoys, but this is prohibited by State law. When informed that this equipment is needed by the lobsterman for his livelihood, most visitors are eager to cooperate.

14. Picnicking

Picnicking occurs on the Refuge incidental to other activities. There are no picnicking facilities located on the Refuge. Most visitors picnic on the beach, in private vehicles, or groups in their school buses. Several complaints were received from visitors who felt trash cans were needed on the beach.

15. Off-Road Vehicling

The only off-road vehicle use allowed is beach access by oversand vehicle for the purpose of surf fishing. Two "beach buggy" access routes are located on the Refuge and two more are located at Sandy Point State Reservation. Users must have a Refuge surf fishing permit. Two new signs were posted which clearly stated the regulation. 62% of all surf fishing permits were for oversand vehicles, as compared to 38% for walk-on permits, indicating that most surf fishermen, especially nighttime fishermen, prefer vehicle access.

16. Other Non-Wildlife Oriented Recreation

Fruit picking is a popular activity in the fall of the year. Local visitors enjoy picking the beach plums, for which Plum Island is named, so much so that we have imposed a daily limit of one quart per person per day, to maintain the quality of the activity for a large number of visitors. The season begins the day after Labor Day and ends October 31. Visitors also enjoy picking cranberries although this is a minimal activity due to few cranberry sites. Should they be lucky enough to find them in abundance, the same Refuge limitations apply.

17. Law Enforcement

Law enforcement staffing at the station seems to flucuate much like the tide. The station started with one full time officer and two seasonal officers. Our assistant manager had LE authority but we lost him to a transfer. Our ORP had LE authority but her responsibilities kept her in the office most of the time. Our two seasonals were placed on intermittent status in February and returned to full time in April. We were able to pick up a third LE seasonal in May. On July third our first seasonal resigned for a National Park Service job, the second seasonal resigned in September and the last seasonal resigned in October. Our ORP transfered in December leaving us with one full time Refuge Officer and a new seasonal officer.

Our ability to sucessfully prosecute cases is hindered by this constant turn-over of personnel. Our seasonals write quite a few tickets during their average three month appointment. However, if a violator choses a court hearing it is often three to four months before the case reaches the docket and by then the seasonal has departed for the next employment opportunity. These cases are dismissed due to a lack of prosecution. A second full time officer would be a good solution.

This year, the violation notices issued worked out as follows.

OFFENSE	TOTAL NUMBER	FINES COLLECTED $
Parking	112	560
Speeding	32	1,120
4x4 Travel on Beach w/o Permit	11	825
Non Compliance with Refuge Specific Regulations	40	1,000
General Trespass	25	1,250
Non Compliance with Surfcasting Permits	20	1,000

Fireworks Possession	1	100
Camping	3	150
Failure To Pay Entrance Fee	4	100
Destruction of Vegetation	1	50
Minor in Possession of Alcohol	3	150
Unplugged Shotgun	3	75
Possession Alcohol while Hunting	1	75
Hunting w/o License	1	50
Possession Toxic Shot	3	150
Wanton Waste	1	50
Possession 26 or More Shotshells	3	60
Bag Limit Black Duck	2	100
Totals	266	6865

The following cases were made by Officer Lane using his Deputy Massachusetts Environmental Police Officer status.

Offense	**Total Number**	**Sentence or Fines Collected**
Possession Marijuana	1	1 year probation and $15
Failure to Display Fish to a Police Officer	2	2 years probation and $120 each
Possession Undersized Striped Bass	2	2 years probation and $130 each
Operating with Revoked License	1*	* Sentenced to
False Information to a Police Officer	1*	six months House of Corrections and
Forged Drivers License	1*	$1,000
Forged Car Registration	1*	
Clamming in Sewage Contamination Zone	1	$450
Lobstering without License	4	$1400
Failure to Stop for a Police	1+	
Driving Under Influence of Alcohol 3rd Offense	1+	+ Subject is scheduled for trial in 1/90
Operating with Revoked License	1+	
Failure to Keep Right of the Center Line	1+	
Discharge of a firearm within 150 feet of a paved road.	1#	# Subject fined $250 and 6 months probation.

Discharge of a firearm within 500 feet of a dwelling. 1#

Public Endangerment to wit improper use of a firearm. 1#

In additon, 17 individuals were arrested on default warrants from various courts in Massachusetts and New Hampshire.

January and February were fairly quiet months for our officers. They spent their time supervising the special costal Canada goose hunting season. Officers Rainey and Perley were placed on intermittent status. The Massachusetts Environmental Police periodically requested assistance from Officer Lane in arresting clammers digging in sewage contamination zones. Weekends provided plenty of opportunity to run radar, chase down unleashed dogs and write parking tickets. Officer Lane, ARM Smith, and ORP Kennedy attended firearms training at Pease Air Force Base.

During March the crackdown on illegal clamming continued with as much manpower and equipment, such as night vison equipment, being loaned out to the Environmental Police as possible. Tickets for staying on the refuge after closing, speeding, and entering closed areas seemed to be the mainstay of the month. Officer Lane also spent time arranging for speakers for the upcoming LE refresher.

The pace picked up in April. The two seasonals returned to full-time status and along with Officer Lane and ORP Kennedy attended the 40 hour LE refresher in Virginia. Lane and Kennedy also attended a fish identification workshop presented by the National Marine Fisheries Service.

One hundred and thirty people were removed from the section of beach closed for the piping plover.

In April the officers also had to deal with an increase in the number of 4-wheel-drive trespasses on the beach. In one incident the operator tried to drive his 1989 Blazer from the island to the mainland. Nothing out of the ordinary except he opted not to use the bridge. Three days and five complete tide cycles later, the vehicle was finally winched from the tidal flats; a total loss. Two 55 gallon drums of an unknown substance were removed from the beach with the guidance of the Environmental Police. The local police also requested backup from the refuge on several occasions; including a bomb threat and a serious traffic accident.

This weekend warrior thought driving to the mainland would be no problem.

6/89 - EPO LeBoeuf

May proved to be an interesting month. The Massachusetts Environmental Police raided a local seafood dealer and seized 1,500 undersized lobsters. The state turned to the refuge for help in transporting the critters to the refuge for release. The refuge was able to provide 4x4 trucks and manpower.
Refuge Officers provided backup to Newburyport Officers as they arrested a subject wanting to shoot another subject for tangling his fishing lines.
Officer Lane, acting on a tip from a concerned sportswoman, arrested two males for failing to display fish caught to police officer, possession of undersized striped bass and possession over the limit of striped bass. During the subsequent inventory search of the vehicle belonging to one of the suspects, marijuana seeds were found in the ash tray. Faced with the option of having the new 1989 Celica dismantled or telling the officer where the rest of the dope was, the wife produced a bag with eight joints from her underwear.

Firearms training was conducted at Pease Air Force Base for all officers.
Finally, our LE staff was kept busy keeping the public out of the Plover closures and writing numerous tickets for public use violations.

Early in June the clam flats were closed because of Paralytic Shellfish Poisoning (Red Tide). With no supply and an increaing demand for clams (fried clams and New England go hand in hand in the summer), clam poaching was the thing to do. The price for a bushel jumped from $35 to $138. Our officers and the Environmental Police made several good cases. Enforcement of fisheries regulations relating to striped bass was also a priority. A fishing trawler, in violation of State law, by dragging within the three mile State zone was observed by Officer Lane and a quick response by a Customs Service Chopper and a Coast Guard patrol boat led to the trawlers seizure.

July was busy. Beautiful weather brought visitors out in hordes. Preventative law enforcement patrols were the order of the day. Environmental Police assigned two officers to the refuge for the 4th. It was a very orderly time. Towards the end of the month the biting greenhead fly was doing its part in visitor control.

The Captain purchased this boat 6 hours earlier - and promptly ran aground.,

7/89 - Lane

During August our officers continued to write violation notices for our most popular problems: illegal parking, trespassing after hours, and non compliance with conditions of a surfcasting permit. The clam flats remained closed due to Red Tide and pollution, as a result patrols of these areas continued. The majority of the officers' time was spent on preventative patrols.

Visitation finally began to slow down in September. Weekends were still busy but the dog days of summer were behind us. As the migration of the striped bass and the blue fish began, an extra effort was put into inspections of the surfcasters for violations. With the legal size for a Striper at 36 inches, some surfcasters found it hard to throw back those just short of this mark.

Officer Lane was sent to FLETC for the Firearms Instructor Training Program for the last two weeks of the month.

During October our attention turned to the early Canada Goose season. There were no major violations recorded after 70 hunters were contacted. Weekend visitation continued at a good pace as the birdwatchers kept an eye on the migrations.

On November 22 duck season started and extra LE help came from Rachel Carson NWR, FWS Agent Dowd and officers of the Environmental Police. All the angles were covered and several good cases were made. Again during our three day anterless deer hunt there was a strong LE presence and only one person was cited for shooting a buck.

During December extreme cold weather froze most of the Plum Island River and most of the tidal flats which in turn put a damper on waterfowl hunting. Waterfowl patrols with the Environmental Police continued in those area where hunters were frequenting. In addition, primitive firearms season for deer took place on the bordering State area without any problems.

Two firearms training exercises were conducted by Officer Lane for FWS personnel; at Ninigret, Great Meadows and Rachel Carson NWR: one in Rhode Island and one in New Hampshire.

Officer Lane in December arrested a local subject for operating under the Influence (his 3rd time), operating after a revocation, failure to stop for a police officer, and failure to keep right of the center lane.

I. EQUIPMENT AND FACILITIES

1. New Contruction:
   - Added ± $8,400 worth of gravel to southern 1/2 of refuge road. It helps - but really not enough.

   - W.C.S. @ North Pool dike was finally finished and accepted. Contractor had - rough time getting grass mix to take - but finally met terms of contract. We now have working WCS in the North Pool where none had existed before. This will allow lowering/ raising (with seawater) of water levels toward gaining some active management of the pool.

- In conjuction with the contract to add/rehab water control structures - four seperate sections of the chip and seal portion of the refuge road received 3 1/2" of asphalt. The worst sections of the road were selected, and to date the asphalt has held up quite well. Some minor cracking, but no potholes have developed.

3. Major Maintenance
   - Removed leaking UST/gasoline @ headquarters - cost ± $11,000/ will not replace(use credit cards.)

   - Removed 2 UST(gas & diesel) @ sub-headquarters ± cost of $2,000.00 (replace diesel service in FY 90)

   - Initiated contract to remove "surface junk and debris" found in U.S. Govt. Tract #1100 - the "promised land" - future site for a new headquarters facility. Details outlined under Section J. #2 - items of interest.

4. Equipment Utilization & Replacement
   - Received a used 1977 Dodge Van(8 pass) from the RO for use in the YCC program.
   - Received a new airboat, primarily for use on Canada banding assignments.

Temporary Park Ranger Julia Haack applied her skills to our new airboat - "The Greenhead". No relation to the "Green Hornet".

7/89 - Manning

5. Communications Systems
   - With the arrival of Assistant Refuge Manager Martinkovic; the computers at the refuge have begun to hum - and we now can use electronic mail ..... as long as we remember to look in the electronic mail box!

6. Energy Conservation (NTR)

7. Other (NTR)

J. OTHER ITEMS

2. Items of Interest: (1989)

In October of 1989, a contract was let to clean up the "junk" found on U.S. Tract #1100 - the "promised land"; site of our future headquarter facility. An initital 21E Report(Oil and Hazardous Materials Site Assessment) indicated some minor contamination from the junk, but nothing really significant ..... oops! By the end of the year, an $11,500 contract had swelled to close to $400,000! Industrial solvents, PCB's and asbestos topped the list of hazardous wastes found in this former salvage yard.

Chronology of Hazardous Materials 3/26 to 12/30/89

March 26, 1985 - Service accquires site from the Trust for Public Land, with assistance from the Massachusetts Audubon Society and the New England chapter of the Sierra Club. Report indicates that the potential for contamination from oil or hazardous materials was "not" significant.

