DRAFT ENVIRONMENTAL ASSESSMENT

FLOOPLAIN HABITAT RESTORATION AT THUNDER RANCH, UTAH

Prepared by

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for

Upper Colorado River Endangered Fish Recovery Program
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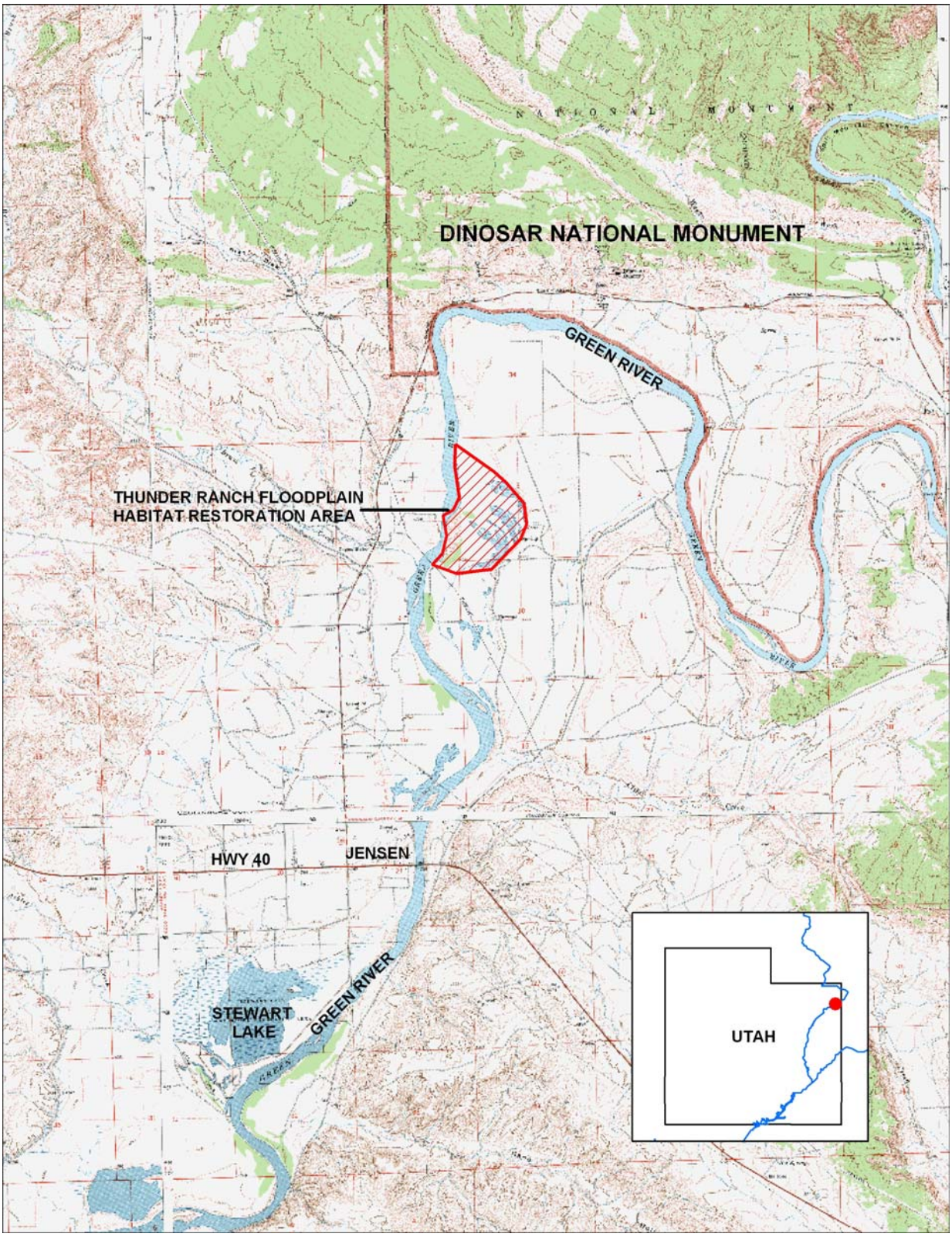

Figure 1-Locator Map

TABLE OF CONTENTS

List of Figures

List of Tables

CHAPTER 1 – INTRODUCTION

Proposed Action

The Upper Colorado River Endangered Fish Recovery Program (Recovery Program) is proposing to restore endangered fish habitat at 292 acres of Green River bottomlands located on the Thunder Ranch near Jensen, Utah. The Recovery Program has acquired a 325 acre easement from Thunder Ranch to improve floodplain habitat for the benefit of endangered Colorado River fishes. The project area is located adjacent to the Green River within an old meander river channel. Several ponds and wetlands exist in the project area, but are isolated from the Green River by an earth-filled levee. By notching the existing levee that separates the ponds from the Green River, the proposed action would allow endangered fish larvae to drift from the river into the ponds and use the ponds as a nursery habitat. An active razorback sucker spawning site is located several river miles upstream of the project area. Sub-adult and adult razorback sucker and Colorado pikeminnow would also benefit with access to additional habitat.

Figure 2-Thunder Ranch Bottomlands

Need for and Purpose of Action

This Draft Environmental Assessment (EA) evaluates effects on the human environment from notching the earthen levee to entrain endangered fish larvae into ponds located on the Thunder Ranch adjacent to the Green River. The property is located in Uintah County, near Jensen, Utah and is owned by Thunder Ranch, L.L.C (Frontispiece Map). The Bureau of Reclamation (Reclamation) prepared this EA in cooperation with the U.S. Fish and Wildlife Service (Service) and other federal and state agencies to comply with the National Environmental Policy Act (NEPA), Endangered Species Act (ESA), and related U.S. Department of the Interior policies and regulations. This report is intended to serve as a Biological Assessment prepared under Section 7 of ESA. If, based on this analysis, Reclamation concludes the proposed action would have no significant impact on the human environment, preparation of an Environmental Impact Statement would not be required.

Need: The loss of floodplain habitat is a factor that has contributed to the decline of the endangered fishes of the Upper Colorado River Basin. To reverse this trend, the Recovery Program seeks opportunities to restore, enhance, and protect floodplain habitats that will support recovery of the species.

Upper Colorado River Basin Endangered Fish Recovery Program

In 1988, the Governors of Colorado, Utah and Wyoming; the Secretary of the Interior; and the Administrator of Western Area Power Administration entered into a cooperative agreement to initiate the Recovery Program. The Recovery Program is a cooperative partnership involving Federal and State agencies, environmental groups and water and power user organizations. Pursuant to the Endangered Species Act of 1973 (16 USC 1531 et seq.), the Recovery Program seeks to recover four species of endangered fish (Colorado pikeminnow, razorback sucker, humpback chub, and bonytail) while water development proceeds in accordance with Federal and State laws. Recovery is defined as achieving and maintaining natural self-sustaining populations of the species.

Recovery Program elements include:

- Habitat management including identifying and acquiring instream flows, changing operations of Federal dams, and operating other reservoirs in a coordinated manner to benefit endangered fish.
- Habitat development including restoring floodplain/wetland habitats, constructing fish passageways around dams and other barriers in the river, and installing screens to prevent entrainment of endangered fish into diversion canals.
- Native fish propagation and genetic management involving establishing facilities to hold adult brood stock to prevent extinction of these rare fish and maintain their genetic resources; develop grow-out ponds; conduct research to improve survival of endangered fish raised in captivity and stocked in the wild; and support appropriate stocking and reintroduction efforts.
- Nonnative species and sport fishing entailing managing detrimental nonnative fish

species in habitat considered "critical" to endangered fish. This also involves educating and distributing information to anglers to reduce accidental capture of endangered fish.

- Research, monitoring and data management provides information about what these fish need to survive, grow, and reproduce in the wild. Efforts include compiling data on the number, sizes, and locations of endangered fish; monitoring endangered fish population trends; and making river flow recommendations.

The razorback sucker is one of four species of Colorado River fishes that are in danger of becoming extinct. This species in particular is dependant upon floodplain habitat to ensure its survival and recovery. Razorback suckers spawn on the ascending limb of the hydrograph during spring runoff. After eggs hatch, larvae begin to drift downstream. Larvae that drift into floodplain wetlands have a better chance of survival than those that remain in the main channel. Floodplain wetlands have warmer water temperatures, resulting in greater food production and faster growth rates for young fishes, thereby increasing the chances of survival because larger fish are less vulnerable to predation. Floodplain habitats also provide a quiet-water shelter from main channel river currents, which reduces energy expenditure that can be used for growth. Inundated wetland vegetation also offers hiding places for avoiding predators.

Construction of levees has disconnected many floodplain wetlands from the main river channel, thereby denying access to larvae that are drifting down the river. Without access to these nursery habitats, few larvae are able to survive. The river environment is harsh compared to the floodplain wetland environment. Water temperatures are colder, food is relatively scarce, and there is no cover available to escape predation.

The proposed action will construct a series of notches in the levee that isolates the Thunder Ranch bottomlands from the Green River. This will allow a portion of the Green River to flood the property during spring runoff filling the ponds and provide a seasonal connection between the ponds and the Green River. Some of the razorback sucker larvae drifting downriver at this time of year would become entrained in the ponds. The ponds provide important nursery habitat that may help prevent the extinction of this species.

Purpose: The purpose of the proposed action is to facilitate entrainment of drifting razorback sucker larvae into the Thunder Ranch bottomland ponds. In these types of environments, larvae are able to survive and grow until they are ready to leave for the river to join the adult population. Without these types of habitats, few razorback sucker larvae are able to survive. In addition, adult razorback sucker and Colorado pikeminnow will benefit with access to additional habitat.

