

**1 of 2**

**ENVIRONMENTAL ASSESSMENT  
OF REMEDIAL ACTION AT THE  
NATURITA URANIUM PROCESSING  
SITE NEAR NATURITA, COLORADO**

**February 1994**

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AT THE NATURITA URANIUM PROCESSING SITE  
NEAR NATURITA, COLORADO**

**February 1994**

**Prepared for  
U.S. Department of Energy  
UMTRA Project Office  
Albuquerque, New Mexico**

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**MASTER**

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**LIST OF ACRONYMS AND ABBREVIATIONS**

<b><u>Acronym</u></b>	<b><u>Definition</u></b>
ac	acre
ASSP	alternate site selection process
AUM	animal unit-month
BLM	Bureau of Land Management
CADSAR	comparative analysis of disposal site alternatives report
CDH	Colorado Department of Health
CDOT	Colorado Department of Transportation
CFR	Code of Federal Regulations
cm	centimeter
°C	degrees Celsius
°F	degrees Fahrenheit
DOC	U.S. Department of Commerce
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
EA	environmental assessment
EPA	U.S. Environmental Protection Agency
FR	Federal Register
ft	foot
ft <sup>3</sup>	cubic foot
ft <sup>3</sup> /s	cubic feet per second
FWS	Fish and Wildlife Service
gal	gallon
ha	hectare
in	inch
km	kilometer
km <sup>2</sup>	square kilometer
kt	knot
L	liter
μR/hr	microrentgens per hour
m	meter
m <sup>2</sup>	square meter
m <sup>3</sup>	cubic meter
m <sup>3</sup> /s	cubic meters per second
MCL	maximum concentration limit
mg/L	milligrams per liter
mi	mile
mi <sup>2</sup>	square mile
MOU	memorandum of understanding
mph	miles per hour
mrem	millirem
NC	not calculated
NEPA	National Environmental Policy Act of 1969
NMPM	New Mexico Principal Meridian

**LIST OF ACRONYMS AND ABBREVIATIONS (Concluded)**

<b><u>Acronym</u></b>	<b><u>Definition</u></b>
NRC	U.S. Nuclear Regulatory Commission
NRHP	National Register of Historic Places
pCi	picocurie
pCi/g	picocuries per gram
pCi/m <sup>2</sup> s	picocuries per square meter per second
pCi/L	picocuries per liter
PL	public law
PMP	probable maximum precipitation
Ra-226	radium-226
RAC	Remedial Action Contractor
REA	radiological and engineering assessment
ROW	right-of-way
SHPO	State Historical Preservation Officer
TDS	total dissolved solids
Th-232	thorium-232
TSP	total suspended particulates
UMTRA	Uranium Mill Tailings Remedial Action
UMTRCA	Uranium Mill Tailings Radiation Control Act of 1978
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
yd	yard
yd <sup>3</sup>	cubic yard

## 1.0 SUMMARY

The *Uranium Mill Tailings Radiation Control Act* (UMTRCA) of 1978, Public Law (PL) 95-604, authorized the U.S. Department of Energy (DOE) to perform remedial action at the Naturita, Colorado, uranium processing site to reduce the potential health effects from the radioactive materials at the site and at vicinity properties associated with the site. The U.S. Environmental Protection Agency (EPA) promulgated standards for the UMTRCA that contain measures to control the contaminated materials and to protect groundwater quality. Remedial action at the Naturita site must be performed in accordance with these standards and with the concurrence of the U.S. Nuclear Regulatory Commission (NRC) and the state of Colorado.

Contaminated materials at the Naturita processing site cover an estimated 50 acres (ac) [20 hectares (ha)] within the 53-ac (21-ha) designated site and approximately 194 ac (79 ha) adjacent to the site. The uranium mill tailings at the site were removed and reprocessed from 1977 to 1979. The contaminated areas include the former tailings area, the mill yard, the former ore storage area, and adjacent areas that were contaminated by uranium processing activities and wind and water erosion. The estimated volume of contaminated materials at and adjacent to the Naturita site is 534,000 cubic yards (yd<sup>3</sup>) [408,000 cubic meters (m<sup>3</sup>)], and there are approximately 8000 yd<sup>3</sup> (6100 m<sup>3</sup>) of contaminated debris (e.g., buildings and mill equipment) at the site. In addition, there are approximately 400 yd<sup>3</sup> (310 m<sup>3</sup>) of contaminated materials at 21 properties in nearby communities (vicinity properties).

The proposed remedial action for the Naturita processing site is relocation of the contaminated materials and debris to the Dry Flats disposal site, 6 road miles (mi) [10 kilometers (km)] to the southeast. At the disposal site, the contaminated materials would be stabilized and covered with layers of earth and rock. The proposed disposal site is on land administered by the Bureau of Land Management (BLM) and used primarily for livestock grazing. The final disposal site would cover approximately 57 ac (23 ha), which would be permanently transferred from the BLM to the DOE and restricted from future uses. The remedial action activities would be conducted by the DOE's Uranium Mill Tailings Remedial Action (UMTRA) Project.

The proposed remedial action would result in the loss of approximately 162 ac (66 ha) of soils at the processing and disposal sites; however, 133 ac (55 ha) of these soils at and adjacent to the processing site are contaminated and cannot be used for other purposes. If supplemental standards are approved by the NRC and state of Colorado, approximately 112 ac (45 ha) of contaminated soils adjacent to the processing site would not be cleaned up. This area is steeply sloped. The cleanup of this contamination would have adverse environmental consequences and would be potentially hazardous to remedial action workers. Another 220 ac (89 ha) of soils would be temporarily disturbed during the remedial action. The final disposal site would result in approximately 57 ac (23 ha) being removed from livestock grazing and wildlife use.

The removal of the contaminated materials at and adjacent to the processing site would slightly affect the 100-year floodplain of the San Miguel River and would result in the loss

of riparian plant communities along the San Miguel River and Dry Creek. Approximately 5 ac (2 ha) of the riparian plant communities meet the U.S. Army Corps of Engineers (USACE) definition of a wetland.

The southwestern willow flycatcher has been proposed as threatened and endangered. This bird species has not been present in the area of the processing site since 1986, but potential habitat for the species does exist at and near the site. The use of water from the San Miguel River for the remedial action "may affect" the endangered Colorado squawfish, humpback chub, bonytail chub, and razorback sucker and would have an adverse effect on the critical habitat of these fish species.

The proposed remedial action could affect historical and cultural resources at the processing and disposal sites and could create a strain on local housing. Traffic associated with the remedial action would increase traffic and noise levels on State Highways 90 and 141. Measures for mitigating the adverse environmental impacts of the proposed remedial action are discussed in this environmental assessment (EA). If supplemental standards are approved for other contaminated areas at and adjacent to the processing site, these areas would not be cleaned up. This would slightly increase the public health risks after remedial action but could substantially decrease the health risks to remedial action workers. Applying supplemental standards to other areas could also reduce other environmental impacts such as the disturbance of cultural resources and riparian plant communities.

There would be positive environmental impacts associated with the proposed remedial action. The potential health effects related to the contaminated materials would be reduced, and the processing site would be available for more productive uses in the future. In addition, the remedial action would result in increases in local expenditures and possibly in employment.

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## 2.0 INTRODUCTION

### 2.1 BACKGROUND

In response to concern about the potential public health hazards related to uranium mill tailings and the associated contaminated materials left abandoned or otherwise uncontrolled at inactive processing sites throughout the United States, Congress passed the UMTRCA, PL 95-604, on November 8, 1978. In the UMTRCA, Congress acknowledged that potential health hazards are associated with uranium mill tailings and identified a number of sites that were in need of remedial actions. The Naturita processing site is one of these sites.

Uranium mill tailings are the residues of uranium ore processing operations. They consist of finely ground rock, similar to sand. The tailings were removed from the Naturita site from 1977 to 1979, but contaminated materials and debris remain at and adjacent to the site. The principal potential hazard associated with the contaminated materials and debris results from the production of radon, a radioactive gas formed from the radioactive decay of the radium contained in the contaminated materials. Radon can move through the materials into the air. Increased exposure to radon and its decay products over a long period of time increases the probability that health effects (i.e., cancers) may develop in persons living and working near the contaminated materials. Another hazard is associated with radioactive and other hazardous elements leaching out of the contaminated materials through the underlying soils to contaminate groundwater. Exposure to gamma radiation, the inhalation and ingestion of airborne radioactive particulates, the ingestion of food grown in contaminated soil in areas around the processing site, and the ingestion of surface waters and groundwaters contaminated by the materials also pose potential hazards. If the contaminated materials and debris are not properly stabilized, natural processes such as wind and water erosion or removal of the materials by people could spread the contamination and increase the potential for public health hazards.

To protect public health, the EPA promulgated the standards for remedial actions under the UMTRCA in Title 40, *Code of Federal Regulations*, Part 192 (40 CFR Part 192). These standards became effective on March 7, 1983. On September 3, 1985, the U.S. Court of Appeals for the Tenth Circuit remanded the EPA groundwater standards portion of 40 CFR Part 192 [40 CFR Part 192.20(a)(2) and (3)]. The EPA subsequently proposed new groundwater standards [52 *Federal Register* (FR) 36000; September 24, 1987] that, although not final at the time of this writing, are nonetheless applicable to the remedial action at the Naturita site. Compliance with the proposed standards is evaluated in this EA; however, the need for groundwater remediation at the processing site will be evaluated during the groundwater restoration phase of the UMTRA Project.

## 2.2 DESCRIPTIONS OF THE PROCESSING AND DISPOSAL SITES

### 2.2.1 Processing site

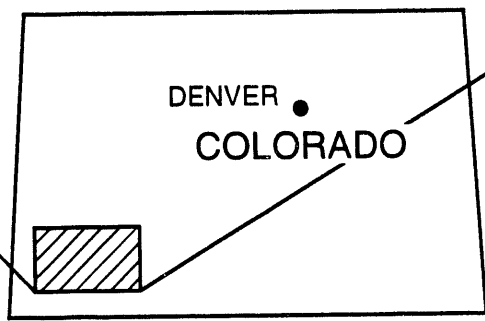
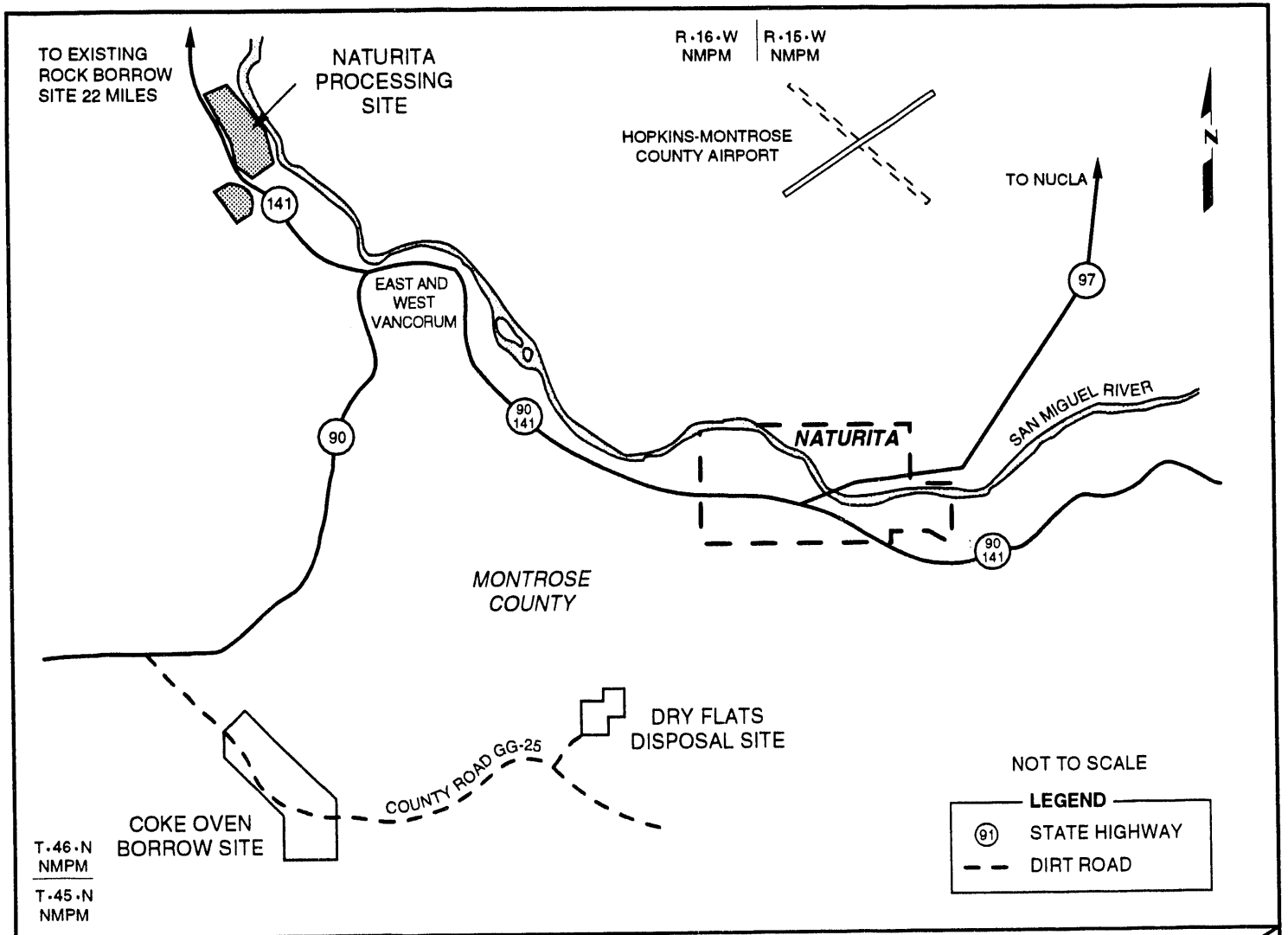
The Naturita processing site is in Sections 14 and 15, Township 46 North, Range 16 West (Secs. 14 and 15, T46N, R16W), New Mexico Principal Meridian (NMPM) in Montrose County, Colorado. The site is approximately 2 road mi (3 km) northwest of the unincorporated town of Naturita (Figure 2.1). The site is on the west bank of the San Miguel River, a perennial tributary of the Dolores River. The majority of the designated site is privately owned, but a small portion of the site is on land administered by the BLM. The area around the designated site contains privately owned and BLM-administered lands.

The Naturita mill was built in 1930 and became operational in 1939 when it was modified for the recovery of vanadium. It was modified again in 1942 for the recovery of both uranium and vanadium. The mill was shut down from 1945 to 1947. Uranium milling resumed in 1947 and continued until 1958; the mill was shut down again from 1958 to 1961. An upgrader plant was operated at the site from late 1961 to early 1963. The mill was shut down and dismantled in 1963, and all of the equipment was decontaminated. From 1977 to 1979, the tailings at the site were removed and reprocessed at a new facility approximately 3 mi (5 km) to the south. After being reprocessed, the tailings were stabilized at the new facility (FBDU, 1981).

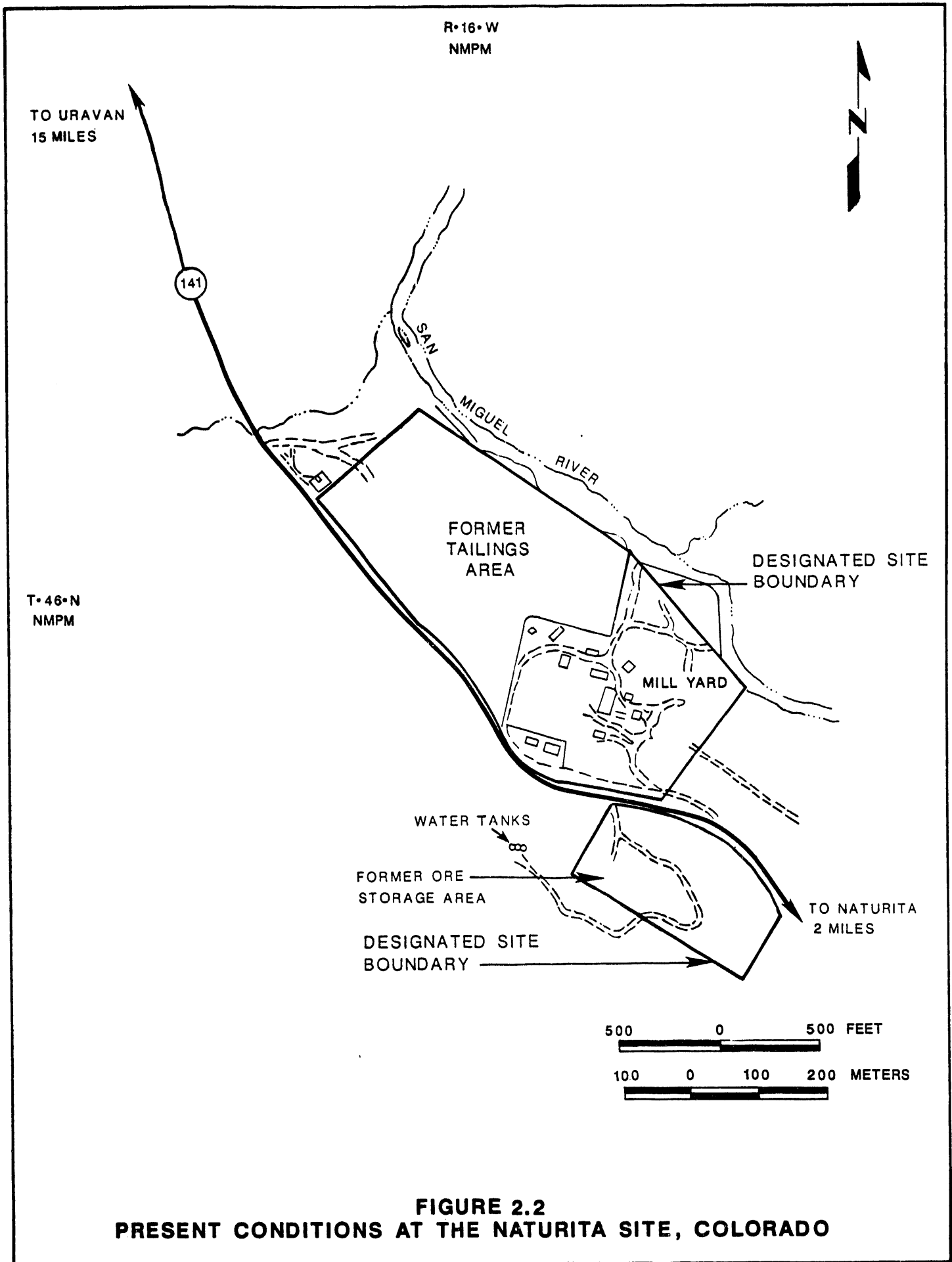
The designated Naturita site covers 53 ac (21 ha) and contains the former tailings area, mill yard, and part of the former ore storage area (Figure 2.2). There are no tailings at the site, but there are 116,900 yd<sup>3</sup> (89,400 m<sup>3</sup>) of contaminated materials in the 27-ac (11-ha) area of the former tailings pile. The 12-ac (5-ha) mill yard contains 114,700 yd<sup>3</sup> (87,700 m<sup>3</sup>) of contaminated soil, and the former ore storage area [12 ac (5 ha)] contains 11,600 yd<sup>3</sup> (8900 m<sup>3</sup>) of contaminated soil. Tailings have been dispersed by uranium processing activities and wind and water erosion and have contaminated 290,800 yd<sup>3</sup> (222,300 m<sup>3</sup>) of soil covering 194 ac (79 ha) adjacent to the designated site. The total estimated volume of contaminated materials is 534,000 yd<sup>3</sup> (408,300 m<sup>3</sup>), and there are 8000 yd<sup>3</sup> (6100 m<sup>3</sup>) of contaminated debris (buildings, foundations, and abandoned construction and mill equipment) at the site. In addition, there are approximately 400 yd<sup>3</sup> (310 m<sup>3</sup>) of contaminated materials at 21 off-site vicinity properties in East Vancorum and Naturita (Figure 2.1). Vicinity properties are properties located outside the designated site boundary that have been contaminated by tailings. The tailings may have been dispersed by wind or water erosion or removed by people before the potential hazards of the tailings were known.

### 2.2.2 Disposal site

The proposed disposal site, called the Dry Flats disposal site, is in Secs. 25 and 36, T46N, R16W, NMPM. The disposal site is 6 road mi (10 km) southeast of the Naturita processing site via State Highways 141 and 90 and County Road



**FIGURE 2.1**  
**LOCATION OF THE NATURITA SITE, COLORADO**



GG-25 (Figures 2.1 and 2.3). The disposal site is on a broad mesa that dips gently to the northeast. The Dry Flats disposal site and surrounding land are administered by the BLM and are used primarily for livestock grazing. Section 4.7, *Land Use*, provides details on land use at and around the proposed disposal site.

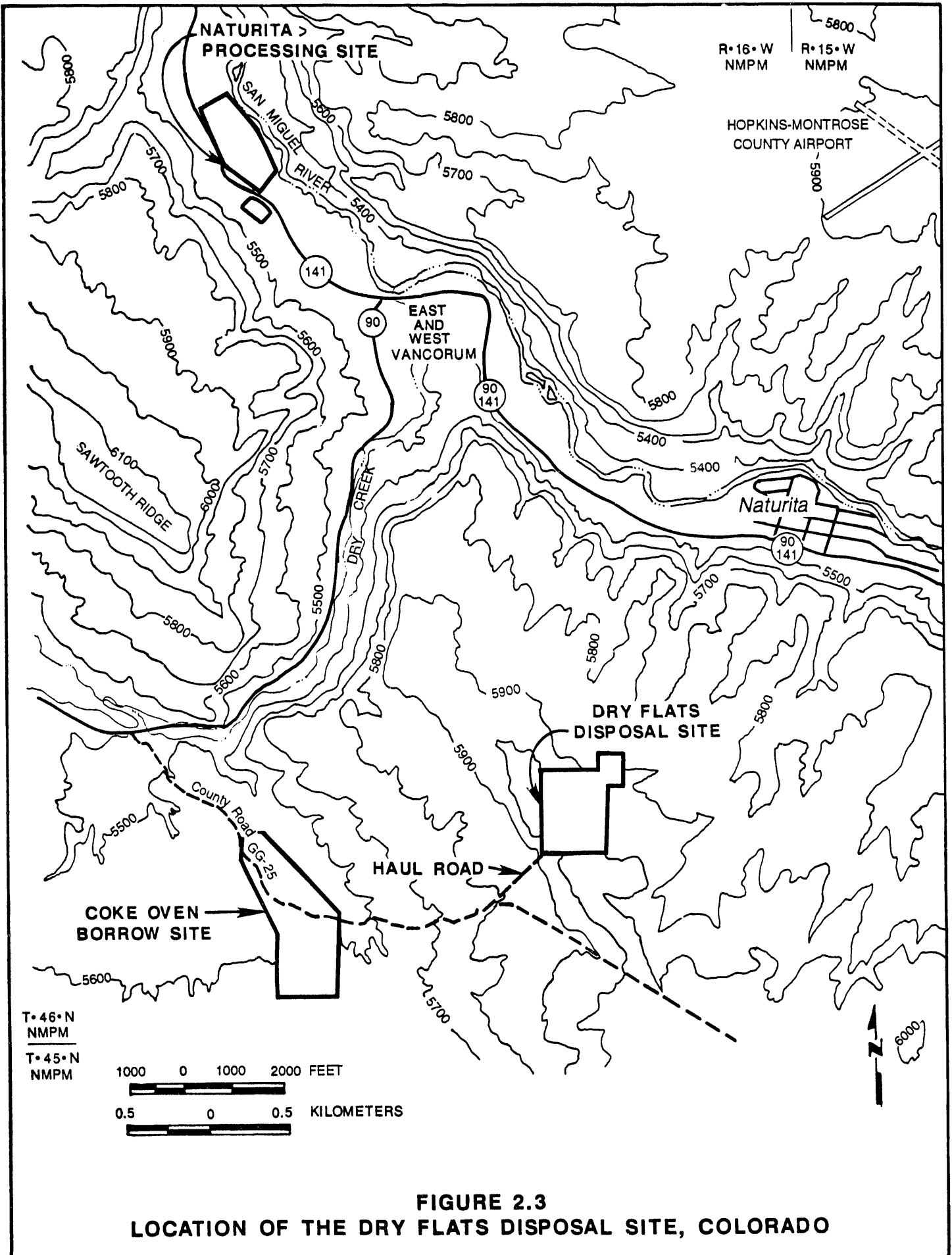
## 2.3 ISSUES OF CONCERN

An EA of the proposed remedial action at the Naturita processing site was prepared in 1990. Comments on the EA were received from the EPA, BLM, Fish and Wildlife Service (FWS), Colorado Department of Health (CDH), UMTRA Project Naturita Citizens Advisory Committee, and Office of Environmental Restoration and Waste Management of the DOE. The major concerns expressed in those comments are summarized below.

- The EA should include the relocation of the Naturita contaminated materials and debris to an existing mill tailings site at Uravan, Colorado, as another remedial action alternative. The environmental impacts of the Uravan alternative should be evaluated in the EA.
- A better characterization of existing groundwater and geochemical conditions at the Dry Flats disposal site should be provided in the EA. Potential groundwater contamination due to the proposed remedial action should be fully addressed in the EA.
- Updated and/or additional information on flora and fauna and threatened and endangered species should be included in the EA.
- Details in the EA should be verified (e.g., the total volume of contaminated materials), and additional details on various subjects (e.g., permanent withdrawal of the disposal site and land use) should be included in the EA.
- The EA should include a section on cumulative environmental impacts for other projects in the Naturita area.

The EA of the proposed Naturita remedial action was revised in August 1993. All of the comments received on the 1990 EA were considered in the revision of the EA, and changes in the design for the Dry Flats disposal site were incorporated in the EA. In addition, the revised EA contained a more concise and focused evaluation of the environmental impacts, and the discussions of issues related to remedial action activities on BLM-administered lands were closely coordinated with the BLM. Comments on the revised EA were received from the EPA, BLM, FWS, CDH, UMTRA Project Naturita Citizens Advisory Committee, and DOE. The major concerns expressed in these comments are summarized below.

- The EA should provide a better description of the process used to evaluate and reject remedial action alternatives.



**FIGURE 2.3**  
**LOCATION OF THE DRY FLATS DISPOSAL SITE, COLORADO**

- Additional support for the absence of mineral resources at the Dry Flats disposal site should be provided in the EA.
- The difference between the terms "riparian habitat" and "wetlands" should be specified in the EA. The mitigation of impacts to wetlands through the USACE 404 Permit process should be clarified in the EA.
- The EA should more adequately address the socioeconomic impacts of the proposed remedial action (e.g., impacts to housing and schools in the Naturita area).
- An Air Pollution Emissions Notice and Emission Permit from the state of Colorado would require that a dust control plan be implemented before the start of the remedial action.
- The EA should specify that there would be an appreciable increase in traffic during the remedial action, but the increase would be for a short duration.
- Impacts to the southwestern willow flycatcher, prairie dogs, and endangered fish species should be clarified in the EA.
- Land ownership at the Naturita processing site should be clarified in the EA, and the process for implementing supplemental standards should be included in the EA.
- The EA should describe the various rights-of-way (ROW) that would be required for the remedial action activities at the Dry Flats disposal site. The amounts of surface disturbance caused by specific remedial action activities (e.g., road improvement and disposal cell construction) should be clarified in the EA.

All of the comments received on the August 1993 revised EA were considered in the preparation of the final EA. In addition, the DOE has maintained close communication with the involved parties through an established public information program and the remedial action process.

## 2.4 ALTERNATIVES TO THE PROPOSED ACTION

### 2.4.1 No action

The no action alternative consists of taking no steps toward the remediation of the processing site. The BLM could deny approval for the currently proposed action and could deny all permits associated with using the identified sites and roads on BLM-administered land; thus, no public lands would be disturbed. The contaminated materials and debris would remain where they are currently located until the DOE could identify another suitable disposal site. The selection of this alternative would not be consistent with the intent of Congress in the UMTRCA and would not result in compliance with the EPA standards.

## 2.4.2 Alternatives no longer under consideration

The DOE performed two comparative analyses of disposal site alternatives to select a preferred remedial action for the Naturita processing site. These analyses included the evaluation of technical, environmental, and cost factors as well as the risks associated with each disposal site alternative. Technical factors included disposal site stability and groundwater conditions, and environmental factors included the presence of threatened and endangered species and the proximity of residences and population centers. Cost factors included special design features (e.g., costs of special erosion protection measures) and haulage distances for both contaminated materials and borrow materials. Risks were evaluated for each alternative by probability and included disposal site stability, erosion potential, and groundwater conditions. The state of Colorado and NRC were consulted during these analyses, and the results of the analyses are provided in the draft and final comparative analysis of disposal site alternatives reports (CADSAR) for the Naturita site (DOE, 1986; 1988a).

### First comparative analysis of disposal site alternatives

During the first comparative analysis of disposal site alternatives (DOE, 1986), four alternatives for the disposal of the Naturita contaminated materials and debris were identified. The first alternative was to stabilize the contaminated materials and debris at the Naturita processing site. Two other alternatives were to relocate the contaminated materials and debris to the Coke Oven site or to the adjacent Durita Facility, a Title II uranium processing facility that has ceased operations. These sites are approximately 5 road mi (8 km) south of the Naturita site. The fourth alternative was to consolidate and stabilize the Naturita contaminated materials and debris with the tailings and contaminated materials at the Slick Rock UMTRA Project site approximately 45 road mi (72 km) southwest of the Naturita site.

Naturita processing site—Two conceptual designs for the disposal of the contaminated materials and debris at the Naturita processing site were evaluated. The first design would involve the construction of two separate disposal areas at the site or relocation of part of the contaminated materials and debris to another disposal site to provide adequate disposal capacity. The second design would involve special erosion protection measures and the relocation of State Highway 141 to provide adequate disposal capacity at the site. While these design alternatives might be cheaper and quicker than relocating all of the contaminated materials and debris, they were found to be technically and environmentally unsuitable. For example, part of the disposal areas would be within the floodplain of the San Miguel River, and groundwater levels in the underlying alluvium would be only 10 feet (ft) [3 meters (m)] below the bottoms of the disposal areas. Therefore, disposal at the Naturita processing site was not considered to be a viable remedial action alternative.

The conceptual designs for disposal at the Coke Oven site, Durita Facility, and Slick Rock site were similar to the conceptual designs for disposal at the



Naturita site, except that all of the contaminated materials and debris would be relocated from the processing site to a more remote disposal site. At each disposal site, the contaminated materials and debris would be stabilized in a disposal cell that would be designed for long-term stability and radiation protection in accordance with the EPA standards.

Coke Oven site—The Coke Oven alternative would be the cheapest of the three relocation alternatives. However, this alternative would be technically and environmentally unsuitable, primarily because the Coke Oven site has the potential for seismic activity due to salt dome collapse.

Durita Facility—The Durita Facility alternative would be more expensive than the Coke Oven alternative but cheaper than the Slick Rock alternative. The comparative analysis showed that this alternative would not be technically and environmentally suitable. For example, the Durita Facility also has a potential for seismic activity due to salt dome collapse, and there would be a potential for settlement of the Naturita contaminated materials and debris if they were placed over existing contaminated materials at the facility.

Slick Rock site—The comparative analysis showed that the Slick Rock alternative would not be technically and environmentally suitable. There is a potential fault in the area of the Slick Rock site, and the disposal cell would be within the floodplain of the Dolores River. The Slick Rock alternative would be the most expensive of the three relocation alternatives.

The first comparative analysis of disposal site alternatives resulted in various recommendations for activities that should be undertaken to prepare the final CADSAR and to provide the information necessary to select a preferred remedial action for the Naturita processing site.

#### Second comparative analysis of disposal site alternatives

After the first comparative analysis, a formal, three-phase alternate site selection process (ASSP) (DOE, 1988b) was initiated to identify more viable disposal sites for the Naturita contaminated materials and debris. This process resulted in the selection of the Third Park, Dry Flats, and Bitter Basin alternate disposal sites. The Third Park site is approximately 15 road mi (24 km) northeast of the Naturita site, and the Dry Flats site is approximately 6 road mi (10 km) southeast of the processing site. The Bitter Basin site is approximately 9 road mi (14 km) northwest of the Naturita site. The ASSP gave the Dry Flats site the highest ranking, followed by the Bitter Basin and Third Park sites. The Third Park site was dropped from further consideration because local residents and county officials expressed strong opposition to using this site.

After the ASSP was completed, a second comparative analysis of disposal site alternatives was performed (DOE, 1988a). It evaluated relocation of the Naturita contaminated materials and debris to the Coke Oven, Dry Flats, and Bitter Basin disposal sites. The Coke Oven alternative was retained from the

first comparative analysis for comparative purposes because the Third Park alternate disposal site had been eliminated during the ASSP. The second comparative analysis also evaluated another conceptual design for disposal of the contaminated materials and debris at the Naturita processing site.

Naturita processing site—The additional conceptual design for disposal at the Naturita processing site consisted of constructing a disposal cell against the steep slope in the southern portion of the site and southwest of State Highway 141. State Highway 141 would be relocated to the east to accommodate the disposal cell, and a diversion ditch would be built between the cell and the upstream drainage area to divert storm runoff away from the cell. The analysis showed that this alternative would be the least expensive and quickest disposal alternative, but it was again the least favorable alternative in terms of technical and environmental factors and risks. As in the first comparative analysis, the disposal cell would be within the floodplain of the San Miguel River, and groundwater levels in the underlying alluvium would be only 10 ft (3 m) below the bottom of the disposal cell. Again, disposal at the Naturita site was not considered to be a viable remedial action alternative.

The conceptual designs for disposal at the Coke Oven, Dry Flats, and Bitter Basin sites were similar to the conceptual design for disposal at the Naturita site, except that all of the contaminated materials and debris would be relocated from the processing site to a more remote disposal site. At each disposal site, the contaminated materials and debris would be stabilized in a disposal cell that would be designed for long-term stability and radiation protection in accordance with the EPA standards.

Coke Oven site—The Coke Oven alternative would be the cheapest of the three relocation alternatives, but the comparative analysis showed that it would be technically and environmentally unsuitable. The Coke Oven site has the potential for seismic activity due to salt dome collapse and for erosion due to geomorphic conditions.

Dry Flats site—The comparative analysis showed that the Dry Flats alternative would be the most favorable of the relocation alternatives in terms of technical and environmental factors and risks. For example, the Dry Flats site is geologically stable with no potential for flooding or erosion. The Dry Flats alternative would be more expensive than the Coke Oven alternative but cheaper than the Bitter Basin alternative.

Bitter Basin site—The comparative analysis showed that the Bitter Basin alternative would not be technically and environmentally suitable. The Bitter Basin site has the potential for erosion and has the most difficult access of the three remote disposal sites. The potential erosion could be solved by engineered design features, but the Bitter Basin alternative would be the most expensive of the three relocation alternatives.

Based on the two comparative analyses of disposal site alternatives, the DOE selected disposal at the Dry Flats site as the preferred remedial action alternative for the Naturita contaminated materials and debris. The state of Colorado concurred in this selection. Based on the draft and final CADSARs for the Naturita site, the NRC has determined that the EPA standards could be satisfied at the Dry Flats disposal site.

#### Uravan, Colorado, site

In 1990, the owner of an existing uranium mill tailings site at Uravan, Colorado, formally proposed the Uravan site as a disposal site for the Naturita contaminated materials and debris. The Uravan site is approximately 15 road mi (24 km) northwest of the Naturita processing site. The Uravan site is also a Superfund site and is being reclaimed under the *Comprehensive Environmental Response, Compensation, and Liability Act* and a court decree between the site owner and the state of Colorado. There were many liability issues associated with disposing of UMTRA Project contaminated materials at the site. In 1993, the site owner withdrew its proposal to accept the Naturita contaminated materials and debris.

