

Ouray National Wildlife Refuge

Draft Comprehensive Conservation Plan and Environmental Assessment

February 2000

Prepared by
U.S. Fish and Wildlife Service
Ouray National Wildlife Refuge
266W 100N Suite #2
Vernal, UT 84078

Table of Contents

Introduction/Background	5	
Refuge Overview		
History of Refuge Establishment, Acquisition, and Management		
Purpose and Need for Plan	6	
NWRS Mission	13	
Refuge Purpose	13	
Refuge Vision Statement	13	
Legal and Policy Guidance	13	
Planning Process		
Description of Planning Process	14	
Planning Issues and Opportunities	14	
Riparian Restoration and Overbank Flooding	14	
Nonnative Plants	15	
Selenium	16	
Mosquitos.....	16	
Summary Refuge and Resource Description		19
Geographic/Ecosystem Flyway Setting	19	
Refuge Habitats	20	
Riverine	23	
Riparian	23	
Brennan Bottom	24	
Johnson Bottom.....	24	
Leota Bottom	29	
Wyasket Bottom	30	
Sheppard Bottom	31	
North and South Roadside Draw	32	
Moist-soil Units	32	
Croplands	33	
Woods Bottom	33	
Uplands	34	
Semidesert Shrubland	34	
Grassland.....	34	
Clay Bluffs.....	34	
Refuge Wildlife	35	
Riverine	35	
Riparian	36	
Uplands		
Semidesert Shrubland and Grassland	37	
Clay Bluffs.....	37	
Special Status Species	38	
Threatened and Endangered	39	
Species of Management Concern	39	
Public Use	40	
Refuge Cultural and Paleontological Resources	40	
Refuge Land Acquisition	43	
Special Management Areas	43	
Refuge Fire Management.....	43	
Water Rights.....	44	
GIS Mapping Data Needs	44	

Management Direction

Refuge Goals, Objectives, and Strategies

Refuge Goals 45
Refuge Objectives and Strategies 45

Implementation and Monitoring 57

Funding and Personnel 57
 Permanent Personnel Needed 57
Step-down Management Plans 57
Monitoring and Evaluation 58
Partnership Opportunities 59

Appendix A. Glossary 60

Appendix B. Bibliography/References 63

Appendix C. RONS List 66

Appendix D. Compatibility Determinations 75

Appendix E. Compliance Requirements 84

Appendix F. Mailing List 86

Appendix G. List of Preparers 88

Appendix H. Species Lists of Ouray National Wildlife Refuge
Including birds, mammals, reptiles and amphibians, fish, and plants. 89

Appendix J. Final Environmental Assessment: Acquisition and Enhancement of Floodplain Habitats Along the Upper Colorado, Green, and Gunnison Rivers as Part of the Recovery Program For Endangered Colorado River Fishes. 117

Appendix K. Environmental Assessment: An Element of the Recovery Program for Endangered Fish Species in the Upper Colorado River Basin: Levee Removal Project 122

Appendix L. Water Rights 126

Introduction/Background

In the Uintah Basin of northeastern Utah lies the 11,987-acre Ouray National Wildlife Refuge. Located about 30 miles southwest of Vernal, the Refuge protects riparian woodland, bottomland wetlands, and grasslands bordering the Green River (see Map 1 and 2). Geographically, the Refuge is long and narrow covering about 19 square miles. The Refuge was established on May 25, 1960, under authority of the Migratory Bird Conservation Act of 1929 and Public Land Order 2730, and land acquisition was initiated in 1961 using Duck Stamp funding. Most of the acreage is owned in fee title (5,032 acres), 3,110 acres was transferred from the BLM, 2,692 acres is leased from the Ute Tribe, and 1,153 is leased from the State of Utah (see Map 3).

The Refuge was originally established to provide prime breeding, resting, and feeding areas for migratory waterfowl. Early in its history, much of the Refuge's floodplain and wetland habitats were altered with the construction of dikes and levees to gain control over seasonal water flow from the Green River. Impounded marsh units were created to provide secure water, food, and nesting cover for waterfowl. Since the construction of Flaming Gorge Dam upstream, the Green River system has changed dramatically resulting in long-term loss and degradation of riparian habitats and wildlife species dependent on them. The Refuge's riparian habitat is now critically important to protect declining fish and migratory bird species using the Green River corridor.

The greatest challenge in managing the Refuge lies in determining the area's optimum ecological potential given past and present human intervention. Refuge managers will be required to perform a balancing act in managing for all trust species. Numerous uncertainties exist over the habitat's potential to be restored in the presence of human-regulated river flows and the overabundance of nonnative plants and animals. The newly proposed management direction will require collection of additional historic (both pre- and post-Flaming Gorge Dam construction) and present day vegetative and wildlife inventories and habitat structure and composition data. Past emphasis on waterfowl production had very little need for this data and it is not presently available to the Refuge staff. A need also exists to further study levee removal modifications and to assess keeping man-made impoundments and the 150 acres of croplands. It is feared that if abandoned, these intensively altered sites will become dominant stands of nonnative vegetation. Modern day invasive species control technology, and limited resources offer no reassurance that these areas can be restored. This Plan identifies, through goals and objectives, some of the sites which presently lend themselves to restoration. The Refuge presently lacks much of the data needed to pursue large scale restoration, so proposes to collect information on which to base well informed management decisions. Some of the man-made impoundments cannot be restored without posing serious problems to existing roads, water control structures, fences, public use facilities, and buildings. It is anticipated that the accomplishment of the identified goals will require much, if not all, of the 15-year planning period.

Refuge Overview

History of Refuge Establishment, Acquisition, and Management Purpose and Need for Plan

The U.S. Fish and Wildlife Service (Service) is the principal Federal agency with responsibility for conserving, protecting, and enhancing fish and wildlife and their habitats. The Service manages a diverse network of more than 500 national wildlife refuges, a System which encompasses over 93 million acres of public land and water which provides habitat for more than 5,000 species of birds, mammals, reptiles, fish, and insects.

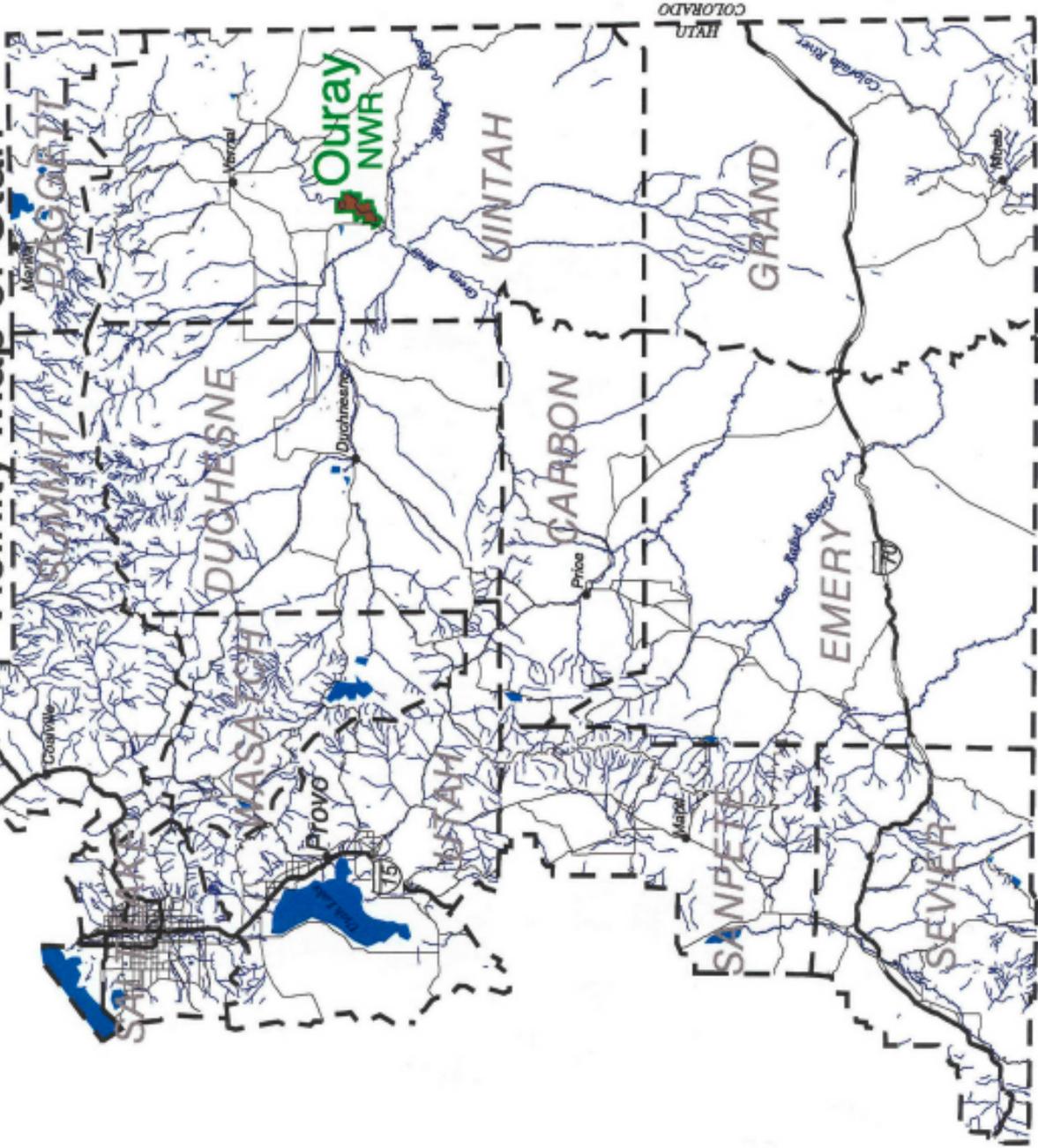
Comprehensive conservation plans (CCP) were mandated by the National Wildlife Refuge System Improvement Act of 1997. The Act requires that all lands and waters of the National Wildlife Refuge System (System) be managed in accordance with an approved CCP that guides management decisions, sets forth strategies for achieving Refuge purposes, and contributes to the System mission. This CCP establishes the goals, objectives, and strategies that will guide the management of Ouray National Wildlife Refuge for the next 15 years. It will serve as the basis for more detailed step-down management plans and budgets. The Plan is comprehensive in the sense that it addresses all activities that occur on the Refuge, though activities and strategies are stated broadly. Detailed descriptions of strategies or activities will appear in step-down plans. Refuge objectives are established based on the Refuge purposes, other Federal laws, National Wildlife Refuge System goals, Service policies and directives.

The Refuge was originally established as a prime waterfowl production area which would also provide needed resting and feeding areas for migratory birds traveling along the Green River corridor. The current management strategy of the Refuge takes into account new biological information and insight into the importance of western riparian and floodplain systems to a variety of fish and wildlife species. Human demands on water resources have resulted in loss, alteration, and degradation of riparian habitats. The species dependent upon such river systems have declined throughout the western states, contributing to population declines of the bald eagle, peregrine falcon, whooping crane, Uintah Basin hookless cactus, and four species of fish native to the Green River. All these species have been placed on the federally threatened and endangered species list since the Refuge was established in 1960.

Managers now realize that Refuge floodplains cannot easily be transformed into wetlands intensively managed for waterfowl production. The riparian corridor, overlooked as a major habitat type in the early 1960's, is critical and supports tremendous biological diversity (Knopf et al., 1988). The listing of the razorback sucker and Colorado pikeminnow in 1987 has posed new required management considerations under the Endangered Species Act of 1973. The proposed plan will de-emphasize waterfowl production and shift management emphasis toward enhancement of riparian and wetland habitat for waterfowl, other migratory birds, and endangered fish species.



Vicinity Map of Utah



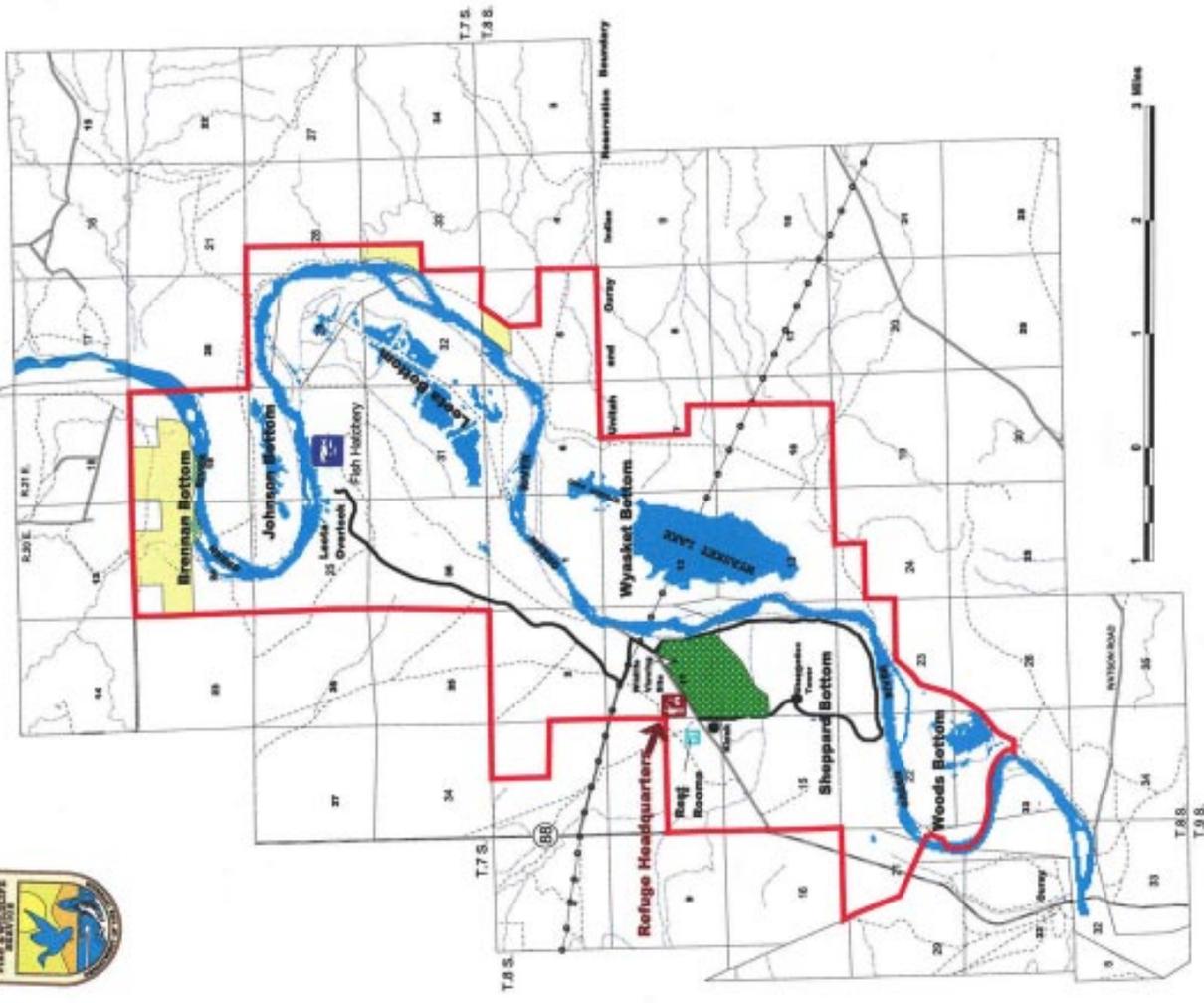
Map Location



State of Utah

Map # 1 Vicinity Map

Ouray National Wildlife Refuge Base Map



LEGEND

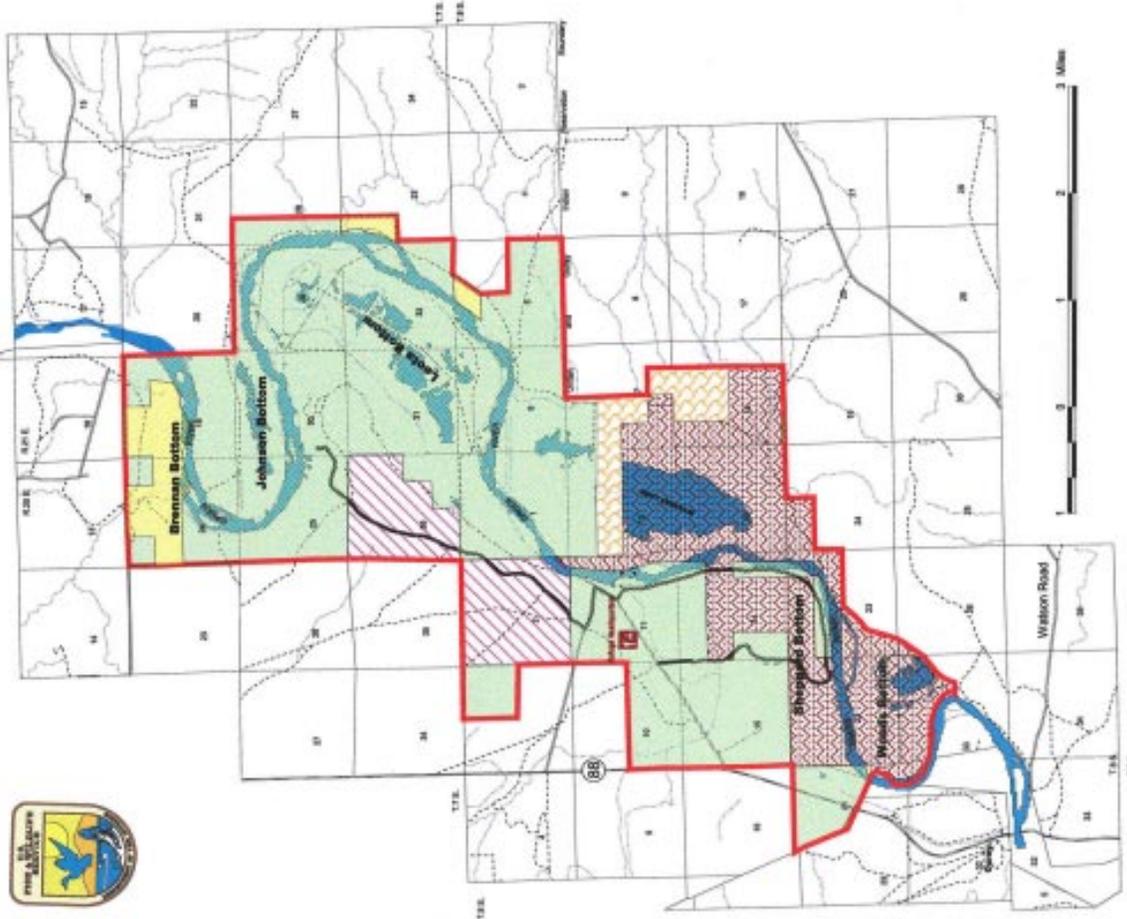
- Closed to Public Access
- Private Lands
- Open Water
- Ouray NWR Boundary
- Improved Roads
- Unimproved Roads
- Auto Tour Route
- Highway
- Intermittent Streams
- Pipeline



Map # 2

DRAFT

Ouray National Wildlife Refuge Landownership Map



LEGEND

-  Tribal Lease to U.S. Fish and Wildlife Service
-  Leased Tribal Lands
-  U.S. Fish and Wildlife Service Lands
-  State Leased Lands
-  Private Lands
-  Ouray NWR Boundary



State of Utah

Map # 3

DRAFT

NWRS Mission

The Mission of the National Wildlife Refuge System is “to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.”

