

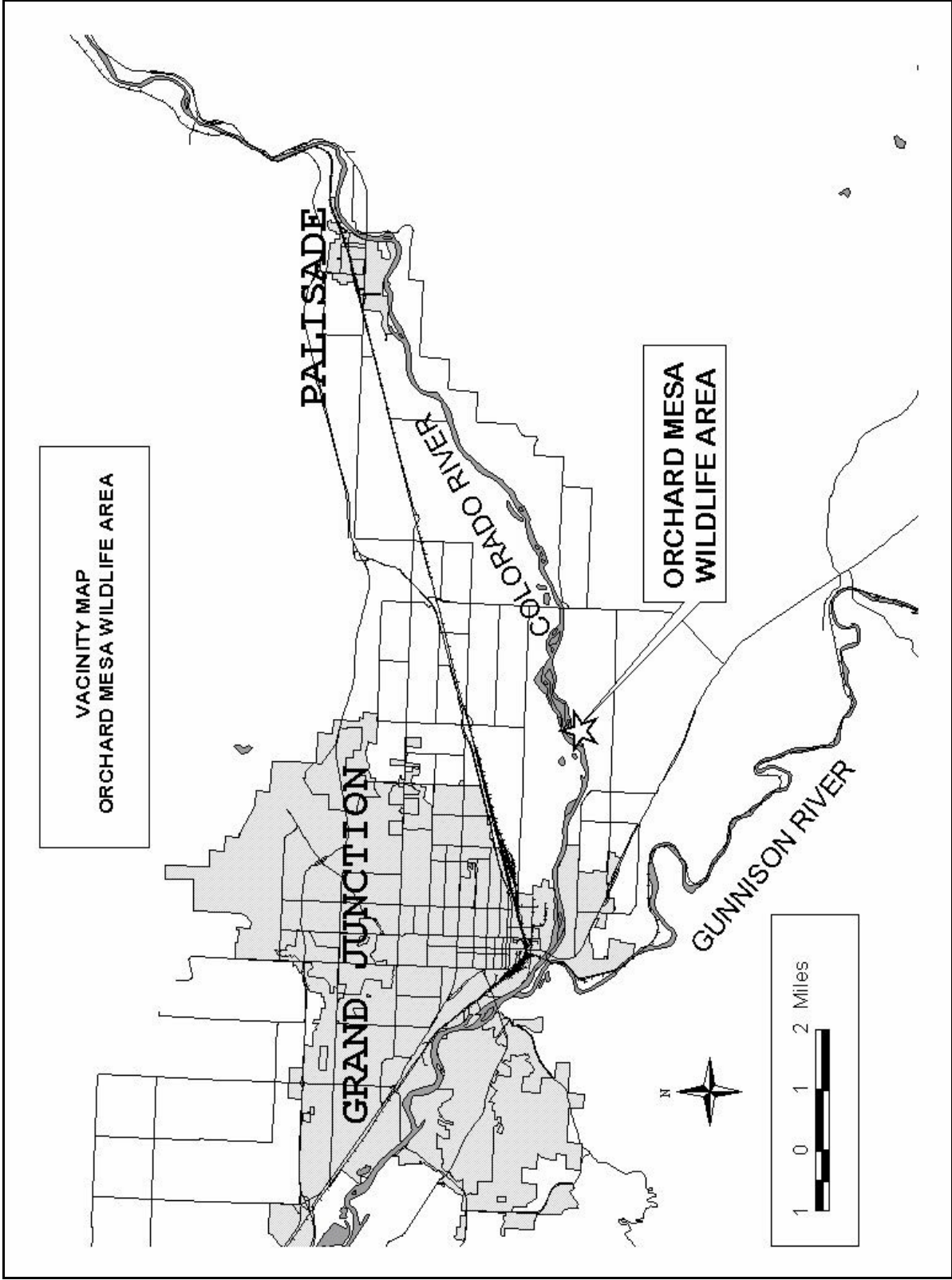
# **FINAL ENVIRONMENTAL ASSESSMENT**

## **Orchard Mesa Wildlife Area Selenium Remediation Project**

**Prepared by Bureau of Reclamation  
Western Colorado Area Office  
Grand Junction, Colorado**

**October 23, 2000**





## TABLE OF CONTENTS

### CHAPTER I - INTRODUCTION

Proposed Action .....	1
Purpose and Need .....	1
Background Information .....	1
Public Scoping .....	3

### CHAPTER II - ALTERNATIVES AND PREFERRED ALTERNATIVE

Alternatives .....	3
Evaluation of Alternatives .....	5
Preferred Alternative .....	5
Environmental Commitments .....	5

