MALHEUR NATIONAL WILDLIFE REFUGE

Burns, Oregon

ANNUAL NARRATIVE REPORT

Calendar Year 1985

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

MALHEUR NATIONAL WILDLIFE REFUGE

Princeton, Oregon

ANNUAL NARRATIVE REPORT

Calendar Year 1985

Refuge Manager — Date 4/21/86 — Refuge Supervisor Review — Date

Regional Office Approval — Date 4/28/86

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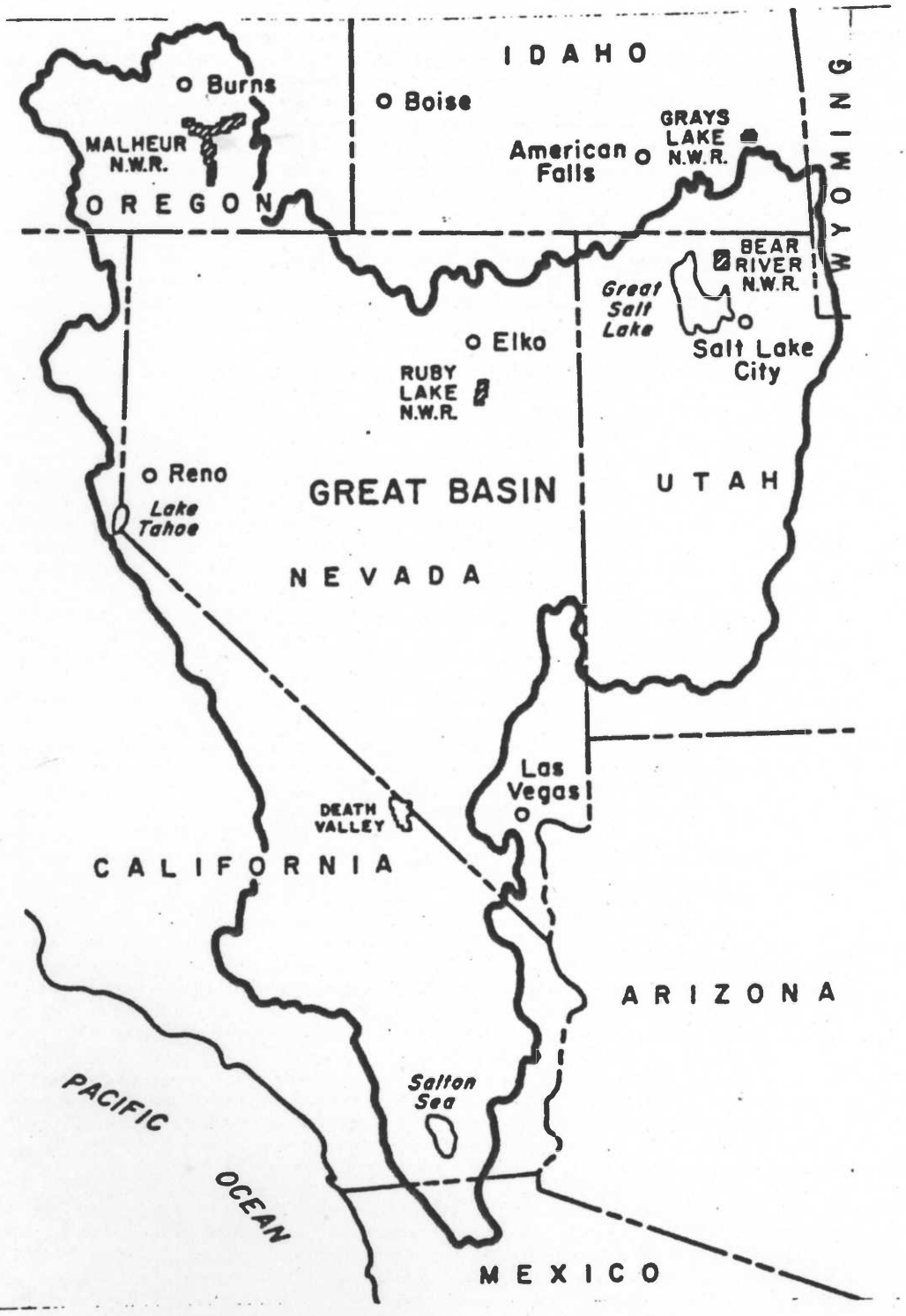
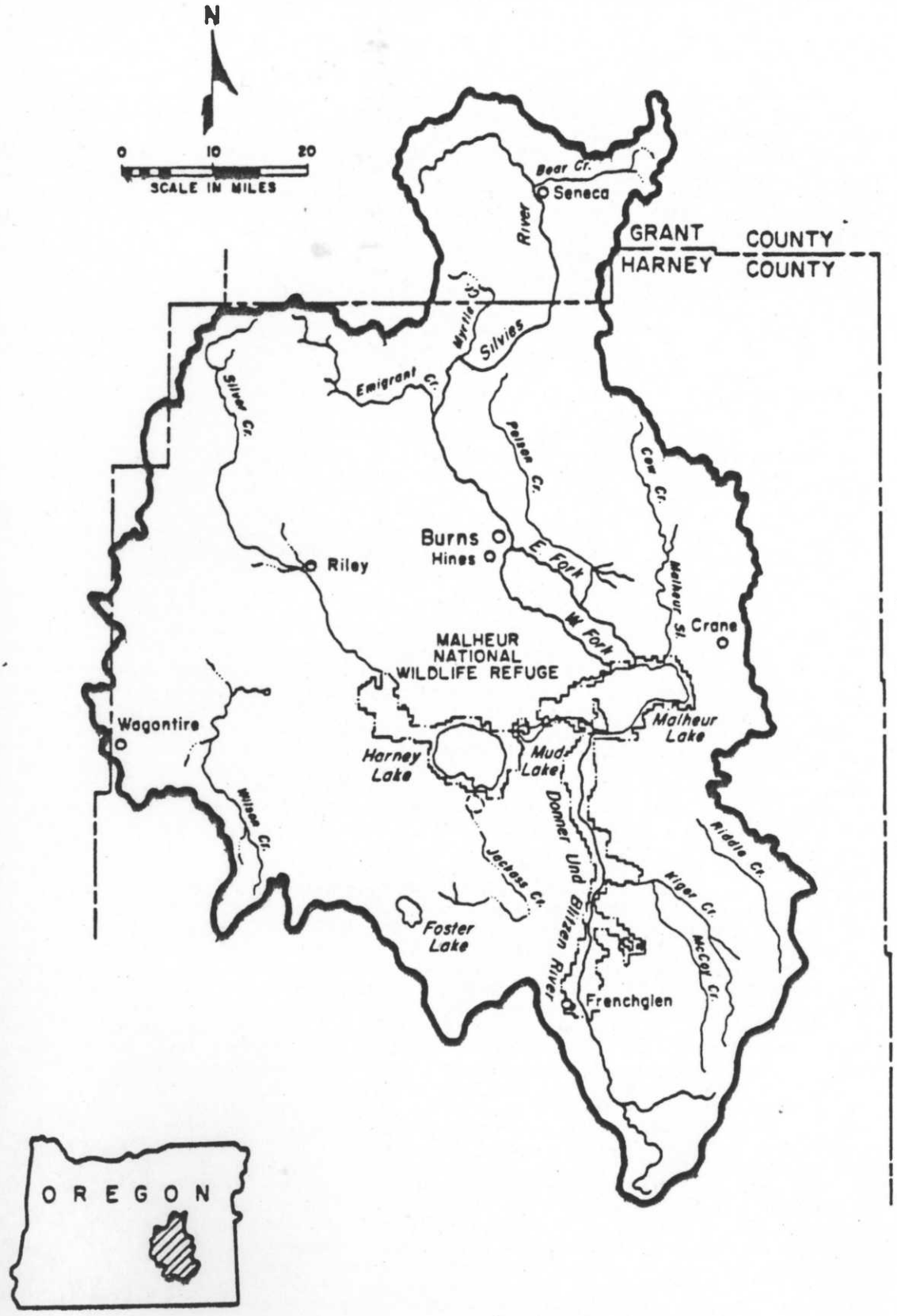
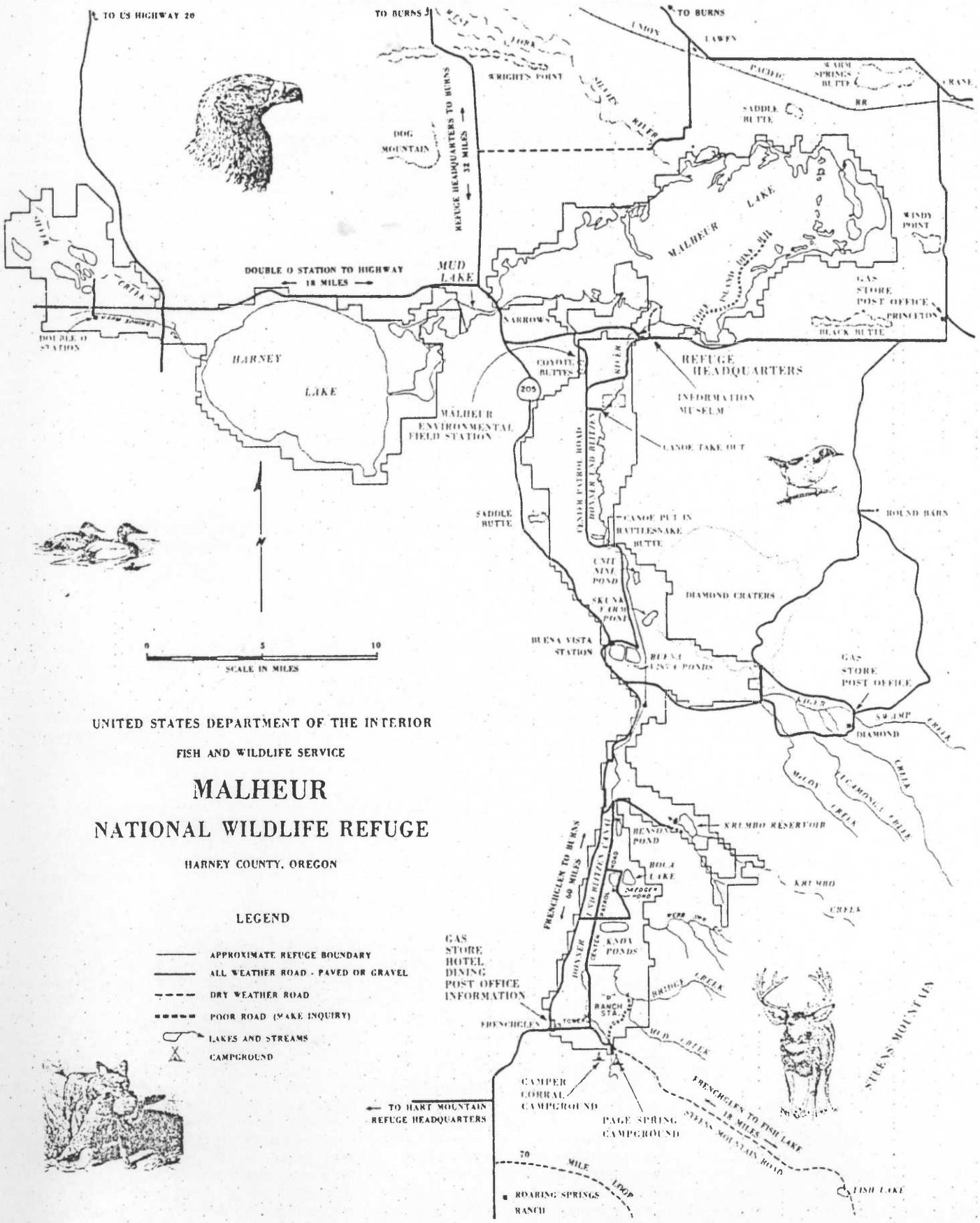


Figure 1. Location of the Malheur NWR in Relation to the Great Basin


N
0
10
20
SCALE IN MILES
Bear Cr.
Seneca
River
GRANT COUNTY
HARNEY COUNTY
Myrtle Cr.
Silvies
Silver Cr.
Emigrant Cr.
Poison Cr.
Cow Cr.
Burns
Hines
Riley
E. Fork
W. Fork
Malheur R.
Crane
MALHEUR
NATIONAL
WILDLIFE REFUGE
Wagontire
Malheur Lake
Harney Lake
Mud Lake
Donner Und
Willow Cr.
Jackass Cr.
Riddle Cr.
Kiger Cr.
McCoy Cr.
Foster Lake
Silvies River
Frenchglen
OREGON



UNITED STATES DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE

MALHEUR

NATIONAL WILDLIFE REFUGE

HARNEY COUNTY, OREGON

LEGEND

- APPROXIMATE REFUGE BOUNDARY
- ALL WEATHER ROAD - PAVED OR GRAVEL
- DRY WEATHER ROAD
- POOR ROAD (MAKE INQUIRY)
- LAKES AND STREAMS
- CAMPGROUND

A. Highlights

A summary of significant events recorded in 1985 follows:

The flooding issue consumed many staff hours - see Section A.

Malheur Lake reached a new peak elevation - see Section B.

Predator control was nearly approved through channels by the year's end - see Section D-3.

The Habitat Management Specialist position became a reality - see Section E-1.

A 6,000 acre prescribed burn was completed in Unit 8 - see Section F-9.

Pelicans nested on an island in Malheur Lake for the first time since 1960 - see Section G-4.

Houses were moved to higher ground out of the way of Malheur Lake - see Section I.

UPDATED REPORT ON THE IMPACTS OF FLOODING ON MALHEUR NWR AND HARNEY COUNTY, OREGON

The 1984 Narrative Report contains a good summary of flooding impacts. This report summarizes the flood related activities and actions that have taken place during 1985.

On January 14-18 the Service hosted a facilitated modeling workshop in Bend, Oregon. We utilized the services of the Western Energy and Land Use Team (WELUT) to facilitate the workshop and build a computer model. County, State, and Federal Agencies involved in the issue attended and provided expertise in hydrology, habitat, and wildlife. The computer model could be used to roughly evaluate the impacts of different alternatives for reducing the impact of flooding against the no action alternative. The knowledge gained from group discussions on the issue and developing the model was as important as the model itself. All agreed to meet later in the year to refine the model.

On March 28 the Oregon State University Department of Soil and Wildlife and Water Resources Research Institute held a one day workshop to identify data groups and research needs and concerns relating to the Corps of Engineers (COE) proposed Virginia Valley Canal Alternative and its impacts on the Malheur River System. A wide variety of University, Environmentalist, USFWS, and Oregon Department of Fish and Wildlife (ODFW) personnel participated in this excercise.

During the spring the Refuge, ODFW, Portland Office of Ecological Services (ES) and the FWS prepared a Planning Aid Letter (PAL) on the impacts of the various structural and non-structural alternatives. The PAL was submitted to the COE on April 10. The feasibility study was designed to be a broad brush review of known data and a sorting out of possible alternatives. The PAL focused on fish and wildlife present prior and following the flooding. During the feasibility study phase of a project the Service did not take a position for or against an alternative but outlined impacts and conditions or concerns that would have to be addressed if the COE determined it had the authority to act and if an alternative(s) was found that had a positive benefit: cost ratio.

FWS comments on all structural alternatives addressed four principal concerns:

1. To avoid detrimental impacts on wildlife resources, regulation of lake levels would have to allow or duplicate natural water cycles.

a. Allow historic drought/wet cycles in the marsh that recycle nutrients, aerate soils, and set back plant succession.

b. Maintain water levels during the nesting season to protect nests and broods.

c. Provide gradual declines of water that would produce mudflats required by shorebirds, particularly in the late summer and early fall.

d. Prevent winter declines that expose muskrat houses and cause mortalities of muskrats, thereby impacting Canada goose production.

While there was insufficient information to determine project impacts on the Malheur River, we expressed our concerns on the impacts of introducing carp into a high quality cold water fishery, stream channel and bank erosion, etc. The FWS position was that extensive studies were needed to quantify impacts and potential mitigation.

The WELUT workshop results were included in the PAL to outline potential impacts to wetland habitats and wildlife resulting from alternatives under study by the COE.

During May, 1985 the COE released its preliminary reconnaissance report on its Malheur Lake studies. It evaluated nine alternative solutions to reduce the impacts of flooding.

		Construction Cost
1.	Virginia Valley Canal (500 & 1000 CFS)	$38-45M
2.	Virginia Valley Canal with a pumping plant	$47M
3.	Crane Creek Canal and Tunnel	$54-58M
4.	Owyhee Basin Canal and Tunnel	$345M
5.	Alvord Desert Canal and Tunnel	$264M
6.	Silvies Canyon Reservoir	$147M
7.	Donner und Blitzen Diversion to Catlow Valley	$115M
8.	Allow Malheur Lake to rise	$7-38M
9.	Private land exchange	$15M

The Preliminary Reconnaissance Report (PRR) determined flood related impacts to total $13,513,000.

During the reconnaissance study the COE had studied the economic benefits of passing the flood water thru 1,000 CFS Virginia Valley Canal down the Malheur River and past the three private and eight federal existing hydropower plants on the Snake and Columbia River. The value of the hydropower generated over the 50 year life of the project amounted to an annual benefit of $4,332,000. Taking this

into consideration the 1,000 CFS Virginia Valley Canal has a Benefit: Cost Ratio of 1.5:1.0. The report concluded that sufficient evidence existed to recommend to Congress that the Virginia Valley Canal had sufficient economic viability that a full feasibility study be conducted.

This information was presented to Refuge and ES personnel in Walla Walla on May 6 with the additional facts that caused us even greater alarm. Manager Constantino's report of the meeting follows.

ISSUE PAPER - COE MAY 1985
PRELIMINARY RECONNAISSANCE REPORT
MALHEUR LAKE, OREGON, UPPER SNAKE RIVER TRIBUTARIES

On May 6, 1985, ODFW (Sayre, Faast) and FWS (Peterson, Vorderstrasse, Constantino, Paullin) met with COE Walla Walla District Personnel to discuss the contents of the above report. Of immediate concern was the selection by the COE of a preferred alternative for solving the flooding in Harney County that had not been proposed, reviewed, nor commented on by affected agencies during the Recon study period.

We were also asked to attend a June 11 meeting in Burns, Oregon (Judge White's office) where the COE-WW hopes to discuss with affected agencies the operational criteria for the preferred alternative.

The Preferred Alternative contained the following elements.

1. Construction of a 17 mile canal from Malheur Lake to the South Fork of the Malheur River thru the Virginia Valley.

   - The canal would start 1/2 to 1 1/4 mile within Unit 6, Malheur Lake, Malheur NWR

   - The bottom elevation of the canal is proposed at 4081 MSL or 8' below the bottom of the lake bed.

   - The canal would be designed with the capability to carry 1,000 CFS out of the marsh whenever lake elevations exceeded 4093.0 MSL.

   - A simple stoplog structure would be installed to control outflow.

2. The canal would be operated to remove any water out of the marsh whenever the lake exceeded 4093.0 MSL, except for April thru June when the Malheur River system is too full to carry additional water.

3. Utilizing HWY 205 and a proposed structure at the Narrows, Harney and Mud Lakes would be permanently separated from Malheur Lake. No water would be allowed to flow between the two systems. This is to prevent the waters of Harney-Mud Lakes, which are of poor quality, from mixing with and contaminating Malheur Lake prior to its passage to the high value agricultural lands of Malheur County in the vicinity of Vale - Ontario.

4. The majority of project benefits would be derived from operating Malheur Lake as a reservoir for hydropower production as the water would pass thru three private and eight federal existing hydropower plants in the Snake and Columbia Rivers. By doing this the COE projects a project benefit-to-cost ratio of 1.5.

5. The preferred alternative would completely destroy and prevent the reestablishment of the fishery and riparian habitats of the Malheur River System.

6. The entire project schedule, especially the feasibility study period, was greatly compressed due to the COE's desire to begin construction by mid FY-87.

The ODFW and FWS were asked to perform the Fish & Wildlife Report studies & evaluation, and submit the draft report on 10/1/85 and the final report by 1/1/86.

There was not enough time to do field work, fine-tune and use the WELUT Water-Vegetation-Wildlife Model, or perform other tasks vital to this study.

PRELIMINARY EVALUATION OF PREFERRED ALTERNATIVE & COMPRESSED PROJECT SCHEDULE

1. While the Service has stated previously that it would be desirable to lower the present lake level, the project presently being considered appears to threaten the future viability of the Malheur-Mud-Harney Lake system.

   - The construction of a canal within the refuge with the ability to completely dewater the entire system, or act as a subsurface drain is of extreme concern for both its impact to refuge resources and the threat that it could be used after construction to serve other purposes that would further conflict with refuge objectives and operations.

- The proposal to operate the Malheur Marsh as a hydro reservoir runs in complete opposition to Malheur NWR Master Plan objectives and strategies, the Compatability Test mandated by the NWR Administrative Act, and our responsibilities under the Migratory Bird Treaty Act.

- Diversion of water out of the Malheur-Mud-Harney Lake system conflicts and possibly threatens refuge water rights critical to the maintenance of the wetlands of this important regional resource.

- It is extremely premature to discuss operational criteria for the preferred alternative when we have so many concerns and serious conflicts between the proposal and wildlife resources.

2. The proposed feasibility study time table is too short to allow for adequate analysis of the project or development of acceptable modifications or alternatives to the preferred alternative.

RECOMMENDED ACTION

1. The USFWS & ODFW must quickly select a course of action for dealing with this issue. Our position and course of action must be well thought out and be easily understood by the COE, elected officials, and concerned citizens. We recommend:

   A. Advise the COE, etc. that the following elements of the preferred alternatives are incompatible with the primary purposes of the Malheur NWR.

      - The extension of the canal onto the Refuge (loss of wetlands,subsurface drainage, impact of structure on nesting, brooding, & wintering migratory birds).

      - Water must be allowed to flow unimpeded from Malheur Lake into the Mud-Harney Lake system once the initial draw down is completed (to protect & maintain the wetlands of Mud Lake).

      - The canal must be redesigned so that operations do not divert water out of the Harney Basin below an elevation somewhere between 4095-97' MSL (to protect wetlands established during historic "1900-80" water regimes).

      - Both established & non-established refuge water rights for the Malheur-Mud-Harney Lake system must not be compromised by the diversion of

water out of the Harney Basin (to protect water rights necessary to the maintenance of refuge wetlands).

- Operation of the Malheur Marsh as a hydropower reservoir would have serious impacts to the wetland and migratory bird resources, both on and off the refuge, and may prove to be an unacceptable proposal to us.

B. Advise the COE that to do the minimum required for an adequate Fish & Wildlife Coordination Act Report during the Feasibility Study the following time table is required:

- October 1 - Provide COE with a Planning Aid Letter which addresses F&W concerns related to the new, selected alternative described in the Corps Reconnaissance Report. A Draft Coordination Act Report can not be provided by October 1, as has been verbally suggested by the Corps.

- Develop better information for hydrology, vegetation, and wildlife submodels for the Malheur/Harney simulation model. Joint effort of ES, Malheur NWR, and WELUT to be coordinated with involved agencies and completed during period July-September.

- Plan for final Malheur/Harney modeling workshop to be held in mid-to late September.

- Conduct Malheur River instream flow analysis. to be completed by early November. (Field work may be done by ODFW or contractor).

- Evaluate impacts of altered flows on riparian and other wildlife habitats of Malheur River by early November.

- Assess impacts of canal construction of wildlife habitat with special emphasis on deer and antelope movement.

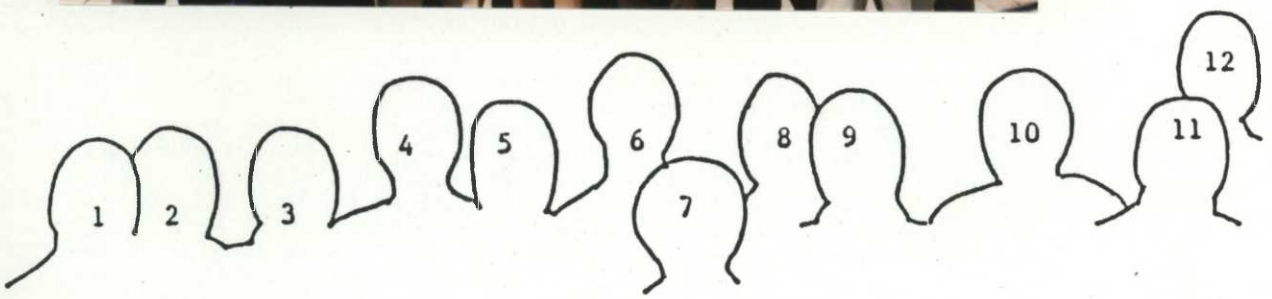
- Draft CAR- Dec. 1 (COE Draft Feasibility Report due Jan.1).

- Final CAR- Mar. 1 (COE Final Feasibility Report due end of March).

