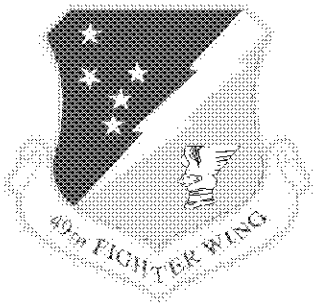
Final
Environmental Assessment



Repair Bonito Pipeline
Otero and Lincoln Counties, New Mexico

August 2001

49 CES/CEV
Holloman Air Force Base
HQ ACC/CEVP

ACRONYMS AND ABBREVIATIONS

AFB	Air Force Base
AFI	Air Force Instruction
ARMS	Archaeological Records Management System
BEA	Bureau of Economic Analysis
BLM	Bureau of Land Management
BMP	Best Management Practice
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CO	carbon monoxide
CWA	Clean Water Act
dBA	A-weighted decibels
DE	Declaration of Excess
DoD	Department of Defense
EA	Environmental Assessment
EBS	Environmental Baseline Survey
EIAP	Environmental Impact Analysis Process
EO	Executive Order
EPA	Environmental Protection Agency
ERIS	Economic Resource Impact Statement
ESA	Endangered Species Act
FHWA	Federal Highway Administration
FY	fiscal year
m^2	square meters
mgd	million gallons per day
MSL	mean sea level
NAAQS	National Ambient Air Quality Standards
nd	no date
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NM	New Mexico
NMAAQS	New Mexico Ambient Air Quality Standards
NMCRIS	New Mexico Cultural Resources Information System
NMED	New Mexico Environment Department
NMDGF	New Mexico Department of Game and Fish
NMSHTD	New Mexico State Highway and Transportation Department
NO_2	nitrogen dioxide
Nox	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
O_3	ozone
OSHA	Occupational Safety and Health Administration
Pb	lead
PM_{10}	particulate matter less than 10 micrometers in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
ppm	parts per million
PSD	prevention of significant deterioration
ROW	right(s)-of-way
SCAQMD	South Coast Air Quality Management District
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO_2	sulfur dioxide
SOx	sulfur oxides
SWPPP	Stormwater Pollution Prevention Plan
TSP	total suspended particulates
$\mu g/m^3$	micrograms per cubic meter
USAF	U.S. Air Force
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
UTM	Universal Transverse Mercator
VOC	volatile organic compound
WSMR	White Sands Missile Range

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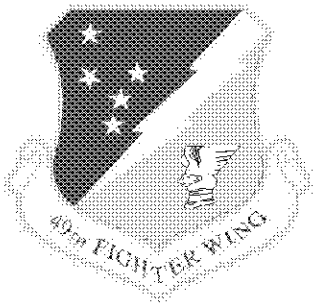

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FINDING OF NO SIGNIFICANT IMPACT AND FINDING OF NO PRACTICABLE ALTERNATIVE

1.0 NAME OF PROPOSED ACTION

Repair Bonito Water Pipeline, Otero and Lincoln Counties, New Mexico.

2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

The U. S. Air Force proposes to repair the Bonito water pipeline, located in Otero and Lincoln Counties, New Mexico. This pipeline, which lies within easements conveyed to the U. S. Air Force (AF), extends about 66 miles from Nogal, New Mexico to the La Luz reservoir in Alamogordo, New Mexico. Since its construction in the 1950's, the concrete and steel pipeline has corroded and weakened due to corrosive soils and high pressures on the line. While most of the line is located within highway and railroad rights-of-way (ROW), some portions pass on AF easements, across private property. When originally constructed, most of this private property was undeveloped, but some now have areas planted and structures erected over and adjacent to the line.

This proposal involves placing about 40 miles of new pipe, adjacent to the existing pipe. This 40-mile stretch of line, from La Luz to Oscura, has experienced the most damage due to higher head pressure. The remaining 26 miles of pipeline (Oscura to Nogal) would have spot repairs conducted and a cathodic protection system installed to inhibit corrosion and extend the life span of the pipe. Where permitted, the old pipe would be left in place and new pipe installed, parallel to the existing one.

Along with the Proposed Action, two alternatives to repair the Bonito water pipeline were analyzed in detail: (1) the No Action Alternative, and (2) repairing the pipeline using the existing alignment only (Existing Alignment Alternative).

3.0 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

The Environmental Assessment (EA) provides an analysis of potential environmental impacts resulting from implementing the Proposed Action or either one of the alternatives. Ten resource categories were evaluated in detail to identify potential environmental consequences. Resource categories discussed in the EA are earth resources, water resources, air quality, biological resources, cultural resources, land use, aesthetics, solid waste, socio-economics, and environmental justice.

Under the No Action Alternative, environmental impacts from new pipeline construction would not occur. If the existing pipeline continues to be used without necessary repairs, extensive surface water loss from pipeline failures would also continue. Additionally, inefficient distribution of surface water by the existing pipeline would result in supplemental water needs being met via ground water from wells and the local aquifer. Because Bonito surface water supplies replenish at a much faster rate than the aquifer, continued dependence on groundwater could result in long-term impacts to water resources.

Earth Resources. Potential for soil erosion exists for either the Proposed Action or the Existing Alignment Alternative. Approximately 320 acres of ground would be bladed bare during the new pipeline installation, however, not all of this area would be disturbed at any one time. Control measures such as minimizing the length of open trenches and stabilizing backfill, using erosion control matting, and placing rows of plastic covered straw bales would be implemented to minimize impacts.

Water Resources. The Proposed Action and Existing Alignment Alternative would occur in floodplains (no wetlands), potentially crossing over or under four large and numerous small drainages. Construction procedures to minimize surface water impacts such as those listed in the Earth Resources subsection would be detailed in the Stormwater Pollution Prevention Plan. This Plan, prepared by the construction contractor, is required to comply with the National Pollution Discharge Elimination System and Section 404 requirements under the Clean Water Act.

Air Quality. The proposed construction is located in an area which is in attainment for all criteria pollutants and, therefore, does not require a conformity determination.

Approximately 16 tons of carbon monoxide (CO), 3 tons of volatile organic compounds (VOC), 8 tons of nitrous oxide (NOx), 0.2 tons of sulfur dioxide (SO_2), and 6 tons of particulate matter less than 10 microns in size (PM_{10}) would be generated each year over a two-year construction period in either the Proposed Action or the Existing Alignment Alternative. Emissions include those generated from ground disturbance, construction equipment, concrete disposal and worker travel. CO emissions under the proposal would comprise 0.06% and 0.15% of the CO, 0.06% and 0.24% of the VOCs, 0.2% and 0.59% of the NOx, 0.08% and 0.18% of the SO_2, and 0.02 and 0.04% of the PM_{10} generated per year in Otero and Lincoln Counties, respectively. These emissions are low in comparison to those generated each year in Otero and Lincoln counties and would not result in exceeding National Ambient Air Quality Standards.

Visibility in the vicinity of the project work area may be reduced due to fugitive dust generated during construction, however, it would be minor and short term in nature. Additionally, impacts would be minimized by implementing measures such as limiting ground disturbing construction during windy time periods and wetting down of soils throughout the construction project.

Biological Resources. Approximately 150 acres of Chihuahuan Desert shrubland would be temporarily altered or unavailable as wildlife habitat during construction activities under the Proposed Action or Existing Alignment Alternative. This impact would be minimal as creosote bush and mesquite shrublands, the most common plant community type in the Chihuahuan Desert would regenerate once construction was completed. Additionally, reseeding of disturbed areas would occur.

Surveys identified no threatened, endangered, or sensitive species or habitats in the project area.

Cultural Resources. During consultations with the New Mexico State Historic Preservation office (SHPO), the AF provided field survey and records research data identifying 32 recorded sites in the vicinity of the proposed Action and Existing Alignment Alternative. Twenty of these are not in the affected project area. The 12 remaining sites include five which have been previously excavated and appear extensively disturbed. The AF has recommended to the SHPO

that no further work be done to these sites. Field surveys normally are limited to ground surface investigations. While it is not anticipated, there is a possibility that excavation of the pipe trench could reveal subsurface artifacts. Therefore, the AF would require the pipeline replacement contractor provide a federal and state permitted archaeologist on site to monitor construction and conduct artifact recovery if necessary.

Land Use. The majority of pipeline repairs and replacement would occur in roadway and railroad ROW. Therefore, land use would be consistent with current use for both the Proposed Action and the Existing Alignment Alternative. When the alignment would pass through or adjacent to private property, construction could affect about 245 productive pecan trees (about 0.3% of the pecan orchards in Otero County). This could be avoided if the landowners allow the pipeline to remain in place.

Aesthetics. In both the Proposed and the Existing Alignment Alternative, the majority of disturbance would occur in existing transportation corridors already modified by man-made features. Alterations in the visual environment from construction would be noticeable to residents located on or adjacent to the pipeline, however, they would be short term and not change the overall, scenic quality of the landscape. Noise from construction activities and pipe crushing would be loud but short term. Pipe crushing would not occur in residential areas.

Solid Waste. Under the Proposed Action, an estimated 530 tons of chip seal or asphalt, 1,550 tons of base course material, and 25,600 tons of existing pipeline would be removed over a two-year period. A similar volume of waste would be generated under the Existing Alignment Alternative. The Lincoln-Otero Regional landfill has adequate capacity for this amount of waste material. The landfill's remaining service life could be reduced by about five months (less than 3.0%).

Socioeconomics. Approximately 176 directly related jobs could be generated under either the Proposed Action or the Existing Alignment Alternative. However, these jobs could be filled from either the local workforce or by workers who temporarily relocate to the area for the project's duration. The local economy would additionally benefit from expenditures on supplies, with over 18 million in earnings generated from the project over an 18 to 24 month time period. This is a 36% increase in construction sector earnings over Otero and Lincoln Counties 1998 construction sector earnings of 66 million dollars.

Environmental Justice. This action would not disproportionately impact low income minority populations. The proposed action and existing alignment are located within the same region of influence (Otero and Lincoln counties, New Mexico) With the exception of a six mile corridor across private land, the pipeline would continue to be located on public property. Under the proposed action, the old pipeline would be left in place or removed. New pipeline would be installed along newly established public property corridors and existing easements across private property would be canceled. Under the existing alignment alternative, the old pipeline would be removed and new pipeline installed in its place. Under either the proposed action or the existing alignment alternative, any disturbance to private land or structures along the six mile corridor would be returned to a like or better condition.

4.0 CONCLUSION

On the basis of the findings of the Environmental Assessment, no significant impact to human health or the natural environment would be expected from implementing either the Proposed Action, the Existing Alignment Alternative, or any alignment that is a combination of the Existing Alignment and the La Luz Option, Alamorosa Option One, Alamorosa Option Two, and/or the Tularosa Overpass Option. Therefore, issuance of a Finding of No Significant Impact is warranted, and preparation of an Environmental Impact Statement, pursuant to the National Environmental Policy Act of 1969 (Public Law 91-190) is not required.

Pursuant to Air Force Instruction 32-7064 (Integrated Natural Resources Management), and Executive Order 11988 (Floodplain Management), and taking the above information into account, I find that there is no practicable alternative to this action and that the action alternatives include all practicable measures to minimize harm to floodplain environments.

Donald G. Cook

DONALD G. COOK
Lieutenant General, USAF
Commander, Air Combat Command

August 30, 2001

DATE

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY

Background

The Air Force is proposing to repair the Bonito water pipeline in Otero and Lincoln Counties, New Mexico. The pipeline extends about 66 miles from a metering station located in Nogal, New Mexico to the La Luz reservoir on the north side of Alamogordo, New Mexico. The pipeline was originally constructed in the 1950s by Holloman Air Force Base (AFB) in exchange for half of Alamogordo's right to the water in Bonito Lake. This pipeline, when fully operational, supplies half of the water supply for Holloman AFB and about one fifth of the water for the City of Alamogordo (Alamogordo).

The pipeline lies within easements conveyed to the Air Force. It is located mostly within highway and railroad rights-of-way (ROW), but some portions pass through private property. When it was originally constructed, little of the private property was occupied or developed. Since then, planted areas, driveways and structures have been developed over and adjacent to the line and some of the land has been used for agriculture and other rural uses.

Description of the Proposed Action

Under the Proposed Action, it is estimated that up to 40 miles of the pipeline would be replaced from La Luz to Oscura. This section of the line experiences the most frequent failures. Construction would begin in Spring 2002 and continue for 18 to 24 months. Spot repairs would be performed on the remainder of the pipeline to Nogal, and a cathodic protection system would be installed that would inhibit corrosion and extend the service life of the pipe.

In most locations, it is proposed to remove the old pipe and replace it with new. However, where permitted, the old line would be left in place and a new line installed parallel to the existing one. Construction activity would involve about 40 miles of trenching for pipeline removal and replacement. Trenches would generally be six feet wide and six feet deep. At stream crossings the pipeline would either pass under the stream or be suspended above it. Trenches would generally be deeper and wider at stream crossings. Soil from the trench would be used to backfill over the new pipeline. Construction, stockpiling of soil, and grading would take place in a 50-foot wide work area along the pipeline alignment. Techniques for replacing existing pipeline may also include slip-lining existing pipe, pipe bursting, and boring under existing highways and the railroad. Where the existing pipe traverses private property, the pipe could be left in place if agreed to by landowners. Removed pipe would be taken to the regional landfill or recycled. Pipe may be crushed to reduce its volume or to separate concrete and steel material.

To install the cathodic protection system, holes would be dug at each pipe section (every 33 feet) to reveal the joint. A strap would be attached to connect the steel in adjacent sections together, forming a continuous electrical bond. An underground electric cable would connect the pipe to anode beds placed every one or two miles. Constructing anode beds involves drilling a 6-inch diameter hole to a depth of 200 to 300 feet. The hole is filled with anodes, packed with a carbon material and sealed. The anode bed is linked to a rectifier in a metal panel box located to the side of the bed. A rectifier connects the deep well anode bed to the bonded pipe. An impressed electrical current counteracts the normal electrolytic current, thereby reducing the rate of corrosion.

Optional alignments are proposed to by-pass about 6.4 miles of the existing alignment that crosses private property. The new alignments would all be located along and within county and state highway public ROW.

Several measures would be taken to reduce construction impacts in compliance with state and federal regulations. Both National Pollutant Discharge Elimination System (NPDES) and Section 404 permits would be acquired prior to construction, and a Stormwater Pollution Prevention Plan (SWPPP) would be developed. These would specify control measures to minimize erosion and sedimentation during construction. Where property or infrastructure is damaged or removed, it would be repaired or reinstalled using similar structures and products.

Purpose and Need for the Action

The purpose of the project is to replace part of the Bonito pipeline and to do spot repairs and install cathodic protection on the remainder. Some alternative alignments are also being considered in order to avoid replacing the pipeline where it bisects private property. As additional funds become available, the entire line from Nogal to the La Luz reservoir may be replaced. Environmental analysis would be supplemented, as needed, in the future.

Since its construction in the 1950s, the concrete and steel pipeline from Nogal to La Luz has corroded and weakened at varying rates due to corrosive soils and high pressures on the line, and has washed out at low water crossings. Failures (leaks and blowouts) have become very frequent since the mid 1980s. These have required spot repairs, and on occasion shutting down the line. When this happens, Holloman AFB relies on wells and uses more groundwater, depleting the aquifer at a rate faster than it naturally recharges. Sometimes, leaks have caused damage to property from surface and underground flooding. The Air Force is concerned about future failures that could result in further loss and damage.

With these concerns, the Air Force submitted a funding request to replace the line. Congress recently appropriated $18 million, a portion of the funds needed to replace the entire pipeline.

Alternatives to the Proposed Action

In addition to the Proposed Action, two alternatives are being considered: one that would replace pipeline in the existing alignment only (Existing Alignment Alternative); and the other, taking no action (No Action Alternative).

Environmental Impacts of the Proposed Action

As required by the National Environmental Policy Act, this environmental assessment evaluates the potential environmental impacts associated with the proposed pipeline repairs. The findings for each resource area are described below.

Earth Resources. Implementing control measures of the SWPPP would minimize potential for soil erosion. Best Management Practices (BMPs) identified by the New Mexico Environment Department would be used for the project.

Water Resources. Because both NPDES and Section 404 permits would be obtained and would include control measures to limit erosion and sedimentation in drainages, no exceedances of water quality standards are anticipated. There are no wetlands in the project area. The pipeline

may be buried in three intermittent streams with sizeable floodplains and some smaller drainages. Using BMPs, impacts to floodplains would be minimal.

Air Quality. There are likely to be short-term localized adverse effects on air quality from dust. An estimated 11.2 tons of particulate matter with a diameter of 10 microns or less (PM_{10}) would be generated over two years. However, standard control measures would maintain PM_{10} emissions below significant levels. All other criteria pollutants would also be below significant levels.

Biological Resources. Construction activities would disturb soil and vegetation. However, effects on wildlife habitat would be minimal because most of the affected areas have already been considerably altered from natural conditions. About 150 acres of Chihuahuan Desert shrubland would be altered or removed but this is not considered a significant impact because these shrublands occur along the heavily traveled U.S. 54, which potentially limits their usefulness as wildlife habitat. Field surveys were conducted to determine if any threatened, endangered, or sensitive species or habitats are present in the project area. Given the time of year, many plant types were not easily identifiable. Follow-up surveys conducted by the Air Force in appropriate seasons found no listed or sensitive species along the ROW.

Cultural Resources. Recent records research found that fieldwork, primarily for the NMSHTD, had identified 29 cultural resources sites in the vicinity of the Proposed Action and alternatives. New field surveys of all previously unsearched areas identified three more sites, and updated the description of one previously recorded site. Of the total 32 sites in the vicinity, only 12 are actually in the area that would be impacted by the pipeline repair project. Of those 12, one is a wire fence and wood-enclosed historic grave, which would be avoided by the pipeline repair. One is an historic artifact cluster, where in-field recording has exhausted the information potential. The third is an extensive trash dump on the south edge of Carrizozo, which has been reworked by multiple episodes of pipeline construction. The fourth and fifth are prehistoric sites, which have been excavated at the request of the NMSHTD. No further work is proposed at those five sites. The remaining seven sites have artifact scatters or features near the proposed pipeline repair, but no intact remains are apparent in the area of direct affect. In whole extent, each of these sites appears potentially eligible to the National Register of Historic Places. However, the actual areas of proposed effects have been reworked multiple times by previous episodes of highway and pipeline construction and repair, obscuring any surface evidence that may have been present. To record the actual effects of pipeline repair, or lack thereof, the construction activities within these seven sites would be monitored by a state and federally permitted archaeologist, to record and recover any intact subsurface remains affected by the Proposed Action.

Land Use. In general, pipeline replacement, repair, and removal would occur mostly in roadway and railroad ROW. Use of these corridors for public infrastructure would not be altered. Where the alignment passes through, or is adjacent to, private property, driveways, landscaping, and other property improvements may be damaged. During construction, residents and businesses may experience inconvenience from loss of direct access, rerouting of traffic, dust, noise, and changes in the visual surroundings. These effects would be temporary and have no permanent impact on land use. About 4,450 linear feet of pecan orchards (and an estimated 245 trees) may be disturbed by pipe removal. These impacts could be avoided through the agreements that allow

the unused pipe to remain in place. This impact would not be avoided under the Existing Alignment Alternative.

Aesthetics. Most of the pipeline disturbance would occur in transportation corridors that are already modified by manmade features. There would be short-term alterations in the foreground visual environment from construction work. These changes would be noticeable to residents who are located on or adjacent to the pipeline, but at greater distances they would not be apparent nor change the overall scenic quality of the landscape. No long-term changes to the visual environment are expected. Noise from equipment during construction and pipe removal would be short-term and would not result in permanent incompatible conditions.

Solid Waste. The Lincoln-Otero County Regional Landfill has adequate capacity for the amount of waste material and debris that could be generated by the Proposed Action. The landfill has a remaining life span of about 16 years. Maximum estimates of waste material (27,686 tons) would reduce the life span by about five months or 3 percent. A similar volume of waste could be generated under the Existing Alignment Alternative.

Socioeconomics. The project could generate about 176 direct project-related jobs based on an $18-million dollar budget. The local economy would also benefit from some expenditures on supplies. It is expected that jobs would be filled either by local workers or workers who temporarily move to the area for the duration of the project. Therefore, no population changes are expected.

Environmental Justice. Apart from short-term inconvenience, no adverse impacts would be expected on human activities or the physical environment in the project area. Therefore, there would be no potential to disproportionately affect low-income or minority populations.

Environmental Impacts of the Existing Alignment Alternative

Impacts from this alternative would generally be the same as the Proposed Action for most resources. The following difference is noted:

- Use of the existing alignment would affect rural residents and about 4,450 linear feet of pecan orchards (about 5.1 acres) in the La Luz area. This represents a loss of about 0.3 percent of the pecan orchards in Otero County, and would affect two or three growers.

- Residents may experience temporary inconvenience as described under the Proposed Action.

Environmental Impacts of the No Action Alternative

No environmental impacts related to new pipeline construction would occur. However, use of the Bonito pipeline water supply would remain uncertain. Therefore, the impact of the No Action Alternative is that dependence on groundwater would continue, and would result in acceleration of groundwater depletion. This situation is not preferable considering that the Bonito surface water supplies replenish at a much faster rate than the aquifer. Potential for future pipe failures that may cause surface and subsurface flooding, subsidence, property damage, and associated economic loss would remain.

1.0 INTRODUCTION

This environmental assessment (EA) addresses a proposal by the U.S. Air Force (USAF) to repair the Bonito water pipeline which runs from the La Luz reservoir, north of Alamogordo, in Otero County, to Nogal, in Lincoln County, New Mexico. The EA has been prepared in accordance with the National Environmental Policy Act of 1969 (NEPA) (42 United States Code [USC] 4321-4347), the Council on Environmental Quality (CEQ), the Regulations for Implementing the Procedural Provisions of the NEPA (40 Code of Federal Regulations [CFR] 1500-1508), and the Air Force Instruction (AFI) 32-7061, Environmental Impact Analysis Process (EIAP).

Chapter 1 provides background and an overview of the project, the purpose and need for the action, and scope of the EA. It also summarizes the environmental compliance requirements, agency coordination, and public involvement for the project. Chapter 2 describes the alternatives being addressed, alternatives considered but not carried forward, other major projects in the region, and summarizes impacts for each alternative. Chapter 3 provides a description of the affected environment for a range of environmental and social resources. Chapter 4 summarizes the environmental impacts that may result from implementing each alternative under consideration. Chapter 5 summarizes cumulative impacts from implementing the action along with other actions in the region. Chapters 6, 7, and 8 provide the names of the preparers, persons and agencies contacted, and references used for the EA, respectively.

1.1 BACKGROUND

The original Bonito pipeline was constructed in the early 1900s. The wood stave and metal-banded pipeline transported water to the railroad in the Tularosa basin. This line is no longer in service but is in the ground and listed in the National Register of Historic Places (NRHP). In 1954, the City of Alamogordo (Alamogordo) purchased the water right to the Bonito Lake water supply from the El Paso and Rock Island Railroad Company and Southern Pacific Company. Alamogordo agreed to give half the water right (1,449.02 acre-feet per year, not to exceed 1.531 million gallons per day [mgd]) to Holloman Air Force Base (AFB), in exchange for installing a new 66-mile concrete and steel pipeline between Nogal and the La Luz reservoir (shown in Figure 1-1). An order through the New Mexico State Engineer's Office transferred a portion of the water right to Holloman AFB in 1955, and the pipeline was constructed from January 1956 to September 1957.

The pipeline provides about half the water supply for Holloman AFB and about 20 percent of the supply for Alamogordo. It also provides lesser amounts to the communities of Nogal and Carrizozo, and to the Southern Pacific Transportation Company. The pipeline lies within easements and permits conveyed to the Air Force. Most of the pipeline is within the rights-of-way (ROW) of county, state, and federal roads, or railroad ROW. Some of the pipeline alignment crosses private property. When it was originally constructed, little of the private property was occupied or developed. Since then, orchards, driveways, and structures have been developed over and adjacent to the line and some of the land has been used for other agricultural and rural uses.

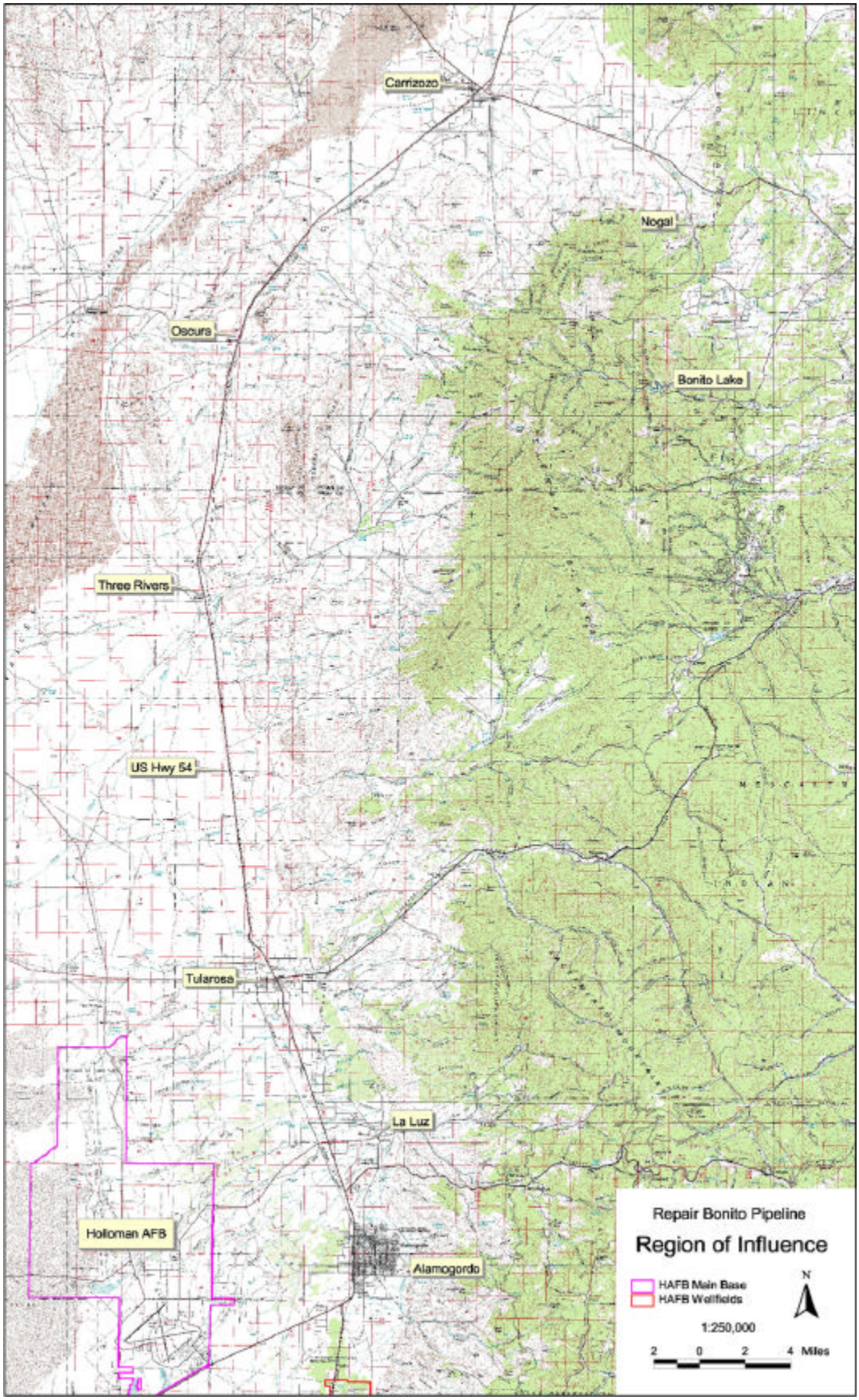

Figure 1-1 Repair Bonito Pipeline Project Area

1.2 PURPOSE AND NEED FOR THE ACTION

The Air Force proposes to replace part of the pipeline, and to do spot repairs and install cathodic protection on the remainder, to restore it to serviceable and reliable condition. Some alternative alignments are also being considered in order to avoid replacing the pipeline where it bisects private property. Eventually, if the funds are available, the entire line from Nogal to the La Luz reservoir may be replaced. Analysis would be supplemented if this is possible in the future.

Since its construction in the 1950s, the concrete and steel pipeline from Nogal to La Luz has corroded and weakened at varying rates due to corrosive soils and high pressures on the line. The elevation change between Bonito Lake and the reservoir causes the water to flow through the entire line under gravity pressure. Gradient changes between Oscura and La Luz subject this particular portion of the line to the highest head pressures.

Where the line passes under an overpass north of Tularosa, it makes two forty-five degree turns. In this area, the line is very close to the railroad, which also goes under the overpass. Historically, failure of the line in close proximity to the railroad has raised concerns about the possibility a washout of the railroad bed in the future. The line also passes through a half dozen large drainages that historically flood, erode the soil and burst the pipe on a regular basis.

Failures (leaks and blowouts) have become frequent since the mid-1980s. These have required spot repairs, and on occasion shutting down the line. When this happens, Holloman AFB must rely on wells and uses more groundwater, depleting the aquifer at a rate faster than it naturally recharges. Sometimes, leaks have caused damage to property from surface and underground flooding. The Air Force is concerned about future failures that could result in further losses and damage.

With these concerns, the Air Force submitted a funding request to replace the line. Congress recently appropriated $18 million, a portion of the funds needed for this project.

1.3 SCOPE OF THE ENVIRONMENTAL ASSESSMENT

1.3.1 Scoping

Several environmental issues were identified by Holloman AFB to address in the EA. These were based on the nature of the proposed work and an understanding of local conditions. Issues included:

- Potential for wind and water-caused soil erosion and subsequent water and air quality effects;
- Potential for ground disturbance to affect threatened and endangered plant and animal species and habitats of concern;
- Potential for ground disturbance to increase opportunities for noxious or invasive plants to root and spread;
- Potential for construction activities to disturb cultural resources;

- Potential for volume of solid waste from pipe removal to impact local solid waste facility capacities; and,
- Potential for losses in revenues from disruption or displacement of commercial and agricultural operations in the affected area.

The Air Force has actively pursued public and local agency input into the proposal, seeking issues and concerns to be addressed in the environmental analysis. Letters were initially sent to all owners of land through which the easement passes to advise them that survey crews would be working along the easement. A second letter was then sent to those landowners and to a wider range of elected officials, local agencies, and to landowners in neighborhoods through which the pipeline runs, inviting them to meetings held in Alamogordo on March 5, 2001, and in Carrizozo on March 6, 2001. Forty people attended the meeting in Alamogordo and comments were received from six persons. Ten persons attended the meeting in Carrizozo and comments were provided by two persons. Materials from public involvement activities are included as Appendix A.

Issues identified through the public scoping process included:

- Concerns about the status of Holloman AFB's easements for the pipeline and related property value issues; and,
- Loss of revenues for local pecan growers from removal of or damage to pecan trees during pipeline repairs and replacement.

Comments were received from three agencies and two individuals on the Draft EA. Clarifying revisions have been incorporated into this EA where appropriate, but overall assessment of impacts remain unchanged from the Draft EA.

1.3.2 Environmental Impact Analysis

The EA addresses the impacts that could result from implementing the pipeline repair project. It will examine impacts generated directly from construction activities, and the environmental benefits or disadvantages of using the existing or alternative alignments. Results from natural resources and cultural resources surveys conducted in February and March 2001, and other environmental documentation are incorporated into the EA. Because visibility of many species is limited during the early spring, and certain animal species are not present then, follow-up surveys were conducted in April, May, and June 2001.

This EA evaluates the potential for environmental impacts. Based on identified issues and the type of activities involved, resources addressed include: earth, water, air, biological, and cultural resources, land use, aesthetics, solid waste, socioeconomics, and environmental justice.

Any permits and licenses required for the project would be acquired by the Air Force or construction contractor. These would include Clean Water Act (CWA) Section 404 permits, National Pollutant Discharge Elimination System (NPDES) permits, rights-of-entry, and easements or permits on new alignments. An Environmental Baseline Survey (EBS) will be completed for any new lands acquired by permit. The findings from the EA will be used as a basis for stipulations in the Request for Proposals for the construction services contract.

1.4 REGULATORY COMPLIANCE

This EA has been prepared principally to comply with NEPA. It also addresses the Proposed Action's compliance with other applicable environmental laws and regulations. Table 1.4-1 summarizes the requirements of NEPA and reviews other key federal environmental regulatory requirements applicable to the proposal.

Table 1.4-1 Potential Permit Requirements

Type of Permit or Regulatory Requirement	*Requirement*	*Agency*
National Environmental Policy Act	Required for approval of federal project.	Council on Environmental Quality, U.S. Department of the Air Force
Corps of Engineer Section 404	Required for authorizing fill within wetlands or waters of the United States.	U.S. Army Corps of Engineers
Endangered Species Act	Required to consult on impacts of project implementation on federally listed or proposed threatened and endangered species.	U.S. Fish and Wildlife Service
Clean Water Act	National Pollutant Discharge Elimination System stormwater permit.	U.S. Environmental Protection Agency and State of New Mexico
Clean Air Act and Amendments	Establishes nationwide standards and requires conformity to state plans.	U.S. Environmental Protection Agency and State of New Mexico
National Historic Preservation Act	Requires federal agencies to consider potential impacts to cultural resources.	New Mexico State Historic Preservation Office
Executive Order (EO) 13084, Consultation and Coordination with Indian Tribal Governments	Required to consult with tribal entities on federal projects.	U.S. Department of Defense
EO 13112, Invasive Species	Required to prevent/control spread of invasive weeds from federal projects.	Invasive Species Council (multiple agencies)
EO 11990, Protection of Wetlands	Required to avoid impacts to or loss of wetlands.	U.S. Army Corps of Engineers and State of New Mexico
EO 11988, Floodplain Management	Required to avoid effects on or development in floodplains.	U.S. Army Corps of Engineers and New Mexico Environment Department
EO 12372, Intergovernmental Review of Federal Programs	Requires federal agencies to cooperate with and consider state and local views.	U.S. Department of the Air Force
EO 12898, Environmental Justice	Requires federal agencies to consider potential disproportionate effects on minority and low-income populations.	U.S. Air Force
EO 13045, Protection of Children	Requires federal agencies to consider potential disproportionate health and safety risks to children.	U.S. Air Force

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2.0 PROPOSED ACTION AND ALTERNATIVES

The Air Force is proposing to repair the Bonito pipeline through a combination of installing new pipeline for about 40 miles of the route (from Oscura south to the La Luz reservoir), and performing spot repairs and installing cathodic corrosion protection, which minimizes potential for deterioration, on the remainder (from Oscura north to Nogal).

The existing pipeline is about 66 miles long from Nogal to the La Luz reservoir. Figure 2-1 shows the alignment where it starts at the La Luz reservoir heading due west along the south side of Bonita Boulevard (a gravel roadway). At the intersection of Bonita Boulevard and Bonita Avenue (an asphalt roadway) in La Luz, the line changes direction and heads northwest. It underlies Bonita Avenue for 0.25 miles up to the intersection of Bonita Avenue and New Mexico 545 (NM 545) (also known as Alamo Street).

At that point, the pipeline continues northwest, in a nearly straight line, passing through a number of developed rural residential and agricultural properties, including pecan orchards, before crossing U.S. 54 in Alamorosa (see Figure 2-2). It continues northwest, passes under the railroad line, and heads north along the west side of the railroad ROW (Figure 2-3). It continues north between the railroad and Railroad Avenue (to the west of and generally parallel to the railroad) for about 3.75 miles.

Figure 2-3 shows the existing pipeline as it approaches the U.S. 54 railroad overpass north of Tularosa. At the point where Railroad Avenue ties in to an asphalt county road that skirts the west side of the U.S. 54 overpass, the pipeline remains parallel to the railroad and passes underneath the overpass. It continues parallel to and in the existing ROW on the west side of the railroad. South of the overpass, the existing alignment is west of U.S. 54. As it passes under the overpass, it moves to the east of the highway and continues north between U.S. 54 and the railroad. At a point roughly one mile north of the overpass, the existing line crosses back to the west side of U.S. 54. It then continues north, in the existing ROW, all the way to Carrizozo.

Just south of the village of Carrizozo, the line passes back under U.S. 54 and the railroad, heading east, as shown in Figure 2-4. It passes along the south side of 17th Street, north along the east side of Water Canyon Road, east along the south side of 14th Street, and north along the east side of Country Club Road. At the intersection of Country Club Road and U.S. 380, the line heads east on the south side of U.S. 380.

The line follows U.S. 380 to the intersection with NM 37 to Nogal. At the intersection it crosses under NM 37 and continues along the east side of the NM 37 ROW. The line crosses back and forth under the highway a few times before reaching the village of Nogal. Through the village it follows the ROW on the west side, located very close to the roadway. NM 37 swings east near the south edge of the village, and crosses Nogal Creek. At this point the pipeline crosses under the road, runs east across the drainage, along the north side of the road for a few hundred feet, then turns south across NM 37 and runs a few hundred feet to Holloman's Nogal metering station.

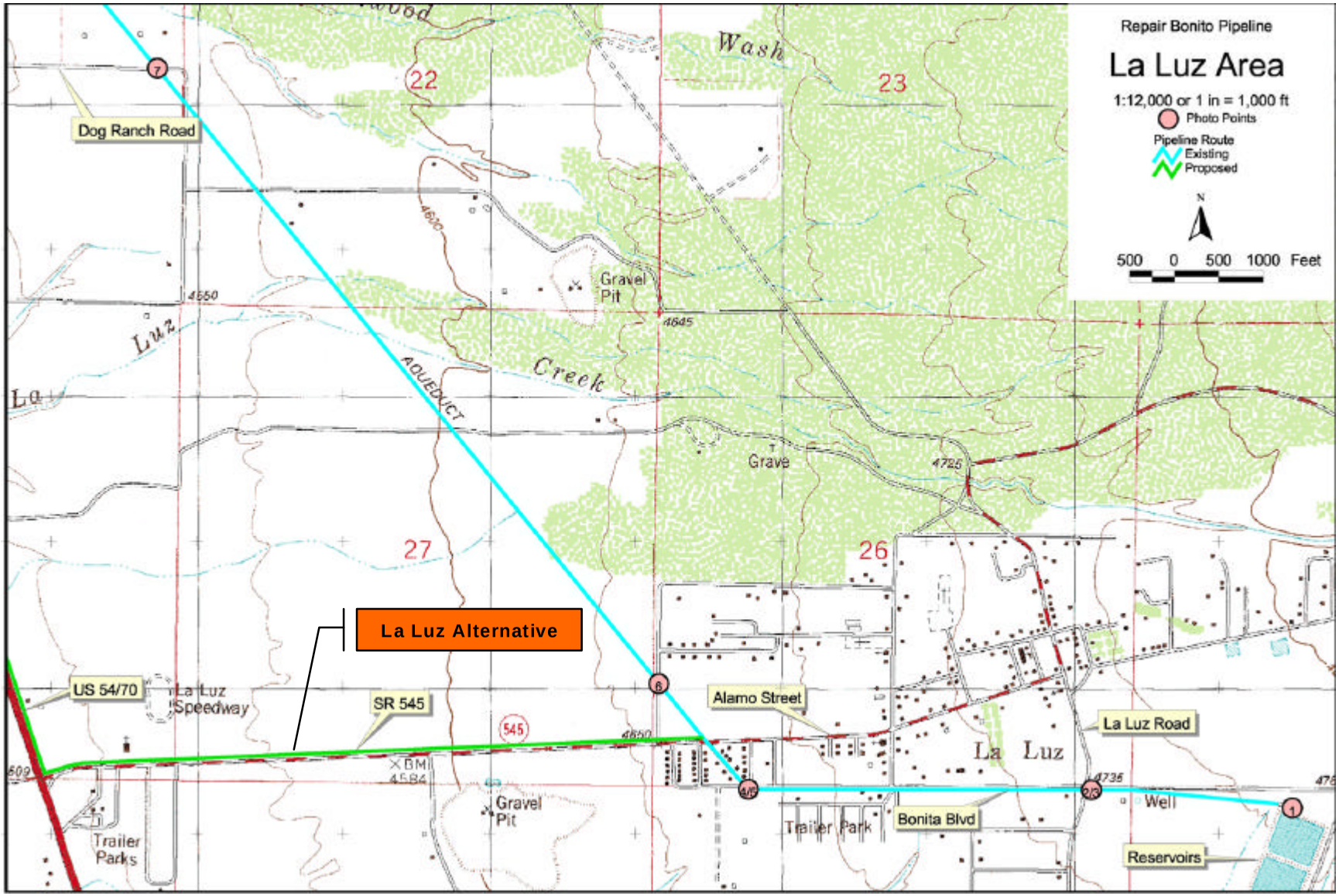

Figure 2-1 Bonito Pipeline¾Existing and Alternative Pipeline Alignments in La Luz Area

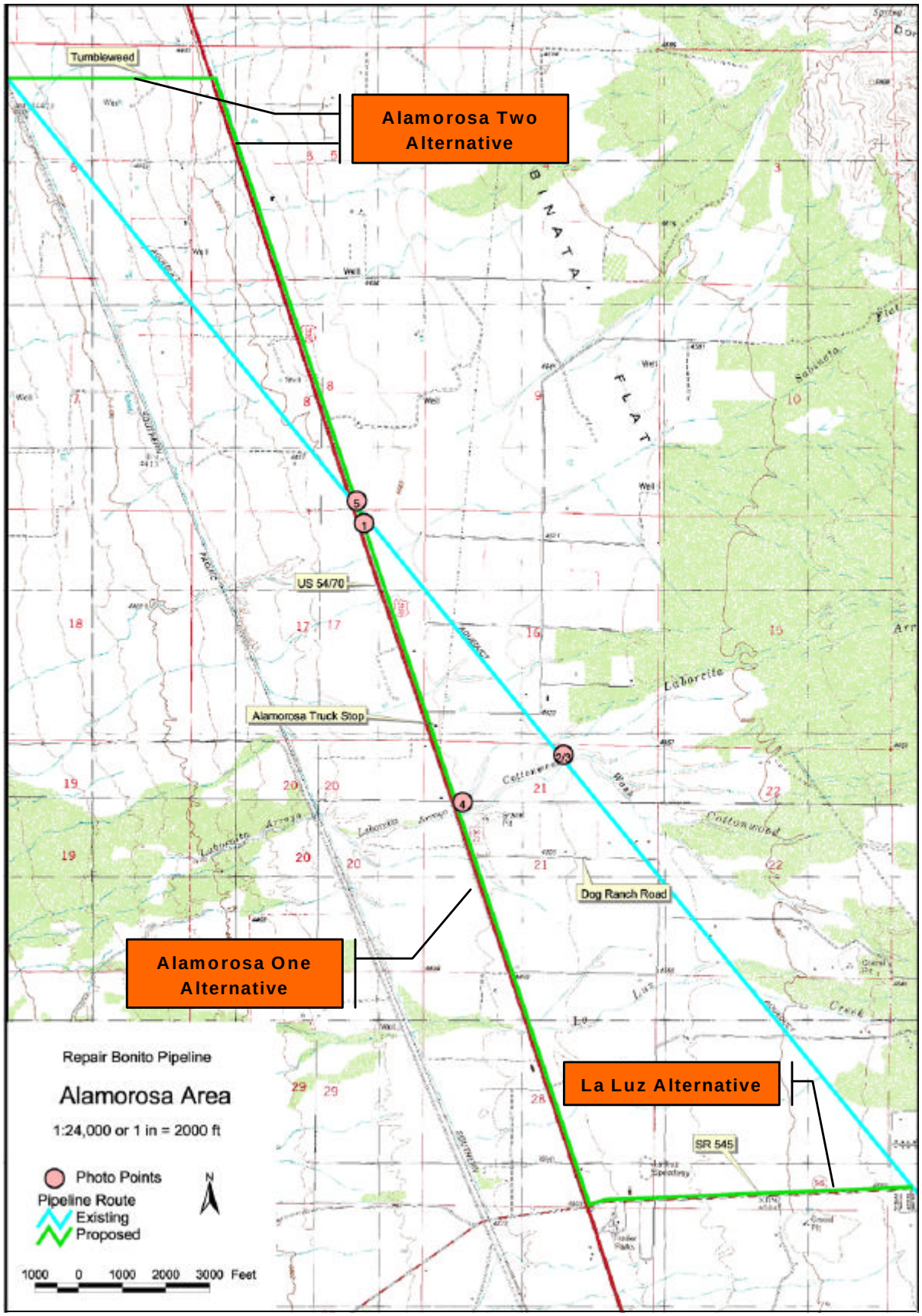

Figure 2-2 Bonito Pipeline—Existing and Alternative Pipeline Alignments in Alamorosa

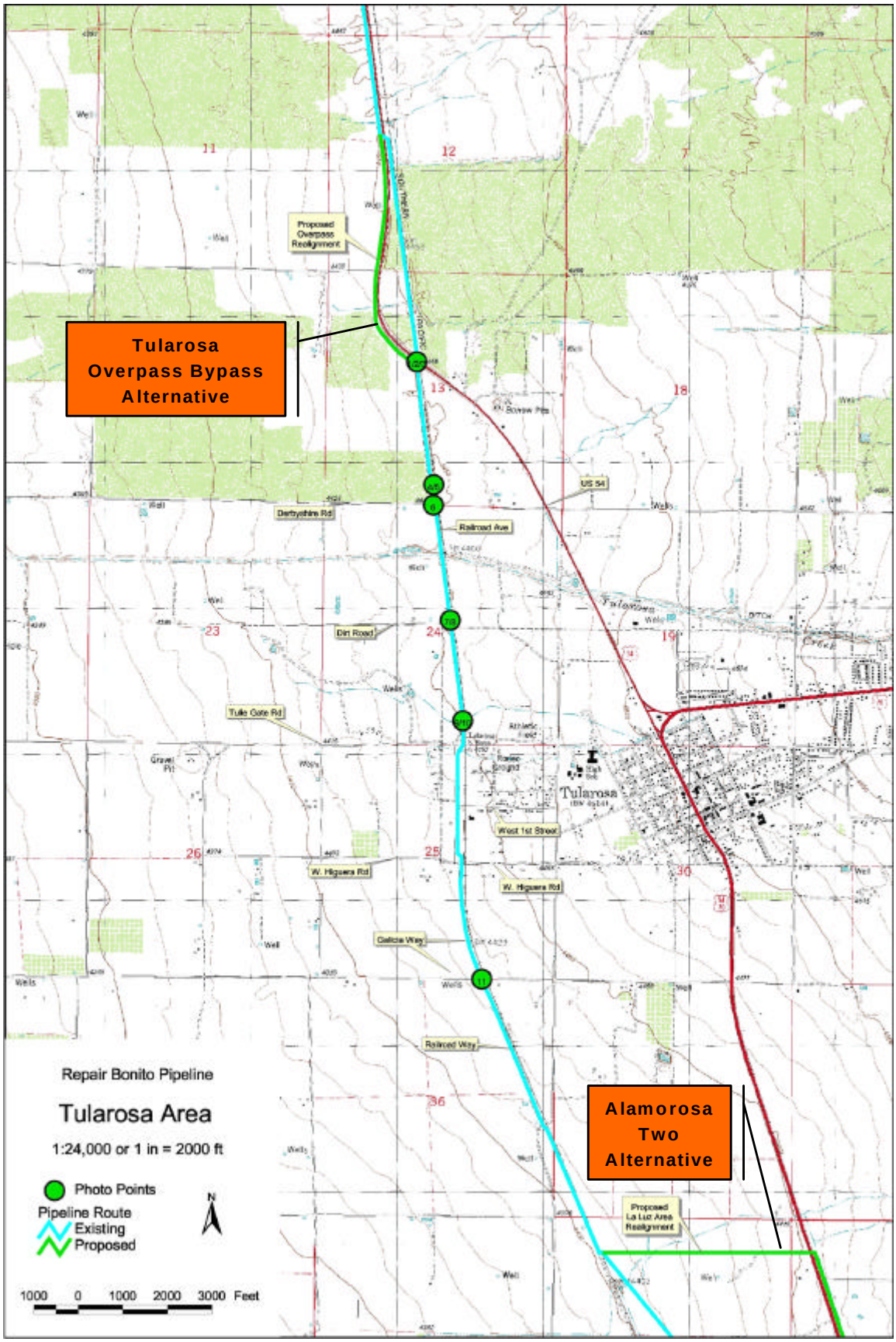

Figure 2-3 Bonito Pipeline—Existing and Alternative Pipeline Alignment in Tularosa

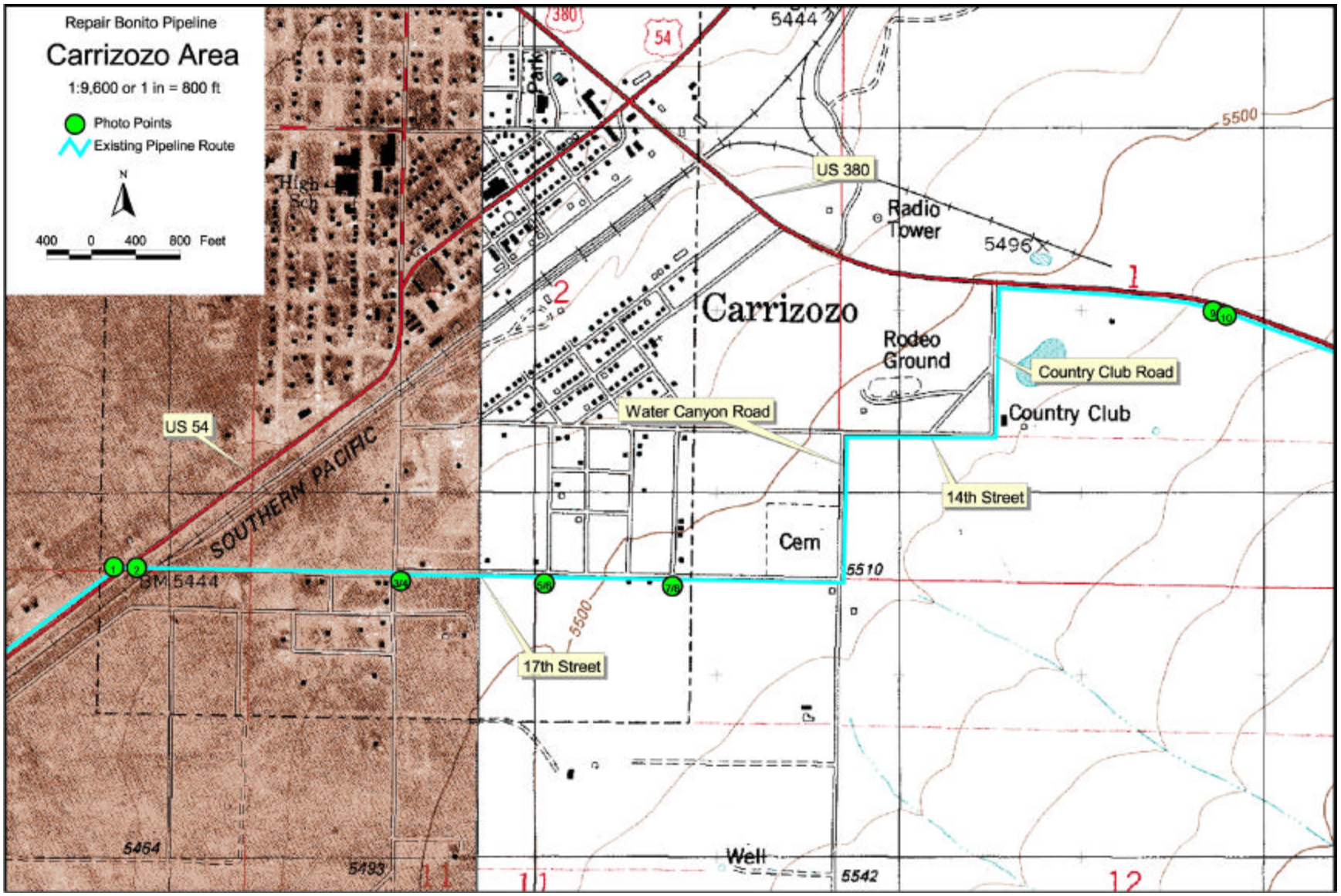

Figure 2-4 Bonito Pipeline ¾ Alignment at Carrizozo, New Mexico

In addition to taking no action, two alternatives are being considered; one that would reroute the pipeline in roadway ROW in selected segments between La Luz and Oscura (Proposed Action), and another would replace pipeline in the existing alignment (Existing Alignment Alternative). The following sections describe the proposed construction activities and the alternative options.