Background Information

Thunder Ranch

The Thunder Ranch is located approximately 3 miles northeast of Jensen, Utah in Uintah County. Thunder Ranch encompasses approximately 2,000 acres and is used primarily for ranching. Side-roll sprinkler systems are used to irrigate large pastures above the project area. The Ranch is located adjacent to the Green River and downstream of Dinosaur National Monument (Frontispiece Map). The Recovery Program acquired an easement on 325 acres of floodplain bottomland from Thunder Ranch in 2003 for the purpose of enhancing endangered fish habitat. The easement allows for increasing the frequency of flooding the bottomland site. Additional water impoundment is not permitted under the easement conditions.

The project area provides wildlife habitat for numerous avian species including neo-tropical migrants. The ponds, wetlands, and bottomlands associated with Thunder Ranch are important for migrating waterfowl. Elk, deer and turkey also use the project area.

Water Quality Issues

Elevated selenium levels from springs and seeps which enter the Thunder Ranch bottomland site have detrimental effect on water quality and area wildlife. The Utah standard for selenium is 4.6 parts per billion (ppb). Springs and seeps associated with irrigation returns have been documented in the 2,000 ppb range. Ponds and wetlands within the project area have selenium concentrations in the range of 4 to 10 ppb.

CHAPTER 2 - PROPOSED ACTION AND ALTERNATIVES

Alternatives evaluated in this environmental assessment include No Action and the Proposed Action.

No Action Alternative: Under the No Action Alternative, the Recovery Program would not take action to enhance endangered fish habitat at Thunder Ranch. Notches to entrain larval razorback sucker would not be constructed in the existing levee.

Proposed Action: Tetra Tech Inc. of Breckenridge, Colorado was contracted by the Recovery Program to develop a habitat restoration plan for Thunder Ranch (Tetra Tech Inc., 2003). Survey data used to design the restoration plan were collected in 1993 as described in a report entitled "*Green River Razorback Sucker Spawning Reach, Hydrologic Study near Jensen, Utah*" (Tetra Tech Inc., 1993). The primary focus of the study was to investigate the hydraulic conditions and channel geometry changes at a large cobble bar which splits the river several miles upstream of the Jensen Bridge. As a compliment to the spawning bar investigations, additional hydrographic data was collected in a reach of the Green River near a series of abandoned meander bends downstream of Dinosaur National Monument. River cross sections were surveyed to predict overbank flows into the project area.

Tetra Tech, Inc. developed a habitat restoration plan to seasonally flood the project area with a frequency of the 1.25 year flow event (12,000 cfs) (Figure 2). An existing levee separates the wetlands and adjoining bottomlands from the Green River. The restoration plan calls for a series of seven notches in the levee to allow flows above 12,000 cfs to flood the project area. This would require some local floodplain shaping of higher ground behind the levee.

Two-dry wells will be formed; each to supply a constructed refreshening flow channel that would provide limited flows to the bottomland with river discharges greater than 7,500 cfs. The purpose of the refreshening channels is to supply water to the wetlands when the runoff does not reach the inundation notches. This "fresh" water supply would improve the bottomland habitat in years when the river does not connect to notches designed to capture larval fish. The diversion for the freshening flows will be from constructed depressions, or dry wells, that are pits dug into the alluvium separated from the river by the levee. As the river rises, these dry wells would fill with groundwater, thus supplying smaller amounts of water for longer periods compared to the levee notches. The freshening flow channels are approximately 3 feet wide.

An outlet channel will also be constructed to provide flow through conditions for the bottomland. The outlet channel will be 700 feet long and 30 feet wide with riprap stabilizing the channel invert and grade in two locations. Natural vegetation will also be established for bank stabilization at the river confluence. The outlet invert is at an elevation of 4,831.0 feet to maximize ponding depths and slopes to 4,829.0 feet near the river's edge based on minimizing hydraulic forces at the outlet. The flow through condition would maximize the amount of

drifting larvae that can be entrained in the bottomland during river connection.

A seep collection system will be constructed along the eastern bluff of the bottomland to transport the seep water directly to the Green River to reduce selenium concentrations within the ponds and wetlands. The seeps occur in the middle of the bluff slope and run on or near the slope surface to the ponds. The object of the seep collection system is to intercept waters with high selenium concentrations that run on the surface of the slope and to pipe them directly to the river without interaction with the ponded bottomland. The groundwater seeps at Thunder Ranch are perennial and represent a perched aquifer. A majority of the seeps are of poor water quality and have elevated selenium levels. Details of the seep collection system include: a gravel infiltration area; perforated pipe; conveyance pipe; access boxes; gates and controls; and a construction platform. To prevent floating of the conveyance pipe, anchors may be required where adequate burial is not possible. The outlet at the river will be fitted with a hinged gate to prevent high river flows from depositing sediments in the pipe and to prevent rodents from nesting in the pipe during low flow periods. A temporary construction platform may be required for heavy equipment access to the site. . In addition, 100 feet of perforated pipe (seep collection) will be constructed and piped for over 2,000 feet to drain in the river.

Suitable materials excavated from the levee notches will be utilized to construct an offset levee at the South end of the bottomland. The offset levee will be constructed at elevation 4,836 feet to provide flood protection equal to existing conditions. Acceptable material will be deposited in upland sites adjacent to the bottomlands in areas approved by Thunder Mountain Ranch. Other spoils may be deposited in upland areas adjacent to the excavation. To implement the proposed action, 9,700 cubic yards of material will be excavated; 3,600 cubic yards will be used to construct the offset levee; 260 cubic yards of rock and gravel will be imported; 224 square yards of filter fabric will be used; and approximately 6 acres will be within the construction limits The project area will be incorporated into the National Wildlife Refuge system and the easement will be managed as a component of the Colorado River Wildlife Refuge with operations based at the Ouray Wildlife Refuge near Vernal, Utah. Construction activities would be preformed by Reclamation's Provo Area Office. Construction would begin in 2004 before or after spring runoff.

Other Alternatives Considered:

Several preliminary alternatives were considered for enhancing endangered fish habitat at Thunder Ranch. These included 1) increasing the inundation frequency in the south half of the bottomland only (157.6 acres) with an ideal inundation period, 2) increasing inundation frequency over the entire bottomland (291.1 acres) with inundation occurring only with discharges greater than the 2-year flow event of 16,900 cfs. These alternatives were eliminated from further consideration because they did not maximize potential benefits to the endangered fishes.

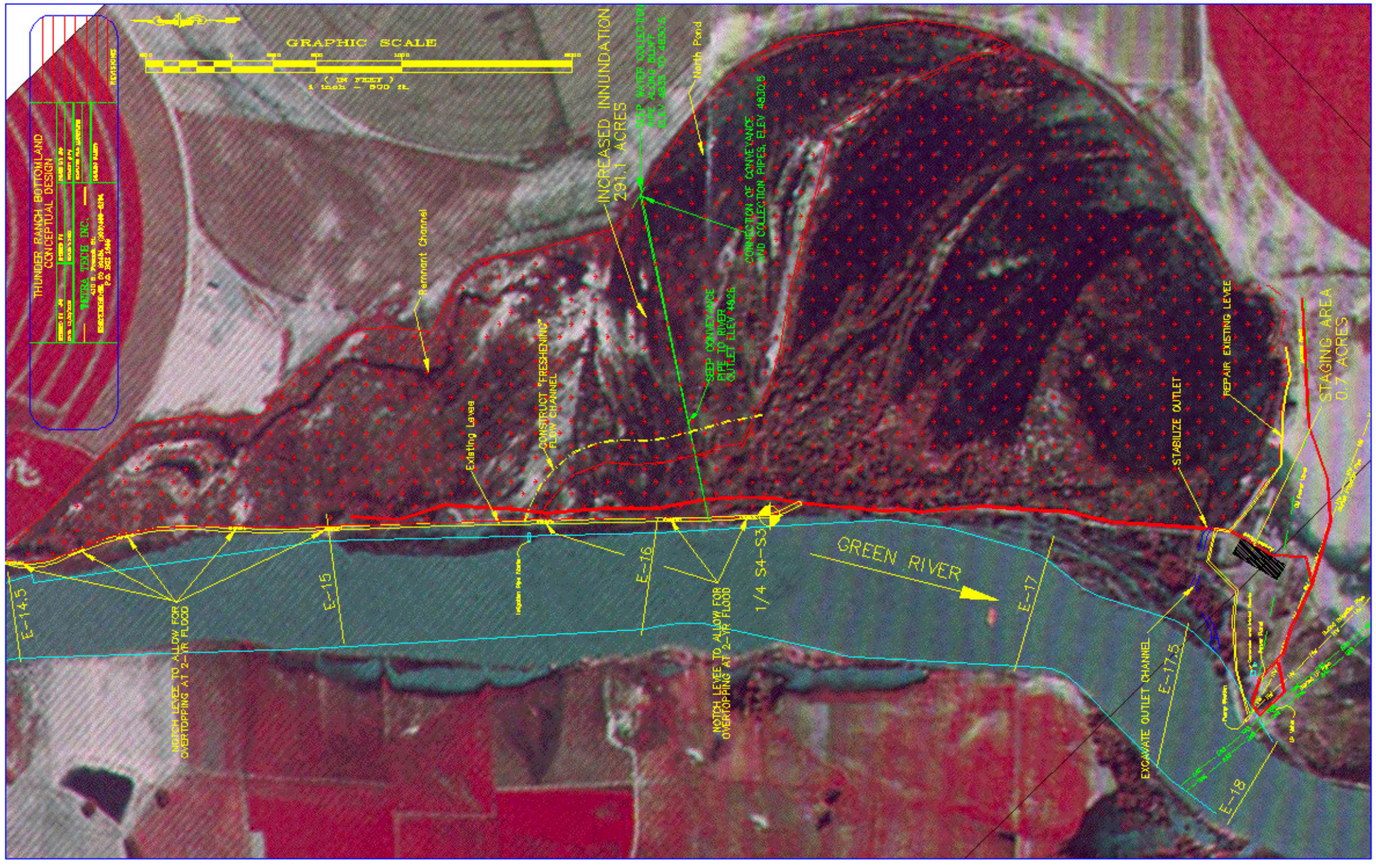

Figure 3-Proposed Plan

CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

General

This chapter discusses resources that may be affected by the proposed action of notching the levee at the Thunder Ranch Bottomlands. During the preparation of this Draft EA, information on issues and concerns was received from project-area residents and easement holders, and the U.S. Fish and Wildlife Service (see Chapter 4, Consultation and Coordination, for further details).