Brigadier General George R. Robertson, Division Engineer North Pacific Division, COE was interviewed on Portland TV evening news in mid-May and proclaimed the COE had found the acceptable solution to the Malheur Lake flooding and that Congress had authorized the COE to proceed with the Feasibility Study. If things went well the General said, the COE would have the canal in place in 1987 and the lake lowered to normal levels within three years.

Harney County officials and citizens were elated. The environmental community and most of the major newspapers in Oregon however questioned the wisdom of operating Malheur Lake for hydropower. The COE came under heavy attack for the findings and recommendations contained in the Preliminary Reconnaissance Report.

General Robertson and Colonel Royce, Walla Walla District Engineer had just recently transferred into their positions and were relatively new to the Malheur flooding issue. Regional Director Myshak first met with the General to outline our concerns with the Preliminary Reconnaissance Report. During the meeting RD Myshak invited both the General and Colonel Royce and their staff to tour the Refuge and flooded areas with the Regional Director and discuss the issue in greater detail. The General accepted the invitation and the tour took place August 15-16, 1985.



1. Dale White, Harney County Judge
2. Richard Myshak, Regional Director, Region 1
3. Larry DeBates, Assistant Regional Director, Wildlife Resources
4. George Constantino, Refuge Manager, Malheur NWR
5. David Riley, Assistant Regional Director, Habitat Resources
6. Russ Peterson, Field Supervisor, Portland Field Office, Habitat Resources
7. Arlene Miller, Secretary, Malheur NWR
8. Colonel James Royce, District Engineer, Walla Walla District
9. Vic Armacost, Chief Planning Division, Walla Walla District
10. General George Robertson, Division Engineer, Pacific NW Division
11. Ed Mains, Chief Environmental Resources Branch, Pacific NW Division
12. David Paullin, Wildlife Biologist, Malheur NWR

This meeting proved to be a key point in the issue. In summary, the General stated he and Colonel Royce had reconsidered the Preliminary Reconnaissance Report content and would direct the Walla Walla District Staff doing the Feasibility Study that the hydropower generation objective was to be considered only after assuring that the Refuge and its wildlife resources would not be jeopordized or significantly impacted; and the time schedule for the completion of the Feasibility Report would be lengthened to allow the FWS and ODFW to do an adequate evaluation.

Colonel Royce stated that the final Reconnaissance Report would be issued in late August. He would welcome a revised PAL that addressed only items or proposed actions contained in the Reconnaissance Report that had not been included in the original PAL study. The revised PAL was submitted in late August. It included the following table outlining the FWS's minimum criteria for the design and operation of the Virginia Valley Canal.

Action	Function
1. Limit discharge to water above 4,095'	Protect wildlife/recreation values and natural lake characteristics. Allow treatment and restoration of Malheur R. fishery between extended periods of canal use.
2. Meet refuge water rights from Blitzen to Malheur and Mud Lakes before diverting as follows:	Maintain water rights and source of water needed in managing Malheur and Mud Lake wetlands.

1/01	- 3/14:	200 cfs,	36,000 ac. ft.
3/15	- 6/15:	284+ cfs,	51,268 ac. ft.
6/16	- 9/30:	242+ cfs,	43,627 ac. ft.
10/01	- 12/31:	200 cfs,	36,000 ac. ft.
			166,895

3. Build canal off refuge.	Actions 3 and 4 limit potential conflict with NWR Admin. Act, and potential for future threat through expanded use of canal.
4. Limit canal bottom depth to 4,093'.	
5. Allow water to flow unconstrained into Mud and Harney Lakes (would not affect plans to prevent Harney water from entering Malheur during discharge periods).	Maintain wildlife and natural wetland characteristics. Maintain Research Natural Area values and wilderness characteristics of Harney Lake.

	Maintain Refuge water rights needed to manage Mud Lake wetlands.
6. Limit canal discharge to maximum of 500 cfs.	Minimize effect of canal on natural lake level fluctuations.
7. Limit canal discharge so total Malheur River flow does not exceed 1,000 cfs.	Minimize erosion/sedimentation problems in Malheur River.
8. Implement habitat restoration projects.	Offset any unmitigated impacts to fish and wildlife resources of the Malheur-Harney Lakes Basin and Malheur River System.
9. Limit canal discharge period to October - December.	Limit introduction of high water temperatures to Malheur River.
	Limit interference with natural fluctuation of Malheur Lake during nesting and brooding season.

The Final Reconnaissance Report was issued in late August. It was clearer and more specific but still concluded that the Virginia Valley Canal had a 1.5:1.0 benefit ratio, and recommended that a Feasibility Study be initiated. It did specify a structure to be placed at the Narrows to allow water to flow from Malheur to Mud and Harney Lake but left mute the proposal to place the outtake structure within the refuge.

During the fall we attended a number of meetings to exchange information, reset deadlines, refine the WELUT model, etc. By the end of the year the time schedule was changed to require a FWS Coordination Act Report (CAR) in draft by March 1, 1986 and final on April 1, 1986. The draft CAR Report is due May 1 and the final in June, 1986.

In November Congressman Robert Smith was successful in inserting a $15M authorization for actions necessary to resolve the impacts of flooding in Harney County in the 1985 Omnibus Water Bill that was passed and signed by the President. Appropriation would hinge on the COE's Feasibility Study and final approval and direction by Congress.

Congressman Smith's actions caused the Oregon State Legislature concern as it came unexpected and without any formal/finalized report to justify the proposal. They felt the action may have pre-empted the State's right to determine what should be done with the issue. The Legis-

lature's Joint Committee on Water Policy held two fact finding hearings on the flooding issues. During the fact hearing Refuge Biologist David Paullin was questioned concerning the impacts of flooding and alternatives under study. During the second hearing Colonel Royce provided information on what the COE's study had developed and how the Colonel saw the final recommendations may turn out.

One final note, the COE's new regulations require local/state agencies to fund 25% of the construction and operation costs of any project the COE undertakes unless it is wholly of benefit to the Nation. Harney County had to sign a written agreement to cost share the construction and operating costs of any project before the COE could undertake the Reconnaissance Study. They signed under protest stating they had no other choice. The County had also received a promise from Senator Mark Hatfield that he would protect the County from ever having to cost share the project.

Based on the Colonels statements, the COE is concentrating its studies on a preferred alternative that includes the following:

1. A 300-500 CFS Virginia Valley Canal that would utilize pumps and a highline canal to lower the lake to 4095' MSL.

   - All structures would be off Refuge.

   - There would be no structure with the capability to lower the lake level below 4095 feet MSL.

   - A structure would be installed at the Narrows to prevent Harney Lake from flowing into Malheur Lake (due to water quality problems in Harney Lake) but unrestricted flows would be allowed from Malheur into Mud and Harney Lakes.

   - Downstream water quality and flood control concerns by farmers in Ontario and Vale may limit canal operations to October thru March.

   - The FWS is developing recommendations for canal operation based on fish and wildlife concerns that would allow natural water regimes to occur April thru September.

2. Purchase flooded private land between 4095' MSL and the Refuge boundary (to be added to the Refuge).

What the final recommendations will be and if a positive cost benefit will be achieved is uncertain at this time.

The preliminary WELUT model results predict that under the

"No Action" alternative it might be decades before the famous Malheur Marsh would re-evolve to its historic vegetative composition and diversity. (Primarily a function of the fact that bulrush requires mudflats for germination and not vegetative reproduction). Until the lake experiences a significant dewatering we will be left with large areas of open water or at best a donut of emergent vegetation around the shore of the lake.

Our overall objective is to protect the integrity of Malheur Lake. The primary thought of our actions in this issue is to support non-structural solutions. If a structural solution proves feasible, our comments will be directed towards conditions that minimize changes to the natural hydrological patterns.

During the next few months we will be carefully evaluating the available information and assisting ES in the preparing of Coordination Act Report.

B. Climatic Conditions

A record peak water level occurred in Malheur-Mud-Harney Lake again this year. The new peak level was recorded on April 23 at 4102.68 feet mean sea level. The demands placed on refuge personnel by these high water levels again dominated the refuge operation. Houses had to be moved and the storage yard was flooded. Data demands by various agencies and the general public were enormous.

A strong north wind pushed the foot-thick ice up on the south shore of Malheur Lake in mid-March. The force of this ice sheared off buildings, powerlines, fences, the headquarters photo blind, the Benson Boat Landing trees and road edges. The Harney Lake sand dune formation is now just a remnant of its former size as wave action from the high water continues to "melt" it away. Pelican Island in Malheur Lake is also severely eroded on the west face.

Table 1 documents water elevation changes during the recent flood. The dry summer allowed for increased evaporation this year. Water levels were more stable during the nesting period this year which contributed to the first white pelicans nesting on the refuge since 1960.

Table 1. Malheur Lake elevation data, Malheur National Wildlife Refuge, Oregon, 1985.

MALHEUR LAKE ELEVATIONS FOR THE LAST FOUR YEARS (FEET MSL):

1981	Peak	June 9	4094.45
	Low	Sept. 25	4092.70
1982	Peak	June 1	4095.85
	Low	Oct. 25	4093.47
1983	Peak	June 30	4098.80
	Low	Nov. 1	4097.80
1984	Peak	June 25	4102.42
	Low	Oct. 9	4101.38
1985	Peak	April 23	4102.68
	Low	Oct. 31	4100.62

MALHEUR LAKE ELEVATION CHANGES

Month	Rise/Decline (in feet) 1982-3	1983-4	1984-5
Nov. - Jan.	+ 1.69	+ .96	+ .38
Feb.	+ .08	+ .12	+ .16
Mar.	+ .60	+ .45	+ .20
Apr.	+ 1.18	+ 1.47	+ .50
May	+ 1.04	+ 1.02	- .43
June	+ .74	+ .60	- .38
July	- .02	- .16	- .49
Aug.	- .32	- .42	- .52
Sept.	- .32	- .30	- .12
Oct.	- .24	- .16	- .12

1985 brought average spring runoff (see Table II.) and an extremely dry summer-fall. The winter started out snowy and very cold. The low temperature for the year was recorded on February 4 (-16 degrees F). July 7 brought 94 degrees F for the year's high. Precipitation totaled 6.15 inches. Only 1949 and 1959 were drier since weather records were initiated in 1938. Precipitation has averaged 9.41 inches annually during the past 48 years.

A chronological summary of 1985's weather follows. January started with several days of persistent, heavy fog. There were two to three inches of snow on the ground and low temperatures were in the teens. January's total precipitation of .07 inches was the lowest ever recorded. The low temperature for February (-16 degrees F) tied the low record set in 1956. February brought a transition to spring temperatures at mid-month. Thirteen inches of ice on Malheur Lake began to push up on road edges, causing severe damage to State Highway 205 and Sodhouse Lane, a paved county road.

Tremendous ice pile-ups such as this one along Sodhouse Lane abruptly changed the face of the south shore of Malheur Lake. Photo was taken to the east of the Field Station entrance off of Sodhouse Lane.
March GMC

March started a warm, dry trend which lasted through October. Total precipitation for March was .08 inches, the lowest ever for this month. Ice left Malheur Lake on March 22 for the latest record in history. Ice sheared off major powerlines across the Narrows between Harney and Malheur Lake and leveled buildings, trees and fences along the south shore of Malheur Lake.

April continued warm and dry. Runoff from the Silvies was not sufficient to flood private lands around Burns and most of the waterfowl migration passed over unnoticed. Malheur Lake reached its peak early - 4102.68 feet MSL on April 23. May brought more warm, dry weather and evaporation started to lower lake levels. The last killing frost occurred on May 6. June brought more warm, dry weather which caused a shortage of water for irrigation in the Blitzen Valley. The last light frost was observed on June 2 as the temperature dipped to 32 degrees F. July's high temperature of 94 degrees F was the high for the year.

August and September continued warm and dry, although temperatures remained below 90 degrees F. The mercury dipped to 26 degrees F on September 29 for the first hard frost of the fall. October continued warm with high temperatures in the 60 degree F range and a high of 77 degrees F on the first of the month.

The warm, dry spell ended abruptly in mid-November as snow and below zero (degrees F) temperatures blew in. Malheur Lake froze over on November 9 due to frequent snows and cold temperatures. Most Canada geese and mallards were forced out of the Harney Basin as snow covered their feeding areas in mid-November. Their roosting areas then froze over as extremely cold weather persisted. December brought 25 days with lows below zero (degrees F). One to two feet of snow and these severe temperatures made life difficult for resident game species. Mountain snows were near normal at year's end. This fact plus good evaporation during the past summer gives some hope of eventually returning to more "normal" water levels in the lake system.

Table II. HARNEY BASIN FLOW RECORDS IN ACRE-FEET.

Year	Silvies	Blitzen	Silver Creek	Total	% of Normal
1976	114,300	89,750	26,750	230,800	97
1977	19,260	46,480	16,610	82,350	35
1978	145,200	116,200	51,360	312,660	131
1979	205,000	117,500	43,550	366,050	154
1980	148,700	114,000	35,260	297,960	125
1981	75,000	57,500	17,780	150,280	63
1982	293,000	122,900	79,000	494,900	208
1983	428,500	177,000	80,000(est.)	685,500	288
1984	408,500	198,200	76,300(est.)	683,000	287
1985	143,900	95,020	*	*	*
Average				237,960	100

* Unavailable at time of writting, but total flow was estimated at 270,000 acre-feet which equals 114 percent of normal.

C. Land Acquisition

3. Other

Regional Surveyors completed 80% of the necessary boundary surveys on the Dunn Land Exchange. Early snowfall in November brought this effort to a halt.

The Surveyors are scheduled to return in the Spring of 1986. When this is done Mr. Dunn will fence the new boundary and we will be finished with this project. The Dunn Land Exchange gave Mud Lake to FWS for refuge lands in Diamond Valley.

Constantino met several times and joined two tours with BLM District Personnel to review the land exchanges proposed in the Refuge Land Protection Plan. The lands in question are primarily boundary exchanges that would benefit both agencies. By the end of the year there was considerable agreement on what should be exchanged. The untimely transfer of the BLM Realty Officer to the USFWS-Alaska in October brought this project to a temporary halt. We hope to get this effort back on track in 1986.

D. Planning

1. Master Plan

The Master Plan was approved by the Regional Director on September 10, 1985. We received it back from the printers in early December. A large list of agencies, citizens and organizations were notified in writing of its availability in mid-December. After ten years of work, we are extremely happy to have the document finished.

3. Public Participation

A major public concensus building project was mounted on behalf of the Draft Environmental Assessment on the Alternatives for Enhancing Greater Sandhill Crane Production. It was difficult for many citizens to believe that predator control was needed to reach our greater sandhill crane production objectives. After receiving considerable criticism and challenge on the first draft of the EA we realized that everything from our data to creditability as professionals was being questioned.

We knew there must be a better way to approach the problem so we reviewed the literature on public involvement, talked to other agencies who had successful public involvement processes, and consulted with regional personnel for suggestions.

Our approach to building public confidence and reaching concensus was to convince citizens that we did in fact have a problem worth solving, and that we were searching and selecting alternative actions in a reasonable way. Every effort was made to:

1. Be honest with ourselves and the public.

2. Truely listen to their thoughts and concerns on the issue.

3. Involve the public in the decision making process (public workshop), and incorporate their suggestions into the EA.

4. Write a thorough EA that tried to address what was developed in step #3.

Everything we did in our public involvement process was built upon these four steps. The results were gratifying. We not only were able to gain approval for actions that we thought would work, but we also gained creditability with a wide variety of citizens and special interest groups. A copy of the Executive Summary of the EA is attached to the back of this report to give the reader a summary of what is contained in the approved EA/Plan.

A public workshop was held to discuss greater sandhill crane management problems. The resulting predator control plan was later met with little opposition.
May DGP

The Annual Permittee Meeting was held in May. The Refuge Staff reviewed the new Habitat Management Program, our intention to closely monitor permit compliance, and discussed our participation in the Emergency Forage Program.

A major point of discussion was the proposed new hay and grazing rate. The permittees were very concerned about the proposed increase in the AUM rate from $3.70 to $5.43. They raised good questions on the rate evaluation process and the way the rate was adjusted for the difference in forage quality between private ranches used for comparison and the Refuge. We agreed to reconsider the proposed rate increase and eventually recomputed the rate at $4.33/AUM.

An especially productive meeting was held with Chapter Leaders from Audubon Groups in Oregon. As a result the Portland Audubon Chapter took the lead in the Audubon "Adopt-A-Refuge" Program for Malheur and has worked hard to find qualified volunteers to staff our HQ Visitor Contact Station and organize work parties to improve the Refuge. 1986 will be the year this effort should bear fruit.

4. Compliance with Environmental and Cultural Resource Mandates

The Malheur NWR Master Plan/Environmental Assessment was completed this year.

The EA/Plan on Alternatives for Enhancing the Production of Greater Sandhill Cranes was approved in mid December by the Regional Director.

The following archeological investigations were undertaken or completed this year:

Malheur NWR Headquarters Site

35 HA 403 National Register

$4,000 for testing areas proposed for housing, roads, and equipment storage areas.

Heritage Research Associates

"Archeological Testing in the Southeast Area of the Headquarters Site, Malheur NWR, Harney County, Oregon", by Rick Minor and Ruth L. Greenspan.

Heritage Research Associates Report No. 36.

Headquarters Sewer Project

Dr. Mel Aikens, University of Oregon

$4,325 for spot screen testing of construction spoil and handling of any cultural resources unearthed during the project.

35 HA 403 Malheur NWR Headquarters Site

Dr. Aiken's report is pending.

Former report:

"Archeological testing in the Southeast Area of the Headquarters Site, Malheur NWR, Harney County, Oregon", by Rick Minor and Ruth L. Greenspan.

Heritage Research Associates Report No. 36.

Harney-Winnemucca 115 Kv Powerline Project (relocation)

Dr. Jerry R. Galm, Principal Investigator, Eastern Washington University, Cheney, Washington, 99004

Bonneville Power Administration and USFWS joint project to relocate a powerline across the Narrows portion of the refuge.

Report pending.

Double-O Sewer Project

Heritage Research Associates

$800 for surface search and spot subsurface testing for cultural resources.

Letter report in file. Essentially a negative finding if construction is completed as in proposal.

5. Research and Investigations

Malheur NR85 - "Effects of Prescribed Burning on Major Plant Communities of the Malheur National Wildlife Refuge"-MLH-19.

This research project was conducted by Rick Young, a doctoral candidate at Oregon State University. The project was supported by Squaw Butte Experiment Station and the Refuge.

The objectives and justification for the study were previously described in an earlier Narrative Report. The final dissertation should provide recommendations of fire prescriptions for upland and marsh vegetation, fire management and fire observations. His dissertation is scheduled to be completed in 1986.

Malheur NR85 - "Influence of Vegetation Structure and Composition, and Water Distribution on Nest Site Selection of Ground Nesting Birds in the Double O Area." - MLH-20.

Principal investigators in this study were Craig Foster, a Master's Degree candidate from Humboldt State University, and David Paullin, Refuge Biologist. The objectives and justification for the study were previously described in an earlier Narrative Report. Foster's thesis was completed in 1985. The final segment is scheduled for completion in 1986.

Malheur NR85 - "Color Marking Juvenile Trumpeter Swans on Malheur NWR, Oregon." - MLH-21.

Gary Ivey, Assistant Wildlife Biologist, has been the principal investigator in this study. Objectives and justification for the study were previously listed in our 1982 Narrative Report.

Four adult swans were captured during the molt and collared in 1985. The location and collar numbers were as follows: Sodhouse Bay (48AA and 57AA), Knox Pond (58AA), and Vogler Swamp (60AA). Because production was so low in 1985 (2) no attempts were made to collar cygnets this year.

Table III lists the number of collared swans observed from each year's banding effort during subsequent years. During 1985 four collared swans were found dead. On January 5, 41AA and 25AA were found dead in the west canal (illegal shooting); (25AA was banded as a cygnet in 1982 on Wright's Pond and 41AA was banded as a cygnet in 1983 on Buena Vista Pond). On April 22 the remains of 30AA were found at Rail Pond next to some coyote scats. The bird had been banded as a cygnet on Rail Pond in 1982. Finally, the remains of 50AA were found in the west canal at West Swamp Field on February 14. This bird was banded the previous summer as a cygnet. The cause of death for 50AA is unknown; however since the bird was found in the same canal near where 25AA and 41AA were shot, poaching is suspected.

Table III. Number of collared swans observed following initial collaring, Malheur NWR, 1980-1985.

Year Collared	# Collared	# Observed					
		1980	1981	1982	1983	1984	1985
1980	10	9	6	2	1	1	0
1981	10**	-	5**	3**	0	0	0
1982	15**	-	-	14**	8	5	2
1983	12	-	-	-	9	7	5
1984	8	-	-	-	-	6	4
1985	4***	-	-	-	-	-	1

**Includes 1 adult
***All adults

Malheur NR 85 - "Color-marking of Greater Sandhill Cranes on Malheur National Wildlife Refuge, Oregon" - MLH 30.

The objectives and justification for this study were covered in last year's Narrative Report. In 1985, 12 cranes were captured, banded, and color marked with plastic leg bands. One of the birds captured this year was originally banded and color-marked in 1969 as an adult male. To date, nearly 325 cranes have been marked providing valuable long-term data on crane ecology particularly as it relates to land use practices at Malheur NWR. C.D. Littlefield is conducting this research.

Malheur NR 85 - "Color Marking White-faced Ibis from Colonies Nesting at Malheur National Wildlife Refuge, Oregon and vicinity (Harney Basin)" - MLH 32.

The objectives and justification for this study were included in last year's Narrative Report. A total of 31 ibis nestlings were color marked in 1985. No sightings of marked ibis were recorded outside the basin in 1985. Gary Ivey is the primary investigator.

Malheur NR 85 - "Study of Population Trends of Small Mammals on Malheur National Wildlife Refuge, Oregon" - MLH 33.

This study was initiated in 1985 by Dr. David Kerley of Eastern Oregon State College at LaGrande. The objectives and justification for this study are as follows:

Objectives:

1. Establish one trapping grid in each of two distinct habitats; sagebrush and grassland.

2. Obtain "baseline" data on annual rodent population fluctuations. The animals which will be specifically studied are: Peromyscus maniculatus, Perognathus parvus, Dipodomys ordi, Microtus montanus and Eutamias minimus.

3. Create a data sheet for collecting field data which is easy to copy into a data base management system such as "dBASE II". A computer program will be written to convert data from the data base management system to a format compatible with the program "Capture".

4. Recommend the placement size, and number of permanent grids which can be used to accurately estimate population size in various habitats on the refuge.

5. Recommend a trapping schedule that can be used to predict population trends on the refuge during various times of the year.

"Effect of Early-Spring Burning on Greater Sandhill Cranes (Grus canadensis tabida) at Malheur National Wildlife Refuge, Oregon" -MLH-34.

This study was initiated in 1985 by C.D. Littlefield. The primary objective is to determine how prescribed burning affects the overall nesting biology of sandhill cranes. The study is a long term monitoring effort aimed at evaluating prescribed burning as a possible tool to help the refuge reach sandhill crane production objectives.

On 30 March 1985, a prescribed burn was conducted on Malheur NWR. Hectares in the proposed area consisted of 2430, of which an estimated 2227 were burned. Greater sandhill crane territories, located in meadow-marshland habitat, were 95%+ burned. Of the 11 crane nests located about a month after the burn, nine hatched for a success rate of 81.8%. Two nests were destroyed by unknown predators, likely coyotes. All nests had two-egg clutches and both eggs hatched in all successful nests except for one which contained an infertile egg. Nesting success was high when compared to crane nests located outside the study area on Malheur NWR. Of 39 nests located elsewhere, nesting success was 38.5%. Of those lost one was abandoned and 23 were predated.

Reasons for the higher success in the burned area were attributed to a decrease in small mammal populations which are an important prey base for coyotes before birds initiate nesting. The reduction in small mammal numbers resulted in most coyotes leaving the study area during the crane nesting period. A second factor for the higher success was water depth. Crane nests in the study area were in deeper water than elsewhere on the refuge. Mammalian predators, particularly coyotes, have the tendency to avoid crane nests in deep water.

Water depths ranged from 10.4 to 62.5 cm and averaged 42.4 cm. Water depths for nests located elsewhere on Malheur NWR in 1985 ranged from moist soil to 64.5 cm and averaged 23.0 cm. The principal reason for cranes nesting in deeper water on the study area can be attributed to standing vegetation. Many of the deepest marshes were moist at the time of burning; therefore, these few small emergent patches survived the fire. Most crane nests located within the burned area were placed in these patches.