Refuge Purpose

The Ouray NWR was established on May 25, 1960, by the authority of the Migratory Bird Conservation Act of 1929. Land acquisition was initiated in November 1960, and the Refuge became operational in late 1961 for “use as an inviolate sanctuary, or for any other management purpose, for migratory birds.”

Refuge Vision Statement

The Green River corridor is a ribbon of riverine, riparian, and seasonal wetland habitats threading through the arid desert lands of southwest Wyoming, northwest Colorado, and eastern Utah. Historically many species of birds and other wildlife depended on this corridor for navigation and provided a chain of feeding and resting areas along their migration paths each year. Because of a broad array of changes in land-use and water development projects in the western states, riparian habitats are now rare, and the species dependent on them in decline (Howe and Knopf 1991).

The most vital contribution Ouray National Wildlife Refuge can make to the Upper Colorado River Ecosystem (UCRE) is to restore and enhance riparian woodlands and seasonal wetlands along its 12 River miles. The 11,987-acre Refuge will be managed for a variety of native plants and wildlife with emphasis on migratory birds, threatened and endangered species, and compatible wildlife-dependent public use. The Refuge welcomes visitors and will provide them with opportunities to understand and appreciate the vital role riverine systems play in the arid west. Opportunities for wildlife-dependent recreation such as wildlife observation, photography, hunting and fishing will also be provided. Information generated from the research conducted under this Plan will enhance understanding and cooperation among local land-use interests, residents, and management agencies. The Refuge will work with individuals, organizations, and agencies to promote wildlife conservation in the Green River Basin. As a result, the unique biological resources, and natural beauty of the Green River will be enhanced and restored for future generations.

Legal and Policy Guidance

Refuges are guided by the mission and goals of the National Wildlife Refuge System, the Refuge purpose as described in its establishing legislation, executive orders, Service laws and policy, and international treaties. Key concepts and guidance for the System are covered in the System Administration Act of 1966, the Refuge Recreation Act of 1962, Title 50 of the Code of Federal Regulations, the Fish and Wildlife Service Manual, and, most recently, through the National Wildlife Refuge System Improvement Act of 1997. Appendix E contains a partial list of other Federal laws governing the administration of the System.

Planning Process

Description of Planning Process

The Ouray National Wildlife Refuge Comprehensive Conservation Plan is guided by the established purposes of the Refuge, the mission of the National Wildlife Refuge System, Fish and Wildlife Service compatibility standards, other Service policies, plans and laws directly related to Refuge Management. This Plan establishes the goals, objectives, strategies, and monitoring and evaluation for the Refuge.

The Plan will be used to prepare step-down management plans and revise existing plans, performance standards and budgets which describe specific actions to be taken by the Refuge. The effects of major management actions will be monitored and evaluated to provide information to future managers as to the result of actions taken.

Issues addressed in this Plan were identified by the public, Refuge staff, and cooperating agencies. A formal effort was made to obtain input from local residents, Refuge visitors, and from individuals who have expressed interest in the Refuge. Public comment was solicited through an open house held at the Refuge on April 27, 1996; a news release was sent to public officials, local, State, and other Federal agencies, local groups and interested individuals, and the circulation of questionnaires.

The duration of the CCP is 15 years; however, the Plan may be revised if necessary within that time. The CCP will supersede the Refuge Master Plan written in 1962.

Planning Issues and Opportunities

Four issues are of particular concern when planning future management actions for Ouray NWR. These include degradation and loss of riparian habitat, invasion of nonnative plants, selenium control, and mosquito production.

Riparian Restoration and Overbank Flooding

The use of overbank flooding as a management option has become an issue for the Refuge and for the Green River in general. Periodic high River flows helped create and maintain bottomland wetlands (bottoms) in low areas adjacent to the River (Cooper and Severn 1994). These wetlands historically supported many species of wildlife such as endemic native fish and migratory birds. Now that much of the River course is controlled by levees and the Flaming Gorge Dam, overbank flooding is a rare event (FLO Engineering 1996). Special status wildlife species that depend upon these wetlands during part of their life cycle are the endangered Colorado pikeminnow (previously known as Colorado squawfish) razorback sucker and the bald eagle. Three of four endangered Colorado River fish are found in the Green River near the Refuge, and two of them have been found in Refuge wetlands (Modde 1997, Modde and Wick 1997, Modde and Irving 1998).

In the fall of 1997 and spring of 1998, the Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin (Recovery Program), in cooperation with the Refuge, breached levees in Woods Bottom, Leota Bottom, and Johnson Bottom to evaluate habitat and wildlife responses to a planned seasonal floodplain inundation. Responses by nonnative and native fish, other wildlife, and plants are being recorded to gauge the effects of reestablishing overbank flooding.

Nonnative Plants

Ouray NWR, like most modified landscapes, has been invaded by a variety of nonnative plants, some of which were introduced as ornamental plants. Nonnative plants usually flourish in disturbed landscapes and tend to out-compete native plants (Di Tomaso 1998, Olson 1999). The current River flow regime and other on-site modifications or limitations (e.g., lack of independent water control to manipulate varying water depths or flood regimes within units) does not favor native riparian plant communities and contributes to the spread of nonnative species (Laubhan 1997). As a result, less habitat exists that supports native wildlife (Trammel and Butler 1995, Schmidt and Whelan 1999) resulting in either smaller population sizes or less diversity in species that are native to the River corridor (Knopf and Olson 1984, Kerpez and Smith 1987, DeLoach 1989). Additionally, many nonnative plants alter the physical characteristics of the system. Some species change the chemical profile of the soil (Di Tomaso 1998) or increase soil erosion, sedimentation, and flooding that are better minimized by native vegetation along riparian areas (DeLoach 1989, Sheley et al. 1995, Wiesenborn 1996). The nonnative plants of major concern to the Refuge are: saltcedar (*Tamarix sp.*), perennial pepperweed (*Lepidium latifolium*), Russian-olive (*Elaeagnus angustifolia*), and Russian knapweed (*Centaurea repens*).

The exact degree of infestation and species composition is presently unknown. A current cursory estimate on the degree of infestation by species and bottom site is shown under Goal A, Objective 1. The Refuge staff recognizes the need to map and identify the degree of infestation and species composition as a means of baseline information on which to gauge efforts being carried out. The Refuge staff is proposing the use of a Global Positioning System (GPS) and Geographic Information System (GIS) to record and map infestations as one of its strategies within Goal A.

Current invasive weed management techniques being employed include both mechanical and chemical techniques. The only biological control agent currently available for species known to occur on the Refuge is a soil nematode (*Subanguina picridus*) for Russian knapweed. The Refuge staff experimented with the nematode with very little success. The staff works closely with the Uintah County Extension Office, Uintah County Weed Department, and other land management agencies in an effort to improve communications and control techniques.

The Uintah County Weed Department annually sprays 50 acres of Refuge roadsides with a tank mix of Escort and 2,4-D amine to help control the spread of perennial pepperweed. The Refuge is currently treating salt cedar, perennial pepperweed, Russian knapweed, and Russian olive with the following techniques:

Salt cedar - tank mix of 50 percent Round-Up and 50 percent Arsenal applied foliarly
- experimenting with above mix on resprouts following burning
- experimenting with straight Arsenal as a foliar application

Perennial pepperweed - Escort/2,4-D amine 50:50 mix
- experimenting with straight Escort (with and without mowing)

Russian knapweed - 2,4-D amine within farm field
- Escort/2,4-D amine on roadsides

Russian Olive - 2,4-D Ester stump treatment
- Arsenal stump treatment

The Refuge staff continues to experiment with numerous techniques which have been researched and proven to work in other states.

Selenium

Accumulation of high concentrations of selenium within the Refuge is a serious issue which poses life threatening health problems for wildlife. Selenium is a naturally occurring element found in the soil, water, and vegetation within and adjacent to Refuge lands. Selenium is essential for most living organisms but can be toxic when concentrated (Hamilton et al., 1996, Waddell pers. comm.). For the past nine years, the Service's Ecological Services Division, in conjunction with the U.S. Geological Survey (USGS), has been conducting extensive studies of selenium to determine the levels and distribution of selenium in soil, water, and wildlife in and adjacent to the Refuge. Numerous dead birds and deformed bird embryos have been found. Based on data collected thus far, selenium on the Refuge has been linked to water flows through the Roadside Draw located in the southwest corner of the Refuge and impoundments in the immediate area. Approximately \$2.5 million has been spent to minimize the flow and accumulation of water in the Roadside Draw. Despite the Service's efforts, high concentrations of selenium still occur, and data indicates farm irrigation occurring north of the Refuge leaches selenium from the soil and is discharged on the Refuge via groundwater (Waddell pers. comm.).

In an effort to prevent additional increases in water flow through the Roadside Draw, the Refuge requested that the Bureau of Land Management (BLM) consider Refuge objectives in their land-use planning of areas adjacent to the Refuge. BLM has agreed with our request and has incorporated necessary wording into the Diamond Mountain Resource Management Plan. The Refuge staff is continuing the cleanup of contaminated sites.

The Refuge, with the assistance of the Ecological Services Division and the USGS, is currently evaluating levee removal to provide dilution of the concentrated selenium. This proposal would in essence return this site to the way it once functioned prior to construction of the protective dike. This proposal involves partial removal of the Sheppard Bottom protective dike, and modification to the interior dikes of S3 and S5. A separate Environmental Assessment will be prepared in the year 2000 for this project. Please refer to the Selenium Project (Map 4) for additional information.

Mosquitos

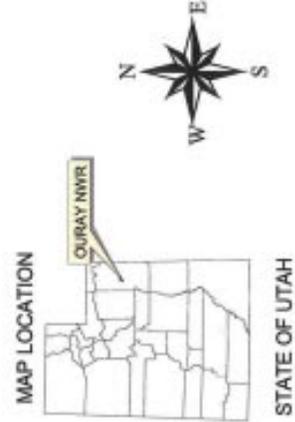
Refuge wetlands produce large numbers of mosquitos. This creates serious conflicts with neighboring communities and concern over mosquito borne Western Equine and St. Louis Encephalitis. The Uintah County Mosquito Abatement District (UCMAD), in cooperation with the Refuge, has applied the larvicide BTI (Bacillus thuringiensis israelensis), a biological control to Refuge wetlands, in an attempt to reduce the mosquito population. Malathion is also used, but only as a last resort when disease vectors are present, and the areas fogged are on administrative and upland sites. Refuge cooperation exists in the form of cost sharing for BTI (when the budget allows), monitoring of mosquito populations using a light trap, and providing access for monitoring and control. The Refuge cooperates with the District's effort to suppress mosquitos as long as it does not conflict with the purpose of the Refuge. In 1999, a total of 9,712 acres were treated with BTI and 170 acres were treated with malathion (the acreage includes repeat treatments of the same sites). A sentinel flock of domestic poultry located on a nearby ranch is routinely checked for mosquito borne infectious diseases.

The Refuge is also currently evaluating the use of other mosquito control chemicals including the larvicide Agnique, and community bat box construction and placement in cooperation with the Boy Scouts of America and other interested volunteers. Potential conflicts can exist between mosquito control and providing food, shelter, and cover for endangered fish and migratory birds.

The Refuge greatly appreciates the professional working relationship and the numerous accomplishments UCMAD has made on the Refuge.

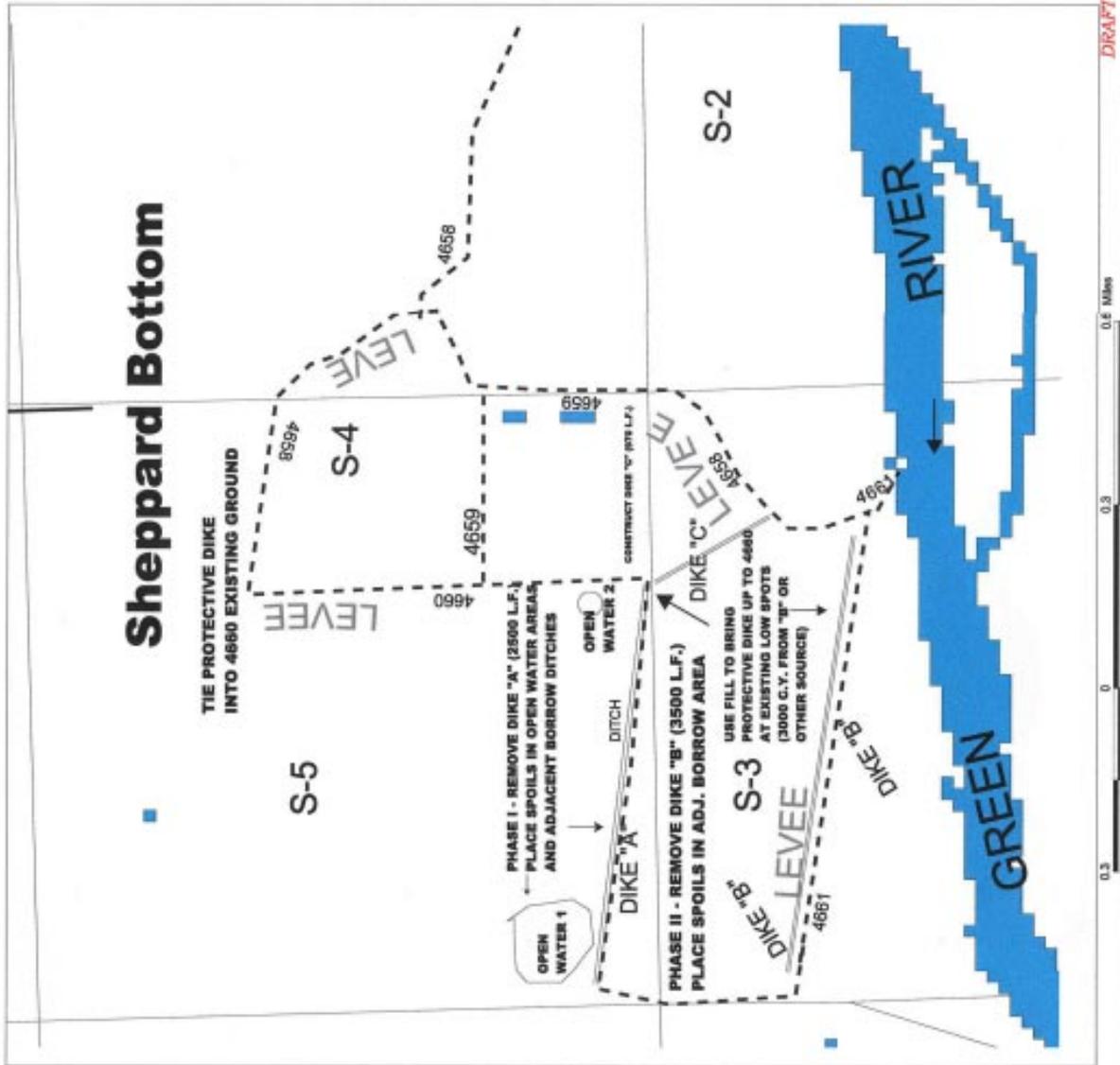
Ouray National Wildlife Refuge Selenium Project Map

Shepard Bottom (S-3/S-5) Dike - Removal



Flo Engineering Inc. gathered data for this project

Map # 4



Summary Refuge and Resource Description

Geographic/Ecosystem Flyway Setting

The U.S. Fish and Wildlife Service is organized into watershed based ecosystems (see Map 5). The Ouray NWR, Browns Park NWR in Colorado, and the Seedskaadee NWR in Wyoming all lie within the Upper Colorado River Ecosystem (UCRE). All three refuges are similar in that they are located along the Green River.

