Central Office

NISQUALLY NATIONAL WILDLIFE REFUGE

Olympia, Washington

ANNUAL NARRATIVE REPORT

Calendar Year 1988

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

REVIEWS AND APPROVALS

NISQUALLY NATIONAL WILDLIFE REFUGE

Olympia, Washington

ANNUAL NARRATIVE REPORT

Calendar Year 1988

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Refuge Manager Date

Refuge Supervisor Review Date

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Regional Office Approval Date

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INTRODUCTION

The Nisqually Delta, site of Nisqually National Wildlife Refuge, is situated at the southern end of Puget Sound in Washington State (Thurston and Pierce counties). Interstate 5 crosses the Delta and is the southern boundary of the Refuge. The Interstate Highway links the Refuge to the Seattle-Tacoma metropolitan area 15 miles to the northeast and the Lacey-Olympia area five miles to the west. The Lacey and the Sea-Tac area are both growing rapidly toward the Refuge.

The Nisqually River, starting on the southern slopes of Mount Rainier 75 miles away, empties into open saltwater at the Nisqually Delta (Figure 1). Refuge lands consist of the flat river delta which rises no more than 20 feet above mean sea level, and upland bluffs with elevations reaching 200 to 300 feet. On the mudflats are depressions of varying depth (2 to 10 feet) and some small ridges formed by the ebb and flow of tidal currents.

Over the past 20 years the Nisqually Delta's importance in the Pacific Northwest has changed. Once viewed as a rich river bottom farmland, the Delta is now recognized as a valuable habitat for fish and wildlife. By the mid-60's farming within the Delta was economically waning and a proposal by the Port of Tacoma to build a deep water port facility near the mouth of the Nisqually River catalyzed public concern. The public concern has continued and still represents a viable force in management of the Delta. Interest in preserving the Delta, originally generated by Margaret McKenny and the Nisqually Delta Association, led to a series of legislative and governmental actions aimed at protecting the Delta from resource degradation.

In 1967 the Washington State Department of Game purchased holdings of approximately 616 acres of Delta tidelands and salt marshes. In 1970 the Governor of Washington created the Nisqually River Task Force to obtain information in preparation of a plan for preserving and protecting both the Nisqually River and Nisqually Delta. In 1971 the United States Secretary of the Interior designated portions of the Nisqually Delta as a National Natural Landmark. In 1972 the Task Force recommended that the entire Nisqually River Basin from Mount Rainier to Puget Sound be managed as a total glacier-to-ocean environmental system, and specifically, that the Delta be set aside as a wildlife refuge. In January 1974, acquisition of the Nisqually National Wildlife Refuge was approved by the Migratory Bird Conservation Commission and established for management by the U.S. Fish and Wildlife Service.

The Nisqually Delta was chosen for refuge status because of its diversity and uniqueness of habitats, its existing importance for waterfowl in the Pacific Flyway, and its potential for habitat enhancement. The wetlands of the Nisqually Delta form one of the largest remaining undisturbed estuaries in western Washington supporting an abundance and variety of plant and animal life (Figure 2). Twelve major habitat associations ranging from

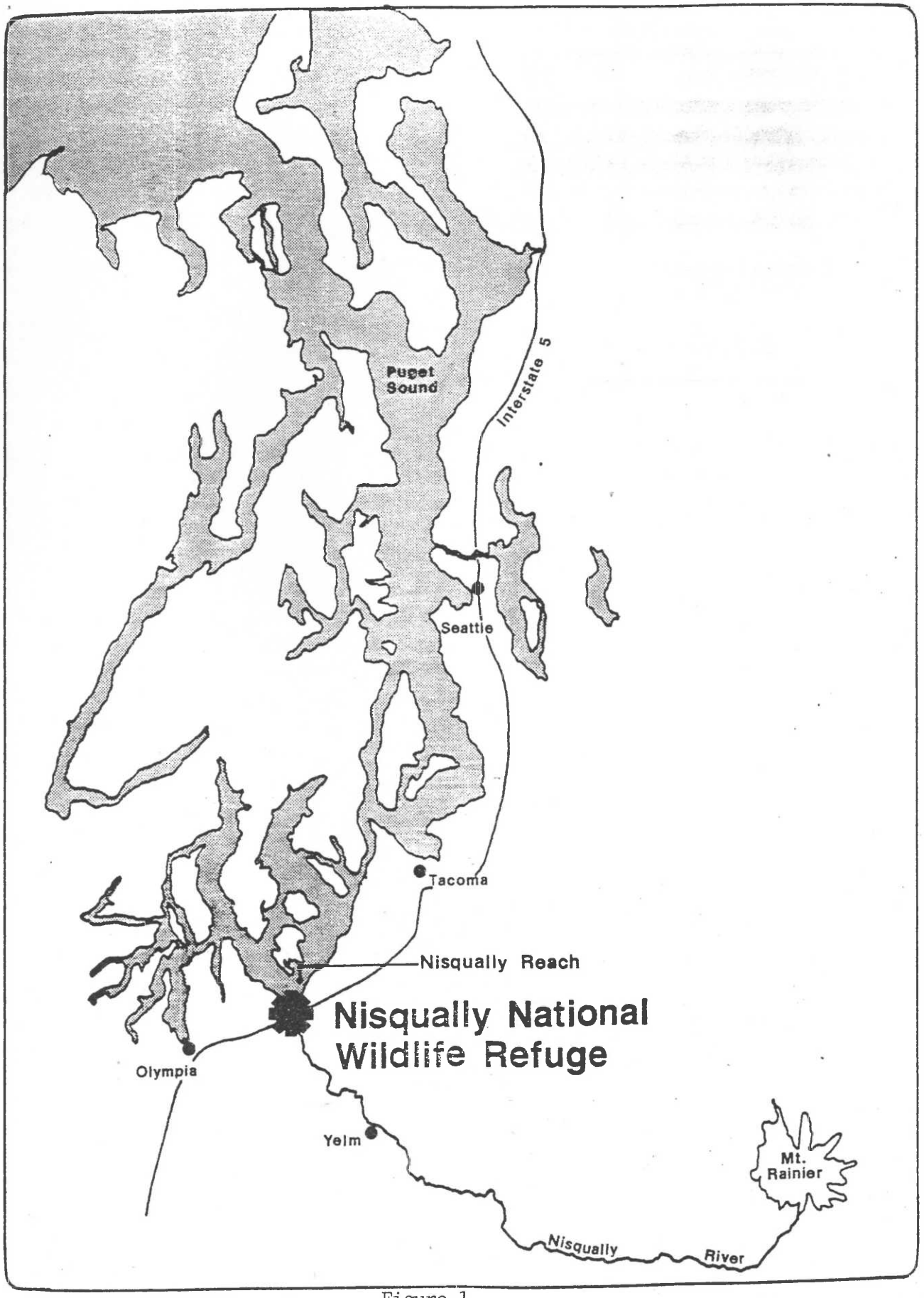
Puget Sound
Interstate 5
Seattle
Tacoma
Nisqually Reach
Nisqually National Wildlife Refuge
Olympia
Yelm
Mt. Rainier
Nisqually River

Figure 1

open saltwater to forested uplands exist within the Refuge's proposed 3,780 acres. This includes a unique combination of independent fresh and salt marsh habitats adjacent to each other. A large number of waterbirds are attracted by the diverse combination of aquatic plants and invertebrate organisms supported by the Delta. The plentiful food supply and shelter from most of the winter storms make the Delta a natural resting and wintering area for migratory birds.

Figure 2. Mt. Rainier rises above the Nisqually grasslands, but the old North Barn has seen better days.

The waters of the Nisqually River, McAllister Creek, and Red Salmon Creek serve as either spawning, rearing, or passage areas for anadromous fish. The fisheries resources of the Nisqually Basin are an important component of the Puget Sound fisheries.

In 1985, the Washington State Legislature passed SHB-323, which was a mandate for the State Department of Ecology to develop an overall management plan for the Nisqually River Basin. The plan (with the Fish and Wildlife Service participating) was completed in 1987 and directed the formation of a Nisqually River Council to provide opportunities for balanced enhancement of economic, cultural and natural resources within the basin. The Fish and Wildlife Service is represented on the Council.

Table 1 depicts the representative habitat types for the total proposed acreage for the Refuge and Figure 3 illustrates the arrangement of habitats with major associated species.

Table 1

Table 1. Habitat Types of Nisqually Delta

	Acreage	% of Refuge
Total Refuge Acreage	3,780	100
Habitat Types:		
Open Water - Fresh	70	1.85
Mudflats	1360	36
Freshwater Marsh	35	1
Salt Marsh	715	19
Mixed Conif.- Decid. Forest	160	4.2
Deciduous Woodland	90	2.3
Shrub	15	0.4
Grassland	465	12.3
Cropland	70	1.85
Tidally Influenced Fresh/Salt Water	200	5.3

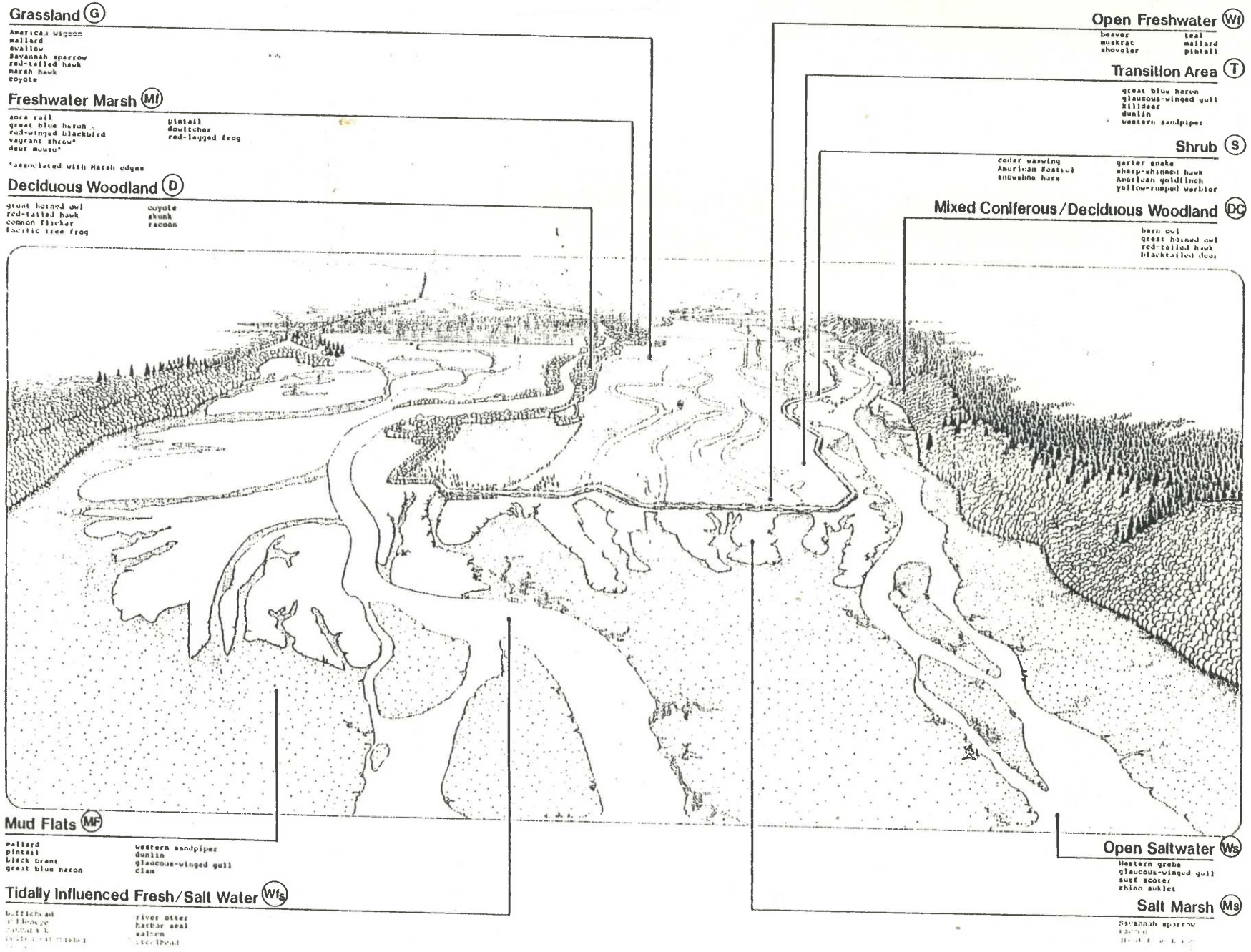
Grassland (G)
American wigeon
mallard
swallow
Savannah sparrow
red-tailed hawk
marsh hawk
coyote
Freshwater Marsh (Mf)
sora rail
great blue heron
red-winged blackbird
vagrant shrew*
deer mouse*
pintail
dowitcher
red-legged frog
*associated with marsh edges
Deciduous Woodland (D)
great horned owl
red-tailed hawk
common flicker
Pacific tree frog
coyote
skunk
racoon
Open Freshwater (Wf)
beaver
muskrat
shoveler
teal
mallard
pintail
Transition Area (T)
great blue heron
glaucous-winged gull
killdeer
dunlin
western sandpiper
Shrub (S)
cedar waxwing
American Kestrel
snowshoe hare
garter snake
sharp-shinned hawk
American goldfinch
yellow-rumped warbler
Mixed Coniferous/Deciduous Woodland (DC)
barn owl
great horned owl
red-tailed hawk
blacktailed deer
Mud Flats (MF)
mallard
pintail
black brant
great blue heron
western sandpiper
dunlin
glaucous-winged gull
clam
Tidally Influenced Fresh/Salt Water (Wfs)
river otter
harbor seal
salmon
Open Saltwater (Ws)
Western grebe
glaucous-winged gull
surf scoter
rhino auklet
Salt Marsh (Ms)
Savannah sparrow

Figure 3

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A. HIGHLIGHTS

- Annual Labor Day Open House and volunteer recognition (H-1).
- Take Pride in America lecture series hosted by Nisqually volunteers(E-4).
- Nisqually NWR implements refuge entrance fee (H-1).
- Several mounted specimens donated to Twin Barns Education Center (E-4).
- Grays Harbor NWR legislation was signed by President (C-3).
- Volunteer program second in the Region (E-4).
- Controversial acquisition gets go head (C-1).
- Farm Bill to provide opportunities for wetlands preservation and restoration (C-3).

B. CLIMATIC CONDITIONS

Our attempts at keeping ponds at maximum levels in 1988 were again hampered by drier than usual weather during the months when optimum water levels are desirable (Figure 4 and Figure 5). We are beginning to wonder if this is going to be a permanent pattern. With the fracturing of our ozone layer this might well be a possibility.

C. LAND ACQUISITION

1. Fee Title

No tracts of land were acquired in 1988. The present acreage in fee title and easement totals 2817.93 acres and total acreage within the proposed boundary is approximately 3,800 acres. Eight parcels remain to be acquired to round out the approved acquisition.

Of the parcels remaining to be acquired, the two most significant are lands owned by Ken Braget (325.75 acres) east of the Nisqually River, and tidal areas on the Nisqually Delta containing 616.91 acres owned by Washington Department of Wildlife. To fully implement the approved Conceptual Plan for Nisqually, the FWS must have administrative control over the two parcels.

Several meetings were held with county planners and other state resource agencies throughout the year to discuss preservation strategies for the Meek property. The best alternative proved to be fee acquisition by the

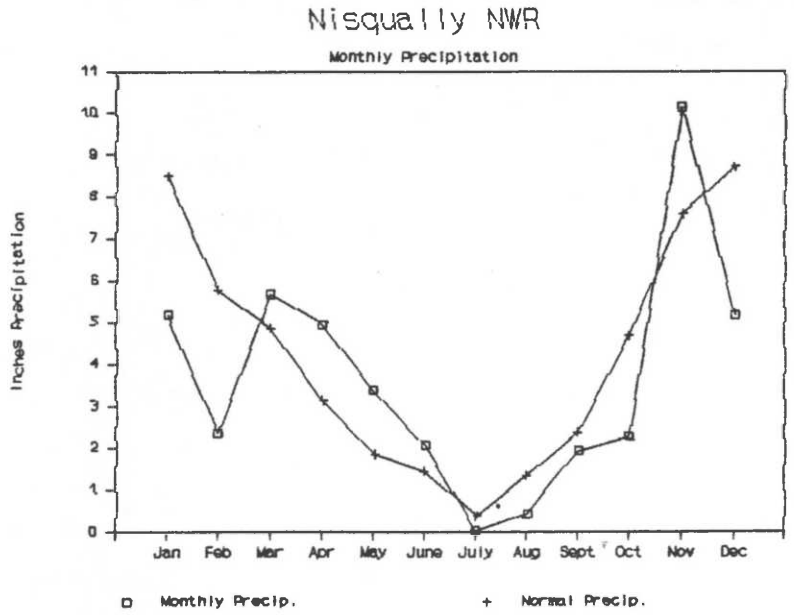


Figure 4.

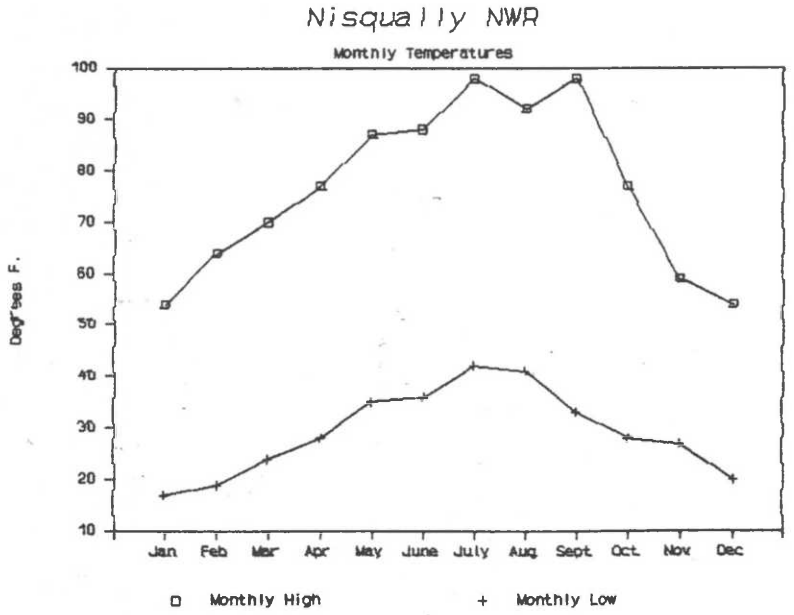


Figure 5.

Service.

Approval was given to acquire the Meek property, which is a 150 acre parcel on top of the bluff above McAllister Creek. The tract is a forested parcel of land which is required to provide adequate buffering from proposed

developments west of the Refuge. There is considerable local and congressional support for this acquisition.

2. Easements

Two easements totaling .55 acres on the bluff along McAllister Creek and a lease with Washington Department of Transportation for 26.51 acres along the SW boundary are included in the total Refuge acreage.

3. Other

The Food Security Act of 1985, popularly known as the Farm Bill, was passed to help reverse the declining economic environment on the American farm. Several conservation provisions were included in the Farm Bill that present an opportunity to conserve and restore millions of acres of wetlands. One of the principal conservation goals of the Farm Bill is to reverse the loss of wetlands in the United States.

In 1987, a Memorandum of Understanding between Farmers Home Administration and the U.S. Fish and Wildlife Service was signed to implement procedures for interagency coordination.

Personnel of the Service are expected to screen inventory lands to determine if opportunities exist to protect, enhance or restore resources that fall within the preview of the Service.

In Region 1, Fish and Wildlife Enhancement has the lead role in coordinating and implementing the program. Refuge personnel are to be involved in reviewing inventory properties to assess the need of attaining a conservation easement or gaining fee title to the land.

Nisqually Refuge Complex personnel are responsible for a ten county area in northwest Washington. During 1988 we reviewed five inventory properties and found significant resource values on most of them. The latest scenario is that if a property has important resources we should assure protection and not worry about operating dollars for these areas. Of the five properties reviewed we may end up as easement manager on two of them.

In 1988, legislation was signed by the President to establish Grays Harbor National Wildlife Refuge (see appended mini-narrative).

D. PLANNING

2. Management Plan

The Public Use Plan for Nisqually Refuge was completed and submitted for approval. A first draft of the Habitat Management Plan was completed for Nisqually Refuge. The Volunteer Services Plan was completed and approved. The plan was prepared by our "volunteer" Volunteer Coordinator Lucy Anderson.

E. ADMINISTRATION

1. Personnel

The Nisqually Maintenance worker, Bob Watson, transferred to Ruby Lake Refuge on September 11, 1988. His position remained unfilled through the end of the year. Biological Technician Schaff was promoted from GS-5 to GS-6. The Refuge Assistant position was reclassified which resulted in an upgrade for that position from a GS5 to GS6. The following displays the staffing for the Nisqually Complex for the last 8 fiscal years.

	Permanent			
	Full Time	Part Time	Intermittent	Temporary
FY88	9	1	1	
FY87	9	1	1	
FY86	8	1	1	
FY85	8	1	1	
FY84	8		1	1
FY83	8			2
FY82	6			1
FY81	5	1		
FY80	5			2

Six permanent full time employees are stationed at Nisqually (Figure 6).One permanent part time, three permanent full time, and one intermittent are stationed at Dungeness.

Figure 6.

2 4 3 1 7 5

1. Willard B. Hesselbart, Refuge Manager, EOD 11/7/76 . . . .PFT - GS12
2. Michael J. McMinn, Ass't Refuge Manager, EOD 08/18/85. . .PFT - GS 9
   Nancy J. Curry, Refuge Manager, CRO, EOD 12/20/87. . . . .PFT - GS 9
   Ulrich W. Wilson, Wildlife Biologist, CRO, EOD 08/01/85. .PFT - GS11
3. Ellie Henke, Outdoor Rec. Planner, EOD 09/25/77. . . . . .PFT - GS 9
4. William H. Schaff, Biological Technician, EOD 07/19/87 . .PFT - GS 6
5. Kathryn N. Haworth, Refuge Assistant, EOD 01/02/75 . . . .PFT - GS 6
   Vernon K. Wray, Operations Supv.CRO, EOD 08/01/74. . . . .PFT - WG10
6. Rollin R. Watson, Maintenance Worker, TRN 09/11/88 . . . .PFT - WG 8
   to Ruby Lake NWR
   Max J. Krueger, Park Rngr, Mar-Sept and Nov-Dec, 1987. . .PPT - GS 5
   Robert G. Horn, Maintenance Helper, ...Temp- WG 5
7. Lucy Anderson, Volunteer Coordinator . . . . . .

2. Youth Programs

The Nisqually Complex had its twelfth annual YCC program this year with six enrollees at Nisqually NWR. One group leader was hired at the GS-4 level.

YCC Camp Budget

$6,681	Enrollee Salaries
2,399	Staff Salaries
3,952	Supplies
$13,042	TOTAL (Target was $12,700)

The main objective of the 1988 YCC was to modify and improve existing trail conditions to provide accessibility for handicap visitors. On the River Trail the YCC's used cut-and-fill methods to achieve the 1:12 slope required to conform to handicap access specifications. Seven yards of gravel were used to fill any areas of the Trail that were laterally uneven or subject to flooding. 219 feet of chicken wire were tacked on the Trail's boardwalk, and 1026 linear feet of 2x2 were nailed to 513 feet of boardwalk. Many of the areas that were narrower than 36 inches were widened to at least that width.
Along with the River Trail, the Barn Owl Trail has been selected to be modified for handicap visitors. The construction of the bulkhead from the Dike Trail and the gravel ramp from the Memorial Grove has made the Barn Owl Trail more accessible to handicap visitors. The new 252 foot boardwalk raises the trail off an uneven and perpetually wet section of the trail, and provides an even and safe surface for wheelchairs. The 2x2 railing, as it did on the River Trail, ensures the safety of the blind and wheelchair users by defining the edge of the boardwalk.

The boardwalk support is exclusively provided by pier-blocks and 4x4's. The planking was done with 2x10 spaced approximately one-half inch apart. This simple method of construction allowed the enrollees to complete the boardwalk with minimal supervision. The enrollees gained a sense of accomplishment, and when it was over called it "our boardwalk" (Figure 7).

During the Dungeness Spike Camp the crew was set to the following tasks: laying bark on the equestrian trail, picking up plastic litter from the Dungeness Spit and cleaning out garbage from the fire rings in the county park. More than any other activity this summer, picking up plastics from the beach increased the enrollee's awareness of how the carelessness of humans threatens the existence of wildlife. The second day of beach cleanup the crew saw an elephant seal and over a hundred harbor seals, they discussed how the seals could not differentiate between their natural food and plastics, and how they get caught in nylon fishing nets. Beach clean up is physically demanding, especially out on the end of the Spit where it had never been cleaned. Nevertheless, the enrollees worked hard to collect more than 150 garbage bags full of litter in two days.

Figure 7. YCC's building the boardwalk to the Twin Barns. EH 88

One of the least glamorous of jobs undertaken by the YCC's this year was the hand pulling of tansy ragwort and poison hemlock. The crew leader tried to emphasize that what was pulled by hand decreased the necessity to use potentially harmful herbicides. The weeds were found in all parts of the Refuge with high concentrations of poison hemlock found behind the Twin Barns and tansy ragwort in the SW corner of McAllister Creek.

As a community service project the crew spent two days mowing lawns, cleaning yards and garages, weeding, and pruning for disabled elderly people of the Olympia area. Karen McCarthy of the Volunteer Chore Service did an excellent job informing the elderly folks of the crew's impending arrival. In all but one of the visits the folks were home and had some work for the crew to do.

Besides these major projects, the crew was also engaged in the following activities: clearing elderberries from the around the Barns as part of a restoration project, brushing back approximately seven miles of trails on the Refuge, organizing and cleaning the inside of the Twin Barns and the shop, helping in the construction of a bulkhead off the Dike Trail connecting the Barn Owl Loop Trail, construction of a brochure dispenser and periodic washing of Refuge vehicles.

3. Other Manpower Programs

Three young people, Annette Woodson, Tony Parker, and Pat Dumar, were hired this year from the Thurston County Youth Services Program. Two worked in maintenance and one as an office helper/receptionist.

4. Volunteer Programs

The Volunteer Services program continues to play an important role in the various management programs on the Refuge. Again this year the Orientation & Training class, (3 consecutive Saturdays-5 hours each day), was held March 26 and April 2 & 9 for all new members. "Regulars" also attended as the Project Leader updated everyone on current Service, Complex and Refuge issues in addition to the usual topics. Staff members teaching were Willard B. Hesselbart, Project Leader, Michael J. McMinn, Assistant Refuge Manager, Bill Schaff, Biological Technician and Ellie Henke, Outdoor Recreation Planner. Volunteers assisting were Aage B. Anderson, Richard Van Deman and Lucy G. Anderson. Following the course, all new volunteers received a Volunteer Handbook, patch, and cap supplied by the Refuge. Those volunteers engaged in work projects that are highly visible to the public are also given a shirt allowance.

Over the last seven years that volunteers have been used on the Refuge, we have experienced a steady increase in the participating numbers of volunteers and the total hours donated to the Refuge (Figure 8 and Figure 9).

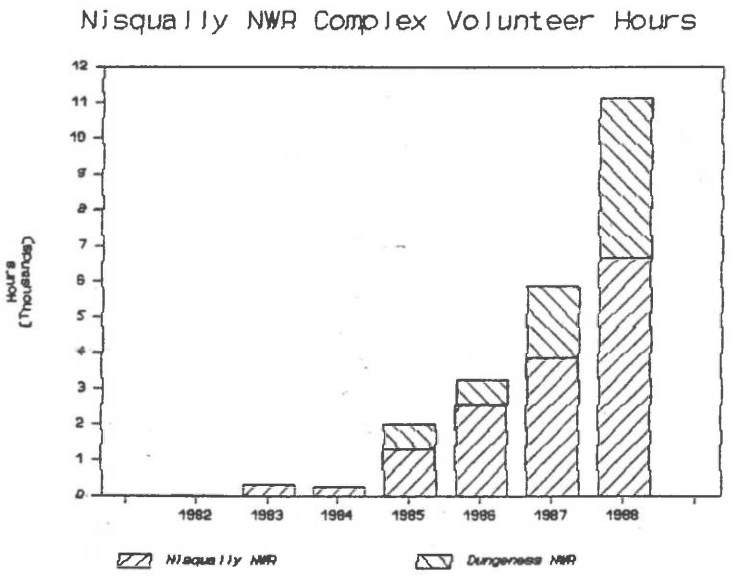


Figure 8.

In 1988 our volunteer staff grew by 40% while hours donated grew by 58% over 1987. When comparing 1988 to 1985 we have increased our ranks by 33 1/3% and hours by 80%.

In the 1988 Volunteer Report issued by the Regional Office, the Nisqually NWR Complex now ranks second in the Region for total hours volunteered.

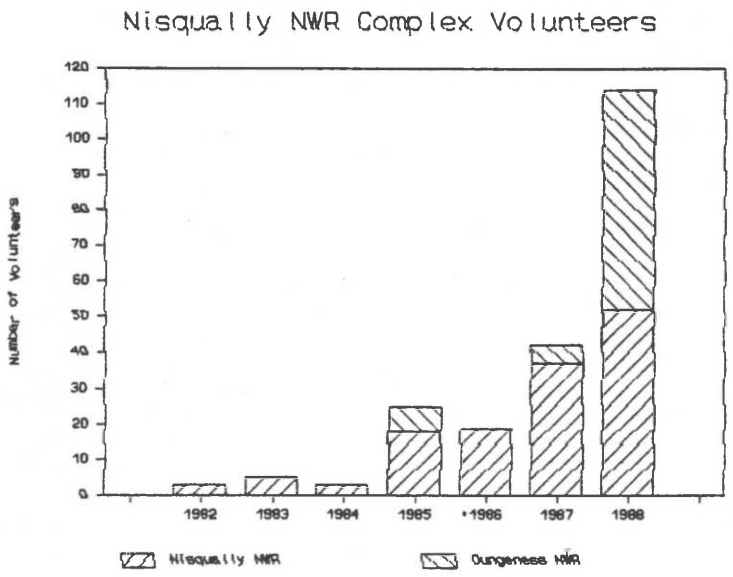


Figure 9.

The Volunteer Program will accept any individual who wishes to give services to the Refuge. Membership is classified as individual, group, intern, and family.

Following orientation, volunteers are allowed to review the Work Project Manual which presents job descriptions for all projects listed under the various management programs on the Refuge. Projects are: 1) Administration & Operations, 2) Habitat Management, 3) Public Use and Signing and 4) Maintenance.

Although volunteers are only required to give 8 hours per month (96 hours per year) many volunteers served on more than one project. Projects for 1988 are:

Entry Fee Program. Because of tight budgets and the non-available time of Refuge staff, Volunteers were asked to conduct the Entry Fee program. Their tasks include stocking the pay station with envelopes, exchanging pipe safes, counting monies, reporting statistical information and mailing monies to Denver.

All of the work has been done by two teams of volunteers with a back-up team: Bill and Marguerite Allyn , Lee Bettinger and Ellen Iverson, and Rena Vizzard and Lucy Anderson. All volunteers are bonded by the Refuge. Alice Ireland and Dan Huttmann folded all of the pay envelopes so they would fit the dispenser. A total of 428+ hours were donated to the Service for this project.

Exhibit Committee. One of the most active projects, the volunteers are

responsible for is designing and rehabilitating existing exhibits and building and installing new displays in the Interpretive Room of the Education Center in the north Twin Barn.

Dori Wysocki, taxidermist, completed three exhibits: a red-tail hawk holding a long-tail weasel in its talons, two sharp-shinned hawks - one immature clutching a grosbeak and a mature watching, and a trumpeter swan (Figure 10 and Figure 11). Over 35 species of birds and 10 species of mammals are in the freezer awaiting work. We also have acquired a mounted bald eagle, received from Dungeness NW Refuge, and a great horned owl given by Law Enforcement, Bellevue office.

Carla McCully, Beverly Wallin, Aage Anderson, Dan Huttmann and Lucy Anderson also serve on this committee.

Interpretation. Guided nature walks, explaining exhibits in the Interpretive Room, giving off-refuge presentations for schools, groups and/or organizations, developing slide-sound programs, hosting school reservations in the Education Center classroom and giving orientation talks to visiting school groups and other visitors, are all performed by volunteers. Over 5700 individuals visited the Interpretive Center: 3300 students and 2400+ other visitors. The following volunteers also represented the Refuge at the Puyallup Fair, Adopt-a-Stream Conference, and in cooperation with the local Boy Scout Council are developing the Take Pride in America Scouting Program: Aage Anderson, Belinda Fremont, Ellen Iverson, Beverly Wallin, Richard Van Deman, Marie Berchtold, Mary Kay, Charles, Tracy and Kristie Askins, Tom Reynolds, Dan Huttmann, Ada and Jack Davis, Dave McNett, Kurtis Fremont and Lucy Anderson; all gave 2107 hours in this project.

Clerical Support. Over 658 hours were provided for clerical assistance in the Refuge office and Volunteer Services office. Support services were given by Marie Berchtold, Beverly Wallin, Ellen Iverson, Mary Kay Askins and Lucy Anderson. Services include answering phones, typing reports, filing, completing forms, handling mail and answering inquiries for Refuge information.

Summer Lecture Series. Again this year, volunteer Pam Miller developed and presented the Take Pride in America Summer Lecture Series. Four hundred and fifty attendees heard a variety of topics:
1) "Marine Mammals of Puget Sound", John Calambokidis, Research Biologist;
2) "Origin of the Nisqually River; the Nisqually Glacier", Carolyn Driedger, Hydrologist;
3) "Life History and Migration of Nisqually River Salmon", Duane Phinney, Chief of Habitat Management, Wa. State Dept. of Fisheries;
4) "Wetland Plant Communities of the Nisqually Delta", Michelle Stevens, Wetlands Ecologist;
5) "Occurrences of Unusual Marine Life as Indicators of Changes in Ocean Conditions", Alan Mearns, Research Biologist;
6) "Seabird Natural History in Puget Sound", Steven Speich, Biologist; and
7) "Nisqually Delta Re-visited: the Fascinating Early History of the Area", Delbert McBride, Curator Emeritus, Wa. State Capital Museum.

Figure 10. There is lasting benefit when volunteers do work like this.

Figure 11. A decorative flower bouquet livens up the red-tailed hawk mount for the Open House. 88

Aquatic Insect Study. The purpose of this study, developed by volunteer Aage Anderson, is to compile a species list of the aquatic insects and other invertebrates found in six pre-selected ponds on the Refuge to determine seasonal variation of species due to changes in water characteristics; and to utilize the compiled species list in studies on aquatic insects as a food source for water-birds (Figure 12). A representative sampling of aquatic insects has been collected with some of the species identified and pinned in display cases.

From this study has come the "What's Under a Duck" exhibit in the Interpretive Room. School children and other visitors are fascinated by the insects on display in the 45-gal. aquarium donated by the Weyerhaueser Garden division. With accompanying drawings, text, and mounted specimens, viewers are able to better understand the insects that live in our ponds. Other volunteers on the collection teams are: Dan Huttmann, Barry Bidwell, Randy McCully, Jr., and Richard Van Deman (506 donated hours).

Figure 12. Aage Anderson gets lots of help with the insect study.

Habitat Vegetation Study. This project, conducted by Volunteer Richard Van Deman, is based on previous studies completed on the Refuge in years past. A species list of 327, representing 96 plant families, has been established but is by no means complete. To date 113 have been collected and 68 species have been mounted for the herbarium. The goals of this ongoing study will identify the different habitats on the Refuge and control the undesirable plant life, insure that the wildlife has a continuous food source by monitoring and controlling habitats, and provide a source of reference for use by researchers and the general public on plant identification with a printed plant list. Rena Vizzard, Evergreen State

College intern, completed a wetlands classification study in conjunction with this study (754 hours donated).

Raptor Study - Great horned Owl. Carla and Randall McCully initiated the great-horned owl study but due to illness had to withdraw from the program they have conducted the previous 2 years. Sam Cushman picked up the study, located the nest and completed the behavioral study for the year.

Northern Harrier. Jeff Schwilk participated in the northern harrier behavior study by locating a nest and observing daily behavior.

Both of these young volunteers gave 126 hours for these projects.

Great Blue Heron Study. This year the study was conducted by Arvie Johnson from a portable blind built by volunteers and placed on the Refuge side of McAllister Creek across from the rookery. Donating 384 hours, Arvie observed from April through June at which time Lynn Niemi, an Eastern Washington University intern, returned to our Volunteer Program and completed the Heron study. Lynn also assisted in the collecting of eggs and chicks for a study on the effects of PCB's, DDT, and DDT metabolics on these birds, conducted by Fish and Wildlife Enhancement Division.

Waterfowl Harvest Survey. Volunteers again this year conducted the hunter's bag check at Luhr Landing for people hunting on adjacent Dept. of Wildlife lands. Also included this year was a survey on hunting locations utilized by these hunters. Those assisting with the survey were Charles Askins, Robert Lowery, Richard Van Deman, Lynn Niemi, Bill and Chris Schaff and Aage and Lucy Anderson.

Nesting Box Structures. This year the building, maintenance and survey of nesting box use was combined into one major project conducted by Richard Van Deman, who, also as a volunteer, stepped in and assumed some of the responsibilities of the maintenance worker, donating 164 hours for the project.

Parking Lot Rehabilitation. Chad Balcom, an Eagle Scout candidate and volunteer, conducted his project for an Eagle Scout Award (Figure 15). Revision of the parking lot was deemed necessary when the Entry Fee program was initiated. Chad drew up plans, moved existing trees, shrubs and fence and then replanted the trees and shrubs and added additional plantings. His group also replaced the fence and then mended fences around the office area. The group donated 185 hours to the Refuge.

Other Volunteer Projects conducted this year:
Quarterly Photo Survey, Wildlife Determination Survey, Bird Banding, Bi-monthly Bird Surveys; Gift Catalog; Briefing Book; Volunteer Services Recruitment brochure; Open House; Teacher Packets and Workshop; and Protection Island Dedication. Most of the projects are on-going from one year to the next which gives us a continuity in our projects although we are always ready to accept new projects regardless of the time involved.

On September 2, the Annual Open House was held on the Refuge (Figure 13 and Figure 14). At that time the following awards were presented:

Certificates of Appreciation to:

Bill Allyn	Marguerite Allyn	Charles Askins
Kristie Askins	Tracy Askins	Charles Baird
Jeremy Berchtold	Paul Berchtold	Lee Bettinger
Ada Davis	Jack Davis	Sarah Emery
Sean Erickson	Treven Gee	Cathlene Hanson
Charlene Holmes	Alice Ireland	Ellen Iverson
Joey LaRocque	Rene LaRocque	Robert Lowery
Carla McCully	Randall McCully	Randy McCully
Dave McNett	Pam Miller	Georgia Ramsey
Judy Riggs	Monica Rollers	Bill Schaff
Chris Schaff	Sabrina Schaff	Jeff Schwilk
Stan Smith	Gary Sutton	Steve Thereault
Rena Vizzard	Jim Pruske	Tom Reynolds

Certificates and 100 hour pins:

Chad Balcom	Marie Berchtold	Sam Cushman
Dan Huttmann	Arvie Johnson	Lynn Niemi
Beverly Wallin	Dori Wysocki	

Certificates and 500 hour pins: Aage Anderson Richard Van Deman

Certificate and 1000 hour pin: Lucy Anderson (2500+ hours)

Special Letters of Recognition: Dan Huttmann and Richard Van Deman
Whose quick thinking and action prevented a fire on the Refuge from becoming a major incident (Figure 16).

Volunteer of the Year Award (given for the Complex):
Bill and Suzanne Sterling, Volunteer Caretakers, Protection Island National Wildlife Refuge.

This year also saw the Volunteer Services Plan, prepared by Lucy G. Anderson, Volunteer Coordinator, and approved by the Asst. Regional Director, Wildlife Resources on August 1, 1988.

The last special event of the year for all volunteers was the first Volunteer Christmas Party held in the north Twin Barn Education Center, December 16, 1988. Forty-eight volunteers and their families joined together for a potluck and evening of good comradeship (Figures 13 - 16).

Figure 13.A good looking volunteer crew. 88

Figure 14.Volunteers Ada and Jack Davis receive their Certificate of Appreciation. 88

Figure 15. Eagle Scout, Chad Balcom, received a volunteer 100 hour award and pin for his work on the expanded parking lot. 88

Figure 16. Special recognition given to (lf) Dan Huttmann and (rt) Richard Van Deman.

