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UMTRA
Ground Water Project

Biological Assessment for Ground Water Remediation at the Shiprock Site

Final

April 2001

Prepared by the
U.S. Department of Energy
Grand Junction Office

Work Performed Under DOE Contract No. DE–AC13–96GJ87335 for the U.S. Department of Energy
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Grand Junction, Colorado

Project Number UGW-511-0020-26-000
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Contents

Figures

Tables

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Introduction

The U.S. Department of Energy (DOE) is proposing remedial action to clean up ground water contaminated with residual radioactive material that resulted from processing uranium and vanadium ore on the Navajo Indian Reservation at Shiprock, New Mexico (Figure 1). Residual radioactive material is regulated by the Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978.

Contaminated ground water reaches the ground surface in seeps and ephemeral washes that are hydrologically connected to the San Juan River. DOE has determined that contaminant concentrations warrant remedial action at the site to comply with U.S. Environmental Protection Agency (EPA) standards in 40 CFR 192 and to minimize the potential for adverse effects to human health and the environment. DOE is completing this biological assessment in conjunction with National Environmental Policy Act (NEPA) regulations in 10 CFR 1021. Because the proposed action is not considered a "major construction activity," DOE will complete an environmental assessment and will also exercise the regulatory authority provided in 50 CFR 402.06 to consolidate the statutory requirements of both the Endangered Species Act and NEPA. DOE recognizes Navajo Nation sovereignty and lead authority maintained by the Navajo Fish and Wildlife Department (NFWD) for species regulated under the Endangered Species Act. Although a biological assessment does not appear to be required by regulations, DOE has elected to prepare one as a best management practice. Since 1997, DOE has conducted extensive informal consultation with the U.S. Fish and Wildlife Service (USFWS) and NFWD through meetings, telephone conversations, and written correspondence.

Background

The Shiprock Uranium Mill Tailings Remedial Action (UMTRA) Project site is in San Juan County in the northwest corner of New Mexico. In the early 1950s, the Shiprock area experienced dramatic growth resulting from uranium and oil and gas exploration. In January 1952, the U.S. Atomic Energy Commission established a uranium-ore buying station at the Shiprock site. In 1954, Kerr-McGee Oil Industries, Inc., completed construction of the uranium mill just east of the buying station. Kerr-McGee operated the mill, known as the Navajo Mill, from November 1954 to March 1963 when it was sold to the Vanadium Corporation of America (VCA). VCA operated the mill until August 1967 when the company merged with Foote Mineral Company, which continued operation until milling ended in August 1968. Before and during the milling operations, the site was leased from the Navajo Nation. In 1973, the lease expired and the site ownership reverted to the Navajo Nation. During its life, the mill processed about 1.5 million tons of ore. Some of the mill buildings and most of the equipment were dismantled and placed in a tailings pile from the time that milling ended in 1968 to the expiration of the Foote Mineral Company lease in 1973.

Soon after acquiring the site in 1973, the Navajo Nation asked EPA and other federal agencies for assistance in stabilizing the tailings piles. Some moving of the tailings and filling of drainages had already occurred by June 1974. Remedial action criteria brought by UMTRCA legislation in 1978 made it necessary to prepare a revised site engineering assessment, followed