The UCRE incorporates the watersheds, headwaters, tributaries, including the Green River, and mainstem of the Colorado River in Wyoming, Utah, and Colorado. The aquatic systems in this region are vital not only for native wildlife but also for millions of people in seven arid southwestern states. Once naturally diverse, many of these systems have been fragmented and degraded as a result of water development projects, land-use practices, and introduction of nonnative animals and plants. An interagency planning team met in 1994 to develop broad goals and objectives for the UCRE. Resource issues identified by the team for the Ecosystem are closely related to resource issues and concerns raised by the staff of Ouray NWR. The goals developed are:

- P Restore and maintain an aquatic system capable of supporting the diversity of native aquatic communities to achieve recovery of listed and candidate species and prevent the need for future listings.
- P Reverse the current trend (of decline in wetland and riparian habitats); restore, maintain, and enhance the species composition, the extent and spatial distribution of wetland/riparian habitats.
- P Promote terrestrial biological diversity and ecosystem stability through sound land management practices thereby avoiding fragmentation, degradation, and loss of terrestrial habitats.

Ouray NWR is also included in the Intermountain West Joint Venture region of the North American Waterfowl Management Plan. Other regional wildlife resource planning efforts which may affect management of the Ouray NWR have been conducted by the Service, other Federal agencies, States, and conservation interest groups. Such initiatives also include cooperative management plans for Pacific Flyway migratory bird species. Species for which plans exist include the Rocky Mountain population of Canada goose, western Canadian Arctic snow goose, Pacific Flyway Ross' goose, Rocky Mountain population of trumpeter swan, western population of tundra swan, Rocky Mountain population of greater sandhill cranes and Western Management Unit of mourning dove.

The Refuge lies within the Uintah Basin, a subdivision of the Colorado Plateau physiographic province. Refuge habitats include about 19 square miles of riverine, riparian, and upland habitats. Benchlands are held up by upper strata of the Uinta Formation, which form rounded and sculptured bluffs bordering the River valley. Pleistocene and earlier terrace gravel cover the benchlands. Bottoms and alluvial fans derived from the benches cover the margins of river terraces in the valley. Elevation ranges from 5,072 feet above sea level atop Leota Bluff, to 4,650 feet along the Green River at the south end of Sheppard Bottom.

In some years, the Refuge area receives suitable flows from the Green River and the Yampa River to adequately flood critical floodplain habitat for the endangered Colorado River Fishes. The Refuge serves as a partner and cooperator in the Recovery Program. Many of the necessary habitat conditions required by the endangered fish are also conducive to migratory bird management.

Refuge Habitats

National, regional, and local efforts have been made to simplify, standardize, and describe habitat classifications. For example, Cowardin et al. (1979) developed a classification system for wetlands and deepwater habitats in the United States. In 1997, Dall et al. proposed a system for mapping riparian areas in the western United States. More specifically, Hansen et al. (1995) developed a classification for Montana's riparian areas. To be directly useful for management, classification and identification of certain habitats and areas must be gleaned from these existing systems but refined for a particular management area (i.e., Ouray NWR). On the Refuge, three general habitat categories occur: riverine, riparian, and uplands. The following defines and describes these general habitat categories, including improvements or developments within riparian areas. Specific impoundment surface acres, capacities, and maximum pool elevations are shown in Table 1.

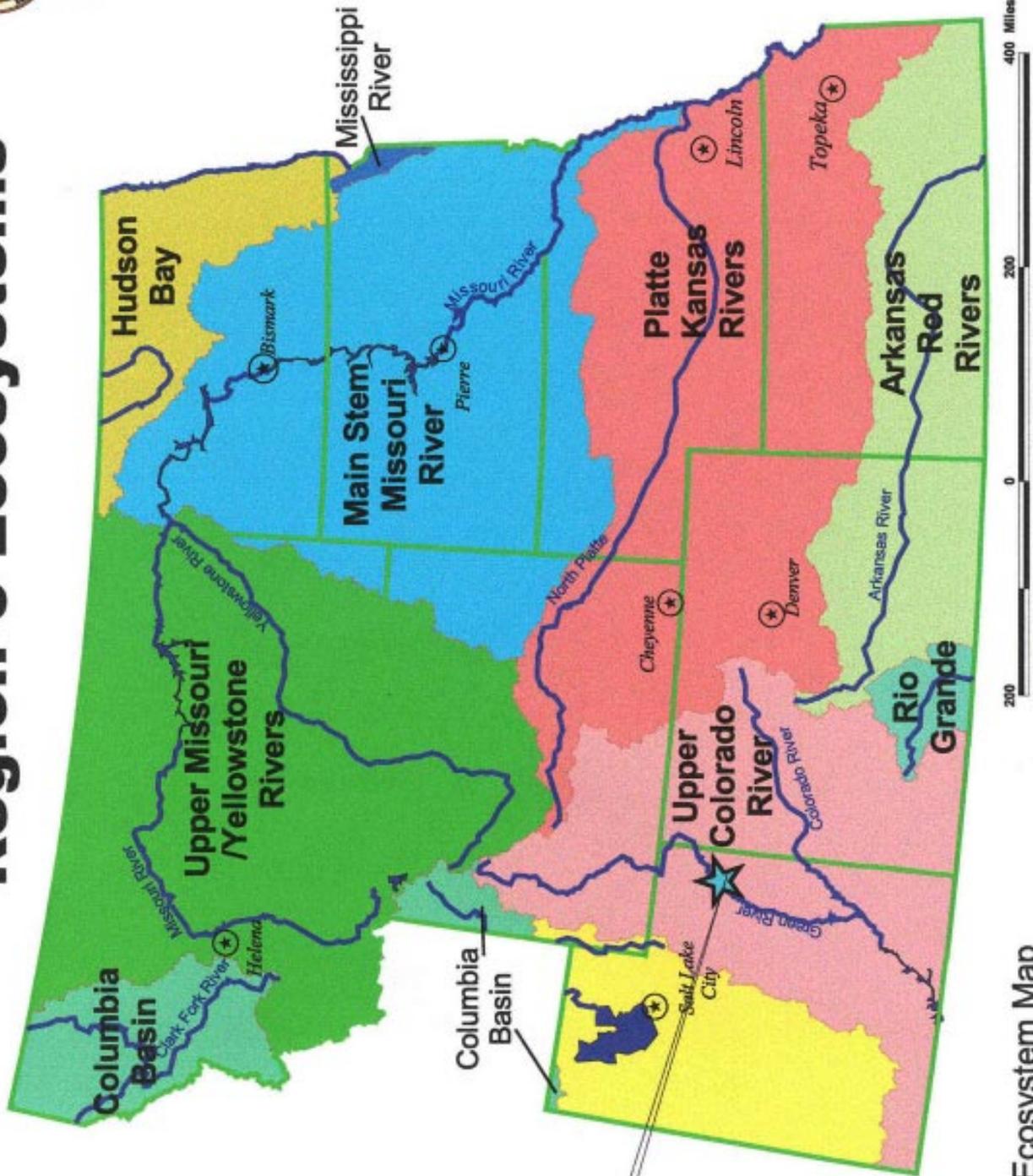
Table 1. Ouray NWR Wetland Area/Capacity Elevation Table*			
Pool Designation	Pool Capacity Surface Acres	Pool Capacity Acre-Feet	Full Pool Elevation
J-1	31	42	4667.00
J-2	41	74	4666.00
J-3	58	35	4666.00
J-4	<u>16</u>	<u>16</u>	4666.00
	146	267	
L-1	57	157	4668.00
L-2	88	230	4668.00
L-3	107	382	4666.00
L-4	84	340	4666.00
L-5	80	222	4663.00
L-6	99	362	4664.00
L-7	120	275	4662.00
L-7A	20	40	4662.00
L-8	118	289	4662.00
L-9	83	227	4662.00
L-10	<u>151</u>	<u>553</u>	4664.00
	1016	3077	
P-1	12	11	4656.00
P-2	10	10	4656.00
P-3	8	8	4656.00
P-4	8	11	4656.50
P-5	<u>12</u>	<u>16</u>	4656.00
	50	56	
S-1	95	177	4658.00
S-2	260	314	4658.00
S-3	217	703	4658.00
S-4	70	196	4658.00
S-5	<u>129</u>	<u>399</u>	4658.00
	771	2200	
Woods Main	309	850	4655.00
Woods Back	<u>91</u>	<u>124</u>	4655.00
	400	974	
Wyasket Pond	253	644	4663.00
Wyasket Lake	<u>1393</u>	<u>3267</u>	4661.00
	1646	3911	
Total AC/CAP:	4029	10485	

*Based on FLO Engineering's Ouray NWR Bottomland Sites Elevation/Area/Capacity Tables Final Report (Revised 8/97)



Draft

Region 6 Ecosystems



Refuge Location

Map # 5 Ecosystem Map

Riverine

Riverine, as defined by Cowardin et al. (1979), is any wetland or deepwater habitat contained within a channel, with the exception of wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens. Within the Refuge boundary, 12 miles of the Green River meet this definition which equates to approximately 1,180 acres.

The Green River watershed encompasses 45,000 square miles, originating in Wyoming's Wind River Range and stretching 730 miles through Colorado and finally connecting to the Colorado River in Canyonlands National Park, Utah. The northern Refuge boundary begins approximately 120 River miles downstream from Flaming Gorge Dam. The Green River receives additional flows from the unregulated Yampa River that lies between the dam and the Refuge, with an average of two flow peaks per year (Collier et al. 1996, Laubhan 1997).

The dam, erected in 1962, has forever altered the timing of flows (see Figure 1 and 2 for pre- and post-dam flows). Historically, the Green River would begin to rise in March, peak in June, and decline in July. Many native fish species found nowhere else evolved with this variability in River flow and sediment concentration and temperatures specific to the Green River. Under influence of Flaming Gorge Dam, the Green River's high flows now coincide with releases to power peak electrical demands of summer and winter, but the total amount of water released per year has not significantly changed (Collier et al. 1996). Daily peak electrical demands result in daily River flow fluctuations that can be as extreme as 1.5 feet per day as recorded 107 miles downstream from the dam at Jensen, Utah (Valdez 1989). Even though these present-day permutations present obstacles to endangered fish recovery and habitat restoration, the Green River continues to be the lifeline of Ouray NWR and its flora and fauna.

Riparian

Riparian as defined by Dall and others (1997): "...are plant communities contiguous to and affected by surface and subsurface hydrologic features of perennial or intermittent lotic and lentic water bodies (rivers, streams, lakes, or drainage ways). Riparian areas have one or both of the following characteristics: 1) distinctively different vegetative species than adjacent areas, and 2) species similar to adjacent areas but exhibiting more vigorous or robust growth forms. Riparian areas are usually transitional between wetland and upland." (See Map 6 and 7).

National Wetland Inventories (NWI) following the Cowardin and others (1979) classification have recently been completed for Ouray NWR. However, these data are based on 1983, color infrared (CIR) aerial photography. This particular year saw the onset of a 100-year flood event. Therefore, the information gleaned from the NWIs represent a best-case scenario from an ecological standpoint. For example, Hansen (1994) states that recent research has shown that most cottonwood and willow recruitment is due mainly to very large flooding events and not to average flow events. Although 100-year flood events are best-case scenarios, today, management on a daily basis is more on-line with average flows.

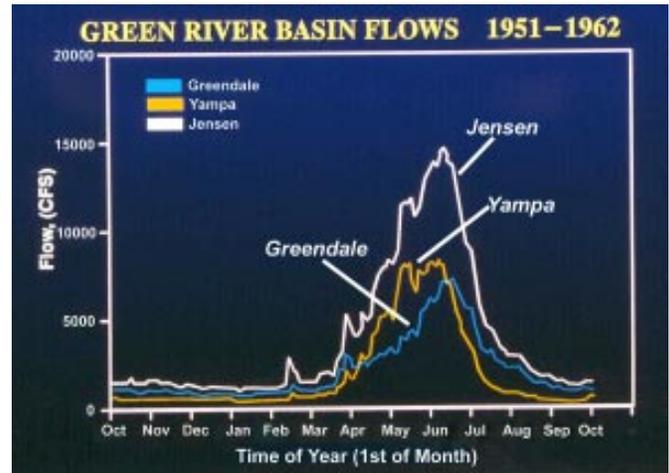


Figure 1. Pre-Dam Average Annual Flows

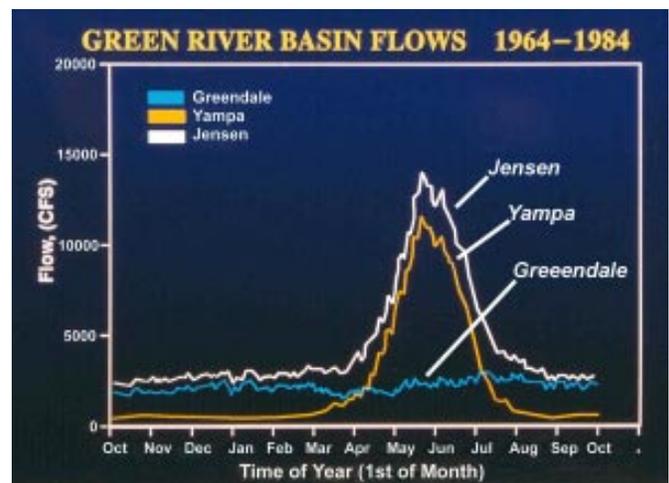


Figure 2. Post-Dam Average Annual Flows

With the exception of the NWI, no other riparian or wetland ecological site classification has been completed on or near the Refuge (Hansen 1994). Therefore in the CCP, the definition of “riparian” will follow Dall, et. al. 1997, but the data used will be from the NWI (following Cowardin 1979). Although Cowardin describes vegetation by life forms within classes such as forested (trees), scrub/shrub, emergents, etc., and since complete baseline biological inventories and other assessments (e.g., structure and composition of existing vegetation) are lacking for the Refuge, additional discussion of vegetation by bottoms is in general terms and based on casual or anecdotal observations. Additional recommendations and information have been provided during 1- and 2-day field visits and on-site assessments by Murray Laubhan (Midcontinent Ecological Science Center), Leigh Fredrickson (Gaylord Laboratory), Paul L. Hansen (University of Montana), Charlie Pelizza (Lake Andes NWR), and several others.

The CCP describes Refuge management units defined by previous Refuge staffs and that probably date back to the inception of this Refuge. These management units (previously identified as bottoms or distinct natural forming depressions between the River’s edge and the uplands) are Brennan, Johnson, Leota, Wyasket, Sheppard, and Woods or Old Charley Wash.

Several intermittent streams drain the adjacent uplands located on and off the Refuge. Only the stream habitat associated with the North and South Roadside Draw near the main entrance to the Refuge will be discussed in the CCP because it has been the most impacted by human presence.