5. Funding

Complex Budget:

FY86	FY87	FY88	FY89
1260 - 364,600	O&M - 311,300	1261 - 265,500	1261 - 345.500
1270 - 400	Small - 32,200	1262 - 71,600	1262 - 72,000
	ARMM -	- 49,700	1240 - 8,100
	RPRP - 4,000	- 45,000	RP - 10,000
		New Sta- 85,000	New Sta- 15,000
		OPS - 27,000	Pay Act- 30,000
		YCC - 12,700	1X Maint. 20,000
			YCC - 12,700
$365,000	$347,500	$556,500	$513,300

6. Safety

All Complex staff completed annual baseline hearing tests. Periodic safety meetings with films were led throughout the year.

The Lacey Fire Department completed the annual building fire inspection. The propane tank at the shop required a barricade which was immediately installed.

8. Other

Barbara Whitesitt, CGS, completed a procurement review of the Complex. All was in order.

F. HABITAT MANAGEMENT

1. General

The overall condition of the habitat types at Nisqually NWR is good. Nisqually encompasses a variety of habitat types ranging from marine to riparian forest and hosts a wide range of wildlife species and human uses.

This year again saw an extremely dry summer with precipitation below normal until the fall rains came the beginning of November.

2. Wetlands

The wetland areas at Nisqually were managed according to our Water Management Plan with the exception that water was kept in most sloughs longer and drawn down slower than originally proposed. This was due to the number of waterfowl with young using each area. Sloughs were not completely drawn down until checks revealed no young present or the young were old enough to move to other areas.

Shannon Slough was again kept moist all summer long and was used as a feeding and resting site all summer. This is the third year Shannon has been kept full and the result is a very thick growth of sago pondweed and the cattails are crowding out other vegetation along the banks.

The wet meadow fields around the Refuge produced a good quantity of feed in the form of seed. Cattail control is still of ongoing concern. Due to uncooperative weather and the transfer of our pesticide applicator/maintenanceman we were unable to conduct any chemical herbicide control programs. Several small experimental plots were hand cleared of cattails to measure the rate of regrowth, this method is too labor intensive to do on a large scale unless we can organize some volunteer groups to clear other areas where burning is impossible.

3. Forests

The riparian forest along the Nisqually River is in very good condition as wildlife habitat. Consisting of cottonwood with red alder and big leaf maple, the area has plenty of standing dead and blown down trees. Some of these downed trees are courtesy of the resident beaver population but they all provide excellent habitat for the numerous woodpeckers and flickers in the area (Figure 17).

Figure 17. Young alders and crabapples are a favorite treat for our local beavers. 88

The orchard was pruned and spot spraying was conducted to control tent caterpillars. Again this year the annuals and perennials were allowed to grow and flower which attracted many species of passerines.

4. Croplands

This year 35 acres were plowed, disced, and seeded in stepto barley by one of the coop farmers (Figure 18). Although the weather did not cooperate and shortly after seeding the rains stopped, the area did produce some excellent barley to be left in the field as waterfowl food.

5. Grasslands

The grassland units of the Refuge were in good shape this year. A moist spring and dry summer produced a good seed crop. The one problem with most of the grassland areas is the invasion of Canada thistle. In many areas this can be controlled by either force account or cooperative mowing.

8. Haying

The cooperative farmers hayed a total of 245 acres this year. Both farmers have been more successful in getting their fields chopped and picked up in a timely manner than in the previous years. One cooperative farmer hayed approximately 170 acres and planted the 35 acres of stepto barley. The second cooperative farmer hayed approximately 75 acres.

Figure 18. Discing the 35 acres north of the twin barns, which will be planted with barley. 88

9. Fire Management

No prescribed burns were conducted this year. There were two small wildfires on the Refuge. One was caused by spark emissions and the other by a seized bearing from the cooperative farmers tractors. The total area burned was less than one acre. The first fire was on the Centerline road north of the Twin Barns and was spotted by two Refuge volunteers whose quick action was credited with containing this burn at the start. The second burn was in the south fields and burned one large round bale of hay. The refuge pumper trailer was left in a ready position all summer.

10. Pest Control

One refuge volunteer spent 100 hours hand pulling gorse, scotch broom, and tansy ragwort. In the spring of 88 four chemicals were used to control either plant or insect pests. They were:

Round-Up, 3 acres were sprayed to control weeds on roads and trails.

Dipel 2x, 6 acres were sprayed to control tent caterpillars along the dike trail and in the orchard.

Weedmaster, this chemical was spot sprayed on scotch broom, gorse, tansy ragwort, and water hemlock.

Agri-Strep Type D, was spot sprayed on fruit trees to control fireblight.

Again this year live trapping was conducted to remove a striped skunk from under the shop office.

12. Wilderness and Special Areas

The lands of the Nisqually Delta, outside the Brown Farm Dike, are designated as a National Natural Landmark. Refuge staff have been working with Gordon Atkins (NPS) to review the boundaries. These lands were listed as non-threatened on the annual report submitted to the National Park Service.

G. WILDLIFE

1. Wildlife Diversity

The Black Hills Audubon Society conducted the Annual Christmas Bird Count, which included all of Nisqually Refuge, on December 31, 1988. This year's count totaled 9529 individuals with 79 species. Table 2 compares this year's data with that of previous years.

Table 2

Annual Christmas Bird Counts

Year	1988	1987	1986
Total Individuals	9529	9078	9066
Number of Species	79	62	69

Several species were seen during the Christmas Bird Count which had not previously been recorded during these counts. These include two cinnamon teal, a blue-wing teal, a black-shouldered kite, and a northern saw-whet owl.

2. Endangered and/or Threatened Species

Each fall a peregrine falcon has returned to utilize the Refuge fields. This year the first peregrine sighting was made on October 15th. The bird has been seen on several occasions by staff and visitors since that time.

Bald eagles have used the Refuge regularly this year. February 11 was a banner day for bald eagles, with 12 being spotted. This is the highest daily total on record.

The annual mid-winter bald eagle count was conducted by Refuge staff on January 7 & 8. A total of 68 bald eagles were recorded. Table 3 represents the eagle count for 1988 and the prior 4 years data for the south and mid-Puget Sound area.

Table 3

Mid Winter Bald Eagle Count

Year	1988	1987	1986	1985	1984
Adult	52	44	54	21	78
Immature	16	7	6	4	14
Totals	68	51	60	25	92

3. Waterfowl

Ducks - The 1987 mid-winter waterfowl counts (Table 5) showed 5782 ducks on the Refuge. Of those, 74% wigeon, 15% mallard, and 5% green-winged teal. These numbers showed a slow decline until mid-summer, then by October the peak was almost 13,000 ducks. Waterfowl aerial surveys were flown in January, February, March, October, November, and December.

Wood ducks were back on the Refuge by March 25. Wood ducks utilized 6 artificial nest boxes this year which is a record. The estimated production is 48 young (Table 4). Other nesting species include mallard, teal, gadwall and shoveler.

Geese - We have a resident flock of 40 Canada geese which use the Refuge and surrounding lands.

Nisqually is not very attractive to other goose species, however we do have some limited use by black brant and snow goose in the winter and early spring.

Swans - Eight tundra swans were seen by Refuge visitors on October 29 and six were also seen on November 18.

4. Marsh and Water Birds

The great blue heron is by far our most conspicuous member of this group. The heron colony, located on the west side of McAllister Creek, was active again this year with the first activity being on March 7. A total of 33 active nests were counted on March 25 (Figure 19). Activity continued around the rookery until August 19. An estimated 48 young were fledged this year.

Table 4

Comparison of Active Structure and Species

Year	Box #												Total #
	3	4	5	7	8	9	12	14	18	19	20	21	boxes
1982	HM	WD		WD									21
1983	S	WD		S		S							19
1984	WD	WD/S			WD	S	S			S			21
1985	WD	WD	S	WD									23
1986	NO DATA												
1987	WD	WD									WD		21
1988	WD						WD	WD	WD	WD		WD	18

WD - Wood Duck HM - Hooded Merganser S - Starling

* 1986 individual box data not available - total usage was 11%

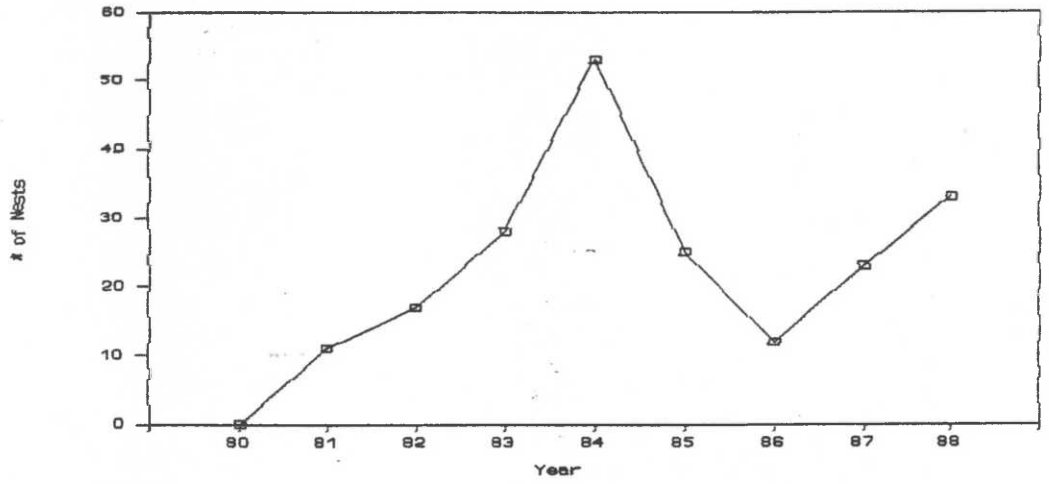


Figure 19. Great Blue Heron Nest Summary

The study conducted by Donald Norman, Huxley College of Toxicology, in cooperation with Fish and Wildlife Enhancement (Figure 20) and Nisqually Refuge was aimed at determining levels of polychlorinated biphenyls (PCB), congeners and chlorinated pesticides (DDT, DDT Metabolites) and determining a useful method by which salvaged juveniles can be utilized to access contaminant levels.

American bitterns, Virginia rails, and coots are common on the Refuge. On October 15 several sandhill cranes were recorded on the Refuge. Last year a small group of sandhills were on the Refuge at about the same time of

Table 5

1988 Waterfowl Survey Results

Species	January	February	March	October	November	December
Swans						
Canada Goose			24			
Snow Goose						
White-Fronted Goose						
Brant		10				
Total Goose		**10**	**24**			
Mallard	867	195	156	568	417	765
Gadwall						6
Wigeon	4297	897	2280	11068	9714	6074
GW Teal	300	56	10	·1260	502	116
Shoveler		10	10			6
Pintail	25			5	112	32
Total Dabbler	**5489**	**1158**	**2456**	**12901**	**10745**	**6999**
Redhead		11	6			
Canvasback		4	4			
Scaup		19	104		7	23
Ringneck			5			
Goldeneye	5	20	109			4
Bufflehead	124	108	83		76	122
Ruddy Duck						
Total Divers	**129**	**162**	**311**		**83**	**149**
Scoter	148	274	149	1	929	228
Merganser	16	7	52		2	40
Oldsquaw					2	2
Total Other	**164**	**281**	**201**	**1**	**933**	**270**
TOTAL WATERFOWL	**5782**	**1618**	**2992**	**12902**	**11761**	**7418**

year.

5. Shorebirds, Gulls, Terns & Allied Species

August was shorebird month on the Refuge with an increase from 10-15 western sandpipers to 8000 a week later. Most of the small peeps prefer the tide flats north of the Brown Farm Dike and McAllister Creek at low tide. The large peeps are dispersed over a broad area of the Refuge. Dowitchers, dunlin, greater and lesser yellowlegs were a common sight this summer and fall. In July a black-necked stilt took up residence on Nisqually for about two weeks.

Figure 20. Don Kane (AFWE) assists in collecting Great Blue Heron eggs and dead chicks for the contaminate study. 88

Herring, glaucous-winged, and ring-billed gull are all common on Nisqually, we also have Bonaparte's and western gull regularly.

Pigeon guillemot are common in south Puget Sound waters off Nisqually Reach. It is also possible to see an occasional marbled murrelet and rhinoceros auklet.

6. Raptors

The raptor populations of Nisqually are quite healthy. An abundant food supply of waterfowl and small birds and mammals allow for easy hunting. Red-tailed hawks (Figure 21) and northern harriers are the most common species and five other species of hawk/falcon are regular nesters or visitors. On October 20, and for about a week after, an immature northern goshawk was on the Refuge. A black-shouldered kite has spent most of this fall on the Refuge. First spotted the beginning of August, this bird has stayed until mid-December.

On September 21 three turkey vultures were spotted. Osprey are seen sporadically throughout the year. A pair of great horned owls fledged two young on the Refuge this year. Other nesting owl species include common barn and screech owls. A long-eared owl was seen on October 15 and the short-eared owls returned on October 31. In March an immature snowy owl was recorded both on and adjacent to the Refuge.

Figure 21. This immature red-tailed hawk survived his trip to the rehab center and was later released on the Refuge. 88

7. Other Migratory Birds

A new nest box program for western bluebirds was started, with 18 boxes being built and placed in the field on November 23. The closest known bluebird nesting is just south of the Refuge on the east side of the Nisqually River. By placing these new boxes in suitable locations near that location we hope to induce nesting on the Refuge. Fourteen boxes were built for purple martin use. These boxes will be placed in the field in the spring of 89. These boxes will replace martin boxes in place, which are being used by starlings.

8. Game Mammals

There is no big game hunting or trapping on Nisqually. In 1988 there were more sightings of black-tail deer on the Refuge than in past years. There are two groups of coyotes on the Refuge. Several pups were produced this year. A family of weasel took up residence by the Twin Barns Environmental Center much to the delight of many visitors.
The resident beaver population is booming to the joy of the visitors.

9. Marine Mammals

On several occasions in the spring of 1988 small pods of Orca's were spotted off the Nisqually Reach. These same waters are used regularly by harbor seals and occasionally sea lions.

There was also a gray whale spotted off the Nisqually Reach in the spring.

10. Other Resident Wildlife

Several Volunteers are working on study projects involving collecting, identifying, and cataloging aquatic insects.

11. Fisheries Resource

The Nisqually River and the McAllister Creek river systems are heavily fished by Indian gill netters for chum and coho salmon in the fall and winter. Both rivers also support a sport fishery for steelhead and sea-run cutthroat trout.

14. Scientific Collections

One graduate student was issued a Special Use Permit to collect great blue heron eggs and chicks for a toxicological study done in conjunction with Fish and Wildlife Enhancement (See D-5). Ten eggs, five healthy young and 35 salvaged dead were taken for this project.

A Volunteer has donated her time to mount several birds which have been salvaged. To date a red-tailed hawk, a pair of sharp-shinned hawks and a tundra swan have been mounted and are in use in the Environmental Education Center.

15. Animal Control

Research has been conducted on the Refuge this year on flocking, roosting, and nesting areas of European starling. Starling nest box traps have been constructed and a draft starling control plan has been written. With luck this plan will go into effect next spring to reduce the displacement of native cavity nesters by starlings and to lessen the impact of starlings on the nest box program for wood ducks and American kestrels.

16. Marking and Banding

The post-season banding effort at Nisqually NWR consisted of 36 trap nights. Starting January 11, 1988 and ending on February 11, five nights were missed due to ice conditions. Two traps were used this season, a permanent swim-in trap and a portable Y trap (Figure 22 and Figure 23).

A total of 251 ducks were banded in 1988. The breakdown is as follows:

	Male		Female	
Mallard	126	50%	122	49%
Pintail	2	<1%	1	<1%

Mallard retraps: 122 (105 banded 88; 14 banded 87; 2 banded 82; 1 unknown band).

Total staff time for the season was 54 hours, for a time of .2 hours per bird. Estimated staff time costs were $648.00 for a per/duck cost of $2.57.

This compares with the previous years results of 269 ducks banded, 130/131 mallard M/F and 6/1 pintail M/F and 71 retraps.

One Canada goose was banded in August of 88. Four barn owls were banded in the nest in May.

Figure 22. This Y trap was very successful again this year.

Figure 23. The swim-in was always good for several birds each day.

H. PUBLIC USE

1. General

Entrance Fee Program:

The numbers of visitors to Nisqually fell from 70,000 visits in 1987 to around 50,000 visits in 1988. The decrease was undoubtedly due to the implementation of an entrance fee program. Nisqually was one of several refuges chosen to begin charging an entrance fee in 1988. Selection for the program was based on 1) number of Refuge visitors, 2) controllable access points to the Refuge, and 3) entrance fees not being a hardship on the local community. Nisqually qualified on all counts, and our target date for implementation was set for May 1, 1988. Having already been through the "entrance fee experience" at Dungeness, we considered ourselves old hands and had a pretty good idea what starting an entrance fee program would involve.

A Regional Office team consisting of Sandy Wilbur, Ed Murczek, Sam Buzbee, and Ed Collins (Sacramento NWR) visited Nisqually in March to review the Dungeness entrance fee program and to discuss the Nisqually program. Final planning decisions were made following their visit, and our entrance fee program began to take shape:

- We would use news releases, club newsletters, radio talk shows, information handouts, the Refuge reader-board, and anything else we

could think of to inform the public about the program before it started. (Figure 24)

- The first road sign saying this is a fee area would be placed along the entrance road. (Figure 25).

- Our parking lot would be improved and expanded to accommodate 40 cars and 2 buses (This was originally planned before the entrance fee program came along).

- Visitors would be attracted from the parking lot to our existing information kiosk, which also leads them to the trail system.

- The entrance fee station would be placed along the trail just beyond the information kiosk (Figure 26). This location would allow people to visit the kiosk first to learn about the Refuge and decide whether they really wanted to stay.

- The entrance fee station would be based on an honor system. Visitors would take an envelope, fill in the information requested, tear off a stub, put their money in the envelope, seal it, and place it in a pipe safe. There would be no attendant at the fee station.

- The entrance fee would be $2.00/family/day, or family admission with a duck stamp, Golden Eagle, Golden Age, or Golden Access Passport.

- A team of Volunteers would be recruited and trained to collect the fees from the pipe safe and submit the money to the Denver Service Finance Center.

- The "honor system" would be backed up by an occasional enforcement effort.

All the components came together by May 1. The parking lot was completed; the pipe safe, signs, and envelope dispensers arrived; and the fee station was constructed. McMinn worked the first weekend of fee collection to monitor compliance and public reaction. very few negative comments were received, and compliance was as expected: 50% Saturday and 75% Sunday.

Before the entrance fee program was implemented we were asked to estimate the amount of money we thought would be raised from entrance fees and sales of duck stamps and Golden Eagle Passports. Our "best guess" for a full year of fee collection was:

Entrance Fees.	$43,530
Duck Stamps.	$22,500
Golden Eagle Passports	$ 625

How close did we come? Table 6 reveals our actual receipts for the first eight months of operation.

Figure 24. Announcements on the reader board broke the news to the public about the upcoming entrance fee program. EH-88

Figure 25. News signs arrived to let people know what they were in for. EH-88

Table 6. 1988 ENTRANCE FEE COLLECTIONS

Month	Entrance Fee	Duck Stamp	Golden Eagle Passport	Total
May	$ 1600.00	$ 250.00	$ 800.00	$ 2650.00
June	1511.50	-	300.00	1811.50
July	1602.75	310.25	75.00	1988.00
August	2025.00	120.00	25.00	2170.00
September	1226.00	2050.00*	25.00	3301.00
October	1635.50	170.00	25.00	1830.50
November	631.00	-	-	631.00
December	200.00	-	25.00	225.00
TOTAL	$10431.75	$2900.25	$1275.00	$14607.00
Amount Returned to Nisqually NWR**	$ 3129.52	None	$ 382.50	$ 3412.02

*This figure includes revenue from duck stamps sold at the Western Washington State Fair at Puyallup.

**Thirty percent of entrance fee and golden eagle passports.

OK! so we miscalculated.....Where did we go wrong? Probably our biggest error was not taking enough off for return visitors using Golden Eagle Passports, Golden Age Passports, and duck stamps. Although we haven't sold as many duck stamps as expected, we have sold more Golden Eagle Passports and issued many Golden Age Passports. The methods people used to enter the Refuge during the first six months of the program are summarized in Table 7.

Recent monitoring efforts have revealed that nearly half the people entering the Refuge have Golden Eagle Passports, Golden Age Passports, or Duck Stamps, but they are not stopping at the entrance fee station to fill out that information on the fee envelopes. They just walk into the Refuge with their passport rather than taking a fee envelope stub. Based on that information, our visitation picture probably looks more like this for a six month period:

Figure 26. Pay your money and take your ticket here.

Table 7.

Table : Method of Entry
(Recorded from Entrance Fee Envelopes)

Month	Entrance Fee	Golden Age Passport	Golden Eagle Passport	Golden Access Passport	Duck Stamp	TOTAL Under 16 year old (enter free)	TOTAL Over 16 Years old
May	741 people	117	71	4	78	459	1481
June	675	122	62	16	77	300	1470
July	901	170	92	11	121	474	1454
August	823	193	143	13	87	491	1883
Sept.	621	140	82	5	103	479	1054
Oct.	810	112	72	7	103	368	1448
TOTAL	4571 people	854	522	56	569	2571	8790

11,000 people pay/register at the fee station
8,000 people have passports but don't stop at the fee station.
1,000 school students (enter free)
4,000 people don't pay (sneak in)

24,000 visits in six months

This total figure is consistent with the data we get from our car and trail counters.

The entrance fee envelopes also show that although most of our visitors come from Washington State, we have also had visitors from 40 other states, Washington D.C., and 12 other countries.

The legislation for the entrance fee program allows 30% of the revenues raised from entrance fees and sale of Golden Eagle Passports to be returned to the Refuge for operations and maintenance. As Table 6 shows, that only amounted to about $3400 at Nisqually this year. That would hardly be enough to operate the entrance fee program if not for our team of volunteers. We were able to recruit six volunteers to help operate the entrance fee program. Pairs of volunteers collect the fee envelopes from the pipe safe on Mondays and Fridays, they compile the visitor data recorded on the envelopes, open the envelopes and account for the money, and convert it to a money order. The volunteers have been extremely reliable and contribute greatly to the success of the program.

At this point, a questions that must be raised is "is the entrance fee program worthwhile?" We will be attempting to answer that question in 1989 when we go through an annual review for the first full year of operation. Certain considerations and fringe benefits will have to be considered. The program is not making as much money as anticipated, however, with the use of volunteers it can still be run economically (not counting start-up costs). We also feel that the entrance fee program has helped reduce the number of non-wildlife oriented visitors who used to come to throw frisbees, fly kites, etc. These people have virtually disappeared this year. In the long term, Nisqually is fast becoming an urban refuge, with housing developments proposed on almost all sides. We feel the entrance fee program will help us limit future visitation to those who are sincerely interested in enjoying the wildlife, and will help us in our battle to avoid becoming just another city park.

Other General Public Use Activities:

Special guests to Nisqually this year included Art Hughlett, President of the National Wildlife Refuge Association, and Dick Rodgers, also from the National Wildlife Refuge Association.

Nisqually also hosted the annual Resources Meeting, a Western Washington Bluebird Society meeting, and two Nisqually River Council meetings.

Outdoor Recreation Planner Henke attended the National Association of Interpreters conference in San Diego in October. She had the opportunity to meet other Fish and Wildlife folks who were attending the conference, and got many new ideas about sponsorship, marketing, and interpretive techniques from the sessions and fieldtrips.

The Nisqually sign order, first submitted in December, 1986, was at last delivered in January, 1988.....to the Coastal Refuges Office. The signs finally made their way to Nisqually and have been installed along the

trails, entrance road, and parking lot. They look great, and provide greatly improved directional information for visitors to find their way around the Refuge (Figure 27). Like everyone else, we have been caught in the catch-22 of trying to order signs when there aren't any approved sign standards.

Figure 27. New directional signs point the way to Refuge services.EH-88

Volunteers Richard Van Deman and Lucy Anderson began a sign maintenance survey, checking all refuge signs for deterioration and repair needs. They have identified some needed maintenance work, which will probably be delegated to the 1989 YCC crew.

Henke completed Section 504 Handicapped Access Evaluations for all the Refuges in the Complex in February. The report identified areas where accessibility of Refuge programs and facilities should be improved. The worst areas at Nisqually are the office trailers, the Twin Barns Education Center, and some of our main trails. The office is located in two old house trailers that were converted into office space. Nothing in the trailers is constructed to Section 504 accessibility standards, so the easiest way to solve the problem would be to torch them and start over. However, since no funding seems to be available for new offices, we identified ways to at least get a wheelchair into the reception and meeting room areas. Adjustments for a disabled employee would have to be based on their disability. The Twin Barns Education Center is fairly good except for the entrance and the restrooms. A simple concrete ramp will solve the entrance problem. The restrooms were supposed to have been built to accessibility standards but weren't. A major renovation is needed to correct the problem. Refuge trails generally are level but have gravel surfaces. We have been trying to find a way to bond the gravel into a hard surface without going to paving.

Nisqually is the location where the 1854 Medicine Creek Treaty was signed. This Treaty created local Indian reservations and gave the tribes the right to fish in their "usual and accustomed places." In February members of the Nisqually tribe and other participants donned full costume to recreate the treaty signing for a documentary film about Northwest Indians and salmon (Figure 28).

Figure 28. This colorful scene was staged on the Refuge for a film about the medicine Creek Treaty, signed in 1854. MJM-88

The first draft of the Nisqually Public Use Plan was submitted to the Regional Office in December. We will have to wait for final approval until after the holidays.

The Annual Open House was held on Labor Day, September 5, and was attended by 200-250 visitors. Volunteers and staff helped prepare the Twin Barns, provided refreshments, and were on hand to greet people and answer questions. Volunteer awards were presented, including an "over 1000 hours" pin to Lucy Anderson for donating approximately 2500 hours, and special recognition of Richard Van Deman and Dan Huttmann for their response to a fire on the Refuge. The Volunteer of the Year plaque was awarded to Bill and Suzanne Sterling at the Protection Island Establishment Ceremony. This year's Open House was particularly difficult to organize because it followed so closely after the Protection Island Establishment Ceremony.

On-going maintenance of public use facilities this year included replacing the bridge on the trail between the Twin Barns and Brown Farm Dike Trail, building a ramp down the side of the dike to the bridge(YCC), reducing the slope of the trail to the Twin Barns and building new sections of low boardwalk (YCC), brushing and graveling the Nisqually River Trail (YCC),

putting new chicken wire and a low curb on Nisqually River Trail boardwalks (YCC), and installing new benches around the Brown Farm Dike Trail (Boy Scouts). A revised Project Worksheet was submitted for a comfort station.

Henke represented the Regional Office at an interagency trail meeting organized by the National Park Service in Seattle. Production of a guide book to northwest trails was discussed.

Henke also met with Steve Durand of Jones and Jones Associates to discuss interpretive opportunities for the Nisqually River Management Plan.

2. Outdoor Classrooms - Students

The number of students visiting Nisqually Refuge continued to increase, as it has over the past several years;

1985 - 1587 students
1986 - 1635 students
1987 - 1750 students
1988 - 2100 students

Most of the classes come from local elementary schools, although a few come from as far away as Seattle and Grays Harbor. A smaller number of classes come from high schools and colleges, and we are also having visits from quite a few pre-schools as well (Figure 29).

Figure 29. School students assemble near the information kiosk for their Refuge Fieldtrip. EH-88

We are also beginning to have more "educational" visits from senior centers and hospitals for the mentally handicapped. Although not specifically within our definition of "students," they take great interest in the exhibits and volunteer talks and enjoy learning about the Refuge, even if they don't get a grade or badge.

Volunteers gave orientation talks to approximately 40% of the school groups that visited the Refuge. Many of the groups that did not have an orientation talk did not request one as they had their own lesson plan and activities to work on. Many of the groups had borrowed learning materials and had an introduction to the Refuge before their visit. We were unable to accommodate several groups that had requested orientation talks when no volunteers were available.

3. Outdoor Classrooms - Teachers

Approximately 100 teachers received some kind of training or assistance on the Refuge this year. Many met with the Outdoor Recreation Planner to plan their fieldtrips and to learn more about the Refuge and the learning materials that are available for them to use. Others attended Project Wild and Project Learning Tree workshops held in June. These workshops helped them become more familiar with the activities offered in the "PLT" and "Wild" materials. In addition, teacher information packets were given to about 120 teachers and group leaders for orientation to what we have to offer.

The Refuge staff and Volunteer Coordinator met in January to discuss procedures for the Education Program. With more services being offered to increasing numbers of school groups we need to continually improve communication among teachers, Refuge staff, and volunteers. To do this, Henke and Anderson developed a new reservation and confirmation system. With the new system teachers are required to submit a written application for reservations rather that just requesting a reservation over the phone. This reduces the possibility of confusion and errors with their reservations. The application forms are provided in the teacher information packets. Teachers are asked to request 1st and 2nd choice dates for their fieldtrips, and to check services they would like, including viewing the Twin Barns exhibits, volunteer orientation talks, borrowing learning materials, etc. They are then sent a written confirmation of their date and the services that will be provided. This new system gives us a written record of every visiting school group, what they wanted to do on the Refuge, and what services we provided.

In its first year of operation the system worked fairly well. The greatest remaining area of confusion is sharing information about confirmed programs and services between the Refuge staff and the volunteers.

In January through March Evergreen State College student Rena Vizzard worked as an intern with the outdoor classrooms program. She updated the teacher information packets, and did all the preparations and announcements for a teacher workshop. A trial workshop was conducted for Rena's college class, but the "real" one did not fill and was cancelled. Rena also

handled all the school mailings for National Wildlife Week. She wrote a cover letter and an "Education Update" newsletter, which were mailed along with 135 Wildlife Week teachers packets provided by the National Wildlife Federation to 123 schools and day care centers in the Olympia area.

Outdoor Recreation Planner Henke continued to participate as a staff member of the Cispus Workshop. She attended the staff training session in January, and additional planning meetings in April and October. Assistant Manager McMinn also attended the week-long workshop in March. The workshop offers training in communication, meeting management, and facilitating skills.

Henke was also a member of the Education Working Group of the Nisqually River Council. They have been developing an education program prototype for the Nisqually River Basin. In October, Nisqually hosted the first segment of the two-day teacher workshop. The teachers visited various education sites in the Nisqually River Basin, and then discussed developing education curricula dealing with the entire Basin. The project has had support from many entities, including the National Park Service, U.S. Fish and Wildlife Service, Northwest Trek, Pioneer Farm and the State Superintendent of Public Instruction's office.

Henke also attended a meeting hosted by the State Department of Ecology in June to discuss interagency cooperation in development and management of education and interpretive programs. At present there is very little coordination among agencies, although most of us are involved in education and interpretation of the same resources, issues, and problems. Perhaps this is the first step toward greater interagency cooperation in the future.

4. Interpretive Foot Trails

An order of new Nisqually River Trail brochures arrived in January in plenty of time for our spring busy season. The trail also received a face-lift from the YCC's and Maintenanceman Bob Watson and Bio Tech Bill Schaff. Watson and Schaff built a new handicap access ramp from the dike to the trail. Although the trail is not accessible to wheelchairs all year because of high tides, this ramp will improve access during drier parts of the year. We do not put a handicap access symbol at the trailhead because of these seasonal difficulties. The YCC's cleared overgrown brush back from the trail, replaced old damaged chicken wire on the boardwalks, and put low curbs along the sides of the boardwalks to define the edges for wheelchairs and blind people. The chicken wire is put on the boardwalks so they won't be slippery when winter rains come.

6. Interpretive Exhibits/Demonstrations

The interpretive exhibits in the Twin Barns Education Center are open to the public on the 2nd and 4th Saturdays of each month, thanks to the assistance of volunteers. Over 100 people visited the Education Center on

New Years Day and 2400 people visited the Center throughout the rest of the year (not including school groups). Visitors are able to view exhibits that have been constructed by volunteers, or watch films or slide shows that are shown twice during the day.

The volunteers also handled construction and coordination of this year's Puyallup Fair booth. The booth featured a "wetlands protection" theme with a wetland diorama and mounted birds. Volunteers, Refuge staff, and staff from the Fish and Wildlife Enhancement and Law Enforcement offices worked at the booth and sold 184 duck stamps. Many favorable comments about the exhibit were received. Henke has been collecting information from various exhibit companies about appropriate panel systems for future exhibits. We are interested in getting a system of panels with a cloth surface that will accept velcro.

Henke submitted slides to the Regional Office of all the Refuges in the Complex. The slides will be used in a national interactive video display about National Wildlife Refuges.

Henke also contacted Promotion Products Inc. to get a price estimate for replacing the damaged "You Are Here" panels at Nisqually. Their estimate of $3622 to replace three panels was more than we could afford this year so the project will be postponed until next year.

7. Other Interpretive Programs

Volunteers Pam Miller and Lucy Anderson organized the second annual "Take Pride in America" summer lecture series held at the Twin Barns Education Center. Guest speakers were invited to give talks on a variety of subjects on Wednesday evenings throughout the summer. The lectures were usually attended by up to 80 people. (See Section E-4 "Volunteer Program.")

Other interpretive talks included:

- Hesselbart gave a slide presentation about the Refuges of Puget Sound to the Lady Lion's Club.

- Schaff and Anderson gave a talk to the Wally Byam Caravan Club (Airstream trailer group).

- Hesselbart gave an orientation talk about the Nisqually Complex to a group of visiting volunteers from Northwest Trek.

- Volunteers Dave McNett and Dan Huttmann assisted as interpretive guides for the Refuge.

8. Hunting

Although Nisqually has no Refuge hunting program we do monitor the hunting that takes place on neighboring Washington Department of Wildlife land. A

waterfowl hunter harvest survey was conducted at Luhr Beach on Saturday and Sundays throughout the hunting season.

9. Fishing

Nisqually has two areas where anglers may fish from the river banks: The Nisqually River Bank Fishing Area and the McAllister Creek Bank Fishing Area. This year new signs were posted to identify these areas, but we still have very little idea of the use these areas are receiving. A fishing information handout is available at the kiosk and at the office, and Refuge trail directional signs guide visitors to the fishing areas.

Anglers may also fish from boats anywhere along the Nisqually River or McAllister Creek. Most sport fishing in these rivers is for salmon and steelhead, and the Nisqually Tribe runs a commercial salmon fishery.

11. Wildlife Observation.

The Refuge trails offer many wildlife observation opportunities and take visitors past most of the major habitat types in the area. The observation deck at the Twin Barns offers a good view of freshwater marshes and grasslands, and several snags have been artificially installed nearby to attract raptors in to closer view. The Refuge also has two photography blinds that are frequently used by visitors. A register near the office allows visitors to record their observations and to find out what other visitors have seen.

12. Other Wildlife Oriented Recreation

Increasing numbers of visitors are enjoying watching wildlife from canoes and kayaks in the waters around the Refuge. Most put in at Luhr Beach and paddle McAllister Creek and across Nisqually Flats. This activity appears to cause more wildlife disturbance than visitors walking on the dike, but not as much disturbance as powerboats going through the same areas. Additional monitoring is needed.

14. Picnicking

Although the Refuge offers no picnicking facilities, many visitors bring lunches to eat along the trails while they are hiking. Others also enjoy picnics in the orchard and sitting on the observation deck at the Twin Barns.

16. Other Non-Wildlife Oriented Recreation

Fruit picking continues to be a popular activity in late summer and fall. A bumper crop of blackberries attracted both birds and berrypickers. Judging from the number of dried and rotting blackberries left on the vines at the end of the season there seems to be enough berries for all. Apple and pear pickers followed on the heels of the blackberry pickers. Visitors may pick windfalls, but are not allowed to climb the trees or use ladders.

Many people bring ingenious apple picking devices on long poles to reach the fruit on the upper branches without damaging the trees.

17. Law Enforcement

Violation Notices issued 1988:

Violation	No.	Fine	No.Closed
Over limit-Waterfowl	2	$125.00	2
Take non-game bird	1	$125.00	1
	3	$375.00	3

The over limit cases were made on an adjacent hunt club. Each man had one over the reduced season daily limit. The non-game bird (taken and in possession) was a horned grebe that was mistaken for a coot. So much for hunter education. No trespass cases were made this year. It would appear that the word got out that we no longer were issuing warnings.

We had several cars broken into while parked in the main lot. Usually they did no damage and only took purses. No pattern developed as they struck every three to five weeks any day between Monday and Friday between 9:00 a.m. and 4:00 p.m.. We will install warning signs to inform the visitor.

Assistant Manager McMinn spent most of a night in January assisting Sheriff's deputies in tracking down a salmon poacher and a lost police dog. Two poachers were apprehended netting salmon in McAllister Creek, but a third man escaped. A police dog was sent after the poacher but it apparently fell into the creek and got lost. The dog finally showed up later in the morning. The poacher also escaped into the night.

I. EQUIPMENT AND FACILITIES

1. New Construction

The following construction projects were completed in 1988:

- The parking lot was expanded from 20 slots to a capacity of 56 vehicles and space for two buses. This project was done force account with assistance from Engineering (Figure 30, Figure 31, and Figure 32).

- An entrance fee station was constructed. The new fee station is located just adjacent to the entry kiosk. This project was also done force account.

Figure 30. Fill for the parking lot was brought in form a local gravel pit while Bill Schaff ran the dozer. EH-88

Figure 31. Bob Watson makes sure the parking lot is packed and FLAT! EH-88

Figure 32. The finishing touches. EH-88

Figure 33. Pressure washing cleaned up the Barns before a clear sealant was applied to the outer surface. 88

2. Rehabilitation

The following rehab projects were completed in 1988:

- A new ramp and footbridge were constructed to make the Twin Barns loop trail handicap accessible.
- Signing on the Refuge was upgraded and new signs were installed in support of the entrance fee program.
- The Refuge headquarters was painted on the outside.
- Several pieces of siding on the Twin Barns were replaced.
- A contract was awarded to Thomas Carr Painting for power washing and application of sealant to Twin Barns exterior (Figure 33).
- The headquarters roof was painted
- Several sections of boardwalk on the Nisqually River Trail and Twin Barns loop trail were replaced.
- Some rehab work was done on the water control structures.
- A new ramp was constructed on the Nisqually River Trail to provide access for handicapped.

3. Major Maintenance

The following regular and recurring maintenance projects were completed in 1988.

- Some sections of the split-rail fence were refurbished.
- Noxious weeds were controlled be mechanical and chemical methods.
- Downed timber was removed from trails as required.
- Considerable maintenance was performed on several pieces of heavy equipment.
- The wood duck nesting boxes were taken down for refurbishing and re-installed.
- Some force account mowing was done to improve browse for wintering waterfowl.
- Routine building and grounds maintenance was performed as needed.
- Several sign supports were re-painted

4. Equipment Utilization and Replacement

It was a rather lean year for equipment upgrading and replacement due to budget shortfalls, which is really nothing new.

Our heavy equipment demands more than normal maintenance because all the equipment is stored outside. A much needed equipment storage building was tentatively funded in FY89 with ARMM dollars but budget cutbacks and rules for expenditure of ARMM dollars changed so the building was put on the back burner.

5. Communication System

A new repeater link was installed this year. We essentially moved the Nisqually base station to Capitol Peak (ten miles east of the Refuge) and installed a VHF link. This location now provides excellent communications with the repeater 100 miles north on Mt Lyman. Prior to this arrangement we were able to reach the repeater less then 10 percent of the time. We also are now able to reach the Grays Harbor area.

6. Computer Systems

A second computer setup was purchased for the Coastal Refuges Office similar to the system installed last year at Nisqually.

7. Energy Conservation

The energy consumption over the past five years is as follows:

1984 - 77,720 kwh
1985 - 87,990 kwh
1986 - 84,728 kwh
1987 - 59,851 kwh
1988 - 105,196 kwh

The significant increase is primarily due to increased pumping that was done to maintain water during the summer drought. We also have more personnel working more days at the Coastal Refuge Office in Sequim, WA.

8. Other

Several items were acquired from Fort Lewis off excess property. The total value of property acquired in CY88 equals approximately $7,000.

The maintenance worker for Nisqually also screens property at the request of the Regional Office or other refuges in Washington and Oregon.

The following property was transferred to other refuges and agencies:

Dump truck - 2.5 yd - 3-way to Malheur Refuge.
Mower - thatcher - 19: self-propelled to Malheur Refuge.
Generator, Winpower - 24 amp to Olympic National Park.