2.1 PROPOSED ACTION

It is estimated that about 40 miles would be replaced from La Luz to Oscura. This section of the line experiences the most frequent failures due to high pressures on the line and deterioration from corrosive soils. Construction would begin in Spring 2002 and continue for 18 to 24 months. Spot repairs would be performed on the remainder of the line, and a cathodic protection system would be installed that would inhibit corrosion and extend the service life of the pipe.

2.1.1 Proposed Alignments

The majority of the new pipeline would follow the existing alignment (as described in the beginning of Chapter 2). Alignment options are proposed to avoid conflicts with private property and structures between the La Luz reservoir and the Tularosa overpass. Figures 2-1, 2-2 and 2-3 illustrate the location of the existing and alternative alignments. The Proposed Action is to implement all of these alignments.

La Luz Option

Figure 2-1 shows that at the point where the existing alignment on Bonita Avenue intersects NM 545, a new line would be tied in and the old line cut, capped, and left in place. This new line would continue west, along the south side of NM 545, to U.S. 54. A permit within the existing, previously disturbed ROW would be required.

Alamorosa Option One

At the point where the La Luz realignment reached U.S. 54, the new line would change direction (see Figure 2-2), continuing in a north-northwest direction, along the east side of the highway. A new permit within the existing, previously disturbed ROW would be required. This new line would be connected to the existing at the point where the existing crosses U.S. 54. This would be approximately three miles north of the NM 545 and U.S. 54 intersection.

Alamorosa Option Two

This alignment would begin at the endpoint of Alamorosa Option One, continuing north-northwest along the east side of U.S. 54 for approximately two more miles. At the intersection of U.S. 54 and Tumbleweed Road (a gravel roadway), the new line would change direction. It would pass under U.S. 54, and continue west in the Tumbleweed Road ROW. It would pass under the railroad and connect back into the existing pipeline. New permits within the existing, previously disturbed ROW would be required. The bypassed line would be cut, capped, and left in place, or disposed of at the regional landfill. From this point, the line would follow the existing alignment along the west side of the railroad.

Tularosa Overpass Option

This alternative alignment would avoid passing under the U.S. 54 overpass in Tularosa, and instead, follow along the west side of U.S. 54 in the highway ROW. A new permit would be required for the new alignment. This new alignment would avoid the overpass, eliminate two highway crossings and achieve separation from the railroad at the overpass. The bypassed section of line would be cut, capped, and left in place, or disposed of at the regional landfill.

The combined realignments of the Proposed Action could add 1.1 miles to the total length of the existing 66-mile pipeline alignment.

2.1.2 Construction Activity

It is proposed to remove old pipe and to replace it with new pipeline, or to install new pipe parallel to the old pipe, left in place, where permitted. This would require digging a trench about six feet in depth and about six feet in width. Soil would be piled to the side and used to backfill the trench. The backfill would be compacted and graded to match the adjacent surface contours. Equipment and vehicles would operate within an area of about 25 feet on either side of the excavated trench. The work for trenching, installing, and backfilling any given section of pipe would occur over a few days and proceed sequentially along the line. For uncomplicated stretches, work crews would probably have one or two backhoes, a couple of standard pick-up trucks, a light crane, and a larger truck for hauling supplies, equipment and debris. There may be about five to six workers. It is not known whether one or more crews would operate at the same time, possibly decreasing the length of the construction period. Other techniques that may be used include: 1) Slip-lining the old pipe with a flexible liner, or 2) "Pipe bursting" the old pipe by inserting the new pipe inside the old and breaking the old pipe, and 3) Boring under the existing highways and railroad.

The pipeline alignment crosses many drainages, culverts, and irrigation ditches. At most of these, the pipeline would be placed in the ground, but aerial crossing could occur at some of the wider drainages or where other conditions (such as erodibility of soil, or depth to bedrock) preclude burying the pipe. It is anticipated that the pipeline would be suspended above Temporal Creek, a very large and active drainage. The design for an aerial crossing would likely entail constructing concrete piers and welding a supportive framework. At most crossings, the pipeline would be placed in the ground at a depth of six to ten feet below the level of the entrenching drainage bed. Trenches would be stepped and shored in accordance with Occupational Safety and Health Administration (OSHA) standards and would therefore be wider than the standard six-foot trench.

Best Management Practices (BMPs) would be used to control dust and soil erosion during construction. Steel plates would be used to span open trenches where roads or driveways are cut, to allow traffic flow and access to the extent feasible. In general, any improvements that are removed or damaged would be replaced with similar structures and products.

A cathodic protection system is used to inhibit corrosion of steel where soils have high corrosive properties. This system would be installed on the remainder of the pipeline (about 30 miles) and some spot repairs would be accomplished. A hole about five feet in diameter would be dug to

expose pipe joints. Pipe joints are spaced every 33 feet, therefore about 4,800 joints would be exposed (depending on the final distance of pipe to be protected). A strap is attached to connect the steel in one pipe section to the steel in the adjacent section, creating a continuous bonded pipe. Anode beds would be placed every one or two miles. These entail drilling a 6-inch diameter hole to a depth of 200 to 300 feet, and placing anodes down the length of the hole. The anode hole is backfilled with a carbon material, capped, and covered with soil. Nearby, a two by three-foot steel cabinet (mounted on a stand) would house a rectifier. This device links the anode bed to the bonded pipe with an underground electric cable. (An impressed electrical current counteracts the normal electrolytic current, thereby reducing the rate of pipeline corrosion.) The system would require an electrical power source to operate.

About 36 acres would be disturbed by trenching and hole digging operations. Accounting for disturbance from grading and equipment and vehicle activity, ground surface and vegetation would be disturbed in an overall area of up to 320 acres during the repair project.

About 40 miles of old pipe (6,400 sections) would be removed where required by existing permits. (New pipe would be placed in the old trench, where the alignments overlap.) Where the pipe crosses private property, under certain conditions, it would be left in place if agreed to by landowners. In addition to pipe, approximately 7,300 linear feet of gravel, chip seal, or asphalt road (and base course) would be dug up. Because none of this material is classified as hazardous, it would not require special treatment or disposal. It is expected that waste material would be taken to a licensed local landfill or recycled. In either case, some or all the pipe may be crushed to separate steel from concrete or to reduce the volume of waste material. Crushing would generally occur along the alignment when it is removed. In residential areas, pipe sections would be transferred to a central location away from housing before being crushed.

The construction contractor would use areas for staging and storing equipment and personnel for the duration of the project. This could include a small trailer and a fenced area. There may be one or more staging areas, which may be relocated as the project progresses. The contractor would make arrangements with private or public landowners for staging areas.

2.1.3 Management Actions to Reduce Potential for Environmental Impacts

Several methods have already been identified to minimize potential environmental impacts from construction. Any plans, standards, or practices required by state and federal law would be used. Specific methods include:

- A Stormwater Pollution Prevention Plan (SWPPP) prepared by the construction contractor in accordance with any state and federal requirements. The plan would describe all methods used to control stormwater runoff and soil erosion during and following construction.

- A Noxious Weed Management Plan prepared that meets the requirements of federal and state Executive Orders (EO) regarding noxious plants. Disturbed areas would be reseeded with state-approved seed mixes.

- A Traffic Control Plan prepared in accordance with New Mexico State Highway and Transportation Department (NMSHTD) standards for all construction that would take place within road or street ROW. This plan would address all aspects of traffic safety.

- In general, any property (including fencing, irrigation systems, landscaping, driveways and other roadways) removed during construction would be replaced in kind.

- During construction, vehicular access would be maintained to businesses and residences along the route to the maximum extent possible.

2.2 EXISTING ALIGNMENT ALTERNATIVE

Under this alternative, the existing alignment would be used and none of the optional alignments would be used. Overall, this alignment is about 1.1 miles shorter than the Proposed Action, but the extent of construction and pipe removal is expected to be almost equivalent for this alternative and the Proposed Action. Within available funding, the maximum amount of pipeline would be replaced (about 40 miles) and the remainder would be repaired and protected as described above for the Proposed Action. Consequently, estimated ground disturbance would be essentially the same as described in Section 2.1.2.

Figures 2-1 to 2-3 show the location of the existing alignment between La Luz (at the intersection of Bonita Boulevard and NM 545) to a point along the railroad at Tumbleweed Road where the alternative alignment would end. For this 6.4-mile stretch, the pipeline traverses mostly private property, including about 4,450 linear feet of pecan orchards. One garage structure is also located above the pipeline.

2.3 NO ACTION ALTERNATIVE

Under this alternative, spot repairs would continue to be made on the existing pipeline. Currently, maintenance on the pipeline within the project area is performed by a small crew. Both minor and major repairs are performed on an as-needed basis. Occasionally, these require some trenching and reconstruction of surrounding areas. Segments of removed pipeline are intermittently disposed of at the regional landfill. Based on the reliability of the existing line and past events, it is expected that Holloman AFB would periodically lose access to water supply from Bonito Lake and increase the use of groundwater withdrawals. For example, in 2000, only 10 percent of Holloman AFB water came from the Bonito supply. About 690 million gallons came from groundwater, and just over 70 million gallons came from Bonito Lake (Urey 2001).

2.4 ALTERNATIVES ELIMINATED FROM DETAILED STUDY

The following alternatives were considered but eliminated from further consideration for the reasons noted.

- Install New Pipeline in Shortest Route Possible to Nogal. This option was eliminated because it would involve extensive easement acquisition and traversing of private property.

- Install New Pipeline to Minimize Pressure in Tularosa Area. This option would mostly involve realigning the southern half of the pipeline further east of Tularosa at higher elevations to eliminate the depression in the Tularosa area. This option was eliminated because it would involve extensive easement acquisition and traversing of private property.

2.5 OTHER PROJECTS WITHIN THE REGION CONSIDERED IN CUMULATIVE IMPACTS

U.S. 54 Improvements. The NMSHTD, in cooperation with the Federal Highway Administration (FHWA) is constructing a new two-lane roadway approximately 52 feet east of the current alignment of U.S. 54 from milepost 85 to milepost 119.5 between Tularosa and Carrizozo. Construction work on this project is expected to begin in the near future.

U.S. 380 Improvements. The NMSHTD and FHWA are also preparing to evaluate a proposal to make improvements to 42.3 miles along U.S. 380 between Carrizozo and Hondo, New Mexico. These would mostly involve surface repairs, reconstruction and widening of shoulders, bridge and intersection reconstruction, and realignment to improve roadway geometry. A draft environmental assessment is pending. Construction would not begin until the environmental analysis process is completed.

2.6 COMPARISON OF ALTERNATIVES

Table 2.6-1 summarizes the environmental impacts of the Proposed Action and alternatives.

Table 2.6-1 Summary of Environmental Impacts

Resource	*Proposed Action*	*Existing Alignment*	*No Action*
Earth	No significant impact with erosion control measures.	Same as Proposed Action.	Potential for surface and subsurface flooding and subsidence.
Water	No significant impact with erosion control measures. At least 15 stream crossings stabilized, reducing potential for sedimentation in surface water.	Same as Proposed Action.	Increased use and depletion of groundwater; loss of pipeline water; no stabilization of stream crossings would occur, increasing the potential for sedimentation in the future.
Air Quality	Total emissions of 11.2 tons PM_{10}; emissions of all criteria pollutants below significant levels.	Same as Proposed Action.	No impact.
Biological	Insignificant loss of wildlife habitat; minimal effect from loss of small amount of remnant Chihuahuan Desert shrubland vegetation; recommend follow-up study for southwestern willow flycatcher to determine presence and suitable measures to minimize impacts.	Same as Proposed Action.	No impact.
Cultural	Twelve sites in the area of direct effects. No further action recommended on five of these sites. One gravesite to be avoided. Seven sites to be monitored during construction. All remains affected, if any, would be recorded and recovered.	Same as Proposed Action.	No impact.
Land Use	No long-term impact on land use. Short-term inconvenience to some residents and businesses. Loss of pecan trees within 4,450 linear feet corridor by 50 feet wide (about 5.1 acres) from pipe removal may be avoided through agreements with private landowners.	No impact on land use. Short-term inconvenience to some residents and businesses. Loss of pecan trees within 4,450 linear feet corridor by 50 feet wide (about 5.1 acres).	Potential for damage to property/structures due to flooding and subsidence.

Resource	*Proposed Action*	*Existing Alignment*	*No Action*
Aesthetics	Short-term changes to foreground scenery. No long-term impact.	Same as Proposed Action.	No impact.
Solid Waste	Up to 27,686 tons of solid waste to regional landfill represents about 5 months or 3 percent of remaining service life.	Similar to the Proposed Action.	No impact.
Socioeconomics	Slight benefit from 176 jobs and project expenditures in local economy. Possible loss of revenue from about 245 productive pecan trees.	Loss of revenue from about 245 productive pecan trees.	Economic consequences associated with flood damage.
Environmental Justice	No impact.	No impact.	No impact.

Notes: PM_{10} Particulate matter less than 10 microns in diameter.

3.0 AFFECTED ENVIRONMENT

3.1 EARTH RESOURCES

3.1.1 Definition of Resource

This section focuses on the soils within the region of influence because surface disturbance would result from implementation of the alternatives other than the No Action Alternative. Soils are the unconsolidated and organic material at the ground surface in which plants grow. The region of influence for soils includes the location of the pipeline that would be excavated, in addition to the width of the easement or ROW, in which soil disturbance is likely to occur. The underlying geology would not be affected and will only be characterized as it has influenced the soils described in the affected environment.

3.1.2 Existing Conditions

The project area is located within the Tularosa Basin. In general, the soils in Lincoln County are deep, well drained, and nearly level to gently sloping that occur on hills and in valleys. In Otero County, the pipeline crosses soils that are, in general, deep, well drained, and nearly level to gently sloping. Some of these soils formed in parent material high in gypsum, while others are formed from alluvium or limestone (SCS 1981, SCS 1983).

Soil characteristics that have the potential to affect the construction plans, the surrounding environment during construction, or the pipeline once installed include depth to bedrock, texture, permeability, strength and stability, and susceptibility of bare soil to erosion by wind and water. Depending on their chemistry, soils can also cause concrete to corrode and fracture, and steel to oxidize. The soils along the proposed and existing pipeline routes are described in Tables 3.1-1 and 3.1-2 by mapping unit name. The tables summarize their surface texture and potential for wind and water erosion, and potential for corrosion of concrete and steel. Their high corrosivity supports the need for plastic pipe or cathodic protection. Mapping unit names and numbers are those used by the Natural Resources Conservation Service (formerly the Soil Conservation Service) (SCS 1981, SCS 1983, NRCS 1997).

3.2 WATER RESOURCES

3.2.1 Definition of Resource

Water resources comprise the water on or beneath the ground surface. The streams in the Tularosa Basin are the main water resource that have the potential to be affected by the proposed construction activities. The water rights in the Bonito Pipeline system come from Bonito Lake.

3.2.2 Existing Conditions

The Tularosa Basin is part of the Central Closed Basins, a cluster of four drainage systems in south-central New Mexico. This basin contains all surface water flows within its boundaries. The upper reaches of Three Rivers and of the Sacramento River are the main perennial streams in the

Table 3.1-1 Lincoln County Soils—Potential for Corrosion

Map Unit Name	*Map Unit Symbol*	*Component*	*Surface Texture*	*Potential for Water Erosion*	*Potential for Wind Erosion*	*Potential for Corrosion of Concrete*	*Potential for Corrosion of Steel*
Darvey-Asparas association, gently sloping	8	Darvey	Loam	Moderate	High	Low	High
Darvey-Asparas association, gently sloping	8	Asparas	Loam	Moderate	High	Low	High
Deacon loam, 0 to 8 percent slopes	10	Deacon	Loam	Moderate	High	Low	High
Gabaldon silt loam, 0 to 2 percent slopes	19	Gabaldon	Silt loam	Moderate	High	Low	High
Malargo-Bluepoint association, hummocky	34	Malargo	Loam	Moderate	High	High	High
Malargo-Bluepoint association, hummocky	34	Bluepoint	Loamy fine sand	Slight	Very high	Low	High
Onite-Bluepoint association, hummocky	45	Bluepoint	Loamy fine sand	Slight	Very high	Low	High
Onite-Bluepoint association, hummocky	45	Onite	Loamy fine sand	Moderate	Very high	Low	High
Reflection-Malargo association, moderately sloping	68	Malargo	Fine sandy loam	Moderate	High	High	High
Reflection-Malargo association, moderately sloping	68	Reflection	Fine sandy loam	Moderate	High	High	High
Reventon-Sampson association, gently sloping	72	Sampson	Loam	Moderate	Moderate	Low	High
Reventon-Sampson association, gently sloping	72	Reventon	Loam	Moderate	Moderate	Low	High
Ruidoso-Tortugas association, moderately sloping	77	Ruidoso	Silty clay loam	High	High	Low	Moderate

Map Unit Name	*Map Unit Symbol*	*Component*	*Surface Texture*	*Potential for Water Erosion*	*Potential for Wind Erosion*	*Potential for Corrosion of Concrete*	*Potential for Corrosion of Steel*
Ruidoso-Tortugas association, moderately sloping	77	Tortugas	Very cobbly silt loam	High	Slight	Low	Moderate
Sampson loam, 0 to 5 percent slopes	79	Sampson	Loam	Moderate	Moderate	Low	High
Tulargo loam, 0 to 5 percent slopes	94	Tulargo	Loam	Moderate	High	High	High
Tulargo-Andergeorge association, gently sloping	95	Tulargo	Loam	Moderate	High	High	High
Tulargo-Andergeorge association, gently sloping	95	Andergeorge	Gravelly fine sandy loam	Moderate	High	High	High

Sources: NRCS 1997, SCS 1983

Table 3.1-2 Otero County Soils—Potential for Corrosion

Map Unit Name	*Map Unit Symbol*	*Component*	*Surface Texture*	*Potential for Water Erosion*	*Potential for Wind Erosion*	*Potential for Corrosion of Concrete*	*Potential for Corrosion of Steel*
Alamogordo-Gypsum land complex, 0 to 5 percent slopes	AEC	Gypsum Land	Gypsum	Low to moderate	Low to moderate	High	High
Alamogordo-Gypsum land complex, 0 to 5 percent slopes	AEC	Alamogordo	Very fine sandy loam	Low to moderate	Low to moderate	High	High
Alamogordo-Gypsum land-Aztec complex, 15 to 50 percent slopes	AGE	Alamogordo	Fine sandy loam	Low to moderate	Low	High	High
Alamogordo-Gypsum land-Aztec complex, 15 to 50 percent slopes	AGE	Gypsum Land	Gypsum	Low to moderate	Low	High	High
Alamogordo-Gypsum land-Aztec complex, 15 to 50 percent slopes	AGE	Aztec	Sandy loam	Low to moderate	Low	High	High
Bluepoint-Onite-Wink association, nearly level	BOA	Bluepoint	Loamy fine sand	Low	Low to moderate	Low	High
Bluepoint-Onite-Wink association, nearly level	BOA	Wink	Fine sandy loam	Low	Low to moderate	Low	High
Bluepoint-Onite-Wink association, nearly level	BOA	Onite	Loamy sand	Low	Low to moderate	Low	High
Largo silt loam, 0 to 3 percent slopes	LDB	Largo	Silt loam	High	Moderate	Low	High
Largo-Ogral complex, 0 to 5 percent slopes	LGB	Largo	Silt loam	High	Moderate	Low	High
Largo-Ogral complex, 0 to 5 percent slopes	LGB	Ogral	Very fine sandy loam	Low	Low	Low	High
Onite-Pintura association, gently sloping	OPB	Pintura	Loamy fine sand	Low to moderate	Low	Low	High
Onite-Pintura association, gently sloping	OPB	Onite	Loamy fine sand	Low to moderate	Low	Low	High
Tome silt loam, 0 to 5 percent slopes	TDB	Tome	Silt loam	Very high	Very high	Low	High

Sources: NRCS 1997, SCS 1981

basin (State of New Mexico 2001). Much of the land in the basin is covered with deposits of gypsum, alluvial and eolian sand, gravel, and clay, and alkali flats of varying thickness, with basalt lava beds in the northern portion of the valley.

The major surface water quality concerns identified by the New Mexico Environment Department (NMED) include sediment deposits in streams, elevated temperatures, and conductivity. Causes of these problems are attributed to the removal of riparian vegetation and the destabilization of streambanks, among others (State of New Mexico 2001). Specifically, Three Rivers at U.S. 54 is listed on the State of New Mexico 303(d) List for Assessed Stream and River Reaches (State of New Mexico 2000) as a high quality cold water fishery, a use not fully supported due to elevated temperature and conductivity levels, and almost total diversion of the flow for private water rights uses upstream of U.S. 54. Much of the flow is also diverted from Tularosa Creek, which is also listed as not fully supporting its designated use as a cold water fishery, but the specific pollutants and causes are unknown (State of New Mexico 2000).

There are currently 81 stream crossings (Green 2001) of the Bonito pipeline between the Tularosa U.S. 54 railroad overpass and Oscura. Four of these crossings are considered major drainages, and fifteen have eroding channels (Gomolak 2000). Several stream crossings occur along the rest of the pipeline. In the project area, only four major drainages, Three Rivers, Temporal Creek, Tularosa Creek, and La Luz Creek, are intermittent streams with sizeable floodplains. Most of the stream crossings are through arroyos with ephemeral flows that have been created through erosion and have little or no associated floodplain.

Surface water rights on the Bonito system include a maximum of 1,449.02 acre-feet per year and 1.531 mgd each for Holloman AFB and Alamogordo (City of Alamogordo no date[nd]).

The Tularosa Basin has significant groundwater resources that provide the majority of the water for use by the people of the region. In general, the depth to groundwater along the pipeline is less than 200 feet. Much of the deeper groundwater is saline, and not fit for human consumption. The main groundwater quality problems in the basin are high concentrations of naturally occurring dissolved solids, and contamination due to leaking petroleum products and nitrates (State of New Mexico 2001).

Peak water usage for Holloman AFB over the last ten years has been about 3.5 mgd (Montoya 2001) based on monthly data, with an average of about 2 mgd. Alamogordo uses a peak of 8 mgd. Most of this water now comes from wells in the Tularosa-Hueco aquifer. Total water use from fresh groundwater sources in the Tularosa Valley were 22.24 mgd in 1990 (USGS 1990). The Bonito pipeline supplies about one-half of Holloman's water usage and one-fifth of Alamogordo's annually, when fully operational. However, due to leakage and blowouts, the pipeline supply has dwindled. In 2000, only about 10 percent of Holloman's water supply came from Bonito Lake (Urey 2001).

3.3 AIR QUALITY

3.3.1 Definition of Resource

Federal Air Quality Standards. Air quality in a given location is determined by the concentration of various pollutants in the atmosphere. The significance of a pollutant concentration in a region or geographical area is determined by comparing it to federal and/or state ambient air quality standards. Under the authority of the Clean Air Act (CAA), the Environmental Protection Agency (EPA) has established nationwide air quality standards to protect public health and welfare, with an adequate margin of safety. These federal standards, known as the National Ambient Air Quality Standards (NAAQS), represent the maximum allowable atmospheric concentrations and were developed for six "criteria" pollutants: ozone (O_3), nitrogen dioxide (NO_2), carbon monoxide (CO), respirable particulate matter less than 10 micrometers in diameter (PM_{10}), sulfur dioxide (SO_2), and lead (Pb).

The EPA designates areas of the U.S. as having air quality equal to or better than the NAAQS (attainment) or worse than the NAAQS (nonattainment). Former nonattainment areas that have recently achieved attainment of the NAAQS are designated as maintenance areas. Areas are designated as unclassifiable for a pollutant when there is insufficient ambient air quality data for the EPA to form a basis of attainment status. For the purpose of applying air quality regulations, unclassifiable areas are treated similar to areas that are in attainment of the NAAQS.

The NAAQS are defined in terms of concentration (e.g., parts per million [ppm] or micrograms per cubic meter [$\mu g/m^3$]) determined over various periods of time (averaging periods). Short-term standards (1-hour, 8-hour, or 24-hour periods) were established for pollutants with acute health effects and may not be exceeded more than once a year. Long-term standards (annual periods) were established for pollutants with chronic health effects and may never be exceeded.

In 1997, EPA promulgated two new standards: a new 8-hour O_3 standard (which could eventually replace the existing 1-hour O_3 standard) and a new standard called $PM_{2.5}$, which are fine particulates (with diameters less than 2.5 microns) that have not been previously regulated. In addition, EPA revised the existing PM_{10} standard. The two new standards were scheduled for implementation over a period of several years, as monitoring data became available to determine the attainment status of areas in the U.S. However, EPA was challenged in court on these new and revised standards, and in May 1999, the U.S. District of Columbia Court of Appeals issued a ruling stating that the CAA as applied and absent further clarification "effects an unconstitutional delegation of legislative power." Furthermore, the court stated that:

- The new 8-hour O_3 standard was remanded back to EPA for further consideration and "cannot be enforced";
- The new $PM_{2.5}$ standard was allowed to remain in place, but affected parties can apply to have this standard vacated under certain conditions; and,
- The revised PM_{10} standard was vacated and replaced by the pre-existing PM_{10} standard.

The case was appealed to the U.S. Supreme Court, and in February 2001, the court upheld the 8-hour O_3 standard and instructed the EPA to develop a reasonable interpretation of the

nonattainment implementation provisions. The Supreme Court has validated the EPA's standard setting authority and procedures. Implementation of the new standards will take place over the next few years as the EPA responds to this court decision. In the meantime, EPA has reinstated and will enforce the existing 1-hour O_3 standard.

State Air Quality Standards. Under the CAA, state and local agencies may establish air quality standards and regulations of their own, provided these are at least as stringent as the federal requirements. The Proposed Action would involve ground disturbance (grading and trenching) activities within Otero and Lincoln Counties, New Mexico. For selected criteria pollutants, the State of New Mexico has established its state ambient air quality standards (NMAAQS), which are somewhat more stringent than the federal standards (NMDEI 1997). A summary of the federal and New Mexico ambient air quality standards that apply to the proposed project area is presented in Table 3.3-1.

State Implementation Plan. The CAA of 1977 set provisions for the attainment and maintenance of the NAAQS. For non-attainment regions, the states are required to establish a State Implementation Plan (SIP) designed to eliminate or reduce the severity and number of NAAQS violations, with an underlying goal to bring state air quality conditions into (and maintain) compliance with the NAAQS by specific deadlines. This plan is to be prepared by local agencies and incorporated into the overall SIP of each state, which is designed to eliminate or reduce the severity and number of NAAQS violations, with an underlying goal to bring state air quality conditions into (and maintain) compliance with the NAAQS.

The Clean Air Act Amendments (CAAA) of 1990 established new federal nonattainment classifications, new emission control requirements, and new compliance dates for nonattainment areas. The requirements and compliance dates are based on the severity of nonattainment classification.

General Conformity. CAA Section 176(c), General Conformity, established certain statutory requirements for federal agencies with proposed federal activities to demonstrate conformity of the proposed activities with the each state's SIP for attainment of the NAAQS. In 1993, EPA issued the final rules for determining air quality conformity. Federal activities must not:

(a) Cause or contribute to any new violation.

(b) Increase the frequency or severity of any existing violation.

(c) Delay timely attainment of any standard, interim emission reductions, or milestones in conformity to a SIP's purpose of eliminating or reducing the severity and number of NAAQS violations or achieving attainment of NAAQS.

General conformity applies only to nonattainment and maintenance areas. If the emissions from a federal action proposed in a nonattainment area exceed annual thresholds identified in the rule, a conformity determination is required of that action. The thresholds become more restrictive as the severity of the nonattainment status of the region increases.

3.3.2 Existing Conditions

Climate. The area generally has clear skies and excellent visibility. There are only 20 days per year when there is a cloud ceiling less than 3,000 feet above ground level, and 22 days per year when the visibility is less than 6 miles (most of these occur in the winter). Although winds in the region can be strong and gusty in the vicinity of a thunderstorm, typically they are relatively low, averaging 5 mph. The prevailing wind direction is from the west, although southerly winds are common during the warmer months.

Table 3.3-1 Ambient Air Quality Standards

Air Pollutant	*Averaging Time*	*Federal NAAQS*		*New Mexico AAQS*	
		Primary	*Secondary*	*Primary*	*Secondary*
Carbon Monoxide (CO)	8-hour	9 ppm	---	8.7 ppm	---
	1-hour	35 ppm	---	13.1 ppm	---
Nitrogen Dioxide (NO_2)	AAM	0.053 ppm	0.053 ppm	0.05 ppm	0.053 ppm
	24-hour	---	---	0.10 ppm	---
Sulfur Dioxide (SO_2)	AAM	0.03 ppm	---	0.02 ppm	---
	24-hour	0.14 ppm	---	0.10 ppm	---
	3-hour	---	0.5 ppm	----	0.5 ppm
Particulate Matter (PM_{10})	AAM	50 $\mu g/m^3$	50 $\mu g/m^3$	---	50 $\mu g/m^3$
	24-hr	150 $\mu g/m^3$	150 $\mu g/m^3$	---	150 $\mu g/m^3$
Particulate Matter ($PM_{2.5}$) [(a)]	AAM	15 $\mu g/m^3$	15 $\mu g/m^3$	---	---
	24-hour	65 $\mu g/m^3$	65 $\mu g/m^3$	---	---
Total Suspended Particulates (TSP)	AGM	---	---	60 $\mu g/m^3$	---
	30-day	---	---	90 $\mu g/m^3$	---
	7-day	---	---	110 $\mu g/m^3$	---
	24-hr	---	---	150 $\mu g/m^3$	---
Ozone (O_3) [(b)]	1-hour	0.12 ppm	0.12 ppm	0.12 ppm	0.12 ppm
	8-hour	0.08 ppm	---	---	---
Lead (Pb) and Lead Compounds	Calendar Quarter	1.5 $\mu g/m^3$	1.5 $\mu g/m^3$	1.5 $\mu g/m^3$	1.5 $\mu g/m^3$

Sources: 40 CFR 50, NMAQB 1997

Notes: AAM = Annual Arithmetic Mean
AGM = Annual Geometric Mean
ppm = parts per million
$\mu g/m^3$ = micrograms per cubic meter

(a) The $PM_{2.5}$ standard (particulate matter with a 2.5 µm diameter) was promulgated in 1997, and will be implemented over an extended time frame. Areas will not be designated as in attainment or nonattainment of the $PM_{2.5}$ standard until the 2002-2005 timeframe.

(b) The 8-hour ozone standard was promulgated in 1997, and may eventually replace the 1-hour standard. The U.S. Supreme Court has instructed the EPA to develop a reasonable implementation of the 8-hour nonattainment provisions. During the interim, the 1-hour ozone standard will continue to apply to areas not attaining it.

The atmosphere in the region is generally well mixed. The seasonal and annual average mixing heights can vary from 400 meters in the morning to 4,000 meters in the afternoon. The morning mixing heights are usually low, due to nighttime heat loss from the ground, which produces surface-based temperature inversions. After sunrise, these inversions quickly break up, and solar heating of the earth's surface results in good vertical mixing in the lower layers of the atmosphere.

Dust is frequently entrained into the atmosphere in this region of the country because of gusty winds and the semiarid climate. The Texas Panhandle-southern New Mexico area is considered the worst area in the United States for windblown dust, and occasionally the dust is of sufficient quantity to restrict visibility. Most of the seasonal dust storms occur in March and April, when wind speeds are higher.

Local Air Quality. A review of the federally published attainment status for New Mexico in 40 CFR 81.332 indicated that Otero and Lincoln Counties are designated as in attainment, better than national standards, or unclassifiable for all criteria pollutants (EPA 2000).

Current Emissions. Baseline emissions along the pipeline are predominantly from vehicular traffic and other human activities in the area. To a small degree, activities are associated with routine maintenance and repair crews, who commute as needed to various work areas and contribute to baseline emissions. These emissions would include particulate emissions from minor trenching, grading, and other ground disturbance activities; combustion emissions from construction equipment; and vehicle emissions from workers commuting to and from the worksite.

These routine maintenance and repair activities are expected to continue throughout the duration of the Proposed Action and alternatives. Therefore, the current emissions, which are expected to be relatively minor, would be expected to continue throughout the duration of the construction and are not quantified here. Only the change in emissions due to the Proposed Action and alternatives will be evaluated in this document.

3.4 BIOLOGICAL RESOURCES

3.4.1 Definition of Resource

Biological resources include native or naturalized plants and animals, and the habitats in which they occur. Although the existence and preservation of biological resources are intrinsically valuable, these resources also provide essential aesthetic, recreational, and socioeconomic values to society. This section describes plant and animal species or vegetation types that typify the biological resources in the area of the pipeline and focuses on species protected under federal or state law. For purposes of this assessment, sensitive species are plants and animals listed as threatened, endangered, or are of concern to the U.S. Fish and Wildlife Service (USFWS), the New Mexico Department of Game and Fish (NMDGF) (NMDGF 2000), and the New Mexico Rare Plant Technical Council (NMRPTC 1999), which designates state-protected species.

This section addresses six categories of protection status species with the potential to occur in the study area. These include: 1) Federal Listed Threatened and Endangered Species, 2) Federal Proposed Species, 3) Candidate Species, 4) State Listed Threatened and Endangered Species,

5) Species of Concern, and 6) State Rare and Sensitive Species. These categories are defined below.

Federal Listed Threatened and Endangered Species – The Endangered Species Act (ESA) of 1973 provides protection to species listed under this category. Endangered species are those species that are in danger of extinction throughout all or a significant portion of [their] range. Threatened species are those that are likely to become endangered species in the foreseeable future.

Federal Proposed Species – Any species of fish, wildlife, or plant that is proposed in the *Federal Register* to be listed under Section 4 of the ESA.

Candidate Species – These are species that the USFWS is considering for listing as federally threatened or endangered but for which a proposed rule has not yet been developed. In this sense, candidates do not benefit from legal protection under the ESA. In some instances, candidate species may be emergency listed if the USFWS determines that the species population is at risk due to a potential or imminent impact. The USFWS encourages federal agencies to consider candidate species in their planning process as they may be listed in the future.

State Listed Threatened and Endangered Species – A list of state threatened and endangered species is maintained by the state of New Mexico and these species are protected from harassment, taking, and possession. Similar definitions of threatened and endangered in the federal category apply to the state category. State and federal lists often include the same species.

Species of Concern – Species of concern to the USFWS are species for, which there is insufficient information to determine if they should be listed. It is an informal term and these species receive no legal protection under the ESA.

State Rare and Sensitive Species – New Mexico rare plant species include species with narrow ranges, or occurrences that are more widespread but are numerically rare.

3.4.2 Existing Conditions

Field surveys for sensitive species and other biological features were conducted along the Bonito pipeline ROW in February and March 2001 in support of this environmental assessment. Follow-up surveys for sensitive and invasive species were conducted in April, May, and June 2001 (a season more appropriate for identifying species) by a Holloman AFB biologist. A list of sensitive plants and animals that could occur along the ROW was provided by biologists from Holloman AFB. The methods used and the results of the surveys for these species, as well as information on other biological features of interest, appear in Appendix B, Biological Resources, and are summarized here. The scientific names of all species mentioned in this section appear in Appendix B, Biological Resources.

3.4.2.1 Vegetation

Upland Vegetation

The Bonito Pipeline route passes through Chihuahuan Desert shrublands and grasslands through much of its route, as well as the plains mesa grasslands in the Carrizozo area and pinyon pine-juniper woodlands near the northern terminus (Dick-Peddie 1993). A total of 190 species of plants were observed and the native plant communities were described during field surveys in February and March 2001. Creosotebush dominated shrublands occur along approximately 43 miles (57 percent) of the 75 miles surveyed. In some areas, it is almost a monoculture with sparse honey mesquite, purple prickly pear, and grass cover. In other areas, there is greater grass cover and honey mesquite, four-wing saltbush and other shrub species are more common. Honey mesquite dominated shrublands occur along about 10 miles of the line (13 percent) and generally occur in more sandy areas. Four-wing saltbush is also common and less common species include wolfberry, snakeweed, and joint-fir. Common grasses included mesa dropseed and bushy muhly.

Grasslands generally occur in the northern part of the pipeline and it traverses an estimated 20 miles of this type (27 percent). Species such as alkali sacaton and galleta are common and are in association with hairy grama, ring muhly, threeawn, and black grama. In some areas, yucca is a common species in these grasslands.

Only the upper 2 miles (3 percent) of the pipeline near Nogal traverses Pinyon pine-juniper woodlands. Shrubs such as four-winged saltbush, broom snakeweed, winterfat, and skunkbush are scattered throughout. Extensive grass cover consists of galleta, curly mesquite, blue grama, hairy grama, black grama, and threeawn. In some areas, the woodlands are an open juniper savannah with the same grassland plant community.

Wetlands and Ephemeral Drainages

Wetlands were not observed along the pipeline ROW although some wetland habitat was observed at sewage treatment ponds near the south end of the route. Tularosa Creek was the only perennial stream crossed by the pipeline (see Figure 1 in Appendix B). The vegetation along Tularosa Creek in the pipeline ROW has been highly impacted and little vegetative cover remains. A dense stand of seep-willow, willow, and salt cedar occurs along this stream, both east and west of the pipeline. These shrubs are 15 to 20 feet high in many places. This habitat extends for an unknown distance down stream and up stream from U.S. 54.

The remaining drainages are dry arroyos and swales that typically contain flowing water during storm events and range from small drainages to wide arroyos and swales. A total of 84 washes were inspected (see Figure 1 in Appendix B). Forty were arroyos, which had obvious incised channels, and the remaining 44 were swales that were generally shallow with no obvious incised channel. Most arroyos had rocky or sandy bottoms and vegetation was restricted to the edges of the channel where species such as alkali sacaton and Johnson grass may be encountered. A few contained some woody vegetation such as desert willow, seep-willow, and brickellbush and a few salt cedars. Vegetation in the swales consisted of various species of grass such as Johnson grass and tobosa. The vegetation in most of these drainages was altered from human activity and

varied from being essentially devoid of vegetation to having a fairly natural plant cover (Table 1 in Appendix B).

Noxious Plants

Areas of fairly dense growths of noxious plants were mapped during recent surveys (see Figure 2 in Appendix B). Additional noxious plant species were identified in follow-up surveys in April, May, and June 2001 by Holloman AFB personnel. These locations are also shown on Figure 2 in Appendix B. Of the thirteen noxious plant locations that were mapped, African rue and field bindweed were the most common.

3.4.2.2 Wildlife

The background information regarding wildlife that likely occurs in the area of the pipeline was obtained from detailed studies conducted recently at White Sands Missile Range (WSMR) and on Fort Bliss south of Alamogordo (U.S. Army 1998, 1999a,b) as well as observations made during biological surveys conducted for this study.

Amphibians and Reptiles

Recent studies in southern New Mexico resulted in the observation of about 50 species of amphibians and reptiles (U.S. Army 1999b). Of these, 37 and 31, respectively, species occur in Chihuahuan Desert grasslands and shrublands. Common species in the grasslands are the northern earless lizard, southern prairie lizard, and striped whiptail, and in the shrublands are the striped whiptail, side-blotched lizard, and marbled whiptail. Snake species such as the western diamondback rattlesnake and bull snake are common and widespread throughout the area while the Mojave and prairie rattlesnakes are more apt to occur in grasslands and the Texas long-nosed snake in the desert shrublands. A study of amphibian and reptile use of arroyo-riparian habitat and the surrounding uplands in the Chihuahuan Desert showed that there was no statistical difference in species richness and abundance between the two habitat types (U.S. Army 1999a). No species of amphibians or reptiles were observed during surveys along the pipeline route due to the timing of the surveys (February and March) and the cold rainy weather.

Avifauna

The avifauna in southern New Mexico is quite diverse as indicated by studies on Fort Bliss and WSMR where 334 and 264 species were recorded respectively (U.S. Army 1998, 1999b). Many of these species are migrants (129 of the 334 species on Fort Bliss) and others occur in the forested habitat on the two military installations. Avifauna studies on McGregor Range resulted in an average of 45 species recorded in the creosotebush dominated habitats, 50 in the mesquite dominated habitat, 34 in the black grama grasslands, and 63 species in the pinyon pine-juniper woodlands. The black-throated sparrow was by far the most common species recorded in the shrublands in the Tularosa Basin; the western kingbird, Scott's oriole, and ash-throated flycatcher were other common species. The eastern meadowlark and horned lark were the most common species in grassland habitats in the Tularosa Basin. The most common species in the pinyon pine/juniper woods in the Sacramento Mountains foothills were the northern mockingbird, bushtit, and spotted towhee (U.S. Army 1999a). The Swainson's hawk and red-

tailed hawk were the most common nesting raptors recorded in the desert shrublands and grasslands.

A total of 51 species of birds were recorded during five days of field surveys (see Table 2 in Appendix B). Species observed such as the mourning dove, ladder-backed woodpecker, verdin, black-throated sparrow, pyrrhuloxia, meadowlarks, and house finch are common breeding species in the Chihuahuan Desert and likely are breeding species in the area of the ROW. Cliff swallow nests were observed under 24 bridges over drainages along the pipeline. Four stick nests were observed. All were at least 400 feet from the pipeline ROW. Due to their size, they are assumed to be Chihuahuan raven nests (see Figure 1 in Appendix B).

The pipeline crosses numerous drainages and all except Tularosa Creek are ephemeral. The dense vegetation and perennial water along Tularosa Creek may provide habitat for riparian nesting species such as the yellow-breasted chat, yellow warbler, and the blue grosbeak as well as federal and state sensitive species such as the southwestern willow flycatcher. Recent studies in the Chihuahuan Desert have shown that dry arroyos (referred to as arroyo-riparian habitat) tend to support a higher density of breeding birds then the surrounding uplands and are important to migrating birds including neotropical migrants (Kozma 1995, Kozma and Mathews 1997, U.S. Army 1999a).

Mammals

Mammal species diversity is high in southern New Mexico as indicated by surveys on Fort Bliss where 58 species have been recorded and on WSMR where 75 species occur (U.S. Army 1998, 1999b). Small mammal studies in the Chihuahuan Desert indicated the silky pocket mouse and Merriam's kangaroo rat were the most abundant species. Other common species were the deer mouse, hispid cotton rat, and white-footed mouse (U.S. Army 1999a). Another study in the Chihuahuan Desert showed that small mammals relative abundance were greater in the arroyo-riparian habitat than in the surrounding upland habitat. Arroyos with greater shrub diversity, canopy cover, and height supported more small mammals than the surrounding areas (Jorgensen et al. 1998).

Other common mammal species in this area are the desert cottontail, black-tailed jackrabbit, coyote, and badger. Species of mammals or their sign observed along the pipeline ROW include the coyote, black-tailed jackrabbit, desert cottontail, mule deer and skunk as well as pocket gopher and woodrat mounds.

3.4.2.3 Sensitive Species

The USFWS and NMDGF have been contacted for lists of threatened and endangered species in Otero and Lincoln Counties. Based on recent studies in the project area, surveys for federal and New Mexico sensitive species or potential habitat were conducted from February 26 through March 2, 2001 (see Table 3.4-1). Sensitive species that were observed or are likely to occur in the project area, based on the recent survey, are described below. Additional information can be found in Appendix B.

Table 3.4-1 Sensitive Species Observed or with the Potential to Occur along the Bonito Pipeline ROW in Otero and Lincoln Counties[1]

Common name	*Scientific name*	*Status*[a]		*Occurrence along Pipeline ROW*
		F	S	
Plants				
Kuenzler's hedgehog cactus	*Echinocereus fendleri var. kuenzleri*	E	E	Four possible specimens observed along ROW. Follow-up surveys in May identified these specimens as a common species, *Echinocereus triglochidiatus.*
Night-blooming cereus	*Peniocereus greggii*	SC	E	Potential habitat in Chihuahuan Desert shrublands. Not observed in area of pipeline ROW.
Villard's pincushion cactus	*Escobaria villardii*	SC	E	Three specimens possibly observed within pipeline ROW in February, but not relocated on four subsequent visits.
Turk's head barrel cactus	*Ferocactus haematacanthus var. haematacanthus*	_	R	Not observed during surveys. Only known from a single individual in New Mexico near Texas border.
Todsen's pennyroyal	*Hedeoma todsenii*	E	E	Occurs on gypsiferous soil on steep north facing slopes, and such habitat does not occur along pipeline ROW.
Alamo beardtongue	*Penstemon alamosensis*	SC	R	Basal leaves of unknown penstemon adjacent to ROW. Follow-up surveys in May confirmed this to be a common species.
Kerr's milkvetch	*Astragalus kerrii*	SC	R	Two small tufted milkvetch growing along ROW west of Nogal. Survey in May found these to be common species.
Wildlife				
Texas horned lizard	*Phrynosoma cornutum*	SC	_	Not observed. Potential habitat present on and in area of ROW.
Mountain plover	*Charadrius montanus*	PT	_	Potential habitat in grassland along ROW.
Western burrowing owl	*Athene cunicularia*	SC	_	Not observed and burrows along ROW show no evidence of use.
Southwestern willow flycatcher	*Empidonax trailii extimus*	E	E	Only potential habitat is along Tularosa Creek.
Loggerhead shrike	*Lanius ludovicianus*	SC	_	Observed at three locations. Wintering and likely breeding species along ROW.
Black-tailed prairie dog	*Cynomys ludovicianus*	C	_	No prairie dog towns observed along pipeline ROW.
Botta's pocket gopher	*Thomomys bottae*	_	S	Pocket gopher mounds observed in 6 locations along ROW. Species unknown.