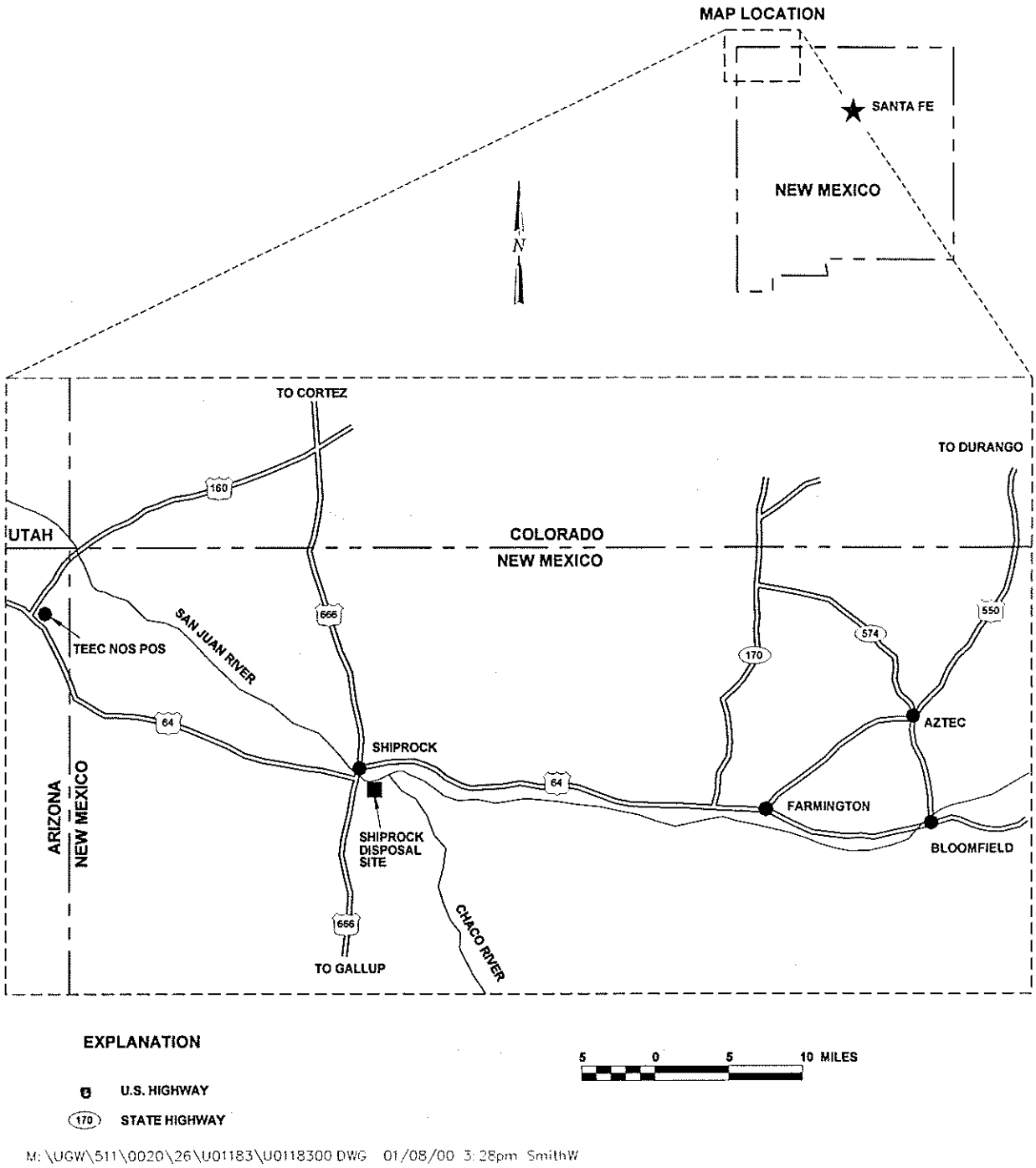

Figure 1. Location of the Shiprock Site

by surface and ground water characterization studies. These characterization studies resulted in an environmental assessment proposing remedial action for surface contamination. Surface remediation (primarily soils and buildings) occurred during late 1985 and 1986 and consisted of consolidating two tailings piles (stabilization in place) into one disposal cell. A photographic record of remediation and disposal cell construction during 1985 through 1987 is archived at the DOE Grand Junction Office (DOE-GJO). The U.S. Nuclear Regulatory Commission issued a license in September 1996 to DOE-GJO for long-term care of the disposal cell.

Following surface remediation, DOE began to evaluate whether ground water had become contaminated from residual radioactive material leaching through soils. In 1995, EPA promulgated final standards for the cleanup of ground water at 40 CFR 192. The *Final Programmatic Environmental Impact Statement for the Uranium Mill Tailings Remedial Action Ground Water Project* (PEIS) (DOE 1996) provides a general discussion of ground water contamination at designated former uranium-ore processing sites. The PEIS also provides a framework for selecting site-specific ground water compliance strategies that comply with EPA regulations and requires that site-specific NEPA documentation be completed as necessary to evaluate alternatives to comply with EPA regulations.

To comply with site-specific regulatory requirements for characterization, DOE completed the *Final Site Observational Work Plan for the Shiprock, New Mexico, UMTRA Project Site* (SOWP) (DOE 2000a), which includes the monitor well locations, contaminants of potential concern, a site evaluation and findings, and an updated ecological risk assessment. The USFWS provided comments to the draft SOWP by letter dated February 29, 2000. The final SOWP and Environmental Assessment describe interim actions completed in November 2000 to mitigate potential short-term risks to ecological receptors.

Action Summary

The Shiprock site is divided by topographic and hydrologic features into two regions: a floodplain area adjacent to the San Juan River, and a terrace area south of the floodplain and about 60 feet in elevation above the floodplain (Figure 2). The terrace system is further subdivided into terrace east and terrace west.

Floodplain Compliance Strategy

Active Remediation Phase

The proposed action for the floodplain aquifer is active remediation in combination with natural flushing and monitoring. Past ore-processing activities may have affected as much as 150 million gallons (460 acre-feet) of ground water in the floodplain. The active remediation phase of the strategy would consist of drilling from 5 to 25 extraction wells, withdrawing water from the wells and pumping it through underground piping to a lined evaporation pond, and spray-evaporating the water. The proposed location of the evaporation pond is in the terrace east area. The specific location of the pond, anticipated to be about 350 feet (ft) by 170 ft (1.4 acres), would be determined jointly by DOE and Navajo UMTRA. The size, location, and number of

spray nozzles to be placed in the pond would be identified in the Ground Water Compliance Action Plan. A buffer zone of at least 100 ft around the pond would also be needed to provide room for maintenance and for removal of residue from evaporation. This area would be fenced and posted to control access.

A wildlife management plan would be developed to avoid adverse effects to sensitive species during installation and operation of the extraction system in the floodplain and the evaporation pond in the terrace east area. Concerns would include noise levels, avoidance of critical habitat, seasonal uses by sensitive species such as the southwestern willow flycatcher, buffer zones, and necessary restrictions. The plan would be developed in consultation with the USFWS and NFWD before fieldwork began.