The following property has been listed as excess to our needs:

Typewriter, Royal - electric - p/n 161875
Typewriter, IBM Selectric - p/n 158427
Generator, Electric - 1SKV - p/n 179126
Tool, cement trowel - 29" finishing - no p/n
Canopy for full size pick up - no p/n
Boat, Raft - Bonair Cuda I - p/n 17660
Mower, rotary - Gyro - 5 ft. blade - p/n 167680
Tractor, Massey Ferguson w/attachments - p/n 173256
Super Tow - Model 704 - no p/n
Copier, Saxon 301 wet copier - no p/n
Intertec Data System - Compustar - no p/n
Vehicle, All Terrain - 3-wheel Honda -p/n 181874 (salvage for parts)

The disposal of property that is excess to our needs takes an extremely long time and sometimes never happens. GSA does not seem to follow-up on

items that have been listed with them. The overhead involved with property disposal is considerable and unwarranted.

J. OTHER ITEMS

1. Cooperative Programs

National Wildlife Refuge Permits (R1-95) were issued to the following individuals in 1988:

Name	Purpose
Jack Davis	Christmas Bird Count
Ron Sanford	Film Production
Jeanne Welch	Cultural Resource Survey
Corps of Engineers	COE Management Training
Morton Elementary	Salt Marsh Education
Doug Bertran	Heron Rookery Filming
Seattle Aquarium	Salt Marsh Photography
Rena Vizzard	Vegetation Study
Diane Brown	Vegetation Study

The Special Use Permit (3-1383) was issued to the following:

Douglas and Maren Bell, Museum of Vertebrate Zoology, University of California; For the collection of western and glaucous-winged gulls from Protection Island, San Juan Islands, and the Washington Coastal Refuges.

Dan Norman, Western Washington University; to collect and salvage eggs and young from the McAllister Creek Heron rookery.

Joy Marie Boater, University of Puget Sound; To collect small mammals.

SEATTLE TIMES reporter and photographer to be on Destruction Island for collection of information for a feature story.

Joe Galusha, Walla Walla College; glaucous-winged gull study.

University of Washington Biology Department; Conduct study on Destruction Island vegetation and feral rabbits.

Margo Smith; Cutting of hay.

Nisqually Refuge Complex staff participated in the following cooperative wildlife surveys:

Mid-winter waterfowl inventory (aerial survey)
Winter bald eagle survey (aerial survey)
Band-tailed pigeon surveys

3. Items of Interest

Meetings, Training, etc:

Marine Plastic Pollution;	Hesselbart
Cispus Workshop Staff Training;	Henke
Marine Bird Workshop, Portland;	Hesselbart
Wildlife Habitat Symposium;	Hesselbart
Technical Advisory Mtg OCS;	McMinn
Cispus Workshop;	McMinn, Henke (instructor)
Heavy Equipment Training;	Schaff
Annual Law Enforcement Training;	McMinn, Curry, Krueger
Nisqually River Council Meetings;	Hesselbart, Henke
Basic Refuge Manager Academy;	Schaff
Shoreline Public Access Workshop;	Hesselbart
National Wetlands Forum;	Hesselbart
Aviation Management Seminar;	Hesselbart
Fire Training, S130, S190;	Schaff
First Aid;	McMinn, Henke, Schaff
Project Leaders Meeting, Reno;	Hesselbart
National Assoc. of Interpreters conf;	Henke
Managing Multiple Priorities training;	Hesselbart

Nisqually Refuge hosted the annual Resources meeting at the Twin Barns.

Nisqually River Council used the Twin Barns for several scheduled meetings.

Nisqually Refuge hosted the annual Western Washington Blue Bird Society meeting in the Twin Barns.

McMinn and Schaff conducted a waterfowl hunter orientation class at Luhr Beach.

Refuge staff provided baseline wildlife data during an oil spill off Whidbey Island.

Bill Schaff and Ellie Henke were presented Special Achievement awards (Fig.34 & 35).

Bill Schaff was presented with his 10 year service pin.

Lynne Korn, Congressional Research Services, visited the Refuge to discuss current issues.

Manager Hesselbart prepared a letter in support of the American Lake Seaplane Base operations. We use this operator for all our survey flights. A local citizen group wants to close it down. They claim the noise disturbs the bald eagle that has been nesting for some three or four years. The power boats that fill the lake in the summer make more disturbance but then they don't fly over houses. The base has been there since the 1940's.

McMinn and Sandy Wilbur met with Fayatte Krause, of the Nature Conservancy, and Mr. John DeMeyer, Manager, Division of Aquatic Lands, DNR, to discuss

options for the management of the tidelands surrounding Protection Island Refuge. All parties have agreed to cooperate but we still need to find the legal avenue that is acceptable to all parties.

4. Credits

Staff receiving credit for writing, editing, graphics, typing and photography of this report are as follows:

Bill Hesselbart	Introduction A. Highlights C. Land Acquisition D. Planning I. Equipment and Facilities Editing
Mike McMinn(MM)	E. Administration J. Other Items H. Law Enforcement Word Processing Graphics
Ellie Henke(EH)	H. Public Use Appended News Releases Editing
William Schaff(WS)	F. Habitat Management G. Wildlife
Nadeen Haworth	B. Climatic Conditions Word Processor/Assembly
Joani Easterlund	Edit/Assembly
Lucy Anderson	E.4 Volunteer Program

Figure 34. Bill Schaff receives a Special Achievement Award. 88

Figure 35. Ellie Henke receives a Special Achievement Award. 88

The Olympian, March 22, 1988

River meets sea along Nisqually

Delta divides urban-rural environment where wildlife management takes top priority

By Jim Stevenson

Nisqually. It is a symbol so vast and inescapable that we are upon it, our automobiles hurtling down into its heart, before we fully realize it is stretched out before us.

Nisqually. Upstream, the river's headwaters pool first at the base of a glacier on the steep sides of Mount Rainier, plunging from there only a short 75 miles to the southern wash of Puget Sound, where fresh and salt water meet and mingle in the natural cauldron of the estuary.

In its sweep, it thus links southwest Washington's four extremes: Puget Sound and Mount Rainier, tide and current. But if it is the mix that appeals to nature, it is the symbolic dividing line that grasps the imagination.

The Nisqually marks the boundary between Thurston and Pierce counties, the territorial limits between the urban Seattle-Tacoma megalopolis and still bucolic, life-is-sweeter Olympia. It is the point after which river is sea; before which, the salmon has come home.

Reaching from bluff to bluff, the flat is so vast that once one leaves the roadway and moves toward the delta, even the whizzing traffic on Interstate 5 becomes only a small and annoying trifle of the landscape.

Nowhere is the view better or the atmosphere more thought-provoking than from the diked trail of The Nisqually National Wildlife Refuge, which sits astride the Nisqually delta.

Its grasslands, salt marshes, meandering streams, meadows and mudflats teem with wildlife — more than 200 species of birds, 125 species of fish, 50 species of mammal and 300 higher-plant species.

It's the food, incidentally, and not necessarily the water.

"Salt marshes are extremely fertile," says Assistant Refuge Manager Michael J. McMinn. The biomass — or tonnage of food produced — is why estuaries are so important for seafood nutrients.

The long marsh grasses die and decay annually, starting a food production cycle that men will complete — carefully flooding the diked refuge in the winter and then letting it dry out in the spring for maximum vegetation growth.

The refuge management even resorts to haying on some areas and burning off the excess vegetation in others, although the damp Northwest weather has been known to thwart those plans, as have tricky winds that might blow smoke back toward the freeway.

"I've been here for two burning seasons and I haven't lit a match," McMinn laughed.

Ironically, many Olympia-area residents may think of the refuge as entirely natural — pristine, undisturbed.

But human intervention has been part and parcel of the Nisqually flats for decades, certainly stretching back to the 1904 decision to dike off the central portion of Nisqually for farmland.

On another level, it goes back centuries, for the bounty of the delta was no secret to primitive men and later the Nisqually Indians.

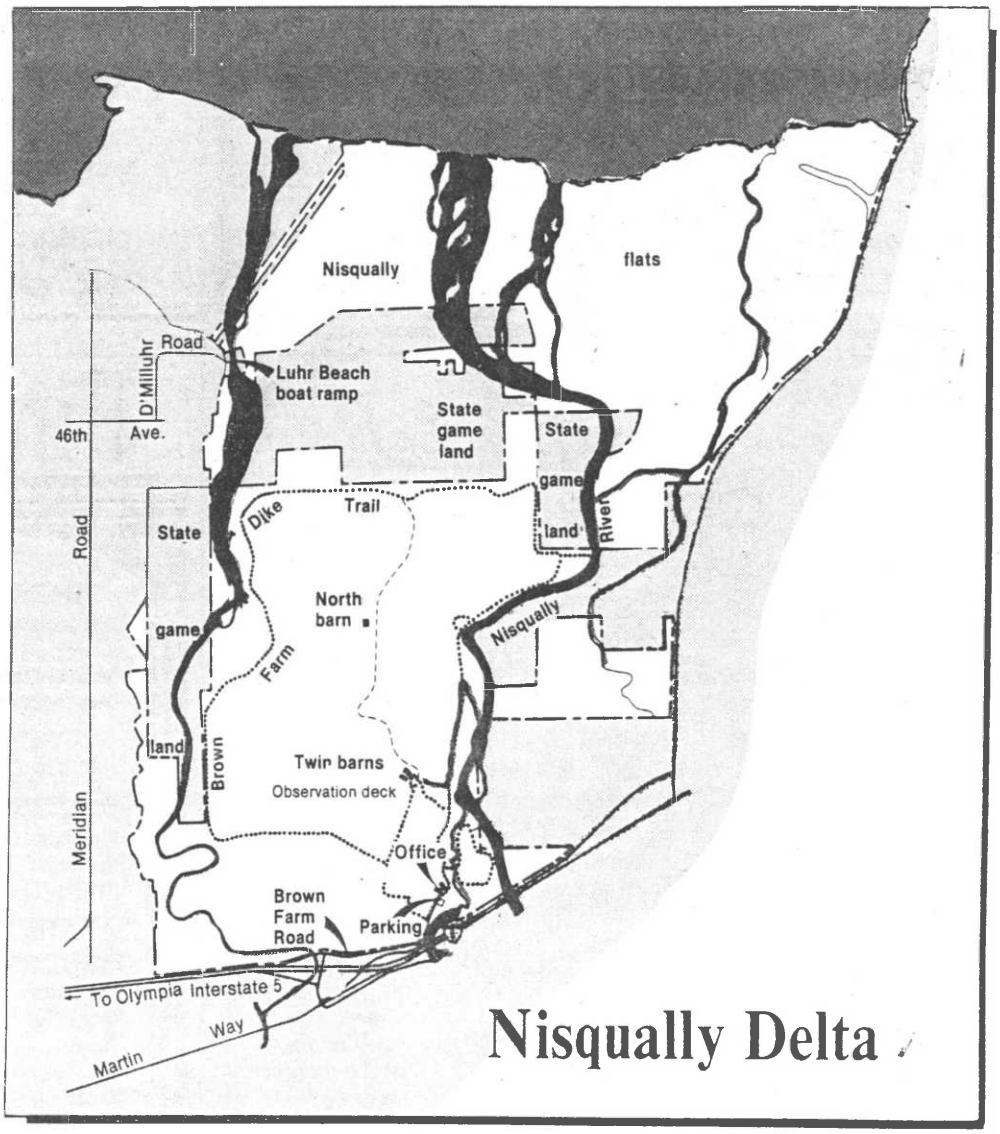
The A.L. Brown Farm created its fertile fields by using crews of men and horse-drawn scoops to build up dikes and hold back the seawater. The Brown Farm, buffered by its seawalls, became known throughout the area for comb honey, mincemeat, chickens, butter, eggs, sausages and cheese.

When the farm became uneconomical in the 1960s, it was offered for sale. At about the same time, a "super-port" was proposed for the deep waters of Nisqually Reach just to one side of the delta, and the city of Seattle reportedly considered the site for a possible garbage dump.

Those environmental threats helped galvanize citizen interest in preserving the area as wildlife habitat, and the Nisqually Delta Association was formed at the end of the decade.

That group's efforts culminated in a state legislative study on the preservation of wild-

The Olympian,
March 22, 1988



life in the area. In 1971 the area outside the Brown Farm Dike was declared a National Natural Landmark.

The refuge was formed in 1974 after funding was approved by Congress, and its operation was turned over to the U.S. Fish and Wildlife Service. The agency and the state Game Department, which owns some adjoining stretches of the delta, work cooperatively.

Today the old farm dikes form the spine of a 5.6-mile trail system with shorter sidecuts off to the riverside, to several photo blinds or to the old twin barns that date back to the farm. The main trail simply circles the refuge, giving hikers and bird lovers a chance to stretch their legs and watch the wildlife.

But it is the latter activity that rules. The refuge has banned biking, jogging and straying from the trails, and refuge officers are beginning to view "walkers" with prejudice.

"Walkers" stride out onto the trails, shoulders back, their Walkmans plugged into their ears, and "you *know* what's on

See Nisqually/**page 46**

Nisqually—

From page 12

their mind — it's that 5.6 miles," McMinn laughs.

"Our major problem," he adds, more seriously, "is the attitude that we're a park. We are not a park. We are not here to meet the recreational needs of the greater Olympia-Tacoma area."

He quotes from the regulations: "All public use is secondary and incidental. We cannot allow a secondary use if it interferes with our primary purpose."

That primary purpose is wildlife, and not necessarily nature's way.

"We don't want the place to go natural," McMinn said. "Some management decisions can be to do nothing . . . but I can make this better for a wider variety of wildlife by active management."

The choices are broad ones: At one extreme, refuge managers could let forest overtake the center, diked portion of the refuge, thus solving one current problem of where the hawks can perch. At the other extreme, they could blow the dike and let the sea back in, poisoning the vegetation but returning it to salt marsh.

But any solution may quickly become a new problem.

In fact, the dike did break in the mid-1970s, letting the sea flood the old farmland, and it took several years for the plant life to recover. In addition, years of diked dryness have allowed the center portion of the farmland to sink well below the level of the marsh outside the dikes.

The trees that were killed when the salt water did break through eventually turned into snags, good news for the hawks, owls and eagles that needed a place to perch. But today, the snags are falling down — and so is an old barn left standing just for the raptors.

The active-management answer, for now, has been to "plant" fake snags — telephone-pole-lookalikes, really — for the hawks.

Although the refuge allows no hunting within its boundaries, the adjoining state lands can be used for duck blinds, and the refuge closes its dike trail, which runs within 10 yards of some of the blinds, during those hunters' weeks.

So far, there's been no conflict or controversy surrounding the hunting nearby. That could change with down-the-road plans to allow some hunting on parts of the refuge itself provided several parcels of private land across the Nisqually River could be added to the preserve.

"It would probably cause some confrontation," McMinn said, reflectively. Although he's not a hunter, he said he can appreciate the long association of hunters with the delta, and he said hunting can be compatible with refuge goals.

McMinn breaks down those goals three ways: first, waterfowl; second, "a diversity of habitat;" and third, environmental education.

Refuge volunteers will get some responsibility for the education programs, especially adult education, which is relatively new, McMinn said.

Volunteers currently range from someone who keeps the visitors' center stocked with brochures to trashpickers, research aides and clerical help. The five-person refuge staff is almost wholly concerned with administrative tasks, which include overseeing eight other refuges in Western Washington, McMinn said.

The refuge recently completed a three-day training program for volunteers and expects to conduct similar programs as needed, probably every six months or so.

Although the volunteer program is new, that kind of participation by the public has been a part of the refuge since its founding.

A refuge pamphlet concludes: "Continued citizen involvement in planning and decision-making processes will reflect the value people place on wildlife and habitat and will determine their continued existence on the Nisqually Delta."

Here's how to get most out of a trip to Nisqually:

☐ **When to go:** Early morning, evening and when the weather clears after a storm are good times to observe wildlife. Spring bird migration usually goes from mid-March through mid-May, and fall migration from September through December.

☐ **How to behave:** You will see more animals if you are quiet. Be sure to listen for animal calls or songs, or try sitting down along the trail and waiting. Please stay on the trails. Refuge rules say: No jogging, no pets, no fires and no camping. Bicycles and motorbikes are not allowed on the trail. Hikers are not allowed off the trail.

☐ **Hours:** The refuge is open daily from sunrise to sunset. Office hours are 7:30 a.m. to 4 p.m. Monday through Friday.

☐ **Fishing, hunting:** Waterfowl hunting is allowed only on the Washington Department of Game's Nisqually Habitat Management Area outside the Brown Farm Dike. Fishing is permitted on both the Nisqually River and McAllister Creek by boat but only in certain areas from the banks.

The Olympian, June 15, 1988

Nisqually timberland plan emerges

The Olympian

Development of a resource management plan for thousands of acres of forest land in the Nisqually River basin will be the topic of a public meeting Thursday.

The state Department of Natural Resources will spearhead the pilot project. It's patterned after the Timber, Fish and Wildlife agreement forged last year by the state, timberland owners, Indian tribes and environmentalists.

That agreement calls on interested parties to prepare long-term land-use plans for blocks of timberland.

Public meeting

Thursday's Nisqually River basin meeting will begin at 7 p.m. at the University of Washington's Scott Hall at Pack Forest off Highway 107 near Eatonville. The address is 9010 453rd St. E.

The pact would be designed to increase protection of fish, wildlife and water quality while offering participating forest-land owners guarantees that they could harvest timber.

By July 1, 1988, the state hopes to form a working committee and ground rules for developing the plan, as well as boundaries, said DNR project coordinator Warren Warfield.

The meeting Thursday is aimed at bringing together landowners and other parties interested in plan participation, Warfield said.

The Weyerhaeuser Co. has committed to the planning process about 43,000 acres it owns between Alder Dam and Fort Lewis. Warfield estimated that about 30 percent of the property to be included in the resource management plan would be in Thurston County.

"It won't be the entire river basin," Warfield said.

The Thursday meeting will begin at 7 p.m. at the University of Washington's Scott Hall at Pack Forest off Highway 107 near Eatonville. The address is 9010 453rd St. E.

The plan is scheduled for completion in July 1989 with the bulk of the work coming next winter, Warfield said.

Sunday
October 23, 1988
The Olympian

Educators get lesson from river

TACOMA (AP) — The angry western grebe gave the 22 assembled teachers a Latin lesson they could never get in a classroom.

Tony Angell, the state's superintendent of environmental education, held the shrieking, frantic bird next to the water at the Nisqually Wildlife Refuge on Friday, following its rescue after it had knocked itself unconscious on an Olympia cheese factory tower.

The animal turned and quickly thrust its long, sharp, spear-like beak at Angell's face as he prepared to release the bird in front of the teachers.

"I just got one in my mouth," Angell spat.

Pam Miller, director of the Nisqually Reach Nature Center, explained the bird's name came from the Latin phrase for "spear thrower."

Miller, Angell, the state Department of Ecology and members of the Nisqually River Council are hoping lots of the state's students soon will be learning equally vivid lessons about Western Washington's ecology, cultural history and economy.

The proposed classroom is the Nisqually River watershed, reaching 176 miles from the river's source at Mount Rainier's Nisqually Glacier to the refuge on south Puget Sound.

Lessons will be provided by members of the Nisqually River Council and other property owners along the rural river.

The teachers are expected to return to their schools to bring the river and its environmental, cultural and economic features into school curriculums, and develop more hands-on field trips.

The Olympian
Wednesday, October 12, 1988

Waterfowl hunt to open Saturday

Some parts of Nisqually to be open, some closed

The Olympian

When waterfowl hunting season opens this Saturday, sportsmen face certain restrictions in the Nisqually Delta area.

The state Department of Wildlife's Nisqually Wildlife Area is the only part of the delta open to hunting.

Posted areas of the Nisqually National Wildlife Refuge, which is managed by the U.S. Fish and Wildlife Service, are closed to hunting.

Access to the hunting areas is limited. They can only be reached by boat, and the closest public boat ramp is at Luhr Beach, which is reached from Martin Way and Meridian Road.

Hunters must use non-toxic shot while hunting in the Nisqually Delta area. Federal agents will be enforcing the ban on lead ammunition.

Non-hunters may still visit the federal wildlife refuge during hunting season, but they need to watch for the "Area Closed" signs. Portions of the Brown Farm Dike Trail will be off limits to maintain a buffer zone between hunters and non-hunters.

The waterfowl hunting season is set for Oct. 15 to Oct. 23 and Nov. 12 through Dec. 31.

Meanwhile, the latest information on hunting regulations and local duck population forecasts will be presented by wildlife biologists at a workshop at 7:30 p.m. on Thursday

The workshop for hunters and other interested persons will be presented by U.S. Fish and Wildlife Service biologist Bill Schaff and state Department of Wildlife biologist Dan Kraege.

Hunters' workshop

The U.S. Fish and Wildlife Service and state Department of Wildlife will hold a pre-season seminar for waterfowl hunters at the Nisqually Reach Nature Center on Thursday night.

The session will begin at 7:30 p.m. at the center, which is located at 4949 D'Milluhr Road, next to the public fishing pier and boat launch at Luhr Beach.

Nisqually Valley News | Oct 27, 1988

Yelm Historical Society casts three votes at a general membership meeting

The Yelm Prairie Historical Society held a general membership meeting October where several key votes were recorded.

Members discussed the town of Yelm's offer to work with the Society toward the common goal of preserving the heritage of the region through the establishment of a museum.

Members were informed such an offer was still only a remote possibility, but voted unanimously to have the president deliver a letter of intent to the town stating the Society's support.

The letter will also indicate the Society is willing to negotiate appropriate agreements with the town.

Members also voted to accept as one of its long-term goals the mission of working with the town and the state-sponsored Nisqually River Council to assist in a Nisqually River Basin interpretive program and center. The Society would include museum exhibits on the geology, hydrology and ecology of Yelm Prairie and the Nisqually basin, all keeping within the goals and objectives of the Society.

Members authorized expenditure of up to $75.00 for materials to construct an exhibit in the storefront of the old Wolf's building on Yelm Avenue.

Discussion turned to the Society's part in the Washington State centennial kick-off celebration November 11. As Yelm's kick-off, the week of November 14-19 will be set aside for a week of "celebrating Yelm."

Several ideas were presented and discussion included ways for the Society to assist the Centennial Committee.

The Society will hold a general membership meeting November 1 in addition to the already-scheduled meeting November 15, to complete plans for the opening celebration.

All members and others who are interested in being a part of this week of celebration, the first event of the centennial year, are encouraged to meet in Yelm City Hall, Tuesday, November 1. Meeting time will be 7:00 p.m.

Tacoma News Tribune, November 13, 1988

Weyerhaeuser plans community

Critics concerned about environmental impact on Nisqually Delta

By Rob Carson
The News Tribune

Early next year, Weyerhaeuser Co. bulldozers will begin cutting roads into 3,000 acres of land next to the Nisqually Delta, building the framework for a brand-new city of 14,000 people.

The real-estate arm of the giant forest-products company has quietly revealed a master plan that will add 3,600 new houses and apartment units to the isolated area, level more than two square miles of office and industrial sites and create an estimated 17,000 new jobs.

The new development, which Weyerhaeuser's marketing people are calling Northwest Landing, has been designed as a mixed-use community in the style of Federal Way's West Campus and the company's controversial Snoqualmie Ridge project proposed for rural King County. Complete development of the site is expected to be phased in over 40 years.

According to Robert Shedd, vice president of Weyerhaeuser's land management division and manager of the Northwest Landing project, his company expects to spend $9 million building the infrastructure of the project during 1989. By the end of the year, he said, new access roads, water and sewer connections, street lights and landscaping should be in place for the first of three phases of development.

No businesses have committed themselves to locating on the new sites so far, but Shedd said he expects the first phase of development to consist mainly of warehousing and distribution enterprises.

"It's an ideal place for building," Shedd said. "The soils are stable, there's no problem with earthquakes or slides, and it's right next to the freeway."

The Weyerhaeuser property, a spectacular 5 square miles of high bluffs and wooded plateaus overlooking Puget Sound, became an environmental cause celebre in 1976 when the timber company proposed building a 250-acre log-export facility and deep-water port there, just 2,000 feet from the boundary of the Nisqually National Wildlife Refuge.

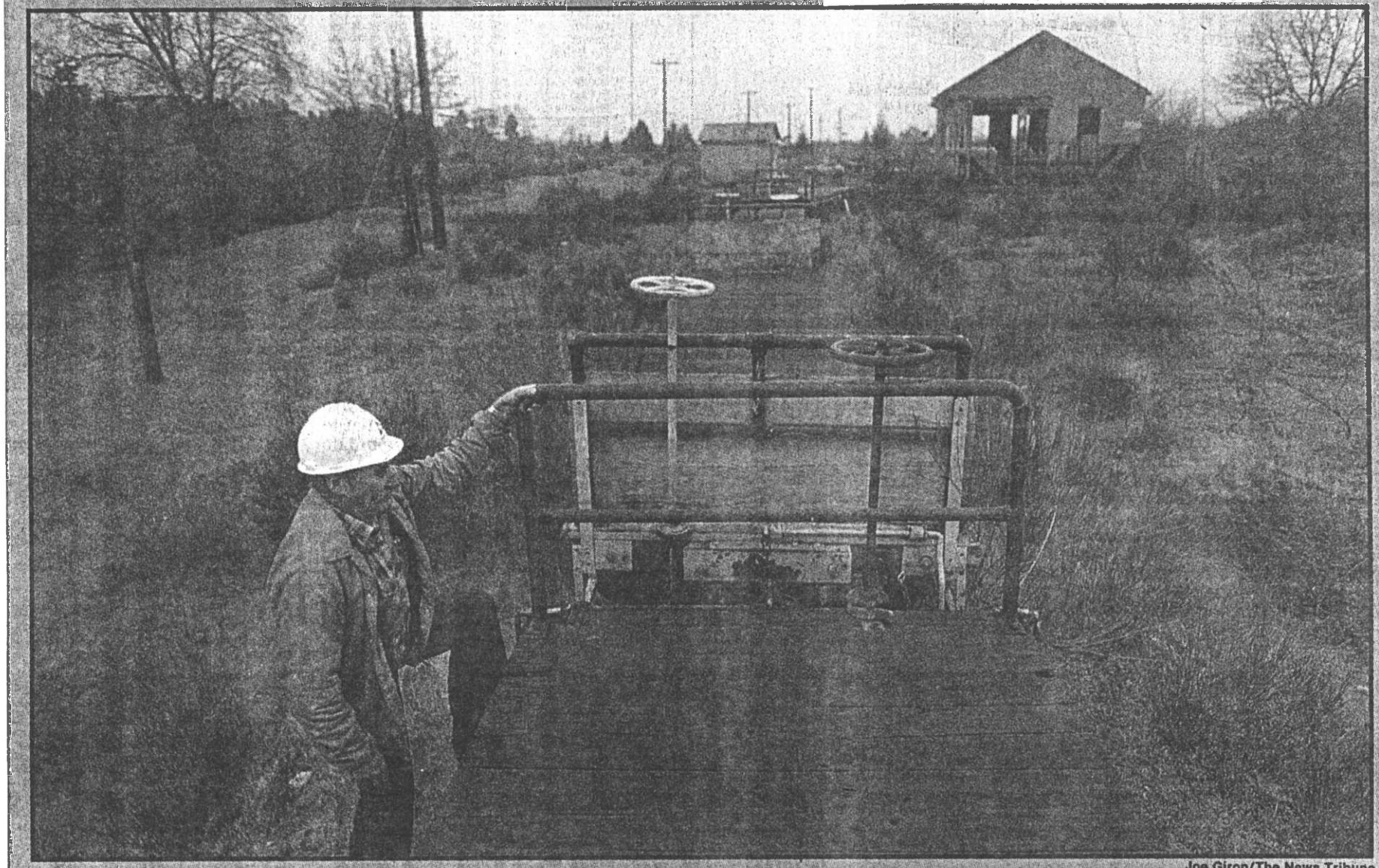
In 1985, after nine years of legal battles, Weyerhaeuser finally got the OK from the state Supreme Court to build its log dump and dock. But by then the wood-products industry had fallen into a slump, making the facility uneconomical — at least temporarily.

While acknowledging they had lost the war, environmentalists consoled themselves at having at least won a reprieve. Since then, members of the Nisqually Delta Association and the Washington Environmental Coun-

Please see **Nisqually**, back page

A new city on the Sound

The News Tribune, Sun., Nov. 13, 1988



Joe Giron/The News Tribune

Jack Myers climbs on an old railroad car on property near DuPont that Weyerhaeuser plans to turn into a 3,200-acre planned community.

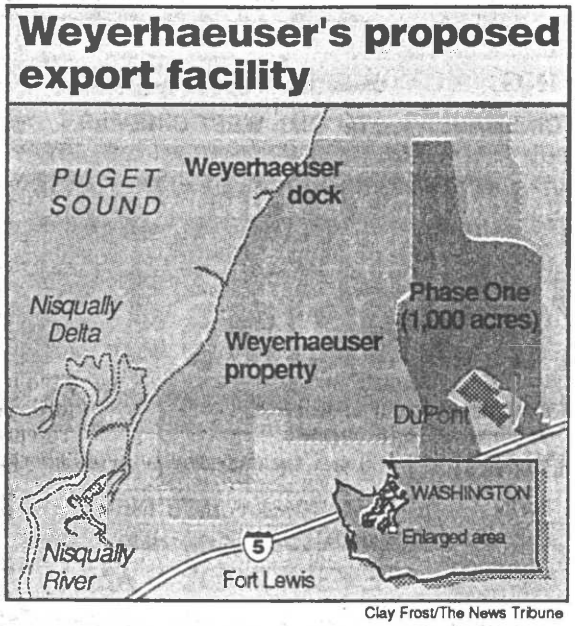
cil, the two groups primarily responsible for stalling the project, have kept a wary eye on the timber giant, watching for further developments.

Now their questions about Weyerhaeuser's plans for the remainder of the Nisqually site have at last been answered and, according to some of the company's most determined critics, their worst fears have been realized.

At 3,000 acres, the total Nisqually development will dwarf Weyerhaeuser's Snoqualmie Ridge (2,050 acres) and West Campus (1,600 acres) projects. The Northwest Landing project is so extensive that Weyerhaeuser is lobbying the Federal Highway Administration to build a new interchange on Interstate 5 to provide access, according to Washington State Transportation Department officials.

In January, if all goes as planned, the first contracts will be signed for site work on phase one of the enterprise: 1,000 acres of industrial and commercial sites that will surround the village of DuPont and stretch northwest toward the Sound. Already, Weyerhaeuser has spent $1.8 million on a new access road and is in the process of tearing down the 70-year-old DuPont School to make room for commercial development along I-5.

Weyerhaeuser's new development would technically become part of DuPont (population 600), but it would in fact overwhelm the tiny community, expanding its population by a factor of 23 and its developed land area by 50 times.



Clay Frost/The News Tribune

Considering that the Weyerhaeuser project will be the largest development of its kind ever built in the state and one of the largest in the country, it has so far drawn relatively little venom from environmentalists who were so incensed by the spectre of the export dock.

"We haven't been watching it as closely as we perhaps should have," said Nisqually Delta Association president Mary Martin. "We've been distracted by other issues on the Nisqually."

But according to the mayor of DuPont, Mark Jackson, the relative calm is because the Weyerhaeuser plan is unassailable on any logical grounds. The new development is a model community plan, he said, which will have virtually no effect on the delta or the water quality of Puget Sound.

"These are really the planning techniques of the '90s," Jackson said. "We're way out ahead of everybody with this. We're talking about a world-class campus here."

Others attribute relative calm to lack of information, charging that Weyerhaeuser has been unduly secretive about its plans. "Nobody really knows what they (Weyerhaeuser) are up to," said Flo Brodie, president emeritus of the Nisqually Delta Association. "It's extremely difficult to find out what's going on."

Brodie is a seasoned veteran of the Nisqually Delta wars, having signed on in 1965 to fight a deep-water port in the delta proposed by the Port of Tacoma. She has also helped ward off various other development schemes for the Nisqually area, including an aluminum plant proposed by the Port of Olympia and a City of Seattle plan to dump its garbage in the Nisqually reach.

Brodie and others are concerned that the Weyerhaeuser development will inevitably harm the Nisqually estuary, a vast triangle of marsh grasses, braided fresh-water streams and tangled vegetation. They worry about such things as increased runoff from paved streets and parking lots, the noise, light and glare, the loss of animal habitat. They worry about the effect of sewage and surface runoff on water quality in the delta and the Sound, about leachate from solid-waste sites seeping into the ground water — and about the possibility that a portion of the industry Weyerhaeuser attracts could be heavily polluting pulp and wood products manufacturers.

The estuary, those opposed to urban development say, is the home of 244 species of animals, an essential feeding area for some 30,000 migrating ducks and geese, an irreplaceable breeding ground for marine life and the site of one of the healthiest salmon runs left in the Northwest.

Contributing to opponents' hesitation about extensive development of the Weyerhaeuser site, Martin said, is their regard not only for the area's environment but for its historical importance as well. The property has, in fact, been the setting for some major events in Northwest history.

As a sign in front of the tiny DuPont historical museum notes, the property about to be developed by Weyerhaeuser was the site of the first home built by white settlers on Puget Sound. It was the original location of the Hudson's Bay Co. in Washington, the site of the first wedding between whites on Puget Sound, the birthplace of the Puget Sound region's first white child, and the original site of old Fort Nisqually (the remnants were packed up and moved to Point Defiance in 1934).

During the first years of the 20th century, E.I. du Pont de Nemours & Company gradually acquired title to what is now the Weyerhaeuser site and built a dynamite factory there. The village of DuPont was built as a company town. A buffer zone established around the plant for safety reasons accounts for the property's isolation over the years.

In 1976, du Pont de Nemours closed the explosives factory and sold its property to Weyerhaeuser.

While those opposed to Weyerhaeuser's Nisqually project regard its colorful history as reason to protect the land, Weyerhaeuser developers and DuPont city officials use the history to conclude that a precedent was set for industrial use as far back as the Hudson's Bay Co., and that their plan to develop the land amounts to a logical continuation of land-use tradition.

The fact that DuPont's comprehensive plan was largely paid for by Weyerhaeuser leads critics of development to the conclusion that the timber company in effect purchased planning policies favorable to development.

"It's a clear case of the tail wagging the dog," said one DuPont-area resident who declined to be quoted on the record. "Weyerhaeuser owns DuPont, lock, stock and barrel. Whatever Weyerhaeuser wants, Weyerhaeuser gets."

Mayor Jackson is infuriated by such allegations. While Jackson readily admits that Weyerhaeuser contributed $75,000 to help pay for the city's comprehensive plan, he steadfastly denies any coercion in the course of its preparation. Jackson should know. Before becoming DuPont's mayor, he was the DuPont city planner, a position he held throughout the comprehensive planning process.

"The pro- and anti-development debate is juvenile," Jackson said. "Growth is going to occur in the Puget Sound area, like it or not. The method of controlling it is the only issue. We believe we have a state-of-the-art development and land-use plan.

"The people in DuPont don't necessarily want development. What they want is local control of inevitable development and environmentally responsible development. We have no jobs, no place for our people to work, and no tax revenue. So we made an agreement with Weyerhaeuser."

The Tacoma/Pierce County Economic Development Board also supports the project. "It's a good site, a good location," said the board's vice president, John Austin.

Tacoma News Tribune
November 13, 1988

History of Nisqually Delta area

1792: Captain Peter Puget charts Nisqually delta area while mapping Puget Sound for the British Vancouver Expedition.

1833: Hudson's Bay Co. builds cabin and storehouse on beach near Sequalitchew Creek. First settlers arrive: four men, four oxen, four horses. Original Fort Nisqually constructed on uplands.

1838: Fort Nisqually becomes home base for Beaver, the first steamship on Puget Sound.

1839: First Catholic mass for Puget Sound Indians held at Fort Nisqually.

1840: First full-blooded white couple married north of the Columbia.

1841: First public observance of American Independence Day west of the Mississippi River.

1842: First white child born north of the Columbia River.

1848: Snoqualmie Indian attack leads to first murder trial on Puget Sound.

1869: British occupation ends. U.S. acquires title to Fort Nisqually and other Hudson's Bay Co. land for $650,000.

1906: E.I. du Pont de Nemours & Co. buys Fort Nisqually site, begins construction of dynamite factory.

1934: Remains of Fort Nisqually removed to Point Defiance Park in Tacoma.

1951: du Pont company town sold to residents, and incorporated as fourth-class town.

1964: City of Seattle explores possibility of using Nisqually reach as garbage dump.

1965: Port of Tacoma announces plans to develop Nisqually Delta as deep-water port.

1967: Port of Olympia attempts to locate aluminum plant on Thurston County side of the delta

1970: Nisqually Delta Association formed.

1971: City of DuPont annexes entire 3,200-acre holdings of DuPont Co.

1974: Nisqually National Wildlife Refuge created.

1976: DuPont Co. closes explosives factory, sells all land holdings to the Weyerhaeuser Co. for $12 million. Weyerhaeuser announces intent to build 250-acre log dump and precast concrete pier in the Nisqually reach. Environmental organizations file suit to stop project.

1985: Washington State Supreme Court clears the way for Weyerhaeuser export facility. Company says it will not proceed immediately. City of DuPont completes comprehensive plan and land-use zoning code.

1988: Weyerhaeuser Co. announces intent to develop Nisqually property as Northwest Landing, a 3,000-acre mixed-use community with eventual population of 14,000 people.

"They've got a healthy mix of residential and industrial. Weyerhaeuser always does quality work."

Sewage would be handled by septic systems and an existing treatment plant at Fort Lewis in the beginning, but within five years, according to Shedd, a new $10 million secondary treatment plant would be built between DuPont and the Sound. Treated effluent from the new plant would empty into Puget Sound at Tatsolo Point.

Of the 3,000 acres in the total development, Weyerhaeuser has offered 100 acres to the University of Washington as a site for a Pierce County branch campus. To sweeten the deal, it has offered to supply space in a Northwest Landing office park for the university to use until it gets state funding to build its own facilities. The total value of the gift to the UW, Weyerhaeuser officials estimate, would be $2 million.

That offer, Shedd says candidly, was made with the expectation that a branch campus would induce high-tech industry to locate on surrounding Weyerhaeuser property.

Shedd said his company has also offered to donate 200 acres at Northwest Landing to the United States Olympic Committee for an athletes' training facility

"The fact of the matter really," Shedd said, "is that the Weyerhaeuser Company purchased this property. The public could have bought it at the same time. It had every opportunity to do so and didn't. So, as a public company, why shouldn't our shareholders see some profit from this purchase. That's the American way."

Firm plans to build city by Dupont

Weyerhaeuser sets sights on Nisqually

SEATTLE (AP) — Weyerhaeuser Co.'s real-estate branch has revealed a master plan for a city for 14,000 people on 3,000 acres of land next to the Nisqually Delta.

The plan would add 3,600 houses and apartment units to the area, level more than two square miles for office and industrial sites and create an estimated 17,000 new jobs.

"Northwest Landing" has been designed as a mixed-use community in the style of Federal Way's West Campus and the company's Snoqualmie Ridge project proposed for rural King County. The company also is working on a similar 1,150-acre development called Meridian Campus, west of the Nisqually Delta in Thurston County.

Complete development of the Dupont site is expected to be phased in over 40 years.

Robert Shedd, vice president of Weyerhaeuser's land management division and manager of the project, said the company plans to spend $9 million building the infrastructure of the project during 1989.

See Development/Page 2B

The Olympian
November 14, 1988

Development-

From Page 1B

"It's an ideal place for building," Shedd said. "The soils are stable, there's no problem with earthquakes or slides, and it's right next to the freeway."

State transportation officials said the project is so extensive that Weyerhaeuser is lobbying the Federal Highway Administration to build a new interchange on Interstate 5 to provide access.

The company hopes the first contracts will be signed for site work on phase one of the enterprise in January: 1,000 acres of industrial and commercial sites that will surround the village of DuPont and stretch northwest toward the Sound.

Weyerhaeuser has already spent $1.8 million on a new access road and is in the process of tearing down the 70-year-old DuPont School to make room for commercial development along I-5.

Weyerhaeuser's new development would technically become part of DuPont (population 600), but it would expand its population by a factor of 23 and its developed land area by 50 times.

While opponents of the development say they are appalled by its size and the changes they fear it will bring to the delta, they have so far organized no formal protests.

Mark Jackson, the mayor of DuPont, said the new development is a model community plan that will have virtually no effect on the delta or the water quality of Puget Sound.

"These are really the planning techniques of the '90s," Jackson said. "We're way out ahead of everybody with this. We're talking about a world-class campus here."

Others are concerned that the Weyerhaeuser development will inevitably harm the Nisqually estuary, a triangle of marsh grasses, fresh-water streams and vegetation.

The estuary is the home of 244 species of animals, an essential feeding area for some 30,000 migrating ducks and geese, a breeding ground for marine life and the site of one of the healthiest salmon runs left in the Northwest, said opponents of the project.