### CHAPTER III - AFFECTED ENVIRONMENT/ENVIRONMENTAL CONSEQUENCES

General .....	6
Recreation Resources .....	6
Land Use and Vegetation .....	7
Fish and Wildlife Resources .....	7
Threatened and Endangered Species .....	9
Water Rights and Water Uses .....	10
Historical and Cultural Resources .....	10
Indian Trust Assets .....	10
Environmental Justice .....	10
Summary and Environmental Commitments .....	11

### CHAPTER IV - CONSULTATION AND COORDINATION

General .....	11
Review Comments on Draft Environmental Assessment .....	12
Distribution List .....	12

### REFERENCES CITED

### FIGURES

Locator Map .....	Frontispiece Map
Figure 1 - Project Map .....	2

### TABLES

Table 1 - Screen Options .....	14
Table 2 - Summary of potential impacts associated with the two alternatives evaluated in this environmental document. Alternative 1 “No Action” and Alternative 2 “Pipe and Dilute” for the Orchard Mesa Wildlife Area, Mesa County, Colorado .....	12

### APPENDIX A - Distribution Mailing List

## CHAPTER 1 - INTRODUCTION

### **Proposed Action**

The Bureau of Reclamation (Reclamation) proposes to develop and implement a process to reduce selenium-related health effects in fish and aquatic birds at the Orchard Mesa Wildlife Area (OMWA) near Grand Junction, Colorado.

### **Purpose and Need**

High concentrations of selenium have been documented to cause reproductive failure and birth defects in fish and waterfowl. There is a need to reduce selenium levels in two backwater areas along the Colorado River within Reclamation's OMWA. The purpose of the project is to protect local fish and wildlife resources and reduce selenium bio-accumulations in endangered fishes and aquatic birds.

This environmental assessment (EA) was prepared by Reclamation in compliance with the National Environmental Policy Act of 1969; the Endangered Species Act; and related Department of Interior (DOI) policies and regulations. Based on this document and on comments received, it has been determined that the proposed action is not a major Federal action significantly affecting the environment, and a Finding of No Significant Impact has been prepared. Chapter IV of this EA discusses and responds to comments received on the draft.

### **Background Information**

In 1996, Reclamation and the Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin (RIP) jointly purchased about 153 acres of Colorado River bottomland. The area was purchased as a wetland mitigation site for the salinity control project in the Grand Valley and to protect endangered fish habitat (see Frontispiece Map). The salinity control project consisted of lining project canals to prevent seepage. The mitigation site is managed as wildlife habitat and will be referred to in this document as the Orchard Mesa Wildlife Area (OMWA).

The Bureau of Reclamation has actively managed the OMWA by planting cottonwood and other riparian plant species, applying salt cedar control, and providing flood irrigation. Water quality testing identified high concentrations of selenium in two backwater areas (see Figure 1). Selenium concentrations were recorded as high as 30 parts per billion (ppb). The Colorado Water Quality Standard for selenium is 5 ppb. The U.S. Fish and Wildlife Service (Service) expressed concerns that selenium concentrations may be bio-accumulating in endangered fishes and aquatic birds.

### **National Irrigation Water Quality Program**

The National Irrigation Water Quality Program (NIWQP) is an intra-departmental program that evaluates Department of the Interior (DOI) irrigation projects; considers drain water contamination and related impacts to endangered species or migratory birds; develops

alternatives for remediation; and implements alternatives. Program participants are the Geological Survey, Service, Bureau of Indian Affairs, and Reclamation. These projects are necessary to ensure that federally constructed irrigation projects are in compliance with the Endangered Species Act and Migratory Bird Treaty Act. The program is managed by Reclamation on behalf of the participating agencies.

An interdisciplinary (ID) team was formed in October 1998 with the assignment to develop a selenium remediation plan for the OMWA. The team members were:

	<u>Speciality</u>
Steve McCall - Reclamation	Environmental analysis
Del Smith - Reclamation	Wetlands/ ground water
Larry Burns - Reclamation	Design & cost estimates
Jone Wright - Reclamation	Public information
Dave Butler - Geological Survey	Water & sediment monitoring
Barb Osmundson - Fish & Wildlife Service	Biota impacts & monitoring
Mike Baker - Reclamation	Team leader/ general planning

**Public Scoping**

In November 1998, the ID Team held a tour and workshop to inform the public and interested agencies about the problems and issues at the OMWA and to obtain the public's ideas on how to correct the problems. Two newsletters were developed and distributed to stakeholders to present information on the alternatives and study progress, and solicit stakeholder input. Nineteen remediation options, suggested by the public and study team, were then screened (see Table 1 in the appendix).