In the natural flushing strategy, natural geochemical and biological processes and ground water movement decrease ground water contaminant concentrations through time. Included in the proposed action are institutional controls, which consist of prohibiting grazing, prohibiting drilling of new wells for use of ground water, and ensuring that artesian well 648 continues to flow and that its water continues to discharge down Bob Lee Wash to the floodplain. UMTRCA authorizes the use of institutional controls to minimize the potential for risk to human health and the environment. DOE completed a Range Management Plan (DOE 2000b) that restricts grazing in the floodplain for a 5-year period during initial remediation. The Navajo Nation and affected grazing allottees entered into an agreement with DOE (DOE 1999), whereby DOE would compensate affected parties for loss of grazing rights during this period. Access to the floodplain is also controlled by the Navajo Nation and DOE for activities that may affect or be affected by UMTRA Project actions. DOE would also request that the Navajo Water Code Administration ensure that artesian well 648 be allowed to continue flowing directly into Bob Lee Wash, which discharges to the floodplain through a wetland area. The past 40 years of continuous flow from well 648 to the floodplain has flushed contamination from much of the floodplain to the north and northwest of the wetland at the mouth of Bob Lee Wash. Success of the proposed remediation for the floodplain will depend on well 648 continuing to flow. The time frame for institutional controls is projected to be between 10 and 30 years from the time the U.S. Nuclear Regulatory Commission concurs with the Ground Water Compliance Action Plan.

Any adjustments to this strategy will be incorporated during completion of the Ground Water Compliance Action Plan. Piping and the evaporation pond would be placed in areas that would not affect local activities and sensitive resources, including cultural resources and plant and animal species protected by federal and Navajo regulations. DOE would receive approval from the New Mexico State Engineer's Office if it is determined that water rights in the San Juan River could be affected.

DOE would conduct ground water and surface water monitoring during the period of pumping contaminated ground water from the floodplain. Table 3 in the Environmental Assessment identifies the monitoring locations, target analytes and monitoring parameters, and rationale. The proposed monitoring would be conducted semiannually for 5 years after pumping commences. For the second 5-year period (through year 10), monitoring would be conducted annually,

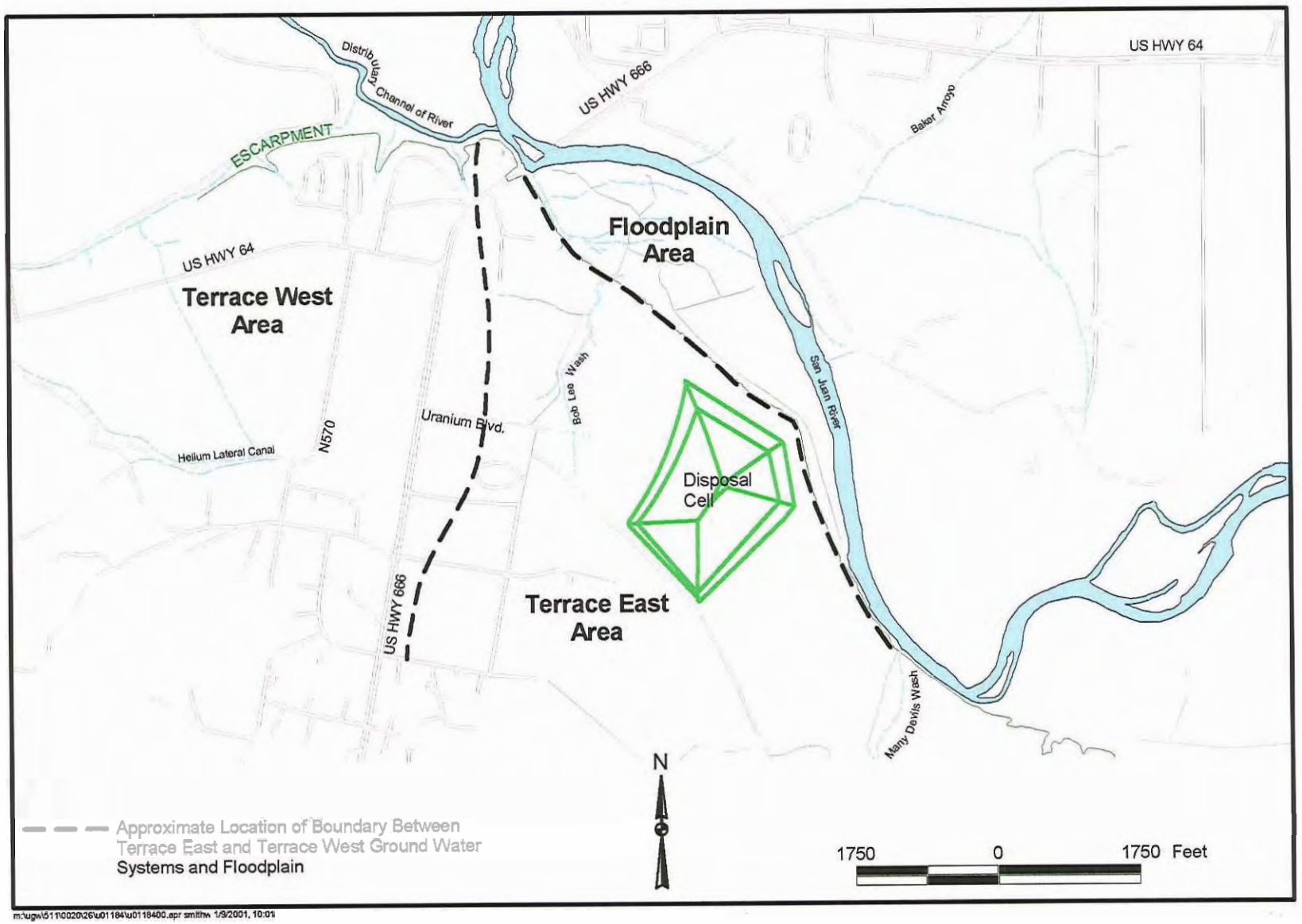

Figure 2. Floodplain and Terrace Areas at the Shiprock Site

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followed by sampling every 5 years or as necessary. Existing interim actions currently prevent exposure to contaminated ground water at seeps on the escarpment along the edge of the floodplain. During the initial 5-year period, DOE would evaluate the success of the active remediation phase of the floodplain compliance strategy based on decreasing concentrations of mill-related constituents.