Seattle Post Intelligencer, November 14, 1988

Weyerhaeuser plans new city for 14,000 in town of Du Pont

P-I Staff and News Services 11-14-88

Weyerhaeuser Co.'s real-estate branch has revealed a master plan for a brand-new city for 14,000 people on 3,000 acres of land next to the Nisqually Delta in the town of Du Pont.

The plan would add 3,600 houses and apartment units to the area and level more than two square miles for office and industrial sites.

The community, to be called "Northwest Landing," would include all of Du Pont except for the already developed areas in the southwest and southeast corners of the Pierce County town.

An estimated 17,000 new jobs would be created within the community by the time the site is completely developed in 40 years.

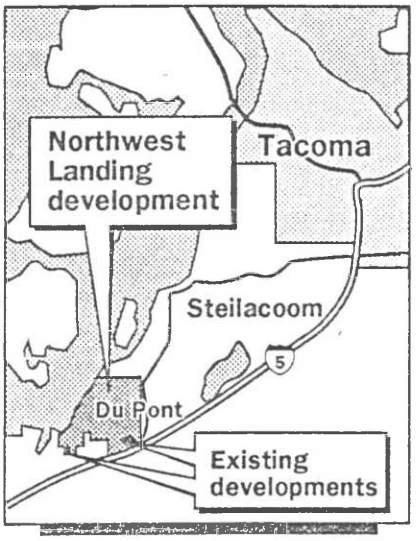
Those jobs will cover "the entire spectrum of employment opportunities," with an emphasis on "21st century, information-age technologic kinds of industries," Du Pont Mayor Mark Jackson said yesterday.

Northwest Landing has been designed as a mixed-use community in the style of Federal Way's West Campus and the company's Snoqualmie Ridge project proposed for rural King County.

Robert Shedd, vice president of Weyerhaeuser's land management division and manager of the project, said the company plans to spend $9 million building the infrastructure of the project during 1989.

"It's an ideal place for building," Shedd said. "The soils are stable, there's no problem with earthquakes or slides, and it's right next to the freeway."

Jackson believes the first new jobs created in Northwest Landing would be related to warehouse and distribution because of Du Pont's location just north of Interstate 5.



But since the community is being modeled on such developments as North Carolina's Research Triangle, other jobs are expected to be more in line with telecommunications, fiber optics and other information-age technologies, he said.

When Northwest Landing is fully built, it will cover 35 percent to 40 percent of the Weyerhaeuser property, Jackson said. The rest of the land will be "publicly or privately owned open spaces," he said.

Residential areas and employment centers will be linked by trails and paths, in addition to roads, Jackson said.

"It is conceivable at buildout that an individual or family could live or work in Northwest Landing and never have to rely on the polluting (automobile)," he said.

State transportation officials said the project is so extensive that Weyerhaeuser is lobbying the Federal Highway Administration to build a new interchange on Interstate 5 to provide access.

The company hopes the first contracts will be signed for site work on phase one of the enterprise in January: 1,000 acres of industrial and commercial sites that will surround the village of Du Pont and stretch northwest toward Puget Sound.

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While opponents of the development say they are appalled by its size and the changes they fear it will bring to the delta, they have so far organized no formal protests.

Jackson said the new development is a model community plan that will have virtually no effect on the delta or the water quality of Puget Sound.

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Others are concerned that the Weyerhaeuser development will inevitably harm the Nisqually estuary, a triangle of marsh grasses, fresh-water streams and vegetation.

The estuary is the home of 244 species of animals and an essential feeding area for some 30,000 migrating ducks and geese.

The area also is a breeding ground for marine life and the site of one of the healthiest salmon runs left in the Northwest, said those opposed to the project.

The Herald, November 14, 1988

Town envisioned for large area near Nisqually Delta

Associated Press

SEATTLE — The Weyerhaeuser Co. is planning a brand-new city for 14,000 people on 3,000 acres next to the Nisqually Delta.

The plan would add 3,600 houses and apartment units to the area, level more than two square miles for office and industrial sites, and create an estimated 17,000 new jobs.

"Northwest Landing" has been designed as a mixed-use community in the style of Federal Way's West Campus and the company's Snoqualmie Ridge project proposed for rural King County.

Complete development of the site is expected to be phased in over 40 years.

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Peninsula Daily News, November 14, 1988

City of 14,000 proposed near Nisqually Delta

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Tacoma News Tribune, November 15, 1988

Planned community has lot of potential

To grow or not to grow. That is not the question for the tiny town of DuPont.

The question, according to DuPont Mayor Mark S. Jackson, is how to manage the growth that is inevitable in a way that balances economic development with quality of life issues. The Weyerhaeuser Co.'s Northwest Landing project appears to try to answer that question.

Over the next 40 years, Weyerhaeuser hopes to create a 3,000-acre planned community consisting of homes, industry and offices in the area just north of the Nisqually Delta. It would bring an estimated 17,000 jobs to the area — making it very attractive not only to Pierce County but also to DuPont, which, according to Jackson, has "no jobs, no place for our people to work and no tax revenue."

Although Jackson insists that Weyerhaeuser's "model" plan will have virtually no effect on the Nisqually Delta or water quality in the South Puget Sound, environmentalists who fought Weyerhaeuser's earlier plans for the site — a log export facility and deep-water port — have a more skeptical attitude. Among their concerns are the effect of runoff from paved streets and parking lots, noise, light, pollutants leaching into the ground water and loss of animal habitat.

Although the Northwest Landing project is an attractive and promising one, it is important that a number of questions be answered.

How will the additional traffic be handled on the already congested Interstate 5 corridor? What about the increased pressure on schools? Just what kind of industries will be allowed into the community? These are the kinds of questions that would be addressed in a comprehensive land use plan; unfortunately, Pierce County voters rejected such a plan when it was put to them.

Growth can be good if it's done carefully and doesn't outpace the surrounding area's ability to cope with it. Landowners should be able to develop their land, but in a way that is environmentally sound. If Weyerhaeuser is able to show that its project successfully addresses these concerns, then its Northwest Landing will be a very desireable element in Pierce County.

Progress closes in on Nisqually Delta

By Brad Shannon
The Olympian

Environmentalists worried about the future of the Nisqually River Valley and its delta wildlife sanctuary are feeling old anxieties and despair. as two very large developments take shape to the east and west.

One project eventually would create a city of 14,000, nearly the population of Lacey, just over the bluff on the east or DuPont side of the delta. The other project would add 7,000 residents, comparable to Tumwater, in a new community to the west at Hawks Prairie.

The scenarios would fully develop over 25 to 40 years,. but that doesn't soothe longtime friends of the delta.

"They're locking in this little delta area like a vise," complains Mary Martin, president of the Nisqually Delta Association, which formed in 1971 after a Seattle garbage dump and delta "super port" were proposed at the site.

See Nisqually/Page 6A

More inside

Town of Dupont: Historic town faces changes.
Delta dilemma: Prospect of crowds worries planners.
All on Page 6A.

Nisqually—

From Page One

Martin's group later fought tenaciously against a Weyerhaeuser Co. deep-water log-export dock that would have jutted 400 meters off the Nisqually Reach shore. That port proposal eventually won permit approval, and was upheld on a ruling by the state Supreme Court in 1985. Weyerhaeuser ultimately shelved the project — temporarily — citing the nasty 1980s recession in the Northwest forest products industry.

The delta is prized by Martin's group as the lone undeveloped major estuary on the West Coast south of Alaska. It is home to some 244 species of animals and 30,000 migrating ducks and geese.

The Nisqually River also is known for a large salmon run — and despite decades of threatened development, a fairly undeveloped marred ridge line still exists along both edges of the valley.

The Nisqually Indian Tribe also is watching the developments. Larry Sanchez, tribe chairman, said, "Of course, the Nisqually Tribe has concerns about any major development planned for the area around the Nisqually Delta. The tribe is committed to protecting the delta. We are monitoring Weyerhaeuser's plans for DuPont and will be evaluating their potential impacts."

The salmon run in the Nisqually River is the tribe's spiritual, cultural and economic base.

DuPont Mayor Mark Jackson, on the other hand, sees no alternative to the emerging developments — the only questions for him are how to manage them and who controls them. "Growth in the Interstate 5 corridor is as inevitable as rain in Western Washington," he says, arguing strongly that the delta won't be harmed.

DuPont, he says, is requiring adequate buffers. His office also is open to discuss any environmental concerns, he says.

Today, the log-export port issue dangles vaguely, somewhere out in the future. The marketing manager for Weyerhaeuser Real Estate Co.'s land management division, J.J. McCament, says, "From a corporate standpoint it is a project that is very viable. . . . I don't think it's a question of will it be built; it's a question of when it will be built."

In the limelight now are two other Weyerhaeuser Real Estate Co. projects — Meridian Campus northeast of Lacey, and Northwest Landing at DuPont.

Both are on the verge of starting. Also, adjacent to the Weyerhaeuser project northeast of Lacey, a Burlington Northern subsidiary is putting together a sizable development that includes the site of a winter thoroughbred horse-racing proposal.

Meridian Campus project manager Michael Massoth says he is awaiting a local improvement district agreement with other landowners and the city of Lacey before proceeding with sewer, road and water-line work on his seven-phase, 30-year development just west of Meridian Road. This northeast Thurston County project will put 2,800 homes on 1,150 acres for 7,000 people — while retaining some 22 percent of the land as open space.

Rich Cobb, Lacey Public Works director, says sewer improvement district petitions probably will go

The Olympian
Nov. 20, 1988

out in a few weeks to the approximately 40 owners of land in the 2,268-acre LID area. Assuming landowners approve the sewer extension north of Interstate 5, the Lacey City Council could be asked to approve the LID — backing it with city credit — early next year.

Cobb foresees a day when Meridian Campus and the neighboring developments are annexed to Lacey.

To the east and north of the Nisqually River, in Pierce County, the larger DuPont project looms on 3,200 acres. Weyerhaeuser's McCament says 14,000 residents and 17,000 jobs are forecast for the DuPont project over a 40-year period.

The project's first phase, expected to cover about 1,000 acres in the east and southern parts of the development over the next 10 years, will offer office space in a campus-type setting, as well as multifamily housing, retail and professional service space, warehouse distribution sites and light manufacturing.

McCament says the company has a small dock on Puget Sound still used to ship explosives such as dynamite to other ports every six weeks or so. Explosives storage and shipping have been ongoing at the site, she says.

In the sense that each is a development package, each proposal is similar to Weyerhaeuser's 1,600-acre West Campus project that began in the 1970s in the sprawling Federal Way area of south King County.

But the self-contained West Campus was built by a Weyerhaeuser-owned construction firm, McCament says. The construction at DuPont will be done by whoever buys land in the project. Covenants tied to land deeds — instead of an overall design concept — will be used to guide design and development, says McCament.

Except for the dock area where Weyerhaeuser has easement, a steep bluff would serve as a greenbelt separating the project from the water — and views from the delta would be sheltered, according to McCament.

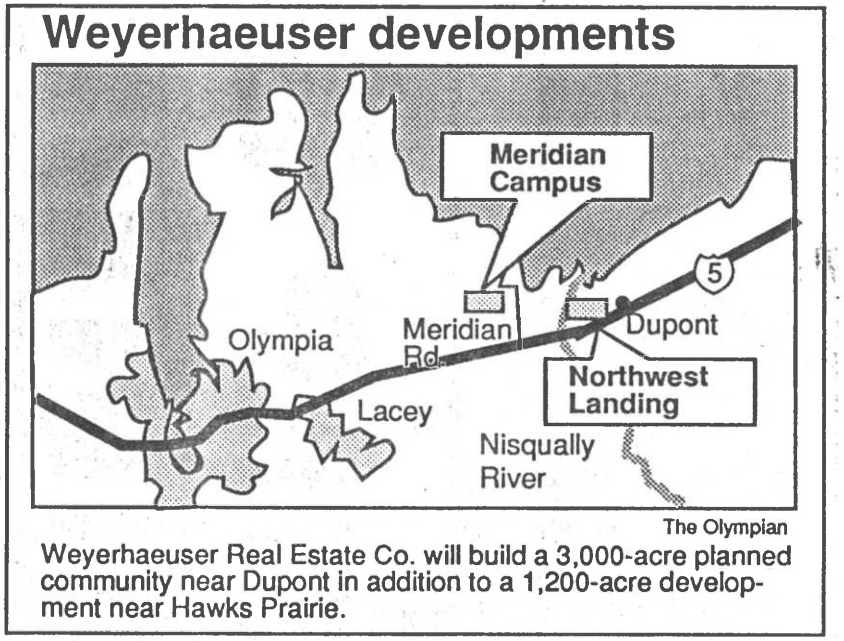
McCament said the company is hoping to get permits early next year for about $9 million in road and water tower improvements on the southeastern portion of the site. Sewerage alternatives are under study. The DuPont City Council already has approved a tentative $8.5 million LID that will finance Weyerhaeuser's road work.

Martin, the environmentalist, says her group will work to limit any harm the developments cause the environment. She says her concerns include road runoff, stormwater, septic tank use, location of sewer outfalls and the sheer volume of human activity in the vicinity. "The (Puget) Sound just isn't going to stand that pollution," she says of the possible placement of sewer outfalls serving each development.

"If they would just decrease the density on these developments there wouldn't be the problem. But greed rules."

Martin considers the delta and valley to be under siege — with logging threatening ridge areas upstream along the valley. A ridge area on the western flank of the refuge, comprising 150 acres, for instance, is under threat of clearing to make way for homes.

DuPont's Mayor Jackson, a former city planner and a state Department of Ecology employee, is skeptical about environmental threats. He considers the Weyerhaeuser planning and open space provisions to be state of the art — tried in California and North Carolina, but new to Washington.



Weyerhaeuser Real Estate Co. will build a 3,000-acre planned community near Dupont in addition to a 1,200-acre development near Hawks Prairie.

The Olympian, November 20, 1988

Delta custodians ponder options

By Brad Shannon
The Olympian

Bill Hesselbart, manager of the Nisqually National Wildlife Refuge, foresees a day when neighboring development in Thurston and Pierce counties could actually limit access to the 2,800-acre Nisqually Delta sanctuary.

"I guess overall the thing that concerns us with this development on two sides of us is these people (residents and workers) in the year 2000 are going to want a place to recreate . . . We're looking at a potential of overuse," he said.

A critical issue is whether the developments themselves contain enough recreation attractions for the estimated 21,000 residents and more than 17,000 workers they'll bring to the area bordering the Nisqually Valley, according to Hesselbart.

In response to overuse, the refuge could expand its sanctuary portion, in effect cutting the public off from a larger part of the migratory bird habitat, or the refuge could cut back the hours and seasons that areas of the delta are open to visitors.

"That's something we'll have to look at," he said.

The refuge, created in 1974 by an act of Congress, currently records about 70,000 human visitors yearly, its outdoor recreation planner Ellie Henke said. It is under the jurisdiction of the U.S. Fish and Wildlife Service

The Olympian, December 4, 1988

Margaret McKenny

She was an environmentalist before the word was in vogue and helped preserve Sylvester Park, Priest Point Park and other local treasures.

A list of who's who in the Thurston County environmental movement begins with the name Margaret McKenny

Long before words such as "ecology" and "environmentalist" were in vogue, McKenny was fighting, and winning, several key conservation battles.

"Prior to Margaret, there was not that much environmental awareness around here," said Herb Legg, a McKenny friend and fellow citizen activist.

If you appreciate Sylvester Park in downtown Olympia, thank McKenny for leading the citizens' effort more than 30 years ago to stave off developers who wanted to cut down the majestic maples and build an underground parking lot there.

If you are worried about the rapid loss of mature Douglas fir stands in the Olympia area, thank McKenny and other far-sighted naturalists who halted timber harvests in the 1950s in Olympia's Watershed Park and portions of Priest Point Park.

If you are grateful for the preservation of the Nisqually Delta as a federal wildlife refuge, thank McKenny for persistently beating back bids to build everything from an industrial port to a garbage dump where the river meets Puget Sound.

"I can remember Margaret saying: 'You know Flo, we didn't do anything today for the Nisqually Delta,' " said Flo Brodie, an Olympia environmentalist.

Death claimed Margaret McKenny at the age of 84 in 1969. But her memory is vivid in the minds of many.

"I'm always dragging her name to the forefront," said Brodie, who met McKenny in 1961 and used to drive her to the woods for mushroom-hunting expeditions, a lifelong interest of McKenny's.

"She was very much a naturalist," Brodie recalled. "She emphasized the education of children. She spent a lot of time with youngsters. She felt that if children don't get an environmental education early, they wouldn't get one at all."

Born in Olympia in 1885, McKenny was the daughter of Gen. Thomas McKenny, who arrived in Olympia as a territorial official in 1867.

"She was a general's daughter and she acted like it," Legg said. "She ordered us men around like we were privates. She wasn't abrasive, but she was straightforward. She just told 'em."

McKenny was educated at the Providence Academy in Olympia, the University of Washington and the Lowthrop School of Landscape Architecture in Groton, Mass.

She lived on the East Coast for many years, working as executive secretary of the City Gardens Club of New York.

An educator and author, she wrote more than 15 books over a span of more than 30 years on such topics as mushrooms, wildflowers, birds and garden flowers.

She returned to her native Olympia in 1947. She taught

By John Dodge
The Olympian

Olympian file photo

Margaret McKenny is credited with saving much of the natural beauty of the South Sound area.

Margaret McKenny

Olympia connection: An Olympia author, educator and naturalist who is considered the mother of the Thurston County environmental movement.

Born: April 17, 1885, in Olympia.
Died: Aug. 4, 1969, in Olympia.

"Thanks in large part to Margaret McKenny, a lot of Olympians have learned the true meaning of the word 'ecology. . ' "
Gordon Newell

creative writing to children, offered help identifying mushrooms to anyone interested, wrote, studied nature and served as the community's environmental conscience.

Her book "The Savory Wild Mushroom," which was revised and enlarged in a 1987 edition, remains a popular field handbook for the amateur mushroom hunter.

"She popularized mycology," said Michael Beug, a professor at The Evergreen State College. "She brought it to the public and explained it to the public. She was one of the first to do that."

Legg said his fondest memories of McKenny involve trips to her house on Water Street.

"I remember going to her place with a bag full of mushrooms and having her take the best two or three," he said. "She was the mushroom lady."

McKenny, Legg and a handful of other environmentalists tackled Olympia City Hall in the summer of 1955 to stop conversion of Sylvester Park and timber harvesting in Watershed Park.

"We said neither of the parks should be sold without a vote of the people," Legg recalled. After a 10-month legal battle that went all the way to the state Supreme Court, McKenny and her forces prevailed.

As early as 1947, McKenny was generating public interest and lobbying politicians to protect the Nisqually Delta from development.

She formed the Washington Citizens' Committee for Outdoor Recreation, which was the forerunner of the Nisqually Delta Association. The NDA became the driving force behind creation of the Nisqually National Wildlife Refuge in the 1970s.

McKenny also launched the Olympia Audubon Society, which became the Black Hills Audubon Society.

"There is a clear continuity between Margaret and the people in the environmental movement today," Legg said.

Her legacy lives on in other ways, from the flowering hawthorns and red maples she helped to plant along Capitol Boulevard to the campground named after her in the state's Capitol Forest.

Mike Contris, an editor and columnist for The Olympian for many years, offered this tribute to Margaret McKenny in 1981:

"She truly admired the beauty of this place and although she had no children of her own, she wanted every child to come to know and love the flora and the fauna of the place at least as much as she did."

The Olympian, December 4, 1988

Chief Leschi

Determined to protect his people and their ancestral lands, he became the enemy during the Indian wars. Even so, many settlers refused to believe he was guilty of crimes. But the territorial governor was bent on setting an example and forced his execution.

Chief Leschi of the Nisquallys was considered a rebel, but not without cause.

As American settlers surrounded the Nisqually Indians and the newly established territorial government sought to move them away from their traditional land, Leschi refused to acquiesce. It led to war.

"Chief Leschi was a very wise Indian man and he knew his people to always be coast Indian people who had to have a relationship to the water," said Ramona Bennett, principal of the Wa He Lut Indian school in Nisqually.

Leschi refused in the mid-1800s to sign a treaty that would have meant moving his people from their traditional farming and fishing grounds along the banks of the Nisqually River to unproductive rocky highlands near what is now Tolmie State Park.

His opposition fueled growing tensions between Indians and settlers, and Leschi was branded an outlaw, became a leader in the Indian wars and ultimately was hanged.

Leschi was born of a Nisqually father and Yakima mother. His village was at Mashel River at the point where it empties into the Nisqually. He was from noble lineage, his mother the daughter of the Klikitat chief and his father a leading horse breeder, said Cecelia Svinth Carpenter, a Nisqually Indian, author and historian. He spoke both the Shaptin language of his Yakima mother and the Salish of his father. Leschi never spoke English but could converse in Chinook jargon, a trading language.

Most distinguishing were said to be his penetrating eyes.

"He was exceptionally well-endowed with leadership qualities. He was a born leader," said

By Jeff Black
The Olympian

Chief Leschi defended the needs of his people and was hanged for allegedly inciting war.

Nisqually tribal photo

Chief Leschi

Olympia connection: Sub-chief of Nisqually Indians.

Born: 1808, Mashel River.
Died: 1858, hanged near Steilacoom.

"In Indian ways you don't do something to be selfish and satisfy someone else's ego. He had to do what he had to do."
Cecelia Svinth Carpenter, Nisqually historian.

Carpenter.

The Nisqually people were first known as the Squally-abach, meaning "people of the grass country," according to Carpenter, who is writing a book on the history of the tribe. French voyagers called them Nesquallys and gave the same name to the river.

Leschi traveled quite extensively, by foot, canoe and later by horse. He was a slave owner as was common at the time.

In 1833, Hudson's Bay Company extended its trading network into southern Puget Sound with the building of Fort Nisqually. The fort was built on high land north of the Nisqually delta. In 1843, Dr. William F. Tolmie became chief trader at the fort and learned to speak the Nisqually language. He and his clerk, Edward Huggins, became close friends with Leschi, who served as guide. The British outpost was a hub of activity, Indian traders from throughout the region making long journeys to come to the fort.

In 1846, when the international boundary was set at the 49th Parallel and Americans moved from the area near the Columbia, settlers claimed Nisqually lands. James McAllister settled his family on fertile lands on the delta at Leschi's invitation and James Longmire took up a claim east of Yelm. The establishment of a U.S. Army fort at Steilacoom completed the surrounding of the Nisquallys.

"The British were more amiable toward the Indians," said Carpenter. Many of the British married Indians and established long-term relationships, while the Americans would often come for a while and leave.

See Leschi/**Page 10**

Leschi—

From Page 9

This changeover from British to American influence with the Nisquallys began to mark the difference, Carpenter said.

The whole Indian way of life — fishing, hunting, gathering food, traveling in the territory — changed in a short time, Carpenter noted. "It was all gone within 30 years and we were confined to the reservation." This all happened as Leschi was in his prime as a leader, she said.

Congress carved Washington Territory out of Oregon in March 1853 and Issac I. Stevens was appointed governor and superintendent of Indian affairs.

Stevens was charged by the federal government with setting up a treaty commission and arranging for chiefs to be appointed from the tribes to sign the documents. It was Stevens who commissioned Leschi as sub-chief.

The first treaty concluded was the Medicine Creek Treaty, so named because the signing took place at Medicine Creek on the Nisqually delta, called She-nah-nam by the Indians. The treaty was explained to assembled members of the Nisqually and Puyallup tribes on Dec. 26, 1854.

Michael T. Simmons, a founder of Tumwater, aided in drafting it. According to settler and author Ezra Meeker, Simmons was informed that the Indians would sign anything presented to them, and when the treaty was ready the terms were presented to the Indians without consultation.

Wild rumors had circulated among the tribes about the intentions of the treaty, including the possibility of shipping them to Alaska. One provision struck a chord when it was announced the treaty included the right of the government to relocate the Indians on a whim.

The treaty included provisions for protecting some Indian rights to shellfish, hunting and fishing grounds. But the hitch was that it confined the Nisqually Indians on a reservation with rocky soil on the hill above the delta.

On the second day of the treaty meeting, Leschi resigned his commission as sub-chief, pulling the piece of paper from beneath his blanket and shredding it in front of the governor. Leschi is said then to have departed, according to most accounts, but his signature was found on the document.

"Leschi wanted prairie land for horse grazing and a river for fishing. He couldn't sign the treaty. He had to do what he had to do," said Carpenter.

Settlers who had not been at the treaty meeting believed Leschi had signed, but other sources say Simmons may have forged his name.

For a time nothing happened, but tensions were running high as bands of Indians in Eastern Washington and King County had become hostile. The treaty was not enforced and Leschi began his fall plowing. When Stevens dashed off to conclude other treaties, Acting Gov. Charles Mason sent a group of volunteers to take Leschi into "protective" custody. Leschi fled to a camp in the White River area of King County.

Later that fall, two Olympia volunteer companies left for the White River. Four other companies were established as a reserve force, and stockades were built at Chambers Prairie and Grand Mound. Indian troubles in other parts of the state fanned the flames.

McAllister, counting on the gentleness of the Nisquallys, rode toward the camp, but he and a companion were killed in an ambush. A few days later settlers A.B. Moses and Col. Joseph Miles were killed. The Indian wars were on.

In King County there were several raids and ambushes by Indians on settlers and Olympia grieved over its first war casualties. Two other Thurston County citizens, William Northcraft and William White, were killed.

By winter the war was deemed over by the governor. It was premature as there was an attack on the growing town of Seattle, where naval cannon fire aided in beating back a band of hostile Indians. Some said Leschi led the attack, but that was disputed.

The Indian wars took their toll on Leschi, who had moved his family to the White River area, then fled to his mother's people east of the Cascades. Leschi longed for his home on the prairie and returned.

It is said he was betrayed by his nephew, Slugia, for a reward of 50

blankets, and was imprisoned at Fort Steilacoom in the custody of the U.S. Army. The Army at first considered Leschi a prisoner of war, not a criminal, but the governor pressed for murder charges based on the death of Moses.

A jury of settlers disagreed with the charges at his first trial, resulting in a hung jury.

"Think about it. The settlers knew there was a war on and it is your job to kill during the wartime," said historian Carpenter.

Ezra Meeker, a hop grower in the Puyallup Valley, was one of the four jurors who believed Leschi innocent and later wrote a book called "The Tragedy of Leschi," disputing any charges leveled at the chief.

But Stevens seemed determined to make Leschi the sacrificial lamb of the Indian wars, and at a second trial, the sub-chief was sentenced to hang on Jan. 22, 1858, at Fort Steilacoom. But the Pierce County sheriff wasn't thrilled about the idea. Neither was the Army, which refused to surrender Leschi to the hangmen, said Carpenter.

Tolmie, who had known Leschi longer than any other white man, made an impassioned plea for mercy to the Supreme Court. But the Supreme Court, spurred by an unprecedented call from the Legislature, rejected Leschi's appeal and resentenced him to death.

This time the Thurston County sheriff was charged with the duty of execution, which was to take place on Feb. 19.

A posse was dispatched to Steilacoom and the group took Leschi out on the prairie to be hanged. The spot where he was hanged has since become a shopping center, a fact which does not sit well with many Indians.

"It's called the Thunderbird Shopping Center. Can you believe that? It would be like going to the Mount and doing a Crucifix Shopping Center," said Bennett, the Wa He Lut school principal. Her school's namesake was one of Leschi's warriors.

Even the executioner, Charles Granger, later told Meeker he felt he was hanging an innocent man.

In a strange twist, Gov. Stevens had sometime earlier revoked the Medicine Creek Treaty and before Leschi's death the tribe was given the land he had requested before the war.

A cart was borrowed from a settler and Leschi's body was taken to the prairie near Yelm for burial, Carpenter said. Later, as the boundaries of the Nisqually reservation were cut into by Pierce County and Fort Lewis, Leschi's body was moved to Puyallup, where his granddaughter lived. The tombstone now sits in a cemetery near the Puyallup tribal center. The Puyallups, who also revere Leschi, named their school system after him.

GRAYS HARBOR NWR MINI-
NARRATIVE

MINI-NARRATIVE

FOR

GRAYS HARBOR NATIONAL WILDLIFE REFUGE

1988

U.S. Department of Interior
Fish and Wildlife Service
National Wildlife Refuge System

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APPENDED: Public Law 100-406

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I. BACKGROUND

A. Location

Grays Harbor, located on the Western Coast of the State of Washington, is one of two major estuaries on the Washington Coast and is the only coastal estuary in the State with an authorized deep water navigation channel and major port. The Grays Harbor estuary provides an important transportation link to local, national, and international markets and serves as focal point for the regional economy. In addition, the estuary is a nursery ground and passage way for a vast array of living resources and an important link in the migratory patterns of many fish and wildlife species.

The opening of the pear-shaped bay, also known as Grays Harbor, lies about 45 miles north of the entrance to the Columbia River and about 58 miles south of Cape Flattery. The harbor is approximately 12 miles wide at its widest point and covers an area of 97 square miles at high tide. It extends inland from the mouth due east for 17 miles to the mouth of the Chehalis River. The bay is connected to the ocean by a channel approximately 2 miles long and 1.5 miles wide.

The two major cities near Grays Harbor are Aberdeen, located at the mouth of the Chehalis River and Hoquiam, located 12 miles east of the Pacific entrance to Grays Harbor. Aberdeen and Hoquiam actually merge forming a single community through the continuity of streets.

B. History

On May 7, 1792, the first white men sailed into Grays Harbor. Among these men was Captain Robert Gray, for whom the harbor was named. A trickle of settlers developed into a considerable stream, flowing into the Chehalis valley and along the shores of the harbor. The early settlers did fairly well and their success enticed others to the area. Lumbering and fishing are the principal economies of the area.

Throughout the years, an increasing number of demands have been placed on the estuary by an expanding economic base. The ability of the estuary to accommodate these demands results in conflicts between the various groups that want to use the resources of the estuary and the agencies responsible for managing those resources. The responsibility for making decisions about the use of the land and water resources of the Grays Harbor area falls to local, state and federal agencies. Each agency has its own agenda or written guidelines to assist decision-making on what may or may not be done. The resulting process for making decisions is confusing, uncertain and often frustrating for the individuals involved.

In response to increasing conflicts, the Grays Harbor Regional Planning Commission formed an Estuary Planning Task Force in late 1975. In September 1976 the Task Force received federal funds to prepare a Grays Harbor Estuary Management Plan. The Plan prepared by participating local, state, and federal

agencies was to avoid piece-meal decision making in the permit processes. The Plan has been adopted by local and some state agencies but has not been approved by the involved Federal agencies.

At the urging of several individuals and local organizations, Senator Dan Evans and Congressman Don Bonker compromised and introduced legislation to establish the Grays Harbor National Wildlife Refuge. The intent of the legislation is not to circumvent the Grays Harbor Estuary Management Plan but to be compatible with it. The legislation merely expedited the process of offering permanent protection to the Bowerman Basin portion of the Grays Harbor estuary.

C. Natural Values

Grays Harbor is of critical importance to certain migratory shorebirds and waterfowl and provides important habitat for many types of fish and wildlife, including threatened and endangered species.

Four aspects of the natural history of shorebirds raise concern for their conservation: the fragile characteristics of their life histories, their concentration into small migration and wintering sites, the precise timing and energy requirements in migration, and their competition with man.

The shorebirds have low reproductive rates and the breeding season is short. The low reproductive rates result in high survivorship among adults. The shorebirds disperse widely on the breeding ground, but during migration they are restricted to patches of coastal wetland and intertidal mudflats. Bowerman Basin (Grays Harbor area) is one of four systems of estuary and bay that support more than one million shorebirds during migration. The study of availability of food indicate that the shorebirds have no alternative to gathering at these limited sites. The shorebirds double their weight during the feeding phase at the stopover areas. Many of the sites needed by shorebirds are highly prized by man. Protection of the key areas from further development is critical in the conservation strategy for shorebirds.

D. Status

The President signed Public Law 100-406 on August 19, 1988. This law authorized the Service to acquire approximately 1,800 acres in the Grays Harbor area. The Act recognizes: that Bowerman Basin is a tidal mudflat within Grays Harbor which attracts hundreds of thousands of migratory shorebirds during spring migration, that Bowerman Basin provides extraordinary recreational, research and educational opportunities, that Bowerman Basin is an internationally significant environmental resource that is unprotected and may require active management.

The purposes for which Grays Harbor Refuge is established and shall be managed for include:

- to conserve fish and wildlife populations and their habitats.

- to fulfill international treaty obligations of the United States with regard to fish and wildlife.

- to conserve species threatened with extinction.

- to provide an opportunity, consistent with other purposes, for wildlife-oriented recreation, education and research.

II. ACQUISITION

A. Status

The environmental assessment for acquisition of Grays Harbor Refuge is in draft stage and should be finalized early in CY89.

The Act is specific on the acquisition issue. There shall be included within the boundaries of the Refuge those lands, waters, marshes, tideflats depicted on a map dated December, 1987 (Figure 1). The Secretary may make minor revisions in the boundaries to carry out the purposes of the Refuge and to facilitate the acquisition of property within the Refuge. The Secretary is authorized to acquire up to 68 acres of lands and waters owned by the City of Hoquiam within the boundaries of the Refuge. The Secretary shall, not later than the 3rd anniversary of the effective date of this Act, acquire by transfer or purchase or both the approximately 1,711 acres owned by the Port of Grays Harbor (See Section 4 of P.L. 100-406).

The Service has completed an appraisal of the City property and has gross cost estimates on the remaining parcels, exclusive of the Port land.

III. ACTIVITIES OF 88

A. Management Planning

The Act was fairly specific in directing the Service to prepare a management plan for the development and operations of the Refuge. The plan is to be prepared within 18 months of passage of the Act and is to include:

- the construction of a visitor center suitable for year-round use with emphasis on education and research;

- viewpoints, boardwalks, and access;

- parking and other necessary facilities; and

- a plan setting forth refuge management priorities and strategies.

Personnel of the Service have formed a planning team to facilitate the process. The team consists of representatives from Nisqually staff and Regional Office personnel.

A couple of meetings were held in 88 with land owners and interested local agencies to review the legislation and scope out the planning process.

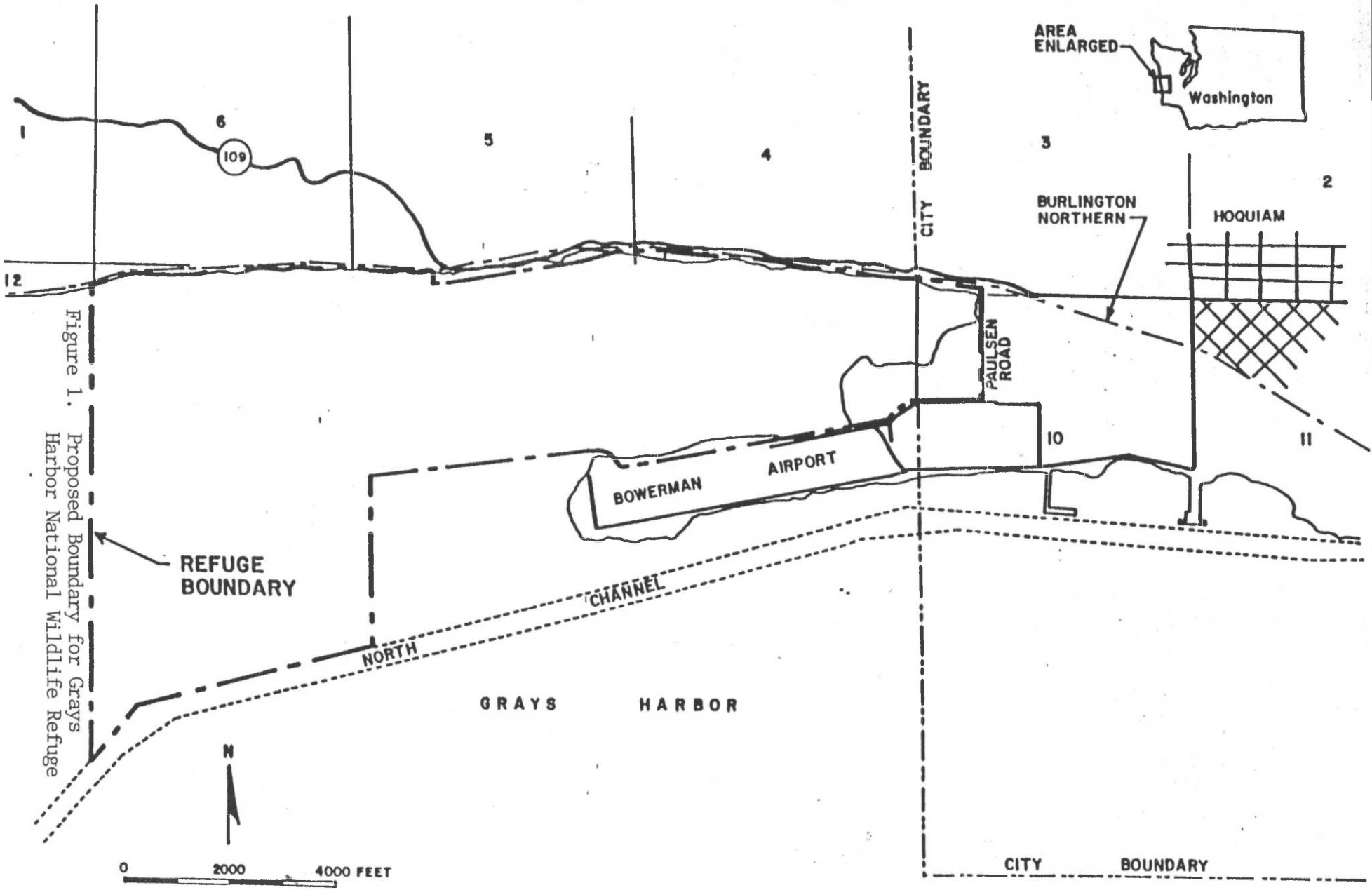

Figure 1. Proposed Boundary for Grays Harbor National Wildlife Refuge

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
GRAYS HARBOR NATIONAL WILDLIFE REFUGE
GRAYS HARBOR COUNTY, WASHINGTON
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B. Resource Information

The short time frame dictated by the legislation for completing the management plan forces us to utilize secondary sources of information on the wildlife resources of the Bowerman Basin area.

In the fall of 88, personnel of Nisqually began conducting monthly aerial surveys of this wintering area. We have attained the data from previous surveys done by personnel of Willapa Refuge.

Fortunately, there are some local individuals that have information on wildlife use. Hopefully, they will be willing to share their information with us.

IV. FUTURE

A. Acquisition

Congress authorized up to 2.5 million for acquisition and to carry out other provisions of the Act. The Service received $850,000 in FY89 for purchase of the City of Hoquiam property. This leaveS $1.65 million to carry out other provisions of the Act.

Acquisition of the Port of Grays Harbor ownership will be the ultimate challenge in the next couple years. Basically, the Port wants to use the 1,711 acres referred to in the legislation as a mitigation bank to credit against for further filling and development in Grays Harbor. The Service is in for some tough negotiations as this practice of setting up a mitigation bank could have long-term adverse impacts on the Fish and Wildlife Enhancement operation in northwest Washington. If some or all of the land owned by the Port of Grays Harbor must be purchased the Act allows the Service to request additional funding for acquisition of the Port property.

B. Spring Festival

Each spring between early April and early May up to one million shorebirds are present at Bowerman Basin. This concentration of birds has attracted several thousand people to view this spectacular display. In the past a group called Friends of Bowerman Basin set up displays at local malls and promoted the spring arrival of the shorebirds. Even though we do not have a Refuge yet established the Act has been passed and therefore, people are assuming that the Service will do something this spring and will be responsible for handling the influx of people.

The planning team has met with individuals and groups who have participated in the past to determine their interests in assisting with the activities this spring.

It appears as though the Service will be taking a very active role in the spring of 89 in promoting and handling the spring spectacular. We are also

planning on having a dedication ceremony for the Refuge and pay tribute to those responsible for the legislation.

C. Management Planning

During the next calendar year the management plan as called for by the legislation will be prepared. Meetings will be held with affected parties to provide opportunity for public participation in the process. We will be consulting with experts from the scientific field to explore management opportunities that may be available to us.

D. Contaminant Assessment

Prior to any Service acquisition a contaminant assessment of the area must be completed. For fiscal year 89, $45K has been set aside to collect samples. Some preliminary analysis may have to be done to facilitate acquisition. Complete analysis is scheduled to be completed by FY90.