From the scoping process eight options met the initial screening criteria and were developed by the ID Team:

1. Treatment Plant
2. Evaporation Ponds
3. Collect and Convey Directly to the Colorado River
4. Divert and Reuse
5. Deep Well Injection
6. Dilute or Flush
7. Retire Agricultural Lands
8. Remove Beaver Dams

## CHAPTER II -ALTERNATIVES AND THE PREFERRED ALTERNATIVE

### Alternatives

The Team evaluated the options in terms of cost and implementation ability. The following screening criteria were employed:

- provides a long-term fix
- is cost effectiveness
- acceptable to the public
- easy to maintain with low operation & maintenance costs
- consistent with wildlife area purposes & objectives; does not cause any degradation to wildlife area functions
- adaptable to anticipated long-term Colorado River course changes

From this screening, alternatives were developed for further study and refinement. Following further consultations with geomorphology and endangered fish experts, the following final array of alternatives were developed.

**Alternative 1. No Action** - The No Action alternative would take no action to address high selenium concentrations in the backwater areas and selenium bio-accumulation would continue at the OMWA. Associated affects to fish and aquatic birds would also continue.

**Alternative 2. Pipe and Dilute** - Selenium contaminated return flows from two surface drains would be diverted away from the East backwater directly into the Colorado River through buried pipelines. The water discharged directly into the river would mix and be diluted by the much larger river volume. A flushing channel would be cut to route clean river water to dilute selenium concentrations in the West backwater. Mitigation for lost habitat would involve new habitat improvements within the OMWA or at another location along the Colorado River. The estimated construction cost of the Preferred Alternative would be approximately \$83,000 and annual expenditures for operation and maintenance would be about \$6,000.

This alternative was the ID and agencies' Preferred Alternative. On-site meetings with representatives of the Recovery Program, Army Corps of Engineers, Service, Mesa Land Trust (operators of the wildlife area) and Reclamation were held on July 12 and August 17, 2000 to discuss exact locations of the improvements and other "specifics" of the plan.

**Alternative 3. Construct New Wetlands and Dilute** - A new wetland area would be excavated near the East backwater area which would be designed to fill with "clean" water infiltrating from the Colorado River. This area would then serve as replacement habitat when beavers and their dams in the East backwater are removed to prevent ponding of irrigation drainage (and the resulting selenium bio-accumulation). The contaminated drainage would be routed directly to the Colorado River where it would be mixed and diluted in the much larger river volume. Also, a channel to route clean river water would be cut to dilute selenium concentrations in the West

backwater. The estimated construction cost would be approximately \$83,000 and annual expenditures for operation and maintenance would be about \$6,000.

**Alternative 4. Replace Habitat Offsite** - clean habitat (currently inaccessible to endangered fish) would be acquired at another location along the Colorado River to replace the contaminated habitat at the OMWA. This property would be developed for use by endangered fish and other wildlife. The estimated acquisition and development cost would be approximately \$395,000 and annual operation & maintenance costs would be \$6,000. This off-site mitigation would not fix the selenium problem at the OMWA.

**Alternative 5. Divert and Dilute** - contaminated water from a major irrigation drain would be conveyed via an open channel directly to the Colorado River bypassing the East backwater; the remaining drainage and seep water flowing into the East backwater would be diluted by pumping from the Colorado River for 6 months prior to the reproductive season of endangered razorback suckers. A channel would be cut to divert “clean” river water to dilute selenium concentrations in the West backwater. The estimated implementation cost would be approximately \$65,000 and annual operation & maintenance costs would be \$13,000.

### **Evaluation of Alternatives**

Each of these alternatives were evaluated using an estimated 10-year life to correspond to the estimated life of the East and West backwater channels. These channels, which prior to large floods in the early 1980's were the mainstem of the Colorado River, are now rapidly filling with sediment and will eventually change from depressions retaining water to year round bottomlands that flood only during runoff.

The alternatives were evaluated and compared. Some of the conclusions were:

- Alternative 2 appeared to be the best fit for Recovery Program needs
- Alternative 3 was discouraged by the Recovery Program
- Alternative 4 doesn't satisfy the needs statement
- Alternatives 2 & 3 had the lowest estimated annual cost (for an anticipated 10 year life)
- Alternative 5 would involve more traffic which would disrupt wildlife and have more extensive operation and maintenance needs.
- It is important to adopt a plan that minimizes environmental impacts.

