

# Nevada Test Site Resource Management Plan Annual Summary

January 2000



U.S. Department of Energy  
Nevada Operations Office  
Las Vegas, Nevada

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## 2 Executive Summary

The *Nevada Test Site (NTS) Resource Management Plan (RMP)* (Department of Energy, Nevada Operations Office (DOE/NV), 1998a) published in December of 1998 describes the NTS stewardship mission and how its accomplishment will preserve the resources of the ecoregion while accomplishing the objectives of the mission. As part of the *NTS RMP*, DOE/NV has committed to perform and publish an annual summary review of DOE/NV's stewardship of the NTS. This annual summary includes a description of progress made toward the goals of the *NTS RMP*, pertinent monitoring data, actions that were taken to adapt to changing conditions, and any other changes to the *NTS RMP*.

The Department of Energy (DOE) policy for land and facility use planning (DOE Policy 430.1) and the NTS land use policy contained in the *DOE/NV Strategic Plan* (DOE/NV, 1998b) continue to provide the basis for stewardship of the NTS.

The *NTS RMP* has defined goals for twelve resource areas based on the principles of ecosystem management. The overall goal of the *NTS RMP* is to facilitate improved NTS land use management decisions within the Great Basin and Mojave Desert ecoregions.

### Mission Goals

- √ Preserve the capability to resume underground nuclear testing on the NTS and accomplish stockpile stewardship and national security missions.
- √ Administer activities on the NTS so that resources are used effectively.
- √ Use the NTS for compatible activities that contribute to the economic diversification of southern Nevada.

- √ Identify, characterize, and remediate the lands and facilities contaminated by past activities to a standard compatible with the land uses and missions of the NTS.

### Site Support Activities and Facilities Goal

- √ Manage facilities and services to support missions on the NTS effectively.

### Health and Safety Goal

- √ Minimize health and safety risks to individuals on and around the NTS.

### Land Goals

- √ Accommodate activities and projects on the NTS while minimizing impacts to undisturbed lands.
- √ Minimize impacts to sensitive areas of the NTS.

### Water Goals

- √ Maintain an adequate water supply for existing and new uses on the NTS while ensuring a long-term sustainable supply of water for the NTS and the surrounding ecosystem.
- √ Maintain the quality of waters that are presently clean.
- √ Minimize the impact to groundwater quality should resumption of underground nuclear testing be required.
- √ Manage groundwater resources to maximize the availability of water while minimizing the impacts to human health and the environment from contamination remaining from underground nuclear testing.

### Cultural Goal

- √ Identify, evaluate, and protect cultural and historical landscapes and resources.

### American Indian Goal

- √ Consult with culturally affiliated tribes to identify values and resources and develop management recommendations.

### Biological Goals

- √ Protect and conserve significant biological resources.
- √ Minimize the cumulative impacts to biological resources.

### Air Goal

- √ Maximize air quality on the NTS.

### Geological and Mineral Goal

- √ Consider the impacts of NTS operations on unique geological features and mineral resource areas.

### Airspace Goal

- √ Manage the NTS airspace to enhance national security, public safety, and operational safety in the conduct of missions on the NTS.

### Socioeconomic Goal

- √ Manage the resources and missions in a manner that considers the local and regional social and economic values and stimulates the local and regional economy.

Overall, the resources at the NTS are healthy and able to accommodate increased activity. DOE/NV continues to cooperate with the surrounding land use managers through the Five-Party Agreement (Five-Party Agreement, 1997) and as needed with various agencies.

The five mission areas of National Security, Environmental Management, Technology Diversification, Energy Efficiency and Renewable Energy, and NTS Stewardship are well managed and complimentary to the regional ecosystems. Funding for the National Security Programs was secured for Fiscal Year (FY) 2000. The interdisciplinary process described in the *NTS RMP* has been formalized as *DOE/NV Manual, Project Screening and Location Process* (DOE/NV Manual 412.X). Proposed activities at the NTS are addressed through this process. The NTS Development Corporation continues to seek out potential projects that could be located at the NTS that would contribute to the economic diversification of southern Nevada.

Bechtel Nevada (BN) completed the *DOE/NV Asset Management Plan* (DOE/NV, 1999a) that documents the process for strategically managing the assets of the DOE/NV, including the NTS. BN also continued consolidating functions and has closed approximately 189 unused facilities on the NTS to provide more cost-effective management of infrastructure in support of ongoing missions.

The DOE Office of Oversight, within the Office of Environment, Safety and Health evaluated the safety management program at the NTS. The evaluation was conducted from January-March, 1999. The evaluation report dated April 1999 (DOE, 1999) provided nine opportunities for improvement. A DOE/NV corrective action plan (DOE/NV, 1999b) was approved by DOE Headquarters (DOE/HQ) in July 1999.

DOE/NV continued to review all new activities proposed for the NTS through the project screening and location process. More than 50 projects came through the process in 1999. A vast majority of these projects were sited in existing facilities or on previously disturbed lands. In all cases, impacts to undisturbed lands at the NTS were minimized.

The project screening and location process considers impacts to environmentally, culturally, or mission sensitive resources on the NTS. None of the activities reviewed by the process had significant impacts to sensitive areas of the NTS.

In April of 1999, the United States Air Force (USAF) filed a Land Withdrawal Extension Application. The application requested that the lands described as Pahute Mesa in the existing Memorandum of Agreement (MOA) with DOE be transferred to the DOE. Additionally, the application requested that the lands withdrawn for DOE under Public Land Order (PLO) 1662 be transferred to the USAF. Consequently, the *Military Lands Withdrawal Act of 1999* (Public Law 106-65) renewed the withdrawal of about three million acres of land currently withdrawn for defense use as part of the Nellis Air Force Range (NAFR). This action also increased the size of the NTS from 1,350 square miles (mi<sup>2</sup>) (3,496 square kilometers (km<sup>2</sup>)) to approximately 1,375 mi<sup>2</sup> (3,561 km<sup>2</sup>).

DOE's water use did not change significantly this year. As a result, there were no concerns relating to availability of water for DOE and the surrounding ecosystem. DOE operations continued to comply with applicable federal and state water pollution control laws. There were no instances of contaminant release to the groundwater. DOE continued to characterize the nature and extent of contamination related to underground nuclear testing. Among the significant achievements, new characterization wells were drilled in Oasis Valley down gradient of the Pahute Mesa testing area and groundwater modeling of Frenchman Flat was performed.

Seven cultural resource surveys were conducted, the largest covering 4.2 mi<sup>2</sup> (10.9 km<sup>2</sup>) in Frenchman Flat in Area 6. Fieldwork to establish the Frenchman Flat Historic District identified 152 structures of which 50% - 65%

are eligible for the National Register of Historic Places (NRHP). A final report will be completed in the first quarter of FY 2000. The *Cultural RMP* (DOE/NV, 1999c) was completed in FY 1999.

The tribes were consulted regarding the effect of NTS activities on resources important to American Indians. A meeting was held with the Consolidated Group of Tribes and Organizations (CGTO) to discuss tribal involvement in DOE/NV activities and programs at the NTS.

Biological surveys for 21 projects covering 0.4 mi<sup>2</sup> (1 km<sup>2</sup>) were conducted. Conservation recommendations implemented included avoiding flagged burrows, minimizing ground disturbance and destruction of Joshua trees, and restricting travel to existing roads and trails. Deserts tortoise protective measures included conducting clearance surveys before ground disturbing activities and avoiding flagged burrows. Maps delineating the locations of significant biological resources continue to be upgraded with new survey data.

Air quality at the NTS remains excellent. The use of water and chemical dust suppressants; mechanical devices such as bag houses, covers on transport trucks, covers on conveyor belts; use of high-efficiency particulate air filters; and revegetation of disturbed areas helped reduce the total amount of air emission on the NTS to 20.69 tons per year (18,770 kilograms per year). The current NTS air quality operating permit allows up to 100 tons per year (90,718 kilograms per year) of emissions.

The geology of the NTS provides a variety of rock types for study of unique volcanic features and fossil assemblages and for exploration of mineral deposits. Geologic core samples were collected in rock formations that were excavated during national security project activities. Several seismic stations and geological trenches were reclaimed and backfilled with minimal surface disturbance. A

mapping project of the Mine Mountain area and a sampling project in the Timber Mountain Caldera added to the geologic knowledge base and could be useful in determining new mineral resource areas at the NTS.

In FY 1999, DOE/NV continued its participation in education outreach activities such as the Science Bowl and the JASON Project. In addition, in FY 1999, Memorandums of Understanding (MOUs) to support and protect the social and economic values of the surrounding communities were established with Esmeralda County and the town of Pahrump, Nevada.