Brennan Bottom

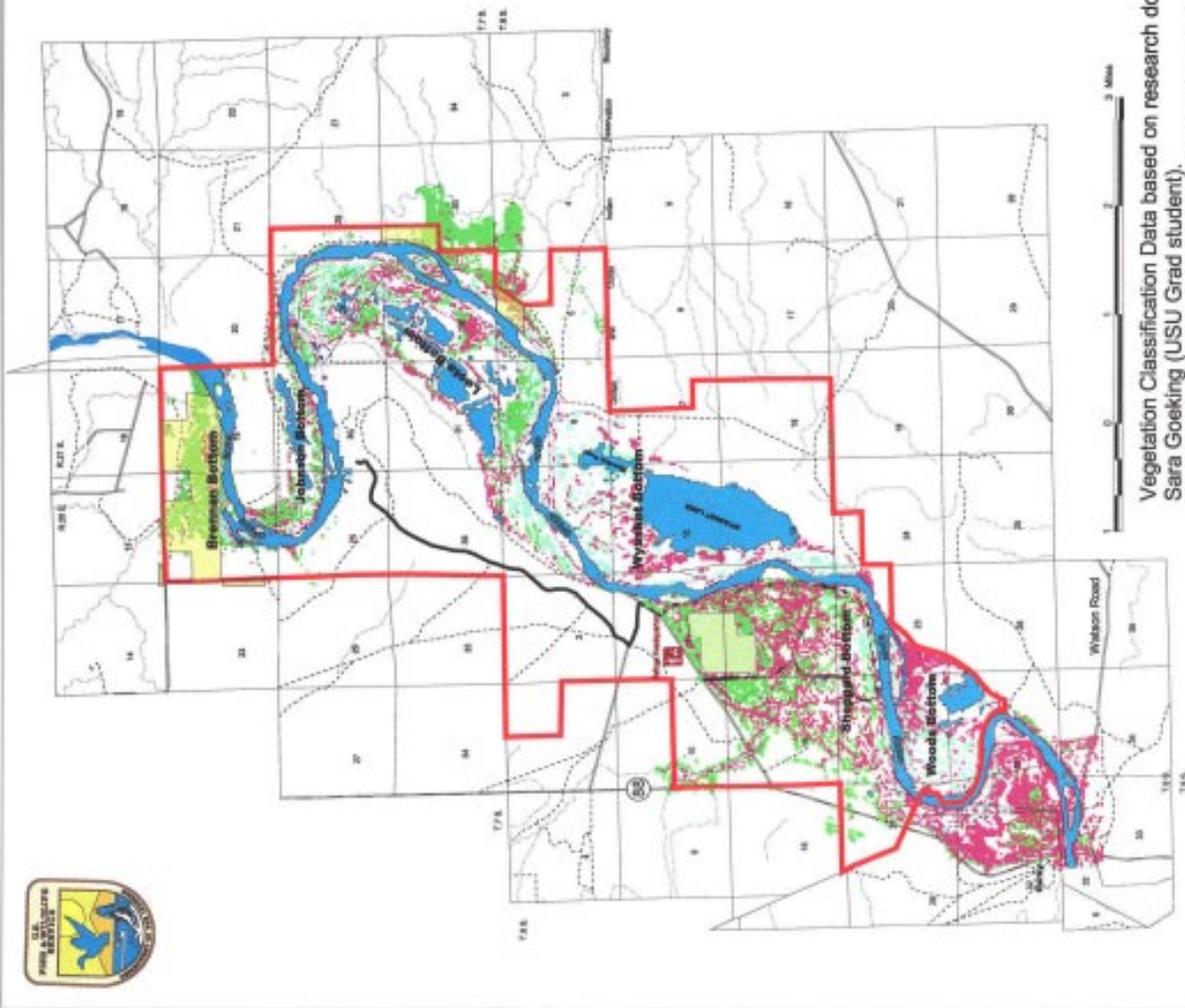
Brennan Bottom is the northernmost (upstream) bottomland on the Refuge. Most of the bottomland is privately owned, but it falls within the executive boundary of Ouray NWR. All inventoried wetlands (ca. 154 acres) in Brennan are classified as palustrine (see Cowardin et al. 1979 for more information). Approximately 77 acres of seasonally flooded emergent wetlands comprise 50 percent of the classified wetlands. Other temporarily flooded wetlands are forested (51 acres), scrub/shrub (24 acres), and impounded unconsolidated shore (2 acres) (USFWS, Brennan Basin 1999). The approximately 160 acres in Refuge ownership are associated uplands (i.e., areas that are not wetlands). Uplands will be discussed in a later section. As most of the classified wetlands in Brennan are in private ownership, the Refuge has no active water management capabilities.

Johnson Bottom

Approximately 250 acres of inventoried wetlands exist in Johnson Bottom (USFWS, Brennan Basin 1999). In 1983, 73 percent (182 acres) of the wetlands were classified as lacustrine. The lacustrine wetland is an impounded, intermittently exposed, artificially flooded aquatic bed. Presently, this represents the bulk of Johnson Bottom units J-1 through J-4. The remaining acreage (68 acres) is classified as palustrine. Specifically, three acres are artificially/temporarily impounded emergent wetlands, 21 acres are temporarily flooded forest, and 44 acres are scrub/shrub wetlands (USFWS, Brennan Basin 1999).

The four units within Johnson Bottom provide deep, open-water habitat. Aquatic submergent vegetation is currently nonexistent due to water turbidity caused by common carp. The vegetation that does occur on the outer edges consists primarily of cattail and hardstem bulrush. Although the dominance of these species is not known, other vegetation specific to the forested and scrub/shrub classifications include cottonwoods, willow species, Russian olive, Tamarix, greasewood, and sagebrush.

Ouray National Wildlife Refuge Riparian Woodlands Map



- LEGEND**
- Cottonwood
 - Irrigated Agriculture
 - Saltcedar
 - Whitetop/Grass
 - Open Water
 - Private Lands
 - Ouray NWR Boundary

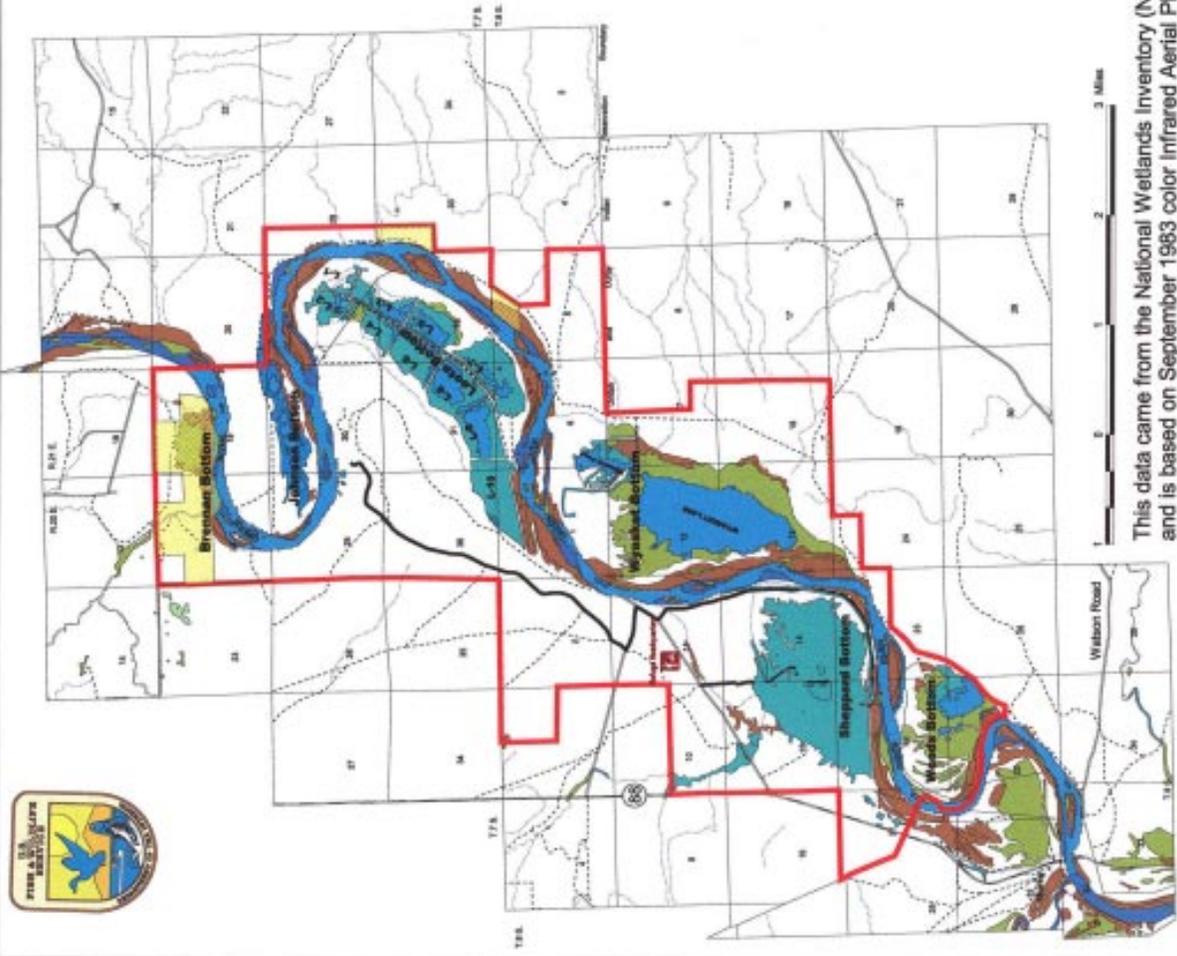


Map # 6

DRAFT

Vegetation Classification Data based on research done by Sara Goecking (USU Grad student). Some discrepancies may have occurred in her data.

Ouray National Wildlife Refuge Wetlands Map



LEGEND

- Lake
- River
- Saturated
- Seasonal
- Semipermanently Flooded
- Temporarily Flooded
- Upland
- Private Lands
- Ouray NWR Boundary

Frequency	Regime	Acreage
1	LAKE	182,425
3	RIVER	1165,848
6	SATURATED	13,411
95	SEASONAL	1803,377
42	SEMI-PERMANENT	1868,066
153	TEMPORARY	1592,220
6	UPLAND	36265,419



State of Utah

Map # 7

DRAFT

This data came from the National Wetlands Inventory (NWI), and is based on September 1983 color infrared Aerial Photographs. The data was gathered during a 100 year flood event.

These four man-made impoundments are essentially managed as one unit, with the gravity flow inlet coming into J-1 and Green River water fed on through to J-4. Three interior dikes that subdivide this wetland have deteriorated over the years and do not allow for independent management. A management decision was made in 1988 to remove the electric line from a permanent pump station located in this remote area. Partial levee removal along the southeast corner of J-4 was completed in March 1998 and is designed to flood at River flows of 13,000 cubic feet per second (cfs). Construction of a new drain structure/fish kettle in the southeast corner of J-3 was completed in the fall of 1999. Both projects were constructed by the Bureau of Reclamation and funded by the Recovery Program. A proposal is being considered to remove what is left of the three interior dikes that subdivide this wetland.

Leota Bottom

More than 1,250 acres of wetlands classified as palustrine occur in Leota Bottom. According to 1983 aerial photography, temporarily flooded wetlands in Leota are emergent (40 acres), scrub/shrub (158 acres), and forested (220 acres). Other classified wetlands in Leota are excavated, semipermanently flooded unconsolidated bottom (0.47 acres), seasonally flooded emergent (4 acres), and impounded artificially/seasonally flooded scrub/shrub (24 acres). However, the bulk of palustrine wetlands in Leota are comprised of impounded artificially/semipermanently flooded emergent wetlands (808 acres) (USFWS, Brennan Basin 1999), which approximates the area in Leota units L-1 through L-10, including L-7A.

The eleven units within Leota Bottom provide an array of habitat gradients from pockets of deep to shallow open-water and areas of open-water interspersed with aquatic emergents. Cattail and hardstem bulrush are also the dominant plant species within these impoundments. Similar to Johnson Bottom the dominant species are not known, but other vegetation specific to the forested and scrub/shrub classifications include cottonwoods, willow species, Russian olive, Tamarix, squaw bush, greasewood, and sagebrush.

Of all the wetland sites on the Refuge, Leota has been the most intensively developed. Water sources for the Leota impoundments are the Green River and Pelican Lake. Green River water can either be pumped or gravity fed into the wetland complex through L-2. A new inlet structure and gauging station was constructed in 1997 to make gravity flow more feasible. Pelican Lake water can be gravity fed via pipeline into L-10. In March 1998, partial levee removal adjacent to L-7 and L-7A was accomplished and is designed to flood at River flows of 15,000 cfs and 20,000 cfs. A new drain structure/fish kettle located at the south end of the complex, was constructed in June 1999. These projects were constructed by the Bureau of Reclamation and funded by the Recovery Program and the Refuge Flood Relief Funds. Texas crossings or spillways were constructed in 1999 between L-1/L-2, L-2/L4, L1/L3, L4/L6, and L6/L8. The spillways relieve hydrologic pressure exerted on interior dikes and thus minimize water erosion.

Wyasket Bottom

Of the 1,373 acres of inventoried wetlands that exist in Wyasket Bottom, 67 percent (924 acres) are lacustrine and 33 percent (449 acres) are palustrine. Relatively speaking, these acreages correspond to what has been managed as Wyasket Lake and Wyasket Pond within this bottom. Of the lacustrine wetlands, 39 acres are temporarily flooded, 868 acres are seasonally flooded, and 17 acres are semipermanently flooded. The temporarily and seasonally flooded lacustrine wetlands are further classified as impounded, artificially flooded, and unconsolidated shore, whereas the semipermanent lacustrine wetland is further classified as excavated and unconsolidated bottom. The classified palustrine wetlands are temporarily, seasonally, semipermanently, and artificially flooded. The temporarily flooded palustrine wetlands include scrub/shrub (175 acres), forested (151 acres), impounded artificially flooded emergent (17 acres), and emergent (2 acres). Additional classifications and modifiers of the seasonally flooded palustrine wetlands are impounded, artificially flooded unconsolidated shore (16 acres) and emergent (3 acres), emergent (5 acres), and unconsolidated shore (0.37 acres). The semipermanently flooded palustrine wetlands include the following additional classifications and modifiers, impounded, artificially flooded emergent (77 acres) and excavated, artificially flooded aquatic bed (3 acres) (USFWS, Brennan Basin, Ouray SE, and Ouray 1999).

When flooded, Wyasket Lake functions as a natural moist-soil unit producing an abundance of foods in the form of seeds and invertebrates for waterfowl, shorebirds, and other waterbirds. The predominant emergent plant species are dock and smartweeds, with some fringes of reed canarygrass. Sago pondweed is the dominant submergent vegetation in Wyasket Lake.

Wyasket Pond has a history of overabundant emergent vegetation. Cattail and hardstem bulrush are the dominant plant species covering almost the entire pond. The dominance of other species is not known, but other vegetation specific to the forested and scrub/shrub classifications in Wyasket Bottom include cottonwoods, Russian olive, Tamarix, squaw bush, greasewood, and sagebrush.

Wyasket Bottom is the least developed wetland site on the Refuge and floods naturally at a river flow of 18,000 cfs. Green River water can be diverted to Wyasket Pond via gravity flow inlet or pump station, although the pump station has not been used since 1991. This water can also be diverted to Wyasket Lake through the Wyasket Pond inlet structure, but careful consideration must be given to this practice. Diverting water to Wyasket Lake during the runoff period can set the stage for a mid-to-late summer drawdown, triggering an outbreak of avian botulism. Therefore, the Refuge staff has recently decided against actively diverting water to Wyasket Lake at River flows less than 18,000 cfs.

Sheppard Bottom

All 967 acres of inventoried wetlands in Sheppard are temporarily, seasonally, and semipermanently flooded palustrine wetlands. Further modifiers and classification of temporarily flooded palustrine wetlands are forested (84 acres), scrub/shrub (78 acres), emergent (6 acres), and impounded, artificially flooded scrub/shrub (0.61 acres). Two acres of unconsolidated shore temporarily flooded wetlands exist in this Bottom. Additional classification of semipermanently flooded palustrine wetlands include excavated, artificially flooded emergent (770 acres), impounded, artificially flooded aquatic bed (20 acres), and emergent (7 acres) (USFWS, Ouray and Pelican Lake 1999).

During the NWI inventory of 1983, Sheppard Bottom units S-1 through S-5 were inundated and were thus classified as 770 acres of excavated palustrine, artificially/semipermanently flooded emergent wetlands. This may not reflect the area's average condition and illustrates the need to further refine, describe, and qualify data that was recorded in 1983 with what is generally present over time. Additionally, moist-soil units were created north and adjacent to Sheppard Bottom Unit 4 since the CIR photographs were taken in 1983. These moist-soil units (ca. 50 acres) would probably be classified as palustrine, unconsolidated bottom, artificially flooded, impounded wetlands. Furthermore, about 150 acres of farm fields or croplands are considered to lie within Sheppard Bottom. This classification with the potential farmed (f) modifier was not interpreted from the 1983 CIR photographs (see below for more information on moist-soil units and croplands).

Similar to Wyasket Pond, Sheppard Bottom units S-1 through S-5 become almost entirely covered with cattail and hardstem bulrush with the exception of a few scattered pockets of open water and encroachment of Tamarix. Other dominant species are not known, but other vegetation specific to the forested and scrub/shrub classifications in Sheppard Bottom include cottonwoods, Russian olive, Tamarix, and squaw bush. S-2, S-3, S-4, and S-5 were burned in 1999 to reduce emergent vegetation cover and to reduce fuel loads that could damage surrounding cottonwoods with potential wildfire.

Water for Sheppard Bottom is received from the Green River via a gravity flow inlet and pump station. Similar to all bottoms, inundation of Sheppard also occurs through "subup" or subsurface water movement caused by River flows. Correlation of specific River flows (e.g., cubic feet per second or cfs) with "subup" need to be determined for all of the Bottoms on the Refuge to facilitate better management decisions and planning. Water is also provided to Sheppard Bottom from Pelican Lake via gravity flow pipeline and seep/spring flows from Roadside Draw.