September 1989 - Funds became available and the Service awards a contract to LRS Enviro-Services of Hampton, New Hampshire, to clean up debris from the site, including several drums containing unknown liquids.

October 11 - Contractor begins clean-up.

October 13 - Contractor locates additional drums, collects samples for analysis. Refuge Manager Jack Fillio directs contractor to provide weekly summaries of findings.

Ocotber 16-17 - Contractor isolates 12 small transformers, takes samples. Environmental Protection Agency and DEP contacted regarding possible hazardous materials site. Town and City governments, Congressional offices, along with The Newburyport Daily News, also notified.

October 18-19 - Test results indicate PCBs and toxic chemicals present on site. Contractor erects snow fence, warning signs at site.

October 27 - By this date, contractor uncovered more than 50 drums and 100 transformers. 24-hour security established at site. Decision made to secure area with chain-link fence.

November 1-17 - Contractor continues investigation of site, locates additional contaminants, including loose and solid asbestos.

November 17 - Contractor begins air quality monitoring. Tests show no radioactive materials or airborne contaminants. Contractor samples eight residential wells on east side of Plum Island Turnpike, from Sportsman's Lodge south.

November 21 - Contractor notified that three samples contaminated with chemicals; contractor informs Service, DEP, and City of Newburyport. Three homes notified by Newburyport Health Director not to use their water for drinking or bathing. Service provides bottled drinking water to residences.

November 28 - Improper procedures invalidate contractor's November 17 samples. Therefore, State DEP resamples 10 wells (all 8 residential wells and 2 additional wells); samples submitted to State laboratory for analysis, but no control samples taken.

November 30 - State test results indicate presence of chloromethane but no other toxic compounds. Residents asked to continue to refrain from drinking well water until sampling program completed.

December 1 - DEP invalidates its November 30 results because control samples were not included.

December 4 - Contractor notifies the Service that additional results from November 27 samples showed three wells with slightly elevated levels of lead.

December 5 - State DEP resamples residential wells with control samples. Preliminary results indicate minor contamination in the control sample; additional samples will be taken.

December 20 - Public information meeting. Approximately 40 residents attended. Concerns expressed included well testing; overpack removal; Phase II studies progress.

December 28 - A meeting was held at the request of Congressman Mavroules and involved 17 Federal, State, City and State legislative representatives to basically inform all interested parties of the current situation, as well as future plans to clean up the site. Congressman Mavroules offered his assistance to the Service in obtaining funding for the project.

December 30 - The 6-foot high security fence was complete. The Service issued a contract amendment to LRS-Enviro Services to remove and dispose of overpacks.

Manager Fillio accepting a donated painting from local artist Hank Walker on behalf of the upcoming Joppa Arts Wildlife Festival.

9/89 - Manning

Portion of contaminated soil and transformers found at the hazardous waste site - Tract #1100. The yellow barrels are "overpacks" to contain hazardous liquids.

11/89 - DeSerres

The "Drew Crew", Bill and Phyllis Drew; our volunteer shorebird and waterfowl survey team.

10/89 - Manning

3. Credits

Fillio	Sections A, C, I, J, K, Pond Island NWR, Thatcher Island NWR
Martinkovic	Sections B, F, G, J.3, E.2, E.3, E.6-8, Photo Coordinator, Editing, Assembly
Lane	Section H.17
Bell	Section E.1, Editing, Assembly
Garcia	Typing, Editing, Assembly

POND ISLAND

POND NWR

POND ISLAND NATIONAL WILDLIFE REFUGE
POPHAM BEACH, MAINE

ANNUAL NARRATIVE REPORT
CALENDAR YEAR 1989

Pond Island NWR

Pond Island is a 10-acre, treeless rock-base island offshore from Popham Beach, Maine. The U.S. Coast Guard transferred title to the island in 1973 to the U.S. Fish and Wildlife Service. An existing navigational light(light house) remains under juristiction and control of the U.S. Coast Guard as they they retrained a R.O.W. for the facility.

Access is by boat only, with a limited area of shoreline suitable for the safe landing of watercraft. The majority of the island's edge is too rocky for safe landings. Only minimal public use is attributed to this refuge.

Normal population of bird life using the island are as follows:

Herring Gull	1,000
Great Black-Backed Gull	200
Common Eider	100

No evidence of Terns or Plover have been found to date. Other species observed include Song Sparrows, and Spotted Sandpiper.

Upon receiving a request from the state of Maine, Division of Inland Fisheries and Wildlife; Service personnel(Woody DeSerres and Eric Smith, Parker River; Jason Barker, Rachel Carson; and Gerry Atwell, Regional Field Biologist) traveled to Pond Island to investigate a possible Avian cholera outbreak along the coast of Maine. The following is a brief account of that trip.

June 2, 1989 - Weather: Overcast skies, Temperature at 65F, wind/ water calm. We arrived on the island at approximately 1200 hours and remained for one hour five dead common eiders(1 male, 4 females) were found in good flesh(recent) - along with 46 others(4 drakes, 42 hens), 26 gulls(2 herring and 24 black-backed). Since this visit was of short duration - it is estimated that only 50-60% of dead specimens were accounted for - total live populations observed included 2,000 gulls and 150-200 ciders.

During collection - sanitation procedures were followed in order to minimize the opportunity of spreading the disease. All personnel actually collecting specimens washed down(gloves, boots, and boat) with a bleach water solution. Specimens were double bagged and incinerated the same day.

Five specimens were sent to the National Wildlife Health Laboratory in Madison, Wisconsin for testing. All five were confirmed Avian Cholera.

The outbreak of Avian Cholera is apparently not unusual along the Maine coast - but this is the first time in recent years(at least back to 1983) that any outbreak have affected Pond Island.

THACHER'S ISL.

Thatcher - NAR

THATCHER ISLAND NATIONAL WILDLIFE REFUGE

Rockport, Massachusetts

ANNUAL NARRATIVE REPORT
Calendar Year 1989

Thatcher Island National Wildlife Refuge consist of 22 acres (the northern portion of the island), transferred to the U.S. Fish and Wildlife Service from the U.S. Coast Guard in 1972.

Repairs to Thatcher Island North Tower Contract #14-16-0005-88-0161B July 1988/Consultant Preservation Partnership final plans and specs. for repairs to North Tower approved by FWS/review.

Bids were solicited for potential contractors on August 5, 1988 bid opening on 9/7/88.

The award was made on 9/14/88 to:
International Chimney Corporation
55 South Long Street
P.O. Box 260
Buffalo, New York 14221
Contr. #14-16-0005-88-055
in the amount of $80,000.00

Work suspended due to weather conditions, on 12/6/88 with work to resume on May 1, 1989.

Work included:
- repointing of Tower
- epoxy grounting
- reconstruction of entrance pavillion
- repairs to stairs and floors
- repairs to catwalk railings

At the request of the Thatcher Island Association, Parker River staff constructed a series of signs to assist the Vistor. Signs were made at the Great Meadows NWR shop by Maintenance Harry Sears.

A revised Cooperative Agreement between the Service and the Town of Rockport was drafted, and sent in for review in June 1987.

July 20, 1989/wildlife survey conducted by Refuge Biologist Carl Fergeson/ ORP Janet Kennedy assisted.

Herring Gull	1,200 est. adults
	200+ est. young
Black-backed Gull	250 est. adults
	78 est. adults
Double-crested Cormorant	27
Common Eider	19

15+ pigeons using lower level of light house
2 White goats using refuge property

Very succesful herring and greater black-backed gull meeting colonies on Thatcher Island. They are mostly nesting around the north to southeast perimeter in and around the boulders and in Virginia Rose and seaside Goldenrod vegetation.

- No evidence of Tern nesting.

1/4/89 Historic structure review and report conducted by Regional Archeologist John Wilson.

7/27/89 Phase I work under contract #14-16-0005-88-055 was substantially completed this date/except for exterior painting - which was delayed due to extensive periods of rain during the end of July and early August.

8/23/89 Interim Progress report submitted by A&E firm(consultant)

The Preservation Partnership
345 Union Street
New Bedford, MA 02740

Staff Visits to Thatcher Island FY 89

7/20 Carl and Janet/ Wildlife Survey; and Janet orientation to island.

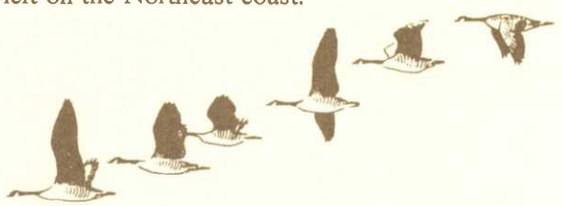
8/21 Fillio/Paul Saulnier(RO)/John Wilson(RO)/ inspection of Tower rehab job etc./ Ned Camerson/

PARKER RIVER

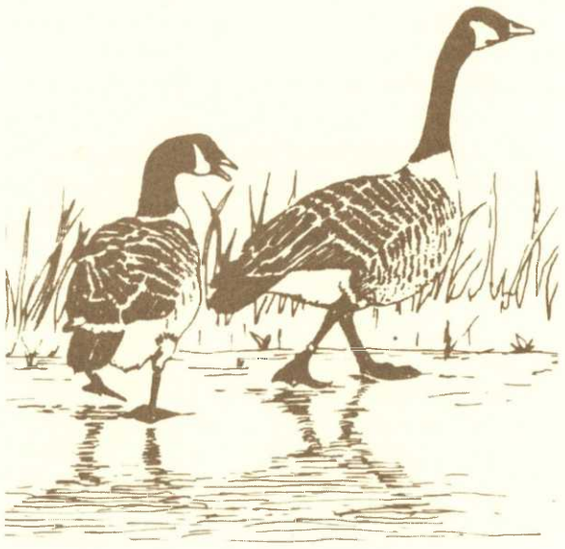
NATIONAL WILDLIFE REFUGE • MASSACHUSETTS

INTRODUCTION

The Parker River National Wildlife Refuge is located on 4,662 acres of salt marsh, freshwater marsh, beaches and dunes in Essex County, Massachusetts. The refuge includes the southern two-thirds of Plum Island and is one of the few natural barrier beach-dune-saltmarsh complexes left on the Northeast coast.



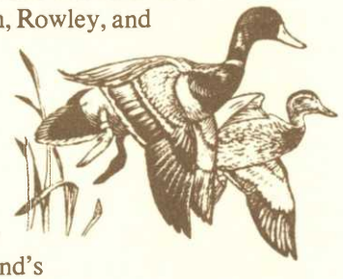
Each year over 400,000 people visit the refuge to enjoy its natural beauty and diversity of wildlife. In addition to birdwatching and environmental education, visitor activities include surf fishing, hiking, clamming, plum and cranberry picking, and hunting.



HISTORY

Plum Island was discovered by Champlain in 1601 and first mapped by Captain John Smith in 1616. Large heaps of shells called middens give evidence of the past use of the island by coastal Massachusetts Indians, but they established no permanent settlements, probably due to the lack of fresh water.

During the 1630's the area became known as Plum Island, as early settlers took note of the profusion of wild beach plums in the late summer. Residents of Ipswich, Rowley, and Newbury were allowed to graze their livestock on the island until 1739, when the practice was declared illegal due to depletion of the island's vegetation. Saltmarsh haying was an important industry until the mid-1800's and circular "straddles," used to keep mown hay above tidal waters, can still be seen in the marshes.



In 1806, a road and bridge were built connecting the island with the mainland. By 1890, a horsecar line reached Plum Island from downtown Newburyport. Much of the natural vegetation disappeared as more and more cottages sprung up.

In the early 1930's the Massachusetts Audubon Society acquired 1600 acres as a bird sanctuary. Parker River NWR was established in 1942 when the U.S. Fish and Wildlife Service acquired this area from the Audubon Society and an additional 3,050 acres from private landowners with funds from duck stamp sales. In 1985 an additional 12 acres was acquired on the mainland for a future headquarters facility.

