JULIA BUTLER HANSEN REFUGE FOR THE COLUMBIAN WHITE-TAILED DEER

Cathlamet, Washington

(Lewis and Clark N.W.R.)

ANNUAL NARRATIVE REPORT

Calendar Year 1989

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

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REVIEW AND APPROVALS

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James A. Hidy — Refuge Manager — 5/29/90 — Date

Leonard R. Wilson — Associate Manager, ID/OR/WA — 6/26/90 — Date

John H. Doebel — ARD-Refuges and Wildlife — 7/3/90 — Date

#1-One of the larger Columbian white-tailed deer bucks in velvet. 89-RTV

INTRODUCTION

The Julia Butler Hansen Refuge for the Columbian White-tailed Deer (formerly the Columbian White-Tailed Deer National Wildlife Refuge), is located near Cathlamet, in southwestern Washington. Refuge lands include Tenasillahe Island, Price and Hunting Islands, and the refuge mainland. The refuge mainland lies in south central Wahkiakum County at about 10 feet in elevation along the north bank of the Columbia River. Tenasillahe Island is a diked island of the Columbia River lying in Clatsop County, Oregon.

This refuge, along with Lewis and Clark NWR, is managed as a satellite of Willapa National Wildlife Refuge.

The refuge is part of the Columbia River flood plain, and was subject to tidal influences before the area was diked early in this century. Drainage of the refuge is controlled by a 60 HP pump, tidegates and drainage ditches. The area is characterized by poorly drained river bottom renovated pastures separated by woodlots, sloughs and drainage ditches. The native vegetation of the area is classified as tideland spruce community.

Topography is flat with hills on the boundary rising abruptly from refuge bottom lands. Sloughs drain the interiors of the islands and the mainland, which is bounded on the southeast by the Elochoman River, on the southwest by the Columbia, and on the northwest by Brooks Slough.

Columbian White-Tailed Deer NWR was established in 1972 to preserve essential habitat for the propagation and protection of the endangered Columbian white-tailed deer, indigenous to this river bottom habitat. Refuge objectives are to:

1. Maintain, protect and improve existing habitat for Columbian white-tailed deer.
2. Provide habitat and protection for migratory bird populations consistent with Columbian white-tailed deer habitat requirements.
3. Provide suitable habitat for resident wildlife.
4. Provide an opportunity for public enjoyment of the wildlife consistent with wildlife needs.
5. Provide an area to conduct research for the enhancement of Columbian white-tailed deer and other wildlife.

The refuge consists of a total of 4,745 acres. Acreage by unit can be summarized as follows:

Hunting Island	748.53 acres
Price Island	57.83 acres
Tenasillahe Island	1,978.81 acres
Mainland	1,958.83 acres
TOTAL	4,744.70 ACRES

Acreages by land type as shown on the Land Type Inventory Form are:

Inland Fresh Meadow	350 acres
Coastal Open Fresh Water	200 acres
Grassland (Introduced)	2,650 acres
Non-Commercial Forest Lands	945 acres
Brush	600 acres

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A. HIGHLIGHTS

-- A draft proposal for downlisting the Columbian white-tailed deer (CWTD) from endangered to threatened was completed and submitted to the Regional Office. Section G.2.

-- Fifty Roosevelt elk were captured on the refuge and moved to three different locations in the County. Section G.8.

-- The Preliminary Project Proposal for acquisition of a third secure habitat for the CWTD was approved. Section C.1.

-- Maintenance Worker Al Halfmoon retired on August 1, after serving 16 years at this refuge. Section E.1.

B. CLIMATIC CONDITIONS

TABLE I

1989 Climatological Data

MONTH	PRECIP. (Inches)	SNOW (Inches)	TEMPERATURE (°F) Max.	Min.	Avg. High	Avg. Low
January	10.50	1.50	56	29	48	37
February	4.44	6.00	60	4	46	28
March	8.02		63	21	55	38
April	3.24		84	35	67	43
May	2.65		86	36	69	46
June	3.08		95	38	74	51
July	2.38		86	40	75	52
August	1.56		83	44	75	55
September	.56		90	39	78	48
October	3.43		76	30	64	45
November	12.49		61	32	55	42
December	4.95		58	27	49	37
TOTAL	57.30					

Overall, the winter was mild, followed by a wet spring and cool summer. Average precipitation is about 75 inches. We are located in a sharp rain gradient. A weather station in Skamokawa, three miles west of headquarters, has recorded a 27-year average of 100.5 inches. Going in the other direction, Longview, Washington, 25 miles east, averages about 45 inches.

One extremely cold weather event occurred in the first week of February. On February 2, the temperature fell to 4° F and strong east winds blew for the next 2 days. Temperatures remained below freezing until February 6. The duration of the freeze along with the winds caused three of the domestic water supply systems on the refuge to freeze, with some plumbing repairs required.

C. LAND ACQUISITION

1. Fee Title

The Preliminary Project Proposal (PPP) for acquiring CWTD habitat in the Westport, Oregon area was approved, after a survey for contaminants proved negative. The Service has started coordination with The Nature Conservancy toward acquiring lands here. Securing adequate habitat in this area will meet the remaining requirements of the Recovery Plan for removing the deer from the Endangered Species list. The PPP identified the Wallace Island Complex, Woodson Wetlands, Kerry Island, Peterson Point and the Westport Wetlands as areas for inclusion into the refuge.

2. Easement

Additional habitat security is a possibility in the Westport area through the purchase of a perpetual easement on the River Ranch (formerly Magruder Ranch). When originally approached with this concept by refuge staff in 1988, James River Corporation representatives were favorably inclined. This is expected to become part of the acquisition effort proposed in the PPP described in the previous section.

Associated with an easement on the River Ranch would be the development of a cooperative agreement with James River Corp. for management of their cottonwood plantation for benefits to resident deer. Such an agreement would not provide perpetual security, but would probably benefit deer over the next 15 years, at least. Furthermore, it may provide information on management techniques that could be applied to the thousands of acres of land being put into cottonwood along the lower Columbia River.

3. Other

One-hundred-fifty-five acres of land on the refuge mainland are leased from the Washington Department of Natural Resources for $4,800 per year (up from $200 per year when the refuge was first established). Efforts are continuing to have the Washington Department of Wildlife assume control of the parcel, thereby reducing refuge expenditures.

The 10-year memorandum of agreement between the Fish and Wildlife Service and Charles Emerick, a Puget Island dairy farmer, is currently in its seventh year. This agreement allows Mr. Emerick to graze 25 to

35 head of cattle on 20 acres of the Julia Butler Hansen Refuge for the Columbian White-tailed Deer, in exchange for habitat and deer protection on his 350-acre farm. If the population of deer on Mr. Emerick's farm exceeds 32 animals, the Service must translocate some of the deer. The Service essentially has an easement on the Emerick property preventing land development, parcel subdivision, and removal of brush and other cover important to the deer.

D. PLANNING

2. Management Plan

The Habitat Management Plan was modified to include a reliable means of tracking the condition class, species composition and trend on forage units. Plans are to finalize this document in 1990.

3. Public Participation

As a result of a general public meeting concerning corn damage from CWTD on Puget Island and several shootings of deer, a Coordinated Resource Management Planning (CRMP) committee representing all parties involved was organized in 1988 to resolve the problem. The committee included representatives from the U.S. Fish and Wildlife Service, Washington Department of Wildlife, Oregon Department of Fish and Game, Wahkiakum County Commissioners, Washington State University, County Extension Service, James River Corporation, Puget Island dairy farmers and local gardeners. Attempts were made to locate an advocacy group other than the Service to represent the welfare of CWTD. Local conservationists did not want to incur the wrath of some of their neighbors, and non-local groups could not get a representative to attend due to the distance.

#2-Congressional Aids Donna Levin and Mary Legry receiving a briefing on the downlisting proposal for the Columbian white-tailed deer, and depredation problem from Refuge Manager Jim Hidy and Associate Manager ID/OR/WA Sandy Wilbur. 89-RTV

Four meetings were held this year continuing the CRMP process. At the February 7 general CRMP meeting, reports on the studies conducted in 1988 quantifying crop damage and testing techniques for controlling deer depredations to corn were presented (See NR-1988). Also at this meeting, plans for proceeding with efforts to downlist the CWTD to threatened status were discussed, and revisions were made to the CRMP document.

On March 30, the refuge provided a demonstration of deer and goose hazing using a trained herding dog. Martha Jordan of Ardea Associates, Snohomish, Washington was contracted to conduct the demonstration. The deer hazing demonstration was conducted for personnel from Animal and Plant Health Inspection Service (APHIS) and Ridgefield NWR personnel, while being video taped for later showing to members of the CRMP

Committee. A live demonstration of goose hazing was later provided for the Committee and the Wahkiakum Eagle Newspaper. Even though the dog was trained specifically for herding and not hazing, it showed that this technique has potential as long as communication with the dog can be maintained.

On June 21, Jim Hidy met with a group of gardeners on Puget Island who were concerned about a rapid change in deer behavior due to James River Corporation's activities in the area. Since James River started using temporary fences and herding to protect cottonwood plantations established this year on the island, the deer have increased their impacts to gardens and ornamentals near houses in certain areas. The group was provided information on repellents, the CRMP process and ways to help the downlisting effort.

At the July 27 CRMP Meeting, our plans for preparing the "downlisting package", at the refuge level in order to expedite the process, was the primary topic. This proposal was received by the group with enthusiasm. Changes in deer behavior on Puget Island due to James River Corporation's fencing were also discussed.

In general, the CRMP process seems to be yielding good results. Over a 2-year period, we have gone from a position of being blamed for deer damage (and many of the economic problems of the County), to one of being generally supported in our effort to recover the deer. The foundation of this support has been communicating our goals and legal limitations to the public.

E. ADMINISTRATION

(2) (4) (1)

#3-Staff photo. 89-RTV

1. Personnel

1. Richard T. Vetter, Jr., Refuge Manager, GS-9, PFT

2. Alan C. Clark, Complex Wildlife Biologist, GS-11, PFT

3. Alphonse F. Halfmoon, Maintenance Worker, WG-8, PFT
(Not pictured - retired August 1, 1989)

4. Bruce Britton, Maintenance Worker, WG-8, PFT

TABLE II

FIVE-YEAR STAFFING COMPARISON (AT YEAR'S END)

YEAR	PERMANENT Full-Time	PERMANENT Part-Time	TEMPORARY	TOTAL FTE
FY 89	3			4
FY 88	4			4
FY 87	4			4
FY 86	4			4
FY 85	4			4

2. Youth Programs

#4-Part of the YCC Crew attempting to move cattle from one pasture to another. 89-RTV

A Youth Conservation Corps Crew was shared between the main office at the Willapa Refuge and this station. Twice a week six enrollees and a supervisor conducted work projects at the refuge. These included constructing and maintaining fence lines, herding cattle, organizing the shop and picking up litter. Bruce Britton organized the work projects and provided technical assistance. The following enrollees participated in the program:

Tracy M. Bighill
David F. Gollersrud
Stacy A. Katyryniuk
Kristin M. Kollmann
Tiffiny A. Nedry
Jennifer M. Smalley

4. Volunteer Program

Thirteen individuals volunteered time to assist with the elk capture this year. They were Dan Bolton, Polly Britton, Diane Clark, Larry Davis, Vern Davis, Clara de la Torre, Nick Divine, James Lee, Michael Nelson, Mary Pruitt, Kyle Smith, Joan Suther and Chuck Whittey.

5. Funding

A comparison of funding over the last five years for this refuge complex alone is complicated by the reorganization of the Lower Columbia River Refuge Complex in 1986. Table III attempts to compare base funding before and after the reorganization.

TABLE III
FIVE-YEAR BASE FUNDING SUMMARY

Willapa, Julia Butler Hansen, and Lewis and Clark NWRs

(Figures represent O&M base including YCC. Fire, Quarters, Resource Problem, and Large ARMMS funds are not included.)

1989	$ 361,700
1988	360,800
1987	386,400*
1986	331,429**
1985	372,600***

*Includes $34,400 in yearend add-ons
**Includes Endangered Species and Expense of Sales Funding
***This figure is a rough estimate of that part of the Lower Columbia River Complex Budget allocated to the three refuges.

Due to unanticipated expenditures associated with the Nestucca Oil Spill and the replacement of entry signs at JBH Refuge, this year's funding base of $349,700 was inadequate. An additional $12,000 was provided by the Regional Office to make up this shortfall. Resource Problem Projects funded this year were, visitor facilities for Willapa Headquarters ($35K), and Cordgrass Control ($15K). Separate fire funding in the amount of $3,800 was allocated to cover the cost of Willapa's Fire Protection Agreement with the Washington State Department of Natural Resources. Construction funds from a Regional Office Account in the amount of $5,800 were used to remove underground gasoline storage tanks. Proceeds from the sale of the Gehrig Launch in the amount of $8,900 were spent on equipment needed to put two smaller boats into service.