Improved land use decisions at the NTS will require interagency cooperation, stakeholder and tribal government involvement, and an interdisciplinary approach to land use planning decisions. The DOE/NV has continued to participate in the Five-Party Agreement with the NAFR, the Bureau of Land Management (BLM), the United States Fish and Wildlife Service (USFWS), and the state of Nevada. The purpose of the Five-Party Agreement is to enhance management of the natural resources within the Great Basin and Mojave Desert ecoregions located on the NTS, the NAFR, and the Desert National Wildlife Range. The parties have agreed to meet at least annually to share information and discuss issues of mutual concern.

## 3 Resource Management at the Nevada Test Site

### 3.1 Introduction

The *NTS RMP* was published in December of 1998. The *NTS RMP* described the NTS stewardship mission and how its accomplishment will preserve the resources of the ecoregion while accomplishing the objectives of the mission. As part of the *NTS RMP*, DOE/NV has committed to perform and publish an annual summary review of DOE/NV's stewardship of the NTS. This annual summary includes a description of progress made toward the goals of the *NTS RMP*, pertinent monitoring data, actions that were taken to adapt to changing conditions, and any other actions that were taken.

The DOE policy for land and facility use planning and the NTS land use policy continue to provide the basis for stewardship of the NTS.

### 3.2 Progress Towards Goal

- √ Improve land use management decisions within the Great Basin and Mojave Desert ecoregions.

Over the past year, DOE/NV has participated in the Five-Party Agreement by participating in both meetings of the five parties.

DOE/NV is continuing consultation with the Department of Interior regarding the status of the existing NTS land withdrawals, with respect to current and proposed activities at the NTS.

An Environmental Assessment for the Desert Rock Sky Park is expected to be complete in February 2000. The DOE/NV proposes to issue a general use permit to the NTS Development Corporation to develop, operate and maintain a commercial/industrial park in Area 22 of the NTS near the Desert Rock Airport. The purpose of the development

would be to support the economic diversification mission of the DOE/NV. The development will provide land and infrastructure for private enterprise, commercial and industrial operations that are compatible with and/or directly support other DOE/NV missions and programs. DOE/NV has coordinated this action with the USAF, BLM, the state of Nevada, Nye and Clark counties and the CGTO.

DOE/NV has also participated in the review of the Yucca Mountain Project (YMP) Environmental Impact Statement (EIS) (DOE Office of Civilian Radioactive Waste Management (DOE/OCRWM), 1999).

### 3.3 Adaptive Management Actions Taken

The adaptive management actions taken sections in this document describe the actions taken to manage the resource to try to achieve the goals listed for each resource.

DOE/NV continues to cooperate with the surrounding land managers through the Five-Party Agreement meetings and on an as needed basis with the various agencies.

The interdisciplinary process described in the *NTS RMP* has been formalized as *DOE/NV Manual 412.X, Project Screening and Location Process*.

### 3.4 Other Actions Taken

No other actions were needed for this resource.

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## 4 Mission Resources

### 4.1 Introduction

The NTS plays a vital part in the national security interests of the United States. A cornerstone of this role was the United States nuclear weapons testing program. Since the moratorium on nuclear testing began on October 2, 1992, the primary mission of the NTS changed to supporting the DOE Stockpile Stewardship and Management Program for the nation's enduring nuclear weapon stockpile. The mission of the NTS is composed of five mission elements (DOE/NV, 1998b):

- ✓ National Security – support the DOE Stockpile Stewardship Program through subcritical and other weapons physics experiments, emergency management, test readiness, work for other defense organizations and other experimental programs.
- ✓ Environmental Management – support environmental restoration, groundwater characterization activities, hazardous waste management, and radioactive waste management.
- ✓ Technology Diversification – support non-traditional departmental programs and commercial activities that are compatible with the Stockpile Stewardship Program.
- ✓ Energy Efficiency and Renewable Energy – support the development of solar energy, alternative fuel and energy efficiency technologies.
- ✓ Stewardship of the NTS – manage the land and facilities at the NTS as a unique valuable national resource.

### 4.2 Progress Towards Goals

- ✓ Preserve the capability to resume underground nuclear testing on the NTS and accomplish the stockpile stewardship and national security missions.

Funding to accomplish this goal has been secured for FY 2000 and will be submitted for future FYs in order that these critical programs are maintained at the NTS.

- ✓ Administer activities on the NTS so that resources are used effectively.

The activities conducted on the NTS continue to be addressed with internal procedures like the project screening and location process in order to evaluate projects to ensure resources are effectively used. Activities are also coordinated and scheduled to ensure that there are no conflicts with other activities on the NTS.

- ✓ Use the NTS for compatible activities that contribute to the economic diversification of southern Nevada.

The NTS Development Corporation continues to seek out potential projects that could be located at the NTS that would contribute to the economic diversification of southern Nevada. A few of the potential projects now being considered are the Desert Rock Sky Park near Desert Rock Airport and the Hastings Chariots project which involves a private company that would like to explore the possibility of micro-gravity research by launching sounding rockets from the NTS.

- ✓ Identify, characterize, and remediate the lands and facilities contaminated by past activities to a standard compatible with the land uses and missions of the NTS.

As a further clarification to the goal, characterization and remediation activities at contaminated sites are performed to industrial standards. The use of industrial standards restricts future use of these sites to industrial use.

Sixteen assessments and twenty-eight remedial actions were completed in FY 1999. In addition, approximately one hundred sites went through preliminary assessment, which resulted in a better understanding of the nature and extent of the contamination at a particular site.

### 4.3 Monitoring Data

Over the course of FY 1999, the DOE/NV Site Operations Division and Stockpile Stewardship Division maintained the *DOE/NV Master Schedule of Activities on the NTS* and the *DOE/NV Schedule of NTS Programs, Operations, Experiments, and Exercises*. These schedules, in conjunction with the issuance of operations permits for the various activities being conducted on the NTS, ensure that there are no conflicts between projects active on the NTS.

DOE/NV project managers, task managers and facility representatives performed routine site visits and assessments throughout the year. Additionally, schedule, budget and milestones were tracked in the Nevada Project Management Information System.

#### 4.3.1 Environmental Monitoring at and near the Nevada Test Site

Air monitoring included active surveillance for alpha, beta, gamma, tritium and plutonium content; and passive inspection for radon concentrations.

Groundwater monitoring included surveillance of the groundwater elevation, pH, specific conductance, alpha, beta, plutonium, tritium, and major cations/anions.

Radiation exposure monitoring was conducted using Thermoluminescent Dosimeters.

Vegetation monitoring consisted of sampling for tritium uptake.

#### 4.3.2 Environmental Monitoring at the Area 3 and Area 5 Radioactive Waste Management Sites

Air monitoring included active surveillance for alpha, beta, gamma, tritium and plutonium content; and passive inspection for radon concentrations.

Groundwater monitoring included surveillance of the groundwater, elevation, pH, specific conductance, total organic compounds, total organic halogens, tritium, and major cations/anions.

Meteorology monitoring included surveillance of precipitation, air temperature, humidity, wind speed and direction, barometric pressure, solar radiation, net radiation, and soil heat flux.

Radiation exposure monitoring was conducted using Thermoluminescent Dosimeters. Air particulates evaluated included samples that were analyzed for gross alpha, gross beta, gamma spectroscopy and plutonium.

Subsidence monitoring of the temporary caps on filled disposal pits, trenches, and boreholes was periodically inspected and recorded.

Vadose zone monitoring included surveillance of the total water storage, soil water content, soil water potential, soil temperature; and migration of tritium.

Vegetation monitoring consisted of sampling for tritium uptake.

#### **4.4 Adaptive Management Actions Taken**

No adaptive management actions were needed for this resource.

#### **4.5 Other Actions Taken**

No other actions were needed for this resource.

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## 5 Site Support Activities and Facilities Resources

### 5.1 Introduction

The NTS has an infrastructure consisting of telecommunications and data networks, power distribution systems, roads and grounds, laboratory facilities, medical facilities, storage facilities, bunkers, warehouses, office space, water distribution systems, sewage systems, and other structures. The NTS also provides other services such as feeding, housing, janitorial, busing, vehicles, equipment, and limited recreation facilities.

The NTS has extensive telecommunications infrastructure in the area of radio frequency communication and data networking. This incorporates two-way radio for administrative functions as well as remote data acquisition. Fiber optics interconnections were added to the infrastructure with the completion of several interconnections between power sub stations and other facilities.

### 5.2 Progress Towards Goal

- √ Manage facilities and services to support missions on the NTS effectively.

BN completed the *DOE/NV Asset Management Plan*, which documents the process for strategically managing the assets of the DOE/NV, including the NTS. BN continued consolidating functions and closed approximately 189 unused facilities on the NTS to provide more cost-effective management of infrastructure in support of ongoing missions.

A “partnering” contract was awarded to Webb Link Wireless for a paging system upgrade that will combine the local NTS area with national coverage in a single pager. Two cellular telephone sites have been added to enhance coverage in Mercury and Area 6. This service was completed with the cooperation of Western Wireless and AT&T.

### 5.3 Monitoring Data

Additional maintenance data was added to the Facility Information Management System and the Facility Administrative Maintenance Information System databases.