WILDLIFE HABITAT

Located along major bird migration routes, over 300 species of birds use the refuge. Parker River's extensive salt marshes serve as important feeding and resting areas for migratory birds. Peak concentrations of up to 25,000 ducks and 6,000 geese occur during fall and spring migrations. In addition, the refuge provides habitat for large flocks of warblers and shorebirds.

The barrier beach, a fragile, environmentally unstable area, constantly changes with winds and tides. Sections of the refuge beach are protected by fences to provide nesting areas for least terns and piping plovers.

Two miles of dikes create 265 acres of freshwater marsh in three major pools. Natural waterfowl foods found here attract a wide variety of water birds and other wildlife. Man-made structures in the freshwater pools encourage nesting by geese and ducks.

Eighty acres of mowed grass pasture provide habitat for geese, deer, and rabbits. Canada geese with their young may be viewed at close range in these fields during the late spring.

CALENDAR OF EVENTS

January/February

Snowy owls, rough-legged hawks, Northern harriers present and frequently seen flying over marshes or roosting in trees at marsh edge; heavy storms may block refuge road for extended periods.

March/April

Marshes thaw; northbound migrations of waterfowl, raptors and early shorebird and wading birds; courtship activity of waterfowl around April 1; serviceberry flowers in late April.

May/June

Geese hatch and broods feed in roadside fields; warbler migration peaks in May; beach plums, false heather, and honeysuckle flower; striped bass migration reaches refuge.

July/August

Ducks hatch and feed in pools; fox kits play near dens; mosquitoes and greenhead flies in strength, demanding personal protection; purple loosestrife flowers; concentrations of snowy egrets; large flocks of shorebirds and swallows seen in late August.

September/October

Plum/cranberry picking (check regulations); waterfowl migration underway; hunting permit applications available September 1; Youth Waterfowl Training Program ends late September; glasswort in salt marshes very colorful; peregrine falcons seen occasionally.

November/December

Migrating Canada and snow geese present; American black duck numbers peak; sea ducks rafting in large numbers offshore; snow buntings, horned larks, and Lapland longspurs seen in large flocks; seals sunning on Emerson's Rocks; marshes freeze.

U.S. FISH AND WILDLIFE SERVICE

Parker River is one of more than 400 refuges in the National Wildlife Refuge System administered by the U.S. Fish and Wildlife Service. The National Wildlife Refuge System is a network of lands and waters managed specifically for the protection of wildlife and wildlife habitat and represents the most comprehensive wildlife resource management program in the world. Units of the system stretch across the United States from northern Alaska to the Florida Keys, and include small islands in the Caribbean and South Pacific. The character of the refuges is as diverse as the nation itself.

The Service also manages National Fish Hatcheries, and provides Federal leadership in habitat protection, fish and wildlife research, technical assistance, and the conservation and protection of migratory birds, certain marine mammals, and threatened and endangered species.

If you would like more information about this refuge, the Refuge system, or if you would like to volunteer your services, please contact:

Refuge Manager, Parker River NWR
Northern Boulevard, Plum Island
Newburyport, MA 01950
Telephone: (617) 465-5753

Take Pride in Parker River National Wildlife Refuge

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

RL-52550-1
August 1986

PARKER RIVER

NATIONAL WILDLIFE REFUGE

NEWBURYPORT, MASSACHUSETTS

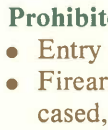
VISITOR INFORMATION

Visitor hours are ½ hour before sunrise to ½ hour after sunset. To control public entry, an automatic gate operates during times posted at the entrance. The only legal entry into the refuge is through this gate.

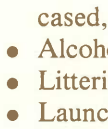
Reminder: On warm days, the refuge parking lots are often filled to capacity by 9 a.m. When this occurs, the main gate is closed until 3 p.m. This entry control limits visitor use and helps to protect refuge wildlife and habitat from overuse.

Access to the beach is over boardwalks at each parking lot, except Lot #4. (This lot is reserved for visitors using the Hellcat Swamp Wildlife Trail.) You should remain on the boardwalks to avoid damaging the dune vegetation. Swimming is at your own risk. There are no lifeguards and undertows and tides are very strong.

As you travel through the refuge you will encounter regulatory signs such as speed limit and parking area signs. Two other signs you will also see are:



Closed Area: Certain areas of the refuge are closed to visitors for management purposes; entry beyond this sign is prohibited.



Public Hunting Area: This sign marks areas open to hunting only by permit during open seasons.

PUBLIC USE ACTIVITIES

Permitted:

- Wildlife Observation
- Photography
- Beachcombing
- Hiking on trails
- Surf fishing
- Plum and cranberry picking: one quart per person, from Tuesday after Labor Day to October 31
- Pets, on leashes 10 feet or less, from September 30 through April 30 on the ocean beach only.

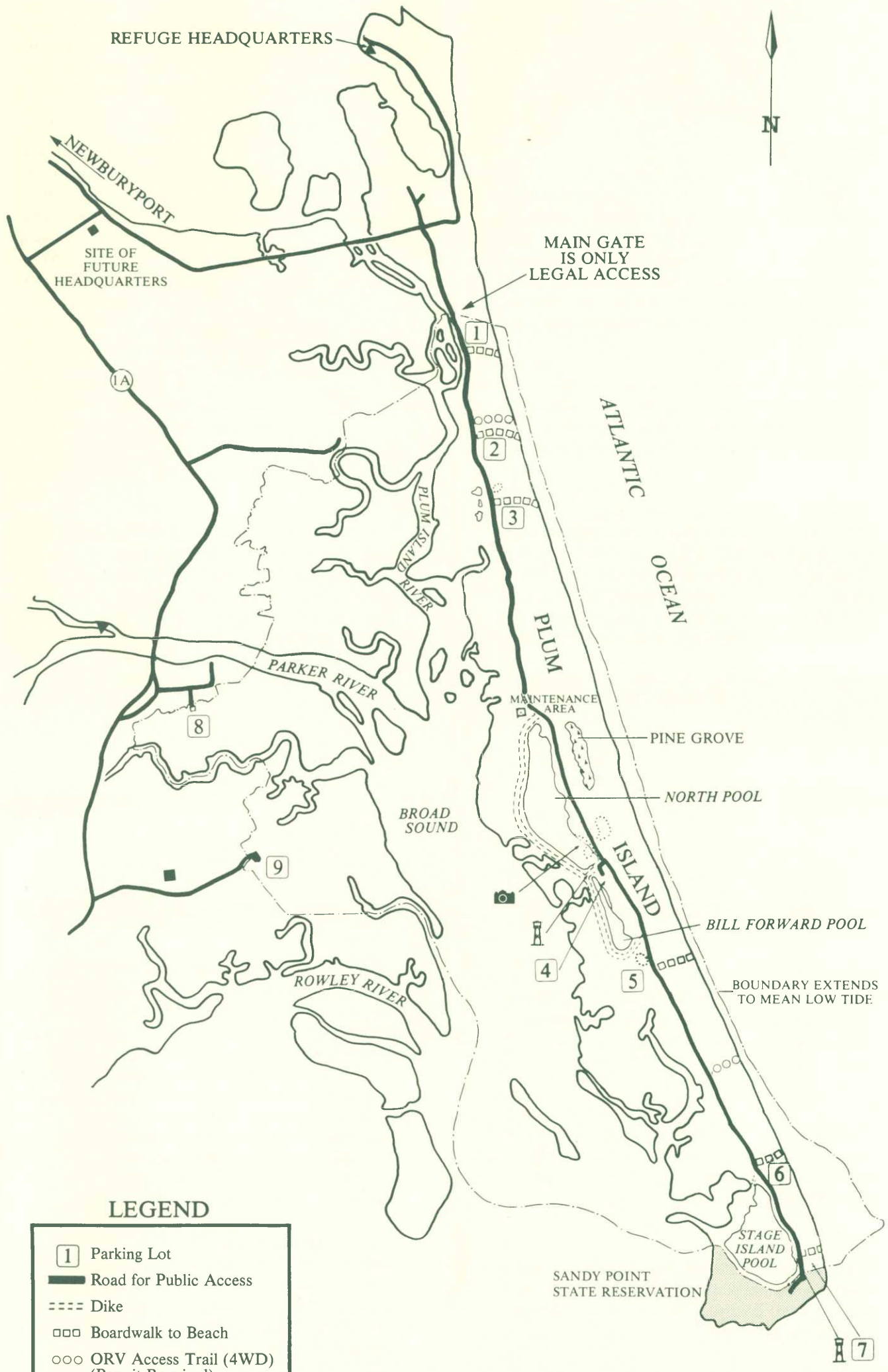
By Special Permit Only:

- Clamming
- Hunting
- Night fishing and use of over-the-sand surf fishing vehicles
- Classroom or group visits

Prohibited:

- Entry other than through main gate
- Firearms, except during hunting season, then cased, broken down, and in trunk
- Alcoholic beverages (Town Regulation)
- Littering
- Launching/landing any watercraft
- Parking in other than designated lots
- Feeding wildlife
- Removing any beached fishing gear
- Any disturbance to the dunes: digging, sliding, or destroying vegetation
- Horses.

Remember: *People and wildlife use the road. Obey posted speed limits!*

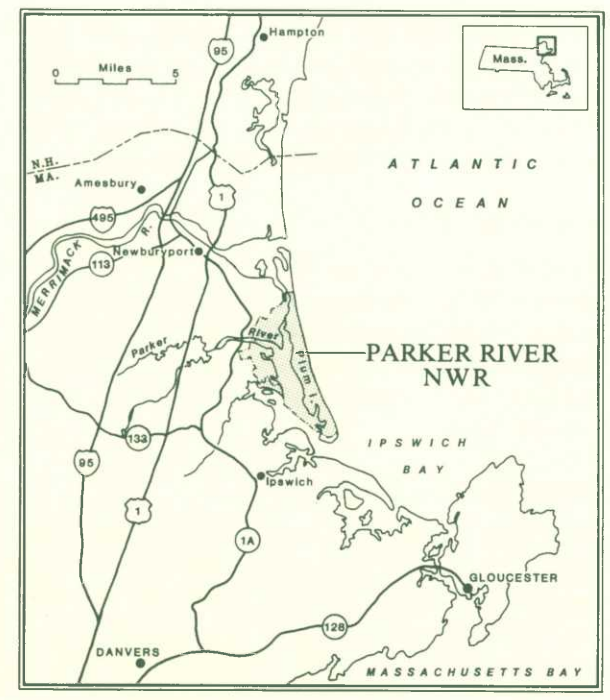


REGULATIONS

Regulations for National Wildlife Refuges are in the Code of Federal Regulations, Titles 50 and 43. State and local laws are also enforced by refuge, state, and local enforcement officers.

Additional information is available at the gate (when staffed) or at the refuge headquarters. Literature available includes: bird list, reptile/amphibian/mammal list, Hellcat Swamp Wildlife Trail Guide, and Sport Fishing Regulations. Information on hunting programs and group visits for environmental education is available at refuge headquarters (address on back cover).

DIRECTIONS:
Headquarters is at the North tip of Plum Island, 32 miles northeast of Boston, and is best reached from the Route 113 exit of I-95. Follow Route 1-A to signs indicating the Refuge and Plum Island.



Mission: As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally-owned public lands and natural and cultural resources. This includes fostering wise use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historic places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also promotes the goals of the Take Pride in America campaign by encouraging stewardship and citizen responsibility for the public lands and promoting citizen participation in their care. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. Administration.