E. Administration

Standing, left to right: 11, 5, 6, 13, 4, 9, 10, 3
Sitting, left to right: 14, 1, 7, 12, 8, 2

PERSONNEL

1. George M. Constantino, GS-13 PFT. . Refuge Manager
2. Richard W. Voss, GS-11 PFT. . . . . Asst. Refuge Manager
   EOD: 09/02/85
3. Bradley D. Ehlers, GS-9, PFT. . . . Asst. Refuge Manager
4. David N. Johnson, GS-11 PFT . . . . Habitat Mgmt. Specialist
   EOD: 02/17/85
5. David G. Paullin, GS-11, PFT. . . . Wildlife Biologist
6. Gary L. Ivey, GS-9, PFT . . . . . Asst. Wildlife Biologist
7. W. Ruth Warneke, GS-5, PFT. . . . . Refuge Assistant
8. Arlene Miller, GS-5, PFT. . . . . Secretary
9. Norman J. Warneke, WL-9, PFT. . . . Maintenance Leader
10. Marvin L. Jess, WG-10, PFT. . . . . Crane Operator
11. Clyde R. Miller, WG-9, PFT. . . . . Maintenance Mechanic
12. Tom Downs, WG-9, PFT. . . . . Maintenance Mechanic
13. Blake G. Nuffer, WG-9, PFT. . . . . Maintenance Mechanic
    EOD: 04/15/85
14. Rebecca Buck, GS-3, PPT . . . . . Clerk-Typist
15. Glen Grindstaff, WG-7, INT. . . . . Vehicle Operator
16. Carroll D. Littlefield, GS-7, INT . Wildlife Biologist
17. Allison A. Banks, GS-5, TFT . . . . Biological Technician
    EOD: 04/15/85 TER: 09/28/85

18. Tom Mears . . . . . Biological Volunteer
    EOD: 01/07/85 TER: 03/29/85 (thru SCA)
19. Karlyn Yates-Mills. . . . . Biological Volunteer &
    EOD: 03/26/85 TER: 12/31/85 (SCA) Surveying Aide
20. Susan A. Lindstedt. . . . . Biological Volunteer
21. Tom Johnson, GS-5 TFT . . . . . YCC Work Leader
    EOD: 06/07/85 TER: 08/03/85
22. Tom Walker, GS-5, TFT . . . . . YCC Work Leader
    EOD: 06/07/85 TER: 08/03/85
23. Dean F. Knauer, GS-12 PFT . . . . . Asst. Refuge Manager
    Transfer: 05/18/85

On February 17, David Johnson became Malheur's Habitat Management Specialist. He transferred to us from Arapaho NWR and has put forth outstanding effort in inventorying and collecting data and knowledge of the refuge's historic habitat programs.

Assistant Refuge Manager, Dean Knauer, transferred to the colder climate of Upper Souris NWR in North Dakota. Brad Ehlers was given a temporary promotion to GS-11 to fulfill the duties of this position until it was filled in September. The position was filled by Richard Voss, who joined Malheur's staff on September 2. His previous assignment was Klamath Basin Refuges and in the three short months remaining in 1985, Richard measured real gain in identifying, prioritizing, and scheduling much-needed maintenance efforts.

Selection was made for the Maintenance Mechanic position at the Double-O substation. Blake Nuffer arrived in mid-April from Rupert, Idaho. He has proven to be a hard-working and co-operative staff addition.

Many biological projects were completed by Bio-Tech Allison Banks, who took on tasks ranging from hospital care of sick and injured wildlife to botulism pick-up to field assignments and report writing.

Glen Grindstaff was once again our temporary addition to the maintenance staff. His dependable efforts aided much in accomplishing such projects as the Double-O rehab, fence building in prescribed burn areas, and new bridge construction at Grain Camp.

C.D. Littlefield was employed intermittently in continuance of our emphasis on greater sandhill crane management program.

The following gives a history of Malheur's personnel management:

	Permanent Full-time	Permanent Part-time	Temporary
FY 81	12		4
FY 82	12		4
FY 83	12		10
FY 84	12		6
FY 85	13	1	5

Brad Ehlers, Gary Ivey, Ruth Warneke, and Dave Paullin received Special Achievement Awards for their performance during the previous period.

The award winning staff at Malheur - Brad Ehlers, Gary Ivey, Ruth Warneke and Dave Paullin.
February DNJ

2. Youth Programs

A twelve-enrollee, non-residential Youth Conservation Corps (YCC) Camp supervised by two group leaders was hosted from June 10 to August 2. Brad Ehlers served as refuge coordinator for the program. Enrollees were recruited from Crane and Burns High Schools. Enrollees randomly selected in a drawing at the local State Employment Office were:

Rosie Andueza
Mary Gibson
Joyce Kowash
Kelly Landon (replacement)
Tammra Luelling
Brad Needham
Rodney Pierce
Tony Presley
Wayne Stewart
Dina Tiller
Paul Tiller
Selene Warburton

Group leaders were hired via SCA (Student Conservation Association, Vashon, Washington) contract with input from refuge personnel. Tom Johnson was selected for his fourth year. His previous experience added immeasureably to the program. Tom Walker was selected as the second leader.

Enrollees were divided into two crews of six on most projects. Bill Alquire, Burns EMT, provided a Basic First Aid Course to the camp on day one. Major field projects completed included five miles of new fence construction, fifteen miles of fence rehabilitation, headquarters maintenance (mowing, painting, clean-up), community project (painted Sodhouse School), six miles of electric fence removal, and construction of two rock walls for safety considerations at public use areas.

The crews were put on four, ten hour days to conserve gasoline and travel time to and from Burns which was a 36 mile drive one way. Spike camps were also utilized in the Frenchglen area for the same reasons.

Tom Johnson's crew built fence with Blake Nuffer at the Double-O Substation during the last week of the camp. They rehabilitated and constructed nine miles of fence which was previously burned by the Harney Wildfire. Their timely efforts held livestock on BLM lands to the south which saved refuge habitats for wildlife and designated permittees.

Problems with YCC were more numerous than last year. One enrollee was terminated for disciplinary reasons during the second week of camp. He was immediately replaced. Crew leaders continued to receive late checks from SCA. This problem ignited adverse feelings in one crew leader and counseling was required.

Funding for YCC came out of station funds and amounted to $21,360 (excluding group leader salaries which were picked

up by RO contract with SCA). Enrollees completed 3,750 hours of work with the resulting projects valued at $21,700. The enrollees also gained valuable work experience and an appreciation for our natural resources.

4. Volunteer Programs

Four volunteers were utilized in the biological and habitat programs in 1985. They contributed approximately 1600 hours. Three volunteer positions that were planned through the Student Conservation Association were cancelled due to budget restraints. These twelve week positions would have cost the station approximately $1,000 each.

Tom Mears was selected as the SCA biological volunteer for the winter period. He assisted with wildlife surveys such as bald eagle roost counts, raven roost counts, rabbit counts and trumpeter swan surveys. He also entered wildlife data into the computer system.

Karlyn Mills volunteered from May through December, for one or two days per week. She conducted the raven nesting survey and assisted in various wildlife inventory procedures. She also spent considerable time assisting the Habitat Management Specialist in habitat/vegetation monitoring and in summarizing historical land use data, as well as adding data to computer files.

C.D. Littlefield spent many hours while on a non-pay status, volunteering his time on sandhill crane marking, conducting raptor surveys, rabbit surveys, breeding bird surveys, and various other wildlife inventories including bird banding. C.D. wrote the Quarterly American Bird Reports for the refuge. C.D. also "saved the day" many times for other staff members by providing valuable wildlife information.

Sue Lindstedt volunteered to assist C.D. with crane marking and surveys and also assisted with some bird banding projects.

5. Funding

Table IV summarizes station funding for the last five years.

Our 1260 funds were divided as follows:

RRP's	$ 48.8
Water Rights	5.0
Large ARMM's	40.0
Small ARMM's	142.7
Fire Mgt.	18.9
Other O & M	346.9
	$602.3

Table IV. Operational Budgets, Malheur NWR, FY 81-85

Funds Source	Fiscal Year (funds in dollars)				
	1981	1982	1983	1984	1985
1260	373,200	415,000	448,000	569,500	602,300
1240 (I&R)	49,000	50,000	51,000	-	-
6860 (Ex/S1)	43,000	25,000	21,000	21,000	21,000
1270 (ADC)	-	-	500	500	500
8610 (QTRS)	-	-	14,200	9,500	3,200
1520 (YCC)	-	-	-	15,000	14,640
2201 (Donation)	-	-	-	100	-
Total	465,200	490,000	553,800	615,600	641,640

6. Safety

Station safety meetings were held monthly with all refuge personnel present. Safety committee meetings were held in February, May, June and October. Station Safety Chairman for the year was Brad Ehlers. The Station Safety Committee consisted of Arlene Miller, Tom Downs, Dave Paullin and Brad Ehlers. Major projects completed by the committee included a station safety inspection, a written safety hazard analysis of explosives and investigation and review of all accidents. Committee actions continued from the previous year included all-terrain vehicle training, fire extinquisher checklists, periodic vehicle inspections and tracking and updating Defensive Drivers Training and First Aid Training.

An extensive safety session was held at refuge headquarters on the afternoon prior to the 6,000 acre Unit 8 prescribed burn. Crews, duties and the safety hazards associated with each were outlined. A general fire safety session was presented with emphasis on the ten fire situations that shout "watch out".

Another fire safety day was held on June 14 just prior to the wildfire season. Refuge employees all completed fire shelter training and the step test (physical fitness test). Fire training films were viewed and operation of the new radios was explained. BLM Fire Coordinator Mike Hartwell and John Raleigh (Frenchglen Fire Crew Leader)

administered the step test and joined in a fire coordination session with the entire refuge staff. This cooperative training day is invaluable as refuge and BLM fire crews are jointly involved in wildfire suppression annually.

Ken Nueberger completed his inspection of refuge bridges in October. All bridges were inspected, load recommendations were approved and the signs were ordered. They will be erected in 1986. These actions should minimize bridge failure in the future.

Ramelli bridge was completely replaced following the initial 1984 bridge inspections by Ken Neuberger-RO,EN. Bridge stringers were unsound dictating it's closure for over a year.
July DNJ

Three accidents occurred this year. Two of these could have easily resulted in fatalities. Arlene Miller fell on the ice at the back entrance to the office. Her wrist was injured and several doctor visits were required in the healing process.

The first serious accident took place on March 22. Marv Jess and Clyde Miller were transporting a crawler tractor from refuge headquarters when the lowboy slid off the road and got stuck on a sharp curve by the Northwest Big Sagebrush Field Corrals. Marv was attempting to unload the dozer when it slid sideways off the trailer and rolled on its side into the ditch. Marv rode the dozer down and was unhurt. The newly installed ROPS held and actually prevented the dozer from rolling completely over. Extremely slippery road conditions contributed to this accident.

The next serious accident took place as Norm Warneke and Glen Grindstaff were returning to Burns at the close of the workday on September 11. They had been fencing in cool, rainy weather. Glen (passenger) fell asleep on the way in and Norm became drowsey in the warm cab and did not notice a vehicle stopped at the Dog Mountain Road behind a large cattle drive. Norm hit the brakes before impact, but still hit the rear of the other vehicle with considerable force. The refuge vehicle was nearly totaled and the other vehicle received extensive damage to its rear bumper and utility box. Norm and Glen sustained only minor cuts and bruises. This accident could have easily caused two fatalities. Corrective actions included the use of the AM radio, a fresh air flow and the passenger to help keep the driver alert. This accident was investigated by the Harney County Sheriff's Department in addition to the Station Safety Committee.

Dave Johnson filling out the forms for a vehicle accident in which Norm Warneke and Glen Grindstaff narrowly escaped serious injury.
September GMC

7. Technical Assistance

The refuge staff was frequently called on to provide various agencies with information on lake water levels, flood effects, stream flows, etc. Agencies most frequently assisted were the State Watermaster, Soil Conservation Service, Army Corps of Engineers and State and County Highway Departments.

C.D. Littlefield provided greater sandhill crane management recommendations to the Nature Conservancy, Nevada Game and Fish Department, the University of Alaska, Modoc NWR, California Department of Fish and Game and the Oregon Department of Fish and Wildlife.

Dave Paullin and Dave Johnson provided on-site advice to the Lakeview BLM in June. Rising water levels in Warner Valley provided an opportunity to manage a large area for waterfowl production. Their recommendations were well received.

Dave Paullin and Dave Johnson provided guidance to Lakeview BLM while planning a waterfowl improvement on BLM lands.
June DNJ

F. Habitat Management

1. General

Habitat management and the use of the different management strategies (haying, grazing, burning, etc.) continues to be a source of debate and discussion at Malheur. However, problems associated with the flooding of Malheur Lake dominated habitat in 1985. Following are the summaries of general habitat management efforts for 1985:

HCEFB participation - Malheur again participated in the Harney County Emergency Forage Board Program which was established to help off-set forage losses associated with flooding. Details of our participation are summarized in Section F-7.

Habitat Workshop - Malheur hosted a three day Wildlife Habitat Management Workshop October 8-10. The objectives of this workshop were as follows:

1. To gain a consensus on: what our habitat problems and potential solutions are; where have we made progress; what is our vegetative trend; and where do we need to go from here.

2. To use participant expertise in developing a method to document habitat condition and trend in relation to wildlife objectives. What criteria can we use to measure attainment of success or reasons for failure in our habitat management program.

3. To gain from the participant's experience how best to design a public consensus process to implement numbers 1 and 2.

Participants included Marvin Kaschke and David Frazen of the Sheldon-Hart NWR Complex, Eldon McLaury - previous biologist at Malheur, Charles Peck - S.E. Idaho Complex, David Ganskopp - Researcher - Squaw Butte Experimental Station - USDA, Carol Evans - Biologist - Ruby Lake NWR, David Chamberlain - Extension Agent - Harney County Oregon, John Oldenmeyer - Researcher - Denver Wildlife Research Center, and Refuge Biological and Management Staff.

The workshop was considered a success and proceedings are currently in draft form.

Utilization surveys were initiated in 1985 to allow systematic monitoring and analysis of different treatments. This new effort will assess the quality and quantity of nesting cover, feeding areas, brooding and pairing habitat following habitat management actions. The information will be used in a computer monitoring system.

Computer monitoring system - The staff at Malheur spent many hours in 1985 developing a computer system which will help monitor habitat management efforts. The dBase system uses biological, habitat and management inputs to allow tracking of habitat conditions, biological response, permittee performance and treatment strategies on over 100 fields, 4 major habitat types, 6 key wildlife species, 70 treatment strategies and 29 permittees. The system is already proving to be a valuable management tool.

Habitat Management Tours - Six members of the Malheur staff spent two days visiting Summer Lake and Sycan Marsh to exchange habitat management information. Personnel of the State Wildlife Management area at Summer Lake provided an excellent tour of their area and discussions were generated in relation to developments. Personnel from The Nature Conservancy provided a tour of Sycan Marsh. This marsh is a valuable production area for greater sandhill cranes. Many discussions centered around the intensive summer grazing program, predator problems, crane nesting, fledgling success, population monitoring, vegetation monitoring and marsh management.

Grazing research proposal - John Oldenmeyer and Fritz Knopf of the Denver Wildlife Research Center spent 2 days (at the request of the refuge staff) developing a research proposal which would evaluate the feasibility of using livestock grazing as a means of opening up monotypic stands of emergent vegetation. The proposal which is dependent upon funding could have regional and possibly national implications, and is tentatively scheduled to begin in late 1986.

2. Wetlands

Malheur Lake continued to be a massive open-water lake with only a few areas of emergent vegetation. High water conditions have eliminated the dense stands of emergents that were formerly present in the center of the lake. Malheur Lake peaked at 4102.68 on April 23 and the three lakes (Harney-Mud-Malheur) covered approximately 180,000 acres.

Irrigation in the Double 0 Unit was initiated as soon as water became available in the spring because of unpredictable water availability in that area. In the Blitzen Valley, irrigation was generally delayed until early April, primarily to delay nesting by greater sandhill cranes because early nesters have suffered higher nest predation rates. Because 1985 was a drier than normal year, many areas of the Double 0 and the Blitzen Valley dried up early in the season resulting in poor brood water conditions for waterfowl and other marsh birds.

Dune Pond in the Double 0 and Unit 9 Pond in the Blitzen Valley were both kept dry during the 1985 growing season. Both of these areas will be burned in early 1986 to allow nutrients to recycle and improve habitat conditions. West Krumbo Swamp Pond was also kept dry but will not be burned. Knox Swamp was drawn down in October and burned. We plan to blast pothole openings in dense emergent stands in Knox Swamp to increase open water area for trumpeter swans, geese, and diving ducks.

Boca Lake was dried up during July to facilitate carp control. Carp were forced into the outlet ditch which was then treated with rotenone. An excellent stand of smartweed was produced in the pond bottom. East Knox Pond which was drawn down through the winter for carp control, produced an excellent stand of sago pondweed in 1985. West Knox Pond was managed for moist soil plants after farming was not accomplished. Because it was drawn down too early, a poor stand of smartweed resulted.

Diamond Swamp became nearly dry in early fall, as planned, but did not completely dry out because the Center Canal had to be filled to water cattle in an adjacent field. Darnell Pond was dried up in late summer and should provide improved habitat after the dike is repaired in 1986. Both East and West Buena Vista Ponds were managed as permanent ponds in 1985.

4. Croplands

The primary objective of farming on Malheur is to provide food for greater sandhill cranes during the fall migration. This crane population is declining because of low recruitment and a high rate of mortality on their wintering grounds in the Central Valley of California. The grain fields have helped hold cranes here longer, thus reducing their winter mortality rate. The grain fields are also utilized by Canada geese, mallards, deer and upland game during the fall. Both cooperative and force account farming have been used in the past. Force account farm ground near Sodhouse Dam was too wet to be worked this year.

Cooperator Harlan Crawford planted 250 acres of barley in the East Grain Camp Field and 100 acres in the Lava Beds Field. Yields were poor due mainly to late planting, the record dry summer and an inadequate gravity irrigation system. Harlan experimented with a modified no-till system as suggested by refuge personnel. His drill was inadequate and weed control via aerially sprayed chemicals was poor. Yields averaged less than ten bushels per acre overall. However, approximately fifty acres on the south end of the East Grain Camp Field produced well enough to justify harvesting by the Cooperator.

Greater sandhill cranes used the East Grain Camp Field extensively until they left for their wintering grounds prematurely in late September. There was ample grain in the south end of East Grain Camp Field to support the cranes for several more weeks if they had remained. Mule deer and antelope utilized both fields extensively in December as snow covered their normal winter feed farther up the slope.

5. Grasslands

Native grasslands at Malheur consist primarily of upland sites which are intermingled with meadows and marshes. Vegetation includes great basin wildrye, big sagebrush, greasewood, rabbit brush, saltgrass and a diversity of finer grasses and forbs. Management of these upland areas emphasizes dabbling duck nesting cover. However, the treatment strategies aimed at maintaining productive meadows often conflicts with the nest cover objective because grazing tend to over-treat the uplands. This is minimized as much as possible through adjusted stocking rates, timing of grazing and frequency of treatments.

Many areas on the east side of the refuge associated with the foothills of Steen's Mountain were formerly converted to crested wheatgrass after they were burned by wildfires. These seedings are best suited to provide fall/spring feeding areas for Canada geese. Management involves moderate to heavy fall/spring grazing to maintain optimum new growth.

Fences are constructed at Malheur NWR using rock cribs for corners and brace panels. This long tailed weasel took up residence at West Grain Camp Field.
July DNJ

6. Other Habitats

Riparian vegetation associated with creek bottoms, river banks, canals, dikes, road ditches and human dwellings provides a very important habitat element for many species of songbirds. The fruit orchards and other "exotic" trees planted around refuge headquarters continue to provide birdwatchers with excellent opportunities to observe a wide variety of species. Willows and other shrubs along water-courses offer good habitat for willow flycatchers, yellow warblers and other songbirds. Management of these areas involves minimizing impacts associated with treatment of meadows, weed control and wildfire. To date, many areas have been fenced along the river and the primary water delivery ditches. Hay only treatment is used in some areas as a means of minimizing livestock impacts.

7-8. Grazing and Haying

Livestock grazing and haying are used to maintain habitat diversity of meadows and marshes. These areas quickly become rank and overgrown without treatment and are very resilient to livestock grazing. By varying the intensity and frequency of treatment in the fields where grazing is used, habitat diversity can be enhanced. Seasonality is restricted to winter grazing with the exception of crested wheat grass seedings (see Section F-5). Conflicts associated with grazing include livestock impacts to riparian areas and upland nesting cover.

Three primary strategies are used - Graze Only (GO), Rake Bunch Grazing (RBG), and Hay Only (HO).

GO - is used in the crested wheat grass seedings (see Section F-5) since haying is not feasible on these rocky, low production areas.

RBG - is the primary method of applying livestock grazing. Under this strategy, permittees are allowed to cut and "rake bunch" forage into small stacks during August. Livestock are then allowed to graze the cut vegetation in place during the winter months (September - February).

HO - permittees cut, bale and remove vegetation from the field.

We also continued to participate in the Harney County Emergency Forage Program (HCEFP). A total of 8703.4 AUM's and 2298.4 tons of hay were provided to ranchers affected by flooding conditions.

Summary of Treatments

The following information provides a summary of the field treatments.

Treatment Strategy	Acres	%	Intensity	Forage Removed
Idle	38,498	20.8	0	0
Graze (Regular)	17,752	9.6	1.41 AUM/AC.	25,080.9 AUM's
Graze (HCEFB)	10,306	5.6	.84 AUM/AC.	8,703.4 AUM's
Hay (Regular)	582	0.3	1 TON/AC.	582.05 TONS
Hay (HCEFB)	2,298	1.2	1 TON/AC.	2,298.4 TONS
Farm	350	.1	-	-
Flooded meadow, permanent lake, ponds, unfenced refuge lands	115,214	62.2	-	-
Total	185,000	99.8%		

33,784 AUMs+2800 TONS = 40,784 AUMs

Following is a list of total grazed fields and the intensity of use applied.

Fields Grazed - Regular Permits

Field Name	Acres	AUM's	Intensity AUM/AC.
Peterson	773	1250.5	1.61
Rock Island	620	793.8	1.28
Plow	320	330.8	1.03
N. Stinking Lake	410	779.	1.90
Upper Swamp	255	788.3	3.09
Yriarte	502	423.3	.84
Horse	300	606.4	2.02
Center Sagebrush	2692	1828.5	.67
W.E. Big Sagebrush	1133	1005.9	.89
N. Meadow B	478	394.	.82
Larson A&B	498	597.	1.20
Skunk Farm	924	1679.	1.81
Tipton	389	714.	1.84
Retherford Lake	664	585.	.88
N. Swamp	2771	1342.2	.48
W. Center	300	554.9	1.84
S. Center	379	876.5	2.30
Witzel	175	585.7	3.34
Lower Krumbo #2	154	516.	3.35
Middle Krumbo	336	165.9	.49
Upper Krumbo	236	235.9	1.00
Jones	727	2016.	2.77
Dredger #1	784	630.2	.80
Faye	677	2008.9	2.96
North Little Juniper	393	889.	2.26
W. Big Juniper	401	235.2	.59
E. Big Juniper	410	790.5	1.92
Barley	182	450.	2.47
Mud Creek	108	30.9	.28
S. Meadow	877	1975.	2.25
			(average)
Totals	17,991	25080.9	1.39 overall)

Fields Grazed - Harney County Emergency Forage Board

Field Name	Acres	AUM's	Intensity	AUM/AC.
Grain	367	378.5	1.03	
N.W. Big Sagebrush	4121	3173.7	.77	
Little Sagebrush	1435	275.4	.19	
Rimrock	593	1008.7	1.70	
House	701	725.4	1.03	
S. White	790	967.5	1.22	
Boca Lake	142	204.8	1.44	
N. Meadow	412	1491.5	3.61	
U. Bridge Creek	1532	317.9	.20	
Big Poison	213	160.	.75	
Totals	10306	8703.4	.84	(average (overall)

Most fields in the Hay Only category received treatments to only part of the field and it was not possible to determine actual acres cut. However, hay removal was estimated to average about 1 Ton/Acre on native meadow allowing direct conversion. Following is a list of fields included in the 84-85 haying program.

Fields Hayed -
Harney County Emergency Forage Board and Regular Program

Field Name	Type of Permit	Field Total Acres	Estimated Acres Hayed	Tons
Willard	HCEFB	456	240	239.6
Hughett	HCEFB	364	364	410.
Little Sagebrush	HCEFB	1435	81	80.5
Jenkins	HCEFB	774	40	39.7
Suicide	HCEFB	389	389	461.9
W. Grain Camp	HCEFB	357	215	215.6
W. Hamilton	Regular	189	7	6.95
Lower Krumbo #2	Regular	154	142	141.7
Warm Springs	HCEFB	377	291	291.1
Bridge Creek	Regular	1006	434	433.4
Island	HCEFB	831	560	560.
Totals		6332	2763	2880.3

9. Fire Management

Wildfires were fewer than expected considering the dry summer and abundant cheatgrass on the surrounding uplands. Only two major fires occurred this year. A total of five wildfires required refuge response. A fire consumed less than one acre in the Butte Field in February. Arson was suspected. The area is close to State Highway 205 and the weather made burning conditions very marginal. It was quickly controlled by Clyde Miller. A lightning strike started a sage-cheatgrass fire just west of Buena Vista Substation in mid June. A rain shower extinquished the blaze within the hour.