Station disbursements for Julia Butler Hansen and Lewis and Clark National Wildlife Refuges totalled $191,576.46.

6. Safety

Safety meetings were held periodically throughout the year and as the need arose for a particular topic relating to a planned project. Three reportable accidents required medical examinations. Two resulted from minor puncture wounds received by staff while handling frozen,

oiled birds. The third accident involved a fall from a ladder which resulted in a bruised shoulder. Examinations all revealed that injuries were minor and no time was lost from work.

#5-A new, larger wooden deck was added to the 80-ton barge to allow for safer loading and transportation of heavy equipment using steel tracks. 89-RTV

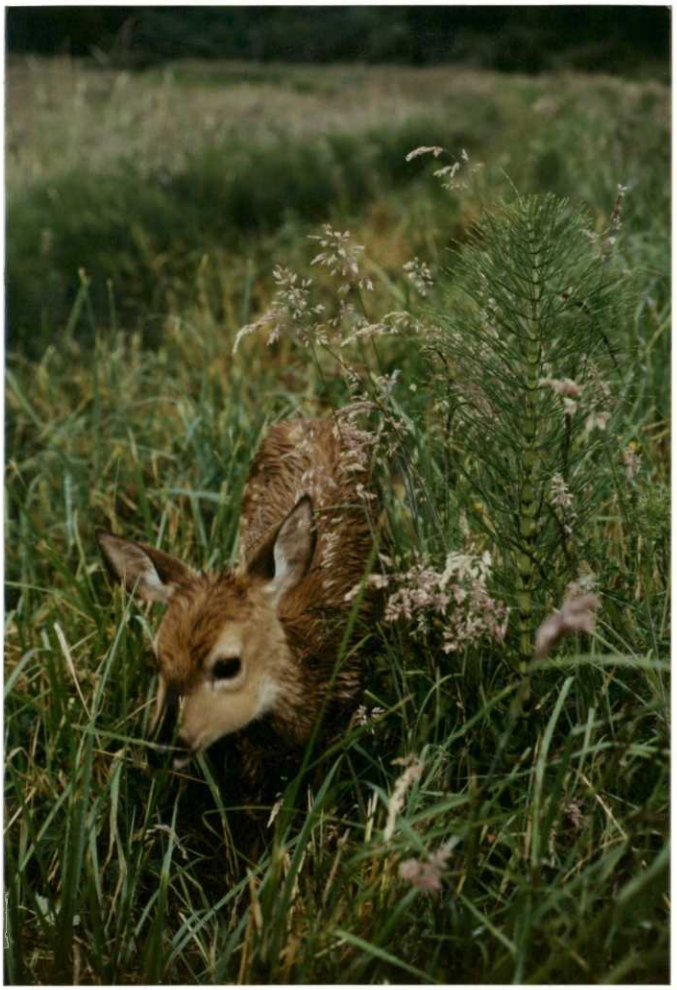
F. HABITAT MANAGEMENT

1. General

The primary objective of the refuge's management program is to provide a high-quality habitat for the Columbian white-tailed deer (CWTD). To assist in achieving this goal, the refuge has been divided into habitat units of two basic types, cover and food. The units are interspersed to provide a large amount of "edge" and ensure that feeding areas and cover areas are in close proximity so that deer may utilize the entire refuge. Distribution of deer on the refuge is correlated with areas containing woody cover adjacent to short grass/forb fields. The units are not mutually exclusive: cover units provide food, and food units contain cover.

A secondary refuge objective is to increase the numbers of wintering ducks and geese. Management practices for deer often contribute to the habitat requirements of waterfowl as well, and complement the refuge's role as an area of important winter habitat along the Pacific Flyway.

Cover units total approximately 2,517 acres. Hunting and Price Islands are also cover units. The desired vegetation for each cover unit is a mix of old fields, brush and woodlots (except for Hunting and Price Islands, which are forested and managed as natural areas). Woody vegetation should be dominant in about 60 to 75 percent of each unit to provide browse and all-season cover for CWTD. The unharvested, tall grass-cover fields are important as fawning cover. There is reason to believe the extremely dense growth of herbaceous vegetation in these fields is more effective in shielding fawns from predators than the typical understory vegetation in woodlots.



#6-A 1-day-old Columbian white-tailed deer fawn utilizing one of the grass-cover field units for protection from coyotes. 89-J.Suther

The cover unit objective is mixed woods and brush with an overstory of species such as red alder, black cottonwood, Sitka spruce, red cedar, cascara, big-leaf maple, and an abundant understory of shrubs such as creek dogwood, snowberry, vine maple, red elderberry, nine-bark, willow and salmonberry. Scattered openings in the overstory help maintain the understory and permit growth of other desirable species such as blackberry, thimbleberry, hawthorn, wildrose and various forbs and grasses.

Food units consist of 25 fields (1,611 acres) which are primarily managed to provide high quality forage in the form of grasses and forbs for deer and waterfowl. The most economical technique for maintaining fields in a grass-type habitat is through grazing and/or haying/green

chopping by cooperative farmers. These techniques maintain the forage in a short, vigorous growing stage that provides a nutritious, palatable crop for wildlife and cattle. Legumes, a preferred food, also have a better chance of competing with the taller grasses when the entire field is maintained in this manner.

2. Wetlands

Historically, the entire refuge was once a spruce swamp flooded twice daily by ocean tides backing up the Columbia River. Once all the old-growth trees were cut, a dike was constructed and the better sites were transformed to pastures and hayfields. Dikes and tidegates continue to control flooding during high tides and heavy winter rains. As the tide runs out, several tidegates allow water that naturally accumulated behind the dike and some that seeps through the dikes to drain into the Columbia River. The Refuge has about 130,000 lineal feet of ditch that borders fields and drains excess water into sloughs and eventually out the tidegates. During high tides and heavy rains in the winter, periodic flooding of grass fields does occur and provides excellent feeding areas for waterfowl.

5. Grasslands

Most of the grassland fields are actively managed by cooperative farmers and our refuge staff, with the remaining fields serving as cover for CWTD. The actively managed fields are assigned to 9 cooperators and are either grazed or cut for hay/silage, depending on the cooperator's farming operation. Approximately 985 acres were grazed and 214 acres hayed in 1989. In return, for the value of the forage removed, the cooperators spray weeds, mow pastures and apply fertilizer until the value of the forage removed balances with the habitat maintenance work performed. Under this arrangement, the fields are managed in a manner that provides high quality forage at an early palatable growth stage for deer and waterfowl. Habitat improvements by cooperators benefit both the refuge and cooperators.

#7-As part of the Cooperative Farming Program, local farmers harvest hay and silage in exchange for habitat improvements, such as fertilizing. 89-RTV

7. Grazing

Grazing is presently allowed from mid-April through mid-October at a maximum stocking rate of 6 AUMs/acre on both the Tenasillahe and Mainland Units. The mild climate and heavy rainfall in Southwestern Washington result in rapid, lush growth of forage. However, the nutritional value is low due to the rapid growth, and most local farmers fertilize their fields annually. Some of the pastures on the refuge are fertilized by cooperators as part of their farming agreements.

Currently, all pastures on the refuge are on a rest-rotation-grazing system utilizing two to three pastures. The results have been marginal since most cooperators move their cattle to suit their needs, or simply leave gates open on a regular basis. Overall, this type of grazing allowed the cattle to utilize the preferred plants without being forced to utilize undesirable species.

This year, two permittees participated in an intensive rest-rotation-grazing program utilizing portable electric fences to divide larger fields. Each field was surveyed with the permittee for the establishment of fence lines, water access, carrying capacity and the most critical item, firm grazing dates. This type of grazing requires more attention by the cooperator to moving cattle, and closer monitoring by the Refuge Manager, but should pay off over time with improved habitat and cattle forage. The pilot program was a success with a better utilization of all plants in the pasture. Several permittees are not interested in the program, but now that we have the endorsement of the local Cooperative Extension Service and Soil Conservation Service, the program will be expanded in 1990 to include the remaining pastures. The diagram below represents one of this year's successful grazing plans.

TABLE IV

1989 REST-ROTATION GRAZING PROGRAM
28 HEAD OF CATTLE

UNIT F31		UNIT F30 (BACK 1/2)		UNIT F30 (FRONT 1/2)	
30 ACRES		17 ACRES		15 ACRES	
Date	Days	Date	Days	Date	Days
5/1 - 5/22	22	5/22-6/4	12	6/5 -6/15	10
6/16- 7/8	22	7/9 -7/20	11	7/21-7/31	10
8/1 - 8/22	22	8/23-9/2	11	9/3 -9/13	10
9/13-10/5	22	10/6-10/5	5	10/2 -10/17	5
10/17-10/24	7				

The following photographs document the general procedure for obtaining quality forage for deer through intense rest-rotation-grazing.

#8-Pastures consisting primarily of reed canary grass obtain a height of 7 feet. They are generally grazed from April to October. 89-RTV

#9-The same pasture 30 days later, just as cattle are being rotated to adjacent fields in the grazing system. 89-RTV

#10-The final result 18 days after being grazed. The new growth at the 5" level provides a palatable and nutritious forage for deer. 89-RTV

#11-Vegetation plots which are being used to document the effect of intense rest-rotation-grazing systems on plant species composition and abundance. 89-RTV

#12-A fence line contrast demonstrating the effectiveness of intense rest-rotation-grazing on mature reed canary grass. The fence is a portable, single strand, 12-volt electric fence. 89-RTV

#13-Intense short duration grazing utilizes all the forage in the field except the largest bunches of tussock. 89-RTV

A summary of agricultural use and work performed under the Cooperative Farming Agreements/Special Use Permits is provided as follows.

TABLE V
1989 COOPERATORS

Name	Acres	Use	Work Performed
Jim Anderson	32	Graze	Mow/Fence Repair
Charles Emerick	22	Graze	Fertilize
Wallace Kaste	99	Graze	Spray/Mow
Herb Kehrli	111	Graze/Hay	Fertilize/Mow
Bill Oatfield	69	Graze	Mow/Fertilize
Bernard Schroder	390	Graze/Hay	Mow/Fertilize
Don Wages	694	Graze/GC/Hay	Mow/Fertilize/Fence Repair
Jerry Ledtke	51	Graze/Hay	Mow/Fence Repair
Al McClain	34	Hay	Fertilize

TABLE VI
1989 AGRICULTURAL USE SUMMARY

Area	Acres
Grazed Mainland	547
Grazed Tenasillahe	438
Green Chop/Hay - Mainland	214
TOTAL ACRES GRAZED	985
TOTAL ACRES GREEN CHOP/HAY	214
TOTAL AGRICULTURAL USE MAINLAND	761
TOTAL AGRICULTURAL USE - TENASILLAHE ISL.	438

#14-Cattle being transported on the 80-ton refuge barge to Tenasillahe Island. Two trips are required in the spring with each 30-minute trip carrying about 80 adult cows.

89-RTV

#15-Unloading 1-Ton fertilizer bags at Tenasillahe Isl. As part of a cooperative farming agreement, about 18,000 lbs were applied to 3 fields at the rate of 300 Lbs/Acre.
89-RTV

8. Haying

(Section F.5)

9. Fire Management

A prescribed Fire Plan for parts of Tenasillahe Island was approved by the Regional Office in 1988. Using fire as a means of habitat management has not been tested here on the refuge, but we believe it could be an effective tool if the weather conditions are favorable. Burning selected fields in conjunction with grazing would most likely improve the overall condition of the fields. After a burn, test plots would be treated with fertilizer and clover seed to improve vigor and species composition. Inadequate fuel loads postponed the burn in 1988, and the weather never cooperated for a burn in 1989. The summer of 1989 was unusually cool and the vegetation never cured until after the fall rains. Even under ideal conditions in this region, the "window of

opportunity" for burning would only be a few days. Often the month of February provides a dry period when the grasses have cured and a burn might be possible.

10. Pest Control

Several tansy ragwort, *Senecio jacobaea*, plants were located on the refuge, but each plant had several caterpillars from the defoliating moth, *Tyria jacobaeae*, consuming the plant. This moth was introduced several years ago along with the flea beetle, *Longitarsus jacobaeae*, in an effort to control tansy ragwort, which proved to be very successful.

After using the influence of several other agencies, a new County Engineer, the Prosecuting Attorney and local landowners, the Commissioner of the Diking District covering refuge lands reluctantly agreed to allow the improvement and repair of several water control structures on the dike that surrounds the refuge. We have been negotiating with the Diking District since 1986, and have made several offers including the purchase of the structures, themselves.

The new improvements will allow for better drainage of agricultural fields and set the stage for the best natural control of common rush, *Juncus effusus*, which has been spreading through low-lying areas with poor drainage. Small drainage ditches bordering the fields are scheduled for cleaning in 1990. It is anticipated that after a year of proper drainage, followed by mowing and spot spraying, the plant should start to die off.