For each resource, the potentially affected area and/or issues are identified, existing conditions are described, and impacts expected under the No Action and Action Alternative is discussed. This chapter concludes with a summary comparison of the alternatives and a list of mitigation measures.

The project area is located in Uintah County, Utah, along the Green River, which includes Thunder Ranch. Uintah County has a population of about 25,900 (U.S. Census, 2001). Vernal, Utah is the county seat with a population of 7,714. Jensen, Utah is approximately 3 mile down river from the project area. No population estimates are available for Jensen. Uintah County was historically dominated by ranching and gilsonite mining. Irrigation systems were developed and although agriculture remains important in Uintah County today, industry, tourism and phosphate mining are Uintah County's major industries.

The low-elevation lands along the Green River are arid to semiarid. The annual precipitation in the lower elevations of the area (in years 1951 to 1980) ranged from 7.75 inches at Jensen to 6.04 inches at the city of Green River, Utah. The area has hot summers and cold winters.

The climate and geologic formations make this area conducive to salinity and drainage problems. The Mancos Shale, the most common formation in the Jensen area, is more than 5,000 feet thick. It consists of gray and yellow weathering, soft, calcareous shales of marine origin. It contains a few sandstone lenses and nodular calcareous beds (Stephens et al., 1992). The prehistoric marine-based formation is high in boron, selenium, and uranium that may be leached and transported by water. Calcareous shale contains as much as 20 percent calcium carbonate in the form of finely precipitated materials or small organically fixed particles (Pettijohn, 1957).

Streamflow and floodplain habitat of the Green River has been significantly altered by water diversions and uses, infringement by railroads and pipelines, gravel operations, highways and bridges, flood control levees, channelization, and by the operation of upstream storage reservoirs (primarily Flaming Gorge Dam).

Land Use and Recreation

Thunder Ranch totals about 2,000 acres in size. In 2003, The Recovery Program acquired an easement on 325 acres of floodplain bottomland within the Ranch to enhance endangered fish habitat on the property by creating larval nursery habitat for razorback sucker. Colorado pikeminnow are also expected to benefit from the habitat enhancement.

The bottomland is separated from the Green River by an earthen levee. Historically, portions of the bottomlands were irrigated using dry wells and pumps. Thunder Ranch currently uses the bottomland primarily as wildlife habitat for elk, turkey, and waterfowl, however some livestock grazing may occur. The Recovery Program easement allows Thunder Ranch to continue these operations, however no new developments are allowed. The bottomlands contain several ponds and wetlands supported primary from snowmelt and groundwater. Springs and seeps associated with irrigation return also contribute to the ponds and wetlands. The bottomlands are separated from the remaining portions of the Ranch by the Green River to the west, and a steep bluff to the east. The portion of the Ranch above the bottomlands is primarily used for irrigated agriculture, livestock grazing, and includes several residences and associated outbuildings.

Nine utility and pipeline easements have been recorded within or adjacent to the project area. These easements include:

1. Moon Lake Electric Association, Recorded 11-3-79 for electrical transmission or distribution line or system, Parcel 3;
2. Mid-American Pipeline Company, Recorded 10-27-99 for valve site and appurtenant rights, Parcel 5;
3. Mid-American Pipeline Company, Recorded 10-27-99 for valve site and appurtenant rights; Parcel 5;
4. Mid-American Pipeline Company, Recorded 10-27-99 for valve site and appurtenant rights; Parcel 5;
5. Questar Pipeline Company, Recorded 9-7-89 for gas pipeline and appurtenant rights; Parcel 5;
6. Questar Pipeline Company, Recorded 9-7-89 for gas pipeline and appurtenant rights; Parcel 5 and 7;
7. Chevron Inc. and Chevron Pipe Line Company, Recorded 5-28-85 for pipeline and appurtenant rights, Parcel 5;
8. MAPCO, Inc., Recorded 3-7-80 for pipeline and appurtenant rights, Parcel 7;
9. Pacific Northwest Pipeline Corporation, Recorded 8-19-55, Parcel 7;

Under both the No Action and Proposed Action, utility and pipeline easements through the Thunder Ranch bottomlands would continue to be used. The easement holders were contacted and reviewed the proposed action and have determined that it will not impact their utilities and pipelines or their ability to use these easements in the future if an offset levee were constructed to provide the current level of flood protection below the project area.

Temporary construction access would utilize existing roads to access the project area. Heavy construction equipment would be needed to notch the levee and construct the seep collection system. If soil compaction occurs from heavy equipment use, disking may be necessary to revegetate the temporary access.

Land use would not change as a result of the proposed action and surrounding landowners would continue to be susceptible to seasonal flooding when river flows rise above the existing levee.

Recreation is limited primarily to hunting as permitted by Thunder Ranch. Hunting and recreation access would continue to be controlled by Thunder Ranch as described in the easement document. Recreation resources would not be affected by the proposed action.

Vegetation

Two primary plant communities are found within the project area: the riparian community along the Green River and the bottomland ponds and wetlands.

The Thunder Ranch bottomlands can be characterized as an old abandoned river meander that has remnant depressions of the old river bed which may capture and store windblown snow in the late winter or early spring. In April and May, while the river is rising, the melting snow and spring precipitation adds to the surface water in these depressions and the ponded water surface expands. As the summer ensues, the wetlands begin to diminish through evaporative and groundwater flow through the old river channel alluvium. By late fall, the wetland ponds usually decrease to a relatively small surface water area which is densely vegetated with cattails and bulrush. The wetlands water surface area decreases throughout the summer despite being fed by seepage from the bluffs to the east. This groundwater seepage inflow to the wetlands is irrigation seepage water from the cultivated land to the east. Historical observations have indicated that in some years the ponded water in the wetlands may virtually disappear by mid-fall (Tetra Tech Inc., 1993).

Riparian Community

Vegetation alongside the Green River consists predominately of cottonwoods, tamarisk, and willow. Box elder, red-osier dogwood, horsetail, *Forestiera*, rabbitbrush, greasewood, common reed, saltgrass, sedges, and rushes are also found (Welsh et al., 1993) in the vicinity.

Bottomland Pond and Wetland Community

Dominate vegetation within the bottomland pond and wetland community includes cattails, bulrushes, rushes and sedges. Scattered willow stands and cottonwoods occur in upland areas between the ponds and wetlands. Surprisingly, tamarisk and other noxious weeds are not abundant within the bottomland community.

No Action

The No Action Alternative is predicted to have no effect on vegetation resources.

Proposed Action

The proposed action is predicted to have no affect the riparian community along the Green River. Increasing the flood frequency would likely have a beneficial effect on the bottomland pond and wetland community. Increased flood frequency is predicted to increase the amount and duration of flooded bottomlands resulting in increased wetland vegetation (cattails, bulrush, rushes, sedges, etc.). One possible negative impact would be that allowing the Green River to flow through the site could expand the range of tamarisk and other noxious weeds within the bottomland pond and wetland community. This would be minimized with the implementation of a noxious weed control program managed by the National Wildlife Refuge consistent with current refuge guidelines.

In consultation with the U.S. Army Corps of Engineers (Corps), the levee notching would require authorization under Section 404 of the Clean Water Act. Because fill material will be placed below the ordinary high water line, the activity would be within the jurisdiction of the Clean Water Act. Because the desired outcome is to provide seasonal connectivity between the pond and the Green River, the exposed sides of the outflow notch would need protection. The proposed action would protect the outflow notch with riprap material. In addition, construction of the seep collection system may require temporary discharges within jurisdictional wetlands to provide construction access. The installation of collection and delivery pipe within the wetlands and below the ordinary high water line would also be considered a discharge into "Waters of the United States". Reclamation has requested authorization from the Corps under Regional General Permit No. 57, Projects Beneficial to the Recovery of the Upper Colorado Endangered Fish Species. This proposed action would be beneficial for jurisdictional wetlands by providing additional water to support the ponds and wetlands and by improving water quality with seasonal flushing and dilution.

Fish and Wildlife Resources

Fisheries

In the Green River near Thunder Ranch, there are 27 fish species; of which 16 are exotic species that dominate the system (see Table 1). There are 11 native fish species. Four of these species are federally listed as endangered. Only seven species are considered abundant or common, of which only two (speckled dace and bluehead sucker) are native fish species. The mountain whitefish, mountain sucker, and mottled sculpin are native species considered rare or incidental in the Green River within the study area, but these species have not been given special status.