APPENDED PHOTOS

PROPOSED GRAYS HARBOR NATIONAL WILDLIFE REFUGE

Figure 2. The proposed Refuge will include approximately 1,800 acres of tidelands, saltmarsh and some surrounding uplands. 88-WS

Figure 3. Some members of the planning team meeting on-site to begin the planning process. 88-EH

Figure 4. The wooded area in the background referred to as the "Fan" should be included within the Refuge. It supports wildlife divesity and provides year round opportunity for birding. 88-BH

Figure 5. Bowerman Basin is principally for the shorebirds. Up to 1 million stop during the spring migration. 88-SW

Figure 6. Pecking and probing for food on the incoming tide. 88-SW

Battle Over Bowerman Basin

Pacific Northwest conservationists are fighting to protect one of the continent's prime shorebird staging areas

by Jack DeWolf Swenson

GRAYS HARBOR is one of very few harbors along Washington's rugged coast in which mariners can find shelter from North Pacific storms. Enclosed by a narrow entrance, it opens into one of the largest estuaries on the Pacific coast, providing anchorage not only for wayward sailboats but more often for the fishing boats, freighters and big rafts of logs that support the economy of the region. The harbor is also a major staging area for migrating shorebirds: particularly at Bowerman Basin, they stop to feed and rest on the productive tideflats.

In recent years, this complex mixture of uses—by boats, log booms and birds—has combined to trouble the relatively calm waters of Grays Harbor, requiring various agencies and citizens' groups to try to balance their concern for both the environment and the economy. As a result, Bowerman Basin, the focus of this controversy, is also becoming a staging ground of a different sort. As if the basin were a pawn in a chess game, its owners seem more concerned for its ransom than its preservation.

The significance of Bowerman Basin as a major shorebird staging area was discovered less than a decade ago when Steven G. Herman, professor of ornithology at The Evergreen State College in Olympia, visited Grays Harbor with some of his students. In October, 1979, while recording bird observations in his journal, Herman coined the name "Bowerman Basin" to identify the mud flats north of Bowerman Airfield. The basin probably would not be known beyond his journal were it not for the sighting that day of a rare peregrine falcon, a species well known for having suffered a nearly fatal decline because of toxic pesticides. That sighting prompted the professor to return the following April, and it was then that he first saw the basin's astonishing concentration of shorebirds.

As it turned out, he was very lucky: he happened to arrive during the migration peak that occurs each year between April 23 and April 25. Herman recalls that he had known of other researchers studying shorebirds at Bowerman Basin, but nothing he had read prepared him for such a spectacle. "It was such a huge aggregation of such lovely birds that I was awestruck," he says. "There were no words to describe it. I had simply never seen that many birds in one place in all of my life. Here were half a million shorebirds and I kept wondering why others hadn't reported these numbers and why this place wasn't known around the world." Later he learned that previous researchers had been censusing here on the 15th and 30th of every month and hence had missed the migration peak on April 23-25.

Although local birders had noticed great flocks at the basin, no one had realized how unusually large they were. Subsequent research by Herman and John Bulger, one of his former students, revealed that each spring and fall Grays Harbor, and particularly Bowerman Basin, becomes a crucial stopover place for shorebirds migrating along the Pacific coast, some traveling thousands of miles between South America and the Arctic. Most of the migrants are western sandpipers (85 to 90 percent during peak periods), followed by dunlins (which also winter at Grays Harbor), short-billed and long-billed dowitchers and red knots, as well as 19 other species. At Grays Harbor more than a million shorebirds in all congregate to feed on crustaceans and other invertebrates found in the 37,000 acres of exposed tideflats there and to replenish fat reserves for the long journey ahead. Nearly half of the throng of shorebirds crowd into Bowerman Basin, even though it comprises only about two percent of the harbor's intertidal habitat.

Herman and other biologists recognize Bowerman Basin as the "ecological nucleus" of Grays Harbor. Its tideflats are composed of finer-grained silty clay that contains more invertebrate prey than the coarser-grained sandflats elsewhere in the harbor. Biologists have also noted that the basin is slightly higher in elevation than most of the harbor. Because of this, it remains exposed longer on rising tides and drains sooner on falling tides, allowing the birds several more hours of feeding time each day.

These physical differences are thought to be the main reasons for the unusually high concentrations of birds at Bowerman Basin. However, Herman suspects that loss of adja-

Massed at Bowerman Basin's edge while high tide submerges the mud flats, western sandpipers (bottom) and shortbilled dowitchers wait to resume their feeding. Birders watch the birds.

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cent habitat has forced birds into a continually diminishing area. For the last 40 years, landfills and development have been claiming similar wetlands that extended both east and south of their present limits.

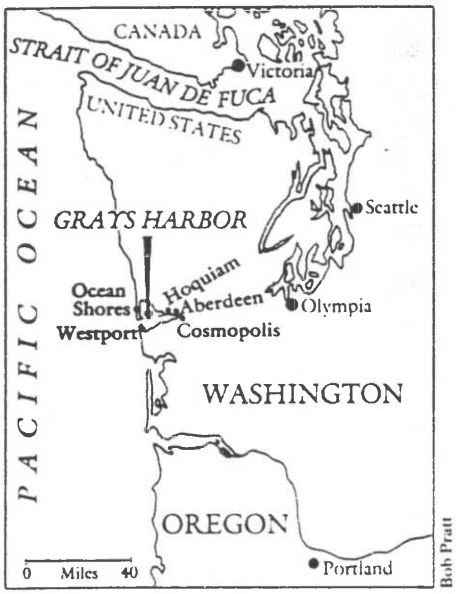
In North America, only four staging areas that attract concentrations exceeding a million shorebirds have so far been identified. Two are on the Atlantic coast—at the Bay of Fundy in Canada and at Delaware Bay. The other two are on the Pacific coast—at the Copper River Delta in Alaska and at Grays Harbor. Their importance cannot be overestimated. Biologists consider these areas crucial to the survival of numerous shorebird populations. J. P. Myers, an internationally known shorebird biologist, has warned that these unusual concentrations of birds "break the usual link between a species' abundance and its immunity to extinction." In other words, with birds that congregate like these, all of the eggs are in one ecological basket. If anything goes wrong at this point in their yearly cycle, entire populations will be affected.

Jack Swenson/T[illegible]uck & Associates

Myers and seven other prominent biologists have proposed including Grays Harbor in a network of western hemisphere "sister reserves" critical to shorebird migration.

While the importance of protecting Bowerman Basin should therefore be obvious, the basin unfortunately does not exist in a vacuum. Efforts to safeguard the basin's habitat values have come into conflict with long-standing uses of the estuary, resulting in an uphill battle against lumber and shipping interests and most particularly against the local port authority. This public regional authority owns and operates marine terminals and small-craft marinas, an industrial park, the airport bordering Bowerman Basin and extensive tracts of the estuary's tidelands, including the basin itself. And port officials had plans for the basin long before its biological significance was even discovered.

Since the early 1900s, Grays Harbor has been a deepwater port used for shipping forest products. The 30,000 people living in the towns of Aberdeen, Hoquiam and Cosmopolis on the eastern border of the harbor depend heavily on this industry. (Tourism and fishing are also important, although less so, at Westport and Ocean Shores near the mouth of the harbor.) The heavy dependence on the timber industry has resulted in a fluctuating and generally declining local economy. As a result, unemployment in Grays Harbor for the last decade has surpassed state and national averages. For more than 30 years, economic development programs for the harbor have called for diversification, but attempts to attract other water-dependent industrial uses typically have failed. The shipping facilities continue to be used almost exclusively for export of timber-related products.



Bob Pratt

In order to maintain the navigation channel, Grays Harbor has been dredged extensively over the years. Between 1945 and 1975, nearly 4,000 acres of intertidal wetlands in the harbor were filled with dredged material. These filled wetlands have since been developed because of the paucity of flat land around the harbor. The dredging and filling continued largely unregulated until the environmental movement in the 1970s produced stricter regulations on land use, especially in the nation's wetland and shoreline areas. The new rules required that any proposed estuarine development at Grays Harbor had to be reviewed by four federal agencies (U.S. Army Corps of Engineers, Environmental Protection Agency, U.S. Fish and Wildlife Service and National Marine Fisheries Service) and four Washington State departments (Ecology, Fisheries, Wildlife and Natural Resources). Although the tightened regulations slowed the rate of wetlands destruction, they also created a maze of permit processing. This finally prompted a move toward advance planning for land use in Grays Harbor.

In 1975 the Grays Harbor Regional Planning Commission formed an Estuary Planning Task Force to look to the future of the harbor. Including representatives from the county, the harbor's five townships, the port and all of the state and federal agencies involved, the task force was described as "a wildly disparate group" by Daniel Jack Chasan, writing in *Pacific Search Magazine* ten years ago. In his article, he described the task force as "united only by a common dissatisfaction with the way things were going and a common apprehensiveness about the future." The port and the municipalities, he wrote, did not like the delays and uncertainty of the permit process; the resource agencies did not like the piecemeal nibbling away at the estuary. He concluded: "Without an overall plan to which all parties agreed, there was little chance that the situation would improve from either point of view." Chasan's comment proved sound. After ten years marked by disagreement, public criticism and numerous redraftings, a final plan was published in 1986, though it has yet to be approved by the participating agencies.

The prime targets for industrial expansion have been Bowerman Airfield and some 2,200 acres of adjacent wetlands, including the core of Bowerman Basin. These lands, owned by the port, lie along the navigation channel and close to roads and rail and utility lines. (In 1962 the airfield and 500 wetland acres at the heart of the basin were purchased by the port from the county for a total of one dollar.) In the 1970s, port officials planned to fill these wetlands, including Bowerman Basin, for industrial expansion—that is, until discovery of the Bowerman shorebirds and of the presence of peregrine falcons generated concern for the basin's preservation. At that time, a rising public outcry, as well as the weight of the Endangered Species

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In a flurry of beating wings, some of Bowerman Basin's huge numbers of western sandpipers whirl just above the water at last spring's migration peak.

Act, put the port authority's plans at bay.

In 1981, the U.S. Fish and Wildlife Service (FWS), responding to a request from the federal Office of Coastal Zone Management for its views on the Grays Harbor Estuary Management Plan, issued a formal jeopardy opinion saying the proposed development of Bowerman Basin "is likely to jeopardize the continued existence of the peregrine falcon." This action taken under the Endangered Species Act has blocked the port authority from filling 1,711 acres of its basin wetland holdings, and conservationists for several years have been seeking to have this and additional acreage made a national wildlife refuge.

The port authority has been holding out for clearance to fill 564 acres of other wetlands as a condition for giving up the 1,711 acres. Port officials consider this tradeoff, now written into the management plan, to be the "balance" between economic and environmental needs that the plan ostensibly is intended to accomplish. But Charles Dunn, supervisor of the FWS field office in Olympia, disagrees. "The balance that was originally intended just isn't there," he says.

Conservation groups, including Defenders of Wildlife, Friends of the Earth, the National Audubon Society and the Sierra Club, have voiced similar concerns about the estuary management plan. They assert that not only does the purported balance not exist, but not enough consideration has been given to the thousands of acres of wetlands that already have been destroyed in the harbor. Critics also contend that there was a blatant lack of public input during the critical early stages of the planning process.

Many opponents of the present estuary management plan, including an FWS official who requested anonymity, continue to call it "the port's plan." To rectify this perceived imbalance, a Citizens' Grays Harbor Estuary Management Plan was drafted, proposing increased protection of Bowerman Basin and its surrounding tidelands. Stating that the basin should be designated an international shorebird sanctuary, the citizens' plan opposes the continued filling of wetlands within Grays Harbor. It recommends that the port authority should not be allowed to destroy more wetlands until it develops 293 acres of filled shoreline property now unused or underused. The citizens' plan also suggests that the port could then, if needed, implement its project to relocate Bowerman Airfield and develop the airfield peninsula for water-dependent industry without destroying existing wetlands. This citizens' plan is not mentioned in the Grays Harbor Estuary Management Plan. It is mentioned, however, in the environmental impact statement, which says that the task force did determine that the citizens' plan "could satisfy the future social and economic needs of the region while providing greater protection to the natural resources."

David Ortman, northwest representative of Friends of the Earth and a veteran in the battle to preserve Grays Harbor's wetlands, is particularly concerned about the potential clout that the estuary management plan might have if it is approved by all of the agencies involved. He points out that language linked to the future of Bowerman Basin is "hidden away" in a separate section of the plan; it states that if permits are not approved for specific future landfills in the harbor, the port will maintain ownership of the basin for the next 20 years. "You don't hold an international shorebird sanctuary hostage, using it like some trading chip in a Monopoly game," Ortman complains.

Fearing that the management plan, if approved, will set a precedent for land use within the harbor, Ortman and other conservationists recently have been pushing hard for provision of refuge status by act of Congress. Just before Christmas, the House of Representatives approved legislation to establish a Grays Harbor National Wildlife Refuge to protect approximately 1,800 acres of Bowerman Basin, and similar legislation was scheduled for a Senate hearing in late February. The acreage would be acquired by purchase, transfer under certain obligations incurred by the port under the Federal Water Pollution Control Act, or both. A recent preliminary appraisal by FWS, which isn't backing the legislation assertedly because of budgetary constraints, put the value of the 1,800 acres at $2.5 million. Of concern to some refuge proponents, however, is a provision in the legislation that could allow the port authority to proceed with its plans to fill in an additional 564 acres of wetlands, mostly along the edge of the basin.

Officials at the port authority insist that they are not opposed to a refuge at Bowerman Basin. But they are continuing to perfect plans for developing the Bowerman peninsula and the tideflats to the west, acreage that really should be included in the refuge. They continue in spite of the environmental impact statement which states that filling this area will result in "adverse impacts to wintering and migratory shorebirds through the loss of feeding and roosting sites" and concludes: "In the face of uncertainty and based solely upon the interests of the bird population, caution suggests that there be no additional filling in or near the Bowerman Basin."

Proponents of a Bowerman Basin wildlife refuge are concerned about the impact of further development not only on birds but also on tourism in the area. Herman warns, "If they profane the Bowerman peninsula with additional buildings, railroads and lighting, they'll ruin it." Tourism is now the second major source of income for Grays Harbor County, and the shorebirds at Bowerman Basin, even without a refuge, already draw several thousand birdwatchers to the area each year.

And so the fate of Bowerman Basin hangs in the balance. If the basin is preserved as a national wildlife refuge, the region will undoubtedly benefit from increased tourist income. More importantly, Grays Harbor will remain a resource of special value—an intact and healthy estuary for fish, birds and people that offers a yearly wildlife spectacle seen in few other places on earth. □

Jack Swenson, a Seattle biologist and naturalist, wrote "The Beleaguered Plover." DEFENDERS, *Mar/Apr 87.*

k Swenson

Bowerman Basin Day: April 23

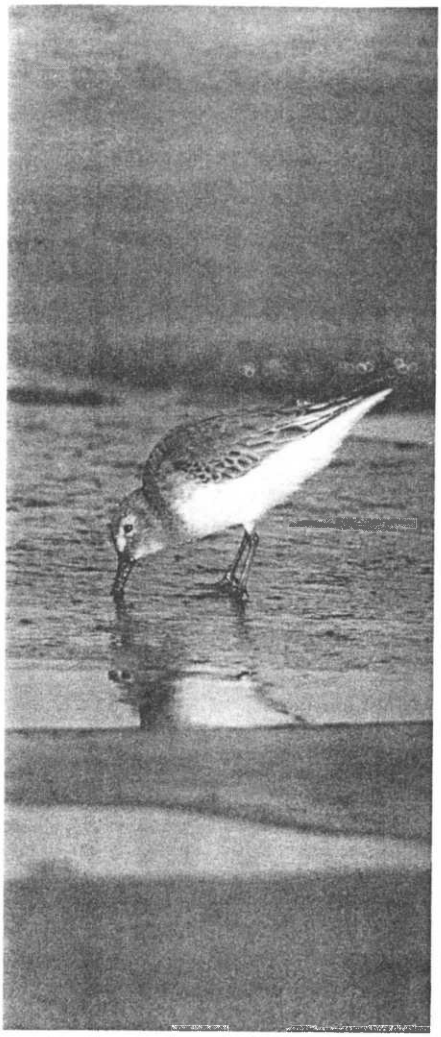
BY JANET O'MARA

Every spring, thousands of shorebirds stop over in Bowerman Basin, a small but very special wetland on the Washington coast, near Hoquiam. Peregrine falcons, northern harriers and red-tailed hawks also frequent the area. It is a spectacular sight!

The Department of Wildlife, in cooperation with the Friends of Bowerman Basin, is holding its annual "Bowerman Basin Day" on April 23. On that day, we will have spotting scopes set up and biologists and other expert birders to help you identify what you see. Bring rain gear and rubber boots.

Bowerman Basin is a critical stop for migratory shorebirds to rest and store up fat reserves for their long journeys twice a year. In the spring, great numbers of the birds stop by on their way from Central and South America to breeding grounds in the Arctic and sub-Arctic. During the late summer and early fall, smaller numbers of southbound birds travel through the area again.

Out of the two dozen species that frequent the area, the five most abundant are the Western sandpiper, dunlin, short-billed and long-billed dowitchers and red knot. During the high tide, the shorebirds concentrate along the northwest tip of the Bowerman peninsula. As the tide begins to recede and the mudflats are exposed, the shorebirds erupt into flight to spread out over the basin to feed. This activity is observable from the parking areas. Birders with rubber boots can walk out to the northwest tip on a marshy "trail" along the northernmost edge of the peninsula.



High tides on April 23 are *5:35 a.m.* and *7:33 p.m.* Low tide is at *12:44 p.m.* Optimum viewing times will thus be in the early morning and late afternoon, with a midday gap. *ww*

Area Attractions

To help you plan a full day or weekend, we have compiled a list of other area attractions:

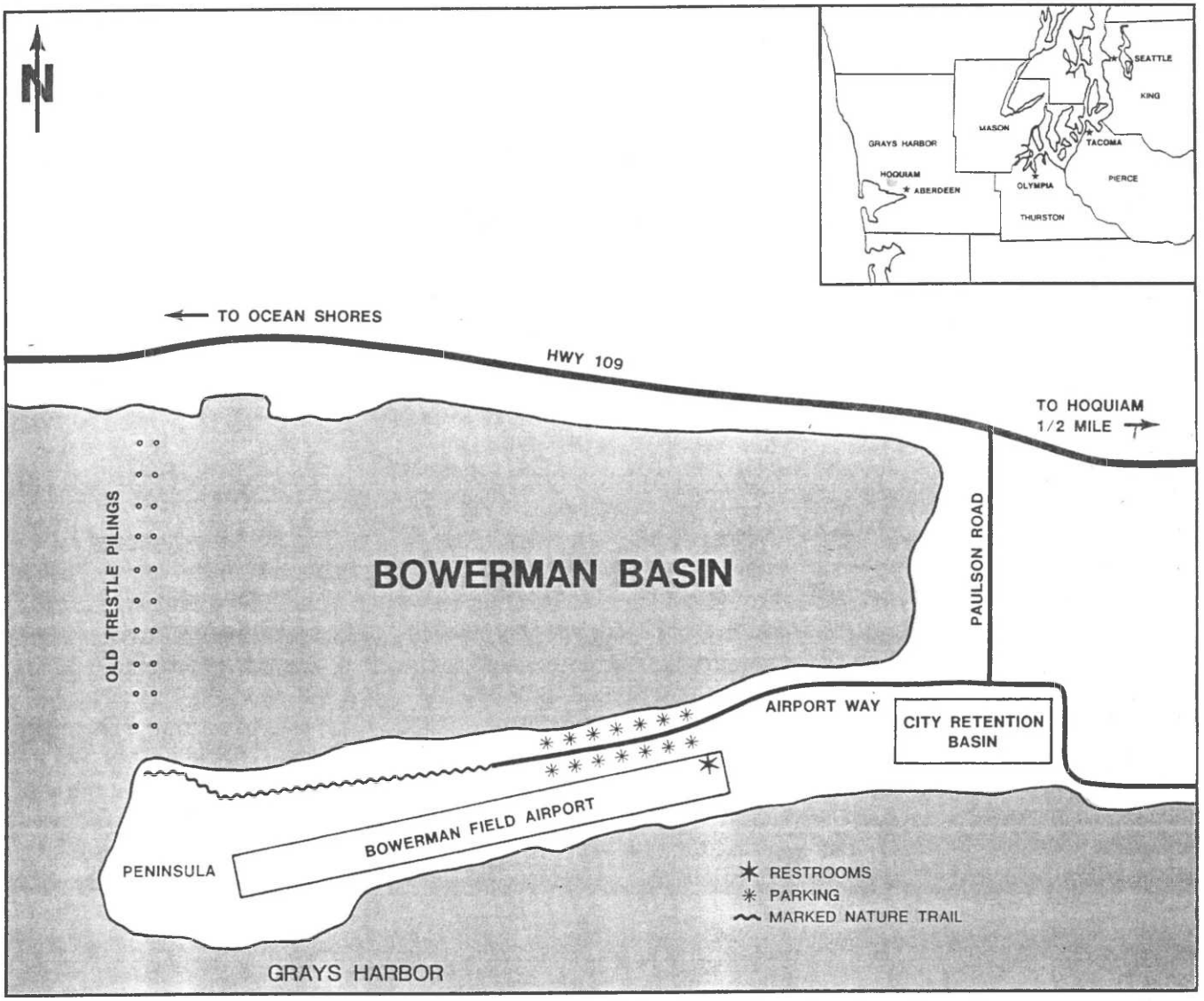
Watch the construction of the 100-ton Lady Washington, a "tall ship," and view historical maritime displays. Grays Harbor Historical Seaport, 320 S. Newell, along the Chehalis River. Open 10 a.m. to 5 p.m. *Free.*

Eight historical murals of early Grays Harbor life adorn area buildings and there's a driving tour map available at the Grays Harbor Historical Seaport office, 813 East Heron, Aberdeen. *Free.*

The Aberdeen Museum features room displays of life in early Grays Harbor. 111 East Third, Aberdeen. *Free.*

The Polson Museum features historical displays of early Grays Harbor life and logging. 1611 Riverside Avenue, Hoquiam. *Free.*

The State Audubon Council



Spring Conference, at the Westwood Lodge Motel, Hoquiam, will be held April 22-24. It is free and the public is welcome. Program includes presentations on "Shorebirds Across the Americas," on Saturday and a Bowerman field trip on Sunday morning. For more information, call the Audubon office in Olympia, 206-786-8020.

Please Remember

Keep to the "trail;" do not wander on to the airstrip or trample the marsh.

Do not park vehicles beyond the gravel strip parking areas.

Come prepared! Bring rain gear, rubber boots, binoculars, spotting scope and camera.

Support conservation efforts directed at the preservation of wetlands like Bowerman Basin.

Top Left:: Washington's most popular shorebird "event" draws many spectators. WASHINGTON DEPARTMENT OF WILDLIFE

Bottom Left: *Thousands of shorebirds feed in the rich mud of the Basin.* WASHINGTON DEPARTMENT OF WILDLIFE

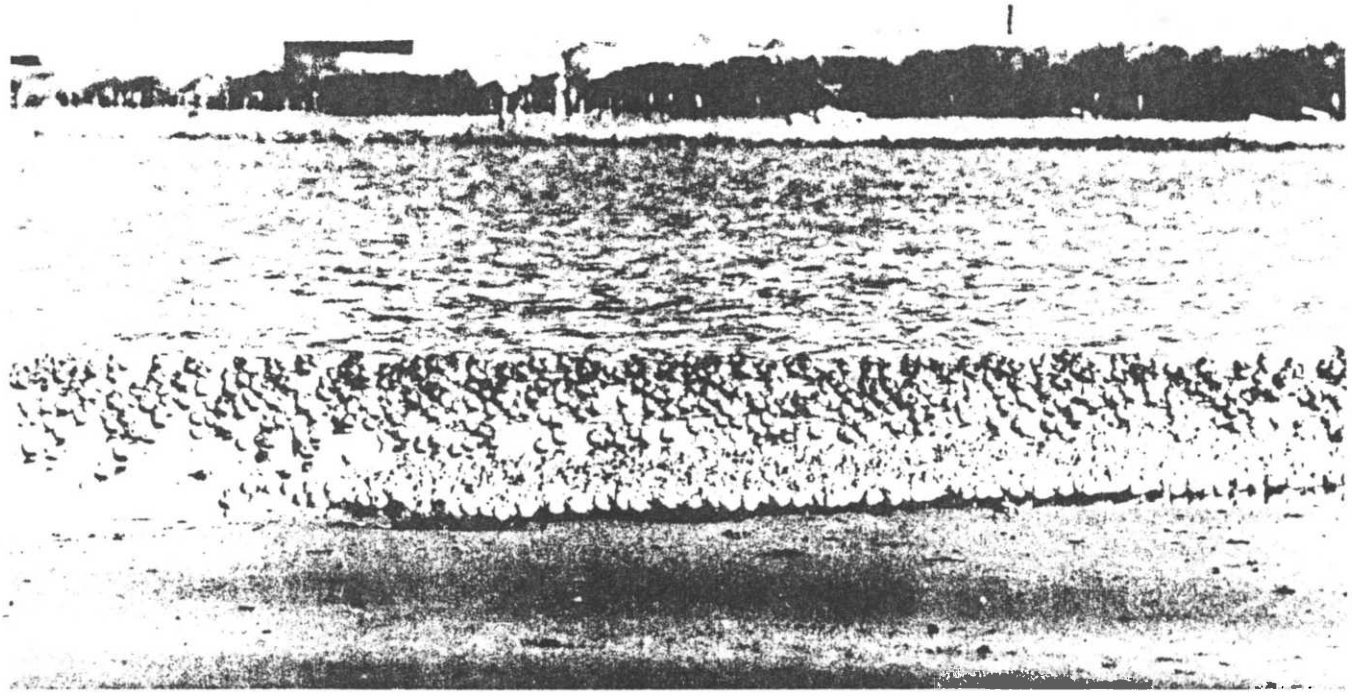
Map: To find Bowerman Basin, drive 1/2 mile west of Hoquiam to Paulson Road and turn left. Turn right on Airport Way. Look for Bowerman Basin signs and for parking on both sides of the road.

Minding the Mud for Migrants

by Jack Davis

For a few days each spring Washington's Grays Harbor is the scene of a wildlife event that has become of international interest. It is the swift passage of migratory shorebirds on their journey northward to their nesting grounds. For most of them, their brief stop at the harbor is not casual; it is part of an elaborate and precarious ritual that is essential to their survival. What happens at Grays Harbor is a fragment of a great drama of many parts, each one of them crucial.

Of about 24 species of shorebirds normally found on the mudflats of Grays Harbor in spring, half can be considered abundant. By far the most numerous are western sandpipers. The tendency of these small birds to concentrate in such compact groups is deceiving, for although the groups may not appear large, a sizable portion of the entire world's population may be assembled here at one time. One of the perils to their existence is that facts such as this are only now being discovered by scientists. As is the case with most wildlife, human ignorance is the greatest fundamental threat to western sandpipers. *(Continued on page 18. Charles Krebs photo.)*



Western sandpipers and long-billed dowitchers are among the most numerous shorebirds found at Bowerman Basin. *(Paul Vandeveer photo.)*

Minding the Mud

More than half of the Grays Harbor Estuary, about 60 square miles, is exposed at low tide. Tidelands are exceptionally productive natural protein factories. Complex food webs develop among the inhabitants, beginning with primitive, simple plants and extending upward to include humans. This explains the attraction of Grays Harbor to the birds, but to appreciate how much more it is to them — and to us — requires a closer look.

Most shorebirds are noted for their long migrations. Western sandpipers winter along the West Coast from California to Peru, far from their breeding areas in western Alaska. In early spring some ancient instinct stirs in their tiny brains and the birds become small express machines, heading northwest toward Alaska as fast as their physical limits allow.

So it is that during the fourth week of April the western sandpipers reach Grays Harbor, tired and hungry. Within hours, they must store in their small bodies the energy necessary to take them to their next and final refueling point, on the Copper River Delta some 1,500 miles distant. When the tides recede, the birds fall upon the exposed mud and feed with voracious urgency, and when it floods they pack together and roost — conserving energy.

Scientists generally agree that estuaries are among the most productive and important environments on earth. Even though we don't consume the abundant seaweed and miroscopic algae directly, phytoplankton in enormous quantities is absorbed by zooplankton, which in turn is consumed by a wide range of creatures. The food chain grows longer and more complex as shorebirds, salmon and many other marine fish, shellfish and other kinds of potential menu-items for humans thrive on the production of the estuary.

The main dinner item for the smaller species of shorebirds is a small amphipod (**Corophium stimpsoni**). In some places in Grays Harbor, research biologists have found densities of corophium in excess of 55,000 per square meter. Literally hundreds of species of clams, marine annelids, polychaete worms and crustaceans are also available in great abundance.

Shorebirds, as is true of all wildlife, assume ecological niches in which to survive. Each species selects a way of "making a living" that avoids direct competition with others. While long-billed dowitchers and western sandpipers both probe the mud for food, for example, the remarkable difference in their bill lengths allows the two species to exploit different depths. Similarly, while both are present at Grays Harbor at the same time, they nest in different regions. Birds seen together during migration may never encounter each other at different times and places.

Last year perhaps 1,500 people visited Hoquiam within a week to see the great congregation of shorebirds. The port of Grays Harbor endured a mass invasion of Bowerman Airport with tolerant good humor. The airport provides by far the best area for viewing, and it's also adjacent to the heaviest concentrations of birds. At feeding time, perhaps half of all the birds within Grays Harbor may be on Bowerman Basin's 500 acres of mudflats.

Bowerman Basin is also where you're most likely to see falcons chasing their prey. The endangered peregrines and smaller merlins prompt one of the most spectacular wildlife exhibitions to be found anywhere. When one of the predators launches an aerial attack,

shorebirds by the thousands rise as one and fly with amazing precision and speed. The entire flock twists, turns, wheels and rolls in perfect unison. How these maneuvers are executed is as bewildering as it is breathtaking. Only the falcons, superb hunters that they are, would select such an elusive prey.

Within minutes of such a disturbance, the shorebirds settle again on the mud to resume feeding. Watching the frenzied activity, one wonders how there could possibly be enough tiny animals to supply the throngs of birds. Bowerman Basin obviously has exactly the right conditions to support a fantastic abundance. Furthermore, due to its elevation, the basin is the first to emerge from the ebbing tide, and the last to be inundated when the tide rises. For hungry shorebirds, Bowerman Basin is the ultimate opportunity.

Only recently have biologists begun to realize the significance of "philopatry," an instinctual compulsion of birds to depend absolutely on very specific habitats for their existence. This trait allows scant latitude for adaptation or adjustment. Deprive the birds of selected habitat and you deprive them of life. Such extreme specialization and dependency makes little sense to us, the "alpha animals" who are equipped to think. So it's not surprising that the record of our attitudes toward other creatures is filled with indifference and intolerance.

The western shores of North America have relatively few coastal estuaries. Add to that their attraction for human settlement and development and the result is vastly diminished habitat for many forms of wildlife. California destroyed two-thirds of its coastal wetlands within a century. In the Grays Harbor estuary, 4,000 acres of tidal lands have already been filled. Much of Hoquiam's waterfront industry, as well as Bowerman Airport, rests on dredged sediments piled on former tidelands.

Western sandpipers are small, averaging about one ounce each. Singly or in scattered groups, they can almost escape notice. In the range of human perception, little living things tend to be less appreciated than large ones. So while we marvel at the annual migration of the gray whale, that of the western sandpiper is largely ignored. In terms of bulk, one whale equals 1,280,000 sandpipers — a fact that determines to a great extent the difference in human awareness of the two species. It is but a small step from awareness to appreciation.

I've had the privileged experience of being on board a boat off Monterey, California, in the midst of a group of gray whales, and I have also witnessed the shorebird migration at Hoquiam. In both cases, there were enough other people present to compare their reactions to both events. For sheer impressiveness, the shorebirds won the competition hands down.

The point is that a great many more people have seen gray whales pass along the coast than have seen the unrivaled congregation of shorebirds at Hoquiam. We must now determine the relative importance of preserving this unique shorebird spectacle, present and future, for others.

Meanwhile, the shorebirds will be presenting their annual spectacular display again this April, as they have for eons past. Plovers, turnstones, sandpipers, dowitchers, knots and yellowlegs will gather in one of the greatest rendezvous of shorebirds to be found anywhere.

Although those of us alive today arrived on the scene too late to view the thundering herds of American bison that once filled the Great Plains, we still have a chance to observe an equivalent wildlife spectacle. The status of the shorebirds isn't as precarious as that of the buffalo a century ago, but we can't afford to wait too long.

Additional Reading

Herman, Steven G., and John B. Bulger: **The Distribution and Abundance of Shorebirds During the 1981 Spring Migration at Grays Harbor, Washington.**

Johnsgard, Paul A.: **The Plovers, Sandpipers and Snipes of the World.**

Robbins, Chandler S., et al.: **Birds of North America.**

Peterson, Roger Tory: **A Field Guide to Western Birds.**

Washington State Department of Game: **Estuaries, a Resource Worth Saving.**

Scheffer, Victor B: **Message From the Shore.**

Federal, state and local officials have worked with the Port of Grays Harbor since the mid-70s to settle conflicts between harbor development and protection of the area's natural resources. The Department of Game has pushed for a solution allowing necessary and careful development while preventing serious harm to fish and wildlife. To protect the heart of the basin, the department wants the port to transfer to it the title to 1,700 acres in exchange for 500 acres of fill for development. The department also wants selected natural areas protected, "speculative" filling for possible future development restricted, re-creation of salt marsh lost to filling and a mitigation plan established for the harbor. — Editor's note.

The crowds of shorebirds are often joined by crowds of observers and ornithologists, who become part of the spectacle. *(Jack Davis photo.)*

The Spring Bird Migration at Bowerman Basin

By Charles W. Bergman

Bowerman Basin is a kind of backwater in Grays Harbor, just west of Hoquiam on the way to Ocean Shores. Bordered by a peninsula with Bowerman Airfield on it, the shoals of this basin are among the highest and shallowest in Grays Harbor, so they form a large tideflat that is one of the last to fill up with the rising tides. Following the rhythms of the tides, shorebirds crowd into the 500-acre basin as the waters cover the rest of the harbor, feeding on the last exposed mudflats.

In 1980, Steve Herman from The Evergreen State College discovered that spectacular numbers of migrating shorebirds flock to the basin. For one week in late April, usually peaking on the 23rd or the 24th, up to 450,000 of them congregate there at high tides. According to Steve, it's the largest gathering anywhere in North America south of Alaska and one of the great natural events on the continent.

Grays Harbor is on the southern boundary of the Olympic Peninsula, fed by the Chehalis River, and reached by taking Highway 12 through Aberdeen and Hoquiam to Highway 109. A street sign about a mile past Hoquiam will point south to the airport, and you turn onto the road. If it's peak week, just follow the people from the parking lot, along a muddy trail by some willows, out to the best vantage points on the mudflats.

According to Steve, Bowerman is a sort of staging area for the birds. It seems to be the last major stop for these birds before they head north to the Copper River delta in Alaska, where they gather again (meeting other birds coming from other places), rest, and disperse for their nesting grounds in the Arctic. At Grays Harbor, they spend about four or five days fattening up for the long flight. Some 85 per cent of the birds are western sandpipers, followed by short-billed dowitchers and dunlin. Steve has documented 24 species in all.

When you cut through the willows onto the basin, you'll drop into the mud and grass of a salt marsh. The stink of marsh gas, methane, rises up to your nose, rich and earthy.

Find out when the high tide for the day will be, and plan to arrive on the flats about an hour earlier. That way, the shorebirds will be pushed toward you in ever-increasing numbers. Expect to find maybe fifty other aficionados gathering on the sandy high ground. As you settle in your viewing spot, you may fall into discussions with your neighbors about the chances that Bowerman Basin will escape the threatened development and be made into a National Wildlife Refuge.

Dress for rain, but if you're really lucky, you can get a bright day, with thin spring sun and the high winds of April.

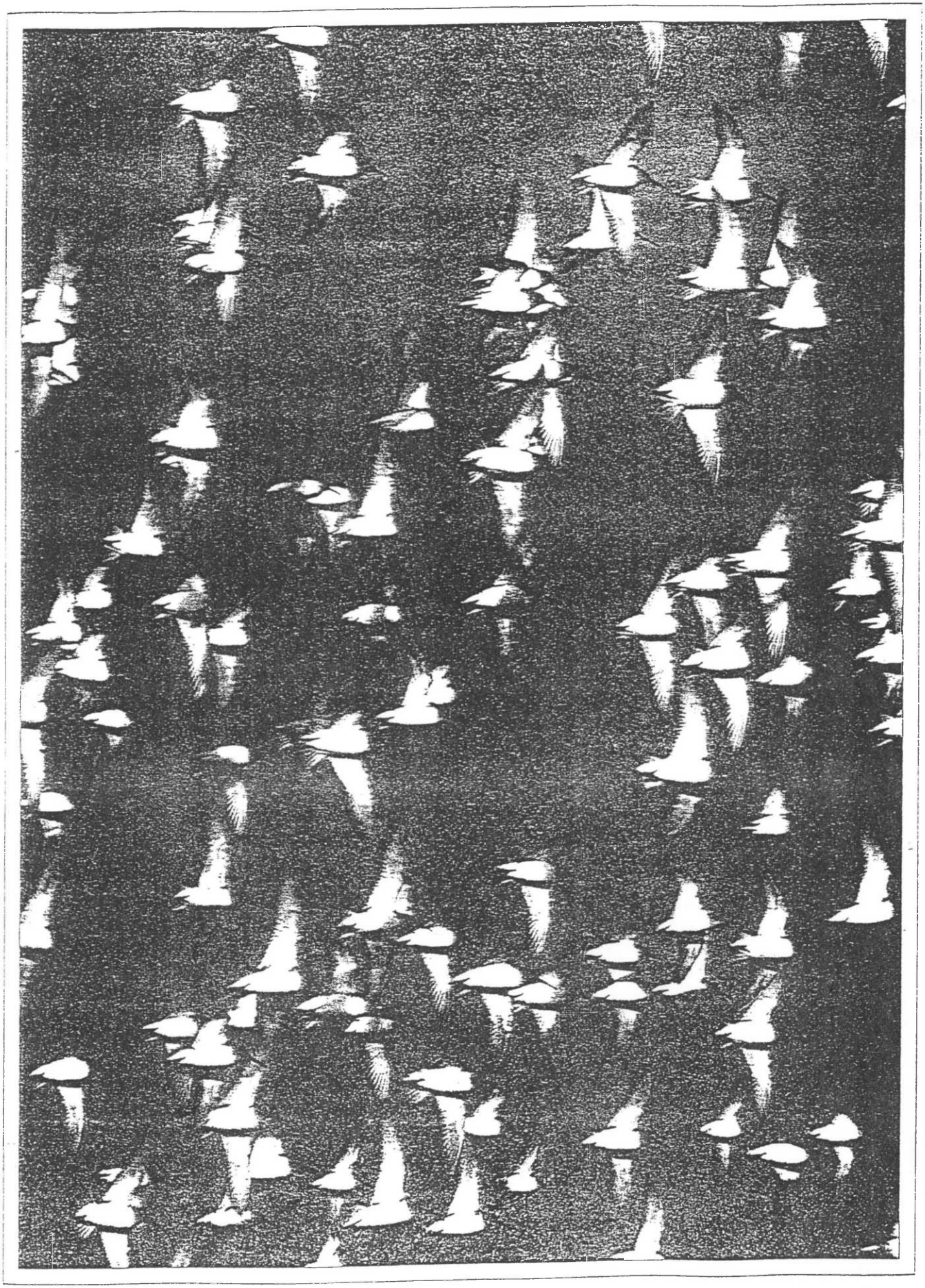
The mud just off the sand is a deep brown tinged with a brackish green. As your boots sink in around your scope, you'll squeeze up a gray slime the color of elephants, to the sound of slurping and sucking. You'll have trouble guessing the numbers of the birds, but they'll be growing. Maybe 200,000 when you arrive. The sandpipers working the basin twitter like a swarm of millions of insects, or, more romantically, like the sound of rain pattering in a low murmur on a still lake, a soft and insinuating loudness.

Don't try to think. For just a while, don't try to understand the scene unfolding before you. Just open up and take it in. Even more spectacular than the numbers are the visual images. The shallow waters of the long bay have a dark sheen, glistening like polished graphite. Flocks of shorebirds rise on the stiff wind, sliding from spot to spot like glissades, changing constantly riot of shifting shapes.