### **Preferred Alternative**

Because it appeared to be the best fit for the Recovery Program needs and favorably compared to other alternatives for lowest estimated annual cost, Alternative 2 was chosen as the Preferred Alternative (See Figure 1).

### **Environmental Commitments**

The following environmental commitments would be included as part of any alternative selected. Environmental commitments are designed to reduce impacts to natural and other resources and would be completed concurrently with other project features.

1. All permits and contracts would have a “stop work” clause in the event that cultural or paleontological resources are found during construction.
2. All temporary roads and access points would be recontoured and reseeded to reduce erosion. All specifications would include provisions to reduce erosion, restore landscapes, and provide for revegetation.
3. Design and construction plans would emphasize preserving all mature trees.
4. All wetlands disturbed were identified in the Section 404 of the Clean Water Act permit application under Regional Permit Number 57, Projects that Benefit Recovery of Endangered Fishes. Direct wetland disturbance caused by the installation of the drain pipe and flushing channel would be mitigated. Backwaters would be monitored to document the effects caused by diverting drainage water. Mitigation criteria would be developed to ensure that any reductions in wetland acreage are replaced.
5. The wetlands mitigation would be developed with the concurrence of the Service and the Army Corps of Engineers.
6. Construction activities would be restricted to between August 1<sup>st</sup> and December 30<sup>th</sup> to reduce impacts to nesting birds (including a heron rookery) and potential winter roosting by bald eagles.
7. The P drain (a drainage that enters the OMWA from the southeast portion of the property) will be monitored and evaluated to determine if it is a viable source of replacement water for the east backwater.

### **CHAPTER III - AFFECTED ENVIRONMENT/ENVIRONMENTAL CONSEQUENCES**

#### **General**

The OMWA is located along the south bank of the Colorado River about 3 miles east of downtown Grand Junction, Colorado. The property is accessed from Mesa County C Road about 0.3 miles east of Mesa County 30 Road.

The property was purchased in 1996 to replace wildlife habitat lost during the lining and piping of irrigation canals and laterals in the Grand Valley, and to protect endangered fish habitat.

Lands surrounding the OMWA are private and agricultural in nature. Hay crop production and horse pasture are the primary uses. The OMWA receives return flows from surrounding lands irrigated by water via the Orchard Mesa Canal part of the Grand Valley Project.



### **Recreation Resources**

The OMWA is managed by Reclamation as a wildlife area and public access is limited to foot traffic. Waterfowl and big game hunting are regulated by the Colorado Division of Wildlife. The area receives limited recreational use because of restricted access and close proximity to residences.

Recreation resources are not expected to be impacted by the Preferred Alternative.

### **Land Use and Vegetation**

The OMWA includes about 153 acres of river bottomland at an average elevation of 4,600 feet. The area is managed as wildlife habitat for fish and wildlife. The area is surrounded by private agricultural lands.

A wetlands delineation was conducted in July 1999 by Reclamation's Technical Service Center in Denver, Colorado (USBR 1999a). The delineation identified nine vegetation community types within the OMWA. The community types are as follows:

1. Upstream Bench
2. Upper (Dry) Drainage Ditch
3. Middle Drainage Ditch
4. Lower Drainage Ditch
5. Permanent and Semi-Permanent River Channel and Braids
6. Mature Riparian Woodlands
7. Salt Cedar-Cheatgrass Complex
8. High Flow Channel Complex
9. Spoil Pile

Common plant species included Fremont cottonwood (*Populus fremontii*), salt cedar (*Tamarix chinensis*), sandbar willow (*Salix exigua*), Russian olive (*Eleagnus angustifolia*), Siberian elm (*Ulmus pumila*), black greasewood (*Sarcobatus vermiculatus*), skunkbush sumac (*Rhus trilobata*), Douglas rabbitbrush (*Chrysothamnus viscidiflorus*), cheatgrass (*Bromus tectorum*), saltgrass (*Distichlis spicata*), wheatgrass (*Agropyron spp.*), canary reedgrass (*Phalaris arundinacea*), alkali sacaton (*Sporobolus airoides*), foxtail barley (*Hordeum jubatum*), salt marsh bulrush (*Scripus paludosus*), cattail (*Typha latifolia*), spike rush (*Eleocharis macrostycha*), and sedges (*Carex spp.*).