For further information contact:

Refuge Manager
Parker River National Wildlife Refuge
Northern Boulevard, Plum Island
Newburyport, MA 01950
Telephone (508) 465-5753

Hellcat Swamp

Wildlife Trail Guide

Parker River National Wildlife Refuge

Massachusetts

DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE

RL-53550-4 October 1989

Hellcat Swamp Nature Trail

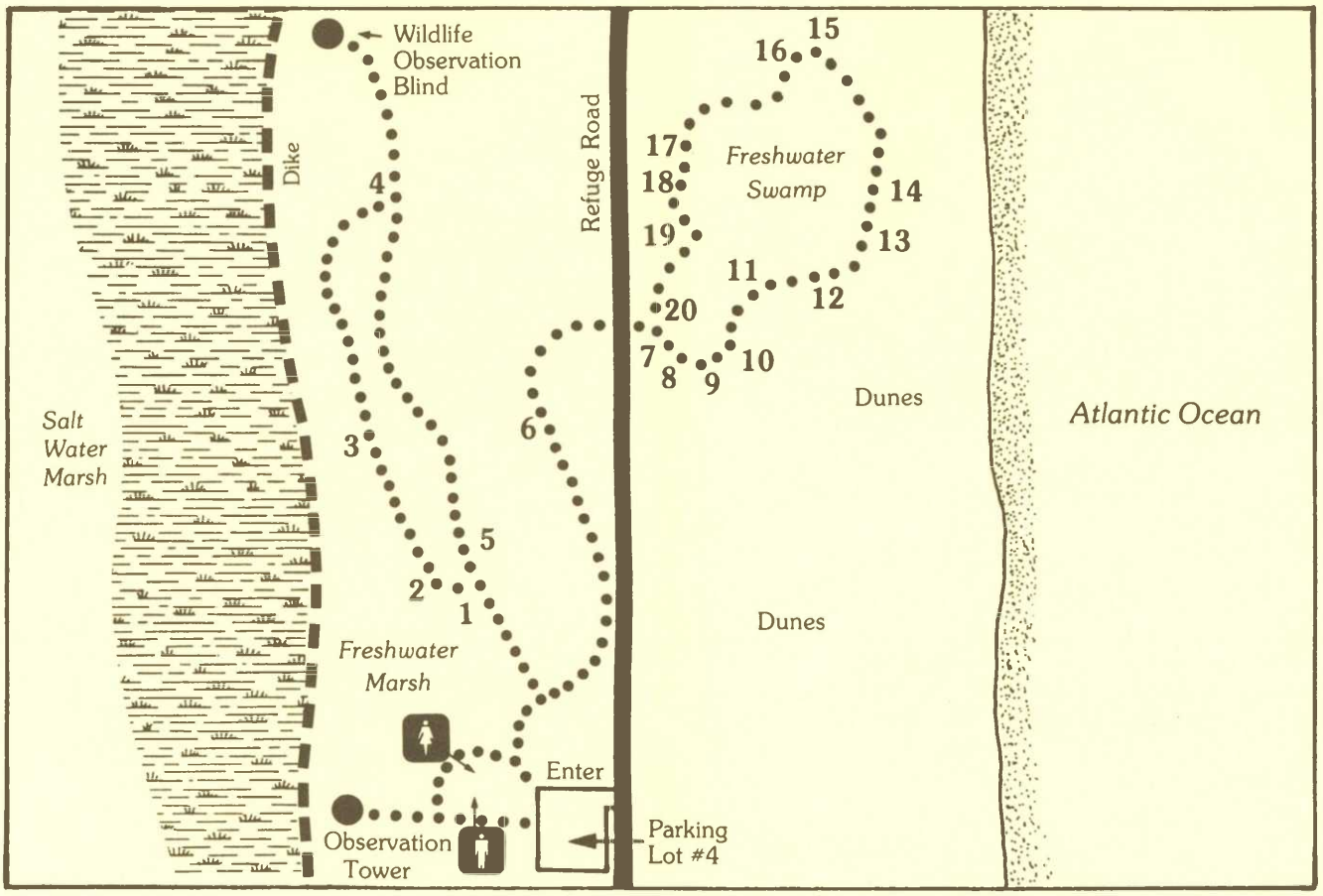
This two-mile-long nature trail is divided into loops so that visitors may enjoy the varied wildlife habitats at Parker River National Wildlife Refuge. The habitats reflect both natural processes and human activities at the Refuge. To prevent damage to vegetation and dunes and to avoid deer ticks, please stay on the boardwalk. To preserve dunes, no access to the ocean is permitted from this trail.

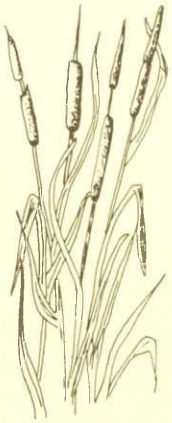
The observation tower path is to the left of the trailhead. The trail boardwalk is straight ahead.

1 The freshwater marsh before you was created by the U.S. Fish and Wildlife Service to provide habitat for migratory birds. Habitat is the food, water, cover, and shelter needed by animals to survive. National Wildlife Refuges are managed to promote wildlife diversity by providing many different habitats for wide varieties of wildlife.

2 Parker River National Wildlife Refuge was established in 1942 as a resting place for migrating waterfowl. Refuge personnel have modified the landscape to provide better habitat for waterfowl. The water control structure in the middle of the dike allows Refuge staff to raise and lower the water levels in the impoundment, thereby encouraging some plant species to grow while discouraging those species not usable by waterfowl.

3 The cattails nearby are being crowded out by two exotic plant species introduced from Europe and Asia. Purple loosestrife is the low shrub and phragmites the tall reedy plant with the tufted tops growing near the boardwalk. These plants do not provide the cover and food needed by birds. Fire, mechanical harvesters, cutting, and managing water levels are some of the methods used by Refuge staff to control nuisance plants and promote the growth of cattails and other species favored by wildlife.





Cattails

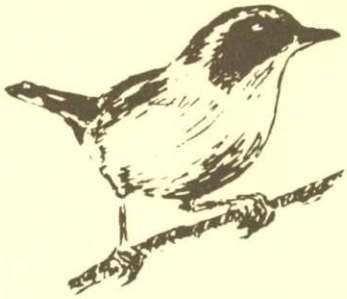
Phragmites

4 The path to the left leads to an observation blind. By approaching the blind quietly you may be able to see herons, rails, and ducks swimming or feeding in the marsh during spring, summer, and fall. The path to the right leads to stop number five and to the upland and dune portions of the trail.

5 Slight differences in soil nutrients, acidity or moisture are often indicated by the kinds of plants you see growing. Grasses tolerate drier sites and usually need soil low in acid. Such grassy clearings, where buds and leaves grow along the sunny edges, attract cottontail rabbits and other small mammals.

6 This upland forest habitat is named for Ralph Goodno, a local educator who brought many classes to the Refuge over the years. He took an active interest in developing environmental education materials for teachers and students so that all could better appreciate the diversity of Parker River National Wildlife Refuge.

7 Hellcat Swamp is especially known for its variety of bird life. Over 300 species of birds regularly visit the Refuge. Most of these species feed and rest in this seemingly-misplaced swamp which lies amidst the sand dunes.



Yellowthroat

8 Many of the plants which you see along the trail grew from seeds sown by birds. Songbirds feast on the fruit of blueberry, pin cherry, woodbine, raspberry, and honeysuckle; then pass the seeds on to the soil after digesting the pulp.

9 The colorful "paint" spattered on this tree is a mat of small plants called lichens. Lichens are combinations of algae and fungi which are dependent on each other. The algae cannot live out of water without the protective coating of the fungus. The fungus, in turn, depends on the algae for food. Together they produce an acid-like substance which can change rocks into soil, thus providing anchorage for other plants.

10 Wind and shifting dune sands have partially buried this black cherry. The gnarled growth pattern of the tree reflects the intensity of seasonally-strong winds at the Refuge.

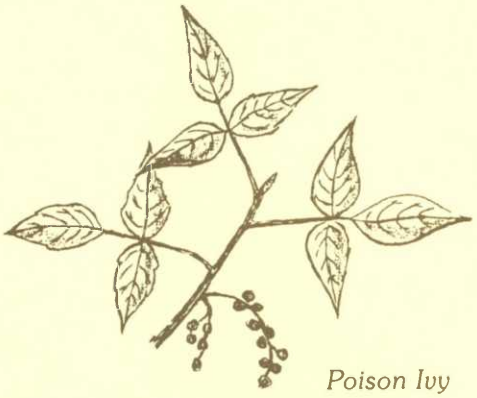
Speckled Alder

11 This 50-foot-high dune provides a panorama of mainland, salt marsh, freshwater marsh, Hellcat Swamp, sand dunes, and Atlantic Ocean, all of which are linked together. As dunes form, they act as a barrier to ocean storms and winds. Plants grow on the back sides of dunes, stabilizing them. Foot traffic across the dunes damages plant roots, leaving the dunes more vulnerable to wind and waves. Please help protect the dunes and salt marsh by staying on the boardwalk.

12 The dunes which parallel the beach protect the estuary from pounding surf. Wind is a powerful and active force in shaping the dunes. The blowout (depression) in front of you shows the effect of whirling winds that dig into areas which lack dune vegetation. Depending on the severity of the wind, this blowout may continue to grow larger unless pioneering species, like the false heather to your right, move in and stabilize the sand.

13 The Japanese black pines were planted in 1953 to help stabilize the dunes. Plans call for replacing them with native trees. White-tailed deer seek shelter from severe winter winds in the pine areas.

14 The freshwater swamp before you nestles in a pocket where roots can reach the freshwater table beneath the sand. A brushy mixture of bayberry, poison ivy, spirea, blackberry, and woodbine surrounds the swamp. In the middle, speckled alder, black cherry, willow, and trembling aspens dominate. Salt spray has killed back the tops of many of the alder bushes, but new growth is springing up from a large and well-established root system.



Poison Ivy

15 Watch for ruffled-up depressions in the sand which may contain a few feathers. The feathers are often from the ring-necked pheasant which took a dust bath to clean its feathers and rid its body of parasites.

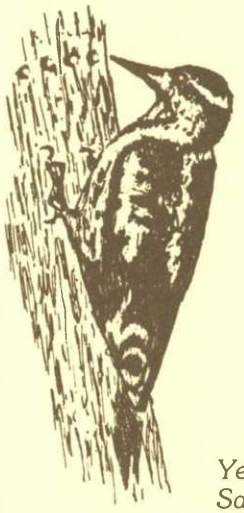
16 Bayberry has adapted to the dry environment of the dunes by developing waxy leaves. The leaf coating prevents the plant from losing too much moisture to the air. The fragrant berries are the source of the scent for bayberry candles. Birds, particularly yellow-rumped warblers and tree swallows, may be seen feeding on the berries during the summer months.

Bayberry

17 The Massachusetts Audubon Society helped prepare this memorial to Ludlow Griscom, an ornithologist who first reported the variety of bird life found on Plum Island. The stone is of glacial origin and was moved to this location in 1965 to commemorate Griscom's efforts to preserve the area.

18 The dominant plants in this swamp are serviceberry, arrow wood, speckled alder, blueberry, and winter berry. The majority of these plants provide natural food for birds and can be obtained from large nurseries for planting in your own yard. Wildlife can benefit from human-created habitats, whether on a national wildlife refuge or in your own backyard.

19 Look up to see the borings on the cedar tree in front of you. Yellow-bellied sapsuckers have chiseled into the tree to feed on the sap which flows just under the bark. Sapsuckers also eat insects, especially those attracted to the sweet sap.