One flock rises and stretches int long, twisting ribbon over the wat The backs of the western sandpipers brown at a distance, and their li wings create a dark shimmer in flock. The birds reel into sharp tur and their bright white bellies flash the sun like a shattering mirror. smaller group lifts up, more compact twisting teardrop shape that spins ir a long rolling candy cane. Anoth group darts up like a dark cloud in hyperkinetic swirl, like the high-spe clouds in time-lapse Disney phot graphy. Still another group will hurt toward shore, waving like a flag in pounding gale. And then, as if wit one mind, the whole flock will break one side in a shocking belly roll white. On shore, the dazzled crow gapes and stutters out a chorus of ooh In the building energy, some peopi are themselves moving in the muc shuffling and almost jumping, findin it impossible to contain themselves And trying to fly?

The sandpipers will be moving ir closer with the tide, but don't forget tc watch the gulls. They will flap past the sandpipers, their slow wing beats belying predatory intent and contrasting with the almost violent, frenetic speed of the shorebirds. Gulls terrify the smaller birds. They fling themselves into the air ahead of the gulls, like dominoes flipping up instead of falling. As the gull snakes through them, looking for a weakling to grab, the sandpipers roll away from it, the white coursing along the flock like a current of energy, like a whitecap blown toward shore in a crashing surf, like the Wave rocking through the Kingdome at a Seahawks

Dunlins blanket the sky as they look for food in the marshlands.



ART WOLFE photo

game.

As the sandpipers approach at high tide, they'll rise and fall all around you. Thousands race across the mud, probing the muck for little shrimp-like animals, and then charging off again on whirring legs, looking like children's wind-up toys.

The high-tide rush

Then there is the real rush. Flocks will fly right around the people, straight at you, twittering like bells. As close as twenty feet away from you, a flock will split and swerve around you, their wings beating the air with a thunderous whoosh. It's like getting lost in a white rush of pounding wings, as if they've flown right through you, the way a flock of birds will stream into a tree in full leaf and disappear.

At high tide, with about 400,000 birds in the basin, they pack together, shoulder to shoulder, roosting in ranks. All are coming into breeding plumage, with varying degrees of cinnamon in their feathers, and they rest with their heads tucked under their wings, creating a study in texture and pattern.

As soon as the tide begins to recede, the birds scatter out to feed again.

On the way back to the car, stop at an overlook along the way. It's a good place for one last panoramic effect — clouds of birds shimmering out over the water like a steady storm.

But more than that, you might see a falcon — either a merlin (a little bird) or, if you're especially lucky, a peregrine, the fastest of birds and an image of pure speed. With all the sandpipers, Bowerman Basin is one of the best places all along the coast to see birds of prey, especially the endangered peregrine falcon. Watch for them cruising in from the far hills, a smooth easy wing beat, like a slow glide on skates over ice. Look for the long tail. Look, if you can, for the muttonchop sideburns. Look especially at the wings, long and curved and pointed like scythes, their incomparably beautiful wings.

A lonely Willet breaks away from the crowd.

JANIS BURGER photo

A falcon slams into a flock of birds to try to isolate a single victim. In a stoop, peregrines can reach speeds of 150 mph. If you lose sight of them in the panic of thousands of shorebirds, they're still easy to follow. A wave of white flows through the flock, and suddenly the falcon will shoot up at the end, swooping in an arc torqued with power, banking in a flash of wings. It's a steep power climb that falconers call "throwing up." Then the bird will pitch back into the boiling swirl of the flock.

It's a drama that will make you scream as you stand on shore, watching.

What's most impressive in all this assembly of birds is the way the sandpipers fly in flocks, as if they are a single body flying with a common soul. Why don't they crash into each other all over the place?

"Lots of theses are being incubated on that issue in graduate schools right now," according to Steve Herman. "One guy suggests they use electromagnetic currents to communicate, and they've found a high incidence of iron in the brain cells of some shorebirds as evidence."

It's a great twilight-zone sort of explanation. But Steve helped another researcher in the basin, who developed a more prosaic theory. They caught dunlin in nets and tested them for visual acuity. The man concluded that a sandpiper's eyesight is quick enough to account for its instantaneous responses in flight. He published his idea under the clever but sexist title, "The Chorus Girl Theory of Flock Synchronization."

I suspect that for most people who see the migration at Bowerman Basin, the thousands of shorebirds offer more than a spectacle. It's hard not to compare it with our own migrations. These birds simply are what they are, and do what they do, and it is enough. For most of us, as well, life is a migration. We travel, hoping to find something new or looking for a place where we belong. Yet like the shorebirds, who return year after year, the farther we go, the more we are returning.

Charles W. Bergman teaches English and writing at Pacific Lutheran University. He has written for National Geographic and Audubon.

Photos on opposite page (top) A flock of Western Sandpipers and a few Dunlin feed in the marshes. (bottom) These western Sandpipers (Red Knots) sleep as they wait for the tide to change.

DON JOHNSON photo

ART WOLFE photo

It's for the birds: Measure gives life to new refuge

By David Whitney
News Tribune Washington (D.C.) Bureau

WASHINGTON — The House approved legislation Monday creating the Grays Harbor National Wildlife Refuge to protect a critical wetlands area for migratory birds.

The House action sends the Senate-passed measure to the White House for President Reagan's expected signature. The bill has the unanimous support of the state's congressional delegation.

The legislation authorizes the acquisition of a 1,711-acre area known as Bowerman Basin, which is owned by the Port of Grays Harbor. It also endorses the purchase of about 68 acres owned by the City of Hoquiam adjacent to the port property.

Bowerman Basin is used as a stopover point by hundreds of thousands of migratory waterfowl in the spring and fall.

The area also is the year-round home for many birds, including bald eagles, peregrine falcons, geese, plovers and owls.

Rep. Don Bonker (D-Vancouver), the House sponsor of the bill, said Bowerman Basin is "the last major estuary many of the shore birds will use before embarking on the final 1,500-mile leg of their migration to arctic and sub-arctic breeding grounds."

"Preservation of Bowerman Basin and other key wetlands in the estuary is critical to the survival of these shore birds," he said.

Under the legislation, the port property would be acquired by extending so-called "mitigation credits" allowing the port to develop other estuary property under the federal Clean Water Act.

That act says any disturbance of wetlands areas must be mitigated through the preservation of other wetlands from development.

Should no such development occur, the port could exchange its credits for cash.

The bill authorizes $2.5 million in spending next year for the new refuge. The House has approved the money as part of a separate appropriations bill now in conference with the Senate.

The bulk of that money would go to construct a visitors center and boardwalks

The News Tribune
August 9, 1988

Grays Harbor refuge is signed into law

WASHINGTON — President Reagan has signed into law legislation creating the Grays Harbor National Wildlife Refuge in Washington state.

The area, about 1,800 acres, is a major staging area for migratory shorebirds. Hundreds of thousands of these birds use the area, also known as Bowerman Basin, in their spring and fall treks from asfar south as South America to Northern Canada and Alaska.

— News Tribune Washington (D.C.) bureau

The News Tribune
August 23, 1988

Battle won to save Bowerman Basin

A long-running battle to preserve Bowerman Basin near Hoquiam as a refuge for migrating birds was won Friday when President Reagan signed a bill creating an 1,800-acre wildlife refuge.

The basin is part of the 94-square-mile Grays Harbor estuary on the central coast of Washington state. It is internationally recognized as a staging area for shorebirds that annually migrate between Central and South American wintering areas and breeding grounds in Alaska.

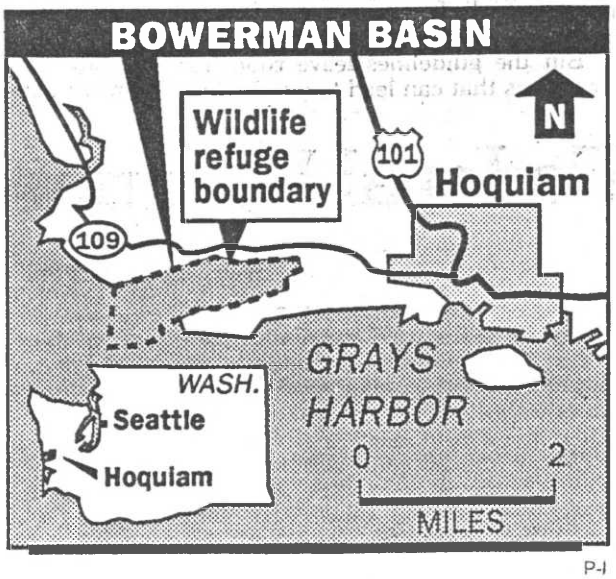
A visitor center, viewing points and boardwalk will be built to accommodate thousands of bird watchers who come to watch as many as a million or more birds gather at the basin.

Sen. Brock Adams, D-Wash., and U.S. Rep. Don Bonker, D-Wash., who helped shepherd the bill through Congress, applauded the president's action in signing the bill Friday.

The land will be acquired from the city of Hoquiam and Port of Grays Harbor, including a buyout of a lease of a beer distributor operating on the site.

The Olympian
August 23,1988

Bird refuge becomes law



A two-year battle to preserve Bowerman Basin as a refuge for migrating birds finally was won late Friday as President Reagan signed the refuge bill into law.

The bill creates an 1,800-acre wildlife refuge in Grays Harbor Estuary near Hoquiam. A visitor's center, viewing points and boardwalk will be built there to accommodate the thousands who come to view the spectacle of the spring migration.

A million or more birds gather at the spot at one time during spring migration from Central and South America to breeding grounds in Alaska. The shore birds, including sandpipers, plovers and dunlin, use the area to feed and rest before the last, 1,500-mile leg of their journey.

The land will be acquired from the city of Hoquiam and Port of Gray's Harbor, including a buyout of the lease of a beer distributor operating on the site. Although Reagan opposed the bill because of its $2.5 million price tag, he signed it after it won bipartisan support in both houses of Congress.

Seattle Post-Intellegence August 23, 1988

House OKs Bowerman Basin bill

Grays Harbor refuge proposal now only needs Reagan's approval

The Associated Press

Legislation to establish the Grays Harbor National Wildlife Refuge in Washington state was sent to President Reagan after the House approved it on a voice vote.

Environmentalists and the bill's sponsors consider the proposed refuge in the Bowerman Basin area of Grays Harbor an important fish and wildlife habitat, particularly for the endangered peregrine falcon and bald eagle and as breeding grounds for migrating shorebirds.

The legislation approved Monday would direct the Department of Interior to acquire 1,711 acres by purchase or transfer from the Port of Grays Harbor. The property could count toward meeting the port's obligations under the Clean Water Act to mitigate the impact of development.

The department would also be authorized to purchase as much as 68 acres from the city of Hoquiam and provide compensation and relocation expenses to people who lease property in the area.

See Estuary/Page 10A

Estuary—

From Page 9A

The bill would authorize the department to spend $2.5 million to establish the refuge over three years, but money would have to be approved through separate appropriations legislation.

The bill had passed the House earlier, but the legislation was reworked after the Senate made some technical changes, said Rep. Don Bonker, D-Wash., a key backer of the legislation.

He said the 10-year battle to protect the area "has not been easy. For years, the port and other development interests in Grays Harbor wanted to fill the wetlands to create more industrial sites. Property owners in the area were nervous about possibly losing their land or restrictions on how they could use their land if a wildlife refuge was located nearby.

"After months of effort, we hammered out a solution that everyone — from the port to the Audubon Society — could support," Bonker said in a news release. Then, the legislation survived "an uphill battle" in Congress, he said.

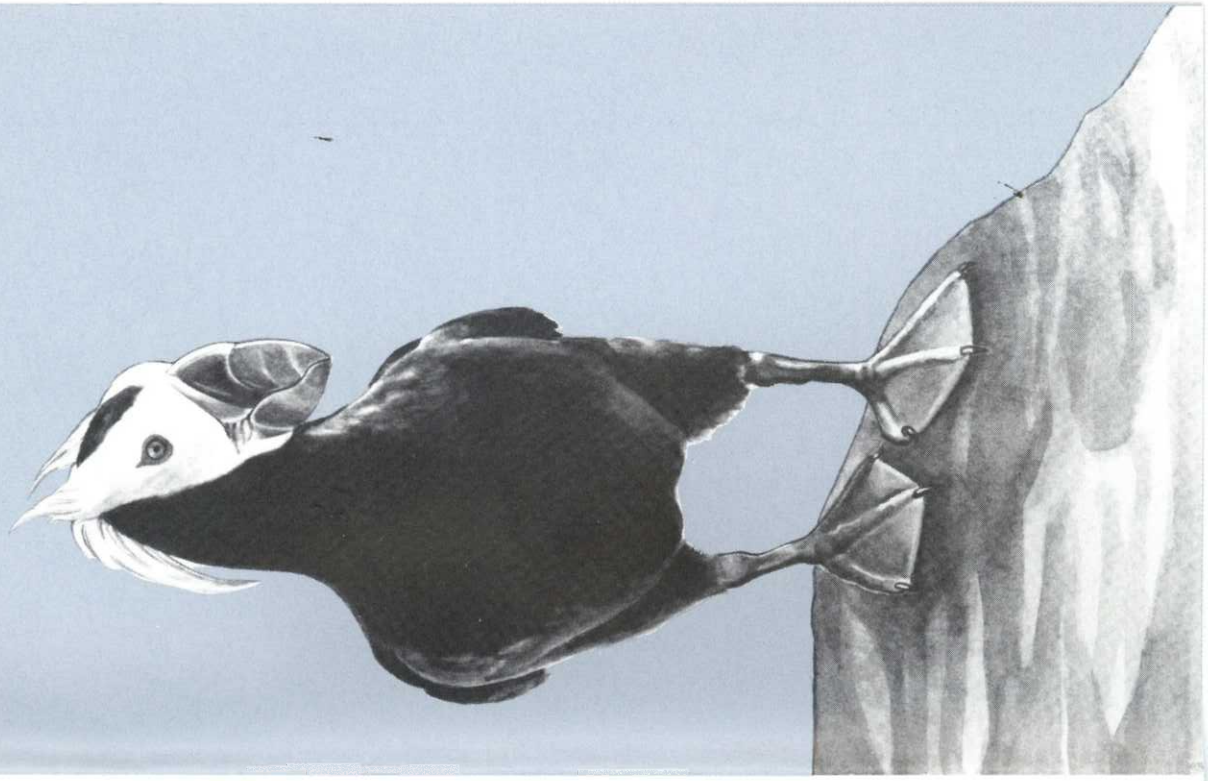
The basin is part of the 94-square-mile Grays Harbor estuary, much of it tidal wetland. The City of Hoquiam created the basin in the 1940s by a series of fills to build an airport.

The highest mudflat in the estuary, the basin provides abundant food and high-tide habitat to more than a million migrating shorebirds.

"Because of their dependence on a few staging areas, these migratory shorebirds are more vulnerable than their great numbers might suggest," Bonker's release said. "At one time, there may be more than four-fifths of the entire breeding population of some species in one of these sites. If one of these staging areas is lost to pollution or development, then entire species of shorebirds could be threatened with extinction."

National Wildlife Refuges of

Puget Sound and Coastal Washington



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Washington Islands: Flattery Rocks NWR, Quillayute Needles NWR and Copalis NWR

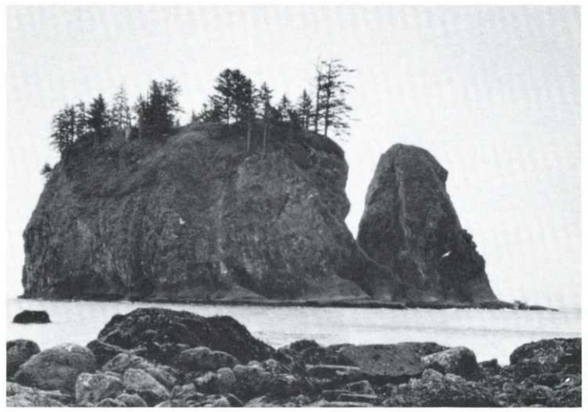
Extending for more than 100 miles along Washington's Pacific coast from Cape Flattery to Copalis Beach are the 870 islands, rocks, and reefs of the Washington Islands refuges. These islands are protected from human disturbance and predators, yet are close to abundant ocean food sources. They are a vital sanctuary where 14 species of seabirds nest and raise their young. Nesting in burrows dug into the cliffs are rhinocerous auklets, tufted puffins, Cassin's auklets, Leach's petrels, and fork-tailed petrels. Other seabirds such as common murres, gulls, and Brandt's, pelagic, and double-crested cormorants build nests high on open ledges. During migration the total population of seabirds, waterfowl, and shorebirds may exceed a million birds. Sea lions, harbor seals, sea otters, and whales may also be seen around the islands.

San Juan Islands National Wildlife Refuge

Eighty-three reefs, rocks and islands in the San Juan Islands of northern Puget Sound have been set aside as San Juan Islands National Wildlife Refuge. These islands have also been designated by Congress as a wilderness area where seabirds, eagles and marine mammals will have an undisturbed place to live and raise their young. Several islands have high cliffs and grassy slopes where seabirds such as cormorants, pigeon guillemots, and gulls prefer to nest. Bald eagles, a threatened species in Washington state, build their nests high in the large trees of forested islands and catch fish in the surrounding waters. Harbor seals haul out to rest or to have their pups on the smaller rocks and reefs, as well as, on the rocky beaches of the larger islands.

Protection Island National Wildlife Refuge

Nearly 72% of all the seabirds in Puget Sound nest on this important island, which is located at the mouth of Discovery Bay off Washington's Olympic Peninsula. Its high grassy slopes are ideal for burrow nesting birds, including 17,000 pairs of rhinocerous auklets. These birds lay their eggs in the safety of burrows dug deep into the hillsides, and catch small fish called sandlance from surrounding waters to feed their chicks. Pigeon guillemots, pelagic cormorants, tufted puffins, black oystercatchers, and over 4,000 pairs of glaucous-winged gulls also nest on Protection Island. Up to 250 harbor seals may be seen hauled out on the rocky island beaches.



The "Seabird" Refuges

Seabirds nest high on the grass-covered slopes and cliffs of undisturbed islands along Washington's Pacific coast, Strait of Juan de Fuca, and San Juan Islands.

What Are Seabirds?

These are species of birds that are especially adapted to living on or near the ocean. Most live their entire life at sea, coming ashore only to nest on isolated islands and shoreline cliffs. Some adaptations that help them survive in the harsh marine environment are:

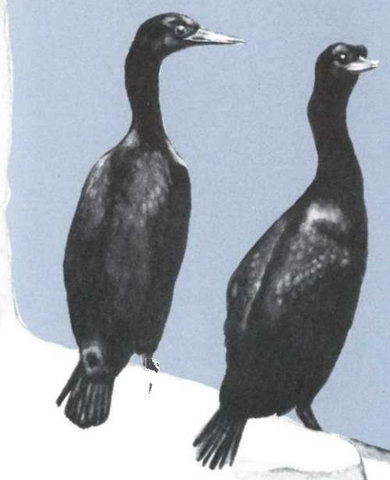
Wings — some species have short, stubby wings to help swim under water, while others have long, narrow pointed wings to help them soar on sea breezes.

Legs — placed far back on the body, and webbed feet for more efficient swimming.

Bill — may be hooked or serrated to help catch marine organisms.

Salt Glands — located near the eye to extract excess salt from the blood.

Seabirds most commonly seen in the Pacific Northwest are cormorants, gulls, pigeon guillemots, tufted puffins, rhinocerous auklets, and common murres.



Why Do They Nest Here?

Although they spend most of the year alone or in small groups, seabirds gather in large colonies to nest. These colonies are usually located on the grassy slopes or high cliffs of isolated, predator-free coastal islands near waters with abundant supplies of food. Washington's coastal islands offer ideal habitat for seabird nesting colonies. These islands are free from disturbance by humans and predators, and the cold waters are rich with fish and other sealife for the birds to eat and to feed to their young.

Seabirds and People Don't Mix

Although they are protected by federal law and international treaty, seabirds are still affected by man's activities. Nesting seabirds are particularly sensitive to disturbance, and even scientists or birdwatchers coming too close can cause the birds to flee in panic. Baby birds and eggs may be crushed or lost in the resulting confusion. Predatory mammals such as cats, foxes and dogs are lethal to seabirds when introduced onto nesting islands by people. Whole colonies of seabirds have been wiped out by rats that escaped from ships. Commercial fishing also takes its toll when birds become tangled in the nets and drown. Other threats from humans include oil spills and low-level chemical pollutants.

How Do Different Animals Share the Same Island?

Many wildlife species live together on a nesting island, but each builds it nest and uses the island's resources in its own way.

Bald Eagles — may roost in large trees or build nests on the forested islands. they catch fish to eat from the surrounding waters.

Gulls — prefer to make nests in the flat, grassy areas at the top of the cliffs. They usually lay three eggs. Gulls may eat the eggs or chicks of other birds when the adults are away from the nest.

Rhinoceros Auklets — must have open, grassy hillsides to dig their nesting burrows. A single egg is laid in burrows up to eleven feet deep, and is incubated for about six weeks. The parents are usually active only at night.

Tufted Puffins — lay a single egg in an underground burrow dug three to six feet into the steep, grassy hillsides. They incubate the egg for six weeks, and the chick spends another six to eight weeks in the burrow after it has hatched.

Common Murres — do not build nests. They lay a single egg on a bare cliff. The egg tapers into a pear shape so it will spin instead of roll. This pear shape prevents the egg from rolling off the cliff.

Cormorants — make a rough nest of sticks, seaweed, and feathers on cliff ledges. They may lay four or five eggs, and catch fish for the chicks to eat when they have hatched.

Pigeon Guillemots — nest in the rubble of rocks and driftwood along the beaches and lower cliffs. They lay two eggs, which are incubated for about 30 days. Both parents help feed the chicks.

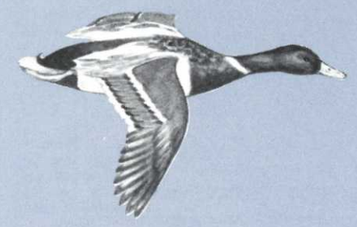
Black Oystercatchers — lay two or three eggs in a pebble-lined hollow built among the driftwood and rocks along the beach.

Harbor Seals — haul out to rest on rocky beaches and spits of sand along the islands. They usually have one pup, which is born on land.

The "Migratory Bird" Refuges

What Are Migratory Birds?

While some birds live in one area year-round, "migratory birds" make regular seasonal flights from one area to another. These birds usually fly between wintering areas and summer breeding grounds. Although many species go north and south, others travel between coastal breeding areas and the open sea. Migration allows them to escape the short days and low food supplies of winter, only to return to raise their young when days are longer and food supplies more abundant. "Migratory" birds include many species of waterfowl, shorebirds, seabirds and songbirds.



Nisqually National Wildlife Refuge

Ducks, hawks, salmon and sand shrimp live side by side at Nisqually National Wildlife Refuge. Salt marshes lie adjacent to freshwater marshes, and mudflats quickly turn to thick forests. Located on the delta where the Nisqually River flows into Puget Sound, this refuge is managed to protect the diversity of habitats and wildlife species found there. Ten different habitat types, ranging from salt marshes, mudflats, and estuaries to freshwater marshes, grasslands, and forests are the home of 177 species of birds, 27 species of fish, 35 mammals, and 5 reptiles and amphibians.

Migratory waterfowl are of special importance at Nisqually. Up to 20,000 ducks and 300 geese find food, water, and shelter here during their spring and fall migrations, and many stay throughout the winter. Other migrants such as goldfinches, warblers, and swallows arrive in the spring and stay at Nisqually throughout the summer to nest and raise their young.

Other "resident" birds may be seen at Nisqually all year long. Great blue herons are a common sight in the marshes and grasslands, while red-tailed hawks soar overhead and nest high in cottonwood trees along the river.

Why Do They Come Here?

Like people, migratory birds need food, water and shelter. Both Nisqually and Dungeness National Wildlife Refuges have abundant supplies of water and offer a smorgasbord of foods to suit a variety of avian tastes. Shorebirds may feast on mudflat invertebrates while goldfinches prefer the fluffy seeds of thistles and dandelions. These refuges also have protected places where birds can find shelter from high winds and storms, and where they are safe from harassment by people. Migratory birds use Nisqually and Dungeness at different times and in a variety of ways. Some birds come in the fall and stay throughout the winter, while others arrive in the spring to raise their young through the summer months. Other birds stop for only a few days to eat and rest before continuing their fall and spring migrations.

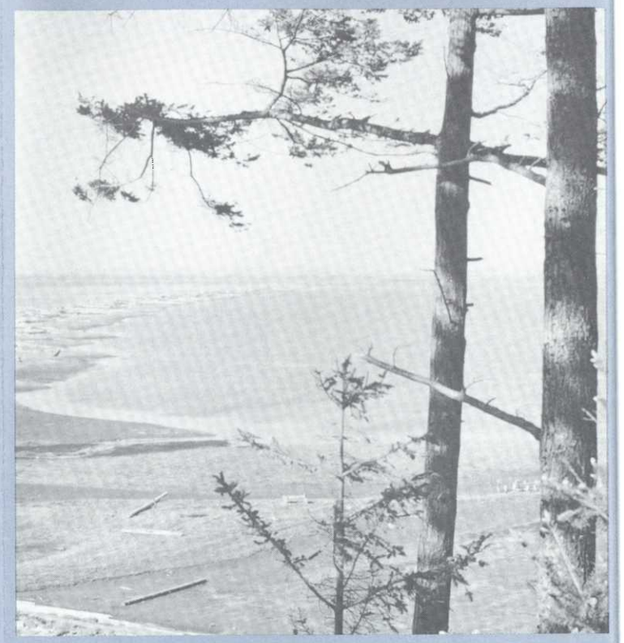
Do Other Animals Live Here Too?

The variety of habitats found at Nisqually and Dungeness National Wildlife Refuges make them the home of a wide variety of wildlife. In addition to migratory birds, many "resident" birds such as the great blue heron live at these refuges throughout the year. Land mammals such as raccoons, weasels, and black-tailed deer also live and raise their young at Nisqually and Dungeness, as do marine mammals such as harbor seals and sea lions. Clams, crabs, sand shrimp and other invertebrates abound in the mudflats and many kinds of fish inhabit the surrounding waters.

Dungeness National Wildlife Refuge

Dungeness Spit is formed by eroding soil, wind, and water currents, and stretches for five and one-half miles along the Strait of Juan de Fuca. It breaks the rough sea waves to form a quiet bay, sand and gravel beaches, and tideflats where wildlife can find food and protection from wind, waves, and pounding surf. The bay and estuary of the Dungeness River produce micro-organisms that form the base of the food web, feeding a variety of wildlife including waterfowl, seabirds, shellfish, anadromous and ocean fish. Shorebirds and waterfowl feed and nest along the beaches, while seals haul out of the water to rest in the sun. The tideflats are the home of crabs, clams, oysters, and other shellfish. Shorebirds such as turnstones, phalaropes, and sandpipers may be seen searching for food along the water's edge.

As many as 30,000 waterfowl stop briefly at Dungeness each fall on their journey south for the winter and north in the spring. Up to 10,000 spend the winter at the refuge. Black brant, a species of goose that depends on eelgrass for its food, is present throughout the winter months and during spring migration.



How Do I Visit These Refuges?

The Migratory Bird Refuges — Nisqually and Dungeness

Refuge Hours — These Refuges are open to the public daily from sunrise to sunset. The office at Nisqually is open from 7:30 a.m.-4:00 p.m., Monday through Friday.

Wildlife Observation — Fall migration (Oct.-Nov.) is the best time to see large numbers of birds, and many stay throughout the winter. Nisqually has an observation deck and three photo blinds; Dungeness has an overlook with spotting scope.

Boating — Boaters are welcome at Dungeness and outside the Brown Farm Dike at Nisqually. There are two boat launches near Cline Spit at Dungeness. At Nisqually the closest launch is at Luhr Beach where a hunting or fishing license or a Washington Department of Game Conservation license is required to park.

Fishing — Anglers must comply with Washington State fishing regulations. Visitors may fish by boat or from the shore at Dungeness, and by boat or from two designated bank fishing areas at Nisqually.

Clamming — Visitors may dig for clams at Dungeness but are subject to Washington State shellfish regulations. (Shellfish may be toxic from red tides from May through October. Inquire locally about conditions.)All oysters are privately owned and may not be harvested by the public.

Horseback Riding — Riding is permitted on designated trails at Dungeness daily from October 16 to April 14. From April 15 to October 15 they are open only on weekdays and closed on weekends and holidays. Access trails through Dungeness Recreation Area are closed to horses from October 13 to January 15. Nisqually is not open to horseback riding.

Drinking Water — No drinking water is available at these refuges. Please bring your own.

Litter — Please carry out what you bring in.

Pets, fires, jogging, or camping are not permitted on these refuges. Bicycles and motorbikes are not permitted on refuge trails.

The Seabird Refuges — Washington Islands, San Juan Islands, and Protection Island

Go ashore only at the Marine State Parks on Matia and Turn Islands in the San Juan Islands.

All of Turn Island and five acres on Matia Island are also managed as Marine State Parks. They provide boat mooring areas and facilities for camping and picnicking. Toilets are provided but no water is available on these islands. The rest of Matia Island except the designated Wilderness Trail is closed to the public.

STAY AT LEAST 200 YARDS AWAY FROM ALL OTHER REFUGE ISLANDS — THEY ARE CLOSED TO THE PUBLIC.

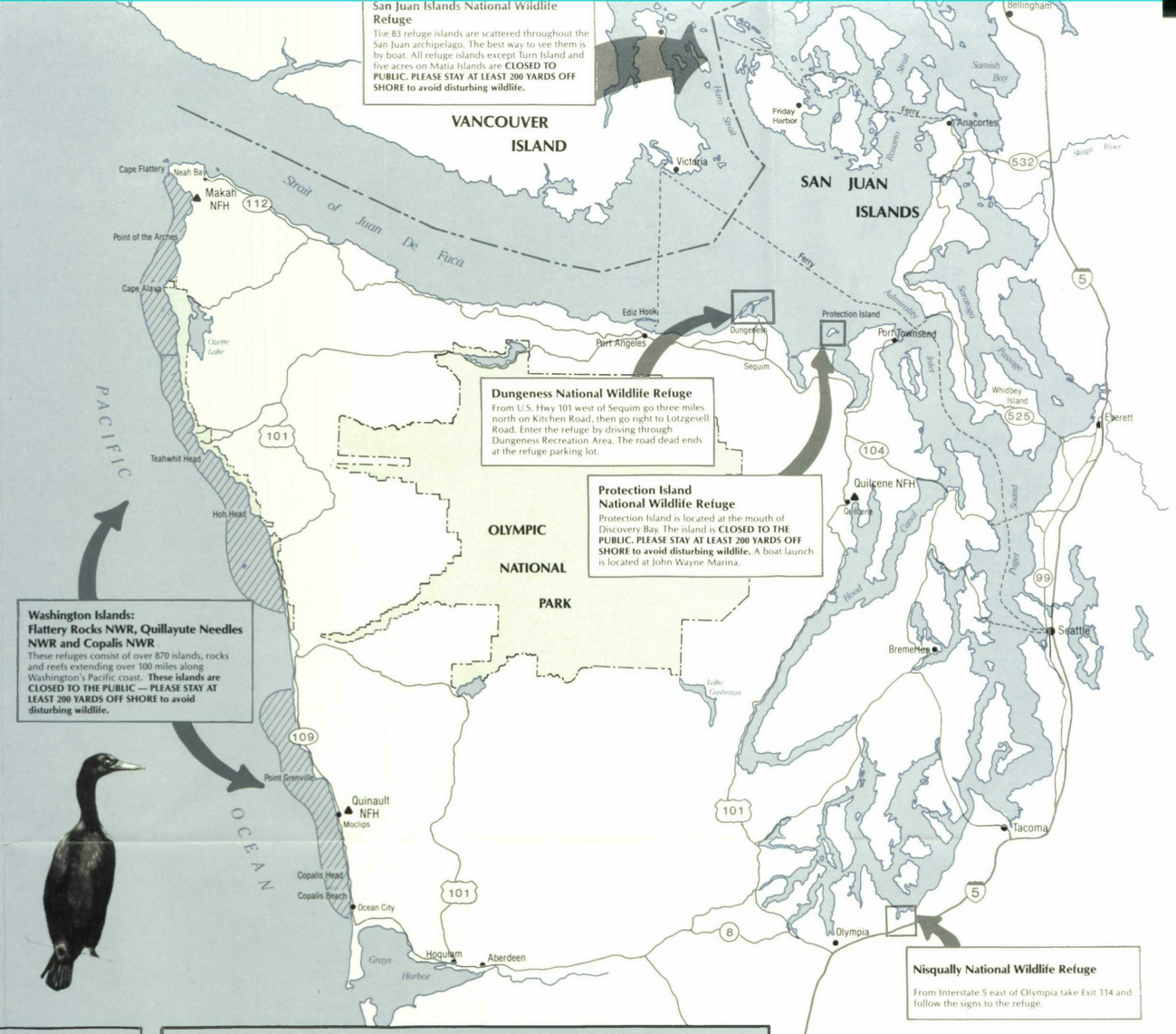
When people come too close:

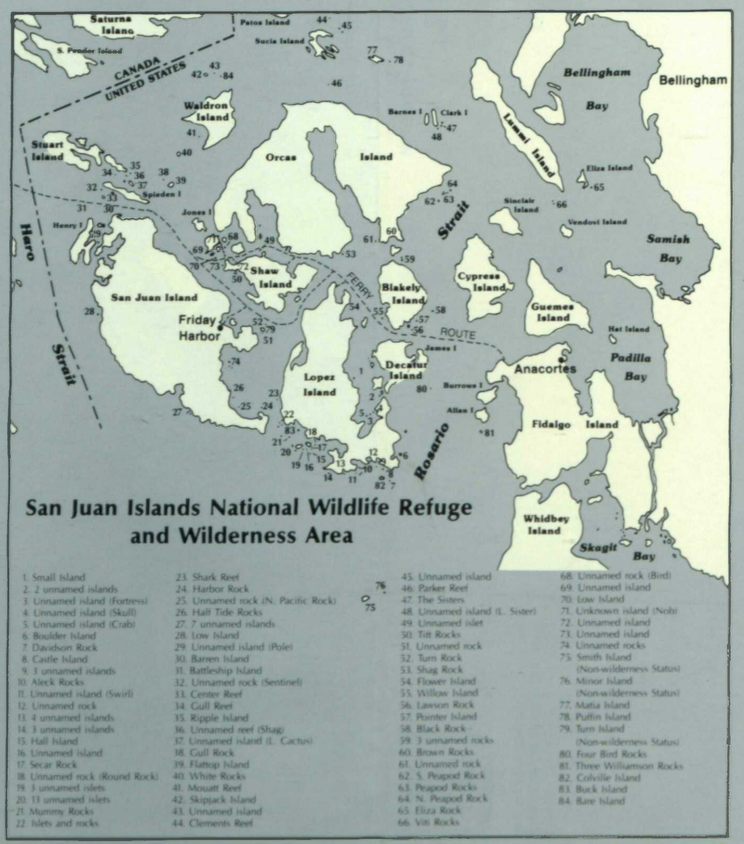
— baby birds and eggs are crushed and trampled when adult birds leave the nest.
— bald eagles may abandon their nests.
— baby seals may be drowned or crushed when adults stampede.

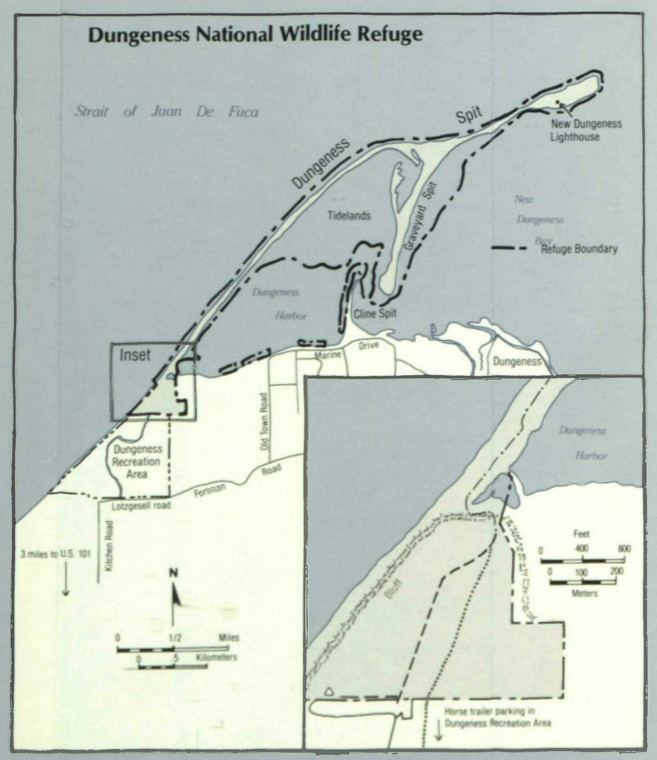
Call (206) 753-9467 to report trespassers.

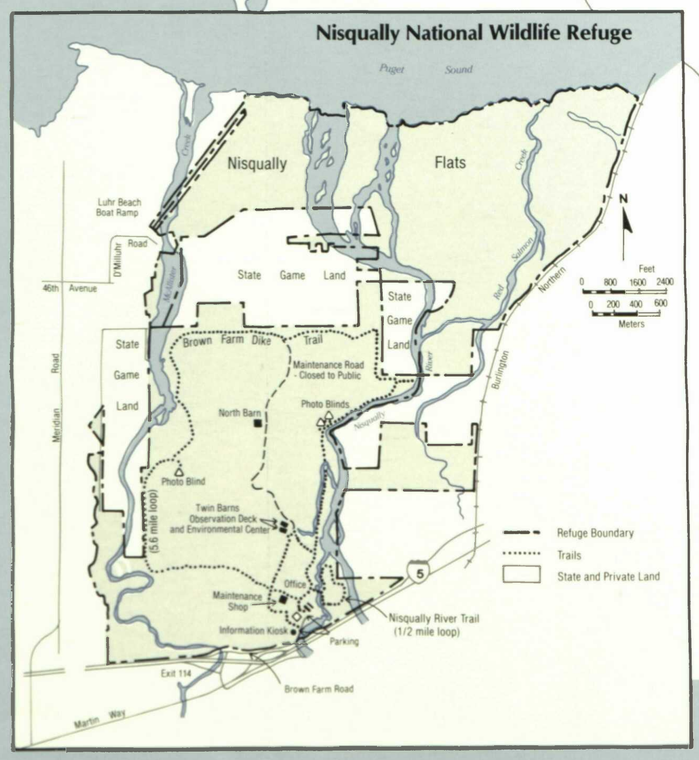
Learn about these refuges at mainland interpretive sites.

— Look for panels telling about Protection Island NWR at John Wayne Marina near Sequim.
— Read about the wildlife of Washington Islands at Lake Ozette, Rialto Beach, Second Beach, Ruby Beach, and Kalaloch along the Washington coast.
— Information about San Juan Islands NWR is located at marinas and resorts throughout the San Juan Islands.









WILDLIFE OBSERVATION TIPS

WHEN - Early morning, evening and when the weather clears after a storm are good times to observe wildlife. Spring bird migration usually goes from mid-March through mid-May, and fall migration from September through December.

WHERE - Be sure to look in a variety of habitats, along the "edges" between habitats, and remember to look high and low as well as at eye level. Please stay on the trails.

HOW - You will see more animals if you are QUIET. Be sure to listen for animal calls or songs, or try sitting down along the trail and waiting.

WHAT TO BRING - Binoculars or spotting scopes are helpful for observing wildlife, and a good field guide will help you identify what you see. You are always welcome to bring your camera and a lunch to eat along the trail. DON'T FORGET YOUR RAINCOAT!

MORE INFORMATION:

Contact: Refuge Manager
Nisqually National Wildlife Refuge
100 Brown Farm Rd.
Olympia, Washington 98506
Phone: (206) 753-9467

Dungeness and San Juan Islands National Wildlife Refuges are also managed from the Nisqually National Wildlife Refuge office.

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

RF 13530-1 FEBRUARY 1984

NISQUALLY

National Wildlife Refuge

Washington

NISQUALLY

A HOME FOR WILDLIFE

Sand shrimp, ducks, salmon, and hawks live side by side on Nisqually National Wildlife Refuge. Salt marshes lie adjacent to freshwater marshes, and mudflats quickly turn to thick forests. Nisqually Refuge was set aside in 1974 to protect this diversity of habitats and the many wildlife species that live in them.

Migratory waterfowl are of special importance at Nisqually. Up to 20,000 ducks and 300 geese find food, water, and shelter in the grasslands, mudflats, and freshwater marshes during spring and fall migration.