North and South Roadside Draw

Water has not been impounded in this Draw since 1996 because of selenium concentrations that pose health risks (e.g., deformities, reduced reproduction, etc.) to wildlife. However, during the NWI inventory of 1983 the habitat in the North and South Roadside Draw was classified as impounded semipermanently flooded palustrine wetlands. Specifically, the North Draw has 36 acres of classified emergent and 0.38 acres of classified aquatic bed wetlands, while the South Draw has 7 acres of classified emergent and 6 acres of classified aquatic bed wetlands. The South Draw is bordered by 21 acres of temporarily flooded, emergent, palustrine wetlands (USFWS, Pelican Lake and Ouray 1999). Regardless of the classifications based on 1983 CIR photographs, remnants of the ponds exist but flows from the intermittent stream and natural spring seeps are no longer impeded.

Presently, reed canarygrass is the dominant plant species in the roadside Draw. Efforts have been made to establish cottonwoods by pole planting and have met with little success. Other vegetation present includes willow species, phragmites or common reed, Russian Olive, Tamarix, Russian knapweed, perennial pepperweed, cattail, and cocklebur.

Water in the Roadside Draw collects from irrigation overflow and springs or seeps containing high selenium concentrations. The Pelican Lake pipeline project was conceived in the early 1990's in an attempt to reduce the amount of contaminated water entering Refuge wetlands. Since no significant decrease occurred in contaminated water flow after the pipeline was constructed, the Roadside Ponds were retired from use in 1996. The Parker moist-soil management units were created in part in 1997 to offset these wetland losses.

Moist-soil Units

The Parker Tract moist soil management units were constructed in March 1997. Five independently controlled impoundments exist, P-1 through P-5, that total 50 acres. Pelican Lake is the primary water source for these impoundments via gravity flow pipeline. Each unit has its own inlet, and outlets that connect with a drain canal that empties into S-1. Structures occur between units which allow for water to be diverted from unit to unit.

Green River water can also be diverted via the Sheppard inlet by backing this water into the units through the drain structures. This water should only be used as a last resort as it contains an extraordinary amount of salt cedar and perennial pepperweed seed during the runoff period, which readily germinates on exposed mud flats in mid-to-late summer.

The dominant vegetation in some of these units is alkali bulrush. Because of shallow water and the absence of common carp, this tract has the potential to produce an abundance of vegetative and invertebrate food for waterbirds. Production will be dictated by the ability to control or regulate salinity within these units, which may limit the germination of smartweeds, wild millets, and other preferred vegetation.

Croplands

Croplands, or agriculture fields, comprise less than 1 percent (150 acres) of the total Refuge acreage. Agricultural activities such as plowing, discing, seeding, and irrigating are undertaken by a local landowner under a cooperative farming agreement. Crops are planted on a rotation basis and consist of alfalfa, small grains such as barley, and row crops such as grain sorghum or milo. Refuge croplands augment available forage for migratory birds, mule deer, elk, and other resident wildlife. Nearly 1,000 Canada geese and 2,000 mallards have been counted on these fields at any one time. Western meadowlark, red-winged blackbird, American goldfinch, horned lark, and savannah sparrow benefit from the croplands on the Refuge. Bald eagle, peregrine falcon, and golden eagle also use croplands either by preying directly on birds or feeding on bird carcasses.

For the near future, Refuge farm fields will be maintained to produce grain crops. Simply retiring the fields would create nonnative plant infestations unless careful revegetation planning is done. If new revegetation techniques are developed, a slow transition will be made toward establishing native seedbearing plants that will support migratory birds.

Woods Bottom

Inventoried wetlands in Woods Bottom equal 478 acres. Eighty-six acres are classified as artificially/semipermanently flooded, aquatic bed lacustrine wetlands. The remaining 392 acres are classified palustrine wetlands. Specifically, 86 acres are temporarily flooded forested and 81 acres are scrub/shrub wetlands. Additionally, 19 acres are temporarily/artificially flooded emergent and 4 acres are scrub/shrub wetlands. The rest are seasonally/artificially flooded emergent (169 acres) and unconsolidated shore (33 acres) wetlands (USFWS, Ouray 1999).

The predominant emergent plant species are smartweeds and dock, with some fringes of reed canarygrass. Sago pondweed is the dominant submergent vegetation in Woods Main Pool and Backside Pool. The dominance of other species is not known, but other vegetation specific to the forested and scrub/shrub classifications in Woods Bottom include cottonwoods, Russian olive, Tamarix, and squaw bush.

Woods Bottom is the southernmost (downstream) wetland bottomland habitat on the Refuge. It is divided into two areas by an interior dike, creating a large main pool to the east. The western portion consists of some open water between fingers of high sand dunes. Green River water is delivered by gravity flow either through the inlet on the north side or the drain structure on the south side of the main pool. No permanent pumpsite exists for this location.

Woods Bottom was the first wetland bottomland site on Refuge to be enhanced/restored as nursery habitat to benefit native endangered fishes and is managed cooperatively with the Recovery Program. The drain structure was modified in 1993 with the construction of a fish kettle to facilitate handling and processing of fish. In the fall of 1997, levee removal occurred along the south side of the backside pool which allows for flooding at River flows of 13,000 cfs. Flooding occurs naturally into the main pool at flows of 14,000 cfs. More recently, Woods Bottom is also being operated for nonnative fish removal and has potential for growout of hatchery-produced wild-strain endangered fishes.

Riparian habitat decline along the Green River has been occurring since the construction of Flaming Gorge Dam (Hansen 1994, Laubhan 1997). Native riparian vegetation historically evolved with a dynamic hydrologic regime. Spring flooding and the deposition of fine textured soil is especially important to cottonwood phenology. Dam operations have eliminated historic spring flooding, sifted fine textured soils, and stabilized the water regime allowing nonnative plants to thrive and spread. Nonnatives that are displacing some of the native vegetation include perennial pepperweed or giant whitetop, tamarisk or saltcedar, Russian-olive, and some Russian knapweed. All of the nonnatives are scattered throughout this habitat and are mixed with other species except for tamarisk and pepperweed which has formed monotypic stands.

Uplands

For the purposes of this document, uplands are defined as those areas that are neither riverine nor riparian. However, on the Refuge and from a management perspective, uplands are further divided into three categories; semidesert shrubland, grasslands, and clay bluffs. Uplands have received little attention and, therefore, habitat and wildlife information is lacking. The following discussions are in general terms. Acreage figures are estimates and may not be accurate.

Semidesert Shrubland

Approximately 2,669 acres of semidesert shrubland cover the Refuge. Greasewood, rubber and low rabbitbrush, spiny hopsage, shadscale, fourwing saltbush, winterfat, big sagebrush, bud sagebrush, black sagebrush, Indian ricegrass, needle-and-thread, sand dropseed, and nonnative cheatgrass occur on this upland habitat type. This habitat also supports the state and federally threatened Uintah Basin hookless cactus. Semidesert shrubland habitat is scattered within the boundary of the Refuge but generally occurs in the transition zone between riparian areas and the clay bluffs.

Grassland

Alkali sacaton, inland saltgrass, western wheatgrass, Great Basin wildrye, desert paintbrush, Nelson and scarlet globemallow can be found in the 1,520 acres of grassland that occur on the Refuge. This habitat, like semidesert shrublands, is scattered within the boundary of the Refuge, but generally occurs above the clay bluffs on what is locally referred to as a bench.

Clay Bluffs

Little is known about the relative importance of the 1,935 acres of barren clay bluffs that occur on the Refuge. These clay bluffs make up part of the geological Morrison Formation formed during the Jurassic period of the Mesozoic era. Although this upland is practically devoid of vegetation on the surface, it is believed to be rich in dinosaur artifacts (Morris and Stubben 1994).

As previously stated, less is known about upland habitats on the Refuge. Before reasonable objectives for management of this habitat can be developed, a better understanding of the existing flora and fauna is needed. This must be accomplished through baseline biological inventories, determining the potential natural communities for uplands, gleaned information from other scientific sources as they become available, etc.

Refuge Wildlife

Information on certain wildlife species and their needs is readily available while information on other species is sorely lacking. For example, a wealth of knowledge exists on waterfowl and production because previous Refuge management emphasis was placed on these species. Concerted efforts are underway to determine the needs of migratory songbirds, small mammals, reptiles and amphibians, and insects using baseline biological inventory techniques as mist-netting, point counts, and trapping. For the purposes of the CCP and particularly this section, the following discussion on wildlife is in general terms and by habitat. Other information included in the riparian habitat section involves a brief discussion on avian botulism in Wyasket Bottom. Because of the lack of specific information, discussion of wildlife is combined for semidesert shrubland and grassland in the upland section. Following the description on wildlife by habitat, a brief discussion is provided on special status species that occur or have occurred on the Refuge.

Riverine

At different times of year, the Green River is a primary roost area for Canada and snow geese, mallard, gadwall, northern pintail, American wigeon, green-winged teal, and common merganser. Shorebirds such as greater and lesser yellowlegs, willet, and killdeer, benefit from the shallow water margins adjacent to riverbanks and sandbars. Mule deer, elk, moose, and black bear utilize the Green River as a watering source. Other mammals that are Green River or water obligate species include beaver and northern river otter. Several nonnative fish species exist in the River and likely displace the state and federally endangered bonytail, Colorado pikeminnow, humpback chub, and razorback sucker. Over 40 nonnative fish species have been introduced to the Colorado River System and of those, green sunfish, smallmouth bass, channel catfish, black bullhead, northern pike, fathead minnow, and red shiner have also become established in the Green River (B. Haines pers. comm).

As for many rivers of the western states, the Green River is the lifeblood of the semidesert ecosystem in which the Refuge lies. The River provides habitat for many species of wildlife, some of which are state and federally threatened or endangered. The Green River also serves as a landmark feature for many migratory bird species providing orientation during migration.

Riparian

Representative bird and mammal species that depend on riparian areas for breeding include great blue heron, Canada goose, mallard, green-winged teal, mourning dove, yellow-billed cuckoo, great horned owl, Lewis' woodpecker, downy woodpecker, hairy woodpecker, northern flicker, western kingbird, black-capped chickadee, house wren, warbling vireo, yellow warbler, yellow-breasted chat, spotted towhee, northern oriole, beaver, northern river otter, porcupine, and meadow vole. Many other Refuge wildlife species are probably dependent on riparian habitats. Because previous management emphasis was placed on waterfowl and waterfowl production within these riparian habitats, other wildlife species and their life history requirements were overlooked. Local knowledge and studies conducted in similar areas have shown the significance of riparian habitats to a host of species (Chaney et al. 1990, Knopf et al. 1988).

The restoration/enhancement of riparian habitat, particularly wetland bottoms, may be a critical link to endangered fish recovery. These bottoms provide food and cover essential to the survival of larval razorback suckers during their "critical period" (i.e., survival from larval stage to juvenile stage) (Wydoski and Wick 1998). Although the importance of these habitats to endangered fish recovery is recognized, many bottoms are no longer connected to the River because of increased sediment deposits and reduced flows. In conjunction with the Bureau of Reclamation and the Recovery Program, efforts are underway to "restore natural flows" through these bottoms by removing or breaching containment levees along the River, particularly along Johnson, Leota, Woods, and portions of Sheppard Bottoms. These projects were initiated to restore native fish habitat, but will likely meet Refuge objectives by improving riparian and wetland habitat for migratory birds. The effects of levee removal on the biota in these areas is being carefully monitored and evaluated.

Wyasket Lake, the least altered unit on the Refuge, hosts thousands of waterfowl and hundreds of waterbirds. Even as the Lake benefits wildlife, it also poses a threat to wildlife. Because Wyasket Lake has been less modified, a more "natural" regime of periodic spring flooding, summer drawdown and dry up occur. This, coupled with biotic and abiotic factors, may be the cause of recent avian botulism outbreaks that have resulted in up to 1,000 waterbird deaths per year. Botulism is a naturally occurring bacteria of wetland soils that multiplies when water recedes, water and soil temperatures rise during summer, and plant material decomposes (Locke and Friend, 1987). Birds feeding in the area can pick up the bacteria, become ill, and die. Bird carcasses produce more bacteria, and other birds that feed on maggots on or near them become ill as well. Avian botulism outbreaks were documented in 1995, 1996, 1997, and 1999. It is probable that outbreaks occurred prior to 1995; however, they went undetected due to lack of staff on the ground to make these kinds of observations.

It is important to keep in mind that these riparian habitats serve many species of animals directly and indirectly. For example, birds of prey such as bald eagle, peregrine falcon, and great-horned owl reap the benefits of the smorgasbord (ducks, shorebirds, gulls) that utilize these wetlands. The wandering garter snake, Woodhouse's toad, boreal chorus frog, and northern leopard frog benefit from riparian habitats. Historically, some of these riparian habitats are believed to have provided important nursery habitats for the state and federally endangered razorback sucker. This is one of the major reasons additional riparian habitats are being restored through breaching levees in Woods, Leota and Johnson Bottoms. Riparian habitats serve as natural filters for our most precious resource, water, and enhance the area's aesthetics that people have come to enjoy. As water developments and diversions increase throughout the western United States, the riparian habitat that occurs on the Refuge will be of greater importance to existing plant and wildlife species that depend upon these riparian corridors.

Uplands

Semidesert Shrubland and Grassland

Animal species using this habitat for some or all of their life cycle include burrowing owl, short-eared owl, American kestrel, loggerhead shrike, sage thrasher, Brewer's sparrow, sage sparrow, Ord's kangaroo rat, black and white-tailed jackrabbit, desert cottontail, white-tailed antelope squirrel, mule deer, and pronghorn. Eastern fence lizard, short-horned lizard, side-blotched lizard, western whiptail, yellow-bellied racer, smooth green snake, and western rattlesnake make their permanent home in the semidesert shrubland of the Refuge.

Clay Bluffs

Through casual observation and anecdotal evidence, it is known that the bluffs provide nesting areas for golden eagle and American kestrel, and provide perching sites for golden eagle, red-tailed hawk, ferruginous hawk, prairie falcon and peregrine falcon. Horned lark and western meadowlark can also be observed on the bluffs. The clay bluffs, caves, cracks, and crevices also provide wintering homes for the Great Basin gopher snake, short-horned lizard, and especially the western rattlesnake. The few small caves may serve as dens for mountain lions and other species yet to be confirmed as occurring on the Refuge, such as spotted, Townsend's big-eared, and Mexican free-tailed bats.

More emphasis needs to be placed on studying Refuge upland habitats to conserve the species dependent on them, to develop an appropriate management direction, and to understand the importance of this habitat within the UCRE.

Special Status Species

A special status species is one that is either listed as endangered or threatened under the Endangered Species Act of 1973, or listed by State protective acts. Additionally, Utah lists species of management concern due to population declines, limited distribution range, or both. For purposes of this Plan, these are also considered special status species. The Refuge provides habitat for 26 special status species of wildlife and plants (see Table 2).

Table 2. Special Status Species of Ouray National Wildlife Refuge¹			
SPECIES	STATUS²	ABUNDANCE³	PRIMARY REFUGE HABITAT USE
BIRDS			
Bald Eagle	ST, FT	Rare Spring, Occasional Fall, Common Winter	Riparian Habitats & Wetlands/Bottomlands
Peregrine Falcon	SE	Rare Spring and Fall	Wetland/Bottomlands
Southwestern Willow Flycatcher	SE	Rare Summer	Riparian Habitats
Ferruginous Hawk	ST	Occasional Summer	Semidesert Shrubland
Yellow-billed Cuckoo	ST	Uncommon Summer	Riparian Habitats
Northern Goshawk	SP	Rare Winter	Riparian Habitats
Swainson's Hawk*	SP	Uncommon Spring, Summer, Fall	Grassland
Caspian Tern	SP	Rare Spring, Summer, Fall	Wetlands/Bottomlands
Black Tern	SP	Uncommon Spring, Fall, Common Summer	Wetlands/Bottomlands
Burrowing Owl*	SP	Uncommon Spring, Summer, Fall	Grassland
Short-eared Owl	SP	Uncommon Spring, Summer, Fall, Winter	Grassland
Common Yellowthroat	SP	Uncommon Spring, Summer, Fall	Wetlands/Bottomlands
American White Pelican	SD	Occasional Spring, Summer, Common Fall	Wetlands/Bottomlands
Osprey	SD	Rare Spring, Summer, Fall	Riverine & Riparian Habitats
Sage Grouse	SP/SD	Rare Spring, Summer, Fall, Winter	Semidesert Shrubland
Long-billed Curlew*	SP/SD	Rare Spring, Summer, Fall	Grassland & Wetlands/Bottomlands
Lewis' Woodpecker	SP/SD	Common Spring, Summer, Uncommon Fall	Riparian Habitats
Blue Grosbeak	SP/SD	Uncommon Spring, Summer, Fall	Riparian Habitats & Wetlands Bottomlands
MAMMALS			
Northern River Otter	SP/SD	Uncommon resident with sightings increasing	Riverine & Wetlands/Bottomlands
Lynx	SP/SD	Rare, Observed only once on Refuge	
FISH			
Bonytail	SE,FE	No wild bonytail caught in several years	Riverine
Colorado Pikeminnow	SE,FE	Ouray reach is an important nursery habitat area	Riverine & Wetlands/Bottomlands
Humpback Chub	SE,FE	Severely reduced in numbers	Riverine
Razorback Sucker	SE,FE	Green River only known spawning areas, Severely reduced in numbers	Riverine & Wetlands/Bottomlands
Roundtail Chub	ST	Reduced in numbers and distribution	Riverine
REPTILES			
Smooth Green Snake	SP/SD	Uncommon, Distribution is unclear	Wetlands/Bottomlands
PLANTS			
Uintah Basin Hookless Cactus	ST,FT	Common	Dry gravel terraces

¹Source: Utah Division of Wildlife Resources. 1998. Utah Sensitive Species List.