Terrace East Compliance Strategy

Approximately 40 million gallons (123 acre-feet) of contaminated water is believed to remain in the terrace alluvium as a result of past milling operations. The proposed compliance strategy for terrace east is active remediation. The objective is to pump mill-related water out of the base of the alluvium and weathered Mancos Shale. The purpose of this action is to eliminate the exposure pathways that existed at the washes and seeps before the interim actions were in place. Success would be measured by demonstrating that the seeps have dried up. DOE would establish a system for measuring the flow from seeps draining into Bob Lee Wash and seeps 425 and 426 along the base of the escarpment. Baseline data collection would begin in 2001. Afterward, data would be collected two times per year during normal water sampling. Flows in the washes and from the escarpment seeps are anticipated to decline toward the end of the 5-year period.

Remediation will require the installation of at least two extraction wells and two french drains in the ground water system. The french drains would be constructed as interceptor trenches, that is, trenches excavated below the water table to intercept ground water flowing through the alluvium. The trenches would likely have a perforated pipe at the bottom and be partially backfilled with gravel or small rock to prevent soil from plugging the perforations in the pipe and to provide a flow path to the pipe. Water would be withdrawn from the wells and french drains at a total extraction rate of about 8 gallons per minute (gpm) and pumped through underground piping to the same lined evaporation pond used to spray-evaporate water extracted from the floodplain. The location of the piping would be determined during completion of the Ground Water Compliance Action Plan. The evaporation pond and piping would be placed in an area that would not affect humans and sensitive resources, including cultural resources and plant and animal species protected by federal and tribal regulations.

The time needed for completing terrace east remediation is estimated at 5 to 7 years. During this period, DOE would continue to monitor and evaluate the success of the active remediation phase. The ground water and surface water monitoring would be concurrent with pumping contaminated ground water from the terrace area. Table 4 of the Environmental Assessment describes the proposed monitoring locations, purpose, and target analytes. The monitoring would be conducted semiannually for the first 5 years after pumping commences. For the second 5-year period (through year 10), monitoring would be conducted annually, followed by sampling every 5 years or as necessary. Results of analyzing for mill-related constituents and major elements would be used to evaluate the extent and nature of any continuing sources of contamination.

DOE would develop a wildlife management plan that targets protection of sensitive species subject to federal and tribal regulations. The essential elements of the plan would include identifying species likely to occur in the area, monitoring requirements, and proposed mitigation

measures such as fencing and other appropriate controls that would reduce or eliminate wildlife contact with the pond. The plan would be developed in consultation with NFWD and USFWS.

Terrace West Compliance Strategy

The application of supplemental standards with monitoring is proposed for the terrace west. Supplemental standards are regulatory standards that are used instead of background concentrations, maximum concentration limits, or alternate concentration limits in situations where ground water meets at least one of eight criteria in 40 CFR 192.21. The criterion proposed for terrace west is that of "limited use ground water." Limited use means ground water that is not a current or potential source of drinking water because (1) widespread ambient contamination not related to milling activities exists that cannot be cleaned up using treatment methods reasonably employed in public water systems, or (2) concentrations of total dissolved solids are in excess of 10,000 milligrams per liter (mg/L), or (3) the surficial aquifer will not consistently produce 150 gallons per day (0.1 gpm).

After about 7 years of active remediation in the terrace east system, recharge from terrace east to terrace west should be hydraulically cut off, and the source of mill-related contamination would no longer affect the terrace west area. The types of monitoring proposed for the terrace west area are the same as those for the terrace east area. Monitoring locations, target analytes, and rationales are in Table 4 of the Environmental Assessment. Monitoring will be conducted to ensure that mill-related constituents do not affect water quality in terrace west and to confirm that certain constituents continue to be present because of leaching from Mancos Shale.

None of the proposed activities meet the criteria for a "major construction activity" within the context of NEPA or the Endangered Species Act. All proposed activities are being conducted to provide a long-term beneficial impact to human health and the environment.

Listed Species and Critical Habitat

Investigations, surveys, meetings, and discussions with NFWD and USFWS took place between 1997 and 2001. Ecosphere Environmental Services conducted surveys in August 1998 (Ecosphere 1998) and November 1999 (Ecosphere 1999) to evaluate the presence of listed species or critical habitat. Although biological assessments are required to address only species and habitat protected under the Endangered Species Act, NFWD species are also included in recognition of Navajo Nation sovereignty. Table 1 identifies species protected under the Endangered Species Act that may occur in the project area. The 1998 survey determined that one federally listed plant species, the Mesa Verde cactus (threatened), and one sensitive fauna species, the western burrowing owl, are known to exist in the terrace east project area. Some of the Mesa Verde cactus colonies have been fenced off by the Navajo Nation for protection. Western burrowing owl burrows have been located in several areas in the terrace east.