The Jackass Wildfire was only one of 42 fires ignited by a lightning storm on July 7th.
July .DNJ

A severe storm front moved over the area on July 7. This front was essentially dry with lots of associated lightning strikes. BLM dispatch had 42 fires reported from this storm and their crews were spread very thin. Two of the fires consumed refuge habitat. The Jackass Fire consumed 5,400 acres with 600 of that total on the refuge. This fire consumed sagebrush-cheatgrass habitats west of State Highway 205 from Rockcrusher Point to the Foster Flat Road near Buena Vista Substation. Two crews of refuge firefighters supplemented by BLM encouragement were able to control this blaze within a two-day period. Meadows were still green and wet and prevented further spread of the fire east to the Diamond area.

The Harney Lake Fire also started as a result of this storm front and burned a total of 52,490 acres. Of this total, 1753 acres were consumed on the Double-0 portion of the refuge. The sagebrush-cheatgrass habitats along the southern boundary of the Double-0 Unit from Ross Spring to Harney Lake were affected. Refuge personnel and neighboring ranchers fought hard to save the buildings at the Double-0 Substation. All the buildings were saved but the windows in the shop building were cracked from the heat. Thirteen miles of boundary fence were also damaged.

The Double-0 Substation buildings were in jeopardy during the Harney Lake Wildfire. A hand-cut firebreak and backfire were employed to save the structures.
July DNJ

A Fire Rehabilitation Plan was written and approved to replace and repair fences damaged by the Harney Lake Fire for a total of $15,313. Refuge personnel (labor) and fence materials were both funded by fire funds. The fences were replaced in time to keep livestock out of refuge fields as they moved off BLM grazing allotments in late July and early August.

A refuge permittee ignited grasses in the South White Field on August 19 as he was welding on his haying equipment. The resulting peat fire was extinquished in two days. The permittee lost his baler in the blaze.

Prescribed burning efforts were directed at a 6,000 acre parcel in Unit 8. The primary objectives of this burn were to change sagebrush dominated uplands to great basin wildrye and alkali wildrye grasses for ground nesting birds and to recycle nutrients tied up in thick hardstem bulrush expanses. The burn plan was written and approved. Blacklines were burned around wells, corrals and powerlines. The burn was completed on March 30 by seven refuge employees in thirteen hours. See Table V for prescription and actual conditions. Winds were SW-NW at 6-15 mph, temperatures ranged from 44 - 53 degrees F and relative humidity ranged from 36 - 57. Flame heights approached fifty feet in hardstem bulrush and maximum rates of spread were 100 feet in ten seconds.

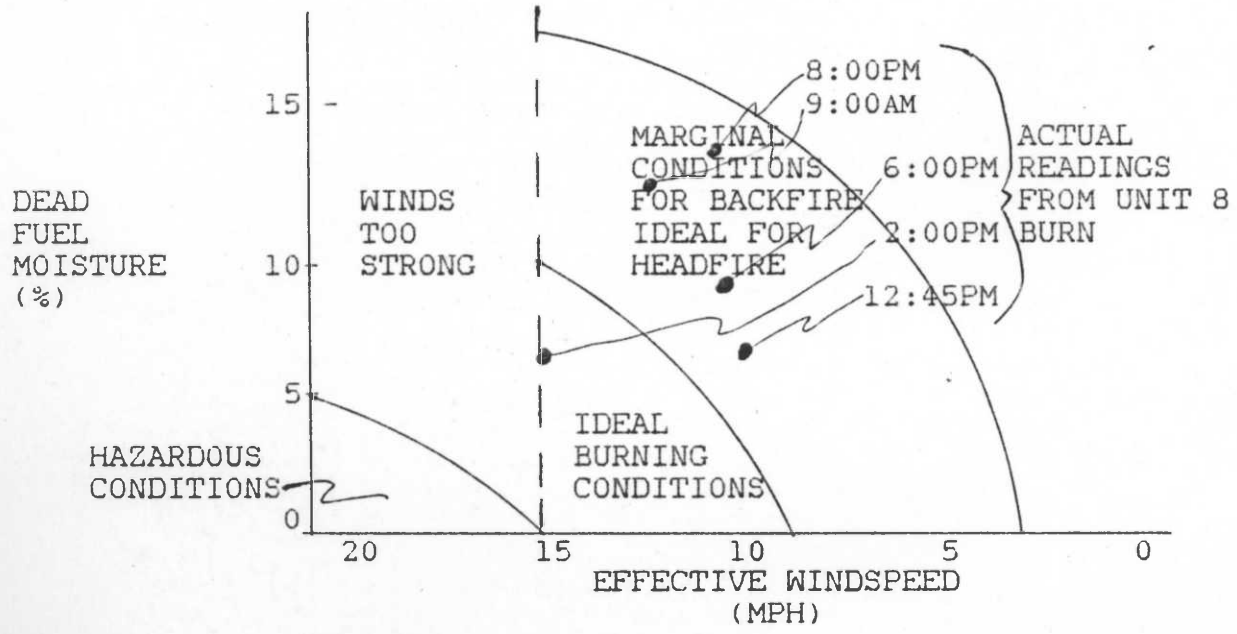


Table V. Diagrammed Burn Prescription for emergent-grass habitats with Unit 8 actual figures plotted.

Dave Paullin and Brad Ehlers closely monitoring a test backfire just prior to the Unit 8 burn. The burn was completed the same day. March GMC

Grass fuels burned to the bare soil. These grasses responded well to the burn and greened up quickly as the soil warmed and irrigation started. Bulrush burned to moisture laden duff - generally two to four inches above the soil. Four to six inches of ash covered former bulrush matts after the burn. Bulrushes responded with heavy growth as they were flooded. Deeper bulrush expanses were partially killed in conjunction with flooding. Great basin wildrye/sagebrush types burned to the soil where fuels were continuous. Sagebrush was reduced by 80% and great basin wildrye responded with scattered vigorous growth and excellent seed production. Based on our previous experience, great basin wildrye will reproduce both from seed and rootstalks and will cover the uplands with excellent dabbler nesting cover in two to three years.

Greasewood flats, discontinuous brush patches, and hayed fields did not burn completely. Burn objectives were met and the cost was less than one dollar per acre. Wildlife response to the burn for a spring feeding area was tremendous. Mallards, Canada geese and greater sandhill cranes used the area extensively in April and May. Cranes also had excellent nesting success in the burn area this year (see Section D.5).

An aerial of the Unit 8 prescribed burn just after it was completed. Areas that did not burn on the left and upper part of the photo were hayed meadows and greasewood uplands with sparse fine fuels.
April DGP

Knox Swamp (100 acres) was control burned on October 24 to remove accumulated litter thereby recycling nutrients. The area will also be used to experiment with pothole blasting in our attempt to open up extensive bulrush expanses in this pond mainly to create trumpeter swan feeding areas.

Manager Constantino, Brad Ehlers, and Dave Johnson completed S-390, Advanced Fire Behavior at the Redmond Air Center March 4-7. All agreed it was an excellent course and wished they had the opportunity to take it many years ago.

10. Pest Control

We again contracted with the Harney County Weed Department to spray 2, 4-D along road sides in July to control Canada thistle and perennial pepperweed. Approximately $1300 was spent spraying an estimated 60 miles of roadsides.

Beavers caused a number of problems with our water management system by plugging up culverts, etc. We normally issue several permits each year for trappers to remove problem beavers. This year Refuge Manager Constantino agreed to a request by the local Harney County Fur Takers that locals would be given priority over others for these control permits. He then denied several requests from beaver trappers from out of the county to take care of problem beavers and contacted the local trappers and asked for their help. The locals never showed up due to low fur prices and high travel costs involved in driving from town to the P-Ranch area. The other trappers moved out of the area and no control was achieved in 1985.

11. Water Rights

Several alternatives under study by the Corps of Engineers for solving the impacts related to flooding by Malheur Lake involved preventing Malheur Lake water from flowing into Harney Lake or moving water out of the basin and refuge and into the Malheur-Snake-Columbia River System. This caused us great concern as these actions could seriously impact refuge wetlands and water rights. The Regional Engineering Office assisted us in presenting the COE with Refuge water rights and maximum and minimum flows required to protect Refuge resources.

12. Wilderness and Special Areas

This fall Refuge Manager Constantino was asked by the Harney County Economic Development Committee to consider allowing the development of a wind surfing area on Harney Lake. Part of the proposal called for the establishment of roads, parking lots, and swimming beaches on and adjacent to the Harney Lake Sand Dunes.

As the entire area is a proposed wilderness area and a research natural area the request was denied. Once presented with our reasons for affording the unique area special protection the HCEDC had no problem with our position against the proposal.

G. WILDLIFE

1. Wildlife Diversity

Two new bird species were recorded on the refuge, Bell's vireo and the yellow-throated warbler. These observations both represented new state records. This year was characterized by numerous sightings of vagrant eastern birds. Unusual bird sightings are summarized in Table VI.

Table VI. Unusual bird sightings, Malheur NWR, Oregon - 1985.

Species	Date
Pacific Loon	Nov. 2
Common Loon	Oct. 18, Nov. 2
Surf Scoter	Nov. 2
Northern Goshawk	Oct. 31
Merlin	Oct. 12
Ruddy Turnstone	May 16
Parasitic Jaeger	Sept. 8-30
Common Tern	Oct. 22-25
Northern Saw-whet Owl	Feb. 25, May 16, July 5
Black Swift	Sept. 11
Black-chinned Hummingbird	Sept. 12
Olive-sided Flycatcher	June 7
Blue-gray Gnatcatcher	May 6
Gray Catbird	May 23
Bell's Vireo	May 26
Red-eyed Vireo	Aug. 25, Sept. 11
Tennessee Warbler	May 31
Northern Parula	May 29-31, June 4-7
Magnolia Warbler	May 31, June 2
Black-throated Gray Warbler	Aug. 19
Yellow-throated Warbler	June 9-11
Palm Warbler	May 19
Blackpoll Warbler	May 16-18
Black-and-white Warbler	May 15
Ovenbird	May 24-31
Rose-breasted Grosbeak	May 24
Green-tailed Towhee	Oct. 27
American Tree Sparrow	Dec. 17-19
Chipping Sparrow	Dec. 17
White-throated Sparrow	Sept. 27
Harris' Sparrow	Oct. 27, Dec. 17
Great-tailed Grackle	May 9 - late June
Pine Grosbeak	Jan. 13, 22
Common Redpoll	Nov. 19 - Dec. 20
Lesser Goldfinch	July 5, Oct.

2. Endangered and/or Threatened Species

The refuge staff again participated in winter bald eagle roost counts. The counts are a multi-agency attempt to document winter bald eagle use in the Malheur-Harney Basin. The 1985 peak count was March 26 when 151 birds were documented from only two roosts, Rattlesnake and Coffeepot. The peak refuge population was estimated at 20 birds on March 1.

No peregrine falcon sightings were reported.

3. Waterfowl

The record abundance of water in the Great Basin and the Malheur-Harney Basin in particular, scattered waterfowl populations widely. Because of the flooded wetlands off-refuge, our waterfowl use was down dramatically, in some cases setting all-time low records.

The mid-winter waterfowl survey revealed 2,500 Canada geese, two tundra swans, 52 trumpeter swans and 735 ducks using the refuge. By the end of January, northern pintails, tundra swans and snow geese had arrived. Peak numbers and dates for selected spring migrants appear in Table VII.

Table VII. Estimated Spring Waterfowl Peaks, Malheur NWR, 1985.

Species	Number	Period
Tundra Swans	2,495	27 Feb.
Canada Goose	6,340	27 Feb.
Snow Goose	11,825	15 Mar.
Mallard*	3,830	27 Feb.
Northern Pintail	35,190	27 Feb.
Green-winged Teal	2,250	1 Apr.
American Wigeon	2,250	12 Mar.
Northern Shoveler	1,260	1 Apr.
Canvasback	1,315	1 Apr.
Ruddy Duck	2,370	17 Apr.

*No spring "peak" of migrant mallards was ever detected; however, by late May our breeding population was estimated at 3,378.

As Malheur Lake levels increased and the water spread out, spring migrants concentrated on newly flooded shallows on private land where they were not counted. Total spring duck use on the refuge continues to decline most notably on Malheur Lake. Water nearly 14 feet deep, widespread failure of emergent vegetation and a nearly total decimation of sago pondweed virtually eliminated most of the spring waterfowl maintenance on Malheur Lake.

Table VIII. Spring Waterfowl Use-days, Malheur NWR, 1981-85.

	Use-days in Thousands				
Species	1981	1982	1983	1984	1985
Tundra Swan	425	133	295	83	30
Trumpeter Swan	9.1	7.8	7.4	6.9	4.7
Geese	1,062	1,974	2,465	1,220	576
Ducks	3,466	3,653	1,525	2,265	1,204
Totals	4,962.1	5,767.8	4,292.4	3,574.9	1,815.2

The duck breeding population was an estimated 9,878 pairs, down considerably from the post-carp control years of 1978-80 when the refuge supported over 20,000 pairs. Causes of the decline are: 1) record high water in Malheur Lake continued to inundate much of the uplands for dabblers and emergents for divers, 2) high carp populations coupled with deep water eliminated sago pondweed on Malheur Lake, which is essential to attract breeding hens, particularly redhead and ruddy ducks, 3) a large prescribed burn in Unit 8 (5500 acres) temporarily removed much of the nesting cover in this portion of the refuge reducing attractiveness for pairs and 4) continental waterfowl populations dipped to 30 year lows. The most common nesting duck in 1985 was the cinnamon teal, followed by mallard, gadwall and redhead.

Table IX. Estimated Waterfowl Breeding Pairs, Malheur NWR, 1985.

Species	1982	1983	1984	1985	% Change From 1984
Trumpeter Swan	16	16	16	17	+ 9%
Canada Goose	1,427	1,379	523	644	+24%
Ducks					
Mallards	1,662	2,012	2,768	1,687	-39%
Gadwall	1,521	1,466	1,391	1,621	+17%
Pintail	292	379	362	227	-37%
Green-winged Teal	154	84	162	105	-35%
BW/Cinnamon Teal	3,643	3,991	4,521	4,495	- 1%
American Wigeon	136	176	138	91	-34%
Northern Shoveler	705	511	409	446	+ 9%
Wood Duck	0	0	0	0	
Dabbler Sub-total	8,113	8,619	9,751	8,672	-11%
Redhead	2,006	2,176	1,338	825	-38%
Canvasback	310	453	246	108	-56%
Lesser Scaup	10	39	13	35	+169%
Ring-necked Duck	5	27	7	4	-43%
Ruddy Duck	602	457	257	229	-11%
Common Merganser	0	29	40	5	-88%
Diver Sub-total	2,993	3,181	1,901	1,206	-37%

Estimated duck production (11,270) was down slightly from 1984 (Table X). This is the lowest estimated production since 1961 (a drought year). Reasons for this low production include: 1) severe spring flooding in the Double 0 and Blitzen Valley during the peak of duck nesting; 2) record high lake levels in Malheur, Mud, and Harney Lakes; 3) high carp populations in many area of the refuge; 4) high predation on nests and broods; 5) inadequate irrigation; 6) low flyway and continental populations of waterfowl and; 7) record wet conditions throughout the west which have enhanced opportunities for bird dispersal.

Table X. Duck Production Trends of the Major Nesting Ducks on Malheur NWR, 1981-85.

Species	1981	1982	1983	1984	1985	Average 1981-85
Mallard	5,040	2,920	3,630	3,654	2,253	3,499
Gadwall	5,780	4,700	4,410	756	752	3,280
Blue-winged/ Cinnamon Teal	6,930	7,230	6,420	2,723	5,178	5,696
Redhead	6,845	4,490	5,195	2,646	1,408	4,117
Ruddy Duck	1,975	1,080	775	344	242	883
Total	26,570	20,420	20,430	10,123	9,833	17,475

Only two trumpeter swans were produced on Malheur NWR in 1985. This is the lowest production since 1977, a drought year. The average production in recent years (1958-84) was 10.7 cygnets. An aerial survey on May 30 recorded 36 swans (17 pairs and two singles) in the Harney Basin. Seven pairs were known to nest and 4 of these were known to hatch 13 cygnets. Reasons for nest failures and fledgling loss were not documented.

Estimated Canada goose production in 1985 was 700, only 53% of the average production from 1972 through 1984 (1309). This represents a slight improvement over 1984's record low production of 523. High predation of nests, primarily by raccoons and ravens; and habitat loss due to high lake levels (lack of muskrat houses) continue to be the primary factors limiting goose production.

The fall waterfowl migration passed with no major build-up of migrants. The high water which left much of Malheur Lake too deep for feeding, combined with the near total failure in sago pondweed production, made the fall migration of 1985 the lowest in recent years (Table XII). One species which reflects the present condition of Malheur Lake is the tundra swan. In 1985, swans "peaked" at 15 during the fall migration, whereas the average peak for the past 25 years was 5,245. Similar declines for other species are listed in Table XII. One of the few reminders that a fall migration was in progress was the occasional passing of snow geese or tundra swans over headquarters. Most waterfowl flew over the refuge and if they stopped, it was only for a short time.

Table XI. Fall Waterfowl Use-days, Malheur NWR, 1981-85.

Species	Use-days in Thousands				
	1981	1982	1983	1984	1985
Tundra Swan	46	339	13	32	0.4
Trumpeter Swan	7.8	8.6	9.0	10.4	6.2
Geese	735	1,304	561	859	496
Ducks	5,827	5,621	3,688	2,569	2,254
Total	6,615.8	7,272.6	4,854	3,470.4	2,756.6

Table XII. Estimated Fall Waterfowl Peaks, Malheur NWR.

Species	1985		Recent Fall Peaks	
	Number	Period	Number	Year
Tundra Swan	15	26 Nov.	31,230	1980
Canada Goose	4,435	11 Oct.	10,625	1983
Snow Goose	675	1 Nov.	8,000	1979
Mallard	13,450	25 July	31,230	1980
Pintail	5,020	25 July	94,170	1980
Green-winged Teal	4,305	26 Sep.	17,750	1982
American Wigeon	3,485	1 Nov.	21,440	1979
Northern Shoveler	1,330	26 Sep.	22,580	1979
Redhead	410	25 July	17,700	1979
Canvasback	175	26 Sep.	20,950	1979

Estimated refuge production of coots was 10,551, less than a third of the production in recent years. Coot use on the refuge portion of Malheur Lake was greatly reduced as high water eliminated emergent vegetation necessary for nesting.

4. Marsh and Water Birds

Only 32 great blue herons, one double-crested cormorant, and one pied-billed grebe were recorded on the refuge during two Christmas bird counts. Record sub-zero temperatures in November and December forced even some of our hardiest winter residents to migrate south.

The first spring arrival for marsh and waterbird species were recorded on 5 February when a horned grebe was observed on Sodhouse Spring (previous record was April 8). Black-crowned night herons also set a new arrival date in 1985 (March 1 - previous record March 2). All species arrived earlier than their average arrival dates with the exception of the American bittern which was not recorded until April 16.

Unusual sightings for 1985 included: 1) Common Loon: mid-March and again in the fall on Krumbo Reservoir (October 18-November 2) and 2) a Pacific Loon was observed on Krumbo Reservoir November 2 for the fourth record in southeast Oregon.

Colonial nesting waterbirds were censused on the refuge and elsewhere in the basin. Malheur Lake's record high water levels resulted in very little suitable emergent vegetation for colonial nesting within the refuge portion of the lake. Large colonies occurred at Squarewell at the mouth of the East Fork of the Silvies River, at Vogler Swamp, and at Sodhouse Ranch west of refuge headquarters. Many small colonies established in 1984 in flooded willow stands and in trees around flooded ranches on the north side of the lake continued in 1985. The tree colony near the mouth of Silver Creek in Harney Lake continued to expand. Some minor colonies developed on small islands and in flooded greasewood in Malheur and Harney Lakes.

Table XIII summarizes estimates of nesting pairs of key colonial waterbirds using the basin in 1985. Record numbers of snowy egrets and white-faced ibis nested in the basin this year.

A summary of production of colonial waterbirds, by species, is listed in Table XIV for both refuge and off-refuge colonies. White-faced ibis, snowy egret, and ring-billed gull production all set new high records for the basin.

White pelicans nested on an island near the Narrows (the first nesting in the basin since 1960), producing three young. Great blue heron and double crested cormorant production fell from 1984 record high levels primarily because many of the nesting trees were toppled by ice during spring breakup on Malheur Lake. This resulted in shifting of colonies to other flooded trees around the lake. A large new colony of cormorants and great blue herons developed in the trees over Sodhouse Ranch (on the refuge). These trees were on dry ground surrounded by Malheur Lake waters.

Malheur Lake reached its highest elevation (4102.68) on 23 April 1985. This was .26 feet higher than the 1984 record. The lake was much more stable during the nesting season than in recent, previous years, resulting in improved nesting conditions for over-water nesting colonial waterbirds.

Table XIII. Estimate of nesting pairs of key colonial birds using the Malheur-Harney Lakes Basin, Oregon, 1966 through 1985, with averages for the "normal period (1966-1981) and the "wet" period (1982-1985).

Year	Double-crested Cormorant	Great Blue Heron	Black-crowned Night-Heron	Great Egret	Snowy Egret	White-faced Ibis	Franklin's Gull
1966	125	200	600	400	50	10	250
1967	50	125	250	200	60	15	250
1968	50	100	500	400	150	20	250
1969	45	110	600	235	60	20	350
1970	50	100	500	180	55	25	500
1971	45	110	750	150	35	20	600
1972	70	150	750	285	80	25	500
1973	85	200	775	230	125	55	1000
1974	75	200	1000	350	140	80	1000
1975	60	210	360	100	55	40	0
1976	40	190	400	200	80	25	200
1977	70	200	375	125	50	110	10
1978	20	40	525	400	135	190	520
1979	80	205	730	415	30	150	1100
1980	180	320	320	200	140	600	1250
1981	235	320	270	170	115	650	1330
Average 1966-81	80	174	544	253	86	127	569
1982	360	472	700	550	200	900	900
1983	330	448	800	765	100	420	150
1984	829	572	245	545	141	910	450
1985	739	331	629	562	227	1420	200
Average 1982-85	565	456	593	605	167	913	425

Table XIV. Colonial Nesting Waterbird Production Summary, Malheur NWR and Harney Basin, 1985.

Species	# Produced on Malheur NWR	# Produced Off-refuge	Total
White pelican	3	0	3
Double-crested cormorant	472	864	1336
Great blue heron	374	306	680
Great egret	192	898	1090
Snowy egret	0	410	410
Cattle egret	0	5	5
Black-crowned night heron	342	959	1301
White-faced ibis	486	2832	3318
Franklin's gull	28	252	280
California gull	0	582	582
Ring-billed gull	0	990	990
Caspian tern	0	490	490
Forster's tern*	0	180	180
Western grebe*	245	202	447
Eared grebe*	70	42	112

* Not a complete survey of all nesting sites for these species.

Frequent colony abandonment and inter-colony shifting which was prevalent in 1984 due to rapidly increasing lake levels was greatly reduced in 1985 because of more stable water levels.

Greater sandhill cranes were counted as they migrated out by C.D. Littlefield between 18 September and 4 October. This provided a unique opportunity to determine the number of cranes using the refuge and provide an accurate count for the Central Valley Population. A total of 4240 greater sandhill cranes was counted leaving the refuge for California wintering areas. In addition, 700 cranes staged on Langell Valley, Klamath Co., Oregon and 300 at Modoc NWR, Modoc Co., California. Combining numbers from these three areas, 5240 greater sandhill cranes were recorded in 1985.

Recent information indicates the subspecies is more common in southern British Columbia than orginally thought. Recent sightings of color-marked birds in British Columbia indicate cranes nesting in south-central British Columbia are migrating through Malheur NWR. Considering an estimated 3400 cranes occupy nesting habitat in Oregon and California, it is possible that over 1800 greater sandhill cranes are present in British Columbia. Future color-marking hopefully will clarify the status and distribution of the subspecies in British Columbia.

5. Shorebirds, Gulls, Terns and Allied Species

Shorebird use of the refuge was low again due to the continued high levels of Malheur, Mud and Harney Lakes. Very little shorebird habitat existed in these areas due to high water.

Unusual bird observations in this group are included in Table VI, Section G1. The most noteworthy observation of birds in this group was of an estimated 15 parasitic jaegers which harassed gulls in Harney and Malheur Lakes in September.

For the most part, birds in this group arrived within the range of dates that have been previously recorded during spring migration. Four species set new early arrival date records. Dunlins and California gulls both arrived 3 days before the previous early arrival date record, caspian terns were recorded one day early and red-necked phalaropes broke the previous record by 10 days.

Snowy plovers did not nest on the refuge this year because of continued high water conditions at their nesting areas around Harney and Stinking Lakes. By the end of the summer, Stinking Lake levels lowered enough to provide what appeared to be suitable nesting habitat.