### 5.4 Adaptive Management Actions Taken

In January 1999, BN published the *DOE/NV Asset Management Plan* that established the process for strategically managing the assets of the DOE/NV, including the NTS. It integrates the planning, acquisition, construction, maintenance, and disposition of land, facilities, infrastructure, and capital equipment. Information in the plan will be updated quarterly.

### 5.5 Other Actions Taken

No other actions were needed for this resource.

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## **6 Health and Safety Resources**

### **6.1 Introduction**

A variety of safety and health protection programs exist to protect workers, the environment, and the public from potential safety and health hazards from work at the NTS. BN in conjunction with the national laboratories, and all site users, manages the various safety and health programs. Industrial safety, industrial hygiene, and radiological safety are the major safety and health program elements operated and managed in accordance with state, federal, and DOE requirements.

### **6.2 Progress Towards Goal**

- √ Minimize health and safety risks to individuals on and around the NTS.

Work processes were accomplished using the Integrated Safety Management (ISM) principles. Safe and healthful work places/activities were maintained by the use of engineering controls, administrative controls, and personal protective equipment.

DOE/NV is also implementing corrective actions in response to a DOE/HQ ISM evaluation.

### **6.3 Monitoring Data**

Radiological, industrial hygiene, and industrial workplace monitoring were conducted on a routine operational basis during FY 1999. Workplace monitoring records are available; however, complete statistics reflecting all of the NTS monitoring activities have not yet been compiled. No particular anomalies were noted or brought to the attention of DOE/NV.

### **6.4 Adaptive Management Actions Taken**

The DOE Office of Oversight, within the Office of Environment, Safety and Health, evaluated the safety management program (industrial safety, industrial hygiene and radiological safety) at the NTS as implemented by DOE Defense Programs; the DOE/NV; BN; and selected site users and subcontractors. The evaluation was requested by DOE/NV in order to obtain an independent perspective on the effectiveness of the ISM processes being established at NTS while those processes are in their early stages of implementation. The DOE/HQ evaluation was conducted January-March, 1999. The DOE/HQ report, dated April 1999, provided the following opportunities for improvement:

- ⇒ Increase management attention by DOE, contractor, and user organizations to the implementation of ISM at NTS to ensure timely and effective completion, consistently effective implementation across individual organizations, and compatibility of organizational interfaces.
- ⇒ Accelerate efforts to fully define the DOE organizational approach for approving work and overseeing activities at NTS by clarifying the roles and responsibilities of each organizational element and improving safety management processes.
- ⇒ Improve and better utilize the safety management accountability mechanisms available to DOE/NV to drive improvements in safety performance for the contractor, user organizations, and Federal employees.
- ⇒ Increase DOE, BN, and user organization emphasis on better defining safety management roles and responsibilities for

activities being conducted at NTS to eliminate confusion and overlap associated with complex organizational interfaces.

- ⇒ Increase management attention to ensure that DOE and contractor personnel conducting critical safety management.
- ⇒ Ensure workers are appropriately trained and qualified to competently perform their assigned tasks.
- ⇒ Increase attention to integrating safety into business and decision-making processes to ensure that resources allocated to environment, safety, and health functions receive adequate priority.
- ⇒ Sustain DOE and BN management attention to improving the use and effectiveness of Work Smart standards and execution plans, including the flow down to individual facilities and work activities.
- ⇒ Direct management attention toward strengthening institutional processes to correct weaknesses in the readiness assessment process, the work control process, and the use of procedures.
- ⇒ Increase management attention to strengthening DOE/NV and BN feedback and improvement systems, with particular emphasis on assessment programs.

DOE/NV sent a Corrective Action Plan in response to the DOE/HQ evaluation. DOE/HQ approved the Corrective Action Plan in July 1999.

The opportunities for improvement are being actively addressed by chartered DOE/NV Task Forces and various contractor/user initiatives.

On November 4, 1998, *Occupational Radiation Protection* (10 Code of Federal Regulations (CFR) Part 835) was amended to include requirements for managing radioactive materials, areas, and

sealed sources. As a result, this involved making minor changes to the *NV/YMP Radiological Control Manual* (DOE/NV, 1999d).

## 6.5 Other Actions Taken

No other actions were needed for this resource.

## **7 Land Resources**

### **7.1 Introduction**

The NTS comprises 1,375 mi<sup>2</sup> (3,561 km<sup>2</sup>) of land and is located entirely within Nye County. The NTS is located approximately 65 miles (105 kilometers) northwest of Las Vegas, Nevada. The NTS is naturally buffered from public access on three sides by rugged, mountainous, undeveloped, federally controlled landmasses.

Four PLOs and a MOU with the USAF define the boundaries of the NTS. In April of 1999, the USAF filed a Land Withdrawal Extension Application. The application requested that the lands described as Pahute Mesa in the existing MOA with DOE be transferred to the DOE. Additionally, the application requested that the lands withdrawn for DOE under PLO 1662 be transferred to the USAF. Figure 7-1 depicts the new boundaries of the NTS as defined by Public Law 106-65, Section 3011. Land transactions associated with the DOE withdrawn under this law were effective October 25, 1999.

Land use at the NTS is generally described by the *EIS Record of Decision Land Use Map* (DOE/NV, 1996). Within each of these land use zones are areas that will be designated for specific mission use and future development consistent with the *EIS Record of Decision Land Use Map*. These areas may include previously disturbed areas, areas with desirable slope and soil conditions for construction, and areas that have mission requirements of remoteness and space for safety and security reasons. Designated areas will be protected from certain uses. These areas may be sensitive to development for mission, environmental, or cultural reasons.

### **7.2 Progress Towards Goals**

√ Accommodate activities and projects on the NTS while minimizing impacts to undisturbed land.

Over fifty projects came through the project screening and location process in 1999. The majority of these projects were sited in existing facilities or on previously disturbed lands. In all cases, impacts to undisturbed lands at the NTS were minimized.

√ Minimize impacts to sensitive areas of the NTS.

The project screening and location process considers impacts to environmentally, culturally, or mission sensitive resources on the NTS. None of the activities reviewed by the process had significant impacts to sensitive areas of the NTS.

### **7.3 Monitoring Data**

In FY 1999, 41 projects were reviewed as part of the Project Location and Screening process. Seven projects approved through the process had the potential to disturb new land at the NTS. One project had the potential to disturb 65 acres (26 hectares). The other six projects combined would disturb less than 5 acres (2 hectares).

### **7.4 Adaptive Management Actions Taken**

The project screening and location process was utilized throughout the year. There were some member changes to the Site Use and Development Board and the Site Use and Development Working Group. These changes were due to changes within the DOE/NV organization and did not impact the management of resources at the NTS.