The purchase of a new tractor and mower allowed for better control of Canada thistle, *Cirsium arvense*. Over 400 acres were mowed with an additional 100 acres sprayed in an effort to control seed dispersal. Fortunately, only 5% of the seeds from an individual plant are actually viable.

About 20 galls containing the stem gall fly, *Urophora cardui*, were released on Tenasillahe Island in an effort to biologically control Canada thistle. If additional and larger releases continue in the future, this weed problem might be solved naturally.

#16-A gall from the stem fly, *Urophora cardui*, which is being used as a form of biological control on Canada thistle, *Cirsium arvense*. 89-RTV

#17-The stem gall fly, shown above, emerges from the gall as an adult and feeds on nectar during its 3-week life. Before the females die, they lay eggs on the stem of the plant. Larvae that emerge from the eggs enter the plant and form a gall, which interferes with the plant's physiology and stresses it to a point which affects viable seed production.

89-RTV

#18–Purple loosestrife, *Lythrum salicaria*, continues to spread on parts of Tenasillahe Island and along the Elochoman River which borders the Mainland refuge. Large concentrations were documented on maps and plans are being made for an aerial survey in 1990. 89-RTV

#19-Ideal growth conditions allow purple loosestrife to obtain heights of 7 feet and 4 feet across. 89-RTV

G. WILDLIFE

1. Wildlife Diversity

A great variety and abundance of wildlife are attracted to the refuge's mosaic of habitat types and estuarine location. Deer, elk, migratory waterfowl, bald eagles and other raptors, river otters and coyotes are especially popular with the visiting public.

2. Endangered and/or Threatened Species

The lower Columbia River population of Columbian white-tailed deer is divided into four principal subpopulations, each separated from the other by main channels of the Columbia (Figure 1). Two of these subpopulations - Washington Mainland and Tenasillahe Island (Oregon) - are located within the refuge. The other two are located on private lands on Puget Island, Washington, and the Westport/Wallace Island area of Oregon. The Recovery Plan criteria for recovery is the maintenance of a minimum of 400 deer distributed in at least three viable subpopulations on suitable secure habitat. Once this is achieved, the deer can be delisted. If only two of the subpopulations are on secure habitat, but the other criteria are met, the deer can be downlisted to threatened.

#20-A Columbian white-tailed deer with atypical antlers, grazing a recently mowed field. 89-RTV

Substantial progress has been made toward recovery. This year, Biologist Clark prepared a draft proposal to reclassify to threatened. This was made possible by the continued growth of the Tenasillahe Island subpopulation, which now meets the Recovery Plan criteria for viability, i.e., more than 50 individuals in the fall of the year.

A herd composition and population survey summary for the past five years is contained in Table VII. The surveys are conducted in November and December each year. Recruitment increased somewhat on the 2,000-acre refuge mainland after 1988's low. However, the 1989 fawn:doe ratio of 29:100 is still well below the 40:100 that past experience indicates is necessary to maintain herd size. That is good because the present density of about 125 deer per square mile would probably result in eventual habitat deterioration. The management target for the mainland is 200.

Figure 1 Subpopulations of Columbian White-Tailed Deer in the Lower Columbia River area.

TABLE VII. CWTD HERD COMPOSITION AND POPULATION SURVEY SUMMARY
LOWER COLUMBIA RIVER

REFUGE MAINLAND

Year	Sex & Age Ratio Buck:Doe:Fawn	Avg. No. Per Count	Highest Count	Estimated Population
1985	43:100:62	208	295	480
1986	61:100:43	216	235	500
1987	64:100:34	227	245	500
1988	73:100:14	173	196	410
1989	44:100:29	158	167	375

TENASILLAHE ISLAND

Year	Sex & Age Ratio Buck:Doe:Fawn	Avg. No. Per Count	Highest Count	Estimated Population
1985	No Data	No Data	14	40
1986	70:100:27	13	19	55
1987	101:100:43	24	38	70
1988	78:100:53	28	34	80
1989	79:100:43	29	38	85

PUGET ISLAND

Year	Sex & Age Ratio Buck:Doe:Fawn	Avg. No. Per Count	Highest Count	Estimated Population
1985	37:100:59	143	152	215
1986	53:100:40	129	151	195
1987	46:100:58	122	123	185
1988	52:100:53	135	142	205
1989	43:100:40	135	141	205

WESTPORT

Year	Sex & Age Ratio Buck:Doe:Fawn	Avg. No. Per Count	Highest Count	Estimated Population
1985	53:100:45	54	59	75-125
1986	61:100:40	53	60	75-125
1987	67:100:56	66	81	100-150
1988	79:100:66	53	68	100-150
1989	56:100:29	57	78	100-150

WALLACE ISLAND

Nothing new to report. The island may support as many as 40-50 CWTD.

The Tenasillahe Island subpopulation apparently continued its modest growth. For the fourth consecutive year, numbers were estimated using the Schnabel modification of the Peterson-Lincoln Index. This year's estimate of 85 was based on the presence of 16 marked deer. The fawn: doe ratio of 43:100 was down slightly from last year's 53:100, but was still encouraging considering that ratios of 20-30:100 were typical prior to 1987. As discussed in the 1987 and 1988 Narratives, transplanting additional deer to the 2,000-acre island apparently resulted in enhanced productivity.

Deer numbers remained stable at about 200 on 4,000-acre Puget Island. Farms and residential areas occupy most of the island, and deer damage to crops, gardens, and ornamental plantings is a constant problem. A new dimension was added this year when James River Corporation leased several farms, totalling about 500 acres, and planted hybrid cottonwoods for fiber production. This is an extension of their operations in the Westport area. The cottonwoods are very palatable to deer, and the Company was forced to fence many of the fields. Even that wasn't foolproof, and they hired several people to haze deer out of the plantings. Their costs for deer damage control exceeded $200 per acre. Even so, James River has been one of the more cooperative landowners we have dealt with. They have regularly sought our advice concerning means to reduce the impact of their operations on the white-tails, and even removed the fencing after the first growing season when most of the terminal shoots were four feet or more in height.

The trend counts indicated that the Westport/Wallace Island subpopulation also remained fairly stable even though productivity declined somewhat this year. The fall fawn:doe ratio was 29:100, down from the 52:100 average of the previous four years. Nevertheless, this herd appears to be thriving. Efforts to secure the habitat of a third subpopulation and thus meet the goals of the Recovery Plan for delisting are presently being directed toward this area. Realty prepared an acquisition package which is now on the LAPS list. The Nature Conservancy is assisting and has begun preliminary negotiations with some landowners.

The lower Columbia population has increased from an estimated 300-395 individuals in the mid-1970's to 720-975 at present. Each of the subpopulations has increased proportionately (Table VIII). There is no documentation of a concomitant increase in range, but sightings of white-tails in peripheral areas are on the rise. All in all, there is

justifiable optimism that this population will meet the criteria for delisting in the near future.

TABLE VIII. Present estimated numbers of Columbian white-tailed deer compared with estimates from the mid-1970's (lower Columbia River population).

	Mid-1970's	1989
Washington Mainland	150-200	325-400
Tenasillahe Island	30-40	80-100
Puget Island	50-75	175-225
Westport/Wallace Is.	70-80	140-200
TOTAL	300-395	720-975

The nesting pair of bald eagles on Tenasillahe Island fledged one young this year. This was the first documented production on the refuge since 1974. Eagle productivity in the estuary as a whole is discussed in the Lewis and Clark NWR Narrative.

3. Waterfowl

Peak waterfowl numbers for the past ten years are shown in Table IX. Most waterfowl use of the refuge is by wintering and migrating birds.

TABLE IX. PEAK WATERFOWL POPULATIONS

Julia Butler Hansen Refuge for the Columbian White-Tailed Deer

Year	Tundra Swan	Canada Geese	Ducks
1989	27	2,700	4,130
1988	24	3,082	2,880
1987	40	2,395	7,990
1986	12	2,430	3,740
1985	20	2,800	3,240
1984	20	3,800	10,600
1983	20	2,750	9,700
1982	30	1,600	12,430
1981	60	2,200	18,540
1980	60	2,200	37,390
1979	40	1,550	9,140
10-YEAR AVERAGE	31	2,595	11,064

A glance at TABLE IX reveals a marked decline in peak duck numbers in recent years. The average for the past five years was 4,395, whereas the average for the five years preceding those was 17,730. The causes of this decline are probably related more to managerial, climatic, and circumstantial considerations than to changes in waterfowl populations. The refuge is not managed to attract wintering ducks. Narrow, winding sloughs and drainage ditches provide the only standing water much of the time. Duck use is greatest when migration peaks coincide with heavy rains that cause temporary flooding of the fields. The aerial surveys cover the entire estuary and are not timed to measure maximum numbers on the refuge, which is a very small part of a large wintering area.

Canada goose numbers peaked at 2,700, which is about average for recent years. Nearly 10,000 Canadas presently winter in the vicinity of the estuary. There were fewer than 5,000, 12 to 15 years ago. Principal subspecies include Taverner's, *B.c. taverneri*, lesser, *B.c. parvipes*, dusky, *B.c. occidentalis*, western, *B.c. moffiti*, and cackling, *B.c. minima*. The growth in overall numbers, combined with sharply reduced

hunting seasons to protect the declining dusky, has resulted in escalating agricultural damage complaints. A Coordinated Resource Management Team has been formed to seek solutions to the problem. One of their suggestions is that the refuge upgrade management of its 1,600 acres of grass fields to attract and hold more birds. This would be possible as well as compatible with our management for deer, given sufficient funding.

The staff read neck collar numbers on 54 duskies, 47 westerns (two of which were collared in Nevada, the rest locally), 4 cacklers, and 1 snow goose.

#21-A wintering flock of Canada geese representing the following subspecies: duskies (dark individuals - some marked with red neck collars), cacklers (smallest individuals in foreground), and Taverner/lesser and western Canada geese scattered throughout the rear of the flock.
89-RTV

There is relatively little waterfowl nesting on the refuge. Production was estimated at 160 mallards, 50 wood ducks, 20 Canada geese, 20 cinnamon teal and 20 mergansers.

4. Marsh and Water Birds

Twelve pair of great blue herons nested in the small rookery on Price Island. Other species observed this year included double-crested cormorant, common loon, red-throated loon, arctic loon, American bittern, Virginia rail, sandhill crane and western, pied-billed and horned grebe.

5. Shorebirds, Gulls, Terns and Allied Species

Thousands of gulls and Caspian terns congregate on the lower Columbia during the annual February smelt run. Dunlin, long- and short-billed dowitchers, and western and least sandpipers often feed in partially flooded fields during spring and fall migrations.

6. Raptors

The osprey pair that nests on Price Island produced three young this year. A second nest, discovered last year on private lands 3/4 mile from the refuge office, fledged two young. Although it is a small sample, this production is interesting when compared to that of bald eagles in the vicinity. Eagles nesting on the Washington shore of the estuary produced only 0.63 young per occupied site.

The search for a black-shouldered kite nest continues. Kites first began colonizing this area about ten years ago, but a nest has yet to be discovered.

7. Other Migratory Birds

Less common species observed this year included merlin, peregrine falcon, palm warbler and American pipit.

8. Game Mammals

The resident herd of Roosevelt elk on the Refuge Mainland increased from about 60 in 1987 to 80 (34 cows, 11 calves, 35 bulls) by the fall of 1988. The management target is 20-30 so that competition with the deer for browse will be minimized. The corral trap, which was last used in 1985, was refurbished this spring, and a capture operation was conducted on April 5. Participants included personnel of the FWS, Washington Department of Wildlife, Oregon Department of Fish and

Wildlife, Washington Department of Natural Resources and a few volunteers. A helicopter was used to haze elk into the trap.

A total of 57 elk, consisting of 16 mature bulls, 4 spikes, 27 cows, and 10 calves were captured in two runs. Seven of the mature bulls refused to move through the loading chute to the truck, and were eventually released on site. The others were loaded without major incident and transported to three sites in the nearby Willapa Hills and released. There were two mortalities during transport. Fifteen of the elk were ear tagged.

This was the third elk relocation since the trap was constructed in 1984. A total of 107 have been moved off the refuge. Six are known to have returned; however, only 1/3 of the relocated elk were marked. If the marked individuals are representative of all the elk moved, then about 18 (6x3), or 17%, have returned to date. That isn't bad considering the release sites were within about 15 miles of the refuge. The elk were not moved further away because of local pressure to keep them in the County.

Reproduction and immigration built the herd back up to 55 by year's end. Apparently, we will need to relocate elk at least every second year.