The wetlands delineation identified about 60-acres of jurisdictional wetlands within the OMWA (see Figure 1). Jurisdictional wetlands are defined as wetlands regulated under the Clean Water Act by the U.S. Army Corps of Engineers (Corps). Wetlands must meet hydric vegetation, hydrology, and hydric soils criteria to be classified as a jurisdictional wetland. It is estimated that less than 0.5 acres of wetlands would be directly impacted during construction activities by the Preferred Alternative. The East and West backwaters are about 0.8-acres and 2.0-acres in size,

respectively. These backwaters will be monitored to determine the amount of impact. Potential wetland mitigation for the Preferred Alternative includes development of replacement habitat or providing replacement water to the backwaters. The Corps authorized the project under Regional Permit Number 57, Projects that are beneficial to the recovery of endangered fish (Project Number 200075396).

### **Fish and Wildlife Resources**

The OMWA supports diverse populations of fish and wildlife. The OMWA provides excellent breeding and wintering bird habitat, and good wintering habitat for mule deer. Species documented during field investigations include mule deer (*Odocoileus hemionus*), mourning dove (*Zenaida macroura*), Canada goose (*Branta canadensis*), black billed magpie (*Pica pica*), Gambel's quail (*Callipepla gambelli*), and beaver (*Castor canadensis*).

Breeding bird surveys conducted on the OMWA by Reclamation in 1997 (Broderick 1998) documented European starling (*Sturnus vulgaris*), bank swallows (*Riparia riparia*), belted kingfisher (*Ceryle alcyon*), brown-headed cowbird (*Molothrus ater*), Canada goose, mallard (*Anas platyrhynchos*), mourning dove, western meadowlark (*Sturnella neglecta*), American robin (*Turdus migratorius*), black-headed grosbeak (*Pheucticus melancephalus*), blue grosbeak (*Guiraca caerulea*), Bullock's oriole (*Icterus galbula bullocki*), western kingbird (*Tyrannus verticalis*), great blue heron (*Ardea herodias*), cliff swallow (*Hirundo pyrronota*), American kestrel (*Falco sparverius*), green-winged teal (*Anas crecca*), Lazuli bunting (*Passerina amoena*), western tanager (*Piranga ludoviciana*), black billed magpie, common merganser (*Mergus merganser*), Bewick's wren (*Thryomanes bewickii*), song sparrow (*Melospiza melodia*), American goldfinch (*Carduelis tristis*), Gambel's quail, house finch (*Carpodacus mexicanus*), and wood duck (*Aix sponsa*).

A heron rookery was documented within the project area and leopard frogs were documented in the middle drainage ditch. Winter surveys conducted in February 1998 documented mallard, Canada goose, common merganser, northern pintail (*Anas acuta*), northern shoveler (*Anas clypeata*), green-winged teal, bald eagle (*Haliaeetus leucocephalus*), northern harrier (*Circus cyaneus*), red-tailed hawk (*Buteo jamaicensis*), song sparrow, white-crowned sparrow (*Zonotrichia leucophrys*), black-billed magpie, dark-eyed junco (*Junco hyemalis*), European starling, mourning dove, northern flicker (*Colaptes auratus*), mule deer, raccoon (*Procyon lotor*), beaver, ground squirrel (*Spermophilus spp.*) (Broderick 1998).

The 1999 Christmas bird survey (USBR 1999b) also documented great blue heron, Canada goose, green-winged teal, mallard, gadwall (*Anas strepera*), American widgeon (*Anas americana*), common goldeneye (*Bucephala clangula*), bufflehead (*Bucephala albeola*), common merganser, bald eagle, sharp-shinned hawk (*Accipiter striatus*), cooper's hawk (*Accipiter cooperii*), redtail hawk, American kestrel, ring-necked pheasant (*Phasianus colchicus*), Gambel's quail, Virginia rail (*Rallus limicola*), American coot (*Fulica americana*), common snipe (*Gallinago gallinago*), mourning dove, belted kingfisher, downy woodpecker (*Picoides pubescens*), Northern flicker, scrub jay (*Aphelocoma coerulescens*), black-billed magpie, American crow (*Corvus*

*brachyrhynchos*), common raven (*Corvus corax*), black-capped chickadee (*Parus atricapillus*), bushtit (*Psaltriparus minimus*), brown creeper (*Certhia americana*), Bewick's wren, marsh wren (*Cistothorus palustris*), ruby-crowned kinglet (*Regulus calendula*), American robin, American pipit (*Anthus rubescens*), cedar waxwing (*Bombycilla cedrorum*), European starling, spotted towhee (*Pipilo erythrophthalmus*), song sparrow, white-crowned sparrow (*Zonotrichia leucophrys*), dark-eyed junco, slate-colored junco (*Junco hyemalis*), red-winged blackbird (*Agelaius phoeniceus*), house finch, American goldfinch, and house sparrow.