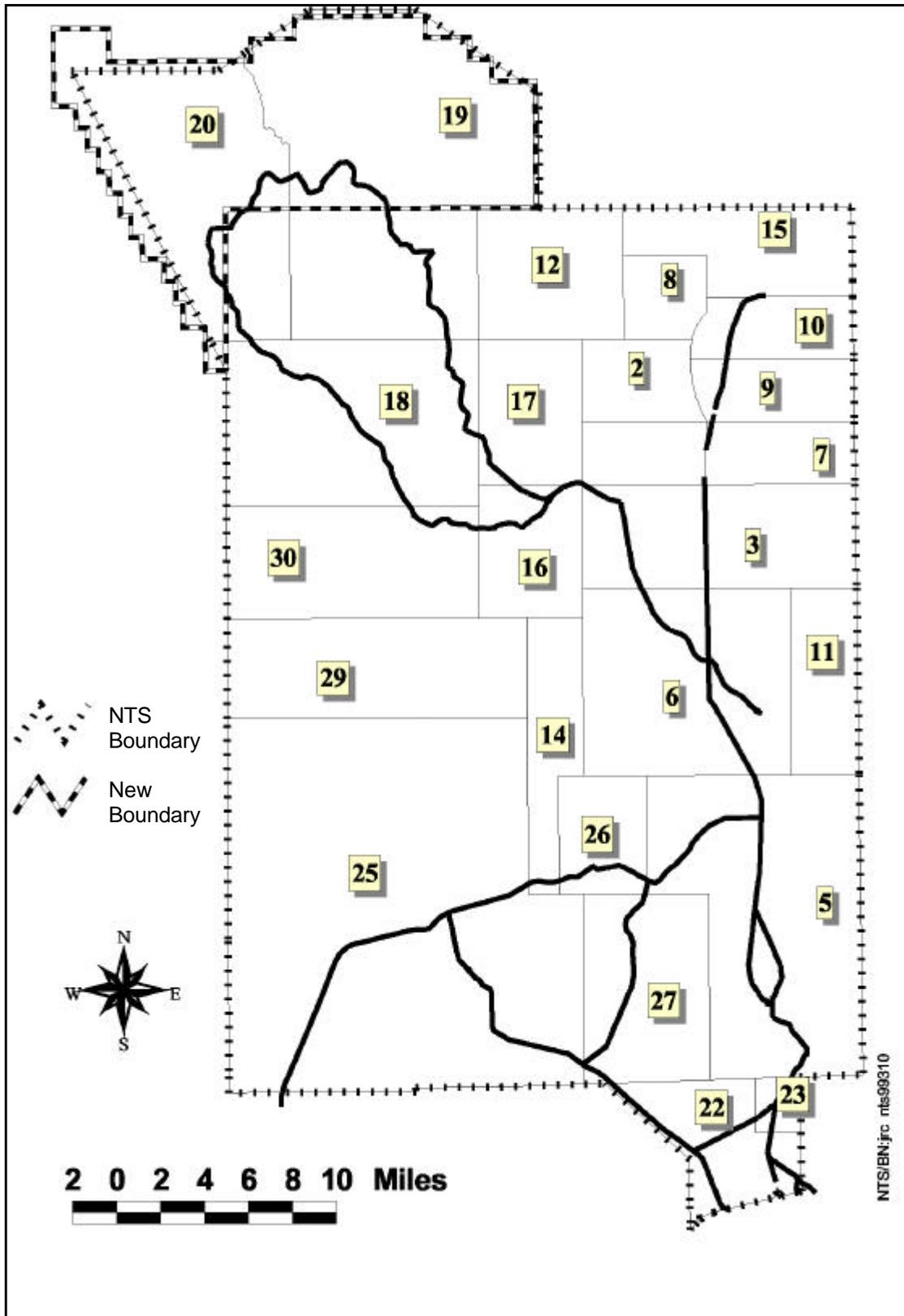


Figure 7-1 New Nevada Test Site Boundary (Effective 11/6/2001)

## 7.5 Other Actions Taken

In April of 1999, the USAF filed a Land Withdrawal Extension Application. The application requested that the lands described as Pahute Mesa in the existing MOA with DOE be transferred to the DOE. Additionally, the application requested that the lands withdrawn for DOE under PLO 1662 be transferred to the USAF. Figure 7-1 depicts the proposed boundaries of the NTS. As a result, the *Military Lands Withdrawal Act of 1999* (Public Law 106-65) renewed the withdrawal of about three million acres of land currently withdrawn for defense use as part of the NAFR. The renewal, which included all lands that were previously withdrawn under Public Law 99-606 (16 United States Code (USC) 460ff), authorizes the USAF to continue using the NAFR into 2025. This action also increased the size of the NTS from 1,350 mi<sup>2</sup> (3,496 km<sup>2</sup>) to approximately 1,375 mi<sup>2</sup> (3,561 km<sup>2</sup>).

An Environmental Assessment for the Desert Rock Sky Park is expected to be complete in February 2000. DOE/NV proposes to issue a general use permit to the NTS Development Corporation to develop, operate and maintain a commercial/industrial park in Area 22 of the NTS near the Desert Rock Airport. The purpose of the development would be to support the economic diversification mission of the DOE/NV. The development will provide land and infrastructure for private enterprise, commercial and industrial operations that are compatible with and/or directly support other DOE/NV missions and programs.

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## 8 Water Resources

### 8.1 Introduction

Water resources of the NTS include surface water and groundwater. Natural surface water consists of 20 springs and seeps derived from local groundwater recharge and shallow lakes, catchments, and ephemeral streams containing water only after significant precipitation. The springs are associated with sensitive habitats containing flora and fauna of extremely limited distribution. Artificial impoundments include sewage lagoons and tunnel effluent containment ponds. Groundwater is present in large quantities in carbonate, alluvial, and volcanic aquifers beneath the NTS. The quality of a small portion of the NTS groundwater is degraded by radionuclides from underground nuclear testing, but the majority of NTS groundwater is of good quality.

### 8.2 Progress Towards Goals

- √ Maintain an adequate water supply for existing and new uses on the NTS while ensuring a long-term sustainable supply of water for the NTS and the surrounding ecosystem.

DOE's water use did not change significantly this year. As a result, there were no concerns relating to the availability of water for DOE or the surrounding ecosystem. To support the long-term attainment of the goal, DOE continued to aggressively support the completion of a regional groundwater flow model by the United States Geological Survey (USGS). This valuable groundwater resource management tool is being supported by a number of federal, state, and local entities.

- √ Maintain the quality of waters that are presently clean.

DOE's operations continued to comply with applicable federal and state water pollution

control laws. There were no instances of contaminant release to the groundwater.

- √ Minimize the impact to groundwater quality should resumption of underground nuclear testing be required.

The United States continued to observe a moratorium on underground nuclear testing. Therefore, this goal was not needed.

- √ Manage the groundwater resources to maximize the availability of water while minimizing the impacts to human health and the environment from contamination remaining from underground nuclear testing.

DOE continued to characterize the nature and extent of contamination related to underground nuclear testing. Among the significant achievements, new characterization wells were drilled in Oasis Valley down gradient of the Pahute Mesa testing area and groundwater modeling of Frenchman Flat was performed. While progress was made, this long-term goal will take years of work to achieve through the implementation of appropriate remedial steps.

### 8.3 Monitoring Data

Monitoring of groundwater levels in wells and monitoring of water use indicated no significant changes in 1999.

Surface water quality monitoring detected no significant changes in radiological and non-radiological constituents at permitted facilities on the NTS and at off-site springs. Groundwater quality trends as measured in monitoring wells continued unchanged. Of note is the continuing rise in tritium content in well UE-5n, located in Area 5. The increase in the well is attributed to continuing effects from the CAMBRIC radionuclide migration test

completed in 1992. The Environmental Protection Agency reports a high of 125,000 picocuries/liter for a sample taken in September 1999.

#### **8.4 Adaptive Management Actions Taken**

No adaptive management actions were needed for this resource.

#### **8.5 Other Actions Taken**

No other actions were needed for this resource.

## 9 Cultural Resources

### 9.1 Introduction

Historical and prehistoric cultural resources are abundant at the NTS. Prehistoric sites include rock shelters, brush houses, fire pits, and most commonly, artifact scatters on the ground. Historical sites include mining districts, isolated homesteads, stage way stations, fences, and corrals. Sites associated with nuclear testing and nuclear rocket development are mostly remnants of test effect structures, rocket engine test stands, underground bunkers, and rocket engine maintenance facilities.

### 9.2 Progress Towards Goal

- √ Identify, evaluate, and protect cultural and historical landscapes and resources.

Seven cultural resource surveys were conducted, the largest covering 2,690 acres (1,089 hectares) in Frenchman Flat in Area 6; six sites were located on that project but none were eligible for the NRHP. No sites were found on any of the other surveys. A historical survey of the Frenchman Flat Historic District in Area 5 was initiated; to date, 152 structures have been identified with half to two-thirds of them potentially eligible for the NRHP. This work, and consultation with the Nevada State Historic Preservation Office to determine eligibility, will be completed in the second quarter of FY 2000.

### 9.3 Monitoring Data

Fieldwork to establish the Frenchman Flat Historic District in Area 5 identified 152 structures of which 50% - 65% are potentially eligible for the NRHP. A final report will be completed in the second quarter of FY 2000. Seven archeological surveys were conducted to identify, evaluate, and protect cultural and historical landscapes and resources. The largest

of these encompassed 2,690 acres (1,089 hectares) in Frenchman Flat near the Device Assembly Facility. No sites eligible for the NRHP were found on any of the seven surveys.

A list of sites and priorities for site integrity monitoring in FY 2000 was developed.

### 9.4 Adaptive Management Actions Taken

The *Cultural RMP* for the NTS was completed in FY 1999.

### 9.5 Other Actions Taken

No other actions were needed for this resource.

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## 10 American Indian Resources

### 10.1 Introduction

The CGTO has a long-standing relationship with DOE/NV and is actively involved in the DOE/NV American Indian Religious Freedom Act Compliance Program, *Native American Graves Protection and Repatriation Act* (25 USC 3001) activities, *Low-Level Radioactive Waste Transportation Study* (DOE/NV, 1998c), Rapid Cultural Assessment activities and American Indian Monitoring Program. The group includes 16 tribes and 3 official Indian organizations, representing the Southern Paiutes, Western Shoshones, and Owens Valley Paiutes. Each ethnic group has cultural and/or historical ties to the NTS and the surrounding areas. The primary focus of the CGTO has been the protection of traditional cultural resources and they have identified several sites at the NTS that are important to Indian people. These include storied rocks, rock shelters, wooden lodges, rock rings, springs, and certain archeological sites.

### 10.2 Progress Towards Goal

- √ Consult with culturally affiliated tribes to identify values and resources and develop management recommendations.

A meeting was held with the CGTO to discuss tribal involvement in DOE/NV activities and programs at the NTS. *Native American Graves Protection and Repatriation Act* consultation was initiated for two private artifact collections from the NTS and the Hot Creek Collection from the Central Nevada Test Area.

### 10.3 Monitoring Data

No monitoring was performed for this resource.