#22-With the use of a helicopter and personnel working the woodlots, elk were forced into the entrance of a funnel-shaped trap. 89-RTV

#23-Elk detained in a smaller section of the trap until they can be loaded on transport trucks and released off the refuge in the surrounding foothills. 89-RTV

15. Animal Control

There was little interest in trapping nutria this year because of low fur prices. One permittee trapped occasionally and took 125 nutria.

H. PUBLIC USE

1. General

Public entry is restricted on most of the refuge and thick vegetation prevents use of two smaller islands which are open to the public. Therefore, most of the use is confined to roads bordering the refuge and one hiking trail through the center of the refuge. Over 56,813 visits were made by the public, an increase of 3,706 from 1988. The refuge staff responded to 457 public inquiries throughout the year. Major uses are described below with total visits and activity hours summarized on Table X.

#24-One of the more unique forms of public use, an artist attempts to capture a Columbia River wetland. 89-RTV

5. Interpretive Tour Routes

Eighty-five individuals from local school groups, scout troops and other groups accounted for 192 activity hours of interpretive programs on the refuge. Most programs were presented by the Refuge Manager.

#25-Refuge Manager Rick Vetter conducting a refuge tour for the Mt. St. Helens Hiking Club on Tenasillahe Island.
89-J.Suther

8. Hunting

Waterfowl hunting is allowed on portions of Hunting and Tenasillahe Islands. Hunting Island receives very little use due to the thick vegetation and deep open water surrounding most of the island.

A 1973 land donation on Tenasillahe Island by the Clifton Athletic Club included reserved hunting rights for 25 years. There are currently eight years remaining on the agreement. Since hunting is restricted to members only, and the slough provides good habitat for wintering ducks, hunting success is excellent.

#26-Refuge Manager Vetter measuring Canada geese at the Refuge Check Station. Hunters are required to check all geese shot during the special hunt. 89-J. Suther

For the second straight year the refuge assisted with the Washington Department of Wildlife special Canada goose hunt by operating a mandatory check station for successful hunters. Over the 6 days of hunting, 74 hunters were checked with 3 dusky Canada geese, 126 westerns and 28 Taverners/lessers.

9. Fishing

Only fishing for warm water species (perch, bass and catfish) is allowed on the refuge, and this is restricted to a small area inside the dike near the pumphouse on Brooks Slough Road. Cold water fishing for steelhead, salmon and sturgeon occurs from the County Dike Road in the Elochoman and Columbia Rivers which border the refuge. This type of fishing receives considerably more interest, but fish runs continue to decline.

11. Wildlife Observation

Wildlife observation accounts for the greatest form of public use, because of the high numbers of deer and elk and the ease with which they can be observed from a vehicle. The Mainland portion of the refuge is limited to hiking and horseback riding, on a single road cutting through the center of the refuge. This restriction is necessary to protect the deer from daily disturbance. Use of the road is light except for a group of walkers from the nationwide organization which accounts for 90% of the use.

12. Other Wildlife-Oriented Recreation

Wildlife photography at both the amateur and professional level are becoming popular activities for visitors. During the fall, unique photo opportunities exist for catching shots of large Roosevelt elk sparring for control of their harems. Deer also provide outstanding behavioral shots since they are in full rut and are often oblivious to humans.

16. Other Non-Wildlife Oriented Recreation

Over 400 individuals participated in organized running and bicycling events during the summer. The events are sponsored by the County Extension Service and a local church group. Both groups use the County Road between Skamokawa and the refuge shop.

17. Law Enforcement

Most law enforcement work occurs during the hunting season and involves checking waterfowl hunters. Since the refuge is located both in Washington and Oregon, an extra effort is required to coordinate with both state law enforcement agencies and their regulations.

Overall, the refuge attracts only a small number of hunters, since most hunters prefer Lewis and Clark NWR. About 20 waterfowl hunters were checked in the field and no citations were issued.

Although there is no big game hunting on the refuge and the boundary is clearly posted, the abundance and trophy-type size of Columbian white-tailed deer and Roosevelt elk create a trespass hunting and poaching problem. Some hunters are completely oblivious to Federal protection of the CWTD, an endangered species. This occasionally results in the shooting and take of a deer from State Highway 4. Other animals are shot maliciously with the individual having no intent of taking the animal.

During this year's black-tail deer hunting season, an individual shot a CWTD from the State Highway and removed it from the Refuge. Several people witnessed this event and reported it to the local sheriff. A Department of Wildlife Agent caught the subject washing his hands at a local cafe and issued a citation resulting in a $2,000 fine.

A similar incident involving Roosevelt elk resulted in two elk being wounded. The hunters left once they realized it was a National Wildlife Refuge and there are a few leads in the case which may lead to a citation.

TABLE X

Julia Butler Hansen Refuge for the Columbian White-tailed Deer

SUMMARY OF PUBLIC USE

ACTIVITY	1989 VISITS	1989 AH	1988 VISITS	1988 AH	1987 VISITS	1987 AH	1986 VISITS	1986 AH	1985 VISITS	1985 AH
1. Tours - Conducted	130	251	85	192	110	140	56	135	90	160
Public Inquiries	457		455		390		460		540	
Pers. Appearances	7		4		2		2		5	
News Releases	5		3		5		7		5	
2. Env. Ed. - Students	12	36	15	210	30	60	6	30	20	300
3. Other On-Refuge Prog.	4	12	3	42					15	30
Hunt-Gen. Waterfowl	65	260			77	385	98	490	170	810
Fish - Cold Water	1,390	6,100	1,100	4,690	960	3,350	1,130	3,820	1,550	4,600
Fish - Warm Water	200	525	230	620	230	640	280	790	235	650
Wildlife Obs. - Foot	780	1,560	870	1,740	210	420	140	260	140	220
Wildlife Obs. - Veh.	54,152	54,152	49,989	49,989	44,000	44,000	43,100	43,100	41,800	41,800
Photography	36	167	28	150	17	173	13	75	7	40
Rec. Non-Wildlife, Oth.	80	320	325	1,400						
TOTAL VISITS	56,813		53,107		45,634		44,843		44,067	

I. EQUIPMENT AND FACILITIES

2. Rehabilitation

Fiberglass skylight sheets purchased in 1988 for repairing the shop roof were added to the sections of the roof in most need of repair. The project is about 40% complete and should be finished in 1990.

Repairs were made on the refuge office water pump system and a new type of filter system was added to the water intake. Due to extreme high tides (11 feet), associated with high runoff from local rivers, the intake line is constantly being damaged. Funds for improving the entire system are expected in 1990.

The 8-foot electric fence designed to control elk movement onto the refuge was repaired over a 1-mile section. The charger unit was also moved from a U.S. Government residence to a pumphouse in an effort to reduce phone line interference.

Major repairs were made to refuge living quarters with part of the work being contracted. The work included installation of thermo-break windows, roof insulation, light fixtures, baseboard heating and leveling the back steps.

4. Equipment Utilization and Replacement

An old crew cab truck that was used on Tenasillahe Island was declared excess and replaced with a Chevrolet Suburban that was being used on the Mainland.

Proceeds from the sale of the Gehrig Launch vessel were used to outfit a used Boston Whaler with a new 70 HP Johnson engine and console. Two Boston Whalers will now be available for use on the Columbia River.

8. Other

#27-Construction of the new trash rack and walkway on the Elochoman River tide gate. The renovation was long overdue and we had to gather the support of several agencies and landowners to convince the Diking District Commissioner to approve funds. 89-RTV

J. OTHER ITEMS

4. Credits

Rick Vetter prepared the initial draft of most of this Narrative Report. Al Clark wrote the Climate and Wildlife Sections. Eileen Dunlap spent many extra hours typing and putting together the final product.

For More Information, contact:

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U.S. Fish and Wildlife Service
Department of the Interior
13552 July 1989

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Julia Butler Hanson
National Wildlife Refuge
For the
Columbian White-tailed Deer
Oregon-Washington

Columbian white-tailed buck enjoys early morning feeding.

Historical range of the Columbian white-tailed deer.

Refuge Name Honors Late Congresswoman

In 1988, Congress changed the name of the refuge to the Julia Butler Hansen National Wildlife Refuge for the Columbian White-tailed Deer.

Julia Butler Hansen (1907-1988), the daughter of a pioneer Cathlamet family, served in public office for 43 years, beginning with the Cathlamet City Council in 1937. She spent 22 years in the Washington Legislature and 14 years in Congress. She was the first woman to chair an appropriations subcommittee in Congress.

As head of the Appropriations Subcommittee for Interior and Related Agencies, she exerted tremendous influence on Federal natural resource agencies, including the Fish and Wildlife Service, which manages the National Wildlife Refuge System.

Columbian White-tailed Deer: Endangered but Improving

Endangered Species - The Columbian white-tailed deer, one of thirty-one subspecies of white-tailed deer in North America, is an endangered species. It is found only along the lower Columbia River near Cathlamet, Washington, and Westport, Oregon, and along the Umpqua River near Roseburg, Oregon.

Once Common - The Columbian white-tailed deer once ranged throughout the river valleys west of the Cascade Mountains from the Umpqua River in Oregon northward through the Willamette Valley to Puget Sound, and westward down the lower Columbia River. Explorers Lewis and Clark recorded the first observations of this deer in 1806, reporting it as abundant from The Dalles to the mouth of the Columbia River.

Habitat Loss Reduced Numbers - Pioneer settlers cleared trees and brush from the floodplains along the rivers to convert the land to agriculture. The deer were forced into smaller and smaller areas as their habitat was altered. By the turn of the century, the Columbian white-tailed deer had disappeared from nearly all of its range, and in the 1930s it was thought to be extinct. Remnant populations later were discovered at the places where the deer are now found.

Refuge Established to Help Save Species - The 4,400-acre Columbian Whitetailed Deer National Wildlife Refuge was established in 1972 as a sanctuary for approximately 230 of the remaining deer. The current population along the lower Columbia River, both on and off the refuge, is about 900 animals. The management goals of the refuge are to provide secure habitat and a stable population so the deer, listed as "endangered" since 1975, can be reclassified to "threatened" or removed from the Endangered Species list.

Refuge Management Aids Deer

Cover Reestablished - The deer prefer an interspersion of woodland and grassland. They will not travel far from the security of cover when feeding in the grasslands, so trees are being planted and brush is being allowed to return to some of the larger cleared areas to encourage greater deer use.

Grasslands Maintained - Livestock grazing and haying are used to keep fields in short, green forage for deer feeding. Height of grasses and legumes is critical since new growth has the greatest nutritional value and palatability for the deer. Crops sometimes are grown in some fields to help control weeds and provide wildlife food.

Deer habitat-clearing near brush cover.

Off-Refuge Habitat Important Too

The refuge alone cannot preserve enough habitat to save the deer from extinction. Deer habitat on private lands on Puget Island and on the Oregon side of the Columbia River is vital to reestablishing this species and maintaining viable populations.

Swans and American wigeon feed on grasslands.

Bald eagles are seen occasionally.

Other Wildlife Benefit

Elk Compete With the Deer for Habitat - Roosevelt elk also like the food, cover and protection from disturbance provided on the refuge. Unfortunately, elk are large, herd animals that trample shrubs in the woodlots which are important food sources for the deer.

The presence of elk in the woodlots also prevents the deer from using them for cover. Consequently, when the elk population on the refuge grows too large, some of the animals are trapped and moved to remote areas of the county.

Birds Use Refuge Habitats - Swans, Canada geese and ducks, which spend the winter on the lower Columbia River, also like to feed on the short grass and the crops left in the fields. Bald eagles use refuge trees as perches, while red-tailed hawks and black-shouldered kites hunt rodents in the fields. Refuge sloughs and shorelines attract great blue herons, grebes, loon, cormorants, snipe, and other birds.

Enjoying the Refuge

Although the deer are present on the refuge year-round, the best time to see them and other refuge wildlife is between September and May. The refuge is open daily between dawn and dusk.

Wildlife Observation - The deer and elk are easily observed from Steamboat Slough Road and Brooks Slough Road on the Washington mainland (see map) in early morning and evening. Stay in your car since it makes an excellent blind for wildlife observation and photography. Use binoculars, spotting scopes and telephoto lenses for close-up views and photographs.

Hiking - Public entry on the mainland unit is limited to foot travel on the Center Road. Public entry on Tenasillahe Island is limited to foot travel on the dike. These restrictions are necessary to protect the deer from disturbance.

Boating - Hunting, Price and Tenasillahe Islands are only accessible by boat. Launching facilities are available on the Washington shore at the Cathlamet Mooring Basin, the Washington Department of Wildlife boat launch on State Highway 4 between Cathlamet and Skamokawa, and at Skamokawa Vista Park. Launching facilities on the Oregon shore are available at Aldrich Point.

Hunting - Migratory bird hunting is permitted on the refuge portion of the Hunting Islands in accordance with Washington State and Federal regulations. Birds that may be hunted are geese, ducks, coots and snipe. Temporary blinds may be constructed but they must be available for general use on a first-come, first-serve basis.