Notes: 1. As determined from field surveys during the February and March 2001, and April/May 2001.
[a] F = Federal, S = State, E = Endangered, SC = Species of Concern, R = Rare, PT = Proposed Threatened, C = Candidate, S = Sensitive.

Federal Listed, Proposed Species, and Species of Concern

During surveys in late February and early March four possible Kuenzler's hedgehog cactus were observed along the pipeline ROW. Inconclusive siting of Villard's pincushion cactus were observed, one in silty clay soil and two above a road cut on a terrace. A few basal leaves of an unknown penstemon (sp.) were observed on the lower slopes and adjacent highway ROW in the pinyon pine-juniper woodlands west of Nogal, and two low-growing tufted milkvetch were observed west of Nogal near the upper end of the pipeline. These locations are included in Figure 3 in Appendix B. Follow-up surveys in April and May were not able to relocate Villard's pincushion cactus on four visits, and this species is not believed to be present in the ROW. The surveys determined that four possible Kuenzler's hedgehog cacti were not this species; rather, they are *Echinocereus triglochidiatus*, not a species of concern. Also, the unknown penstemon and milkvetch were identified as common species.

The Texas horned lizard is typically found in arid and semiarid habitat with sparse vegetation in loose sand or loamy soils dominated by grass with scattered cacti, yucca, and assorted woody species (Pianka and Parker 1975). Potential habitat occurs in the area especially in the more sandy soils associated with the mesquite shrub communities. It is therefore assumed that this species may occur in the pipeline ROW.

The mountain plover is generally considered an associate of the short grass prairie dominated by blue grama and buffalo grass (Knopf and Miller 1994) often in areas of disturbed ground such as occur at prairie-dog towns or heavily grazed areas. It has been recorded from Lincoln County during the breeding season and there are some old records from Otero County (Sagar 1996). Based on its habitat requirements, the grasslands in the area of the pipeline ROW may provide potential habitat for this species although its occurrence in the ROW next to U.S. 54 and other roads during the breeding season would be very unlikely.

The western burrowing owl nests in prairie, desert, sagebrush, and pinyon/juniper habitat as well as disturbed areas such as prairie dog towns, road cuts, and airports. This species was most often associated with prairie dog towns in the Chihuahaun Desert grasslands and observed much less often in shrubland habitat (U.S. Army 1999a). No burrowing owls were observed along the pipeline ROW during the field surveys and there was no evidence of occupancy of burrows observed in the ROW. Given that part of the burrowing owl population migrates out of the area during the winter, it is possible that these burrows could become occupied by burrowing owls in the spring.

The southwestern willow flycatcher breeds only in dense riparian vegetation near surface water or saturated soil in linear or irregularly shaped stands with patches of dense vegetation interspersed with small openings (Sferra et al. 1997, Sogge et al. 1997). The willow flycatcher has been recorded occasionally in arroyo-riparian habitat in the Chihuahuan Desert on McGregor Range but these birds are assumed to be migrants because they were not present during the breeding season. It was determined that there is no appropriate breeding habitat for the southwestern willow flycatcher anywhere on the 1.1 million acre Fort Bliss (U.S. Army 1999b).

The only potential habitat for this species in the area of the pipeline ROW is the dense seep-willow and willow habitat along Tularosa Creek. This species nests in both of these habitats,

(Sogge and Marshall 2000) so surveys by the Air Force for the southwestern willow flycatcher will take place from May into July to determine if it nests in this habitat in the area of the pipeline.

The loggerhead shrike winters as well as breeds in the area of the pipeline. It was fairly common in the Chihuahuan Desert as indicated by studies on McGregor Range where this species was consistently about 10 percent of the breeding bird population (U.S. Army 1999b). It is also widespread on WSMR (U.S. Army 1998). This species was observed at three locations on and near the pipeline ROW (see Figure 3 in Appendix B). It is not known if these birds were winter or year around residents but it is assumed that the loggerhead shrike is a nesting species in the area of the pipeline

The black-tailed prairie dog is found in open and shrub dominated grasslands. It seems to have a patchy distribution in the region. It was recorded in the grassland habitat on Otero Mesa in 17 active prairie dog towns (U.S. Army 1999a). There are no known active prairie dog towns in the extensive grasslands on WSMR (U.S. Army 1998). Potential habitat occurs along the 20 miles of pipeline that traverses grasslands in the northern part of the ROW. This habitat was inspected on foot or from a slow moving vehicle and no prairie dog towns were observed along or in the area of the pipeline ROW.

State Listed, Proposed Species, and Species of Concern

Botta's pocket gopher (a state listed species) lives in a wide range of habitats from dry deserts to montane meadows and can spend up to 90 percent of the time underground (Davis 1974). It has been recorded from the Chihuahuan Desert on McGregor Range south of the pipeline (U.S. Army 1999a). Several areas of active pocket gopher mounds were observed along the pipeline ROW (see Figure 3 in Appendix B). The inhabitants of these mounds would need to be trapped before the species identification can be made.

3.5 CULTURAL RESOURCES

3.5.1 Definition of Resource

Cultural resources are any prehistoric or historic district, site, or building, structure, or object considered important to a culture, subculture, or community for scientific, traditional, religious or other purposes. They include archaeological resources (both prehistoric and historic), historic architectural resources, and traditional cultural resources. Only significant cultural resources (as defined in 36 CFR 60.4) are considered for potential adverse impacts from an action. Significant archaeological and architectural resources are either eligible for listing, or listed on the NRHP. Significant traditional cultural resources are typically identified to federal agencies by Native American tribes or other groups, and may be eligible for the NRHP.

On 21 November 1999, the Department of Defense (DoD) promulgated its American Indian and Alaska Native Policy, which emphasizes the importance of respecting and consulting with tribal governments on a government-to-government basis. The Policy requires an assessment, through consultation, of the effect of proposed DoD actions that may have the potential to significantly affect protected tribal resources, tribal rights, and Indian lands before decisions are made by the services.

3.5.2 Existing Conditions

3.5.2.1 Cultural Resource Background

Our understanding of major developments throughout the prehistory of the Tularosa basin encompasses occupations from three periods: PaleoIndian, Archaic and Formative. Information presented for each of these time intervals includes artifact assemblages, settlement patterns, architectural characteristics, and subsistence practices. There is little published information on traditional cultural resources in southern New Mexico. However, consultations with the Mescalero Apache and other tribes have yet to indicate the presence of such resources in the area potentially affected by this proposal.

PaleoIndian Period

Previous archaeological research in the Southwest has revealed that human occupation of the area spans thousands of years. The earliest well documented archaeological remains of the area are assigned to the PaleoIndian period, dating between 9000 and 6000 B.C. The distinctive PaleoIndian stone tool assemblages, containing finely made lanceolate points, are generally thought to be indicative of adaptations specialized for the hunting of large game. Representative of these assemblages are the Clovis and Folsom "cultures," both of which are documented as occurring in southern New Mexico and southwest Texas (Beckes 1977, Eidenbach 1983, Harkey 1981).

A continuation of a highly mobile hunting and gathering subsistence base is assumed into late PaleoIndian times. It is during this period that sets of diversified lithic technologies are introduced. Sites and isolated occurrences within the project area are generally assigned to the PaleoIndian period based on the presence of specialized tools and projectile points (Kauffman and Wright 1987).

Archaic Period

A more diversified set of exploitative technologies came into use about 6000 B.C., generally referred to as the start of the Archaic Period in this region. The Archaic Period lasts from approximately 6000 B.C. to 1 B.C. Several important changes are thought to have occurred during the Archaic Period. The shift in focus from big game hunting to a broader spectrum hunting and gathering subsistence base is foremost, accompanied by postulated increases in the resource zones and types of resources utilized. Settlement patterns also changed noticeably, reflecting more dispersed and variable subsistence strategies. Such patterns are recognized in the variability of known Archaic sites. Archaic sites have been recorded in a variety of environmental and topographical zones (Dick 1965, Human Systems Research 1972, Laumbach 1980, Martin et al. 1949, and Whalen 1971). Most of the Archaic sites known from the project area are from surface scatters and not from excavated sites. However, several excavated Archaic sites are present.

Formative Period

There was a shift away from nomadic hunting-and-gathering around 1 B.C. toward a more sedentary settlement system, reflecting a greater emphasis on the cultivation of crops such as

maize and beans and may have been prompted by increasing population growth. In the southern New Mexico area, the Formative period has been subdivided into three phases including the Mesilla (A.D. 900-1100), Doña Ana (A.D. 1100 -1200), and El Paso (A.D. 1200-1400) phases.

The Mesilla Phase is defined by the presence of undifferentiated brownware ceramics and a subsistence base composed of a mixture of hunting and gathering and agriculture. Recent research indicates that pithouses and plain brownware ceramics were present in the area from as early as A.D. 200 (Carmichael 1985, O'Laughlin 1980).

Sites dating from the Dona Ana phase, although ephemeral and not well documented, have been recorded in the Rio Grande valley, the Hueco Bolson, and the Tularosa Basin (Carmichael 1983, Miller 1989, O'Laughlin 1981). Both pithouse and adobe pueblos are known from this phase in riverine and non-riverine areas.

The El Paso Phase (A.D. 1200-1400) represents the terminal portion of the Mogollon phase sequence as it is currently defined. Architecture consists of above ground, linear-roomed, adobe pueblos. Site locations are varied, but alluvial terraces and playa margins appear to be preferred. The ceramic assemblage is also varied and contains El Paso Polychrome, Mimbres Classic Black-on-White, Chupadero Black-on-White, Three Rivers Red-on-Terracotta, Gila and Tonto Polychrome, and a variety of Chihuahuan wares.

At the time of first contact with Native Americans, Spanish explorers noted a myriad of small groups of hunter-gatherers situated along the margins of the Rio Grande River. Among the many names assigned to these groups were Sumas, Jumanos or Quemanderos and, finally the Apaches (Forbes 1957). These groups lacked the large agricultural villages that were the foundation of Spanish colonization policies which required access to native land and labor. Therefore, these groups were largely ignored. Because of this, there is a corresponding dearth of documentary information about Native Americans in southern New Mexico throughout most of the Spanish period. Despite sporadic Spanish and Mexican military campaigns and the spread of European diseases, the Mescalero Apache continued to occupy much of their traditional homeland in the Sacramento Mountains, ranging westward across the Tularosa Basin.

The Seventeenth, Eighteenth, Nineteenth, and Twentieth Centuries

The project area remained largely unoccupied by Euro-American peoples through much of the eighteenth and nineteenth centuries. The earliest Spanish settlement in the region occurred with the founding of a chapel at La Luz in 1719 (Julyan 1996, Pearce 1965). The initial impetus for permanent Euro-American occupations in the project area can be traced to a series of disastrous floods that occurred along the main stem of the Rio Grande in 1862, and again in 1865 (Carter 1953), and the establishment of Fort Stanton in Lincoln County. Fort Stanton was intended to provide an outpost for troops engaged in suppression of Apache raiding.

The late nineteenth century was characterized by substantial growth in the project area. This growth, accompanied by the founding of a succession of new towns, can be related directly to two intertwined events: the discovery of precious metals and the advent of railroads, vital to the need to transport ore to regional smelters. The region's earliest railroad extended from El Paso, TX, northward to Capitan, NM (Myrick 1990, Robertson 1986). Many towns sprang up or

became established as water stops along the railroad including Carrizozo (1899), Three Rivers (1899), and Oscura (1899) (Julyan 1996, Pearce 1965).

Railroad companies went to great lengths to import water suitable (non-saline) for their steam locomotives (Myrick 1990). For example, Bonito Lake was constructed to provide water for steam locomotives (Julyan 1996, Pearce 1965). The Bonito pipeline was designed specifically to provide usable water for the railroad in the Tularosa Valley, but early on it also began to provide drinking water to towns along the track and continues to do so today. This pipeline, often rebuilt over the intervening years, is the predecessor of the Bonito pipeline that is the focus of this project.

Demand for rail transport increased during World War I in order to move raw materials for the war effort. Yet, with the cessation of hostilities, commodity metal prices, notably copper, approached all-time lows and railroads lost revenues. This same cycle repeated during and after World War II. The postwar years, as in the beginning of the twentieth century, were typified by low commodity metal prices, labor strikes, and a reduction in mining activities. All these factors contributed to a slump in rail traffic. Further, the gradual replacement of steam locomotives by diesel locomotives during the 1950s signaled the progressive decline of the many small towns that once dotted the railroad through the Tularosa Basin. With water no longer so crucial, and maintenance facilities no longer needed, the population of many small towns dropped to near nineteenth century levels.

Beginning in the late 1940s, the Tularosa Basin experienced a shift toward a more diversified economic base. Farming, ranching, and mining characterized most of the nineteenth and early twentieth centuries. Within the southern part of the project area, pecan orchards have recently been established. The beginning and expansion of both Holloman Air Force Base and the White Sands Missile Range brought a highly visible military presence into the region.

3.5.2.2 Cultural Resource Inventory

Initial knowledge of the cultural resources in the vicinity of the Proposed Action and alternatives was gathered from the State of New Mexico Cultural Resources Information System (NMCRIS) and Archaeological Records Management (ARMS) section of the Office of Cultural Affairs. As a result of NMSHTD projects, such as Michalik (1998, revised 2000), much of the area within and adjacent to the Bonito pipeline corridor has been recently surveyed, resulting in the discovery of numerous archaeological sites. Twenty-nine of those site records indicated proximity to the pipeline corridor, and required further research. Four of those sites have been recently excavated (Shields 2000).

To complete the cultural resources inventory coverage of the entire area of the Proposed Action and alternatives, 206.6 additional acres of survey were conducted for this EA (Ackerly 2001). Three previously unrecorded sites were found, and the description of one previously recorded site was expanded to reflect currently observable conditions. The resulting list of 32 archaeological sites is presented in Table 3.5-1. Figure 3.5 shows the location of the sites listed in Table 3.5-1.

Table 3.5-1 Summary of Known Sites in the Project Area

Number[1]	*Within Pipeline Easement*	*Type*	*Age*
6834**	No	Lithic Scatter	Unknown
6837**	No	Lithic Scatter	Unknown
6838	Unknown	Lithic Scatter	Unknown
9061	No	Historic Village	1890-present
13495	No	Sherd/Lithic Scatter with Pithouses and Hearths	A.D. 750-1175
50086	No	Historic Mine	1850-present
50107	No	La Luz Historic District	1865-present
72438	No	Multicomponent Archaic and Historic	> 3000 B.C. and Historic
85817**	No	Sherd/Lithic/Groundstone Scatter	A.D. 200-1400
86735*	No	Historic Trash Scatter	Post-1900
86736*	Yes	Sherd/Lithic Scatter with Fire-Cracked Rock Concentrations	A.D. 1000-1350
86737*	No	Multicomponent Late Pueblo and Historic	A.D. 1175-1400 and Post-1900
86738	No	Historic Trash Scatter	Post-1900
109326	No	Historic Structures and Debris	1920-1960
114462	No	Multicomponent Lithic Scatter and Historic Foundations/Trash	Unknown Prehistoric and Post-1900
114579	Yes	Prehistoric Artifacts	Circa A.D. 1200
114580	Yes	Prehistoric Artifacts	Circa A.D. 1200
114581	Yes	Prehistoric Artifacts	Circa A.D. 1200
114582	Yes	Multicomponent Sherd/Lithic Scatter with roomblock mound	A.D. 1150-1400
114583	Yes	Prehistoric Structures and Artifacts	Circa A.D. 1200
120972	Yes	Sherd/Lithic/Ground Stone Scatter with Fire-Cracked Rock Concentrations	A.D. 1100-1350

Number[1]	*Within Pipeline Easement*	*Type*	*Age*
120973	Yes	Sherd/Lithic/Ground Stone Scatter with Fire-Cracked Rock Concentrations	A.D. 1100-1350
120974	No	Sherd/Lithic/Ground Stone Scatter with Fire-Cracked Rock Concentrations	A.D. 1100-1350
120975	No	Sherd/Lithic/Ground Stone	A.D. 1100-1350
120976	No	Sherd/Lithic Scatter with Fire-Cracked Rock Concentrations	A.D. 1200-1400
120977	No	Lithics with Fire-Cracked Rock Concentrations	Unknown
120978	No	Historic Foundations and Trash Scatter	Post-1900
120979*	No	Historic Trash Scatter	Post-1900
121047	Yes	Historic Grave	Post-1900
132130	Yes	Lithic Scatter, Prehistoric Artifacts	n.d.
132131	Yes	Historic Dump	Late 1800-early 1900
132132	Yes	Historic Trash Dump, Single Event	1930s

Notes: 1. Number assigned by the Laboratory of Anthropology state index of sites.
* Excavated; see discussion.
** Location on record reportedly in ROW, but sites are not in ROW (Ackerly 2001, Gomolak 2001).

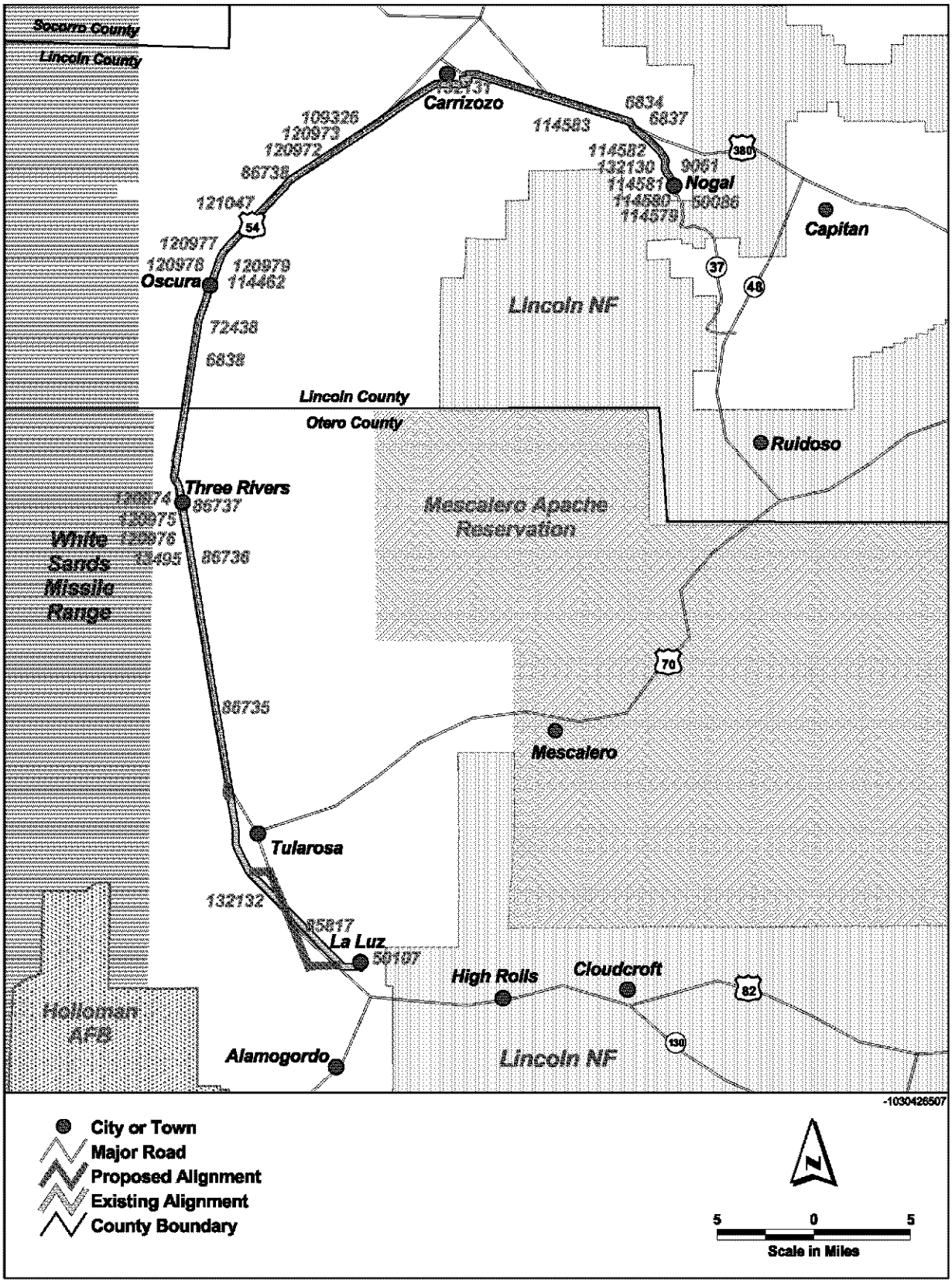

Figure 3-5 Location of Cultural Resources along the Bonito Pipeline

As a unit, any of these sites may be eligible for inclusion on the NRHP because they appear to retain recoverable data potentially important to the prehistory of the region. However, the portions of the sites, within the area to be affected by the Proposed Action or alternatives, have received major impacts from highway and pipeline construction. Because of the perplexity posed by the proximity, potential, and previous effects, the records and sites were perused by professional personnel from Holloman AFB. Of the 32 sites within the vicinity of potential effects, only 12 actually overlap the existing or proposed pipeline work area. Brief discussions of all 32 sites are provided below, along with discussion of the possible effects, effects minimization rationale, and proposed treatment of each site (Gomolak 2001).

LA 6834 & LA 6837. The locations on digital record (NMCRIS) indicate these might be near the pipeline; however, the paper site file records (ARMS) show these sites about four miles east of their digital representation, and associated with topographic relief and knolls along U.S. 380. No appreciable local relief, and no knolls are along U.S. 380 where it is paralleled by the pipeline; and, no such sites were found during recent surveys (Leach 1996, Ackerly 2001). It is most likely that these sites are east of the NM 37 turnoff, in more hilly terrain along U.S. 380. They are not in the area to be affected by the proposed pipeline repair project.

LA 6838. This is a dispersed lithic artifact scatter, several meters west (outside) of the U.S. 54 ROW fence at mile marker 104.7. The highway fence line is the western limit of the permissible pipeline disturbance, and roughly the eastern limit of the site. This site would not be affected.

LA 9061. This site is on record to provide a reference number for historical records of Nogal village and the vicinity. No known cultural resources in the immediate vicinity of Nogal would be affected by the proposed pipeline repairs.

LA 13495. The "Hatchet Site" is a huge (estimated at 2.7 million square meters) prehistoric and historic site, immediately west of the west side U.S. 54 highway fence, at mile marker 96. Several prehistoric pithouses were excavated there circa 1960, and the site record has since been updated several times. Whether due to absence, or the extent of highway and pipeline disturbance, there are no indications of potentially significant subsurface remains (such as ash or artifacts surfaced by the previous pipeline trench) in the area to be disturbed by the proposed pipeline repair. Likewise, there is no indication that the site continues further east, as do others discussed below. No cultural resources should be affected.

LA 50086. This site is on record to provide a reference number for historical records of old mines in the Nogal vicinity. No known cultural resources in the immediate vicinity of Nogal would be affected by the proposed pipeline repairs.

LA 50107. The La Luz Historic District is approximately one quarter to one half mile removed from the proposed pipeline project as it passes through La Luz. None of the features pertinent to the historic district would be affected by the pipeline repairs.

LA 72438. Located near mile marker 105.5 on U.S. 54, this site is characterized as very sparse (80 artifacts over 16,000 square meters). Archaic period lithic artifact scatter including two projectile points; with an overlay of about 30 early historic artifacts including aqua and purple glass, cans and metal fragments. It is immediately outside (west) of the highway fence, but does

not appear to extend into the area to be affected by the proposed pipeline repair. No cultural resources should be affected, and no further work is recommended.

LA 85817. This site is located east of the powerline which is outside (east) of the U.S. 54 highway ROW fenceline, between NM 545 (La Luz Road) and Alamorosa. It is a low density ceramic and lithic artifact scatter, and is outside of the area to be affected by the proposed pipeline repair.

LA 86735. "Temporal Station" is an early railroad facility located east of U.S. 54, about a half mile north of Temporal Creek. The pipeline is west of U.S. 54. Further, excavations (Shields 2000) have recovered substantial data, and are considered to have exhausted the information potential of this site. No potentially significant cultural resources would be affected by the currently proposed pipeline repairs.

LA 86736. This site is a large prehistoric artifact scatter extending 380 meters north-south along, and several hundred meters east and west of, both the pipeline and U.S. 54 around mile marker 94.9. Prehistoric campfire remains, lithic and ceramic artifacts, and one human burial were recovered from subsurface contexts at this site (Shields 2000). Extensive excavations done within the highway ROW, including the area to be affected by the proposed pipeline repair, are considered to have exhausted the data potential of that specific area of the site. No potentially significant cultural resources should be affected by the proposed pipeline repair.

LA 86737. This site has prehistoric and historic components, extends 625 meters north-south along, and an undetermined distance east and west of, both the pipeline and U.S. 54 at Three Rivers, NM. Numerous surface, but few subsurface, artifacts were recovered from the extensive excavations at this site (Shields 2000). Those excavations are considered to have exhausted the information potential of the portion of the site within the U.S. 54 ROW, which also includes the area to be affected by the proposed pipeline repairs. No potentially significant cultural resources should be affected at this location.

LA 86738. The site is a railroad camp and old rail road bed, east of U.S. 54, north of Oscura, NM. The old rail bed was also separately recorded at this area as LA 128684 (and elsewhere as LA 78447). None of these remains on record are in the area to be affected by the proposed action or alternatives.

LA 109326. This site is an assortment of historic artifacts and structural debris outside (north) of the U.S. 54 ROW fence, near mile marker 120. The site map shows a small overlap onto the existing pipeline; if so, the debris were scattered there after 1956, and are not currently identifiable. The recorder (ARMS, Joanne Eakin, NMSHTD 1995) indicated it may be the bulldozed remains of a 1920-1960s structural site. This site was determined potentially eligible (ARMS, Dan Reilley 1995) to the NRHP; however, none of the remains will be affected by the Proposed Action nor alternatives.

LA 114462. The site is a railroad section camp, east of U.S. 54, immediately north of the Oscura crossroads. It was later recorded again, but as LA 127397. A very few prehistoric flaked stone artifacts were found amongst the historic debris. This site would not be affected by the proposed pipeline project.

LA 114579. Nearly 1.9 miles south of U.S. 380 on NM 37, this site was originally estimated to consist of 700 to 1000 artifacts within about 100 meters along the NM 37 highway ROW (ARMS, Leach 1996), and to extend an unknown distance both northeast and southwest of the highway. Flaked stone, ground stone and a variety of ceramic artifacts characterize a puebloan occupation around 1200 A.D. Subsequent monitoring (ARMS, Michalik 1997), of trenching to install a fiber optic cable through the site area, did not discover any subsurface remains and estimated the disturbance of the portion of the site within the highway ROW to be near 100 percent. They also dramatically lowered the estimated number of artifacts. However, possibly intact subsurface remains may be affected by the pipeline repair activities. Monitoring of trenching is recommended to record and recover subsurface remains, if any, disturbed by the Proposed Action.

LA 114580. This site extends 80 meters along NM 37, near 1.8 miles south of U.S. 380, and an undetermined distance northeast and southwest beyond the highway ROW (Leach 1996). It is also probably puebloan, although possibly earlier than 114579. As at 114579, fiber optic trench monitoring found no subsurface remains, greatly reduced the estimated number of artifacts present, and described the portion of the site within the highway ROW as almost completely disturbed (Michalik 1997). However, possibly intact subsurface remains may be affected by the pipeline repair activities. Monitoring of trenching is recommended to record and recover subsurface remains, if any, disturbed by the Proposed Action.

LA 114581. Located about 1.4 miles south of U.S. 380, this site extends 300 meters along NM 37, and an unknown distance northeast and southwest beyond the ROW. It consists of dispersed flaked and ground stone artifacts, and a very few pieces of prehistoric pottery (Leach 1996). As with LA 114579 and 114580, this area was monitored during trenching to install a fiber optic cable. No subsurface remains were reported, the estimated number of artifacts was cut by half, and the site area within the highway ROW was described as close to 100 percent disturbed (Michalik 2000). However, possibly intact remains may be present, thus monitoring of excavations for pipeline repairs is recommended to record and recover subsurface remains, if any, affected by the Proposed Action.

LA 114582. The site was recorded 1.1 miles south of U.S. 380, as hundreds of lithic and ceramic debris strewn within 50 meters along the south side NM 37, and extending in undetermined quantity and distance both southwest and northeast of the highway. The observations include mounds, on a rise cut by the south edge of the highway ROW, that are possibly prehistoric structures (Leach 1996). As with LA 114579, 114580 and 114581, monitoring of a fiber optic trench through the site, recorded no subsurface remains, reduced the estimated artifact count by half, and described the portion of the site within the highway ROW as nearly 100 percent disturbed (Michalik 1997). That work concentrated on the south side of the highway. Subsequent re-recording of the site (Ackerly 2001) raised the estimated artifact count substantially, to include thousands within 170 meters along the north side of the ROW. The area to be affected by the proposed pipeline action parallels the north edge of NM 37, and as such, is cut into a surface created by highway construction, much of which appears to be below the original surface contour of the surrounding terrain. The artifacts within the area of the proposed pipeline project affects are almost certainly in disturbed context; however, possibly intact subsurface remains may be present. Monitoring of excavations for pipeline repairs is recommended to record and recover subsurface remains, if any, affected by the Proposed Action.

LA 114583. The site is an old railroad bed that parallels U.S. 380 east from Carrizozo, NM. That rail alignment is not in the area to be affected by the Proposed Action, except near the Carrizozo Country Club where it has previously been obliterated by street and golf course construction. No further affects would result from the Proposed Action.

LA 120972. This site is on both sides of U.S. 54 at mile marker 117. The site consists of a 150 by 240 meter, medium density scatter of ceramic and lithic artifacts, and seven fire cracked rock concentrations, in association with one probable surface structure and one semi subterranean structure. The structures and most of the surface artifacts are southeast (up slope) of the highway ROW, while the existing pipeline and Proposed Action are in the northwest side (down slope) of the highway ROW. Surface observations during a recent survey for the NMSHTD (ARMS, Turner 1997) found that "..cultural material in the highway ROW is visible only in the areas disturbed by the installation of a buried fiber optics line." It is distinctly possible that subsurface remains are present within the area to be affected by the Proposed Action. Monitoring of excavations for the pipeline project is recommended to record and recover subsurface remains, if any, affected by the Proposed Action.

LA 120973. The site extends along 400 meters of U.S. 54 at mile marker 116.3, and extends about 100 meters west and 150 meters east of the highway. A wide variety of ceramic and lithic artifacts (similar to LA 120972) are only visible outside the highway ROW, and in the fiber optic disturbed area. Unlike LA 120972, only one fire cracked rock concentration is apparent. Both sites are on gentle slopes in an open area where sheetwash and eolian deposition may have obscured surface visibility of prehistoric phenomena. It is distinctly possible that subsurface remains are present within the area to be affected by the Proposed Action. Monitoring of excavations for the pipeline project is recommended to record and recover subsurface remains, if any, affected by the Proposed Action.

LA 120974. This site is a small prehistoric site 20 meters west of the U.S. 54 west fence, at mile marker 95.5 near Three Rivers, NM. It is not in the area to be affected by the Proposed Action.

LA 120975. The site is a small prehistoric site about 100 meters west of the U.S. 54 west fence, at mile marker 95.5 near Three Rivers, NM. It is not in the area to be affected by the Proposed Action.

LA 120976. The site is a small prehistoric site about 10 meters west of the U.S. 54 west fence, 0.1 miles north of the Three Rivers cross road. It is not in the area to be affected by the Proposed Action.

LA 120977. The site is a small prehistoric site far west of U.S. 54, near mile marker 110. It is not in the area to be affected by the Proposed Action.

LA 120978. This site is a large historic site that extends west from the U.S. 54 west fence, immediately north of Oscura, NM. It includes a concrete and cinder block remnant structure with three depressions nearby, and a wide scatter of artifacts dating between 1900 to 1950. It is adjacent to, but not in, the area to be affected by the Proposed Action.

LA 120979. This site appears to have been used repeatedly by railroad, and possibly highway, work crews as a work camp and break area. It is east of U.S. 54 at mile marker 90.6, and has been recently excavated (Shields 2000). It is not in the area to be affected by the proposed pipeline project.

LA 121047. This site is an historic grave, located in the highway ROW, between the pipeline and the west edge of U.S. 54 at mile marker 109.2. The grave is surrounded by a 6 by 8-foot, four post, wooden fence, which is in turn surrounded by a four strand barbed wire fenced rectangle on iron "T" posts. Earlier records described a brass marker giving the name "R.L. Shorty LEA," who is thought to have been killed by lightening. The brass marker was gone prior to a 1998 update of the site record. As of April 2001, a wooden cross of 2 by 2-inch lumber, and a small aluminum marker proclaiming the grave to be for the "Infant (child of) George and Alice Holliday," had been added. The Proposed Action must be controlled to avoid this well marked grave.

LA 132130. This site is a light scatter of prehistoric artifacts surrounding one dense cluster of lithic debris exposed in the existing south side road cut of NM 37, about 1.3 road miles south of U.S. 380. It is immediately west of LA 114581, and may or may not be associated with the puebloan occupations represented by LA 114579, 114580, 114581 and 114582. If the artifacts exposed in the road cut are the "outer edge" of intact subsurface materials, those materials may be much older than the nearby sites appear. All activities taking place in this site area should be planned and monitored for avoidance of effects to the materials exposed in the road cut; and, to observe for, record and recover any intact subsurface remains uncovered by the Proposed Action.

LA 132131. The site is a large historic dump area on the south edge of the village of Carrizozo. Artifacts include glass and crockery from the late 1800s and early 1900s. While quite interesting from a material culture and dating viewpoint, the artifacts do not appear associable with any cultural feature or phenomenon more specific than "Carrizozo Turn of the Century." Further, any finer context of pre-1956 artifacts, in the area to be affected by the currently Proposed Action, was previously demolished by the 1956 reconstruction of the pipeline. That would appear to considerably devalue the data that is present at this location. No further work is recommended.

LA 132132. This site is a small, single event, 1930s historic trash dump along the existing pipeline between U.S. 54 and the railroad, near Alamorosa. It has been thoroughly recorded (Ackerly 2001), which has preserved the data available from the artifacts. There are no apparent indications of depth or other associations relatable to these artifacts. No further work is recommended.

3.6 LAND USE

3.6.1 Definition of Resource

Land use comprises natural conditions or human-modified activities occurring at a particular location. Human-modified land use categories include residential, commercial, industrial, transportation, communications and utilities, agricultural, institutional, recreational, and other developed use areas. Management plans and zoning subdivision regulations determine the type

and extent of land use allowable in specific areas and are often intended to promote the use of land for the benefit of the public health, welfare and safety or other applicable laws.

The attributes of land use addressed in this section include land status (or categorization of land by type of owner), general land use patterns and activities, land use planning and zoning (where applicable), and special use areas.

3.6.2 Existing Conditions

The Bonito pipeline alignment and proposed alignment sections are within Otero and Lincoln Counties, New Mexico. Land within the existing pipeline easement is owned by a combination of the Bureau of Land Management (BLM), New Mexico State Trust, and private individuals. Available records show that there are over 100 property owners along the alignments. Much of the existing alignment falls within state and local highway and railroad ROW. BLM lands in Lincoln County fall within the Roswell District Office area and lands in Otero County are within the Las Cruces District Office. Adjacent public lands are mostly managed for mineral extraction and livestock grazing.

Lincoln and Otero Counties approve and permit development on private property in accordance with local and state subdivision regulations. Lands within the project corridor are not subject to zoning regulations.

When the pipeline was constructed in the 1950s, most of the land along the alignment was undeveloped. Then and now, most of the land remains vacant and is used for livestock grazing. However, as the communities of Nogal, Carrizozo, Tularosa, Alamorosa, and La Luz have grown, development has occurred on private property along the alignment. These areas are typically characterized by low density commercial, rural residential and agricultural uses. Several manmade improvements have been constructed or developed on or adjacent to the pipeline including: driveways, roadways, a few structures (both homes and businesses), fences, irrigation systems, orchards, pastures, lawns and landscaped areas. The following describes the type of development along different portions of the route.

La Luz Area. Through La Luz, the pipeline runs beside and under roadways, adjacent to low density housing. It passes underneath driveways, fences, irrigation lines, landscaped areas, and possibly septic tanks and service lines.

Alamorosa Area. The line crosses private property with rural residential development, pecan orchards (about 4,450 linear feet), gravel pits, and some undeveloped open desert shrubland. Proposed new alignments along NM 545 (south side) and U.S. 54 (east side) would border low density residential and intermittent commercial businesses (gift and convenience shops, gas and truck stops, ranches). Improvements similar to those listed above are on private lands adjacent to the NM 545, U.S. 54, and Tumbleweed Lane ROW. However, developments, which would be affected by the construction, are essentially limited to driveways, wire and fiber optic communication lines, electric transmission lines, and possibly some local utility lines.

Alamorosa to Tularosa. The existing alignment is within the railroad ROW from Tumbleweed Lane northward to just after the U.S. 54 Tularosa overpass. Adjacent private property is mostly very low density (rural) residential. Some residents have cattle and corrals. The proposed

alignment along Tumbleweed Lane would be within the dirt roadway. The roadway runs through low-density, rural residential land.

U.S. 54 from Tularosa to Carrizozo. The pipeline is on the west side of the highway in the highway ROW. Adjacent land is mostly federal and state-owned, primarily used for livestock grazing.

Village of Carrizozo. The pipeline crosses under U.S. 54 and follows roadways through the south side of Carrizozo, through residential areas. It passes the old Country Club building and the local golf course and recreation park on the east side of the town. At that point it picks up the U.S. 380 ROW.

Carrizozo to Nogal. The line is entirely within the U.S. 380 and NM 37 ROW between Carrizozo and Nogal. At some locations where the road has been rebuilt and realigned, the pipeline is further from the road. Adjacent land is almost entirely privately owned ranch land.

Nogal. Through the village of Nogal, the pipeline is mostly on the west side of the roadway. The precise alignment is not marked but appears to be located very close to or underneath the roadbed (Ackerly 2000). It passes homes and community buildings (such as the U.S. Post Office) and stores, crossing under access driveways. The distance between the road and the adjacent buildings is often very restricted (less than 20 feet). The line crosses to the east side at the main drainage and back to the southwest side of the road at the far end of the village. The pipeline then goes south along a dirt road up to a metal shed (owned by Holloman AFB) that houses the Nogal metering station.

Special Use Areas. There are no special use areas directly adjacent or overlapping the pipeline alignments. However there are some special use and specially designated lands within the surrounding area. The BLM manages the Three Rivers Petroglyphs Recreation Area, located 3.5 miles east of U.S. 54 and the pipeline. The north end of the White Mountains Wilderness Area in Lincoln National Forest is two miles east of the village of Nogal. White Sands Missile Range is located a few miles west of U.S. 54 between Carrizozo and Holloman AFB. The Lincoln National Forest and Mescalero Apache Indian Reservation are located to the east of U.S. 54.

3.7 AESTHETICS

3.7.1 Definition of Resource

Aesthetic resources include perceptual attributes that contribute to the quality of the surrounding environment for certain human activities. This EA addresses visual resources and the noise environment.

Visual Resources. Visual resources are the natural and manmade features that give a particular environment its aesthetic qualities. In undeveloped areas, landforms, water surfaces, and vegetation, are the primary components that characterize the landscape. Manmade elements may also be visible. These may dominate the landscape or be relatively unnoticeable. Both manmade and natural features form the overall impression that an observer receives of an area or its landscape character, and contribute to overall quality of life. Attributes used to describe the

visual resource value of an area include landscape character, perceived aesthetic value, and uniqueness.

Noise. Noise is considered to be unwanted sound that interferes with normal activities or otherwise diminishes the quality of the environment. It may be intermittent or continuous, steady or impulsive, stationary or transient. There is wide diversity in responses to noise that not only vary according to the type of noise and the characteristics of the sound source, but also according to the sensitivity and expectations of the receptor, the time of day, distance between the noise source and the receptor (e.g., a person or animal).

3.7.2 Existing Conditions

Visual Resources. The project area is located in a highly scenic area with the Sacramento Mountains in the east and the Tularosa Valley to the west. The landscape is largely natural with wide vistas. The pipeline corridor mostly follows along roadway and railroad corridors that have been altered by construction and are dominated by manmade features. Various shrubs and weeds mostly occupy these corridors, which have undergone previous ground disturbance. The pipeline corridor also passes through low-density rural residential areas where there are a variety of manmade features and planted landscapes. Intermittent structures, outbuildings and barns, lawns, orchards, open corrals, and other improvements such as fences, driveways, and overhead utility infrastructure are visible and have altered the landscape in near and middle distance viewing area, although they are subordinate in the far distant viewing range. U.S. 380 is part of the Billy the Kid Scenic By-Way. This designation promotes the cultural and scenic quality of this area.

The BLM has designated the Sacramento Mountains as an Area of Critical Environmental Concern along the west slopes of the mountain range. Viewing points along the escarpment overlook the Tularosa Valley. This area is managed for its visual resource value. Views both to and from the mountains are characterized by the grandeur of large panoramas and natural landscape.

Noise. The pipeline mostly passes through isolated areas where natural noise levels are low. The noise levels in low-density rural residential areas are also generally low. The pipeline is mostly located in highway and railroad ROW, where transportation noise contributes average noise levels. There are several noise sensitive locations (residences) along the pipeline. In a recent EA prepared by the NMSHTD for proposed improvements to U.S. 54 between Tularosa and Carrizozo, 1999 noise levels for four residential locations along U.S. 54 were reported. They ranged from 60 to 63 A-weighted decibels (dBA) [L_{eq}][1]. These noise levels are moderately high at residential locations near the U.S. 54 roadway due to the large percentage of truck traffic and high speeds on U.S. 54 (NMSHTD 2000a). At residences located away from the major roadway, noise from traffic diminishes rapidly, and noise levels are considerably lower.

[1] Traffic noise is quantified in decibels, which measure relative acoustic energy intensities. A-weighted decibels, or dBA, are used to simulate human response to noise and average hourly levels. $L_{eq}(h)$ are used to address the time-varying characteristics of noise. The full unit of measurement is the dBA(L_{eq}[h]) (NMSHTD 2000).

3.8 SOLID WASTE

3.8.1 Definition of Resource

Solid waste resources include public agencies and private companies that provide licensed facilities for solid waste disposal. They are generally described in terms of their capacity and lifespan for receiving waste.

3.8.2 Existing Conditions

The Lincoln-Otero County Regional Landfill is the solid waste facility serving Lincoln and Otero Counties and Alamogordo. It is located along U.S. 54, 24 miles south of Alamogordo. It is owned by an authority comprised of the two counties and Alamogordo, and Alamogordo operates the facility on a day-to-day basis (Rardin 2001). The landfill first opened in 1994 and has 93 acres permitted for receiving solid waste. Since it opened, 15 acres have been filled. The landfill receives an average of 71,000 tons per year. Recently, the landfill has been filling at a rate of 5 acres per year. Current tipping fees that would apply to Holloman AFB are $22 per ton (Hamann 2001).

3.9 SOCIOECONOMICS

3.9.1 Definition of Resource

Socioeconomics addresses population, employment and earnings. Agricultural production is also addressed, since a portion of the pipeline may cross pecan orchards. The ROI for socioeconomics includes the two counties in which the pipeline is located, Otero County and Lincoln County, New Mexico.

3.9.2 Existing Conditions

3.9.2.1 Population

Otero County had a population of 62,298 persons in 2000 compared to 51,928 persons in 1990 (U.S. Census 2001). This represents a gain of 20.0 percent, which is similar to the 20.1 percent gain for the State of New Mexico. Lincoln County's 2000 population was 19,411, increasing from 12,219 in 1990. This represents a gain of 58.9 percent, which is higher than either Otero County or the State. Alamogordo had a population of 35,582 in 2000, compared to 27,596 in 1990, a gain of 28.9 percent.

3.9.2.2 Employment and Earnings

Table 3.9-1 presents employment by industry for Otero County in 1988, 1993, and 1998 using data from the Bureau of Economic Analysis (BEA 2000). There were 27,085 jobs in Otero County in 1998, an increase of 322 jobs or 1.2 percent over the 1993 job total (BEA 2000). Government employment comprised the largest sector in 1998, with 9,403 jobs (34.7 percent of employment), followed by services with 7,210 jobs (26.6 percent) and retail trade with 4,189 jobs (15.5 percent). Federal civilian and military workers comprised 24.5 percent of Otero County's employment in 1998, compared to 29.4 percent in 1993.

Table 3.9-1 Otero Employment Percentage Index

Employment by Industry, Otero County (1988, 1993 and 1998)						
Sector	*1988*	*Percent of Total*	*1993*	*Percent of Total*	*1998*	*Percent of Total*
Total:	26,840		26,763		27,085	
Farm employment	545	2.0	615	2.3	580	2.1
Agricultural services, forestry, fishing, and other	148	0.6	207	0.8	ND	ND
Mining	64	0.2	49	0.2	ND	ND
Construction	1,080	4.0	1,230	4.6	1,476	5.4
Manufacturing	1,404	5.2	1,352	5.1	865	3.2
Transportation and public utilities	622	2.3	967	3.6	1,414	5.2
Wholesale trade	304	1.1	330	1.2	311	ND
Retail trade	3,685	13.7	3,942	14.7	4,189	15.5
Finance, insurance, and real estate	1,090	4.1	1,066	4.0	1,351	5.0
Services	6,106	22.7	6,484	24.2	7,210	26.6
Federal government, civilian	2,683	10.0	2,243	8.4	2,114	7.8
Federal government, military	6,785	25.3	5,634	21.1	4,535	16.7
State and local government	2,324	8.7	2,644	9.9	2,754	10.2

Source: BEA 2000
Note: ND = Withheld to avoid disclosing data for individual operations.

Table 3.9-2 presents employment by industry for Lincoln County. There were 10,208 jobs in Lincoln County in 1998, an increase of 2,357 jobs or 30 percent over the 1993 job total (BEA 2000). Services comprised the largest sector with 2,913 jobs (28.5 percent of employment), followed by retail trade with 2,463 jobs (24.1 percent) and government employment with 1,206 jobs (11.8 percent). Federal civilian and military workers comprised 1.8 percent of Lincoln County employment in 1998 compared to 2.2 percent in 1993.

Earnings of persons employed in Otero County increased from $652.2 million in 1993 to $703.2 million in 1998, an increase of 7.8 percent. Industries with the largest share of total earnings in 1998 were military, 29.7 percent of earnings; services, 18.9 percent, and federal civilian government, 14.2 percent. In 1993, the largest industries were military 33.3 percent, services 18.9 percent; and federal civilian government 12.9 percent. Otero County had a per capita personal income of $18,310 in 1998, which was 87 percent of the State average of $21,164, and 67 percent of the national average of $27,203.

Total earnings of persons employed in Lincoln County increased from $125.1 million in 1993 to $167.7 million in 1998, an increase of 34.1 percent. Industries contributing the largest amount of earnings in 1998 were services, 27.1 percent of earnings, retail trade, 19.0 percent, and state and local government, 18.6 percent. In 1993, the largest industries in terms of earnings were services, comprising 25.5 percent, state and local government, 22.7 percent, and retail trade with 16.9 percent. Lincoln County had a per capita personal income of $19,375 in 1998, which was 92 percent of the State average of $21,164, and 71 percent of the national average, $27,203.