### 10.4 Adaptive Management Actions Taken

No adaptive management actions were needed for this resource.

### 10.5 Other Actions Taken

No other actions were needed for this resource.

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# 11 Biological Resources

## 11.1 Introduction

The NTS is located along the transition zone between the Mojave and Great Basin deserts and has a diverse and complex mosaic of plant and animal communities. The communities are representative of both deserts, as well as some communities common only in the transition zone. This transition zone extends to the east and west beyond the boundaries of the NTS. Desert tortoises, a federally threatened species, are found in southern third of the NTS. Mule deer, mountain lions, and antelope can be found in the mountains and valleys of Pahute and Rainier Mesas. A small herd of wild horses occurs in the northern half of the NTS near Rainier Mesa. Doves, hawks, ravens, and owls are common throughout the area. Rare plants include Clokey's egg vetch, Blue Diamond cholla, and Beatley's milk vetch. Several springs and seeps are found throughout the area.

## 11.2 Progress Towards Goals

- √ Protect and conserve significant biological resources.

Biological surveys for 21 projects covering 278 acres (113 hectares) were conducted. Conservation recommendations implemented included avoiding flagged burrows, minimizing ground disturbance and destruction of Joshua trees, and restricting travel to existing roads and trails. Desert tortoise protective measures taken included conducting clearance surveys before ground disturbing activities and avoiding flagged burrows. Maps delineating the locations of significant biological resources such as candidate species and species of concern, roost sites, nesting sites, burrows, and pristine, unique and sensitive habitats continue to be upgraded with new survey data. Knowing where these resources are located makes it much easier to site new projects to avoid them.

- √ Minimize the cumulative impacts to biological resources.

Actions taken to minimize cumulative impacts included avoiding flagged burrows and habitats, siting projects in previously disturbed areas, restricting travel to existing roads and trails, and onsite project monitoring. The development of adaptive management thresholds also contributed to minimize cumulative impacts by establishing impact tolerance levels, which, if exceeded, would require adaptive management actions to stay within those levels.

## 11.3 Monitoring Data

### 11.3.1 Compliance with the Biological Opinion for Desert Tortoise Protection

See Table 11-1.

### 11.3.2 Biological Surveys

See Table 11-2.

### 11.3.3 Candidate Species and Species of Concern

No new field surveys were conducted for plant species of concern. A topical report for the candidate plant Clokey's egg vetch was published (Anderson, 1998). Due to extensive survey work completed on this species and an overall understanding of its distribution on the NTS, the Northern Nevada Native Plant Society petitioned the USFWS to remove the plant from the list of candidate species under the *Endangered Species Act* (16 USC 1531-1543). Twenty-four transect surveys covering approximately 47 miles (76 kilometers) were conducted throughout the NTS to locate new burrowing owl burrows. Twenty-eight new burrows were found, bringing the total to 64

**Table 11-1 Summary of Tortoise Compliance Activities  
Conducted during Fiscal Year 1999**

<b>Project</b>	<b>Project Number</b>	<b>Compliance Activities</b>	<b>Tortoise Habitat Disturbed (acres)</b>	<b>Tortoise Habitat Disturbed (hectares)</b>
Jackass Flats to Mercury Fiberoptic Cable	99-03	100%-coverage survey, 13 unavoidable burrows excavated and crushed, flagged 3 burrows to avoid, post-activity survey to document acreage disturbed	19.5	7.89
Characterization of Test Cell A Leach Fields	99-05	100%-coverage survey, post-activity survey	0.34	0.14
GEOCORE Alignment Grid	99-06	Post-activity survey	1.22	0.49
Characterization of Camp Desert Rock Fuel Storage Site (Corrective Action Unit (CAU) 321)	99-07	100%-coverage survey, flagged two burrows outside project area to avoid, post-activity survey	4.20	1.70
Characterization of Three Sites in Area 25 (CAU 240)	99-09	100%-coverage survey, post-activity survey	0.04	0.02
Sunrise 99 Project	99-10	100%-coverage survey, post-activity survey	1.28	0.52
Off-road Driving near the Army Research Laboratory	99-11	Post-activity survey	0.0	0.0
Characterization of Area 25 Building 4839 Leach Field (CAU 263)	99-12	100%-coverage survey, post-activity survey	0.26	0.11
Characterization of Test Cell C Sewage Lagoons (CAU 232)	99-16	100%-coverage survey, flagged burrow for avoidance, post-activity survey	0.0	0.0
Phoenix Facility Pad	99-17	Post-activity survey	0.84	0.34
Characterization of Reactor Maintenance and Disassembly and Engine Maintenance and Disassembly waste dumps (CAU 143)	99-18	100%-coverage survey, flagged burrow for avoidance	0.33	0.13

**Table 11-1 Summary of Tortoise Compliance Activities  
Conducted during Fiscal Year 1999 (continued)**

<b>Project</b>	<b>Project Number</b>	<b>Compliance Activities</b>	<b>Tortoise Habitat Disturbed (acres)</b>	<b>Tortoise Habitat Disturbed (hectares)</b>
Burma Road Repairs	99-20	100%-coverage survey, post-activity survey	1.47	0.59
Characterization of Area 22 Sewage Lagoons/Strainer Box (CAU 230/320)	99-21	100%-coverage survey	0.0	0.0
<b>Total</b>			<b>29.48</b>	<b>11.93</b>

known burrows on NTS. Sixty-one of the 64 burrows were monitored for owl use and breeding activity. Seven breeding pairs were observed; four in the Transition Desert ecoregion and three in the Great Basin Desert ecoregion.

Monitoring continued to identify the distribution of bat species of concern and their roost sites. Mist netting was conducted at five water sources with a total of 80 bats, representing 11 of the 13 species known to occur on the NTS, captured. Of the 80 bats captured, 46 were bat species of concern. Seasonal road surveys using the Anabat II bat detection system continued. The Anabat II system records and analyzes species-specific, ultrasonic vocalizations (calls) of free-flying bats. No new bat species were recorded during the road surveys.

**11.3.4 Raptors**

Surveys to locate raptor nests and the number of breeding pairs continued. Five active raptor nests were found this year consisting of two golden eagle nests and three red-tailed hawk nests. Nine other known nests that were active last year were not active this year. An adult golden eagle was found dead at the base of a power line pole in Yucca Flat; it had been electrocuted.

**11.3.5 Special Interest and Game Species**

Thirty-one adult wild horses and five foals were counted this year, which is a 43% reduction in numbers since 1995 (from 54 to 31 individuals). Natural processes and predation are the likely causes of decline. Horses used Captain Jack, Wildhorse, Little Wildhorse, and Gold Meadow springs and the Camp 17 man-made pond.

Spotlighting surveys for mule deer on Pahute and Rainier Mesas were conducted once over three consecutive nights in August. A total of 12, 8, and 7 deer were observed during the three consecutive nights.

**11.3.6 Wildlife Water Sources**

Five new water sources discovered in 1998 were visited to determine if they meet the criteria of jurisdictional wetlands; three of the five met the criteria. Eighteen wetlands were visited at least once to record the presence/absence of land disturbance, water flow rates, and surface area of standing water (Table 11-3).

Quarterly monitoring was conducted at 35 plastic-lined sumps, 39 sewage treatment ponds, 13 unlined well ponds, and 4 radioactive containment ponds. The presence of standing

**Table 11-2 Summary of Biological Surveys Conducted  
on the Nevada Test Site during Fiscal Year 1999**

<b>Project</b>	<b>Project Number</b>	<b>Important Species/ Resources Found</b>	<b>Area Surveyed (acres)</b>	<b>Area Surveyed (hectares)</b>	<b>Mitigation Recommendations</b>
Access Road for Fiberoptic Cable Installation	99-01	Pahute Mesa beardtongue plants	1.8	0.72	Restrict earth-moving to existing roadbed
U9av Radiation Stay-Out Fence	99-02	None	0.27	0.11	None
Jackass Flats to Mercury Fiberoptic Cable	99-03	Tortoise burrows, tortoise scutes, predator burrows, habitat for Parish's phacelia plant, Joshua trees, cacti	118	47.77	Restrict construction to within 25 feet of staked centerline of cable route
U1h Shaft	99-04	None	74	30.00	None
Characterization of Test Cell A Leach Fields	99-05	Predator burrows	1.7	0.70	Avoid burrows
Post-Activity Survey of GEOCORE Alignment Grid	99-06	None	1.3	0.54	For future access to site, use the existing off-road vehicle trails
Characterization of Camp Desert Rock Fuel Storage Site (CAU 321)	99-07	Tortoise burrows	4.7	1.90	Avoid flagged burrows
Clean Closure of U2bu Crater (CAU 109)	99-08	Predator burrow	0.12	0.05	Avoid flagged burrow
Characterization of Three Sites in Area 25 (CAU 240)	99-09	Cacti	16	6.40	Avoid cactus
Sunrise 99 Project	99-10	Joshua trees, cacti, pallet	20	0.79	Avoid resources