Temporary displacement of wildlife may occur during construction. However, no long-term impacts are expected. Construction activities would be scheduled between August 1<sup>st</sup> and December 30<sup>th</sup> to avoid disturbing nesting birds and winter roosts.

### **Threatened and Endangered Species**

Threatened and endangered species are plants and animals legally protected under the Endangered Species Act (ESA). The draft EA served as Reclamation's biological assessment under Section 7 of the ESA. The preferred alternative would not affect threatened and endangered species with exception to the bald eagle, Colorado pikeminnow and the razorback sucker. These species may be affected but in a beneficial manner. The Service (2000b) concurred with findings in the biological assessment. The Service (2000a) provided a list of threatened and endangered species that might be affected by the proposed project or might be present in the area. The list is as follows:

Bald eagle	<i>Haliaeetus leucocephalus</i>
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>
Colorado pikeminnow with critical habitat	<i>Ptychocheilus lucius</i>
Razorback sucker with critical habitat	<i>Xyrauchen texanus</i>
Humpback chub	<i>Gila cypha</i>
Bonytail	<i>Gila elegans</i>
Uinta Basin hookless cactus	<i>Sclerocactus glaucus</i>

The bald eagle uses the OMWA during winter months. Three birds have been documented using the mature cottonwood trees as winter roosts in February through March (Broderick 1998). No nesting has been documented in the area. The eagle is expected to benefit from the Preferred Alternative. Construction activities would occur in the fall of 2001 prior to wintering birds visiting the OMWA. The potential for bio-accumulation of selenium in food sources (fish, carrion, small mammals) is expected to be reduced by the Preferred Alternative. Mature cottonwood trees used for roosting and perching would not be affected by the Preferred Alternative. The Preferred Alternative is anticipated to affect, but not likely to adversely affect, the bald eagle.

The southwestern willow flycatcher may occur in the project area, however surveys conducted by Reclamation biologists did not document nesting. One flycatcher was found north of the Colorado River about 0.5-miles north and east of the OMWA. No nesting was documented with this bird.

The Preferred Alternative is scheduled for the fall of 2001 outside the nesting season, therefore it is not expected to affect the southwestern willow flycatcher.

Of the four listed fishes: Colorado pikeminnow, razorback sucker, bonytail and humpback chub, only the Colorado pikeminnow and razorback sucker occur within the project area. Both species occur within the "Sensitive 15-mile Reach" and have been stocked by the Upper Colorado River Endangered Fishes Recovery Implementation Program. The OMWA is within designated critical habitat for the Colorado pikeminnow and the razorback sucker. Backwater habitats are important rearing and nursery habitats for both species. The Recovery Program also plans to stock bonytail within this reach in future years. Concerns about potential bio-accumulations of selenium in fishes and waterfowl is identified in the need and purpose of the proposed project. By reducing the concentrations of selenium in backwaters, it is anticipated that the Colorado pikeminnow, razorback sucker, bonytail, and designated critical habitats will benefit from the Preferred Alternative. Therefore, the Preferred Alternative may affect, but is not likely to adversely affect these species. The Preferred Alternative is not expected to affect humpback chub because it does not occur within the project area.

The Uinta hookless cactus is found in gravelly soil of hills and mesas in the Colorado and Gunnison River valleys. Its distribution includes Montrose, Delta, Mesa, and Garfield Counties in Colorado (Colorado Native Plant Society 1989 and Spackman et al 1997). The cactus has not been documented in the project area and suitable habitat is limited. The Uinta hookless cactus is not anticipated to be affected by the Preferred Alternative.

All construction contracts would have "Stop Work Clauses" that would require the contractor to stop construction activities if a threatened or endangered species is encountered. If this would occur, construction would be halted until consultation with the Service was completed.

### **Water Rights and Water Uses**

The OMWA receives irrigation drainage and tail water from irrigation on Orchard Mesa via the OM 4 Drain. This water is used for replacement wildlife habitat associated with the Grand Valley Salinity Control Project. Water rights and water uses will not be affected by the Preferred Alternative and no new water diversions would occur.

### **Historical and Cultural Resources**

Historical and cultural resource surveys were completed when the property was purchased by Reclamation in 1997. No sites were documented, therefore the Preferred Alternative would not have an affect on historical or culture resources. All construction contracts would have "Stop Work Clauses" that would require the contractor to stop construction activities if cultural resources are encountered. If this would occur, construction would be halted until consultation with the State Historical Preservation Officer was completed.