### 3.0 PROPOSED ACTION

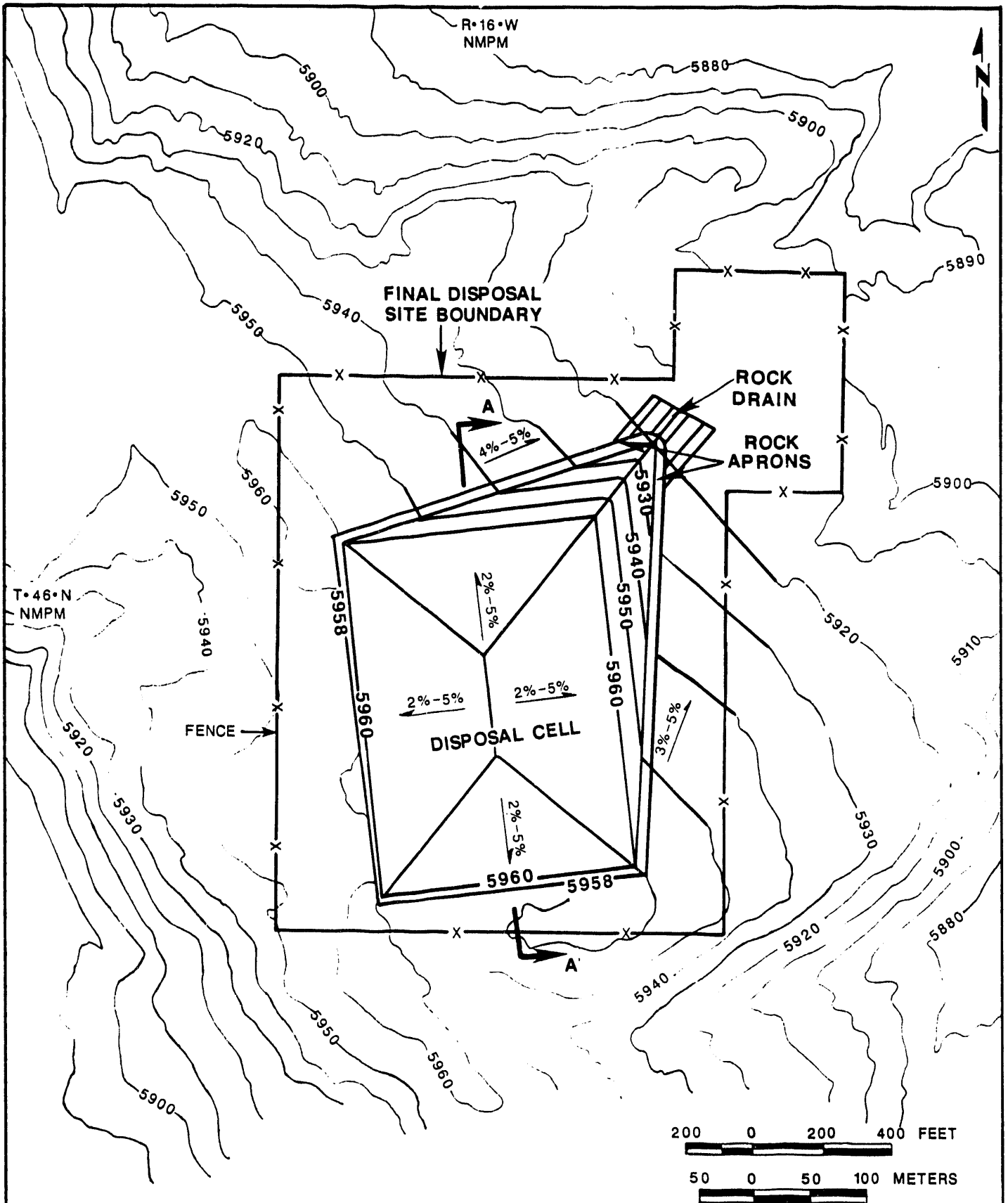
#### 3.1 DESCRIPTION OF THE PROPOSED ACTION

The proposed action is to relocate the contaminated materials and debris from the Naturita site to the Dry Flats disposal site 6 road mi (10 km) southeast of the processing site. The contaminated materials would consist of 243,200 yd<sup>3</sup> (186,000 m<sup>3</sup>) of contaminated materials from the former tailings area, mill yard, and former ore storage area; 177,900 yd<sup>3</sup> (136,000 m<sup>3</sup>) of contaminated materials from areas adjacent to the designated site; 8000 yd<sup>3</sup> (6100 m<sup>3</sup>) of contaminated debris (e.g., buildings and foundations); and 400 yd<sup>3</sup> (310 m<sup>3</sup>) of contaminated materials from vicinity properties. The total estimated volume of contaminated materials and debris to be relocated to the disposal site would be 429,500 yd<sup>3</sup> (328,400 m<sup>3</sup>). Approximately 112,900 yd<sup>3</sup> (86,300 m<sup>3</sup>) of contaminated materials adjacent to the processing site and west of State Highway 141 would not be cleaned up with the application of supplemental standards, as discussed later in this section (also see Sections 4.5, 5.1, 5.4, and 5.9).

Approximately 6 ac (2 ha) of the 12-ac (5-ha) former ore storage area and the contamination west of State Highway 141 [112 ac (45 ha)] are on lands administered by the BLM. The rest of the contamination on and adjacent to the designated processing site is on privately owned lands. The cleanup of contamination on BLM-administered lands would be authorized by a memorandum of understanding (MOU) or other agreement between the BLM and DOE. The cleanup of contamination on privately owned lands would be authorized by remedial action agreements between individual land owners and the DOE.

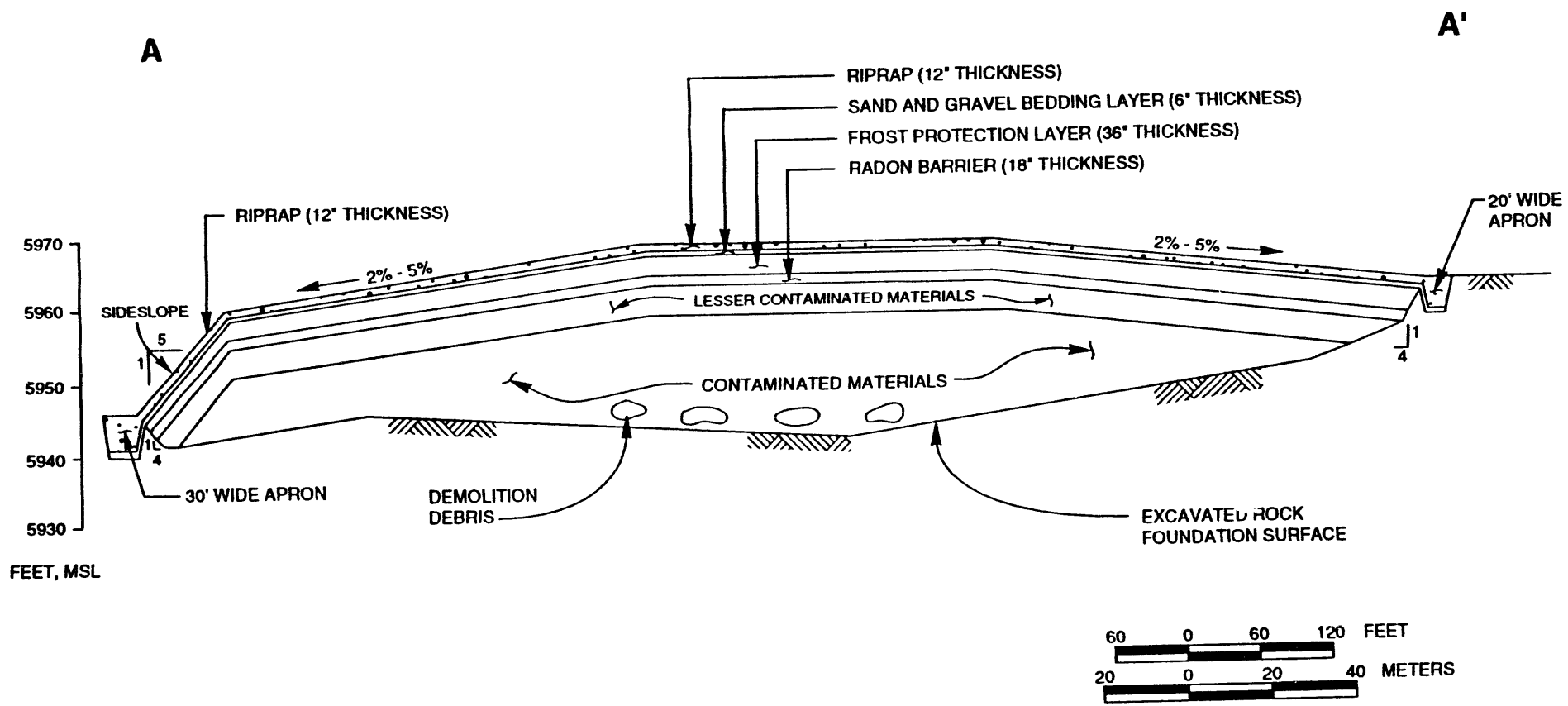
The temporary Dry Flats disposal site would cover approximately 105 ac (42 ha) and would consist of the final disposal site [57 ac (23 ha)] and a 48-ac (19-ha) area around the final disposal site. The 48-ac (19-ha) temporary area would be used for a staging area (e.g., equipment washing and fuel storage facilities) and a stockpile area for uncontaminated earthen and rock materials. The DOE has obtained a 2-year segregation or temporary land withdrawal for the temporary disposal site from the BLM. Prior to any activity at the disposal site, a permanent jurisdiction transfer or permanent land withdrawal would be obtained from the BLM to transfer administration of the final disposal site to the DOE. The DOE would also obtain an ROW for the 48-ac (19-ha) temporary area around the final disposal site from the BLM. After the remedial action, the temporary area would be reclaimed in accordance with the ROW.

At the Dry Flats disposal site, the contaminated materials and debris would be placed in a disposal cell that would be excavated approximately 3 ft (0.9 m) below the ground surface (Figures 3.1 and 3.2). The debris from the processing site would be placed in the bottom of the disposal cell, then covered with the most highly contaminated materials followed by less-contaminated materials.



**FIGURE 3.1**  
**FINAL CONDITIONS AT THE DRY FLATS**  
**DISPOSAL SITE, COLORADO**

3-3



**FIGURE 3.2**  
**TYPICAL CROSS SECTION**  
**OF THE DRY FLATS DISPOSAL SITE, COLORADO**

All of the contaminated materials would then be covered with a 1.5-ft (0.5-m) thick layer of fine-grained earthen materials (radon barrier) to prevent radon emanation. Successive cover layers would consist of a 3-ft (0.9-m) thick frost protection layer, a 0.5-ft (0.2-m) thick sand and gravel bedding layer, and a 1-ft (0.3-m) thick layer of riprap. The disposal cell would cover approximately 21 ac (9 ha). The final restricted disposal site would encompass 57 ac (23 ha), and the perimeter of the final disposal site would be fenced with a five-strand barbed wire fence 4.5 ft (1.4 m) high and signed with a warning specifying restricted access. A detailed description of the engineering design for the final disposal site is provided in the remedial action plan (DOE, 1993a).

After remedial action, the Naturita processing site would be backfilled with clean fill material, recontoured to promote surface drainage, and revegetated. The site would then be released for development or other productive uses. The cleanup and/or control of existing groundwater contamination beneath the processing site will be evaluated during the groundwater restoration phase of the UMTRA Project.

The remedial action is scheduled to take 33 months with two winter shutdown periods of 4 months each (December through March). The first 9 months of remedial action would consist of demolishing the structures and other debris at the processing site and preparing the necessary work areas, facilities, and roads. After the first winter shutdown, the contaminated materials and debris would be relocated to the disposal site, which would take approximately 8 months. The second winter shutdown would be followed by the final 8 months of remedial action, during which the final disposal site would be completed and all disturbed areas would be restored. It is estimated that the remedial action would require from 13 to 76 workers, with an average work force of 54 workers. The estimated cost of the remedial action is \$9.8 million.

Background levels of total suspended particulates (TSP), radionuclides, and noise would be established prior to any surface-disturbing activities associated with the remedial action. Monitoring programs would be developed and implemented by the Remedial Action Contractor (RAC) to ensure compliance with applicable standards or regulations. All remedial action vehicles that leave contaminated areas and enter public roadways would be monitored for contamination and decontaminated if necessary.

A detailed, site-specific, long-term surveillance program for the final Dry Flats disposal site would be developed jointly by the DOE and NRC to ensure the disposal site's continued compliance with the EPA standards. This program may include site inspections, aerial photography, groundwater monitoring, surveillance reports, custodial maintenance, and contingency plans in case of severe natural events or unusual human intrusion.

Approximately 112 ac (45 ha) of BLM-administered land adjacent to the Naturita processing site and west of State Highway 141 contain 112,900 yd<sup>3</sup> (86,300 m<sup>3</sup>) of contaminated materials exceeding the EPA's surface cleanup

standards. This area is steeply sloped. The cleanup of this contamination would have adverse environmental consequences and would be costly and potentially hazardous to remedial action workers. An application for implementing supplemental standards for this contamination would be submitted to the NRC and the state of Colorado. If this application were approved, this area would not be included in the remedial action. Other areas at and adjacent to the processing site may be considered for supplemental standards. If supplemental standards were implemented for additional areas, these areas would also not be cleaned up. Supplemental standards are discussed further in Sections 4.5, 5.1, 5.4, and 5.9.

The proposed action includes the incorporation of the contaminated materials recovered from 21 vicinity properties associated with the Naturita processing site. The impacts associated with the vicinity property cleanup were evaluated in a separate document (DOE, 1985) and are not discussed further in this EA.

### 3.2 BORROW SITES

The remedial action would require the use of earthen materials, gravel, and rock. Earthen materials for construction of the disposal cell and for restoration of the Naturita processing site and the final disposal site would be excavated from the Coke Oven borrow site (Figure 2.3). Some of the earthen materials for restoration of the processing site would be obtained from the excavation of the disposal cell. The Coke Oven borrow site is in Sec. 35, T46N, R16W, NMPM, approximately 4 road mi (6 km) south of the processing site and 2 road mi (3 km) west of the Dry Flats disposal site. The borrow site is on BLM-administered land that is used for livestock grazing, and the proposed use of the borrow site would have to be authorized by a Free Use Permit issued by the BLM. As part of this authorization, no surface disturbance could occur at the borrow site until a mining and reclamation plan was approved by the BLM. In addition, a Mined Land Reclamation Permit would have to be obtained from the state of Colorado's Division of Minerals and Geology prior to any surface disturbance.

The Coke Oven borrow site would cover a maximum area of 175 ac (71 ha). Of this area, 40 ac (16 ha) contain cultural resource sites (Section 4.8) and would not be disturbed by the borrow activities. A maximum of 80 ac (32 ha) would be disturbed by the excavation of approximately 431,100 yd<sup>3</sup> (329,600 m<sup>3</sup>) of earthen materials, and a maximum of 55 ac (22 ha) would be used for material stockpiling, equipment parking, and other purposes. Surface soil at the borrow site would be removed and stockpiled for restoration of the site. The earthen materials for the remedial action would be excavated to depths ranging from 4 to 10 ft (1 to 3 m). After completion of the remedial action, the borrow site would be recontoured to resemble the surrounding land surface and to promote surface drainage. All disturbed areas would then be revegetated according to the approved mining and reclamation plan.



The source of gravel and rock for the construction of access roads and the disposal cell would be an existing, privately owned, commercial borrow site 22 road mi (35 km) northwest of the Naturita processing site. Approximately 86,600 yd<sup>3</sup> (66,200 m<sup>3</sup>) of gravel and rock would be required.

### 3.3 TRANSPORTATION ROUTES

The contaminated materials and debris would be transported by truck from the Naturita processing site to the Dry Flats disposal site along State Highways 141 and 90, County Road GG-25, and a new haul road from County Road GG-25 to the disposal site (Figure 2.3). The Coke Oven borrow site would be adjacent to County Road GG-25, and no haul road to the borrow site would be necessary. Gravel and rock would be trucked from the existing, commercial borrow site to the disposal site along State Highways 141 and 90, County Road GG-25, and the new haul road. All of the materials would be transported in accordance with applicable U.S. Department of Transportation (DOT) and Colorado Department of Transportation (CDOT) regulations and any MOUs or other agreements between the DOE, DOT, and CDOT.

County Road GG-25 is approximately 10 ft (3 m) wide and has a concrete, low-water crossing at Dry Creek. The county road now covers approximately 3 ac (1 ha) over the 2.5 mi (4 km) to the Dry Flats disposal site. The county road would be widened to a maximum of 32 ft (10 m) and improved, and a culvert crossing would be installed at Dry Creek. The improved county road would cover approximately 10 ac (4 ha). Approximately 0.25 mi (0.4 km) of new haul road would be constructed from County Road GG-25 to the disposal site. This haul road would be 32 ft (10 m) wide and would cover approximately 1 ac (0.4 ha).

County Road GG-25 crosses land administered by the BLM and a small tract of private land. The new haul road to the disposal site crosses only BLM-administered land. An ROW 100 ft (30 m) wide for the improvement of County Road GG-25 would be obtained from the BLM by the Montrose County Road Commission. This ROW would cover approximately 30 ac (12 ha). The DOE would negotiate a land-use agreement for the road improvement with the owner of the small tract of private land crossed by the county road. Another 100-ft (30-m) wide ROW for the construction of the new haul road would be obtained from the BLM by the DOE; this ROW would cover approximately 3 ac (1 ha). After completion of the remedial action, the improved County Road GG-25 would be left intact except that the culvert crossing at Dry Creek would be removed and replaced with another concrete, low-water crossing. This action was requested by the Montrose County Road Commission. The new haul road would be reduced to minimum BLM standards [e.g., 16 ft (5 m) wide], and the excess road width [approximately 0.5 ac (0.2 ha)] would be reclaimed in accordance with the ROW issued by the BLM.

If temporary utilities such as water and telephone service were extended to the Dry Flats disposal site, they would be placed immediately adjacent to improved

County Road GG-25 and the new haul road. The utilities would be placed above or below the ground surface as required and would be removed upon completion of the remedial action. The appropriate ROW for these utilities would be obtained from the BLM, and this ROW would probably be 30 ft (9 m) wide and 2.75 mi (4.4 km) long [10 ac (4 ha)]. Any land disturbed by the installation and removal of the utilities would be reclaimed in accordance with the requirements of the ROW. The temporary utilities would also cross the small tract of private land along County Road GG-25. The installation and removal of the utilities and reclamation of any land disturbance on this private land would be performed in accordance with the land use agreement negotiated with the owner for the county road improvements.

### **3.4 CONFORMANCE TO LAND USE PLANS AND POLICIES**

Areas at and adjacent to the Naturita processing site, the Dry Flats disposal site, and the Coke Oven borrow site are on lands administered by the BLM's Uncompahgre Basin Resource Area. These lands are subject to the BLM resource management plan as well as the applicable BLM permits. For the Uncompahgre Basin Resource Area, the emphasized resources are wildlife, grazing, minerals, cultural resources, and recreation (BLM, 1985; Pfifer, 1993). The BLM's administration of the lands to be affected by the remedial action and the authorization of the applicable permits would reflect the resources emphasized in the resource management plan.

Montrose County does not have a land use master plan for the west end of the county, which includes the Naturita area. The Naturita area is zoned for general agriculture, and there are no restrictions on any development that is not restricted in other areas as long as all applicable permits are obtained. There are no land use or zoning restrictions that would prohibit the proposed remedial action for the Naturita processing site (Warren, 1993). There is a local desire to develop the processing site as a golf course (Showalter, 1993). The proposed remedial action would allow the processing site to be released for any use consistent with existing land use controls. However, certain use restrictions may be imposed at the Federal and state levels to protect human health and the environment and to prevent the use of potentially contaminated groundwater at the site. Certain use restrictions may also be imposed at the Federal and state levels to allow future cleanup and/or control of existing groundwater contamination beneath the processing site during the groundwater restoration phase of the UMTRA Project.

### **3.5 COMPLIANCE WITH EPA STANDARDS**

The purpose of the proposed remedial action is to stabilize and control all contaminated materials associated with the Naturita processing site in a manner that complies with the EPA standards in 40 CFR Part 192. Consistent with this

purpose and the EPA standards, the following major design objectives were established for the proposed action:

- Levels of radium-226 (Ra-226) would be reduced to levels consistent with the EPA standards in areas released for unrestricted use. The concentration of Ra-226 in soil averaged over any area of 100 square meters (m<sup>2</sup>) would not exceed the background level by more than 5 picocuries per gram (pCi/g) averaged over the first 15 centimeters (cm) of soil below the surface, and 15 pCi/g averaged over 15-cm-thick layers of soil more than 15 cm below the surface. If residual radionuclides other than Ra-226 and its decay products are present in sufficient quantities and concentrations to pose a significant radiation hazard, supplemental standards would be developed and applied with NRC concurrence. Remedial action would reduce other residual radioactivity to levels that are as low as reasonably achievable.
- The engineering design controls would be effective for up to 1000 years to the extent reasonably achievable and, in any case, for at least 200 years.

In addition, the disposal site design must comply with the proposed EPA groundwater protection standards for inactive uranium mill sites, in Subparts A and C of 40 CFR Part 192 (52 FR 36000; September 24, 1987). The DOE has designed a multicomponent cover system that would meet the radiation protection standard, reduce the amount of infiltration from precipitation, and protect the radon barrier from frost and biointrusion. The cover system would achieve compliance with the proposed EPA standards.

When final standards are promulgated, the DOE would evaluate groundwater protection requirements and would undertake any action necessary to ensure that the final standards are met. The need for and extent of groundwater remediation at the Naturita processing site will be evaluated during the groundwater restoration phase of the UMTRA Project.

## 4.0 AFFECTED ENVIRONMENT

### 4.1 CLIMATE AND AIR QUALITY

The Naturita region has a semiarid continental climate with low precipitation and humidity, large temperature variations, and high evaporation. The annual mean maximum temperature is 65 degrees Fahrenheit (°F) [18 degrees Celsius (°C)], and the annual mean minimum temperature is 36°F (2°C). The annual mean precipitation is probably between 9 and 16.5 inches (in) (23 and 42 cm), with most precipitation occurring from July through October. The average annual snowfall is expected to be 30 to 32 in (76 to 81 cm) (NOAA, 1986, 1984). The topography at the Naturita site indicates that north-northwest, down-valley and south-southwest, up-valley winds would prevail at the processing site. The estimated average annual wind speed at the Dry Flats disposal site is expected to be 7 miles per hour (mph) [6 knots (kt)] (Pioneer, 1979), and the average wind speed at the Naturita site would be expected to be somewhat less given the protected nature of the San Miguel River Valley.

The closest Colorado air quality monitoring station is in Montrose. Only TSP are monitored at this station (CDH, 1985). In addition, 9 months of ambient TSP data are available for Disappointment Valley, approximately 15 air mi (24 km) southwest of the Naturita site. The Disappointment Valley data reveal no violations of Federal (40 CFR Part 50) and state (CAQCC, 1979) primary and secondary standards for TSP (Pioneer, 1979). None of the remaining EPA priority air pollutants (sulfur dioxide, carbon monoxide, ozone, nitrogen dioxide, and lead) are measured at or near Naturita. However, the levels of these pollutants are expected to be very low due to the remote nature of the site. The Naturita area is considered to be in attainment for TSP and the other EPA priority air pollutants.

### 4.2 GEOLOGY AND SOILS

The Naturita site is underlain by unconsolidated alluvial floodplain deposits of the San Miguel River and fill material. The fill material was placed during construction of the site to divert the river and increase the area of the existing alluvial terrace. The alluvium consists of rounded river gravel and cobbles in a silty to clayey-sand matrix and is underlain by the Brushy Basin and Salt Wash Members of the Jurassic Morrison Formation. The Brushy Basin Member consists of interbedded shale, sandstone, and conglomerate lenses; the Salt Wash Member is composed of sandstones with some shales.

The Dry Flats disposal site is on a broad mesa that dips gently to the northeast. Soils at the disposal site consist mostly of silty clay that is underlain by claystone-shale along the crest of the site and by sandstone over the rest of the area. These are the uppermost strata of the Cretaceous Dakota Sandstone. Resistant sandstone is exposed on drainage divides and in drainages in about 20 percent of the site area. A broad joint pattern with three sets of trends

influences the drainage and erosional patterns. The local drainages become increasingly more incised downslope as they approach the canyon of the San Miguel River. Over most of the site, sandstone lies within 2 ft (0.6 m) of the surface and apparently represents a previously exposed surface. Some of the lower slopes at the disposal site range from 3 to 4 percent, and the soil cover has been eroded to expose resistant sandstone in the flat-bottomed drainages. There are no significant incisions in the channels, and gulying has not developed on any sandstone surfaces.

Mineral resources in the region with potential economic value are uranium, potash, coal, and oil and gas. Uranium does not occur in the area of the Dry Flats disposal site. The nearest uranium deposits are within the Colorado Uranium Belt several miles to the west. Potash has been associated with the Paradox Valley salt core structure adjacent to the Dry Flats site, but the only known potash production has been near Moab, Utah, more than 40 mi (64 km) to the west. Coal seams occur within the Dakota Sandstone at the disposal site, but only a few of the boreholes drilled at the site encountered coal. These shaley and discontinuous coal seams were less than 2 ft (0.6 m) thick and up to 20 ft (6 m) deep. Coal seams less than 3 ft (1 m) thick are generally not economical at that depth. The nearest coal mine is approximately 3 mi (5 km) east of the Dry Flats site.

Several natural gas deposits have been developed in the region, but oil production has been relatively minor. The production has been mostly from formations of Permian and Pennsylvanian age at depths on the order of 2200 ft (671 m). Reports indicate that these formations have been intensely mapped by geophysical surveys for potential petroleum resources, but there has been no oil and gas development near the Dry Flats disposal site. The nearest active gas field is at Andy's Mesa, approximately 10 mi (16 km) south of the disposal site. The Montrose Dome gas field was 3 mi (5 km) southwest of the Dry Flats site on the south side of Coke Oven Valley near Dry Creek. This field was last operated in 1958. The oil and gas leases on BLM-administered lands near the Coke Oven borrow site are adjacent to the Montrose Dome gas field.

The site region lies entirely within the Colorado Plateau Interior seismotectonic province. Most of the recorded earthquakes that affect the Colorado Plateau in this province are at the boundary of the plateau. Within a 40-mi (64-km) radius of the Dry Flats disposal site, only one earthquake of magnitude 4.0 has been recorded (NGDC/NOAA, 1989).

### **4.3 SURFACE WATER AND FLOOD HAZARD**

The Naturita processing site is on the west bank of the San Miguel River, which flows in a northwesterly direction through San Miguel Canyon. The San Miguel River originates in the San Juan Mountains near Telluride, Colorado, and joins the Dolores River 20 mi (32 km) downstream from the town of Naturita. In the vicinity of the processing site, the San Miguel River has a drainage area of 1209 square miles (mi<sup>2</sup>) [3131 square kilometers (km<sup>2</sup>)].

A U.S. Geological Survey (USGS) gaging station on the San Miguel River near the town of Naturita is 3 mi (5 km) upstream of the processing site. The recorded average maximum and average mean monthly flows were 2000 and 330 cubic feet per second (ft<sup>3</sup>/s) [57 and 9 cubic meters per second (m<sup>3</sup>/s)], respectively; however, on April 15, 1942, a peak flow of 7100 ft<sup>3</sup>/s (201 m<sup>3</sup>/s) was recorded (USGS, 1979). Approximately 31 ac (13 ha) of the former tailings area and mill yard are within the 100-year floodplain of the San Miguel River (Attachment 1, *Floodplains and Wetlands Assessment*).

There are no current uses of the water in the San Miguel River in the vicinity of the processing site. The town of Naturita currently withdraws water from the San Miguel River upstream of the processing site for municipal use. Withdrawal of water downstream of the processing site is minimal (Trachsler, 1989).

Surface water quality for the San Miguel River depends on the flow rate of the river. The concentration of total dissolved solids (TDS) upstream from the Naturita site varies inversely with flow rate; the suspended sediment concentrations vary widely and are directly proportional to the flow rate. All trace metal concentrations reported from the river upstream from the processing site have been below the levels specified by the EPA in the *National Interim Primary Drinking Water Regulations* (40 CFR Part 141). There were substantial increases in dissolved Ra-226 concentrations in the river between sampling points upstream and downstream of the processing site before the tailings were removed (ORNL, 1980). Since the removal of the tailings in 1979, the DOE's sampling of the river water has not revealed any contamination attributable to the processing site.

The Dry Flats disposal site is approximately 1 air mi (2 km) south of and 500 ft (152 m) above the San Miguel River, which is the nearest perennial stream. A topographic drainage divide runs across the Dry Flats disposal site from northwest to southeast, with the disposal cell located principally on the northeast side of the divide. Ephemeral surface water flow on the northeast side follows a number of drainages toward the San Miguel River. Ephemeral surface water flow on the southwest side follows drainages toward Dry Creek. Flooding is not considered to be a hazard at the disposal site because of the location near a drainage divide and the distance from, and elevation above, the closest perennial stream channel (the San Miguel River).

#### 4.4 GROUNDWATER

##### Naturita processing site

Groundwater beneath the Naturita processing site occurs in unconsolidated alluvial floodplain deposits of the San Miguel River and in sandstones of the Salt Wash Member of the Jurassic Morrison Formation. The alluvium is considered to be the uppermost aquifer at the site. Groundwater depths in the alluvium range from 2.5 to 18 ft (0.8 to 5 m) below the land surface. The occurrence of shallow groundwater in the alluvial aquifer is limited by the lateral extent of the

alluvium in the vicinity of the site. The alluvial aquifer is recharged principally by seepage from the San Miguel River southeast of the site and by the infiltration of precipitation. The groundwater flow direction in the alluvium is approximately parallel to the river. Groundwater is discharged from the alluvial aquifer by seepage into the river northwest of the site where the river valley narrows.

In the Salt Wash Member, groundwater is confined with a potentiometric surface that is higher in elevation than the water table in the alluvium. The alluvium and the Salt Wash Member are separated by a regional aquitard (Brushy Basin Member of the Jurassic Morrison Formation) consisting of thick, laterally extensive, interbedded shales with some sandstones. There is no observed hydraulic interconnection between the alluvium and the Salt Wash Member in the vicinity of the site. The Salt Wash Member is a major regional groundwater system in the Naturita area. The recharge area for the Salt Wash aquifer consists of the upturned edge of this formation on the southwestern flank of the Uncompahgre Uplift. The potential area of natural discharge from the Salt Wash aquifer is the San Miguel River northwest of the Naturita site before reaching Uravan, Colorado.

Background groundwater quality is defined as the quality of groundwater at the site if contamination had not occurred from uranium processing activities. In the alluvial aquifer, the groundwater has pH values that range from 6.7 to 7.3, and the groundwater is characterized as a mixed cation (sodium-potassium-magnesium-calcium/sulfate bicarbonate) type. The average TDS content is approximately 1100 milligrams per liter (mg/L). Analyses of groundwater samples indicated that background concentrations of molybdenum, nitrate, selenium, and uranium have exceeded the proposed EPA maximum concentration limits (MCL) at some time; all other hazardous constituent concentrations were below the proposed EPA MCLs. Nitrate exceeded the proposed EPA MCL only once and could have been the result of laboratory contamination or improper sampling. Also, uranium was slightly above the proposed MCL only once, and all other uranium concentrations were below the proposed MCL.

Background groundwater quality in the Salt Wash aquifer is affected by the presence of naturally occurring uranium mineralization underlying the Naturita site. Groundwater in the Salt Wash Member has not been affected by uranium processing activities at the site due to the Brushy Basin Member aquitard separating the Salt Wash Member from the alluvium. The pH values range from 7.0 to 7.4, and the groundwater is characterized as a sodium-sulfate-chloride type. The average TDS concentration is 5684 mg/L. Groundwater analyses indicated that background concentrations of molybdenum, selenium, and uranium and activities of net gross alpha and Ra-226 and Ra-228 have exceeded the proposed EPA MCLs. All other hazardous constituents have been below the proposed EPA MCLs.

Groundwater from several wells within 2 mi (3 km) of the Naturita processing site is used for domestic purposes. These wells are located in the San Miguel River valley upgradient of the processing site and adjacent to the valley north of the river. Groundwater is drawn from the alluvial and Salt Wash aquifers. There is no potential for contamination of these wells, because the Salt Wash aquifer is not hydraulically interconnected with the alluvium and the river is a discharge point for the alluvial groundwater. No future use of the alluvial aquifer is expected, because the alluvium has a finite lateral extent in the vicinity of the site and a limited ability to supply groundwater. Alternative supplies of good quality water are available from the town of Naturita. Naturita's primary and secondary water supplies are the San Miguel River and a deep well in the Salt Wash aquifer, respectively.

#### **Dry Flats disposal site**

Groundwater can potentially occur in sandstone zones in the bedrock units beneath the Dry Flats disposal site. The bedrock units include (from the surface down) the Dakota Sandstone and Burro Canyon Formation of Cretaceous age and the Brushy Basin and Salt Wash Members of the Jurassic Morrison Formation. It is difficult to determine actual thicknesses and contacts between formations in the area because of similarities between the lithologies and gradational contact zones between the units. Near the proposed disposal cell area, detectable groundwater occurs initially (unconfined) as basal saturation in sandstones of the Burro Canyon Formation, which overlie the regional Brushy Basin aquitard at depths ranging from 185 to 200 ft (56 to 61 m). The next occurrence of groundwater (confined) is in sandstones in the lower part of the Brushy Basin Member at depths of approximately 500 ft (152 m). Based on the estimated thicknesses of units in the area, it appears that the top of the Salt Wash Member is approximately 700 ft (213 m) below the surface.

The shallower saturated sandstone zone in the basal portion of the Burro Canyon Formation is designated as the uppermost aquifer at the Dry Flats disposal site. Although this unit does not represent an aquifer from a water resource perspective, it could be classified as an aquifer from a regulatory perspective because it is the first zone of saturation on top of a regional aquitard and would be the first groundwater affected by any potential seepage of leachate from the disposal cell.

Recharge to the sandstone zones beneath the disposal site is restricted to infiltration from precipitation. Downward migration of water is inhibited, particularly beneath the Burro Canyon Formation, by the thick mudstone in the Brushy Basin aquitard. There is no evidence of discharge of groundwater from the shallower Burro Canyon Formation along the contact with the Brushy Basin Member in the downslope drainages northeast of the site or in the cliff faces along the San Miguel River canyon.

Two seeps/springs in the Coke Oven Valley were observed within a 1-mi (2-km) radius of the proposed disposal site on the southwest side of the drainage



divide. The origins of these discharges are most likely deep percolation from precipitation events and discharge of groundwater from the Dakota Sandstone. Groundwater in the Dakota on the southwest side of the drainage divide is relatively shallow in the Coke Oven Valley and has an upward gradient resulting in discharge to the surface drainage. A third seep/spring was observed within a 1-mi (2-km) radius of the proposed disposal cell. This perched water discharge is on the northeast side of the drainage divide. On this side, the Dakota Sandstone is unsaturated with the exception of localized occurrences of perched water. Some perched water from deep percolation may accumulate in near-surface sandstone units overlying more impermeable shale layers or in localized colluvial materials in the drainages. The origins of the discharge are most likely deep percolation from precipitation events and discharge of localized shallow perched water in the upper sandstone units.

The direction of groundwater flow in the shallower saturated zone of the Burro Canyon Formation is to the northeast, and the average hydraulic conductivity is relatively low. The potential yield of groundwater from this zone is very low, less than 150 gallons (gal) [568 liters (L)] per day. The direction of groundwater flow in the lower part of the Brushy Basin Member was not determined. Based on information from two deep monitor wells, there is an upward vertical gradient from the confined groundwater in sandstones of the Brushy Basin Member.

Groundwater quality in the shallower saturated zone of the Burro Canyon Formation was determined by analyzing samples taken during six sampling periods from August 1989 through July 1992. Groundwater quality is characterized by activities of net gross alpha exceeding the MCL, with a mean activity of 37 picocuries per liter (pCi/L). The average concentration of TDS is 3203 mg/L.

Within a 2-mi (3-km) radius of the Dry Flats disposal site, there are several domestic water wells in the Coke Oven valley to the west and in the San Miguel River valley to the north. The wells in the Coke Oven valley tap the Dakota Sandstone, and the wells in the river valley tap the shallow alluvial and Salt Wash aquifers. There is no existing or potential use of the groundwater in the uppermost aquifer (Burro Canyon Formation) in the immediate vicinity of the disposal site because sustainable amounts of groundwater are not available from the aquifer. However, the shallow perched water discharging from the observed seeps/springs within a 1-mi (2-km) radius of the Dry Flats disposal site is of beneficial use to livestock and wildlife.

#### 4.5 RADIATION

The natural background gamma exposure rate at the Naturita processing site ranges from 11.8 to 15.1 microröntgens per hour ( $\mu\text{R/hr}$ ) and averages 13.5  $\mu\text{R/hr}$ . Background surface soil samples collected within a few miles of the processing site indicated mean concentrations of  $2.3 \pm 1.0$  pCi/g for Ra-226;  $6.7 \pm 1.6$  parts per million for thorium-232 (Th-232); and  $1.9 \pm 0.2$  percent

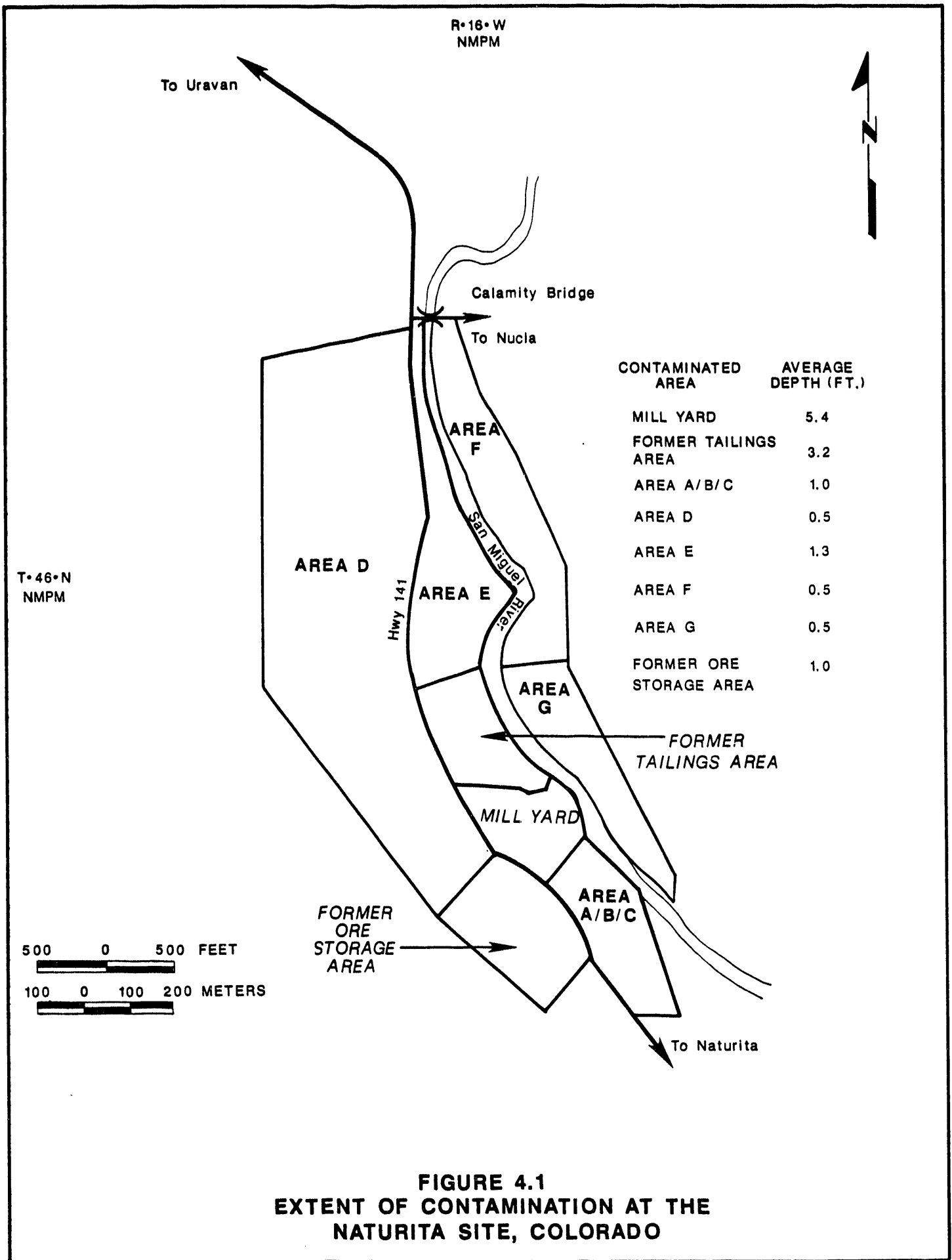
for potassium-40 (K-40) (BFEC, 1985). Baseline radon concentrations averaged 2.0 pCi/L for the Naturita area and ranged from 1.0 to 3.2 pCi/L (FBDU, 1981).