**Table 11-2 Summary of Biological Surveys Conducted  
on the Nevada Test Site during Fiscal Year 1999 (continued)**

<b>Project</b>	<b>Project Number</b>	<b>Important Species/ Resources Found</b>	<b>Area Surveyed (acres)</b>	<b>Area Surveyed (hectares)</b>	<b>Mitigation Recommendations</b>
Post-Activity Survey for Off-road Driving near the Army Research Laboratory	99-11	None	0.47	0.19	None
Characterization of Area 25 Building 4839 Leach Field (CAU 263)	99-12	None	2.2	0.91	None
U1h Drainage Ditch	99-13	None	30	12.20	None
Stockade Wash Road Shoulder Maintenance	99-14	Habitat for Ripley's spring parsley plant, yuccas	9.1	3.70	None
Raptor Nest Survey of Phoenix Facility Towers	99-15	Raptor roosting sites	N/A	N/A	Flush birds from towers prior to activity
Characterization of Reactor-Maintenance and Disassembly and Engine-Maintenance and Disassembly waste dumps (CAU 143)	99-18	Tortoise burrow	1.6	0.65	Avoid flagged burrow
U2g-as Trench	99-19	None	0.40	0.16	None
Burma Road Repairs	99-20	Tortoise burrows, predator burrows	9.1	3.67	Restrict repair work to within 30 feet of road edge
CAU 230/320	99-21	None	1.2	0.47	None
<b>Total</b>			<b>278</b>	<b>112</b>	

**Table 11-3 Seasonal Data from Selected Natural Water Sources on the Nevada Test Site Collected during Fiscal Year 1999**

Water Source	Date	Surface Area of Water		Surface Flow Rate		Disturbance at Spring
		(square feet)	(square meters)	(cubic feet/)	(liters/minute)	
Cane Spring	10/22	110	10	0.095	2.7	None
Cane Spring	1/20	1,350	125	0.11	3	Soil cave-in into cave pool
Cane Spring	4/15	600	56	0.081	2.3	None
Captain Jack Spring	10/29	190	18	0.085	2.4	Horse grazing/trampled vegetation
Captain Jack Spring	2/9	160	15	0.074	2.1	Horse grazing/trampled vegetation
Coyote Spring	4/14	11	1	0	0	None
Cottonwood Spring	5/12	20	2	0	0	None Surface Area
Gold Meadows Spring	1/21	1,080	100	NM	NM	Horse grazing/trampled vegetation
Gold Meadows Spring	7/26	0	0	NM	NM	Horse grazing/trampled vegetation
Little Wildhorse Seep	4/21	0	0	0	0	Horse grazing/trampled vegetation
Little Wildhorse Seep	5/5	20	2	NM	NM	Horse grazing/trampled vegetation
Pahute Mesa Pond	5/5	24,490	2,275	NM	NM	None
Rattlesnake Seep	5/5	32	3	NM	NM	None
Reitmann Seep	1/26	16	1.5	0.002	0.05	None
Tippipah Spring	10/8	3,180	295	0.21	6	None
Tippipah Spring	1/13	2,800	260	0.19	5.4	None
Tippipah Spring	4/5	4,090	380	0.13	3.6	None
Topopah Spring	10/22	300	28	0.03	0.8	None

**Table 11-3 Seasonal Data from Selected Natural Water Sources on the NTS  
Collected during FY 1999 (continued)**

Water Source	Date	Surface Area of Water		Surface Flow Rate		Disturbance at Spring
		(square feet)	(square meters)	(cubic feet/minute)	(liters/minute)	
Topopah Spring	2/4	390	36	0.02	0.7	None
Topopah Spring	5/3	740	69	0.0099	0.28	None
Wahmonie Seep No. 1	4/1	320	30	0.13	3.6	None
Wahmonie Seep No. 2	4/1	40	4	NM	NM	None
Wahmonie Seep No. 3	4/1	0	0	0	0	None
Wahmonie Seep No. 4	4/1	380	35	NM	NM	None
Whiterock Spring	10/20	60	6	0.099	2.8	None
Whiterock Spring	1/14	1,880	175	0.067	1.9	None
Wildhorse Seep	4/21	0	0	0	0	Horse grazing/ trampled vegetation
Wildhorse Seep	5/5	20	2	NM	NM	Horse grazing/ trampled vegetation
Yucca Playa Pond	10/8	0	0	0	0	None
Yucca Playa Pond	1/20	247,500	23,000	NM	NM	None

NM - Not measurable due to diffused flow.

water and animals or their sign was recorded. Four coyotes and one deer drowned in a plastic-lined sump at groundwater characterization well ER-20-6 in Area 20. Recommendations to install a sediment ramp in one corner of this sump and lowering the water level 4-5 feet (1.2-1.5 meters) were made in the quarterly reports.

### **11.3.7 Hazardous Materials Spill Center**

Chemical spill test plans for six experiments were reviewed: 1) ORCA which tested ten different chemicals; 2) Chemical Agent Dual Detection Identification Experiment; 3) off-gas tests for Inhibited Red Fuming Nitric Acid; 4) Remote Sensor Test Range Engineering Checkouts using two chemicals; 5) OSPREY II using five chemicals; and 6) FROSTPROOF. The latter test was not at the Hazardous

Materials (HAZMAT) Spill Center but was a stream fate study along the Cambric Ditch. Letters documenting the first five reviews were submitted to the DOE/NV Environment, Safety and Health and Emergency Management Divisions on November 30, and December 3, 1998 and April 5 and April 22, 1999. Comments on the FROSTPROOF test were provided on August 4, 1999.

Biota monitoring was not conducted for any of the chemical tests at the HAZMAT Spill Center during FY 1999. No baseline monitoring was conducted at established control-treatment transects near the HAZMAT Spill Center due to insufficient funding.

### 11.3.8 Routine Radiological Monitoring of Biota

Routine radiological monitoring of biota at the NTS in FY 1999 started on August 8, 1999 and continued through September 30, 1999. Monitoring was restricted to two contaminated locations, E-Tunnel Ponds and Cambric Ditch, and two control sites, Camp 17 Pond and Cane Springs. Vegetation samples of salt cedar were taken at Cambric Ditch and Cane Spring. Animal trapping for mourning doves and cottontail rabbits continued for 20 trapping days. No doves were trapped or observed at

the bait stations, perhaps due to low dove numbers at the sampling sites and on the NTS. One cottontail rabbit was taken for analyses from Cambric Ditch.

## 11.4 Adaptive Management Actions Taken

### 11.4.1 Implementation of the Nevada Test Site Biological Opinion for Desert Tortoise Protection

Adherence to the terms and conditions of the Biological Opinion (Mendoza, 1996) by DOE/NV, its contractors, and other NTS users will ensure that the desert tortoise is protected and cumulative impacts to the tortoise and its habitat are minimized. In the Opinion, the USFWS determined that incidental take and the cumulative acreage of tortoise habitat disturbed are parameters to be measured and monitored annually. The threshold levels established by the USFWS for these parameters are presented in Table 11-4. The USFWS determined that incidental take and acres disturbed below these limits are “not likely to jeopardize the continued existence of the Mojave population of the desert tortoise.” If either of these limits is exceeded, then the Opinion requires DOE/NV to reinitiate consultation with the USFWS. However, re-initiation of consultation will occur if these limits are met to ensure that NTS

**Table 11-4 Parameters and Threshold Limits for Desert Tortoise Adaptive Management on the Nevada Test Site**

<b>Monitored Parameter</b>	<b>Threshold Value</b>	<b>Adaptive Management Action</b>	<b>Current Value of Monitored Parameter</b>
Number of tortoises incidentally injured or killed per year as a result of NTS activities	3	Re-initiate consultation with Service	0
Number of tortoises captured and displaced from NTS project sites per year	10	Re-initiate consultation with Service	0
Total acres of desert tortoise habitat disturbed by NTS projects since 1992	3,015	Re-initiate consultation with Service	199

projects can continue while consultation proceeds. Re-initiation of consultation is the adaptive management action, for it will reassess the impact of NTS activities on the tortoise and the efficacy of mitigation measures to minimize incidental take and loss of tortoise habitat. During FY 1999, the threshold values for these parameters were not met; hence, adaptive management was not required.

#### 11.4.2 Biological Surveys

A geographic information system (GIS) geospatial database containing locations of past and present projects where biological surveys have been conducted is being developed. Project locations will be linked to other GIS data of vegetative types and animal distributions on the NTS. The linked data will then be used to develop monitoring and adaptive management parameters for selected species or habitats.

#### 11.4.3 Candidate Species and Species of Concern Surveys

The adaptive management criterion for candidate plant species and plant species of concern on the NTS will be the population disturbance index (PDI). This index will be computed for each plant species (x) listed in Table 11-5 by dividing the number of locations of a species that contain new disturbance (LD) by the total number of locations of the same species (L):

$$PDI_{(x)} = LD_{(x)} / L_{(x)}$$

This index can range from 0 to 1. The PDI for each species will be computed in FY 2000 when all survey data is entered into the GIS database. Once threshold values have been determined, adaptive management actions for each species will be developed.