²SE= State Endangered, ST= State Threatened, FE= Federally Endangered, FT= Federally Threatened, SP= Special concern because of decrease in population, distribution, and/or habitat availability, SD= Special concern because requires specific habitat that is limited or restricted, SP/SD= Special concern due to both a declining population and limited range.

³Common= likely to be seen in suitable habitat, Uncommon= present, but not certain to be seen, Occasional= seen only a few times during a season, Rare= seen at intervals of 2 to 5 years.

Spring= March-May, Summer= June-August, Fall= September-November, Winter= December-February.

*Indicates that bird is a confirmed nester on Refuge.

Threatened and Endangered

Federally endangered or threatened species that occur or have occurred on the Refuge include the bald eagle, bonytail, Colorado pikeminnow, humpback chub, razorback sucker, and Uintah Basin hookless cactus. State listed species and species of management concern include peregrine falcon, southwestern willow flycatcher, ferruginous hawk, yellow-billed cuckoo, and roundtail chub. Seven of these species are regularly encountered on the Refuge throughout different seasons of the year. Sightings of the peregrine falcons on the Refuge are increasing. During spring and fall, peregrines can often be observed hunting for waterbirds over wetlands and bottomlands. Bald eagles have become a common sight particularly during fall and winter when upwards of 30 individuals have been observed in one day. Eagles watch for prey from large standing cottonwood trees along the River's edge or along some of the bottomlands. Another relative of the falcon and eagle, the ferruginous hawk, can be seen occasionally hunting over the expanse of the semidesert shrubland on the Refuge during summer.

The federally endangered Colorado pikeminnow and razorback sucker and the state threatened roundtail chub can be found within the Refuge's stretch of the Green River. Ouray National Fish Hatchery is augmenting the extant populations of these fish that occur on the Refuge and adjacent to the Refuge. Additionally, efforts are being coordinated through the Recovery Program and other agencies to mimic natural river-flows that may aid in the recovery of these species that are on the brink of extinction.

Surveys conducted in 1997 revealed that the Uintah Basin hookless cactus is more common on the Refuge than once believed. A survey undertaken in 1988 revealed the existence of 1,260 individual plants, while a count in 1997 led to the discovery of an additional 846 plants; bringing the known total of the Uintah Basin hookless cactus on the Refuge to 2,106 individuals. This cactus is typically found towards the top of gravel covered terraces. The Refuge has the potential to serve as a good learning ground on the biology of this species as this habitat is not presently manipulated for habitat management in any manner.

Species of Management Concern

Species of management concern (Table 2), whether because of population declines, limited distribution range, or both that occur or have occurred on the Refuge include northern goshawk, Swainson's hawk, Caspian tern, black tern, burrowing owl, short-eared owl, common yellowthroat, American white pelican, osprey, sage grouse, long-billed curlew, Lewis' woodpecker, blue grosbeak, northern river otter, and smooth green snake. Black tern, American white pelican, and Lewis' woodpecker are commonly observed on the Refuge. Although listed as uncommon, northern river otter and smooth green snake observations on the Refuge are increasing. Swainson's hawk, burrowing owl, long-billed curlew, and Lewis' woodpecker have been confirmed as nesting on the Refuge.

Some of these species make use of the Refuge for only a brief period. However brief the stay may be, the Refuge provides a vital haven for feeding, resting, and loafing which cannot be found for many miles around.

Public Use

No accurate counts of Refuge visitors have been kept, but current estimates are 10,000 visitors per year. Visitation includes school tours and programs, teacher workshops, senior citizen tours, boy scouts, and hunters and anglers. Most public use occurs from April through November.

Wildlife observation is the major public use activity on the Refuge. The Refuge's 12-mile auto tour route is enjoyed by many throughout the year. From spring wild flowers and broods of ducklings to large numbers of mule deer in the fall and winter, viewers are drawn from the local communities and throughout the area. Bird watching is rapidly becoming a popular activity on the Refuge.

Hunting and fishing are also popular. The opportunity to harvest mule deer, waterfowl, and ring-necked pheasants attracts hunters from across Utah. The public may hunt for deer, waterfowl and pheasant in Leota Bottom and for deer and pheasant in Johnson and Wyasket Bottoms. Fishing is allowed only on the Green River. Fishing for channel catfish is a popular activity among many local residents. State prescribed seasons and hunting regulations apply on the Refuge.

Additional wildlife-dependent public uses include wildlife photography, interpretation and environmental education. Compatible activities that support some or all of these uses also include canoeing and rafting on the Green River, sightseeing, bicycling and horseback riding on designated roads, and hiking.

Current public use facilities include an informational kiosk with a nearby picnic table and outhouses, an auto tour route with observation tower, a visitor center, and parking areas for hunters, anglers, observers and photographers (see Map 8). The kiosk contains general Refuge information, a changeable panel, a cork board for posting hunting regulations, fishing regulations, and Refuge hours, and leaflet dispensers. The tour route displays and information leaflet need updating to reflect changes in the landscape and management practices. Some informational and directional signs on the Refuge have recently been updated.

Refuge Cultural and Paleontological Resources

Limited cultural resource studies have been conducted on lands included in the Refuge. Information on the cultural history of the Uintah Basin is sketchy and difficult to compile. Much of the Refuge was disturbed many years ago during construction of dikes, levees, and roads so few intact sites remain to be surveyed. In recent years, seven project-specific cultural and paleontological resource surveys and inventories were conducted in Brennan Basin, the Ouray L-9/10 borrow site, for a powerline for Ouray NWR, the Pelican Lake Pipeline, and the Ouray National Fish Hatchery and water pipeline sites. Five prehistoric sites (one of which may be the site previously identified) and four isolated finds of prehistoric material (mostly lithic acquisition materials) were located. Reports of these surveys are on file at the Refuge office. In 1998, three projects sites for Leota Bottom levee and spillway construction were surveyed with no materials found. A thorough inventory of potential cultural and paleontological resource sites is needed for the majority of Refuge lands. Other than an interpretive sign on Leota Bluff describing explorations by John Wesley Powell, no cultural or paleontology exhibits or materials have been developed for the Refuge.

The earliest archaeological work done in the Refuge vicinity was by John Wesley Powell in 1869 and 1871. No prehistoric sites were reported by Powell from his explorations along the Green River through the Refuge.

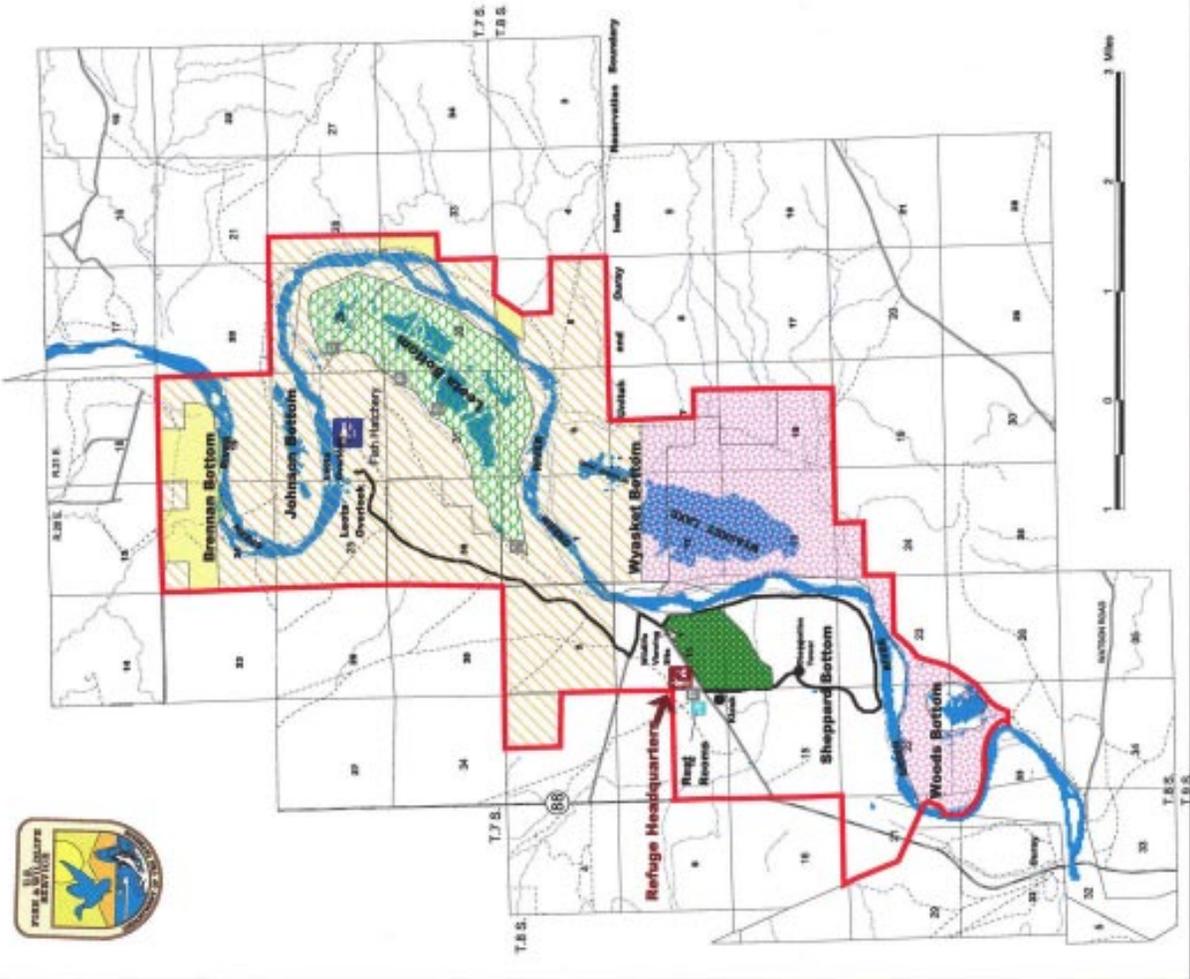
Ouray National Wildlife Refuge Public Use Map

LEGEND

-  Tribal Hunting Only
-  Deer and Pheasant Hunting
-  Waterfowl, Deer and Pheasant Hunting
-  No Hunting Zone
-  Private Lands
-  Closed Area
-  Ouray NWR Boundary
-  Auto Tour Route
-  Parking



Map # 8



Map Location



State of Utah

DRAFT

In the early 1940's, Harvard University collected a large sample of fossil mammal specimens dating to the Late Eocene (38 to 56 million years ago) Uinta Formation from a site they called Leota Quarry. It has been determined that this site falls within the boundaries of Ouray NWR. The University of Utah Department of Anthropology conducted a survey of the proposed Refuge in 1961. One surface site on the bank of the Green River in Leota Bottom and scattered artifacts on the River terraces were identified. They determined that it was not necessary to salvage the little prehistorical material on Refuge lands. In 1978, the Smithsonian Institute also conducted a paleontological study on this site. Several skulls of small sheep-like artiodactyls were found. Judging from the quantity as well as the quality of specimens, they felt additional collecting is definitely warranted, but none has been done to date.

Refuge Land Acquisition

The present acreage of the Ouray NWR totals 11,987. This Refuge acreage is made up of 2,692 acres of leased Ute Tribal lands, 1,153 acres of land leased from the State of Utah, 3,110 acres transferred from the BLM, and 5,032 acres of land purchased in fee title. The Executive Order boundary of the Refuge includes 13,984 acres (see executive order boundary map). It is the desire of the U.S. Fish and Wildlife Service to purchase all lands within the Executive Order boundary, including all leased lands, when they become available and/or from willing sellers.

The Recovery Program is actively pursuing acquisition and enhancement of floodplain habitats through wildlife easements along the Green, Upper Colorado, and Gunnison Rivers (see Appendix J. for description and Environmental Assessment). Easements on the Green River will become part of the Refuge System and will be monitored and enforced by the Refuge staff.

Special Management Areas

To be proposed for Wilderness designation, an area must contain at least 5,000 contiguous, roadless acres. No Refuge lands meet this criteria, so no Wilderness designation is being pursued. The Green River in the region of Ouray NWR is not currently being considered for Wild and Scenic River designation as it does not meet 2 basic designation criteria. The River is not free flowing, and the majority is altered by protective levees and diking.

Refuge Fire Management

Fire management on the Ouray NWR presently consists of prescribed fire, hazardous fuels reduction, and wildfire suppression preparedness. The Refuge is a partner in the Uintah Basin Interagency Fire Center in Vernal, for wildland and prescribed fire activities. Prescribed fire at Ouray has been primarily used as a vegetation management tool in wetlands to control cattail and other emergent vegetation. Fire was also used experimentally to control nonnative plants such as perennial pepperweed in upland areas with mixed results. The challenge in utilizing prescribed fire to manage Refuge wetlands comes in preventing the spread of the fire into neighboring cottonwood and willow stands which results in injury or mortality of many trees. Fire damage and windthrow have contributed to the degradation of the Refuge's riparian corridor. Prescribed burning of wetlands adjacent to the riparian corridor is an appropriate tool used to manage this ecotype as fire is a naturally occurring event for these plant communities. The use of fire requires a thorough understanding of fire behavior and use of wide fire breaks to protect sensitive habitats. A more thorough analysis of prescribed fire and benefits to specific Refuge habitats needs to be completed and addressed in the Fire Management Plan to properly use this tool to achieve habitat management objectives.

Water Rights

Utah's Water Appropriation System requires permits for surface water and groundwater use, under general administrative supervision of the State Engineer, Department of Natural Resources, Division of Water Rights. A water right is appurtenant to the land, but may be severed, transferred, exchanged, or sold. Any change in point of diversion, type of use, amount, or season of use requires approval of the State Engineer. All surface and groundwater uses are regulated. In times of shortage, domestic use has priority over all other uses, regardless of priority date. Forfeiture occurs when a water right has not been used for five years. Abandonment occurs when the owner's *intent* to abandon is proven without regard to nonuse.

Currently, the Refuge holds state water rights sufficient to manage wetlands and marshes to meet its goals. For descriptions and details on these rights refer to Appendix L.

GIS Mapping Data Needs

Presently, GIS capabilities on Ouray include ArcView 3.0 and a Trimble GeoExplorer. In the future, periodic upgrades or additions in hardware (e.g., computer, monitor, plotter, etc.) and software (e.g., ArcView 3.2 or ArcInfo) may be required. Maps that are available include digital raster graphs (DRGs), NWIs, and other data (prescribed burn areas, trap locations, impoundment areas, etc.) collected locally by Refuge staff. Other GIS data desired for management planning, include digital orthophoto quads (DOQs), videography, replication of NWI during an average flow year, vegetation mapping to complement habitat mapping, etc. Because gaps exist in electronic mapping databases for the Uintah Basin, compiling and sharing existing data will be possible through partnerships with other agencies, universities, and on-site mapping.

Management Direction

Refuge Goals, Objectives, and Strategies

Refuge Goals

The following goals are derived from the Refuge System mission, Refuge purpose, other Service landscape and species plans, and from the management issues discussion in the preceding pages of this Plan.

- A. Restore and enhance riparian and wetland habitats for migratory birds that depend upon the Green River corridor.
- B. Provide habitats that support the recovery of federally listed and Utah state special status species on or adjacent to the Refuge.
- C. Maintain healthy grassland and semidesert shrubland habitats for wildlife.
- D. Minimize wildlife exposure to environmental contaminants on or adjacent to the Refuge.
- E. Provide opportunities for compatible wildlife-dependent recreation.
- F. Increase awareness of the Refuge and the role of the Refuge in fisheries and wildlife management, the National Wildlife Refuge System, and the UCRE for visitors and local communities through environmental education, interpretation, and compatible recreation.
- G. Provide protection for cultural and paleontological resources on the Refuge and educate visitors about these sites.

Refuge Objectives and Strategies

P Goal A: Restore and enhance riparian and wetland habitats for migratory birds that depend upon the Green River corridor.

Habitats that occurred historically along the Green River were used by an array of bird species migrating through the arid west between wintering and breeding areas. Human related activities altered the characteristics of River flows, and subsequently, plant communities sustained by the River have been drastically altered. Migratory birds and other wildlife-dependent on the River ecosystem have declined as a result. The Refuge will work to enhance the quality of riparian and wetland habitats to protect this vital migration corridor.

Six well defined bottoms or naturally occurring floodplain depressions exist within the Refuge. They contain the riparian and wetland habitats so vital for migratory birds and native fishes. Each bottom differs in its infrastructure, floodability and plant community, requiring differing management actions to promote restoration and enhancement.