Sport Fishing - Waters around the refuge, including the Elochoman River, Steamboat Slough, Brooks Slough and the Columbia River, are open to fishing in accordance with State regulations. Consult pertinent Oregon and Washington regulations for seasons and limits.

Environmental Education - The refuge offers space and guidance to teachers and educational groups to conduct outdoor classroom activities.

Dogs - Dogs and other pets must be kept on leash except during waterfowl hunting. Use of retrievers to recover downed birds is encouraged.

Fires - Fires are prohibited.

For More Information, contact:

Refuge Manager
Julia Butler Hansen National Wildlife Refuge
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U.S. Fish and Wildlife Service
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13552 July 1989

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Julia Butler Hanson
National Wildlife Refuge
For the
Columbian White-tailed Deer
Oregon-Washington

LEWIS AND CLARK NATIONAL WILDLIFE REFUGE

Cathlamet, Washington

ANNUAL NARRATIVE REPORT

Calendar Year 1989

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

REVIEW AND APPROVALS

LEWIS AND CLARK NATIONAL WILDLIFE REFUGE

Cathlamet, Washington

ANNUAL NARRATIVE REPORT

Calendar Year 1989

James A. Hedy — Refuge Manager — 5/29/90 — Date

Lonford L. Williams — Associate Manager, ID/OR/WA — 6/26/90 — Date

John H. Dorbel — ARD-Refuges and Wildlife — 7/5/90 — Date

#1-A summer sunset over islands on the Refuge, with unusually calm water. 89-RTV

INTRODUCTION

Lewis and Clark National Wildlife Refuge lies in the estuary of the Columbia River in Clatsop County, Oregon. The refuge contains some 20 named islands and unnamed sand bars, tidal marshes and mudflats beginning 12 miles above the river's mouth and extending upstream for 15 miles. The area is the largest natural marsh in western Oregon.

The nearest cities are Astoria, Oregon, located southwest of the refuge, and Cathlamet, Washington, located northeast of the refuge. Along with the Columbian White-Tailed Deer Refuge, it is managed as a satellite of Willapa National Wildlife Refuge.

The refuge was established in 1972 to preserve the wetland habitats of the Columbia River estuary as a wintering area and migrational stopover area for migratory birds - primarily waterfowl and shorebirds. The refuge's primary management objective is to protect and enhance migratory birds and associated habitats of the Columbia River estuary.

The refuge's management program consists of monitoring, planning and enforcement. Monitoring includes both establishing baseline data and long-term monitoring of key wildlife populations. The planning function involves participation in the overall management planning processes for the estuary being conducted by other agencies. Enforcement involves not only game laws but Army Corps of Engineer's permits, Section 7 consultations and other regulatory requirements.

The Service "owns" just a small fraction of the 38,000-acre refuge. It is managed under cooperative agreements with Clatsop County and the State of Oregon for the county and state lands within the refuge. The State of Oregon has permit and licensing authority regarding development.

Current acreage of Lewis and Clark National Wildlife Refuge can be summarized as follows:

Fee Title	2,851
Managed by USFWS under agreement with State of Oregon	29,727
Managed by USFWS under agreement with Clatsop County	4,300
Other acreage - gift, other Federal Agencies	1,222
TOTAL ACRES	38,000

Acreages by land type as shown on the Land Type Inventory Form are:

Wetland - Estuarine	35,100
Upland - Sand	700
Upland - Brush	1,200
Woodland	1,000

INTRODUCTION

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(Inside Back Page)

A. HIGHLIGHTS

-- A major fertilizing project was conducted on Miller Sands and Rice Island for maintaining grass seedings. Section F.5.

-- Goose nesting continues to increase on the refuge. Section G.3.

-- Caspian tern colony continues expansion on Rice Island. Section G.5.

-- Refuge staff participates in Portland Rose Festival activity. Section H-7.

B. CLIMATIC CONDITIONS

TABLE I

1989 Climatological Data

MONTH	PRECIP. (Inches)	SNOW (Inches)	TEMPERATURE (°F) Max.	Min.	Avg. High	Avg. Low
January	10.50	1.50	56	29	48	37
February	4.44	6.00	60	4	46	28
March	8.02		63	21	55	38
April	3.24		84	35	67	43
May	2.65		86	36	69	46
June	3.08		95	38	74	51
July	2.38		86	40	75	52
August	1.56		83	44	75	55
September	.56		90	39	78	48
October	3.43		76	30	64	45
November	12.49		61	32	55	42
December	4.95		58	27	49	37
TOTAL	57.30					

Overall, the winter was unusually cold, followed by a wet spring and cool summer. Average precipitation is about 75 inches. We are located in a sharp rain gradient. A weather station in Skamokawa, three miles west of headquarters, has recorded a 27-year average of 100.5 inches. Going in the other direction, Longview, Washington, 25 miles east, averages about 45 inches.

C. LAND ACQUISITION

1. Fee Title

Department of Labor's interest in transferring 65 acres on the tip of Tongue Point to the Service cooled considerably this year when that agency realized that it would be responsible for conducting substantial investigations into possible contaminants and archeological resources. The wooded point provides excellent eagle perches and in recent years supported an eagle nest. As a high point of land jutting conspicuously into the lower river, it has always attracted human activity, but never supported peacetime development. For this reason, it is available as excess property today, but has a long history of Native American and military use needing better understanding. The contaminant concern comes from its use as a naval base during World War II.

In contrast, the 89-acre parcel adjacent to "Emerald Heights" (former naval housing) is expected to be transferred by Department of Labor to the Service in 1990. This wooded parcel just inland from Tongue Point, supports one of the most productive eagle nesting territories on the lower river.

From late 1988 through 1989, the Oregon Eagle Foundation attempted to raise money to purchase 15.3 acres of upland and timber from Cavenham Forest Industries at Twilight Marsh for an eagle sanctuary. The parcel is located about 5 kilometers southeast of Tongue Point and provides habitat for perching, foraging, roosting and training of young. The Foundation's intent was to donate the sanctuary to the Service for inclusion into the Lewis and Clark NWR. The site's value to eagles and proximity to the refuge made it a desirable acquisition from the Service's point of view. However, the Foundation needed approval from National Oceanic and Atmospheric Administration (NOAA) to obtain a $30,000 Coastal Zone Management 306-A grant, and NOAA would not approve the Foundation's proposal if the land was to be transferred to the Service. This decision was based on the General Accounting Office report to Congress this year, citing problems with incompatible uses on National Wildlife Refuges. The Foundation was able to obtain the grant and the property by arranging ownership by Clatsop County as a preserve. Regardless of ownership, preservation of this parcel is a benefit to the eagles and other wildlife.

Some progress toward the exchange of federal property at South Tongue Point for State-owned lands within the Lewis and Clark NWR was made this year. At year's end, there was agreement on the priority of lands to be acquired by the Service. That priority starts with the major dredge spoil islands and Karlson Island, due to potential threats under state ownership, then continues through the remaining lands based on habitat value. An appraisal is scheduled for 1990.

D. PLANNING

5. Research and Investigations

LAC-NR-88. Western Canada goose Population Monitoring.
P. J. Miller, Washington Department of Wildlife.

Populations of the Western Canada goose were cooperatively monitored in the Lower Columbia River (LCR) by the Washington Department of Wildlife, United States Fish and Wildlife Service, Corps of Engineers and Oregon Department of Fish and Wildlife.

Nest searches, banding and collaring are expected to continue for at least the next 5 years to evaluate an experimental early season on this population.

#2-Western Canada geese temporarily detained in part of the portable drive trap. These individuals were banded and collared. 89-RTV

#3-Volunteer Joan Suther measuring the culmen on a western Canada goose. 89-RTV

E. ADMINISTRATION

(2) (4) (1)

#4-Staff photo. 89-RTV

1. Personnel

1. Richard T. Vetter, Jr., Refuge Manager, GS-9, PFT

2. Alan C. Clark, Complex Wildlife Biologist, GS-11, PFT

3. Alphonse F. Halfmoon, Maintenance Worker, WG-8, PFT
   (Not pictured - retired August 1, 1989)

4. Bruce Britton, Maintenance Worker, WG-8, PFT

5. Funding

A comparison of funding over the last five years for this refuge complex alone is complicated by the reorganization of the Lower Columbia River Refuge Complex in 1986. Table II attempts to compare base funding before and after the reorganization.

TABLE II
FIVE-YEAR BASE FUNDING SUMMARY

Willapa, Julia Butler Hansen, and Lewis and Clark NWRs

(Figures represent O&M base including YCC. Fire, Quarters, Resource Problem, and Large ARMMS funds are not included.)

1989	$ 361,700
1988	360,800
1987	386,400*
1986	331,429**
1985	372,600***

*Includes $34,400 in yearend add-ons
**Includes Endangered Species and Expense of Sales Funding
***This figure is a rough estimate of that part of the Lower Columbia River Complex Budget allocated to the three refuges.

Due to unanticipated expenditures associated with the Nestucca Oil Spill and the replacement of entry signs at JBH Refuge, this year's funding base of $349,700 was inadequate. An additional $12,000 was provided by the Regional Office to make up this shortfall. Resource Problem Projects funded this year were, visitor facilities for Willapa Headquarters ($35K), and Cordgrass Control ($15K). Separate fire funding in the amount of $3,800 was allocated to cover the cost of Willapa's Fire Protection Agreement with the Washington State Department of Natural Resources. Construction funds from a Regional Office Account in the amount of $5,800 were used to remove underground gasoline storage tanks. Proceeds from the sale of the Gehrig Launch in the amount of $8,900 were spent on equipment needed to put two smaller boats into service.

Station disbursements for Julia Butler Hansen and Lewis and Clark National Wildlife Refuges totalled $191,576.46.

F. HABITAT MANAGEMENT

1. General

Lewis and Clark National Wildlife Refuge encompasses about 38,000 acres of the Columbia River estuary. Habitat types within the refuge boundary include (1) deep, open water, (2) shallows, mudflats and sandbars, (3) tidal marshes, (4) tidal swamps and (5) uplands. The sizes and shapes of the various islands are constantly changing as a result of both natural and man-made forces. As the river nears the Pacific Ocean, the slowing current causes the silt load to be deposited naturally in the form of low islands and sandbars. In addition, the main river channel is dredged on a regular basis by the Army Corps of Engineers to keep it open for traffic, and the resulting quantity of material is deposited on designated islands.

2. Wetlands

The refuge contains the largest natural marsh in western Oregon. Of the 35,100 acres classified as estuarine, 10,000 acres are small islands, mudflats and tidal marshes. The remainder is open water or tidelands. Many of the islands become flooded twice a day at high tide.

On the upstream islands, marsh vegetation gradually gives way to trees and shrubs. These higher islands are thickly vegetated with Sitka spruce, black cottonwood, willow, red osier dogwood, and other shrubby plants. The lower islands are covered with sedges and rushes, and show evidence of increased sedimentation and shoaling in many areas.

5. Grasslands

Grass seeding projects completed in 1987 continue to produce forage and cover for nesting western Canada geese. However, heavy use of the area by an expanding goose population required an application of fertilizer to maintain grass quality. A blend of Triple 16 fertilizer of 300 lbs/acre was applied to 70 acres on Miller Sands Island and 50 acres on Rice Island. The project was completed in only two days due to the use of a helicopter. The results were excellent and should maintain the seeding for two more years. This operation used the last of a fund created by the Mobile Oil Company as mitigation for an oil spill on the lower river in 1984. The mitigation funds were used for

the purchase of fertilizer (and seed in 1987), the U.S. Army Corps of Engineers provided the helicopter, and refuge staff provided labor and ground transport.

#5-Loading of the aerial fertilizer bucket with fertilizer for application on Miller Sands and Rice Islands. 89-RTV

6. Other Habitat

#6-One of many ocean-going vessels navigating the Columbia River shipping channel on a daily basis. The U.S. Army Corps of Engineers maintains the channel at a depth of 40 feet between Portland, Oregon and the mouth of the Columbia River. 89-RTV

A Special Use Permit was issued to the Port of Portland to deposit excavated materials resulting from dredging operations in the Columbia River shipping channel on Welch, Fitzpatrick, Jim Crow Sands, Miller Sands and Rice Islands. The term of use is through September 30, 1990. No activity is allowed between March 1 and May 15, to avoid disturbance to nesting Canada geese. Operations also are not

permitted between May 30 and July 15 on the west end of Rice and Miller Spit to avoid disturbance to nesting glaucous-winged gulls and Caspian terns. Deposition is allowed on existing spoil areas only, with limited inwater filling as approved. Depending on the site, existing spoil areas may be seeded with approximately 20 pounds per acre of an approved grass/legume mixture and fertilized. Planting must be accomplished between August 15 and September 15, to allow proper germination and growth.