Table 3.9-2 Lincoln Employment Percentage Index

Employment by Industry, Lincoln County (1988, 1993 and 1998)						
Sector	*1988*	*Percent of Total*	*1993*	*Percent of Total*	*1998*	*Percent of Total*
Farm employment	448	6.5	477	6.1	533	5.2
Agricultural services, forestry, fishing, and other	159	2.3	180	2.3	238	2.3
Mining	128	1.9	105	1.3	ND	ND
Construction	458	6.7	592	7.5	955	9.4
Manufacturing	79	1.2	292	3.7	367	3.6
Transportation and public utilities	243	3.5	245	3.1	329	3.2
Wholesale trade	75	1.1	100	1.3	ND	ND
Retail trade	1,596	23.3	1,756	22.4	2,463	24.1
Finance, insurance, and real estate	681	9.9	623	7.9	956	9.4
Services	1,832	26.7	2,199	28.0	2,913	28.5
Federal government, civilian	139	2.0	112	1.4	123	1.2
Federal government, military	63	0.9	62	0.8	58	0.6
State and local government	962	14.0	1,108	14.1	1,025	10.0
Total:	6,863		7,851		10,208	

Source: BEA 2000
Note: ND = Withheld to avoid disclosing data for individual operations.

Holloman AFB had 6,298 total personnel in fiscal year (FY) 2000, of which 3,930 were military (62.4 percent), including 3,316 active duty U.S. military personnel and 614 German Air Force military personnel (USAF 2001). The military personnel have 4,850 dependents. There were 2,368 civilian personnel (37.6 percent), including 1,018 appropriated fund civilians and 1,350 other civilians, which includes non-appropriated fund civilians, contract civilians, and employees of private businesses on the base. In addition, a large number of retired military personnel reside in the area around Alamogordo, in part due to access to the Commissary, Base Exchange, and military hospital.

In 2000, the total direct economic impact of Holloman AFB was approximately $297 million, as shown in Table 3.9-3. In addition to the direct economic impact of the base, an estimated 1,981 indirect jobs and $73.3 million of associated payrolls were produced. The total annual economic impact of Holloman AFB was therefore $370.5 million in 2000. The USAF defines the Economic Impact Region for Holloman as a 50-mile commuting area from the center of the military installation. Communities within this area generally receive the most benefit from the payroll spent by military and civilian employees, and profit by supplying many of the procurement needs of the base. In addition, the flow of federal funds from outside the community results in an increase in local income and jobs. If additional communities beyond the 50-mile area were included in the economic impact estimate, such as Las Cruces, El Paso, Roswell, and Albuquerque, an estimated $20 million of additional benefits would have been identified in 2000.

3.9.2.3 Agriculture

Otero County had 417 farms and Lincoln County had 337 farms in 1997 (U.S. Department of Agriculture 1999). The State of New Mexico had 14,094 farms. Otero County ranked 25th in the State out of 32 counties for cash receipts from all farm commodities, (excluding livestock grazing) in 1998 with receipts of $15,786,000 (New Mexico Department of Agriculture 2001). Lincoln County ranked 22nd with $17,940,000 in receipts. By comparison, Chavez County, the leading farm commodity-producing county in the State, had $334,571,000 in cash receipts and the State had $1.95 billion in receipts.

Table 3.9-3 Holloman Expenditures

Holloman AFB Payrolls, Appropriations, Construction, and Contract Expenditures in FY 2000	
Payroll	
Military	$172,228,639
Civilian	48,841,908
Non-Appropriated	29,083,451
Appropriations (Materials Equipment, and Supplies Procurement)	15,772,302
Construction	
Military Construction	1,459,277
Non-Appropriated Fund	512,300
Military Family Housing	2,832,224
Operations and Maintenance	4,416
Contracting (Services)	26,500,000
Total:	$297,234,517

Source: USAF 2001

Otero County had 1,081,057 acres in farms in 1997. These farms contained 1,543 acres of pecan orchards in 88 orchards, which contained 20 or more trees. The State of New Mexico had 29,622 acres of pecans in 1,105 orchards in 1997 within 15 producing counties. Pecan production in Otero County was 1.6 million pounds in 1997 and 1.7 million pounds in 1998. The State produced 45 million pounds of pecans in 1997 and 32 million pounds in 1998. Growers received an average of between $0.45 per pound to $1.53 per pound for pecans in selected years since 1970. The pecan price was $1.49 per pound in 1998, up 58 percent from the 1997 price of $0.94.

3.10 ENVIRONMENTAL JUSTICE

3.10.1 Definition of Resource

The objectives of EO 12898, Environmental Justice, include identification of disproportionately high and adverse health and environmental effects on minority populations and low-income populations that could be caused by a proposed federal action. Accompanying EO 12898 was a Presidential Transmittal Memorandum that referenced existing federal statutes and regulations,

including NEPA, to be used in conjunction with the EO. The CEQ issued Environmental Justice Guidance Under NEPA in December 1997. Air Force guidance for implementation of the EO is contained in the Interim Guide for Environmental Justice Analysis with the EIAP, dated November 1997 (USAF 1997). EO 13045, *Protection of Children from Environmental Health and Safety Risks*, requires each federal agency to identify and assess environmental health risks and safety risks that may disproportionately affect children. Agencies must ensure that their policies, programs, and activities address disproportionate environmental, health, or safety risks to children.

Minority populations include all persons identified by the Census of Population and Housing to be of Hispanic origin, regardless of race, and all persons not of Hispanic origin other than White (i.e., non-Hispanic persons who are Black, American Indian, Eskimo or Aleut, Asian or Pacific Islander, or other race). Low-income populations include persons living below the poverty level ($12,674 for a family of four in 1989, adjusted based on household size) as reported in the 1990 Census of Population and Housing (Geolytics 1996). Although preliminary data on population, race, and ethnicity are available from the 2000 Census, income and poverty data are not yet available and therefore, 1990 Census data is used in the environmental justice analysis for consistency. The percentage of low-income persons is calculated as a percentage of all persons for whom the Bureau of the Census determines poverty status, which is generally a slightly lower number than the total population.

In order to determine whether environmental impacts would disproportionately affect minority or low-income populations, it is necessary to establish a basis of comparison, referred to as the "region of comparison," which consists of the geopolitical units that encompass the impact footprint of the proposed project. Most environmental effects from the Proposed Action would be expected to occur in Otero County and Lincoln County, New Mexico.

3.10.2 Existing Conditions

Based upon the 1990 Census of Population and Housing, Otero County and Lincoln County had a total combined population of 64,147 persons, of which 22,210 (34.6 percent) were minority and 10,788 (17.4) percent were low-income. Of the total population, 15,579 (24.3 percent) were persons of Hispanic origin. In addition, the Census reported persons not of Hispanic origin according to race, of whom 2,714 (4.2 percent) were Black; 2,826 (4.4 percent) were American Indian, Eskimo or Aleut; 1,005 (1.6 percent) were Asian or Pacific Islander; and 86 (0.1 percent) were of other races. Otero County's population included 15,987 children (i.e., ages 17 and under) in 1990. Lincoln County's population included 3,105 children in 1990.

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4.0 ENVIRONMENTAL CONSEQUENCES

4.1 EARTH RESOURCES

4.1.1 Methodology

The published soil surveys and the updated data tables of soil characteristics provided the descriptive information for the affected environment. The impact analysis is qualitative and is based on the assumption that soil disturbed during excavation is susceptible to wind erosion in this climate any time during the year and to water erosion during rain events. Temporary and permanent stabilization of disturbed soils will minimize offsite impacts on air and water resources. The permeability and texture of the soils described in Chapter 3.1 can be used as a measure of the water holding ability of the soil that can affect the success of seeding to stabilize the disturbed soil.

4.1.2 Impacts

4.1.1.2 Proposed Action

Under the Proposed Action, there would be a total of approximately 320 acres of bare ground during the installation of the new and removal of the old pipe, including about 38 acres where the cathodic protection would be installed every 33 feet. Not all of this area would be disturbed at any one time. The staging of excavation, the stabilization of disturbed soils, and the mitigation measures to be used to minimize wind and water erosion would be described in the SWPPP that would be submitted by the contractor, and approved by the U.S. Army Corps of Engineers and the Air Force, in fulfillment of the EPA requirement for a Construction General Permit under the NPDES program.

The construction procedures and plans for stabilization of all stream and arroyo crossings would be addressed in the application for the Joint Permit from the U.S. Army Corps of Engineers (Section 404 of the CWA) and the Surface Water Quality Bureau of the NMED (Section 401 of the New Mexico Water Quality Act). Site specific plans for minimizing impacts to soils and resulting impacts to waterways would be included in these permit applications. Most of the soils in Lincoln County and some of the soils in Otero County along the pipeline are highly susceptible to wind erosion. Standard construction practices would be used to minimize wind erosion, thereby minimizing potential impacts to air and water quality from dust and sediments.

According to the NMED Surface Water Quality Bureau, the simplest way to keep from polluting surface water with sediment during construction in a stream channel is to keep water away from the work area (NMED 2001). This can be done by keeping equipment out of the stream or performing work during periods of low flow, and using suggested BMPs. BMPs for working in streams include, but are not limited to the following:

- Rows of straw bales covered in plastic (used to temporarily keep water out of work sites in small streams);

- Boards propped up with rocks, with the whole structure covered in plastic (also used to temporarily keep water out of work sites in small streams);

- Concrete barriers or water bags (used for pipeline crossings, bridge pier construction, etc.). Dirt coffer dams are no longer allowed by the Environment Department.

Once work is completed, all three of these methods can be removed very easily. Activities to avoid in streams include pushing river bottom or gravel bars to eroding banks, using river bottom materials to construct dams or berms, or trying to straighten the channel (NMED 2001).

There is potential for water erosion during storms in any soil, whether or not the soil is susceptible to water erosion or located in or near a stream crossing, especially when the surface water is concentrated in an open trench. Erosion can be reduced by minimizing the length of open trench and unstabilized backfill, by using surface water control measures such as small diversions across the trench, and temporary and permanent seedings.

Temporary erosion control BMPs would include use of fast-growing seedings, erosion control matting or geotextile material, straw bales placed perpendicular to the prevailing wind, or leaving the soil rough as temporary wind erosion control measures. Permanent erosion control BMPs would include such practices as planting suitable seed mixtures held down with erosion control netting or mulch with a chemical "sticker," gravel or asphalt covering on the road berms, and erosion control woody plant cuttings and seed establishment on the streambanks.

Seed mixtures suitable for erosion control should include fast-germinating species to provide quick ground cover plus competitive species that will minimize the potential for noxious weeds to become established. According to the NRCS District Conservationist in Lincoln County (Haussler 2001), the seed mixture should include sideoats grama for quick germination, along with some blue grama and other native grasses. Where the area would not be mowed, he recommended adding fourwing saltbush and plains bristlegrass. The USFWS specifically recommends that seed mixtures not include exotics. Also, all removed vegetation, particularly any riparian vegetation and remnant Chihuahuan Desert shrubland, should be replaced in kind (see Appendix A).

Of particular importance is the timing of the planting of the permanent seed mixtures, which should occur between June 1 and August 31 in this region. Any seedings should be monitored for at least one year to ensure that they have been successfully established. The SWPPP (which would include erosion control measures) and Noxious Weed Management Plan would follow guidelines established by the NMSHTD and would be subject to the approval of NMSHTD.

Typically, any BMPs that are implemented to stabilize a site in order to minimize water erosion also protect the site from wind erosion. Once these practices are installed, there would be no significant impacts to soils caused by implementing the Proposed Action.

4.1.2.2 Existing Alignment Alternative

Excavating the pipeline along the existing alignment would have the same potential for impacts to soils, and associated impacts to water and air, that have been described under the Proposed Action. There would be a similar amount of soil disturbance under this alternation. Measures would be developed and described in detail in the SWPPP and the permit applications for stream

crossings. Therefore, there would be no significant impacts to soils caused by implementing this alternative.

4.1.2.3 No Action Alternative

Because no additional soil disturbing activities would occur over current maintenance and operations, there would be no impacts to soils if this alternative is implemented. Possible future pipeline failures could cause surface and subsurface flooding that results in subsidence and undermining of structures along the pipeline.

4.2 WATER RESOURCES

4.2.1 Methodology

The potential for impacts to water resources due to pipeline construction would result primarily from surface disturbance during construction, until the soil surface is stabilized. This is especially true during excavation of the pipe in or near stream crossings. Other possible impacts to water resources could come from any petroleum or chemical spills that occur during construction. The evaluation of impacts on water resources is based on a qualitative analysis of the surface disturbing activities, and the potential for erosion or spills to affect both surface and groundwater.

4.2.2 Impacts

4.2.2.1 Proposed Action

Lincoln County soils along the pipeline route are, overall, more susceptible to erosion than the soils in Otero County. However, sedimentation in streams and arroyos due to water erosion in an open trench in which stormwater is concentrated, or on unstabilized soils during construction, is likely to occur along any part of the pipeline, unless control measures are employed. Impacts in floodplains of the major drainages would be similar to impacts along the rest of the pipeline, especially at the arroyo crossings. Construction in floodplains would need to comply with the local floodplain management requirements. Otero County is one of the communities that participates in the National Flood Insurance Program administered by the Federal Emergency Management Agency.

As described in Section 4.1.2, the SWPPP and the designs for each of the stream crossings included in the Joint Permit applications would contain plans to minimize the impacts to surface water during construction. Seed mixtures and other permanent stabilization measures would also be included, to ensure that the backfilled trenches would not contribute to identified surface water quality problems or create new ones. At least fifteen eroding channel crossings have been identified and would be sloped and stabilized. These measures would provide a benefit to those streams and arroyos over current conditions.

In compliance with State of New Mexico Ground and Surface Water Quality Protection Regulations (20 NMAC 7.4), any spills that occur during construction must be cleaned up and disposed of appropriately. A spill prevention and mitigation plan would be developed before construction begins.

By using the full water rights available from Bonito Lake, Holloman AFB and Alamogordo would be extracting less water from the aquifer. Based on 1990 water use, this would reduce the use of fresh groundwater in the Tularosa Valley by 14 percent (City of Alamogordo nd, USGS 1990). This would have a significant benefit to the groundwater resources by reducing the use of the aquifer if the pipeline supplies more of the water to the two main population centers in the basin.

4.2.2.2 Existing Alignment Alternative

If this alternative is selected, control measures and plans similar to those described for the Proposed Action would be required, resulting in no significant impacts to water resources. This alternative would affect the same floodplains as the Proposed Action and provides no benefit over the Proposed Action. Once the pipeline is in use, similar reductions in use of the aquifer would afford benefits to the basin.

4.2.2.3 No Action Alternative

No surface disturbance would occur as a result of construction activities to install and repair the pipeline, so no change to surface water resources would occur. The benefits of stabilizing fifteen stream crossings would not occur. No reduced extraction of fresh water from the aquifer would occur because Alamogordo and Holloman AFB would continue to supply their populations mainly from well water. As the pipeline continues to deteriorate, increasing amounts of water would leak from the pipe along the way and flow through the permeable soils.

4.3 AIR QUALITY

4.3.1 Methodology

The approach to the air quality analysis was to estimate the increase in emission levels due to the Proposed Action. Air emissions resulting from the Proposed Action and alternatives were evaluated in accordance with federal, state, and local air pollution standards and regulations. The analysis included assessing potential impacts from ground disturbance activities along the pipeline, and vehicle emissions from construction equipment and workers who would commute to the site. Air quality impacts from a proposed activity or action would be significant if they:

- Increase ambient air pollution concentrations above any NAAQS.
- Contribute to an existing violation of any NAAQS.
- Interfere with or delay timely attainment of NAAQS.
- Impair visibility within any federally mandated PSD Class I area.

According to the New Mexico Air Quality Bureau, the Proposed Action and alternatives, including impacts to visibility would not be covered under state or federal PSD regulations because it includes only fugitive dust and mobile source emissions (NMAQB 2001).

According to EPA's General Conformity Rule in 40 CFR Part 51, Subpart W, any proposed federal action that has the potential to cause violations, as described above, in a nonattainment or

maintenance area must undergo a conformity analysis. A conformity analysis is not required in an attainment area. Since Lincoln and Otero Counties are designated as attainment for all criteria pollutants, a conformity determination is not required.

4.3.2 Potential Impacts

Air quality impacts during construction activities related to the Proposed Action would occur from: (1) particulate emissions (i.e., fugitive dust) from ground clearing and trenching activities, (2) products of combustion from the construction equipment, and (3) vehicle miles traveled by the construction workers.

4.3.2.1 Proposed Action

Ground-Disturbing Activities. Under the Proposed Action, 40 miles would be trenched for new pipeline and about 15 percent of the remainder of the line would be excavated to install cathodic protection. As a worst case, a maximum of 67.1 miles of 6-foot-wide trench would be excavated using backhoes and trenching machines. Any combination of construction activity, repairs, and pipe removal would not amount to more than this maximum case under the Proposed Action. Ground clearing for equipment access and temporary storage of soil would require the use of a grader, and would result in disturbance of an average of 25 feet on each side of the trench. The trenching and grading portion of the project would require approximately 130 working days over a period of 24 months (i.e., one quarter of the entire project duration would be spent on ground-disturbance activities). The overall project work force along the pipeline is estimated at 40 workers, 5 days per week, for 104 weeks.

Particulate emissions (i.e., fugitive dust) were evaluated for the construction of a 6-foot-wide trench and the clearing and grading of a 50-foot-wide overall work area of 67.1 miles long. The disturbed work area would be 49 acres for the trench alone and 407 acres overall, under the conservative assumption that the entire 67.1-mile pipeline would be replaced. Based on a South Coast Air Quality Management District (SCAQMD) emission factor of 55 pounds/day per acre/day (SCAQMD 1993) and assuming that approximately 130 actual working days would be used for trenching and grading activities, the emissions of PM_{10} were estimated to be 11.2 tons of PM_{10} over a 24 month period (i.e., 5.6 tons per year). Although construction related impacts on air quality might be locally significant, depending on the timing, wind conditions, and dust suppression methods used, they are short-term, temporary effects. In practice, the emissions could be significantly less due to the implementation of control measures in accordance with standard construction procedures. For instance, spraying of water on exposed soil during construction and prompt replacement of ground cover (grass and landscaping) are standard procedures that could be used to minimize the amount of dust generated during construction. Consequently, actual PM_{10} emissions from construction activities are expected to be very small and over a short period of time. Therefore, the construction related impact on air quality is below significance level.

Non-Road Combustion Sources. Combustion emissions from trenching machines and backhoes were estimated using exhaust emission factors compiled in the SCAQMD's California Environmental Quality Act (CEQA) Handbook (SCAQMD 1993). The emissions were calculated based on the assumption that ground clearing and trenching activities would require

one grader, one diesel-fired trenching machine, and one diesel-fired backhoe loader, eight hours per day for 130 days over the entire 18 to 24 month period. Total combustion emissions from trenching activities are estimated to be 1.9 tons of CO, 0.5 tons of volatile organic compounds (VOC), which are precursors to ozone formation, 3.3 tons of nitrogen oxide (NO_x), 0.3 ton of SO_2, and 0.2 ton of PM_{10} over the 24-month period.

Using efficient grading practices and avoiding long periods where engines are running at idle may reduce combustion emissions from construction equipment. Potential impacts from fuel combustion equipment could be further minimized through the implementation of a phased construction schedule to reduce the number of units operating simultaneously, and the performance of regular engine maintenance programs.

Concrete Disposal. Air emissions from the crushing and disposal of the concrete pipeline would consist of fugitive dust and combustion emissions from the concrete crusher, a loader, and a dump truck. Emission factors for fugitive dust from the concrete crushing activities were obtained from the EPA's *Compilation of Air Pollutant Emission Factors*, (EPA 1995). Combustion emissions were estimated using emission factors from the *California Environmental Quality Act (CEQA) Handbook* (SCAQMD 1993) and *Calculation Methods for Criteria Pollutant Emission Inventories* (Jagelski and O'Brien 1994). The emissions were calculated based on the assumption that the 6,400 sections of pipeline, weighing four tons each, would be crushed and transported to a landfill located 24 miles south of Alamogordo. On average, 25 sections would be crushed per day, 5 days per week, for 51 weeks. The dump truck would make 1,700 trips to the landfill, traveling an average of 50 miles each round-trip. The emissions shown in Table 4.3-1 for concrete disposal were estimated under the assumption that all concrete crushing operations could occur within a single year.

Table 4.3-1 Emissions Resulting from the Proposed Action

Activity	*Emissions (tons/year)*[1]				
	CO	*VOC*	*NO_x*	*SO_2*	*PM_{10}*
Ground Disturbance	-	-	-	-	5.6
Non-Road Fuel Combustion	0.9	0.2	1.7	0.2	0.1
Concrete Disposal	2.5	0.8	4.9	-	0.6
Worker Travel	13.8	1.9	1.1	-	0.1
Totals:	16.2	2.9	7.7	0.2	6.4

Note: [1] Numbers are rounded to one decimal point.

Construction Worker Travel. Air emissions occur due to vehicle travel by workers to the site. For this assessment, it was assumed that the people who perform the pipeline repairs and related on-site activities of the repairs would commute from Alamogordo to the work location. Since the pipeline is 67.1 miles long, with Alamogordo located near its southern terminus, the average commute was assumed to be approximately 35 miles each way. Project workers who do not commute to the worksite, including office workers, consultants, and other support personnel, were not included in this estimate, because it was assumed that their commuting activities would

not change as a result of the Proposed Action (i.e., they would be working in their offices whether or not this particular project were to occur).

Commuting emissions were calculated assuming that each of the 40 workers would drive an average round-trip of 70 miles each day, 5 days per week, over a 104-week period. Average vehicle occupancy was assumed to be 1.2 workers per vehicle. This equates to an average of 33 daily round trips and approximately 606,660 commuting miles per year.

Potential air pollutant emissions under the Proposed Action due to vehicular travel by personnel were quantified using emission factors from Calculation Methods for Criteria Pollutant Emission Inventories (Jagelski and O'Brien 1994). All vehicles were assumed to be light-duty, gasoline-powered vehicles with 1995 as the average vehicle model year. Total exhaust emissions from worker commutes are estimated to be 27.6 tons of CO, 3.8 tons of VOC, 2.2 tons of NO_x, and 0.1 tons of PM_{10} over the 24-month period.

Total Emissions. The annual emissions from the Proposed Action are displayed in Table 4.3-1. Annual emissions were estimated from the two-year totals presented above by assuming that half of the emissions would occur during each of the two years. In this table, VOCs are precursors to the formation of O_3 in the atmosphere, NO_x include NO_2 and other related compounds, and sulfur oxides (SO_x) include SO_2 and other related compounds. Due to the relatively low amount of the pollutants that would be discharged into the atmosphere, as well as the temporary nature of these emissions, the impacts from the Proposed Action on air quality in the area are below significance level.

4.3.2.2 Existing Alignment Alternative

Under the Existing Alignment Alternative, ground disturbance, non-road combustion, and vehicle-commuting activities would be virtually identical to those under the alternative alignment alternative.

4.3.2.3 No Action Alternative

Under the No Action Alternative, the current routine maintenance activities would continue unchanged. Air emissions would be identical to those of the baseline conditions.

4.4 BIOLOGICAL RESOURCES

4.4.1 Methodology

Impacts to biological resources would occur principally from activities associated with digging the trench to replace the pipeline. It was assumed that about a 50 foot wide area would be disturbed for this activity and as indicated in Section 2.1.2, this activity would take place along a 40-mile section of the pipeline from La Luz to Oscura affecting about 230 acres. In addition, smaller amounts of land would be impacted along the 30 miles of pipeline ROW north of Oscura due to cathodic protection of the pipeline. It was assumed that about 44 acres of land would be affected for this activity. In addition, impacts to wildlife near the pipeline ROW may occur due to noise and other human activity.

4.4.2 Impacts

4.4.2.1 Proposed Action

Upland Vegetation

Vegetation impacts would be heaviest along the 40 miles of pipeline that would be replaced from La Luz north to Oscura. The ROW that would be used for the southern 12 miles of the Proposed Action is highly disturbed by human activity and little native vegetation would be affected. North of this disturbed area starting about two miles north of Tularosa and extending up to Oscura, remnant native vegetation exists in the ROW. Generally, a planted zone of grass two to four feet wide is between the road and the remnant plant community. There are about 24 miles of creosotebush and three miles of mesquite shrublands in this section of the ROW. Assuming a 50-foot disturbance zone and subtracting three feet of grass along the highway, approximately 137 acres of creosotebush and 17 acres of mesquite shrub communities would be cleared or degraded. North of Oscura, land disturbance along the remaining 30 miles of pipeline ROW would be less than described above. The ROW in the area of this activity consists of degraded remnant mesquite shrublands, grasslands, and pinyon pine-juniper woodlands. The major impact to upland vegetation, then, would be to the 27 miles of remnant Chihuahuan Desert shrublands. This impact would be minor because these shrublands occur along heavily traveled U.S. 54, which potentially limits their usefulness as wildlife habitat. In addition, creosotebush and mesquite shrublands are the most common plant community types in the Chihuahuan Desert in the Tularosa Basin and are apparently expanding in this desert at the expense of grasslands (Buffington and Herbel 1965, Hennessy et al. 1983).

Wetlands and Ephemeral Drainages

There would be no wetlands affected by this project. Tularosa Creek is the only perennial stream that would be affected and the streambed and surrounding stream bank along the pipeline ROW are currently almost devoid of vegetation. Therefore, the placement of a new pipeline would not impact vegetation along Tularosa Creek. Of the 84 ephemeral drainages inspected during field surveys, 46 occur along the ROW south of Oscura (see Figure 3 in Appendix B). Of these, 26 are arroyos and 20 are swales. The vegetative characteristics of 44 of these drainages are known, and of these, 34 (77 percent) are already highly impacted by human activity. This has resulted in the almost complete lack of vegetation in some and the removal or degradation of vegetation in others. The remaining 10 drainages contain remnant native vegetation or vegetation resulting from a reseeding program. This vegetation would be cleared to install the pipeline. This impact would be somewhat lessened when the swales and the banks of arroyos would be revegetated after construction. Revegetation would also occur along those 34 swales and arroyos that currently lack or have reduced vegetative cover. It is assumed that the 39 swales and arroyos that occur along the pipeline north of Oscura would be much less affected by the Proposed Action because of smaller amounts of land that would be disturbed. Section 4.1 discusses measures to take to prevent soil erosion, including reseeding.

Wildlife

Although general wildlife surveys over a number of seasons were not conducted along the pipeline, based on studies in the area and the results of field surveys, as described in Section 3.4 and Appendix B, the species composition along the pipeline is generally known. The greatest impacts to wildlife would likely occur along the 27 miles of remnant Chihuahuan Desert shrublands that would be affected between Tularosa and Oscura. It is believed that the impact to wildlife in this area would be minor because the acceptability of this habitat to wildlife is greatly reduced due to its close proximity to the heavily traveled U.S. 54.

As indicated above, 10 swales and arroyos that currently have remnant native vegetation or good growth of reseeded vegetation would be affected. Although the width of these drainages was not measured, if it is assumed that average width of the three currently vegetated swales was 20 feet and seven currently vegetated arroyos 40 feet, then a swath 50 feet wide would result in the loss or degradation of 0.1 acres of swales and 0.3 acres of arroyo habitat. This small loss of habitat that is in close proximity to the heavily-traveled U.S. 54 is considered insignificant in terms of loss of wildlife habitat.

Sensitive Species

As indicated in Section 3.4, during follow-up surveys in April, May, and June 2001 (a season more appropriate for identifying species), Villard's pincushion cactus could not be relocated. Kuenzler's hedgehog cactus was not identified; rather, a common species was present. Also, a common species of penstemon and milkvetch were identified, not the state rare Alamo beardtongue and Kerr's milkvetch. Based on these surveys, these sensitive species have not been located in the ROW area of potential impact.

The Texas horned lizard is a federal species of concern and it may occur in various areas along the pipeline ROW. Sandy and sandy loam soils occur along much of the route in both Otero and Lincoln Counties (see Section 3.1) so this species of concern could occur along the pipeline both north and south of Oscura. Therefore, this relatively slow "sit and wait" foraging reptile (Pianka 1966) may be susceptible to direct mortality from equipment and vehicles along the pipeline. Surveys would be conducted for this species during the late spring or summer.

Potential habitat for the federally proposed threatened mountain plover habitat occurs in the grasslands in the northern part of the ROW north of Oscura. It is believed that this species would not be affected by pipeline repair activities because the potential is very low that it occurs in the area given the lack of mountain plover observations elsewhere in the Chihuahuan Desert grasslands and the high level of human activity along the heavily traveled roads next to the ROW. Western burrowing owls (a federal species of concern) were not observed along the pipeline ROW, nor were any site conditions particularly suitable for this species. Therefore, the proposed activities would have no effect on this species.

Potential habitat for the federally endangered southwestern willow flycatcher may occur to the east and west of the pipeline alignment, where Railroad Boulevard, the pipeline, and the railroad cross Tularosa Creek. However, no southwest willow flycatchers have ever been observed in southeast New Mexico (Barker 2001). Further, no stands of that potentially appropriate habitat

would be affected by the proposed construction. There is no apparent reasonable expectation that southwest willow flycatchers would be affected by the Proposed Action.

Further, the proposed pipeline repairs would cause considerably less noise and dynamic disturbance to the vicinity than is currently caused by frequent traffic on the railroad and Railroad Boulevard, which are on either side of the pipeline at this location. In the highly unlikely case that southwest willow flycatchers occupy an area in immediate proximity to the Proposed Action, they would be thoroughly acclimated to human and mechanical presence and noise, and would be unlikely to be affected by the Proposed Action.

The loggerhead shrike (a federal species of concern) was observed along the pipeline ROW during the surveys, and is assumed to nest in the Chihuahuan Desert shrublands and grasslands along the pipeline. It is believed that the impacts of pipeline construction would be minimal on this species because it can leave the area when construction crews are active and reoccupy the habitat once they have departed.

The black-tailed prairie dog is a federal candidate species and is not known to occur along or near the pipeline ROW. The state-sensitive Botta's pocket gopher may occur along the ROW, but more detailed studies would be needed to determine what species of pocket gopher actually resides in the area.

Noxious Plants

As indicated in section 3.4 and Appendix B, 12 areas of fairly dense growth of noxious plants were identified and mapped along the pipeline route. There were other smaller areas of noxious plant growth that were not mapped. A revegetation/erosion control plan would be developed and submitted to the NMSHTD for their approval. The NMSHTD requires that all areas of weed growth be removed before revegetation takes place (NMSHTD 2000b). Therefore, essentially all areas of current noxious weed growth along the pipeline route would either be eliminated during pipeline repairs or before revegetation commences.

A noxious plant management plan consistent with the NMSHTD "Noxious Weed Management Plan" requirements would be formulated and, with state approval, implemented. The purpose of this plan is to reduce the potential for noxious plants to become established in the disturbed ground along the pipeline ROW. It will included measures to: 1) control noxious plant seeds that occur in soil where these plants currently grow, 2) clean construction equipment before and during construction, and 3) use weed free seed and mulch (NMSHTD 2000b).

4.4.2.2 Existing Alignment Alternative

As described in Chapter 2, the south end of the pipeline under this alternative would use the existing alignment. This section of pipeline has been altered by human activities and includes pecan groves and land that has been otherwise severely degraded in terms of supporting native flora and fauna. The remainder of the pipeline ROW for this alternative follows the same alignment as under the Proposed Action so the impacts to vegetation, wildlife, and sensitive species described for that alternative would be the same for this alternative.

4.4.2.3 No Action

Under the No Action Alternative, the biological conditions along the pipeline ROW as described in Section 3.4 and in Appendix B would continue to exist. It is assumed that certain maintenance activities along the ROW would continue and habitat along certain sections would continue to be degraded. Other areas that support remnant vegetation such as between Tularosa and Oscura would also continue to exist. Under this alternative, it is expected that the general pattern of vegetation cover and wildlife use that exists today along the pipeline ROW would continue into the future.

4.5 CULTURAL RESOURCES

4.5.1 Methodology

Impacts on cultural resources from the Proposed Action and alternatives are assessed by 1) identifying the nature and location of elements of the alternatives; 2) comparing those locations with identified cultural resource locations, areas considered sensitive, and surveyed locations; 3) assessing the known or potential significance of cultural resources, and 4) determining the extent, intensity, and context of the effects. In consultation with the State Historic Preservation Office (SHPO), a determination is made as to whether the effects would be adverse, and where appropriate, measures are identified to avoid, reduce, or otherwise mitigate those effects.

4.5.2 Impacts

4.5.2.1 Proposed Action

In accordance with the National Historic Preservation Act (NHPA), consultation with the New Mexico SHPO regarding this Proposed Action has been initiated. The Class III survey performed for this proposal (Ackerly 2001, 3 sites), as well as research into other recent studies and the state records systems (NMCRIS, ARMS, 29 sites) and field verification by Holloman personnel, identified 32 cultural resource sites in proximity to the Proposed Action and alternatives. Thirteen sites are no closer than the general vicinity of the project. Seven sites are adjacent to but not in the area to be directly affected. Portions of twelve sites overlap the area to be affected by proposed Bonito pipeline repairs. As a whole, any of these sites may be eligible to the NRHP under Criterion d of Section 106 of the NHPA. All of the sites in the area to be affected by the currently proposed pipeline repairs have been subject to prior disturbance from construction of earlier water pipelines, the highway rights of way and fences, fiber optic cables, railroad maintenance and other associated modern activities. Recommended measures for each of the 12 sites are presented below.

Two sites near Three Rivers, NM, LA 86736 and 86737, have been excavated for NMSHTD purposes, which included extensive trenching for data recovery in the area of proposed pipeline repair affects (Shields, 2000). This data recovery is being considered sufficient remedy for highway reconstruction to proceed through these site areas. The Bonito pipeline repairs would only affect a portion of these sites within the highway ROW, thus the same lack of adverse effect is expected, and no further cultural resources work is proposed at these sites.

Two sites, LA 102972 and 102973, in open terrain southwest of Carrizozo, retain very little surface evidence within the highway ROW. However, features and artifacts are apparent to both sides of the area to be affected by the Bonito pipeline repairs, and a recent fiber optic line laid through the site appears to have surfaced additional artifacts (ARMS, Turner 1997). Pipeline trenching or excavations within the area of each site would be monitored to observe for affected subsurface remains. Any such remains would be recorded, and the affected portions of subsurface cultural resources would be excavated for data recovery, then analyzed and reported.

Sites LA 114579, 114580, 114581, 114582, and 132130, along NM 37 near Vera Cruz Spring and the confluence of Indian and Nogal Canyons, all have been heavily affected by multiple episodes of highway and pipeline reconstruction. It is most likely that the artifacts, now visible within the highway ROW and area of proposed pipeline affects, are in construction consequent context, which may have effectively demolished the relevance of the data potential of those artifacts. However, these areas may retain intact subsurface features; thus, construction would be monitored to observe for affected cultural resources. Any such remains would be recorded, and the affected portions of subsurface cultural resources would be excavated for data recovery, then analyzed and reported.

Site LA 121074 is an historic grave. It is enclosed by a wooden frame, fenced in barbed wire and T-posts, and is plainly visible between the proposed pipeline and the pavement edge of U.S. 54. Due caution would be exercised to avoid construction impacts to this grave.

Sites LA 132131and 132132 are historic dumps. LA 132131 is on the south edge of Carrizozo, with many material fragments dating to the early 1900s. The artifacts to be affected by the currently proposed Bonito pipeline repairs are in a context created by previous episodes of pipeline construction, and would not suffer any appreciable comparative dislocation from another episode of pipeline construction. LA 132132 is a small, discrete, 1930s historic trash dump near Alamorosa. In-field recording of artifacts (Ackerly 2001) has effectively preserved the data potential at this location. No further cultural resources work is anticipated at either of these sites.

4.5.2.2 Existing Alignment Alternative

The impacts of this alternative would be no different than the Proposed Action for cultural resources.

4.5.2.3 No Action

There would be no impact from the No Action Alternative.

4.6 LAND USE

4.6.1 Methodology

Land use impacts can result if an action displaces an existing use or reduces the suitability of an area for its current, designated or formally planned use. In addition, a proposed activity may be incompatible with local plans and regulations that provide for orderly development to protect the general welfare of the public, or conflict with management objectives of a federal or state agency

of an affected area. Land use development would need to comply with federal and state environmental laws and regulations.

4.6.2 Impacts

4.6.2.1 Proposed Action

Under the Proposed Action, pipeline would be replaced and repaired within ROW for roadways or railroad. Any new easements or permits would be within existing roadway ROW on land that is currently used for public infrastructure. In some places, there has been encroachment on the pipeline easement. Where the pipeline alignment passes between a roadway and structure, driveways and landscaping may be dug up. Because such improvements would generally be replaced, there should be no long-term change to adjacent land. Interruptions in irrigation supplies at critical growing times could impact both commercial and subsistence farming. If irrigation channels were interrupted, they would be restored to operating condition as soon as possible. The construction contractor would notify property owners in advance of pending project activity so that interim arrangements for animals, property, access, or water supplies, for example, could be made.

It is also possible that public infrastructure, such as electric or communication lines could be severed. To minimize potential impacts, the lines would be identified before work begins and avoided. In the event that service lines are interrupted, repair would occur as quickly as possible.

Other impacts from construction, such as noise, dust, and visual changes from ground disturbance, could be disruptive to residents. These would be temporary and would not affect long-term land uses. Traffic may slow down on some roadways where work is being performed and cause minor inconvenience for short periods of time for travelers along affected roadways (such as U.S. 54, U.S. 380, and NM 37). Where trenches cut across driveways and roadways, access would be maintained to the extent possible using steel plates to span across trenches. Any inconveniences would be temporary and have no long-term effect on land use.

About 40 miles of the old pipe may be removed, including 6.4 miles that traverse private property in the La Luz area. This would require trenching and maneuvering equipment to remove pipe. Rural residents in this area may experience the same inconveniences from pipe removal as described above. This land is mostly low-density rural residential and agricultural areas, including pecan orchards. It is estimated that the pipeline traverses about 4,450 feet of pecan orchards. Assuming a 50-foot-wide work area, 5.1 acres supporting about 245 trees could be affected. This represents about 0.3 percent of the pecan orchards in Otero County, and would directly affect a few growers. The average size of pecan farms along the pipeline is about 80 acres, so each grower could lose a small portion (about 2 to 5 percent) of their productive capacity. Since pecan trees take up to 30 years to reach full production, these impacts would be long-term. Also, irrigation systems would likely be severed and need to be replaced or repaired. Confining work to a smaller area (less than 50 feet wide) and selectively clearing as few trees as possible could reduce impacts on pecan orchards. Because the root systems of adjacent trees become intertwined, avoiding disturbance between productive season from May to September would minimize impacts on adjacent trees that are not removed. Interruptions to irrigation systems would also be more disruptive during these months and should be avoided. Through

agreements with private landowners, the USAF could leave the old pipeline in place and thereby avoid impacts on orchards.

4.6.2.2 Existing Alignment Alternative

Under this alternative, effects on land use would be similar to the Proposed Action. For most areas, the activities during construction would have temporary effects, as described above. The pipeline would be replaced through about 6.4 miles of private property in the La Luz area. Therefore, effects on private improvements and pecan orchards would occur as described for the Proposed Action. These impacts would be minimized as described above; however, the choice of not using the existing alignment would not be an option for avoiding impacts.

4.6.2.3 No Action

There would be no change in land use from the continued maintenance and operation of the pipeline. However, based on past events, the possibility for a pipe failure that causes extensive flooding, subsidence, and property damage exists. This type of incident is not likely to change land uses.

4.7 AESTHETICS

4.7.1 Methodology

Visual Resources. There are no federal laws specifically protecting visual resources, but federal and state land custodians and local governments can adopt regulations and procedures to protect resources within their jurisdiction. Local agencies or land developers may enforce standards to control the appearance of development. To assess impacts to visual resources, areas that have high visual value, low tolerance for visible modification, or designated visual resource classification, are identified. The degree to which an action would modify the existing surroundings is used to assess the level of impact.

Noise. Noise impacts are considered qualitatively. The type of noise, noise sources, and duration are described generally. The degree of impact from noise is characterized generally based on the sensitivity of affected areas to noise, and changes to the current noise environment.

4.7.2 Impacts

4.7.2.1 Proposed Action

Visual Resources

Construction activities for the new pipeline and repairs would take place mostly in existing roadway and railroad ROW. Because these areas are already dominated by manmade features and disturbed areas would be reseeded with similar vegetation, there would be little change to the visual environment. Both construction and final appearance of project features from distant viewing points in the Sacramento Mountains would be subordinate and would not create noticeable changes within the overall landscape. The small panels for the anode bed rectifiers would be the only visible evidence of the project once vegetation is reestablished. These would

hardly be noticed in the context of other manmade improvements along the roadside. The final condition along the roadway would be similar to existing conditions and should have no long-term impact on the U.S. 380 Scenic By-Way.

Where the pipeline passes alongside or through residential and commercial properties (mostly in La Luz and Alamorosa, and spot locations at every 33 feet in Carrizozo and Nogal), construction may damage or remove driveways, fences, landscapes and other improvements. Although the construction contractor would replace these with similar products, there may be changes in the appearance of the foreground to which residents and property owners are accustomed. These changes may be perceived as detrimental and intrusive. However, it is expected that these effects would be short-term, as people become accustomed to minor changes and plants and landscapes are reestablished.

Noise

Noise would be generated by construction and repair activities, and pipe crushing and removal over the length of the pipeline. The type of equipment and vehicles that would operate would be no louder than a heavy trailer truck. Noise would generally be from mobile sources, generated intermittently during the day on the work site, and would only occur for a few days at any given location. Most of the areas where construction would take place are along highways that are already exposed to elevated noise from vehicular traffic, particularly trucks (NMSHTD 2000). There are a few isolated residences and businesses along U.S. 54 and U.S. 380 that may be exposed to elevated noise during construction, but both distance from the work area and building structure would somewhat reduce interior noise levels.

In some locations, project activities would occur in areas that are naturally quiet and closer to residences. Homes along NM 37 through Nogal are located closer to work areas and may experience work site noise more directly. The additional noise from equipment in the La Luz neighborhood would also be intrusive during the short period that work is being performed. However, noise would be temporary and not result in any long-term changes or effects. The noisy process of pipe crushing would not occur in residential areas, but at a centralized location away from these noise-sensitive areas.

4.7.2.2 Existing Alignment Alternative

Visual Resources

Visual impacts would be similar under this alternative as for the Proposed Action. Replacement of pipeline along the existing alignment in the La Luz area could alter the appearance of some properties until repairs are complete and reseeding or landscapes reestablished. The impacts would be similar where the pipeline traverses private property under this alternative as they were alongside private property in roadway ROW under the Proposed Action.

Noise

Noise effects would be similar to the Proposed Action. More residences would be exposed to noise during construction, but the duration would be intermittent and temporary.

4.7.2.3 No Action

Visual Resources

There would be no change in visual resources from current conditions.

Noise

There would be no change in noise levels from current conditions.

4.8 SOLID WASTE

4.8.1 Methodology

Impacts on solid waste facilities are based on the amount of solid waste to be generated, expressed as a percentage of current annual solid waste. Reduction in estimated life span of regional facilities is also estimated. Reductions in life span that would require near-term expansion of capacity (within 5 years) would potentially be a significant impact. In this case, the feasibility of expanding or permitting new areas for receiving solid waste would be examined. If the life span would be reduced by over 25 percent (but not affect near-term capacity), this would be noted as a moderate impact on the system.

4.8.2 Impacts

4.8.2.1 Proposed Action

Under the Proposed Action, it is estimated that up to 7,300 cubic feet of chip seal or asphalt (about 533 tons) and 21,870 cubic feet of base course material (about 1,553 tons) would be removed during trenching for the new pipeline, repairs and installing cathodic protection along paved roadways. In addition, up to 6,400 sections of the existing pipe, each weighing about 4 tons, could be removed. Combined, this would generate about 27,686 tons of solid waste debris over two years.

Since the regional landfill opened in 1994, about 15 acres have been filled. Recently, it has been filling at a faster rate of 5 acres (or 71,000 tons) per year (Hamann 2001). Based on this, the remaining 78 acres may fill within 16 years. Assuming this recent rate, project debris could represent up to a 20 percent increase in tipping at the landfill for two years. This could generate almost $610,000 in revenue for the landfill, but could reduce the remaining service life by about 5 months (or almost 3 percent). This is a notable reduction, but overall, an insignificant impact.

It is assumed that construction debris would not be dumped in vacant areas, and concrete trucks or other vehicles or equipment would not be allowed to clean out in vacant areas. All material would be deposited at suitable sites.

4.8.2.2 Existing Alignment Alternative

Under this alternative, about 192 tons of asphalt or chip seal and 562 tons of base course would be removed. In addition, up to 40 miles of existing pipe would be removed. The total amount of

waste that could be taken to the landfill would be similar to the Proposed Action and have insignificant impacts.

4.8.2.3 No Action

Under the No Action Alternative, there would be no change in solid waste generation from Bonito pipeline operations and maintenance activities, therefore, no impact on regional landfill capacity.

4.9 SOCIOECONOMICS

4.9.1 Methodology

Baseline conditions for population, employment, and earnings were analyzed for Otero and Lincoln Counties, providing statewide comparisons in some cases. Agriculture was analyzed for Otero County only, based on the potential for impacts to pecan orchards. Historical population data for selected years were obtained from the U.S. Census Bureau. Historical data describing total employment, employment by sector and earnings by sector for selected years were obtained from the Bureau of Economic Analysis (BEA). Employment and expenditure data for Holloman AFB were derived from the Economic Resource Impact Statement (ERIS) for FY 2000. Agriculture information including data on farms, farm receipts, pecan production and prices were obtained from either the U.S. Department of Agriculture or the New Mexico Department of Agriculture. Construction worker data were developed based on total construction expenditures for the Proposed Action, utilizing assumptions about labor and non-labor construction expenditures developed for other Air Force projects and average earnings per construction worker for Otero County. Impacts to pecan production were calculated based on the estimated amount of acreage that would be disturbed, derived from field surveys, then applying assumptions based on historic data on pecan production per acre and price per pound in Otero County pecan orchards.

4.9.2 Impacts

4.9.2.1 Proposed Action

Population

The project is not expected to create a long-term change in population since jobs associated with operations and maintenance of the pipeline are expected to be similar to or less than current levels. In addition, construction workers would either reside in the local area or if hired from outside the local area, are anticipated to relocate on a temporary basis for the duration of their work.

Employment and Earnings

Construction expenditures for the pipeline are projected to be approximately $18 million over an 18 to 24 month period starting in the Spring of 2002. Otero County, by comparison, produced $44 million of earnings in the construction sector and Lincoln County produced $22.3 million in 1998.

Estimated construction expenditures of $18 million for the Proposed Action are expected to produce an estimated 176 direct project-related jobs. This assumes that an estimated 45 percent of the $18 million in construction expenditures would be attributed to worker payrolls or $8.1 million, which would be allocated over two years. It then factors in the average earnings per construction sector employee in Otero County, which was $23,026 in 1998, to estimate the number of construction workers. These construction workers would in turn spend their payrolls on goods and services, which would also produce an economic benefit. A portion of the $18 million in construction expenditures would be used for purchases of materials and services and similar non-labor costs.

Once the pipeline repair and replacement is complete, additional expenditures would be made for operations and maintenance. However, since the proposed improvements would be expected to reduce the frequency of pipeline failure and repair that has occurred as well as the use of alternative water supplies, it is likely that operations and maintenance expenditures would be at or below current levels.

The specific jurisdictions receiving economic benefits from the project would depend on the location and availability of contractors, construction workers, and suppliers of materials and services needed for the pipeline replacement and repair, and might include, for example, Alamogordo, Las Cruces, El Paso, Roswell, and perhaps Albuquerque. Construction crews are expected to reside in or temporarily relocate to the local area or commute from nearby locations.

Agriculture

The Proposed Action would avoid crossing approximately 5.1 acres of pecan orchards in Otero County, which would be disturbed by implementation of each of the other alternatives with the exception of the No Action Alternative. This represents approximately 0.3 percent of the acreage in pecan orchards in Otero County. The estimated annual production value for 5.1 acres of pecan orchards in Otero County is $6,399 (5.1 acres x an average of 1,037 pounds of pecans per acre x $1.21 average price per pound). The average price per pound is based on available local pecan price data for Otero County for several recent years and the pounds per acre is based on 1997 data. Multiplied by a seven-year recovery period for new trees to reach effective production, this would result in about $50,000 in production losses.