### **Indian Trust Assets**

Indian trust assets are legal interests in property held in trust by the United States for Indian tribes or individuals. Reclamation and other Federal agencies share the responsibility to protect these assets. There have been no trust assets identified in the project area, and therefore no impact on these assets is predicted.

**Environmental Justice**

Executive Order 12898 on Environmental Justice provides that Federal agencies analyze programs to assure that they do not disproportionately adversely affect minority or low income populations or Indian tribes. There are no potentially affected populations in the project area and no adverse affects on environmental justice are predicted.

**Summary and Environmental Commitments**

The primary effect of the Preferred Alternative would reduce the concentration of selenium within the East and West backwater on the Orchard Mesa Wildlife Area. This would in turn reduce the likelihood of bio-accumulation in endangered fishes and aquatic birds.

Wildlife would be impacted by increased noise and activity during construction and by the loss of wetlands associated with the construction of the pipeline. The impacts would be mitigated by restricting the construction activity between August 1<sup>st</sup> and December 30<sup>th</sup> to reduce impacts to nesting and winter wildlife. Mitigation for impacts to wetlands would be approved by the Service and the Army Corps of Engineers.

Table 2 summarizes a comparison of impacts of the No Action and preferred alternative.

Table 2. Summary of potential impacts associated with the two alternatives evaluated in this environmental document. Alternative 1 “No Action” and Alternative 2 “Pipe and Dilute” for the Orchard Mesa Wildlife Area, Mesa County, Colorado. 1/

<b>Environmental Factor</b>	<b>Alternative 1 ( No Action)</b>	<b>Alternative 2</b>
Recreation Resources	o	o
Land Use and Vegetation	o	--
Fish and Wildlife Resources	---	++
Threatened and Endangered Species	---	+++

Water Rights and Water Uses	o	o
Historical and Cultural Resources	o	o
Indian Trust Assets	o	o
Environmental Justice	o	o
Reduces Selenium Concentrations	No	Yes

- 1/ (++) indicates some positive impact;  
 (+++) indicates the greatest positive impact;  
 (-) indicates some negative impacts;  
 (—) indicates the greatest negative impacts;  
 (o) indicates no know impact.

## CHAPTER IV - CONSULTATION AND COORDINATION

### **General**

During the development of the alternatives for selenium remediation for the Orchard Mesa Wildlife Area, public scoping was conducted. A pre-stamped comment card was provided with the 74 copies of the newsletter that were distributed. Five responses were received. Following the development of a final array alternatives, the newsletter concept was again used to distribute the information and obtain input. The local irrigation district manager and others agreed this would be appropriate based on the level of stakeholder interest.

The comment cards returned by the stakeholders showed Alternative 2 as the most favored but no action was a close second. There was also a consensus that we should not do any harm to the OMWA. The comments were generally taken to be an encouragement to do the minimum necessary to remove the hazard and make sure we do not create any new hazards or spend too many dollars on something that the river will reclaim. This all fit with the ID Team's objectives.

Following the NIWQP's decision on whether to implement the Preferred Alternative, the stakeholders would be informed of the decision and the plan for implementation, again by newsletter. Throughout the process, stakeholder input has been vital in helping the team make appropriate decisions.

Interagency consultation included Reclamation, U.S. Geological Survey, Service, Army Corp of Engineers, Colorado Division of Wildlife, and Mesa Land Trust.

### **Review Comments on Draft Environmental Assessment**

In September 2000, the draft EA was distributed to agencies, organizations, and interested parties listed in Appendix C. Only three comments were received.

Comments from the U.S. Fish and Wildlife Service and the Recovery Program concurred with the draft EA and supported the implementation of the Preferred Alternative.

One comment was received from a private individual. This comment asked about tapping into funding for desalination of the Colorado River to meet International agreements with Mexico for use in treating selenium in upstream efforts. The comment also asked if selenium could be removed during desalination.

#### Response

The National Irrigation Water Quality Program (NIWQP) is a national program directed at addressing water quality issues including both elevated salinity and selenium concentrations resulting from irrigation. The NIWQP will be providing both the construction and maintenance funding for the OMWA remediation project.

Selenium can be removed during the desalination process, however the cost are significant. During the initial development of alternatives for treatment of selenium for the OMWA, development of a desalination facilities was considered. Cost were estimated in the millions of dollars and alternative was eliminated because of enormous cost.

#### Distribution List

Appendix A contains the mailing list for the final EA. The list includes all individuals, agencies, and organizations who provided comments on the draft EA or expressed interest during the scoping process. In addition, others who specifically requested a copy of the final EA are included in the list.