Several recent studies in backwater sites downstream of the project area have documented selenium in invertebrates and fish. Invertebrates are a common fish food. Levels of selenium found in plankton in Stewart Lake approximately 4 river miles downstream of Thunder Ranch,

Table 1-Nonnative and Native Fish Species in the Project Area

Abundant	Common	Rare—Incidental	Special Status
Nonnative Fish Species			
Carp	Fathead minnow	Rainbow trout	None
Red shiner	Channel catfish	Brown trout	
	Black bullhead	Northern pike	
		Longnose dace	
		Creek chub	
		Sand shiner	
		White sucker	
		Utah sucker	
		Green sunfish	
		Smallmouth bass	
		Walleye	
Native Fish Species			
None	Speckled dace	Mountain whitefish	Razorback sucker
	Bluehead sucker	Mountain sucker	Humpback chub
		Mottled sculpin	Bonytail
		Flannelmouth sucker	Colorado pikeminnow
		Roundtail chub	

were documented at 10 ppb dry weight. Extensive sampling in the Stewart Lake Waterfowl Management Area of the Green River also documented high levels of selenium contamination in fish. Geometric mean concentration of selenium ranged from 9.1 to as high as 47.9 ppb (Interior, 1997).

The normal background level of selenium in fish tissue nationwide is 1.7 ppb. Tissue levels from Stewart Lake and the Green River near Stewart Lake routinely exceed the threshold of 4 ppm for whole body samples known to cause impaired fish reproduction (Lemly, 1993). Conditions at the project site are predicted to be similar to those at Stewart Lake, but on a smaller scale. Irrigation return flows into the project area are smaller and drain a much smaller area, however, seeps and springs associated with these return flows, were reported have high selenium concentrations (Waddall, 2001).

Avian Species

There are at least 209 species of birds potentially inhabiting the project area and vicinity. Approximately 43 percent of the total species in the study area are neotropical migrants. These migrants are the subject of increasing concern as their numbers continue to decline as a result of habitat loss and degradation, both in their northern breeding habitats as well as their southern wintering habitats in Mexico and Central and South America. Additionally, these migrants face mortality from hazards encountered during migration, such as power lines, buildings, predators, and severe weather.

Large numbers of waterfowl use the area, primarily during spring and fall migration periods. The Uintah Basin forms part of the Central Flyway and serves as an important stopover for waterfowl, with Stewart Lake a focal point for waterfowl use. Waterfowl that nest in the Unitah basin include American coot, mallard, and gadwall. Elevated tissue levels of selenium have been documented in waterfowl collected from the Stewart Lake Waterfowl Management Area, and evidence of reproductive impairment in the form of embryo and chick deformities, as well as mortalities, has been documented (Stephens et al., 1988, 1992; Waddell and Wiens, 1994; and Hamilton, 1995). The project area is used by migrating and nesting Canada geese, with rare appearances by snow geese and blue geese. Mallards, gadwalls, pintails, teals, shovelers, and mergansers are common migratory inhabitants along the middle Green River. Widgeon, redhead, canvasback, scaup, goldeneye, and ruddy ducks are occasionally found in the area (Interior, 1997).

Red-tailed hawks, northern harriers, golden eagles, pheasants, plovers, sandpipers, snipe, gulls and coots use habitats associated with or within the vicinity of the Thunder Ranch bottomlands. Great blue heron nest nearby, and white pelicans are occasional seasonal migrants. Migrating whooping cranes, peregrine falcons, and wintering bald eagles are found in the vicinity of the project area.

Mammals

At least 46 species of mammals inhabit the project area and vicinity. Most mammals use the Thunder Ranch bottomlands and adjacent Green River. Some mammals use the adjacent agricultural land. Mammals occurring within the project area include but are not limited to mule deer, elk, and beaver. Given the documented evidence of selenium toxicity in water birds and fish species near the project area, it is possible that mammals in the area would exhibit selenium toxicity. However, no studies of selenium toxicity in mammals in the project area or vicinity have been conducted.

Amphibians and Reptiles

Seventeen species of amphibians and reptiles use the study area and vicinity (Interior, 1997). Little is known about site-specific population numbers and species distributions, however. As with mammals, no research has been done on amphibians and reptiles in the project area to determine tissue levels of selenium. Those species that forage in the contaminated wetlands are likely to have elevated levels of selenium.

No Action

Under the no action alternative, avian, mammals and amphibians and reptiles would continue to be exposed to elevated selenium concentrations associated with the irrigation return flows into the Thunder Ranch wetlands and ponds. Fish species would continue to be excluded from the wetlands and ponds except during flow events that exceed the 10-year flow event (>greater than 30,000 cfs). During flows greater than the 10 year event, fish species would become entrained in the ponds and wetlands and exposed to elevated selenium levels.

Proposed Action

Under the proposed action, wildlife would be impacted by increased noise and activity during construction, however this would be short-term. Riparian and wetland dependent wildlife species would benefit from the increased freshening flows into the ponds and wetlands. Increased flood frequency and freshing flows would aid in reducing selenium concentrations in the Thunder Ranch bottomlands, which in turn would likely reduce tissue levels of selenium in avian, mammals and amphibians and reptiles that currently use the Thunder Ranch bottomland. Construction of the seep collection system would assist in reducing selenium levels by collecting irrigation runoff and delivering it directly to the Green River for dilution.

Fish species that currently have to access to the ponds and wetlands only at the 10-year flood frequency (>30,000 cfs) or greater would also benefit with greater river connectivity. Fish species entrained in the Thunder Ranch bottomlands are exposed to elevated selenium levels without the ability to leave the bottomland ponds and wetlands. The proposed action would allow entrained fish to leave the ponds and wetlands with greater frequency, thus reducing bioaccumulations of selenium in larger fish. It should be noted, however, that notching the levee would also increase the number of fishes exposed to selenium levels greater than those in the Green River. Effects to endangered fishes are discussed in greater detail in the next section.

Threatened and Endangered Species

Informal consultation with the U.S. Fish and Wildlife Service identified 13 federally listed threatened or endangered species and four candidate species that may occur within the project area and vicinity. These include: 1) Colorado pikeminnow (*Ptychocheilus lucius*), 2) razorback sucker (*Xyrauchen texanus*), 3) humpback chub (*Gila cypha*), 4) bonytail (*Gila elegans*), 5) bald

eagle (*Haliaeetus leucocephalus*), 6) Canada lynx (*Lynx canadensis*), 8) Mexican spotted owl (*Stix occidentalis lucida*), 9) Black-footed ferret(*Mustela nigripes*), , 10) Clay Reed-Mustard (*Schoenocrambe argillacea*), 11) Uinta Basin hookless cactus (*Sclerocactus glaucus*), 12) Ute Ladies's Tresses (*Spiranthes diluvialis*, and 13) Shrubbry-Reed-mustard (*Schoenocrambe suffrutescens*). Western yellow-billed Cuckoo (*Coccyzus americanus* occidentalis), Graham beardtongue (*Penstemon grahamii*), Horseshoe milkvetch (*Astragalus equisolensis*), and White River Beardtongue (*Penstemon scariousus var. albifluvis*) are candidate plants species that may also occur within the project area.

For purposes of Section 7 Compliance with the Endangered Species Act, this EA also serves as the biological assessment for federally listed species.

Suitable habitat does not occur within the project area for the following threatened and endangered species. Canada lynx, black-footed ferret, Mexican spotted owl, and shrubby reed-mustard. In addition, suitable habitat does not occur within the project area for candidate species: Graham beardtongue, horseshoe milkvetch, and White River beardtongue. Therefore, these were eliminated from further analysis. Species evaluated in detail are as follows:

Endangered Fishes

Razorback Sucker

The razorback sucker was once one of the most abundant and widely distributed fish in the mainstem rivers of the Colorado River Basin (Jordan and Evermann, 1896; Minckley, 1973). A relatively large stock of razorback suckers remains in Lake Mohave (Minckley et al., 1991). However, the formerly large Lower Colorado River Basin populations have been extirpated from all natural riverine environments, and recruitment is nearly nonexistent in the remnant stocks (Minckley et al., 1991). In the Upper Colorado River Basin, razorback suckers persist in the lower Yampa and Green Rivers, mainstem Colorado River, and lower San Juan River (Minckley et al., 1991). The largest extent of riverine populations occurs in the upper Green River basin, particularly between "Razorback Bar" and Ashley Creek and includes portion of the Green River within the project area, but it consists of only about 500 fish (Interior, 1997). The Service (1994b) designated 17 reached of the Colorado River system as critical habitat for the razorback sucker. In the Upper Basin, critical habitat designations included portions of the Green, Yampa, Duchesne, Colorado, White, Gunnison, and San Juan Rivers and their 100-year floodplain. The project area is within designated critical habitat.

In riverine habitats, razorback suckers spawn in the spring with rising water levels and increasing temperatures. The fish move into flooded areas such as Ashley Creek and Stewart Lake in early spring, making spawning migrations to specific locations as they become reproductively active. Spawning occurs over rocky runs and gravel bars (Karp and Tyus, 1990).

In non-reproductive periods, adult razorback suckers occupy a variety of habitat types. These include impounded and riverine areas and habitats, including eddies, backwaters, gravel pits, flooded bottoms and flooded mouths of tributary streams, slow runs, sandy riffles, and others (Minckley et al., 1991). Summer habitat use includes deeper eddies, backwaters, holes and mid-channel sandbars (Karp and Tyus, 1990; Minckley et al., 1991).