Additional costs could result from replacement of irrigation systems. In general, where fences, utility lines, irrigation, driveways and plants would be taken out for the project (i.e., on agricultural or non-agricultural lands), they would be replaced in kind or improved. Existing or future easements, acquisitions or other agreements would address the individual interests of landowners with regard to the pipeline repair or replacement activities, and would provide for future operations and maintenance access, as necessary. Where the pipeline crosses rangeland or pasture, it is anticipated that long-term productive capacity would not change.

4.9.2.2 Existing Alignment Alternative

Construction expenditures for the Existing Alignment Alternative are expected to be similar to the Proposed Action and therefore would have similar population, employment and earnings effects to those of the Proposed Action. This alternative would, however, cross developed

properties and approximately 5.1 acres of pecan orchards in Otero County, which have an estimated annual production value of $6,399.

4.9.2.3 No Action

The No Action Alternative would result in a continuation of the use of water wells and drawing down of the potable aquifer, due to frequent failures of the existing pipeline. The costs of recurring pipeline failures, loss of hundreds of thousands of gallons of water, potential economic consequences from flood damage, and reliance upon alternative water supplies, would continue. Because the No Action Alternative would avoid carrying out proposed construction and repairs associated with the Proposed Action and Alternatives, it would avoid new disturbance of developed properties and approximately 5.1 acres of pecan orchards in Otero County with an estimated annual production value of $6,399.

4.10 ENVIRONMENTAL JUSTICE

4.10.1 Methodology

Data on minority populations and low-income populations for Otero County and Lincoln County were developed from 1990 Census data published by Geolytics, Inc. This is the most recent data available that provides a sufficient level of detail necessary to characterize both minority and low-income populations for analysis of Environmental Justice issues. Although preliminary data on population, race, and ethnicity are available from the 2000 Census, income and poverty data are not yet available, and therefore, 1990 Census data is used in the analysis for consistency. Total population, percent minority and percent low-income were described for the two counties. Other resource impacts identified in the EA were considered to determine the potential for high and adverse health and environmental impacts to human populations. If such impacts were identified, an analysis of the potential for disproportionately high and adverse impacts to minority and low-income populations would be conducted, comparing the demographics of the affected area to the two-county region of comparison.

4.10.2 Impacts

4.10.2.1 Proposed Action

The potential for impacts to landowners or populations within the pipeline corridor is limited by the fact that most of the pipeline construction and upgrade would occur in public ROW. If realignments are required (e.g., in areas where encroachment has occurred, such as the villages of Nogal, Alamorosa, and La Luz) most of the new realignments would fall within county, state, and federal highway ROW. The pipeline would not traverse reservation lands. The pipeline easement would avoid traversing some private lands and 5.1 acres of pecan orchards that would be disturbed by other alternatives. Other portions may cross range land or pasture, but it is expected that these activities could continue. Easements or other conveyances are in place or would be acquired as appropriate to enable construction and on-going maintenance of the pipeline and construction-related disruptions would be temporary.

There may be short-term inconvenience to residents and businesses, but no long-term nor substantial impacts would occur that affect local human or social activities, or the physical

environment. Therefore, no disproportionately high and adverse impacts on minority or low-income populations are anticipated as a result of the Proposed Action. There would also be no disproportionate health risks or safety risks to children as a result of the project.

4.10.2.2 Existing Alignment Alternative

There would not be disproportionately high and adverse impacts on minority or low-income populations as a result of the Existing Alignment Alternative. Some developed areas along the existing alignment and pecan orchards would be disturbed under this alternative. When the easements were originally acquired, most of this land was undeveloped.

4.10.2.3 No Action

Local demographic trends related to minority and low-income populations residing in the area are expected to continue under the No Action Alternative.

5.0 CUMULATIVE IMPACTS

Cumulative impacts to environmental resources result from incremental effects of proposed actions, when combined with other past, present, and reasonably foreseeable future projects in the area. Cumulative impacts can result from minor, but collectively substantial actions undertaken over a period of time by various agencies (federal, state, and local) or individuals. In accordance with NEPA, a discussion of cumulative impacts resulting from projects that are proposed, under construction, recently completed, or anticipated to be implemented in the near future is required. Any of these other actions that may occur in the area would require NEPA analysis (specific to those proposals) prior to implementation.

In evaluating the potential for cumulative impacts, the environmental documentation for the U.S. 54 Improvement Project between Tularosa and Carrizozo, probable improvements to U.S. 380 between Carrizozo and Hondo, and this Proposed Action were considered. Over 1,000 acres will be disturbed for U.S. 54 highway improvements and removal of the existing lanes once completed. Up to 520 acres may be disturbed for the U.S. 380 project (NMSHTD 2000c). It is assumed that similar BMPs and controls would be used for this project if implemented as required by the NMSHTD. Potential cumulative impacts for each resource are summarized below.

Earth Resources. Impacts to soils could result from erosion during these projects. All projects being undertaken or proposed would include specifications regarding "temporary erosion, sediment, and water pollution control." These would be included in construction contracts and SWPPPs prepared for each project and would minimize impacts on soil resources.

Water Resources. All required permits (in compliance with NPDES and Section 404 program) would be acquired prior to construction on these projects. Temporary and permanent erosion and sedimentation control measures would be implemented, and no violations of water quality standards would be anticipated.

Air Quality. Short-term localized adverse effects on air quality could result from smoke, dust, and exhaust emissions from combined activities in the project area (NMSHTD 2000a). The U.S. 54 project would strictly control all burning operations. All projects would use practices to minimize dust and particulate matter during construction and activities will be performed in compliance with applicable NMED regulations. Therefore, no exceedances of criteria pollutants would be anticipated.

Biological Resources. Road improvements along U.S. 54 are projected to impact 117 acres of altered Chihuahuan Desert Shrublands (NMSHTD 2000a), in addition to 137 acres estimated for the Bonito repairs. It is expected that if the loggerhead shrike, a federal species of concern, is present in the U.S. 54 project area, it would likely leave temporarily during construction and not be affected by these projects. This species is also found in the U.S. 380 project area, as well as a population of the federally-endangered Kuenzler's hedgehog cactus. Although in the vicinity, neither of these two species are in the pipeline area of effect; therefore, there would be no cumulative impact from this proposal. Other federal or state species or their habitats may be identified in follow-on surveys for the Bonito project. Impacts would be minimized through measures identified through coordination with the USFWS and NMDGF. Therefore, overall effects on federal or state sensitive species would be minimal.

Cultural Resources. All potentially affected cultural sites would be reviewed by the SHPO, and appropriate avoidance or other measures would be prepared. Consultation and concurrence with the SHPO about treatment of sites would be completed prior to construction on these projects. Therefore, impacts on cultural resources would be minimal.

Land Use. Neither the U.S. 54 improvement project, nor repairs of the Bonito pipeline, would alter land use along roadways in the project area. Residents and businesses located along the pipeline may experience some temporary inconvenience and discomfort during construction, until property is restored to its original condition.

Aesthetics. Improvements along roadways would not have long-term impacts on aesthetics because these areas are already dominated by manmade improvements. Due to confined work areas, there would be short-term changes in the Nogal streetscape from construction through the village.

Average noise levels along U.S. 54 between Tularosa and Carrizozo are projected to increase over the next 20 years from increased traffic. The U.S. 54 improvements are expected to offset some of these increases at specific residences along the route. Noise from construction for both the highway and the Bonito pipeline project would occur over the next couple of years, but would be temporary and not contribute to long-term elevated noise levels. The affected areas are sparsely populated, so impacts would be minimal.

Solid Waste. During construction of the new lanes for the U.S. 54 improvement between Tularosa and Carrizozo, the existing two-lane highway would be demolished and the pavement recycled. Therefore, apart from some debris during the course of construction, both projects would not be hauling significant quantities of material to regional landfills.

Socioeconomics. Implementing these projects is expected to benefit the area's economic development through creation of jobs and increased expenditures in the local area over the next few years. During construction there may be interruptions in traffic flow, but these would be short-term and the new highway would ultimately improve access to the area.

Environmental Justice. No cumulative adverse effects on human activities are expected. Community cohesion would not be negatively affected by the highway improvements, and no relocations would be required. Conditions that affect minority or low-income persons disproportionately would not be present.

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APPENDIX A
AGENCY COORDINATION AND PUBLIC INVOLVEMENT MATERIAL

ORDER OF CONTENTS

FINAL ENVIRONMENTAL ASSESSMENT DISTRIBUTION LIST—
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Ecological Service Field Office
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Albuquerque, NM 87113-1001

Mr. Rob Lawrence
U.S. Environmental Protection Agency
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Bureau of Land Management
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Las Cruces District Office
1800 Marquess Street
Las Cruces, NM 88005

Bureau of Land Management
Attention: NEPA Coordinator
Roswell District Office
2909 West Second Street
Roswell, NM 88201-2019

Mescalero Apache Tribe
Executive Committee
Attention: Sara Misquez, Chair
P.O. Box 227
Mescalero, NM 88340

NMSHTD
Environmental Division
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Santa Fe, NM 87501-1149

Mayor Manuel Hernandez
Town of Carrizozo
P.O. Box 247
Carrizozo, NM 88301-0247

Mr. Tom Stewart
Manager, Lincoln County
300 Central Avenue
P.O. Box 711
Carrizozo, NM 88301-0711

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City of Alamogordo
1376 East 9th Street
Alamogordo, NM 88310

New Mexico Office of Cultural Affairs
Historic Preservation Office
Attention: Elizabeth Oster
228 East Palace Avenue
Santa Fe, NM 87501

Alamogordo Public Library
920 Oregon Avenue
Alamogordo, NM 88310

NMSU-A Library
2400 North Scenic Drive
Alamogordo, NM 88310

Ruidoso Public Library
107 Kansas City Road
P.O. Box 8690
Ruidoso, NM 88345-8690

Otero County Clerk's Office
1000 New York Avenue
Alamogordo, NM 88310

Lincoln County Clerk's Office
300 Central Avenue
Carrizozo, NM 88301-0711

Holloman AFB Library
Building 224
Holloman AFB, NM 88330

FINAL ENVIRONMENTAL ASSESSMENT DISTRIBUTION LIST—
REPAIR BONITO PIPELINE

Arnhart, Tom and Cynthia Flavion-Arnhart
Baker, R.M.
Bottemiller, Capt. Greg
Bullert, Bruce
Burnett, Paul
Chapman, Scott
Cooper, Don
Curtis, Monroe
Edwards, Jim
Hammond, Ruth
Hendrickson, Alan
Hoppers, Roxena
Kizer, James A.
McIntosh, William
Miller, Ernie Lee & Don
Moeller, Robert
Morrison, Richard
Najar, Lucinda
Stalling, Diane (Ruidoso News)
Steinborn, Jeff
Stephen Sanchez
Tovar, Jr., Eduardo
Young, Elton

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH FIGHTER WING (ACC)
HOLLOMAN AIR FORCE BASE, NEW MEXICO

Colonel Marc E. Rogers
Commander, 49th Fighter Wing
490 First St., Suite 1700
Holloman AFB NM 88330-8277

APR 26 2001

Mescalero Apache Tribe Executive Committee
Attn: Sara Misquez, Chair
P.O. Box 227
Mescalero, NM 88340

The US Congress has recently funded a project to repair the Bonito Pipeline that provides water to Holloman AFB and the City of Alamogordo. As you may know, this pipeline runs from Bonito Lake north of Ruidoso, north to Nogal, then follows NM Highway 37 northwest to US Highway 380 and extends west along 380 to Carrizozo. From Carrizozo the pipeline runs south along the west side of US 54 and the railroad until its south of Tularosa, where it turns southeast to the reservoir at La Luz. Although this does not cross any current Mescalero property, it does run through an area historically used by Apache, and could possibly contain areas of traditional cultural importance.

Although the entire area to be affected by the pipeline repairs has been heavily disturbed by years of highway, railroad and rural development, we have conducted cultural resources and biological resources surveys, and are preparing an Environmental Assessment of the pipeline reconstruction. These documents will soon be provided to the Mescalero Executive Committee and to the Tribal Historic Preservation Officer for review and comment. We are unaware of any Traditional Cultural Properties of interest to the Mescalero within the area of the project, and would appreciate your evaluation of the project from that perspective, as well as the environmental review.

As good neighbors, we are taking this opportunity to officially inform the Mescalero of this pipeline project, and we solicit your comments concerning this projects. Written comments should be mailed to:

49FW/PA
490 First St., Suite 2800
Holloman AFB NM 88310

Questions should be addressed to Mr. Robert Pepper, 49th Fighter Wing Public Affairs, at (505) 572-5406.

Marc E. Rogers

MARC E. ROGERS
Colonel, USAF
Commander

Global Power for America

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH FIGHTER WING (ACC)
HOLLOMAN AIR FORCE BASE, NEW MEXICO

Mescalero Apache Tribe
Tribal Historic Preservation Office
Attn: Donna Stern-McFadden
P.O.Box 227
Mescalero, NM 88340

Greetings,

14 May 01

The U.S. Air Force, acting through the Holloman Air Force Base 49th Civil Engineer Squadron, is proposing to repair the portion of the Bonito Pipeline between Nogal and La Luz, NM. Because the Congressional appropriation for this project is not adequate to completely replace the existing line, we have proposed to place new pipe from La Luz to approximately Oscura, NM, and to cathodically protect the existing line between Oscura and Nogal, NM. The actual amount of new pipe versus the extent of cathodic protection remains to be defined. However, there will be either trenching for new pipe, or intermittent excavations for cathodics, along the entire line from Nogal to La Luz.

The Army Corps of Engineers, Albuquerque, is the contracting agent for the Air Force on this project. Science Applications International Corporation (SAIC) is preparing an Environmental Assessment, which we will forward to you as soon as it becomes available. The report on the cultural resources survey conducted for this project is enclosed for your review and comment.

The pipeline from Nogal to La Luz was completely rebuilt in 1956, using concrete/steel/concrete pipe. Almost all of this pipeline alignment has been quite thoroughly disturbed by construction of the previous pipelines, as well as NM Highway 37 and US Highways 380, 54 and 70. However, no cultural resources survey had included the entire area of potential effects.

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Mr. Andrew Gomolak, Archaeologist/Geologist/NEPA Analyst for the Environmental Analysis Section of our Environmental Flight has; researched records from the NM Cultural Resources Information System, read both Michalik's and Ackerly's reports, and, conducted field review of the sites discussed in the reports. He proposes the following site specific observations and recommendations for your consideration.

SITE	RECOMMENDATION
LA 6834	- not in area of pipeline, no affect.
LA 6837	- not in area of pipeline, no affect.
LA 6838	- not in area of pipeline, no affect
LA 13495	- not in area of pipeline, no affect.

LA 72438 - due to absence, or the extent of previous disturbance along the pipeline/road, no surface evidence of potential significance is currently in the area of the pipeline construction. No artifacts nor features were originally recorded within the highway/pipeline. No affect, no further action required.

LA 85817 - not in area of pipeline, no affect.
LA 86735 - not in area of pipeline (site is East of US 54, pipeline is West), no affect.

LA 86736 - low density, diffuse scatter of surface artifacts through general vicinity, but not on pipeline area of effect. HSR testing, scraping and trenches on the East side of US 54 found buried features in or near areas of higher artifact density. Excavations on the West side of US 54 found no subsurface remains. The site is being considered "mitigated" for highway construction purposes. The pipeline is within the highway right of way, on the West, in an area where no subsurface remains were found. No further work is recommended.

LA 86737 - area of pipeline effects is completely, and fairly deeply, reworked by current and historic road and pipeline maintenance. HSR testing, scraping and trenching found very few surface or subsurface artifacts in the West side of the US 54 right of way. However, a variable density surface scatter throughout the vicinity extends East and West, and one artifact concentration is about twenty meters beyond the highway fence, west of the west edge of the pipeline affected area. Monitor construction excavations for intact subsurface remains, record and recover if any found.

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LA 114582 - This site includes probable structures southwest, and up slope, of the highway. The apparent northern periphery of the extensive artifact scatter is in the NM 37 right of way, and overlaps the existing pipeline between the northeastern edge of the pavement and the highway ROW fence. Current plans call for only intermittent excavations in this area, to install cathodic devices. Monitor construction excavations for intact subsurface remains, record and recover if any found.

LA 120972 - due to absence, or the extent of previous disturbance along the pipeline/road, no surface evidence of potential significance is apparent in the area of the pipeline construction. However, similar sites in the vicinity (LA 86736, 37) had appreciable subsurface remains, and two fire cracked rock features are close to the pipeline affected area. Monitor construction excavations for intact subsurface remains, record and recover if any found.

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LA 132131 This historic dump is in the area where only intermittent excavations are planned for the installation of cathodic protection devices. Any early historic debris on, or in the immediate vicinity of, the pipeline, will have previously been completely reworked and displaced by the 1956 pipeline construction trenching and backfilling, and subsequent erosion. No further work is recommended.

We sincerely appreciate your effort in review of the enclosed report and our recommendations. If you have any questions, please call me at 505-572-3931 or 5878.

AR Gomolak

ANDREW R. GOMOLAK
NEPA Analyst, Archaeologist
49 CES/CEV
550 Tabosa Avenue
Holloman AFB, NM 88330-8458

Encl: Ackerly Survey Report

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR COMBAT COMMAND
LANGLEY AIR FORCE BASE, VIRGINIA

10 APR 2001

MEMORANDUM FOR U.S. Fish and Wildlife Service
New Mexico Ecological Services Field Office
2105 Osuna Rd NE
Albuquerque NM 87113-1001

FROM: HQ ACC/CEVP
129 Andrews Street, Suite 102
Langley Air Force Base VA 23665-2769

SUBJECT: Request for Species List - Bonito Water Pipeline Right of Way

1. The United States Air Force (Air Force) is preparing an Environmental Assessment (EA) to evaluate potential environmental impacts resulting from repair of the Bonito Water Pipeline in Otero and Lincoln Counties, New Mexico. This pipeline, which lies within easements conveyed to the Air Force, extends about 66 miles from Nogal to the La Luz Reservoir in Alamogordo. It provides water to both Holloman Air Force Base and the City of Alamogordo. Under the proposed action, approximately 38 miles of deteriorated pipe in the segment between La Luz and Oscura would be replaced. During replacement, there would be some partial realignment of the pipeline's route in order to minimize crossing of private property. The remainder of the pipeline to Nogal would undergo spot repairs, and a cathodic protection system would be installed to inhibit corrosion and extend the pipes' lifespan.

2. In addition to the proposed action, two additional alternatives are being analyzed in detail: (1) replacing the same amount of pipe, but re-installing it in the existing right of way, and (2) the no-action alternative.

3. The EA will analyze the potential effects of this proposed action on environmental resources. Pursuant to the Endangered Species Act and the National Environmental Policy Act, we are requesting information regarding federally listed or proposed species that may be present in the potentially affected area. This area can be defined as the areas potentially affected during repair and replacement of the pipeline (see attached map). If any of this information is available digitally, we would appreciate receiving it in that format. Until the extent of the potential impact to listed species is determined, we will make no decision regarding the need for a Section 7 consultation.

4. Please provide responses and direct inquiries on this matter to Mr. Roy Barker, Command Natural Resources Manager at (757) 764-9338.

/s/
ALTON CHAVIS
Chief, Environmental Analysis Branch

Attachment:
Map of Potential Effect Area

Global Power For America

cc: NM Fish and Game Dept

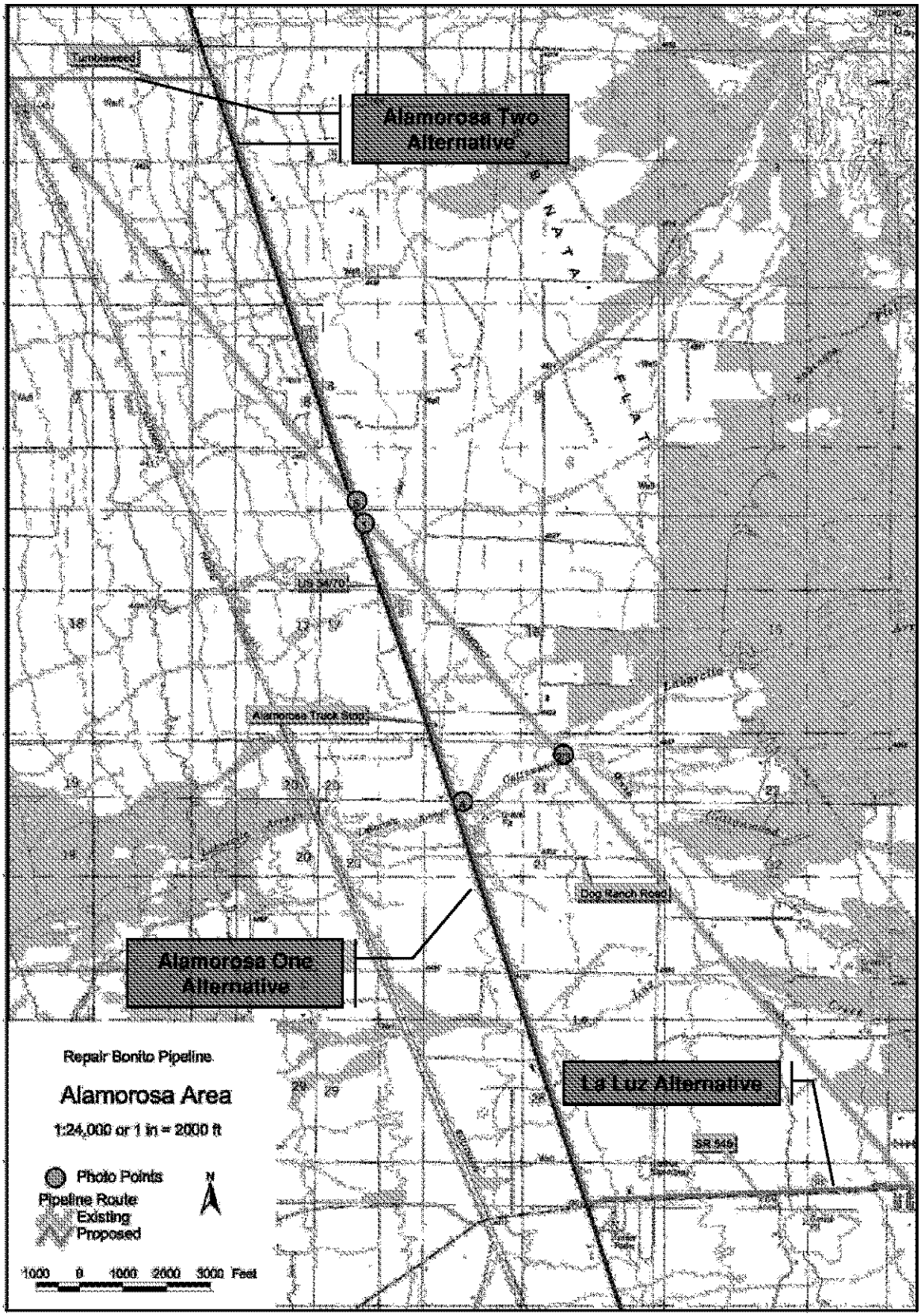

Figure 2-2. Bonito Pipeline – Existing and Alternative Pipeline Alignments in Alamorosa

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Mexico Ecological Services Field Office
2105 Osuna NE
Albuquerque, New Mexico 87113
Phone: (505) 346-2525 Fax: (505) 346-2542

April 30, 2001

Cons. # 2-22-01-I-340

Mr. Roy Barker, Command Natural Resources Manager
HQ ACG/CEVP
129 Andrews Street, Suite 102
Langley Air Force Base, VA 23665-2769

Dear Mr. Barker:

This responds to your April 10, 2001, letter requesting information on threatened or endangered species or important wildlife habitats that could be affected by a project to repair and/or replace an existing water pipeline. The Bonito Water Pipeline is located in Otero and Lincoln counties, New Mexico, within easements extending about 66 miles from Nogal to the La Luz Reservoir in Alamogordo. The pipeline will be replaced for 38 miles between La Luz and Oscura, and spot repairs in the pipeline to Nogal.

We have enclosed a current list of federally-endangered, threatened, candidate species, and species of concern that may be found in Otero and Lincoln counties, New Mexico. Additional information about these species is available on the internet at <http://nmrareplants.unm.edu>, <http://nmnhp.unm.edu/bisonm/bisonm.cfm>, and <http://ifw2es.fws.gov/endangeredspecies>. Under the Endangered Species Act, as amended (Act), it is the responsibility of the Federal action agency or its designated representative to determine if a proposed action "may affect" any threatened, endangered, or proposed species, or critical habitat, and if necessary, to consult with us further. If your action area has suitable habitat for any of these species, we recommend that species-specific surveys be done during the appropriate flowering/breeding season to evaluate any possible project-related impacts.

Candidates and species of concern have no legal protection under the Act and are included in this document for planning purposes only. We are required to monitor the status of these species. If significant declines are detected, these species could potentially be listed as endangered or threatened. Therefore, actions that may contribute to their decline should be avoided. We recommend that candidates and species of concern be included in your surveys.

Under Executive Order 11990, Federal agencies are required to minimize the destruction, loss, or degradation of wetlands, and preserve and enhance their natural and beneficial values. We recommend you contact the U.S. Army Corps of Engineers for permitting requirements under Section 404 of the Clean Water Act if your proposed action could impact wetlands.

The Migratory Bird Treaty Act (MBTA) prohibits the taking of migratory birds, nests, and eggs, except as permitted by the U.S. Fish and Wildlife Service. To minimize the likelihood of adverse impacts to all birds protected under the MBTA, we recommend construction activities occur outside the general migratory bird nesting season of March through August, or that areas proposed for construction during the nesting season be surveyed, and if necessary, avoided until nesting is complete.

Please keep in mind that the scope of federally-listed species compliance also includes any interrelated or interdependent project activities (e.g., equipment staging areas, offsite borrow material areas, or utility relocations) and any indirect and cumulative effects. We suggest you contact the New Mexico Department of Game and Fish, and the New Mexico Energy, Minerals, and Natural Resources Department, Forestry Division for information regarding fish, wildlife, and plants of State concern.

Thank you for your concern for endangered species and New Mexico's wildlife habitats. If you have any questions, please contact Maija Meneks at the letterhead address or at (505) 346-2525, ext. 153.

Sincerely,

Joy E. Nicholopoulos

Joy E. Nicholopoulos
Field Supervisor

Enclosure

cc: (w/o enc)
Director, New Mexico Department of Game and Fish, Santa Fe, New Mexico
Director, New Mexico Energy, Minerals, and Natural Resources Department, Forestry Division, Santa Fe, New Mexico

Threatened, Endangered, and Candidate Species,
and Species of Concern
Lincoln County
April 26, 2001

Lincoln

Black-footed ferret, Mustela nigripes, E**
Black-tailed prairie dog, Cynomys ludovicianus, C
Cave myotis, Myotis velifer, SC
Fringed myotis, Myotis thysanodes, SC
Gray-footed chipmunk, Tamias canipes, SC
New Mexican meadow jumping mouse, Zapus hudsonius luteus, SC
Occult little brown bat, Myotis lucifugus occultus, SC
Organ Mountains Colorado chipmunk, Eutamias quadrivittatus australis, SC
Townsend's big-eared bat, Corynorhinus townsendii, SC
Pecos River muskrat, Ondatra zibethicus ripensis, SC
American peregrine falcon, Falco peregrinus anatum, SC
Arctic peregrine falcon, Falco peregrinus tundrius, SC
Baird's sparrow, Ammodramus bairdii, SC
Bald eagle, Haliaeetus leucocephalus, T
Ferruginous hawk, Buteo regalis, SC
Loggerhead shrike, Lanius ludovicianus, SC
Mexican spotted owl, Strix occidentalis lucida, T w/PCH
Mountain plover, Charadrius montanus, PT
Northern aplomado falcon, Falco femoralis septentrionalis, E
Northern goshawk, Accipiter gentilis, SC
Yellow-billed cuckoo, Coccyzus americanus, SC
Longfin dace, Agosia chrysogaster*, SC
White Sands pupfish, Cyprinodon tularosa, SC
Sacramento mountain salamander, Aneides hardii, SC
Texas horned lizard, Phrynosoma cornutum, SC
Bonita diving beetle, Deronectes neomexicana, SC
Sacramento Mountains silverspot butterfly, Speyeria atlantis capitanensis, SC
Sacramento Mountains blue butterfly, Icaricia icariodes new subspecies, SC
Sacramento Mountains checkerspot butterfly, Euphydryas anicia cloudcrofti, SC
Desert viceroy butterfly, Limenitis archippus obsoleta, SC
Goodding's onion, Allium gooddingii, SC
Kuenzler hedgehog cactus, Echinocereus fendleri var. kuenzleri, E
Sierra Blanca cliffdaisy, Chaetopappa elegans, SC
Wright's marsh thistle, Cirsium wrightii, SC

Otero

Big free-tailed bat, Nyctinomops macrotis (=Tadarida m., T. molossa), SC
Black-footed ferret, Mustela nigripes, E**
Black-tailed prairie dog, Cynomys ludovicianus, C
Cave myotis, Myotis velifer, SC
Desert pocket gopher, Geomys bursarius arenarius, SC
Fringed myotis, Myotis thysanodes, SC
Gray-footed chipmunk, Tamias canipes, SC
Greater western mastiff bat, Eumops perotis californicus, SC
Guadalupe southern pocket gopher, Thomomys umbrinus guadalupensis, SC
New Mexican meadow jumping mouse, Zapus hudsonius luteus, SC
Occult little brown bat, Myotis lucifugus occultus, SC
Townsend's big-eared bat, Corynorhinus townsendii, SC
Spotted bat, Euderma maculatum, SC
White Sands woodrat, Neotoma micropus leucophaea, SC
American peregrine falcon, Falco peregrinus anatum, SC
Arctic peregrine falcon, Falco peregrinus tundrius, SC
Baird's sparrow, Ammodramus bairdii, SC
Bald eagle, Haliaeetus leucocephalus, T
Black tern, Chlidonias niger, SC
Ferruginous hawk, Buteo regalis, SC
Interior least tern, Sterna antillarum athalassos, E
Loggerhead shrike, Lanius ludovicianus, SC
Mexican spotted owl, Strix occidentalis lucida, T w/PCH
Northern aplomado falcon, Falco femoralis septentrionalis, E
Northern goshawk, Accipiter gentilis, SC
Southwestern willow flycatcher, Empidonax traillii extimus, E
Western burrowing owl, Athene cunicularia hypugaea, SC
Mountain plover, Charadrius montanus, PT
White-faced ibis, Plegadis chihi, SC
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White Sands pupfish, Cyprinodon tularosa, SC
Sacramento mountain salamander, Aneides hardii, SC
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Sacramento Mountains blue butterfly, Icaricia icarioides new subspecies, SC
Alamo beardtongue, Penstemon alamosensis, SC
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Goodding's onion, Allium gooddingii, SC
Guadalupe rabbitbrush, Chrysothamnus nauseosus var. texensis, SC
Gypsum scalebroom, Lepidospartum burgessii, SC
Kuenzler hedgehog cactus, Echinocereus fendleri var. kuenzleri, E
Sacramento Mountains thistle, Cirsium vinaceum, T
Sacramento prickly poppy, Argemone pleiacantha ssp. pinnatisecta, E
Sierra Blanca cliffdaisy, Chaetopappa elegans, SC
Todsen's pennyroyal, Hedeoma todsenii, E
Villard's pincushion cactus, Escobaria villardii, SC
Wright's marsh thistle, Cirsium wrightii, SC

Index

E	=	Endangered (in danger of extinction throughout all or a significant portion of its range).
PE	=	Proposed Endangered
T	=	Threatened (likely to become endangered within the foreseeable future throughout all or a significant portion of its range).
PT	=	Proposed Threatened
CH	=	Critical Habitat
PCH	=	Proposed Critical Habitat
C	=	Candidate Species (taxa for which the Service has sufficient information to propose that they be added to list of endangered and threatened species, but the listing action has been precluded by other higher priority listing activities).
SC	=	Species of concern (taxa for which further biological research and field study are needed to resolve their conservation status OR are considered sensitive, rare, or declining on lists maintained by Natural Heritage Programs, State wildlife agencies, other Federal agencies, or professional/academic scientific societies). Species of concern are included for planning purposes only.
S/A	=	Similarity of Appearance
*	=	Introduced population
†	=	May occur in this county from re-introductions in Colorado.
XN	=	Nonessential Experimental Population
**	=	Survey should be conducted if project involves impacts to prairie dog towns or complexes of 200-acres or more for the Gunnison's prairie dog (*Cynomys gunnisoni*) and/or 80-acres or more for any subspecies of Black-tailed prairie dog (*Cynomys ludovicianus*). A complex consists of two or more neighboring prairie dog towns within 4.3 miles (7 kilometers) of each other.
***	=	Extirpated in this county

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Mexico Ecological Services Field Office
2105 Osuna NE
Albuquerque, New Mexico 87113
Phone: (505) 346-2525 Fax: (505) 346-2542

June 13, 2001

Cons. # 2-22-01-I-340

Mr. Andrew Gomolak
49th CES/CEV
550 Tabosa Avenue
Holloman AFB, NM 88330-8458

Dear Mr. Gomolak:

This letter responds to your May 18, 2001, request for comments on a draft Environmental Assessment (EA) concerning the Bonito water pipeline project. This project proposes to replace approximately 40 miles of pipeline in Otero and Lincoln counties, New Mexico; and conduct spot repairs and install a cathodic protection system on an additional 26 miles. The total pipeline length is about 66 miles, and lies within easements conveyed to the Air Force between Nogal, New Mexico to the La Luz Reservoir in Alamagordo, New Mexico. Several realignment options exist which would route sections of pipeline currently crossing private property to existing public right-of-ways.

Construction activity for the replacement portion of the pipeline would involve trenching, with options at stream and arroyo crossings for the pipeline to transverse either underground or aerially. Construction, stockpiling of soil, and grading would take place in a 50-foot wide work area along the pipeline alignment; and trenching activities would require digging a trench about six feet wide by six feet deep.

Construction activity for the cathodic protection installation portion of the pipeline would involve digging a hole five feet in diameter at each pipe joint, with joints spaced every 33 feet, and to place a strap to connect the exposed pipe sections. Additionally, anode beds would be set in a 6-inch diameter hole drilled 200 to 300 feet deep every one or two miles.

Overall, total disturbance, including construction and equipment and vehicle activities, is estimated to be 320 acres, including removal or disturbance of approximately 150 acres of remnant Chihuahuan Desert shrubland. Actual trenching and hole digging operations will total about 36 acres. The current pipeline crosses 81 stream channels (arroyos, swales, irrigation ditches, intermittent streams) within the corridor for proposed pipeline replacement, including Temporal Creek, a perennial system.

General Comments

- Aerial pipeline crossings of drainages, permanent or intermittent, if not properly constructed, could cause excessive erosion during high flow events. Burying pipes under a drainage may also cause erosion if the excavation is not properly backfilled. In either case, if the drainage channel dimension, pattern, profile, substrate, or slope is significantly changed, excessive erosion is likely and should be avoided. For long term stability, we recommend native vegetation be established.

- Findings of wildlife and plant surveys should be included in the final EA; and appropriate plans developed in the case of threatened and endangered species.

- The Service recommends that vegetation which is removed, especially riparian vegetation at Temporal Creek and remnant Chihuahuan Desert shrubland, should be replaced in kind.

Specific Comments

- The seed mixture described on page 4-2 includes South African lovegrass species, which is a non-native species. The Service recommends using a seed mixture which does not include exotics.

If you have any questions, please contact Maiju Meneks at the letterhead address or at (505) 346-2525, ext. 153.

Sincerely,

Joy E. Nicholopoulos
Field Supervisor

cc:
Director, New Mexico Department of Game & Fish, Santa Fe, New Mexico

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH FIGHTER WING (ACC)
HOLLOMAN AIR FORCE BASE, NEW MEXICO

15 MAY 2001

MEMORANDUM FOR HISTORIC PRESERVATION DIVISION
Office of Cultural Affairs
Attn: Elizabeth Oster
228 East Palace Avenue
Santa Fe. NM 87501

FROM: 49 CES/CD
550 Tabosa Avenue
Holloman AFB, NM 88330-8458

SUBJECT: Bonito Pipeline

1. The US Air Force, acting through the Holloman Air Force Base 49th Civil Engineer Squadron, is proposing to repair the portion of the Bonito Pipeline between Nogal and La Luz, NM. The Congressional appropriation for this project is to completely replace the existing line from La Luz to approximately Oscura, NM, and to cathodically protect the existing line between Oscura and Nogal, NM. The actual amount of new pipe versus the extent of cathodic protection remains to be defined. However, there will be either trenching for new pipe or intermittent excavations for cathodics along the entire line from Nogal to La Luz.

2. The Army Corps of Engineers, Albuquerque, is the contracting agent for the Air Force on this project. Science Applications International Corporation (SAIC) is preparing an Environmental Assessment (EA), which we will forward to you as soon as it becomes available. The report on the cultural resources survey conducted for this project is attached for your review and comment.

3. The pipeline from Nogal to La Luz was completely rebuilt in 1956, using concrete/steel/concrete pipe. Almost all of this pipeline alignment has been quite thoroughly disturbed by construction of the previous pipelines, as well as NM Highway 37 and US Highways 380, 54 and 70. However, no cultural resources survey had included the entire area of potential effects.

4. The New Mexico State Highway and Transportation Department recently (1999) contracted with Archaeological Services (Laura Michalik, Report #1058) to survey a wide Right of Way (ROW) for US 54 improvements. That survey inventoried the area including the pipeline between Mile Marker 84.8 (North of Tularosa) and Mile Marker 119.7 (South of Carrizozo). Sites recorded by that and prior surveys are being excavated by Human Systems Research (HSR) of Tularosa, NM.

5. As a part of the EA of the pipeline repair project. SAIC contracted with Dos Rios Consultants of Silver City, NM, to conduct a cultural resources survey of all portions of the pipeline project outside the area reported upon by Michalik. The report (Neal Ackerly, March 2001, attached) describes three newly observed sites, adds to the description of one previously recorded site and includes a summary table of other known cultural resources in the vicinity of the pipeline.

6. Mr. Andrew Gomolak, Archaeologist/Geologist/NEPA Analyst for the EA Section of our Environmental Flight, researched records from the NM Cultural Resources Information System, read both Michalik's and Ackerly's reports and conducted field review of the sites discussed in the reports. He proposes the following site-specific observations and recommendations for your consideration:

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7. We sincerely appreciate your effort in review of the enclosed report and our recommendations. If you have any questions, please call Andrew "JR" Gomolak at 505-572-3931.

Howard E Moffitt

HOWARD E. MOFFITT
Deputy Base Civil Engineer

Attached:
Neal Ackerly Report

STATE OF NEW MEXICO
DEPARTMENT OF GAME & FISH
P.O. Box 25112
Santa Fe, NM 87504

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May 21, 2001

Alton Chavis, Chief, Environmental Analysis Branch
Department of the Air Force
HQ ACC/CEVP
129 Andrews Street Suite 201
Langley Air Force Base VA 23665-2769

Re: Request for Species List – Bonito Water Pipeline Right of Way

NMGF No.7471

Dear Mr. Chavis,

In response to your letter dated April 10, 2001 regarding the above referenced project, the Department of Game and Fish (Department) does not anticipate significant impacts to wildlife or sensitive habitats. For your information, we have enclosed a list of sensitive, threatened and endangered species which occur in Otero and Lincoln Counties.

For more information on listed and other species of concern, contact the following sources:

1. http://www.fw.vt.edu/fishex/states/nm.htm for species accounts and to download New Mexico Species of Concern (wildlife species by county)
2. http://www.nmnhp.unm.edu for custom, site-specific searches on plants and wildlife
3. http://www.nmnhp.unm.edu/bisonm/BISONM.CFM for simple searches by listing category
4. New Mexico State Forestry Division (505-827-5830) for state-listed plants
5. U.S. Fish and Wildlife Service (505-346-2525) for federally listed wildlife species and critical habitats.

Thank you for the opportunity to review and comment on your project. If you have any questions, please contact Bill Hays of my staff at 505-827-9913 or bhays@state.nm.us

Sincerely,

Tod W. Stevenson

Tod W. Stevenson, Chief
Conservation Services Division

TWS/BH

xc: Field Supervisor (New Mexico Ecological Services, USFWS)
*(*Area Operations Chief, NMGF)
Bill Hays (Assistant Chief Conservation Services Division, NMGF)

NEW MEXICAN WILDLIFE of CONCERN

STATUS & DISTRIBUTION

STATE OF NEW MEXICO: THREATENED, ENDANGERED, SENSITIVE, ENDEMIC
USFWS: THREATENED, ENDANGERED, CANDIDATE, PROPOSED, SPECIES OF CONCERN
US BUREAU OF LAND MANAGEMENT: SENSITIVE
US FOREST SERVICE: SENSITIVE
EXTIRPATED FROM NEW MEXICO
US "CITES" LISTED
HARVESTABLE
EXTINCT

TABLE KEY

FWS ESA	US FISH & WILDLIFE SERVICE; ENDANGERED SPECIES ACT.
NM WCA	NEW MEXICO; WILDLIFE CONSERVATION ACT
FS R3	US FOREST SERVICE; REGION 3, NEW MEXICO & ARIZONA (old list, revision in progress)
BLM NM	UNDER CONSIDERATION FOR US BLM SENSITIVE, NEW MEXICO
NM Sen	NEW MEXICO; SENSITIVE (INFORMAL) and/or ENDEMIC TO NM
FWS SOC	US FISH & WILDLIFE SERVICE; SPECIES OF CONCERN (INFORMAL)
E	ENDANGERED
T	THREATENED
P	PROPOSED
C	CANDIDATE
CW	CANDIDATE with "Warranted But Precluded" determination
R	RESTRICTED
s	SENSITIVE or SPECIES OF CONCERN (SOC)
g	Cooperative Agreement (sometimes in lieu of listing)
n	ENDEMIC TO NEW MEXICO
h	Federal "Critical Habitat" designated
m	Recovery or Management Plan
()	In progress or draft

ADDITIONAL INFORMATION

COMPLETE SPECIES ACCOUNTS: Information pertaining to taxonomy, status, distribution, habitat, environmental association, food habits, management practices and references for all vertebrates and selected invertebrates in New Mexico is in a database, the Biota Information System Of New Mexico (BISON), maintained by the New Mexico Department of Game and Fish, Conservation Services Division.

Accounts on the Web at: **http://www.cmiweb.org/states/nm.htm**

Searches & account links: **http://nmnhp.unm.edu/bisonm/BISONM.CFM**

USFWS accounts:
http://ifw2es.fws.gov/endangeredspecies/lists/ListSpecies.cfm

or contact Jon Klingel
Conservation Services Division
New Mexico Department of Game & Fish
P.O. Box 25112
Santa Fe, New Mexico 87504

voice:505-827-9912 fax:505-827-9956
e-mail: jklingel@.state.nm.us

Or NM Department of Game and Fish, Endangered Species Program in Santa Fe at (505) 827-9904.

Information on federal status species is provided as a courtesy only. We suggest you contact the indicated federal agency for specifics regarding the status of these species. Offices: USFWS, Ecological Services Office, Albuquerque; US Forest Service Region 3 Office, Albuquerque; and US Bureau of Land Management State Office, Santa Fe.