Radiometric and soil sample analyses were made at and in the vicinity of the processing site to establish the extent and depth of contamination (Figure 4.1) (TAC, 1989; BFEC, 1985). The gamma exposure rate ranged from 8 to 369  $\mu\text{R/hr}$  in the contaminated areas, with an area-weighted average of 39.1  $\mu\text{R/hr}$  (ORNL, 1980). Ra-226 concentrations in soil ranged from 0.5 to 822 pCi/g in various areas around the site and had a volume-weighted average of 68.8 pCi/g (TAC, 1989; BFEC, 1985). In addition, eight buildings and abandoned construction and mill equipment remain at the site. All of the buildings exhibit some alpha contamination, and gamma exposure rates are above the EPA standard of 20  $\mu\text{R/hr}$  above background (BFEC, 1985).

Radon concentrations were measured at the site boundary from April 26, 1989, to March 12, 1990, using integrating Track-Etch<sup>®</sup> detectors (TAC, 1990). Concentrations ranged from 0.6 to 5.6 pCi/L and averaged 2.5 pCi/L. Radon flux measurements were made at the site in 1981 using the charcoal canister technique (FBDU, 1981). Fluxes ranged from 0.5 to 124 picocuries per square meter per second (pCi/m<sup>2</sup>s) and had an area-weighted average of 20.2 pCi/m<sup>2</sup>s for the mill yard and former tailings and ore storage areas.

Supplemental standards are defined under 40 CFR 192.22(a) as "coming as close to meeting the otherwise applicable standards as is reasonable under the circumstances." The bases for applying supplemental standards are 1) limited long-term health impacts; 2) unlikely human habitation of the area; 3) probable long-term environmental harm; 4) potential risk of injury to workers if remedial action were undertaken; and 5) unrealistically high remedial action costs relative to the benefits. Area D, west of the processing site and State Highway 141 (Figure 4.1), is considered for exclusion from remedial action by the application of supplemental standards. The rationale for applying supplemental standards to Area D is based on a combination of radiological, ecological, geomorphological, and engineering considerations.

Radiological characterization of Area D identified 112 ac (45 ha) of land contaminated by Ra-226 that exceeded the EPA's surface cleanup criteria of 5 pCi/g above background (2.3 pCi/g). Ra-226 concentrations ranged from 2 to 96 pCi/g, with an average of 21 pCi/g. Gamma exposure rate measurements ranged from 13 to 55  $\mu\text{R/hr}$  and averaged 24  $\mu\text{R/hr}$ . If Area D is not cleaned up, radiological impacts to individuals and the general population residing on or in the vicinity of the area could result from direct gamma exposure and the inhalation of radon decay products or resuspended radioactive particulates. The steep terrain of the area would rule out the likelihood of anyone permanently inhabiting or constructing a residence in the area; therefore, long-term health impacts due to on-site exposures are not a serious consideration. The radiological impacts to individuals and the general population residing in the vicinity of Area D would be negligible and are discussed in Section 5.4.



The terrain in Area D consists of steep, sparsely vegetated slopes cut by erosion gullies. Removing the contaminated materials from these slopes would require the removal of most, if not all, of the shallow soil and all associated vegetation. The vegetation in the area is considered to be rare by the state of Colorado (O'Kane, 1987, 1986; Voight, 1984), and removal of the upper few inches of soil would make the slopes sensitive to erosion. Successful revegetation of the disturbed area would be difficult, and severe erosion could bring mud and debris onto State Highway 141 unless the slopes were restabilized after remedial action. Furthermore, the steepness of the contaminated terrain would prevent the use of conventional excavation equipment normally used on the UMTRA Project and would present hazardous working conditions for the remedial action workers. The cleanup could cost three to five times the amount anticipated for other areas of the Naturita site.

It is evident from the above analysis that all the criteria for applying supplemental standards to Area D have been met. The long-term health effects for an individual or the potentially exposed population would be negligible, and costly measures would be required to remove the contamination and restore the area to promote nonerosive drainage and reestablish rare plant communities. Finally, any construction activities on the steep terrain would be hazardous to remedial action workers. Therefore, an application for implementing supplemental standards in Area D would be submitted to the NRC and the state of Colorado for approval. If the application were approved, Area D would not be included in the remedial action at the Naturita site.

Additional areas may be considered for the application of supplemental standards. These areas might include steep slopes where conventional cleanup techniques cannot be employed and where disturbances would likely cause future erosion problems and areas containing protected vegetation, wildlife habitat, or cultural resources.

#### 4.6 FLORA AND FAUNA

This section describes the flora and fauna at and near the sites that would be affected by remedial action. Additional information on riparian plant communities and wetlands is provided in Attachment 1, *Floodplains and Wetlands Assessment*. Additional information on the flora and fauna and threatened and endangered species is provided in Attachment 2, *Biological Assessment*.

##### Flora

The San Miguel River Valley contains riparian areas surrounded by steep juniper-covered hillsides. Approximately 47 ac (19 ha) of riparian habitat along the San Miguel River have been contaminated at and adjacent to the Naturita processing site. The plant communities in this habitat are immature and mature cottonwood trees, cottonwood and willow seedlings and saplings, degraded cottonwood and willow saplings, upper riparian shrub, and willow. Other plant

species in the riparian habitat include salt cedar, yellow sweet-clover, horsetail, sedges, rushes, Russian olive, squawbush, wild rose, grasses and herbs, rabbitbrush, and big sagebrush. Only the riparian areas containing the cottonwood and willow seedlings [approximately 4 ac (2 ha)] meet the USACE definition of a wetland (Jacobsen, 1992). Riparian vegetation along Dry Creek near the Coke Oven borrow site generally grows in a thin band along the creek and is dominated by willow and salt cedar. Scattered clumps of mature cottonwood trees are also found along the creek.

Upland plant community types occur in elevated areas next to the San Miguel River riparian habitat and at the Dry Flats disposal and Coke Oven borrow sites. The upland plant community near the river is dominated by black greasewood, big sagebrush, rabbitbrush, and widely scattered juniper, pinon pine, and Gambels oak. Big sagebrush is the dominant plant species at the Dry Flats and Coke Oven borrow sites. The pinon-juniper woods with an understory of big sagebrush grow near the Dry Flats disposal site, and much of the haul road to the disposal site would traverse this plant community type. There are also areas of cleared sagebrush in the vicinity of the Dry Flats and Coke Oven sites. Big sagebrush has begun to reinvade these sites and is typically the most common species.

### **Fauna**

Limited fish sampling in the San Miguel River indicates that the flannelmouth sucker and rainbow trout are the most common species. At least 11 species of reptiles and amphibians occur in the riparian habitat along the San Miguel River, while 14 species occur in the upland habitats. The Woodhouse toad, western whiptail, plateau striped whiptail, fence and sagebrush lizards, bull snake, and western terrestrial garter snake were observed.

A total of 78 species of birds were recorded at the Naturita site. Sixty-four species were observed in the riparian habitat, and 29 species were observed in the upland habitats. Of the 78 bird species, 16 were observed in both the riparian and upland habitats. Nesting bird surveys along the San Miguel River have shown that the yellow warbler is the most common species in the riparian habitat. Other common nesting species are the spotted sandpiper along the river, the western wood pewee and northern oriole in cottonwood stands, and the yellow-breasted chat in shrubby areas. Waterbirds such as the great blue heron, mallard, and belted kingfisher were frequently observed along the river but are not known to nest in the area. Nesting raptors were not observed in the site area. Turkey vultures have been roosting for a number of years in a cottonwood stand across the river from the processing site.

A total of 27 species of birds are known to nest in the riparian habitat along Dry Creek. The northern oriole, western kingbird, ash-throated flycatcher, and northern mockingbird were the most common species and were most frequently associated with the small stands of cottonwood trees along Dry Creek. The western meadowlark and rock wren were common in the big sagebrush habitat,

while the blue-gray gnatcatcher and black-throated gray warbler were observed in the pinon-pine woods. No nesting raptors were observed in the area of the Dry Flats disposal and Coke Oven borrow sites, but the red-tailed hawk, American kestrel, and Cooper's hawk were observed. The prairie falcon, golden eagle, common barn owl, long-eared owl, great horned owl, western screech owl, and burrowing owl could occur in the areas of the processing, disposal, and borrow sites.

At least 19 species of mammals may occur in the riparian habitat along the San Miguel River, and 26 species may occur in the upland habitats. Beaver sign is common along the river and Dry Creek, and the mule deer is common along the river. Two small Gunnison prairie dog towns occur at the Dry Flats disposal and Coke Oven borrow sites. Mule deer sign was observed throughout the Dry Flats area, and the area may serve as winter range. There is no critical deer winter range in the area. A small number of elk may winter in the pinon-juniper woods in the area of the Dry Flats disposal and Coke Oven borrow sites.

#### Threatened and endangered species

Consultations with the FWS revealed that six Federally listed threatened and endangered species, one Federally proposed species, and nine Federal candidate species may occur in the area of the processing, disposal, and borrow sites. The Federally listed Colorado squawfish, bonytail chub, humpback chub, and razorback sucker were determined not to occur in the San Miguel River at the Naturita site. The Federal candidate ferruginous hawk, loggerhead shrike, northern goshawk, Columbian sharp-tailed grouse, white-faced ibis, and Paradox lupine were also determined not to occur at or near the processing, disposal, and borrow sites.

The endangered bald eagle winters in small numbers along the San Miguel River in the processing site area but does not nest in the area. The endangered black-footed ferret is closely associated with prairie dog towns. However, due to the very limited number and size of prairie dog towns in the area, the black-footed ferret would not be expected to occur at or in the area of the processing, disposal, and borrow sites. The Federal candidate flannelmouth sucker and roundtail chub reside in the San Miguel River in the area of the processing site. The Federally proposed southwestern willow flycatcher was heard calling near the processing site in 1986 but was not observed or heard calling in 1990 through 1993. This species does not currently nest in the processing site area, but potential habitat for the species does occur at the site.

#### **4.7 LAND USE**

Most of the land surrounding the Naturita processing site, Dry Flats disposal site, and Coke Oven borrow site is administered by the BLM and used primarily for livestock grazing. The closest residences to the processing site are 15 homes in East and West Vancorum (Latta, 1993) approximately 1 road mi (2 km) southeast of the site. The town of Naturita is approximately 1 air mi

(2 km) northeast of the Dry Flats disposal site, and there is one residence, the Coke Oven Ranch, approximately 2 air mi (3 km) west of the disposal site.

The former tailings area and mill yard are on private lands and are not being used at the present time. The former ore storage area is on private land and land administered by the BLM. The BLM-administered land is within the 23,236-ac (9403-ha) Sawtooth grazing allotment that is permitted for a total of 488 animal unit-months (AUM) between January 1 and April 30 of each year. (One AUM will meet the grazing needs of one mature cow and calf for one month.) The portion of the former ore storage area that is within the grazing allotment has steep slopes and probably does not receive much, if any, grazing use (Sazama, 1993). The portion of the former ore storage area that is on BLM-administered land is also within an active oil and gas lease (Lewis, 1993), but the steep slopes in this area probably preclude oil and gas exploration and development activities.

All of the contaminated areas adjacent to the processing site (Figure 4.1) except the area west of State Highway 141 (Area D) are on private lands. None of these private lands are being used except for one parcel south of the site, which is being used for the storage of surplus uranium processing equipment. The area west of State Highway 141 is on land administered by the BLM and is also within the Sawtooth grazing allotment and an active oil and gas lease. This area also has steep slopes and probably does not receive much if any grazing use or oil and gas exploration and development. The BLM-administered lands around the processing site are also a power site withdrawal (Sazama, 1993; Lewis, 1993).

The Dry Flats disposal site is on and surrounded by land administered by the BLM and used primarily for livestock grazing. The site is within the 2387-ac (966-ha) Lillylands-West grazing allotment, which is permitted for 224 AUMs of use between January 15 and March 31 of each year. The disposal site is within a portion of the grazing allotment that was vegetatively treated by the BLM to improve forage production; this portion of the allotment probably produces 5 to 10 percent of the allotment's total forage production. There are two small earthen water tanks for livestock at the site. There are also private lands around the disposal site. These private lands are used primarily for livestock grazing, and the inactive Durita uranium processing facility is on private land approximately 1 air mi (2 km) west of the disposal site (Sazama, 1993). The disposal site is also within two active oil and gas leases (Lewis, 1993).

The Coke Oven borrow site is also on land administered by the BLM and used primarily for livestock grazing. The borrow site is within the 7660-ac (3100-ha) Coke Ovens grazing allotment, which is permitted for 224 AUMs between February 15 and April 15 of each year. There have been no vegetative treatments to improve forage production in the area of the borrow site (Sazama, 1993). The borrow site is within three active oil and gas leases and eight active lode mining claims (Lewis, 1993).

The Naturita area was evaluated for the presence of areas of critical environmental concern, prime and unique farmlands, wild and scenic rivers, and wilderness. None of these critical elements are present in the area (Pfifer, 1993).

#### **4.8 HISTORICAL AND CULTURAL RESOURCES**

Cultural resource surveys of the Naturita site and some of the adjacent contaminated areas were conducted from 1987 to 1989. Nine prehistoric sites and four isolated artifacts were recorded during these surveys. The sites consist of three rock shelters, several lithic scatters, and a petroglyph panel. Three of the sites are considered eligible for nomination to the National Register of Historic Places (NRHP), and additional data are required to determine the eligibility of three sites. The remaining three sites are not considered eligible for nomination to the NRHP (CASA, 1989a). Additional cultural resource surveys are being conducted in the rest of the contaminated areas adjacent to the processing site. In addition, the BLM has evaluated the potential for historical features (e.g., buildings and their contents) at the processing site, and certain features at the site have been recommended as eligible for nomination to the NRHP (Kesterke, 1993).

Cultural resource surveys of the Dry Flats disposal site and haul road [County Road GG-25 and new 0.25-mi (0.4-km) haul road] were conducted between 1987 and 1993. During these surveys, 11 prehistoric (or protohistoric) and historic sites and 12 isolated artifacts were located. The sites are one historic homestead, a possible wickiup, three rock shelters with lithic materials, two hearth sites with lithic materials, and four lithic scatters. Five of the sites are considered eligible for nomination to the NRHP, and additional data are required to determine the eligibility of one site. The remaining five sites are not considered eligible for nomination to the NRHP. Only one isolated artifact was found in the area of the haul road (CASA, 1990a; 1989b).

Cultural resource surveys of the Coke Oven borrow site were conducted in 1989, 1990, and 1993. Seven prehistoric sites and 19 isolated artifacts were located during these surveys. The sites are two rock shelters with lithic materials and five lithic scatters. Five of the sites are considered eligible for nomination to the NRHP, and additional data are required to determine the eligibility of the other two sites (CASA, 1993; 1990a; 1990b; 1989b).

There are no known areas of religious significance to Native Americans in the Naturita area (Fike, 1993).

#### **4.9 SOCIOECONOMIC CHARACTERISTICS**

The Naturita processing site is in the western portion of Montrose County, which is characterized by smaller, rural communities. In 1990, the population of Montrose County was 24,423. Most of this population (72 percent) resides in the eastern portion of the county, which is called the Montrose census



subdivision. The Nucla census subdivision represents the western portion of the county and includes the Naturita site. Nucla is approximately 3 road mi (5 km) north of Naturita. In 1990, the Nucla census subdivision had a population of 2289, and Naturita and Nucla had populations of 434 and 656, respectively (DOC, 1991a). Recent estimates indicate that the populations of these communities have remained stable. The 1992 estimated populations of Naturita and Nucla were 461 and 699, respectively (Reynolds, 1993). Based on 1990 data, Montrose County had an average household size of 2.55 persons and a population density of 10.9 persons per square mile. The 1990 average household size for the Nucla census subdivision was 2.5 persons (DOC, 1991b).

The 1990 total civilian labor force in Montrose County was 11,170 persons with a 6.1 percent unemployment rate. For the Nucla census subdivision, the 1990 civilian labor force was 957 persons, and the unemployment rate was 6.5 percent. The 1990 civilian labor forces in Naturita and Nucla were 184 and 278 persons, with unemployment rates of 3.8 and 9.4 percent, respectively. The 1990 unemployment rate for the state of Colorado was 5.7 percent (DOC, 1991c). A coal-fired electric power plant and supporting coal mine recently went into full production in the Nucla area, and there has been increased construction in the nearby Telluride area (Latta, 1993). Correspondingly, labor trends indicate that unemployment is decreasing in Montrose County. In July of 1993, the county had a total civilian labor force of 12,254 persons with a 5.3 percent unemployment rate (Holiday, 1993; Larson, 1993).

In 1990, Montrose County had 10,353 housing units, and 9405 of these units were occupied. Owner-occupied units made up 72 percent of the housing units. Vacancy rates in Montrose County were 1.8 percent for homeowner units and 8 percent for rental units. These rates were below the state's vacancy rates of 3.3 percent for homeowner units and 11.4 percent for rental units, reflecting a tighter housing market for both types of units. The Nucla census subdivision had 1195 housing units in 1990, and 915 of these units were occupied. Of the 280 vacant units, 57 were for seasonal, recreational, or occasional use. In 1990, Naturita had 230 housing units, of which 43 were renter-occupied and 50 were vacant. Nucla had 338 housing units in 1990. Of these units, 83 were renter-occupied and 63 were vacant (DOC, 1991a, 1991d).

Recent activities in the Nucla and Telluride areas have caused a shortage of available housing, both owner-occupied and rental, in Naturita and Nucla. In fact, almost all of the rental housing in Naturita is rented or has been purchased for permanent housing. People working in the Telluride area tend to seek housing in Naturita and Nucla because housing in Telluride and Norwood is expensive. Telluride and Norwood are approximately 60 and 20 road mi (97 and 32 km) southeast of Naturita, respectively. Two trailer parks in Naturita and Nucla have approximately 20 vacant trailer spaces, and one recreational vehicle park in Naturita has 10 to 12 spaces (Crane, 1993; Latta, 1993). Two motels in Naturita have a total of 62 rooms (Hall, 1993; Hopkins, 1993).

Naturita and Nucla make up the West End School District. The Naturita Middle School (grades 7 and 8) is in Naturita and has a current enrollment of 89 students. The elementary (preschool through grade 6) and high schools are in Nucla. The Nucla Elementary School has a current enrollment of 350 students, and the Nucla High School has a current enrollment of 125 students. The Naturita Middle School and Nucla Elementary School could accommodate a maximum of 15 and 50 additional students, respectively, without providing additional facilities and personnel. The Nucla High School has sufficient classroom space to accommodate additional students, but the teacher-to-student ratio is at or very near capacity. Depending on the number and grades of additional high school students, at least one part-time teacher might have to be hired (Hopewell, 1993; Mahaney, 1993; Harrison and Kelly, 1993).

Three Montrose County deputy sheriffs stationed in Naturita patrol the Naturita-Nucla area. There is an auxiliary sheriff's office in Nucla, and there is also a volunteer sheriff's posse. The town of Nucla has just hired a police officer. The Colorado State Patrol passes through the area at least once a day. Naturita and Nucla share a combined volunteer fire department with approximately 40 firefighters. There is a fire station in each town, and the fire department has three ambulances (Thomson, 1993; Vodopich, 1993).

Emergency medical care and outpatient services are available from clinics in Naturita and in Norwood, approximately 20 road mi (32 km) southeast of Naturita. Emergency medical calls are dispatched through the sheriff's office in Naturita. For extensive medical care, patients may be taken to Montrose, Grand Junction, or, if necessary, to Denver, Colorado (Kettle, 1993). Montrose Memorial Hospital has a capacity of 75 beds with an average occupancy rate of approximately 50 percent (Holman, 1993).

#### 4.10 TRANSPORTATION

The Naturita site is accessible from Naturita on State Highways 90/141 and 141 and from the Dry Flats disposal site on State Highways 90 and 141 and County Road GG-25. State highways 90, 141, and 90/141 are paved, two-lane roads; County Road GG-25 is a dirt road. The 1994 average daily traffic on State Highways 90 and 141 at their intersection is projected to be 360 and 281 vehicles, respectively. The capacities of State Highways 90 and 141 at level of service "A" are 45 and 39 vehicles per hour, respectively. From 1987 to 1992, there were two injury accidents and four property-damage only accidents on State Highways 90 and 141 at their intersection. There were no fatal accidents at this location during this period (Langoni, 1993).

## 5.0 ENVIRONMENTAL IMPACTS

### 5.1 INTRODUCTION AND ASSUMPTIONS

The environmental impacts of the proposed action and no action are discussed in this section. The environmental impacts are based on conservative assumptions and impact assessment procedures and thereby represent a realistic upper limit on the severity of the impacts that may occur. The actual impacts that would occur would probably be less severe than those identified here.

The impacts presented here are also based on the assumption that an application for supplemental standards would be approved for Area D adjacent to the Naturita site (Sections 3.1, 4.5, 5.4, and 5.9); this approval would preclude performing remedial action for Area D. If the application were not approved, the public health impacts after remedial action would decrease very slightly. However, health impacts to remedial action workers could increase substantially, primarily due to the potential physical hazards associated with conducting remedial action in this area. Other environmental impacts (e.g., erosion and the destruction of vegetation) could also increase substantially if the cleanup of Area D were required.

Additional areas at and adjacent to the Naturita site may be considered for the application of supplemental standards. These areas might include steep slopes and areas containing protected vegetation, wildlife habitat, or cultural resources. Remedial action in these areas could be costly and hazardous to remedial action workers and could result in long-term environmental impacts such as increased erosion. If supplemental standards were applied to additional areas, the public health impacts after remedial action would increase slightly, but the health impacts to remedial action workers could decrease substantially. Other environmental impacts of the remedial action, such as the disturbance of riparian plant communities and cultural resources, would be reduced if supplemental standards were applied to additional areas.

### 5.2 NO ACTION

Without any remedial action at the Naturita processing site, the contaminated materials and debris would remain where they are. The contaminated materials would continue to be exposed to erosion from surface runoff and flood flows from the San Miguel River, and eventual erosion of the contaminated materials could result in the transport of contaminants into the river. The Naturita site and adjacent areas would remain unusable and would continue to decrease the value of adjacent lands. The contaminated materials and debris would be susceptible to unauthorized removal and use by humans, which could cause more widespread contamination and increased public health hazards. The contamination of groundwater at the processing site would continue for an indefinite period of time. The Dry Flats disposal site would not be transferred to

the DOE, and the public lands within the disposal site would continue to be administered by the BLM. Finally, without remedial action at the Naturita processing site, the requirements of PL 95-604 would not be met.

### 5.3 GENERAL IMPACT SUMMARY

The proposed remedial action would have no effect on the climate or geology of the affected areas, although it is recognized that both of these elements could affect the longevity of the proposed engineering design and compliance with the proposed EPA groundwater standards. The engineering design elements that would mitigate erosion include the 2- to 5-percent slopes of the disposal cell (Figure 3.1) and the riprap [1.5 to 3.5 in (3.8 to 8.9 cm) in diameter] covering the disposal cell. The Dry Flats disposal site was selected because it is in an area of geologic stability and would not be subject to natural processes that could jeopardize the integrity of the disposal cell.

It is highly unlikely that any usable minerals (e.g., oil, gas, and coal) are present beneath the disposal site (Section 4.2). The UMTRCA, PL 95-604, also authorizes the Secretary of the Interior, with the concurrence of the Secretary of Energy and the NRC, to dispose "of any subsurface mineral rights by sale or lease...if the Secretary of the Interior takes such action as the Commission deems necessary pursuant to the license issued by the Commission to assure that the residual radioactive materials will not be disturbed by reason of any activity carried on following such disposition." The transfer of the mineral rights for the disposal site to the Federal government would be subject to any valid existing mineral rights (e.g., oil and gas leases).

There would be no significant deterioration of air quality during the proposed remedial action. The most important air pollutant of concern would be uncontrolled fugitive dust, and much of the fugitive dust would be produced along the haul road to the disposal site. It is assumed that using water, chemical additives, or a combination of water and additives as a dust suppressant would effectively reduce emissions by at least 50 percent. Covering the haul trucks or using surfactants on their contents would also reduce fugitive dust. An Air Pollution Emissions Notice and Emission Permit would be obtained from the state of Colorado prior to beginning the remedial action. This permit would require implementation of a dust control plan that would include measures such as covering haul trucks, treating haul roads, limiting speeds on unpaved haul roads, and stopping work during windy periods. A monitoring plan to ensure that air quality standards are not exceeded would be developed by the RAC and must be approved by the state of Colorado and Montrose County before any ground-disturbing activities are initiated.

Remedial action at the Naturita processing site would remove soils from approximately 133 ac (55 ha); however, these soils are contaminated and cannot be used for agricultural, commercial, or other purposes. Disturbed areas at and adjacent to the processing site would be reclaimed with uncontaminated soils. Activities at the Dry Flats disposal site would permanently disturb

approximately 28.5 ac (11.2 ha) of soils for the excavation of the disposal cell [21 ac (8 ha)], improvement of County Road GG-25 [7 ac (3 ha)], and construction of the new haul road from the county road to the disposal site [0.5 ac (0.2 ha)]. This disturbance would constitute a permanent loss of soils, but these soils would be used for part of the disposal cell cover or for restoration of the Naturita processing site. Approximately 84.5 ac (34.2 ha) of soils would be temporarily disturbed at the disposal site by the construction of the disposal cell [48 ac (19 ha) within the temporary disposal site and 36 ac (15 ha) within the final disposal site] and construction of the new haul road [0.5 ac (0.2 ha)]. A maximum of 135 ac (55 ha) of soils would be temporarily disturbed at the Coke Oven borrow site. Surface soils in areas to be temporarily disturbed would be scraped, stockpiled, and used to reclaim the sites after completion of the remedial action. A total of approximately 380 ac (153 ha) of soils would be permanently and temporarily disturbed by the remedial action.

#### 5.4 RADIATION

The principal pathways by which individuals could be exposed to radiological hazards during the remedial action include the inhalation of radon decay products and airborne radioactive particulates, direct exposure to gamma radiation, ingestion of contaminated surface water and groundwater, and ingestion of foods produced in contaminated areas. The ingestion of contaminated water and food is not of major concern at the Naturita site, as no water supply wells or agricultural areas have been or would be adversely affected. Calculations of excess health effects from the ingestion of contaminated water from a hypothetical well were considered and shown to be low relative to those from the inhalation and direct exposure pathways. Therefore, excess health effects to the general population were calculated only for the inhalation of radon and radon decay products, direct exposure to gamma radiation, and the inhalation of airborne particulates. The assumptions and detailed calculations for the radiological health impacts are available for review in the UMTRA Project Office in Albuquerque, New Mexico.

Excess health effects are the number of fatal cancers that are estimated to occur in a population due only to the exposure to radiological contaminants associated with the processing and disposal sites and remedial action activities. To put the excess health effect in perspective, an individual in the United States has a 16 percent lifetime chance of contracting a fatal cancer, or one chance in six, due to all other causes in society (NAS, 1980).

During the implementation of the proposed action, the exposure to the general population from the radiological pathways would decrease as the contaminated materials are removed to the Dry Flats disposal site. Remedial action workers would be exposed to contamination during remedial action. However, mitigative measures such as wetting the work areas or stopping work during high winds would be implemented during remedial action to keep airborne radioactive particulate concentrations at a nonhazardous level. No credit was allowed in the excess health effects calculations for the effectiveness of mitigative measures.

As shown in Table 5.1, the increase in general population excess health effects due to radon released from the contaminated materials during remedial action would be smaller than the number of excess health effects without remedial action. This is because radon is currently emanating from the processing site. During remedial action, increases in gamma exposure rates and airborne radioactive particulates would be confined to the close vicinities of the processing and disposal sites. Since the general population densities at the sites are low, these increases would mainly affect remedial action workers. Also, as shown in Table 5.1, the excess health effects to the general population due to gamma radiation exposure and particulate releases would be nearly two orders of magnitude less than those caused by radon decay products. For an individual in the exposed population of 1501 persons within 6 mi (10 km) of the processing site, the total risk for the proposed remedial action would correspond to 1 chance in 5.2 million of an individual contracting a fatal cancer per year of exposure, or 1 chance in 74,000 over a 70-year lifetime. This would be a small increase compared with the natural lifetime incidence of cancer in the United States. However, the increased risk of excess health effects would continue for thousands of years without remedial action.

**Table 5.1 Excess health effects for the general public and remedial action workers<sup>a</sup>**

Exposed group	Radon decay products exposure (x 10 <sup>-4</sup> )	Gamma exposure (x 10 <sup>-4</sup> )	Airborne radioactive particulates (x 10 <sup>-4</sup> )	Total excess health effects (x 10 <sup>-4</sup> )
<b>General public</b>				
Proposed action	2.8	0.021	0.049	2.9
No action <sup>b</sup>	3.9	0.065	NC <sup>c</sup>	4.0
<b>Remedial action workers</b>				
Proposed action	12	4.9	6.3	23
No action	0	0	0	0

<sup>a</sup>An excess health effect of 10<sup>-4</sup> or 0.0001 corresponds to 1 chance in 10,000 of an individual contracting a fatal cancer per year of exposure. The excess health effects for the general public are based on a population of 1501 persons within 6 mi (10 km) of the processing and disposal sites. The excess health effects due to the proposed action were calculated for a typical remedial action scenario (e.g., typical sequence for the excavation of contaminated materials and restoration of disturbed areas) and schedule. A different remedial action scenario and/or schedule would result in a different but very similar number of excess health effects.

<sup>b</sup>The excess health effects for no action are for a 33-month period to allow a direct comparison with the excess health effects due to 33 months of remedial action. The 33-month remedial action period includes two 4-month winter shutdowns. The excess health effects for no action do not include the health effects due to no action at the off-site vicinity properties.

<sup>c</sup>The excess health effects from airborne radioactive particulates for no action were not calculated (NC). Previous calculations of these health effects have shown them to be orders of magnitude less than those from radon decay products and gamma radiation.

Due to their proximity to the contaminated materials, remedial action workers would also be exposed to radon decay products, gamma radiation, and airborne radioactive particulates. During remedial action, individual workers would receive whole-body doses of approximately 40 millirems (mrem) from gamma exposure at the processing site and approximately 30 mrem at the disposal site. The excess worker health effects from gamma exposure during remedial action would be  $4.9 \times 10^{-4}$ .

Remedial action workers would also receive radiation doses from the inhalation of airborne radioactive particulates. Individual workers at the processing and disposal sites would receive 50-year effective whole-body dose commitments of approximately 50 mrem and 130 mrem, respectively. The excess health effects to workers from exposure to airborne radioactive particulates during remedial action would be  $6.3 \times 10^{-4}$ . The combined dose from gamma radiation and airborne radioactive particulates exposure for a worker at each site would be approximately 80 mrem for the processing site and 160 mrem for the disposal site. Both of these doses are less than 4 percent of the standard established by DOE Order 5480.11, *Radiation Protection for Occupational Workers*. In addition, dust control and the use of respirators could greatly reduce workers' inhalation of airborne radioactive particulates.

Exposure to radon decay products would contribute the greatest number of excess health effects (about 52 percent) to remedial action workers. Workers at the processing and disposal sites would be exposed to an average radon concentration of approximately 0.4 pCi/L. This value is well below the EPA's recommended annual average radon action level of 4 pCi/L for an occupied dwelling. The lifetime risk for remedial action workers would be four times greater than that for an individual member of the general public exposed to radon decay products during the 33-month remedial action.

Following remedial action, radon releases from the processing site would be reduced because the contaminated materials would be removed to the Dry Flats disposal site and covered with the compacted radon barrier and frost protection layer. The post-remedial-action radon releases from the disposal site would be no greater than the 20 pCi/m<sup>2</sup>s limit allowed by the EPA standards (40 CFR Part 192). The disposal cell cover would essentially eliminate excess health effects to the general public from gamma radiation and airborne radioactive particulates. In addition to the exposure of the general public to low radon concentrations from the disposal site, radon would emanate at a rate of 4.3 pCi/m<sup>2</sup>s from Area D near the processing site; this radon would be atmospherically dispersed to the population. The total excess health effects to the general public from the disposal site and Area D would be  $3.9 \times 10^{-5}$  per year ( $2.0 \times 10^{-5}$  excess health effects per year from Area D). No action would result in  $24 \times 10^{-5}$  excess health effects per year.

## 5.5 SURFACE WATER

During remedial action at the processing site, the cleanup of the contaminated materials and debris would result in surface disturbance, and surface water runoff from disturbed areas could be contaminated. In addition, contaminated wastewater would be generated by activities such as equipment washing. The remedial action design includes the construction of drainage and erosion controls, including lined wastewater retention ponds, to prevent the discharge of contaminated water from the site. These control measures would be constructed according to applicable regulations. The contaminated water would be retained for evaporation or for use in compacting the contaminated materials. Any sediments from the wastewater retention ponds would be consolidated with the other contaminated materials during the final shaping of the disposal cell at the Dry Flats site. Appropriate drainage and erosion controls, including lined wastewater retention ponds, would also be used at the Dry Flats disposal and Coke Oven borrow sites to prevent or minimize erosion and any associated surface water impacts.

The removal of contaminated materials from the former tailings area and mill yard would disturb approximately 31 ac (13 ha) within the 100-year floodplain of the San Miguel River. Clean fill material would be placed in the disturbed areas concurrently with the removal of the contaminated materials to minimize any increase in the width of the 100-year floodplain. The man-made terraces in the mill yard would be replaced with a gentle slope that would slightly increase the width of the 100-year floodplain, and approximately 38 ac (15 ha) of the processing site would be within the 100-year floodplain after the remedial action. In the vicinity of the processing site, migration of the eastern bank of the San Miguel River is constrained by a resistant mudstone, and the western bank would be restored to a gentle slope with clean fill material after the remedial action. The gentle slope would not restrict the river's flow, and the clean fill material would not be expected to be more susceptible to erosion than naturally deposited river sediments. Therefore, the remedial action would not affect the path or flow regime of the San Miguel River in the vicinity of the Naturita site.

After remedial action, surface water runoff would not cause erosion of the disposal cell and transport contaminants into local surface waters because of the erosion control features incorporated into the remedial action design (Figures 3.1 and 3.2). The topslope and sideslopes of the disposal cell would be limited to 5 percent and 5 horizontal to 1 vertical, respectively, to promote drainage from the cell at nonerosive flow velocities. The topslope and sideslopes would be covered with riprap to resist the erosive forces of the local probable maximum precipitation (PMP) storm, which is a severe rainfall event. To protect against erosion due to runoff from the disposal cell, rock aprons (rock-filled trenches) would be placed at the bottom of the sideslopes (Figure 3.1) to provide protection against undercutting during the local PMP storm. The ground surface adjacent to the bottom of the disposal cell would be graded to direct runoff evenly away from the cell to downgradient areas and to reduce the velocity of the runoff to minimize potential erosion.



The removal of earthen materials at the Coke Oven borrow site could disturb the Mancos Shale or soils that are derived from the Mancos Shale. The Mancos Shale is saline, and this disturbance could cause increased salt concentrations in surface water runoff from the disturbed areas (Jackson and Julander, 1982). Appropriate drainage and erosion controls would be implemented at the borrow site to prevent or minimize erosion and any associated surface water impacts during remedial action. The borrow site would then be restored in accordance with the Free Use Permit issued by the BLM and the Mined Land Reclamation Permit issued by the Colorado Mined Land Reclamation Division. The restoration would include measures to control erosion and to promote sheet flow drainage, which would prevent or minimize increased salt concentrations in surface water runoff from the borrow site.