#7-Part of a multi-agency group involved in protecting lower river resources visit a National Marine Fisheries Research Team conducting a salmon fry census at Miller Sands Island. The information will be used to evaluate and rank fisheries habitat in relationship to future dredge spoil sites. 89-RTV

Before dredging activities began this year, Biologist Alan Clark and Biologist Pat Miller, Washington Department of Wildlife, evaluated the

disposal site on Miller Sands Island. The Corps of Engineers indicated the proposed dredging schedule limited their activities to a time period that would disturb the gull colony on Miller Sands. The conflict was resolved and the dredging activities took place after the gulls dispersed for the year.

During dredging activities on Miller Sands Island, the Corps of Engineers extended the sand spit with new dredge material at the west end of the island by 800 feet. This type of disposal was not authorized in the permit and was brought to the refuge's attention by contacts outside the Corps. Although the additional material will create new habitat for waterfowl, raptors, shorebirds and various other species, it eliminates valuable habitat for young salmon.

During the year, portions of the following islands were used as "beach nourishment" sites by the Corps of Engineers for the disposal of dredging material:

Welch Island	-	276,894 cubic yards
Rice Island	-	205,000 cubic yards
Miller Sands Island	-	174,235 cubic yards

#8-U.S. Army Corps of Engineers conducting a "Beach Nourishment" (dredge spoil) program on Miller Sands Island Spit. The 30" pipe transports 3,000 cu. yds. of material per hour. The dredge operates 24 hours/day, 7 months a year, with a 52-person crew at a cost of $30,000/day. 89-RTV

#9-Caterpillar tractors spreading dredge spoils pumped from the dredge "Oregon". Heavier sand material settles out and is secured on higher ground, while the water carrying the load through the pipe returns to the River. 89-RTV

10. Pest Control

#10-Members of a Washington State Timber Fish and Wildlife Habitat Crew cutting Scotch broom and seeding cleared areas on Miller Sands Island. 89-RTV

Scotch broom (Cytisus scoparius) has been invading grass lands on Miller Island, since the Island was created by the Corps of Engineers. Small stands provide some cover for waterfowl and even nest sites; but, left unchecked, the plant would eventually eliminate open, grass-covered areas. In an effort to control the plant, refuge personnel were joined by a 10-person work force from the Washington State Timber, Fish, and Wildlife Habitat Crew for a 1-day assault on the plant. Armed with chainsaws, the crew cut over 5 acres of brush. All cut material was stacked in brush piles, while the treated areas were seeded

with a mixture of grass and clover. When the root stocks re-sprout in the spring, refuge personnel will spray them with herbicides.

Future management of Scotch broom could involve biological controls with the introduction of a seed weevil (Rhinocyllus canicus). An Environmental Assessment is currently being prepared, and plans are being made with the Oregon Department of Agriculture for such a release.

G. WILDLIFE

1. Wildlife Diversity

The refuge is located in the Columbia River estuary, which provides important wetland habitat that sustains the migratory birds of the Pacific Coast. The estuary is both a wintering area and a migrational stopping area for waterfowl of the Pacific Flyway.

Great blue herons, gulls and shorebirds wade the extensive sandbars and mudflats in search of small fish, insects, worms and crustaceans. Grebes and cormorants dive in the deeper water of the channels in search of fish. The willow, cottonwood and spruce trees of the vegetated islands provide nesting sites and lookout perches for numerous small birds, hawks and bald eagles.

The estuary also is home to many species of fish. They use the estuary for spawning, as a nursery for their young, for feeding, and as a passageway between the ocean and upper river. The estuary is particularly important as a feeding area for juvenile salmon while they go through the physical changes that allow them to survive in salt water.

Harbor seals use sandbars and mudflats as haul out sites at low tides, while both seals and California sea lions feed on a variety of fishes in the estuary. Beaver, raccoon, weasel, mink, muskrat and river otter are other mammals that live on the islands. A few Columbian white-tailed deer are present on some of the upstream islands.

2. Endangered and/or Threatened Species

There are three bald eagle nest sites within the refuge boundaries. The nest on Marsh Island apparently blew down. This pair used an alternate nest on nearby private lands in the Blind Slough area, but failed to produce young. The Karlson Island nest site was occupied, but it also failed. The nest on Quinn's Island was not occupied. It probably serves as an alternate for a pair nesting across the channel at Aldrich Point. They fledged one young. There are 24 known nesting territories in the estuary. Twenty-one were occupied and 9 young were fledged for an average of 0.43 young per occupied site. The 5-year average is 0.55 young per occupied site. For the State of Oregon as a whole, productivity has averaged about 0.90 young per occupied site over the past 5 years. Low productivity in the estuary is thought to be due to the presence of contaminants such as DDE and PCBs.

Eagle numbers in the estuary peak at 100-150 during February and March when many migrants are present.

3. Waterfowl

Most waterfowl use of the refuge is by wintering birds. Duck numbers peaked at 14,050 in December (Table III). This is the second lowest total in the past 10 years. However, a quick glance at Table III reveals considerable variation between years. This variation is likely due more to chance survey results than to changes in populations. For one thing, it is a somewhat hit-or-miss proposition as to whether or not the monthly surveys coincide with migration peaks (the surveys are conducted during the first week of the month to be coordinated with surveys of other wintering areas). Also, there is probably a lot of movement back and forth between the estuary and other nearby wintering areas. Principal species are mallard, pintail, wigeon, green-winged teal and greater and lesser scaup.

Duck nesting is limited by relatively high populations of mammalian predators and frequent tidal inundation of most of the islands. Production was estimated at 400 mallards, 80 mergansers (common and hooded), 60 cinnamon teal and 60 wood ducks.

Between 8,000 and 10,000 Canada geese winter in the vicinity of the estuary. This year's peak count was 8,330. Subspecies include dusky, *B. c. occidentalis*, western, *B. c. moffitti*, lesser, *B. c. parvipes*, cackling *B. c. minima*, and an occasional stray Aleutian, *B. c. leucopareai*. Small numbers of snow geese and white-fronts mix with the flocks.

The resident population of western Canadas continues to increase. A nest survey was initiated on the refuge in 1985, and since then the number of nests has increased by an average of 42% per year. This year's total was 341, compared to 270 last year (Table IV). The dredge spoil islands provide excellent nesting habitat as they are above the reach of the tides and relatively free of mammalian predators. An estimated 560 goslings were fledged this year (this figure is probably conservative - gosling survival rates are not known for this area).

TABLE III

PEAK WATERFOWL POPULATIONS

Lewis and Clark NWR

Year	Tundra Swans	Ducks
1989	600	14,050
1988	330	18,800
1987	630	41,370
1986	640	16,130
1985	655	38,930
1984	640	19,500
1983	540	23,650
1982	300	13,620
1981	580	19,900
1980	520	15,310
1979	400	37,655
10-YEAR AVERAGE	544	22,126

TABLE IV

WESTERN CANADA GOOSE NESTS - LEWIS AND CLARK NWR

Area	1989	1988	1987	1986	1985
Miller Sands	181	146	109	54	28
Rice Island	71	62	46	37	28
Pillar Rock	67	45	41	21	13
Fitzpatrick Island	22	17	14	4	2
Karlson Island	*NS	*NS	9	9	15
TOTAL	341	270	219	125	86

* NS - Not Surveyed

85 to 86 = 45% increase
86 to 87 = 75% increase
87 to 88 = 23% increase
88 to 89 = 26% increase
AVERAGE = 42% increase TOTAL INCREASE 1985 to 1989=297%

4. Marsh and Water Birds

The great blue heron nesting colony on Karlson Island contained 116 nests this year. This was the lowest number on record. The 10-year average is 162.

5. Shorebirds, Gulls, Terns and Allied Species

Approximately 2,700 pairs of Caspian terns nested on the western tip of Rice Island this year. About 500 pairs were present in 1986 when the colony was first established. There were 1,200 pairs in 1987 and 2,600 pairs in 1988. A few hundred gulls (glaucous-winged, western and hybrid) also nested on Rice Island and hearby Miller Sands Spit.

6. Raptors

In addition to the bald eagle (Sec. G.2.), common raptors include red-tailed hawk, sharp-shinned hawk, northern harrier, turkey vulture, kestrel, barn owl, screech owl, great horned owl and short-eared owl.

Merlin and peregrine falcons are sighted occasionally. Osprey, which were rarely observed a few years ago, have been increasing and there are now five known nest sites in the estuary.

8. Game Mammals

Columbian black-tailed deer inhabit Lois, Mott, Karlson and Woody Islands. The other refuge islands are either too small to support deer, lacking in vegetation (dredge spoil islands), or subject to frequent tidal inundation.

9. Marine Mammals

At least 1,500 harbor seals and 200-300 California and northern sea lions utilize the estuary during the fall and winter months. They are a source of controversy as most commercial and many sport fishermen resent the competition for salmonids.

15. Animal Control

For the second consecutive year, the nutria trapping permits were not utilized because of low fur prices.

H. PUBLIC USE

1. General

General signing is lacking on Lewis and Clark National Wildlife Refuge. The refuge boundary generally exists in deep water and would require the use of buoys to post appropriately. Maintenance of posting on each of the islands is beyond the ability of the existing staff. The Clatsop County Road Department has given permission to post refuge informational signs at the boat launches.

Public awareness of the refuge is also lacking. Interpretive signing at the boat launches and refuge brochures are the primary means to publicize the existence of the refuge.

From Public Use Reports, an estimated 8,158 visits were made by the public to the refuge in 1989. The refuge is accessible only by boat, so the majority of visits were in a water-related activity. These visits were tallied in various categories, including (in descending order of popularity): general waterfowl hunting, cold-water fishing, boating, wildlife observation/boat, warm-water fishing, picnicking and camping. Refuge staff responded to over 269 public inquiries throughout the year, and made 2 personal appearances.

6. Interpretive Exhibits and Demonstrations

The multi-projector narrated slide presentation on the Lewis and Clark NWR, prepared under contract with the University of Idaho and placed on exhibit at the Lewis and Clark Interpretive Center at Cape Disappointment, continues to receive a lot of exposure to the public.

7. Other Interpretive Programs

#11-One of 20 vessels transporting people through the refuge on the way to Portland, Oregon, for the "Rose" Festival. 89-RTV

The City of Portland, Oregon, has been sponsoring an annual 7-day event each June, called the "Rose Festival" which starts with over 20 Navy and U.S. Coast Guard vessels traveling up the Columbia River from Astoria to Portland, Oregon. About 1,500 people are allowed to board the vessels in Astoria and travel upstream to Portland on the 8-12 hour cruise. Since they spend 3-4 hours traveling through the refuge, Rick Vetter selected one of the vessels and conducted a unique tour of the refuge from the comfort of a large vessel. The response was very favorable from the public and crew members. If time allows, our participation might become an annual activity.

8. Hunting

Waterfowl hunting is the major public use activity on the Lewis and Clark Refuge. The hunt quality has remained generally good, as the few hunters who use the large area are able to place decoys in unoccupied sites with no crowding by other hunters. Temporary blinds are used on a first-come basis. The refuge was open to waterfowl hunting during the season set by the State of Oregon, October 21 through November 8 and November 22 through December 31.

The size and general configuration of the refuge does not allow for a precise and continual check of hunters and their success. However, estimates during peak hunting opportunities indicated about 1,890 hunters visited the refuge during the season. Table V contains a summary of hunter use and the duck harvest for the past five years. Hunter visits have been declining, apparently in response to shorter seasons, reduced bag limits and steel shot regulations. Hunter success, as measured by the number of ducks taken per visit, has decreased, slightly. Hunters averaged almost 2 1/2 birds per visit this year. The more experienced waterfowlers usually obtained their limit of 5.

TABLE V.

Hunter Use and Duck Harvest
Lewis and Clark NWR

Year	Hunters Checked	Total Bag	Ducks Per Hunter	Est. Total Hunter Visits
1989	153	364	2.38	1,890
1988	153	435	2.84	1,540
1987/88	117	286	2.44	1,965
1986/87	232	502	2.16	2,360
1985/86	149	259	1.74	2,470
1984/85	242	467	1.93	3,310

9. Fishing

#12-Local gillnetters drift for Chinook salmon between Tenasillahe and Price Islands. 89-RTV

Fishing is the second most popular activity on the refuge and is broken into two categories: cold and warm water. Cold-water fisheries also include commercial gillnetting for several species of salmon by local fishermen. Depending on the quality of the fish and ability of the fish sorter, they are sold for use in restaurants or as cat food. This type of harvest has long been contested by sportsmen who believe that sport fishing has a more positive image and contributes significantly more to the general economy. Oregon regulates the sport fishing since most of the refuge is located in that State. However, people fishing

from boats in the Columbia River may use either a Washington or an Oregon license.