EXTINCT

(Native New Mexican Wildlife which no longer exists anywhere)

Rio Grande Bluntnose Shiner	Notropis simus simus	(USFS sensitive)
Phantom Shiner	Notropis orca	
New Mexico Sharp-tailed Grouse	Tympanuchus phasianellus hueyi	(NM endemic)
Hot Springs Cotton Rat	Sigmodon fulviventer goldmani	(NM endemic)
Merriam's Elk	Cervus elaphus merriami	
Florida Mountainsnail	Oreohelix florida	(NM endemic)

APPARENTLY EXTIRPATED

(Native Wildlife apparently no longer occurring in New Mexico but existing elsewhere)

FISH

Shovelnose Sturgeon	Scaphirhynchus platorynchus	(New Mexico endangered)
Spotted Gar	Lepisosteus oculatus	
Colorado River Cutthroat Trout	Oncorhynchus clarki pleuriticus	
American Eel	Anguilla rostrata	
Bonytail Chub	Gila elegans	(federal endangered)
Beautiful Shiner	Cyprinella formosa	(federal threatened, Coop. Aggreement)
Palomas Pupfish	Cyprinodon sp.	(FWS SOC)
Freshwater Drum	Aplodinotus grunniens	

AMPHIBIANS

Western Boreal Toad	Bufo boreas (Possibly extirpated; NM endangered; Fed. Candidate; Mgt. Plan)
Lowland Leopard Frog	Rana yavapaiensis (Possibly extirpated; NM endangered; FWS SOC)

BIRDS

Sage Grouse	Centrocercus urophasianus
Sharp-tailed Grouse	Tympanuchus phasianellus (the only subspecies which occurred in NM is extinct)

MAMMALS

Bison	Bison bison	
Gray Wolf	Canis lupus	(C.l.baileyi reintroduced, other subsp extirpated; federal endangered)
Grizzly Bear	Ursus arctos	(federal threatened)
Black-footed Ferret	Mustela nigripes	(federal endangered with recovery plan)
Mink	Mustela vison energumenos	
Southwestern River Otter	Lutra canadensis sonorae	(FWS SOC; possibly extirpated)
Lynx	Lynx lynx	(federal threatened; almost certainly occured; no verified records)
Wolverine	Gulo gulo	(almost certainly occured; no specimens or verified records)

NEW MEXICAN WILDLIFE OF CONCERN

STATE-WIDE LIST

FISH

Common Name	SCIENTIFIC NAME	FWS ESA	NM WCA	FS R3	BLM NM	NM Sen	FWS SOC
Rio Grande Cutthroat Trout	Oncorhynchus clarki virginalis	-	-	s	-	s m	-
Gila Trout	Oncorhynchus gilae	E m	T	s	-	-	-
Mexican Tetra	Astyanax mexicanus	-	T	s	-	-	-
Longfin Dace	Agosia chrysogaster	-	-	-	s	-	s
Gila Chub	Gila intermedia	-	E	s	s	-	s
Chihuahua Chub	Gila nigrescens	T mg	E	s	-	-	-
Rio Grande Chub	Gila pandora	-	-	-	-	s	-
Roundtail Chub	Gila robusta	-	E	s	s	-	s
Rio Grande Silvery Minnow	Hybognathus amarus	E g(hm)	E	s	-	-	-
Plains Minnow	Hybognathus placitus (Native Pop)	-	-	-	s	s	s
Canadian Speckled Chub	Macrhybopsis aestivalis tetranemus	-	T	-	s	-	s
Spikedace	Meda fulgida	T hmg	T	s	-	-	-
Arkansas River Shiner	Notropis girardi (Native pop.)	T h	E	-	-	-	-
Rio Grande Shiner	Notropis jemezanus	-	-	-	s	s	s
Pecos Bluntnose Shiner	Notropis simus pecosensis	T hgm	T	-	-	-	-
Suckermouth Minnow	Phenacobius mirabilis	-	T	s	-	-	-
Southern Redbelly Dace	Phoxinus erythrogaster	-	E	s	-	-	-
Flathead Chub	Platygobio gracilis	-	-	-	s	-	s
Colorado Pikeminnow	Ptychocheilus lucius	E hmg	E	-	-	-	-
Loach Minnow	Rhinichthys cobitis	T(E) hm	T	s	-	-	-
Speckled Dace	Rhinichthys osculus (Gila pop.)	-	-	-	s	-	s
Desert Sucker	Catostomus clarki	-	-	-	s	s	s
Zuni Bluehead Sucker	Catostomus discobolus yarrowi	-	E	s	s	-	s
Sonora Sucker	Catostomus insignis	-	-	-	s	s	s
Rio Grande Sucker	Catostomus plebeius	-	-	s	-	-	-
Blue Sucker	Cycleptus elongatus	-	E	-	s	-	s
Gray Redhorse	Moxostoma congestum	-	T	s	-	-	-
Razorback Sucker	Xyrauchen texanus	E hg	-	s	-	s	-
Headwater Catfish	Ictalurus lupus	-	-	s	s	s	s
Chihuahua Catfish	Ictalurus sp	-	-	-	-	s	s
Pecos Pupfish	Cyprinodon pecosensis	g	T	-	-	-	-
White Sands Pupfish	Cyprinodon tularosa	g	T	-	-	n	s
Pecos Gambusia	Gambusia nobilis	E mg	E	-	-	-	-
Gila Topminnow	Poeciliopsis occidentalis occidentalis	E m	T	s	-	-	-
Greenthroat Darter	Etheostoma lepidum	-	T	-	-	-	-
Bigscale Logperch	Percina macrolepida (Native pop.)	-	T	-	-	-	-

NEW MEXICAN WILDLIFE OF CONCERN

STATE-WIDE LIST

BIRDS CONTINUED

Common Name	SCIENTIFIC NAME	FWS ESA	NM WCA	FS R3	BLM NM	NM Sen	FWS SOC
Broad-billed Hummingbird	Cynanthus latirostris magicus	-	T	s	-	-	-
White-eared Hummingbird	Hylocharis leucotis borealis	-	T	s	-	-	-
Violet-crowned Hummingbird	Amazilia violiceps ellioti	-	T	s	-	-	-
Blue-throated Hummingbird	Lampornis clemenciae bessophilus	-	-	s	-	-	-
Lucifer Hummingbird	Calothorax lucifer	-	T	s	-	-	-
Costa's Hummingbird	Calypte costae	-	T	s	-	-	-
Elegant Trogon	Trogon elegans canescens	-	E	s	-	-	-
Belted Kingfisher	Ceryle alcyon	-	-	s	-	-	-
Gila Woodpecker	Melanerpes uropygialis uropygialis	-	T	s	-	-	-
Northern Beardless Tyrannulet	Camptostoma imberbe ridgwayi	-	E	s	-	-	-
Southwestern Willow Flycatcher	Empidonax traillii extimus	E h	E	s	-	-	-
Buff-breasted Flycatcher	Empidonax fulvifrons pygmaeus	-	-	-	-	-	s
Thick-billed Kingbird	Tyrannus crassirostris	-	E	s	-	-	-
Loggerhead Shrike	Lanius ludovicianus	-	-	-	s	-	s
Bell's Vireo	Vireo bellii	-	T	s	-	-	-
Gray Vireo	Vireo vicinior	-	T	s	-	-	-
Mexican Chickadee	Poecile sclateri eidos	-	-	s	-	-	-
Gray Catbird	Dumetella carolinensis ruficrissa	-	-	s	-	-	-
Sprague's Pipit	Anthus spragueii	-	-	s	-	-	-
American Redstart	Setophaga ruticilla tricolora	-	-	s	-	-	-
Abert's Towhee	Pipilo aberti aberti	-	T	s	-	-	-
Botteri's Sparrow	Aimophila botterii arizonae	-	-	-	-	s	-
Baird's Sparrow	Ammodramus bairdii	-	T	s	s	-	s
AZ Grasshopper Sparrow	Ammodramus savannarum ammolegus	-	T	-	-	-	-
Yellow-eyed Junco	Junco phaeonotus palliatus	-	T	s	-	-	-
McCown's Longspur	Calcarius mccownii	-	-	s	-	-	-
Varied Bunting	Passerina versicolor	-	T	s	-	-	-

NEW MEXICAN WILDLIFE OF CONCERN

STATE-WIDE LIST

MAMMALS

Common Name	SCIENTIFIC NAME	FWS ESA	NM WCA	FS R3	BLM NM	NM Sen	FWS SOC
Arizona Shrew	Sorex arizonae	-	E	-	s	-	s
Least Shrew	Cryptotis parva	-	T	-	-	-	-
Mexican Long-tongued Bat	Choeronycteris mexicana	-	-	s	s	s	s
Mexican Long-nosed Bat	Leptonycteris nivalis	E mg	E	s	-	-	-
Lesser Long-nosed Bat	Leptonycteris curasoae yerbabuenae	E m	T	s	-	-	-
Western Small-footed Myotis Bat	Myotis ciliolabrum melanorhinus	-	-	-	s	s	s
Yuma Myotis Bat	Myotis yumanensis yumanensis	-	-	-	s	s	s
Little Brown Myotis Bat	Myotis lucifugus carissima	-	-	-	-	s	-
Occult Little Brown Myotis Bat	Myotis lucifugus occultus	-	-	s	s	s	s
Cave Myotis Bat	Myotis velifer	-	-	s	s	s	s
Long-legged Myotis Bat	Myotis volans interior	-	-	-	s	s	s
Fringed Myotis Bat	Myotis thysanodes thysanodes	-	-	-	s	s	s
Long-eared Myotis Bat	Myotis evotis evotis	-	-	-	s	s	s
Western Yellow Bat	Lasiurus xanthinus	-	T	s	-	-	-
Western Red Bat	Lasiurus blossevillii	-	-	s	-	s	-
Eastern Red Bat	Lasiurus borealis	-	-	s	-	s	-
Spotted Bat	Euderma maculatum	-	T	s	s	-	s
Allen's Big-eared Bat	Idionycteris phyllotis	-	-	-	s	s	s
Pale Townsend's Big-eared Bat	Plecotus townsendii pallescens	-	-	s	s	s	s
Big Free-tailed Bat	Nyctinomops macrotis	-	-	-	s	s	s
Greater Western Mastiff Bat	Eumops perotis californicus	-	-	-	s	s	s
Goat Peak Pika	Ochotona princeps nigrescens	-	-	s	s	s n	s
White-tailed Jack Rabbit	Lepus townsendii campanius	-	-	-	-	s	-
White-sided Jack Rabbit	Lepus callotis gaillardi	-	T	s	s	-	s
Penasco Least Chipmunk	Tamias minimus atristriatus	-	E	s	-	n	-
Organ Mountains Colorado Chipmunk	Tamias quadrivittatus australis	-	T	-	s	-	s
Oscura Mountains Colorado Chipmunk	Tamias quadrivittatus oscuraensis	-	T	-	s	-	s
Gray-footed Chipmunk	Tamias canipes canipes	-	-	-	s	-	s
Gray-footed Chipmunk	Tamias canipes sacramentoensis	-	-	-	s	s n	s
Yellow-bellied Marmot	Marmota flaviventris	-	-	-	-	s	-
White-Mountains Ground Squirrel	Spermophilus tridecemlineatus monticola	-	-	s	-	-	-
Rock Squirrel	Spermophilus variegatus tularosae	-	-	-	-	s n	-
Black-tailed Prairie Dog	Cynomys ludovicianus ludovicianus	CW m	-	-	-	s	-
AZ Black-tailed Prairie Dog	Cynomys ludovicianus arizonensis	CW m	-	s	s	s	s
Gunnison's Prairie Dog	Cynomys gunnisoni	-	-	-	-	s	-
Red Squirrel	Tamiasciurus hudsonicus lychnuchus	-	-	-	-	s n	-
Northern Pocket Gopher	Thomomys talpoides taylori	-	-	-	-	s n	-
Botta's Pocket Gopher	Thomomys bottae actuosus	-	-	-	-	s n	-
Botta's Pocket Gopher	Thomomys bottae collis	-	-	-	-	s n	-
Botta's Pocket Gopher	Thomomys bottae connectens	-	-	-	-	s n	-
Guadalupe Pocket Gopher	Thomomys bottae guadalupensis	-	-	s	s	s	s
Mearns' Pocket Gopher	Thomomys bottae mearnsi	-	-	-	s	s	s
Botta's Pocket Gopher	Thomomys bottae morulus	-	-	-	-	s n	-
Botta's Pocket Gopher	Thomomys bottae opulentus	-	-	-	-	s n	-
Cebolleta Pocket Gopher	Thomomys bottae paguatae	-	-	s	s	s n	s
Botta's Pocket Gopher	Thomomys bottae planorum	-	-	-	-	s n	-
Botta's Pocket Gopher	Thomomys bottae ruidosae	-	-	-	-	s n	-

NEW MEXICAN WILDLIFE OF CONCERN

STATE-WIDE LIST

MAMMALS CONTINUED

Common Name	SCIENTIFIC NAME	FWS ESA	NM WCA	FS R3	BLM NM	NM Sen	FWS SOC
Botta's Pocket Gopher	Thomomys bottae tularosae	-	-	-	-	S n	-
Southern Pocket Gopher	Thomomys umbrinus emotus	-	T	-	-	-	-
Desert Pocket Gopher	Geomys arenarius arenarius	-	-	-	S	-	S
Desert Pocket Gopher	Geomys arenarius brevirostris	-	-	-	-	S n	S
Plains Pocket Mouse	Perognathus flavescens gypsi	-	-	-	-	S n	-
Rock Pocket Mouse	Chaetodipus intermedius ater	-	-	-	-	S n	-
Rock Pocket Mouse	Chaetodipus intermedius rupestris	-	-	-	-	S	-
Nelson's Pocket Mouse	Chaetodipus nelsoni canescens	-	-	-	-	S	-
Yellow-nosed Cotton Rat	Sigmodon ochrognathus	-	-	-	S	-	S
White-throated Wood Rat	Neotoma albigula melas	-	-	-	-	S n	-
Mexican Wood Rat	Neotoma mexicana atrata	-	-	-	-	S n	-
Heather Vole	Phenacomys intermedius intermedius	-	-	-	-	S	-
Arizona Montane Vole	Microtus montanus arizonensis	-	E	S	-	-	-
Prairie Vole	Microtus ochrogaster haydenii	-	-	-	-	S	-
Navajo Mogollon Vole	Microtus mogollonensis navaho	-	-	-	-	-	S
Pecos River Muskrat	Ondatra zibethicus ripensis	-	-	-	S	S	S
New Mexican Jumping Mouse	Zapus hudsonius luteus	-	T	S	S	-	S
Mexican Gray Wolf	Canis lupus baileyi	E m	E	S	-	-	-
Red Fox	Vulpes vulpes	-	-	-	-	S	-
Swift Fox	Vulpes velox velox	CW m	-	S	-	S	-
Ringtail	Bassariscus astutus	-	-	S	-	S	-
White-nosed Coati	Nasua narica	-	-	S	-	S	-
American Marten	Martes americana origenes	-	T	S	-	-	-
Western Spotted Skunk	Spilogale gracilis	-	-	-	-	S	-
Hooded Skunk	Mephitis macroura milleri	-	-	-	-	S	-
Common Hog-nosed Skunk	Conepatus mesoleucus	-	-	-	-	S	-
Southwestern River Otter	Lutra canadensis sonorae	-	-	S	S	S	S
Jaguar	Panthera onca arizonensis	E mg	R	S	-	S	-
Sandhill White-tailed Deer	Odocoileus virginianus texana	-	-	-	-	S m	-
Chihuahuan Pronghorn	Antilocapra americana mexicana	-	-	S	-	m	-
Rocky Mountain Bighorn Sheep	Ovis canadensis canadensis	-	-	S	-	m	-
Desert Bighorn Sheep	Ovis canadensis mexicana (endangered pops)	-	E	S	-	m	-
Desert Bighorn Sheep	Ovis canadensis mexicana (hunted pop)	-	-	S	-	S m	-

NEW MEXICAN WILDLIFE OF CONCERN

STATE-WIDE LIST

Common Name	SCIENTIFIC NAME	FWS ESA	NM WCA	FS R3	BLM NM	NM Sen	FWS SOC
MOLLUSCS							
Paper-shell Mussel	Utterbackia imbecillis	-	E	-	-	-	-
Texas Hornshell	Popenaias popeii	-	E	-	-	-	s
Swamp Fingernailclam	Musculium partumeium	-	T	-	-	-	-
Lake Fingernailclam	Musculium lacustre	-	T	s	-	-	-
Long Fingernailclam	Musculium transversum	-	T	-	-	-	-
Lilljeborg's Peaclam	Pisidium lilljeborgi	-	T	s	-	-	-
Sangre De Cristo Peaclam	Pisidium sanguinichristi	(g)	T	s	s	n	s
Chupadera Pyrg Snail	Pyrgulopsis chupaderae	C	E	-	-	n	-
Gila Pyrg Snail	Pyrgulopsis gilae	C	T	s	-	n	-
Socorro Pyrg Snail	Pyrgulopsis neomexicana	E mg	E	s	-	n	-
Pecos Pyrg Snail	Pyrgulopsis pecosensis	-	T	-	s	n	s
Roswell Pyrg Snail	Pyrgulopsis roswellensis	C	E	-	-	n	-
New Mexico Hotspring Pyrg Snail	Pyrgulopsis thermalis	C	T	s	-	n	-
Alamosa Tryonia Snail	Tryonia alamosae	E mg	E	s	-	-	-
Koster's Tryonia Snail	Tryonia kosteri	C	E	-	-	n	-
Pecos Assiminea Snail	Assiminea pecos	C	E	-	-	-	-
Wrinkled Marshsnail	Stagnicola caperatus	-	E	s	-	-	-
Star Gyro Snail	Gyraulus crista	-	T	s	-	-	-
Shortneck Snaggletooth Snail	Gastrocopta dalliana dalliana	-	E	-	-	-	s
Ovate Vertigo Snail	Vertigo ovata	-	T	-	-	-	s
Cockerell's Striate Disc Snail	Discus shimeki cockerelli	-	-	-	s	s	s
Mineral Creek Mountainsnail	Oreohelix pilsbryi	-	T	-	-	n	s
Socorro Mountainsnail	Oreohelix neomexicana	-	-	-	-	s n	-
Woodlandsnail	Ashmunella amblya cornudasensis	-	-	-	s	n	-
Cook's Peak Woodlandsnail	Ashmunella macromphala	-	T	-	s	n	s
Hacheta Grande Woodlandsnail	Ashmunella hebardi	-	T	-	s	n	s
Dona Ana Talussnail	Sonorella todseni	-	T	-	s	n	s
CRUSTACEANS							
Socorro Isopod	Thermosphaeroma thermophilum	E mg	E	s	-	n	-
Noel's Amphipod	Gammarus desperatus	-	E	-	s	n	s
Conchas Crayfish	Orconectes deanae	-	-	-	-	s	-
Fairy Shrimp	Streptocephalus moorei	-	-	-	-	s	-
OTHER INVERTEBRATES							
False Ameletus Mayfly	Ameletus falsus	-	-	s	-	-	s
San Ysidro Mealybug	Distichlicoccus fontanus	-	-	-	-	s n	-
Bonita Diving Beetle	Deronectes neomexicana	-	-	-	-	s	s
Animas Minute Moss Beetle	Limnebius aridus	-	-	-	s	s	s
Anthony Blister Beetle	Lytta mirifica	-	-	-	s	s	s
Blue-black Silverspot Butterfly	Speyeria nokomis nokomis	-	-	-	-	-	s
Mountain Silverspot Butterfly	Speyeria nokomis nitocris	-	-	s	-	-	-
Pearly Checkerspot Butterfly	Charidryas acastus acastus	-	-	-	-	-	s
SW Pearly Checkerspot Butterfly	Charidryas acastus sabina	-	-	-	-	-	s
Cloudcroft Checkerspot Butterfly	Occidryas anicia cloudcrofti	-	-	-	-	s n	-
Obsolete Viceroy Butterfly	Basilarchia archippus obsoleta	-	-	s	-	-	-
Albarufan Dagger Moth	Acronicta albarufa	-	-	-	-	s	s
Slate Millipede	Comanchelus chihuanus	-	-	-	s	s	s

WILDLIFE ENDEMIC TO NEW MEXICO

FISH	
White Sands Pupfish	Cyprinodon tularosa
AMPHIBIANS	
Sacramento Mountain Salamander	Aneides hardii
Jemez Mountains Salamander	Plethodon neomexicanus
REPTILES	
Bleached Earless Lizard	Holbrookia maculata ruthveni
White Sands Prairie Lizard	Sceloporus undulatus cowlesi
Little White Whiptail	Cnemidophorus inornatus gypsi
Woodland Striped Whiptail	Cnemidophorus inornatus juniperus
Plains Striped Whiptail	Cnemidophorus inornatus llanuras
BIRDS	
NM Sharp-tailed Grouse	Tympanuchus phasianellus hueyi
MAMMALS	
Goat Peak Pika	Ochotona princeps nigrescens
Eastern Cottontail Rabbit	Sylvilagus floridanus cognatus
Penasco Least Chipmunk	Tamias minimus atristriatus
Gray-footed Chipmunk	Tamias canipes sacramentoensis
Gray-collared Chipmunk	Tamias cinereicollis cinereus
Rock Squirrel	Spermophilus variegatus tularosae
Red Squirrel	Tamiasciurus hudsonicus lychnuchus
Northern Pocket Gopher	Thomomys talpoides taylori
Botta's Pocket Gopher	Thomomys bottae actuosus
Botta's Pocket Gopher	Thomomys bottae collis
Botta's Pocket Gopher	Thomomys bottae connectens
Botta's Pocket Gopher	Thomomys bottae morulus
Botta's Pocket Gopher	Thomomys bottae opulentus
Cebolleta Pocket Gopher	Thomomys bottae paguatae
Botta's Pocket Gopher	Thomomys bottae planorum
Botta's Pocket Gopher	Thomomys bottae ruidosae
Botta's Pocket Gopher	Thomomys bottae tularosae
Southern Pocket Gopher	Thomomys umbrinus emotus
Desert Pocket Gopher	Geomys arenarius brevirostris
Plains Pocket Mouse	Perognathus flavescens gypsi
Rock Pocket Mouse	Chaetodipus intermedius ater
Hot Springs Cotton Rat	Sigmodon fulviventer goldmani
White-throated Wood Rat	Neotoma albigula melas
Mexican Wood Rat	Neotoma mexicana atrata

WILDLIFE ENDEMIC TO NEW MEXICO - CONTINUED

INVERTEBRATES	
Sangre De Cristo Peaclam	Pisidium sanguinichristi
Chupadera Pyrg Snail	Pyrgulopsis chupaderae
Gila Pyrg Snail	Pyrgulopsis gilae
Socorro Pyrg Snail	Pyrgulopsis neomexicana
Pecos Pyrg Snail	Pyrgulopsis pecosensis
Roswell Pyrg Snail	Pyrgulopsis roswellensis
New Mexico Hotspring Pyrg Snail	Pyrgulopsis thermalis
Alamosa Tryonia Snail	Tryonia alamosae
Koster's Tryonia Snail	Tryonia kosteri
Vallonia Snail	Vallonia sonorana
Metcalf Holospira Snail	Holospira metcalfi
Bishop Tubeshell Snail	Coelostemma pyrgonasta
Mountainsnail	Oreohelix nogalensis
Mineral Creek Mountainsnail	Oreohelix pilsbryi
Black Range Mountainsnail	Oreohelix metcalfei cuchillensis
Pinos Altos Mountainsnail	Oreohelix confragosa
Florida Mountainsnail	Oreohelix florida
San Augustin Mountainsnail	Oreohelix litoralis
Socorro Mountainsnail	Oreohelix neomexicana
Fringed Mountainsnail	Radiocentrum ferrissi
Woodlandsnail	Ashmunella amblya cornudasensis
Goat Mountain Woodlandsnail	Ashmunella harrisi
Maple Canyon Woodlandsnail	Ashmunella todseni
Dry Creek Woodlandsnail	Ashmunella tetrodon fragilis
Mount Riley Woodlandsnail	Ashmunella rileyensis
Cook's Peak Woodlandsnail	Ashmunella macromphala
Florida Mountain Woodlandsnail	Ashmunella walkeri
Hacheta Grande Woodlandsnail	Ashmunella hebardi
Animas Peak Woodlandsnail	Ashmunella animasensis
New Mexico Talussnail	Sonorella hachitana peloncillensis
Dona Ana Talussnail	Sonorella todseni
Animas Talussnail	Sonorella animasensis
Socorro Isopod	Thermosphaeroma thermophilum
Noel's Amphipod	Gammarus desperatus
Mayfly	Lachlania dencyannae
San Ysidro Mealybug	Distichlicoccus fontanus
Grasshopper	Trimerotropis sp.
Long-horned Grasshopper	Plagiostira mescaleroensis
Cricket	Ammobaenetes arenicolus
Cricket	Ammobaentes
Cricket	Ceuthopilus leptopus
Cricket	Ceuthopilus mescalero
Jerusalem Cricket	Stenopelmatus mescaleroensis
Neobine Cricket	Eunemobius
Cloudcroft Checkerspot Butterfly	Occidryas anicia cloudcrofti

NEW MEXICO "CITES" LISTED WILDLIFE

Convention on International Trade In Endangered Species (CITES)

Shovelnose Sturgeon	Scaphirhynchus platorynchus	CITES Appendix II (Export Permit Req.)
Ornate Box Turtle	Terrapene ornata	CITES Appendix II (Export Permit Req.)
Osprey	Pandion haliaetus	CITES Appendix II (Export Permit Req.)
American Swallow-tailed Kite	Elanoides forficatus	CITES Appendix II (Export Permit Req.)
Black-shouldered Kite	Elanus caeruleus	CITES Appendix II (Export Permit Req.)
Mississippi Kite	Ictinia mississippiensis	CITES Appendix II (Export Permit Req.)
Bald Eagle	Haliaeetus leucocephalus	CITES Appendix I (Import & Export Permit)
Northern Harrier	Circus cyaneus	CITES Appendix II (Export Permit Req.)
Sharp-shinned Hawk	Accipiter striatus	CITES Appendix II (Export Permit Req.)
Cooper's Hawk	Accipiter cooperii	CITES Appendix II (Export Permit Req.)
Northern Goshawk	Accipiter gentilis	CITES Appendix II (Export Permit Req.)
Harris' Hawk	Parabuteo unicinctus	CITES Appendix II (Export Permit Req.)
Northern Gray Hawk	Buteo nitidus maximus	CITES Appendix II (Export Permit Req.)
Red-shouldered Hawk	Buteo lineatus	CITES Appendix II (Export Permit Req.)
Broad-winged Hawk	Buteo platypterus	CITES Appendix II (Export Permit Req.)
Swainson's Hawk	Buteo swainsoni	CITES Appendix II (Export Permit Req.)
Zone-tailed Hawk	Buteo albonotatus	CITES Appendix II (Export Permit Req.)
Red-tailed Hawk	Buteo jamaicensis	CITES Appendix II (Export Permit Req.)
Ferruginous Hawk	Buteo regalis	CITES Appendix II (Export Permit Req.)
Rough-legged Hawk	Buteo lagopus	CITES Appendix II (Export Permit Req.)
Golden Eagle	Aquila chrysaetos	CITES Appendix II (Export Permit Req.)
Crested Caracara	Caracara plancus	CITES Appendix II (Export Permit Req.)
American Kestrel	Falco sparverius	CITES Appendix II (Export Permit Req.)
Merlin	Falco columbarius	CITES Appendix II (Export Permit Req.)
Aplomado Falcon	Falco femoralis septentrionalis	CITES Appendix II (Export Permit Req.)
American Peregrine Falcon	Falco peregrinus anatum	CITES Appendix I (Import & Export Permit)
Arctic Peregrine Falcon	Falco peregrinus tundrius	CITES Appendix I (Import & Export Permit)
Prairie Falcon	Falco mexicanus	CITES Appendix II (Export Permit Req.)
Sandhill Crane	Grus canadensis	CITES Appendix II (Export Permit Req.)
Whooping Crane	Grus americana	CITES Appendix I (Import & Export Permit)
Barn Owl	Tyto alba	CITES Appendix II (Export Permit Req.)
Flammulated Owl	Otus flammeolus	CITES Appendix II (Export Permit Req.)
Western Screech Owl	Otus kennicottii	CITES Appendix II (Export Permit Req.)
Whiskered Screech Owl	Otus trichopsis	CITES Appendix II (Export Permit Req.)
Great-horned Owl	Bubo virginianus	CITES Appendix II (Export Permit Req.)
Northern Pygmy Owl	Glaucidium gnoma	CITES Appendix II (Export Permit Req.)
Elf Owl	Micrathene whitneyi	CITES Appendix II (Export Permit Req.)
Burrowing Owl	Speotyto cunicularia hypugaea	CITES Appendix II (Export Permit Req.)
Mexican Spotted Owl	Strix occidentalis lucida	CITES Appendix II (Export Permit Req.)
Long-eared Owl	Asio otus	CITES Appendix II (Export Permit Req.)
Short-eared Owl	Asio flammeus	CITES Appendix II (Export Permit Req.)
Boreal Owl	Aegolius funereus	CITES Appendix II (Export Permit Req.)
Northern Saw-whet Owl	Aegolius acadicus	CITES Appendix II (Export Permit Req.)
Broad-billed Hummingbird	Cynanthus latirostris	CITES Appendix II (Export Permit Req.)
White-eared Hummingbird	Hylocharis leucotis	CITES Appendix II (Export Permit Req.)
Violet-crowned Hummingbird	Amazilia violiceps	CITES Appendix II (Export Permit Req.)
Blue-throated Hummingbird	Lampornis clemenciae	CITES Appendix II (Export Permit Req.)
Magnificent Hummingbird	Eugenes fulgens	CITES Appendix II (Export Permit Req.)
Lucifer Hummingbird	Calothorax lucifer	CITES Appendix II (Export Permit Req.)
Ruby-throated Hummingbird	Archilochus colubris	CITES Appendix II (Export Permit Req.)
Black-chinned Hummingbird	Archilochus alexandri	CITES Appendix II (Export Permit Req.)
Anna's Hummingbird	Calypte anna	CITES Appendix II (Export Permit Req.)
Costa's Hummingbird	Calypte costae	CITES Appendix II (Export Permit Req.)
Calliope Hummingbird	Stellula calliope	CITES Appendix II (Export Permit Req.)
Broad-tailed Hummingbird	Selasphorus platycercus	CITES Appendix II (Export Permit Req.)
Rufous Hummingbird	Selasphorus rufus	CITES Appendix II (Export Permit Req.)
Gray Wolf	Canis lupus	CITES Appendix II (Export Permit Req.)
Mexican Gray Wolf	Canis lupus baileyi	CITES Appendix II (Export Permit Req.)
Black Bear	Ursus americanus	CITES Appendix II (Export Permit Req.)
Grizzly Bear	Ursus arctos	CITES Appendix II (Export Permit Req.)
Black-footed Ferret	Mustela nigripes	CITES Appendix I (Import & Export Permit)
Southwestern River Otter	Lutra canadensis sonorae	CITES Appendix II (Export Permit Req.)
Mountain Lion	Felis concolor	CITES Appendix II (Export Permit Req.)
Jaguar	Panthera onca	CITES Appendix I (Import & Export Permit)
Bobcat	Lynx rufus	CITES Appendix II (Export Permit Req.)
Barbary Sheep	Ammotragus lervia	CITES Appendix II (Export Permit Req.)

NEW MEXICO HARVESTED WILDLIFE

Species which are harvested in New Mexico. Refer to the New Mexico Department of Game & Fish "Proclamations" for seasons, bag limits and appropriate license information.

"Hatchery" Cutthroat Trout	Oncorhynchus clarki
Rio Grande Cutthroat Trout	Oncorhynchus clarki virginalis
Rainbow Trout	Oncorhynchus mykiss
Kokanee Salmon	Oncorhynchus nerka
Brown Trout	Salmo trutta
Brook Trout	Salvelinus fontinalis
Lake Trout	Salvelinus namaycush
Northern Pike	Esox lucius
Black Bullhead	Ameiurus melas
Yellow Bullhead	Ameiurus natalis
Blue Catfish	Ictalurus furcatus
Headwater Catfish	Ictalurus lupus
Channel Catfish	Ictalurus punctatus
Chihuahua Catfish	Ictalurus sp
Flathead Catfish	Pylodictis olivaris
White Bass	Morone chrysops
Striped Bass	Morone saxatilis
Rock Bass	Ambloplites rupestris
Green Sunfish	Lepomis cyanellus
Warmouth	Lepomis gulosus
Bluegill	Lepomis macrochirus
Longear Sunfish	Lepomis megalotis
Smallmouth Bass	Micropterus dolomieui
Spotted Bass	Micropterus punctulatus
Largemouth Bass	Micropterus salmoides
White Crappie	Pomoxis annularis
Black Crappie	Pomoxis nigromaculatus
Yellow Perch	Perca flavescens
Walleye	Stizostedion vitreum
Bullfrog	Rana catesbeiana
Greater White-fronted Goose	Anser albifrons frontalis
Snow Goose	Chen caerulescens hyperborea
Ross's Goose	Chen rossii
Canada Goose	Branta canadensis
Wood Duck	Aix sponsa
Gadwall Duck	Anas strepera
American Wigeon Duck	Anas americana
Mallard Duck	Anas platyrhynchos
Blue-winged Teal Duck	Anas discors discors
Cinnamon Teal Duck	Anas cyanoptera septentrionalium
Northern Shoveler Duck	Anas clypeata
Northern Pintail Duck	Anas acuta
Green-winged Teal Duck	Anas crecca carolinensis
Canvasback Duck	Aythya valisineria
Redhead Duck	Aythya americana
Ring-necked Duck	Aythya collaris
Greater Scaup Duck	Aythya marila nearctica
Lesser Scaup Duck	Aythya affinis
Surf Scoter Duck	Melanitta perspicillata
Bufflehead Duck	Bucephala albeola
Common Goldeneye Duck	Bucephala clangula americana
Barrow's Goldeneye Duck	Bucephala islandica
Hooded Merganser Duck	Lophodytes cucullatus
Common Merganser Duck	Mergus merganser americanus
Ruddy Duck	Oxyura jamaicensis rubida

Sharp-shinned Hawk	Accipiter striatus velox
Cooper's Hawk	Accipiter cooperii
Northern Goshawk	Accipiter gentilis
Harris's Hawk	Parabuteo unicinctus harrisi
Red-tailed Hawk	Buteo jamaicensis
Ferruginous Hawk	Buteo regalis
American Kestrel	Falco sparverius sparverius
Merlin	Falco columbarius
Prairie Falcon	Falco mexicanus
Ring-necked Pheasant	Phasianus colchicus
Blue Grouse	Dendragapus obscurus obscurus
Wild Turkey	Meleagris gallopavo
Montezuma Quail	Cyrtonyx montezumae mearnsi
Northern Bobwhite Quail	Colinus virginianus
Scaled Quail	Callipepla squamata pallida
Gambel's Quail	Callipepla gambelii
Virginia Rail	Rallus limicola limicola
Sora	Porzana carolina
Common Moorhen	Gallinula chloropus cachinnans
American Coot	Fulica americana americana
Sandhill Crane	Grus canadensis
Common Snipe	Gallinago gallinago delicata
Band-tailed Pigeon	Columba fasciata fasciata
White-winged Dove	Zenaida asiatica
Mourning Dove	Zenaida macroura
Great-horned Owl	Bubo virginianus
Abert's Squirrel	Sciurus aberti
Red Squirrel	Tamiasciurus hudsonicus
American Beaver	Castor canadensis
Nutria	Myocastor coypus
Common Muskrat	Ondatra zibethicus
Pecos River Muskrat	Ondatra zibethicus ripensis
Red Fox	Vulpes vulpes
Swift Fox	Vulpes velox velox
Kit Fox	Vulpes macrotis
Common Gray Fox	Urocyon cinereoargenteus scottii
Black Bear	Ursus americanus amblyceps
Ringtail	Bassariscus astutus
Common Raccoon	Procyon lotor
Ermine Weasel	Mustela erminea muricus
Long-tailed Weasel	Mustela frenata
American Badger	Taxidea taxus berlandieri
Mountain Lion	Felis concolor
Bobcat	Lynx rufus baileyi
Collared Peccary	Tayassu tajacu sonoriensis
Elk	Cervus elaphus nelsoni
Mule Deer	Odocoileus hemionus
White-tailed Deer	Odocoileus virginianus
Pronghorn	Antilocapra americana
Rocky Mountain Bighorn Sheep	Ovis canadensis canadensis
Desert Bighorn Sheep	Ovis canadensis mexicana (1 population)
Barbary Sheep	Ammotragus lervia
Persian Ibex	Capra aegagrus
Oryx	Oryx gazella

New Mexican Wildlife of Concern - Bernalillo County

Common Name	SCIENTIFIC NAME	FWS.. ESA	NM... WCA	FS. R3	BLM.. NM	NM... Sen	FWS. SOC
Rio Grande Chub	Gila pandora	-	-	-	-	S	-
Rio Grande Silvery Minnow	Hybognathus amarus	E g(hm)	E	S	-	-	-
Flathead Chub	Platygobio gracilis	-	-	-	S	-	S
Northern Leopard Frog	Rana pipiens	-	-	S	-	-	-
Desert Kingsnake	Lampropeltis getula splendida	-	-	S	-	-	-
Texas Longnose Snake	Rhinocheilus lecontei	-	-	S	-	-	-
Desert Massasauga	Sistrurus catenatus edwardsii	-	-	S	-	-	-
Clark's Grebe	Aechmophorus clarkii	-	-	S	-	-	-
Neotropic Cormorant	Phalacrocorax brasilianus	-	T	S	-	-	-
American Bittern	Botaurus lentiginosus	-	-	S	-	-	-
Least Bittern	Ixobrychus exilis exilis	-	-	S	-	-	-
Snowy Egret	Egretta thula brewsteri	-	-	S	-	-	-
Green Heron	Butorides virescens	-	-	S	-	-	-
Black-crowned Night Heron	Nycticorax nycticorax hoactli	-	-	S	-	-	-
White-faced Ibis	Plegadis chihi	-	-	S	S	-	S
Osprey	Pandion haliaetus carolinensis	-	-	S	-	-	-
Mississippi Kite	Ictinia mississippiensis	-	-	S	-	-	-
Bald Eagle	Haliaeetus leucocephalus	T mg	T	S	-	-	-
Northern Goshawk	Accipiter gentilis	-	-	S	S	S	S
Common Black-hawk	Buteogallus anthracinus anthracinus	-	T	S	-	-	-
Swainson's Hawk	Buteo swainsoni	-	-	S	-	-	-
Zone-tailed Hawk	Buteo albonotatus	-	-	S	-	-	-
Ferruginous Hawk	Buteo regalis	-	-	S	S	-	S
American Peregrine Falcon	Falco peregrinus anatum	m	T	S	-	-	-
Sora	Porzana carolina	-	-	S	-	-	-
Whooping Crane	Grus americana	E mg	E	S	-	-	-
Western Snowy Plover	Charadrius alexandrinus nivosus	-	-	S	-	-	-
Mountain Plover	Charadrius montanus	P	-	S	-	S	-
Black-necked Stilt	Himantopus mexicanus	-	-	S	-	-	-
Long-billed Curlew	Numenius americanus americanus	-	-	S	-	-	-
Black Tern	Chlidonias niger surinamensis	-	-	-	S	-	S
Yellow-billed Cuckoo	Coccyzus americanus occidentalis	-	-	S	-	-	-
Flammulated Owl	Otus flammeolus	-	-	S	-	-	-
Burrowing Owl	Athene cunicularia hypugaea	-	-	-	S	-	S
Mexican Spotted Owl	Strix occidentalis lucida	T (h)mg	-	S	-	S	-
Black Swift	Cypseloides niger borealis	-	-	-	-	S	-
White-eared Hummingbird	Hylocharis leucotis borealis	-	T	S	-	-	-
Belted Kingfisher	Ceryle alcyon	-	-	S	-	-	-
Southwestern Willow Flycatcher	Empidonax traillii extimus	E h	E	S	-	-	-
Buff-breasted Flycatcher	Empidonax fulvifrons pygmaeus	-	-	-	-	-	S
Loggerhead Shrike	Lanius ludovicianus	-	-	-	S	-	S
Bell's Vireo	Vireo bellii	-	T	S	-	-	-
Gray Vireo	Vireo vicinior	-	T	S	-	-	-
Gray Catbird	Dumetella carolinensis ruficrissa	-	-	S	-	-	-
American Redstart	Setophaga ruticilla tricolora	-	-	S	-	-	-
Baird's Sparrow	Ammodramus bairdii	-	T	S	S	-	S
Western Small-footed Myotis Bat	Myotis ciliolabrum melanorhinus	-	-	-	S	S	S
Yuma Myotis Bat	Myotis yumanensis yumanensis	-	-	-	S	S	S
Occult Little Brown Myotis Bat	Myotis lucifugus occultus	-	-	S	S	S	S
Long-legged Myotis Bat	Myotis volans interior	-	-	-	S	S	S
Fringed Myotis Bat	Myotis thysanodes thysanodes	-	-	-	S	S	S
Spotted Bat	Euderma maculatum	-	T	S	S	-	S

DEFINITIONS

FWS ESA: Federal Endangered Species Act of 1973; 12-28-73, P.L. 93-205 87 Stat. 884, as amended. Administered by U.S. Fish and Wildlife Service, Department of Interior. List is published as 50 CFR 17.11 and 17.12.

E ENDANGERED: "... any species which is in danger of extinction throughout all or a significant portion of its range ...". A final rule has been published in the Federal Register.

T THREATENED: "... any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." A final rule has been published in the Federal Register.

P PROPOSED: Species that have been officially proposed for listing as threatened or endangered by the Secretary of the Interior. A proposed rule has been published in the Federal Register.

C CANDIDATE: Species for which the Fish and Wildlife Service has sufficient information on their biological status and threats to propose them as endangered or threatened under the Endangered Species Act. A list has been published in the Federal Register.

W WARRANTED BUT PRECLUDED DETERMINATION: The Fish and Wildlife Service has determined that the petition to list the taxa as threatened or endangered is warranted but is currently precluded by higher listing priorities. A determination has been published in the Federal Register.

NM WCA: New Mexico Wildlife Conservation Act; NM Chapter 17 Statutes Annotated 1973, 17-2 Part 3. The list of Threatened, Endangered and Restricted Species is published as Title 19 of New Mexico Administrative Code, Chapter 33, Part 1 (19 NMAC 33.1). Administered by State of New Mexico, Department of Game and Fish.

E ENDANGERED: "... any species [or subspecies] of fish or wildlife whose prospects of survival or recruitment within the state are in jeopardy due to any of the following factors: (1) the present or threatened destruction, modification or curtailment of its habitat; (2) over utilization for scientific, commercial or sporting purposes; (3) the effect of disease or predation; (4) other natural or man-made factors affecting its prospects of survival or recruitment within the state; or (5) any combination of the foregoing factors." 17-2-38-D, NMSA, 1978.

T THREATENED: "... any species [or subspecies] which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range in New Mexico; ..." 17-2-38-M, NMSA, 1978.

R RESTRICTED: "... any listed large exotic cat species or subspecies" (19 NMAC 33.1). The jaguar is the only Restricted species in this document, it is native to New Mexico.

FS R3: United States Forest Service, Department of Agriculture, Region 3 (Southwest Region; Arizona and New Mexico), Albuquerque, NM. Taxa listed in this category are from the old USFS list developed in 1988. A new list has been developed and is under revision. The new list includes federal ESA listed species and taxa listed by the Heritage Program as globally Rare/Imperiled, regardless of whether they occur on or near Forest lands. It does not include: many at risk taxa which are state-listed in NM, bats (a group generally in trouble) and other taxa which are not yet imperiled but may be significantly impacted by Forest management activities. As soon as a new list is available which meets the definition, it will be coded into BISON and included in updates of this document.

S SENSITIVE: "those species that are likely to occur or have habitat on Nation Forest System lands and that have been identified by the Regional Forester as of concern for reduction in population viability as

evidenced by: significant current or predicted downward trends in population numbers or density, or; significant current or predicted downward trends in habitat capability that would reduce a species' distribution (Forest Service Manual 2670.5). The Forest Service Manual (2672.11) provides the following criteria for potential (but not mandatory) listing of sensitive species: USFWS Candidate species; State lists of endangered, threatened, rare, endemic, unique, or vanishing species; Other sources as appropriate in order to focus conservation management strategies and to avert the need for Federal or State listing as a result of National Forest management activities. These "other sources" have been interpreted by Regional [R3] TES Program managers to include: Species that have been federally delisted within the last 5 years; Species on State Heritage Databases that indicate global and/or regional rarity and/or imperilment (GTN1-3;S1-2).

BLM NM: U.S. Bureau of Land Management, Dept. of the Interior, New Mexico State Office, Santa Fe. State Offices were directed by the Wash, DC Office to develop sensitive species lists. The directive indicated lists would include former USFWS Candidate C2 species until a state office developed their own list. Currently, most of the taxa on the NM list are former C2 species. See USFWS Species of Concern above.

s SENSITIVE: "... are those designated by a State Director, usually in cooperation with the State agency responsible for managing the species, as sensitive. They are those species that are: (1) under status review by the FWS/NMFS; or (2) whose numbers are declining so rapidly that Federal listing may become necessary; or (3) with typically small and widely dispersed populations; or (4) those inhabiting ecological refugia or other specialized or unique habitats." [BLM Manual, Rel. 6-116, 9/16/88, 6840 - SPECIAL STATUS SPECIES MANAGEMENT, Glossary page 6]

NM Sen: New Mexico Department of Game and Fish, informal category which carries no legal requirements.

s SENSITIVE: Taxa which, in the opinion of a qualified NMDGF biologist, deserve special consideration in management and planning, and are NOT listed Threatened or Endangered by the state of New Mexico. These may include taxa that are listed Threatened, Endangered or Sensitive by other agencies; taxa with limited protection; and taxa without any legal protection. The intent of this category is to alert land managers to the need for caution in management where these taxa may be affected.

FWS SOC: U.S. Fish and Wildlife Service, SPECIES OF CONCERN. An informal category which carries no legal requirements except as designated in manuals of other agencies.

s SPECIES OF CONCERN: most of these taxa are former Candidate Category 2 which was defined: "Category 2 comprises taxa for which information now in possession of the Service indicates that proposing to list as endangered or threatened is possibly appropriate, but for which conclusive data on biological vulnerability and threat are not currently available to support proposed rules."