**Table 11-5 Sensitive Plants on the Nevada Test Site for Which the Population Disturbance Index will be Developed**

<b>Plant Species</b>	<b>Number of Known Locations (L<sub>(x)</sub>)</b>	<b>Number of Known Locations Disturbed in FY 1999</b>
<i>Arctomecon merriamii</i> (White bear poppy)	17	0
<i>Astragalus beatleyae</i> (Beatley milk vetch)	33	0
<i>Astragalus funereus</i> (Funeral Mountain milk vetch)	9	0
<i>Astragalus oophorus</i> var. <i>clokeyanus</i> (Clokey's egg vetch)	22	0
<i>Camissonia megalantha</i> (Cane Spring evening primrose)	11	0
<i>Cymopterus ripleyi</i> var. <i>saniculoides</i> (Sanicle biscuit root)	18	0
<i>Frasera pahutensis</i> (Pahute Mesa green gentian)	9	0
<i>Galium hilendiae</i> ssp. <i>kingstonense</i> (Kingston bedstraw)	5	0
<i>Penstemon pahutensis</i> (Pahute Mesa beardtongue)	88	1
<i>Phacelia beatleyae</i> (Beatley phacelia)	41	0
<i>Phacelia parishii</i> (Parish's phacelia)	32	1

Monitoring plans, which will define the parameters to be monitored to ensure that the biological goals are being met for animal species of concern, are being developed and will be completed in FY 2000. Threshold limits for these parameters will be identified as well as species-specific adaptive management actions.

#### **11.4.4 Raptors**

Baseline data on the number of breeding pairs, active nests, habitat use, and fledgling young will continue to be collected in FY 2000. Until more data on these parameters can be collected, specific adaptive management actions cannot be developed.

#### **11.4.5 Special Interest and Game Species**

The current wild horse monitoring study design is being modified to include population threshold levels and a decision matrix of potential research, mitigation, and adaptive management actions that may be implemented.

Adaptive management actions for mule deer will be developed in FY 2000.

#### **11.4.6 Wildlife Water Sources**

Adaptive management actions will be developed in FY 2000.

#### **11.4.7 Hazardous Materials Spill Center**

No adaptive management actions taken

#### **11.4.8 Radiological Monitoring of Biota**

No adaptive management actions taken.

### **11.5 Other Actions Taken**

In FY 1996, efforts began to map the wildlife and plant habitats of the NTS. By the end of

FY 1998, field data collection was completed and the production of GIS-based maps of NTS habitats began. This year efforts focused on the production of plant habitat and species-specific distribution maps, development of software scripts to produce species-specific maps, designing a long-term habitat monitoring plan, and preparation of a topical report detailing the methods and results of habitat and species maps. The GIS-based maps and databases will facilitate ecosystem management on the NTS, preparation of future environmental assessments and EISs, and the siting of new projects and facilities.

The vegetation habitat map was completed and presented in the *NTS RMP*. Several hundred GIS-based maps showing the distribution of single plant species on the NTS were produced. A draft topical report describing the classification of NTS habitat types was prepared and is scheduled to be published in FY 2000. Work began on the development of a long-term habitat-monitoring plan for the NTS. The plan will define a subset of habitats, species, and parameters that will be monitored to measure direct and cumulative impacts of NTS activities on habitats. The plan will describe monitoring techniques and methods, parameter threshold levels, and adaptive management strategies. The plan will be fully developed in FY 2000 and implemented in FY 2001.

## 12 Air Resources

### 12.1 Introduction

This section discusses maintenance of air quality on the NTS. Off-site ambient air quality is not included. The NTS is located in Nevada Intrastate Air Quality Control Region 147. Region 147 has been designated as an attainment area with respect to the *National Ambient Air Quality Standards* (40 CFR Part 81.329). Criteria air pollutants emitted at the NTS include particulates from construction activities, aggregate production, surface disturbance, and fugitive dust from vehicles traveling on paved and unpaved roads. Other pollutants are from various fuel-burning equipment, high explosive tests, incineration, open burning, chemical releases from the HAZMAT Spill Center, and volatile organics from fuel storage facilities. The 1996 National Emission Standards for Hazardous Air Pollutants Report (Black, 1997) summarizes the net total emission of all sources of radiation into the air, primarily tritiated liquid effluent from E Tunnel and resuspension of surface contaminants from historic aboveground tests. Radiation sampling stations, on and off-site, have confirmed this effect to be negligible.

### 12.2 Progress Towards Goal

√ Maximize air quality on the NTS.

The goal to maintain the best air quality on the NTS that is reasonably achievable while accommodating human use and occupancy remains our goal. Due to extremely low use of facilities on the NTS, progress towards the goal is difficult to determine. However, the use of water and chemical dust suppressants; mechanical devices such as bag-houses (with shrouds as necessary), covers on transport trucks, covers on containers, and shrouds/covers on conveyor belts; use of high-efficiency particulate air filters; and revegetation of

disturbed areas helped reduce the total amount of air emission on the NTS to 20.69 tons per year (18,770 kilograms per year). Under the present air quality operating permit, DOE/NV is allowed up to 100 tons per year (90,718 kilograms per year) of emissions for each of the criteria air pollutants. For an area that is 1,350 mi<sup>2</sup> (3,496 km<sup>2</sup>), this is a significant achievement.

### 12.3 Monitoring Data

During FY 1999, DOE continued monitoring radiation in particulates filtered from air on and around the NTS. The monitoring program, described in the *NTS Routine Radiological Environmental Monitoring Plan* (BN, 1988), detected no radiological contaminants in excess of federal standards.

Since activities relating to ambient air quality at the NTS remain below national and state ambient air quality standards and remained below the 100 tons per year limit, no monitoring was conducted during FY 1999. Inspections and visible emission evaluations are discussed in the next section.

### 12.4 Adaptive Management Actions Taken

#### 12.4.1 Pollution Control Program

Pollution prevention planning is incorporated into relevant construction and operations conducted by the DOE on the NTS. The BN Environmental Compliance Department manages the program. Additional actions taken during FY 1999 were:

√ Water spray bars were added at the Area 1 Aggregate Plant to further reduce air emissions.

- √ Water was used to control dust on dirt access roads to the Underground Test Area Project monitoring well sites and at the pads.
- √ In 1999, planning for the installation of a Natural Gas refueling station on the NTS began. In addition, 15% of the motor vehicle fleet operated by DOE/NV and contractors on the NTS now uses some form of alternative fuel. Projected goal is that 67% of the motor vehicle fleet on the NTS will be converted to alternative fuels by FY 2004.
- √ Water and chemical dust suppressants were used on activity and construction sites where surface disturbance occurred and on associated access roads throughout the NTS during 1999.

## **12.5 Other Actions Taken**

No other actions were needed for this resource.

### **12.4.2 Permitting Program**

Monthly surveillance and physical inspections were conducted for all operated air emission producing equipment located on the NTS.

A new program was instituted where easily readable labels with contact telephone numbers were placed on all permitted operating equipment. The user must contact the BN Environmental Compliance Department before using the equipment for consultation on regulatory requirements.

Air Quality Operating Permit AP9711-0549 was modified to continually improve the process and operations of equipment on the NTS.

Several personnel were certified as visible emission evaluators by the State of Nevada. These evaluators will continue throughout the year to evaluate any source of air emissions on the NTS for compliance with Federal and State regulations.

## 13 Geological and Mineral Resources

### 13.1 Introduction

Only broad parameters of the extent of geologic resources on the NTS are known. Common geologic resources include industrial minerals, such as silica, bentonite clay, and zeolites, as well as building stone and aggregate. Hydrocarbon and geothermal resources in the deeper subsurface are more difficult to evaluate. Base and precious metal resources are well known to the mining and mineral industries and several mining districts have been sampled. Economic minerals of interest include gold, silver, mercury, lead, copper, antimony, zinc, arsenic, tungsten, and molybdenum. Most of these deposits are found in proximity to igneous intrusions. The Timber Mountain Caldera complex is also a potential source of mineralization. Rock sections that contain unique fossil assemblages are also considered geologic resources. Mining districts identified in nuclear testing areas are not considered part of the geologic and mineral resources if they are radioactively contaminated or unsafe for surface geologic investigations.

### 13.2 Progress Towards Goal

- √ Consider the impacts of NTS operations on unique geologic features and mineral resource areas.

Project managers for reclamation projects and geologists considering sampling and mapping studies proposed their projects through the project screening and location process. It was recommended that these projects proceed as planned. Establishment of this process ensures that the geological and mineral resource goal is met.

### 13.3 Monitoring Data

The DOE/NV Mining Policy (DOE/NV Policy 450.X) does not allow extraction of the NTS mineral resources, however, monitoring of the geologic features and known mineralized areas requires that DOE/NV protect them against depredation by surface excavation for new construction projects. No new construction projects were approved during 1999. Approved reclamation projects were in non-resource areas and had no impact on the resources.