Baseline plant and animal biological data for the Refuge is very limited. The collection of these data will be the starting point towards accomplishing this goal. Wildlife inventories and vegetation mapping will be initiated for each bottom. Funds are currently available for this bio-monitoring through FY2000 Refuge Operations Needs (\$230k over 3 years). A description of how riparian and wetland objectives will be carried out on each bottom are identified as strategies.

Objective 1. Improve structure and composition of woody and herbaceous riparian communities to provide nesting, feeding, loafing, and resting habitat for migratory birds.

Some of the migratory songbird species which may benefit from the proposed management actions include Lewis' woodpecker yellow-billed cuckoo, western kingbird, black-capped chickadee, warbling vireo, yellow warbler, yellow-breasted chat, spotted towhee, and northern oriole. Once baseline information is collected, as proposed within the following strategies, a detailed Habitat Management Plan identifying each species habitat needs will be prepared.

Strategy: Investigate each bottom's vegetative climax potential, floodability, and potential contribution to its host of wildlife species.

Strategy: Recreate the 1983 NWI inventory and wetland classification survey for average water conditions.

Brennan Bottom

Strategies:

- ✓ Collect baseline fauna and flora inventories and map vegetation by 2003.
- ✓ Evaluate Brennan's floodability and assess its potential climax condition under the new Flaming Gorge regulated flow releases.
- ✓ Reduce nonnative plants by 75 percent within 15 years, using biological, mechanical, and chemical methods, which may include burning and reseeding.
- ✓ Accurately map and quantify existing coverages of nonnative vegetation using GIS and field groundtruthing. Current cursory estimates of nonnative vegetation which exist within Brennan are: whitetop 20 percent, Russian olive 1 percent.
- ✓ Conduct aerial photography, with the assistance of the Bureau of Reclamation, at five-year intervals to gauge vegetative responses caused by new management techniques.
- ✓ Replicate National Wetland Inventory (NWI) under average, post-dam Green River Flow Conditions.
- ✓ Ensure oil and gas extraction activities do not negatively affect desired habitat responses.
- ✓ Investigate private inholding acquisition of sensitive riparian habitats from willing sellers.
- ✓ Repair, post, and maintain four miles of fence to prevent livestock trespass.

Johnson Bottom

Strategies:

- ✓ Collect baseline fauna and flora inventories and map vegetation by 2003.
- ✓ Evaluate Johnson's floodability and assess its potential climax condition under the new Flaming Gorge regulated flow releases.
- ✓ Evaluate vegetative response to depth, timing, duration, and frequency of flooding.
- ✓ Reduce nonnative plants by 75 percent within 15 years, using biological, mechanical, and chemical methods, which may include burning and reseeding.
- ✓ Accurately map and quantify existing coverages of nonnative vegetation using GIS and field groundtruthing. Current cursory estimates of nonnative vegetation which exist within Johnson are: saltcedar 30 percent, whitetop 20 percent, Russian olive 1 percent.
- ✓ Remove three interior crossdikes to restore functional hydrology, facilitate draining, recovery of endangered fish, and the removal of nonnative fish.
- ✓ Conduct aerial photography, with the assistance of the Bureau of Reclamation, at five year intervals to gauge vegetative responses caused by new management techniques.
- ✓ Replicate National Wetland Inventory (NWI) under average, post-dam Green River Flow Conditions.
- ✓ Maintain two miles of fence to prevent livestock trespass.

Leota Bottom

Strategies:

- ✓ Collect baseline fauna and flora inventories and map vegetation by 2003.
- ✓ Evaluate Leota's floodability and assess its potential climax condition under the new Flaming Gorge regulated flow releases.
- ✓ Evaluate vegetative response to depth, timing, duration, and frequency of flooding.
- ✓ Evaluate removal of L1,3,5,7 and 7a dikes to promote restoration and enhancement of the riparian habitat for all dependant species.
- ✓ Reduce nonnative plants by 75 percent within 15 years, using biological, mechanical, and chemical methods, which may include burning and reseeding.
- ✓ Accurately map and quantify existing coverages of nonnative vegetation using GIS and field groundtruthing. Current cursory estimate of nonnative vegetation which exist within Leota are: saltcedar 20 percent, whitetop 10 percent, Russian knapweed 1 percent, Russian olive 5 percent.
- ✓ Conduct aerial photography, with the assistance of the Bureau of Reclamation, at five year intervals to gauge vegetative responses caused by new management techniques.
- ✓ Replicate National Wetland Inventory (NWI) under average, post-dam Green River Flow Conditions.
- ✓ Document, collect, and dispose of birds affected by botulism outbreaks.

Wyasket Bottom

Strategies:

- ✓ Collect baseline fauna and flora inventories and map vegetation by 2003.
- ✓ Evaluate Wyasket's floodability and assess its potential climax condition under the new Flaming Gorge regulated flow releases.
- ✓ Evaluate vegetative response to depth, timing, duration, and frequency of flooding.
- ✓ Evaluate removal of Wyasket Pond dike to promote restoration and enhancement of the riparian habitat for all dependant species.
- ✓ Reduce nonnative plants by 75 percent within 15 years, using biological, mechanical, and chemical methods, which may include burning and reseeding.
- ✓ Accurately map and quantify existing coverages of nonnative vegetation using GIS and field groundtruthing. Current cursory estimate of nonnative vegetation which exist within Wyasket are: saltcedar 20 percent, whitetop 10 percent, Russian knapweed 1 percent, Russian olive 5 percent.
- ✓ Conduct aerial photography, with the assistance of the Bureau of Reclamation, at five ear intervals to gauge vegetative responses caused by new management techniques.
- ✓ Replicate National Wetland Inventory (NWI) under average, post-dam Green River Flow Conditions.
- ✓ Maintain seven miles of fence to prevent livestock trespass.

Sheppard Bottom

Strategies:

- ✓ Collect baseline fauna and flora inventories and map vegetation by 2003.
- ✓ Evaluate Sheppard's floodability and assess its potential climax condition under the new Flaming Gorge regulated flow releases.
- ✓ Evaluate vegetative response to depth, timing, duration, and frequency of flooding.
- ✓ Maintain 0.5 miles of fence to prohibit livestock trespass.
- ✓ Reduce nonnative plants by 75 percent within 15 years, using biological, mechanical, and chemical methods, which may include burning and reseeding.
- ✓ Accurately map and quantify existing coverages of nonnative vegetation using GIS and field groundtruthing. Current cursory estimates of nonnative vegetation which exist within Sheppard are: saltcedar 25 percent, whitetop 30 percent, Russian knapweed 1 percent, Russian olive 5 percent.
- ✓ Conduct aerial photography, with the assistance of the Bureau of Reclamation, at five year intervals to gauge vegetative responses caused by new management techniques.
- ✓ Replicate National Wetland Inventory (NWI) under average, post-dam Green River Flow Conditions.
- ✓ Remove a portion of S-3 protective dike and all of the S-3/S-5 dike to allow flushing of selenium and reestablishment of riparian habitat.
- ✓ Reduce hazardous fuel loads in a 5-acre site south of S-3 to prevent potential wildfire damage.

Woods Bottom

Strategies:

- ✓ Collect baseline fauna and flora inventories and map vegetation by 2003.
- ✓ Evaluate Wood's floodability and assess its potential climax condition under the new Flaming Gorge regulated flow releases.
- ✓ Evaluate vegetative response to depth, timing, duration, and frequency of flooding.
- ✓ Maintain two miles of fence to prohibit livestock trespass.
- ✓ Reduce nonnative plants by 75 percent within 15 years, using biological, mechanical, and chemical methods, which may include burning and reseeding.
- ✓ Accurately map and quantify existing coverages of nonnative vegetation using GIS and field groundtruthing. Current cursory estimates of nonnative vegetation which exist within Sheppard are: saltcedar 20 percent, whitetop 20 percent, Russian olive 5 percent.
- ✓ Evaluate removal of the center dike to improve its hydrologic flow and riparian habitat.
- ✓ Conduct aerial photography, with the assistance of the Bureau of Reclamation, at five year intervals to gauge vegetative responses caused by new management techniques.
- ✓ Replicate National Wetland Inventory (NWI) under average, post-dam Green River Flow Conditions.
- ✓ Continue coordination of water management with the Recovery Program to facilitate riparian habitat improvements and the recovery of endangered fish.

Objective 2. Improve structure and composition of submergent and emergent wetland communities to provide nesting, feeding, loafing, and resting habitat for migratory birds.

This Comprehensive Conservation Plan de-emphasizes the production of waterfowl, but by no means will it ignore this habitat use. Many species of waterbirds utilize the Refuge's man-made and natural wetlands for nesting, loafing, feeding, and migrational stopover habitat. Although the Refuge proposes to restore many areas back to riparian woodland habitat some areas do not readily lend themselves to this conversion and are better managed as natural and/or man-made wetlands.

Refuge wetlands will be managed under a wet/dry rotational scheme which will provide the greatest diversity of habitat and food for migratory waterbirds. At present, many of the Refuge's water management facilities (headgates, stoplog structures, inlet structures and outlet structures) are in a state of disrepair and needed repairs are identified as strategies. A need also exists to collect information on the sub-up potential (river flow-influenced groundwater which rises to the surface within each wetland) of each unit.

Some of the habitat conditions which will be sought are: varying water depths, and a mosaic of varying vegetative structure and composition. At any one time, some wetlands will remain dry, some will contain less than 50 percent vegetative cover, and some will contain more. Wetland units will be managed so that a cycle of dry, shallow water, deep water, sparse vegetation, and dense vegetation is maintained over time. The types of food or protective cover will differ under each condition, but in any one year, a broader variety of conditions will exist. This will provide essential habitats for migratory waterbirds during spring and fall migration. Because of the dynamic nature of the arid Uintah Basin, in some years, enough water will not be available to produce the desired ratio. Under depressed water years, the Refuge will provide habitat which is most conducive to those conditions. Individual bottoms (excepting the Parker Tract) will be managed as a single unit, not as a collection of separate internal impoundments. For example, Sheppard Bottom contains five impoundments. These will be manipulated to contribute to the quality of the Bottom as a whole. In any case, internal impoundments cannot realistically be managed separately because of subsurface water seepage and other water control constraints.

Monthly avian surveys will be conducted on all wetlands to provide managers with the information necessary to enhance or maintain the area. Baseline biological inventories of vegetation and wildlife will be conducted for each wetland. Refuge Operation Needs funds totaling \$230,000 are available to complete this project over the next three years.

Some of the known migratory bird species that utilize Refuge wetland habitats include northern harrier, white-faced ibis, eared, western and pied-billed grebes, dabbling and diving ducks, great blue heron, American bittern, red-winged and yellow-headed blackbirds, marsh wren, black-crowned night heron, and many shorebirds. Many of these birds also use the Green River.

Strategy: Recreate the 1983 NWI inventory and wetland classification survey for average water conditions.

Johnson Bottom

Strategies:

- ✓ Evaluate Johnson's wetland potential to provide a more diverse emergent/submergent/open water wetland mosaic under varying water availability.
- ✓ Collect baseline inventory fauna and flora inventories and map vegetation by 2003.
- ✓ Assess each wetland impoundment sub-up potential for management purposes (at what cfs does the river flow for sub-up to occur).
- ✓ Conduct aerial photography, with the assistance of the Bureau of Reclamation, at five year intervals to gauge vegetative responses caused by new management techniques.
- ✓ Replicate National Wetland Inventory (NWI) under average, post-dam Green River Flow Conditions.
- ✓ Evaluate use of fire, drying, discing, mowing, and root plowing to maintain open water.
- ✓ Coordinate with the Recovery Program on proposed habitat management actions (flooding, draining, mosquito abatement, integrated pest management, etc.) to ensure that fish recovery objectives are not negatively impacted.
- ✓ Reduce nonnative plants by 75 percent within 15 years using biological, mechanical, and chemical methods, which may include burning and reseeding.
- ✓ Accurately map and quantify existing coverages of nonnative vegetation using GIS and field groundtruthing. A current cursory estimate of nonnative vegetation which exists within Johnson's wetlands is: saltcedar 10 percent, whitetop 10 percent, Russian olive 2 percent.
- ✓ Protect great blue heron rookery site from prescribed and wild fires.
- ✓ Pursue funds for reconstructing Johnson's inlet structure.
- ✓ Remove all interior dikes to encourage a more natural hydrologic flood and drawdown regime.

Leota Bottom

Strategies:

- ✓ Evaluate Leota's wetland potential to provide a more diverse emergent/submergent/open water wetland mosaic under varying water availability.
- ✓ Collect baseline inventory fauna and flora inventories and map vegetation by 2003.
- ✓ Assess each wetland impoundment sub-up potential for management purposes (at what cfs does the river flow for sub-up to occur).
- ✓ Conduct aerial photography, with the assistance of the Bureau of Reclamation, at five year intervals to gauge vegetative responses caused by new management techniques.
- ✓ Replicate National Wetland Inventory (NWI) under average, post-dam Green River Flow Conditions.
- ✓ Evaluate use of fire, drying, discing, mowing, and root plowing to maintain open water.
- ✓ Coordinate with the Recovery Program on proposed habitat management actions (flooding, draining, mosquito abatement, integrated pest management, etc.) to ensure that fish recovery objectives are not negatively impacted.
- ✓ Reduce nonnative plants by 75 percent within 15 years using biological, mechanical, and chemical methods, which may include burning and reseeding.
- ✓ Accurately map and quantify existing coverages of nonnative vegetation using GIS and field groundtruthing. A current cursory estimate of nonnative vegetation which exists within Leota's wetlands is: saltcedar 10 percent, whitetop 20 percent, Russian olive 2 percent, Russian knapweed 1 percent.
- ✓ Remove existing unproductive nesting islands and form 2 to 3 larger islands with improved design and rehabilitated cover within L10.
- ✓ Replace all degraded water control structures on interior diked units.
- ✓ Evaluate removal of L1,3,5,7 and 7a dikes and its effect on the Leota wetland complex.
- ✓ Document, collect, and dispose of birds affected by botulism outbreaks.
- ✓ Raise L-9/L-10 dike 18-24 inches to improve open water to emergent vegetation ratio.
- ✓ Evaluate the function and efficiency of 6 new spillways.
- ✓ In conjunction with Ouray National Fish Hatchery, improve management of hatchery effluent discharge.

Wyasket Bottom

Strategies:

- ✓ Evaluate Wyasket's wetland potential to provide a more diverse emergent/submergent/open water wetland mosaic under varying water availability.
- ✓ Collect baseline inventory fauna and flora inventories and map vegetation by 2003.
- ✓ Assess each wetland impoundment sub-up potential for management purposes (at what cfs does the river flow for sub-up to occur).
- ✓ Conduct aerial photography, with the assistance of the Bureau of Reclamation, at five year intervals to gauge vegetative responses caused by new management techniques.
- ✓ Replicate National Wetland Inventory (NWI) under average, post-dam Green River Flow Conditions.
- ✓ Evaluate use of fire, drying, discing, mowing, and root plowing to maintain open water.
- ✓ Coordinate with the Recovery Program on proposed habitat management actions (flooding, draining, mosquito abatement, integrated pest management, etc.) to ensure that fish recovery objectives are not negatively impacted.
- ✓ Reduce nonnative plants by 75 percent within 15 years using biological, mechanical, and chemical methods, which may include burning and reseeding.
- ✓ Accurately map and quantify existing coverages of nonnative vegetation using GIS and field groundtruthing. A current cursory estimate of nonnative vegetation which exists within Wyasket's wetlands is: saltcedar 20 percent, whitetop 20 percent, Russian olive 3 percent, Russian knapweed 1 percent.
- ✓ Document, collect, and dispose of birds affected by botulism outbreaks.
- ✓ Determine the need to flood Wyasket Pond on a year-by-year basis to provide migration and nesting habitat for Virginia rail, sora, and American bittern.
- ✓ Reestablish floodwater flow through Wyasket Pond into Wyasket Lake by either levee removal or construction of new spillways.
- ✓ Evaluate removal of the entire Wyasket Pond dike to reestablish hydrologic flow and improve overall wetland habitat.

Parker Tract

Strategies:

- ✓ Control nonnative plants using biological, mechanical, and chemical means.
- ✓ Flood units with Pelican Lake pipeline water only, as water from the Green River carries whitetop and saltcedar seed. If Pelican Lake water is not available, leave the units dry.
- ✓ Leave at least one unit dry by rotation each year and document the effects to vegetation and invertebrate production.
- ✓ Create a management model using Moist Soil Advisor software.
- ✓ Replicate National Wetland Inventory (NWI) under average, post-dam Green River Flow Conditions.