## REFERENCES CITED

Broderick S. 1998. Wildlife Use of Colorado River Habitat Replacement Areas, Grand Valley, Colorado. Bureau of Reclamation, Denver Technical Service Center.

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USBR. 1999a. Orchard Mesa Mitigation Site Wetland Delineation, Mesa County, Colorado. Bureau of Reclamation Technical Service Center, Denver, Colorado.

USBR. 1999b. 1999 Christmas Bird Survey. Unpublished data, U.S. Bureau of Reclamation, Grand Junction, Colorado.

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US Fish and Wildlife Service. 2000b. Memo from Assistant Field Supervisor, U.S. Fish and Wildlife Service, Grand Junction, Colorado to Area Manager, Reclamation. **October 16, 2000.**



# Table 1 -Screened Options

<u>Options to solve the Problem</u>	<u>Criteria</u>		<u>Comments / Primary reasons for eliminating as an option</u>	Effective in 5 yrs. or less (in place & functional)	Doesn't violate contracts or state laws	Proven technology	Retain this option	<u>Key</u> (Differing opinions within the team are represented by 2 symbols) Y = Yes, meets criteria N = No, doesn't meet criteria U = Undetermined or doesn't sufficiently address the criteria
	Significantly reduces selenium risk to fish & wildlife at OMWA	No harm to river						
<u>Options to treat contaminated water:</u>								
Change irrigation to sprinkler systems	U	Y	U	Y	Y	N	May not be compatible with soils/crops grown in this area/not sufficiently effective	
Line or pipe irrigation canals & ditches	U	Y	Y	Y	Y	N	Not sufficiently effective at OMWA	
Best Management Practices (BMPs)	U	Y	U	Y	Y/U	N	Long term effectiveness is questionable /not sufficiently effective	
<u>Options to transport/dilute contaminated water:</u>								
Use plants to absorb selenium	U	Y	Y	Y	U	N	Concern about bird impacts / unproven technology & plant disposal issues	
Intercept/treat (e.g. w/activated aluminum)	Y	Y	Y	Y	Y/U	Y	Concerns if it will work & how to dispose of waste from the treatment process	
Reverse osmosis/other physical treatment	Y	Y	Y	Y	Y	Y	Concerns about cost and need for waste brine pond	
Biological treatment	U	Y	U	Y	U	N	Ponds may need netting & would have to be off-site/ unproven technology	
<u>Options to dilute contaminated water:</u>								
Add Colorado River water to flush/dilute	U	U	U	Y	Y	Y/U	Concern about long term liability of a pipeline as a point source discharge	
Remove beaver dams	Y/U	Y	U	Y	U	Y	Concern about finding sufficient alternate uses	
Dilute drains at their source	U	Y	U	Y	Y	U/N	Not effective	
<u>Options with no construction needed:</u>								
Improve irrigation efficiency	N	Y	N	Y	Y	N	Concern about potential high cost	
Change land use (agricultural to residential)	U	Y	U	U	U	N	Concern: recurrence & disposal of contaminated sediment/not sufficiently effective	
Buy ag lands that contribute selenium	Y	Y	Y	Y	Y	Y	Retained but lots of potential problems including pond siting, size, bird usage, etc.	
<u>Options for replacement water supply:</u>								
1) Deliver river water via a gravity ditch	U	U	U	Y	Y	Y	Uncertain whether sufficient water can be diverted into the area year round	
2) Pump water (consider a hydraulic pump)	U	Y	U	Y	U	Y	Cuts retention time; does not affect overall loading passing through the wetlands	
3) Collect & deliver irrigation tailwater	U	Y	U	U	Y	U/N	Unrealistic amount of dilution water needed to sufficiently reduce concentrations	
4) Deliver spills from Orchard Mesa canals. These are not options to solve the problem but options for a replacement water supply, which is needed as a component of several alternatives. These were not evaluated using the criteria above, but will be examined separately as water supply alternatives.	U	Y	U	Y	Y	Y	These are non-structural options. Meet crop need w/ correct amount of water at right time /not significantly effective Willing landowners only / not sufficiently effective Willing sellers only; need to isolate hot spots; social/economic, land mgmt. concerns	

<sup>1</sup> Source controls are only partially effective in reducing deep percolation, and though the volume may be reduced, continued irrigation will add drainage to the ground water which picks up selenium. There would most likely still remain a need to address the remainder of the contaminated drainage flowing into a specific area, like OMWA.

**APPENDIX A**

**Distribution Mailing List**