## 5.6 GROUNDWATER

The disposal cell at the Dry Flats site has been designed to control radioactive materials and nonradioactive contaminants in compliance with the proposed EPA groundwater protection standards in 40 CFR 192.01(a)(3). The proposed compliance strategy for the protection of groundwater resources would be a supplemental standard for groundwater in the uppermost aquifer (Burro Canyon Formation), based on limited-use groundwater (Class III) because of low yield [40 CFR 192.11(e)]. The potential yield of groundwater from the uppermost aquifer is low [less than 150 gal (568 L) per day], and the average hydraulic conductivity is relatively low. There is minimal recharge to groundwater in this aquifer and no evidence of discharge of groundwater from the uppermost aquifer anywhere in the site vicinity. There is no existing or potential use of the groundwater in the uppermost aquifer in the immediate vicinity of the Dry Flats site because sustainable amounts of groundwater are not available from the aquifer. Localized occurrences of shallow perched water in the Dakota Sandstone are not considered a part of the uppermost aquifer.

The protection of human health and the environment at the Dry Flats disposal site would be ensured by a combination of design features and advantageous hydrogeologic conditions. The low rate of infiltration through the multilayered disposal cell cover and the low transient drainage from the contaminated materials would result in unsaturated flow that would be accepted into storage in the unsaturated zone in the underlying Dakota Sandstone and Burro Canyon Formation. Any groundwater resource at depth in the Salt Wash Member would be adequately protected from the migration of any potential site-related contamination in the Burro Canyon Formation by the hydrogeologic isolation afforded by the thickness of mudstone (low-permeability aquitard) in the upper part of the Brushy Basin Member, the upward groundwater gradient from the lower Brushy Basin sandstones, and the possibility of geochemical attenuation of some hazardous constituents in groundwater. The appropriate method for groundwater compliance monitoring of the disposal site would be determined and described in the long-term surveillance plan.

The cleanup and/or control of existing groundwater contamination at the Naturita processing site will be evaluated during the groundwater restoration phase of the UMTRA Project and will be a part of a separate National Environmental Policy Act (NEPA) review process. The proposed remedial action would not preclude or interfere with groundwater remediation, should it be required, because the contaminated materials would be relocated to the remote Dry Flats disposal site.

## 5.7 FLORA AND FAUNA

Flora and fauna would be affected directly and indirectly by the proposed remedial action. Direct effects would include the loss of habitat, loss of less mobile wildlife species, and displacement of other wildlife species. Indirect effects would arise from increased fugitive dust, noise levels, and human activity. The duration of the direct effects would depend on the level of restoration, and indirect effects would be for the duration of the remedial action or less.

Remedial action at the Naturita site would disturb approximately 380 ac (153 ha) of land. The majority of this land consists of upland sagebrush and pinon-juniper plant communities [292.5 ac (118.4 ha)], followed by riparian vegetation [47.5 ac (19.2 ha)] and previously disturbed ground with little vegetation [40 ac (16 ha)]. The riparian plant communities along the river are dominated by cottonwood and willow. These plant communities are productive in terms of flora and fauna and are relatively scarce in the region. Consultation with the USACE indicated that only the 4 ac (2 ha) of cottonwood/willow seedlings meet the USACE definition of a wetland (Attachment 1). The remaining riparian plant community types do not meet the USACE definition of a wetland because they lack the proper hydrological conditions or moist soils (Jacobsen, 1992). The 292.5 ac (118.4 ha) of sagebrush and pinon-juniper plant communities represent the second most productive habitat types that would be disturbed. These habitat types are common in the area, and the land to be affected is not in any important wildlife habitat (e.g., critical deer winter range). The USACE has not inspected the riparian plant communities along Dry Creek. It was assumed that the 0.5 ac (0.2 ha) of riparian plant communities that would be disturbed by improving the Dry Creek crossing of County Road GG-25 would meet the USACE definition of a wetland.

The clearing of vegetation from the riparian areas would temporarily reduce or prohibit wildlife use. The duration of this effect would depend on the level of restoration undertaken. Remedial action would remove not only the vegetation but also some of the soil. This soil could not be stockpiled because it is contaminated and must be incorporated into the disposal cell. Prior to any surface disturbance, plans for the restoration of excavated areas would be developed by the RAC and the DOE in consultation with the appropriate regulatory agency or other authority. In general, these plans would involve backfilling, recontouring, and revegetation. Effects would be mitigated by performing restoration as soon as possible after the completion of

surface-disturbing activities. The DOE would mitigate remedial action impacts to wetlands as determined by the USACE Section 404 Permit process. This permit process usually includes review by the EPA and FWS, and it is anticipated that the DOE's Section 404 Permit would include mitigation of remedial action impacts to riparian plant communities that do not meet the USACE definition of a wetland.

The effects on game species at the Naturita site are expected to be minimal. The mule deer is a year-round resident at the processing, disposal, and borrow sites; however, habitat features such as critical winter range do not occur at or near the sites that would be disturbed during remedial action. Parts of the small prairie dog towns at the Dry Flats disposal and Coke Oven borrow sites could be temporarily disturbed by remedial action activities. A limited amount of waterfowl production occurs along the San Miguel River in the site area, but remedial action activities would be expected to have a minimal effect on waterfowl production. The effects on birds of prey at the site are also expected to be minimal to nonexistent. No large hawks are known to nest in the cottonwood stands that may be affected. The American kestrel and certain species of small owls may nest in these areas and be affected. The Cooper's hawk may nest along Dry Creek, but potential nesting sites are well removed from the area of Dry Creek that would be affected by remedial action.

An analysis of possible effects on threatened and endangered species is presented in Attachment 2, *Biological Assessment*. This analysis indicates that there would be no direct effects on threatened and endangered species and other species of concern except possibly the flannelmouth sucker and roundtail chub. The southwestern willow flycatcher was heard calling along the San Miguel River in 1986 but was not observed or heard calling in 1990 through 1993. Surveys for the southwestern willow flycatcher would be conducted in 1994 and possibly in later years. If these surveys revealed that the southwestern willow flycatcher nests in riparian areas that may be affected, formal conferencing with the FWS would be initiated, and a mitigation plan would be prepared. One possible mitigation measure would be to limit remedial action activities in the habitat of the southwestern willow flycatcher.

Remedial action activities would take place in the 100-year floodplain of the San Miguel River and would have the potential to directly affect the flannelmouth sucker and roundtail chub through alteration of the San Miguel River. However, negative impacts would be minimized by not performing remedial action in the river, recontouring and revegetating disturbed ground as soon as possible, using erosion control measures such as mulch and berms where needed, and possibly implementing supplemental standards to exclude a 50-ft (15-m) buffer zone along the river from cleanup activities. It is anticipated that implementation of these measures would result in little, if any, negative impact to these fish. In addition, the removal of contaminated materials that pose a potential ecological risk to the terrestrial and aquatic ecosystems may have a positive impact on the species, along with other species in the terrestrial and aquatic ecosystems.

Using water from the San Miguel River for the remedial action would cause a net depletion of water in the upper Colorado River basin, which would result in a "may affect" determination for the Colorado squawfish, humpback chub, bonytail chub, and razorback sucker. This net depletion of water would also adversely affect critical habitat of these species. These determinations would require formal conferencing with the FWS, which would likely result in the payment of a dollar amount per acre-foot of water used for remedial action. The average annual water withdrawal for the remedial action is estimated to be 86 acre-feet.

## 5.8 HISTORICAL AND CULTURAL RESOURCES

The BLM has evaluated the potential for historical resources (e.g., buildings and their contents) at the Naturita processing site, and certain features at the site have been recommended as eligible for nomination to the NRHP (Kesterke, 1993). The DOE has initiated consultation with the Colorado State Historical Preservation Officer (SHPO) to determine appropriate measures for historical resource preservation and documentation.

Cultural resources at the Naturita processing site, Dry Flats disposal site, and Coke Oven borrow site could be affected by remedial action activities. Prior to any surface-disturbing activities at any of the sites, the DOE would compile the results of all of the cultural resource surveys and prepare an evaluation of the cultural resource sites that could be affected by remedial action. This evaluation would include NRHP-eligibility determinations and mitigative measures (e.g., avoidance or data recovery plans) for the cultural resource sites that could be affected. The evaluation would be submitted to the BLM and SHPO for concurrence, and any data recovery plans deemed necessary would be implemented in accordance with the requirements of the National Historical Preservation Act. If required by the BLM and SHPO, a qualified archaeologist would monitor all surface-disturbing activities to detect any cultural resources that were not located during the cultural resource surveys.

## 5.9 LAND USE

During the remedial action, approximately 133 ac (55 ha) would be disturbed within and adjacent to the designated Naturita processing site. Almost all of this acreage is privately owned land that is not currently being used. The BLM-administered land in the former ore storage area would be disturbed during the remedial action, but the BLM-administered land west of State Highway 141 (Area D in Figure 4.1) would not be disturbed by remedial action due to the application of supplemental standards. Both of these areas have steep slopes and probably do not receive much if any of the grazing in the Sawtooth grazing allotment (Sazama, 1993) or any oil and gas exploration and development. Therefore, the remedial action would not affect the grazing capacity of the Sawtooth grazing allotment or the active oil and gas leases that contain these BLM-administered lands. After remedial action, all of the disturbed areas would be backfilled, recontoured to promote surface drainage, revegetated, and

eventually released for any use consistent with existing land use controls. However, certain use restrictions may be imposed at the Federal and state levels to protect human health and the environment and to prevent the use of potentially contaminated groundwater at the processing site. Certain use restrictions may also be imposed at the Federal and state levels to allow future cleanup and/or control of existing groundwater contamination beneath the processing site during the groundwater restoration phase of the UMTRA Project.

Approximately 84.5 ac (34.2 ha) would be disturbed at the Dry Flats disposal site for the construction of the disposal cell. This would result in the temporary loss of 4 percent of the 2387-ac (966-ha) Lillylands-West grazing allotment, which is permitted for 224 AUMs per year. This acreage loss would represent a temporary loss of 15 to 16 AUMs per year for almost 3 years of remedial action. Construction of the disposal cell would also result in the loss of the two livestock water tanks at the disposal site. After the remedial action, the final restricted disposal site would encompass 57 ac (23 ha), and any future use of this area would be precluded. This would result in a permanent loss of 2 percent of the Lillylands-West grazing allotment, which would represent a permanent loss of 7 AUMs per grazing year (Sazama, 1993). The DOE would mitigate both the temporary and permanent losses of grazing forage and the livestock water tanks according to the terms of a land use agreement negotiated between the DOE and the grazing lessee.

The improvement of County Road GG-25 would disturb approximately 7 ac (3 ha) that is not already covered by the road [3 ac (1 ha)]. The improved road would remain intact after the remedial action as requested by the Montrose County Road Commission. This would represent a permanent loss of approximately 1 AUM per grazing year in the Lillylands-West and Coke Oven grazing allotments. Construction of the new haul road from County Road GG-25 to the Dry Flats disposal site would disturb approximately 1 ac (0.4 ha). After the remedial action, this haul road would be reduced to minimum BLM standards [e.g., 16 ft (5 m) wide], and the excess road width [approximately 0.5 ac (0.2 ha)] would be reclaimed in accordance with the ROW issued by the BLM. With the permanent loss of the disposal site and road acreage [approximately 64.5 ac (26.1 ha)], a total of 8 AUMs per grazing year would be permanently lost in the Lillylands-West and Coke Ovens grazing allotments. These grazing allotments are permitted for a total of 448 AUMs per grazing year. During each year of remedial action, 2 to 3 AUMs in these grazing allotments would be temporarily lost along the road to the disposal site (Sazama, 1993). The DOE would mitigate both the temporary and permanent losses of grazing forage in accordance with land use agreements negotiated between the DOE and the grazing lessees and the owner of the private land that is crossed by County Road GG-25.

A maximum of 135 ac (55 ha) would be temporarily disturbed at the Coke Oven borrow site. This would result in the temporary loss of 2 percent of the 7660-ac (3100-ha) Coke Ovens grazing allotment, which is permitted for 224 AUMs per year. This acreage loss would represent a temporary loss of 16 to

17 AUMs per year for almost 2 years of the remedial action. The DOE would mitigate the temporary loss of grazing forage in accordance with the land use agreement negotiated between the DOE and the grazing lessee. The land disturbed at the borrow site would be restored according to the terms of the Free Use Permit issued by the BLM and the Mined Land Reclamation Permit issued by the Colorado Mined Land Reclamation Division.

The remedial action activities at the Dry Flats disposal site and the Coke Oven borrow site would not affect the active oil and gas leases at these sites. It is unlikely that any oil and gas exploration or development would occur at or immediately adjacent to the disposal or borrow site. If such activities were proposed, the DOE would negotiate an agreement(s) with the lessee(s) to avoid any interference between the activities and the remedial action. Prior to any surface disturbance at the Coke Oven borrow site, a Free Use Permit would be obtained from the BLM subject to any existing oil and gas leases and the validity of any existing lode mining claims.

The proposed action includes implementing supplemental standards for the contamination on approximately 112 ac (45 ha) of BLM-administered land adjacent to the Naturita processing site and west of State Highway 141 (Area D in Figure 4.1). If the application for supplemental standards were approved, this contamination would not be cleaned up. An application for supplemental standards is based on and includes a radiological and engineering assessment (REA) of the property involved. The REA would be provided to the owner(s) of the involved property, and owner comments would be included in the REA. The NRC and state of Colorado must concur in the REA and application for supplemental standards before the supplemental standards could be implemented. After the remedial action was complete, the property would be certified as meeting the EPA standards, and the public land records for the property would be annotated with the action taken. Annotation of the public land records could involve the attachment of land use restrictions to prevent or minimize future hazards. For example, annotation of the public land records for Area D at the Naturita site might include the recommendation that surface disturbance such as excavation be prohibited in the area.

## 5.10 SOCIOECONOMICS

There would be an average of 54 workers and a maximum of 76 workers during the 33 months of remedial action. The majority of the remedial action consists of earthmoving, so the labor categories in highest demand would be truck drivers and heavy equipment operators. The most truck drivers and heavy equipment operators would be required during relocation of the contaminated materials and debris and placement of the radon barrier and frost protection layer. An estimated maximum of 36 truck drivers and 16 heavy equipment operators would be needed for approximately 10 months of the remedial action.

Experience at other Colorado UMTRA Project sites indicates that 60 to 90 percent of the remedial action workers (an average of 32 to 49 workers for the

Naturita site) are hired from within a 60-mi (97-km) commuting radius of a site (DOE, 1993b). If an adequate labor force was not locally available, remedial action workers might commute daily from nearby communities or less frequently from farther communities such as Montrose and Grand Junction. It is also possible that workers currently commuting from the Naturita area to jobs in the Telluride area could choose to work on the Naturita remedial action closer to their residences. The Naturita remedial action would not be expected to appreciably reduce unemployment in the area. The labor needs for the remedial action would be relatively small and the employment period would be relatively short, which would preclude a large influx of permanent workers into the Naturita area.

Secondary employment may be generated when money spent on the remedial action is respent and the new expenditures create a demand for new jobs. Secondary employment generally occurs in the services sector. Experience indicates that the Naturita area would have an average secondary employment multiplier of 1.8 (i.e., for each remedial action job, 0.8 of a new job would be created) (DOE, 1993b). However, due to the relatively short remedial action period, it is unlikely that any appreciable indirect employment would be created.

A certain number of workers, primarily contractor management personnel, would be expected to relocate to the Naturita area for the remedial action. Typically, 15 to 20 management personnel would be expected to relocate during the 33-month remedial action. Some workers with specialized skills (e.g., health physicists) who may not be locally available would be expected to temporarily relocate for shorter time periods. In addition, other workers may temporarily relocate into the area if sufficient workers are not locally available. Workers who temporarily relocate to work on construction projects such as the Naturita remedial action generally do not bring their families with them.

Due to the shortage of available housing in the Naturita area, an influx of remedial action workers could create a strain on local housing, especially during peak construction periods. It is anticipated that most, if not all, of the remedial action housing requirements could be satisfied by filling vacancies at trailer and recreational vehicle parks in Naturita and Nucla (Latta, 1993; Crane, 1993). Motels in Naturita could also provide housing for workers. If sufficient housing could not be found in the Naturita area, it is anticipated that remedial action workers would commute daily or less frequently from farther communities.

Due to the small number of workers expected to relocate into the Naturita area, it is unlikely that the remedial action would have an appreciable adverse effect on community services and facilities. Most of the workers would not be expected to bring families with them, and the maximum effects would occur during peak construction periods that would be of short duration. It is believed that local community services such as utilities and police protection are adequate to accommodate a small, temporary influx of workers (Latta, 1993). The Naturita Middle School and Nucla Elementary School could accommodate a maximum of 65 additional students without providing additional facilities and

personnel. Depending on the number and grades of additional high school students, the Nucla High School might have to hire at least one part-time teacher (Hopewell, 1993; Mahaney, 1993; Harrison and Kelly, 1993).

The remedial action would have direct, positive effects on the economies of the Naturita area and Montrose County due to wages and salaries paid to remedial action workers and expenditures for equipment, materials, and supplies. There would also be direct, positive benefits to the local economies as the monies from these wages, salaries, and local purchases are recirculated. Direct and indirect expenditures by contractors to the DOE would generate tax revenues that would be available for local and state government use.

The remedial action would cost an estimated \$9.8 million, which includes the costs of labor, equipment purchases and leases, materials and supplies, and miscellaneous purchases. Wages and salaries would total approximately \$3.9 million. It is assumed that all of the labor and supplies and one-half of the equipment would be available within Montrose County and that the remainder of the equipment would be available elsewhere in the state of Colorado. The cost of the equipment acquired outside of Montrose County is estimated to be \$600,000. In addition to local, direct expenditures, revenue would be indirectly generated from remedial action money recirculating throughout the economy. Secondary earnings multipliers for similar projects generally range from 1.3 to 1.6, and earnings multipliers used in previous UMTRA Project studies in Colorado have ranged from 1.5 to 1.7, depending on the site location. Using an indirect earnings multiplier of 1.66 for the Naturita area (DOE, 1993b), the remedial action would generate approximately \$3.9 million in direct earnings and \$2.6 million in indirect earnings.

## 5.11 TRANSPORTATION

The existing levels of traffic on local highways are low, so the remedial action would result in an appreciable increase in local highway traffic. However, this increase in traffic would be limited in duration due to the short-term remedial action schedule. The largest number of highway truck trips would be associated with the transportation of the contaminated materials from the processing site to the disposal site, a distance of 0.8 mi (1.3 km) on State Highway 141 and 2.4 mi (3.9 km) on State Highway 90. This activity would take 8 months and would result in an estimated maximum of 300 truck trips per day on State Highways 141 and 90. This amount of truck traffic would approach or slightly exceed the projected 1994 average daily traffic for these highways and could approach or slightly exceed the capacities of the highways at level of service "A."

The level of traffic on State Highways 90 and 141 is low; therefore, there are not any traffic accident statistics that would apply in evaluating accidents due to the remedial action traffic. The UMTRA Project safety record for highway and on-site accidents is well below any accident projections for similar projects. Therefore, traffic accidents due to the remedial action would be expected to be



well below those recorded for state highways from 1987 to 1992. The RAC would consult with the CDOT throughout the remedial action to determine any necessary mitigative measures for increased traffic due to the remedial action.

The CDOT was consulted regarding mitigative measures for the use of State Highways 90 and 141 during the remedial action. The RAC would limit haulage to 10 hours per day, 5 days per week, unless weather or other delays necessitated weekend work to maintain the remedial action schedule. Trained personnel would be used to control traffic at the processing site to avoid traffic delays in excess of 15 minutes. In addition, a rubber mat would be used to cross haul trucks from the former ore storage area to the processing site to avoid the possible contamination of State Highway 141. The CDOT would evaluate the need for mitigative measures at the intersection of State Highways 90 and 141 in response to the anticipated increase in truck traffic due to the remedial action. The haulage of contaminated materials and borrow materials would be performed in accordance with all applicable DOT and CDOT permits and regulations and any MOUs or other agreements between the DOE, DOT, and CDOT.

The use of State Highways 90 and 141 and County Road GG-25 during the remedial action would affect the conditions of these roads, and some road maintenance could be necessary. County Road GG-25 would be improved for the remedial action, and any necessary maintenance of this road would be performed by the RAC. Maintenance of State Highways 90 and 141 would be performed by the CDOT under the provisions of a road maintenance agreement between the DOE, CDH, and CDOT. This agreement would provide for monetary compensation from the DOE for maintenance of the sections of state highways affected by the remedial action.

The haulage of contaminated materials and rock borrow materials to the disposal site would result in increased noise levels at the intersection of State Highways 90 and 141, which could impact residents of East and West Vancorum (Figure 2.1). However, this impact would be temporary (for approximately 12 months) and would be limited to weekdays. Noise levels in Colorado are controlled by city, county, state, and Federal noise regulations, and the DOE would comply with all applicable noise regulations.

## 6.0 MITIGATIVE MEASURES

The following mitigative measures were incorporated into the design and approach for the proposed remedial action to reduce the environmental impacts. The various permits required for the remedial action would contain specific mitigative measures to satisfy permit requirements. For example, the Free Use Permit issued by the BLM would identify specific reclamation requirements for the Coke Oven borrow site.

- An Air Pollution Emissions Notice and Emission Permit would be obtained from the state of Colorado prior to beginning the remedial action. This permit would require implementation of a dust control plan that would include measures such as covering haul trucks, treating haul roads, limiting speeds on unpaved haul roads, and stopping work during windy periods. A monitoring plan to ensure that air quality standards are not exceeded would be developed by the RAC and must be approved by the state of Colorado and Montrose County before any ground-disturbing activities are initiated.
- Surface soils at the Dry Flats disposal site and Coke Oven borrow site would be stockpiled for use in reclamation.
- The DOE would mitigate impacts to wetlands as determined by the USACE Section 404 Permit process. It is anticipated that this permit process would include mitigation of remedial action impacts to riparian habitat that does not meet the USACE definition of a wetland.
- All disturbed areas would be reclaimed as soon as possible in accordance with applicable land use authorizations and agreements. Reclamation may include revegetation with plants native to the area and restrictions on grazing use of the reclaimed areas (e.g., fencing) until revegetation is established.
- The DOE would mitigate the temporary and permanent losses of grazing forage and livestock water sources in accordance with land use agreements negotiated with affected grazing lessees and land owners.
- The DOE would mitigate any impacts to active oil and gas leases by negotiating agreements with affected lessees.
- The DOE would mitigate any impacts to valid lode mining claims by negotiating agreements with affected claimants.
- To prevent off-site contamination during the transportation of contaminated materials, all haul trucks would be monitored and decontaminated prior to entering public roads. All traveled areas would have scheduled monitoring for radioactive contaminants.
- Air quality monitoring stations would be established to determine background levels of TSP and radionuclides prior to remedial action. During the remedial action, scheduled monitoring would be performed in accordance with EPA and state of Colorado requirements. The monitoring results would be included in a quarterly report to the CDH.

- Environmental monitoring is a requirement of the UMTRA Project during remedial action activities at both the processing and disposal sites. Monitoring stations would be strategically located off of the sites to monitor airborne particulates, radon, and environmental gamma radiation exposure. This network of monitoring stations would assist in implementing radiological control measures to ensure that public health is adequately and appropriately protected in accordance with DOE Order 5400.5, *Radiological Protection of the Public and the Environment*.
- Haul trucks would not travel State Highways 90 and 141 on weekends and holidays unless weather or other delays necessitated additional work to maintain the remedial action schedule. Trained personnel would control traffic at the processing site to avoid traffic delays.
- A rubber mat would be used to cross haul trucks from the former ore storage area to the processing site to avoid possible contamination of State Highway 141.
- Mitigative measures would be implemented to control traffic at the intersection of State Highways 90 and 141 as required by the CDOT.
- Portions of the state highways affected by the remedial action would be maintained under the provisions of a road maintenance agreement between the DOE, CDH, and CDOT. This agreement would provide for monetary compensation from the DOE for this maintenance.
- Cultural resource sites would be avoided whenever possible. If cultural resource sites could not be avoided, the DOE would develop and implement data recovery plans for the cultural resources in consultation with the BLM and SHPO. If necessary, a qualified archaeologist would monitor all surface-disturbing activities to detect cultural resources.

## 7.0 CONSULTATION AND COORDINATION

The following Federal, state, and local agencies, organizations, and individuals have been instrumental in providing information and assessing UMTRA Project impacts on their resources.

Name	Contribution
<b>Bureau of Land Management, U.S. Department of the Interior Montrose District and Uncompahgre Basin Resource Area</b>	
Alan Belt	Land use
Mike Blymer	Threatened and endangered species
Robert Carruthers	Threatened and endangered species
Rich Fike	Cultural resources
Tom Hurshman	Land use
Lynn Lewis	Geology and minerals
Dennis Murphy	Soils
Teresa Pfifer	Land use
Jim Sazama	Land use
Bob Welch	Flora and fauna and threatened and endangered species
<b>Colorado Department of Employment and Training</b>	
Dave Larson	Socioeconomics
<b>Colorado Department of Local Affairs, Division of Local Government</b>	
Reid Reynolds	Socioeconomics
<b>Colorado Department of Transportation</b>	
Shirley Gilmore	Transportation
<b>Colorado Division of Highways</b>	
Roger Gilpin	Transportation
Larry Meyers	Transportation
<b>Colorado Division of Wildlife, Colorado Department of Natural Resources</b>	
Tom Nesler	Threatened and endangered species
Rick Sherman	Threatened and endangered species
<b>Colorado Natural Areas Program</b>	
Steve O'Kane	Flora and fauna

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<b>Name</b>	<b>Contribution</b>
<b>Colorado Natural Heritage Inventory</b>	
R. Voight	Flora and fauna
<b>Colorado State Highway Department, Region 5</b>	
Dick Langoni	Transportation
<b>Montrose County, Land Use Department</b>	
Pat Warren	Land use
<b>Montrose County Sheriff</b>	
Margie Thomson	Socioeconomics
Helen Vodopich	Socioeconomics
<b>Montrose Job Service</b>	
Dan Holiday	Socioeconomics
<b>Montrose Memorial Hospital</b>	
Kathy Holman	Socioeconomics
<b>Montrose West Recreation</b>	
John Showalter	Land use
<b>Naturita Basin Clinic</b>	
Ann Kettle	Socioeconomics
<b>State of Colorado, Council of Governments, Region 10</b>	
Colleen Hannon	Land use

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<b>Name</b>	<b>Contribution</b>
<b>Town of Naturita</b>	
Carolyn Bean	Land use
Dan Crane	Socioeconomics
Karen Hall	Socioeconomics
Marcell Hopkins	Socioeconomics
Roberta Latta	Socioeconomics
Leslie Trachsler	Water use
<b>U.S. Army Corps of Engineers</b>	
Ken Jacobsen	Wetlands
<b>U.S. Fish and Wildlife Service, U.S. Department of the Interior</b>	
John Anderson	Threatened and endangered species
LeRoy Carlson	Threatened and endangered species
Bob Leachman	Threatened and endangered species
Jeffrey Opdycke	Threatened and endangered species
Keith Rose	Threatened and endangered species
<b>West End School District</b>	
Phyllis Harrison	Socioeconomics
Wayne Hopewell	Socioeconomics
Shelley Kelly	Socioeconomics
Constance Mahaney	Socioeconomics

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The DOE will continue to consult and coordinate with the appropriate agencies and organizations regarding the remedial action at the Naturita site. In addition, the DOE will maintain close communication with involved agencies and organizations and the general public through an established public information program.

## 8.0 REFERENCES

- BFEC (Bendix Field Engineering Corp.), 1985. "Radiologic Characterization of the Naturita, Colorado, Uranium Tailings Remedial Action Site," GJ-32 (85), prepared for the U.S. Department of Energy, Assistant Secretary for Nuclear Energy, Grand Junction Area Office, Colorado.
- BLM (Bureau of Land Management), 1985. *Record of Decision for San Juan-San Miguel Resource Management Plan and Final Environmental Impact Statement*, U.S. Department of the Interior, Bureau of Land Management, Montrose District, Colorado, San Juan Resource Area and Uncompahgre Basin Resource Area.
- CAQCC (Colorado Air Quality Control Commission), 1979. "Ambient Air Standards for Metropolitan Denver Air Quality Control Region, State Air Pollution Control Areas and the State of Colorado," Colorado Air Quality Control Commission, Denver, Colorado.
- CASA (Complete Archaeological Service Associates), 1993. "Cultural Resource Inventory and Evaluation Testing, Coke Oven Borrow Area, Naturita UMTRA Project, Montrose County, Colorado," Archaeological Report 93-48, prepared by CASA, Cortez, Colorado, for Jacobs Engineering Group Inc., Albuquerque, New Mexico.
- CASA (Complete Archaeological Service Associates), 1990a. "Cultural Resource Planning Inventory, Naturita UMTRA Project, Dry Flats Disposal Site and Coke Oven Borrow Area, Montrose County, Colorado," Archaeological Report 90-12, prepared by CASA, Cortez, Colorado, for Jacobs Engineering Group Inc., Albuquerque, New Mexico.
- CASA (Complete Archaeological Service Associates), 1990b. "Cultural Resource Planning Inventory, Naturita UMTRA Project, Expanded Coke Oven Borrow Area, Montrose County, Colorado," Archaeological Report 90-71, prepared by CASA, Cortez, Colorado, for MK-Ferguson Company, Albuquerque, New Mexico.
- CASA (Complete Archaeological Service Associates), 1989a. "Cultural Resource Inventory, Naturita UMTRA Project, Montrose County, Colorado," Archaeological Report 89-25, prepared by CASA, Cortez, Colorado, for Jacobs Engineering Group Inc., Albuquerque, New Mexico.
- CASA (Complete Archaeological Service Associates), 1989b. "Cultural Resource Inventory, 33 Test Pit Locations, Coke Oven Borrow Site and Dry Flats Disposal Site, Naturita UMTRA Project, Montrose County, Colorado," Archaeological Report 89-37, prepared by CASA, Cortez, Colorado, for Jacobs Engineering Group Inc., Albuquerque, New Mexico.
- CDH (Colorado Department of Health), 1985. "Colorado Air Quality Data Report 1985," State of Colorado, Department of Health, Denver, Colorado.

- Crane, Dan, 1993. UMTRA Project Naturita Citizens Advisory Committee, Naturita, Colorado, personal communication to Dale Jones, Jacobs Engineering Group Inc., Albuquerque, New Mexico, October 4, 1993.
- DOC (U.S. Department of Commerce), 1991a. *1990 Census of Population and Housing: Summary Population and Housing Characteristics, Colorado*, U.S. Department of Commerce, Economics and Statistics Administration, Bureau of the Census.
- DOC (U.S. Department of Commerce), 1991b. *1990 Census of Population: General Population Characteristics, Colorado*, U.S. Department of Commerce, Economics and Statistics Administration, Bureau of the Census.
- DOC (U.S. Department of Commerce), 1991c. *1990 Census of Population and Housing: Summary Social, Economic, and Housing Characteristics, Colorado*, U.S. Department of Commerce, Economics and Statistics Administration, Bureau of the Census.
- DOC (U.S. Department of Commerce), 1991d. *1990 Census of Population and Housing: General Housing Characteristics, Colorado*, U.S. Department of Commerce, Economics and Statistics Administration, Bureau of the Census.
- DOE (U.S. Department of Energy), 1993a. "Remedial Action Plan and Site Design for Stabilization of the Inactive Uranium Mill Tailings Site at Naturita, Colorado," preliminary final, DOE/AL/62350-40PF, DOE UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.
- DOE (U.S. Department of Energy), 1993b. *Final Colorado Economic Impact Study on the Uranium Mill Tailings Remedial Action Project in Colorado*, UMTRA-DOE/AL-400691.0000, DOE UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.
- DOE (U.S. Department of Energy), 1988a. *Comparative Analysis of Disposal Site Alternatives Report for the UMTRA Project Naturita Site Located at Naturita, Colorado*, November 1988, DOE UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.
- DOE (U.S. Department of Energy), 1988b. *Technical Approach Document, Revision 1*, UMTRA-DOE/AL-050425.0000, DOE UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.
- DOE (U.S. Department of Energy), 1986. "Comparative Analysis of Disposal Site Alternatives Report for the UMTRA Project Naturita Site Located at Naturita, Colorado," draft, DOE UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.
- DOE (U.S. Department of Energy), 1985. *Programmatic Environmental Report for Remedial Actions at the UMTRA Project Vicinity Properties*, UMTRA-DOE/AL-150327.0000, DOE UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.



- FBDU (Ford, Bacon & Davis Utah Inc.), 1981. *Engineering Assessment of Inactive Uranium Mill Tailings, Naturita Site, Naturita, Colorado*, DOE/UMT-012, FBDU 360-08, UC-70, prepared by FBDU, Salt Lake City, Utah, for the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.
- Fike, Richard, 1993. Montrose District, Bureau of Land Management, Montrose Colorado, personal communication to Dale Jones, Jacobs Engineering Group Inc., Albuquerque, New Mexico, June 9, 1993.
- Hall, Karen, 1993. Ray Motel, Naturita, Colorado, personal communication to Dale Jones, Jacobs Engineering Group Inc., Albuquerque, New Mexico, October 4, 1993.
- Harrison, Phyllis, and Shelley Kelly, 1993. Nucla High School, Nucla, Colorado, personal communication to Dale Jones, Jacobs Engineering Group Inc., Albuquerque, New Mexico, October 5, 1993.
- Holiday, Dan, 1993. Montrose Job Service, Montrose, Colorado, personal communication to Linda Ulland, Jacobs Engineering Group Inc., Albuquerque, New Mexico, September 16, 1993.
- Holman, Kathy, 1993. Montrose Memorial Hospital, Montrose, Colorado, personal communication to Malu Gawthrop-Cooper, Jacobs Engineering Group Inc., Albuquerque, New Mexico, September 16, 1993.
- Hopewell, Wayne, 1993. Naturita Middle School, Naturita, Colorado, personal communication to Dale Jones, Jacobs Engineering Group Inc., Albuquerque, New Mexico, October 5, 1993.
- Hopkins, Marcell, 1993. Bunkhouse Motel, Naturita, Colorado, personal communication to Dale Jones, Jacobs Engineering Group Inc., Albuquerque, New Mexico, October 4, 1993.
- Jacobsen, Ken, 1992. U.S. Army Corps of Engineers, Grand Junction, Colorado, personal communication to Charles Burt, Jacobs Engineering Group Inc., Albuquerque, New Mexico, October 5, 1992.
- Jackson, William L., and Randall P. Julander, 1982. "Runoff and Water Quality from Three Soil Landform Units on Mancos Shale," in *Water Resources Bulletin*, Vol. 18, No. 6, by American Water Resources Association.
- Kesterke, Alan, 1993. Montrose District, Bureau of Land Management, Montrose, Colorado, personal communication to Mike Abrams, U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico, September 10, 1993.
- Kettle, Ann, 1993. Naturita Basin Clinic, Naturita, Colorado, personal communication to Malu Gawthrop-Cooper, Jacobs Engineering Group Inc., Albuquerque, New Mexico, September 16, 1993.

- Langoni, Richard, 1993. Colorado Department of Transportation, Region 5-Engineering, Durango, Colorado, personal communication to Dale Jones, Jacobs Engineering Group Inc., Albuquerque, New Mexico, June 18, 1993.
- Larson, Dave, 1993. Labor Information Division, Colorado Department of Employment and Training, Denver, Colorado, personal communication to Linda Ulland, Jacobs Engineering Group Inc., Albuquerque, New Mexico, September 15, 1993.
- Latta, Roberta, 1993. Hometown Realty, Naturita, Colorado, personal communication to Dale Jones, Jacobs Engineering Group Inc., Albuquerque, New Mexico, September 23, 1993.
- Lewis, Lynn, 1993. Uncompahgre Basin Resource Area, Bureau of Land Management, Montrose, Colorado, personal communication to Dale Jones, Jacobs Engineering Group Inc., Albuquerque, New Mexico, June 10, 1993.
- Mahaney, Constance, 1993. Nucla Elementary School, Nucla, Colorado, personal communication to Dale Jones, Jacobs Engineering Group Inc., Albuquerque, New Mexico, October 5, 1993.
- NAS (National Academy of Sciences), 1980. *The Effects on Population of Exposure to Low Levels of Ionizing Radiation*, BEIR-III Report, Advisory Committee on Biological Effects of Ionizing Radiation, National Research Council, Washington, D.C.
- NGDC/NOAA (National Geophysical Data Center for National Oceanic and Atmospheric Administration), 1989. *Dry Flats Site: Epicentral Compilation for Magnitude  $M \geq 4$  and Intensity  $I \geq 1$* , Boulder, Colorado.
- NOAA (National Oceanic and Atmospheric Administration), 1986. "Annual Climatological Summary for the Years 1976 through 1985, Paradox, Colorado," National Geophysical Data Center, Asheville, North Carolina.
- NOAA (National Oceanic and Atmospheric Administration), 1984. "Climatology of the United States No. 20, Montrose, Colorado, for the Period 1951-1980," National Geophysical Data Center, Asheville, North Carolina.
- O'Kane, Steve L., 1987. Colorado Natural Areas Program, Denver, Colorado, personal communication to Eloise Mulford, Jacobs Engineering Group Inc., Albuquerque, New Mexico, February 19 and 21, 1987.
- O'Kane, Steve L., 1986. Colorado Natural Areas Program, Denver, Colorado, personal communication to Charles Burt, Jacobs Engineering Group Inc., Albuquerque, New Mexico, February 6, 1986.
- ORNL (Oak Ridge National Laboratory), 1980. *Radiological Survey of Inactive Uranium-Mill Tailings at Naturita, Colorado*, ORNL-5454, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

- Pfifer, Teresa, 1993. Uncompahgre Basin Resource Area, Bureau of Land Management, Montrose, Colorado, personal communication to Dale Jones, Jacobs Engineering Group Inc., Albuquerque, New Mexico, May 14, 1993.
- Pioneer (Pioneer-Uravan, Inc.), 1979. "Environmental Report, San Miguel Mill Project, San Miguel County, Colorado," prepared by Dames and Moore, Denver, Colorado, for Pioneer-Uravan, Inc., available in the DOE UMTRA Project Office, Albuquerque Operations Office, Document Control File No. 11.19.3, Albuquerque, New Mexico.
- Reynolds, Reid, 1993. Colorado Department of Local Affairs, Division of Local Government, Denver, Colorado, personal communication to Linda Ulland, Jacobs Engineering Group Inc., Albuquerque, New Mexico, September 16, 1993.
- Sazama, Jim, 1993. Uncompahgre Basin Resource Area, Bureau of Land Management, Montrose, Colorado, personal communication to Dale Jones, Jacobs Engineering Group Inc., Albuquerque, New Mexico, June 7 and 17 and July 16, 1993.
- Showalter, Jon, 1993. Montrose West Recreation, Nucla, Colorado, personal communication to Dale Jones, Jacobs Engineering Group Inc., Albuquerque, New Mexico, May 26, 1993.
- TAC (Technical Assistance Contractor), 1990. "Naturita Radon Monitoring Pre-Remedial Action Summary, April 1990," unpublished data and analysis prepared by the TAC for the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.
- TAC (Technical Assistance Contractor), 1989. "Former Pile Characterization," unpublished data and analysis prepared by the TAC for the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.
- Thomson, Margie, 1993. Communication Center, Montrose County Sheriff, Naturita, Colorado, personal communication to Rebecca de Neri Zagal, Jacobs Engineering Group Inc., Albuquerque, New Mexico, September 16, 1993.
- Trachsler, Leslie, 1989. Town of Naturita, Colorado, personal communication to Kevin Lambert, Jacobs Engineering Group Inc., Albuquerque, New Mexico, November 17, 1989.
- USGS (U.S. Geological Survey), 1979. *Water Resources Data for Colorado, Water Year 1978, Vol. 3, Dolores River Basin & Green River Basin*, Denver, Colorado.
- Vodopich, Helen, 1993. Communication Center, Montrose County Sheriff, Naturita, Colorado, personal communication to Dale Jones, Jacobs Engineering Group Inc., Albuquerque, New Mexico, October 4, 1993.