A large colony of ring-billed and California gulls was present at the normal location on the Culp Ranch (off-refuge near Burns). A second colony which included these two gull species and also caspian terns was located on an island at the north side of Malheur Lake just northwest of the Cargill Ranch buildings (also off refuge). The number of pairs and production during 1985 for these species are summarized in Table XIII, Section C4.

Shorebirds observed during the Christmas Bird Counts on the refuge in December included only the killdeer and common snipe.

6. Raptors

Unusual raptor sightings on the refuge in 1985 included a northern goshawk, a merlin, and several sightings of lone northern saw-whet owls (See Table VI, Section C1).

Quarterly raptor surveys conducted this year are summarized in Table XV. The surveys, initiated in 1975 by C.D. Littlefield, include 15 routes covering 278 miles throughout various habitats in the Harney Basin. An additional three routes were initiated this year cooperatively with the Oregon Department of Fish and Wildlife. These routes are surveyed by the state's non-game biologist.

The surveys showed lower than normal numbers of turkey vultures, ferruginous hawks, golden eagles, prairie falcons, northern harriers and rough-legged hawks. Higher than normal numbers of red-tailed hawks, Swainson's hawks and American kestrels were recorded.

Golden eagles nesting in the vicinity of the refuge were monitored again this year. Four eagles fledged from 28 nests. Eagle production was down from 1984 (14 fledged). The major factor in this low production appeared to be the continued low population levels of jackrabbits in the basin.

Table XV. Quarterly Raptor Surveys, Malheur NWR, 1985

Species	Number Observed			
	Winter	Spring	Summer	Fall
Turkey Vulture	0	30	20	79
Sharp-shinned Hawk	0	1	0	0
Cooper's Hawk	0	0	0	1
Red-tailed Hawk	16	21	10	45
Swainson's Hawk	0	8	4	17
Ferruginous Hawk	0	2	0	2
Golden Eagle	6	10	9	10
Bald Eagle	2	0	0	0
Prairie Falcon	2	2	2	4
American Kestrel	4	52	7	49
Osprey	0	0	0	0
Merlin	0	1	0	0
Northern Harrier	12	35	11	22
Rough-legged Hawk	114	4	0	0
Great-horned Owl	2	0	0	0
Short-eared Owl	0	0	0	0
Burrowing Owl	0	3	5	0
Black-billed Magpie	26	3	3	2
Common Raven	103	133	63	366
Common Crow	0	15	7	41
Loggerhead Shrike	11	6	10	17
Northern Shrike	8	0	0	0

7. Other Migratory Birds

Table VI. (see G1.) summarizes some of the more unusual passerine bird sightings reported in 1985.

Spring migration resulted in many new early arrival dates in 1985. Lincoln's sparrow set a record for their latest arrival date (15 May).

Loggerhead and northern shrikes, black-billed magpies, American crows and common ravens are censused during quarterly raptor surveys. Common ravens continue to be the most common bird recorded on these surveys with total numbers above the 8 year average for the spring and fall counts but below average for the winter, and summer counts. Magpie numbers were below average throughout the year while shrike and American crow numbers were about normal.

The common raven receives extra attention at Malheur because it has been documented to be a major egg predator. During the winter months, common ravens congregate in communal night roosts which are monitored and censused. Raven roosts counted in early February totaled 1,363 ravens (airport and SE Malheur Lake).

A raven nest survey was again conducted this year. Volunteer Karlyn Mills conducted the survey. Fifty-four historical nest sites and a few new ones were monitored. Eighteen of those were active, a decrease of 28% from the previous three years. Four raven nests were lost on Malheur Lake to record lake levels and no alternate nests were located.

On June 7 a bobolink survey was conducted on four transects in the Blitzen Valley. The survey, begun last year, showed declines in males from 200 to 131 and females from 72 to 20. The survey is conducted to determine bobolink (former sensitive species) response to land use practices. Some of the decline in 1985 is attributed to flooding in the Sodhouse area by Malheur Lake.

Additional activities this year included conducting two Christmas Bird Counts, four Breeding Bird Surveys, and two Dove Coo Counts. A Harris' sparrow recorded on the P-Ranch Christmas Bird Count was a new species for the count. The Sodhouse Christmas Bird Count set record lows for many species, particularly waterfowl. Presumably this was due to record low temperatures which prevailed during much of November and December.

8. Game Mammals

The local mule deer population appeared to be slowly recovering from the effects of the previous two severe winters. The majority of the does on the refuge had twin fawns in 1985.

A herd of approximately 100 pronghorn antelope using the Lava Beds grain field in early December was reported by heavy equipment operator, Marvin Jess. Tom Downs observed a mountain lion near Page Springs Dam in mid-February.

10. Other Resident Wildlife

Resident populations of quail, chukar and ring-necked pheasants increased in 1985 from the previous year but they still have not fully recovered from the crash during the winter of 1981-82 caused by severe winter weather.

The annual Malheur Lake muskrat count (aerial) was conducted on 15 February. The survey estimated 383 houses and 1,915 muskrats on Malheur Lake, 78% of which were off refuge. This estimate contrasts sharply with the estimate of 11,910 houses and 60,000 muskrats during the winter of 1981-82. The near elimination of muskrats on the lake is due to a population crash in 1982 followed by record lake levels from 1982 to the present which have virtually eliminated emergent vegetation on the refuge portion of the lake.

Rabbit surveys were conducted quarterly during the year and jackrabbit populations continued to remain very low throughout the year. However, at year's end scattered pockets of jackrabbits were observed in the county which may signal the beginnings of a long-awaited recovery from the "crash" which began during the winter of 1981-82 and has continued to the present.

Coyote numbers were down in the county; however, observations throughout the year gave evidence to the fact that the refuge still supports a healthy and prospering coyote population. Coyote research conducted by the Oregon Department of Fish and Wildlife on lands adjacent to the Blitzen Valley portion of the refuge estimates coyote densities of 1.5 animals per square mile. It is believed that refuge densities exceed this estimate but no surveys have been conducted to date to estimate refuge coyote populations. We plan to begin this effort in 1986.

11. Fisheries Resources

A Fisheries Management Plan was written for the Blitzen River and its tributaries. These streams will be managed for native redband trout secondarily to migratory bird objectives. The plan was written by Bill Hosford, ODFW District Fisheries Biologist and Brad Ehlers. Current plans to enhance the trout fishery are aimed at stream quality protection and enhancement.

A habitat project was initiated to provide structure to improve survival of bass and crappie fry and fingerlings in Krumbo Reservoir. District Fisheries Biologist Bill Hosford recommended the actions. Nearly 500 tires were banded together in groups of three and submerged along the shoreline and 500 willow cuttings were planted along the waters edge. Fifteen local volunteers, Kim Reaney (OSP Game Trooper), Tom Downs and Brad Ehlers assisted in the habitat improvement project which took place on two Saturdays in the spring.

Volunteers assembling tire "bass houses" at the ODFW compound in Hines. They were later lowered into Krumbo Reservoir to add "structure" to the reservoir bottom.
February Bill Hosford

Carp populations remained high in the Harney-Mud-Malheur Lake system. No test netting was accomplished this year. Carp numbers are expected to increase quickly until they reach an equilibrium with the increased water volume available.

12. Wildlife Propagation and Stocking

ODFW planted 40,000 three inch, native redband trout fingerlings in Krumbo Reservoir in the spring. This stocking was continued as recommended in the Fisheries Management Plan in an effort to establish a two-tiered fishery with large-mouth black bass and white crappie. Rainbow trout were also stocked between Page Springs Dam and the P-Ranch Substation in an effort to keep fishing pressure off the native redbands above Page Springs Dam.

16. Marking and Banding

C.D. Littlefield captured, banded and color-marked 12 greater sandhill cranes on the refuge (see D5, MLH-30). Sue Lindstedt monitored marked cranes on the wintering grounds in California.

Four adult trumpeter swans were captured during their moult and banded and collared (see D5, MLH-21). Because only two cygnets were produced, it was decided not to band them.

In late July, 31 white-faced ibis were color-marked in East Knox Pond (see D5, MLH-32), a continuation of a three-year cooperative study initiated in 1984 by the refuge and the Oregon Department of Fish and Wildlife.

Mallard banding quotas continued to be 200 of each age and sex. As usual, juveniles were hard to come by. Baited swim-in traps were used to capture ducks at West Buena Vista and East Knox Ponds. Mallards banded included 262 adult males, 200 adult females, 63 young males and 42 young females. An additional 32 mallards were banded that had recovered from avian botulism. These were not included in the banding quota totals.

Table XVI. Numbers of each species of birds banded under the refuge permit in 1985.

Species	Number Banded
Snowy Egret	1
White-faced Ibis	64
Trumpeter Swan	4
Canada Goose	1
Mallard	599
Gadwall	12
Northern Pintail	13
American Wigeon	3
Northern Shoveler	7
Cinnamon/Blue-winged Teal	22
Green-winged Teal	7
Redhead	3
Ring-necked Duck	3
Lesser Scaup	1
American Coot	32
Greater Sandhill Crane	12
Caspian Tern	119
Ring-billed Gull	76
California Gull	57
Barn Swallow	6
Yellow Warbler	4
Wilson's Warbler	8
Pine Siskin	1
Lazuli Bunting	1

17. Disease Prevention and Control

A mild outbreak of avian cholera occurred in the basin from late February through mid-April. Only 21 dead birds were actually picked up. A total of approximately 100 dead birds were observed at scattered locations from the air during waterfowl counts in March and April. The majority of these birds were white geese and coots.

Avian botulism was discovered on Malheur Lake in mid-July. Dead birds were picked up with airboats through early September when no fresh dead birds were being found.

Unusually warm temperatures occurred from mid-July through early August and it is assumed that this was the major factor in the initiation of the outbreak. Very cool weather in late August and early September apparently stopped the outbreak.

A total of 3674 dead birds were actually picked up (includes sick birds which later died). Of this total, 84.9% were ducks (48.2% were mallards), 3.4% were western grebes, and 2.5% were coots. The remaining percentages were composed of a wide variety of shorebirds and waterbirds (see Table XVII). It is estimated that at least 5000 birds were lost during the outbreak.

A total of 262 sick birds were picked up and brought to refuge headquarters for treatment. Each bird was given .5 cc of anti-toxin and provided food, water, and shade. Of these, 77% recovered and were released.

Table XVII. Malheur National Wildlife Refuge 1985 Botulism Pick-up Summary.

	TOTAL	% OF OVERALL TOTAL
WATERFOWL:		
Mallard	1771	48.2
Pintail	387	10.5
Gadwall	327	8.9
Shoveler	97	2.6
Cinnamon/Blue-winged Teal	204	5.6
Green-winged Teal	131	3.6
Wigeon	43	1.2
Redhead	2	0.1
Lesser Scaup	2	0.1
Wood Duck	2	0.1
Unidentified Duck	148	4.0
TOTAL DUCKS	3114	84.8
Canada Goose	7	0.2
TOTAL WATERFOWL	3121	84.9
OTHER BIRDS:		
Coot	94	2.6
Sora	18	0.5
Pied-billed Grebe	1	0
Eared Grebe	1	0
Western Grebe	127	3.5
California Gull	11	0.3
Ring-billed Gull	248	6.8
Franklin's Gull	2	0.1
Caspian Tern	7	0.2
Great Blue Heron	1	0
Snowy Egret	2	0.1
White-faced Ibis	6	0.2
White Pelican	6	0.2
Killdeer	1	0
Least Sandpiper	1	0
Wilson's Phalarope	1	0
Long-billed Dowitcher	2	0.1
Black-necked Stilt	18	0.5
Raven	1	0
Yellow-headed Blackbird	1	0
Red-winged Blackbird	3	0.1
TOTAL OTHER BIRDS	553	15.1
OVERALL TOTAL	3674	100

H. PUBLIC USE

1. General

Total visits in 1985 doubled last year's count (see Table XVIII). May continued to be the most popular month with 8,500 visits. This extremely high use was due to a dry spring resulting in good road conditions. All the roads were finally open after several years of constant road construction to keep them above the rising lake waters. The flood in this basin was covered in the Portland Oregonian Newspaper and on Boise, Bend and Portland TV Stations. This coverage attracted many people that just wanted to see the historic high water levels in Malheur Lake. The hill above refuge headquarters became a favorite overlook for "flood watchers".

Visitation increased markedly in May. Many people came to see the historic water level in Malheur Lake. This flooded house on the Taylor place became well-photographed.
March DNJ

Consumptive use totaled 5,420 visits for 24% and non-consumptive use totaled 16,660 for 76% of the total visits. Malheur's visitors have traditionally been largely nonconsumptive. Excellent fishing at Krumbo Reservoir and on the Blitzen River accounted for the increase in consumptive use over that in recent years. The refuge headquarters museum continued to be the major attraction (64% of total visits).

Table XVIII. Total Visits by Calendar Year, Malheur NWR

Visits	Year
37,866.	1978
31,325	1979
26,185	1980 (high gas prices)
35,885	1981
36,395	1982
19,880	1983 (flooding)
11,220	1984 (flooding)
22,080	1985

On August 16, Interior Secretary Hodel landed at the Harney County Airport on his way to Crater Lake National Park. He was accompanied by U.S. Representative Bob Smith who gave Hodel an aerial inspection. Manager Constantino was one of many local, state, and federal representatives who greeted him at the local airport.

Many staff members provided information and/or tours to newspaper and television reporters on the flood situation, habitat management and the predator management plan. Malheur made the Portland Oregonian almost monthly and was featured on several state television newscasts and one national television newscast.

6. Interpretive Exhibits/Demonstrations

The nearly 200 species of mounted birds in the Benson Memorial Museum at refuge headquarters continued to attract the majority of refuge visitors. Sixty-four percent of refuge visitors stopped to view the displays while touring the refuge. The bulk of these birds were mounted by George Benson and Patricia Hansen in the 1930's and 40's. Further interpretation of the exhibit is planned when funds become available.

7. Other Interpretive Programs

On-refuge programs were given to 550 visitors. These usually consisted of slide shows to college wildlife classes and large birding groups followed by a question and answer period. All refuge personnel participated in this activity.

The fourth annual John Scharff Migratory Waterfowl Festival was headquartered at the Burns Union High School April 13 and 14. Federal and state wildlife professionals guided bird tours via bus in the Harney Basin. Films, art exhibits and speakers filled the evening agendas. Lesser sandhill cranes traditionally stage on a field adjacent to Burns' east side along State Highway 78. They were the stars of the festival. Runoff from the Silvies River was not sufficient to flood meadows near Burns this year so the waterfowl migration was not as spectacular as it has

been in previous years. Many birds simply overflew the area. The festival is sponsored by the Burns-Hines Rotary Club. The Kiwanis Club joined the event this year by offering airplane tours of the basin.

Brad Ehlers participated in Career Days at the Burns Union High School on March 1st. ODFW biologists Lemos and Garner, and State Trooper (game division) Reaney joined Brad in presenting programs to three classes and answering their questions. Fifty-five students participated in the three sessions.

8. Hunting

The northwestern one-third of Malheur Lake was opened to waterfowl hunting as in past years. Flood waters have removed most of the emergents and little use was noted on the area. Oregon elected to have their first split season this year. The season ran from October 12 thru November 10 and from November 28 thru January 12. Daily limits were also curtailed to five birds daily with no more than one hen mallard and one hen pintail and two either/or canvasback and redhead. Goose limits were three dark (Canada and white-fronted) and three white (snow and Ross') with a state-wide closure on cacklers due to their low flyway numbers. Bird use and hunter success were too low in this area to evaluate hunter compliance with these new restrictions.

An upland game hunt was held in the Blitzen Valley between headquarters and Diamond Lane November 16-24. Pheasants are the main focus of activity during this hunt. Success is not spectacular compared to other areas. However, it offers the only opportunity to hunt pheasants on public land within the basin. It offers the refuge some positive public relations and provides hunters with a high quality experience. One hundred hunters expended 400 activity hours to bag 50 roosters and 30 California quail this year. Fifty hunters bagged 30 roosters on opening day.

9. Fishing

Krumbo Reservoir and the Blitzen River and tributaries were open to fishing from April 27 through October 31. Open streams included the Blitzen River from Page Springs Dam to Bridge Creek, the East Canal from Page Springs Dam to Bridge Creek, the entire lengths of Bridge and Mud Creek, the West Canal from Page Springs Dam to the first fence crossing and Krumbo Creek from Krumbo Reservoir upstream to the eastern refuge boundary.

Fishing accounted for 22% of total refuge visits. This is a marked increase over past years and is due to improved fishing this year. The early spring left streams low and clear for most of the season. This improved fishing

success and increased the use. Krumbo Reservoir provided excellent fishing from mid-May thru the end of the season. These fish were stocked by ODFW crews in 1984.

Fishermen were encouraged to return bass to the reservoir until their numbers increased. Several fishermen contacted by refuge and state personnel reported that they had complied with the request. (See Section G12.) However, most fishermen were reluctant to return large bass (major spawners) to the water.

This sign was erected at Krumbo Reservoir in an effort to give the warm-water fishery a boost. Fishermen responded to this request moderately well.
April BDE

Vehicle traffic along the Blitzen River and around Krumbo Reservoir was curtailed with the use of signs and barriers. Angler compliance in these areas was excellent.

11. Wildlife Observation

This category includes visitors on foot and in their cars simply looking at wildlife. Greater sandhill cranes, trumpeter swans and other waterfowl demand the most attention in the spring. Migrating passerines stopping at the refuge headquarters trees add to the attraction in May and again in the early fall months. Over 70% of refuge visitors participated in these activities.

17. Law Enforcement

The refuge manager and both assistants have law enforcement credentials on this station. Although this station is large in size, enforcement duties are not that great. The annual LE in-service was held at the California State Patrol Training Academy in Sacramento. This training included experience with tear gas, firearms qualification, and regular refresher segments. The second firearms qualification was held near Burns with local Oregon State Police Range Officer Tim Cundell.

Enforcement activities are concentrated during seasons of increased deer poaching and during peak consumptive use periods on the refuge. Brad Ehlers apprehended two individuals for shooting at a large antelope buck near Knox Spring. Richard Voss apprehended two individuals for shooting a large mule deer buck in the Larson Field near Diamond Lane. He acted on C.D. Littlefield's report.

Ehlers and Ivey apprehended two individuals who were in charge of a church youth group which used a rubber raft to gain access to a pelican and egret nesting island on Malheur Lake. The six individuals paddled the raft in rough, deep water without life vests. The two adults were charged with disturbance of nesting birds and for not possessing life saving devices. Pelicans had not nested on Malheur Lake since 1960. However, they still brought off three young despite the disturbance. Four young common egrets died as a result of the disturbance. See Table XIX for a summary of 1985 apprehensions.

Oregon State Troopers (Game Division) Kim Reaney and John Copenhaver assisted refuge personnel on numerous occasions. Their efforts were welcomed and appreciated.

Table XIX. Convictions Resulting from Federal and State Apprehensions on Malheur NWR, 1985.

Violation	Number
Hunting in closed area	9
Shining on refuge	1
Fishing in closed area	1
Chumming fish	4
Disturbance to nesting birds	2
Boating without lifesaving device	2

I. EQUIPMENT AND FACILITIES

1. New Construction

Heavens Gate Construction completed their contract for the refuge headquarters sewer project thru local subcontractors. Gyllenberg Construction contracted to complete foundations for the three houses and two garages that were moved out of Malheur Lake flood waters in the spring of 1984 by a different contractor. A separate contract was issued to place the buildings, close the foundations and construct a crawl space entrance. Ken Neuberger RO-EN performed final inspections on Oct. 22.

Houses were moved to the northeast slope of Refuge Headquarters hill to prevent water damage from Malheur Lake.
July DNJ

The headquarters contract work progressed slowly this year as contractors, subcontractors, workmen, inspectors, refuge managers, maintenance personnel, engineers and archeologists held numerous meetings and inspections to work out the "hang ups". Ehlers, Warneke, Jess and Miller all spent a considerable number of hours each week coordinating these contracts.

2. Rehabilitation

The bridges at Mud Creek, Boca Lake, West Canal, Grain Camp Dam, and the Blitzen River (Ramelli) were repaired and/or replaced. The Warbler Pond Dike and adjacent roads were ripped, packed, and resurfaced. Approximately 1 mile of canals and ditches in Diamond Swamp, Unit 8 and 10 were cleaned by dragline. This was a very welcome start on the rehab needed to restore the water delivery system to full capacity. Washouts near Busse Dam in the Blitzen River and Stubblefield Canal were repaired.

3. Major Maintenance

Maintenance projects included flood irrigating 60,000+ acres of wet meadow, grading 30+ miles of roads, maintaining 300+ water control structures, repairing 10+ washouts, building 6 bridges, rehabilitating water control structure walkways, signing areas for visitors, rebuilding 15+ miles of fence, mowing/spraying roadside ditches, maintaining water levels on 50+ ponds and reservoirs, monitoring a 30,000+ AUM grazing/2,500+ ton haying program, placing 10 metal gates, botulism clean-up, banding birds, and leaping tall buildings in a single bound!...an honest days work and a job well done!

Clyde Miller and Norm Warneke installing piling in the East Canal to improve irrigation in the adjacent field.

August TED

4. Equipment Utilization and Replacement

A new John Deere tractor/loader and two mowers were delivered in July by Harney County Farm Supply. Bids were taken through the RO on the three pieces of new equipment which were purchased with ARMM funds. They will be used in pre-suppression and prescribed burn preparation.

We continued to pay monthly rent for a GSA dump truck that the local GSA contract service facility can't keep on the road! It was returned to be repaired 8 times this year! This greatly hampered maintenance efforts.

5. Communication System

A radio base station was installed at the Burns office and Oregon State Patrol crystals were placed in three refuge vehicles used for law enforcement work.

6. Computer Systems

This year we spent many hours on the computer. Word processing accounted for 70% of our computers use. By the EOY we had a number of dBase systems to track and analyze haying and grazing permits; vegetation, water and wildlife information and management actions by field; monthly waterfowl census data; and the stations budget and obligation records.

Using a program called POP II prepared by Fossil Creek Software, Fort Collins, Colorado we were able to model the Refuge's greater sandhill crane population. The information developed by the sandhill crane model was a factor in gaining public concensus that the Refuge should take immediate action to increase crane production.

7. Energy Conservation

Vehicle Milage Use - MNWR 1980-1984

Year	Milage	% Change
1980	143,400	-
1981	111,292	-33%
1982	137,320	+22%
1983	172,050	+25%
1984	151,100	-12%
1985	181,100	+17%

J. Other Items

1. Cooperative Programs

This station hosted the sixth annual Burns Interagency Wildlife Meeting at the Harney County Courthouse on March 13. Brad Ehlers organized and served as the chairman for the event. Manager Constantino presented the past, present, and future of livestock grazing on the refuge. He was followed by representatives of the U.S. Forest Service and BLM on the same topic. This was followed by a discussion of grazing on public lands by the entire group. Gary Ivey presented a slide program on wildlife responses to livestock grazing on the refuge. Two other grazing-related papers were presented by BLM and USDA - Squaw Butte Experiment Station. The afternoon was spent on program summaries by wildlife biologists from the various agencies. Agencies represented by the 36 individuals in attendance were: Malheur NWR, ODFW-Hines and John Day, U.S. Forest Service - Hines and John Day, SCS, USDA-Squaw Butte Experiment Station-Burns and Union Station, Murderers' Creek WMA-ODFW and Burns BLM.

The U.S. Geological Survey maintained a continuous-recording water gauge in Malheur Lake at the refuge's request. The gauge was placed approximately 100 yards north of Quarters #2 near the former photo blind location. This gauge provides unquestionably accurate lake level data to a variety of agencies.

Refuge personnel assisted the Soil Conservation Service with the Steens Mountain snow surveys. These surveys provide a base for irrigation planning in the Blitzen Valley and enable more precise estimates of lake level peaks for the year.

Weather data was recorded at four locations on the refuge. Evaporation data was gathered at refuge headquarters.

Brad Ehlers volunteered to assist Migratory Bird Management by serving as the crew leader for the ground-truthing of aerial waterfowl breeding pair counts in the western Dakotas and eastern Montana. Brad worked with Pilot Biologist Jim Voltzer for fourteen days in May completing these transects. Northeastern Montana continued to experience a severe drought combined with accelerated tillage of grasslands causing severe wind erosion. Needless to say, habitat quality was poor for nesting waterfowl.

3. Items of Interest

The employees and family of Malheur Refuge continued to be active in professional and civic affairs. A partial history of their involvement follows:

Constantino - George was elected to the Board of Directors of the Lion's Club and served as Lion's Membership Chairman. He also served on the Special Resolution Committee on Grazing in the West for the Oregon Chapter of the Wildlife Society. Flor served as a Board Member for the Holy Family Society, taught Sunday School and organized a local group for Mothers to share parenting ideas.

Voss - Richard served on the Board of Directors for the Klamath Basin Audubon Club and as such was active in leading field trips, environmental education, the bald eagle conference and desert wilderness. He also served on the Sodhouse School Board. Katherine was chairperson for the Klamath Basin Audubon Club and the Klamath Falls Junior and Senior High School System.