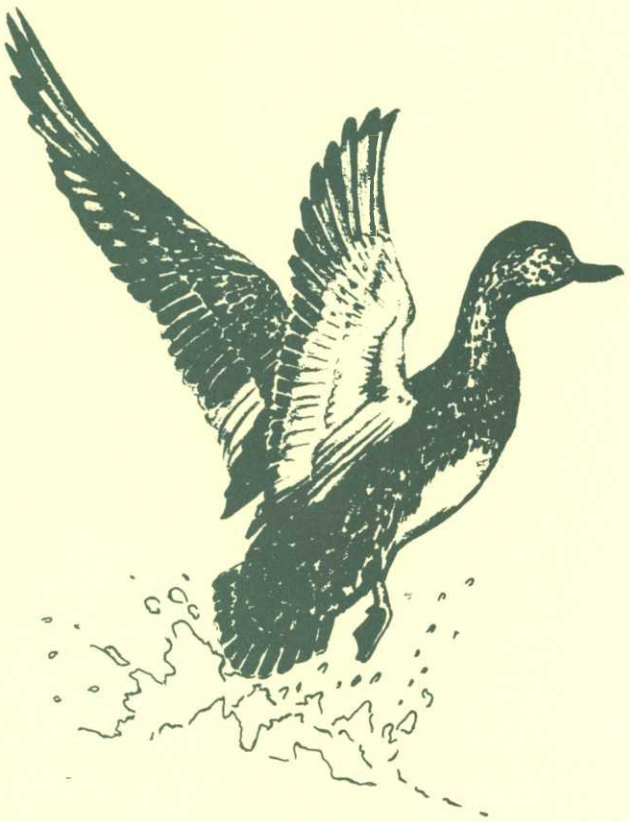
Yellow-bellied Sapsucker

20 Colorful flowers may be blooming along the road edge. Wild roses provide year-round color. In June, the fragrant roses bloom, and are later followed by red, pod-shaped fruits called "rose hips." Rose hips not only provide food for wildlife, but are also used by people in jellies and tea.

You have reached the end of the nature trail. You can return to the parking lot by crossing the Refuge road and following the boardwalk.

Birds of Parker River

National Wildlife Refuge



Massachusetts

Welcome to Parker River National Wildlife Refuge. The Refuge contains 4,662 acres of sandy beach and dunes, bogs, freshwater impoundments and tidal marshes.

The following list, which conforms to the Sixth American Ornithological Union's Checklist, contains 303 species that have been recorded on or seen from the Refuge during the past ten years. A separate list is included of 40 species that have been seen only three or four times in the past decade. This list was prepared in cooperation with the Massachusetts Audubon Society, the Brookline Bird Club, the Peabody Museum, and numerous knowledgeable local birders.

Bird activity on the Refuge is highlighted by shorebird migrations and flocks of swallows in late summer and large flocks of waterfowl in the fall and early spring.

Most birds are migratory. The peak migration periods at Parker River are usually March 1-June 7; and August 1-October 31. The birds' seasonal occurrence and relative abundance are coded as follows:

SEASON

s - Spring	March 21 - June 20
S - Summer	June 21 - September 20
F - Fall	September 21 - December 20
W - Winter	December 21 - March 20

† These species nest on the refuge

a - abundant	a species which is very numerous
c - common	certain to be seen or heard in suitable habitat
u - uncommon	present, but not certain to be seen
o - occasional	seen only a few times during a season
r - rare	seen at intervals of two to five years

		s	S	F	W
LOONS - GREBES					
____	Red-throated Loon	u		c	u
____	Arctic Loon				r
____	Common Loon	c	o	c	c
____	Pied-billed Grebe	u	u	u	
____	Horned Grebe	c		c	c
____	Red-necked Grebe	u		o	u
SHEARWATERS - CORMORANTS					
____	Northern Fulmar	o			o
____	Greater Shearwater	o	o	o	
____	Sooty Shearwater	o	o	o	
____	Manx Shearwater	o	o	o	
____	Wilson's Storm-Petrel	o	o	o	
____	Leach's Storm-Petrel			r	
____	Northern Gannet	u	r	u	u
____	Great Cormorant	o	r	o	u
____	Double-crested Cormorant	a	a	c	o
BITTERNS - HERONS - IBIS					
____	American Bittern	u	u	u	o
____	Least Bittern †	u	u	o	
____	Great Blue Heron	c	u	c	o
____	Great Egret	u	u	u	
____	Snowy Egret	c	c	c	
____	Little Blue Heron	o	u	u	
____	Tricolored Heron	o	o	o	
____	Cattle Egret	o	o	o	
____	Green-backed Heron †	c	c	u	
____	Black-crowned Night-Heron †	c	c	u	o
____	Yellow-crowned Night-Heron	o	u	o	
____	Glossy Ibis	u	u	o	
SWANS - GEESE - DUCKS					
____	Tundra Swan			r	
____	Mute Swan	u	u	u	o
____	Greater White-fronted Goose			r	
____	Snow Goose	u		u	r
____	Brant	u		u	o
____	Canada Goose †	a	a	a	c
____	Wood Duck †	u	u	o	
____	Green-winged Teal †	c	u	c	u
____	American Black Duck †	a	c	a	c
____	Mallard †	a	c	a	c
____	Northern Pintail †	u	u	c	u
____	Blue-winged Teal †	c	c	u	
____	Northern Shoveler †	u	u	u	r
____	Gadwall †	a	c	a	o
____	Eurasian Wigeon	r		r	
____	American Wigeon	u	o	c	o
____	Canvasback	r		r	r

		s	S	F	W
____	Redhead	r		r	r
____	Ring-necked Duck	o		o	r
____	Greater Scaup	u		u	u
____	Lesser Scaup	r		r	
____	Common Eider	c	o	u	c
____	King Eider	r	r	r	r
____	Harlequin Duck	r			r
____	Oldsquaw	c		u	c
____	Black Scoter	c	r	c	u
____	Surf Scoter	u	o	c	u
____	White-winged Scoter	c	o	c	c
____	Common Goldeneye	u		u	c
____	Barrow's Goldeneye	o			o
____	Bufflehead	u		c	c
____	Hooded Merganser	u	r	u	r
____	Common Merganser	r		r	r
____	Red-breasted Merganser	c	u	c	c
____	Ruddy Duck †	r	r	u	r
VULTURE - HAWKS - FALCONS					
____	Turkey Vulture	r		r	
____	Osprey	u	o	o	
____	Bald Eagle	r		r	r
____	Northern Harrier	c	u	c	c
____	Sharp-shinned Hawk	u		u	o
____	Cooper's Hawk	o		o	o
____	Northern Goshawk	o		o	o
____	Red-shouldered Hawk	r		r	
____	Broad-winged Hawk	r		r	
____	Red-tailed Hawk	o	o	o	o
____	Rough-legged Hawk	u		u	c
____	Golden Eagle	r		r	
____	American Kestrel †	c	c	c	u
____	Merlin	o		u	o
____	Peregrine Falcon	o		u	o
____	Gyrfalcon	r			r
GROUSE - PHEASANT					
____	Ring-necked Pheasant †	u	u	u	u
____	Ruffed Grouse	r	r	r	r
RAILS - COOT					
____	Yellow Rail			r	
____	Clapper Rail	o	o	o	
____	King Rail †	o	o	o	
____	Virginia Rail †	u	u	u	
____	Sora †	u	u	u	
____	Common Moorhen †	u	u	u	
____	American Coot	o	o	c	o
PLOVERS - SANDPIPERS					
____	Black-bellied Plover	c	a	c	o

	s	S	F	W
____ Lesser Golden-Plover	r	o	u	
____ Semipalmated Plover	c	c	u	
____ Piping Plover †	u	u	o	
____ Killdeer †	c	c	u	
____ American Oystercatcher	r			
____ American Avocet		r	r	
____ Greater Yellowlegs	c	c	c	r
____ Lesser Yellowlegs	c	c	c	r
____ Solitary Sandpiper	o	o	o	
____ Willet †	c	c	u	
____ Spotted Sandpiper †	u	u	u	
____ Upland Sandpiper	o	o	o	
____ Whimbrel	o	o	o	
____ Hudsonian Godwit		u	u	
____ Marbled Godwit		o	o	
____ Ruddy Turnstone	o	u	o	r
____ Red Knot	o	u	u	
____ Sanderling	c	c	c	u
____ Semipalmated Sandpiper	a	a	a	
____ Western Sandpiper		o	o	
____ Least Sandpiper	c	c	u	
____ White-rumped Sandpiper	u	u	u	
____ Baird's Sandpiper		o	o	
____ Pectoral Sandpiper	u	u	u	
____ Purple Sandpiper	o		o	o
____ Dunlin	c	u	a	o
____ Stilt Sandpiper	r	c	u	
____ Buff-breasted Sandpiper		o	o	
____ Ruff	o	o	o	
____ Short-billed Dowitcher	c	c	o	
____ Long-billed Dowitcher		o	u	
____ Common Snipe	o	o	u	
____ American Woodcock	u	u	u	
____ Wilson's Phalarope †	u	u	u	
____ Red-necked Phalarope	o		o	
____ Red Phalarope	r		r	

GULLS - TERNS - MURRES

____ Pomarine Jaeger		r	r	
____ Parasitic Jaeger		o	o	
____ Laughing Gull	o	o	o	
____ Little Gull	o	o	o	o
____ Common Black-headed Gull	o	o	o	o
____ Bonaparte's Gull	o	o	o	o
____ Ring-billed Gull	c	u	u	c
____ Herring Gull †	a	a	a	a
____ Iceland Gull	o			u
____ Glaucous Gull				o
____ Great Black-backed Gull	a	a	a	a

	s	S	F	W
____ Black-legged Kittiwake	o		o	o
____ Caspian Tern	o	o	o	
____ Royal Tern	o	o	o	
____ Roseate Tern	o	o		
____ Common Tern †	c	c	u	
____ Arctic Tern	r	r		
____ Forster's Tern		o	o	
____ Least Tern †	c	c	u	
____ Black Tern	o	o	o	
____ Black Skimmer	r	o	r	
____ Dovekie			o	o
____ Common Murre	r			r
____ Thick-billed Murre	o		o	o
____ Razorbill	o		o	o

DOVES - CUCKOOS - OWLS

____ Rock Dove	o	o	o	o
____ Mourning Dove †	c	c	c	u
____ Black-billed Cuckoo	u	o	o	
____ Yellow-billed Cuckoo	o	o	o	
____ Eastern Screech-Owl	o	o	o	o
____ Great Horned Owl †	o	o	o	o
____ Snowy Owl	o		u	u
____ Long-eared Owl	r		o	o
____ Short-eared Owl	o		u	u
____ Northern Saw-whet Owl	o		u	u
____ Common Nighthawk	o	u	r	
____ Whip-poor-will	r	r		
____ Chimney Swift	u	u	u	
____ Ruby-throated Hummingbird	u	o	o	
____ Belted Kingfisher †	u	u	u	o

WOODPECKERS - FLYCATCHERS

____ Red-headed Woodpecker	r		r	
____ Yellow-bellied Sapsucker	u	o	o	
____ Downy Woodpecker	u	o	u	o
____ Hairy Woodpecker	r	r	r	r
____ Northern Flicker	c	u	c	o
____ Olive-sided Flycatcher	u	o	o	
____ Eastern Wood-Pewee	u	u	o	
____ Yellow-bellied Flycatcher	u	o	o	
____ Acadian Flycatcher	r			
____ Alder Flycatcher	o	o	o	
____ Willow Flycatcher †	c	c	u	
____ Least Flycatcher	u	u	o	
____ Eastern Phoebe	u	u	u	
____ Great-crested Flycatcher	o	o	o	
____ Western Kingbird			r	
____ Eastern Kingbird †	c	c	u	