Habitat used by juvenile razorback suckers has not been fully evaluated because of the low number of young fish in the river system. However, most studies agree that the larvae prefer shallow, littoral zones for a few weeks after hatching, and then disperse to deeper water areas (Minckley et al., 1991). Laboratory studies indicate that in a riverine environment, the larvae enter stream drift and are transported downstream (Paulin et al., 1990).

The State of Utah's integrated stocking plan for razorback sucker includes annual stockings of 9,930 age 2 (300 mm total length) razorback sucker/per year in the Middle Green River (River Miles 302-249) (Nesler et al., 2003) for a six year period. This includes the Green River within the project area.

Colorado Pikeminnow

Natural populations of Colorado pikeminnow are restricted to the Upper Colorado River Basin in Colorado, Utah, and New Mexico. The species is most abundant in the Green River from the mouth of the Yampa River to its confluence with the Colorado River (Service, 1991). The Service (1994b) designated six reaches of the Colorado River system as critical habitat for the Colorado pikeminnow. Critical habitat is designated in portions of the Colorado, Green, Yampa, White, and San Juan Rivers in the Upper Basin. The project area is within designated critical habitat.

During winter, adult Colorado pikeminnow in the Yampa River use backwaters, runs, and eddies but are most common in shallow, ice-covered shoreline areas (Wick and Hawkins, 1989). In spring and early summer, adult Colorado pikeminnow use shorelines and lowlands inundated during typical spring flooding. This lowland inundation is important for health and reproductive conditioning (Tyus, 1990). Use of these habitats may offset winter stress and replenish energy stores needed for long migrations and spawning. Adults have been reported to migrate up to 200 miles upstream or downstream to reach spawning areas. Migration is an important component in the reproductive cycle of Colorado pikeminnow, and Tyus (1990) reported that migration cues, such as high spring flows, increasing river temperatures, and possible chemical inputs from flooded lands and springs, are important to successful reproduction.

Colorado pikeminnow spawn in whitewater canyons in the Yampa and Green Rivers. Reproduction is associated with declining flows in June, July, or August and average water temperatures ranging from 22 to 25 ^{o}C. After spawning, adults use a variety of habitats, including eddies, backwaters, and shorelines.

In the Green River basin, larval fish emerge from spawning substrates and enter the stream drift as young fry. The fish are then actively or passively transported downstream for about 6 days, traveling up to 100 miles to reach nursery areas (Tyus and Haines, 1991). These areas are productive habitats that consist of short-lived shoreline backwater areas that develop as spring flows decline. Such habitat is associated with lower gradient reaches.

Humpback Chub

The Service designated seven reaches of the Colorado River system as critical habitat for the humpback chub (Service, 1994b). The closest reach to the project area is the section of the Green River from the confluence of the Yampa River downstream to the boundary of the Dinosaur National Monument (approximately 2 miles upstream from the project area).

The present distribution of humpback chub includes the lower 8 miles of the Little Colorado River, Arizona; the Colorado River in Marble and Grand Canyons, Arizona; Cataract and Westwater Canyons in Utah; Black Rocks Canyon in Colorado; Green River in Desolation and Gray Canyons, Utah; and in the Yampa and Green Rivers in Dinosaur National Monument, Colorado and Utah (Service, 1990b), where it is considered rare. A spawning population remains in the Yampa Canyon in Dinosaur National Monument near the confluence of the Green and Yampa Rivers (Karp and Tyus, 1990).

Populations of humback chub are found in river canyons, where they use a variety of habitats including pools, riffles, and eddies. Fish are found associated with boulder-strewn canyons, travertine dams, pools, and eddies (Holden and Stalnaker, 1975); Kaeding and Zimmerman, 1983; Kaeding et al., 1990). This diversity in habitat use suggests that the adult fish are adapted to a variety of habitats, and studies of tagged fish indicate that they move between habitats, probably in response to seasonal habitat changes and life needs (Kaeding and Zimmerman, 1983; Karp and Tyus, 1990).

Humpback chub in reproductive conditions are usually captured in May, June, or July, depending on location. Little is know about their specific spawning requirements other than the fish spawn soon after the highest spring flows when water temperatures approach 20 ^{o}C (Karp and Tyus, 1990, Service 1990b). In Kaeding and Zimmerman (1983), the importance of spring flows and proper temperature for humpback chub is stressed. They also felt that flow reductions and low water temperatures in the Grand Canyon were factors curtailing successful spawning and increasing the humpback chub competition with other species.

Bonytail

The bonytail is classified as endangered by the Service. It is a very rare species of fish. Since few individuals have been found in the last decade, it is believed that recruitment is nonexistent or very low. It is feared that wild populations of bonytail may soon become extinct (extirpated) without recruitment of young fish. The recovery priority for the bonytail indicates a high degree

of threat with a low recovery potential under current habitat conditions (Maddux et al., 1993). It is apparent bonytail chub no longer exist in the Green River near the project area.

Six critical habitat reaches for the bonytail have been designated (Service, 1994b). The nearest critical habitat to the project area ranges from the confluence of the Green River with the Yampa River downstream to the Dinosaur National Monument Boundary (approximately 2 miles upstream from the project area),

The last known riverine area where bonytail were common was the Green River in Dinosaur National Monument where Vanicek (1967) and Holden and Stalnaker (1970) collected 91 individuals during 1962 to 1966. No bonytail have been caught in this portion of the Green River since captures in 1968 to 1970 by Holden and Stalnaker (1975), nor were any bonytail captured in this reach during surveys from 1974 to 1976 (Seethaler et al., 1979), or 1981 to 1983 (Service, 1990).

The bonytail is a species adapted to mainstem rivers, where it has been observed in pools and eddies (Varicek, 1967; Minckley, 1973). Vanicek and Kramer (1969) reported spawning occurred in June and July at water temperatures of about 18 ^{o}C. Although wild bonytail are old fish, they are still capable of successful reproduction. When placed in ponds, they produced large numbers of young (Service, 1990a). Although habitats required for bonytail are not well known, the limited data suggests that flooded, ponded, or inundated riverine habitats may be suitable for adults, especially in the absence of competing nonnative fishes (Service, 1990a).

No Action

Under the No Action Alternative, endangered fish would not benefit from increased access to the Thunder Ranch bottomland site. The existing levee would remain intact and only flows greater than 30,000 cfs (> the 10 years flow event) would connect the bottomlands with the Green River. Specifically, on the 10 year flow event, larval, sub-adult and adult razorback sucker and sub-adult and adult Colorado pikeminnow would have access to the backwater site. As flows reduce after spring runoff, sub-adult and adult fish would leave the backwater site. Larval razorback sucker would remain within the backwater site, isolated from the Green River until the next 10-year flow event. It is likely that most if not all razorback sucker larvae would experience high mortality losses because as water levels in the backwater decreases, oxygen levels would be depleted and selenium levels would continue to elevate as a result of irrigation runoff. The No Action Alternative would have no effect on baseline populations of razorback sucker, Colorado pikeminnow, humpback chub, and bonytail.

Proposed Action

Under the proposed action, the 1.1 year flow event (>12,000 cfs) sub-adult and adult razorback sucker and Colorado pikeminnow would benefit while connection existed between the Thunder Ranch bottomlands and the Green River. As a portion of the Green River flows through the bottomlands, additional habitat would be available to sub-adult and adult fish. As flows begin to

reduce, sub-adult and adult fish would leave the backwater site and return to the Green River. River flows would dilute selenium concentrations during the flow through period, and razorback sucker and Colorado pikeminnow would not be exposed to elevated selenium levels in the bottomland ponds and wetlands.

Larval razorback sucker would benefit from the increased access to the Thunder Ranch bottomland ponds and wetlands, which would serve as functional nursery habitat. Larval razorback sucker could remain in the protected bottomland nursery habitat for the needed two year period for growth before returning to the Green River during spring runoff greater than the 1.1-year frequency (>12,000 cfs). The bottomland site would provided warmer water temperatures than the Green River, provide adequate food supplies, and protect the larval fish from predation. The "Razorback Bar" located upstream would be the primary source for drifting larval razorback sucker.

Larval razorback sucker however may be exposed to elevated selenium levels during periods of drought when the 1.1 year flow event is not met and connection between the Green River, and the bottomland ponds and wetlands is not established. During these periods, snowmelt, rain, groundwater and irrigation return would be the only water source for the ponds and wetlands. During these periods, selenium levels would likely elevated, and may expose larval fish to toxic selenium levels. The potential for this to occur would be reduced by the installation of a seep collection system as described in the proposed action. The seep collection system would collect a portion of the irrigation runoff and drain it directly to the Green River for dilution. The dry wells and refreshing channels would also provide additional flows to the ponds and wetlands to assist in selenium dilutions with flows less than the 1.1 year frequency. In addition, with flows greater than the 1.1 year flow event (<12,000 cfs) would dilute and flush selenium concentrations in the bottomland ponds and wetlands.

Because the proposed action is predicted to provide additional access to sub-adult and adult razorback sucker and Colorado pikeminnow during periods when selenium concentration are diluted and not a concern, the proposed action may affect, but is not likely to adversely affect, Colorado pikeminnow, and sub-adult and adult razorback sucker. Because the proposed action may increase larval razorback sucker exposure to elevated selenium levels during extended drought periods, the proposed action may affect, likely to adversely affect, larval razorback sucker. Incidental take coverage would be needed to address these potential losses. It should be noted however, that overall, the proposed action would be beneficial to larval razorback sucker by increasing available nursery habitat, and increasing potential razorback sucker recruitment in the Green River and assisting in razorback sucker recovery.