Each habitat is used by different kinds of wildlife in a variety of ways:

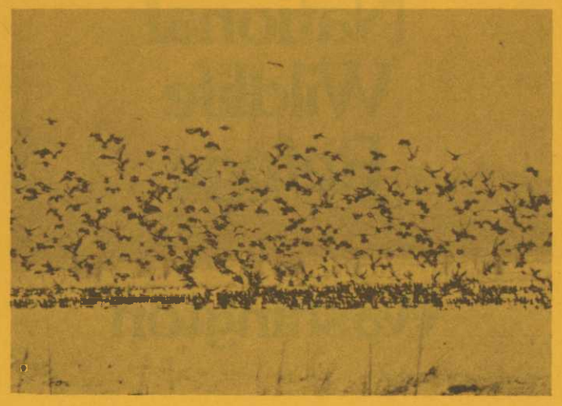
OPEN FRESHWATER PONDS are used for feeding, loafing, and brood rearing by a variety of waterfowl, especially mallards and teal.

OPEN SALTWATER areas of the Nisqually Reach are the home of seals, whales, and a variety of fish.

MUD FLATS support a varied fauna of clams, shrimp, worms, and crabs, and provide important feeding grounds for shorebirds.

FRESHWATER MARSHES are used in spring and fall as stopover areas for migratory waterfowl, and during breeding season as important nesting and feeding areas for marsh birds.

An uncommon snowfall greets these migrating wigeons.



A watchful eye of a red-tailed hawk.

Leaving the handy perch in search of food.

SALT MARSHES serve as resting and feeding habitat for shorebirds and waterfowl. Black brant feed on beds of eelgrass.

DECIDUOUS WOODLANDS are the home of numerous songbirds, raptors, and a variety of small mammals.

MIXED CONIFEROUS FOREST provides a nest site for great blue herons and perches for bald eagles.

SHRUB vegetation along the dikes supports a wide variety of songbirds.

GRASSLANDS provide browse for wigeon. A thriving vole population feeds hawks, owls, and coyotes.

ESTUARY waters, where fresh and saltwater meet, serve as a nursery for anadromous fish, as well as the home of various crustaceans, plankton, and other microorganisms.

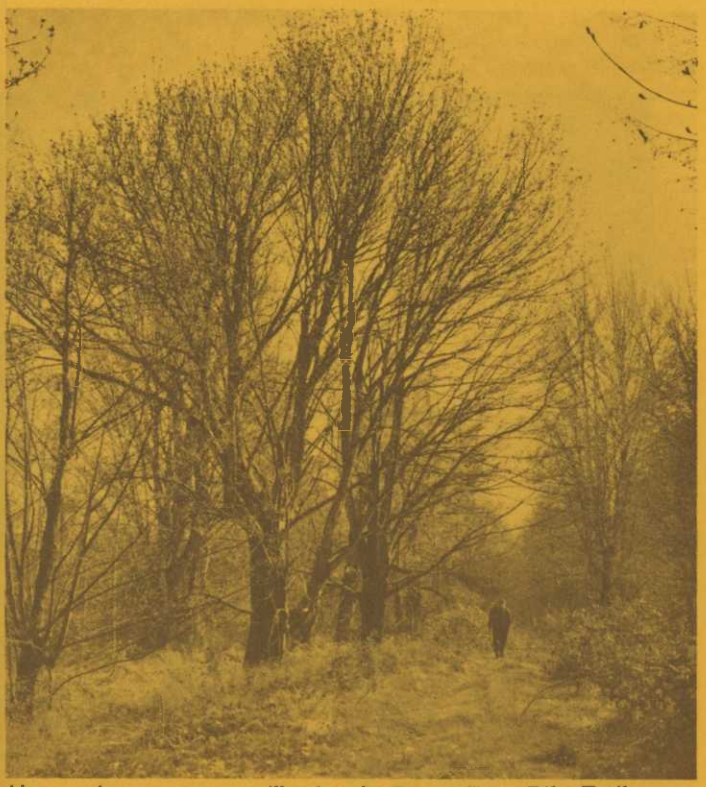
Over 300 species of wildlife benefit from the ten habitats of Nisqually National Wildlife Refuge. The Refuge lies at the south end of Puget Sound between Nisqually River and McAllister Creek and is just north of Interstate 5.

A goldfinch, the Washington State bird, lands on a thistle.

A killdeer reflects on its next meal.

At low tide shorebirds search for tasty morsels.

Ducks thrive and shape-up for their seasonal migrations.



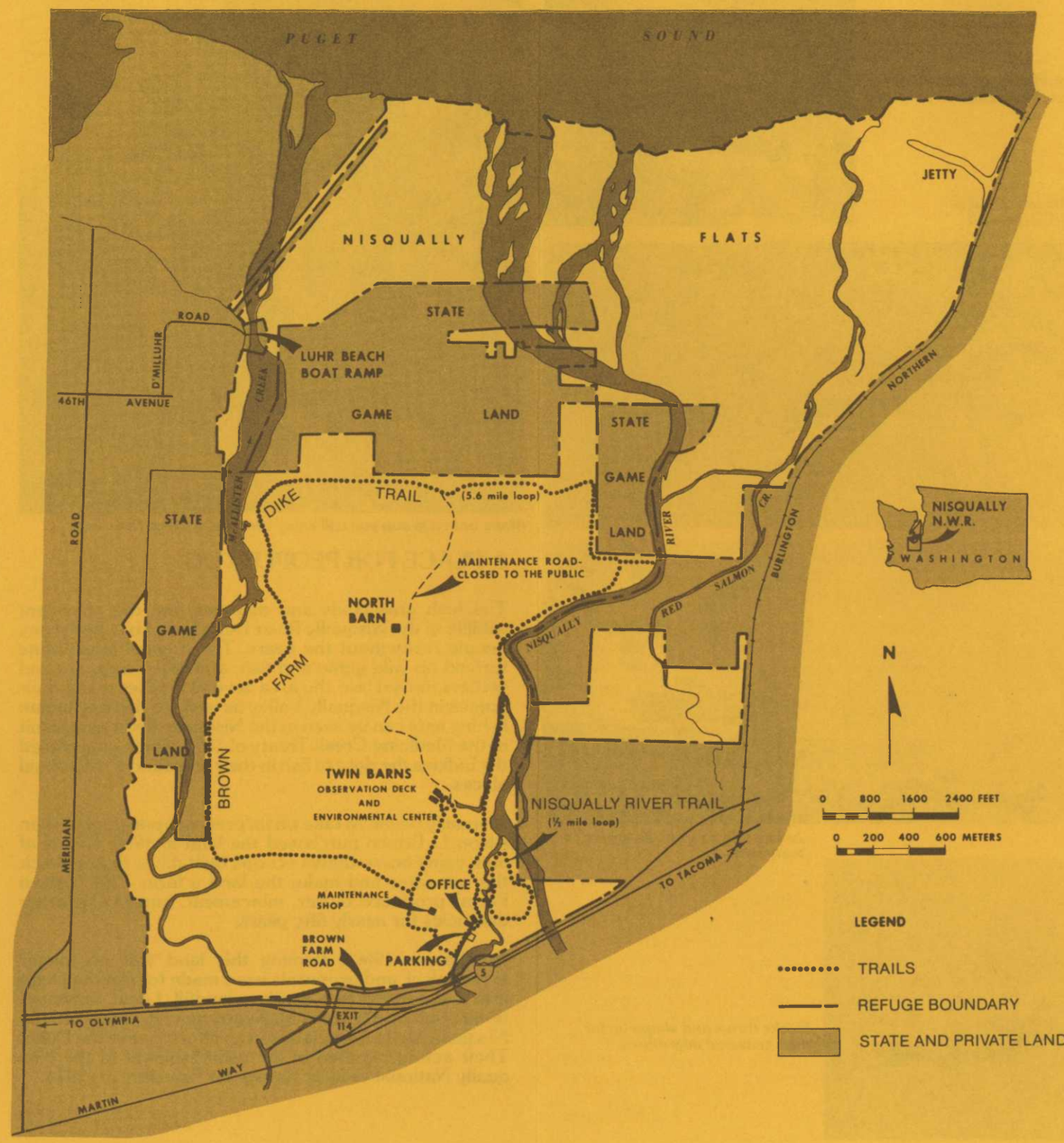
Alone or in a group you will enjoy the Brown Farm Dike Trail.

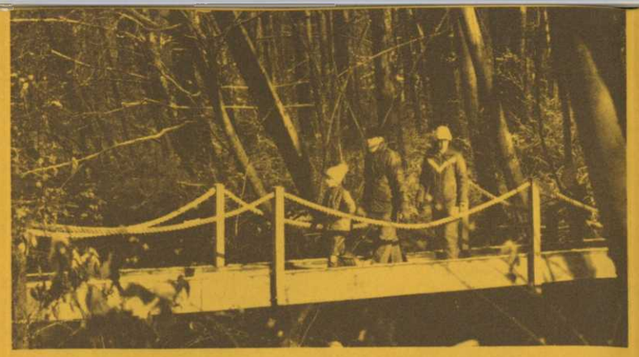
A PLACE FOR PEOPLE TOO

The lush grasslands and marshes and the abundant wildlife of the Nisqually River Delta have attracted many people throughout the years. The original inhabitants thrived on wild game and fish, and when trappers and settlers moved into the area several families made their homes in the Nisqually Valley as well. To this day Indian fishing nets can be seen in the Nisqually River as a result of the Medicine Creek Treaty of 1854, which guaranteed the Indians the right to fish in their usual and accustomed places.

Nisqually began to take on its present appearance when Alson L. Brown purchased the land in 1904. Crews of men using horse-drawn scoops built dikes to hold back the saltwater and make the land a farm. The "Brown Farm" produced butter, mincemeat, honey, and other delicacies for nearly fifty years.

By the mid-1960's farming this land was no longer economical, and proposals were made to turn the Delta into a superport or a sanitary landfill. Local conservationists led by Margaret McKenny quickly organized the Nisqually Delta Association in an effort to save the Delta. Their action resulted in the establishment of the Nisqually National Wildlife Refuge on February 21, 1974.





THINGS TO DO AT NISQUALLY

Nisqually National Wildlife Refuge welcomes people as well as wildlife.

REFUGE HOURS
The Refuge is open daily from sunrise to sunset. Office hours are 7:30 a.m. to 4:00 p.m., Monday through Friday.

HIKING
The trails at Nisqually are open only for walking (no jogging please). Hikers may take the 1/2 mile Nisqually River Interpretive Trail (may be flooded at high tides), the mile loop to the Twin Barns, or the 5.6 mile Brown Farm Dike Trail. To avoid disturbing wildlife, PLEASE STAY ON THE TRAILS AND LEAVE PETS AT HOME.

WILDLIFE OBSERVATION
Wildlife may be seen from all Refuge trails. The observation deck at the Twin Barns and the two photo blinds help visitors get a better view of wildlife.

ENVIRONMENTAL EDUCATION
Teachers and group leaders should contact the Refuge office for information and to make reservations. During office hours scheduled groups may use the Twin Barns Education Center or check out learning materials to use outdoors.

BOATING, CANOEING
Boats are an excellent way to view wildlife. Canoers, Kayakers, and other small boaters should beware of hazardous tides, wind, and weather conditions that exist around the Nisqually Delta. The closest launching ramp is at Luhr Beach. To use Washington State's Luhr Beach landing you must purchase a conservation decal, unless you have a hunting, fishing or trapping license. For more information contact; State Game Department, 516 N. Washington. Olympia, WA, phone (206) 753-5717.

HUNTING
Waterfowl hunting is allowed only on the Washington State Dept. of Game's Nisqually Habitat Management Area outside the Brown Farm Dike. Maps showing hunting areas are available at the Washington Dept. of Game office in Olympia or at the Refuge office.

FISHING
Anglers may fish both the Nisqually River and McAllister Creek by boat. Fishing from the river banks is allowed only in those areas shown on the map.

DRINKING WATER
Sorry, no drinking water is available on the Refuge. Please bring your own.

LITTER
No litter barrels are provided on the Refuge. Please carry out what you bring in.

HANDICAPPED
Refuge trails have gravel or grass surfaces, and may be slippery or muddy when wet. Visitors should examine their own abilities and limitations before using the Refuge.

SORRY, NO PETS, FIRES, JOGGING OR CAMPING ARE ALLOWED ON THE REFUGE. BICYCLES AND MOTORBIKES ARE NOT ALLOWED ON REFUGE TRAILS.

Consult your tide tables before boating to Nisqually Refuge from the north.

Wildlife Observation Tips

When
Early morning, late afternoon, and when the weather clears after a storm are good times to observe wildlife. Spring bird migration usually goes from mid-March through mid-May, and fall migration from September through December. The refuge is open daily during daylight hours.

Where
Be sure to look in a variety of habitats, along the "edges" between habitats, and remember to look high and low as well as at eye level. Please stay on the trails.

How
You will see more animals if you are QUIET. Be sure to listen for animal calls or songs, or try sitting down along the trail and waiting.

What To Bring
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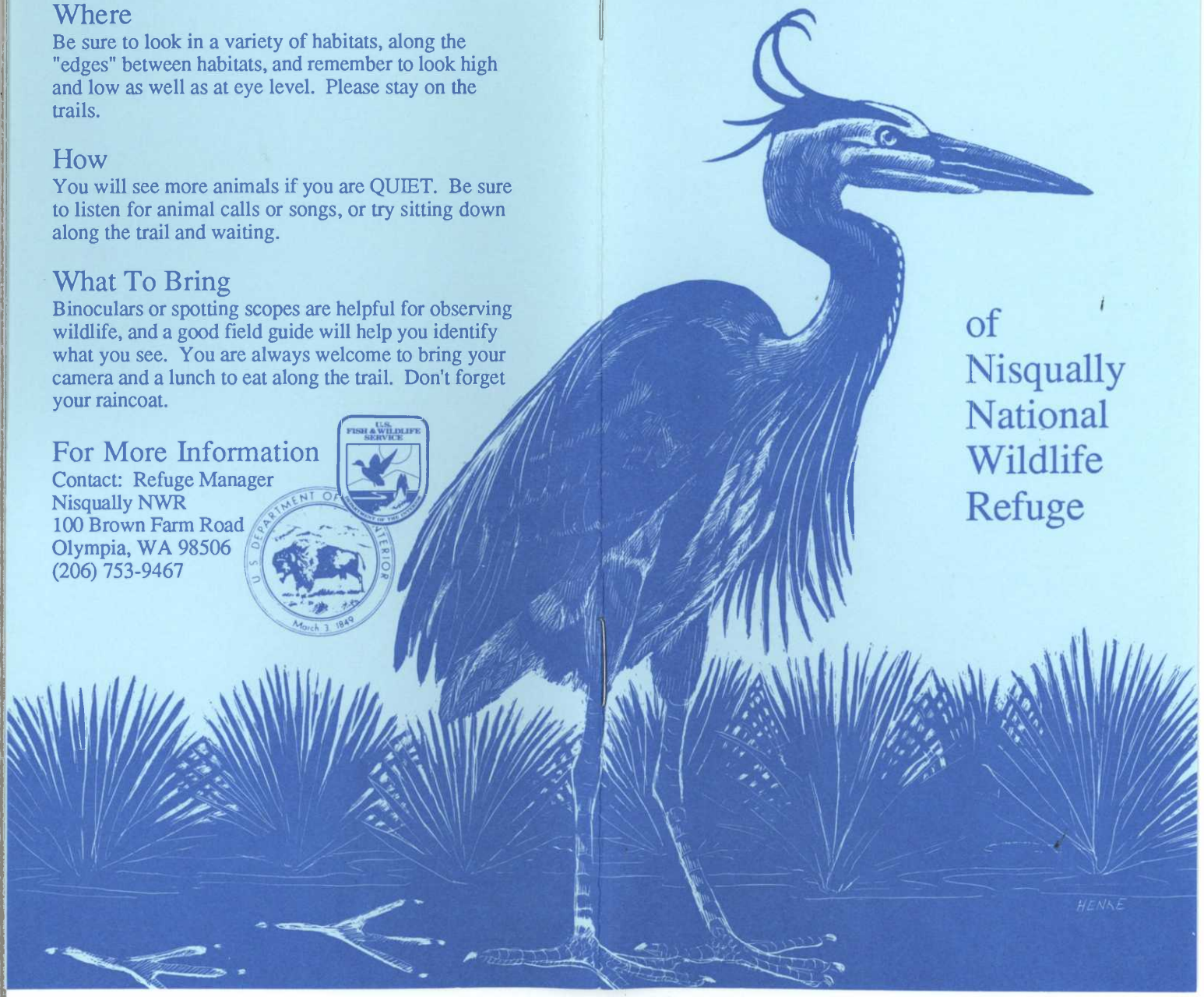
For More Information
Contact: Refuge Manager
Nisqually NWR
100 Brown Farm Road
Olympia, WA 98506
(206) 753-9467

Wildlife

of
Nisqually
National
Wildlife
Refuge



Nisqually: A Mosaic of Habitats

Waterfowl, shorebirds, raptors, marsh and water birds .... all are attracted to the mosaic of habitats found on the Nisqually Delta. A five mile long dike separates saltwater habitats from freshwater habitats and creates a land of diversity for up to 300 species of birds, mammals, reptiles, amphibians, and fish. By walking the 5-1/2 mile Brown Farm Dike Trail visitors can view six distinct habitat types and the wildlife that live in them.

Outside the Dike

Outside the dike are saltmarshes and open mudflats washed by the changing tides of Puget Sound. The salty water brings rich nutrients to the variety of clams, crabs, worms, and shrimp living in the mud, while these creatures in turn feed shorebirds, gulls, ducks, and herons.

Inside the Dike

Inside the dike freshwater marshes and open grasslands provide a quiet resting and wintering area for up to 20,000 migratory waterfowl. The grasslands teem with mice and voles, which are a ready meal for hawks, owls, and coyotes. Thick cattails and sedges surround the freshwater marshes and give protection to marsh wrens, soras, bitterns, and salamanders.

Along the Dike

A walk on the Brown Farm Dike Trail also takes visitors through riparian woodland and brush habitats. Careful observers may see winter wrens, red-legged frogs, pileated woodpeckers, and even great horned owls among the large cottonwood, alder, and big leaf maple trees growing along the Nisqually River. Along McAllister Creek, crabapples, roses, and blackberries provide a smorgasbord for songbirds. Watch for evening grosbeaks, cedar waxwings, and finches.

Nisqually National Wildlife Refuge is open to the public daily during daylight hours. The trails are open only for walking and pets are not allowed. Bring your binoculars, spotting scope, and camera, and enjoy your visit!

Wildlife Species Checklist

Notes

This wildlife checklist contains 176 species of birds that have been observed at Nisqually National Wildlife Refuge and 36 other bird species listed as accidental. The birds' common and scientific names and taxonomic order are categorized into family and subfamily groups in accordance with the 6th edition (1983) of the A. O. U. Checklist of North American Birds. Species of fishes, mammals, reptiles, and amphibians found on the refuge are also listed.

Seasons of occurrence heading columns 1 through 4:

Sp - Spring (March - May).
Su - Summer (June - July).
F - Fall (August - November).
W - Winter (December - February).

Abundance notations in columns 1 through 4:

A - Abundant: Common and in relatively large numbers.
C - Common: Seen on majority of visits to proper habitat.
U - Uncommon: Seen on less than half of visits to proper habitat.
R - Rare: Seen on less than 10% of visits to proper habitat.

Notes (*) in column 5:

N - Nesting recorded on Nisqually Delta.
FT - Federally listed threatened species.
FE - Federally listed endangered species.
SE - State listed endangered species.
SS - State listed sensitive species.
X - Accidental. Less than 5 records of occurrence on Nisqually Delta. They are not reasonably expected to be found more often than once every five to twenty years – if ever again.

Birds

	Sp	Su	F	W	*
GAVIIFORMES					
Gaviidae - Loons					
_ Red-throated Loon *Gavia stellata*	C		C	C	
_ Arctic Loon *Gavia arctica*	R		R	U	
_ Common Loon *Gavia immer*	C	U	C	C	
_ Yellow-billed Loon *Gavia adamsii*					X
PODICIPEDIFORMES					
Podicipedidae - Grebes					
_ Pied-billed Grebe *Podilymbus podiceps*	C	C	C	C	N
_ Horned Grebe *Podiceps auritus*	C		C	C	
_ Red-necked Grebe *Podiceps grisegena*	U		U	U	
_ Eared Grebe *Podiceps nigricollis*				R	
_ Western Grebe *Aechmophorus occidentalis*	C	R	C	C	
PROCELLARIIFORMES					
Procellariidae - Shearwaters					
_ Short-tailed Shearwater *Puffinus tenuirostris*					X
Hydrobatidae - Storm-petrels					
_ Leach's Storm-petrel *Oceanodroma leucorhoa*					X
PELECANIFORMES					
Pelecanidae - Pelicans					
_ Brown Pelican *Pelecanus occidentalis*					X, FE
Phalacrocoracidae - Cormorants					
_ Double-crested Cormorant *Phalacrocorax auritus*	C	C	C	C	
_ Brandt's Cormorant *Phalacrocorax penicillatus*				U	
_ Pelagic Cormorant *Phalacrocorax pelagicus*	U		U	U	
CICONIIFORMES					
Ardeidae - Herons and Bitterns					
_ American Bittern *Botaurus lentiginosus*	U	U	U	U	N

	Sp	Su	F	W	*
	C	C	C	C	N
_ Great Blue Heron *Ardea herodias*					X
_ Great Egret *Casmerodius albus*	U	U	U		N
_ Green-backed Heron *Butorides striatus*					
ANSERIFORMES					
Anatidae - Swans, Geese, and Ducks				R	
_ Tundra Swan *Cygnus columbianus*					X
_ Trumpeter Swan *Cygnus buccinator*	R		U		
_ Greater White-fronted Goose *Anser albifrons*			R		
_ Snow Goose *Chen caerulescens*	C			R	
_ Brant *Branta bernicla*	C	C	C	C	N
_ Canada Goose *Branta canadensis*	U	U	R		N
_ Wood Duck *Aix sponsa*	C	R	C	A	N
_ Green-winged Teal *Anas crecca*	C	C	A	A	N
_ Mallard *Anas platyrhynchos*	C	R	C	A	N
_ Northern Pintail *Anas acuta*	U	R			N
_ Blue-winged Teal *Anas discors*	C	C	U		N
_ Cinnamon Teal *Anas cyanoptera*	C	U	C	C	N
_ Northern Shoveler *Anas clypeata*	C	R	C	C	N
_ Gadwall *Anas strepera*	U		U	U	
_ Eurasian Wigeon *Anas penelope*	C	R	A	A	
_ American Wigeon *Anas americana*	U	R	U	C	
_ Canvasback *Aythya valisineria*	U	R	U	U	N
_ Ring-necked Duck *Aythya collaris*	C	R	C	C	
_ Greater Scaup *Aythya marila*	R		R	U	
_ Lesser Scaup *Aythya affinis*	R			R	
_ Oldsquaw *Clangula hyemalis*				R	
_ Black Scoter *Melanitta nigra*					

	Sp	Su	F	W	*
	C		C	C	
_ Surf Scoter *Melanitta perspicillata*	C	R	C	C	
_ White-winged Scoter *Melanitta fusca*	C		C	C	
_ Common Goldeneye *Bucephala clangula*	U		U	U	
_ Barrow's Goldeneye *Bucephala islandica*	C		C	C	
_ Bufflehead *Bucephala albeola*	U	R	U	C	N
_ Hooded Merganser *Lophodytes cucullatus*	U	U	C	U	
_ Common Merganser *Mergus merganser*	U	U	C	U	
_ Red-breasted Merganser *Mergus serrator*	C	R	C	U	
_ Ruddy Duck *Oxyura jamaicensis*					
FALCONIFORMES					
Cathartidae - Vultures	R	R	R		
_ Turkey Vulture *Cathartes aura*					
Accipitridae - Ospreys, Hawks, Old World Vultures, and Harriers	R		R	R	
_ Osprey *Pandion haliaetus*					X
_ Black-shouldered Kite *Elanus caeruleus*	U	U	U	U	FT, SS
_ Bald Eagle *Haliaeetus leucocephalus*	C	C	C	C	N
_ Northern Harrier *Circus cyaneus*	R		C	C	
_ Sharp-shinned Hawk *Accipiter striatus*	R		U	R	
_ Cooper's Hawk *Accipiter cooperii*					X
_ Northern Goshawk *Accipiter gentilis*					X
_ Red-shouldered Hawk *Buteo lineatus*	C	C	C	C	N
_ Red-tailed Hawk *Buteo jamaicensis*	U		U	U	
_ Rough-legged Hawk *Buteo lagopus*					
Falconidae - Falcons	U	U	U	U	N
_ American Kestrel *Falco sparverius*	U		U	U	
_ Merlin *Falco columbarius*				R	U FE, SE
_ Peregrine Falcon *Falco peregrinus*					X
_ Gyrfalcon *Falco rusticolus*					

	Sp	Su	F	W	*
_ PrairieFalcon *Falco mexicanus*					X

GALLIFORMES

Phasianidae - Upland Game Birds

_ Ring-necked Pheasant *Phasianus colchicus*	U	U	U	U	N
_ Ruffed Grouse *Bonasa umbellus*					X
_ Northern Bobwhite *Colinus virginianus*					X
_ California Quail *Callipepla californica*	U	U	U	U	N
_ Mountain Quail *Oreortyx pictus*					X

GRUIFORMES

Rallidae - Rails, Gallinules, and Coots

_ Virginia Rail *Rallus limicola*	U	C	U	U	N
_ Sora *Porzana carolina*	R	R	R		N
_ American Coot *Fulica americana*	U	U	U	U	N
_ Sandhill Crane *Grus canadensis*			R		SE

CHARADRIIFORMES

Charadriidae - Plovers

_ Black-bellied Plover *Pluvialis squatarola*	U		U	R	
_ Lesser Golden-plover *Pluvialis dominica*			R		
_ Semipalmated Plover *Charadrius semipalmatus*	U		U		
_ Killdeer *Charadrius vociferus*	C	C	C	C	N

Recurvirostridae - Stilts and Avocets

_ Black-necked Stilt *Himantopus mexicanus*					X
_ American Avocet *Recurvirostra americana*					X

Scolopacidae - Woodcock, Snipe, and Sandpipers

_ Greater Yellowlegs *Tringa melanoleuca*	C	R	C	C	
_ Lesser Yellowlegs *Tringa flavipes*	R		U		
_ Willet *Catoptrophorus semipalmatus*					X
_ Spotted Sandpiper *Actitis macularia*	U	U	U	U	N
_ Whimbrel *Numenius phaeopus*	U		U		

	Sp	Su	F	W	*
_ Red Knot *Calidris canutus*					X
_ Sanderling *Calidris alba*	R		R		
_ Western Sandpiper *Calidris mauri*	A	U	A	U	
_ Least Sandpiper *Calidris minutilla*	C	U	C	U	
_ Baird's Sandpiper *Calidris bairdii*	R		U		
_ Pectoral Sandpiper *Calidris melanotos*			U		
_ Sharp-tailed Sandpiper *Calidris acuminata*					X
_ Dunlin *Calidris alpina*	A		A	A	
_ Short-billed Dowitcher *Limnodromus griseus*	U		A		
_ Long-billed Dowitcher *Limnodromus scolopaceus*	U		A	U	
_ Common Snipe *Gallinago gallinago*	C	U	C	C	N
_ Wilson's Phalarope *Phalaropus tricolor*	R	R			N
_ Red-necked Phalarope *Phalaropus lobatus*					X

Laridae - Gulls and Terns

_ Parasitic Jaeger *Stercorarius parasiticus*			R		
_ Franklin's Gull *Larus pipixcan*			R		
_ Bonaparte's Gull *Larus philadelphia*	C	R	C	C	
_ Heermann's Gull *Larus heermanni*					X
_ Mew Gull *Larus canus*	C		C	C	
_ Ring-billed Gull *Larus delawarensis*	C	U	C	U	
_ California Gull *Larus californicus*	C	R	C	R	
_ Herring Gull *Larus argentatus*				R	
_ Thayer's Gull *Larus thayeri*	R		R	U	
_ Western Gull *Larus occidentalis*	R		R	U	
_ Glaucous-winged Gull *Larus glaucescens*	A	A	A	A	
_ Glaucous-winged X Western Hybrid *Larus sp.*	U	R	U	U	
_ Glaucous Gull *Larus hyperboreus*				R	

	Sp	Su	F	W	*
_ Caspian Tern *Sterna caspia*	U	U			
_ Common Tern *Sterna hirundo*			U		
Alcidae - Auks, Murres, and Puffins					
_ Common Murre *Uria aalge*	U		U	C	
_ Pigeon Guillemot *Cepphus columba*	U	U	U	U	
_ Marbled Murrelet *Brachyramphus marmoratus*	U	U	U	U	
_ Ancient Murrelet *Synthliboramphus antiquus*				R	
_ Rhinoceros Auklet *Cerorhinca monocerata*	U	R	U	C	
COLUMBIFORMES					
Columbidae - Pigeons and Doves					
_ Rock Dove *Columba livia*	U	U	U	U	
_ Band-tailed Pigeon *Columba fasciata*	C	C	C	U	N
_ Mourning Dove *Zenaida macroura*	U	R	U		
STRIGIFORMES					
Tytonidae - Barn Owls					
_ Common Barn-owl *Tyto alba*	U	U	U	U	N
Strigidae - Typical Owls					
_ Great Horned Owl *Bubo virginianus*	U	U	U	U	N
_ Snowy Owl *Nyctea scandiaca*				R	
_ Northern Pygmy-owl *Glaucidium gnoma*					X
_ Long-eared owl *Asio otus*					X
_ Short-eared Owl *Asio flammeus*	U	U	U	U	N
CAPRIMULGIFORMES					
Caprimulgidae - Goatsuckers					
_ Common Nighthawk *Chordeiles minor*		U			
APODIFORMES					
Apodidae - Swifts					
_ Vaux's Swift *Chaetura vauxi*		U			
Trochilidae - Hummingbirds					
_ Rufous Hummingbird *Selasphorus rufus*	C	C			N

	Sp	Su	F	W	*
CORACIIFORMES					
Alcedinidae - Kingfishers					
_ Belted Kingfisher *Ceryle alcyon*	C	C	C	C	
PICIFORMES					
Picidae - Woodpeckers					
_ Lewis' Woodpecker *Melanerpes lewis*					X
_ Red-breasted Sapsucker *Sphyrapicus ruber*	C	C	C	C	N
_ Downy Woodpecker *Picoides pubescens*	C	C	C	C	N
_ Hairy Woodpecker *Picoides villosus*	U	U	U	U	N
_ Northern Flicker *Colaptes auratus*	C	C	C	C	N
_ Pileated Woodpecker *Dryocopus pileatus*	U	U	U	U	N
PASSERIFORMES					
Tyrannidae - Tyrant Flycatchers					
_ Olive-sided Flycatcher *Contopus borealis*		U			
_ Western Wood-pewee *Contopus sordidulus*		C	U		N
_ Willow Flycatcher *Empidonax traillii*		C	U		N
_ Western Flycatcher *Empidonax difficilis*	C	C			N
_ Western Kingbird *Tyrannus verticalis*					X
Alaudidae - Larks					
_ Horned Lark *Eremophila alpestris*					X
Hirundinidae - Swallows					
_ Tree Swallow *Tachycineta bicolor*	A	A	A		N
_ Violet-green Swallow *Tachycineta thalassina*	A	A	A		N
_ Northern Rough-winged Swallow *Stelgidopteryx serripennis*	C	C	C		N
_ Cliff Swallow *Hirundo pyrrhonota*	C	C	C		N
_ Barn Swallow *Hirundo rustica*	A	A	A		N
Corvidae - Jays, Magpies, and Crows					
_ Steller's Jay *Cyanocitta stelleri*	C	C	C	U	
_ Black-billed Magpie *Pica pica*					X

	Sp	Su	F	W	*
_ American Crow *Corvus brachyrhynchos*	C	C	C	C	N
Paridae - Titmice					
_ Black-capped Chickadee *Parus atricapillus*	C	C	C	C	N
_ Chestnut-backed Chickadee *Parus rufescens*	C	U	C	C	N
Aegithalidae - Bushtits					
_ Bushtit *Psaltriparus minimus*	C	C	C	C	N
Sittidae - Nuthatches					
_ Red-breasted Nuthatch *Sitta canadensis*	C	C	C	C	N
Certhiidae - Creepers					
_ Brown Creeper *Certhia americana*	U	U	U	U	N
Troglodytidae - Wrens					
_ Bewick's Wren *Thryomanes bewickii*	C	C	C	C	N
_ House Wren *Troglodytes aedon*		U			
_ Winter Wren *Troglodytes troglodytes*	C	C	C	C	N
_ Marsh Wren *Cistothorus palustris*	C	C	C	C	N
Muscicapidae - Muscapids					
_ Golden-crowned Kinglet *Regulus satrapa*	C	C	C	C	N
_ Ruby-crowned Kinglet *Regulus calendula*	U		U	C	
_ Western Bluebird *Sialia mexicana*					X
_ Townsend's Solitaire *Myadestes townsendi*					X
_ Swainson's Thrush *Catharus ustulatus*		C	C		N
_ American Robin *Turdus migratorius*	C	C	C	C	N
_ Varied Thrush *Ixoreus naevius*			U	C	
Mimidae - Mockingbirds and Thrashers					
_ Northern Mockingbird *Mimus polyglottos*					X
Motacillidae - Pipits					
_ Water Pipit *Anthus spinoletta*	U		U	R	
Bombycillidae - Waxwings					
_ Cedar Waxwing *Bombycilla cedrorum*	U	C	C	R	N
Laniidae - Shrikes					
_ Northern Shrike *Lanius excubitor*	R		U	U	

	Sp	Su	F	W	*
Sturnidae - Starlings					
_ European Starling *Sturnus vulgaris*	A	A	A	A	N
Vireonidae - Vireos					
_ Solitary Vireo *Vireo solitarius*	U	U	U		N
_ Hutton's Vireo *Vireo huttoni*	U	U	U	U	N
_ Warbling Vireo *Vireo gilvus*	U	C	U		N
_ Red-eyed Vireo *Vireo olivaceus*	U	U	U		N
Emberizidae - Emberizids					
_ Orange-crowned Warbler *Vermivora celata*	C	C	C	R	N
_ Nashville Warbler *Vermivora ruficapilla*					X
_ Yellow Warbler *Dendroica petechia*	C	C	C		N
_ Yellow-rumped Warbler *Dendroica coronata*	C	C	C	U	N
_ Black-throated Gray Warbler *Dendroica nigrescens*	C	C	C		N
_ Townsend's Warbler *Dendroica townsendi*	U		U		
_ MacGillivray's Warbler *Oporornis tolmiei*	C	C	C		N
_ Common Yellowthroat *Geothlypis trichas*	C	C	C		N
_ Wilson's Warbler *Wilsonia pusilla*	C	C	C		N
_ Western Tanager *Piranga ludoviciana*	U	C	U		N
_ Black-headed Grosbeak *Pheucticus melanocephalus*	U	C	U		N
_ Lazuli Bunting *Passerina amoena*					X
_ Rufous-sided Towhee *Pipilo erythrophthalmus*	C	C	C	C	N
_ American Tree Sparrow *Spizella arborea*					X
_ Chipping Sparrow *Spizella passerina*					X
_ Vesper Sparrow *Pooecetes gramineus*					X
_ Savannah Sparrow *Passerculus sandwichensis*	C	C	C		N
_ Fox Sparrow *Passerella iliaca*	U		U	C	
_ Song Sparrow *Melospiza melodia*	C	C	C	C	N
_ Lincoln's Sparrow *Melospiza lincolnii*	U		U		

	Sp	Su	F	W	*
_ White-throated Sparrow *Zonotrichia albicollis*					X
_ Golden-crowned Sparrow *Zonotrichia atricapilla*	U		U	C	
_ White-crowned Sparrow *Zonotrichia leucophrys*	U	U	U	C	N
_ Harris' Sparrow *Zonotrichia querula*					X
_ Dark-eyed Junco *Junco hyemalis*	C	C	C	A	N
_ Snow-bunting *Plectrophenax nivalis*					X
_ Red-winged Blackbird *Agelaius phoeniceus*	C	C	C	C	N
_ Western Meadowlark *Sturnella neglecta*	U	U	U	U	N
_ Yellow-headed Blackbird *Xanthocephalus xanthocephalus*	U	U	U		N
_ Brewer's Blackbird *Euphagus cyanocephalus*	C	C	C	C	N
_ Brown-headed Cowbird *Molothrus ater*	U	C	U	R	N
_ Northern Oriole *Icterus galbula*		U			N
Fringillidae - Grosbeaks and Finches					
_ Purple Finch *Carpodacus purpureus*	C	C	C	C	N
_ House Finch *Carpodacus mexicanus*	C	C	C	C	N
_ Red Crossbill *Loxia curvirostra*	U		U	U	
_ Pine Siskin *Carduelis pinus*	C	C	C	C	N
_ American Goldfinch *Carduelis tristis*	U	C	C	U	N
_ Evening Grosbeak *Coccothraustes vespertinus*	C	R	C	U	

Mammals

INSECTIVORA — Insectivores

Soricidae — Shrews

_ Vagrant Shrew *Sorex vagrans*
_ (no common name) *Sorex monticolus*
_ Marsh Shrew *Sorex bendirei*
_ Trowbridge's Shrew *Sorex trowbridgei*

Talpidae — Moles

_ Shrew-mole *Neurotrichus gibbsi*
_ Townsend's Mole *Scapanus townsendi*
_ Coast Mole *Scapanus orarius*

CHIROPTERA — Bats

Vespertilionidae — Vespertilionid Bats

_ Yuma Myotis *Myotis yumanensis*
_ Little Brown Bat *Myotis lucifugus*
_ Long-eared Myotis *Myotis evotis*
_ Silver-haired Bat *Lasionycteris noctivagans*
_ Hoary Bat *Lasiurus cinereus*
_ Townsend's Big-eared Bat *Plecotus townsendi*

LAGOMORPHA — Hares, Rabbits, and Pikas

Leporidae — Rabbits and Hares

_ Eastern Cottontail *Sylvilagus floridanus*
_ Snowshoe Hare *Lepus americanus*

RODENTIA — Rodents

Aplodontidae — Mountain Beaver

_ Mountain Beaver *Aplodontia rufa*

Sciuridae — Squirrels and Relatives

_ Townsend's Chipmunk *Eutamias townsendi*
_ Western Gray Squirrel *Sciurus griseus*
_ Douglas' Squirrel *Tamiasciurus douglasi*
_ Northern Flying Squirrel *Glaucomys sabrinus*

Castoridae — Beavers

_ Beaver *Castor canadensis*

Muridae — Murids

_ Deer Mouse *Peromyscus maniculatus*
_ (no common name) *Peromyscus oreas*
_ Bushytail Woodrat *Neotoma cinerea*
_ Western Red-backed Vole *Clethrionomys gapperi*
_ Townsend's Vole *Microtus townsendi*
_ Longtail Vole *Microtus longicaudus*
_ Creeping Vole *Microtus oregoni*
_ Muskrat *Ondatra zibethicus*
_ Roof Rat *Rattus rattus*
_ Norway Rat *Rattus norvegicus*
_ House Mouse *Mus musculus*

Zapodidae — Jumping Mice

_ Pacific Jumping Mouse *Zapus trinotatus*

Erethizontidae — New World Porcupines

_ Porcupine *Erethizon dorsatum*

CETACEA — Whales and Porpoises

Delphinidae — Porpoises and Dolphins

_ False Killer Whale *Pseudorca crassidens*
_ Killer Whale *Orcinus orca*
_ Harbor Porpoise *Phocoena phocoena*

Eschrichtidae — Gray Whale

_ Gray Whale (*FE, SE) *Eschrichtius robustus*

Balaenopteridae — Fin-backed Whales

_ Minke Whale *Balaenoptera acutorostrata*
_ Fin Whale (*FE, SE) *Balaenoptera physalus*

CARNIVORA — Carnivores
Canidae — Coyote, Wolves, Foxes, and Dogs
_ Coyote — *Canis latrans*
_ Common Red Fox — *Vulpes vulpes*
Ursidae — Bears
_ Black Bear — *Ursus americanus*
Procyonidae — Raccoons and Allies
_ Raccoon — *Procyon lotor*
Mustelidae — Mustelids
_ Ermine — *Mustela erminea*
_ Longtail Weasel — *Mustela frenata*
_ Mink — *Mustela vison*
_ Spotted Skunk — *Spilogale putorius*
_ Striped Skunk — *Mephitis mephitis*
_ River Otter — *Lutra canadensis*
Felidae — Cats and Allies
_ Mountain Lion — *Felis concolor*
_ Bobcat — *Lynx rufus*

PINNIPEDIA — Seals and Walrus
Otariidae — Eared Seals
_ Northern Sea Lion — *Eumetopias jubatus*
_ California Sea Lion — *Zalophus californianus*
Phocidae — Earless Seals
_ Harbor Seal — *Phoca vitulina*

ARTIODACTYLA — Artiodactyls
Cervidae — Cervids
_ Columbia Blacktail Deer — *Odocoileus hemionus columbianus*

Reptiles

SQUAMATA
Boidae
_ Rubber Boa — *Charina bottae*
Colubridae
_ Common Garter Snake — *Thamnophis sirtalis*
_ Northwestern Garter Snake — *Thamnophis ordinoides*
_ Western Garter Snake — *Thamnophis elegans*
_ Alligator Lizard — *Gerrhonotus coeruleus*
_ Fence Lizard — *Sceloporus occidentalis*

Amphibians

CAUDATA
Ambystomatidae
_ Long-toed Salamander — *Ambystoma macrodactylum*
Salamandridae
_ Roughskin Newt — *Taricha granulosa*
Hylidae
_ Pacific Treefrog — *Hyla regilla*
Ranidae
_ Red-legged Frog — *Rana aurora*

Fishes

SALMONIFORMES
Salmonidae - Trouts
_ Pink Salmon — *Oncorhynchus gorbuscha*
_ Chum Salmon — *Oncorhynchus keta*
_ Coho Salmon — *Oncorhynchus kisutch*
_ Sockeye Salmon (Kokanee) *Oncorhynchus nerka*
_ Chinook Salmon — *Oncorhynchus tshawytscha*
_ Mountain Whitefish — *Prosopium williamsoni*
_ Cutthroat Trout — *Salmo clarki*
_ Rainbow Trout (Steelhead) *Salmo gairdneri*
_ Brook Trout — *Salvelinus fontinalis*
_ Dolly Varden — *Salvelinus malma*

CYPRINIFORMES
Cyprinidae - Carps and Minnows
_ Peamouth — *Mylocheilus caurinus*
_ Northern Squawfish — *Ptychocheilus oregonensis*
_ Longnose Dace — *Rhinichthys cataractae*
_ Speckled Dace — *Rhinichthys osculus*
_ Redside Shiner — *Richardsonius balteatus*
Catostomidae - Suckers
_ Largescale Sucker — *Catostomus macrocheilus*

SILURIFORMES
Ictaluridae - Bullhead Catfishes
_ Brown Bullhead — *Ictalurus nebulosus*

GASTEROSTEIFORMES
Gasterosteidae - Sticklebacks
_ Threespine Stickleback *Gasterosteus aculeatus*

PERCIFORMES
Centrarchidae - Sunfishes
_ Rock Bass — *Ambloplites rupestris*
_ Pumpkinseed — *Lepomis gibbosus*
_ Warmouth — *Lepomis gulosus*
_ Largemouth Bass — *Micropterus salmoides*
_ White Crappie — *Pomoxis annularis*
_ Black Crappie — *Pomoxis nigromaculatus*
Percidae - Perches
_ Yellow Perch — *Perca flavescens*
Cottidae - Sculpins
_ Sculpins — ssp.