Table 1. Endangered Species Act Flora and Fauna That May Be Present in the Project Area[a]

Species	ESA Status/NFW Group[b]	Area of Site Likely to Occur	Presence Confirmed	Critical Habitat	Suitable Habitat	Comments
Mesa Verde cactus (*Sclerocactus mesae verdae*)	T/3	Terrace east	Y	N	Y	No construction or other activities will occur in Mesa Verde Cactus areas.
Bald eagle (*Haliaeetus leucocephalus*)	T/3	Floodplain	Y	N	Y	Known winter resident but none are currently nesting. Would hunt along the San Juan River.
Southwestern willow flycatcher (*Empidonax traillii extimus*)	E/2	Floodplain	N	N	Y	Suitable habitat is marginal to good and is limited to 1 or 2 isolated areas (less than 1 acre) along the San Juan River. No nests have been found.
Black-footed ferret (*Mustela nigripes*)	E/2	Floodplain and Terrace east	N	N	N	No prairie dog towns are present that would meet criteria for ferret presence.
Colorado pikeminnow (*Ptychocheilus lucius*)	E/2	Floodplain (San Juan River)	N	Y	Y	San Juan River is critical habitat.
Razorback sucker (*Xyrauchen texanus*)	E/2	Floodplain (San Juan River)	N	Y	Y	San Juan River is critical habitat.

[a]Based on surveys and investigations conducted by Ecosphere Environmental Services in 1998 and 1999.
[b]T = threatened, E = endangered as listed in the federal Endangered Species Act (ESA); 2 = Group 2, 3 = Group 3 as listed in the Navajo Endangered Species List. A Navajo Group 2 designation is equivalent to an ESA designation of Endangered, and a Group 3 designation is equivalent to an ESA designation of Threatened.

The Ecosphere surveys also identified marginal to good habitat in two areas of the floodplain for the southwestern willow flycatcher. Ecosphere documented the potential presence of this species in 1997 and 1998 on the basis of one to two "whitting" birds. However, no nests have been located. The San Juan River is designated critical habitat for two endangered fish species: the Colorado pikeminnow and the razorback sucker. The survey included a letter (dated August 3, 1998) from the NFWD identifying a comprehensive list of Navajo Nation species of concern, including the species protected under the Endangered Species Act. Table 2 shows the other sensitive species that are known to occur in the region, although their presence in the project area has not been confirmed. A determination of effect is not required for these species and is provided here as information only. None of the species identified have been observed in the project area, and if any are present, they would not be adversely affected by the proposed action.

The 1999 wildlife survey was undertaken to respond to NFWD and USFWS concerns that threatened and endangered species may inhabit the San Juan River, the floodplain, a designated wetland (Figure 3), and Bob Lee Wash. Copies of the 1998 and 1999 surveys were provided to the NFWD and USFWS. The NFWD was consulted in October 1998 to determine potential species of concern west of U.S. Highway 666 in the terrace west area. The consultation was undertaken to complete additional well installation and characterization in that area. By letter dated November 4, 1998, the NFWD provided DOE with a list of Navajo Nation species of concern. No additional species were identified. For protection purposes, NFWD has requested by letter that specific locations of species of concern not be disclosed.

Table 2. Other Sensitive Species That May Exist in the Project Region

Species of Concern	Federal Status[a]	Navajo Status[b]	Observed	Comments
Rough-legged hawk (*Buteo lagopus*)	MBTA	None	No	Known winter resident in Shiprock area. May hunt in the project area.
Golden eagle (*Aquila chrysaetos*)	MBTA, EPA	Group 3	No	No observations to date. May hunt in the project area.
Ferruginous hawk (*Buteo regalis*)	MBTA	Group 3	No	Known to occur in the region. May hunt in the project area.
Mountain plover (*Charadrius montanus*)	MBTA	Group 4	No	No observations to date. Known to occur in the region in terrace areas. May be limited by human disturbances.
Peregrine falcon (*Falco peregrinus*)[c]	MBTA	Group 3	No	No observations to date. Known to occur in the region. May hunt in this area as an occasional visitor. No suitable nesting sites available.
Roundtail chub (*Gila robusta robusta*)	None	Group 2	No	San Juan River. Suitable habitat exists.
Pronghorn antelope (*Antilocapra americana americana*)	None	Group 3	No	No observations to date. Known to occur in the region. Unlikely to occur in the project area due to human disturbances.
Northern leopard frog (*Rana pipiens*)	None	Group 3	No	Known to occur within 3 miles of the site.

[a]MBTA = Migratory Bird Treaty Act; EPA = Eagle Protection Act.
[b]Navajo Nation Endangered Species List; Groups 1–3 are protected, Group 4 is not.
[c]Delisted from the federal Endangered Species Act in August 1999.

In June 2000, NFWD requested DOE to conduct a comprehensive survey and inventory of Mesa Verde cactus in the terrace east area. The survey was requested based on DOE's need to drill a monitoring well in the Mesa Verde cactus protected area. DOE agreed to conduct the survey because the original survey and population data were more than 10 years old. Results of the survey and locations of populations are documented in the *Shiprock Mesa Verde Cactus Survey and Monitoring Report* (DOE 2000b).

Effects of the Action on Listed Species and Critical Habitat

In determining the potential effects of a proposed action on federally listed species and habitat, several factors must be evaluated. First, the sources and causes of effects must be considered. The location, duration (short-term and long-term), intensity (or degree) of effect, time of year, and cumulative effects are also important factors. Location is critical to determining which species and critical habitat may be present. Of the species addressed in this assessment, six have been evaluated due to the presence or potential presence of a listed species or critical habitat in or near the areas of proposed remedial action. Those six species listed are the Mesa Verde cactus, bald eagle, southwestern willow flycatcher, black-footed ferret, Colorado pikeminnow, and the razorback sucker (Table 1). Critical habitat is included for both endangered fish.