Bonytail and humpback chub are primarily restricted to habitats upstream of the project area within Dinosaur National Monument. Humpback chub and bonytail have not been documented within the project area; therefore the proposed action would have no effect on bonytail and humpback chub.

The proposed action may affect, not likely to adversely affect (Beneficial Effect), Colorado pikeminnow and razorback sucker; and would not adversely modify their designated critical habitat. The proposed action would have no effect on bonytail or humpback chub.

Bald Eagle

The bald eagle is a federally listed threatened species in the United States. Bald eagles are commonly seen in the project area, and the nearby Stewart Lake Waterfowl Management Area and the Ouray National Wildlife Refuge in the winter. Stephens et al. (1992) documented the presence of bald eagles in the Stewart Lake Waterfowl Management Area during 1988 and 1989 nesting surveys.

Wintering bald eagles are associated with unfrozen lakes, rivers, and wetlands. Prey density, suitable perch and roost sites, weather conditions, and freedom from human disturbance determine the location of wintering eagle concentrations (Ohmart and Sell, 1980). Eagle numbers normally vary considerably at particular wintering areas. Wintering bald eagles on the project area have not been observed but are likely to perch in large cottonwood trees.

The trait of feeding on dead or dying waterfowl may be an important factor in the project area. However, ice cover restricts prey availability during winter. Data regarding various trace elements in prey species within the project area is limited to a Service investigation in 1993 (Service, 2001). The Service collected 9 American coot (*Fulcia Americana*) eggs from the Thunder Ranch bottomlands. Selenium concentrations in American coot embryos ranged from 2.56 to 4.92 µg/g dry weight. Selenium concentrations in coot embryos were not substantially elevated; however, one embryo had a deformed bill. However, selenium concentrations in aquatic macro-invertebrates collected during the 1993 evaluation were at levels of concern (6.41 to 7.22 µg/g dry weight) (Service, 2001). For birds collected at Stewart Lake, selenium levels in tissues of waterfowl exceed 6 ppm, the food toxicity level thought to result in reproductive impairment in consumer organisms (Interior, 1997).

No Action

The No Action alternative would have no effect on the bald eagles within the project area.

Proposed Action

Under the proposed action, increased seasonal flows into the bottomlands from the Green River, freshening flows, and construction of the seep collection system would aide in reducing bottomland selenium sources and concentrations. This in turn, would likely result in reduced selenium concentrations in bald eagle prey species. This effect would be beneficial to the bald eagle. Short-term impacts could occur if construction activities occur when the eagle was present in the area during winter. The presence of people and equipment during construction activities would likely temporarily displace eagles to nearby riparian of pond areas. Wintering

habitat for bald eagles is not limiting in the vicinity of the project area. Therefore, the proposed action may affect, but is not likely to adversely affect, bald eagles within the project area.

Western Yellow-billed Cuckoo

The Western Yellow-billed cuckoo is as a Federal candidate species. The taxonomy of yellow-billed cuckoo subspecies has had considerable debate. Most authors have recognized both an eastern and western subspecies. Only the western yellow-billed cuckoo occurs in Utah. Its historic range included all states west of the Rocky Mountains and extended into southern British Columbia at the northern extent and into the northwestern states of Mexico at the southern limits. Estimates of the number of current breeding pairs range widely; however, it is apparent that the cuckoos' population and range have largely diminished since the subspecies was described in 1877. Currently, the range of the cuckoo is limited to dusjunct fragments of riparian habitats from northern Utah, western Colorado, southwestern Wyoming, and southeastern Idaho southward into northwestern Mexico and westward into southern Nevada and California (Parrish et al., 1999). Cuckoos are long-range migrants that winter in northern South America in tropical deciduous and evergreen forests.

Historically, cuckoos were probably common to uncommon summer residents in Utah and across the Great Basin. The current distribution of yellow-billed cuckoos in Utah is poorly understood, though they appear to be an extremely rate breeder in lowland riparian habitats statewide (Parrish et al., 1999).

Yellow-billed cuckoos are one of the latest migrants to arrive and breed in Utah. They arrive in extremely late May or early June and breed in late June through July. Cuckoos typically begin their southerly migration in late August or early September. Yellow-billed cuckoos feed almost entirely on large insects that they glean from tree and shrub foliage (Parrish et al., 1999).

Nesting habitat is classified as dense lowland riparian characterized by a dense sub-canopy or shrub layer (regenerating canopy trees, willows, or other riparian shrubs) with 100 meters of water. Overstory in these habitats may be either large, gallery-forming trees (10-27 meters) or developing trees (3-10 m), usually cottonwoods. Nesting habitats are found at low to mid-elevations (2,500-6,000 feet) in Utah. The nest is a loosely arranged platform of twigs lined with softer materials such as grass, rootlets, and dried leaves. Females lay 1-8 eggs (usually 3) over a period of 9-11 days, Young are brooded by both adults for 7-8 days before leaving the nest. Young climb on branches for about 2 weeks after leaving the nest until they are capable of flight. It is not know whether cuckoos have more than one brood per season in Utah, but multiple brooding has been recorded in California (Utah Division of Wildlife, Parrish et al., 1999). Yellow-billed cuckoo nesting behavior may be closely tied to food abundance. In years of low food abundance, cuckoos may forego nesting; in years when the food supply is abundant, cuckoos may lay a large number of eggs and even parasitize the nests of other species (Nolan and Thompson, 1975). Cuckoos are rarely hosts to brown-headed cowbirds.

Yellow-billed cuckoos are considered a riparian obligate and are usually found in large tracts of cottonwood-willow habitats with dense sub-canopies.

No Action

The no action alternative would have no affect on the western yellow-billed cuckoo.

Proposed Action

The presents or absent of western yellow-billed cuckoo has not been determined. Marginal habitat occurs within the project area and it is likely that migrating cuckoos may use the project area for foraging. The project area lacks the preferred dense cottonwood overstory, but dense understory is abundant in the project area. The proposed action would occur outside of the normal nesting season and would not affect cuckoo nesting. Migrating cuckoos may avoid the project area during construction; however, migrating habitats are common in the vicinity of the project area.

Yellow-billed cuckoo are predicted to benefit from the proposed action in the long-term with increased habitat due to seasonal flooding and by reduced selenium levels in bottomland invertebrates. Therefore, the proposed action is predicted to not likely jeopardize the continued existence of the Federal candidate western yellow-billed cuckoo.

Clay Reed-Mustard

The Utah Natural Heritage Program ranks this plant species as G1, critically imperiled globally because of extreme rarity (five or fewer occurrences or very few remaining individuals) or because of some factor of its biology, making it especially vulnerable to extinction (Forest Service et al., 1991). It is classified as a federally endangered species.

The clay reed-mustard is an endemic species, known only from the vicinity of Big Pack Mountain at the flank of the east Tavaputs Plateau (Goodrich and Neese, 1986). The Forest Service et al. (1991) indicate that it is endemic to the Bookcliffs in Uintah County, Utah.

This species inhabits the mixed desert shrub community of shadscale, Indian ricegrass, and pygmy sagebrush species on the lower Uinta and upper Green River shale formations at elevations of 5,000 to 5,650 feet, blooming in May to early June (Forest Service et al., 1991). It is unlikely that this species occurs in the project area.

No Action

The No Action Alternative would have no effect on clay reed-mustard.

Proposed Action

Suitable habitat for this species does not exist in the project area. Therefore, the proposed action would have no effect on clay reed-mustard.

Uinta Basin Hookless Cactus

The Uinta Basin hookless cactus is listed as threatened. This species is threatened by commercial exploitation and industrial development. This species occurs in Duchesne and Uintah Counties, Utah and Delta County, Colorado (Welsh, 1979).

The cactus occurs in gravelly soils on hills and mesa in the desert shrub community at elevations from 4,000 to 6,000 feet. It could occur in upland areas adjacent to the project area, but no activities are scheduled for these upland sites.

No Action

The No Action alternative would have no effect on Uinta Basin hookless cactus.

Proposed Action

No suitable habitat occurs within the project area. Adjacent upland habitats that may provide suitable habitats will not be affected by the proposed action. Therefore, the proposed action would have no effect on Uinta Basin hookless cactus.

Ute Ladies'-Tresses

The Ute ladies'-tresses orchid was federally listed as a threatened species on January 17, 1992. The Ute ladies'-tresses orchid was never common, occurring over a wide range in small scattered populations. It depends on natural stream processes, and probably natural ungulate (hoofed animal) population levels and behavior, to create and maintain habitat. Both of these environmental features have been radically modified in recent decades. Orchid habitat is grazed heavily by domestic livestock, while native ungulates have been driven from winter range by agricultural and urban development. The intensity and timing of grazing have shifted significantly from that of the native ungulates. Dams, reservoirs, and diversions have altered natural river hydrographs. Streams have been channelized, streambanks riprapped, and flood plains developed for agriculture and urban uses. Increasing recreational use of streams and riparian areas has increased the vulnerability of the orchid to trampling, soil compaction, and changes in stream hydrology. Invasion of exotic species such as whitetop (*Cardaria spp.*), reed canarygrass (*Phalaris arundinaceae*), purple loosestrife (*Lythrum salicaria*), Canada thistle (*Cirirsium arvense*), and Russian olive (*Eleagnus angustifolia*) are serious threats to this orchid.