Ehlers - Brad served as President of Peace Lutheran Church and Co-Chairman of the local Ducks Unlimited Committee. He is also a member of several conservation organizations and the Burns-Hines Rotary Club which sponsors the Annual Spring Waterfowl Festival. Dee served as Treasurer of Peace Lutheran Church, taught Sunday School and was a member of Peace Women's Club.

Johnson - Dave was active in the Pioneer United Presbyterian Church, Burns Lion's Club, Isaac Walton League and the Society of Range Management. He also served as a member of the local Ducks Unlimited Committee, the Hines Volunteer Fire Department and was a Cub Scout Assistant Scout Master. Kaye served as President of Pioneer Presbyterian's Women's Club.

Paullin - Dave served as Oregon Chairman for the Trumpeter Swan Society and a member of several conservation organizations. Dave was also the Chairman of the Budget Board for Burns School District #1. Cathy served as Vice President of the Holy Family Society and as a member of Beta Sigma Phi Sorority.

Ivey - Gary was active in several conservation organizations. Angela was the Clerk for the Sodhouse School District.

Jess - Dovie continued her active role in caring for the less fortunate in the community.

Miller - Arlene was active in the Harney County Cowbelles.

Downs - Tom served as Trustee for the First Evangelical Lutheran Church and as a member of Ducks Unlimited.

Nuffer - Blake served on the Double-O School Board.

Buck - Becky served as Secretary/Treasurer of the Riley Community Club and Vice-President of the Suntex School District #10 PTA. Becky and Al were both active in the Hi-Desert Fur Takers Association.

4. Credits

George M. Constantino - A, C, D 1-4, F 10-12, I6.

Richard W. Voss - I 1-5, 7 and staff photo.

Bradley D. Ehlers - B, E 2-3 & 6-8, F 4&9, G 11-12, H 1-19, J 1-4 and K.

David N. Johnson - F1, 3 and 5-8.

David G. Paullin - D5 and G3.

Gary L. Ivey - E4, F2, abd G 1-2, 4-10, 13-17.

C.D. Littlefield - Part of D5 and parts of G4-10.

W. Ruth Warneke - E5.

Arlene Miller - E1.

Rebecca E. Buck - Typing and assembly.

All personnel have contributed to the information necessary to compile this report. This narrative was edited by Brad Ehlers and George Constantino.

K. Feedback

Subject: New policy requiring approvals before attending meetings on government time.

> "The attached memorandum outlines the latest guidance on meeting attendance approval procedures. If you review the meeting attendance approval diagram, you will see that local chapter meetings of professional societies now require the Director's approval even if the total regional expenditure is less than $5,000. This would include Wildlife Society state chapter and section meetings. According to the Deputy Director's memo of August 1984, even employees who are attending meetings at their own expense must secure the Director's approval, if they wish to go on duty status."

We feel that this policy is unnecessarily restrictive. Many field employees become experts on species or habitat management occurring on their assigned refuge. They naturally want to interact with other experts to discuss common goals and problems related to their expertise. This interaction benefits both the employee and the resource.

Many employees at Malheur have attended meetings on government time but pay for their own room and board. The Oregon Chapter of the Wildlife Society was usually attended annually by biologists and managers from Malheur. At least one formal presentation was given annually and other employees attended sessions and entered into discussions and interacted with other professionals and the public in attendance. This attendance always brought a favorable response. Two employees went on to be officers of the society and many contacts were made at the meeting which ultimately resulted in resource benefits. Attendance also emphasized the importance of publishing and sharing scientific knowledge.

With limited attendance, other agency professionals and professional societies will ask why we are not continuing our support. We further contend that his new policy destroys initiative and lowers morale. This will be especially true of newer employees.

A better way of doing business would be to give the Project Leader a station travel dollar ceiling and the authority to make the decisions on how to best use them.

The Department is not saving money by restricting travel, it is simply spent elsewhere. The total budget remains the same.

We as wildlife professionals need to interact more with others in our field to keep current. This applies especially to remote areas as many refuge employees find themselves in.

Birds

Malheur National Wildlife Refuge

OREGON

Birds

A great diversity of habitats from barren playas to lushly vegetated meadows, attract a variety of bird species to Malheur. The Blitzen Valley, the most accessible portion of the refuge, is made up of meadows dotted with man-made ponds surrounded by sage uplands and basalt rimrocks. Most every species on the refuge can be seen between headquarters and Frenchglen.

The irrigated lawn and woodlot at headquarters is the hotspot for the spring songbird migration (usually peaks in mid-May). The metal tower at P Ranch is famous for its turkey vulture concentrations in the summer.

Early morning and late evening are the best times for observing all wildlife. Abundance of species may vary by the season, as can be seen in the listing which follows.

An exploited colony of egrets, herons, cormorants and ibis was the original purpose for setting Malheur aside as a bird sanctuary in 1908. This colony is still present on the lake, but is not accessible to the public to protect the young birds. A reintroduced flock of Trumpeter Swans also nests on the refuge. Spectacular concentrations of cranes, geese and ducks can usually be viewed in the Blitzen Valley grain fields in September and October.

Good birding!

Those species marked with an * have recently or still do, nest on the refuge. *Italic print* indicates endangered or threatened in Oregon (Federal list). Season and abundance are as follows:

SEASON DESIGNATIONS

S — Spring (March-May)
S — Summer (June-August)
F — Fall (September-November)
W — Winter (December-February)

ABUNDANCE SYMBOLS

a — abundant species
c — common; certain to be seen in proper habitat
u — uncommon; present but not certain to be seen
o — occasionally seen
r — rarely seen (intervals of 2 to 5 years)

	S	S	F	W
LOONS				
Common Loon	r		r	
GREBES				
Horned Grebe*	o	o	r	r
Eared Grebe*	c	c	c	r
Western Grebe*	c	c	c	r
Pied-billed Grebe*	c	c	c	o
PELICANS and CORMORANTS				
White Pelican	u	c	u	r
Double-crested Cormorant*	u	u	u	o
HERONS and BITTERNS				
Great Blue Heron*	c	c	c	u
Great Egret*	c	c	c	
Snowy Egret*	u	u	u	
Black-crowned Night Heron*	c	c	c	r
Least Bittern*	r	r	r	
American Bittern*	u	u	o	r
IBIS				
White-faced Ibis*	u	u	u	r

	S	S	F	W
WATERFOWL				
Whistling Swan	a	r	a	u
Trumpeter Swan*	u	u	u	u
Canada Goose*	c	c	a	c
White-fronted Goose	u		u	r
Snow Goose	c	r	u	r
Ross' Goose	u		u	
Mallard*	c	c	a	c
Gadwall*	a	c	u	u
Pintail*	a	u	a	u
Green-winged Teal*	u	u	c	u
Blue-winged Teal*	u	u	o	r
Cinnamon Teal*	c	a	c	r
European Wigeon	r		r	r
American Wigeon*	c	u	c	u
Northern Shoveler*	c	c	c	o
Wood Duck	r	o	u	r
Redhead*	c	a	a	o
Ring-necked Duck*	u	r	u	o
Canvasback*	c	u	c	o
Lesser Scaup*	c	u	c	o
Common Goldeneye	c	r	c	u
Barrow's Goldeneye			o	o
Bufflehead	c	r	c	c
White-winged Scoter	r		r	
Ruddy Duck*	c	c	c	o
Hooded Merganser	o		u	u
Common Merganser*	c	u	c	c
VULTURES, HAWKS and FALCONS				
Turkey Vulture*	c	c	c	r
Goshawk				o
Sharp-shinned Hawk	u		u	o
Cooper's Hawk	o	r	u	o
Red-tailed Hawk*	c	u	c	u
Swainson's Hawk*	u	u	u	
Rough-legged Hawk	c		a	a
Ferruginous Hawk	o	o	u	o
Golden Eagle*	c	c	u	c
Bald Eagle	r		r	u
Marsh Hawk*	c	c	c	u
Osprey	r	r	r	
Prairie Falcon*	u	u	u	o
Peregrine Falcon	r	r	r	r
Merlin	r		r	
American Kestrel*	u	u	u	o
GALLINACEOUS BIRDS				
Sage Grouse	o	o	u	r
California Quail*	c	c	u	c
Mountain Quail*	r	r	r	r
Ring-necked Pheasant*	c	c	c	c
Chukar*	u	u	u	u
CRANES				
Sandhill Crane*	c	c	a	o

	S	S	F	W
RAILS				
Virginia Rail*	u	u	u	r
Sora*	c	c	c	
American Coot*	a	a	a	u
PLOVERS				
Semipalmated Plover	u		u	
Snowy Plover*	u	u	u	
Killdeer*	c	c	c	o
American Golden Plover	r		r	
Black-bellied Plover	o		o	
SHOREBIRDS				
Common Snipe*	c	c	c	o
Long-billed Curlew*	c	c	u	
Spotted Sandpiper*	u	u	u	
Solitary Sandpiper	r		r	
Willet*	c	c	u	
Greater Yellowlegs	u	o	u	r
Lesser Yellowlegs	o	r	u	
Pectoral Sandpiper	r		o	
Baird's Sandpiper	r	r	r	
Least Sandpiper	c	u	c	
Dunlin	u	u	u	
Long-billed Dowitcher	c	c	c	
Western Sandpiper	u	u	u	
Marbled Godwit	u	o	o	
Sanderling	r		r	
American Avocet*	c	u	c	
Black-necked Stilt*	u	u	o	
PHALAROPES				
Wilson's Phalarope*	c	c	u	
Northern Phalarope	u	o	u	
GULLS and TERNS				
California Gull	c	c	c	r
Ring-billed Gull	c	c	c	r
Franklin's Gull*	c	c	u	
Bonaparte's Gull	r	r	r	
Forster's Tern*	c	c	u	
Caspian Tern	o	u	o	
Black Tern*	c	c	u	
PIGEONS and DOVES				
Band-tailed Pigeon	o	o	r	
Rock Dove*		o		
Mourning Dove*	c	c	c	r
CUCKOOS				
Yellow-billed Cuckoo	r	r		
OWLS				
Barn Owl*	o	o	o	o
Screech Owl	r	r	r	r
Flammulated Owl	r		r	
Great Horned Owl*	c	c	c	c
Burrowing Owl*	u	u	u	r
Long-eared Owl*	u	u	u	u
Short-eared Owl*	c	c	c	u
Saw-whet Owl	r		r	r

	S	S	F	W
GOATSUCKERS				
Poor-will*	u	u	u	
Common Nighthawk*	u	c	c	
SWIFTS				
Vaux's Swift	r		r	
HUMMINGBIRDS				
Rufous Hummingbird	u	c	u	
Calliope Hummingbird	r			
KINGFISHERS				
Belted Kingfisher*	u	u	u	u
WOODPECKERS				
Common Flicker*	c	c	c	c
Lewis' Woodpecker	u	r	u	
Yellow-bellied Sapsucker	u	u	u	r
Williamson's Sapsucker		r	r	
Hairy Woodpecker	o		o	o
Downy Woodpecker	o	r	o	o
FLYCATCHERS				
Eastern Kingbird*	c	c	c	c
Western Kingbird*	c	c	c	
Ash-throated Flycatcher*	o	o	o	
Say's Phoebe*	c	c	c	u
Willow Flycatcher*	u	c	u	
Hammond's Flycatcher	r	r	r	
Dusky Flycatcher	u	r	u	
Gray Flycatcher*	u	u	u	r
Western Flycatcher	o	r	o	
Western Wood Pewee*	c	u	u	
Olive-sided Flycatcher	o	r	o	
LARKS				
Horned Lark*	c	u	c	u
SWALLOWS				
Violet-green Swallow*	c	u	u	
Tree Swallow*	a	c	a	
Bank Swallow*	u	u	u	
Rough-winged Swallow*	u	u	o	
Barn Swallow*	c	c	c	r
Cliff Swallow*	a	a	a	
MAGPIES, CROWS and RAVENS				
Black-billed Magpie*	c	u	c	c
Common Raven*	c	c	c	c
Common Crow*	u	u	u	o
Clark's Nutcracker	r	r	r	r
CHICKADEES				
Black-capped Chickadee	o		o	o
Mountain Chickadee	o		o	o
BUSHTITS				
Bushtit*		o	o	o
NUTHATCHES				
White-breasted Nuthatch	o		o	o
Red-breasted Nuthatch	u	o	u	o
Pygmy Nuthatch		r	r	

	S	S	F	W
CREEPERS				
__Brown Creeper	o	o	o	
DIPPERS				
__Dipper*	o	o	o	o
WRENS				
__House Wren*	u	o	u	
__Winter Wren	r	r	r	r
__Long-billed Marsh Wren*	a	a	a	u
__Canyon Wren*	u	u	u	u
__Rock Wren*	c	c	c	u
MOCKINGBIRDS and THRASHERS				
__Mockingbird	r	r	r	r
__Gray Catbird	r	r		
__Sage Thrasher*	u	c	c	r
THRUSHES, SOLITAIRES and BLUEBIRDS				
__American Robin*	c	c	c	u
__Varied Thrush	▪		u	o
__Hermit Thrush	u	o	▪	
__Swainson's Thrush	▪	o	r	
__Western Bluebird	▪	r	o	o
__Mountain Bluebird*	▪	u	c	o
__Townsend's Solitaire	u	o	u	u
KINGLETS				
__Golden-crowned Kinglet	▪	r	u	o
__Ruby-crowned Kinglet	c		c	o
PIPITS				
__Water Pipit	▪		u	o
WAXWINGS				
__Bohemian Waxwing	o		r	r
__Cedar Waxwing*	o	o	u	o
SHRIKES				
__Northern Shrike	u		u	u
__Loggerhead Shrike*	c	c	c	u
STARLINGS				
__Starling*	c	c	c	u
VIREOS				
__Solitary Vireo	u	r	u	
__Red-eyed Vireo	r	o	r	
__Warbling Vireo*	u	o	▪	
WOOD WARBLERS				
__Black-and-White Warbler	r		r	
__Tennessee Warbler	r		r	
__Orange-crowned Warbler	u	r	u	
__Nashville Warbler	u	o	u	
__Yellow Warbler*	c	u	c	
__Black-throated Blue Warbler	r		r	
__Yellow-rumped Warbler*	c	u	c	r
__Black-throated Gray Warbler	o	r	o	
__Townsend's Warbler	o	o	o	
__Ovenbird	r	r	r	r
__Northern Waterthrush	r	r	r	
__MacGillivray's Warbler	u	o	u	
__Common Yellowthroat*	c	c	c	
__Yellow-breasted Chat*	u	u	u	
__Wilson's Warbler*	c	u	c	
__American Redstart	r	r	o	
WEAVER FINCHES				
__House Sparrow*	c	c	c	c
MEADOWLARKS, BLACKBIRDS and ORIOLES				
__Bobolink*	u	u	u	
__Western Meadowlark*	c	c	c	o
__Yellow-headed Blackbird*	a	a	a	r
__Red-winged Blackbird*	a	a	a	u
__Northern Oriole*	u	u	u	
__Brewer's Blackbird*	a	a	a	c
__Brown-headed Cowbird*	u	c	c	
TANAGERS				
__Western Tanager	c	u	c	
GROSBEAKS, FINCHES, SPARROWS and BUNTINGS				
__Rose-Breasted Grosbeak	r	r	r	
__Black-headed Grosbeak*	o	o	o	
__Lazuli Bunting*	u	r	▪	
__Evening Grosbeak	u	r	o	u
__Cassin's Finch	u		u	r
__House Finch*	u	u	u	r
__Pine Grosbeak	r		r	r
__Pine Siskin	u	r	u	r
__American Goldfinch*	u	u	u	o
__Lesser Goldfinch	r	r		
__Red Crossbill		r	r	
__Green-tailed Towhee	o	r	o	
__Rufous-sided Towhee	u	o	u	r
__Savannah Sparrow*	c	c	c	
__Vesper Sparrow	u	o	u	o
__Lark Sparrow*	c	u	▪	
__Black-throated Sparrow*	r	r	r	
__Sage Sparrow*	c	c	c	
__Dark-eyed Junco	c		c	u
__Tree Sparrow	u		u	u
__Chipping Sparrow*	c	u	u	
__Brewer's Sparrow*	c	c	c	
__Harris' Sparrow	r		r	r
__White-crowned Sparrow	c	r	c	o
__Golden-crowned Sparrow	o		o	
__White-throated Sparrow	r		r	r
__Fox Sparrow*	u	r	u	o
__Lincoln's Sparrow	u	r	u	r
__Song Sparrow*	c	c	c	c
__Snow Bunting				r

The following birds have been seen less than five times on the refuge and are considered accidental:

Arctic Loon
Red-necked Grebe
Cattle Egret
Louisiana Heron
Green Heron
Emperor Goose
Black Duck
European Green-winged Teal
Greater Scaup
Oldsquaw
Surf Scoter
White-tailed Kite
Red-shouldered Hawk
Black Rail
Common Gallinule
Ruddy Turnstone
Whimbrel
Red Knot
Red Phalarope
Parasitic Jaeger
Herring Gull
Sabine's Gull
Common Tern
Snowy Owl
Pygmy Owl
White-throated Swift
Black-chinned Hummingbird
Broad-tailed Hummingbird
Scissor-tailed Flycatcher
Purple Martin
Gray Jay
Blue Jay
Steller's Jay
Brown Thrasher
Veery
Blue-gray Gnatcatcher
Phainopepla
Hutton's Vireo
Northern Parula
Magnolia Warbler
Cape May Warbler
Black-throated Green Warbler
Hermit Warbler
Chestnut-sided Warbler
Bay-breasted Warbler
Blackpoll Warbler
Great-tailed Grackle
Common Grackle
Scarlet Tanager
Summer Tanager
Painted Bunting
Purple Finch
Gray-crowned Rosy Finch
Common Redpoll
Gray-headed Junco

Information

Additional information may be obtained by writing Refuge Manager, Malheur National Wildlife Refuge, P.O. Box 113, Burns, OR 97720

Notes:

Date _____ No. Species _____

Time Afield _____

Observers _____

Weather _____

Remarks _____

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

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

RF14510-2 February 1981

Hunting & Fishing

Malheur National Wildlife Refuge

Oregon

Malheur National Wildlife Refuge

Signs to Follow

Millions of people visit National Wildlife Refuges every year. Millions! The impact of humanity descending upon refuges, if not regulated in part, can degrade these wildlands. Signs grant or restrict certain activities to provide optimum freedom for visitors while also protecting refuge elements from undue human abuse. Please respect the following signs:

This sign delineates the refuge boundary. You may enter the area only on designated access routes.

Used alone or beneath a refuge boundary sign. The area behind this sign may be hunted as permitted by refuge regulations.

Used alone or beneath a refuge boundary sign. The area behind this sign may be fished as permitted by refuge regulations.

This area is closed to ALL entry. No hunting, fishing or sightseeing is permitted. No roads or trails are open to the public.

Hunting Regulations

MALHEUR LAKE AREA (18,000 ACRES)

SPECIES	OPEN DATES
Goose, Duck, Merganser, Coot, Common Snipe, Pheasant & Quail	State Seasons

- Boats without motors are permitted. All Terrain vehicles (ATV's) are prohibited on Malheur Lake.
- Temporary blinds may be constructed but such blinds shall be available for general use on a first-come, first-serve basis. Construction or use of permanent blinds is prohibited.

BUENA VISTA AREA (EAST OF HIGHWAY 205 AS POSTED: 22,000 ACRES)

SPECIES	OPEN DATES
Pheasant, Quail, Chukar, Hungarian Partridge, Rabbit and Hare	Last Nine Days of State Pheasant Season

BOUNDARY AREA (WEST OF HIGHWAY 205 AND KRUMBO CREEK AREA)

SPECIES	OPEN DATES
Goose, Duck, Merganser, Coot and Common Snipe, Pheasant, Quail, Dove, Pigeon, Chukar and Hungarian Partridge, Antelope, Deer (Gun and Archery)	State Seasons
Coyote, Rabbit, & Hare	Sept. 1 to Jan. 31

AREA CLOSED TO HUNTING

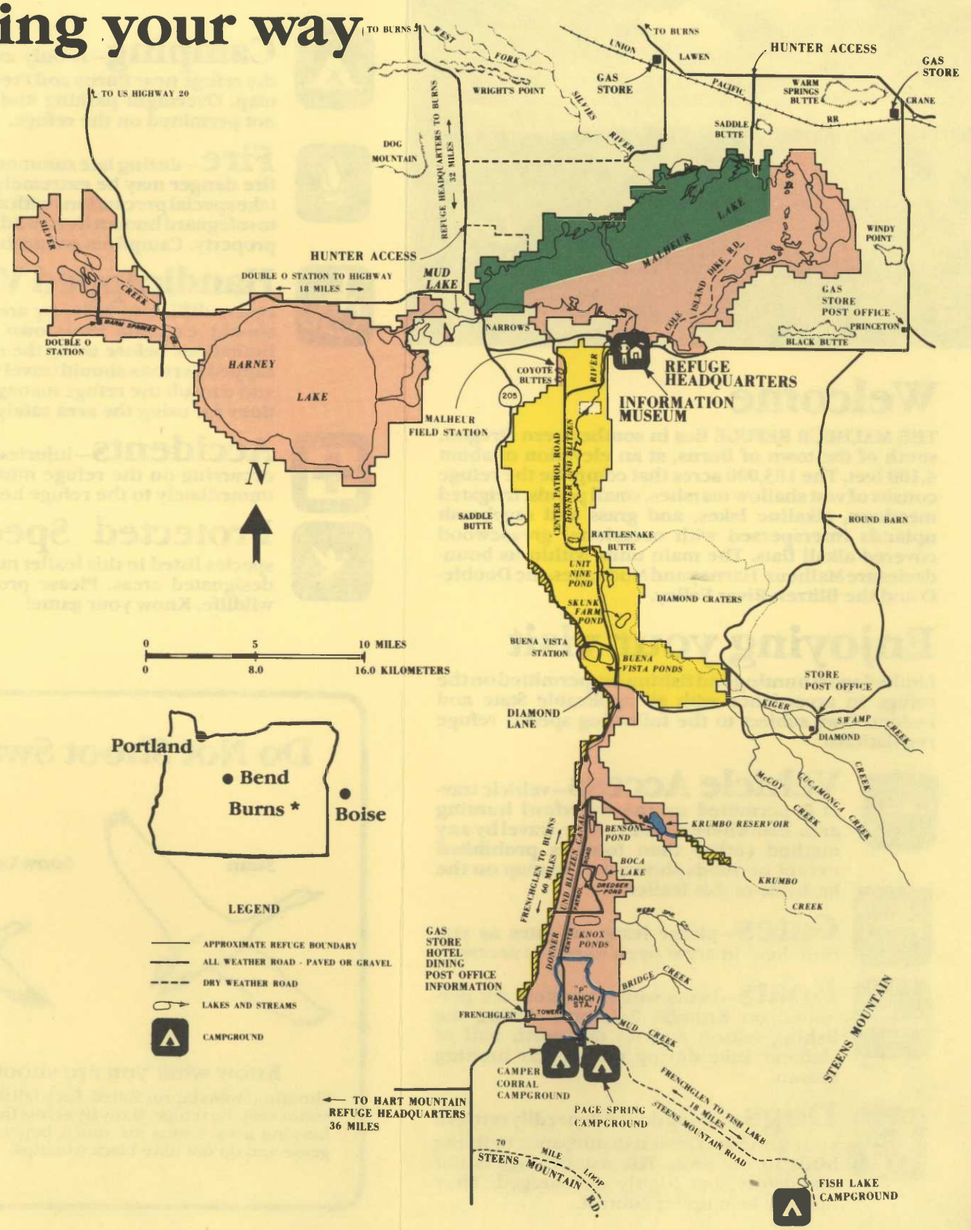
Fishing Regulations

FISHING AREAS

SPECIES	OPEN DATES
All Legal by State Regulation, Primarily Trout and Black Bass.	Concurrent With State Trout Season

- Boats without motors are permitted on Krumbo Reservoir.

Finding your way



Welcome

THE MALHEUR REFUGE lies in southeastern Oregon, south of the town of Burns, at an elevation of about 4,100 feet. The 183,000 acres that comprise the refuge consist of vast shallow marshes, small ponds, irrigated meadows, alkaline lakes, and grass and sagebrush uplands interspersed with occasional greasewood covered alkali flats. The main units within its boundaries are Malheur, Harney and Mud Lakes; the Double-O and the Blitzen River Valley.

Enjoying your visit

Limited sport hunting and fishing are permitted on the refuge in accordance with all applicable State and Federal laws subject to the following special refuge regulations:

Vehicle Access—vehicle travel is permitted on the waterfowl hunting area. Elsewhere on the refuge, travel by any method (other than foot) is prohibited except on roads shown on the map on the backside of this leaflet.

Gates—please leave all gates as you find them in areas open to public access.

Boats—boats without motors are permitted on Krumbo Reservoir during the fishing season and on the north half of Malheur Lake during the regular hunting season.