11. Wildlife Observation

Most wildlife observations are conducted from boats and occasionally by foot when visiting a particular island.

13. Camping

The refuge is open for day use only. Although camping is not allowed, it is known to occur in non-sensitive areas.

14. Picnicking

Picnicking occurs primarily on Welch Island and is generally associated with other activities.

16. Other Non-Wildlife Oriented Recreation

Boating continues to be a popular pastime, although most vessels are associated with other activities.

17. Law Enforcement

Sixty-one waterfowl hunters were checked by refuge staff for compliance with regulations. Two citations were issued for shooting 1 bird (mallard) over the daily bag limit. Both individuals challenged their cases in court and received fines of $250 and $200.

One illegal gillnet set was discovered in a slough on Karlson Island. The net was removed the next day by a law enforcement officer from Washington.

TABLE VI

SUMMARY OF PUBLIC USE - LEWIS AND CLARK NWR

	1989		1988		1987		1986		1985	
ACTIVITY	VISITS	AH	VISITS	AH	VISITS	AH	VISITS	AH	VISITS	AH
Tours-Conducted	40	120								
Oth. On-Ref. Prog.	1,500	6,000					5	10		
Hunting-Waterfowl	1,890	9,450	1,690	8,450	1,965	9,825	3,030	15,150	3,520	17,600
Trapping			32	200						
Fishing										
Cold-Water	2,324	6,490	2,170	6,190	1,870	5,160	2,090	5,980	1,200	3,510
Warm-Water	105	355	130	290	110	330	50	150		
Wildlife Observa.										
Boat	810	1,620	515	1,030	420	840	500	850	1,020	1,330
Boating	1,310	2,610	1,545	3,100	1,790	2,280	1,620	2,040	520	840
Camping										
Wildlife-Orient	5	50	7	70	5	50				
Non-Wildl-Orient	42	690	42	690	30	510				
Picnicking	132	535	132	535	110	440	100	400		
Photography							5	50		
Public Inquiries	269		285		255		270		225	
Pers. Appearances	2		5		2		1		4	
News Releases	1		2		1				1	
Exhibits	1		1		3					
TOTAL VISITS TO REFUGE	8,158		6,556		6,300		7,400		6,260	

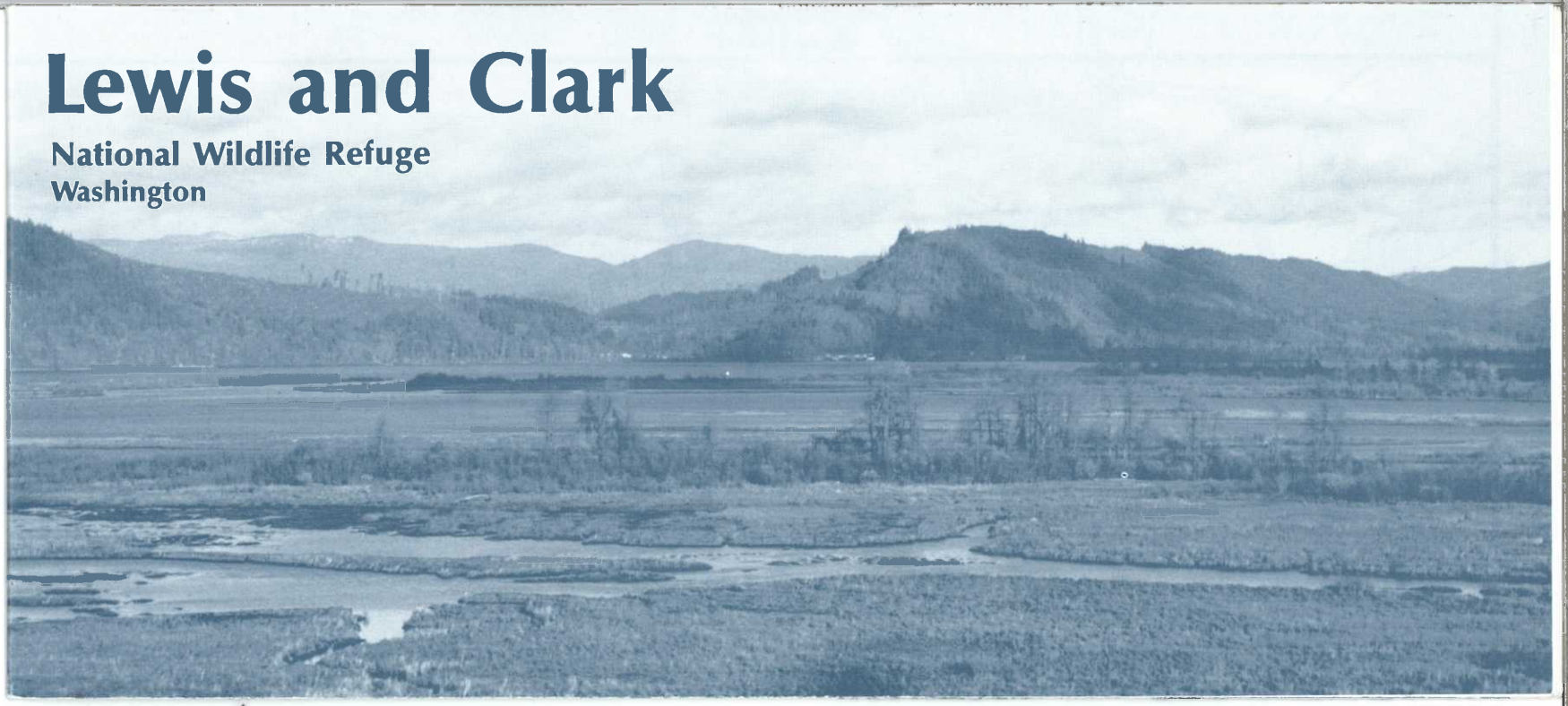
J. OTHER ITEMS

4. Credits

Rick Vetter prepared the initial draft for most of the Narrative Report, while Al Clark wrote Climate, Wildlife, and Research and Investigations Sections. Eileen Dunlap typed and assembled the report.

Lewis and Clark

National Wildlife Refuge
Washington



Lewis and Clark

National Wildlife Refuge

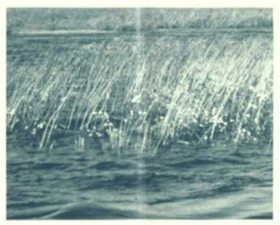
"An estuary preserved for fish and wildlife on the Columbia River"

Deep Water

Salt water and ocean organisms move into the estuary through these main river channels. Migrating salmon and steelhead use deep channels to pass through the estuary, and estuarine fish escape predators in deep water, particularly at low tide.

Shallows and Flats

Mud flats and sandbars are the most productive estuarine habitat. Billions of microscopic plants and animals, shellfish, worms and insects live in the water and mud. Shallow areas serve as nurseries for juvenile fish, and as resting and feeding sites for waterfowl. Shorebirds feed on worms, snails and insects on the mud flats at low tide.

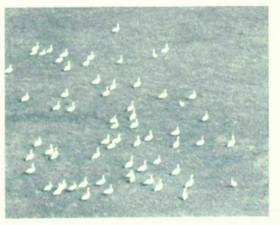


Tidal Marshes

Marshes and their tidal channels provide important habitat for birds, mammals, fish and invertebrates. Marsh vegetation contributes significantly to the estuary food supply.

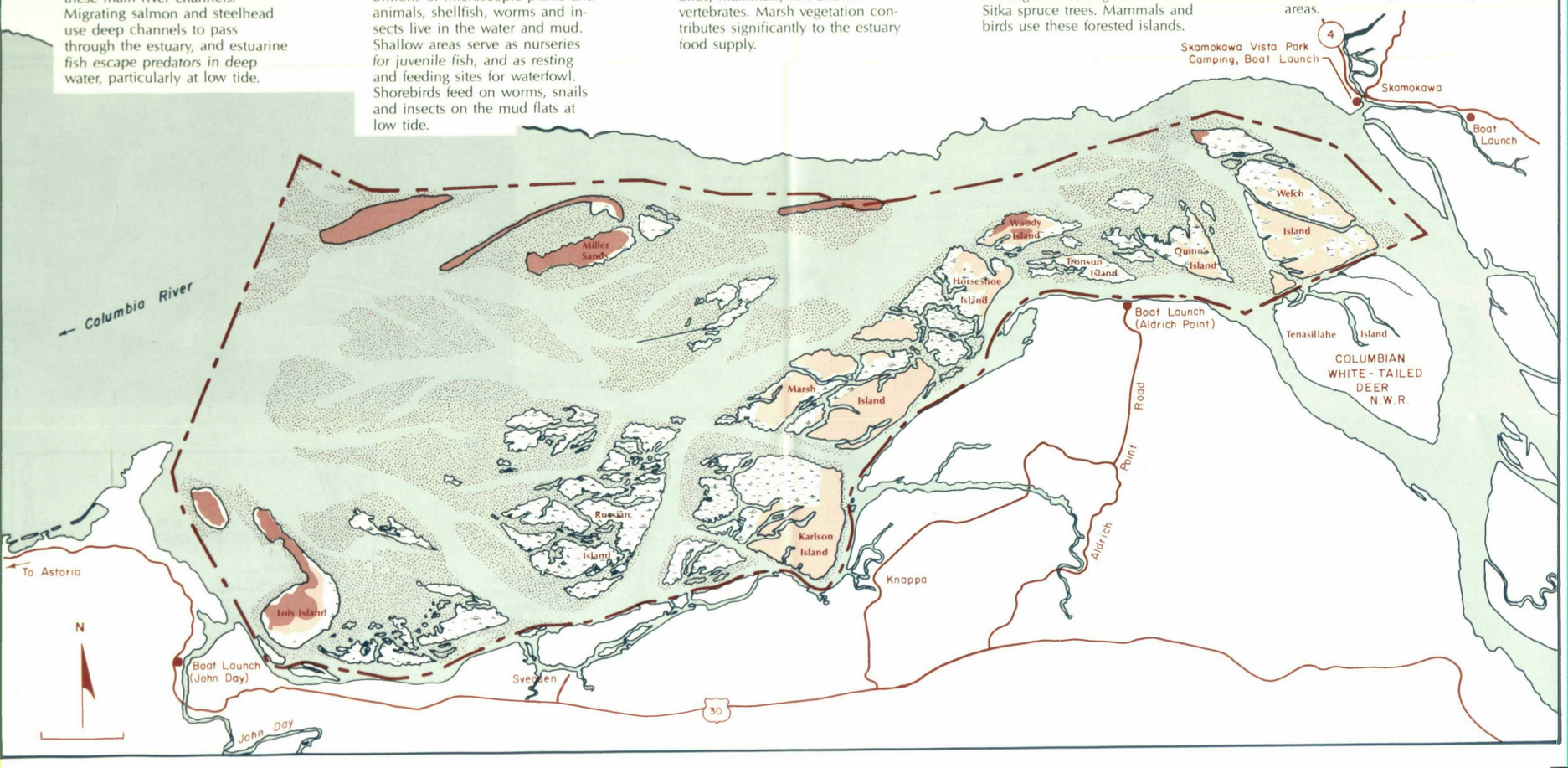
Tidal Swamp

Swamps are higher elevation marshes with woody vegetation, including willow, dogwood and Sitka spruce trees. Mammals and birds use these forested islands.



Upland

Grass planted on the dredge spoil-created uplands provides waterfowl nesting and feeding areas.



Lewis and Clark Paddled Here

Explorers Meriwether Lewis and William Clark neared the goal of their trailblazing journey from the Mississippi River to the Pacific Ocean as they traveled through the estuary of the Columbia River in November 1805. As always, they recorded detailed notes on the geography, plants and animals, and native peoples they encountered. While not the first explorers to visit the Columbia's estuary, they did provide the first scientific knowledge of the American Northwest.

November 5, 1805

"Rained all the after part of last night; rain continues this morning. I slept but very little last night for the noise kept up during the whole of the night by swans, geese, white and grey brant ducks, etc., on small sand island close under the port side; they were immensely numerous, and their noise horrid . . ."