NEW MEXICAN WILDLIFE OF CONCERN

STATE-WIDE LIST

Common Name	SCIENTIFIC NAME	FWS ESA	NM WCA	FS R3	BLM NM	NM Sen	FWS SOC
AMPHIBIANS							
Sacramento Mountain Salamander	Aneides hardii	-	T	s	s	n	s
Jemez Mountains Salamander	Plethodon neomexicanus	gm	T	s	s	n	s
Colorado River Toad	Bufo alvarius	-	T	s	-	-	-
Western Boreal Toad	Bufo boreas boreas	CW m	E	s	-	-	-
Arizona Toad	Bufo microscaphus microscaphus	-	-	s	s	s	s
Great Plains Narrowmouth Toad	Gastrophryne olivacea	-	E	s	-	-	-
Chiricahua Leopard Frog	Rana chiricahuensis	P	-	s	-	s	-
Northern Leopard Frog	Rana pipiens	-	-	s	-	-	-
Lowland Leopard Frog	Rana yavapaiensis	-	E	s	s	-	s
REPTILES							
Western River Cooter	Pseudemys gorzugi	-	T	s	-	-	-
Big Bend Slider	Trachemys gaigeae	-	-	-	-	s	-
Bleached Earless Lizard	Holbrookia maculata ruthveni	-	-	-	-	s n	-
Texas Horned Lizard	Phrynosoma cornutum	-	-	s	s	-	s
Sand Dune Lizard	Sceloporus arenicolus	-	T	-	s	-	s
Northern Sagebrush Lizard	Sceloporus graciosus graciosus	-	-	-	-	-	s
Bunch Grass Lizard	Sceloporus scalaris slevini	-	T	s	-	-	-
White Sands Prairie Lizard	Sceloporus undulatus cowlesi	-	-	-	-	s n	-
Giant Spotted Whiptail	Cnemidophorus burti	-	T	s	s	-	s
Gray-checkered Whiptail	Cnemidophorus dixoni	-	E	-	s	-	s
Little White Whiptail	Cnemidophorus inornatus gypsi	-	-	-	-	s n	-
Mountain Skink	Eumeces tetragrammus callicephalus	-	T	s	-	-	-
Reticulate Gila Monster	Heloderma suspectum suspectum	-	E	s	-	-	-
Gray-banded Kingsnake	Lampropeltis alterna	-	E	-	-	-	-
Desert Kingsnake	Lampropeltis getula splendida	-	-	s	-	-	-
California Kingsnake	Lampropeltis getula californiae	-	-	-	-	s	-
Blotched Water Snake	Nerodia erythrogaster transversa	-	E	s	-	-	-
Texas Longnose Snake	Rhinocheilus lecontei	-	-	s	-	-	-
Green Rat Snake	Senticolis triaspis intermedia	-	T	s	-	-	-
Yaqui Blackhead Snake	Tantilla yaquia	-	-	-	-	s	-
Mexican Garter Snake	Thamnophis eques megalops	-	E	s	s	-	s
Arid Land Ribbon Snake	Thamnophis proximus diabolicus	-	T	s	-	-	-
Narrowhead Garter Snake	Thamnophis rufipunctatus rufipunctatus	-	T	s	s	-	s
Mottled Rock Rattlesnake	Crotalus lepidus lepidus	-	T	s	-	-	-
NM Ridgenose Rattlesnake	Crotalus willardi obscurus	T hmg	E	s	-	-	-
Desert Massasauga	Sistrurus catenatus edwardsii	-	-	s	-	-	-

NEW MEXICAN WILDLIFE OF CONCERN

STATE-WIDE LIST

BIRDS

Common Name	SCIENTIFIC NAME	FWS ESA	NM WCA	FS R3	BLM NM	NM Sen	FWS SOC
Clark's Grebe	Aechmophorus clarkii	-	-	S	-	-	-
Brown Pelican	Pelecanus occidentalis carolinensis	E	E	S	-	-	-
Neotropic Cormorant	Phalacrocorax brasilianus	-	T	S	-	-	-
American Bittern	Botaurus lentiginosus	-	-	S	-	-	-
Least Bittern	Ixobrychus exilis exilis	-	-	S	-	-	-
Great Egret	Ardea alba egretta	-	-	S	-	-	-
Snowy Egret	Egretta thula brewsteri	-	-	S	-	-	-
Green Heron	Butorides virescens	-	-	S	-	-	-
Black-crowned Night Heron	Nycticorax nycticorax hoactli	-	-	S	-	-	-
White-faced Ibis	Plegadis chihi	-	-	S	S	-	S
Osprey	Pandion haliaetus carolinensis	-	-	S	-	-	-
White-tailed Kite	Elanus caeruleus majusculus	-	-	S	-	-	-
Mississippi Kite	Ictinia mississippiensis	-	-	S	-	-	-
Bald Eagle	Haliaeetus leucocephalus	T mg	T	S	-	-	-
Northern Goshawk	Accipiter gentilis	-	-	S	S	S	S
Northern Gray Hawk	Asturina nitida maximus	-	-	S	S	-	S
Common Black-hawk	Buteogallus anthracinus anthracinus	-	T	S	-	-	-
Swainson's Hawk	Buteo swainsoni	-	-	S	-	-	-
Zone-tailed Hawk	Buteo albonotatus	-	-	S	-	-	-
Ferruginous Hawk	Buteo regalis	-	-	S	S	-	S
Aplomado Falcon	Falco femoralis septentrionalis	E mg	E	S	-	-	-
American Peregrine Falcon	Falco peregrinus anatum	m	T	S	-	-	-
Arctic Peregrine Falcon	Falco peregrinus tundrius	-	T	S	-	-	-
White-tailed Ptarmigan	Lagopus leucurus altipetens	-	E	S	-	-	-
Lesser Prairie-chicken	Tympanuchus pallidicinctus	CW	-	-	S	S	-
Gould's Wild Turkey	Meleagris gallopavo mexicana	-	T	S	-	-	-
Sora	Porzana carolina	-	-	S	-	-	-
Whooping Crane	Grus americana	E mg	E	S	-	-	-
Western Snowy Plover	Charadrius alexandrinus nivosus	-	-	S	-	-	-
Piping Plover	Charadrius melodus circumcinctus	T g	E	-	-	-	-
Mountain Plover	Charadrius montanus	P	-	S	-	S	-
Black-necked Stilt	Himantopus mexicanus	-	-	S	-	-	-
Upland Sandpiper	Bartramia longicauda	-	-	S	-	-	-
Long-billed Curlew	Numenius americanus americanus	-	-	S	-	-	-
Interior Least Tern	Sterna antillarum athalassos	E mg	E	S	-	-	-
Black Tern	Chlidonias niger surinamensis	-	-	-	S	-	S
Common Ground-dove	Columbina passerina pallescens	-	E	S	-	-	-
Yellow-billed Cuckoo	Coccyzus americanus occidentalis	-	-	S	-	-	-
Flammulated Owl	Otus flammeolus	-	-	S	-	-	-
Whiskered Screech Owl	Otus trichopsis asperus	-	T	-	-	-	-
Elf Owl	Micrathene whitneyi whitneyi	-	-	S	-	-	-
Burrowing Owl	Athene cunicularia hypugaea	-	-	-	S	-	S
Mexican Spotted Owl	Strix occidentalis lucida	T (h)mg	-	S	-	S	-
Boreal Owl	Aegolius funereus	-	T	S	-	-	-
Buff-collared Nightjar	Caprimulgus ridgwayi ridgwayi	-	E	S	-	-	-
Black Swift	Cypseloides niger borealis	-	-	-	-	S	-

New Mexican Wildlife of Concern - Lincoln County

Common Name	SCIENTIFIC NAME	FWS.. ESA	NM... WCA	FS. R3	BLM.. NM	NM... Sen	FWS. SOC
Rio Grande Chub	Gila pandora	-	-	-	-	s	-
Sonora Sucker	Catostomus insignis	-	-	-	s	s	s
Rio Grande Sucker	Catostomus plebeius	-	-	s	-	-	-
White Sands Pupfish	Cyprinodon tularosa	g	T	-	-	n	s
Sacramento Mountain Salamander	Aneides hardii	-	T	s	s	n	s
Texas Horned Lizard	Phrynosoma cornutum	-	-	s	s	-	s
Desert Kingsnake	Lampropeltis getula splendida	-	-	s	-	-	-
Texas Longnose Snake	Rhinocheilus lecontei	-	-	s	-	-	-
Desert Massasauga	Sistrurus catenatus edwardsii	-	-	s	-	-	-
Osprey	Pandion haliaetus carolinensis	-	-	s	-	-	-
Bald Eagle	Haliaeetus leucocephalus	T mg	T	s	-	-	-
Northern Goshawk	Accipiter gentilis	-	-	s	s	s	s
Common Black-hawk	Buteogallus anthracinus anthracinus	-	T	s	-	-	-
Swainson's Hawk	Buteo swainsoni	-	-	s	-	-	-
Zone-tailed Hawk	Buteo albonotatus	-	-	s	-	-	-
Ferruginous Hawk	Buteo regalis	-	-	s	s	-	s
American Peregrine Falcon	Falco peregrinus anatum	m	T	s	-	-	-
Western Snowy Plover	Charadrius alexandrinus nivosus	-	-	s	-	-	-
Mountain Plover	Charadrius montanus	P	-	s	-	s	-
Yellow-billed Cuckoo	Coccyzus americanus occidentalis	-	-	s	-	-	-
Flammulated Owl	Otus flammeolus	-	-	s	-	-	-
Burrowing Owl	Athene cunicularia hypugaea	-	-	-	s	-	s
Mexican Spotted Owl	Strix occidentalis lucida	T (h)mg	-	s	-	s	-
Blue-throated Hummingbird	Lampornis clemenciae bessophilus	-	-	s	-	-	-
Belted Kingfisher	Ceryle alcyon	-	-	s	-	-	-
Southwestern Willow Flycatcher	Empidonax traillii extimus	E h	E	s	-	-	-
Loggerhead Shrike	Lanius ludovicianus	-	-	-	s	-	s
Gray Vireo	Vireo vicinior	-	T	s	-	-	-
Baird's Sparrow	Ammodramus bairdii	-	T	s	s	-	s
Western Small-footed Myotis Bat	Myotis ciliolabrum melanorhinus	-	-	-	s	s	s
Yuma Myotis Bat	Myotis yumanensis yumanensis	-	-	-	s	s	s
Occult Little Brown Myotis Bat	Myotis lucifugus occultus	-	-	s	s	s	s
Cave Myotis Bat	Myotis velifer	-	-	s	s	s	s
Long-legged Myotis Bat	Myotis volans interior	-	-	-	s	s	s
Fringed Myotis Bat	Myotis thysanodes thysanodes	-	-	-	s	s	s
Pale Townsend's Big-eared Bat	Plecotus townsendii pallescens	-	-	s	s	s	s
Penasco Least Chipmunk	Tamias minimus atristriatus	-	E	s	-	n	-
Organ Mountains Colorado Chipmunk	Tamias quadrivittatus australis	-	T	-	s	-	s
Oscura Mountains Colorado Chipmunk	Tamias quadrivittatus oscuraensis	-	T	-	s	-	s
Gray-footed Chipmunk	Tamias canipes canipes	-	-	-	s	-	s
Rock Squirrel	Spermophilus variegatus tularosae	-	-	-	-	s n	-
Black-tailed Prairie Dog	Cynomys ludovicianus ludovicianus	CW m	-	-	-	s	-
AZ Black-tailed Prairie Dog	Cynomys ludovicianus arizonensis	CW m	-	s	s	s	s
Red Squirrel	Tamiasciurus hudsonicus lychnuchus	-	-	-	-	s n	-
Botta's Pocket Gopher	Thomomys bottae actuosus	-	-	-	-	s n	-
Botta's Pocket Gopher	Thomomys bottae ruidosae	-	-	-	-	s n	-
Desert Pocket Gopher	Geomys arenarius brevirostris	-	-	-	-	s n	s
White-throated Wood Rat	Neotoma albigula melas	-	-	-	-	s n	-
Mexican Wood Rat	Neotoma mexicana atrata	-	-	-	-	s n	-
Pecos River Muskrat	Ondatra zibethicus ripensis	-	-	-	s	s	s
Ringtail	Bassariscus astutus	-	-	s	-	s	-
Common Hog-nosed Skunk	Conepatus mesoleucus	-	-	-	-	s	-

New Mexican Wildlife of Concern - Lincoln County

Common Name	SCIENTIFIC NAME		FWS.. ESA	NM... WCA	FS. R3	BLM.. NM	NM... Sen	FWS. SOC
Socorro Mountainsnail	Oreohelix neomexicana		-	-	-	-	s n	-
Bonita Diving Beetle	Deronectes neomexicana		-	-	-	-	s	s

NATIVE WILDLIFE APPARENTLY NO LONGER OCCURRING IN LINCOLN COUNTY

River Carpsucker	Carpiodes carpio carpio	
Gray Redhorse	Moxostoma congestum	
Pecos Pupfish	Cyprinodon pecosensis	
Mexican Gray Wolf	Canis lupus baileyi	
Grizzly Bear	Ursus arctos	(extirpated from NM)
Black-footed Ferret	Mustela nigripes	(extirpated from NM)
Merriam's Elk	Cervus elaphus merriami	(extinct)
Desert Bighorn Sheep	Ovis canadensis mexicana	

New Mexican Wildlife of Concern - Otero County

Common Name	SCIENTIFIC NAME	FWS.. ESA	NM... WCA	FS. R3	BLM.. NM	NM... Sen	FWS. SOC
Rio Grande Cutthroat Trout	Oncorhynchus clarki virginalis	-	-	s	-	s m	-
Rio Grande Chub	Gila pandora	-	-	-	-	s	-
White Sands Pupfish	Cyprinodon tularosa	g	T	-	-	n	s
Sacramento Mountain Salamander	Aneides hardii	-	T	s	s	n	s
Northern Leopard Frog	Rana pipiens	-	-	s	-	-	-
Bleached Earless Lizard	Holbrookia maculata ruthveni	-	-	-	-	s n	-
Texas Horned Lizard	Phrynosoma cornutum	-	-	s	s	-	s
White Sands Prairie Lizard	Sceloporus undulatus cowlesi	-	-	-	-	s n	-
Little White Whiptail	Cnemidophorus inornatus gypsi	-	-	-	-	s n	-
Desert Kingsnake	Lampropeltis getula splendida	-	-	s	-	-	-
Texas Longnose Snake	Rhinocheilus lecontei	-	-	s	-	-	-
Mottled Rock Rattlesnake	Crotalus lepidus lepidus	-	T	s	-	-	-
Desert Massasauga	Sistrurus catenatus edwardsii	-	-	s	-	-	-
Brown Pelican	Pelecanus occidentalis carolinensis	E	E	s	-	-	-
Neotropic Cormorant	Phalacrocorax brasilianus	-	T	s	-	-	-
American Bittern	Botaurus lentiginosus	-	-	s	-	-	-
Snowy Egret	Egretta thula brewsteri	-	-	s	-	-	-
Black-crowned Night Heron	Nycticorax nycticorax hoactli	-	-	s	-	-	-
White-faced Ibis	Plegadis chihi	-	-	s	s	-	s
Osprey	Pandion haliaetus carolinensis	-	-	s	-	-	-
Mississippi Kite	Ictinia mississippiensis	-	-	s	-	-	-
Bald Eagle	Haliaeetus leucocephalus	T mg	T	s	-	-	-
Northern Goshawk	Accipiter gentilis	-	-	s	s	s	s
Common Black-hawk	Buteogallus anthracinus anthracinus	-	T	s	-	-	-
Swainson's Hawk	Buteo swainsoni	-	-	s	-	-	-
Ferruginous Hawk	Buteo regalis	-	-	s	s	-	s
Aplomado Falcon	Falco femoralis septentrionalis	E mg	E	s	-	-	-
American Peregrine Falcon	Falco peregrinus anatum	m	T	s	-	-	-
Sora	Porzana carolina	-	-	s	-	-	-
Western Snowy Plover	Charadrius alexandrinus nivosus	-	-	s	-	-	-
Mountain Plover	Charadrius montanus	P	-	s	-	s	-
Black-necked Stilt	Himantopus mexicanus	-	-	s	-	-	-
Long-billed Curlew	Numenius americanus americanus	-	-	s	-	-	-
Interior Least Tern	Sterna antillarum athalassos	E mg	E	s	-	-	-
Black Tern	Chlidonias niger surinamensis	-	-	-	s	-	s
Common Ground-dove	Columbina passerina pallescens	-	E	s	-	-	-
Flammulated Owl	Otus flammeolus	-	-	s	-	-	-
Burrowing Owl	Athene cunicularia hypugaea	-	-	-	s	-	s
Mexican Spotted Owl	Strix occidentalis lucida	T (h)mg	-	s	-	s	-
Elegant Trogon	Trogon elegans canescens	-	E	s	-	-	-
Belted Kingfisher	Ceryle alcyon	-	-	s	-	-	-
Southwestern Willow Flycatcher	Empidonax traillii extimus	E h	E	s	-	-	-
Loggerhead Shrike	Lanius ludovicianus	-	-	-	s	-	s
Bell's Vireo	Vireo bellii	-	T	s	-	-	-
Gray Vireo	Vireo vicinior	-	T	s	-	-	-
Gray Catbird	Dumetella carolinensis ruficrissa	-	-	s	-	-	-
American Redstart	Setophaga ruticilla tricolora	-	-	s	-	-	-
Baird's Sparrow	Ammodramus bairdii	-	T	s	s	-	s
Sprague's Pipit (no data)	Anthus spragueii	-	-	s	-	-	-
Varied Bunting	Passerina versicolor	-	T	s	-	-	-
Western Small-footed Myotis Bat	Myotis ciliolabrum melanorhinus	-	-	-	s	s	s
Occult Little Brown Myotis Bat	Myotis lucifugus occultus	-	-	s	s	s	s

New Mexican Wildlife of Concern - Otero County

Common Name	SCIENTIFIC NAME	FWS.. ESA	NM... WCA	FS. R3	BLM.. NM	NM... Sen	FWS. SOC
Cave Myotis Bat	Myotis velifer	-	-	s	s	s	s
Long-legged Myotis Bat	Myotis volans interior	-	-	-	s	s	s
Fringed Myotis Bat	Myotis thysanodes thysanodes	-	-	-	s	s	s
Spotted Bat	Euderma maculatum	-	T	s	s	-	s
Pale Townsend's Big-eared Bat	Plecotus townsendii pallescens	-	-	s	s	s	s
Big Free-tailed Bat	Nyctinomops macrotis	-	-	-	s	s	s
Penasco Least Chipmunk	Tamias minimus atristriatus	-	E	s	-	n	-
Gray-footed Chipmunk	Tamias canipes canipes	-	-	-	s	-	s
Gray-footed Chipmunk	Tamias canipes sacramentoensis	-	-	-	s	s n	s
Rock Squirrel	Spermophilus variegatus tularosae	-	-	-	-	s n	-
AZ Black-tailed Prairie Dog	Cynomys ludovicianus arizonensis	CW n	-	s	s	s	s
Guadalupe Pocket Gopher	Thomomys bottae guadalupensis	-	-	s	s	s	s
Botta's Pocket Gopher	Thomomys bottae tularosae	-	-	-	-	s n	-
Desert Pocket Gopher	Geomys arenarius arenarius	-	-	-	s	-	s
Desert Pocket Gopher	Geomys arenarius brevirostris	-	-	-	-	s n	s
Plains Pocket Mouse	Perognathus flavescens gypsi	-	-	-	-	s n	-
Rock Pocket Mouse	Chaetodipus intermedius ater	-	-	-	-	s n	-
New Mexican Jumping Mouse	Zapus hudsonius luteus	-	T	s	s	-	s
Ringtail	Bassariscus astutus	-	-	s	-	s	-
Western Spotted Skunk	Spilogale gracilis	-	-	-	-	s	-
Common Hog-nosed Skunk	Conepatus mesoleucus	-	-	-	-	s	-
Socorro Mountainsnail	Oreohelix neomexicana	-	-	-	-	s n	-
Woodlandsnail	Ashmunella amblya cornudasensis	-	-	-	s	n	-
Cloudcroft Checkerspot Butterfly	Occidryas anicia cloudcrofti	-	-	-	-	s n	-

NATIVE WILDLIFE APPARENTLY NO LONGER OCCURRING IN OTERO COUNTY

Mexican Gray Wolf	Canis lupus baileyi	
Grizzly Bear	Ursus arctos	(extirpated from NM)
Jaguar	Panthera onca arizonensis	
Merriam's Elk	Cervus elaphus merriami	(extinct)
Desert Bighorn Sheep	Ovis canadensis mexicana	

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH FIGHTER WING (ACC)
HOLLOMAN AIR FORCE BASE, NEW MEXICO

FEB 08 2001

Colonel Douglas M. Hulsey Jr.
49th Fighter Wing
490 First Street, Ste 1700
Holloman AFB NM 88330

Dear Property Owner

Congress has recently provided the funding necessary to repair the Bonito Pipeline. This pipeline supplies water to the City of Alamogordo and to Holloman Air Force Base. The pipeline was constructed in 1957 and is in need of repair. The Air Force intends to repair those portions of the existing pipeline that are prone to or have a history of failure. These repairs will enhance the integrity of the pipeline and reduce the probability of leaks, ruptures and the associated impacts on our neighbors and the environment.

In compliance with the National Environmental Policy Act, the Air Force will prepare an environmental impact analysis addressing the potential effects of the proposed repairs. This analysis includes performing surveys of the area to identify any natural and cultural resources of concern. A review of county property records indicates the pipeline lies within an Air Force easement that crosses your property. As a courtesy we want to inform you that there will be survey teams under contract with the Air Force passing through your area to collect relevant data.

The Air Force also intends to conduct public information meetings in early March. This will allow the public an opportunity to express concerns, identify issues, and provide information that may help us in our planning. Public notices and further letters will provide specific meeting times, dates and locations.

We appreciate your cooperation in this endeavor. If you have any questions or need additional information, please contact the Holloman Air Force Base Public Affairs Office at (505) 572-5406

Sincerely

DOUGLAS M. HULSEY, JR.
Colonel, USAF
Vice Commander

Global Power for America

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH FIGHTER WING (ACC)
HOLLOMAN AIR FORCE BASE, NEW MEXICO

Colonel Marc E. Rogers
Commander, 49th Fighter Wing
490 First Street, Ste 1700
Holloman AFB NM 88330-8277

FEB 16 2001

Dear Community Member

Congress has recently provided the funding necessary to repair the Bonito Pipeline. This pipeline supplies water to the City of Alamogordo and to Holloman Air Force Base. The pipeline was constructed in 1957 and is in need of repair. The Air Force intends to repair those portions of the existing pipeline that are prone to or have a history of failure. These repairs will enhance the integrity of the pipeline and reduce the probability of leaks, ruptures and the associated impacts on our neighbors and the environment.

In compliance with the National Environmental Policy Act, the Air Force will prepare an environmental impact analysis addressing the potential effects of the proposed repairs. As part of this process, we will host public information meetings. The pipeline passes through Nogal, Carrizozo, Tularosa, Alamorosa and La Luz. We have chosen Alamogordo and Carrizozo for the meetings.

The meetings are intended to provide the public with an opportunity to learn about the proposal, ask questions, provide comments and identify issues and concerns. As good neighbors, the Air Force wants the public to understand the proposal and provide feedback that will help in the selection of a reasonable course of action.

The Alamogordo meeting will be held on Monday, March 5, in the auditorium at the Alamogordo Civic Center, 800 E First St. The Carrizozo meeting will be held on Tuesday, March 6, in the Lincoln County Commission Chambers at the Lincoln County Courthouse, 300 Central Ave. The doors will open at both locations at 6:30 p.m. The meetings will begin between 6:45 and 7:00.

We appreciate your interest and look forward to seeing you. If you have any questions or need additional information, please contact the Holloman Air Force Base Public Affairs Office at (505) 572-5406.

Sincerely

Marc E. Rogers

MARC E. ROGERS
Colonel, USAF
Commander

Global Power for America

Public Information Meeting

Repair Bonito Pipeline

Bonito Pipeline Repair Project

Public Meetings

March 5 & 6, 2001

Hosted by The US Air Force
Holloman Air Force Base:
Major McMurtrey
49 CES/CEO

The Presentation Team

Capt Gregg Bottemiller	Moderator
Mr Bob Pepper	Media Relations
Mr Mark Urey	Lead Engineer
Mr Albert Mendez	Pipeline Supervisor
Mr Andrew Gomolak	NEPA Advisor

Tonight's Schedule

The Evening's Activities Fall Into Three Phases

- Presentation: We'll Tell You What We Know About The Project
- Discussion: We'll Exchange Information, Asking and Answering Each Other's Questions.
- Public Comment: You'll Tell Us about your Comments and Concerns

Presentation

- Background
- What We Need To Do
- Why We Need To Do It
- Engineering Options
- Alignment Options
- Cost, Scope and Proposed Schedule
- Region of Influence
- The NEPA/EIAP Process
- The NEPA/EIAP Schedule

Background

- Originally built between 1907 and 1910
- Steel Banded Wooden Stave
- Existing Concrete Encased Steel built in '50's
- Supplies water to Alamogordo and Holloman
- Much lies within road/railroad rights-of way
- Some crosses private property
- Area development has encroached on line

What We Need To Do

- Replace the Failed and Weakened Sections
- Protect the Rest
- Avoid Unnecessary Impacts on People and the Environment
- Stay Within Budget

Why We Need to Do It

- Aging Line
- Aggressive Soils
- Pipe Corrosion
- Pressure Fluctuations
- High Pressures
- Arroyo Crossing Wash Outs
- Water Waste
- Property Damage
- Soil Erosion
- Accelerating Failure Rates

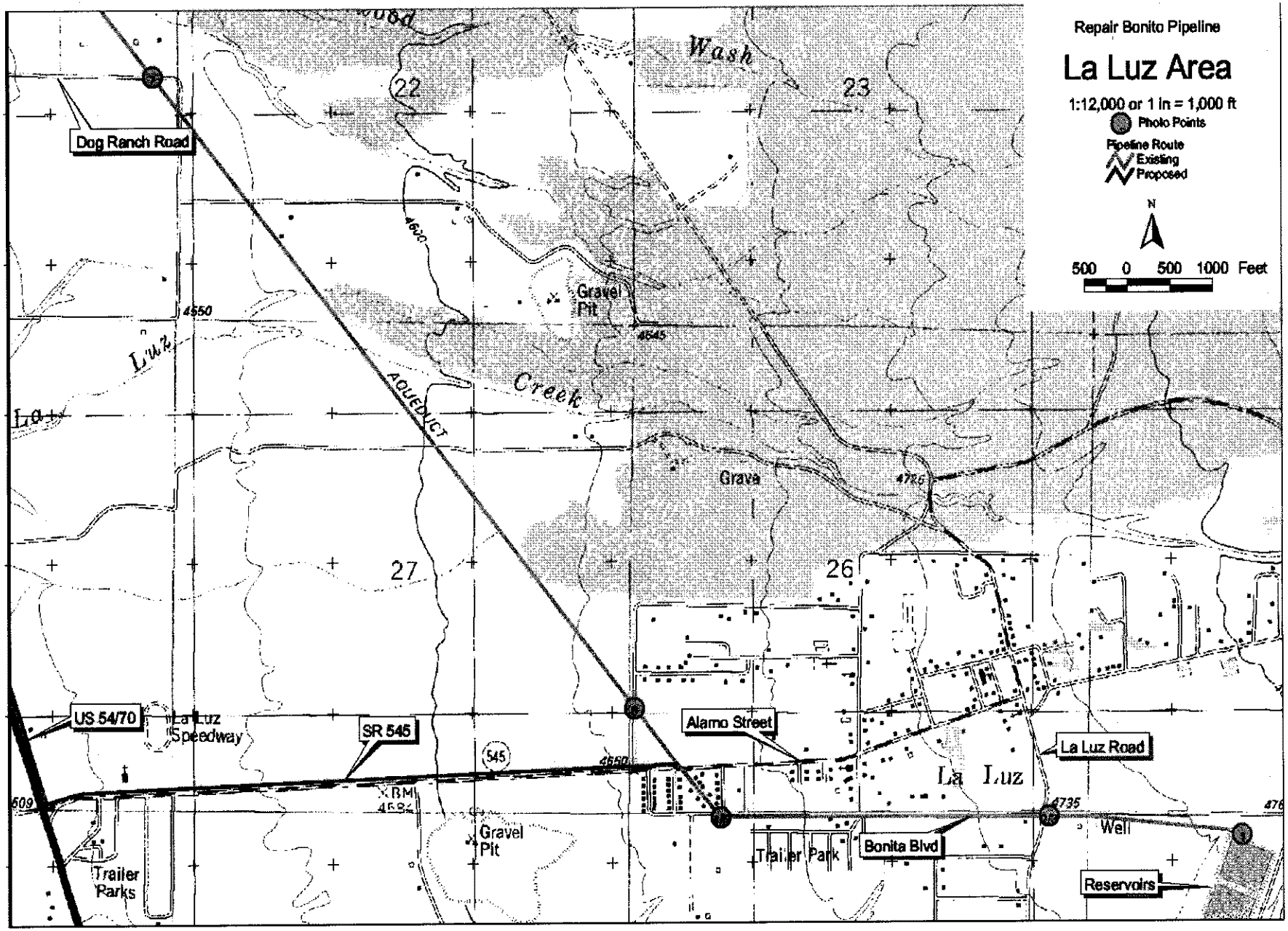
Example Of A Corrosion Blowout

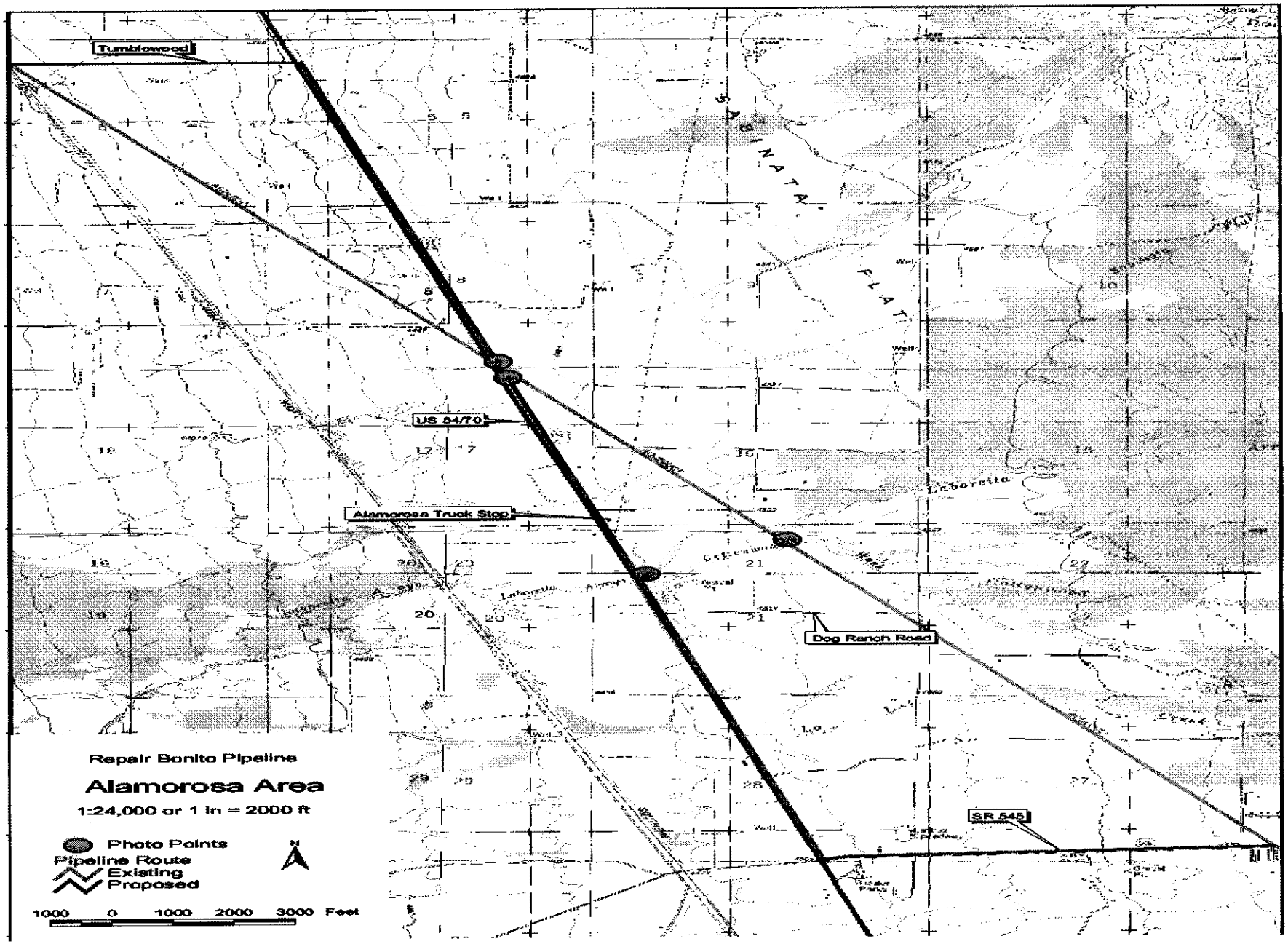
Engineering Options

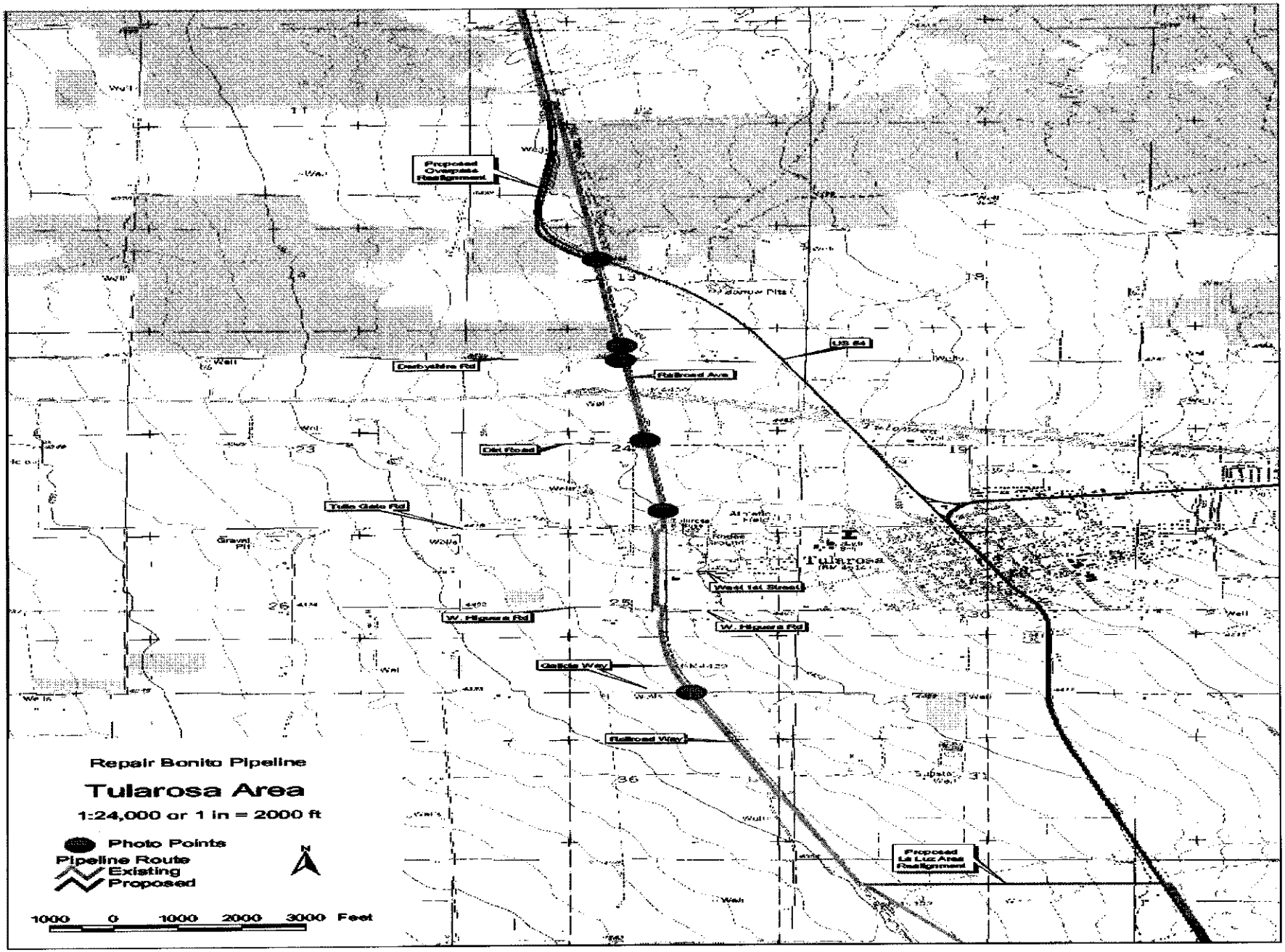
- Abandon the Old In Place and Install New
- Remove the Old and Replace With New
- Slip Line the Old
- Pipe Burst the Old
- Install New where None Existed
- Patch and Cathodically Protect the Old
- Bury the Line and Cross Under Arroyos
- Suspend the Line and Cross Over Arroyos

Alignment Options

- Repair the Existing Alignment Only
- Repair Some Parts of Existing and Bypass Others
- La Luz Bypass
- Alamorosa Bypass One and Two
- Tularosa Overpass Bypass


Repair Bonito Pipeline
La Luz Area
1:12,000 or 1 In = 1,000 ft
Photo Points
Pipeline Route
Existing
Proposed
N
500 0 500 1000 Feet
Wash
22
23
Dog Ranch Road
4650
Gravel Pit
4645
4550
Luz
Creek
AQUEDUCT
La
Grava
4735
27
26
US 54/70
La Luz Speedway
SR 545
545
Alamo Street
La Luz Road
La Luz
4650
609
XBM
4584
Gravel Pit
4735
Well
Trailer Parks
Trailer Park
Bonita Blvd
Reservoirs


Tumbleweed
US 54/70
Alamorosa Truck Stop
Dog Ranch Road
SR 545
SABINATA FLAT
Repair Bonito Pipeline
Alamorosa Area
1:24,000 or 1 In = 2000 ft
Photo Points
Pipeline Route
Existing
Proposed
N
1000 0 1000 2000 3000 Feet


Proposed Overpass Realignment
Derbyshire Rd
Old Road
Tule Gate Rd
W. Higuera Rd
Railroad Ave
West 1st Street
Gaskie Way
Railroad Way
Proposed Las Luz Area Realignment
Tularosa
Repair Bonito Pipeline
Tularosa Area
1:24,000 or 1 in = 2000 ft
Photo Points
Pipeline Route
Existing
Proposed
N
1000 0 1000 2000 3000 Feet

Cost, Scope and Proposed Schedule

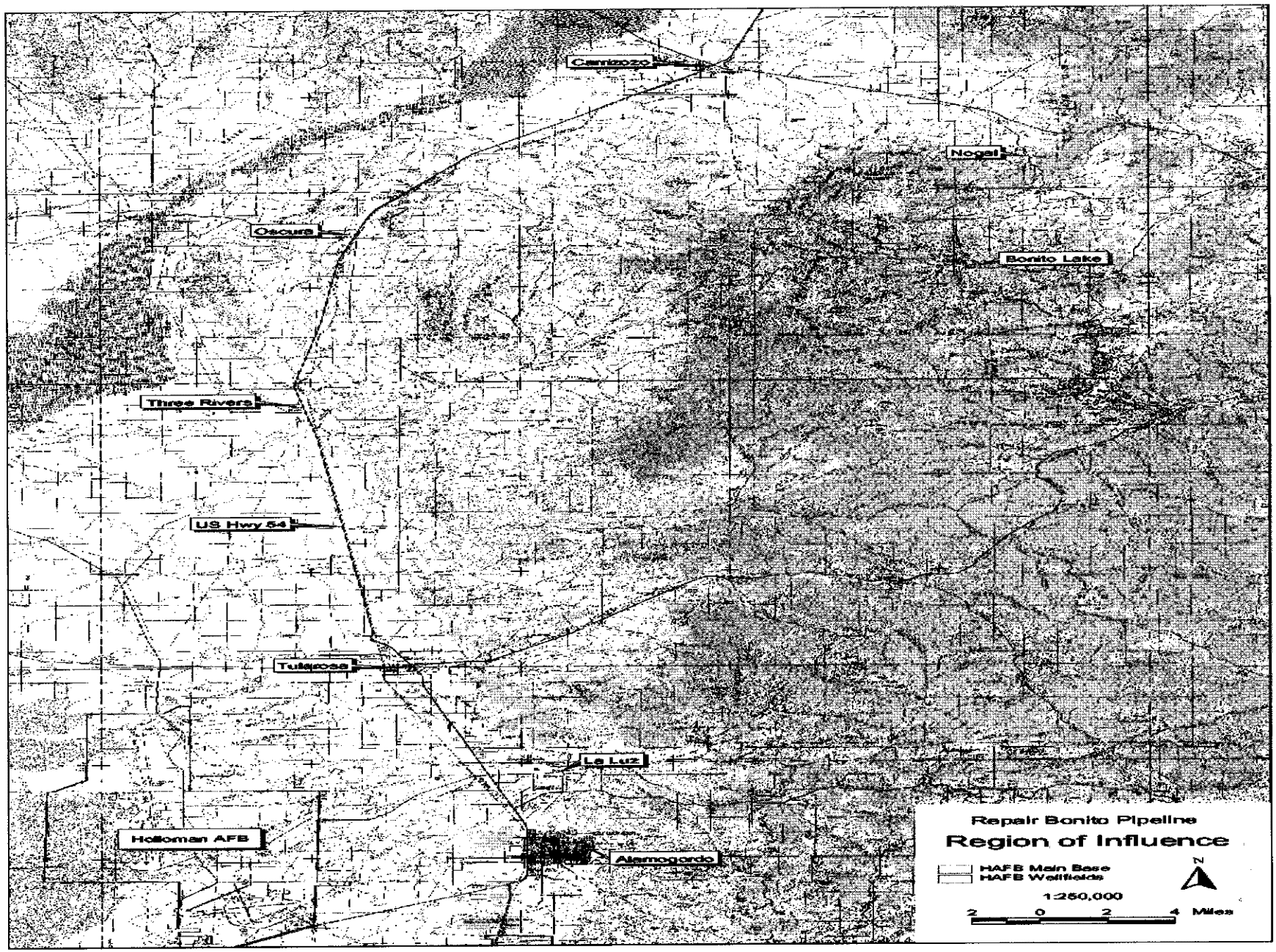
- Congress Funded $18M to Replace 58 KM of Pipeline and cathodically protect 48 KM
- Replace ~36 miles from La Luz to Oscura
- Protect ~30 miles from Oscura to Nogal
- Complete the Impact Analysis This Summer
- Award the Contract This Fall
- Begin Construction Mid 2002
- Complete Construction Mid 2004

Region Of Influence

- Defined as the Entire Area from Nogal, through Carrizozo, Oscura, Three Rivers, Tularosa and La Luz to and Including Alamogordo.

- Ground Disturbance Would Occur ~ 50 Feet on Either Side of the Existing and Bypass Alignments.

- Economic Impacts, both Positive and Negative, Would Vary Throughout the Entire Region.


Carrizozo
Nogal
Oscura
Bonito Lake
Three Rivers
US Hwy 54
Tularosa
La Luz
Holloman AFB
Alamogordo
Repair Bonito Pipeline
Region of Influence
HAFB Main Base
HAFB Wellfields
1:250,000
2 0 2 4 Miles
N

NEPA/EIAP Process

- Prepare an Environmental Impact Analysis.
- Survey Existing and Bypass Routes for Natural and Cultural Resources of Concern
- Solicit both Agency and Public issues and concerns.
- Complete the Public Draft Analysis
- Distribute it for Review and Comment
- Incorporate Pertinent and Valid Comments
- Publish the Final Analysis
- Use It in Making a Decision

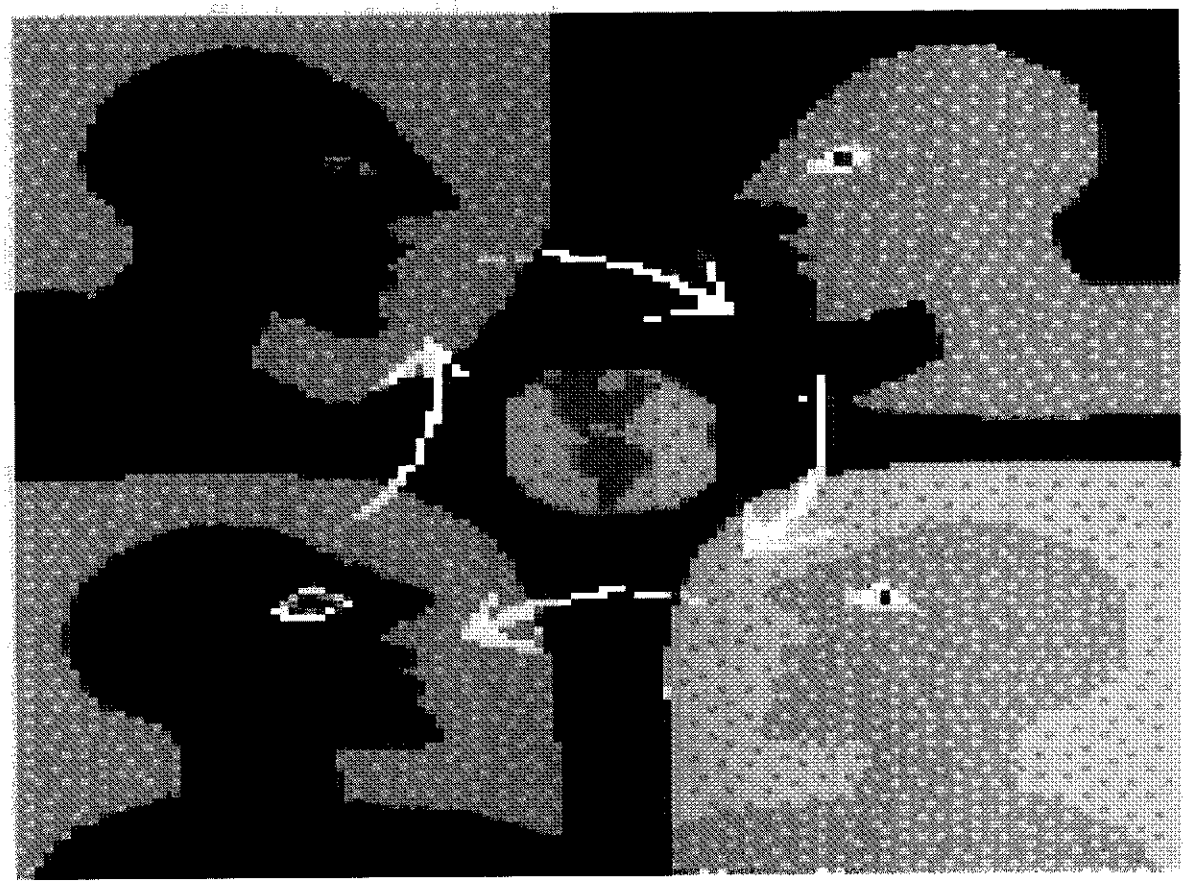
NEPA/EIAP Schedule

Walk The Line Advisory Letter/Release	13 Feb
PIM Advisory Letter/Release/Notice	20 Feb
Public Information Meetings	5/6 Mar
Field Surveys	Feb/Mar
Public Draft Distribution	End Apr
Public Review and Comment Period	30 Days
Final Document Approval & Distribution	Jul

The Presentation Team

Capt Gregg Bottemiller	Moderator
Mr Bob Pepper	Media Relations
Mr Mark Urey	Lead Engineer
Mr Albert Mendez	Pipeline Supervisor
Mr Andrew Gomolak	NEPA Advisor

Discussion



Please

Reconvene

and

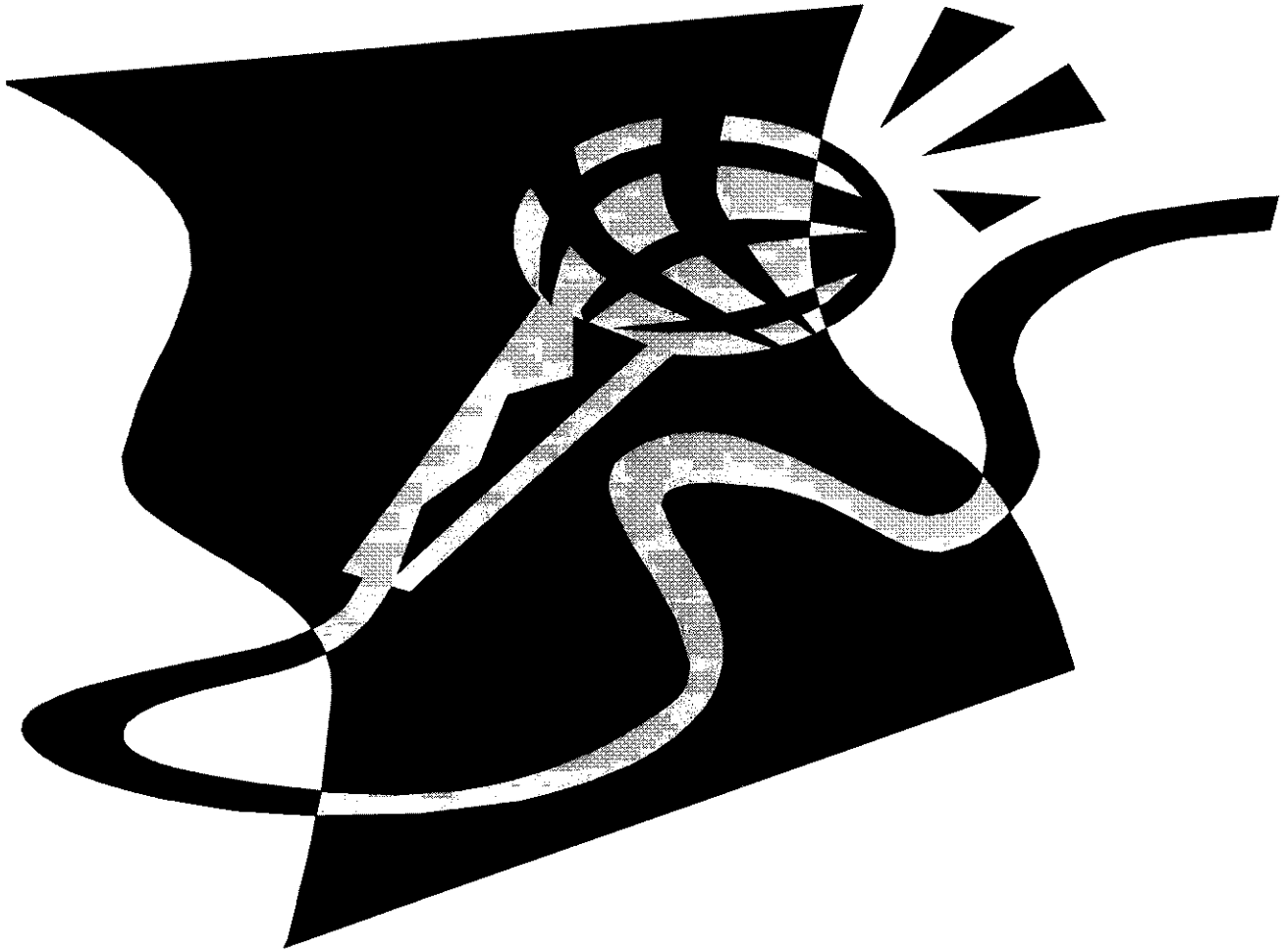
Take Your Seats

Public Comment

Capt Gregg Bottemiller

Moderator

Public Comments



Your Role

- Help us Identify Topics, Issues and Concerns
- Provide Oral Comments - court reporter records
- Complete Written Comment Forms and.....
  - Hand In Here or
  - Take Home, Complete and.....
- Send To 49 FW/PA
  490 First Street, Suite 280
  Holloman AFB, NM 88330
- Review and Comment on the Public Draft
- Questions? Call (505) 572 - 5406

Public Information Meeting

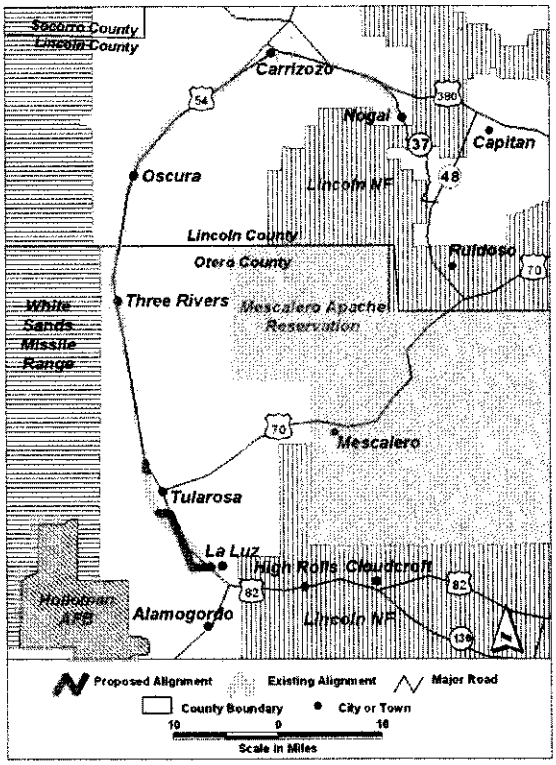
Repair Bonito Pipeline

(505) 572-5406

REPAIR BONITO PIPELINE PROJECT

The U.S. Air Force proposes to repair the Bonito Water Pipeline

The Bonito pipeline has transported water from Bonito Lake since the early 1900s. The existing concrete cylinder steel wrapped pipeline from Nogal to the La Luz reservoir was installed by the Air Force in the '50's. On an average annual basis, that line has supplied roughly half of the Holloman Air Force Base requirement and roughly one-fifth of the City of Alamogordo requirement. The existing line lies within easements conveyed to the Air Force. Most of these are within road, highway, or railroad rights-of-way, but some cross private property.

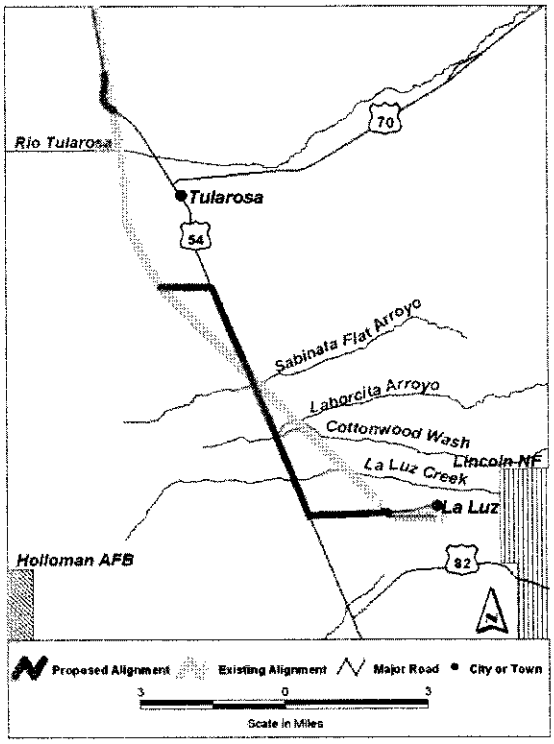


Project Area

Why this project is needed

Due to age, aggressive soils and corrosion, the pipeline has deteriorated over the years. Pressure fluctuations, high pressures and arroyo flooding have contributed to failures and outages, sometimes for extended periods. When this has happened, both Holloman and Alamogordo have relied on their wells. In Holloman's case, 100 percent well dependence has depleted the underground aquifer faster than it could recharge. Failures have wasted water, damaged private property, caused soil erosion and threatened the integrity of the Union Pacific rail bed. The Air Force is concerned about the increasing failure rate and the associated losses.