Dogs—a good dog will speedily retrieve your game and lessen disturbance to flying birds in the area. The use of dogs is not mandatory, but highly encouraged. They must be kept under control.

Camping—is only available off of the refuge near Burns and Frenchglen—see map. Overnight parking and camping are not permitted on the refuge.

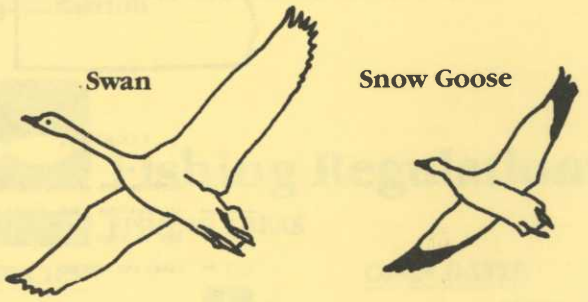
Fire—during late summer and early fall fire danger may be extremely high. Please take special precautions with all flammables to safeguard human lives, wildlife, and other property. Campfires are prohibited.

Handicapped Visitors—access difficulty varies by area and visitors should examine their own abilities and limitations before using the refuge. Handicapped persons should travel with a partner and consult the refuge manager for suggestions for using the area safely.

Accidents—injuries or accidents occurring on the refuge must be reported immediately to the refuge headquarters.

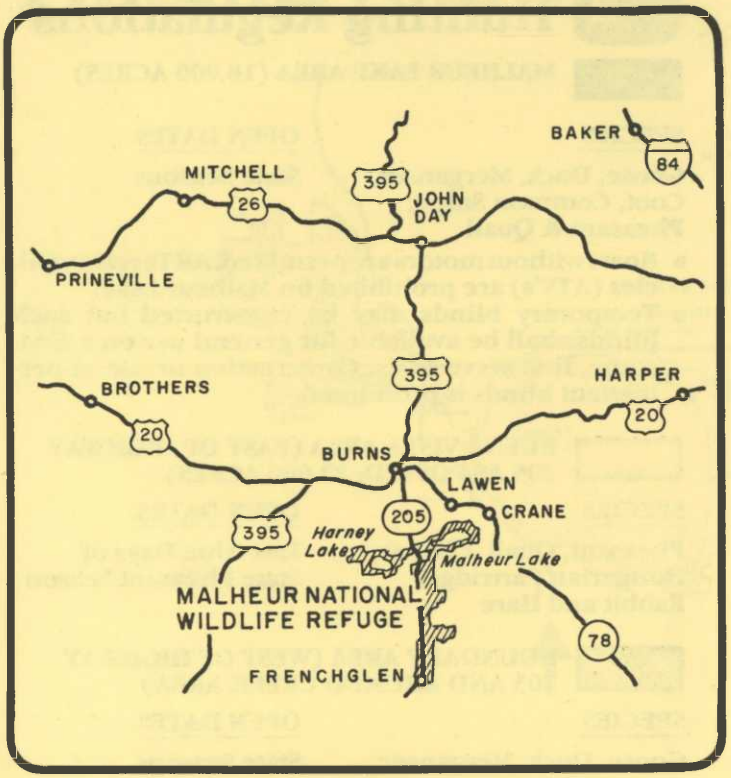
Protected Species—only species listed in this leaflet may be killed in designated areas. Please protect all other wildlife. Know your game!

Do Not Shoot Swans



Know what you are shooting!

Shooting swans is prohibited. Each fall thousands of swans visit the refuge. Many fly across the waterfowl hunting area. Swans are much larger than snow geese and do not have black wingtips.



More Information

- At the Refuge Headquarters you can obtain information about hunting, fishing, road conditions, and nearby services for gasoline, groceries and lodging.
- A museum containing exhibits of wildlife common to the refuge is also located here. It is open daily from 6:00 am to 9:00 pm
- Office hours are 8:00 am to 4:30 pm daily from the first weekend of April to Labor Day Weekend and from Monday to Friday, the rest of the year.
- For further information contact:

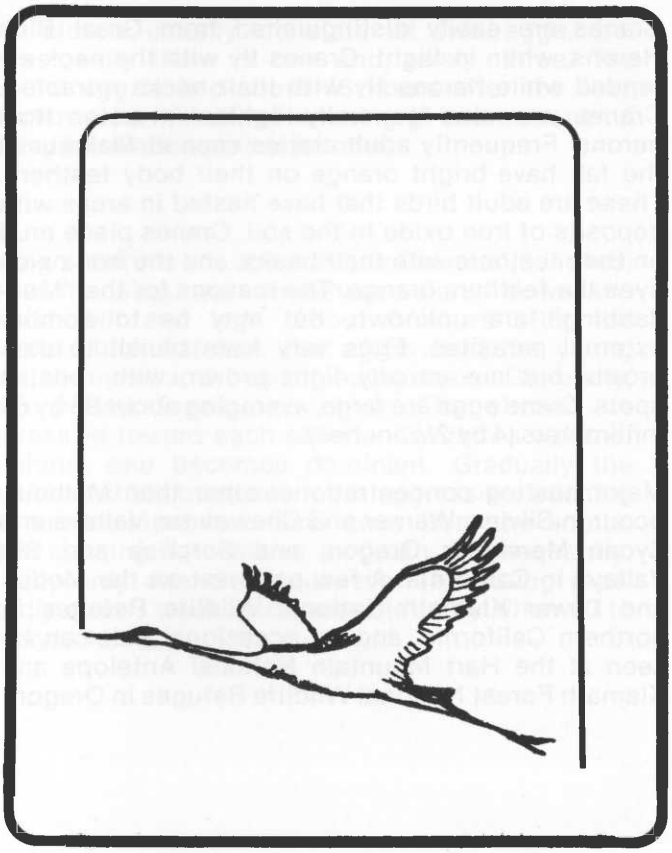
Refuge Manager
Malheur National Wildlife Refuge
P.O. Box 113
Burns, OR 97720
(503) 493-2323

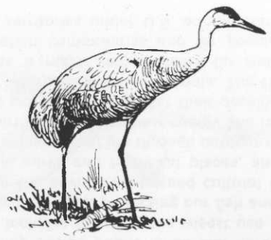
RF 13570-6

June, 1982

Greater Sandhill Crane

Central Valley Population





IDENTIFICATION

Greater Sandhill Cranes are the largest form of sandhill crane. They stand 100 to 120 centimeters (40 to 48 inches) tall and weigh from 22 to 31 kilograms (10 to 14 pounds). Adults are pale gray with a bright red forehead, which becomes accentuated during the breeding season. Fledged juveniles are similar to adults in body size, but are more rust-brown, particularly on the wings and nape of the neck. The juvenile forehead does not become distinctively red until December. However, juveniles can still be distinguished from adults well into February by the rusty brown on the back of the neck.

Up to 90 percent of the population congregates on refuge grain fields at Malheur before migrating south in the fall. These birds spend the night in communal roost sites within three kilometers (two miles) of the feeding area, providing the refuge visitor an opportunity to see an avian spectacle as they fly toward their roost sites in the late afternoon.

On cool October and November mornings when northerly winds blow, cranes begin leaving the refuge in a V-formation flying southwest to California, entering the state through Surprise Valley near Cedarville, California. The flights then turn west-southwest, passing over Alturas and Big, Round and Fall River Valleys. At the west end of Fall River Valley they fly southwest across Lassen National Park, and the town of Chico into the Central Valley as shown on Map 3.

In California, sandhills winter in an area 450 kilometers (280 miles) long between Bakersfield and Chico. Varying numbers can generally be observed during this period at the Merced and Pixley National Wildlife Refuges. In late February, the birds return to their nesting areas by the same migration route.

HISTORY

Cranes are members of an ancient group of birds. Crane fossils 40 to 60 million years old have been found in Wyoming, and other long extinct species are known from both North America and Europe. The sandhill crane has lived for nine million years in its present form. In the past, cranes ranged from Alaska to Mexico. The existence of this much larger historic range is supported by the discovery of fossil eggs near Mexico City.

LONGEVITY

It appears that cranes are a very long-lived bird. Several individuals banded in 1966 as breeding adults were alive at Malheur in 1978. Since cranes do not breed until they are 3 to 5 years old, these individuals were at least 15 to 17 years old. A female Siberian White Crane (*Grus leucogeranus*) died in the National Zoological Park in Washington, D.C. after being captive for 61 years.

THE ANNUAL STORY

Pairs and non-breeding cranes normally begin arriving at Malheur around February 20. The pairs move directly to the territories they occupied in previous years, usually in irrigated meadows, which provide food and concealment for nests. If the territories are dry upon their arrival they concentrate in flooded areas where food is abundant. About 15 percent (about 235 pairs) of the total Central Valley breeding populations nest on this area.

Nesting starts the first week in April after the meadows are flooded, and reaches a peak during late April or early May. Both males and females build the nest, which is normally completed in 1 or 2 weeks. Soon thereafter, the first egg is laid and incubation begins immediately, with both sexes participating.




Cranes are easily distinguished from Great Blue Herons, when in flight. Cranes fly with the neck extended while herons fly with their necks retracted. Cranes are also generally lighter in color than herons. Frequently adult cranes seen at Malheur in the fall have bright orange on their body feathers. These are adult birds that have nested in areas with deposits of iron oxide in the soil. Cranes place mud on their feathers with their beaks, and the iron oxide dyes the feathers orange. The reasons for the "Mud-dabbing" are unknown, but may be to combat external parasites. Eggs vary from bluish to dark brown, but are usually light brown, with reddish spots. Crane eggs are large, averaging about 98 by 64 millimeters (4 by 2½ inches).

Major nesting concentrations, other than Malheur, occur in Silvies, Warner and Chewaucan Valleys and Sycan Marsh, in Oregon, and Surprise and Big Valleys in California. A few pair nest on the Modoc and Lower Klamath National Wildlife Refuges in northern California, and an occasional pair can be seen at the Hart Mountain National Antelope and Klamath Forest National Wildlife Refuges in Oregon.

The central Valley Population of Greater Sandhill (*Grus canadensis tabida*) is one of four populations of the subspecies, and consists of about 3200 birds which nest in south-central and eastern Oregon, and northeast California. Other populations of the subspecies are shown on Map 1.

Lake and Harney Counties in Oregon support the greatest number of nesting pairs in this population with the largest concentration of pairs located on the Malheur National Wildlife Refuge near Burns. Other nesting areas of this Central Valley Population are shown on Map 2.

An undetermined number of cranes nest in British Columbia and Washington and are assumed to be a different population or even a different subspecies.

Since most of the information known about the Central Valley Population has been developed through studies at the Malheur Refuge, much of the information in this leaflet is specific to that area.

FOOD HABITS

Cranes eat a variety of foods, and while preferring small grains, they will eat almost anything available, such as toads, frogs, mice, eggs, young birds, invertebrates, roots and tubers. Their preference for grain occasionally leads to conflicts on private lands.

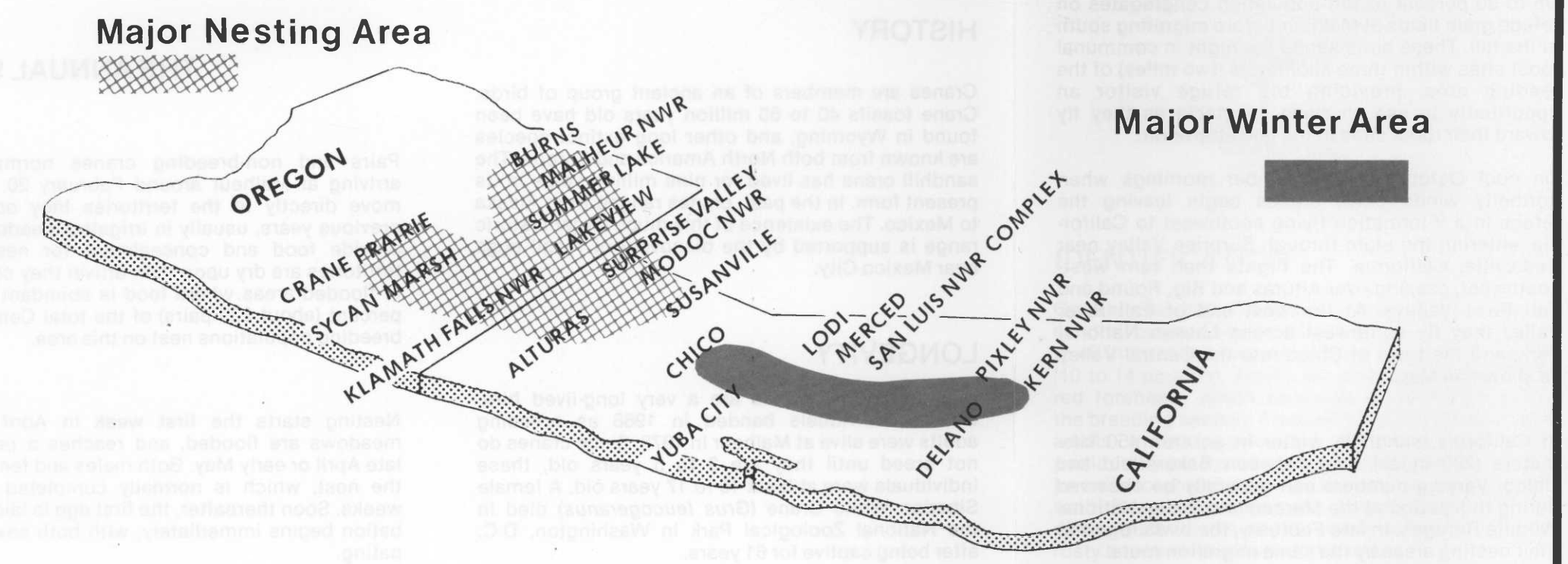
BEHAVIOR

Cranes mate for life, but will take another mate if one is lost. They occupy the same nesting territories, year after year, and simply don't nest if they find conditions on their territories unfavorable.

For many years it was thought that cranes participated in an elaborate courtship dance consisting of vocalizations, jumping into the air, and tossing material about with their beak. Field studies at Malheur have determined that this behavior is a nervous reaction to disturbance and unrelated to courtship. Dancing can be seen during every month of the year and has been observed in 3 day old chicks.

The clutch usually consists of two eggs, but occasionally there is one and, rarely, three. The second egg is laid about 48 hours after the first, which results in the first hatching 48 hours sooner. A 30-day incubation period follows.

Young sandhills are about 20 centimeters (8 inches) tall at hatching, with cinnamon colored down and pinkish bill and legs. About 6 hours after the second chick hatches, the adults lead the young from the nest and begin feeding them. Generally, each parent feeds one chick. The chicks are aggressive toward each other and within a week of hatching, one becomes dominant. Gradually the dominant chick becomes more aggressive, pushing the subdominant individual away from the adults, often causing it to starve to death. Consequently, usually only one chick survives. The young grow rapidly after 3 weeks, and are able to fly when 60 to 70 days old.



Fall Migration Route

Spring Migration Route

PROBLEMS FACING THE POPULATION

Continuing habitat loss due to diking, draining and damming is presently the most serious threat to the population. Once a native meadow has been replaced with alfalfa, for example, it is permanently lost as a crane nesting area.

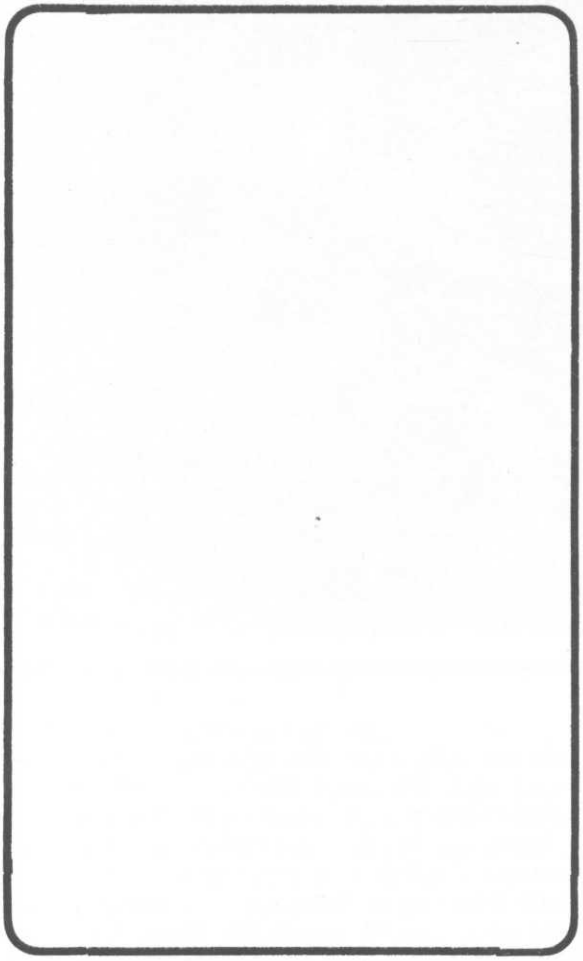
An unknown number of cranes are illegally killed. The sandhill's large size is an easy target for irresponsible hunters, especially in California, where much of the wintering range is near heavily populated areas.

On foggy mornings cranes have been killed when they collide with powerlines. Five cranes died this way in 24 hours on Merced National Wildlife Refuge, California in 1970. Whenever possible, powerlines should be installed under-ground. Installation of universal orange aircraft markers on powerlines which bisect flight paths can be an effective alternative.

Adult Sandhill cranes have few enemies other than man. Coyotes, weasels, mink, bobcats and eagles occasionally take young. Golden Eagles and coyotes have been known to take adults, but such instances are rare. High egg predation does occur in some years. Predators include the raven, raccoon and coyote, with ravens generally being the most destructive.

THE FUTURE

Though this population of unique birds has been stable for the past several years, its continued existence depends upon preservation and proper management of its rapidly shrinking habitat. National wildlife refuge areas will become increasingly important as time passes and other habitat diminishes. However, the ultimate survival of the subspecies will likely hinge on what happens to the privately owned nesting and wintering habitat upon which it is so highly dependent.



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

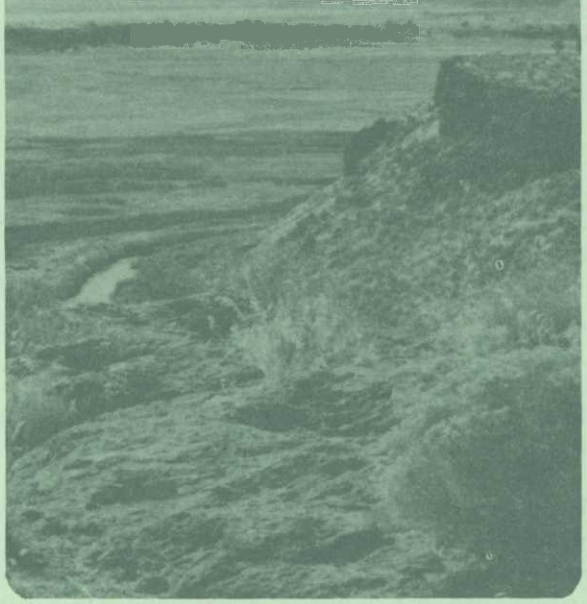
As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

RF 1351700-11 MAY 1979

Malheur National Wildlife Refuge

Oregon

- CHANGES: Office hours are 8:00
4:00 Monday-Friday only - closed
e weekends & holidays. Canoe rout
is phased out. Flooding has al-
tered roads @ HQ; follow signs.



Where to Start —

Current information is available for visitors at Refuge Headquarters. Drive 2 miles east of Burns on highway 78; then south on highway 205 for 24 miles; then east on a county road for 6 miles. All but the last 1/4 mile is paved.

Headquarters may also be approached from the east via a 12 mile gravel road originating at Princeton. Office hours are 8:00 am to 4:30 pm, seven days a week, from April 1st thru Labor Day; and Monday thru Friday, the rest of the year.

Bird Museum —

The George M. Benson Museum, at Headquarters, contains nearly 200 mounted bird specimens of the area. This display is a boon to novice bird watchers and a must for all bird admirers. A few mammal study skins are also available for viewing. The museum is open, year-round, seven days a week, 6:00 am to 9:00 pm.

Enjoy Your Visit

Public use is limited to areas and activities which will conserve wildlife for generations to come.

Wildlife Observation, Photography, and Hiking — a total of 287 species of birds and 58 species of mammals have been observed on the Refuge. Separate bird and mammal lists are available at headquarters.

To minimize disturbance during the nesting season, hiking is limited to designated roads and trails from March 1st through August 15. At other times of the year, hiking is unrestricted except for Harney and Stinking Lake Research Natural Areas and residential areas.

Auto Tour Route — is open year round, weather permitting. Printed tour guides are available at Refuge Headquarters.

Fishing and Hunting — ask for separate leaflet.

Boats — without motors permitted on Krumbo Reservoir during fishing season, on the north half of Malheur Lake during the regular waterfowl hunting season, and on the canoe route. All other Refuge waters are closed to boating.

Pets — on leash or under close supervision are permitted.

Handicapped Visitors — Access difficulty varies by areas and visitors should examine their own abilities and limitations before using the Refuge. Consult the Refuge Manager for suggestions for visiting the area safely.

Littering — please take your litter home.

Open Fires — are prohibited, due to potential fire hazards.

Swimming — is prohibited.

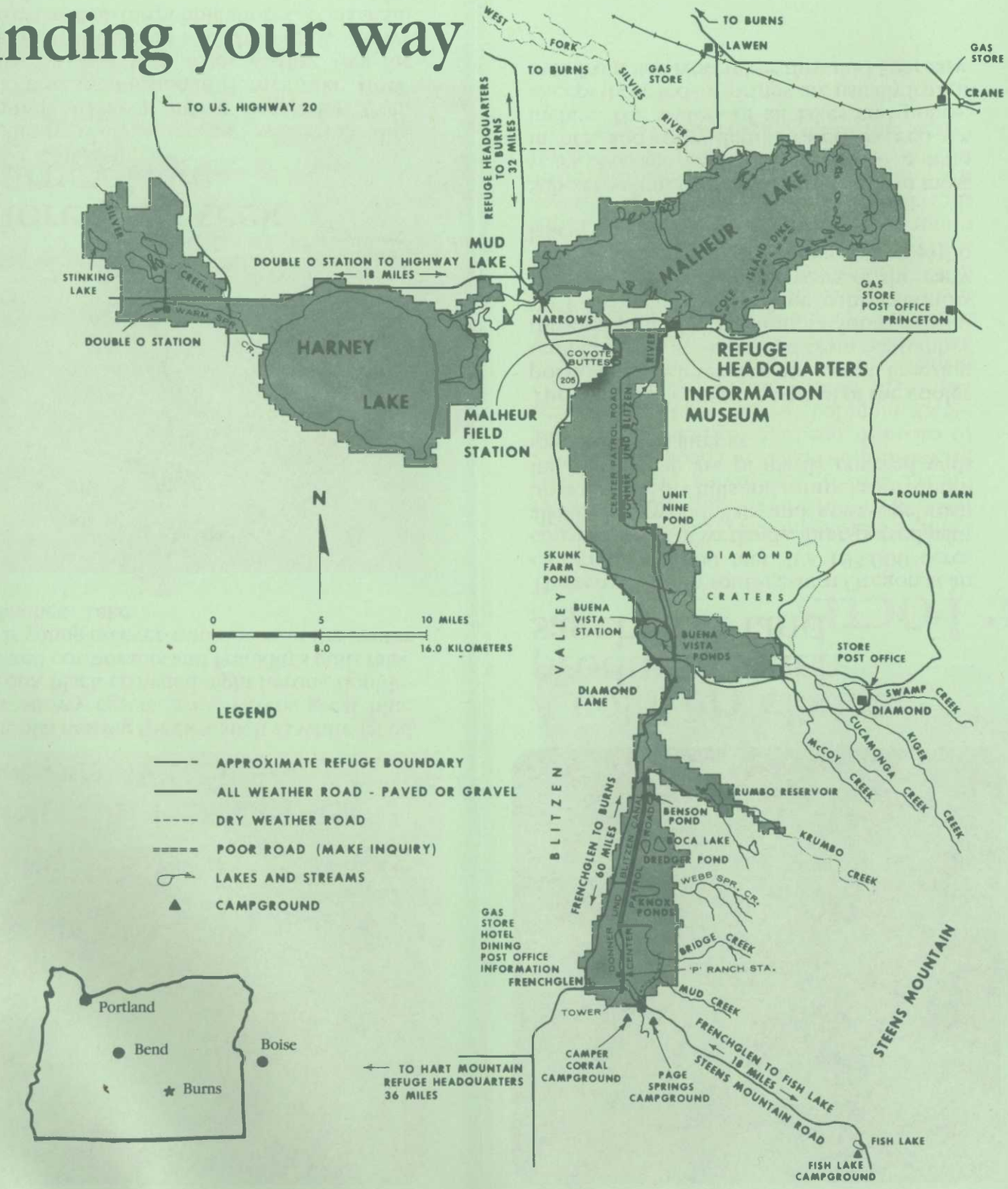
Camping — is only available off of the Refuge near Frenchglen. See map and "nearby accommodations" sections in this leaflet.