These factors, coupled with a low reproductive rate and the tendency to occur in small isolated populations, increase vulnerability to localized catastrophic events, resulting in extirpation of individual populations. The apparent tendency for populations of Ute ladies'-tresses to fluctuate dramatically from one year to the next makes it difficult to assess the population status and distribution. Due to the difficulty in finding individual plants, monitoring is typically done by counting the number of flowering plants.

The orchid occurs primarily in areas where the vegetation is relatively open and not overly dense or overgrown (Coyner, 1989, 1990; Jennings, 1990). A few populations in eastern Utah and Colorado are found in riparian woodlands, but the orchid seems generally intolerant of shade, preferring open, grass, and forbs-dominated sites instead. Plants usually occur as small scattered groups and occupy relatively small areas within the riparian system (Stone, 1993). Once established, Riedel (1992) reported the orchid appears to be tolerant of somewhat drier conditions, as exemplified by conditions in Dinosaur National Monument, but loses vigor and may gradually die out if the groundwater table begins to consistently drop during late summer.

The orchid appears to be well adapted to disturbances cause by water movement through flood plains over time (Service, 1995). It often grows on point bars and other recently crated or "raw" riparian habitat. It tolerates flooding and flood disturbance. For example, point bars and backwater areas (old oxbows, side channels, etc.) are often flooded for several months in the spring during snowmelt.

Populations of Ute ladies'-tresses occur in three general areas of the interior Western United States. Of concern to the Middle Green River is the central population of plants located in riparian meadows or in understory wetland meadows of riparian woodlands in the Colorado River drainage of eastern Utah. This species occurs on all the major drainages to the Green River along the south slope of the Uinta Mountains in the northern portion of the Uinta basin. The estimated population size for the mainstem Green River is 1,600. Populations have been documented in the vicinity of the project area.

No Action

The No Action Alternative would have no effect on Ute ladies'-tresses.

Proposed Action

Suitable habitat occurs within the project area for Ute ladies'-tresses. Construction activities could adversely affect the plants. No plants occur on the existing levee where the proposed seven notches and the outlet structure would be constructed. A survey for plants along the proposed seep collection system by Reclamation would occur prior to its construction. While no plants have been located thus far in the area, it is possible that they occur. If any plants are found, the Service would be consulted and the construction plan revised to protect the plant and its habitat. Overall, restoring the flood frequency of the bottomland site to resemble a more natural hydrograph would be a benefit Ute ladies'tresses and likely create additional suitable

habitat. Therefore, the proposed action may affect, but is not likely to adversely affect Ute ladies'-tresses.

Table 2-Summary of Effects to Threatened, Endangered and Candidate Species in the Project Area

Species	Scientific Name	Project Effect(s)	Status
Razorback Sucker	*Xyrauchen texanus*	May affect, likely to adverse effect (w/ benefical effects)	Endangered
Colorado Pikeminnow	*Ptychocheilus lucius*	May affect, not likely to adversely affect (benefical effect)	Endangered
Humpback Chub	*Gila cypha*	No effect	Endangered
Bonytail	*Gila elegans*	No effect	Endangered
Bald Eagle	*Haliaeetus leucocephalus*	May affect, not likely to adversely affect (beneficial effect)	Threatened
Canada Lynx	*Lynx canadensis*	No effect	Threatened
Mexican Spotted Owl	*Strix occidentalis lucida*	No effect	Threatened
Black-Footed Ferret	*Mustela nigripes*	No effect	Endangered
Western Yellow-billed Cuckoo	*Coccyzus americanus occidentalis*	Not likely to jeopardize the continued existence of	Candidate
Clay Reed-Mustard	*Schoenocrambe argillacea*	No effect	Threatened
Shrubby Reed-Mustard	*Schoencrambe suffrutescens*	No effect	Endangered
Uinta Basin Hookless Cactus	*Sclerocactus glaucus*	No effect	Threatened
Ute Ladies'-Tresses	*Spiranthes diluvialis*	May affect, not likely to adversely affect (Beneficial Effect)	Threatened
Graham Beardtongue	*Penstemon grahamii*	No effect	Candidate
Horseshoe Milkvetch	*Astragalus equisolensis*	No effect	Candidate
White River Beardtongue	*Penstemon scariosus* var. *albifluvis*	No effect	Candidate

Water Quality

Elevated salinity and selenium levels occurring in backwaters, lakes and ponds along the Middle Green River have resulted in the implementation of federal programs to address water quality issues. Reclamation and the Natural Resource Conservation Service have implemented salinity control projects in the Jensen Unit to reduce salt loads in the Green River mainstem as part of the Colorado River Salinity Control Program. Projects have been limited primarily to the lining of irrigation canals, piping laterals, and on-farm efficiency improvements.

Selenium Levels

The National Irrigation Water Quality Program evaluated selenium levels in selected backwater sites along the Green River. Elevated selenium levels were detected from samples collected from Stewart Lake (approximately 5 miles downstream of the project area) (Interior, 1997). Water quality data collected in the Green River show good water quality with selenium levels less than 2 part per billion, however selenium concentrations in Stewart Lake were high (~21 µg/L near the drains and 5 µg/L near the outlet channel (Interior, 1997) .
Data from the Thunder Ranch bottomland ponds and wetlands is limited. In 1993-94, the U.S. Geological Survey sampled selected sites within the Thunder Ranch bottomlands. Selenium levels were significantly higher in the seeps and sediments than from water samples collected from the ponds and wetlands. In addition, selenium levels were higher in the northeastern portion of the bottomlands. In 1993, samples showed selenium levels of 5 µg/L from irrigation runoff feeding springs and seeps and 1 µg/L in the marsh. The 1994 samples were more intensive and collected water, sediment, and biota samples from springs and seeps, marshes, and points along the Green River. Figure 2 shows high selenium concentrations in springs and seeps near the north pond. Waddall (2001) sampled six selected sites within the Thunder Ranch bottomlands. Table 3 compares selenium concentrations measured in 1993-94 with samples collected in 2001. The major concern identified was seepage presumably as a result of irrigation on adjacent fields.

A quantifiable assessment of these sites regarding selenium hazards could not be made during the sampling period. Of particular concern during the assessment were selenium concentrations from seeps in the north pond area (Figure 2). Irrigation practices have changed significantly since the 2001 sampling period. Thunder Ranch was recently purchased and the new owners installed side-roll sprinkler systems and cultivated crop types reducing the amount of irrigation runoff. The amount of reduced runoff that contributes to the springs and seeps has not been quantified. However, reduced irrigation runoff is expected to assist in lower selenium concentrations into the bottomland ponds and wetlands. No other features were noted of serious concern from a contaminant perspective except a natural gas pipeline and power pole with transformers near an irrigation pump.

No Action

Under the No Action Alternative, selenium levels in the Thunder Ranch bottomland would likely continue to remain high. No remediation actions would be implemented to reduce selenium levels.

Proposed Action

Under the proposed action, a seep collection system would collect a portion of the springs and seeps (approximately 100 feet of perforated pipe) using perforated pipe, and transport them directly to the Green River. The Green River would dilute the selenium concentrations to an undetectable level. In consultation with the Service, the hottest selenium sources were identified for collection.

Table 3-Selenium Data Summary for the Thunder Ranch Bottomlands

Site	Year	Media	Selenium Concentration	Hazard
1	2001	Water	2.8 µg/L	Low
2	2001	Water	0.3 µg/L	Low
3	2001	Water	0.4 µg/L	Low
	2001	Soil	0.4 µg/L	None
4 (South Pond)	2001	Water	4.1 µg/L	High
	1993	Water	<1.0-1.0 µg/L	Minimal
	1993	Water	<1.0 µg/L	Minimal
	1993	Seep	5 µg/L	High
	1993	Soil	1 µg/L	Minimal
	1993	Invertebrates	6.91 µg/L	High
	1993	Eggs	3.2 µ	Minimal
	1994	water	<1.0-1.0 µg/L	Minimal
	1994	Seep	5.0-14.0 µg/L	High
	1994	Soil	1.4 µg/L	Minimal
	1994	Invertebrates	5.8 µg/L	High
4 (Middle Pond)	1994	Water	1.5 µg/L	Minimal
	1994	Seep	1.5 µg/L	Minimal
	1994	Invertebrates	7.8 µg/L	High
	1993	Eggs	2.8 µg/L	Minimal
5 (North Pond)	2001	Seep	1580 µg/L	High
	1994	Water	142.7 µg/L	High
	1994	Seep	813.9 µg/L	High
	1994	Soil	17.5 µg/L	High
	1994	Invertebrates	25.7 µg/L	High
6	2001	Soil	4.3 µg/L	High