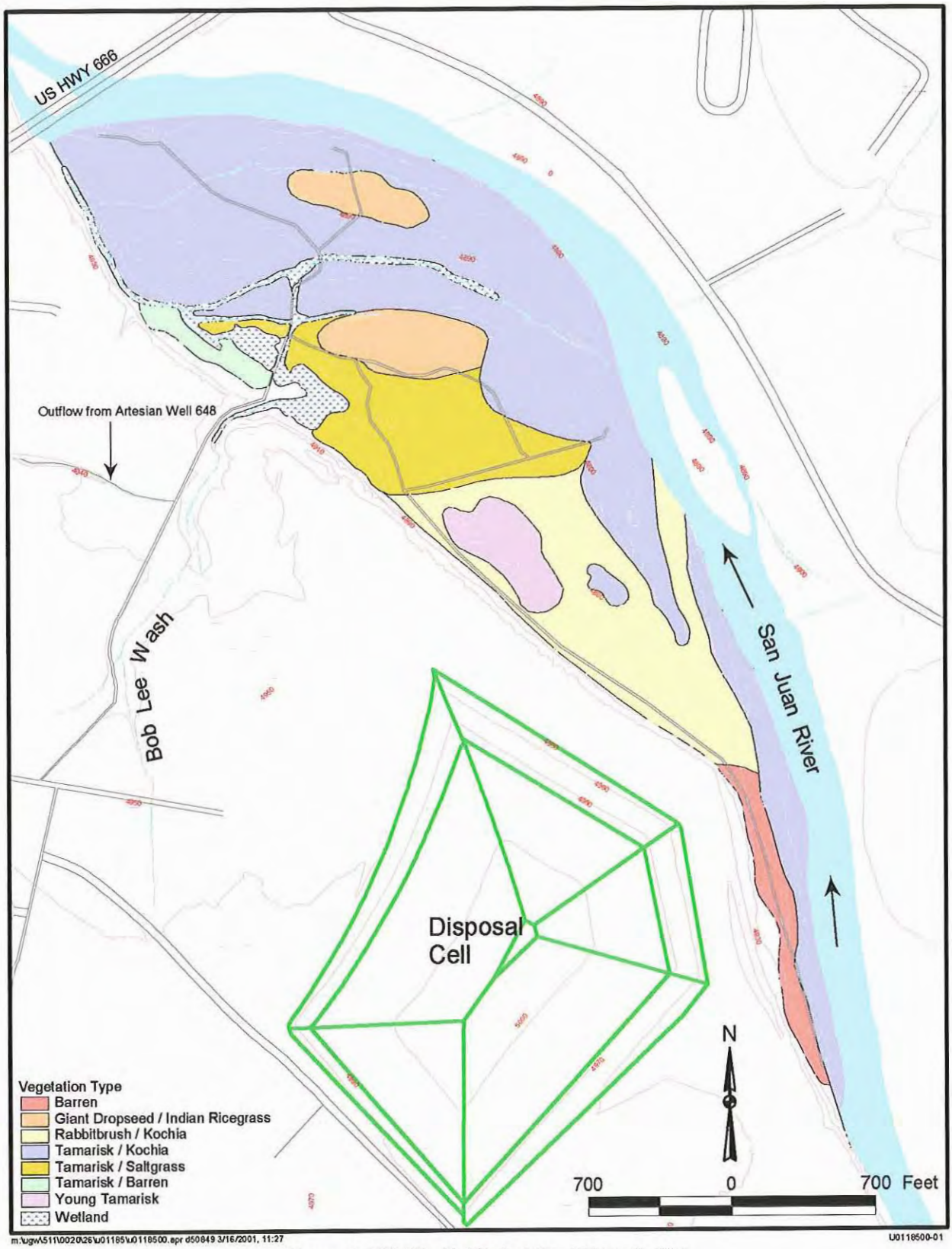

Figure 3. Wildlife Habitat at the Shiprock Site

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The objective of the proposed remedial action is to reduce risk to human health and the environment. DOE has determined that concentrations of some mill-related constituents in ground water exceed EPA standards or may present risks to ecological receptors. The USFWS acknowledges that ecological risks at the site have diminished as a result of surface remediation, but the agency has concerns that potential threats to federally listed threatened and endangered species and critical habitat may still exist (letter February 29, 2000, identified as consultation number Cons. 2-22-00-I-169). The letter included a comprehensive discussion of concerns and recommendations related to potential ecological risks at the site.

To minimize risks to livestock and wildlife, including listed and sensitive species, DOE completed several interim actions in November 2000. These included fencing and netting to eliminate access to contaminated seeps and surface water. Interim actions were implemented in upper Bob Lee Wash, lower Many Devils Wash, and escarpment seeps 425 and 426. The long-term remediation strategy for both washes and seeps 425 and 426 is to deplete the ground water system in terrace east and cut off all flow to the seeps and washes.

DOE believes that the following interim actions, combined with the proposed remedial actions, address USFWS concerns and will have a beneficial effect on listed and sensitive species and critical habitat.

Interim Actions at Bob Lee Wash

- A fence was installed around the perimeter of the upper part of the wash to keep livestock and large animals from entering the wash and to minimize human access.