Acknowledgments

Staff of the Nisqually NWR compiled the information on species occurrence from data supplied to the refuge office over the years by many individuals. NWR staff, Bill Hesselbart, Refuge Manager; Mike McMinn, Assistant Refuge Manager; and Ellie Henke, Outdoor Recreation Planner, reviewed and refined the species lists. Ellie wrote the habitats text and drew the cover artwork. Dr. Murray L. Johnson, Curator of Mammals, Burke Museum, University of Washington, reviewed the listed mammals, reptiles, and amphibians, and enhanced the accuracy of many details. Bob Mowrey served as editor with Flo Brodie as associate.

Contributions for the first printing of this pamphlet were provided by the Margaret McKenny Memorial Fund in her memory.

Margaret McKenny was a teacher and places like the Nisqually Delta were her classrooms. She visited these wetlands often and brought people of all ages here to explore it, enjoy a day in the field, and to tell them about nature. "Everything speaks its name," she used to say; and it seemed as though she could tell you the name of absolutely every mushroom, plant and animal here if she were put to the task. People found themselves listening to this old-world naturalist and being gently pursuaded that the Nisqually Delta was somehow more than the sum of its parts — it was a larger environment that protected and nourished life and it was worthy of preservation. It supported the resident life forms, including man; and also sustained populations of migratory waterfowl along the Pacific Flyway. It had international importance. In those early days, there was no wildlife refuge on the delta and the area was being favored for development by industry. She was one of the first to recognize the impending threat, advocate protection, and influence people to take action. This refuge is her legacy to you and future generations.

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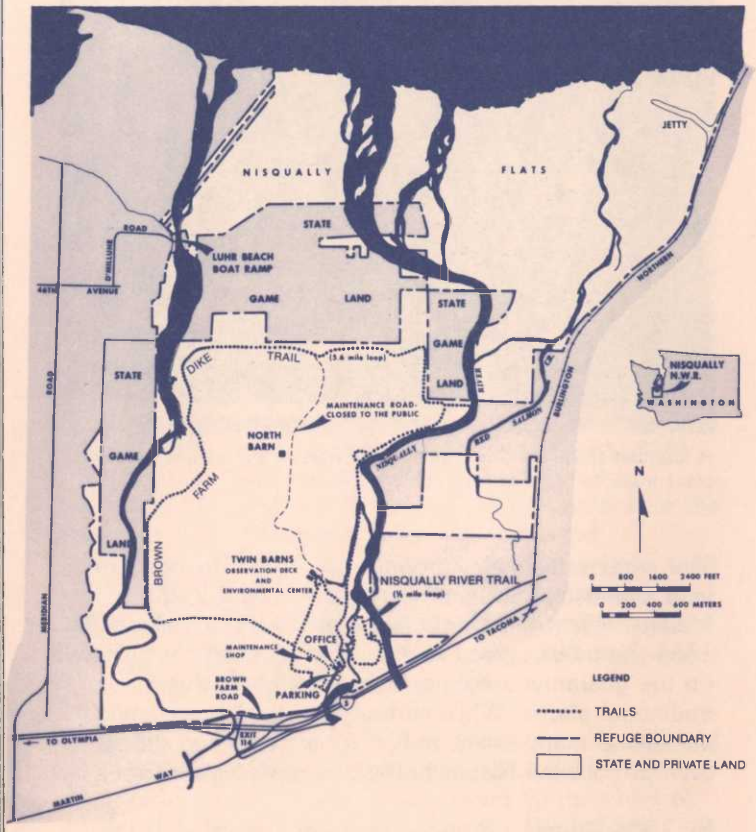

The Nisqually Delta

past, present and future

For more information about Nisqually National Wildlife Refuge contact:

Refuge Manager
Nisqually National Wildlife Refuge
100 Brown Farm Road
Olympia, Washington 98506
(206) 943-7577

For more information about Nisqually Habitat Management Area contact:

Washington Department of Game
905 E. Heron
Aberdeen, Washington 98502
(206) 753-2600 (Olympia) or
(206) 533-9335 (Aberdeen)

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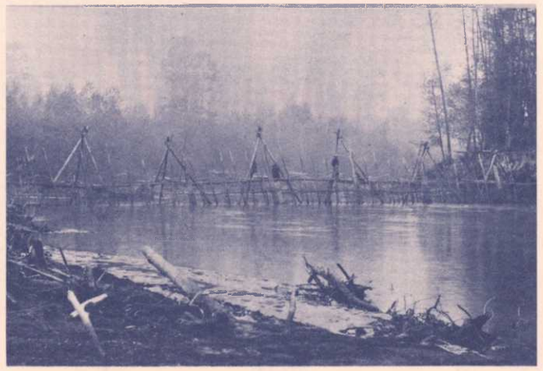


Yelm Jim's fish trap

A founders plaque and memorial grove were dedicated in 1984 and plans made to begin an environmental essay contest.

WHAT GOOD IS THE DELTA FOR PEOPLE?

People have lived near the Nisqually Delta for hundreds of years. During that time the value people saw in the land has been reflected in the uses they have made of it.

Before white settlement, local Indian tribes recognized the value of the Delta for providing food and shelter, as well as the spiritual value of Medicine Creek, now known as McAllister Creek. Clams, crabs, and oysters were abundant and hunting parties returned with ducks as well as deer. Weirs, spears, and gaff hooks were used to catch salmon, which were plentiful in both Medicine Creek and the Nisqually River.

When employees of the Hudson's Bay Company moved into the area during the 1830's the commercial sale of wildlife began. Fort Nisqually was built east of the mouth of the Nisqually River and soon became an active fur trading post. Hundreds of beaver, muskrat, otter, and raccoon pelts were bought at the Fort and sent on to eastern and foreign markets.

The Twin Barns were built on the Brown Farm in 1932

The white settlers also brought with them the concept of land ownership, an idea with little meaning to the Indians. When the Medicine Creek Treaty was signed in 1854 the tribes agreed to live on reservations but insisted on the guaranteed right to hunt and fish in their traditional places. While surrounding land has changed ownership many times, Indian fishing nets can still be seen in both the Nisqually River and McAllister Creek.

By 1904 Alson L. Brown recognized the value of the Nisqually Delta for agriculture. Crews of men using horse-drawn scoops built dikes to hold back the seawater and make the land a farm. The "Brown Farm" was known throughout the area for its comb honey, mincemeat, and other delicacies as well as for chickens, butter, sausages, and cheese.

As cities grew around Puget Sound people began to see other uses for the Nisqually Delta. When the Brown Farm was offered for sale in the early 1960's the city of Seattle considered using the land as a garbage dump, while Tacoma and Olympia proposed building a deepwater port. Other citizens, however, recognized the value of the Delta as habitat for wildlife. As a result of their actions the Nisqually Delta was purchased by the U.S. Fish and Wildlife Service and the Washington Department of Game and set aside for wildlife to use and for people to enjoy.

PEOPLE CAN MAKE A DIFFERENCE

At the time the Nisqually Delta was proposed for development many people began to recognize that the "best" use of the land might not necessarily involve industrial and commercial development. They had seen wildlife habitat disappear around Puget Sound as communities and industry grew, and they knew that the environmental qualities that attracted wildlife had value for people as well.

The proposals to develop the Nisqually Delta triggered citizen action. In 1965 the "Washington Citizens Committee for Outdoor Resources" was organized for the purpose of preserving the Delta from industrial development. Members were encouraged to express their concern by lobbying, writing to their legislators, and voting. As a result the Washington Department of Game began purchasing land on the Nisqually Delta in the area that had been proposed for development.

By 1970 the Nisqually Delta Association was formed and became the lead organization for focusing citizen concern and involvement. They were supported by members of many other organizations, including the Washington Environmental Council, many chapters of the National Audubon Society, and Washington State Sportsmen's Council, the League of Women Voters, and many other organizations and individuals.

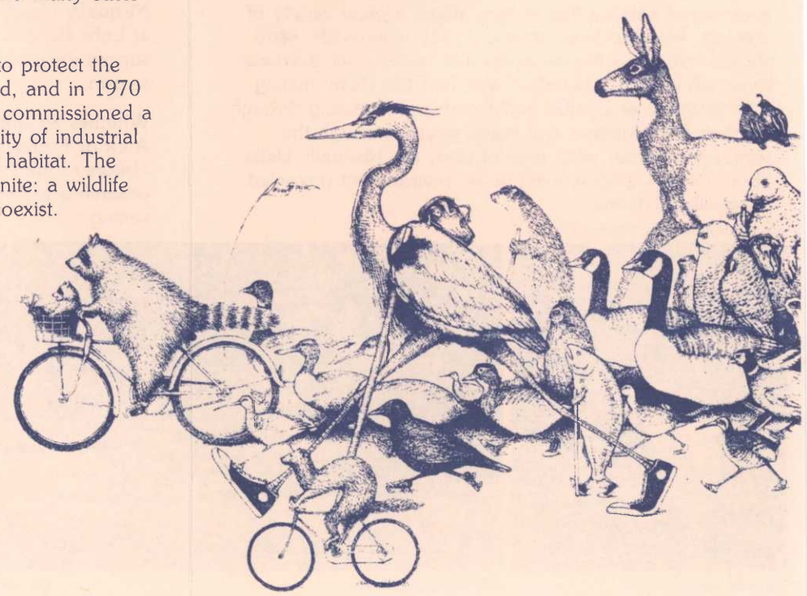
Their actions put pressure on legislature to protect the Delta by law. Various bills were introduced, and in 1970 the Washington House of Representative commissioned a special study to investigate the compatibility of industrial development with preservation of wildlife habitat. The results of the Ray-Alcorn Study were definite: a wildlife refuge and port development could not coexist.

By 1971 the effort to preserve the Delta changed from local to a national level when the area outside the Brown Farm Dike was declared a National Natural Landmark. When the U.S. Congress and the Department of the Interior approved funds in 1974 to create Nisqually National Wildlife Refuge many years of perserverence and effort by local citizens came to fulfillment.

WHAT'S THE OUTLOOK FOR THE FUTURE?

Citizen involvement has helped secure long-term protection for the Nisqually Delta through ownership by the U.S. Fish and Wildlife Service and the Washington Department of Game. However, development of surrounding areas continues to be a potential threat to the wildlife value of the Delta. Continued citizen involvement in planning and decision making processes will reflect the value people place on wildlife and habitat and will determine their continued existence on the Nisqually Delta.

Artwork for the "Get Moving to Save Nisqually Delta" poster was donated to the Nisqually Delta Association by Tom Ingham.



U.S. Fish and Wildlife Service/Ellie Henke

Mt. Rainier towers over the Delta

Barn owls feast on Delta mice and voles

National Audubon Society/G.W. Robinson

MEET THE NISQUALLY DELTA

Seen from Interstate-5 the Nisqually Delta is a glimpse of open space between Olympia and Tacoma. But for those who take the time to look closely this mosaic of grasslands, salt marshes, forests, and mudflats teems with wildlife. The Nisqually River, Puget Sound, McAllister Creek, and the encircling Brown Farm Dike join to create a variety of habitats that in turn attract a great variety of animals. Woodpeckers hammer in the woodlands, sand shrimp burrow in the mudflats, and hawks soar overhead in search of mice. Waterfowl also find the Delta inviting, with as many as 20,000 ducks and geese passing through on their fall migration and many staying through the winter. No matter what time of year, the Nisqually Delta abounds with wildlife living in an environment protected especially for them.

Most of the Nisqually Delta is owned by the U.S. Fish and Wildlife Service and is under the protection of Nisqually National Wildlife Refuge. Surrounding areas make up the Nisqually Habitat Management Area owned by the Washington Department of Game. Together these agencies manage the Delta for wildlife and to be enjoyed by people.

Nisqually National Wildlife Refuge is open to the public during daylight hours throughout the year. Visitors are encouraged to bring binoculars and cameras, and may use Refuge photo blinds, enjoy the observation deck at the Twin Barns, or walk over seven miles of trails. Pets are not permitted on the refuge.

Nisqually Habitat Management Area offers a boat launch at Luhr Beach, fishing and boating in the waters surrounding the Delta, and hunting during waterfowl season.

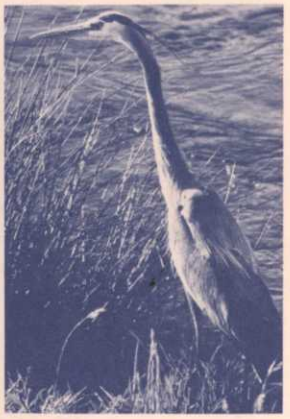
Whether boating the waters of the Habitat Management Area or hiking the trails of the National Wildlife Refuge, visitors to the Nisqually Delta will find the opportunity to observe a wide variety of wildlife in a unique natural setting.

National Audubon Society/P. LaTourette

Greater scaup

The Nisqually Delta

U.S. Fish and Wildlife Service



Great blue heron

National Audubon Society/G.W. Robinson

Best Times For Shorebird Viewing For 1989

April 15	9:00 am - 11:00 am
April 16	10:00 am - 12:00 noon
April 17	11:00 am - 1:00 pm
April 18	11:30 am - 1:30 pm
April 19	12:30 pm - 2:30 pm
April 20	1:00 pm - 3:00 pm
April 21	1:45 pm - 3:45 pm
April 22	2:30 pm - 4:30 pm
April 23	3:00 pm - 5:00 pm
April 24	4:00 pm - 6:00 pm
April 25	4:40 pm - 6:40 pm
April 26	5:30 pm - 7:30 pm
April 27	6:30 pm - 8:30 pm
April 28	5:00 am - 7:00 am
April 29	6:30 am - 8:30 am
April 30	8:00 am - 10:00 am
May 1	9:15 am - 11:15 am
May 2	10:30 am - 12:30 pm
May 3	11:30 am - 1:30 pm
May 4	12:30 pm - 2:30 pm
May 5	1:20 pm - 3:20 pm
May 6	2:15 pm - 4:15 pm
May 7	3:00 pm - 5:00 pm

April 23 -30, 1989, is the peak week which has the heaviest concentration of shorebirds at these times of day.

For More Information, Contact:

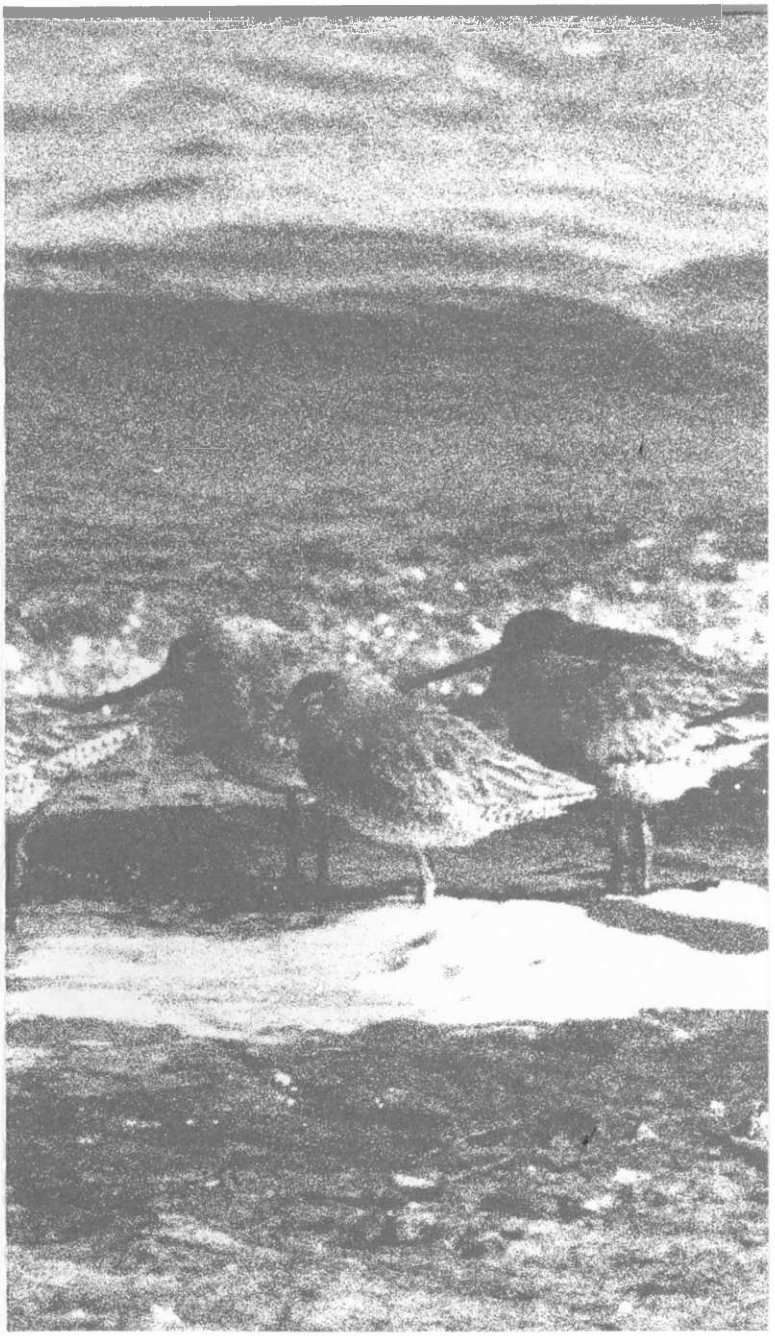
Grays Harbor National Wildlife Refuge
c/o Nisqually National Wildlife Refuge
100 Brown Farm Road
Olympia, WA 98506
Phone (206) 753-9467

*U.S. GOVERNMENT PRINTING OFFICE: 1989-0-691-033/80034

Department of the Interior
U.S. Fish and Wildlife Service

RF13530 April 1989

Bowerman Basin to Become Wildlife Refuge



Bowerman Basin to Become Wildlife Refuge

Refuge Will Protect Shorebird Habitat

Congress authorized the establishment of the Grays Harbor National Wildlife Refuge in August, 1988. The focus of the refuge is Bowerman Basin, which is located in the northeast corner of the Grays Harbor estuary on the coast of Washington.

Grays Harbor is one of four major staging areas for shorebirds in North America. Over one million shorebirds gather, or "stage," here in spring to store up fat reserves and rest for the non-stop flight to their northern breeding grounds. This is the largest concentration of shorebirds on the west coast south of Alaska.

The U.S. Fish and Wildlife Service currently is negotiating with land owners, the City of Hoquiam and the Port of Grays Harbor, to acquire land and waters within the proposed refuge boundary. When land acquisition is completed, the refuge will include 1,800 acres of Bowerman Basin and adjacent uplands.

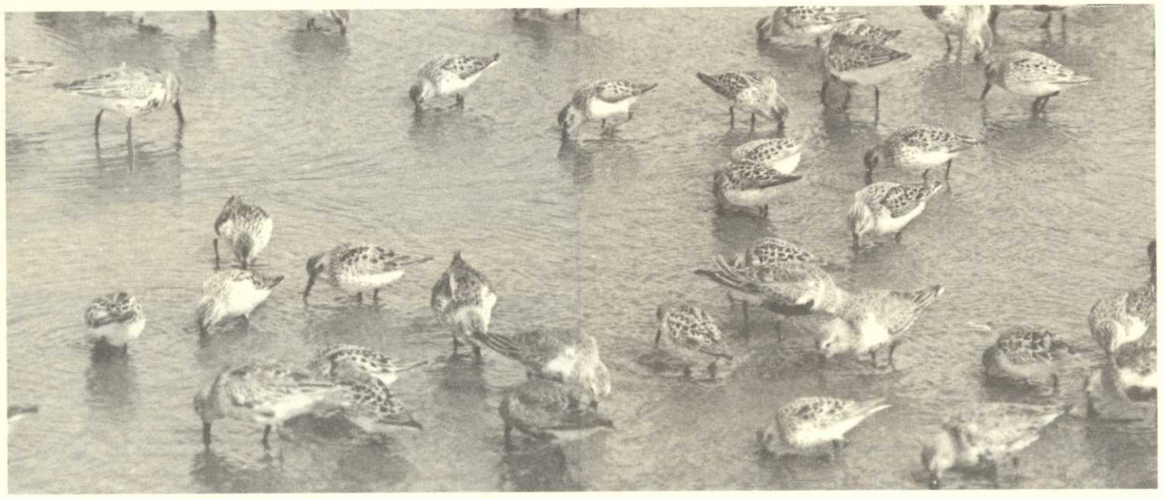
Migration Creates Shorebird Spectacle

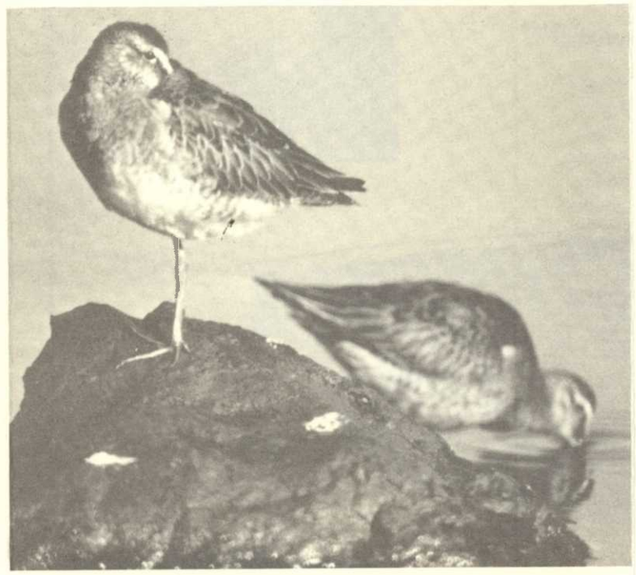
Each spring, over half a million shorebirds, coming from as far south as Argentina, concentrate at the muddy tideflats of Bowerman Basin. This annual event has international significance because these Arctic-bound shorebirds are among the world's greatest migrants, many traveling over 15,000 miles round-trip.

Bowerman Basin Provides Critical Habitat

Although Bowerman Basin occupies only two percent of the intertidal habitat of Grays Harbor, it hosts fifty percent of the shorebirds. A combination of features provides ideal habitat for these birds, who must peck or probe almost continuously to obtain a constant supply of food.

Due to its higher elevation, Bowerman Basin is the last place in Grays Harbor to be flooded at high tide and the first place to be exposed as the tide recedes so the birds have extra feeding time. The mudflats provide an abundance of tiny, shrimp-like animals for food, and surrounding marsh vegetation provides protective cover and roost sites.





Many Species Depend Upon These Mudflats

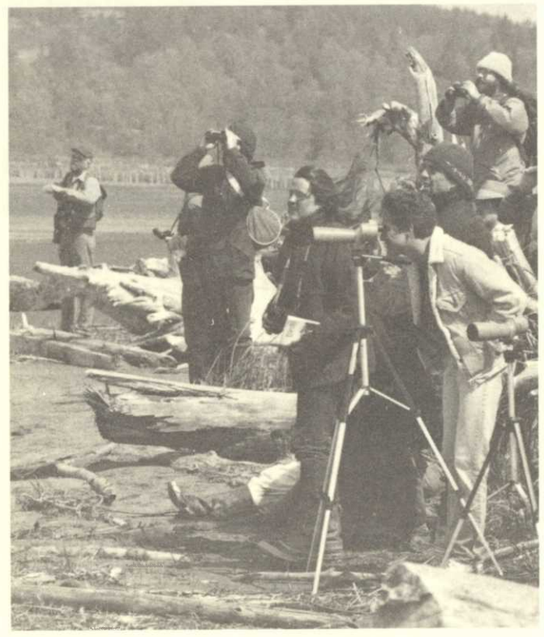
About two dozen species of shorebirds use the Grays Harbor estuary. The five most abundant species are the western sandpiper, dunlin, short-billed and long-billed dowitchers, and red knot. Western sandpipers compose 85 to 90 percent of the shorebirds present in the spring. From June through October the shorebirds return to the estuary on their way south but in lesser concentrations. Thousands of dunlins will stay for the winter.

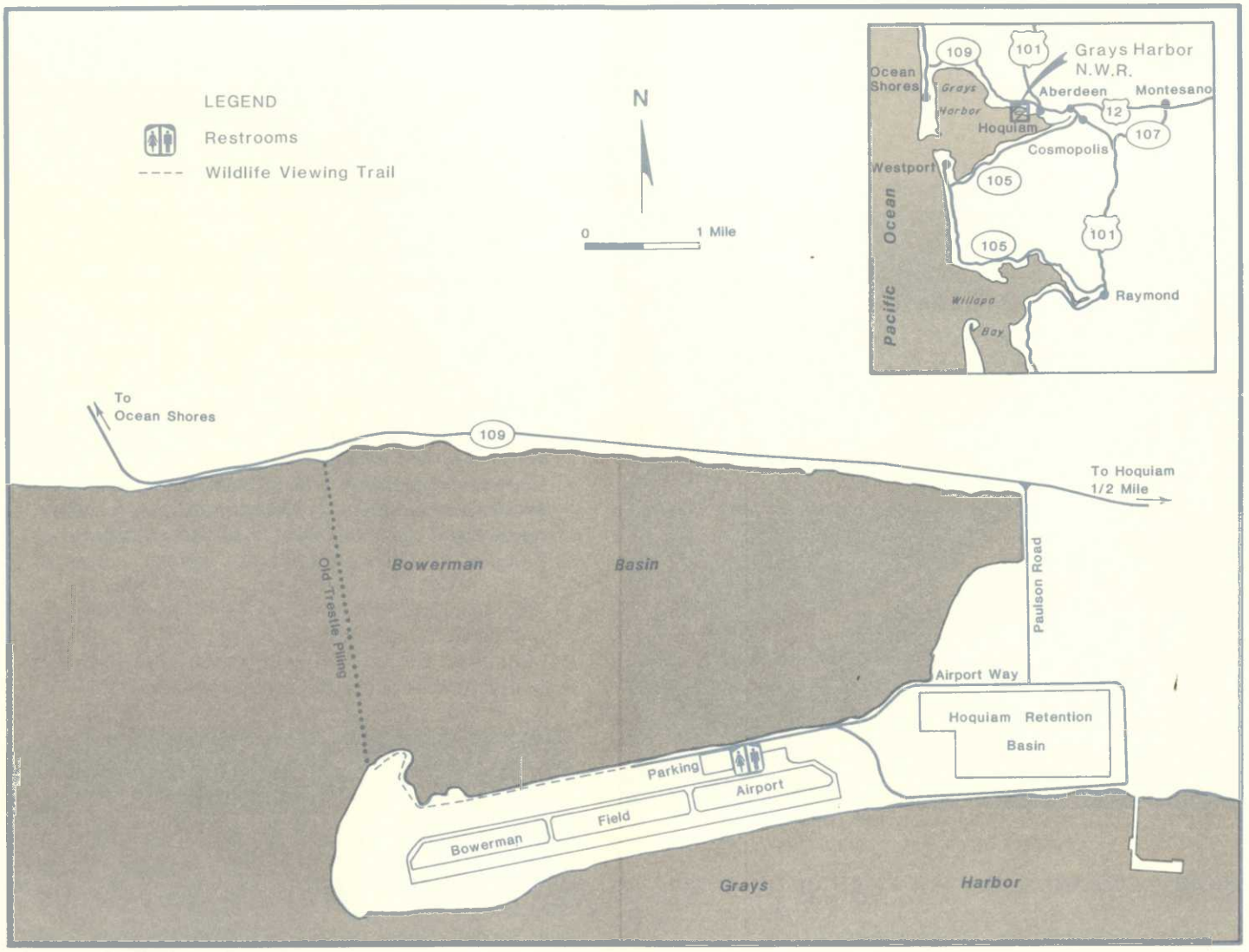
Peregrine falcons, northern harriers, red-tailed hawks, a variety of waterfowl, wading birds, gulls and terns also are present. Black-tailed deer, coyotes, voles, and songbirds use the uplands around Grays Harbor. Salmon, steelhead, flatfish, crabs, clams, shrimp and oysters thrive in the estuary waters.

Tips For Enjoying Wildlife

These tips will help you have a pleasurable and memorable experience while protecting the shorebirds and their habitat.

- Come prepared! Bring rain gear and rubber boots. The trail is wet and muddy in the spring.
- The best viewing times are the hour preceding and the hour after HIGH TIDE. Bring a tidetable or refer to the times listed below.
- Keep a respectful distance from the shorebirds to avoid disturbing them. Every time they fly, they use energy that otherwise could be stored as body fat for the long migration ahead.
- Use binoculars, spotting scopes, and cameras with telephoto lenses to get closer views and photographs.
- Do not trample the marsh.
- Leave pets at home or in your vehicle.





City and Port Cooperate to Provide Wildlife Viewing

Over the years, the City of Hoquiam and the Port of Grays Harbor in cooperation with the Friends of Bowerman Basin, have permitted public access to their lands at Bowerman Basin to view wildlife. The City and the Port are cooperating with the Fish and Wildlife Service for the 1989 spring migration to again provide parking, restrooms and public access for wildlife observation. Wildlife specialists from the Fish and Wildlife Service, Washington Department of Wildlife and cooperating organizations will be on hand to explain about the area and to help identify the wildlife.

Since the refuge is not yet in Fish and Wildlife Service ownership, please respect the current owners' regulations.

Remember:

- stay on the marked "trail"
- avoid wandering onto the airstrip
- park only in the gravel strip parking areas or other designated locations
- use the chemical toilets located near the parking areas.

Brown Farm Dike

Nisqually River Trail runs for 1/2 mile (.8 km) through a riparian woodland. Those able to walk over slightly irregular ground should have little difficulty completing the loop. Look carefully around the symbol markers and you will find the features described in this guide. Come, the trail beckons you to discover

the cool...
damp...
secrets...
of a riparian woodland

Each member of this habitat is adapted to withstand the onslaught of these rapid changes. Some may leap to high ground while others try to retain moisture until the waters return. As you cross the bridge, can you find other ways plants and animals are adapted to life in a riparian woodland?

stinging nettles

Remember how high the water is now and measure it again when you return

Separated from the "man-made" part of the refuge by the Brown Farm Dike, the plants and animals of this forest must be able to survive the whims of the great Nisqually River. Drought or flooding, erosion or choking silt may threaten at any time. Tidal changes in the river and sloughs bring a twice daily wash of salty water, as well as bringing rich life-giving organic matter called detritus.

A brief walk through the forest brings you to a dying slough. Silt and debris carried in by the tides have filled up this channel, creating a fertile soil for growing plants. As more plants grow, more soil is held until the tides can no longer flow through. When the slough fills, the forest will triumph.

red-legged frog

mallard

skunk cabbage

horse-tails

As the slough dies out, you will become surrounded by tall cottonwood trees. No, the wood doesn't look like cotton, but the seeds do. These fast growing trees serve as the high-rise apartments of the forest. The high canopy of leaves provides a safe nesting and perching spot for birds, including red-tailed hawks. Squirrels, songbirds, insects and tree frogs may be seen among the mossy trunks.

hawk nest

black cotton-wood

thimble berry

wild gooseberry

black-berry

snowberry

As you walk beneath the cottonwoods to the river, you will pass many kinds of bushes growing on the forest floor. Many have tasty berries and seeds that are an important source of food for wildlife. How many can you identify along the trail? DO NOT taste any berries unless you are sure what they are.

red-tailed hawk

Battered trees and sandy beaches lead you to the Nisqually River. Rising and falling, soothing and raging, it is the life's blood of the riparian woodland. Strong yet vulnerable, it may bring gifts of fresh water and rich sediments, or succumb to spilled pollutants and the restrictions of upstream dams.

river otter

hooded merganser

golden eye

river otter

The damp bottomland between the river and the next bridge teems with insects. Although some may feed on you, the insects themselves are an important source of food for other forest animals. By feeding on plants, animals, and decaying organic matter, insects convert those materials into an abundant source of protein. Remember, the bug you squash may be someone's lunch!

mosquito larvae

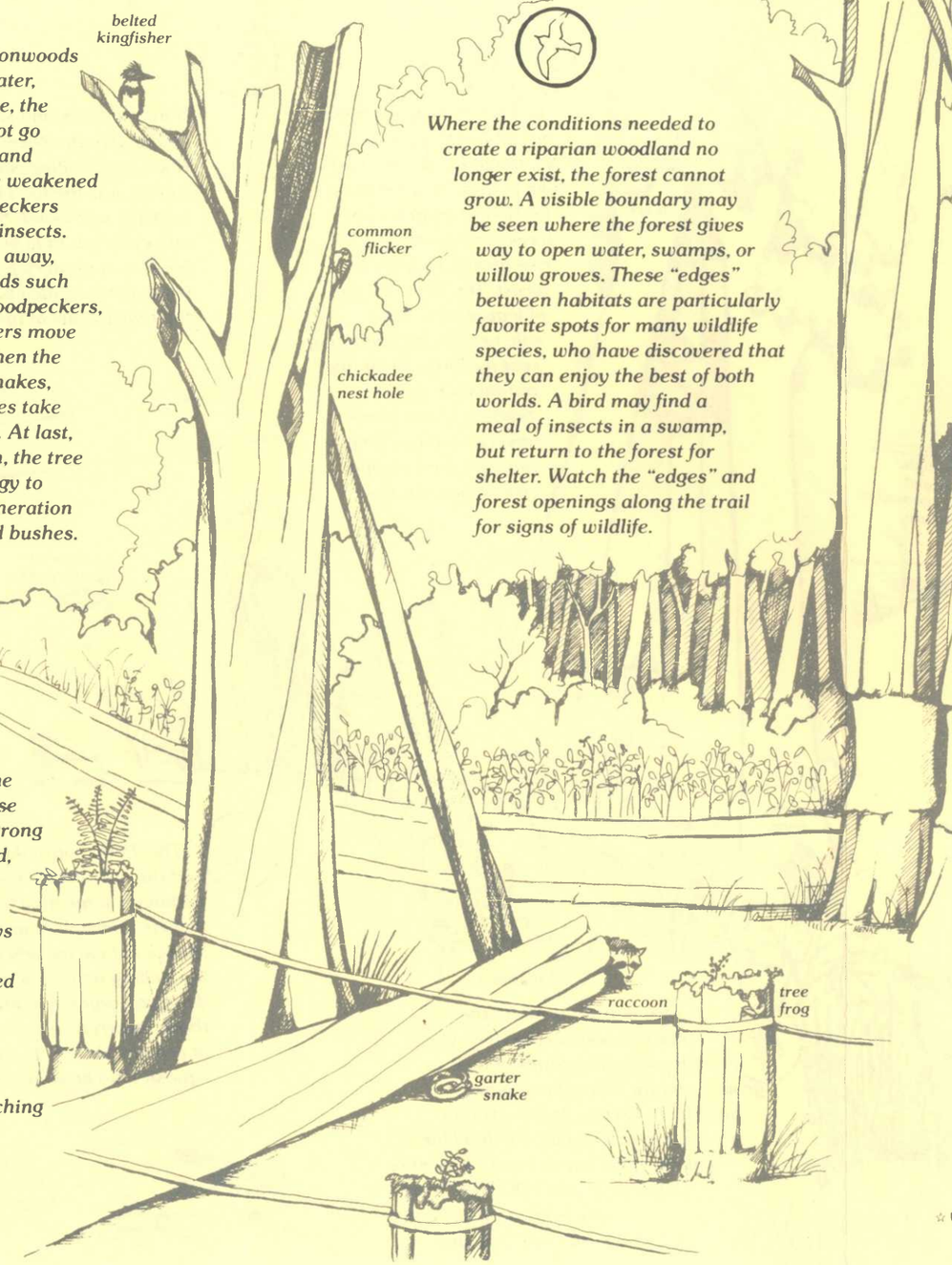
millipede

sow bug

satyr anglewing

When the cottonwoods succumb to water, erosion, or old age, the dying snags do not go to waste. Insects and fungus attack the weakened wood, and woodpeckers drill to reach the insects. As the wood falls away, cavity nesting birds such as chickadees, woodpeckers, and brown creepers move into the holes. When the tree falls, mice, snakes, raccoons, and foxes take their turns inside. At last, devoid of strength, the tree gives its last energy to support a new generation of forest trees and bushes.

Even the works of man fall to the passing of time. These pilings once stood strong when they were used, possibly for logging operations during the Brown Farm days of the early 1900's. Today, with weakened bases and rusting cables, they go the way of the cottonwood snags, feeding the worms and enriching the soil.



Where the conditions needed to create a riparian woodland no longer exist, the forest cannot grow. A visible boundary may be seen where the forest gives way to open water, swamps, or willow groves. These "edges" between habitats are particularly favorite spots for many wildlife species, who have discovered that they can enjoy the best of both worlds. A bird may find a meal of insects in a swamp, but return to the forest for shelter. Watch the "edges" and forest openings along the trail for signs of wildlife.

As you leave, feel free to pause again to feel the currents of this woodland: the ebb and flow of the tides, the growth and death of a tree, the flick of a frog's tongue as it catches a fly. These treasures and more may be found by returning to the forest in different seasons and times of day, and by visiting similar forests growing along the rivers of western Washington.

Don't forget to check the water level in the slough when you re-cross the bridge.

By continuing out the Brown Farm Dike Trail, you may view the grasslands, freshwater marshes, salt marshes, and other habitats of Nisqually National Wildlife Refuge. Enjoy your visit.

Nisqually National Wildlife Refuge
U.S. Fish and Wildlife Service
Department of the Interior

This trail may be flooded during high winter tides. If the water is high during your visit, please visit other parts of the Refuge and return to this trail at a later time.

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