		s	S	F	W
LARK - SWALLOWS - JAY - CROW					
____	Horned Lark †	u	u	u	u
____	Purple Martin †	c	c	u	
____	Tree Swallow †	c	a	a	
____	Northern Rough-winged Swallow †	o	o	o	
____	Bank Swallow †	c	c	u	
____	Cliff Swallow †	u	u	u	
____	Barn Swallow †	c	c	c	
____	Blue Jay †	c	u	c	u
____	American Crow †	c	c	c	c
CHICKADEES - NUTHATCHES - WRENS					
____	Black-capped Chickadee †	u	c	c	u
____	Boreal Chickadee			r	r
____	Tufted Titmouse	r	r	r	r
____	Red-breasted Nuthatch	u	u	u	u
____	White-breasted Nuthatch	u	u	u	o
____	Brown Creeper	o	o	u	o
____	House Wren †	o	o	u	
____	Winter Wren	u	o	u	
____	Marsh Wren †	c	c	u	
KINGLETS - THRUSHES - THRASHER					
____	Golden-crowned Kinglet	u	o	c	
____	Ruby-crowned Kinglet	c	o	c	
____	Blue-gray Gnatcatcher	u	o	o	
____	Eastern Bluebird	r		r	
____	Veery †	u	u	u	
____	Gray-cheeked Thrush	o	o	o	
____	Swainson's Thrush	u	r	u	
____	Hermit Thrush	u		u	o
____	Wood Thrush	u	o	u	
____	American Robin †	c	u	c	o
____	Gray Catbird †	a	a	a	
____	Northern Mockingbird †	u	u	u	u
____	Brown Thrasher †	c	c	c	
WAXWING - SHRIKES - STARLING					
____	Water Pipit	u		u	
____	Cedar Waxwing †	u	u	u	
____	Northern Shrike	o		o	o
____	Loggerhead Shrike	r	r	r	
____	European Starling †	a	a	a	a
VIREOS - WARBLERS					
____	White-eyed Vireo	o	o	o	
____	Solitary Vireo	u		u	
____	Yellow-throated Vireo	o		o	
____	Warbling Vireo	r			
____	Philadelphia Vireo	o	o	u	
____	Red-eyed Vireo †	c	u	c	
____	Blue-winged Warbler	o		o	
____	Golden-winged Warbler	r		r	
____	Tennessee Warbler	u	o	u	
____	Orange-crowned Warbler	r		o	
____	Nashville Warbler	u	o	u	
____	Northern Parula	u	o	u	
____	Yellow Warbler †	a	a	u	
____	Chestnut-sided Warbler	u	o	o	
____	Magnolia Warbler	u	o	u	
____	Cape May Warbler	o	u	u	
____	Black-throated Blue Warbler	u	o	u	
____	Yellow-rumped Warbler	a	o	a	u
____	Black-throated Green Warbler	u	o	u	
____	Blackburnian Warbler	u	o	u	
____	Yellow-throated Warbler	r	r	r	
____	Pine Warbler	o	o	o	o
____	Prairie Warbler	u	o	u	
____	Palm Warbler	u		c	o
____	Bay-breasted Warbler	u	o	u	
____	Blackpoll Warbler	c	o	a	
____	Cerulean Warbler	r			
____	Black-and-white Warbler	c	o	c	
____	American Redstart †	c	u	c	
____	Prothonotary Warbler	r			
____	Worm-eating Warbler	o		o	
____	Ovenbird	u	o	u	
____	Northern Waterthrush	u	o	u	
____	Kentucky Warbler	r			
____	Connecticut Warbler		o	o	
____	Mourning Warbler	u		u	
____	Common Yellowthroat †	c	c	c	
____	Hooded Warbler	o	o	o	
____	Wilson's Warbler	u	o	u	
____	Canada Warbler	u	o	u	
____	Yellow-breasted Chat	o	o	o	
TANAGERS - SPARROWS					
____	Summer Tanager	r			
____	Scarlet Tanager	u	o	u	
____	Northern Cardinal †	u	u	u	u
____	Rose-breasted Grosbeak	u	o	u	
____	Blue Grosbeak	o	o	o	
____	Indigo Bunting	o	o	o	
____	Dickcissel	o		o	
____	Rufous-sided Towhee †	c	c	c	o
____	American Tree Sparrow	u		u	c
____	Chipping Sparrow	u	u	u	
____	Clay-colored Sparrow			o	o
____	Field Sparrow	o	o	o	
____	Vesper Sparrow †	o	o	o	
____	Lark Sparrow			o	o
____	Lark Bunting				r
____	Savannah Sparrow †	c	c	c	o
____	Sharp-tailed Sparrow †	c	c	c	
____	Seaside Sparrow †	o	o	o	o
____	Fox Sparrow	u		u	o
____	Song Sparrow †	a	a	a	u
____	Lincoln's Sparrow	o	o	o	
____	Swamp Sparrow †	c	c	u	o
____	White-throated Sparrow	a	o	a	u
____	White-crowned Sparrow	u	o	u	
____	Dark-eyed Junco	c	o	c	c
____	Lapland Longspur	u	o	c	u
____	Snow Bunting	u	o	c	u
BLACKBIRDS - FINCHES					
____	Bobolink †	c	c	u	
____	Red-winged Blackbird †	a	a	a	o
____	Eastern Meadowlark †	u	u	u	o
____	Yellow-headed Blackbird	r	r	r	
____	Rusty Blackbird	o		o	
____	Common Grackle †	c	c	c	o
____	Brown-headed Cowbird †	u	u	c	
____	Orchard Oriole	r			
____	Northern Oriole	u	o	u	
____	Pine Grosbeak			o	o
____	Purple Finch †	c	c	u	u
____	House Finch †	c	c	c	u
____	Red Crossbill	o	o	o	u
____	White-winged Crossbill	o	o	o	u
____	Common Redpoll	o			u
____	Pine Siskin	o		u	u
____	American Goldfinch †	c	c	c	u
____	Evening Grosbeak	r		r	r
____	House Sparrow †	u	c	u	u

NOTES

Location _____

Date _____ Total _____

Observers _____

Weather _____ Wind _____

Time _____

_____

These additional 40 species have been recorded no more than three or four times in the last ten years.

Eared Grebe
Western Grebe
Cory's Shearwater
American White Pelican
White Ibis
Fulvous Whistling Duck
Garganey
Black Rail
Sandhill Crane
Wilson's Plover
Black-necked Stilt
Spotted Redshank
Bar-tailed Godwit
Long-tailed Jaeger
Franklin's Gull
Thayer's Gull
Ross' Gull
Sabine's Gull
Ivory Gull
Gull-billed Tern
Sooty Tern
Black Guillemot
Atlantic Puffin
Common Barn Owl
Chuck-will's-widow
Black-backed Woodpecker
Say's Phoebe
Scissor-tailed Flycatcher
Fork-tailed Flycatcher
Common Raven
Carolina Wren
Sedge Wren
Sage Thrasher
Bohemian Waxwing
Black-throated Gray Warbler
Western Tanager
Black-headed Grosbeak
Grasshopper Sparrow
Henslow's Sparrow
LeConte's Sparrow

Please report any unusual sightings to:

Refuge Manager
Parker River National Wildlife Refuge
Northern Boulevard, Plum Island
Newburyport, MA 01950
Telephone (508) 465-5753

Take Pride in Parker River National Wildlife Refuge

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

RL-53550-2 October 1989

HOW TO PREVENT LYME DISEASE

Lyme disease can be prevented by knowing what it is, where and how it can be contracted, and by taking simple, common sense precautionary measures.

Avoid deer tick habitats

Lyme disease is spread by deer ticks, which infest deer and white-footed mice. The best way to avoid the disease is to avoid wooded and high-grass areas in regions where Lyme disease-carrying ticks are known to live. In Massachusetts, potential habitats and places where Lyme disease has occured are located in the eastern portion of the state, north and south of Boston.

If you enter a these areas, wear protective clothing - a tucked-in shirt with snug collar and cuffs, long pants tucked into socks, and boots. Insect repellants containing DEET may be helpful.

Check yourself and your children for the presence of ticks after returning from areas which may be tick-infested. The ticks are the size of a pinhead. If they are removed from your body within 24 hours, the disease agent is usually not transmitted. A tick can be removed with tweezers applied to where the mouth enters the skin.

Lyme disease can harm a fetus if contracted during early pregnancy. Pregnant women should exercise special caution in areas of potential risk.

Massachusetts Forests and Parks

The Department of Environmental Management (DEM) has an ongoing surveillance program to identify areas where the risk of Lyme disease is high. In the areas of highest risk, DEM is taking steps to reduce the possibility that park visitors will encounter infected deer ticks. Even in regions where deer ticks are found, the risk of contracting Lyme disease is low in the cleared campsites and at the beaches.

(over)

Dept. of Environmental Management
Division of Forests and Parks
100 Cambridge Street
Boston, MA 02202

Early Detection

If detected early, Lyme disease can be treated effectively with antibiotics. Normally the first symptom is an expanding red rash, usually originating at the site of the bite. This can occur from within two days to about a month after the bite. Other early symptoms include flu-like illness such as fever, headache, stiff neck, sore and aching muscles and joints, fatigue, sore throat and swollen glands. Hives, redness of the cheeks under the eyes, and/or swelling of the eyelids with reddening of the whites of the eyes may also occur.

Unfortunately, these symptoms do not occur in all cases of Lyme disease, so discuss with your doctor any unusual ailments contracted during the summer.

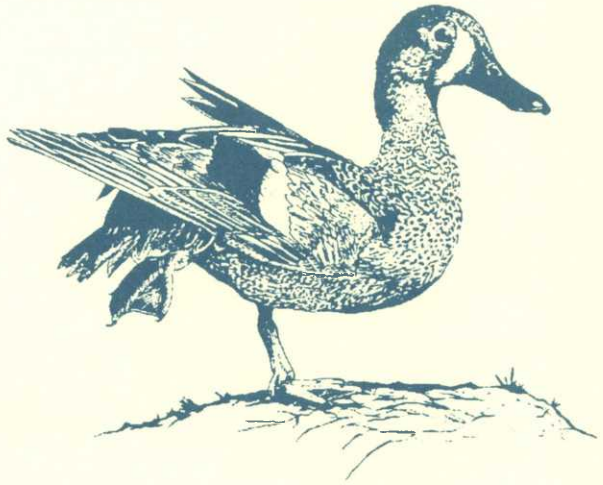
Symptoms of Lyme disease which may occur months or even years after an initial infection are arthritis, heart problems and neurological problems. Children are less likely to exhibit the early symptoms and more likely to have secondary symptoms. Successful treatment at these later stages may be possible, but is more difficult.

DEM wants your experience at our forests and parks to be positive. By taking common sense steps, it is unlikely that you will be affected by Lyme disease.

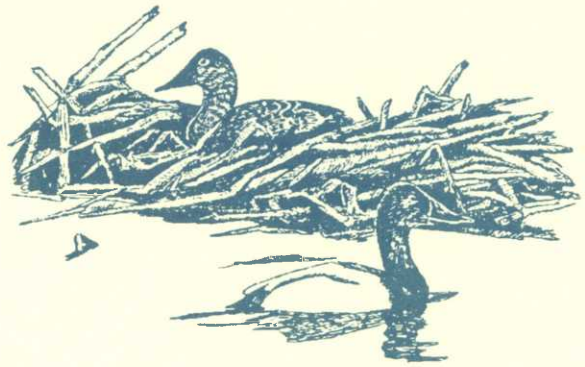
For further information about Lyme disease, call the Massachusetts Department of Public Health, State Laboratory Institute (617) 727-2686.

The
North American Waterfowl Management Plan:
Waterfowl for the Future

Waterfowl are a precious natural resource, important to hunters, birdwatchers and naturalists. But numbers of some of our most popular duck species are at an all-time low. Millions of acres of wetlands have already been destroyed by agriculture, urban development and industry and more are threatened each year. ***Waterfowl need help.***



What's being done? The United States and Canada have joined forces to reverse the decline in certain populations of ducks and geese. In 1986, U.S. and Canadian officials signed a far-reaching document: the **North American Waterfowl Management Plan**. Today, that historic agreement has become an innovative international partnership in wildlife conservation. The Plan has inspired cooperation between Federal, Provincial and State governments as well as private conservation agencies in the two countries.



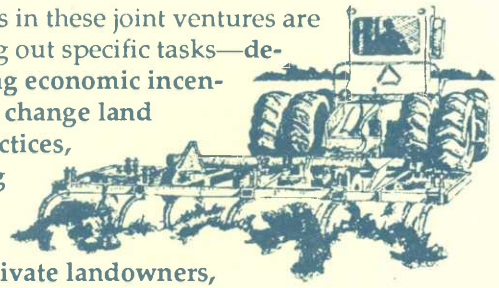
Work has already begun. The Plan has established headquarters in both the U.S. and Canada. At the grassroots level, partners have formed **"joint ventures,"** composed of representatives from public and private organizations.