Voight, R. A., 1984. Colorado Natural Heritage Inventory (Colorado Natural Heritage Program), Denver, Colorado, personal communication to Robert Peel, Jacobs Engineering Group Inc., Albuquerque, New Mexico, September 28, 1984.

Warren, Pat, 1993. Montrose County Land Use Department, Montrose, Colorado, personal communication to Dale Jones, Jacobs Engineering Group Inc., Albuquerque, New Mexico, May 20, 1993.

### CODE OF FEDERAL REGULATIONS

40 CFR Part 50, "National Primary and Secondary Ambient Air Quality Standards," Title 40, *Code of Federal Regulations*, Part 50, U.S. Environmental Protection Agency, Office of the Federal Register, National Archives and Records Administration, Washington, D.C.

40 CFR Part 141, "National Interim Primary Drinking Water Regulations," Title 40, *Code of Federal Regulations*, Part 141, U.S. Environmental Protection Agency, Office of the Federal Register, National Archives and Records Administration, Washington, D.C.

40 CFR Part 192, "Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings," Title 40, *Code of Federal Regulations*, Part 192, U.S. Environmental Protection Agency, Office of the Federal Register, National Archives and Records Administration, Washington, D.C.

### FEDERAL REGISTER

52 FR 36000, "Standards for Remedial Actions at Inactive Uranium Processing Sites; Proposed Rule," September 24, 1987, *Federal Register*, Office of the Federal Register, National Archives and Records Administration, Washington, D.C.

### DOE ORDERS

Order 5400.5, *Radiation Protection of the Public and the Environment*, February 1990, U.S. Department of Energy, Environmental Protection Division, Washington, D.C.

Order 5480.11, *Radiation Protection for Occupational Workers*, December 1988, U.S. Department of Energy, Health Protection Division, Washington, D.C.

**ATTACHMENT 1**  
**FLOODPLAINS AND WETLANDS ASSESSMENT**

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**LIST OF ACRONYMS AND ABBREVIATIONS**

<b><u>Acronym</u></b>	<b><u>Definition</u></b>
ac	acre
CFR	Code of Federal Regulations
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
ft	foot
ft <sup>3</sup> /s	cubic feet per second
FWS	Fish and Wildlife Service
ha	hectare
km	kilometer
m	meter
m <sup>3</sup>	cubic meter
m <sup>3</sup> /s	cubic meters per second
mi	mile
NEPA	National Environmental Policy Act of 1969
NRC	U.S. Nuclear Regulatory Commission
UMTRCA	Uranium Mill Tailings Radiation Control Act of 1978
USACE	U.S. Army Corps of Engineers
yd <sup>3</sup>	cubic yard



## 1.0 PROJECT DESCRIPTION

### 1.1 INTRODUCTION

The *Uranium Mill Tailings Radiation Control Act of 1978* (UMTRCA), Public Law 95-604, authorized the U.S. Department of Energy (DOE) to perform remedial action at the Naturita, Colorado, uranium processing site to reduce the potential health effects from the radioactive materials at the site and at vicinity properties associated with the site. The U.S. Environmental Protection Agency (EPA) promulgated standards for remedial actions at inactive uranium processing sites in Title 40, *Code of Federal Regulations*, Part 192 (40 CFR Part 192). Remedial action at the Naturita site must be performed in accordance with these standards and with the concurrence of the U.S. Nuclear Regulatory Commission (NRC).

In 1979, the DOE established regulations (10 CFR Part 1022) to comply with requirements for the environmental review of floodplains and wetlands. These regulations provide for compliance with Executive Order 11988, *Floodplain Management*, and Executive Order 11990, *Protection of Wetlands*, and are designed to be coordinated with the environmental review requirements of the National Environmental Policy Act of 1969 (NEPA). Pursuant to 10 CFR Part 1022, this assessment describes the impacts of the proposed remedial action on the floodplains and wetlands at the Naturita, Colorado, uranium processing site.

### 1.2 THE PROPOSED ACTION

The designated Naturita uranium processing site encompasses 53 acres (ac) [21 hectares (ha)] on the west bank of the San Miguel River, a perennial tributary of the Dolores River. Contaminated materials cover an estimated 50 ac (20 ha) within the designated site; the contaminated areas are the former tailings area, mill yard, and former ore storage area. An additional 194 ac (79 ha) adjacent to the site have been contaminated by uranium processing activities and wind and water erosion. The estimated volume of contaminated materials and debris at and adjacent to the Naturita site is 542,400 cubic yards (yd<sup>3</sup>) [414,700 cubic meters (m<sup>3</sup>)].

The proposed remedial action for the Naturita site is relocation of the contaminated materials and debris to the Dry Flats disposal site 6 road miles (mi) [10 kilometers (km)] southeast of the processing site. At the disposal site, the contaminated materials and debris would be consolidated, stabilized, and covered with layers of earth and rock. The remedial action would involve the removal of contaminated soils and the disturbance of riparian plant communities within the floodplain of the San Miguel River. After the remedial action, all areas disturbed by the cleanup of the contaminated materials would be backfilled with clean fill material, recontoured to promote surface drainage, and revegetated.

The remedial action would require the use of earthen materials, gravel, and rock. Earthen materials would be excavated from the Coke Oven borrow site approximately 4 road mi (6 km) south of the processing site and approximately 2 road mi (3 km) west of the Dry Flats disposal site. The source of gravel and rock would be an existing borrow site 22 road mi (35 km) northwest of the Naturita processing site.

### 1.3 ALTERNATIVES

Stabilization of the contaminated materials and debris in a disposal cell at the designated processing site was evaluated but was found to be technically and environmentally unsuitable. Six other potential disposal sites were also evaluated. Five of these potential sites were found to be technically and environmentally unsuitable and were rejected. Another potential disposal site is a Superfund site that is being reclaimed under the *Comprehensive Environmental Response, Compensation, and Liability Act* and a court decree between the site owner and the state of Colorado. There were many liability issues associated with disposing of the Naturita contaminated materials and debris at this site. In 1993, the owner of this site withdrew its proposal to accept the Naturita contaminated materials and debris. None of the remedial action alternatives described above would preclude the need to remove contaminated soils and disturb riparian plant communities within the floodplain of the San Miguel River.

No action at the Naturita processing site would leave the contaminated materials and debris in their present location and condition and would not reduce the potential health effects. The contaminated materials would continue to be exposed to erosion from surface runoff and flood flows from the San Miguel River, and eventual erosion of the contaminated materials could result in the transport of contaminants into the river. The no action alternative would not be consistent with the intent of the UMTRCA and would not result in compliance with the EPA standards.

Supplemental standards are defined in 40 CFR 192.22(a) as "coming as close to meeting the otherwise applicable standards as is reasonable under the circumstances." The bases for applying supplemental standards are limited, long-term health impacts; unlikely human habitation of the area; probable long-term environmental harm; potential risk of injury to workers if remedial action were undertaken; and unrealistically high remedial action costs relative to the benefits. The state of Colorado and the NRC must concur in the application of supplemental standards. Some of the contaminated areas at and adjacent to the Naturita site are being considered for exclusion from remedial action by the application of supplemental standards. If supplemental standards were applied to certain areas, the removal of contaminated soils and disturbance of riparian plant communities within the floodplain of the San Miguel River would be reduced.

## 2.0 FLOODPLAINS ASSESSMENT

### 2.1 DESCRIPTION OF THE 100-YEAR FLOODPLAIN

The principal topographic features affecting the 100-year floodplain at the Naturita site are the high, steep east bank of the San Miguel River and the upper and lower terraces of the mill yard. Water surface profiles for the 100-year flood at the processing site were developed using the U.S. Army Corps of Engineers' (USACE) HEC-2 computer program (USACE, 1982). The peak flow for the 100-year flood was determined to be 10,800 cubic feet per second (ft<sup>3</sup>/s) [300 cubic meters per second (m<sup>3</sup>/s)] based on peak flows recorded at the U.S. Geological Survey's gaging station on the San Miguel River at Naturita (USGS, 1979). This peak flow would result in maximum water elevations of 5297 feet (ft) [1615 meters (m)] above mean sea level at the mill yard and 5294 ft (1614 m) above mean sea level at the former tailings pile area. Approximately 31 ac (13 ha) of the mill yard and former tailings area would be inundated to an average maximum depth of 5 ft (1.5 m) (Figure 2.1) (MKE, 1990).

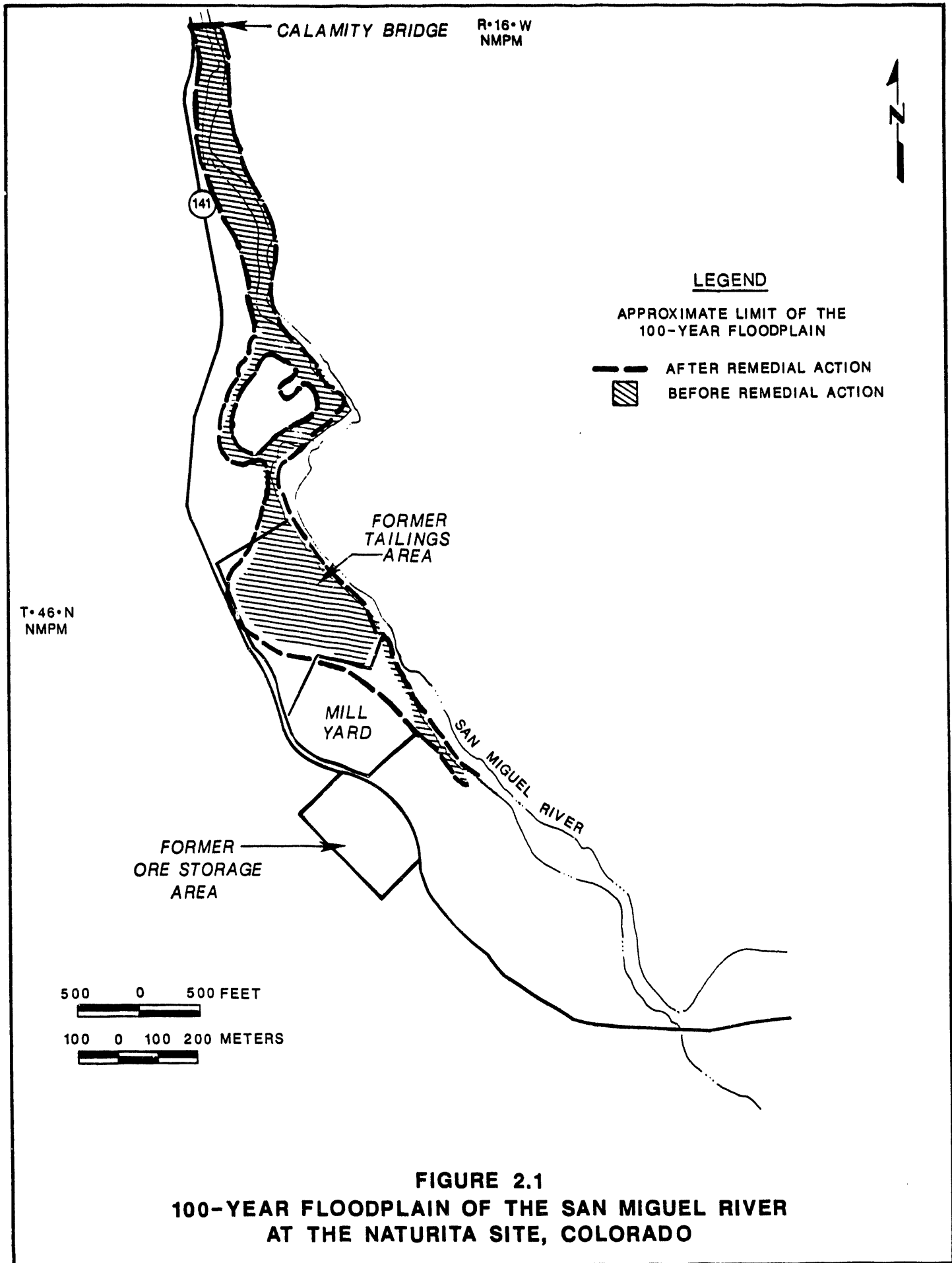
Flooding is not a hazard at the Dry Flats disposal site or the Coke Oven borrow site. These sites are approximately 1 to 3 air mi (2 to 5 km) south of and 200 to 500 ft (61 to 152 m) above the San Miguel River, the nearest perennial waterway.

The proposed remedial action does not constitute a "critical action" as defined in 10 CFR Part 1022.4(c) and (i); therefore, an analysis of the 500-year floodplain at the Naturita site is not required for this assessment.

### 2.2 FLOODPLAIN IMPACTS AND MITIGATION

During the remedial action, approximately 31 ac (13 ha) within the 100-year floodplain would be disturbed with the removal of approximately 263,000 yd<sup>3</sup> (201,000 m<sup>3</sup>) of contaminated materials. The average depth of excavation in these areas would be 3 ft (0.9 m). The removal of contaminated materials from the upper and lower mill yard terraces would allow the width of the 100-year floodplain to increase slightly, thereby reducing the water depth across the former tailings area. Clean fill material would be backfilled into excavated areas as contaminated materials were removed to minimize any increase in the width of the 100-year floodplain. The remedial action would reduce the radioactive contamination in the 100-year floodplain to levels that comply with the EPA standards.

After completion of the remedial action, the processing site would be restored. All disturbed areas would be recontoured to promote surface drainage and revegetated. The man-made upper and lower mill yard terraces would be replaced with a gentle slope. This would result in a slight increase in the width of the 100-year floodplain, and approximately 38 ac (15 ha) at the Naturita site



(Figure 2.1) would be inundated to an average depth of 5 ft (1.5 m) by a 100-year flood after remedial action.

In the vicinity of the Naturita site, migration of the eastern bank of the San Miguel River is constrained by an outcrop of resistant mudstone of the Jurassic Morrison Formation. This mudstone would not be disturbed by the remedial action. The western bank of the river would be restored after the remedial action, but the man-made terraces in the mill yard would be replaced with a gentle slope. This would result in a slight increase in the width of the 100-year floodplain at the site. The gentle slope of the western bank would not restrict the river's flow, and the clean fill material would not be expected to be more susceptible to erosion than naturally deposited river sediments. Therefore, remedial action would not affect the path or flow regime of the San Miguel River in the vicinity of the Naturita site.

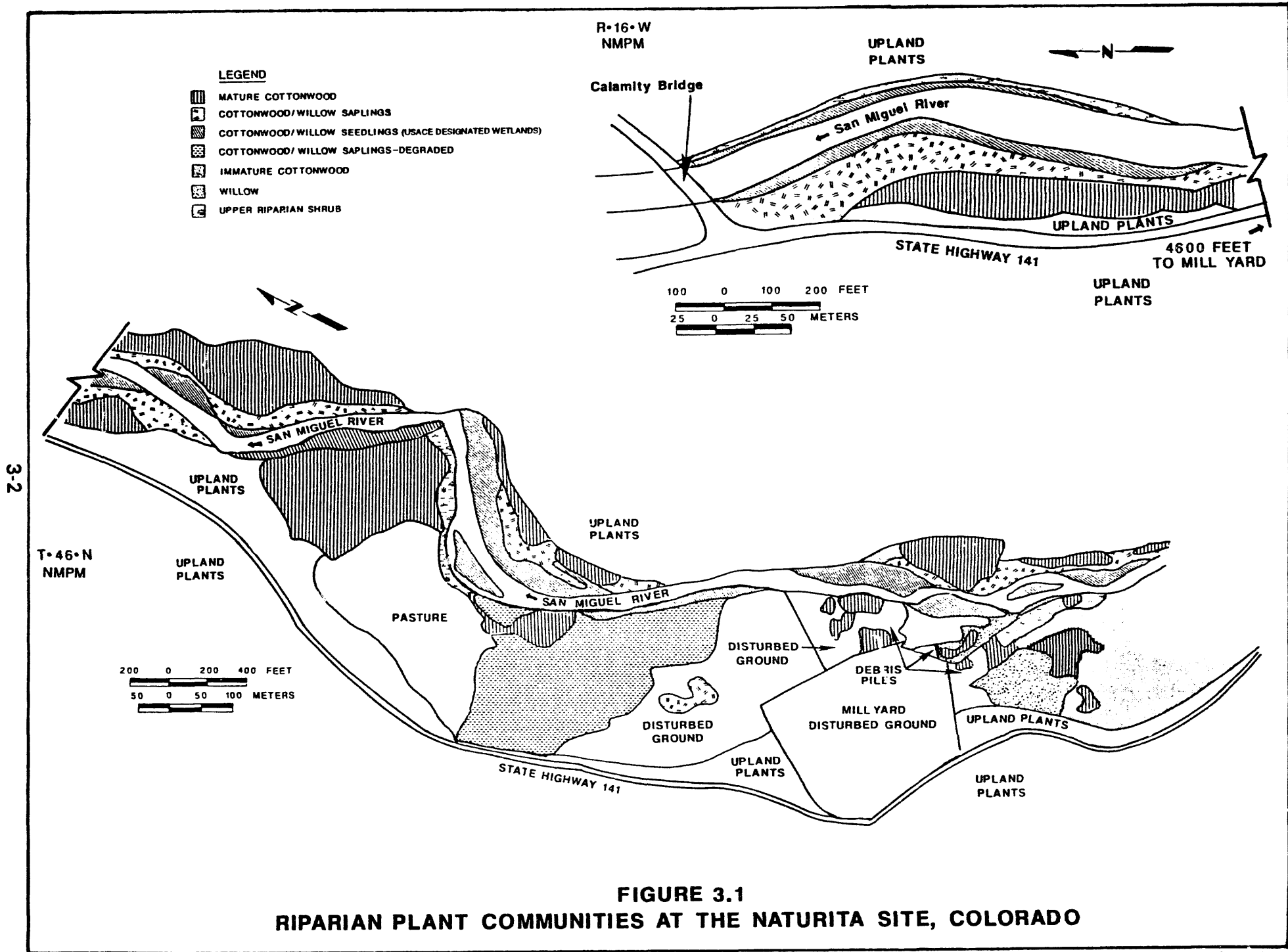
### 3.0 WETLANDS ASSESSMENT

#### 3.1 WETLANDS DESCRIPTION

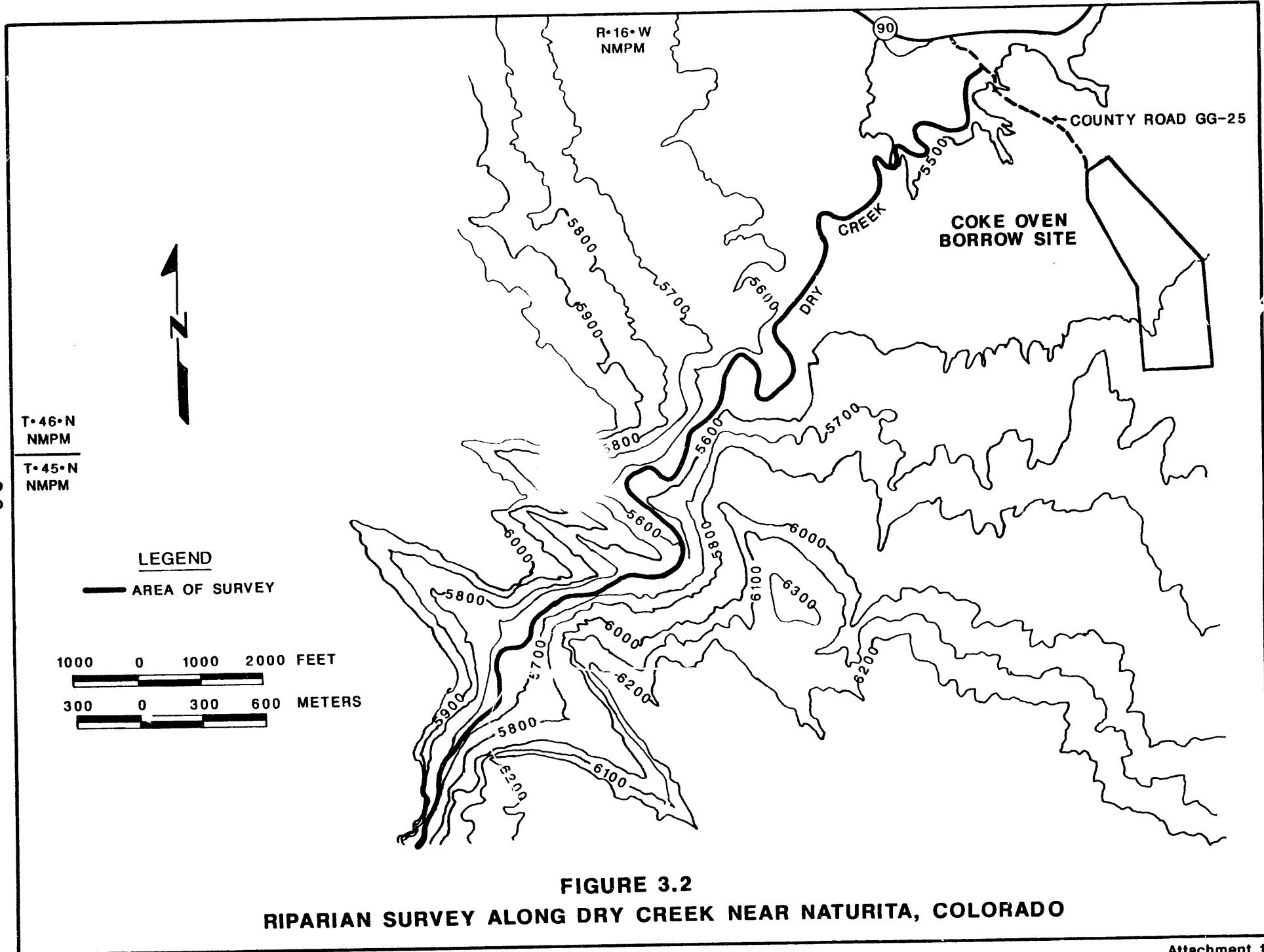
The riparian areas along the San Miguel River at the Naturita processing site were examined during five field trips to the site from 1986 to 1992 (TAC, 1986; 1988; 1990; 1991; and 1992). The riparian areas occupy narrow bands along reaches of the river that are flanked by steep hillsides and broader expanses of relatively level ground where the river flows away from the hillsides (Figure 3.1). The vegetation in the narrow bands grows in three distinct zones. The zone closest to the river is the cottonwood/willow seedling plant community and consists of sandy and rocky bars that are flooded frequently. The dominant woody plant species are cottonwood and willow seedlings. Other commonly observed species are salt cedar, yellow sweet-clover, horsetail, sedges, and rushes. The cottonwood/willow sapling zone typically occurs on terraces above the river and is dominated by a dense growth of cottonwood saplings and willow. This zone is flooded much less frequently than the sandy bars, and a deep build-up of soil has taken place. Other woody plant species in this plant community are salt cedar, Russian olive, squawbush, and wild rose. The ground cover is very dense and dominated by grass. The upper zone is dominated by mature cottonwoods that typically grow up to the base of the hillsides and mark the beginning of the upland plant communities. The ages of these stands of cottonwood vary as indicated by size. Some stands are dominated by trees 25 to 35 ft (8 to 11 m) tall, while most trees in older stands are 45 to 55 ft (14 to 17 m) tall. Within these stands, cottonwood is the only canopy species; willow, salt cedar, squawbush, and rabbitbrush are scattered in the understory. The ground cover is fairly dense, although not as dense as in the cottonwood/willow sapling zone, principally because of reduced penetration of light onto the forest floor.

The plant communities in the broader expanses of the riparian areas are an interspersion of various types (Figure 3.1). Low-lying areas are dominated by willow. Drier ground is typically covered by cottonwood stands of various ages, with willow and other woody species in the understory and a ground cover of grass and herbs. Still drier areas are covered by the upper riparian shrub plant community. This plant community is typically open, and few cottonwoods are present. Riparian shrubs such as willow and squawbush and more upland plant species such as rabbitbrush and big sagebrush grow in fairly dense stands in this plant community. As in most of the riparian areas, there is a dense ground cover of grasses and herbs.

Dry Creek is an intermittent tributary of the San Miguel River and enters the river approximately 1 air mi (2 km) southeast of the Naturita processing site. Dry Creek passes within 0.5 air mi (1 km) of the Coke Oven borrow site and within 1 air mi (2 km) of the Dry Flats disposal site. Dry Creek was surveyed for riparian areas from 1990 to 1993, beginning in the area of the Coke Oven borrow site and proceeding approximately 3 mi (5 km) upstream (Figure 3.2).



**FIGURE 3.1**  
**RIPARIAN PLANT COMMUNITIES AT THE NATURITA SITE, COLORADO**



**FIGURE 3.2**  
**RIPARIAN SURVEY ALONG DRY CREEK NEAR NATURITA, COLORADO**



During the surveys, there were sections that contained water with little or no flow interspersed with dry sections. Riparian vegetation growing in narrow bands along the creek is composed mostly of willow and salt cedar. Other woody shrubs such as rabbitbrush, wild rose, and privet were also observed. Widely scattered, solitary, or small groves of mature Fremont cottonwoods were encountered along this otherwise open riparian zone.

During the course of the field work along the San Miguel River and Dry Creek, wildlife were observed as described in Attachment 2, *Biological Assessment*. Detailed surveys for amphibians and reptiles were not conducted, but their occurrences were noted during the field work. Six species of amphibians and reptiles were observed in the riparian plant communities, and at least five additional species are expected to occur. Bird surveys in the riparian habitat along the San Miguel River were conducted principally during the nesting season. Sixty-four species were recorded, and at least 27 species of birds nest in the riparian habitat along Dry Creek. At least 19 species of mammals may occur in the riparian habitat along the San Miguel River and Dry Creek. Beaver sign was observed along both watercourses. In 1986, there was much fresh beaver sign, and small beaver dams had been constructed in the drainages that run through the dense growth of cottonwoods in the former tailings area. Observations in 1988 revealed very little fresh beaver sign. One active beaver dam was observed along Dry Creek.

In September 1992, the riparian plant communities along the San Miguel River were inspected by a biologist from the USACE. It was determined that the cottonwood/willow seedling plant community was the only plant community that met the USACE definition of a wetland. The other riparian plant communities failed to meet the USACE criteria for jurisdictional wetlands because they are not flooded for sufficient duration during the growing season and they lack hydric soils (Jacobsen, 1992). The riparian plant communities along Dry Creek were not inspected by the USACE, but a small portion of the creek would be affected by the improvement of County Road GG-25 to provide access to the Dry Flats disposal site. County Road GG-25 crosses Dry Creek between State Highway 90 and the Coke Oven borrow site (Figure 3.2), and culverts would be installed at this crossing. It is estimated that a maximum of 0.5 ac (0.2 ha) of riparian plant communities would be disturbed by this culvert installation, and, for the purpose of this assessment, it was assumed that these riparian plant communities would meet the USACE definition of a wetland.

### **3.2 WETLAND IMPACTS AND MITIGATION**

Approximately 47 ac (19 ha) of riparian plant communities have been contaminated along the San Miguel River (Table 3.1). The largest riparian plant community that would be cleared during the remedial action is the 14 ac (6 ha) of degraded cottonwood/willow saplings that developed in the former tailings area after the tailings were removed (Figure 3.1). This area supported a healthy stand of cottonwood saplings and willows in 1986 (TAC, 1986); a subsequent die-off of cottonwoods and willows has produced much open ground and

contributed to the degraded nature of this plant community (TAC, 1990, 1991, and 1992). Mature [13-ac (5-ha)] and immature [8-ac (3-ha)] cottonwood stands would be the next largest plant communities impacted by remedial action. These stands occur principally at the west end of the processing site area. The remaining plant community types that would be impacted are 7 ac (3 ha) of cottonwood/willow saplings and seedlings along the river, 2 ac (1 ha) of upper riparian shrub, and 3 ac (1 ha) of willow in the processing site area. The only riparian plant community that met the USACE definition of a wetland is the 4 ac (2 ha) of cottonwood/willow seedlings next to the river. It is estimated that another 0.5 ac (0.2 ha) of riparian plant communities along Dry Creek would be disturbed by the improvement of County Road GG-25, and it is assumed that these riparian plant communities would also meet the USACE definition of a wetland.

**Table 3.1 Riparian plant communities at the Naturita site, Colorado**

Riparian plant community	Acres	Hectares
Mature cottonwood	13	5
Cottonwood/willow saplings	3	1
Cottonwood/willow seedlings	4	2
Immature cottonwood	8	3
Degraded cottonwood/willow saplings	14	6
Upper riparian shrub	2	1
Willow	3	1
<b>Total</b>	<b>47</b>	<b>19</b>

Clearing 47.5 ac (19.2 ha) of riparian plant communities would constitute an unavoidable impact on vegetation and wildlife. Riparian plant communities are much more productive in terms of plants and wildlife than the surrounding upland plant communities. For example, quantitative studies of breeding birds indicate that densities are 3 to 10 times higher in the riparian habitats than in the desert shrub habitat (Szaro and Jakle, 1985; Johnson and Carothers, 1982). Data from the riparian habitats along the San Miguel River and Dry Creek support this finding; 65 bird species were observed in the riparian habitats, while 29 were observed in the upland desert shrub habitat.

The clearing of vegetation from the riparian areas would temporarily reduce or prohibit wildlife use. Clearing of this vegetation could destroy less mobile wildlife such as small mammals and reptiles and displace larger mammal and birds from the affected areas. The displaced wildlife could be forced to compete with wildlife in other areas for habitat or to use marginal habitat, resulting in a reduced survivorship for the displaced species. The duration of this impact would depend on the types of habitat restoration measures that would be implemented.

The disturbance of wetlands is regulated by the USACE through its Section 404 Permit process, and the mitigation of remedial action impacts to wetlands would be determined by this process. The DOE would submit a Section 404 Permit application to the USACE for the remedial action activities that would affect wetlands. The USACE would publish a notice of availability for the review of the application. Section 404 Permit applications are usually reviewed by Federal agencies such as the EPA and Fish and Wildlife Service (FWS), and it is anticipated that the EPA and FWS would require that the DOE's permit address mitigation of the remedial action impacts to the 43 ac (17 ha) of riparian plant communities that do not meet the USACE definition of a wetland.

The DOE proposes to apply supplemental standards (Section 1.3) to a contaminated area adjacent to the Naturita processing site and west of the San Miguel River. This area does not contain any riparian habitat. If this application were approved by the state of Colorado and NRC, this area would not be cleaned up. Other areas at and adjacent to the processing site may be considered for supplemental standards, and these areas include those containing riparian plant communities and wetlands. If supplemental standards were applied to these areas, remedial action impacts to the 47.5 ac (19.2 ha) of riparian plant communities and wetlands would be reduced. Supplemental standards are discussed in Sections 3.1, 4.5, 5.1, 5.4, and 5.9 of the environmental assessment.

#### 4.0 REFERENCES

- Jacobsen, K., 1992. U.S. Army Corps of Engineers, Grand Junction, Colorado, personal communication to Charles Burt, Jacobs Engineering Group Inc., Albuquerque, New Mexico, October 5, 1992.
- Johnson, R. R., and S. W. Carothers, 1982. "Riparian Habitat and Recreation: Interrelationships and Impacts in the Southwest and Rocky Mountain Region," in *Eisenhower Consortium for Western Environmental Forestry Research*, Bulletin 12, University of Arizona, Tucson, Arizona.
- MKE (Morrison-Knudsen Engineers, Inc.), 1990. "Naturita Site Restoration in Areas Adjacent to the San Miguel River," Calculation No. 17-720-01-00, San Francisco, California.
- Szaro, R. C., and M. D. Jakle, 1985. "Avian Use of a Desert Riparian Island and Its Adjacent Scrub Habitat," in *The Condor*, Vol. 87, pp. 511-519.
- TAC (Technical Assistance Contractor), 1992. "Unpublished Field Notes, Naturita, Colorado, Uranium Mill Tailings Site," September 29, 1992, prepared by the TAC, Albuquerque, New Mexico, for the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.
- TAC (Technical Assistance Contractor), 1991. "Unpublished Field Notes, Naturita, Colorado, Uranium Mill Tailings Site," June 18 through 21, 1991, prepared by the TAC, Albuquerque, New Mexico, for the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.
- TAC (Technical Assistance Contractor), 1990. "Unpublished Field Report, Naturita, Colorado, Uranium Mill Tailings Site," June 11 through 14, 1990, prepared by the TAC, Albuquerque, New Mexico, for the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.
- TAC (Technical Assistance Contractor), 1988. "Unpublished Field Notes, Naturita, Colorado, Uranium Mill Tailings Site," November 3, 1988, prepared by the TAC, Albuquerque, New Mexico, for the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.
- TAC (Technical Assistance Contractor), 1986. "Unpublished Field Notes, Naturita, Colorado, Uranium Mill Tailings Site," June 9 and 11, 1986, prepared by the TAC, Albuquerque, New Mexico, for the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.

USACE (U.S. Army Corps of Engineers), 1982. *HEC-2 Water Surface Profile User's Manual*, Computer Program 723-X6-L202A, Water Resources Support Center, The Hydrologic Engineering Center, Davis California.

USGS (United States Geological Survey), 1979. *Water Resources Data for Colorado, Water Year 1978, Vol. 3, Dolores River Basin & Green River Basin*, USGS, Denver, Colorado.

#### CODE OF FEDERAL REGULATIONS

10 CFR Part 1022, "Compliance With Floodplain/Wetlands Environmental Review Requirements," Title 10, *Code of Federal Regulations*, Part 1022, U.S. Department of Energy, Office of the Federal Register, National Archives and Records Administration, Washington, D.C.

40 CFR Part 192, "Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings," Title 40, *Code of Federal Regulations*, Part 192, U.S. Environmental Protection Agency, Office of the Federal Register, National Archives and Records Administration, Washington, D.C.

#### EXECUTIVE ORDERS

EO11988, "Floodplain Management," May 24, 1977, Office of the President, Washington, D.C.

EO11990, "Protection of Wetlands," May 24, 1977, Office of the President, Washington, D.C.

**ATTACHMENT 2**  
**BIOLOGICAL ASSESSMENT**

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**LIST OF ACRONYMS AND ABBREVIATIONS**

<b><u>Acronym</u></b>	<b><u>Definition</u></b>
ac	acre
DOE	U.S. Department of Energy
EA	environmental assessment
ft	foot
FR	Federal Register
FWS	Fish and Wildlife Service
ha	hectare
km	kilometer
m	meter
mi	mile
UMTRCA	Uranium Mill Tailings Radiation Control Act of 1978
USACE	U.S. Army Corps of Engineers

## 1.0 INTRODUCTION

Pursuant to the Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA), the U.S. Department of Energy (DOE) is proposing to conduct remedial action to clean up the residual radioactive materials at the Naturita uranium processing site in Colorado. The proposed remedial action is to remove the residual radioactive materials from the Naturita site to the Dry Flats disposal site. To address the potential impacts of the remedial action on threatened and endangered species, the DOE prepared a biological assessment. Informal consultations with the Fish and Wildlife Service (FWS) were initiated in 1986, and the FWS provided a list of the threatened and endangered species that may occur in the Naturita study area. This list was updated by two FWS letters in 1988 and by verbal communication in 1990 (Leachman, 1990). The biological assessment was included in the environmental assessment (EA) of the proposed remedial action that was prepared in 1990.