Collection — of any items of antiquity, including Indian artifacts, is prohibited.

Vehicle Access — use of any motorized vehicle is permitted only on designated roads and parking areas.

Weapons — that are dismantled, unloaded and cased or mounted in a vehicle gun rack, may be transported through the Refuge on public roads.

Finding your way



Nearby Accomodations

Motels and Restaurants —

are available in Burns and Hines. A small hotel which also serves meals is located in Frenchglen. It is advisable to make reservations in advance by writing: Frenchglen hotel, Frenchglen, Oregon 97736, (Phone 503/493-2565).

Malheur Field Station is located four miles west of Refuge headquarters and is operated by Pacific University in Forest Grove, Oregon. Many field oriented natural science courses are offered during the summer. Lodging, food service, and laundry facilities are available to the public at the Station for a nominal fee. For information, write: Director, Malheur Field Station, Box 260-E, Princeton, OR 97721, (Phone 503/493-2629).

Groceries and Gasoline —

are available in Burns, Hines, Princeton, Frenchglen, Crane and Lawen.

Camping —

most facilities are located south of the Refuge, near Frenchglen.

Page Spring Campground, about 4 miles east of Frenchglen is operated by the Bureau of Land Management, 74 South Alvord, Burns, OR 97720 (Phone 503/573-2071).

Camper Corral is a private campground located near Page Spring Campground. For reservations write Camper Corral, Frenchglen, OR 97736 (Phone 503/493-2415).

Fish Lake Campground, located 18 miles east of Frenchglen on Steens Mountain is operated by the Bureau of Land Management. This mountain site is usually open from July through mid-October and is cool and insect-free most of the season.

Forest Service Campgrounds, several located north of Burns. Contact U.S. Forest Service in Hines (Phone 503/573-7292).

Discovering Wildlife Throughout the Year

Western Tanager

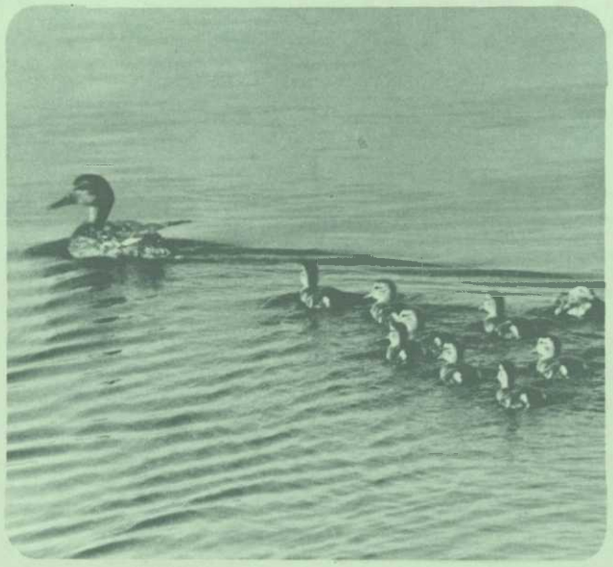
Spring —

Thawing of ice in February heralds the start of the spring waterfowl migration. Pintails are the first to appear—usually in mid-February—and greater sandhill cranes follow a week later. The native meadows south and east of Burns are the best areas to view concentrations of lesser sandhill cranes. Their numbers peak near the end of March. Whistling swans, snow geese, pintails and other waterfowl accompany them.

Great horned owls and golden eagles begin nesting in late February while Canada geese initiate their nests in late March. Waterfowl broods become common in May.

An unforgetable experience can be had by rising at dawn and listening to the sounds of a marsh in early May!

The peak of the songbird migration occurs in mid-May. Refuge headquarters and Page Spring are perennial songbird hotspots. Birding becomes more difficult as the trees leaf out in late May.



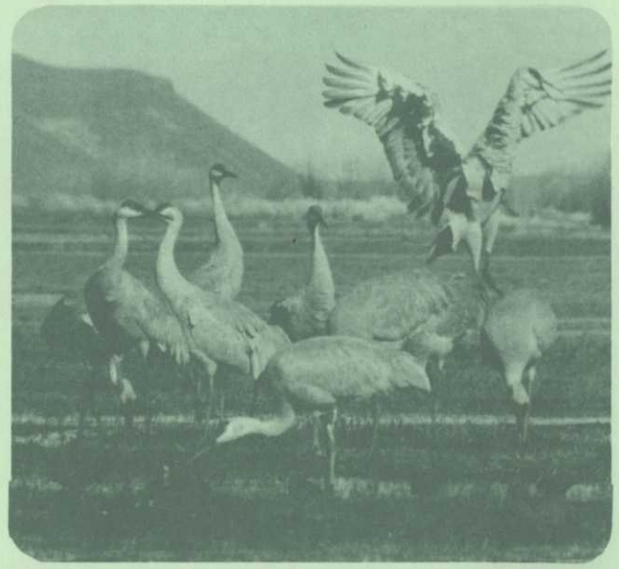
Gadwall brood

Summer —

Marsh and meadow vegetation grows rapidly in June, making wildlife increasingly difficult to see. Goose and duck broods can be seen on many refuge ponds.

Pintails and shovelers peak in mid-August as they congregate on their way back to California and Mexico for the winter.

Shorebirds concentrate on exposed mud flats and alkali playas in August and September. The peak of the fall songbird migration usually occurs in August.



Sandhill Cranes

Fall —

One of the greatest attractions during September and October is the concentration of greater sandhill cranes, Canada geese, and mallards on Blitzen Valley grain fields. Greater sandhill cranes "stage" here before migrating to California's Central Valley for the winter. One hour before sunset near a grain field is an excellent time to witness their feeding flights.

September is also the best fall month for observing vagrant warblers. Snow geese, whistling swans, and rough-legged hawks arrive as trees assume their fall colors in October. The rough-legs remain here thru the winter feeding on meadow voles, mainly in the Blitzen Valley.

Migrating waterfowl can be observed leaving the Basin over the headquarters area at dusk in late October and November. Cold weather in mid-November signals a mass exodus. Whistling swans are the most spectacular as they head south against a crisp November sunset.

Managing Wildlife and Habitat

Headquarters pond

Winter —

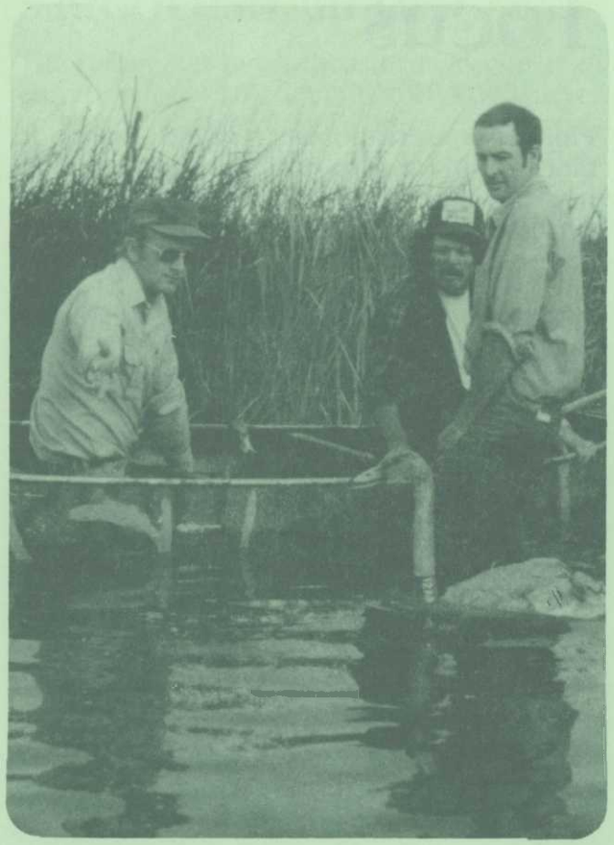
Trumpeter swans may be observed at close range on the headquarters spring-fed pond during cold spells. Mallards and Canada geese also congregate on the remaining open water.

Bald eagles prey upon flocks of waterfowl in the Blitzen Valley during December and January.

Malheur and Harney Lakes remain in an essentially natural condition. The Double-O and Blitzen Valley have been intensively developed. Ponds, canals, dikes and water control structures are used to manipulate water for wildlife. Greater sandhill cranes, trumpeter swans and many species of waterfowl depend on this irrigation for their nesting habitat.

Facilities maintained by the Refuge include 300 miles of dikes, 300 miles of ditches and canals, 180 miles of roads, 650 miles of fences, 400 water control structures, 300 miles of posted boundary, 60 bridges, and 30 buildings. Maintenance personnel are located at Double-O, Headquarters, Buena Vista, and P-Ranch.

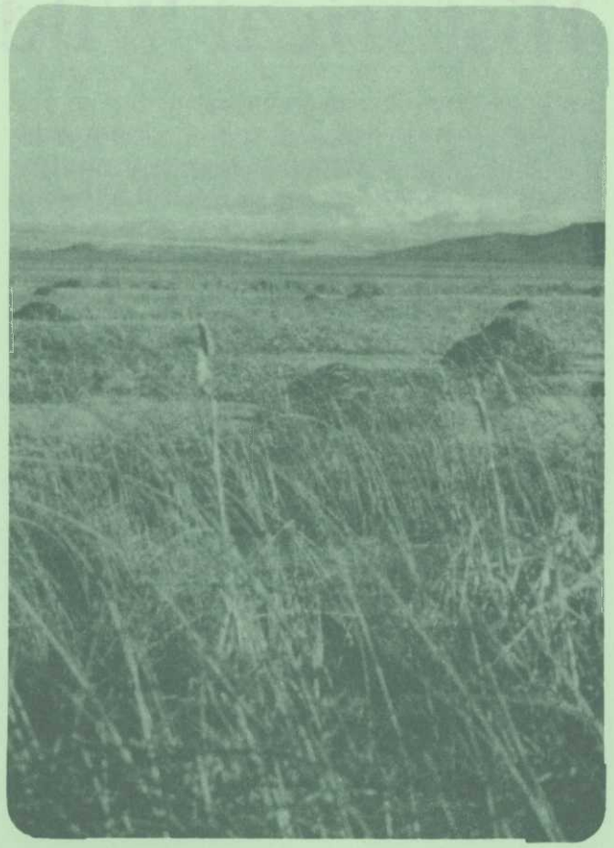
Collaring Trumpeter Swans to track their movements



In August, after the meadows are drained, vegetation in many parts of the Refuge is hayed or grazed. This periodic treatment stimulates vegetative growth and creates tall, dense nesting cover for the following year. Controlled fire is also used to rejuvenate plants.

Muskrats aid in keeping excessive amounts of emergent vegetation under control on Malheur Lake. Their houses are favored nesting sites for Canada geese. Under a permit system, muskrats are trapped for their fur when their numbers are out of balance with their food supply.

Muskrat houses



Malheur — an island of life in the desert

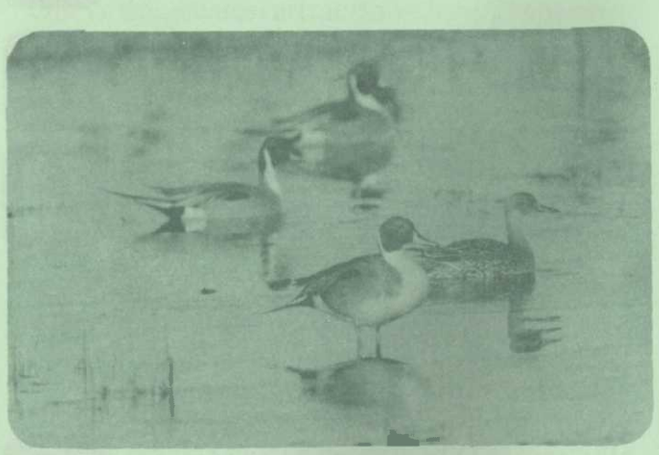
A marsh haven for wildlife —

Malheur Lake serves as a major resting, nesting and feeding area on the Pacific Flyway. It is a large freshwater marsh containing bulrush, burreed and cattail, interspersed with open water. Since 1930, it has ranged from 500 to over 75,000 acres in size. Even during years of high water, its deepest part rarely exceeds eight feet.

Trumpeter Swan family

Blitzen Valley harbors nesting swans and cranes —

Ponds, sloughs and irrigated meadows in the narrow Blitzen Valley attract nesting trumpeter swans and greater sandhill cranes. Trumpeter swans are a re-introduced species.



Pintails

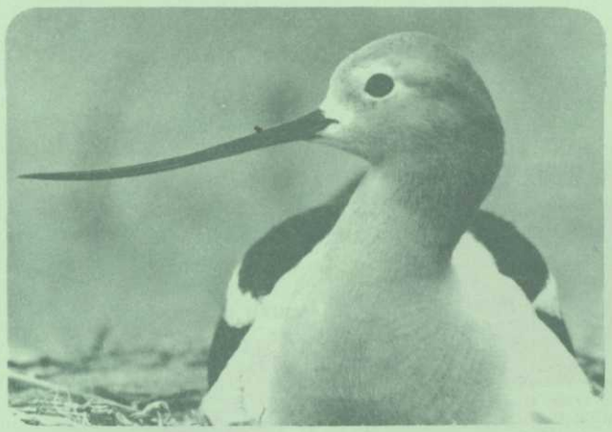
Marshes lure migrating waterfowl —

Many waterfowl species such as canvasbacks, pintails and whistling swans stop at Malheur Lake to rest before continuing on their journey to their California wintering areas, and north in spring to their Canadian breeding grounds.

Snowy Egret at nest

Colonial nesters use deeper water —

Colonial nesting species, such as white-faced ibis, snowy egrets, great egrets, great blue herons, black-crowned night herons, double-crested cormorants and Franklin's gulls raise their young on over-water nests in the center of Malheur Lake.

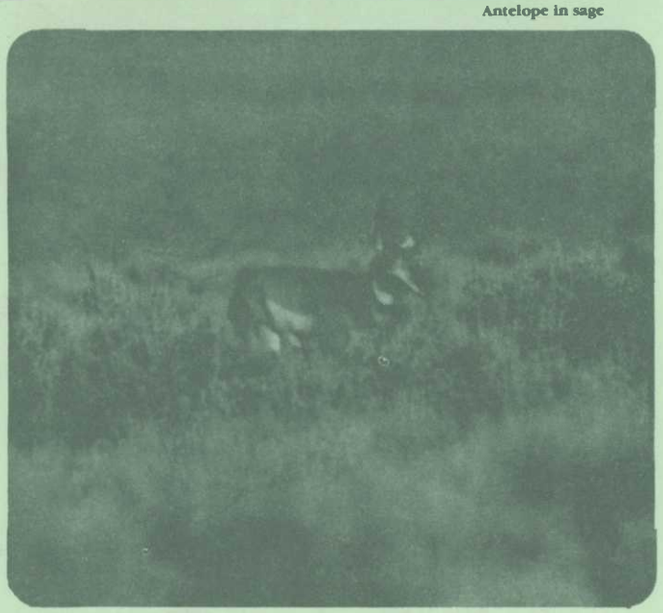


American Avocet

Shorebirds seek Harney Lake

Alkalinity, wave action and water turbidity combine to keep marsh vegetation from becoming established in Harney Lake. However, this lake is a major resting area for migrating waterfowl and shorebirds. Snowy plovers nest on the pebble shores of this semi-dry lake.

Antelope in sage



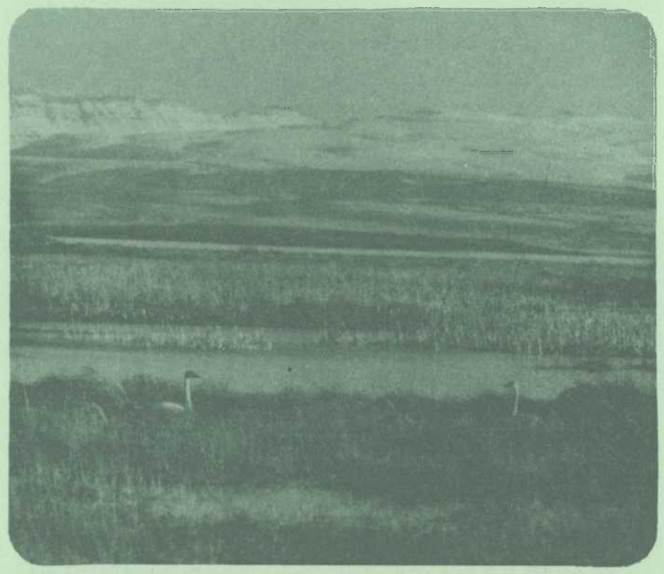
A cold, dry climate produces much sagebrush land —

The refuge lies in southeastern Oregon at an elevation of 4,100 feet. It's 183,000 acres consist mainly of wetlands, interspersed with alkali-greasewood flats and grass-sagebrush uplands. The dry hills and rimrocks surrounding the Refuge are primarily covered with sagebrush and juniper.

The semi-arid climate is typical of the cooler portions of the inter-mountain west. Freezing temperatures are common from September through June. Temperatures seldom exceed 90° F. Drought periods of one to three months are common. In drought years of the early 1930's, it was possible to drive a car across the lakebed of Malheur Lake.

Sub-zero winter temperatures occur in most years. Average annual precipitation is nine inches, and snow depths rarely exceed six inches. The waters of all lakes and ponds, except those fed by springs, are usually frozen over from late November thru mid-February.

Steens Mountain

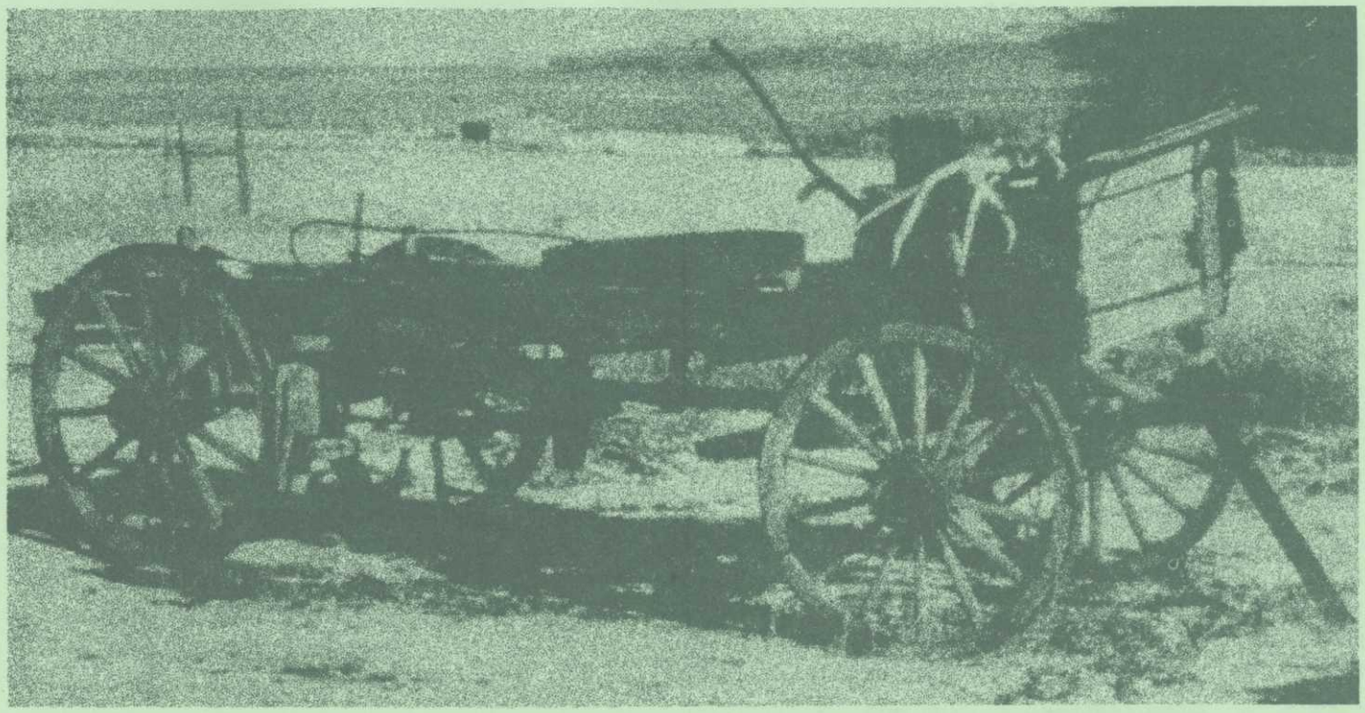


Mountain snow: the life blood of Malheur —

The Silvies and Blitzen Rivers bring water to Malheur Lake from the surrounding mountains. The Silvies River originates in the Blue Mountains, north of Burns. During years of below normal precipitation, its waters are diverted for irrigation and never reach Malheur Lake. In wet years it contributes a major share of the water.

The Blitzen River flows north from Steens Mountain. The river and its tributaries provide water to the Blitzen Valley before entering the south side of Malheur Lake. During wet years, Malheur Lake overflows thru the Narrows channel into Mud Lake and then into Harney Lake, which is the lowest part of the entire drainage. Mud Lake is largely privately owned and its former marshlands are now mostly used for agricultural purposes.

The Double-O area of the Refuge receives water from Silver Creek and a series of springs. This water eventually enters the west side of Harney Lake. Harney Lake ranges in size from 30,000 acres to completely dry.



Sod House Ranch

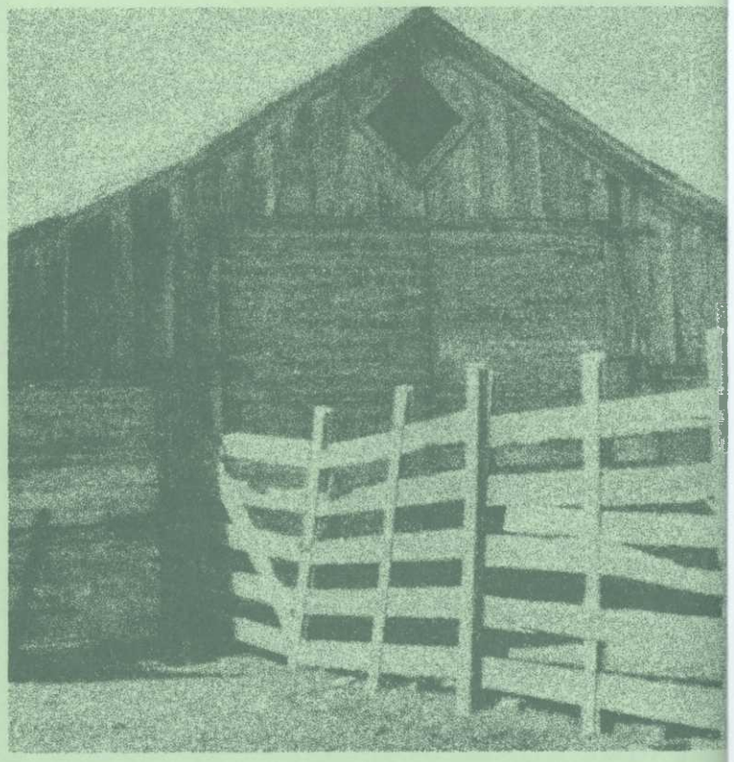
Historical Wildlife Focus

One of over 400 National Wildlife Refuges in the United States, Malheur was established by President Theodore Roosevelt in 1908 to protect nesting migratory birds. Malheur has since been recognized as a major nesting, migration and wintering area for numeorus species of birds and other wildlife.

The Harney Basin was inhabited by Pauite Indians before white men arrived. They were nomadic hunters and gatherers of seeds and roots. Winter camps were often set up around hot springs.

The first white men arrived in 1826. They were in a trapping party lead by Peter Skeen Ogden. California gold miners followed in the 1850's on their way to Idaho gold fields. The first permanent residents arrived in 1862 (Sodhouse at refuge headquarters). Plume hunters came around 1900 to harvest swans, grebes, egrets, and other birds for their feathers.

Pioneer conservationists realized the importance of this area to wildlife and the impact human activity was having on it, so they prevailed upon President Theodore Roosevelt to establish the Lake Malheur Reservation, which included Harney, Mud and Malheur Lakes. The Blitzen Valley was added in 1935 primarily to help protect the water supply to Malheur Lake. Development of wildlife habitat began in 1935, and was aided by the establishment of three Civilian Conservation Corps (CCC) camps on the refuge. The Double-O Unit was acquired in 1941, and since that time minor parcels have been added to round out the refuge to it's present size. Refuge development and maintenance has been furthered by the Job Corps, Young Adult Conservation Corps, and Youth Conservation Corps.



"P" Ranch Barn

For further information contact:

Refuge Manager
Malheur National Wildlife Refuge
P.O. Box 113
Burns, OR 97720
(503) 493-2323

RF 13570-1

June, 1982

Malheur National Wildlife Refuge
P.O. Box 113
Burns, OR 97720

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