In the U.S., six priority joint ventures are underway:

- ***Atlantic Coast**
- ***Central Valley**
- ***Gulf Coast**
- ***Lower Great Lakes-St. Lawrence Basin**
- ***Lower Mississippi Valley**
- ***Prairie Pothole**

In Canada, there are four joint ventures:

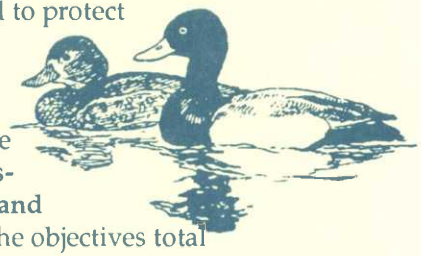
- ***Arctic Geese**
- ***Black Duck**
- ***Prairie Habitat**
- ***Eastern Habitat**



Partners in these joint ventures are carrying out specific tasks—**developing economic incentives to change land use practices, striking agreements with private landowners, improving water management, and sponsoring research studies**. Land acquisition is only one facet of the joint venture initiatives.

The Plan, with its 15-year horizon to 2000, **establishes specific objectives to restore duck populations to the levels of the 1970's**. It aims for breeding populations of 62 million that should produce a fall flight of 100 million birds. Attaining these objectives would mean that 2.2 million hunters could harvest about 20 million ducks annually. **The Plan also lists population objectives for geese and swans.**

Habitat management objectives are equally ambitious. **The Plan targets critical waterfowl breeding, staging and wintering areas in both countries.** In the **Prairie Pothole Region**, cooperators intend to protect and improve 1.1 million acres of habitat. In the **Lower Mississippi Valley and Gulf Coast**, the objectives total 686,000 acres. **California's Central Valley** has an objective of 80,000 acres. Along the **Atlantic Coast**, 50,000 acres will be protected and improved. In the **Lower Great Lakes-St. Lawrence Basin**, more than 10,000 acres have been identified.

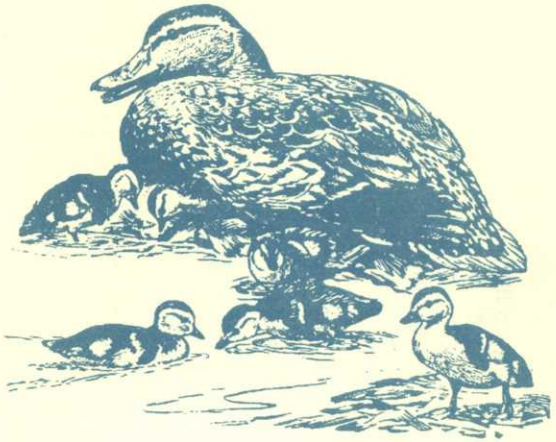


In Canada, the objective is to protect and improve 3.6 million acres in the **Prairie Provinces**, 60,000 acres in the **Lower Great Lakes-St. Lawrence Basin** and 10,000 acres in the **Atlantic Coast.**

Although the Plan focuses on waterfowl, other species will benefit too. Waterfowl habitat offers shelter for a variety of other water birds, shorebirds, songbirds, small mammals and resident game species. Wetland communities also produce invertebrates and plants that are important foods for fish and wildlife. These ecosystems act as pollution filters, floodwater stores, and erosion controls.

The price tag on this unprecedented habitat protection and enhancement program is an estimated $1.5 billion. Federal and State governments will need help securing this sum and are looking to the private sector for support. The Plan calls for $1 billion to be spent in Canada, 75% of which is scheduled to come from U.S. sources.

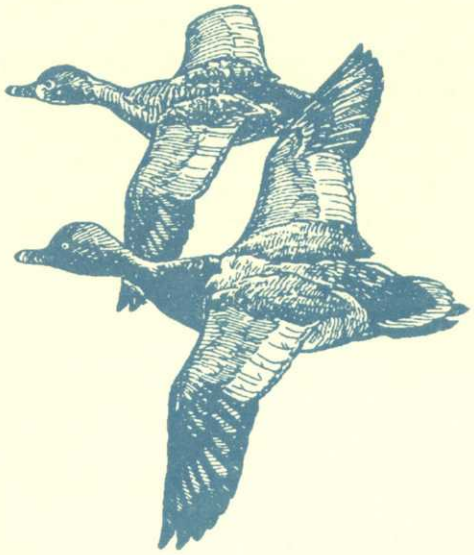
So far, the North American Waterfowl Management Plan has involved Canada and the U.S., but both countries are pursuing a working agreement with Mexico.



If you would like more details about the Plan or want to know how you can help, please write to:

U.S. Fish and Wildlife Service
Federal Bldg., Fort Snelling
Twin Cities, MN 55111

The
North American Waterfowl Management Plan

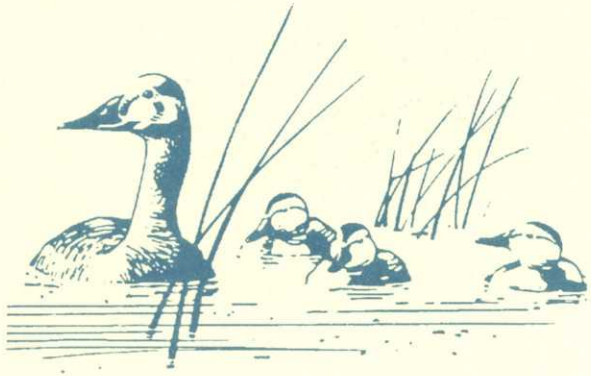


U.S. DEPARTMENT OF THE INTERIOR · MARCH 3, 1849

U.S. FISH & WILDLIFE SERVICE

The
North American Waterfowl Management Plan:
Waterfowl for the Future

A look at an innovative international partnership to save waterfowl.



CAUTION

Feeding Waterfowl May be Harmful!

Regular feeding can cause:

- ☐ Dependency on people for food
- ☐ Bird/People conflicts
- ☐ Spread of Disease
- ☑ All of the above

Over the centuries waterfowl have developed patterns of seeking out and feeding on highly nutritious marsh and grassland plants. These preservation patterns are passed on to each succeeding generation. Survival of waterfowl ultimately depends upon their ability to make use of food and habitat sufficient to maintain healthy populations.

In northern regions of the United States the extreme cold and blanketing snow of the fall and winter months severely reduce the quality and quantity of marsh and grassland plants. Thus, each year most waterfowl, like many other birds, migrate tremendous distances south in search of food and habitat to carry them through the winter months. In the spring they again migrate, this time returning to their northern breeding grounds.

Not all waterfowl, however, complete the entire migrational cycle. Many are sidetracked when they stop to feed and rest in the lakes and marshes found in urban environments. There they are observed by city dwellers who enjoy the beauty of these magnificent wild birds. And there they are fed by people who unknowingly are enticing the birds into delaying their migration and often into becoming permanent residents.

Many urban environments can provide sufficient space and food for *small* populations of waterfowl. However, as thousands of waterfowl concentrate in areas because handouts are non-threatening and easily attainable, the once *wild* birds can soon

The human future depends on our ability to combine the knowledge of science with the wisdom of wildness.

CHARLES LINDBERGH

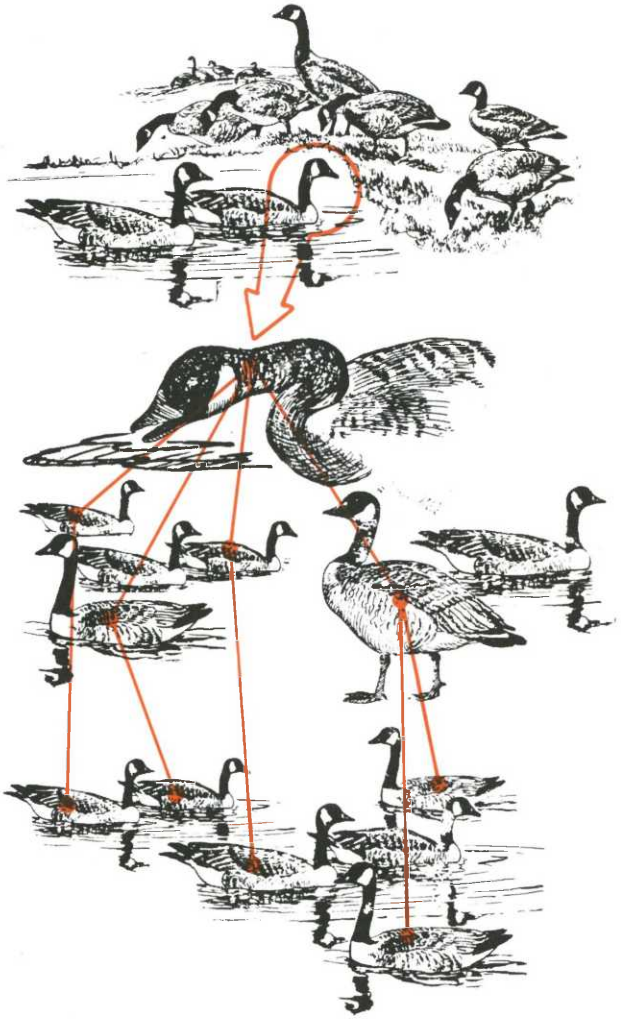
become tame, lose their fear of most things people-related and pick up habits that conflict with the human population and the bird's patterns of migration. Lack of fear of cars or planes can cause traffic problems as birds casually stroll or sit in the middle of roadways or fly across airport runways. Of increasing public concern is the damage waterfowl cause to parks, golf courses and residential lawns where large numbers of birds

graze, trample and defecate on the grass. Excess nutrients in ponds, caused by waterfowl droppings, may also result in water quality problems such as noxious algal blooms in the summertime.

Food handouts often result in large numbers of birds competing for very limited food supplies in small concentrated areas. Such crowding and competition for food combined with the stresses of less nutritious food and harsh weather increases their susceptibility to life threatening diseases like avian cholera, duck plague and avian botulism. These diseases have the potential to kill off large numbers of waterfowl.

The end result of this seemingly kind and generous act of feeding waterfowl can be a continuing cycle of the birds becoming nuisances and being subjected to diseases that can spread like man spreads the common cold.

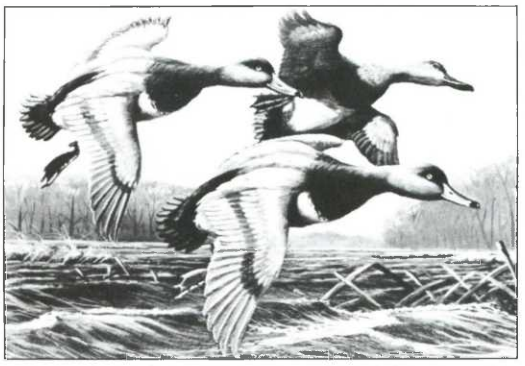
An infected bird may spread the disease to many other birds by infecting the water supply. When the birds are scattered over a large area this does not pose a serious problem. However, when the birds are bunched close together their chances of contracting disease increase and the result may be disastrous.



Transmission of disease through a concentration of geese

If you care for waterfowl, here's what you can do to help them retain their "wildness" and maintain their well-being . . .