The 1990 biological assessment provided the DOE's findings on the potential impacts of the proposed remedial action on threatened and endangered species. In a biological opinion dated December 11, 1990, the FWS agreed with the DOE's findings but asked the DOE to determine if the proposed remedial action would jeopardize the continued existence of the razorback sucker. In 1991, the DOE responded that the San Miguel River would be used as a source of water for the remedial action, which would deplete water in the Upper Colorado River Basin. This depletion "may affect" the razorback sucker but would not jeopardize the continued existence of the species. The FWS agreed with this determination on February 25, 1991.

In 1993, the design for the proposed Naturita remedial action was changed. The remedial action would now disturb an estimated total of 380 acres (ac) [153 hectares (ha)]: 133 ac (55 ha) at the processing site, 105 ac (42 ha) at the Dry Flats disposal site, 135 ac (55 ha) at the Coke Oven borrow site, and 8 ac (3 ha) for improving and constructing roads to the disposal site. The FWS was again consulted in 1993 and provided a new list of threatened and endangered species that may occur in the Naturita study area. The EA and the biological assessment have been revised in response to these changes. Copies of all correspondence with the FWS are provided in Appendix A to this biological assessment.

For this biological assessment, the Naturita study area consists of the Naturita processing site, the Dry Flats disposal site, the Coke Oven borrow site, and the associated haul road. The study area is in the Great Basin sagebrush habitat of the Colorado Plateau (Kuchler, 1975). The processing site is in the San Miguel River valley, which is surrounded by steep juniper-covered hillsides. Flat land is confined to the riparian zone along the river. The Dry Flats disposal site and the Coke Oven borrow site are in upland areas dominated by sagebrush and pinon-juniper plant communities.

## 2.0 FLORA AND FAUNA

Information on the flora and fauna in the Naturita study area was obtained from field reconnaissance surveys (TAC, 1993, 1992, 1991, 1990, 1988, 1986; DOE, 1983), consultations with natural resource personnel from state and Federal agencies, and reviews of pertinent literature. Lists of the flora and fauna observed or expected to occur in the major plant community types at the sites are provided in Tables 2.1 through 2.5, which are presented at the end of this section.

### 2.1 NATURITA PROCESSING SITE

The vegetation at and near the processing site consists of three types: riparian, upland desert shrub, and bare ground with early successional plant species in disturbed areas (Table 2.1). The riparian vegetation growing along the San Miguel River grows in three distinct zones and is described in Attachment 1, *Floodplains and Wetlands Assessment*. The upland desert shrub plant community occurs in small elevated areas along the river between the pockets of riparian vegetation. Common shrub species observed are greasewood, big sagebrush, squawbush, rabbitbrush, saltbush, yucca, prickly pear cactus, and Mormon tea. Widely scattered juniper, pinon pine, and Gambel's oak are also in this area. The ground cover is fairly dense and is dominated by grass and herbs.

Land areas have been disturbed in the mill yard and former tailings area. Much of the mill yard is flat, hard-packed gravel with little, if any, soil. As a result, there is much bare ground with very widely dispersed, early successional species such as Russian thistle and white sweet clover. Rabbitbrush is widely scattered in this area. Sloping areas within the mill yard have remnants of native vegetation; the plant species observed are similar to those observed in the upland vegetation growing between the pockets of riparian vegetation along the river. The eastern part of the former tailings area is rocky and largely devoid of vegetation. A dense growth of cottonwood saplings and young willows and salt cedars has developed in the western one-half of this area. Ground cover includes various species of grass and herbaceous species, including goldenrod, poison ivy, and sweet clover.

Bird surveys in the riparian habitats along the San Miguel River were conducted principally during the nesting season. Sixty-four species were recorded. Three nesting bird censuses were taken over a 6-year period along the San Miguel River from Calamity Bridge upriver to the processing site. These censuses showed the yellow warbler as the most common species. This warbler frequented all riparian habitat types. The spotted sandpiper was also common and was most often seen along the river. The western wood-pewee, northern oriole, house finch, and solitary vireo were frequently heard singing in the mature cottonwood stands. Nesting birds indicative of the shrubby riparian habitat were the yellow-breasted chat and blue grosbeak. The great-blue heron and belted kingfisher were occasionally seen fishing in the river but are not known to nest in the site area. Occasional solitary mallards or pairs of mallards

were observed flying up and down the river, and one brood was heard calling from a dense stand of willow in 1986. The San Miguel River constitutes marginal nesting habitat for waterfowl because of the lack of brood escape cover, especially when the river is low. Nest sites for birds of prey have not been observed along the river, but the prairie falcon (*Falco mexicanus*) and golden eagle (*Aquila chrysaetos*) could use the area for foraging. The common barn owl (*Tyto alba*), long-eared owl (*Asio otus*), great horned owl (*Bubo virginianus*), western screech owl (*Otus kennicottii*), and burrowing owl (*Athene cunicularia*) could also occur in the area. Large numbers (up to 22) of turkey vultures have been roosting for a number of years in a stand of mature cottonwoods across the river from the processing site.

At least 19 species of mammals may occur in the riparian habitat along the San Miguel River and Dry Creek. Beaver sign was observed along both watercourses. In 1986, there was much fresh beaver sign, and small beaver dams had been constructed in the drainages that run through the dense growth of cottonwoods in the former tailings area. Observations in 1988 revealed very little fresh beaver sign. One active beaver dam was observed along Dry Creek. Mule deer were observed along the river, and their sign (droppings) was common. This area is likely a mule deer winter range but not a critical winter range. There are also year-round resident deer in the area.

Limited fish sampling in the San Miguel River resulted in six species being recorded (Table 2.2). The flannelmouth sucker and rainbow trout were the most common species collected.

## 2.2 DRY FLATS DISPOSAL SITE AND COKE OVEN BORROW SITE

The Dry Flats disposal and Coke Oven borrow sites are in upland areas dominated by sagebrush and pinon-juniper plant communities (Table 2.1). Specific plant species vary somewhat from site to site; however, the fauna at and near the sites are similar.

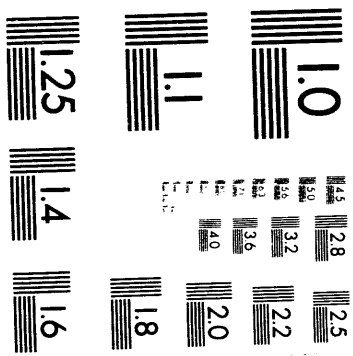
The Dry Flats disposal site is in the sagebrush plant community with pinon-juniper woods nearby. Areas of sagebrush at and near the site have been cleared, and small, reinvading sagebrush is the most common shrub species. Other widely scattered species are rabbitbrush, broom snakeweed, juniper, prickly pear, yucca, and Mormon tea. There is much bare ground between the woody species, and the ground cover is a sparse growth of grass and herbs. Uncleared sagebrush has a much denser growth of woody plants, with sagebrush by far the most common species. The species in the cleared sagebrush zone also grow in the sagebrush plant community. The low ridges at and around the disposal site are covered with an open growth of pinon-juniper woods. Big sagebrush is the dominant understory shrub; other species of shrubs are the same as those observed in the nearby sagebrush plant community.

Sagebrush, greasewood, pinon-juniper woods, and riparian plant communities occur in the area of the Coke Oven borrow site. The sagebrush plant community covers an extensive amount of land in the borrow site area. Sagebrush is the most common species; other shrub species include greasewood, rabbitbrush, and four-winged saltbush. Grass and various herbaceous species, including Indian paintbrush and scarlet globe mallow, make up the sparse ground cover. The greasewood-dominated plant community occurs mostly west of Dry Creek. Other species in this plant community are the same as those recorded in the sagebrush plant community. The pinon-juniper woods occur on the ridge south of the Coke Oven borrow site, and the understory and ground cover plant species are similar to those recorded in the sagebrush plant community. Gambel's oak and mountain mahogany are also common in the pinon-juniper woods. The riparian vegetation occurs along Dry Creek approximately 2000 feet (ft) [610 meters (m)] to the north and west. The vegetation growing along the border of the creek is dominated by shrubs. Willow is the most common species and grows in dense strips in places. Salt cedar is quite common in places, and large cottonwoods grow individually or in small clumps along the creek. Other species noted along the creek are sagebrush, rabbitbrush, greasewood, rush, bulrush, and yellow sweet clover.

The haul road to the Dry Flats disposal site and Coke Oven borrow site would pass through sagebrush and pinon-juniper plant communities, and the species of plants within these areas are comparable to those observed in similar plant community types described above. The Dry Flats disposal site, the Coke Oven borrow site, and the haul road to these sites would be in similar plant community types, so the following discussion regarding fauna would apply to these sites and road. The collared lizard, sagebrush lizard, and plateau striped whiptail were observed at the disposal site, while these species and the fence lizard, bull snake, and garter snake were observed near the Coke Oven borrow site. An additional eight species would be expected to occur in these areas (Table 2.3).

A total of 30 species of birds were recorded in the upland desert shrub and pinon-juniper plant communities (Table 2.4). The meadowlark and rock wren were common in the desert shrub, while the blue-gray gnatcatcher and the black-throated gray warbler were species observed only in the pinon-juniper woods. The red-tailed and Cooper's hawks were the only birds of prey observed. A red-tailed hawk was observed flying in the area of the Dry Flats disposal site; however, no raptor nests were observed at or near this site. A female Cooper's hawk in immature plumage was observed in a clump of cottonwoods along Dry Creek.

Surveys have shown that at least 27 species of birds nest in the riparian habitats along Dry Creek. The northern oriole, western kingbird, ash-throated flycatcher, and northern mockingbird were common and were most often in the clumps of cottonwoods. The rufous-sided towhee, yellow warbler, and lark sparrow frequented the shrubby riparian habitat. Nest sites for birds of prey were not observed in the riparian habitat along Dry Creek. A Cooper's hawk



**2 of 2**

was flushed from a small grove of cottonwoods in 1986, but a search of the area failed to reveal a nest site. The prairie falcon and golden eagle could use the area for foraging. A potential prairie falcon aerie was observed on a ledge of a high cliff at the upper end of the survey area in June 1990, but no falcons were observed. The great horned and burrowing owls could occur in the area of the Dry Flats disposal and Coke Oven borrow sites.

At least 26 species of mammals may occur in the upland habitat at or near the Dry Flats disposal and Coke Oven borrow sites (Table 2.5). Two small towns of Gunnison prairie dogs were observed in the northern portion of the temporary Dry Flats disposal site and at the northwestern corner of the Coke Oven borrow site. Each town contained approximately 20 active burrows. Mule deer sign (droppings) was observed throughout the area. The area likely supports a year-round population of deer, and there may be an increase in deer numbers in the winter. However, judging from the amount of deer sign, it is not a critical deer wintering area. Some elk droppings were observed in the pinon-juniper woods south of the Coke Oven borrow site and likely represent elk that winter in small numbers in this area.

### 2.3 IMPACTS TO FLORA AND FAUNA

Flora and fauna would be affected directly and indirectly by remedial action. Direct effects would include the loss of habitat, loss of less mobile wildlife species, and displacement of other wildlife species. Indirect effects would arise from increased fugitive dust, noise levels, and human activity. The duration of the direct effects would depend on the level of restoration, and indirect effects would last for the duration of the remedial action or less.

Remedial action at the Naturita site would disturb approximately 380 ac (153 ha) of land. Most of this land consists of upland sagebrush and pinon-juniper plant communities [292.5 ac (118.4 ha)], followed by riparian vegetation [47.5 ac (19.2 ha)] and previously disturbed ground with little vegetation [40 ac (16 ha)]. The riparian plant communities along the San Miguel River and Dry Creek are productive in terms of flora and fauna and are relatively scarce in the region. Consultation with the U.S. Army Corps of Engineers (USACE) indicated that only 4 ac (2 ha) of cottonwood/willow seedlings along the San Miguel River meet the USACE definition of a wetland (Section 3.0 of Attachment 1). The remaining riparian plant communities along the river do not meet the USACE definition of a wetland because they lack the proper hydrological conditions (Jacobsen, 1992). The USACE did not inspect the riparian plant communities along Dry Creek, but it is assumed that approximately 0.5 ac (0.2 ha) of wetland area along Dry Creek would be disturbed by improvement of the haul road to the disposal site. The 292.5 ac (118.4 ha) of sagebrush and pinon-juniper plant communities represent the second most productive habitat types that would be disturbed. These habitat types are common in the area, and the land to be affected is not in any important wildlife habitat (e.g., critical deer winter range).



The clearing of vegetation from the riparian areas would temporarily reduce or prohibit wildlife use. The duration of this effect would depend on the level of restoration undertaken. Remedial action would remove not only the vegetation but also some of the soil. This soil could not be stockpiled because it is contaminated and must be incorporated into the disposal cell. Research has shown that the rate of vegetation recovery on mine spoil varies widely, depending on the restoration methods employed (Aldon, 1981; Wagner et al., 1978). The hypothetical maximum effect would result from no restoration except recontouring, which would result in the recovery of the biotic community on land devoid of topsoil. In this case, primary succession [i.e., a sequence of plant communities developing in a newly exposed habitat devoid of life (Ricklefs, 1979)] would take place and recovery would take years (Evans et al., 1978). However, recent experience has shown that procedures such as fertilization, use of proper seed mixtures, pole planting in riparian habitats, and protection from grazing can enhance successful revegetation [(Richardson et al., 1986; Swenson and Mullins, 1985; York, 1985)]. Prior to any surface disturbance, plans for restoring excavated areas would be developed by the RAC and the DOE in consultation with the appropriate regulatory agency or other authority. In general, these plans would involve backfilling, recontouring, and revegetation. Effects would be mitigated by performing restoration as soon as possible after the completion of surface-disturbing activities.

The effects on game species at the Naturita site are expected to be minimal. The mule deer is a year-round resident at the processing, disposal, and borrow sites; however, habitat features such as critical winter range do not occur at or near the sites that would be disturbed during remedial action. Parts of the small towns of Gunnison prairie dogs at the Dry Flats disposal and Coke Oven borrow sites could be temporarily disturbed during the remedial action. A limited amount of waterfowl production occurs along the San Miguel River in the site area, but remedial action activities would be expected to have a minimal effect on waterfowl production. The effects on birds of prey at the site are also expected to be minimal to nonexistent. No large hawks are known to nest in the cottonwood stands that may be affected. The kestrel and certain species of small owls may nest in these areas and be affected. The Cooper's hawk may nest along Dry Creek, but potential nesting sites are well removed from the area of Dry Creek that would be affected by remedial action.

An analysis of possible effects on threatened and endangered species is presented in Section 3.0 of this biological assessment. This analysis indicates that there would be no direct effects on threatened and endangered species and other species of concern except possibly on the southwestern willow flycatcher (*Epidonax traillii extimus*), flannelmouth sucker (*Catostomus latipinnis*), and roundtail chub (*Gila robusta*). The southwestern willow flycatcher was proposed for listing as an endangered species on July 23, 1993 [58 Federal Register (FR) 39495]. This bird species was heard calling along the San Miguel River in 1986; however, this species was not observed or heard along the San Miguel River or Dry Creek in 1990 through 1993. It was therefore determined that the southwestern willow flycatcher does not currently nest in the areas that

would be affected by remedial action. A survey for this bird species would be conducted again in 1994. If this survey revealed that the southwestern willow flycatcher nests in areas that would be affected by the remedial action, a mitigation plan would be prepared in consultation with the FWS. One possible mitigation measure would be to limit remedial action activities in the habitat of the southwestern willow flycatcher.

Remedial action activities would take place in the 100-year floodplain of the San Miguel River and would have the potential to directly affect the flannelmouth sucker and roundtail chub through alteration of the San Miguel River. However, negative impacts could be minimized by not performing remedial action in the river, recontouring and revegetating disturbed ground as soon as possible, using erosion control measures such as mulch and berms where needed, and possibly implementing supplemental standards to exclude a 50-ft (15-m) buffer zone along the river from cleanup activities. It is anticipated that implementation of these measures would result in little, if any, negative impact to these fish. In addition, the removal of contaminated materials that pose a potential ecological risk to the terrestrial and aquatic ecosystems may have a positive impact on the species, along with other species in the terrestrial and aquatic ecosystems.

Water from the San Miguel River would be used for the remedial action (e.g., for dust control and equipment washing). This water use would result in a net depletion of water in the upper Colorado River basin that would result in a "may affect" determination for the Colorado squawfish, humpback chub, bonytail chub, and razorback sucker. In addition, it was determined that this depletion would adversely affect the critical habitat of these fish species. These determinations would require formal conferencing with the FWS and would likely result in the payment of a dollar amount per acre-foot of the average annual water withdrawal for the remedial action. It is estimated that the remedial action would require an average annual water withdrawal of 86 acre-feet from the San Miguel River.

Table 2.1 Plant species observed in the area of the Naturita site, Colorado

Scientific name	Common name	Habitat	
		Riparian	Upland
<b><u>TREES AND SHRUBS</u></b>			
<i>Artemesia tridentata</i>	big sagebrush		X
<i>Atriplex canescens</i>	four-wing saltbush		X
<i>Atriplex</i> sp.	saltbush		X
<i>Cercocarpus montanus</i>	mountain mahogany		X
<i>Chrysothamnus nauseosus</i>	golden rabbitbrush	X	X
<i>Chrysothamnus viscidiflorus</i>	rabbitbrush	X	X
<i>Clematis ligusticifolia</i>	western virgin's bower	X	
<i>Elaeagnus angustifolia</i>	Russian olive	X	
<i>Ephedra</i> sp.	Mormon tea		X
<i>Forestiera neomexicana</i>	privet	X	
<i>Gutierrezia sarothrae</i>	broom snakeweed		X
<i>Juniperus</i> sp.	juniper		X
<i>Opuntia</i> sp.	prickly pear	X	X
<i>Pinus edulis</i>	pinon pine		X
<i>Populus angustifolia</i>	narrowleaf cottonwood	X	
<i>Populus fremontii</i>	Fremont cottonwood	X	
<i>Quercus gambelii</i>	Gambel's oak		X
<i>Rhus radicans</i>	poison ivy	X	
<i>Rhus fendleri</i>	squawbush	X	
<i>Rosa fendleri</i>	Fendler rose	X	
<i>Salix</i> sp.	willow	X	
<i>Salsola kali</i>	Russian thistle	X	X
<i>Sarcobatus vermiculatus</i>	greasewood	X	X
<i>Shepherdia argentea</i>	silver buffaloberry	X	
<i>Tamarix parviflora</i>	salt cedar	X	
<i>Yucca baccata</i>	banana yucca		X
<i>Yucca</i> sp.	yucca		X
<b><u>FORBS AND HERBS</u></b>			
<i>Asclepias</i> sp.	milkweed		X
<i>Astragalus</i> sp.	milkvetch		X
<i>Castilleja</i> sp.	paintbrush		X
<i>Cirsium</i> sp.	thistle	X	X
<i>Cordylanthus wrightii</i>	birdbeak		X
<i>Equisetum arvense</i>	common horsetail	X	
<i>Eriogonum racemosum</i>	red-root buckwheat		X
<i>Helianthus annuus</i>	common sunflower		X
<i>Lactuca ludoviciana</i>	western lettuce		X
<i>Leucelene ericoides</i>	baby white aster		X

**Table 2.1 Plant species observed in the area of the Naturita site, Colorado (Concluded)**

Scientific name	Common name	Habitat	
		Riparian	Upland
<b><u>FORBS AND HERBS</u></b>			
<i>Lupinus sp.</i>	lupine		X
<i>Marrubium vulgare</i>	horehound		X
<i>Melilotus alba</i>	white sweet clover	X	
<i>Melilotus officinalis</i>	yellow sweet clover	X	X
<i>Mimulus sp.</i>	monkey flower	X	
<i>Mirabilis multiflora</i>	Colorado four o'clock	X	
<i>Oenothera sp.</i>	evening primrose	X	
<i>Physalis sp.</i>	twin pod		X
<i>Plantago major</i>	common plantain	X	
<i>Solidago petradoria</i>	goldenrod		X
<i>Solidago sp.</i>	goldenrod		X
<i>Sphaeralcea coccinea</i>	scarlet globemallow		X
<i>Stanleya pinnata</i>	desert prince's plume		X
<i>Tragopogon dubius</i>	goatsbeard	X	
<i>Trifolium sp.</i>	clover	X	
<i>Verbesina encelioides</i>	cowpen daisy		X
<i>Xanthium stumarium</i>	common cocklebur	X	X
<b><u>GRASS AND GRASS-LIKE SPECIES</u></b>			
<i>Agropyron cristatum</i>	crested wheatgrass		X
<i>Bromus tectorum</i>	downy cress	X	
<i>Carex sp.</i>	sedge	X	
<i>Cyperus sp.</i>	flat sedge	X	
<i>Distichlis stricta</i>	salt grass	X	
<i>Eleocharis macrostachya</i>	spike rush	X	
<i>Hilaria jamesii</i>	galleta		X
<i>Juncus sp.</i>	rush	X	
<i>Oryzopsis hymenoides</i>	Indian ricegrass		X
<i>Phragmites communis</i>	reed	X	
<i>Poa sp.</i>	bluegrass		X
<i>Scirpus sp.</i>	bulrush	X	
<i>Sitanion hystrix</i>	squirreltail	X	X
<i>Typhan sp.</i>	cattail	X	

Ref. TAC, 1988, 1986; DOE, 1983.

**Table 2.2 Fish species recorded in the San Miguel River at the Naturita site, Colorado**

Scientific name	Common name
<i>Salmo gairdneri</i>	rainbow trout
<i>Salmo clarki</i>	cutthroat trout
<i>Rhinichthys osculus</i>	speckled dace
<i>Catostomus discobolus</i>	bluehead sucker
<i>Catostomus latipinnis</i>	flannelmouth sucker
<i>Cottus bairdi</i>	mottled sculpin

Ref. CDOW, 1977.

**Table 2.3 Amphibians and reptiles observed or expected to occur in the area of the Naturita site, Colorado**

Scientific name	Common name	Habitat	
		Riparian	Upland
<i>Ambystoma tigrinum</i>	tiger salamander	X	X
<i>Scaphiopus multiplicatus</i>	New Mexico spadefoot		X
<i>Bufo punctatus</i>	red-spotted toad		X
<i>Bufo woodhousii</i> <sup>a</sup>	Woodhouse's toad	X	
<i>Rana pipiens</i>	northern leopard frog	X	
<i>Crotaphytus collaris</i> <sup>a</sup>	collared lizard		X
<i>Phrynosoma douglassii</i>	short-horned lizard		X
<i>Sceloporus graciosus</i> <sup>a</sup>	sagebrush lizard		X
<i>Sceloporus undulatus</i> <sup>a</sup>	eastern fence lizard	X	X
<i>Urosaurus ornatus</i>	tree lizard		X
<i>Uta stansburiana</i>	side-blotched lizard		X
<i>Cnemidophorus tigris</i> <sup>a</sup>	western whiptail	X	
<i>Cnemidophorus velox</i> <sup>a</sup>	plateau striped whiptail	X	X
<i>Elaphe guttata</i>	corn snake	X	
<i>Masticophis taeniatus</i>	striped whipsnake		X
<i>Pituophis melanoleucus</i> <sup>a</sup>	bull snake	X	X
<i>Thamnophis elegans</i> <sup>a</sup>	western terrestrial garter snake	X	X
<i>Crotalus viridis</i>	western rattlesnake	X	X
<i>Opheodrys vernalis</i> <sup>a</sup>	smooth green snake	X	

<sup>a</sup>Species observed at or near the site.

Ref. TAC, 1990, 1988, 1986; Hammerson, 1986; DOE, 1983.

**Table 2.4 Bird species observed in the area of the Naturita site, Colorado**

Scientific name	Common name	Habitat	
		Riparian	Upland
<i>Ardea herodias</i>	great blue heron	X	
<i>Anas platyrhynchos</i>	mallard	X	
<i>Charadrius vociferus</i>	killdeer	X	
<i>Actitis macularia</i>	spotted sandpiper	X	
<i>Cathartes aura</i>	turkey vulture	X	X
<i>Accipiter cooperii</i>	Cooper's hawk	X	X
<i>Buteo jamaicensis</i>	red-tailed hawk	X	X
<i>Falco sparverius</i>	American kestrel	X	X
<i>Phasianus colchicus</i>	ring-necked pheasant	X	
<i>Columba livia</i>	rock dove	X	
<i>Zenaidura macroura</i>	mourning dove	X	X
<i>Chordeiles minor</i>	common nighthawk	X	X
<i>Aeronautes saxatalis</i>	white-throated swift	X	
<i>Ceryle alcyon</i>	belted kingfisher	X	
<i>Selasphorus platycercus</i>	broad-tailed hummingbird	X	
<i>Archilochus alexandri</i>	black-chinned hummingbird	X	
<i>Colaptes auratus</i>	northern flicker	X	
<i>Melanerpes lewis</i>	Lewis woodpecker	X	
<i>Sphyrapicus nuchalis</i>	red-naped sapsucker	X	
<i>Tyrannus verticalis</i>	western kingbird	X	
<i>Myiarchus cinerascens</i>	ash-throated flycatcher	X	
<i>Contopus sordidulus</i>	western wood pewee	X	
<i>Sayornis saya</i>	Say's phoebe	X	
<i>Empidonax wrightii</i>	gray flycatcher	X	
<i>Empidonax traillii</i>	willow flycatcher	X	
<i>Eremophila alpestris</i>	horned lark		X
<i>Tachycineta thalassina</i>	violet-green swallow	X	
<i>Stelgidopteryx serripennis</i>	northern rough-winged swallow	X	
<i>Hirundo pyrrhonota</i>	cliff swallow	X	
<i>Hirundo rustica</i>	barn swallow	X	
<i>Gymnorhinus cyanocephalus</i>	pinon jay		X
<i>Aphelocoma coerulescens</i>	scrub jay		X
<i>Pica pica</i>	black-billed magpie	X	
<i>Corvus brachyrhynchos</i>	American crow	X	
<i>Corvus corax</i>	common raven		X
<i>Parus inornatus</i>	house wren	X	
<i>Parus atricapillus</i>	black-capped chickadee	X	
<i>Troglodytes aedon</i>	plain titmouse		X
<i>Salpinctes obsoletus</i>	rock wren		X
<i>Catherpes mexicanus</i>	canyon wren		X

**Table 2.4 Bird species observed in the area of the Naturita site, Colorado (Concluded)**

Scientific name	Common name	Habitat	
		Riparian	Upland
<i>Polioptila caerulea</i>	blue-gray gnatcatcher		X
<i>Regulus calendula</i>	ruby-crowned kinglet	X	X
<i>Sialia mexicana</i>	western bluebird		X
<i>Turdus migratorius</i>	American robin	X	
<i>Dumetella carolinensis</i>	gray catbird	X	
<i>Minus polyglottos</i>	northern mockingbird	X	X
<i>Sturnus vulgaris</i>	European starling	X	
<i>Vireo vicinior</i>	gray vireo		X
<i>Vireo solitarius</i>	solitary vireo	X	X
<i>Vireo gilvus</i>	warbling vireo	X	
<i>Vermivora celata</i>	orange-crowned warbler	X	
<i>Dendroica coronata</i>	yellow-rumped warbler	X	
<i>Dendroica fusca</i>	blackburnian warbler	X	
<i>Dendroica nigrescens</i>	black-throated gray warbler		X
<i>Dendroica petechia</i>	yellow warbler	X	
<i>Icteria virens</i>	yellow-breasted chat	X	
<i>Pheucticus melanocephalus</i>	black-headed grosbeak	X	X
<i>Guiraca caerulea</i>	blue grosbeak	X	
<i>Passerina amoena</i>	lazuli bunting	X	
<i>Pipilo erythrophthalmus</i>	rufous-sided towhee	X	X
<i>Zonotrichia leucaphrys</i>	white-crowned sparrow	X	X
<i>Zonotrichia albicollis</i>	white-throated sparrow	X	X
<i>Chondestes grammacus</i>	lark sparrow	X	
<i>Amphispiza bilineata</i>	black-throated sparrow		X
<i>Spizella passerina</i>	chipping sparrow		X
<i>Passerculus sandwichensis</i>	savannah sparrow	X	X
<i>Melospiza melodia</i>	song sparrow	X	
<i>Junco hyemalis</i>	dark-eyed junco	X	X
<i>Sturnella neglecta</i>	western meadowlark	X	X
<i>Agelaius phoeniceus</i>	red-winged blackbird	X	
<i>Euphagus cyanocephalus</i>	Brewer's blackbird	X	
<i>Molothrus ater</i>	brown-headed cowbird	X	
<i>Quiscalus quiscula</i>	common grackle	X	
<i>Icterus galbula</i>	northern oriole	X	
<i>Carduelis tristis</i>	American goldfinch	X	
<i>Carduelis psaltria</i>	lesser goldfinch	X	
<i>Carpodacus mexicanus</i>	house finch	X	X

Ref. TAC, 1993, 1992, 1990, 1988, 1986; DOE, 1983.

**Table 2.5 Mammals observed or expected to occur in the area of the Naturita site, Colorado**

Scientific name	Common name	Habitat	
		Riparian	Upland
<i>Sylvilagus nuttallii</i>	mountain cottontail	X	
<i>Sylvilagus audubonii</i> <sup>a</sup>	desert cottontail		X
<i>Lepus californicus</i> <sup>a</sup>	black-tailed jackrabbit		X
<i>Eutamias minimus</i> <sup>a</sup>	least chipmunk		X
<i>Ammospermophilus leucurus</i>	white-tailed antelope ground squirrel		X
<i>Spermophilus richardsonii</i>	Richardson's ground squirrel	X	X
<i>Spermophilus variegatus</i>	rock squirrel		X
<i>Cynomys leucurus</i> <sup>a</sup>	Gunnison prairie dog		X
<i>Thomomys talpoides</i>	northern pocket gopher	X	X
<i>Perognathus flavus</i>	silky pocket mouse		X
<i>Dipodomys ordii</i>	Ord's kangaroo rat	X	X
<i>Castor canadensis</i> <sup>a</sup>	beaver	X	
<i>Peromyscus crinitus</i>	canyon mouse		X
<i>Peromyscus maniculatus</i>	deer mouse	X	X
<i>Peromyscus truei</i>	pinon mouse		X
<i>Onychomys leucogaster</i>	northern grasshopper mouse		X
<i>Neotoma lepida</i>	desert woodrat		X
<i>Ondatra zibethicus</i>	muskrat	X	
<i>Zapus princeps</i>	western jumping mouse	X	
<i>Erethizon dorsatum</i>	porcupine	X	X
<i>Canis latrans</i> <sup>a</sup>	coyote	X	X
<i>Urocyon cinereoargenteus</i>	gray fox	X	X
<i>Procyon lotor</i> <sup>a</sup>	raccoon	X	X
<i>Mustela frenata</i>	long-tailed weasel	X	X
<i>Mustela vison</i>	mink	X	
<i>Taxidea taxus</i>	badger	X	X
<i>Spilogale gracilis</i> <sup>a</sup>	western spotted skunk	X	X
<i>Mephitis mephitis</i>	striped skunk	X	X
<i>Felis rufus</i> <sup>a</sup>	bobcat	X	X
<i>Cervus elaphus</i> <sup>a</sup>	elk		X
<i>Odocoileus hemionus</i> <sup>a</sup>	mule deer	X	X

<sup>a</sup>Species or species' sign observed at or near the site.

Ref. TAC, 1990, 1988, 1986; DOE, 1983; Bernard and Brown, 1978.



### 3.0 THREATENED AND ENDANGERED SPECIES

This section describes the status of the threatened and endangered species and other species of concern that may occur in the study area (Appendix A). The Federally listed threatened and endangered species are the black-footed ferret (*Mustela nigripes*), bald eagle (*Haliaeetus leucocephalus*), Colorado squawfish (*Ptychocheilus lucius*), bonytail chub (*Gila elegans*), humpback chub (*Gila cypha*), and razorback sucker (*Xyrauchen texanus*). The southwestern willow flycatcher was proposed for listing as an endangered species on July 23, 1993 (58 FR 39495). The Federal candidate species are the flannelmouth sucker, roundtail chub, ferruginous hawk (*Buteo regalis*), loggerhead shrike (*Lanius ludovicianus*), northern goshawk (*Accipiter gentilis*), Columbian sharp-tailed grouse (*Tympanuchus phasianellus columbianus*), white-faced ibis (*Plegadis chihii*), and Paradox lupine (*Lupinus crassus*).

#### 3.1 MAMMALS

The black-footed ferret is also listed as endangered by the state of Colorado. No critical habitat has been designated. The ferret, primarily nocturnal, is closely associated with prairie dogs throughout its range. The ferret preys on prairie dogs and uses the prairie dog burrows as shelter and den sites. Because of this close association, all active prairie dog colonies are considered potential black-footed ferret habitat (Clark et al., 1984). The potential for the black-footed ferret to occur at and adjacent to the Naturita processing site is low (Carruthers, 1986). No active prairie dog towns were observed during five surveys of the Naturita site (TAC, 1993, 1992, 1990, 1988, 1986). A small, active Gunnison prairie dog town was found in the northern portion of the temporary Dry Flats disposal site in 1988 (TAC, 1988). The area of the Dry Flats disposal and Coke Oven borrow sites was surveyed for prairie dog towns again in 1993. As recommended by the FWS (Appendix A), a 0.5-mile (mi) [0.8 kilometer (km)] radius around each site was surveyed, and two small Gunnison prairie dog towns were observed. One of these towns is the small town recorded in 1988, and the other town is at the northwestern corner of the Coke Oven borrow site. Each town contained approximately 20 active burrows (TAC, 1993). Parts of each prairie dog town could be temporarily disturbed by remedial action activities; however, neither town is big enough to support the black-footed ferret.

#### 3.2 BIRDS

The bald eagle is also listed as endangered by the state of Colorado. No critical habitat has been designated. The eagle is generally associated with river habitat where suitable perches and viable fisheries are available; large cottonwood trees are used for perching or roosting sites. The eagle feeds mainly on fish; however, carrion, waterfowl, and rabbits may also be consumed, especially during the winter (Woodward-Clyde, 1983). The bald eagle is a locally common winter resident along major rivers and is a rare breeder in western Colorado (CDM and Bio/West, 1983). It is not known to

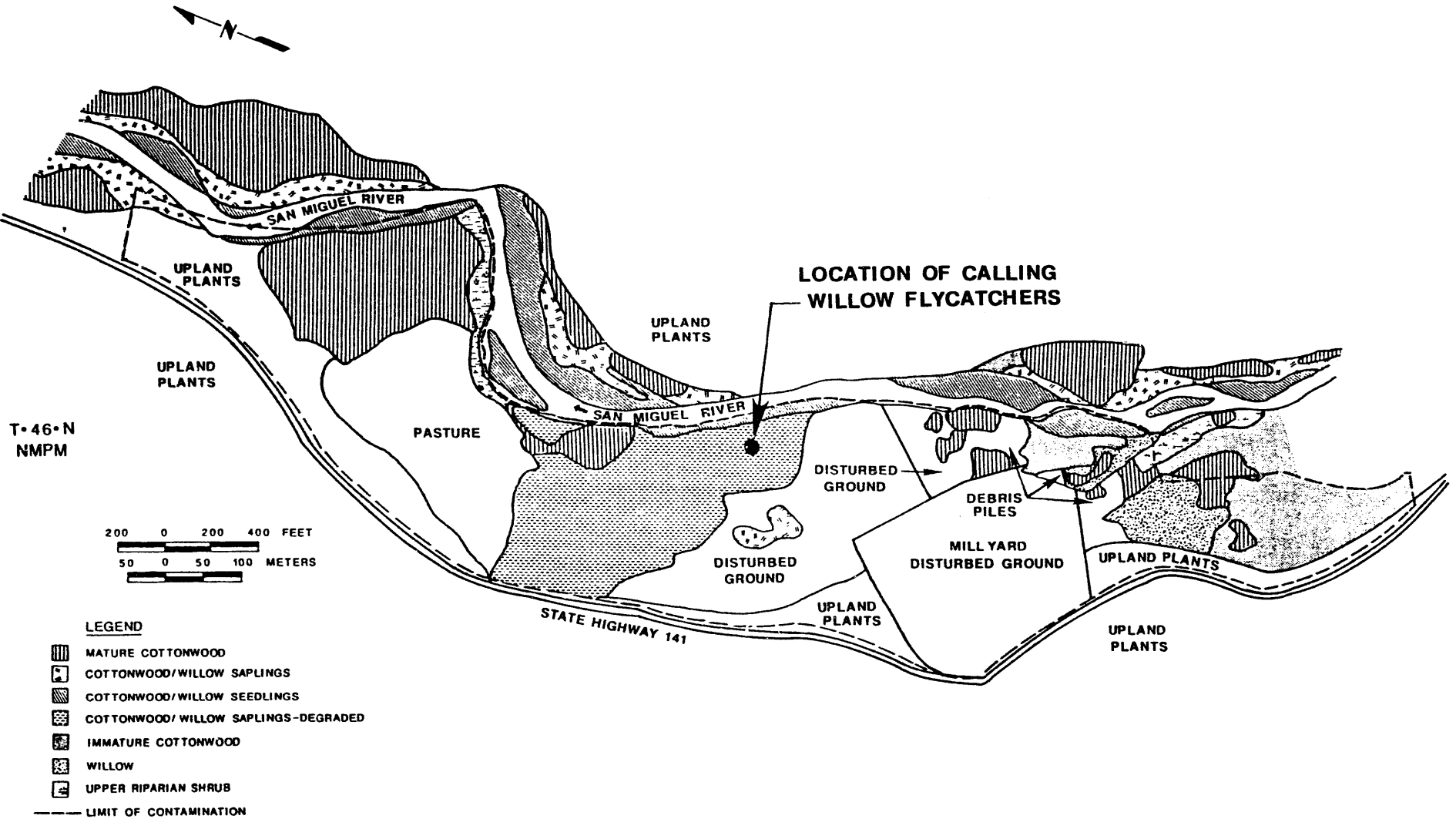
nest along the San Miguel River but does hunt along the river during the winter. In addition, a raptor survey conducted by the FWS in the areas of potential impact did not reveal any bald eagle nests (Opdycke, 1987). Although bald eagles have been seen perched in the cottonwoods in the riparian habitat, there are no known, regularly used roost sites along the river in the area of the Naturita processing site. The bald eagle density is generally low (approximately six) along the river in the processing site area, and use in the upland site areas is sporadic (Welch, 1993; Sherman, 1987; Carruthers, 1986). Two winter concentration areas are near the processing site. One is along the San Miguel River 5 to 6 mi (8 to 10 km) northeast of the site, and the other is along the Dry Creek basin 5 to 6 mi (8 to 10 km) south of the site (Welch, 1993). The remedial action activities would not affect these two winter concentration areas. Given that winter bald eagle use along the San Miguel River is light in the site area, that there will be two 4-month winter shutdowns of the remedial action, that there are no winter perch or roost sites at or near the site, and that there are numerous cottonwood stands along the river, remedial action activities are not expected to affect the bald eagle.