Sheppard Bottom

Strategies:

- ✓ Evaluate Sheppard's wetland potential to provide a more diverse emergent/submergent/open water wetland mosaic under varying water availability.
- ✓ Collect baseline inventory fauna and flora inventories and map vegetation by 2003.
- ✓ Assess each wetland impoundment sub-up potential for management purposes (at what cfs does the river flow for sub-up to occur).
- ✓ Conduct aerial photography, with the assistance of the Bureau of Reclamation, at five year intervals to gauge vegetative responses caused by new management techniques.
- ✓ Replicate National Wetland Inventory (NWI) under average, post-dam Green River Flow Conditions.
- ✓ Evaluate use of fire, drying, discing, mowing, and root plowing to maintain open water.
- ✓ Coordinate with the Recovery Program on proposed habitat management actions (flooding, draining, mosquito abatement, integrated pest management, etc.) to ensure that fish recovery objectives are not negatively impacted.
- ✓ Reduce nonnative plants by 75 percent within 15 years using biological, mechanical, and chemical methods, which may include burning and reseeding.
- ✓ Accurately map and quantify existing coverages of nonnative vegetation using GIS and field groundtruthing. A current cursory estimate of nonnative vegetation which exists within Sheppard's wetlands is: saltcedar 10 percent, whitetop 20 percent, Russian olive 5 percent.
- ✓ Pursue funds to replace all water control structures within Sheppard allowing necessary water management to provide the preferred wetland habitat.

Woods Bottom

Strategies:

- ✓ Evaluate Wood's wetland potential to provide a more diverse emergent/submergent/open water wetland mosaic under varying water availability.
- ✓ Collect baseline inventory fauna and flora inventories and map vegetation by 2003.
- ✓ Assess each wetland impoundment sub-up potential for management purposes (at what cfs does the river flow for sub-up to occur).
- ✓ Conduct aerial photography, with the assistance of the Bureau of Reclamation, at five year intervals to gauge vegetative responses caused by new management techniques.
- ✓ Replicate National Wetland Inventory (NWI) under average, post-dam Green River Flow Conditions.
- ✓ Evaluate use of fire, drying, discing, mowing, and root plowing to maintain open water.
- ✓ Coordinate with the Recovery Program on proposed habitat management actions (flooding, draining, mosquito abatement, integrated pest management, etc.) to ensure that fish recovery objectives are not negatively impacted.
- ✓ Reduce nonnative plants by 75 percent within 15 years using biological, mechanical, and chemical methods, which may include and burning and reseeding.
- ✓ Accurately map and quantify existing coverages of nonnative vegetation using GIS and field groundtruthing. A current cursory estimate of nonnative vegetation which exists within Wood's wetlands is: saltcedar 20 percent, whitetop 20 percent, Russian olive 3 percent, Russian knapweed 1 percent.
- ✓ Remove interior levee to reestablish a more natural flood and drawdown regime.

■ **Goal B: Provide habitats that support the recovery of federally listed and Utah State special status species on or adjacent to the Refuge.**

The needs of threatened and endangered migratory birds and fish that use the Refuge will be provided for by habitat goals such as riparian woodland and wetland enhancement and restoration. Enhancing and restoring wetland and riparian habitats will be conducted to improve food, and cover requirements for bald eagle, peregrine falcon, osprey, razorback sucker, and Colorado pikeminnow in accordance with documented literature.

Providing for this multitude of species is indeed a delicate balancing act. In most cases the proposed management actions can be conducted in such a way that these species can all be taken into consideration. Managing for multiple species will be most feasible in those areas selected to be managed under mimicked natural conditions.

Objective 1. Provide habitats that support the recovery of Colorado River endangered fishes (razorback sucker, Colorado pikeminnow, humpback chub).

The Refuge is currently supporting recent levee removal projects within the Refuge. Much data remains to be gathered and analyzed to show the effectiveness of levee removal and the utilization of these sites by endangered fish. The Colorado River Recovery Program continues to investigate and research other alternatives which may be conducive towards recovering endangered fish.

Strategies:

- ✓ Provide site and operations support for the Ouray National Fish Hatchery and associated research efforts.
- ✓ Participate in the Recovery Program's levee removal project in Leota Bottom, Johnson Bottom, and Woods Bottom. (For additional information please refer to the Environmental Assessment titled "Levee Removal Project of the Floodplain Habitat Restoration Program" dated February, 1997, Appendix K)
- ✓ Provide staff support for enforcement and monitoring of select wildlife easements acquired to restore and preserve endangered fish habitat. (For additional information please refer to the Environmental Assessment titled "Acquisition and Enhancement of Floodplain Habitats" dated May, 1998)
- ✓ Assist the Recovery Program with removal of nonnative fish in Woods, Leota, and Johnson bottoms

Objective 2: Maintain populations of the Uintah Basin hookless cactus.

The Refuge's role in recovering the Uintah Basin hookless cactus is primarily one of caretaker. Management for this species consist of mapping locations and avoiding disturbances to known stands.

Strategies:

- ✓ Conduct field surveys at four year intervals to locate any new stands of cactus and to assess the condition of existent stands.
- ✓ Identify new potential, suitable sites and avoid disturbance of the area.

■ **Goal C: Maintain healthy grassland (Indian rice grass, shadscale etc.) and semidesert shrubland habitats for wildlife.**

Objective: Investigate whether management techniques exist that can insure the health of cold desert grasslands.

Strategies:

- ✓ Measure extent of nonnative vegetation, and select and experiment with techniques to reduce and contain its spread.
- ✓ Maintain fences to control trespass of cattle or feral horses.
- ✓ Determine historical fire return intervals and how prescribed fire may help maintain this healthy grassland.
- ✓ Modify existing fences to allow the passage of pronghorn.
- ✓ Develop baseline inventory and monitoring plans for grassland birds (burrowing owl, sparrows) and vegetation.

■ **Goal D: Minimize wildlife exposure to environmental contaminants on or adjacent to the Refuge.**

Potential large scale irrigation system development, authorized through the Desert Land Entry Act of 1877, on BLM lands north of the Refuge may magnify selenium contamination in Refuge wetlands. Excess irrigation runoff that leaches through naturally occurring selenium-laden soils can become contaminated. As the Refuge lies in a lowland area below agricultural fields, irrigation water may ultimately deposit more selenium on the Refuge. The Refuge will continue its close working relationship with the BLM on this issue.

The Refuge is proposing partial removal of the protective levee and modifications to the interior dikes of S3 and S5 to facilitate the dilution of selenium within Sheppard Bottom. Please refer to the Issues Section (Selenium) and the Selenium Project Map (#4) for additional information on this proposed project.

Objective 1: Reduce the selenium concentration on 240 acres within Sheppard Bottom S-3/S-5.

Strategies:

- ✓ The Refuge will actively work with Ecological Services, the National Irrigation Water Quality Program, the Bureau of Land Management, and other experts to minimize selenium contamination in North and South Roadside Draw, in Sheppard Bottom and any other portions of the Refuge.
- ✓ The Refuge will assist with sampling and data collection, and contribute funding to the program.
- ✓ The Refuge will propose partial removal of the protective levee and complete removal of the S-3/S-5 dike to allow flow through to the Green River. A separate Environmental Assessment will be prepared for this project.
- ✓ Disperse contaminated water to accelerate evaporation, encourage growth of phreatophytes.
- ✓ Transplant cottonwoods and willow along South Roadside Draw to convert the existing open-water wetland into a riparian corridor.
- ✓ Participate with other agencies and the general public during regional irrigation water planning and development.

■ **Goal E: Ouray NWR will promote and enhance opportunities for compatible wildlife- dependent recreation.**

Objective: Provide opportunities for wildlife photography, wildlife observation, hunting, and fishing.

Strategies:

- ✓ By the year 2005, two new nature trails will be developed. Both trails will provide access to riparian and wetland habitats. These trails will be interpreted, and at least one will be universally accessible. Solicitation for potential challenge cost share partners will be initiated upon approval of this Plan.
- ✓ The Refuge will continue to provide hunting and fishing opportunities. Huntible species will include mule deer, waterfowl and ring-necked pheasant in defined units of the Refuge. Fishing in accordance with State regulations is allowed along the Green River. At least one hunting and one fishing site will be made universally accessible.
- ✓ Evaluate feasibility of opening Johnson Bottom to waterfowl hunting.

■ **Goal F: Increase awareness of the Refuge and the role of the Refuge in wildlife and fisheries management, the National Wildlife Refuge System, and the UCRE for visitors and local communities through environmental education, and interpretation.**

Objective: Inform visitors and local communities about the fish and wildlife that depend on the Green River and the Refuge's role in protecting these resources.

Strategies:

- ✓ Ouray NWR will renovate the self-guided auto-tour route through Sheppard Bottom and Leota Bluff. By the year 2003, current signs will be replaced with stand-alone interpretive signs to provide information about Refuge habitat, migratory birds, endangered fish, and the NWR system.
- ✓ By the year 2000, Refuge staff will revise the general brochure to update information and to comply with the Service's publications format. Additionally, distribution of the brochure in local communities will be increased.
- ✓ Refuge personnel will dedicate 8-10 days every spring and fall to conduct Refuge tours with local schools and community groups. A local volunteer will be recruited and trained to assist with tours and possibly expand the program.
- ✓ During the annual spring open house, Refuge staff and volunteers will focus on topics related to Migratory Bird Day, Wetlands Day, Fishing Week, and other natural resource issues. Topics showcased in the fall will include the National Wildlife Refuge System, National Wildlife Refuge Week, and wildlife-dependent uses of the Refuge, such as hunting and fishing.
- ✓ Refuge staff will continue to participate in community events, teacher workshops, and natural resource career development workshops for students in an effort to strengthen community recognition and support of the USFWS mission.

■ **Goal G: Provide protection for cultural and paleontological resources on the Refuge and educate visitors about these sites.**

Objective 1: Protect cultural and paleontological resources on the Refuge.

Strategies:

- ✓ Consult with local experts from other land management agencies, individuals, and interested groups to compile information on potential cultural and paleontological resource sites and materials in the Refuge area.
- ✓ Conduct a cultural resource overview for the Refuge area.
- ✓ Develop a cultural resource/paleontological management plan. The plan will describe Refuge-wide resource inventories, define what stabilization and protection measures will be needed at located sites.

Objective 2: Inform visitors and the local community about cultural and paleontological resources on the Refuge.

Strategy:

- ✓ Incorporate messages about these resources into existing educational materials by designing interpretive and educational exhibits and brochures to raise the awareness of visitors about these resources.

Implementation and Monitoring

Plan implementation is contingent upon the following additional funding and personnel.

Funding and Personnel

Project	Estimated Project Cost
Create Nature Trails	\$17,000
Complete Disabled Access Hunting and Fishing Sites	\$25,000
Renovate Self-Guided Auto Tour Route	\$19,000
Develop Refuge Interpretive Brochures	\$5,000
Control Selenium Contamination	\$95,000
Increase Treatment of Pest Plants	\$98,000
Apply Habitat Treatments and Monitoring (Easement Work etc.)	\$200,000

Permanent Personnel Needed

Funding for two additional permanent employees is needed to implement this Plan. The new Biological Technician position will be responsible for Colorado River Wildlife Management Area easement enforcement and monitoring and assisting the refuge biologist. With the addition of the Colorado River Wildlife Management Area, the level of complexity merits grade increases for the Refuge Manager and Refuge Operations Specialist.

Current Personnel	Personnel Needed
Refuge Manager, GS-12	Refuge Manager, GS-13
Sup. Refuge Operation Specialist, GS-11	Sup. Refuge Operation Specialist, GS-12
Engineering Equipment Operator, WG-10	Engineering Equipment Operator, WG-10
Maintenance Worker, WG-8 (shared with Ouray Fish Hatchery)	Maintenance Worker, WG-8 (full-time Refuge)
Wildlife Biologist, GS-9/11	Wildlife Biologist, GS-11
Outdoor Recreation Planner, GS-9	Outdoor Recreation Planner, GS-11
Administrative Support Assistant, GS-7 (shared w/Jones Hole and Ouray Hatcheries)	Administrative Support Assistant, GS-8 (shared with Ouray Hatchery)
Vacant	Biological Technician, GS-5/6

Step-down Management Plans

In addition to administrative plans required by national policies and guidance, step-down plans that need periodic revision or will need to be developed to augment this CCP include:

- Habitat Management Plan
- Cultural/Paleontological Resource Plan
- Hunting Plan
- Integrated Pest Management Plan
- Fire Management Plan
- Wildlife Inventory Plan
- Wildlife Conservation Plan
- Public Use Plan
- Water Management Plan
- Trapping Plan

Monitoring and Evaluation

Refuge staff will continue to monitor avian (e.g., migratory songbirds) productivity and survivorship through the continuation of the constant effort mist-netting (CEMN). Mist-netting has been conducted in riparian areas on Ouray since 1996 and should continue as long as feasible to evaluate management and control of nonnatives, varying flooding regimes as dictated by the flow out of Flaming Gorge, and other changes as may occur naturally or artificially. Additionally, point counts will be conducted throughout the length of the riparian area occurring on the Refuge to complement CEMN. Also, vegetation on point counts will be monitored according to standards as provided by the Region.

Baseline inventories of small mammals, reptiles and amphibians were initiated during spring and summer of 1999. These inventories have verified certain species' occurrence on the Refuge, such as the Merriam's shrew. Although the efforts carried out are respectable, they still fall short of a complete inventory, as our previous efforts failed to sample some of the known species that occur on the Refuge. Obtaining this information is vital for evaluating future management plans, such as prescribed burning, nonnative weed control, mowing, and other efforts outlined in the CCP.

Levee removal or breaching has occurred in Johnson, Leota, and Woods Bottom to benefit endangered fish, particularly razorback suckers and Colorado pikeminnow. The Recovery Program, UDWR, and other researchers including Utah State University continue to monitor and evaluate the actual benefits of these levee removals to endangered fish recovery and riparian vegetation regeneration (e.g., cottonwoods and willows). Management decisions within levee removal sites may be reached using recommendations provided by the researchers. In the future, proposed levee removals on the Refuge will be evaluated on a case-by-case basis and on recommendations provided by past research.

Before appropriate management objectives can be developed for riparian and upland habitats, past, present, and potential vegetation structure and composition needs to be determined. Past information can be gathered using aerial photographs of riparian areas before regulated flows, soil surveys, existing diaries of explorers, and Refuge annual narratives. Present information can be collected through baseline inventories, while potential vegetation structure information can be gleaned from the scientific literature on potential natural communities or climax communities. Only when past, present, and potential vegetation structure and composition are determined and evaluated for compatibility with present day conditions (e.g., river flows, nonnative vegetation, etc.), can specific objectives and monitoring techniques be developed for riparian and upland habitats.

In order to control the rate of spread of nonnative species such as Tamarix, Russian olive, Russian knapweed, and perennial pepperweed, Refuge staff will evaluate different treatments and control mechanisms for the most efficient form of suppression. We will evaluate the use of different chemicals, concentrations, chemicals in combination with mechanical treatments like mowing and discing, prescribed burning, and chemicals in combination with prescribed burning. Plots of various sizes with various treatments assigned to each plot will be used to monitor the effects of the different treatments.

Implementation of the Plan will be monitored throughout its effective period (2000 through 2014).

Accomplishment of objectives listed in this Plan will be monitored annually by the Refuge Manager's supervisor. Monitoring of accomplishments is critical to the implementation of the Plan.

It is reasonable to believe that substantial changes could occur within the Service during the next 15 years. The objectives of the Plan will be examined a minimum of every five years to determine if revisions are necessary and to allow the addition or deletion of objectives.

Partnership Opportunities

Potential Partners for various Refuge activities are:

Salt Lake City Audubon Society

Refuge staff will support the "Adopt-A-Refuge" initiative sponsored by the National Audubon Society.

Utah Division of Wildlife Resources

Refuge staff will continue law enforcement and management of wildlife both on and off the Refuge.

Uintah County

Refuge staff will continue its close working relationship with the Uintah County Mosquito Abatement District, Uintah County Weed Department, and the Uintah County Commissioners.

Vernal Area and Duchesne Area Chamber of Commerce

Refuge staff will continue to provide Refuge literature and news release on Refuge activities to both Chambers of Commerce

Dinosaurland Travel Board

Refuge staff will continue its cooperative agreement to pay a share of the cost for the local radio broadcast service.

Northeastern Utah Visitor Center

Refuge staff will continue to provide Refuge literature, and seasonal updates for the local radio Refuge announcement.

Utah Field House of Natural History

Refuge will continue to support interpretive displays on the activities of the U.S. Fish and Wildlife Service in the Uintah Basin.

Bureau of Land Management

Refuge staff will continue its partnership with the BLM through sharing equipment, staff, and innovative ideas on how to control selenium contamination on the Refuge.

Uintah Basin Interagency Fire Center

The Refuge will continue its participation in providing wildfire suppression equipment and staff within the ecosystem.

Ducks Unlimited

Ducks unlimited maybe interested in assisting with wetland habitat improve projects on the Refuge.

Dinosaurland Resource Conservation and Development

Refuge staff will continue to support RC&D activities in an effort to share our knowledge of the resource with the local community.

Vernal Junior High Escape Club

Refuge staff will continue to seek assistance for natural resource improvement projects from the Vernal Junior High Escape Club.

Boy Scouts of America

Refuge staff will continue its partnership with local troops who have been instrumental in providing assistance to the Refuge.