- Riprap was placed in low areas of the main drainage where water had ponded to minimize access by birds and small mammals. A woven geotextile was first placed on the surface in the ponded areas to stabilize the soil under riprap loading. Small aggregate was placed over the geotextile, and a geogrid was placed over the aggregate to provide a barrier that prevents small animal access to the water. Large riprap was then placed over the geogrid.

Interim Actions at Many Devils Wash

- A fence was installed in the main wash at the confluence of the East Fork, along the west side of the wash on the terrace above, and along the east side of the wash at access points. The fencing prevents livestock and larger mammals from entering the wash area. A fenced corridor was placed on the siltstone bed at a knickpoint to allow livestock to cross the wash.

- A drainpipe was installed in a shallow trench cut through the siltstone bed at the knickpoint to prevent livestock and wildlife from drinking the contaminated water while using the fenced corridor.

- Riprap was placed in the bottom of the wash in all areas above and below the knickpoint where water has ponded to minimize access by birds and small mammals. A woven geotextile was first placed on the surface in the ponded areas to stabilize the soil under riprap loading. Small aggregate was placed over the geotextile, and a geogrid was placed over the aggregate

to provide a barrier that prevents small animals, including birds, from coming into contact with the water. Larger riprap was then placed over the geogrid.

Interim Actions at Seeps 425 and 426

A chain link fence was constructed around both seeps, and 1-inch mesh netting was placed over the top of each fenced area to prevent birds from accessing the seep water. This action was recommended by USFWS.

Remediation goals, such as reduction in contaminant concentrations, must be achieved while minimizing or eliminating short-term adverse effects such as noise and habitat removal associated with construction, operation, and maintenance of the remedial action components.

Construction

The use of drilling and excavating equipment to install wells, construct the evaporation pond, and dig trenches for buried PVC lines to transport water to the evaporation pond could cause short-term physical disturbances such as habitat removal and noise in the floodplain and terrace east areas.

No effects are anticipated to the Mesa Verde cactus, which is located only in the terrace east area of the project site. Much of the area is already fenced off to protect the cactus, and DOE and NFWD would participate in annual monitoring. DOE would conduct surveys and perform monitoring wherever construction activities may be within 50 feet of this species. DOE has conducted extensive surveys in the area to determine cactus locations and populations and has historically maintained good communication and rapport with NFWD concerning protection of this species.

No effects are anticipated to the bald eagle because it does not routinely use the project site area. No nests have been sighted and there is no evidence that the eagle has historically nested in the area. Potential nesting habitat is marginal and is limited to larger cottonwoods close to the river.

The southwestern willow flycatcher, if present, would be the species with the greatest potential to be affected during construction in the floodplain. To eliminate potential risk to the flycatcher, DOE would not perform construction activities during breeding periods (April 15–July 30) within 200 yards of suitable habitat. The isolated locations in the north part of the floodplain that present marginal to good suitable habitat would not be disturbed during construction activities. Construction in the terrace area would not affect the flycatcher because the terrace area has no suitable habitat for roosting and nesting.

Because the likelihood that the black-footed ferret inhabits the project area is remote, no effect to this species is anticipated.

Construction activities would not adversely affect the Colorado pikeminnow, razorback sucker, or critical habitat because no activities would occur in or near the San Juan River.

Operation and Maintenance

Following construction, operation and maintenance activities in the floodplain, terrace east, and terrace west would be limited to well monitoring, sampling, and field analyses. These activities involve short-term and minimal disturbances such as low-level noise and small vehicles, and none of the six species, or critical or suitable habitat, would be adversely affected.

In the terrace east area, concentrations of some contaminants in the evaporation pond could pose risks to protected wildlife species during the 5- to 7-year active remediation period. Dissolved solids in the evaporation pond would take an estimated 3 to 5 years to reach concentrations that pose a risk to wildlife receptors. Potential risks would be associated with ingestion of contaminated water and direct contact. Of the six protected species, only the bald eagle and southwestern willow flycatcher would potentially have access to the pond. However, use of the pond by either species would be limited by lack of suitable habitat nearby for nesting, feeding, and roosting. The San Juan River is adjacent to suitable habitat, and both species are much more likely to frequent the floodplain area and use water from the river and wetland.

To eliminate or further reduce potential risk from ingestion of pond water, DOE will prepare a wildlife management plan similar to the one developed for the Tuba City UMTRA Project site. That plan was developed jointly by DOE, USFWS, and NFWD, and commits to further investigations, monitoring the pond, and management actions as necessary. The plan will address both sensitive species and species protected under the Endangered Species Act.

Effects of Existing Contaminants

Current concentrations of contaminants in some areas of the site could present risks to wildlife. The proposed remediation strategies and interim actions are designed to minimize or eliminate existing risks to ecological receptors, including listed and sensitive species. The proposed action would create no new risks. The contaminants identified in elevated concentrations in surface water, sediments, or soils that create potential risks are ammonium, manganese, nitrate, selenium, strontium, sulfate, and uranium. The only medium of concern is surface water.

Results of the ecological risk assessment (Section 6.2 of the SOWP [DOE 2000a]) indicate that mill-related constituents are not affecting the Mesa Verde cactus. No complete exposure pathway, such as root uptake, exists to expose this species to contaminated ground water.

Contaminants that currently pose a low to medium potential risk to the Colorado pikeminnow and razorback sucker are selenium, sulfate, and uranium. These risks are not widespread and would be of primary concern to fry in backwaters and eddies.