The willow flycatcher is widely distributed in the United States. There are four subspecies of the willow flycatcher, and the southwestern willow flycatcher (*E.t. extimus*) occurs in the southwestern United States. The northern boundary of the range of *E.t. extimus* has not been determined, although it is believed to be in the area of the New Mexico-Colorado state line. *E.t. extimus* intergrades with the northern subspecies, *E.t. adostas*. Primarily due to the destruction of riparian habitat, populations of *E.t. extimus* have declined precipitously, and 500 to 1000 pairs probably exist in the wild (Unitt, 1987). Therefore, the southwestern willow flycatcher has been proposed for listing as an endangered species (58 FR 39495).

The southwestern willow flycatcher generally nests in willows; in recent years, they have begun to nest in salt cedars. The preferred habitat in the southwest is riparian habitat along bodies of water, such as that which occurs along the San Miguel River (Unitt, 1987). Wildlife surveys of the riparian vegetation along the San Miguel River were conducted in June 1986. Two male willow flycatchers were heard calling repeatedly (TAC, 1986). These birds were singing in the dense growth of cottonwoods and willows that grows in the western part of the former tailings area (Figure 3.1). It is possible that these birds were nesting because the willow flycatcher migration was essentially complete and migrating willow flycatchers rarely sing (Unitt, 1987). These observations took place before *E.t. extimus* was added to the Federal candidate species list or proposed for listing by the FWS, so the information necessary to determine if the singing birds were *E.t. extimus* or *E.t. adostas* was not obtained. These subspecies are differentiated on the basis of color and wing measurements, which requires that the birds be trapped in mist nets, measured, and compared to published color charts. Field surveys for this species were conducted in June of 1990, 1991, and 1993 along the San Miguel River and Dry Creek (TAC, 1993, 1991, 1990). These surveys included approximately 3 mi (5 km) of the San Miguel River upstream and downstream of the Naturita

R-16-W  
NMPM

3-3



**FIGURE 3.1**  
**LOCATION OF THE CALLING WILLOW FLYCATCHERS**  
**AT THE NATURITA SITE, COLORADO, IN 1986**

site and 5 mi (8 km) of Dry Creek beginning at its confluence with the San Miguel River. The southwestern willow flycatcher was not heard or observed in the area of the Naturita site or along Dry Creek. It is not unusual for small, isolated populations of this species to disappear from an area for a year or two and then return (Unitt, 1987). In addition, habitat degradation caused by a die-off of willows and some other riparian plant species was observed in 1990 along the San Miguel River and Dry Creek (TAC, 1990). Drought conditions during the previous 2 years may have been the cause of this die-off.

Based on the surveys for *E.t. extimus* from 1990 through 1993, it was determined that this bird species does not currently nest along the San Miguel River or Dry Creek and that remedial action would not affect this species or jeopardize its continued existence. However, because potential habitat for this species occurs in the areas that would be affected by remedial action, another survey for this species would be conducted in 1994 and possibly later years. If these surveys resulted in the determination that *E.t. extimus* nests in areas that would be disturbed during remedial action, formal conferencing with the FWS would be initiated, and a mitigation plan would be prepared. This plan may include such measures as postponing or suspending remedial action in the area of concern until after the nesting season or trapping the birds and moving them.

The ferruginous hawk occurs in semiarid plains and intermountain areas of Colorado and other western states. This species typically nests in junipers, though it will nest on the ground or rock outcrops if tree nesting sites are not available (Schmutz, 1984; Perkins and Lindsey, 1983; Thurow and White, 1983; Smith and Murphy, 1982). Natural resources personnel familiar with the Naturita site indicate that the ferruginous hawk is occasionally seen in the area (Blymer, 1987); however, ground surveys in the area failed to document the occurrence of this species (TAC, 1993, 1992, 1991, 1990, 1988, 1986; DOE, 1983). In addition, the FWS conducted an aerial survey during the 1986 nesting season, and the ferruginous hawk was not observed (Opdycke, 1987). This analysis indicates that this species does not nest at or near the processing, disposal, and borrow sites. Furthermore, it is doubtful that this species has occurred at the sites during recent years except for an occasional migrant; therefore, remedial action activities would not affect the ferruginous hawk.

The white-faced ibis breeds in colonies in freshwater marshes from eastern Oregon sporadically across to North Dakota and south into parts of Kansas and Colorado. It winters in the southwestern United States and Mexico (Armbruster, 1983). In western Colorado, the white-faced ibis occurs as an uncommon to common migrant in aquatic and agricultural habitats (Kingery and Graul, 1978). Wildlife surveys of the riparian habitat along the San Miguel River in the area of the processing site and along Dry Creek in the area of the Coke Oven borrow site failed to detect the presence of the white-faced ibis (TAC, 1993, 1992, 1991, 1990, 1988, 1986). Therefore, remedial action activities would not affect the white-faced ibis.

The loggerhead shrike occurs as a breeding species throughout most of Colorado, including the Naturita site area (Kingery and Gaul, 1978). It prefers open country with patches of trees and shrubs, and, in Colorado, nests in desert shrub, short-grass prairie, agricultural lands, and riparian areas (FWS, 1992; Kingery and Gaul, 1978). Historically, this species was considered a common to fairly common breeding species in Colorado (Kingery and Gaul, 1978) and nearby Utah (Cook, 1984); however, this species has declined steadily over most of its range, including Colorado, in recent years (Robbins et al., 1986; Ehrlich et al., 1988). The loggerhead shrike nests in sagebrush and riparian plant communities, both of which occur at the Naturita site. Wildlife surveys have been conducted at the Naturita site over the last 10 years, and the loggerhead shrike has never been observed (TAC, 1993, 1992, 1991, 1990, 1988, and 1986; DOE, 1983). It is very unlikely that this species has occurred or will occur at or near the Naturita site; therefore, the remedial action would not impact the loggerhead shrike.

The northern goshawk is a year-round resident in northwest Colorado (Kingery and Gaul, 1978). In the west, this species nests in mature conifer forests such as those dominated by Douglas fir and ponderosa pine (Call, 1978; Moore and Henny, 1983). The remedial action activities would not take place in conifer woods except for a small amount of pinon-juniper woods at the Dry Flats disposal site; therefore, the remedial action would not impact the northern goshawk.

The Columbian sharp-tailed grouse has been reduced to remnant populations in most of its range and has been extirpated from Oregon, California, and Nevada (Marks and Marks, 1988). Historically, this species occurred in wooded terrain in the Naturita area (Rogers, 1969). In recent years, population levels of the Columbian sharp-tailed grouse have declined because of habitat destruction due to coal strip mining, agriculture, and home site development (Giesen, 1981). Information on the Columbian sharp-tailed grouse indicates that it uses mountain shrub and wooded riparian habitats in the winter (Marks and Marks, 1988), and studies of Columbian sharp-tailed grouse habitat use in Moffat County, Colorado, indicated that this species selected mountain shrub habitat (Giesen, 1987). Based on the historic range of the Columbian sharp-tailed grouse and its preference for mountain shrub habitat, which does not occur at the Naturita site, it is likely that the species does not occur in the Naturita area. Therefore, the remedial action activities would not affect the Columbian sharp-tailed grouse.

### 3.3 FISH

The Colorado squawfish is also listed as endangered by the state of Colorado. This fish is the largest minnow in North America. Its historical range includes the Colorado River and all of the larger tributaries from Wyoming to the Gulf of California, such as the San Miguel River. The Colorado squawfish is now rare and limited to the upper Colorado River basin (Valdez et al., 1982). Although the Colorado squawfish historically occurred in the San Miguel River, its relative

abundance was rare, as reported by Nolting (1957). Currently, the squawfish does not occur in the San Miguel River, and it is unlikely that this river meets the habitat requirements of this fish (Carruthers, 1986).

The bonytail and humpback chubs are also listed as endangered by the state of Colorado. These fishes were historically distributed throughout the Colorado River basin in main river channels and larger tributaries. The bonytail chub was most common in the open river area of large river channels, while the humpback chub was restricted to swift, deep water areas, mainly in canyons. Historically, the bonytail chub was reported to be abundant in the San Miguel River (Nolting, 1957). The humpback chub may have also occurred in the San Miguel River. Currently, neither chub species occurs in the San Miguel River, and it is unlikely that the river meets the habitat requirements of these fishes (Carruthers, 1986).

The razorback sucker originally occupied 1500 mi (2414 km) of the Colorado River system. Its current distribution is limited to 600 mi (965 km), mostly in the upper river basin. All specimens of this fish collected in the upper Colorado River were adults, which suggests a low reproductive rate. Although the habitat preference of this species has not been fully evaluated due to the small number of observations, it appears to prefer backwaters and gravel pits with little or no flow and silt bottoms (Valdez et al., 1982). The razorback sucker may have occurred in the San Miguel River. However, this river is not currently occupied by the razorback sucker, and it is unlikely that the river meets the habitat requirements of this fish (Carruthers, 1986).

Endangered fish species do not occur in the San Miguel River, so remedial action would not have a direct impact on these species. However, remedial action at the Naturita site may have an indirect impact on the endangered fish species. The FWS determined that an upper Colorado basin-wide (which includes the San Miguel River) jeopardy situation has existed since 1978 for the four fish species discussed above (FWS, 1987). Depletion of water within the basin, which includes water required for remedial action, would have a negative impact on these species and would result in a "may affect" determination by the FWS. This determination requires the initiation of formal conferencing with the FWS under the Endangered Species Act. According to the "Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin" (FWS, 1987), water depletion subject to a "may affect" determination would require a one-time contribution to the FWS of a dollar amount per acre-foot of water used based on the average annual water depletion caused by a project. Water from the San Miguel River would be used for the remedial action (e.g., for dust control and equipment washing), and it is estimated that the average annual water requirement would be 86 acre-feet. Therefore, this water use would be subject to the one-time monetary contribution to the FWS.

The FWS has designated 2096 mi (3369 km) of the Colorado River and its tributaries as critical habitat for the endangered fish species. Therefore, the

withdrawal of water from the San Miguel River for the remedial action would be "an adverse modification of this critical habitat" that would require formal conferencing with the FWS (refer to the FWS letter dated April 20, 1993, in Appendix A of this attachment). The request for formal conferencing for the adverse modification of critical habitat could be made in the same letter requesting formal conferencing for the "may affect" determination. Mitigation for the adverse modification of critical habitat would be accomplished with the mitigation for the "may affect" determination.

The flannelmouth sucker and roundtail chub are indigenous fish of the San Miguel River (CDOW, 1977) and likely occur in the river in the area of the Naturita site. These species have been declining in the lower Colorado River Basin, including the San Miguel River (Nesler, 1992). Remedial action would involve the cleanup of 47 ac (19 ha) of contaminated materials within the 100-year floodplain of the San Miguel River. This activity would have the potential to impact the San Miguel River, including the flannelmouth sucker and roundtail chub. Potential impacts to the river would be reduced by not performing remedial action in the river, recontouring and revegetating cleared areas as soon as possible, and providing erosion control measures such as mulch or berms where needed. In addition, a 50-ft (15-m) buffer zone between the river and work areas may be left. In most areas, this buffer zone would contain contaminated materials, and an application for supplemental standards would have to be approved by the NRC and state of Colorado. This supplemental standards application would have to show that leaving the contaminated materials in place is protective of human health and the environment. During the remedial action, measures would be taken to protect the water quality of the San Miguel River, and it is possible that supplemental standards would be applied to contaminated areas along the river. Therefore, it would be unlikely that the remedial action would affect these endangered fish species.

### 3.4 PLANTS

The Paradox lupine is also listed by the state of Colorado as a species of concern. The lupine is a perennial plant with white flowers and narrow leaflets that forms dense mats and flowers in early to late May. The lupine occurs in draws and washes with sparse vegetation between 5000 and 5800 ft (1524 and 1768 m) in elevation in the pinon-juniper woodland and sagebrush vegetation types. It grows on clay soils derived from the Mancos Shale Formation in the Naturita-Nucla area (Peterson, 1983; Payson, 1915). The lupine has been found in six locations in Montrose County, Colorado. In the Paradox Valley area, it is found on Quaternary alluvium of the Chinle Formation; in the Naturita area, it occurs on clayey soils of the Mancos Shale Formation. The closest locations to the Naturita site are 1 and 3 mi (2 and 5 km) to the northeast across the San Miguel River and to the east, respectively (Peterson, 1983). The lupine is not expected to occur at the Naturita site because soils of the Chinle and Mancos Shale Formations are not present. However, surveys for this species were conducted in the area of the Dry Flats

disposal and Coke Oven borrow sites. The results of these surveys indicate that this species does not occur at or near any of the sites that were surveyed (Rose, 1990; Anderson, 1989).



#### 4.0 REFERENCES

- Aldon, E. F., 1981. "Long-Term Plant Survival and Density Data from Reclaimed Southwestern Coal Mine Spoils," in *The Great Basin Naturalist*, Vol. 51, No. 3, pp. 271-273.
- Anderson, John, 1989. U.S. Fish and Wildlife Service, Grand Junction, Colorado, personal communication to Charles Burt, Jacobs Engineering Group Inc., Albuquerque, New Mexico, January 31, 1989.
- Armbruster, J. S., ed., 1983. "Impact of Coal Surface Mining on 25 Migratory Bird Species of High Federal Interest," U.S. Fish and Wildlife Service, FWS/OBS-83/35, Fort Collins, Colorado.
- Bernard, S. R., and K. F. Brown, 1978. "Distribution of Mammals, Reptiles, and Amphibians by BLM Physiographic Regions and A. W. Kuchler's Associations for the Eleven Western States," U.S. Department of the Interior, Bureau of Land Management, Denver, Colorado.
- Blymer, Mike, 1987. Uncompahgre Basin Resource Area, U.S. Bureau of Land Management, Montrose, Colorado, personal communication to Eloise Mulford, Jacobs Engineering Group Inc., Albuquerque, New Mexico, February 20, 1987.
- Call, M. W., 1978. "Nesting Habitats and Surveying Techniques for Common Western Raptors," Bureau of Land Management, Technical Note TN-316, Denver, Colorado.
- Carruthers, Robert V., 1986. Uncompahgre Basin Resource Area, U.S. Bureau of Land Management, Montrose, Colorado, personal communication to Charles Burt, Jacobs Engineering Group Inc., Albuquerque, New Mexico, March 27, 1986.
- CDM and Bio/West (Camp, Dresser, & McKee, Inc. and Bio/West, Inc.), 1983. *Biological Assessment Report, Pacific Shale Project*, Wheat Ridge, Colorado, and Logan, Utah.
- CDOW (Colorado Division of Wildlife), 1977. "San Miguel River #1 (Fisheries Survey of the San Miguel River)," Code No. 46842, CDOW, Montrose, Colorado.
- Clark et al. (T. W. Clark, T. M. Campbell, M. H. Schroeder, and L. Richardson), 1984. "Handbook of Methods for Locating Black-Footed Ferrets," U.S. Bureau of Land Management, Wildlife Technical Bulletin No. 1, Cheyenne, Wyoming.
- Cook, A. G., 1984. "Birds of the Desert Region of Uinta County, Utah," *Great Basin Naturalist*, Vol. 44, No. 4, pp. 584-620.
- DOE (U.S. Department of Energy), 1983. "Environmental Assessment of Remedial Actions on the Uranium Mill Tailings at the Naturita site, Montrose County, Colorado," unpublished report, DOE UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.

- Ehrlich et al. (P. R. Ehrlich, D. S. Dobkin, and D. Wheye), 1988. *The Birders Handbook*, Simon and Schuster, Inc., New York.
- Evans et al., 1978. (A. K. Evans, E. W. Uhleman, and P. A. Eby), 1978. *Atlas of Western Surface-Mined Lands: Coal, Uranium, and Phosphate*, U.S. Fish and Wildlife Service, FWS/OBS-78/20, Fort Collins, Colorado.
- FWS (Fish and Wildlife Service), 1992. "Loggerhead Shrike, *Lanius ludovicianus*," FWS, Bismarck, North Dakota.
- FWS (Fish and Wildlife Service), 1987. "Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin," FWS, Region 6, Denver, Colorado.
- Giesen, K. M., 1987. "Population Characteristics and Habitat Use by Columbian Sharp-Tailed Grouse in Northwest Colorado," Colorado Division of Wildlife, Wildlife Research Report 01-03-045 (W-37-R), Fort Collins, Colorado.
- Giesen, K. M., 1981. "Distribution and Status of Mountain Sharp-Tailed Grouse," Colorado Division of Wildlife, Wildlife Research Report W-37-R-34, Fort Collins, Colorado.
- Hammerson, G. A., 1986. *Amphibians and Reptiles in Colorado*, Colorado Division of Wildlife, Department of Natural Resources, Denver, Colorado.
- Jacobsen, K., 1992. U.S. Army Corps of Engineers, Grand Junction, Colorado, personal communication to Charles Burt, Jacobs Engineering Group Inc., Albuquerque, New Mexico, October 5, 1992.
- Kingery, H. E., and W. D. Gaul, ed., 1978. *Colorado Bird Distribution Latilong Study*, prepared by the Colorado Field Ornithologists, Denver, Colorado, for Colorado Division of Wildlife, Denver, Colorado.
- Kuchler, A. W., 1975. "Potential Natural Vegetation of the Conterminous United States," American Geographic Society Special Publication No. 36, New York, New York (Map).
- Leachman, Bob, 1990. U.S. Fish and Wildlife Service, Grand Junction, Colorado, personal communication to Charles Burt, Jacobs Engineering Group Inc., Albuquerque, New Mexico, March 5, 1990.
- Marks, J. S., and V. S. Marks, 1988. "Winter Habitat Use by Columbian Sharp-Tailed Grouse in Western Idaho," in *Journal of Wildlife Management*, Vol. 52, No. 4, pp. 743-746.
- Moore, K. R., and C. J. Henny, 1983. "Nest Site Characteristics of Three Coexisting *Accipiter* Hawks in Northeastern Oregon", *Raptor Research*, Volume 17, Number 3, pp. 65-76.

- Nesler, T., 1992. Colorado Division of Wildlife, Fort Collins, Colorado, personal communication to Charles Burt, Jacobs Engineering Group Inc., Albuquerque, New Mexico, October 19, 1992.
- Nolting, D. R., 1957. "The Effects of Uranium Mill Waste Disposal on the Fish Populations and Aquatic Productivity of the Lower San Miguel and Dolores Rivers," Colorado Department of Game and Fish, Montrose, Colorado.
- Opdycke, Jeffrey D., 1987. U.S. Fish and Wildlife Service, Grand Junction, Colorado, personal communication to John Themelis, U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico, January 13, 1987.
- Payson, E., 1915. "New and Noteworthy Plants from Southwestern Colorado," in *Botanical Gazette*, Vol. VI, pp. 374-376.
- Perkins, M. W., and W. J. Lindsey, 1983. "Nesting Studies of Ferruginous Hawks in the Ely BLM District, Nevada," in *North American Bird Bander*, Vol. 8, No. 3, pp. 106-107.
- Peterson, J. S., 1983. "Status Report for *Lupinus crassus* Payson," Colorado Natural Areas Program, Denver, Colorado.
- Richardson et al. (B. Z. Richardson, S. B. Monsen, and D. M. Bowers), 1986. "Interseeding Selected Shrubs and Herbs on Mine Disturbances in Southeastern Idaho," in *Proceedings - Symposium on the Biology of Artemisia and Chrysothamnus*, U.S. Forest Service, Intermountain Research Station, General Technical Report INT-200, Ogden, Utah.
- Ricklefs, R. E., 1979. *Ecology*, Second Edition, Chiron Press, New York, New York.
- Robbins et al. (C. S. Robbins, D. Bystrak, and P. H. Geissler), 1986. "The Breeding Bird Survey: Its First Fifteen Years, 1965-1979," U.S. Fish and Wildlife Services Resource Publication 157, Washington, D.C.
- Rogers, G. E., 1969. "The Sharp-Tailed Grouse in Colorado," Colorado Game, Fish, and Parks, Technical Publication 23, Denver, Colorado.
- Rose, Keith L., 1990. U.S. Fish and Wildlife Service, Golden, Colorado, personal communication to Charles Burt, Jacobs Engineering Group Inc., Albuquerque, New Mexico, August 9, 1990.
- Schmutz, J. K., 1984. "Ferruginous and Swainson's Hawk Abundance and Distribution in Relation to Land Use in Southeastern Alberta," in *Journal of Wildlife Management*, Vol. 48, No. 4, pp. 1180-1187.

- Sherman, Rick, 1987. Colorado Division of Wildlife, Montrose, Colorado, personal communication to Eloise Mulford, Jacobs Engineering Group Inc., Albuquerque, New Mexico, March 2, 1987.
- Smith, D. G., and J. R. Murphy, 1982. "Nest Site Selection in Raptor Communities of the Eastern Great Basin Desert," in *Great Basin Naturalist*, Vol. 42, No. 3, pp. 395-404.
- Swenson, E. A., and C. L. Mullins, 1985. "Revegetating Riparian Trees in Southwestern Floodplains," in *Riparian Ecosystems and Their Management: Reconciling Conflicting Use*, U.S. Forest Service, Rocky Mountain Forest and Range Experiment Station, General Technical Report RM-120, Fort Collins, Colorado.
- TAC (Technical Assistance Contractor), 1993. "Unpublished Field Notes, Naturita, Colorado, Uranium Mill Tailings Site," June 29 through July 1, 1993, prepared by the TAC, Albuquerque, New Mexico, for the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.
- TAC (Technical Assistance Contractor), 1992. "Unpublished Field Notes, Naturita, Colorado, Uranium Mill Tailings Site," September 29, 1992, prepared by the TAC, Albuquerque, New Mexico, for the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.
- TAC (Technical Assistance Contractor), 1991. "Unpublished Field Notes, Naturita, Colorado, Uranium Mill Tailings Site," June 18 through 21, 1991, prepared by the TAC, Albuquerque, New Mexico, for the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.
- TAC (Technical Assistance Contractor), 1990. "Unpublished Field Report, Naturita, Colorado, UMTRA Project Site," June 11 through 14, 1990, prepared by the TAC, Albuquerque, New Mexico, for the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.
- TAC (Technical Assistance Contractor), 1988. "Unpublished Field Notes, Naturita, Colorado, Uranium Mill Tailings Site," November 3, 1988, prepared by the TAC, Albuquerque, New Mexico, for the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.
- TAC (Technical Assistance Contractor), 1986. "Unpublished Field Notes, Naturita, Colorado, Uranium Mill Tailings Site," June 9 and 11, 1986, prepared by the TAC, Albuquerque, New Mexico, for the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.
- Thurrow, T. L., and C. M. White, 1983. "Nest Site Relationship Between the Ferruginous Hawk and Swainson's Hawk," in *Journal of Field Ornithology*, Vol. 54, No. 4, pp. 395-405.
- Unitt, P., 1987. "*Empidonax traillii extimus*: An Endangered Subspecies," in *Western Birds*, 18:137-162.

- Valdez et al. (R. Valdez, P. Mangan, R. Smith, and B. Nilson), 1982. *Upper Colorado River Investigation, Rifle, Colorado to Lake Powell, Utah*, U.S. Fish and Wildlife Service, Colorado River Fishery Project, Grand Junction, Colorado.
- Wagner et al. (W. L. Wagner, W. C. Martin, and E. F. Aldon), 1978. "Natural Succession on Strip-Mined Lands in Northwestern New Mexico," in *Reclamation Review*, Vol. 1, pp. 67-73.
- Welch, Robert, 1993. Uncompahgre Basin Resource Area, Bureau of Land Management, Montrose, Colorado, personal communication to Charles Burt, Jacobs Engineering Group Inc., Albuquerque, New Mexico, May 27, 1993.
- Woodward-Clyde (Woodward-Clyde Consultants), 1983. *Biological Assessment for Clear Creek Shale Oil Project*, Englewood, Colorado.
- York, J. C., 1985. "Dormant Stub Planting Techniques," in *Riparian Ecosystems and Their Management: Reconciling Conflicting Uses*, U.S. Forest Service, Rocky Mountain Forest and Range Experiment Station, General Technical Report RM-120, Fort Collins, Colorado.

#### FEDERAL REGISTER

- 58 FR 39495, "Endangered and Threatened Wildlife and Plants; Proposed Rule to List the Southwestern Willow Flycatcher as Endangered With Critical Habitat," July 23, 1993, Federal Register, Office of the Federal Register, National Archives and Records Administration, Washington, D.C.

**APPENDIX A**  
**CORRESPONDENCE WITH THE FISH AND WILDLIFE SERVICE**



# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

ENDANGERED SPECIES OFFICE

309 25<sup>1</sup>/<sub>2</sub> ROAD

INDEPENDENCE PLAZA

SUITE B-115

GRAND JUNCTION, COLORADO 81505

TELEPHONE: 303-241-0563

February 27, 1986

IN REPLY REFER TO:

Mr. Dave Lechel  
Manager, Environmental Services  
Jacobs Engineering Group, Inc.  
5301 Central Avenue N.W., Suite 1700  
Albuquerque, N.M. 87108

Dear Mr. Lechel:

We have received your letter of January 22, 1986, regarding Uranium Mill Tailings Remedial Action (UMTRA) Project plans of Department of Energy for clean-up of uranium tailing sites near Naturita, Montrose County, Colorado, and near Slickrock, San Miguel County, Colorado.

We are furnishing you with the following list of rare species which may be present within the area of influence of your project. The lists pertain to both sites with the exception noted below:

### Federally Listed Species

Bald eagle	<u>Haliaeetus leucocephalus</u>
Black-footed ferret	<u>Mustela nigripes</u>
Bonytail chub	<u>Gila elegans</u>
Colorado squawfish	<u>Ptychocheilus lucius</u>
Humpback chub	<u>Gila cypha</u>
Peregrine falcon	<u>Falco peregrinus</u> (Slickrock site only)

Historically, the endangered black-footed ferret (Mustela nigripes) may have occurred in portions of southwestern Colorado. Although unconfirmed sightings of this mammal have occurred in northwestern Colorado, the only known population is in Meeteetse, Wyoming. Literature documents a close association between prairie dogs and black-footed ferrets. The standard that is used for determining possible project effects to black-footed ferrets is the disturbance of currently occupied prairie dog habitat. Should any of the activities that are part of the above-referenced project result in an impact to prairie dogs, black-footed ferret surveys may be necessary.

If water quality in the Colorado River will be affected by project activities, or if remedial action of any kind results in the consumptive use of water from the upper Colorado River basin, then resulting impacts to the Colorado squawfish (Ptychocheilus lucius), humpback chub (Gila cypha), and bonytail chub (Gila elegans) must be addressed in your assessment of impacts.

The lead Federal agency for Endangered Species Act (ESA) Section 7 consultation should review their proposed Federal action and determine if the action would affect any listed species. If the determination is "may affect" for listed species, the Federal agency must request in writing formal consultation from the Field Supervisor, U.S. Fish and Wildlife Service, Endangered Species Office, 2078 Administration Building, 1745 West 1700 South, Salt Lake City, Utah 84104. At this time, this agency should provide this office a biological assessment and/or any other relevant information was used in making the impact determinations.

We would like to bring to your attention species which are candidates for official listing as threatened or endangered species (Federal Register, Vol. 47, No. 251, December 30, 1982, and Vol. 50, No. 188, September 27, 1985). While these species have no legal protection at present under the Endangered Species Act, they are quite rare and restricted. We believe that it is

within the spirit of the ESA to consider project impacts to candidate species at this time. Additionally, we wish to make you aware of the presence of Federal candidates should any be proposed or listed prior to the time that all Federal actions related to the project are complete.

#### Federal Candidate Species

Ferruginous hawk	<u>Buteo regalis</u>
Grand Junction milkvetch	<u>Astragalus linifolius</u>
Long billed curlew	<u>Numenius americanus</u>
Paradox lupine	<u>Lupinus paradox</u>
Razorback sucker	<u>Xyrauchen texanus</u>
Swainson's hawk	<u>Buteo swainsoni</u>
White-faced ibis	<u>Plegadis chihi</u>

The Paradox lupine is known to occur at one of the Naturita sites. Our staff botanist has recently visited the site and confirmed the presence of this rare plant.

We appreciate your interest in conserving endangered species. If you require further information on listed species, please contact John Anderson of our Grand Junction, Colorado office, telephone 303-241-0563.

Sincerely,



Robert P. Smith  
Project Leader





# United States Department of the Interior



## FISH AND WILDLIFE SERVICE FISH AND WILDLIFE ENHANCEMENT COLORADO STATE OFFICE

529 25 1/4 Road, Suite B-113  
GRAND JUNCTION, COLORADO 81505  
(303) 243-2778

IN REPLY REFER TO:

(FWE)

May 26, 1988

Bill Glover  
Manager, Environmental Services  
Jacobs Engineering Group, Inc.  
5301 Central Avenue N.E., Suite 1700  
Albuquerque, NM 87108

Dear Mr. Glover,

This responds to your April 25, 1988, letter regarding the Uranium Mill Tailings Remedial Action Project at Naturita, Colorado. It appears that federally listed species may occur within the area of influence of the proposal.

### Federally Listed Species

Black-footed ferret  
Bald eagle  
Colorado squawfish  
Humpback chub  
Bonytail chub

Mustela nigripes  
Haliaeetus leucocephalus  
Ptychocheilus lucius  
Gila cypha  
Gila elegans

Historically, the black-footed ferret was believed to occur in portions of the construction work area. Literature documents a close association between prairie dogs and black-footed ferrets. Your pre-construction surveys should determine whether your activities will disturb prairie dog colonies. If so, black-footed ferret surveys may be required.

Wintering bald eagles are common throughout Colorado and are primarily associated with streams and reservoirs. Project evaluation should determine whether bald eagles occur in the project area and whether impacts will occur to this endangered bird.

None of the federally listed fish species occur in the project area. However, we believe it is appropriate at this time to consider whether the proposed project will result in a depletion of water from the upper Colorado River basin. If so, formal consultation under the Endangered Species Act will be necessary.

The paradox lupine (Lupinus crassus) is a candidate for federal listing and may occur in the project area. While this plant currently receives no protection from the Endangered Species Act, we believe it is within the spirit of the act to consider potential impacts to this plant at this time.

Section (7c) of the Endangered Species Act requires that the Federal agency proposing a major Federal action significantly affecting the quality of the human environment to conduct and submit to the Service a biological assessment to determine effects of the proposal on listed species. The biological assessment shall be completed within 180 days after the date on which initiated or a time mutually agreed upon between the agency and the Service. The assessment must be completed before physical project modification/alteration begins. If the biological assessment is not begun within 90 days, the species list above should be verified prior to initiation of the assessment.

The lead Federal agency should evaluate the potential impacts of the proposed project and determine if the action may affect any listed species. If a determination is "may affect" for listed species, the Federal agency must request in writing formal consultation from this office and should provide this office with a biological assessment, and any other relevant information used in making impact determinations.

The Fish and Wildlife Service can enter into formal Section 7 consultation only with another federal agency or its designee. State, county, or other governmental or private organizations can participate in the consultation process, help prepare information such as the biological assessment, participate in meetings, etc

The Fish and Wildlife Service (Service) regards wetlands and riparian habitats as an important resource, due to their high value for fish and wildlife. On January 13, 1987, we provided Mr. Themelis with a wetland inventory of the Naturita site. These wetlands were defined according to "Classification of Wetlands and Deepwater Habitats of the United States" (Cowardin, et al., 1977). We recommend that any adverse impacts to wetlands and riparian areas within the project influence be avoided.

If the Service can be of assistance to you in the future please contact this office.

Sincerely,

  
Jeffrey D. Opdycke  
State supervisor

cc: FWS/FWE: SLC  
Official file  
Reading file

RELEACHMAN;cjharris  
Natdoe



# United States Department of the Interior

FISH AND WILDLIFE SERVICE  
COLORADO FIELD OFFICE  
730 SIMMS STREET  
ROOM 292  
GOLDEN, COLORADO 80401

IN REPLY REFER TO:

(FWE)

December 28, 1988

Charles J. Burt  
Environmental Specialist  
Jacobs Engineering Group, Inc.  
5301 Central Avenue N.E. Suite 1700  
Albuquerque, New Mexico 87108

Dear Mr. Burt:

This responds to your November 21, 1988, letter requesting an update of Federally listed species that may be associated with the proposed Uranium Mill-tailings Remedial Action Projects at Slickrock, Naturita, Gunnison and Maybell, Colorado.

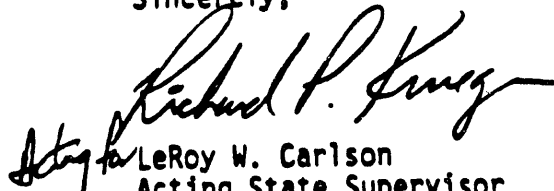
We have reviewed the lists provided to Jacobs Engineering, Inc. in 1986 and 1988. The following changes should be made:

- 1) Naturita site - Delete the Grand Junction milkvetch.
- 2) Maybell site - Delete the White River penstemon. Add the bonytail chub.
- 3) Gunnison site - Add the Colorado squawfish, humpback chub, and bonytail chub.

The list for the Slickrock site needs no changes.

We appreciate the opportunity to update the species lists for these actions. Please contact Bob Leachman of our Grand Junction office at (303) 243-2773 if there are any questions.

Sincerely,

  
LeRoy W. Carlson  
Acting State Supervisor

cc: FWS/FWE, Salt Lake City  
Official File  
Reading File



**UNITED STATES DEPARTMENT OF THE INTERIOR**  
**FISH AND WILDLIFE SERVICE**  
**FISH AND WILDLIFE ENHANCEMENT**  
 Western Colorado Sub-Office  
 529 25 $\frac{1}{2}$  Road, Suite B-113  
 Grand Junction, CO 81505-6199  
 FTS 332-0351  
 COMM (303) 243-2778



**IN REPLY REFER TO:**

FWE/CO:DOE:UMTRA:Maybell  
 Mail Stop 65412 Grand Junction

December 4, 1990

Mr. Mark L. Matthews  
 Project Manager  
 Uranium Mill Tailings Remedial Action Project Office  
 Department of Energy  
 P.O. Box 5400  
 Albuquerque, New Mexico 87115

Dear Mr. Matthews:

This responds to your October 4, 1990 and October 16, 1990, letters forwarding Environmental and Biological Assessments for the Maybell and Naturita Remedial Action Projects. Both projects are in Colorado. Our comments for each project are below.

Maybell Uranium Mill Tailings Site

This office provided you a draft biological opinion dated November 13, 1990, for remedial action at Maybell, Colorado. This opinion was in response to your October 16 letter to Mr. Lee Carlson of our Golden, Colorado office. We have no further requirements for the Maybell site. We will finalize our draft biological opinion within 30 days of receipt of acknowledgement that the recommended depletion payment has been made to the National Fish and Wildlife Foundation.

Naturita Uranium Mill Tailings Site

Biological Assessment

We concur with the biological assessment's conclusion that the proposed project "may affect" federally listed fish. Formal consultation under the Endangered Species Act will, therefore, be required for this project.

We have discussed prairie dog distribution with the Bureau of Land Management in Montrose. It appears that more than 250 acres of prairie dogs may occur within 4.5

Mr. Mark L. Matthews  
December 4, 1990

Page 2

miles of the project site. We suggest you coordinate with the Bureau to ensure your conclusion agrees with their information. Based on the most recent information we have, western Montrose County is occupied by the Gunnisons prairie dog (Cynomys gunnisoni) rather than the white-tailed prairie dog (Cynomys leucurus). This change should be made where appropriate unless your field observations or literature search concludes otherwise.

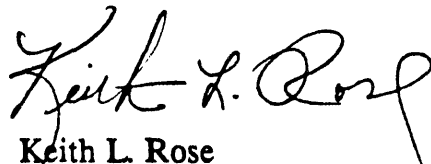
We appreciate the information you have provided regarding the southwestern willow flycatcher. We have alerted Dr. Jim Sedgewick with the Fish and Wildlife Service's National Ecology Research Center in Fort Collins regarding your proposed surveys. Dr. Sedgewick has conducted extensive research on this species and may be able to assist with the surveys proposed for 1991. He may be reached at FTS 323-5466.

#### Floodplains and Wetlands Assessment

We endorse your commitment to restore the wetland that will be effected during project construction. We will anticipate an opportunity to review the proposed re-vegetation/restoration plan during further coordination.

We have no further comments on the documents sent for our review. Please contact Bob Leachman if there are any questions.