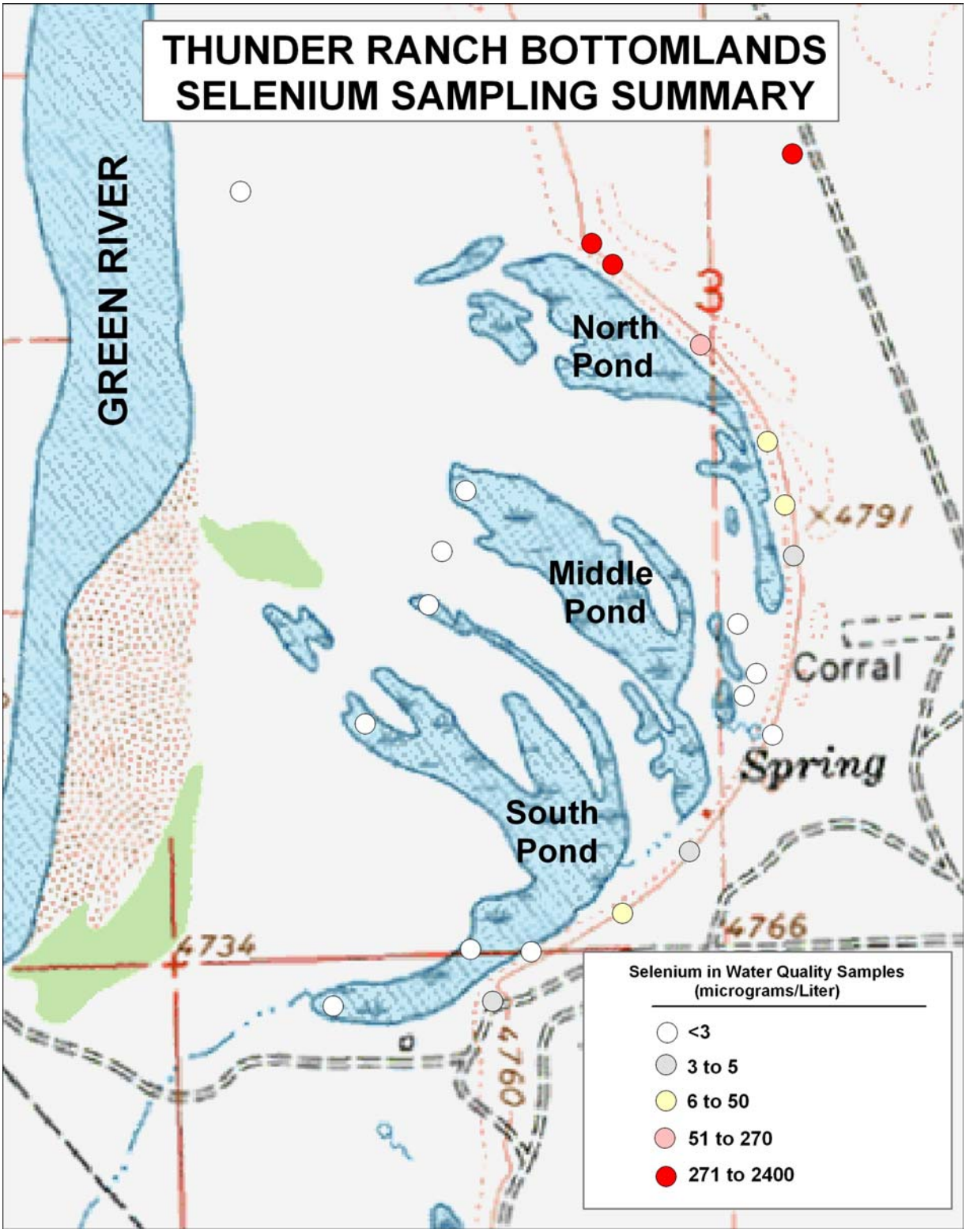

Figure 4-Thunder Ranch Bottomland Selenium Levels

Notching the existing levee and increasing the frequency of the connection between the bottomlands and the Green River would also assist with dilution. In addition, the freshening flows provided by the dry wells would also provide some dilution. The Service would monitor selenium concentrations in the bottomlands after construction. If monitoring indicates that selenium levels remain elevated, the Recovery Program would take action to further reduce selenium concentrations.

The proposed action is predicted to improve water quality conditions at the Thunder Ranch Bottomland. Based on the quantity, quality and the dilution effects of the Green River, effects of proposed action on water quality in the Green River would be undetectable.

Water Rights

The proposed action does not affect the amount of water or ability to divert water for consumptive uses in the Green River. Therefore, the proposed action is predicted to have no effect on water rights.

Historical and Cultural Resource Properties

Cultural resource inventories are being conducted as part of this environmental assessment and survey results will be presented in the Final EA. If cultural or historic properties are identified during surveys, construction design will be modified to avoid sites where possible. If it is determined that that proposed action adversely affects historic or cultural resources within the project area, Reclamation will consult with the Utah State Historic Preservation Officer and develop appropriate mitigation. Because the project area is within the historic Green River meander and was subject to flooding, it is unlikely that cultural resources occur within the project area. Two old cabins were found within the bottomlands, and the proposed action effects on these sites and their eligibility for listing in the Register of National Historic Places will be evaluated. In the unlikely event that cultural or historic resources are encountered during construction, activities would be halted and consultation with the Utah State Historic Preservation Officer initiated.

Indian Trust Assets

Indian Trust Assets are legal interests in property held by the United States for Indian Tribes or individuals. Reclamation and other Federal agencies share the responsibility to protect these assets. No known Indian Trust Assets have been identified, however, Reclamation is consulting with the Ute Indian Tribe to determine if Indian Trust Assets could be affected by the proposed action. Results of the consultation will be included in the Final EA.

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 minority or low income populations in the project area, and no adverse effects related to environmental justice are predicted.

Health and Safety/Disease Vectors

Standing water provides breeding habitat for mosquitoes and other biting flies. These insects can serve as potential disease vectors. The proposed action would likely increase the amount of and duration of standing water by reintroducing river flows into the Thunder Ranch bottomlands, however, standing water currently existing within the project area. The Recovery Program would monitor the need for mosquito control measures and if needed would work with landowners to address the issue if it arises. Therefore, the proposed action is predicted to have an undetectable effect on health and safety/disease vectors.

Socioeconomic

There is no direct socioeconomic effect to implementing the proposed action other than some limited employment opportunities during construction. Reclamation's Provo Force Account crew would perform the construction activities associated with the proposed action. Indirectly, the proposed project is designed to enhance endangered fish habitat to increase the likelihood of endangered fish recovery, allowing continued water development in the Upper Colorado Basins as identified in the Recovery Program Goals.

Cumulative Impacts

Cumulative impacts are impacts on the environment, which result from the incremental impact of the action, when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Past and present activities that have affected river-related resources in the area include irrigation, urban development, and recreational activities associated with construction and operation of the Flaming Gorge Dam, and the Central Utah Project, Colorado River Salinity Control Project, and activities associated with the Upper Colorado River Endangered Fish Recovery Program.

Implementation of all or any of these projects has affected and continues to affect the human environment including but not limited to water quality, water rights, socioeconomic and wildlife resources. Incremental cumulative impacts associated with the implementation of the proposed action are anticipated to be too small to measure.

Summary and Environmental Commitments

In summary, the primary effect of the proposed action would improve habitat for the Colorado pikeminnow and razorback sucker at the Thunder Ranch bottomlands.

The proposed action is predicted to have no effect on land use, water rights, Indian Trust Assets, and historical and cultural resources. The proposed action would also have no effect on the bald eagle, or humpback chub. The proposed actions may affect, but is not likely to adversely affect the Colorado pikeminnow. Some razorback sucker larvae may be adversely affected during drought periods if exposure to elevated selenium levels. The Service would monitor selenium levels in the Thunder Ranch bottomlands and take additional action if necessary. The proposed action would not adversely modify designated critical habitat, and would be beneficial in efforts to recover endangered fishes.

Wildlife would be impacted by increased noise and activity during construction, however this would be short-term. Impacts associated with construction would be mitigated by restricting construction activities to avoid the normal nesting season. Riparian and wetland dependent wildlife and fish species would benefit from additional habitat access and freshening flows into the bottomlands. Fish and wildlife species would also benefit from improved water quality and reduce selenium concentrations in the Thunder Ranch bottomlands.

Vegetation resources impacts would be limited to temporary construction disturbances. Clean Water Act Section 404 authorization would be obtained to discharge riprap material to protect the newly created notch in the levee.

Water quality, specifically selenium concentrations within the Thunder Ranch bottomlands would be improved. Selenium levels would be monitored by the Service to determine if additional remediation is necessary.

Mitigation Measures

1). Construction activities would be coordinated with the owners of Thunder Ranch and would comply with all conditions set forth in the easement document.

2). Section 404 authorization would be obtained from the Corps prior to initiating construction activities. Removed levee material would be discharged in uplands sites above the ordinary high water line and used to construct the offset levee.

4). Construction and levee removal activities would be limited to before and after the spring runoff period when river levels are low.

5) Construction activities would occur outside the normal nesting season to protect nesting waterfowl and migratory birds.

6) Areas disturbed during construction would be revegetated with appropriate plant species (i.e. willows, grasses).

7) A seep collection systems will be installed to collect the major source of irrigation runoff. The Service would monitor selenium levels in the bottomland ponds and wetlands after construction. If selenium levels are elevated, the Recovery Program would take additional action to reduce selenium sources.

8) If any unexpected problems occur that are directly attributable to the notch in the levee, the Recovery Program would take the appropriate corrective action.

CHAPTER 4 – CONSULTATION AND COORDINATION

General

Reclamation and the Service conducted internal scoping to identify issues and concerns associated with the proposed action. The owners of Thunder Ranch participated in the development of the proposed action and development of the acquired easement. Stipulation's in the easement are considered environmental commitments and were incorporated into this Draft EA. Reclamation staff continues to informally coordinate and consult with the U.S. Fish and Wildlife Service, Utah Division of Wildlife, and the U.S. Army Corps of Engineers, as well as the owners of Thunder Ranch. A complete list of agencies, organizations, and individuals is included in the Distribution List.

Distribution List

Appendix A contains the mailing list for this draft EA. The list includes all individuals, agencies, and organizations to whom may have an interest in the proposed action. This draft EA will be made available for public comment and any comments, issues or concerns identified during the public comment period will be addressed in the Final EA. In addition, others who specifically provided written comments or request a copy of the draft EA will receive a copy of the Final EA.

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