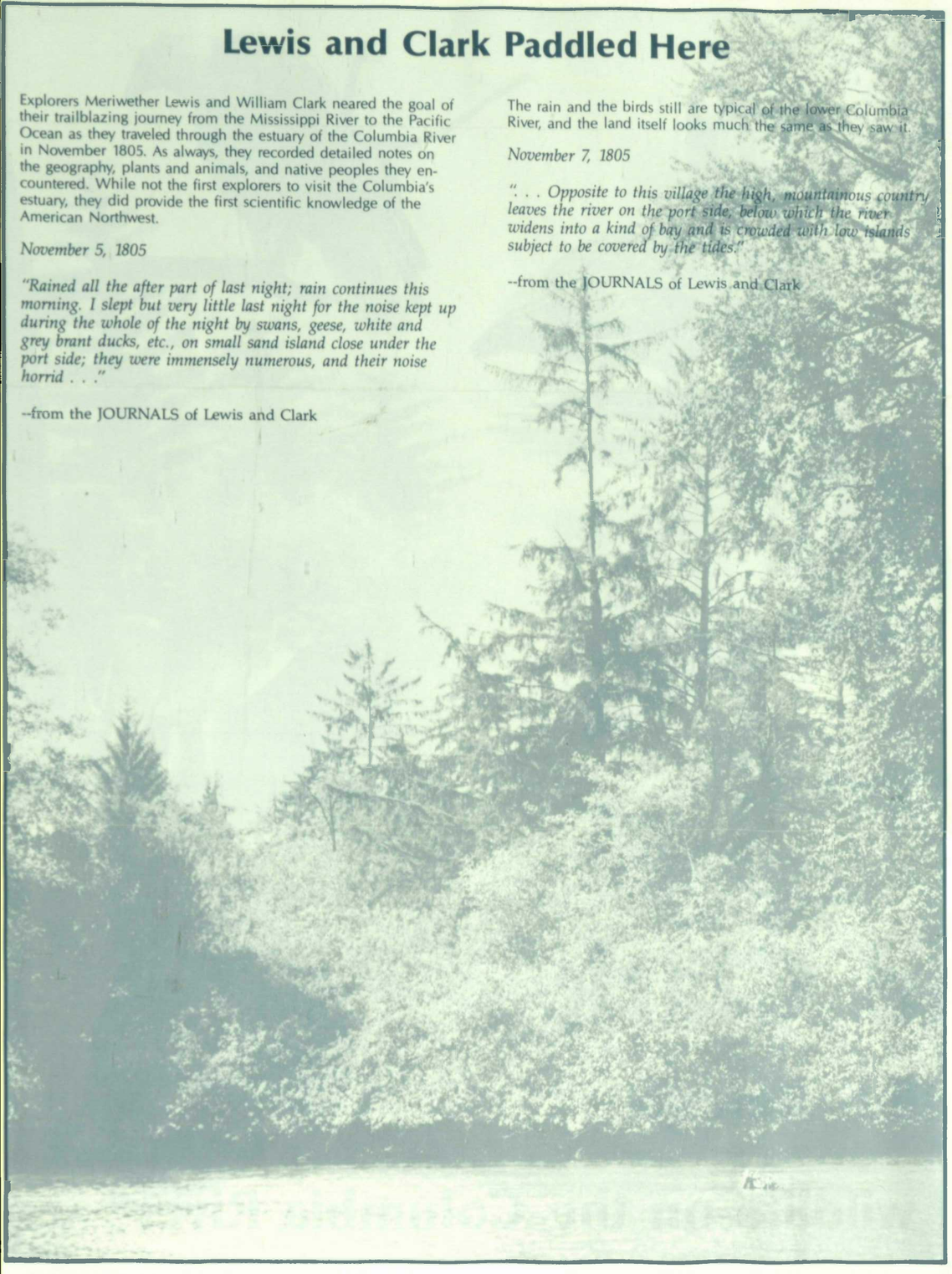
--from the JOURNALS of Lewis and Clark

The rain and the birds still are typical of the lower Columbia River, and the land itself looks much the same as they saw it.

November 7, 1805

". . . Opposite to this village the high, mountainous country leaves the river on the port side, below which the river widens into a kind of bay and is crowded with low islands subject to be covered by the tides."

--from the JOURNALS of Lewis and Clark



Refuge Established to Protect Rich Natural Heritage

The broad estuary of the Columbia River, where the fresh water of the land mingles with the salt water of the ocean, has played a vital role in natural and human history for thousands of years.

As it nears the ocean, the slowing current deposits the river's silt load to form low, marshy islands and sandbars. Twice a day, the islands are part of the land, and twice they are reclaimed by the water when rising ocean tides slow the river's current. These estuary islands form a chain that begins just above Tongue Point and follows the Oregon shore of the main channel upriver to Tenasillahe Island. The Lewis and Clark National Wildlife Refuge was established in 1972 to preserve the estuary land and water as vital fish and wildlife habitat. The refuge includes 35,000 acres of islands, bars, mud flats and tidal marshes.

The refuge is the largest marsh in western Oregon and provides habitat for peak populations of 3,000 tundra swans, 2,000 Canada geese and 50,000 ducks in February and March each year as they gather here before the northward migration.

Tundra Swan
Photo by Kris and Cindy Kennedy

Abundant Fish and Wildlife Resources

The estuary provides important wetland habitat that sustains the migratory birds of the Pacific Coast. The estuary is both a wintering area and a migrational stopping area for waterfowl that nest in Alaska and winter in Oregon and California. The most common species are tundra swans, Canada geese, mallards, pintails, American wigeon, canvasbacks and lesser scaups.

Great blue herons, gulls and shorebirds wade the extensive sandbars and mud flats in search of small fish, insects, worms and crustaceans. Grebes and cormorants dive in the deeper water of the channels in search of fish. The willow, cottonwood and spruce trees of the vegetated islands provide nesting sites and lookout perches for numerous small birds, hawks and bald eagles.

The estuary also is home to many species of fish. They use the estuary for spawning, as a nursery for their young, for feeding, and as a passageway between the ocean and upper river. The estuary is particularly important as a feeding area for juvenile salmon while they go through the physical changes that allow them to survive in salt water. They then migrate into the ocean, where they grow to adulthood and live for several years. As adults, they return through the estuary, seeking out their natal streams upriver to spawn the next generation.

The major sport and commercial fish species include coho, chum and Chinook salmon, steelhead and cutthroat trout, and white sturgeon. Other fish species using the estuary include American shad, smelt, perch, starry flounder, bass, catfish and Pacific lamprey.

Harbor seals use sandbars and mud flats as haul out sites at low tides, while both seals and California sea lions feed on a variety of fishes in the estuary. Beaver, raccoon, weasel, mink, muskrat and river otter are other mammals that live on the islands. A few Columbian white-tailed deer are present on some of the upstream islands.

Fish and Wildlife Need the Estuary

The estuary supports an abundance of life because of the large expanses of shallow water, mud flats, and marshy and swampy islands. Sunlight, fertile soil contributed by the river, and nutrients and oxygen brought in by the tides combine to promote luxurious plant growth, ranging from plankton in the water to trees on the islands. Wetlands like these are the most productive environments on earth.

Although animals eat some of the vegetation, most of it eventually dies and decays. The decaying plant material feeds the estuary. Bits of decomposing plants become coated with bacteria and algae, and tides and currents carry it about. Small animals such as clams, worms and young fish feed on this material. They, in turn, may be eater by larger fish, seals, or birds in a complex food web that also includes humans.

Great Blue Heron
Photo by Kris and Cindy Kennedy

The Estuary Benefits People

Commercial and sport fishermen catch salmon, steelhead, sturgeon and shad. Birders and waterfowl hunters enjoy the great flocks of birds. Boaters cruise leisurely among the islands. Tugs and barges and ocean-going freighters travel through the estuary to and from upriver ports. Marsh plants remove wastes and toxic chemicals from the river by taking up the pollutants into their systems as nutrients.

Humans Impact the Estuary

Despite the benefits the estuary provides, some human activities have had detrimental impacts on it. Dredging and spoil disposal to maintain navigation have altered fish and wildlife habitats. Some marshes have been diked, drained or converted to agricultural land. Anticipated development of industrial and port facilities, such as oil refineries and coal shipment terminals, may create future impacts unless carefully planned.

Wise Use and Public Awareness Needed

Although the fish and wildlife habitats of the Columbia River estuary appear secure within the Lewis and Clark National Wildlife Refuge, refuge status is not failsafe protection. The refuge will always be vulnerable to careless public use and abuse, upstream problems such as pollution and oil spills, and pressures for development. Too often it seems that because these natural resources belong to everyone, they are seen as the responsibility of no one. Refuge managers cannot do their jobs without citizen support for protection of vital fish and wildlife habitats and valuable recreational opportunities.

Enjoying the Refuge

Although the refuge is open year-around, the best time to visit to see large numbers of wildlife is from October through April.

Boating - The islands of the Columbia River estuary are accessible only by boat. Tidal flows and fluctuations, strong winds and wake from ships in the navigation channel can make boating difficult and sometimes dangerous. Deep channels separate most of the islands at high tide, but tide tables and navigation charts should be consulted to avoid grounding on sandbars. If your boat becomes stuck in the mud, wait for the next high tide to float it free. Launch facilities are located at John Day Point and Aldrich Point in Oregon, and at Skamokawa, Washington.

Wildlife Observation - See and photograph wildlife in their natural environments. One secret to seeing more wildlife is to look quietly, since noise scares most animals away. Binoculars and field guide books can help you identify the animals you see.

Hiking - Public entry on the refuge islands is limited to foot travel only.

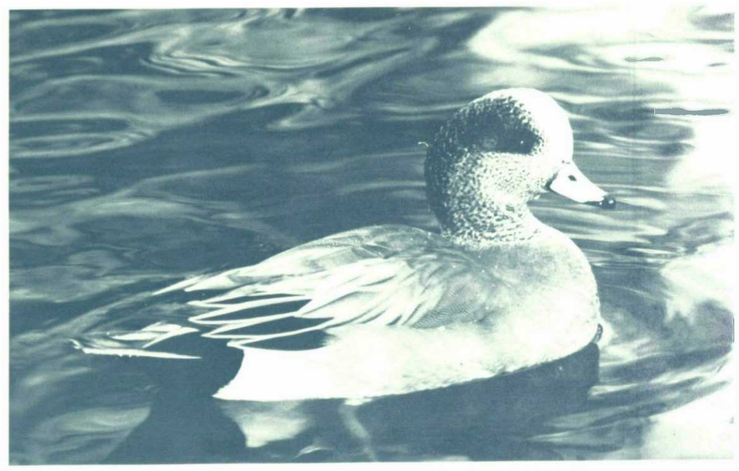
Fishing - Sport fishing is regulated by the State of Oregon.

Hunting - Most of the refuge is open to hunting for geese, ducks, coots and snipe in accordance with State and Federal regulations. All other species are protected and may not be killed. All hunters must possess a valid Oregon hunting license, and all waterfowl hunters 14 years or older must have a signed valid Oregon State Waterfowl Stamp and, in addition, all waterfowl hunters 16 years or older must possess a signed valid Federal Migratory Bird Hunting and Conservation Stamp (Duck Stamp). Temporary blinds may be constructed, but they will be available for general use on a first-come basis on subsequent days.

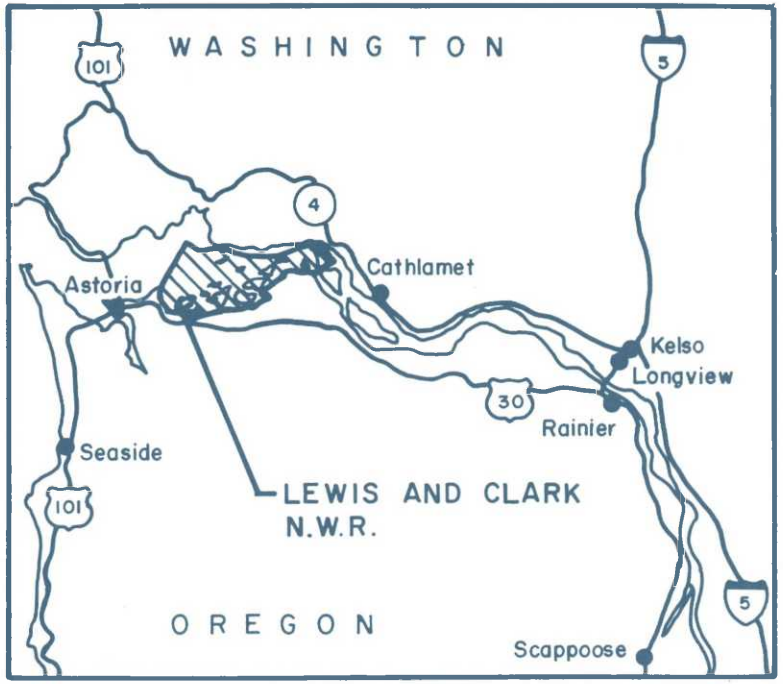
Steel Shot Required - All hunters are required to possess and use only ammunition containing steel shot. Lead shot is toxic to waterfowl and bald eagles, and its use is prohibited.

Closed Areas - All exposed lands on Miller Sands Island and its partially enclosed lagoon, as posted, are closed to hunting. The diked portion of Karlson Island, as posted, is closed to hunting. Tenasillahe Island is closed to hunting.

Camping - The refuge is open for day use only. Camping is available at Skamokawa Vista Park and in private campgrounds.



American Widgeon
Photo by Kris and Cindy Kennedy



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