Sincerely,



Keith L. Rose  
Acting Colorado State Supervisor

cc: FWS/FWE, Golden  
FWS/FWE, Salt Lake City  
CDOW, Montrose



**UNITED STATES DEPARTMENT OF THE INTERIOR**  
**FISH AND WILDLIFE SERVICE**  
**FISH AND WILDLIFE ENHANCEMENT**  
Western Colorado Sub-Office  
529 25 $\frac{1}{2}$  Road, Suite B-113  
Grand Junction, CO 81505-6199  
FTS 332-0351  
COMM (303) 243-2778



IN REPLY REFER TO:

FWE/GJ-6-CO-90-F-13

December 11, 1990

Mr. Mark L. Matthews, Project Manager  
Uranium Mill Tailings Remedial Action Project Office  
Department of Energy  
Albuquerque Operations Office  
P.O. Box 5400  
Albuquerque, NM 87115

Subject: Biological Opinion Regarding Remedial Action at the Naturita, Colorado,  
Uranium Mill Tailings Site

This responds to your October 1, 1990, letter initiating Section 7 consultation under the Endangered Species Act of 1973, as amended. The Fish and Wildlife Service (Service) has reviewed your biological assessment and concurs with your "may affect" determination for Colorado squawfish (*Ptychocheilus lucius*), humpback chub (*Gila cypha*), and bonytail chub (*Gila elegans*), which are all federally listed as endangered. The fourth species addressed in your biological assessment, the razorback sucker (*Xyrauchen texanus*) is currently proposed for listing as endangered. It is the Department of Energy's (DOE) responsibility to confer with the Service on any action which is likely to jeopardize the continued existence of any proposed species (50 CFR Part 402.10). Your biological assessment made the determination that the proposed action "may affect" the razorback sucker; however, the regulations require that the DOE determine whether the proposed action is likely to jeopardize the continued existence of the razorback sucker. Please submit your determination to this office for our concurrence.

We concur with your assessment that the proposed action would not affect the bald eagle (*Haliaeetus leucocephalus*) or black-footed ferret (*Mustela nigripes*). We appreciate your concern and effort in evaluating impacts the project may have on candidate species. Your report on the willow flycatcher (*Empidonax trailii*) was very informative and will be used to document the likelihood of these birds being found in other areas of Colorado in similar habitats.

This biological opinion addresses impacts of the proposal to Colorado squawfish, humpback chub, and bonytail chub. This opinion has been prepared in accordance with Section 7 of the Endangered Species Act (16 U.S.C. 1531 et seq.) and the Interagency Cooperation Regulations (50 CFR 402).

### Biological Opinion

The depletion of 37 acre-feet of water from the Colorado River basin for the remedial action at the Naturita disposal site, with the inclusion of the Conservation Measures outlined below, is not likely to jeopardize the continued existence of the Colorado squawfish, humpback chub, or bonytail chub.

### Project Description

The DOE proposes to consolidate contaminated uranium mill tailings which are associated with uranium milling activities which occurred adjacent to the city of Naturita, Colorado. These tailings and associated contaminated soil, over 800,000 cubic yards, would be disposed of in an approved contaminant area. DOE estimates 37 acre-feet per year of water will be needed to conduct this remedial action.

### Basis for Opinion

Water depletions in the Upper Colorado River Basin have been recognized as a major source of impact to endangered fish species. Continued water withdrawal has restricted the ability of the Colorado River system to produce flow conditions required by various life stages of the fish. Impoundments and diversions have reduced peak discharges by 50 percent since 1942 while increasing flows by 21 percent in some reaches. These depletions along with a number of other factors have resulted in such drastic reductions in the populations of Colorado squawfish, humpback chub and bonytail chub that the Service has listed these species as endangered and has implemented programs to prevent them from becoming extinct.

### **COLORADO SQUAWFISH**

The Colorado squawfish evolved as the main predator in the Colorado River system. The diet of Colorado squawfish longer than three or four inches consists almost entirely of other fishes (Vanicek and Kramer 1969). The Colorado squawfish is the largest cyprinid fish (minnow family) native to North America and, during pre-development times, may have grown as large as six feet in length and weighed nearly 100 pounds (Behnke and Benson 1983). These large fish may have been 25-50 years of age.

Based on early fish collection records, archaeological finds and other observations, the Colorado squawfish was once found throughout warm water reaches of the entire Colorado River Basin, including reaches of the upper Colorado River and its major tributaries, the Green River and its major tributaries, and the Gila River system in

Arizona (Seethaler 1978). Colorado squawfish were apparently never found in colder, headwater areas. Seethaler (1978) indicates that the species was abundant in suitable habitat throughout the entire Colorado River basin prior to the 1850's. Historically, Colorado squawfish have been collected in the upper Colorado River as far upstream as Parachute Creek, Colorado (Kidd 1977).

A marked decline in Colorado squawfish populations can be closely correlated with the construction of dams and reservoirs during the 1960's, the introduction of nonnative fishes, and the removal of water from the Colorado River system. Behnke and Benson (1983) summarized the decline of the natural ecosystem. They pointed out that dams, impoundments, and water use practices are probably the major reasons for drastically modified natural river flows and channel characteristics in the Colorado River Basin. Dams on the mainstem have essentially segmented the river system, blocking Colorado squawfish spawning migrations and drastically changing river characteristics, especially flows and temperatures. In addition, major changes in species composition have occurred due to the introduction of nonnative fishes, many of which have thrived as a result of changes in the natural riverine system (i.e., flow and temperature regimes). The decline of endemic Colorado River fishes seems to be at least partially related to competition or other behavioral interactions with nonnative species, which have perhaps been exacerbated by alterations in the natural fluvial environment.

The Colorado squawfish currently occupies about 1,030 river miles in the Colorado River system (25 percent of its original range) and is presently found only in the upper Colorado River Basin above Glen Canyon Dam. It inhabits about 350 miles of the mainstem Green River from its mouth to the mouth of the Yampa River. Its range also extends 140 miles up the Yampa River and 104 miles up the White River, the two major tributaries of the Green River. In the mainstem Colorado River, it is currently found from Lake Powell extending about 201 miles upstream to Palisade, Colorado, and in the lower 33 miles of the Gunnison River, a tributary to the mainstem Colorado River (Tyus et al. 1982). Recent investigation found adult Colorado squawfish inhabit the San Juan River as far upstream as 163.3 miles above Lake Powell.

The life stages that appear to be most critical are from egg fertilization through its first year of life. It has been demonstrated that these phases of Colorado squawfish development are also closely tied to some specific habitat requirements. It is imperative that proper flows and temperatures are provided during these essential life stages. The conservation measures outlined below will help further investigate and meet the habitat requirements of the Colorado squawfish, thus offsetting project-related impacts and the likelihood of jeopardy for the species.

#### **HUMPBACK CHUB**

Humpback chub generally do not make migrational movements in the upper Colorado River and tend to reside throughout the year within a limited reach of river. Humpback chub are found inhabiting narrow, deep canyon areas, and are relatively restricted in



distribution. They seldom leave their canyon habitat (Service 1982). While humpback chub are still occasionally found dispersed in the Green and Yampa Rivers, the only major populations of humpback chub known to exist in the upper Colorado River basin are located in Black Rocks and Westwater Canyons on the Colorado River. Conservation measures outlined below will contribute to providing proper habitat conditions for humpback chub, thus offsetting the likelihood of jeopardy for the species.

### **BONYTAIL CHUB**

Little is known about the biological requirements of the bonytail chub, as the species greatly declined in numbers in the upper basin shortly after 1960. Until recently, the Service considered the species extirpated from the upper basin; however, a recently collected specimen which exhibits many bonytail characteristics could indicate a small, extant population. It is thought that, should this species persist in the Colorado River, the preferred habitat would be larger river reaches in the Colorado River. Conservation measures outlined below will contribute to conservation efforts for the bonytail chub, thus offsetting the likelihood of jeopardy for the species.

### Conservation Measures

On January 21-22, 1988, the Secretary of the Interior, the governors of Wyoming, Colorado, and Utah, and the Administrator of the Western Area Power Administration were cosigners of a Cooperative Agreement to implement the "Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin" (Recovery Program). An objective of the Recovery Program was to identify reasonable and prudent alternatives that would ensure the survival and recovery of the listed species while providing for new water development in the Upper Colorado River Basin.

The following excerpts are pertinent to the consultation because they summarize portions of the Recovery Program that address depletion impacts, Section 7 consultation, and project proponent responsibilities:

"All future Section 7 consultations completed after approval and implementation of this program (establishment of the Implementation Committee, provision of congressional funding, and initiation of the elements) will result in a one-time contribution to be paid to the Service by water project proponents in the amount of \$10.91 per acre-foot based on the average annual depletion of the project.... This figure will be adjusted annually for inflation.... Concurrently with the completion of the Federal action which initiated the consultation, e.g., ...issuance of a 404 permit, 10 percent of the total contribution will be provided. The balance...will be...due at the time the construction commences...."

It is important to note that these provisions of the Recovery Program were based on appropriate legal protection of the instream flow needs of the endangered Colorado River fishes. The Recovery Program further states:

"...it is necessary to protect and manage sufficient habitat to support self-sustaining populations of these species. One way to accomplish this is to provide long term protection of the habitat by acquiring or appropriating water rights to ensure instream flows.... Since this program sets in place a mechanism and a commitment to assure that the instream flows are protected under State law, the Service will consider these elements under Section 7 consultation as offsetting project depletion impacts."

Thus, the Service has determined that project depletion impacts, which the Service has consistently maintained are likely to jeopardize the listed fishes, can be offset by (a) the water project proponents one-time contribution to the Recovery Program in the amount of \$10.91 per acre-foot of the project's average annual depletion, and (b) appropriate legal protection of instream flows pursuant to State law. The Service believes it is essential that protection of instream flows proceed expeditiously, before significant water depletions occur.

With respect to (a) above (i.e., depletion charge), the applicant will make a one-time payment which has been calculated by multiplying the project's average annual depletion (37 acre-feet) by the depletion charge in effect at the time payment is made. For fiscal year 1991 (October 1, 1990, to September 30, 1991), the depletion charge is \$10.91 per acre-foot of the average annual depletion which equals a total payment of \$403.67 for this project. This amount will be adjusted annually for inflation on October 1 of each year based on the previous year's Composite Consumer Price Index. The Service will notify the DOE of any change in the depletion charge by September 1 of each year. Ten percent of the total contribution (\$40.37) or total payment, will be made to the National Fish and Wildlife Foundation (see Appendix A). The balance will be due at the time the construction commences. Fifty percent of the funds will be used for acquisition of water rights to meet the instream flow needs of the endangered fishes (unless otherwise recommended by the Implementation Committee); the balance will be used to support other recovery activities for the Colorado River endangered fishes.

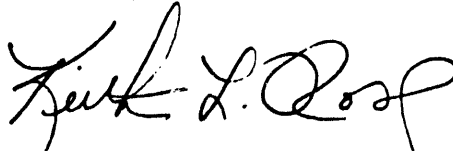
### Conclusion

This concludes our biological opinion on the impacts of proposed remedial action. This opinion was based upon the information described herein. If new information becomes available, new species listed, or should there be any changes in the total average annual amount of water depleted by this project (37 acre-feet per year) or any other project change which alters the operation of the project from that which is described in the biological assessment and which may affect any endangered or threatened species in a

manner or to an extent not considered in this biological opinion (see 50 CFR 402.16), formal Section 7 consultation should be re-initiated. Section 7 consultation must also be re-initiated if there is failure to carry out the Conservation Measures upon which this opinion was based.

Thank you for your interest in conserving endangered species.

Sincerely,

A handwritten signature in black ink, appearing to read "Keith L. Rose". The signature is written in a cursive style with a large, sweeping "K" and "R".

Keith L. Rose  
Acting Colorado State Supervisor

Attachment (Appendix A)

cc: CDOW, Grand Junction  
EPA, Denver  
FWS/FWE, Denver  
FWS/FWE, Grand Junction  
FWS/FWE, Salt Lake City  
FWS/FWE, Washington, D.C.

## REFERENCES

- Behnke, R.J., and D.E. Benson. 1983. Endangered and threatened fishes of the Upper Colorado River Basin. Ext. Serv. Bull. 503A, Colorado State University, Fort Collins, CO. 38 pp.
- Kidd, G. 1977. An investigation of endangered and threatened fish species in upper Colorado River as related to Bureau of Reclamation Projects. Final report, Bureau of Reclamation, Salt Lake City. 36 pp.
- Seethaler, K. 1978. Life History and Ecology of the Colorado Squawfish (Ptychocheilus lucius) in the upper Colorado River basin. Thesis, Utah State University, Logan, Utah.
- Tyus, H.M., B.D. Burdick, R.A. Valdez, C.M. Haynes, T.A. Lytle, and C.R. Berry. 1982. Fishes of the Upper Colorado River Basin: Distribution, abundance and status. pp. 12-70. In: Miller, W.H., H.M. Tyus and C.A. Carlson, (eds) 1982. Fishes of the Upper Colorado River System: Present and Future. Western Division, American Fisheries Society, Bethesda, MD.
- U.S. Fish and Wildlife Service (Service. 1982. Colorado River Fishery Project Final Report. Part I (42 pp), Part II (356 pp), and Part III (342 pp). Prepared for the U.S. Bureau of Reclamation, Salt Lake City. April 1982.
- U.S. Fish and Wildlife Service, 1987. Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin. U.S. Fish and Wildlife Service, Denver, Colorado. 82 pp.
- Vanicek, C.D., and R.H. Kramer. 1969. Life history of the Colorado squawfish Ptychocheilus lucius and the Colorado chub Gila robusta in the Green River in Dinosaur National Monument, 1964-1966. Trans. AFS 98(2):193-

## APPENDIX A

Cooperative Agreement  
between  
U.S. Department of the Interior  
Fish and Wildlife Service  
and  
National Fish and Wildlife Foundation

### I. Background

Three species of fish that inhabit the Colorado River system have been federally listed as endangered: the Colorado squawfish, humpback chub, and bonytail chub. A fourth, the razorback sucker, is currently a candidate for listing. On January 21-22, 1988, the Governors of Utah, Wyoming, and Colorado, the Administrator of the Western Area Power Administration, and the Secretary of the Interior executed a Cooperative Agreement to implement the "Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin" (Recovery Program). The 15-year Recovery Program outlines an aggressive effort to recover the endangered fishes of the Colorado River in a manner that is consistent with Interstate Compacts and State water rights systems. The signing of the Cooperative Agreement also established an Implementation Committee whose purpose is to oversee the Fish and Wildlife Service's (Service) implementation of the Recovery Program. Members of the Implementation Committee include representatives of the States of Colorado, Wyoming, and Utah, the Service, the Bureau of Reclamation, the Western Area Power Administration, and representatives of the water development interests and environmental groups.

The cost for implementing the Recovery Program is estimated at \$58.5 million over the 15-year time frame. Contributions by proponents of water projects (Federal, State and private) are expected to provide approximately \$9-10 million of these funds, assuming full Compact development over the next 15 years. Water project proponents will make a one-time contribution to the Service in the amount of \$10 per acre-foot based on the average annual depletion of projects that complete consultation pursuant to Section 7(a)2 of the Endangered Species Act of 1973, as amended. Payment of the contribution will be specified in the biological opinion for each water project which causes a depletion of water from the Upper Colorado River system. Ten percent of the funds will be payable upon completion of the Federal action which initiated the consultation (e.g., issuance of a 404 permit); the balance will be due at the time construction commences or prior to the depletion becoming effective. Funds from these contributions are to be applied equally to flow acquisition and other priority recovery activities, unless otherwise directed by the Implementation Committee.

In addition, the Recovery Program has a provision for the donation of funds from private parties, including conservation groups. Private donations would be used for priority recovery activities as agreed to by the donor, the Service, and/or the Implementation Committee.

The role of the National Fish and Wildlife Foundation (Foundation) was identified in the Recovery Program. Section 5.5 indicates that all contributed or donated funds accruing from the Recovery Program, regardless of source, will be placed in an interest bearing account, such as those administered by the Foundation, until such time as they are utilized in accordance with the Implementation Committee's approved annual work plan and budget.

## II. Purpose and Objectives

The purpose of this Cooperative Agreement is to establish a mechanism and procedures for (1) the transfer of funds contributed by water project proponents and private donors pursuant to the Recovery Program to the Foundation; and (2) the disbursement of said funds from the Foundation to accomplish Colorado River fishes recovery activities. This Cooperative Agreement will facilitate the accomplishment of recovery activities for the rare Colorado River fishes in an efficient and timely manner.

## III. Authorities

Fish and Wildlife Coordination Act, 16 U.S.C. Sec. 661;  
Fish and Wildlife Act of 1956, 16 U.S.C. Sec. 742f(a)(4); and  
National Fish and Wildlife Foundation Establishment Act, 16 U.S.C.  
Sec. 3703(c)(6).

## IV. Term

This Agreement shall take effect upon execution, with only subsequent contributed and donated funds being transferred to the Foundation, and will remain in effect until completion or termination of the Recovery Program, whichever occurs first. The term of the Cooperative Agreement that implements the Recovery Program is 15 years.

## V. Specific Obligations of the Parties

To accomplish the purposes and objectives of this Cooperative Agreement, each party agrees to cooperate with the other to fulfill its obligations as herein provided.

### A. Service Obligations - The Service will:

1. When this Agreement takes effect, inform water project proponents and potential private donors of the procedures for contributing funds to the Foundation, pursuant to the Recovery Program. Procedures for payment of the contributed funds will be specified in the Biological Opinion for each water project which causes a depletion of water from the Upper Colorado River system, and the Service is responsible for ensuring that private and State water project proponents make payment to the Foundation.
2. Identify, from the list of projects included in the Implementation Committee's approved annual work plan, those that should be funded by the Foundation with Colorado River contributed and donated funds. Use of these funds will be coordinated by the Service, on behalf of the Implementation Committee, with the Foundation. (Attachment 1 identifies the current process and schedule for development of the annual work plan by the Implementation Committee.)
3. Develop, in coordination with the Implementation Committee, requests-for-proposals and/or scopes-of-work for work to be funded with Colorado River contributed/donated funds.

4. Work closely with the Foundation to develop contracts for work to be funded with Colorado River contributed/donated funds.
  5. Appoint a technical project officer for all contracts or projects carried out or funded under this Agreement.
  6. Appoint an individual who will represent the Service in carrying out its obligations under this Agreement, including authorizing the expenditure of funds by the Foundation.
  7. In cases dealing with disbursement of funds for acquiring water rights, provide the Foundation with written direction of the Service's Director or his designee, and a certified resolution of the Implementation Committee recommending allocation of the funds. The resolution will contain the following information:
    - a. The specific purpose for which the funds are being disbursed.
    - b. A detailed description of the water right to be acquired.
    - c. The owner of the water right.
    - d. The exact or maximum amount to be expended in acquiring the water right.
  8. Coordinate and report upon activities of the Foundation with and to the Colorado River Implementation Committee, including providing an annual accounting to the Implementation Committee for all funds maintained, received, and/or expended pursuant to this Agreement.
  9. Continue to maintain separate accounts for funds appropriated by Congress for the acquisition of water rights, and contributed/donated funds received prior to the implementation of this Agreement. Use of funds in these accounts will be coordinated by the Service, on behalf of the Implementation Committee, with those maintained by the Foundation under this Agreement.
- B. Foundation Obligations - The Foundation will:
1. Serve as the Service's designated agent for accepting and administering contributed and donated funds acquired pursuant to the Recovery Program, and disbursing these funds as approved by the Service and the Implementation Committee.
  2. Maintain these funds in a specific account, separate from other Foundation accounts. Interest accruing to this Foundation account will be used for the purpose for which the account was established.
  3. Develop and/or issue, in coordination with the Service, contracts for work to be funded with Colorado River contributed/donated funds as identified in the approved Implementation Committee work plan.
  4. Appoint an individual who will represent the Foundation in carrying out its obligations under this Agreement.

5. Solicit and accept private donations to finance and implement recovery activities, including the acquisition of water rights, pursuant to the Recovery Program. This obligation is contingent upon approval of the Foundation's Board of Directors and the Service, and is separate from Congressional appropriations coming to the Service for acquisition of water rights.
6. Appoint a technical project officer for all contracts or projects carried out or funded under this Agreement.

#### VI. Financial Administration

1. The Foundation will be reimbursed for actual expenses associated with carrying out its obligations under this Agreement (not to exceed two percent of the funds received each year). The Foundation will provide a quarterly statement which itemizes its expenses. Upon review (which will not exceed 30 days), the Service will authorize the Foundation to debit the contributed fund account to reimburse approved expenses.
2. The Foundation will prepare and submit to the Service a semiannual report by July 15 and December 15 of each year, which itemizes all funds maintained, deposited, accrued, and disbursed from the account established pursuant to this Agreement.

#### VII. Project Officers

For the Service (and on behalf of  
the Implementation Committee):

John Hamill, Program Director  
Colorado River Endangered  
Fishes Recovery Program  
U.S. Fish and Wildlife Service  
P.O. Box 25486, DFC  
Denver, Colorado 80225  
(303) 236-7398, FTS 776-7398

For the Foundation:

Whitney Tilt  
Project Manager  
National Fish and Wildlife  
Foundation  
18th & C Streets, NW, Rm 2725  
Washington, D.C. 20240  
(202) 343-1040, FTS 343-1040

#### VIII. Special Terms and Conditions

1. The Foundation will, in coordination with the Service, select the most appropriate investment option for the contributed/donated funds. Primary consideration will be given to selecting extremely safe investments with the highest possible yield. Interest and/or dividends accruing to the account shall be available for the purposes for which the funds were contributed or donated.
2. Funds may be dispersed by the Foundation for purposes not included in the Implementation Committee's annual work plan at the written direction of the Service's designated representative for this Agreement and concurrence of the Chairman of the Implementation Committee.



IX. Amendments

Amendments to this Agreement may be proposed by either party, and shall become effective only upon being reduced to a written instrument executed by both parties.

X. Termination


This Agreement may be terminated by either party upon 90 days written notice to the other. Upon receipt of such written notice, the Foundation will provide an accounting of remaining funds and outstanding contractual obligations of funds. In the case of termination, the Service will make arrangements for transferring the funds administered by the Foundation to another entity, or renegotiate an alternative agreement with the Foundation.

XI. General Provisions

The U.S. Fish and Wildlife Service General Provisions for Grant and Cooperative Agreements, as attached, shall be applicable to this Agreement.

In witness whereof, each party has caused this Agreement to be executed by an authorized official on the day and year set forth below their signature.

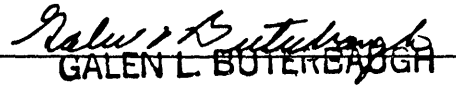
National Fish and Wildlife  
Foundation

BY 

TITLE Executive Director

DATE 5/17/89

U.S. Fish and Wildlife Service

BY   
GALEN L. BOTTERBAUGH

TITLE Regional Director

DATE JUN 14 1989

Process and Schedule  
Colorado River Endangered Fishes  
Annual Work Plan

- December 31** Each Principal Investigator provides a written summary of results of studies and identifies successes, shortcomings and plans for the next year. An oral presentation is provided at the Colorado River annual researcher's meeting in February.
- March 15** Chairman of Technical Group sends out a request for preliminary proposals for new projects.
- June 15** Technical Group meets to rank existing (ongoing) projects and preliminary proposals for new projects. Each project is ranked based on several factors, including:
- a. consistency with the Recovery Program/Plans
  - b. degree of urgency (to avoid jeopardy)
  - c. essential for recovery
  - d. timeliness of study results
  - e. likelihood of success
  - f. relationship to other priority work
  - g. opportunity to do project now
  - h. quality of proposal
- Recommendations are provided to the Management Group on the relative priority of funding existing and new (proposed) projects.
- July 15** Management Group considers the recommendations of the Technical Group, determines available funding, and prepares draft work plan. Management Group transmits a draft work plan to Implementation Committee for review.
- September 1** Implementation Committee meets to review and approve the annual work plan.
- Sept-Dec** Cooperators develop and/or issue requests for proposals, scopes-of-work, and contracts for projects approved in the Implementation Committee's work plan.
- January 31** Implementation Committee meets to review the status of projects contained in their annual work plan.



UNITED STATES DEPARTMENT OF THE INTERIOR  
**FISH AND WILDLIFE SERVICE**

FISH AND WILDLIFE ENHANCEMENT

Western Colorado Sub-Office  
529 25½ Road, Suite B-113  
Grand Junction, CO 81505-6199

FTS 332-0351

FAX: (303) 245-6933

PHONE: (303) 243-2778



IN REPLY REFER TO:

FWE/CO:DOE:UMTRA  
Mail Stop 65412 Grand Junction

February 25, 1991

Mark L. Matthews, Project Manager  
Uranium Mill Tailings Remedial Action Project  
Department of Energy  
P.O. Box 5400  
Albuquerque, New Mexico 87115

Dear Mr. Matthews:

This responds to your three letters dated February 7, 1991, regrading remedial action activities at the Gunnison, Maybell, and Naturita Uranium Mill Tailings sites.

Each of the above letters serve as a biological assessment for the razorback sucker (proposed for Federal listing on May 22, 1990), as required under Section 402.12 of 50 CFR 402. We concur with your conclusion that remedial action activity at each of the sites is not likely to jeopardize the continued existence of the razorback sucker. Further action under Section 7 of the Endangered Species Act is, therefore, not necessary for any of the above projects.

We appreciate your attention to endangered species issues. Please contact me if there are any questions.

Sincerely,

Keith L. Rose  
Acting Colorado State Supervisor

cc: FWS/FWE, Golden  
FWS/FWE, Salt Lake City  
CDOW, Grand Junction  
CDOW, Montrose



UNITED STATES DEPARTMENT OF THE INTERIOR  
FISH AND WILDLIFE SERVICE  
ECOLOGICAL SERVICES

Western Colorado Office  
529 25½ Road, Suite B-113  
Grand Junction, CO 81505-6199

Phone: (303) 243-2778

FAX (303) 245-6933



IN REPLY REFER TO:

ES/CO:DOE-UMTRA  
MS 65412 GJ

April 20, 1993

Ms. Linda Ulland, Manager  
Environmental Services  
Jacobs Engineering Group, Inc.  
5301 Central Avenue N.E., Suite 1700  
Albuquerque, New Mexico 87108

Subject: Naturita UMTRA Project update

Dear Ms. Ulland:

This responds to your March 15, 1993 request for guidance regarding the need to update the biological assessment for the Naturita Colorado Uranium Mill Tailings Remedial Action (UMTRA) Project. As you state in your letter, the Fish and Wildlife Service provided a biological opinion dated December 11, 1990 (FWE/GJ-6-CO-90-F-13) regarding this activity. Due to the need to evaluate other alternatives, the conservation measures included in that opinion to protect federally listed fish species were not implemented. Even though the current project description is not changed from that evaluated in the biological opinion, we believe it is necessary to re-evaluate the potential impacts of this project to federally listed and candidate species due to changes in the status of federally listed fish species, and some of the candidate species. Consequently, we are providing you the following list of federally listed and candidate species that may occur within the area of influence of the proposed project.

FEDERALLY LISTED SPECIES

Colorado squawfish	<u>Ptychocheilus lucius</u>
Humpback chub	<u>Gila cypha</u>
Bonytail chub	<u>Gila elegans</u>
Razorback sucker	<u>Xyrauchen texanus</u>
Bald eagle	<u>Haliaeetus leucocephalus</u>
Black-footed ferret	<u>Mustela nigripes</u>

We have provided Jacob's Engineering biological details regarding the federally listed fish species on numerous occasions; consequently, we are abbreviating this response. However, you should be advised that critical habitat for the federally listed fish species was proposed for designation on January 24, 1993 (Federal Register V58 No. 18). The proposal identifies 2,094 river miles of the Colorado river and its tributaries that are believed to have the essential biological and physical elements required for the conservation of the federally listed fish. The Fish and Wildlife Service will consider any depletion of water from the upper Colorado River basin as an adverse modification of this critical habitat, a conclusion which will require formal conferencing (50CFR402.10) by the Department of Energy with this

office. The request for conferencing may be with the same letter requesting formal consultation due to the "may affect" determinations for the federally listed fish resulting from the depletion of water associated with this project.

Bald eagles are common winter visitors to Colorado. Statewide midwinter counts by the Colorado Division of Wildlife in 1990 documented 589 bald eagles at various rivers and reservoirs throughout the state. Bald eagles are commonly found near permanent water bodies such as streams, rivers, lakes, and reservoirs. Tree height provides bald eagles with visibility and accessibility; diurnal perch trees are therefore usually taller than average, have a diameter of at least 12 inches, and are close to a river or reservoir shoreline (commonly within 33 yards). Winter night roost trees are generally larger than diurnal perches and may be further from a water body or food source. As bald eagles are known to fly up to 18 miles (greater distances may be traveled) from night roosts to feeding areas, they are also frequently seen searching upland habitats for prey or carrion. Over a period of time, bald eagles may be less faithful to wintering sites than breeding sites. Factors influencing their use of particular wintering areas include weather, quantity and concentration of food, availability of alternate locations, and human disturbance.

The Northern States Bald Eagle Recovery Plan classifies essential bald eagle wintering habitat in Colorado as areas that meet one of the following criteria: 1) Locations used annually for two weeks or longer by adult or immature wintering eagles known (or strongly suspected) to be from nearby breeding areas. 2) Locations used annually by 15 or more eagles for two weeks or longer. 3) Locations used by bald eagles during periods of extremely harsh weather, when suitable feeding areas and night roost sites are limited in number (the minimum two week period of use does not apply to this criterion). Areas that are known to be used annually by bald eagles that do not exactly meet the above criteria may also be important.

We have learned that the proposal to alleviate wind blown contamination near the San Miguel River will consider the removal of cottonwood trees on approximately 40 acres. Your evaluation of impacts should determine whether the removal of the cottonwood trees will impact any of the above described bald eagle wintering habitat requirements. Any impact to essential wintering habitat described above will be considered a negative impact to the bald eagle. The Service would therefore expect the Department of Energy to conclude "may effect" to the bald eagle, and request formal consultation with this office. We encourage continued informal consultation with this office prior to conclusion of "may effect" to the bald eagle. There may be opportunities to incorporate project modifications to protect the bald eagle that would allow termination of the consultation process without the need to formally consult. We also suggest you contact Mr. Jerry Craig with the Colorado Division of Wildlife in Fort Collins (303-484-2836). Mr Craig may have more recent bald eagle inventory data for the project area.

As Jacob's Engineering knows, black-footed ferrets are dependent on prairie dogs. We believe there should be a new inventory of all project lands to determine whether prairie dog colonies occur, and whether they will be

disturbed by any phase of the project. The prairie dog inventory should occur on all lands within a one-half mile radius of all project feature boundaries.

#### FEDERAL CANDIDATE SPECIES

Ferruginous hawk	<u>Buteo regalis</u>
Loggerhead shrike	<u>Lanius ludovicianus</u>
Northern goshawk	<u>Accipiter gentilis</u>
Southwestern willow flycatcher	<u>Empidonax traillii extimus</u>
White-faced ibis	<u>Plegadis chihi</u>
Columbian sharptailed grouse	<u>Tympanuchus phasianellus columbianus</u>
Roundtail chub	<u>Gila robusta</u>
Flannelmouth sucker	<u>Catostomus latipinnis</u>
<u>Lupinus crassus</u>	Paradox lupine

The ferruginous hawk is the largest buteo in North America and is a category 2 listing candidate. It is a common summer resident of grasslands in Rio Blanco County, occasionally nests in pinon-juniper woodlands, and feeds on small mammals such as prairie dogs and rabbits. Human disturbance near active nest sites can result in nesting failure. A petition to list the ferruginous hawk was recently determined unwarranted by the Fish and Wildlife Service. However, there is a need to continue monitoring the status of this candidate species.

The loggerhead shrike is a category two listing candidate species. The shrike may be found in a variety of habitats below 6,000 feet elevation, including riparian areas and pinyon-juniper woodlands. The shrike is a fairly common summer resident and spring and fall migrant in Colorado. The loggerhead shrike may feed on large insects, small birds, or mice. The loggerhead shrike has shown significant population declines over much of its range. It has been extirpated from some areas in eastern Colorado, but appears stable in western Colorado. It is a rare to uncommon winter resident in western valleys north to Mesa County and on the southeastern plains north to the southern El Paso County. The loggerhead shrike has also been identified by the Partners in Flight international joint venture as a neotropical migrant worthy of attention.

The northern goshawk is a category two listing candidate. The goshawk is associated with aspen, ponderosa pine, and lodgepole pine between 7,500 and 11,500 feet elevation. Migrants and winter residents are seen on all types of coniferous forest, riparian forest, and occasionally shrublands. Goshawks feed primarily on other birds. The northern goshawk has also been identified by the Partners in Flight international joint venture as a neotropical migrant worthy of attention. Your project activities should be evaluated to determine whether impacts will occur to goshawks or their habitat. Pre-project surveys may be necessary.

The southwestern willow flycatcher is a category two listing candidate. It is a riparian obligate, usually found associated with Fremont cottonwood, Gooding willow, and tamarisk along slow moving watercourses. It is entirely insectivorous. There are no records of this species from Colorado, but it is

believed to have nested in the southwestern part of the state historically. There are less than 1,000 breeding pairs throughout its range. Habitat destruction and fragmentation are the principal reasons for the species decline and threaten its continued survival. The willow flycatcher winters in Central America, and is therefore considered a neotropical migrant. It has been included in the Partners in Flight international joint venture to conserve neotropical migrants. Dr. James Sedgewick is a recognized species expert, who may be contacted at the National Ecology Research Center in Fort Collins (303-226-9466). Your evaluation of the project should determine whether riparian habitats will be impacted. If activities are planned in riparian habitats, surveys for the willow flycatcher may be warranted. Please contact this office for more details if surveys are desired. We are aware that you have conducted surveys for this species in the past and greatly appreciate your attention to this bird. We would endorse your proposal to repeat surveys in the project area.

The white-faced ibis is a category two listing candidate. It is found in wet meadows, marsh edges, and reservoir shorelines, mostly below 6,000 feet elevation, but occasionally up to 9,000 feet. Ibis feed on crayfish, frogs, and grasshoppers. The ibis winters in California and Mexico.

The columbian sharptailed grouse is a category two listing candidate. It is a local resident in Routt and eastern Moffat counties, with smaller populations south to Montezuma county. The grouse is associated with shrublands and cultivated fields between 6,000 and 7,500 feet elevation. Populations have declined due to impacts to habitat. This grouse has declined in numbers and distribution throughout its range, and has been extirpated from California, Nevada, and Oregon. Its remaining stronghold is in western Colorado. Grouse are entirely insectivorous. For additional information on the species biology and distribution, contact Clait Braun with the Colorado Division of Wildlife in Fort Collins (303-484-2836).

The roundtail chub is a category 2 listing candidate. It is a native of the Colorado River basin and may reach 18 inches in length and weigh up to two pounds. Historically, it was the most common member of the genus Gila in the Colorado River basin, but has declined in distribution and abundance at some locales in recent years. In Colorado, it is found in the Colorado, White, Yampa, Dolores, San Juan, and Gunnison rivers. The roundtail chub is a large river fish, and occupies slow moving waters adjacent to areas of faster water. Young-of-the-year prefer shallow river runs, while juveniles concentrate in river eddies and irrigation ditches. Young feed on small insects and algal films, while adults take both terrestrial and aquatic insects along with filamentous algae. Large chubs will take other fish. Spawning takes place over a gravel substrate in early summer in warm water as spring runoff is subsiding. The chub has declined in the Gunnison River, possibly due to coldwater releases from the Curecanti Project. For more information regarding this species biology and distribution, contact this office, or the Colorado River Fishery Project at 303-245-9319.

The flannelmouth sucker is a category 2 candidate species. It is restricted to larger streams and rivers in the middle and upper Colorado River basin, and is found only on the west slope of Colorado. This fish is found in all

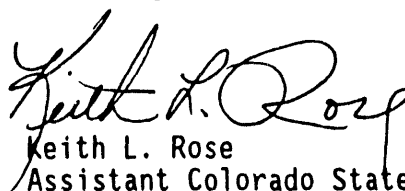
habitat types including riffles, runs, eddies, and backwaters. It feeds on invertebrates, and spawns in early May to early August. Competition with exotic species and/or cold water releases from reservoirs are reasons for their disappearance from the upper Gunnison River, and could impact their distribution elsewhere. Your project evaluation should include... For additional information regarding this species biology and distribution in Colorado, contact this office, or the Colorado River Fishery Project at 303-245-9319.

We are aware that surveys were conducted for the Paradox lupine during preparation of the biological assessment in 1990. You should contact Dr. Lucy Jordan with this office to determine whether additional surveys are needed.

We have provided Jacob's Engineering numerous letters regarding the process required to satisfy section 7 of the Endangered Species Act; consequently, we do not believe it is necessary to remind Jacobs' Engineering of these requirements in this letter. However, we do request that Jacob's Engineering consider alternatives to the tentative proposal to remove approximately 40 acres of cottonwood trees from the San Miguel River riparian corridor. Even if there is no potential impact to wintering bald eagles, riparian corridors provide important habitat for numerous other species of wildlife.

Due to the water depletion associated with this project, it appears that formal consultation and conferencing will be required to bring this issue to closure under the requirements of the Endangered Species Act. We appreciate your attention to endangered species issues, and the effort you dedicate to the candidate species that may occur in the area. Please contact me or Bob Leachman if there are any questions.

Sincerely,



Keith L. Rose

Assistant Colorado State Supervisor

cc: FWS/Ecological Services, Golden  
FWS/Ecological Services, Salt Lake City  
CDOW, Montrose

BLeachman:natumtra.ltr:041993



**DATE**

**FILMED**

3 / 18 / 94

**END**