The Air Force submitted a future-funding request to replace the line some years ago. Recognizing the high failure rate and extended outages, Congress appropriated $18M this fiscal year to repair the pipeline. As a result, the Air Force proposes to replace about 36 miles of the pipeline from the La Luz reservoir to Oscura. It also proposes to do spot repairs and install cathodic protection on the remaining line from Oscura to Nogal, roughly another 30 miles. Cathodic protection should extend the service life of that section by reducing the rate of corrosion. Eventually, the Air Force plans to replace the remaining line to Nogal as additional funds become available.



Existing and Alternative Pipeline Alignments

Besides replacing the line in its current location, the Air Force is evaluating several new alignments that would allow it to bypass some troublesome portions of the existing line. The Air Force must also consider the No-Action alternative. This would mean continuing to use the line as it is. The Air Force does not consider this a viable option.

What to Expect During Construction

Most of the new pipeline would be installed parallel and adjacent to the existing. Except for periodic cutovers, water flow would be maintained while construction was underway. In a few areas where the easement is too narrow to allow the existing line to remain, the old pipe would be removed and replaced with new. The trenching would be about 4 feet wide by 4 feet deep in most locations. It would be deeper where the line crosses arroyos, drainages, and irrigation ditches or passes under roads and structures. Dirt from the trenching would be piled to the side and then repacked over the new pipeline. At some arroyo crossings the pipe would be suspended across rather than buried in it.

Construction would begin in early 2002 and continue for about 18 months. In most locations, the trenching and burying would take a few days. The pipeline would cross some driveways, and access roads, fences and other features would be affected. The construction contractor would be required to ensure that access to businesses and private property was maintained. The public would be notified before work began in their neighborhood.

The Environmental Impact Analysis Process

The Air Force is preparing an Environmental Assessment (EA) as required by the National Environmental Policy Act. Federal agencies must analyze the environmental impacts of their proposals before those actions can legally begin. The EA will identify any special procedures or mitigative measures to be followed prior to or during construction to reduce the impacts.

As part of the assessment, the Air Force has started surveying the natural and cultural resources along the existing and bypass alignments. A draft EA will be available for public review and comment in late April. It will be distributed to local public libraries, and a Notice of Availability will be posted in the local newspaper.

How can you participate?

You can help the Air Force identify the topics, issues and concerns to be addressed in the EA by:

- Making oral comments at this meeting
- Filling out a comment sheet and turning it in at this meeting
- Taking a comment sheet home, filling it out and mailing it to us at

49 FW/PA
490 First Street, Suite 2800
Holloman AFB, NM 88330

- Reviewing and commenting on the Public Draft EA when it comes out.

For information at any time throughout the process you may call: (505) 572-5406

APPENDIX B
NATURAL RESOURCES SURVEY REPORT

Natural Resources Survey Report
Repair Bonito Pipeline

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

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1.0 NATURAL RESOURCES SURVEY REPORT

Field surveys for sensitive species and other biological features were conducted along the Bonito pipeline in support of the Repair Bonito Pipeline Environmental Assessment (EA). A list of sensitive plants and animals that could occur along the pipeline was provided by biologists from Holloman Air Force Base and the results of surveys for these species are also provided in this report. Biologists also inspected the many arroyos and swales crossed by the pipeline and provided information on other wildlife species such as raven and raptor stick nests and cliff swallow nests under the bridges.

A field survey was conducted on approximately 75 miles of the pipeline starting from the northern terminus at Nogal and ending at the southern end near Alamogordo (see Figure 1-1 in the EA). The field surveys were conducted from 26 February through 2 March 2001. Two biologists conducted the surveys and used a combination of pedestrian surveys and surveys from a slow moving vehicle to inspect the alignment. Approximately 20 to 25 miles of the pipeline were surveyed per day.

Sections of the pipeline that were least disturbed were surveyed on foot because they had the best potential for high quality habitat for the species under consideration. In areas surveyed on foot, the investigators walked back and forth covering 50-foot swaths and usually covered 2 to 4 linear miles of habitat. This survey area included a 10- to 15-foot buffer zone beyond the pipeline boundary. Whenever good quality habitat for species of concern was encountered, a more intense survey was conducted throughout the given area.

Sections of the pipeline that had greater levels of disturbance were inspected from a slow moving vehicle. Spot checks were conducted at about .25-mile intervals. All major arroyos and swales along the pipeline were inspected and photographed. In addition, an inventory of noxious plants was also conducted along the pipeline and areas of fairly dense growth were mapped. Global Positioning System (GPS) measurements in Universal Transverse Mercator (UTM) coordinates were obtained for plant and animal species of concern as well as for noxious plants and other wildlife features of interest. UTM coordinates were also taken for arroyos and swales inspected.

This report provides a general description of the vegetation and wildlife communities that occur along the pipeline and the results of sensitive species surveys, surveys of drainages, and noxious plant surveys.

1.1 Vegetation

Upland Vegetation. The Bonito Pipeline passes through Chihuahuan Desert shrublands and grasslands through much of its route. It traverses plains mesa grasslands in the Carrizozo area and pinyon pine-juniper woodlands near the northern terminus (Dick-Peddie 1993). A total of 190 species of plants were observed and the native plant communities were described during field surveys in February and March 2001. Creosotebush (*Larrea tridentata*) dominated shrublands occur along approximately 43 miles (57 percent) of the 75 miles surveyed. In some cases, it forms a monoculture with minor associates being honey mesquite (*Prosopis glandulosa*) and purple prickly pear (*Opuntia macrocentra*). Grass cover is very sparse in this type. In some

areas, creosotebush and honey mesquite are codominants and other species such as four-winged saltbush (*Atriplex canescens*), snakeweed (*Gutierrezia microcephala*) and tarbush (*Flourensia cernua*) are in evidence. Grass covers more land in this type and bush muhly (*Muhlenbergia porteri*), alkali sacaton (*Sporobolus airoides*) and black grama (*Bouteloua eriopoda*) were observed. Honey mesquite dominated shrublands occur along about 10 miles of the line (13 percent) and generally occur in more sandy areas. Four-winged saltbush is also common in this type, and less common species include snakeweed and joint-fir (*Ephedra torreyana*). Common grasses include mesa dropseed (*Sporobolus flexuosus*) and bushy muhly. In some areas, honey mesquite essentially disappears and four-winged salt bush is the dominant shrub along with various species of grasses.

Desert grasslands generally occur in the northern part of the pipeline and it traverses an estimated 20 miles of this type (27 percent). Species such as alkali sacaton and galleta (*Hilaria jamesii*) are common and are in association with hairy grama (*Bouteloua hirsuta*), ring muhly (*Muhlenbergia torreyi*), threeawn (*Aristida* sp.) and black grama. In some areas, yucca (*Yucca elata*) is a common species in these grasslands.

The two miles at the Nogal end of the pipeline (three percent of the line) traverse pinyon pine (*Pinus edulis*) and juniper (*Juniperus monosperma*) dominated woodlands. Shrubs such as four-winged saltbush, broom snakeweed (*Gutierrezia sarothrae*) and skunkbush (*Rhus trilobata*) are scattered throughout. Extensive grass cover consists of galleta, curly mesquite (*Hilaria belangeri*), blue grama (*Bouteloua gracilis*), hairy grama, black grama, and threeawn. In some areas, the woodlands are an open juniper savannah with the same grassland plant community.

Wetlands and Ephemeral Drainages. Wetlands were not observed along the pipeline, although some wetland habitat was observed at sewage treatment ponds near the south end of the route. Cattails (*Typha* sp.) and other wetlands species were observed at the treatment ponds. These ponds would not be disturbed by pipeline construction activities. Tularosa Creek was the only perennial stream crossed by the pipeline (see Figure 1). The vegetation along Tularosa Creek in the pipeline vicinity has been highly impacted and little vegetative cover remains. A dense stand of seep-willow (*Baccharis* sp.) and willow (*Salix* sp.) occurs along this stream starting just west of U.S. Highway 54 (U.S. 54). These shrubs are 15 to 20 feet high in many places and this habitat extends at least 200 yards downstream from U.S. 54.

The remaining drainages are dry arroyos and swales that typically contain flowing water during storm events and range from small drainages to wide washes and arroyos. All were observed from the road and many were inspected on foot. A total of 84 washes were inspected (Figure 1). Forty were arroyos, which had obvious incised channels, and the remaining 44 were swales that were generally shallow with no obvious incised channel. Most arroyos have rocky or sandy bottoms and vegetation is restricted to the edges of the channel, where species such as alkali sacaton and Johnson grass (*Sorghum halepense*) may be encountered. A few contain some woody vegetation such as desert willow (*Chilopsis linearis*), seep-willow (*Baccharis glutinosa*), brickellbush (*Brickellia* sp.), and a few salt cedar (*Tamarix ramosissima*). Vegetation in the swales consists of various species of grass and herbs. The vegetation in most of these drainages have been highly altered from human activity and range from being essentially devoid of vegetation to having a fairly natural plant cover. A total of 78 percent of the drainages show evidence of human disturbance (primarily due to highway and pipeline maintenance) ranging

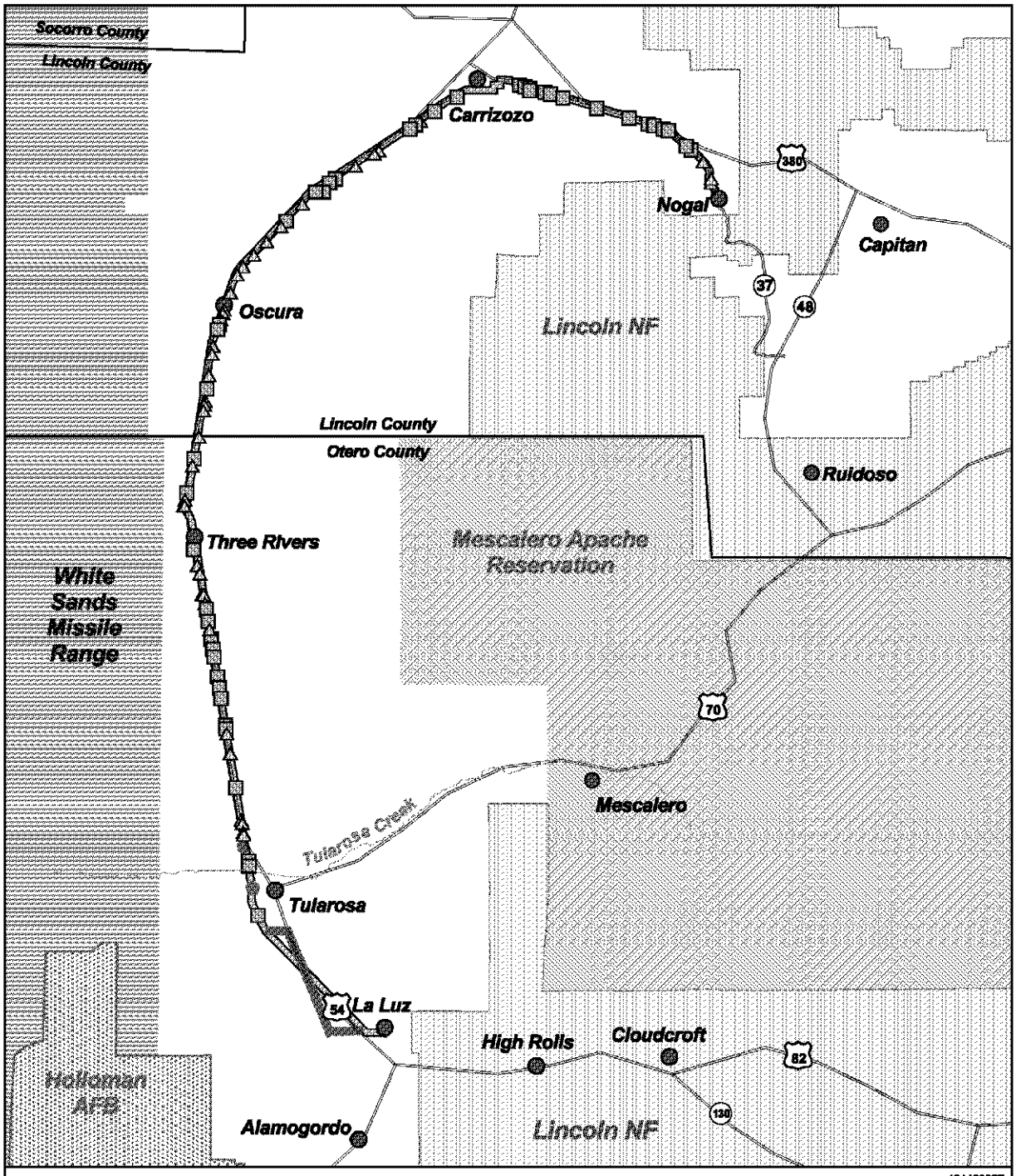

Figure 1: Location of Arroyos and Swales Inspected along the Bonito Pipeline February and March, 2001

from almost complete lack of vegetation to partial vegetative cover (see Table 1). The remaining 22 percent contain relatively natural plant cover. The vegetation in the swales tends to be more highly impacted then in the arroyos.

Table 1. Level of Human Disturbance in Arroyos and Swales Crossed by the Bonito Pipeline, Otero and Lincoln Counties, New Mexico

Drainage	*Bare Ground*		*Partial Vegetation*		*Natural Vegetation*		*Total*
	Number	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*
Arroyo[a]	12	31	17	44	10	26	39
Swale[a]	21	50	13	31	8	19	42
Total:	33	41	30	37	18	22	82

Note: [a] Condition of one arroyo and two swales not determined.

Noxious Plants. Areas of fairly dense growth of noxious plants were mapped (see Figure 2). Thirteen noxious plant locations were mapped. Species encountered included African rue (*Peganum harmala*), field bindweed (*Convolvulus arvensis*), Dalmatian toadflax (*Linaria dalmatica*), and Russian knapweed (*Acroptilon repens*). African rue is found in varying concentrations along the pipeline ROW adjacent to U.S. 54 along a good percentage of the distance between mile marker 105, traveling southward.

1.2 Wildlife

The background information regarding wildlife that likely occurs in the area of the pipeline was obtained from detailed studies conducted recently at White Sands Missile Range (WSMR) and on Fort Bliss south of Alamogordo (U.S. Army 1998, 1999a,b), as well as observations made during biological surveys conducted for this study. Wildlife habitat over much of the pipeline has been degraded due to past human disturbances, so many species typical of the Chihuahuan Desert and plains mesa grasslands would not occur along the pipeline. However, it would be expected that many would occur in relatively undisturbed habitat near the pipeline.

1.2.1 Amphibians and Reptiles

Recent studies in southern New Mexico resulted in the observation of about 50 species of amphibians and reptiles (U.S. Army 1999b). Of these, 37 and 31 species occur in Chihuahuan Desert grasslands and shrublands respectively. Common species in the grasslands are the northern earless lizard (*Holbrookia maculata*), southern prairie lizard (*Sceloporus undulatus*), and striped whiptail (*Cnemidophorus inornatus*). In the shrublands, common species are the striped whiptail, side-blotched lizard (*Uta stansburiana*), and marbled whiptail (*Cnemidophorus marmoratus*). Snake species such as the western diamondback rattlesnake (*Crotalus atrox*) and bull snake (*Pituophis catenifersayi*) are common and widespread throughout the area, while the Mojave (*C. scutulatus*) and prairie (*C. viridis*) rattlesnakes are more apt to occur in grasslands and the Texas long-nosed snake (*Rhinocheilus lecontei*) in the desert shrublands. A study of amphibian and reptile use of arroyo-riparian habitat and the surrounding uplands in the Chihuahuan Desert on McGregor Range showed that there was no statistical difference in

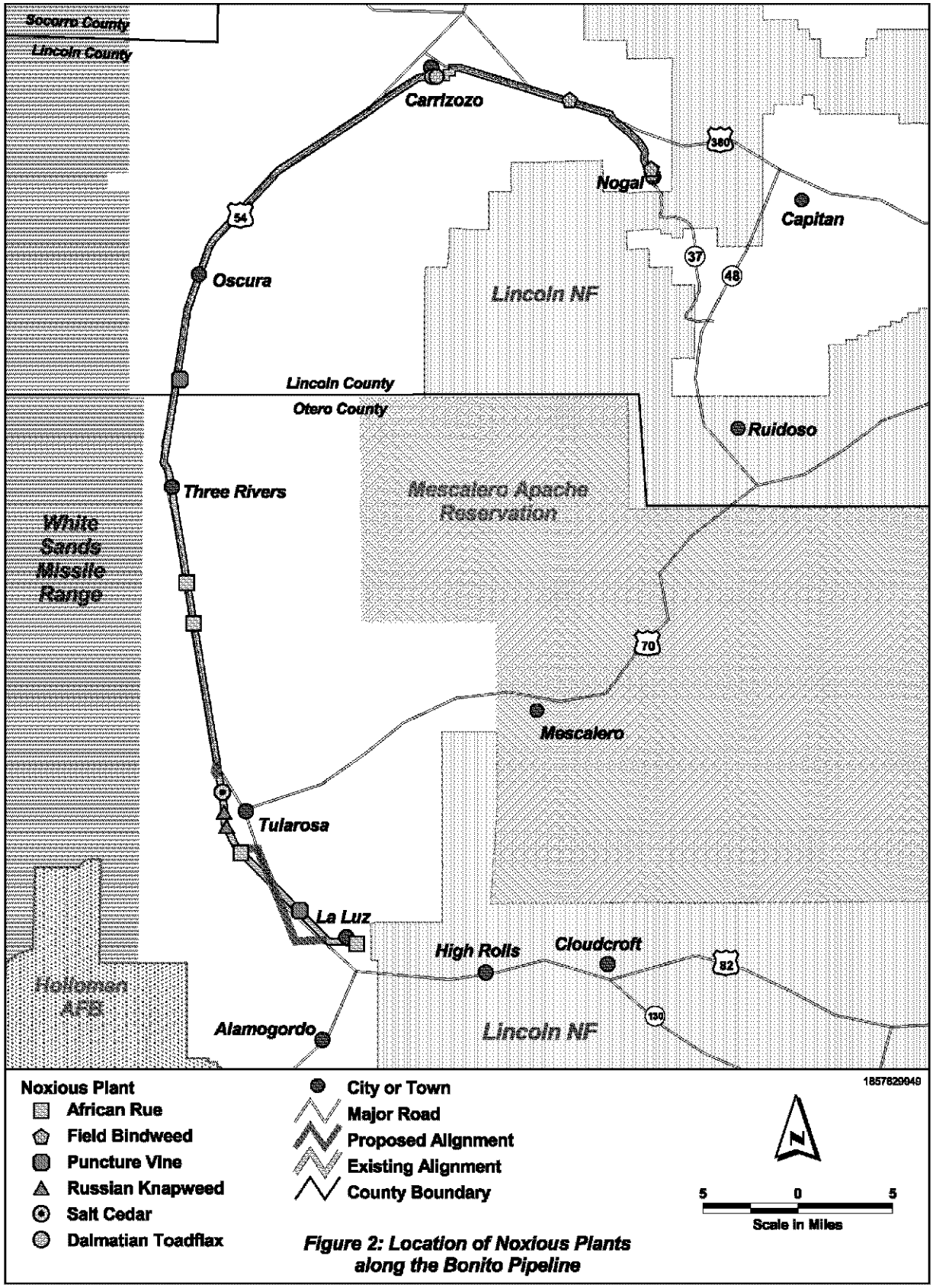

Figure 2: Location of Noxious Plants along the Bonito Pipeline

species richness and abundance between the two habitat types (U.S. Army 1999a). No species of amphibians or reptiles were observed during surveys along the pipeline route due to the timing of the surveys (February and March 2001) and the cold, rainy weather. In addition, as stated above, many of these species would not occur along the pipeline due to the disturbed nature of much of the route.

1.2.2 Avifauna

The avifauna in southern New Mexico is quite diverse, as indicated by studies on Fort Bliss and WSMR, where 334 and 264 species, respectively, were recorded (U.S. Army 1998, 1999b). Many of these species are migrants (129 of the 334 species on Fort Bliss) and others occur in the forested habitat on the two military installations. This section emphasizes bird life in the natural habitats. Avifauna in urban and other built-up areas along the pipeline are typically dominated by species such as the house sparrow (*Passer domesticus*), great-tailed grackle (*Quiscalus mexicanus*), house finch (*Carpodacus mexicanus*), and rock dove (*Columba livia*).

Detailed breeding bird studies on McGregor Range resulted in an average of 45 species in the creosotebush dominated habitats, 50 in the mesquite dominated habitat, 34 in the black grama grasslands, and 63 species in the pinyon pine-juniper woodlands. The black-throated sparrow (*Amphispiza bilineata)* was by far the most common species recorded in the shrublands in the Tularosa Basin; the western kingbird (*Tyrannus verticalis),* Scott's oriole (*Icterus parisorum),* and ash-throated flycatcher (*Myiarchus cinerascens)* were other common species. The eastern meadowlark *(Sturnella magna)* and horned lark *(Eremophila alpestris)* were the most common species in grassland habitats in the Tularosa Basin. Other common species were the black throated sparrow and northern mockingbird *(Mimus polyglottos).* The most common species in the pinyon pine-juniper woods in the Sacramento Mountains foothills were the northern mockingbird, bushtit (*Psaltriparus minimus),* and spotted towhee (*Pipilo maculatus*) (U.S. Army 1999a). The Swainson's hawk (*Buteo swainsoni)* and red-railed hawk (*Buteo jamaicensis)* were the most common nesting raptors recorded in the desert shrublands and grasslands, while other species such as the prairie falcon (*Falco mexicanus),* golden eagles (*Aquila chrysaetos),* American kestrel (*Falco sparverius)* and great horned owl (*Bubo virginianus)* could be expected to forage in the area.

A total of 51 species of birds were recorded during 5 days of field surveys (see Table 2). Twelve of these species are likely to occur in the area only during the winter or during migration. Three of these species may nest at the ponds and wetland near the southern end of the pipeline. Many of the other species observed such as the mourning dove, ladder-backed woodpecker (*Picoides scalaris*), verdin (*Auriparus flaviceps*), black-throated sparrow, pyrrhuloxia (*Cardinalis sinuatus*), meadowlarks (*Sturnella* sp.), and house finch are common breeding species in the Chihuahuan Desert and likely are breeding species in the area of the pipeline. Cliff swallow (*Petrochelidon pyrrhonota*) nests were observed under 24 bridges along the pipeline (see Figure 3). This species is known to double clutch, so breeding populations could be expected in the area from May into August. Four stick nests were observed. All were at least 400 feet from the pipeline. They are assumed to be Chihuahuan raven nests due to their size. However, raptors such as the red-tailed hawk and Swainson's hawk have been known to use raven nests.

Table 2. Bird Species Recorded along the Bonito Pipeline in Otero and Lincoln Counties during Biological Surveys from 26 February through 2 March 2001.

Species		Status				
Common Name	Scientific Name	Winter-migrant	Breeding[a]			
			S	G	PJ	U
Gadwall[b]	*Anas strepera*	X				
Mallard[c]	*Anas platyrhynchos*	X				
Northern shoveler[b]	*Anas clypeata*	X				
Bufflehead[b]	*Bucephala albeola*	X				
Ring-necked duck[b]	*Aythya collaris*	X				
Northern harrier	*Circus cyaneus*	X				
Red-tailed hawk	*Buteo jamaicensis*		X	X	X	
American kestrel	*Falco sparverius*				X	
Scaled quail	*Callipepla squamata*		X	X		
Gambel's quail	*Callipepla gambelii*		X	X		
Sandhill crane	*Grus canadensis*	X				
American coot	*Fulica americana*	X				
Mourning dove	*Zenaida macroura*		X	X	X	
White-winged dove	*Zenaida asiatica*		X		X	X
Rock dove	*Columba livia*					X
Greater roadrunner	*Geococcyx californicus*		X	X		
Ladder-backed woodpecker	*Picoides scalaris*		X	X	X	
Red-shafted flicker	*Colaptes auratus*				X	X
Say's phoebe	*Sayornis saya*		X	X	X	
Loggerhead shrike	*Lanius ludovicianus*		X	X	X	
Western scrub jay	*Aphelocoma californica*				X	
Pinyon jay	*Gymnorhinus cyanocephalus*				X	
Chihuahuan raven	*Corvus cryptoleucus*		X	X	X	
Common raven	*Corvus corax*				X	
Cliff swallow[d]	*Petrochelidon pyrrhonota*		X	X	X	
Mountain chickadee	*Poecile gambeli*				X	
Verdin	*Auriparus flaviceps*		X	X		
White-breasted nuthatch	*Sitta carolinensis*				X	X
Cactus wren	*Campylorhynchus brunneicapillus*		X	X		
Marsh wren[c]	*Cistothorus palustris*					

Species		Status				
Common Name	Scientific Name	Winter-migrant	Breeding[a]			
			S	G	PJ	U
Western bluebird	*Sialia mexicana*				X	
Mountain bluebird	*Sialia currucoides*	X				
Townsend's solitaire	*Myadestes townsendi*	X				
American robin	*Tudus migratorius*				X	X
Curve-billed thrasher	*Toxostoma curvirostre*		X	X	X	
European starling	*Sturnus vulgaris*					X
Canyon towhee	*Pipilo fuscus*				X	
Vesper sparrow	*Pooecetes gramineus*		X	X		
Black-throated sparrow	*Amphispiza bilineata*		X	X	X	
Song sparrow	*Melospiza melodia*	X				
White-crowned sparrow	*Zonotrichia leucophrys*	X				
Dark-eyed junco	*Junco hyemalis*				X	
Pyrrhuloxia	*Cardinalis sinuatus*		X	X		
Red-winged blackbird[c]	*Agelaius phoeniceus*					
Western meadowlark	*Sturnella neglecta*		X	X		
Eastern meadowlark	*Sturnella magna*		X	X		
Common grackle	*Quiscalus auiscaula*					X
Great-tailed grackle	*Quiscalus mexicanus*					X
Brewer's blackbird	*Euphagus cyanocephalus*		X			X
House finch	*Carpodacus mexicanus*		X	X	X	X
House sparrow	*Passer domesticus*					X
Total		12	21	19	22	11

Notes:
[a] S = shrublands, G = grasslands, PJ = pinyon-juniper woodlands, U= urban.
[b] Migrants or wintering species associated with pond and wetland near south end of pipeline.
[c] Potential breeding species associated with pond and wetland near south end of the pipeline.
[d] Cliff swallows not observed - nests observed under bridges over drainages.

The pipeline crosses numerous drainages and all except Tularosa Creek are ephemeral. The dense vegetation and perennial water along Tularosa Creek may provide habitat for riparian nesting species such as the yellow-breasted chat (*Icteria virens*), yellow warbler (*Dendroica petechia*), and the blue grosbeak (*Guiraca caerulea*), as well as federal and state sensitive species such as the southwestern willow flycatcher (*Empidonax trailii extimus*). Recent studies in the Chihuahuan Desert have shown that dry arroyos (referred to as arroyo-riparian habitat) tend to support a higher density of breeding birds then the surrounding uplands and are

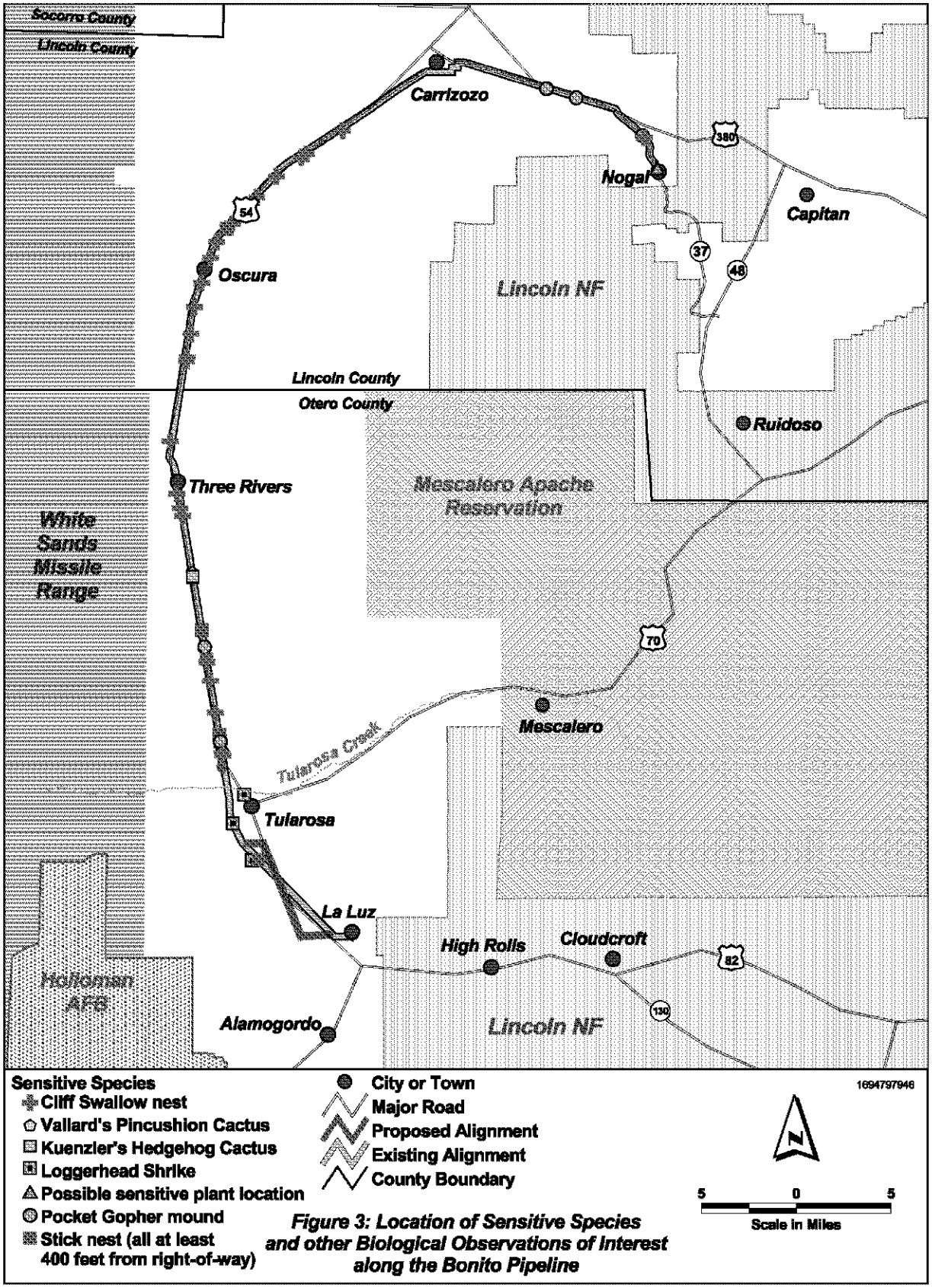

Figure 3: Location of Sensitive Species and other Biological Observations of Interest along the Bonito Pipeline

important to migrating birds including neotropical migrants (Kozma 1995, Kozma and Mathews 1997, U.S. Army 1999a). During a five-year study of arroyo-riparian habitat on McGregor Range, 26 species of neotropical migrants were captured, including Virginia's (*Vermivora virginiae*), orange-crowned (*V. celata*), MacGillivray's (*Oporonis tolmei*), and Wilson's (*Wilsonia pusilla*) warblers, and hermit thrush (*Catharus guttatus*). Over 85 percent of the 341 neotropical migrants captured were in arroyo-riparian habitat. As indicated above, the vegetation in most of the arroyos in the area of the pipeline is highly disturbed and would not be expected to support much bird life including migrants passing through the Chihuahuan Desert. However, the vegetation in 18 arroyos and swales along the pipeline is in fairly good shape and may support more birds than the surrounding uplands, including some neotropical migrants.

1.2.3 Mammals

Mammal species diversity is high in southern New Mexico, as indicated by surveys on Fort Bliss, where 58 species have been recorded, and on WSMR, where 75 species occur (U.S. Army 1998, 1999b). Small mammal sampling in the Chihuahuan Desert shrublands and grasslands on McGregor Range in 1997 and 1998 indicated the silky pocket mouse (*Perognathus flavus)* and Merriam's kangaroo rat (*Dipodomys merriami)* were the most abundant species. Other common species were the deer mouse (*Peromyscus maniculatus)*, hispid cotton rat (*Sigmodon hispidus)*, and white-footed mouse (*Peromyscus leucopus)* (U.S. Army 1999a). Another study in the Chihuahuan Desert on McGregor Range showed that small mammal relative abundance was greater in the arroyo-riparian habitat than in the surrounding upland habitat. Species such as the white-footed mouse, deer mouse (*Peromyscus maniculatus*), western harvest mouse (*Reithrodontomys megalotis*), and white-throated woodrat were more common in arroyo-riparian habitat while Merriam's kangaroo rat and the desert plains pocket mouse (*Perognathus flavescens*) were more common in the uplands. Arroyos with greater shrub diversity, canopy cover, and height supported more small mammals then the surrounding areas (Jorgensen et al. 1998).

Other species of mammals that are common in the Chihuahuan Desert are the desert cottontail (*Sylvilagus audubonii)*, black-tailed jackrabbit (*Lepus californicus*), coyote, (*Canis latrans*), and badger (*Taxidea taxus*). Species of mammals or their sign observed along the pipeline include the coyote, black-tailed jackrabbit, desert cottontail, mule deer (*Odocoileus hemionus*), skunk (*Spilogale* or *Mephitis* sp.), pocket gopher (species undetermined), and woodrat (*Neotoma* sp.).

1.3 Sensitive Species

Surveys for federal and state of New Mexico sensitive species or potential habitat were conducted from February 26 through March 2, 2001 (see Table 3).

Federally Listed, Proposed Species, and Species of Concern

Kuenzler's hedgehog cactus. Kuenzler's hedgehog cactus (*Echinocereus fendleri* var. *kuenzleri*) is a federal and state endangered species and is known in Lincoln and Otero Counties. It occurs in pinyon pine-juniper woodlands and the plains and Great Basin grasslands usually on gentle rocky to gravelly slopes, often on limestone substrates. This variety is often confused with

Table 3. The Occurrence of Sensitive Species along the Bonito Pipeline in Otero and Lincoln Counties as Determined from Field Surveys during February and March 2001

Common Name	Scientific Name	Status[a]		Occurrence along Pipeline
		F	S	
Federally Listed Species or Species or Concern				
Kuenzler's hedgehog cactus	*Echinocerus fendleri var. kuenzleri*	E	E	Four possible specimens observed along pipeline. Follow-up surveys in May 2001 required to confirm identification.
Todsen's pennyroyal	*Hedeoma todsenii*	E	E	Occurs on gypsiferous soil on steep north facing slopes, and such habitat does not occur along pipeline.
Night-blooming cereus	*Peniocereus greggii*	SC	E	Potential habitat in Chihuahuan Desert shrublands. Not observed in area of pipeline.
Villards pincushion cactus	*Escobaria villardii*	SC	E	Three specimens observed along and in area of pipeline.
Alamo beardtongue	*Penstemon alamosensis*	SC	R	Basal leaves of unknown penstemon adjacent to pipeline. Need to check in mid-May 2001 to determine species.
Kerr's milkvetch	*Astragalus kerrii*	SC	R	Two small tufted milkvetch growing along pipeline west of Nogal. Survey in May 2001 to identify species.
Mountain plover	*Charadrius montanus*	PT	_	Potential habitat in grassland along pipeline.
Southwestern willow flycatcher	*Empidonax trailii extimus*	E	E	Only potential habitat is along Tularosa Creek.
Black-tailed prairie dog	*Cynomys ludovicianus*	C	_	Prairie dog towns not observed along pipeline.
Texas horned lizard	*Phrynosoma cornutum*	SC	_	Not observed. Potential habitat present along and in area of pipeline.
Western burrowing owl	*Athene cunicularia*	SC	_	Not observed and burrows along pipeline show no evidence of use.
Loggerhead shrike	*Lanius ludovicianus*	SC	_	Observed at three locations. Wintering and likely breeding species along pipeline.
State Listed and Rare Species				
Turk's head barrel cactus	*Ferocactus haematacanthus var. haematacanthus*	_	R	Not observed during surveys. Only known from a single specimen in New Mexico near Texas border.
Botta's pocket gopher	*Thomomys bottae*	_	S	Pocket gopher mounds observed in 6 locations along pipeline. Species unknown.

Sources: USFWS 2001, NMDGF 2000, NMRPTC 1999

Notes: [a] F = federal, S = state, E = endangered, SC = species of concern, R= rare, PT = proposed threatened, C = candidate, S = sensitive.

Echinocereus triglochidiatus. Four possible Kuenzler's hedgehog cacti were located west of U.S. 54 within the pipeline alignment (Figure 3). Positive identification was not possible because of the timing of the survey. This area will be resurveyed during May 2001 to determine the species identification. Activities on any sites identified would be avoided until suitable measures are coordinated between the Air Force, the U.S. Fish and Wildlife Service (USFWS), and the New Mexico Department of Game and Fish (NMDGF).

Todsen's pennyroyal. Todsen's pennyroyal (*Hedeoma todsenii*) is a federal and state endangered species and has been observed in Otero County. It is found in pinyon pine-juniper woodlands in gypsiferous soils on steep north facing slopes. No suitable habitat for this species was observed along the pipeline.

Night blooming cereus. The night blooming cereus (*Peniocereus greggii)* is a federal species of concern and a rare and sensitive species in New Mexico. This species occurs in the Chihuahuan Desert shrublands and has been recorded in Otero County but not in Lincoln County. It is generally found under creosote and mesquite shrubs, which provide shade, stem support, and protection, and is also found along upper banks and terrace of ephemeral stream courses. Surveys over large areas have resulted in the location of one small population on Fort Bliss and none on WSMR (U.S. Army 1988, 1999b). This species was not observed during surveys along the pipeline, although potential habitat occurs outside the disturbed areas of pipeline for many miles along the alignment.

Villard's pincushion cactus. Villard's pincushion cactus (*Escobaria villardii*) is a federal species of concern and a state sensitive species and has been recorded in Otero County. This species is found in the Chihuahuan Desert shrublands on lower mountain slopes and in semi-desert grasslands. Three individuals of this species were found during field surveys (Figure 3). One was found in silty clay soil and two above a road cut on a terrace. All three were along the pipeline alignment.

Alamo beardtongue. Alamo beardtongue (*Penstemon alamosensis*) is a federal species of concern and a state sensitive species and is known in Otero County. This species is found on the foothill desert shrubland and pinyon pine-juniper woodlands on limestone derived slopes and cliffs. A few basal leaves of an unknown *Penstemon* sp. were observed on the lower slopes and adjacent highway pipeline in the pinyon pine-juniper woodlands west of Nogal. This area will be resurveyed during the middle of May 2001 to determine the species.

Kerr's milkvetch. Kerr's milkvetch (*Astragalus kerrii*) is a federal species of concern and a state sensitive species and has been found in Lincoln County. It grows in pinyon pine-juniper woodlands and lower elevation ponderosa pine (*Pinus ponderosa*) forests. It is usually found on the sides of dry arroyo and channel bottoms with disturbed soils derived from weathered basalts and granite. It can also be found growing in disturbed areas along roads. Two low-growing tufted milkvetch that have the potential to be this species were observed west of Nogal near the upper end of the pipeline (Figure 3). This area will be checked in May 2001 to determine the species.

Mountain plover. The mountain plover (*Charadrius montanus)* is a federally proposed threatened species and has declined by 63 percent since 1966 (Knopf 1994). This species is generally considered an associate of the short grass prairie dominated by blue grama and buffalo grass

(*Buchloe dactyloides)* (Knopf and Miller 1994) although it is known to nest in Utah in habitat dominated by low growing shrubs such as sagebrush (*Artemisia* sp.) and rabbitbrush (*Chrysothamnus* sp.) (Day 1994). Various observers have noted that the mountain plover nests and forages in areas of disturbed ground such as occur at prairie dog towns and areas heavily grazed by livestock (Knopf and Miller 1994; Miller and Knopf 1993; Sager 1996). In New Mexico, this species was observed in a variety of habitats, which usually included some bare ground. Most observations were in the northeast part of the state including a breeding record from northern Lincoln County. It was not recorded in Otero County, although there are two historic records for this county (Sager 1996). Surveys have been conducted for this species on Otero Mesa south of the pipeline starting in 1996, and no breeding birds have been observed. However, one migrant was recorded on Otero Mesa in April 1999 (U.S. Army 1999b). Based on its habitat requirements, the grasslands in the area of the pipeline may provide potential habitat for this species. The potential for this species to occur along the pipeline, particularly during the breeding season, is very low, given the high degree of human activity along the highways next to the pipeline. Approximately six miles of the existing pipeline route traverses land away from highways. This section of the pipeline passes through pecan orchards and creosotebush dominated Chihuahuan Desert shrublands, which do not provide potential habitat for the mountain plover.

Southwestern willow flycatcher. The southwestern willow flycatcher (*Empidonax traillii extimus)* is a federally and state of New Mexico endangered species. This flycatcher is a neotropical migrant that breeds in the southwestern United States and winters in Central and South America. The southwestern willow flycatcher breeds only in dense riparian vegetation near surface water or saturated soil in linear or irregularly shaped stands with patches of dense vegetation interspersed with small openings (Sferra et al. 1997, Sogge et al. 1997).

The southwestern willow flycatcher populations have experienced significant declines. Breeding populations are known from only about 75 locations, and there are an estimated 300 to 500 pairs in existence (Sogge et al. 1997). The principal factors resulting in these declines are the extensive loss, modification, and fragmentation of riparian breeding habitat and brood parasitism by brown-headed cowbirds (*Molothrus ater*) (Sogge et al. 1997). Based on recent surveys (Williams 1997), there are likely less then 200 breeding pairs of southwestern willow flycatchers in New Mexico. The willow flycatcher has been recorded occasionally in arroyo-riparian habitat in the Chihuahuan Desert on McGregor Range, but these birds are assumed to be migrants because they were not present during the breeding season. There is no appropriate breeding habitat for the southwestern willow flycatcher anywhere on the 1.1 million-acre Fort Bliss (U.S. Army 1999b).

The only potential habitat for the southwestern willow flycatcher in the area of the pipeline is the dense seep-willow and willow habitat along Tularosa Creek. It nests in both of these plant species (Sogge and Marshall 2000). Surveys for southwestern willow flycatcher will be performed from late May into early July 2001 to determine if it nests in the area of the pipeline.

Black-tailed prairie dog. The black-tailed prairie dog (*Cynomys ludovicianus*) was recently determined to warrant listing as a threatened species by the USFWS and is now a candidate species (USFWS 2000). There are five species of prairie dogs and the black-tailed prairie dog is the most abundant and widespread. In New Mexico, this species is found in the eastern and

southern portions of the state. This species is found in open and shrub dominated grasslands. It seems to have a patchy distribution in the region around the pipeline. Recent surveys in the grassland habitat on Otero Mesa resulted in the observation of 17 active and 3 inactive prairie dog towns (U.S. Army 1999a), while there are no known prairie dog towns in the extensive grasslands on WSMR (U.S. Army 1998).

Potential habitat for the black-tailed prairie dog occurs along the 20 miles of pipeline that traverses grasslands in the northern part of the pipeline. All this habitat was inspected either on foot or from a slow moving vehicle and no prairie dog towns were observed along or in the area of the pipeline.

Texas horned lizard. The Texas horned lizard (*Phrynosoma cornutum)* is a federal species of concern and occurs in relatively small numbers in the Chihuahuan Desert grasslands and shrublands habitats (U.S. Army 1998, 1999a). For example, it was captured 82 times at 20 sampling locations in the desert shrublands of the Tularosa Basin on McGregor Range. This represents less then one percent of the reptiles captured (U.S. Army 1999a). It is typically found in arid and semi-arid habitat with sparse vegetation in loose sand or loamy soils dominated by grass with scattered cacti, yucca, and assorted woody species (Pianka and Parker 1975). This species was not recorded during this field survey. However, potential habitat occurs in the area, especially in the more sandy soils associated with the mesquite plant communities. It is therefore assumed that this species may occur along the pipeline. Surveys will be conducted during the late spring or summer of 2001 for this species.

Western burrowing owl. The western burrowing owl (*Athene cunicularia*) is a federal species of concern and is not listed in New Mexico. This species nests in prairie, desert, sagebrush, and pinyon pine-juniper habitat as well as disturbed areas such as prairie dog (*Cynomys* sp.) towns, road cuts, and airports. Declines in this species are attributed to the loss of burrow nest sites resulting from the eradication of colonial burrowing rodents, particularly prairie dogs (Finch 1992). This species was most often associated with prairie dog towns in the Chihuahuan Desert grasslands and observed much less often in shrubland habitat. For example, extensive surveys in the grassland habitat on Otero Mesa on McGregor Range resulted in this species being observed only at prairie dog towns where, in 1997, 18 to 22 pairs were recorded from 11 of 16 towns inspected. Observations in the Chihuahuan Desert shrublands in the Tularosa Basin resulted in 11 pairs observed in concrete conduit at a military facility and only one in the native plant community (in Kangaroo rat burrows) (U.S. Army 1999a).

No burrowing owls were observed along the pipeline during the field surveys. There were a few large burrows observed in the area of the pipeline, but there was no evidence of occupancy by burrowing owls. Given that part of the burrowing owl population migrates out of the area during the winter, it is possible that these burrows could become occupied by burrowing owls in the spring.

Loggerhead shrike. The loggerhead shrike (*Lanius ludovicianus)* is a federal species of concern and breeds throughout much of New Mexico. This species has declined over much of its range and is considered a threatened species in Canada and numerous states (Robert and Laporte 1991). Breeding bird data from 1966 through 1995 shows that this species has steadily declined nationwide as well as in New Mexico throughout this period (Sauer et al. 1997). The reasons for

the decline of this species in northern states are not clear. Robert and Laporte (1991) and Brooks and Temple (1990) have observed good nesting habitat in Canada and Minnesota that was not being used by this species. Brooks and Temple (1990) concluded that alteration of the shrikes' winter habitat in the Gulf Coast states may be partially responsible for the decline in this species.

The loggerhead shrike populations north of New Mexico migrate south to New Mexico, Texas, and Arizona to winter (Root 1988) and it is a breeding species as well. It was fairly common in the Chihuahuan Desert grassland and shrubland habitat in southern New Mexico, as indicated by studies on McGregor Range where this species was consistently about 10 percent of the breeding population (U.S. Army 1999b). The loggerhead shrike is also widespread on WSMR and occurs in the desert shrubland and grassland habitats (U.S. Army 1998).

The loggerhead shrike was observed at three locations on and near the pipeline (Figure 3). It is not known if these birds were winter or year-round residents, but it is assumed that it is a likely nesting species in the area of the pipeline.

State Listed and Rare Species

Turk's head barrel cactus. Turk's head barrel cactus (*Ferocactus haematacanthus* var. *haematacanthus*) has no federal status but is a state sensitive species and has been observed in Otero County. This species inhabits the Chihuahuan Desert shrublands and grasslands. Only one record exists for the state and the species was not observed during surveys along the pipeline.

Botta's pocket gopher. Botta's pocket gopher (*Thomomys bottae*) is a state sensitive species and has no federal protected status. It lives in a wide range of habitats from dry deserts to montane meadows and can spend up 90 percent of the time underground (Davis 1974). It has been recorded from the Chihuahuan Desert on McGregor Range south of the pipeline (U.S. Army 1999a). Several areas of active pocket gopher mounds were observed along the pipeline (Figure 3). The inhabitants of these mounds would need to be trapped before the species identification could be made.

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3.0 ACRONYMS AND ABBREVIATIONS

EA	Environmental Assessment
GPS	Global Positioning System
NMDGF	New Mexico Department of Game and Fish
NMRPTC	New Mexico Rare Plant Technical Council
U.S. 54	U.S. Highway 54
USFWS	U.S. Fish and Wildlife Service
UTM	Universal Transverse Mercator
WSMR	White Sands Missile Range

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