The only contaminant that could pose a medium to high risk to the southwestern willow flycatcher is selenium in seeps in the floodplain and Many Devils Wash. The exposure pathways for the flycatcher are ingestion of surface water and food sources. No avian benchmarks were available, so mammalian benchmarks were used. Existing concentrations of contaminants would not adversely affect the bald eagle or the black-footed ferret, if present.

The assessment of potential risk assumes that the receptor uses contaminated media as the sole source of ingestion; also, the assessment does not account for interim actions completed in November 2000, which are anticipated to significantly reduce the potential for adverse effects. Section 6.2 of the SOWP and Section 4.8 of the Environmental Assessment provide the rationale for determining potential risks; SOWP Section 6.2 provides a site conceptual model and food web for ecological receptors.

Cumulative Effects

An evaluation of cumulative effects addresses the effects of DOE's proposed actions relative to other (unrelated) present and future activities at the site. Because DOE is not proposing remedial action in the terrace west area, only the floodplain and terrace east areas are discussed.

Floodplain

Historically, allottees authorized by the Navajo Nation have used the floodplain for grazing. Since 1986, DOE and the Navajo Nation have restricted grazing on approximately 103 acres of the floodplain. This restriction has resulted in considerable improvement to wildlife habitat throughout the floodplain and the 5-acre wetland at the mouth of Bob Lee Wash. DOE has reached an agreement with the Shiprock Chapter to continue to prohibit grazing for an additional 5 years during active remediation. Following this period, it is DOE's understanding that the area will be returned to grazing at the request of the allottees. The short-term positive effect would cease once the area is returned to grazing, and the value of the floodplain and wetland area as wildlife habitat would probably diminish to historical (pre-1986) levels. Limited flycatcher habitat and nesting sites would likely be adversely affected by grazing. Livestock using the wetland as a drinking water source would also deplete the wetland habitat. These concerns have been addressed among DOE, NFWD, USFWS, and Navajo EPA. DOE has suggested that approximately 8 acres of key habitat and sensitive areas (e.g., wetland) within the floodplain be protected by fencing or other means following active remediation. However, that decision is independent of DOE's proposed action and would be made by Navajo Nation authorities.

Artesian well 648 flows to the east into Bob Lee Wash and accounts for most of the surface water in the wash. Discharge from well 648 was measured at approximately 64 gpm. This well was constructed in a deeper aquifer that was not affected by mill-related contaminants. However, the well water contains elevated levels of naturally occurring constituents, including sulfate (2,000 mg/L). Apparently healthy populations of frogs and minnows have been observed in the flow from well 648 on numerous occasions. In fall 1999, a small pond was constructed just south of the outflow ditch; the pond diverts some of the water from flowing directly into Bob Lee Wash. Navajo EPA and Navajo Water Code authorities are attempting to determine who constructed the pond and whether all water will be redirected to Bob Lee Wash. If water is not redirected, the wetland could accumulate contaminants until active remediation in the terrace cuts off contamination feeding the wash. Because of the redirection of flow to the wetland, it is possible that the existing wetland could change in shape or size over time.

Terrace East

The east and southeast portion of the terrace east area is sparsely developed with scattered residences and grazing. This area is where the Mesa Verde cactus has been observed. Cumulative effects in this area would be negligible.

The terrace area directly south of the floodplain is well developed and includes the disposal cell and the Navajo Engineering and Construction Authority (NECA) facility. Southeast of the disposal cell is the fenced NECA gravel pit, which extends nearly to the mouth of Many Devils Wash and includes gravel mining and crushing equipment. South of the disposal cell is the fenced radon cover borrow pit. West of the fenced NECA facility is the Shiprock fairgrounds area, which is the site of the annual Northern Navajo Shiprock Fair. Due to the nature and extent of existing and planned human disturbances, this area is not anticipated to be suitable habitat for any of the species discussed in this biological assessment. Any adverse effects resulting from remedial action would be negligible compared to the effects of ongoing activities. The long-term cumulative effect of remediation would be positive.

Determination of Effects

The ecological risk assessment determined that current concentrations of contaminants could adversely affect the razorback sucker, Colorado pikeminnow, and southwestern willow flycatcher. DOE's proposed actions, combined with existing interim actions, would mitigate or eliminate risks to all six listed species and critical habitat in the long-term, resulting in a beneficial effect. During remediation, planned mitigations and management practices will result in no adverse effects to any of the six listed species located close to construction activities and operation of the evaporation pond. Table 3 summarizes the effects construction activities would have on the listed species.

Table 3. Effects of Remedial Action Construction, Operation, and Maintenance Activities

Species	Area Likely to Occur if Present in Project Area	Short-Term Effect	Long-Term Effect
Mesa Verde cactus	Terrace east	No effect	No effect
Bald eagle	Floodplain	No effect	No effect
Southwestern willow flycatcher	Floodplain	No effect	Beneficial
Black-footed ferret	Terrace east	No effect	No effect
Colorado pikeminnow	Floodplain (San Juan River)	No effect	Beneficial
Razorback sucker	Floodplain (San Juan River)	No effect	Beneficial

Therefore, DOE requests USFWS concurrence that the proposed action may affect, but is not likely to adversely affect, any of the six listed species or critical habitat, subject to implementation of the wildlife management plan. This plan would address short-term management actions that are designed to minimize the potential for adverse effects to protected species.

References

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