### 13.4 Adaptive Management Actions Taken

Mineral surveys in areas of proposed project activity are an option in non-resource areas in the National Security Zone. In the National Security Zone, geologic core samples were collected in tertiary volcanic rock formations that were excavated during project activity. These samples were described and stored at the USGS Core Library/Data Center in Mercury at the NTS. In the Restricted Use Zone, several seismic stations and geologic trenches in non-resource areas were reclaimed and backfilled with minimal surface disturbance. Though recent geologic exposures along the Rock Valley Fault were buried, the geology of the trenches has been documented by the YMP.

A mapping project in the Mine Mountain area and a sampling project in the Timber Mountain Caldera added to the geologic knowledge base and could be useful in defining new host rocks for resource areas. Mapping results will be published as an Open-File Report by the USGS (Slate et al, 1999), and sample analyses will be added to the Petrographic/Geochemical Database and published in scientific journals. Follow up projects in 2000 are already in the planning stages.

## 13.5 Other Actions Taken

A digital map of the NTS and surrounding southwest Volcanic Field (Slate et al, 1999) provides new and updated Quaternary and bedrock geology, new geophysical interpretations of faults beneath the intermontane basins, and improved GIS coverage. In addition, a new isostatic gravity map and aeromagnetic map interpretations were integrated into the digital presentation. Enhanced geophysical interpretations could help to define the location of deep-seated intrusive areas and caldera subsidence features, which are potential areas of mineralization.

A revised interpretation of major structural features in the pre-Tertiary rocks of the NTS (Cole and Cashman, 1999) could help to identify Paleozoic stratigraphic controls and preferred major fault and related shear directions which could have concentrated mineralization in the Oak Springs, Calico Hills and Mine Mountain areas.

## **14 Airspace Resources**

### **14.1 Introduction**

Airspace resources at the NTS are composed of two areas of special use airspace, designated by the Federal Aviation Administration (FAA) as restricted areas 4808 North (R4808N) and 4808 South (R4808S). Although they are "owned" by the FAA, they are used and controlled exclusively by the DOE/NV, 24 hours per day from surface to infinity. Both are restricted from public use, with exceptions being granted periodically for flights supporting projects at the NTS. The restricted airspace surrounding the NTS to the north, east, and west is under the control of NAFR.

### **14.2 Progress Towards Goal**

- √ Manage NTS airspace to enhance national security, public safety, and operational safety in the conduct of missions on the NTS.

Management of the airspace continues in a sound, efficient and capable manner. Several airspace incursions have been detected and the pilots administratively dealt with. The FAA continues to be supportive of DOE/NV actions and remains ready to assist DOE/NV's efforts, as needed. Security of programs and projects continues to receive the highest level of attention when requests for over flights are received and Program Managers remain confident that the steps taken afford the adequate amount of security.

### **14.3 Monitoring Data**

During FY 1999, the military requested use of R4808N for specific missions, as compared to standard daily over flights, a total of fifteen times. Fourteen of these were granted and one was denied for security reasons not within DOE/NV's control.

In addition, the radar monitoring systems detected three intrusions by civilian aircraft, which were investigated by DOE/NV. The owners of two of these aircraft were identified and contacted by letter to respond as to their version of events. One of the pilots' mailing address was invalid, so the letter was returned to DOE/NV for further action. The other pilot replied with a satisfactory account of the event, which was corroborated by an independent source. No further action being necessary, after keeping a copy for DOE/NV records, a copy was sent to the FAA Air Traffic Representative at NAFR. The third intruder aircraft was lost from radar and never identified.

### **14.4 Adaptive Management Actions Taken**

During FY 1999, no new agreements were enacted, nor changes made to existing agreements. The annual traffic count was 19,750 for R4808N and 2,057 for R4808S.

### **14.5 Other Actions Taken**

No other actions were needed for this resource.

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## **15 Socioeconomic Resources**

### **15.1 Introduction**

Socioeconomic analysis is an assessment of the environmental consequences of demographic and economic changes resulting from the implementation of a proposed activity as well as an assessment of the impacts upon local government facility, service, and fiscal conditions. Resources are varied for socioeconomic impact studies involving the community groups around the NTS. These groups include, among others, the NTS Development Corporation, Clark County, Nye County, Esmeralda County, Lincoln County and the local Native American tribes. Data to be evaluated in these studies may include employment, earning, population, and demographic statistics as well as county budgets, capital improvement programs, master plans, functional plans, and community perception analysis.

### **15.2 Progress Towards Goal**

- √ Manage resources and missions in a manner that considers the local and regional social and economic values and stimulates the local and regional economy.

The DOE/NV Human Resources Division is responsible for maintaining employment data for the federal and contractor work force. On a monthly basis, an employment report is updated to include all changes in the DOE/NV federal and contractor work force. In addition, the Human Resources Division has provided demographic data to customers within DOE/NV as well as from DOE/HQ, DOE contractors and the NTS Development Corporation.

In FY 1999, DOE/NV continued its participation in education outreach activities such as the Science Bowl held on February 5-6, 1999 and the JASON Project held on March 1-12, 1999.

In addition, MOUs to support and protect the social and economic values of the surrounding communities were established in FY 1999 between DOE/NV and Nye County and DOE/NV and the town of Boulder City.

### **15.3 Monitoring Data**

No monitoring was performed for this resource.

### **15.4 Adaptive Management Actions Taken**

No adaptive management actions were needed for this resource.

### **15.5 Other Actions Taken**

No other actions were needed for this resource.

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## 18 Glossary

**Baseline.** The initial environmental conditions against which the environmental consequences of various alternatives are evaluated.

**Candidate species.** Plant and animal species for which the USFWS has sufficient information on their biological status and threats to propose them as endangered or threatened.

**Ecosystem.** An interconnected community of living things, including humans and the physical environment with which they interact.

**Endangered species.** A species that is in danger of extinction throughout all or a significant portion of its range.

**Geologic.** Pertaining to earth materials (such as rocks and minerals) and processes that act to change earth materials (such as faulting and erosion).

**Groundwater.** Subsurface water that lies within the zone of saturation.

**Infrastructure.** Utilities and other physical support systems needed to operate a laboratory or test facility. Included are items such as electric distribution systems, water supply systems, sewage disposal systems, and roads.

**Low-level radioactive waste.** Radioactive waste not classified as high-level waste, transuranic waste, or spent nuclear fuel, or the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content.

**Protect.** An administrative action that uses the identification of actions or measures that will ensure continuation of the availability of a resource. It does not necessarily mean the imposition of physical barriers or hardened facilities to prevent access to the resource.

**Radiation.** Emissions, either electromagnetic or particulate, that result from the transformation of an unstable atom or nucleus.

**Remediate.** The process, or a phase in the process, of rendering radioactive, hazardous, or mixed waste environmentally safe, whether through processing, entombment, or other methods.

**Repatriation.** The return of human remains, associated funerary objects, unassociated funerary objects, and objects of cultural patrimony and sacred objects, to the American Indian tribe or organization who is culturally affiliated with those remains and objects, or to lineal descendants of the individual whose remains are being returned. (25 USC 3001)

**Species of concern.** Species of possible management concern are due to their restricted distribution or the presence of habitat disturbance. Further biological research and field study is needed to resolve the conservation status of these species.

**Threatened species.** A species that is likely to become endangered within the near future throughout all or a significant portion of its range.

**Wetlands.** An area that is regularly saturated by surface water or groundwater and subsequently supports vegetation that is adapted for life in saturated soil conditions.

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## 19 Acronyms

BLM	Bureau of Land Management	NAFR	Nellis Air Force Range
BN	Bechtel Nevada	NARA	National Archives and Records Administration
CAU	Corrective Action Unit	NRHP	National Register of Historic Places
CFR	Code of Federal Regulations	NTS	Nevada Test Site
CGTO	Consolidated Group of Tribes and Organizations	PDI	population disturbance index
DOE	U.S. Department of Energy	PLO	Public Land Order
DOE/HQ	U.S. Department of Energy, Headquarters	RMP	Resource Management Plan
DOE/NV	U.S. Department of Energy, Nevada Operations Office	USAF	United States Air Force
DOE/OCRWM	U.S. Department of Energy, Office of Civilian Radioactive Waste Management	USC	United States Code
		USFWS	United States Fish and Wildlife Service
		USGS	United States Geological Survey
EIS	Environmental Impact Statement	YMP	Yucca Mountain Project
FAA	Federal Aviation Administration		
FY	fiscal year		
GIS	geographic information system		
GPO	United States Government Printing Office		
HAZMAT	Hazardous Materials		
ISM	Integrated Safety Management		
km <sup>2</sup>	square kilometers		
mi <sup>2</sup>	square miles		
MOA	Memorandum of Agreement		
MOU	Memorandum of Understanding		

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