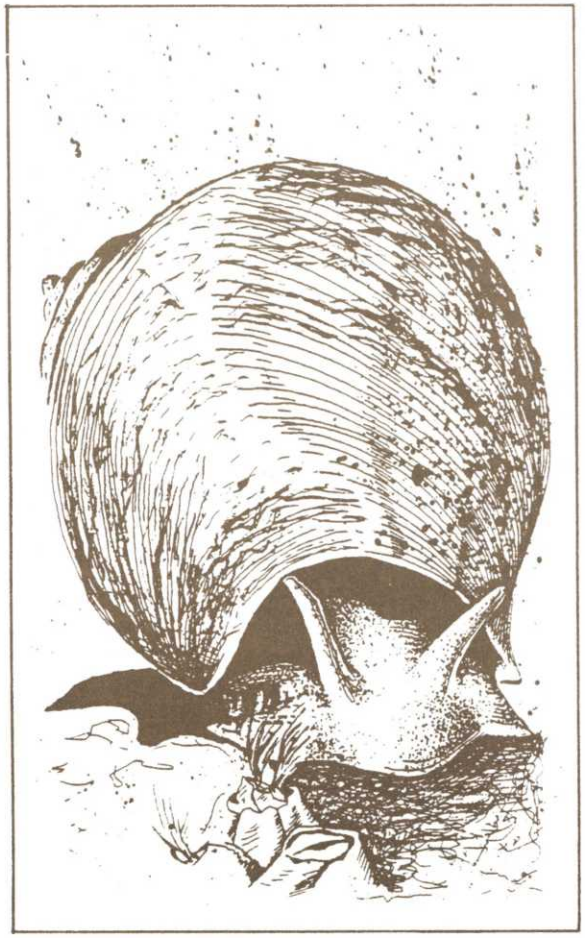
- Stop feeding them! They don't understand the problem . . . You do.
- Purchase a Federal Duck Stamp at most post offices, State Department of Natural Resources Offices or National Wildlife Refuges. *ALL* proceeds from the sale of these stamps are used to purchase wetlands which provide natural habitat for our nation's waterfowl.
- Learn more about waterfowl by visiting a library, nature center, museum, state wildlife management area or National Wildlife Refuge . . . then teach others what you know.
- Preserve the spirit of America by allowing waterfowl to stay wild . . . observe and appreciate them from a distance.



Painting by Arthur G. Anderson selected for use on the 1987 Migratory Bird Hunting and Conservation Stamp.

TAKE PRIDE IN AMERICA

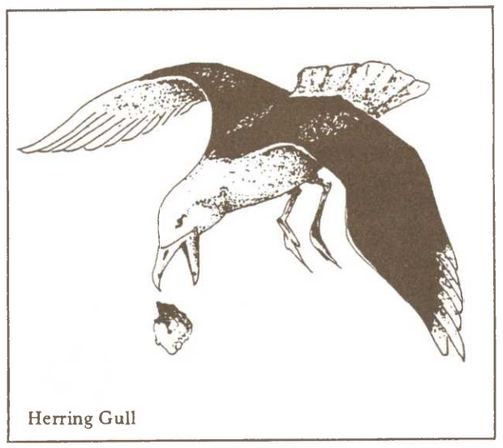
Plum Island: Treasures of Tide Pool Life



CONDITIONS IN TIDE POOLS

The rocks that are in the inter-tidal zone have been colonized by a host of marine organisms. Attached to boulders, under rocks and in the tide pools are animals and plants well adapted for surviving in this zone that is claimed by both the land and the sea.

As you look under rocks and search the tide pools for life, keep in mind the unusual stresses placed upon anything living in this environment. Here are a few things to think of.



Herring Gull

TIDES

Low tide leaves animals that breathe and feed under water exposed to the air for several hours each day. About six hours elapse between high and low tide on Plum Island.

PREDATORS

While exposed to the air, animals here are also vulnerable to predators such as gulls, and terns.

WAVES

When a wave reaches shallow water it will trip and break, releasing its energy. The power of a breaking wave can be enormous and poses a threat to all living here.

SALT

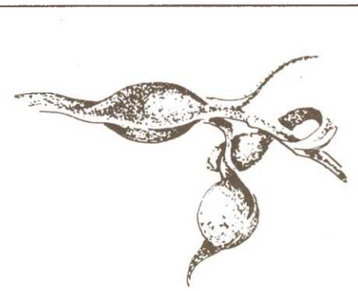
All life found in the inter-tidal zone is accustomed to salt water, but evaporation from the tide pools increases the salinity of the water. The pools can also be diluted by rainstorms occurring at low tide.

TEMPERATURE

In the summer, the air temperature can easily be 20 degrees (Farenheit) warmer than the sea water. Low tide exposes the organisms here to these temperature variations.

ADAPTIONS TO TIDE POOL LIFE

The inhabitants of tide pools have special adaptations which help them survive these extreme conditions. Look for these examples as you explore the tide pools of Plum Island.



Air Bladder

AIR BLADDERS

Some algae use air-filled sacs to suspend themselves near the surface during high tide. This helps them capture the sunlight they need to photosynthesize food.

TOUGH LEAVES

The abrasion caused by sand particles suspended in the turbulent water could shred soft leaves.

HOLDFASTS

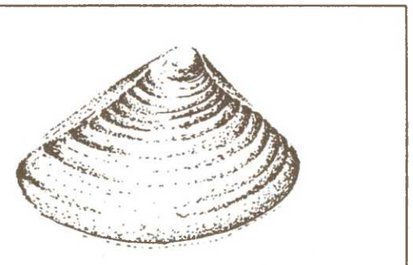
The roots on land-dwelling plants provide access to water and minerals in the soil, and give the plant stability. Plants living in a tide pool get plenty of water, and the minerals they need are dissolved in the sea water. Typical roots could not penetrate the rocks, or provide stability in the shifting sands. Tide pool plants have "holdfasts" instead of roots because holdfasts are better suited to the conditions here.

CAMOUFLAGE AND HIDING

Many tide pool animals find moisture and protection under seaweed during low tide. The coloration of some organisms makes them hard to see.

STICKING TO ROCKS

Several of the invertebrate forms living on rocky shores fasten themselves to rocks to keep from being washed away.



Soft shelled Clam

SHELLS

Most of the animals you will find in tide pools are invertebrates, which means they have no internal skeleton. Instead, they have a shell, or exoskeleton, which protects them from predators and from the motion of waves. Invertebrates stay inside their shell during low tide so their soft, moist bodies won't dry out.

GUIDE FOR IDENTICATION

The following drawings and descriptions will help you identify and understand the life that has adapted to the conditions on a rocky beach. Which methods for survival does each depend on? Please do not collect plants and animals from the tide pools; life is best observed and most beautiful when it is in its natural habitat. Have a fine day and be careful, the rocks can be slippery.

SEA LETTUCE *(Ulva lactuca)*

Sea lettuce is a bright green algae. This marine plant is edible and is most often seen near or below the low tide mark. Notice that it has no veins as do land plants. Can you think why this might be?

KELP *(Laminaria saccharina)*

Kelp is a brown algae that has a single, long, rubbery blade. The blade is unbranched,tapered at one end and has many ruffles along its edge. The holdfast is a long rubbery tube that can attach to rocks, clams, etc. Algin, a gummy substance found in kelp's cell walls, is used in many prepared foods, like jello; and in beer where it stabilizes the foam by making the bubbles more durable.

ROCKWEED *(Fucus vesiculosus)*

This is an olive brown algae with air bubbles within the upper blades. The air sacs keep it suspended during high tide. At low tide, the hanging rockweed protects animals from the sun and predators.

IRISH MOSS *(Chondrus crispus)*

Irish moss is a red-purple algae, that bleaches white when it has been tossed upon the shore. Irish moss is a source of carrageen, a texturizer used in many foods including ice cream.

COMMON PERIWINKLE *(Littorina littorea)*

The shell of the common periwinkle is small with gray brown rings. To feed, periwinkles scrape algae off rocks with their file-like tongues. These snails have two touch-sensitive antennae and two light-sensitive eyes. *See cover

MOON SNAILS *(Lunatia heros)*

The moon snail is reconized by its large, white, spiraled shell. It is a predator and clams are its major food source. The snail engulfs a clam and uses its sharp tongue, or radula to drill a hole through the clam shell. Then the snail slowly sucks the clam out of its shell through this tiny hole. Have you seen any shells with a moon snail hole?

BARNACLE *(Balanus balanoides)*

Barnacles live in small white cone-shaped shells attached to rocks, pilings, and even whales! When the tide comes in, a barnacle feeds by extending its six pairs of legs and kicking small bits of floating food into its mouth. Barnacles close their shells during low tide to avoid drying out.

HERMIT CRAB *(Pagurus)*

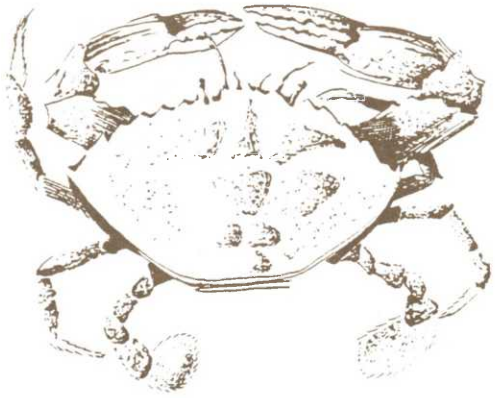
The hermit crab lives in shells abandoned by other animals. Its back legs are modified to hold the crab in its borrowed shell. The shell serves as protection and is discarded for a larger one as the crab grows.

GREEN CRAB *(Carcinus maenus)*

There are many green crabs among the rocks here, but they are rarely seen during the day. They are scavengers and feed at night on anything they can, seeking protection from hungry gulls by hiding under rocks. A crab sheds its hard exoskeleton as its soft body grows. A new skeleton replaces the old one. A leg lost in a fight can be regenerated during this regrowth period.

SEA STAR *(Asterias vulgaris)*

The sea star is easily reconized by its five arms. Small sucker-like feet line the bottom of each arm. Sea stars are predators and can pull clam shells open with their arms and feet. The sea star pushes its stomach into the opened shell, digests the clam, then draws its stomach back out again. There is little edible material in an adult sea star, so it has few natural enemies.



Green Crab

SEA URCHIN *(Strongylocentrotus drobachiensis)*

The green sea urchin is cousin of the sea star and has a shell, or test, covered with sharp spines to protect its soft body. Sea urchins feed on algae which they scrape off rocks with a small beak-like mouth. Using the spines like stilts sea urchins can walk in search of food.

Kelp

Programs are administered by:
Department of Environmental Management
Division of Forests and Parks
Office of Interpretive Services
100 Cambridge Street
Boston, Massachusetts 02202
(617)-727-3180

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
PARKER RIVER NATIONAL WILDLIFE REFUGE
Northern Boulevard, Plum Island
Newburyport, Massachusetts 01950

Welcome to the Parker River National Wildlife Refuge. This 4,662-acre refuge provides nesting, migrating and wintering habitat for 303 species of ducks, geese, songbirds, shorebirds, and others. The U.S. Fish and Wildlife Service manages National Wildlife Refuges for the benefit of wildlife and also provides visitors with a variety of wildlife-oriented recreational opportunities that are compatible with wildlife management activities.

To help defray the cost of management, Congress passed the Emergency Wetlands Resources Act of 1986. This law authorized the U.S. Fish and Wildlife Service to charge entrance fees at National Wildlife Refuges such as Parker River. Fees collected will also serve to help purchase and preserve wetlands throughout the United States.

Fees will be collected as you enter the refuge. You can also purchase annual passes at the gate or at the Refuge Headquarters. The daily fee, or any of the annual passes, admits the holder and accompanying passengers in a private vehicle; or the holder and family (spouse, children, and/or parents) if on foot or bicycle. Children under 16 are admitted free. The following guide explains the fee options.

Fee Option	Cost	Available to	Allows Entry to	Good For
Duck Stamp	$ 12.50	Anyone 16-61 years of age	National Wildlife Refuge Fee Areas	One Year (7/1-6/30)
Golden Age	Free	Anyone 62 years of age or over	All Federal Fee Collection Areas	Lifetime
Golden Access	Free	Anyone who is blind or permanently disabled	" " "	Lifetime
Golden Eagle	$25.00	Anyone 16-61 years of age	" " "	One Year (1/1 - 12/31)
Daily Fee	$ 5.00 per private vehicle or $1.00 per person or family on foot/bike	Anyone 16-61 years of age	Parker River National Wildlife Refuge	One Day

If you have any questions about this new program, you may contact the refuge office at the address shown above, or call: (617) 465-5753.

Enjoy your visit.