

# FOREST PLAN MONITORING AND EVALUATION

## REPORT

**Santa Fe National Forest**

**Fiscal Year 2004**

### FOREST SUPERVISOR'S CERTIFICATION

The Santa Fe National Forest's Land and Resource Management Plan (Forest Plan) was originally approved in July of 1987. Since that date, there have been 12 amendments and change notices made to the Plan. This annual monitoring report is based on the Monitoring Plan included in the Santa Fe National Forest Land and Resource Management Plan and regulatory requirements described in 36 CFR 219.

I have reviewed the annual Monitoring and Evaluation report for the Santa Fe National Forest for Fiscal Year 2004. I have reviewed the enclosed recommendations based on the monitoring data and have assigned appropriate Forest and District staff to address the challenges and recommendations discussed in this report.

Amendments or revisions to the Forest Plan are not likely to be made as a result of this report. Instead, information from this report will be used in the planning and design of the 2007 Santa Fe Forest Planning process.

This Monitoring and Evaluation Report meets regulatory requirements for completing an annual report (36 CFR 219).

/s/ Gilbert Zepeda  
GILBERT ZEPEDA  
Forest Supervisor

7/11/2005  
Date

## **EXECUTIVE SUMMARY**

The Santa Fe National Forest fiscal year 2004 (FY 2004) Forest Plan Monitoring and Evaluation Report is written to inform the Forest Supervisor and the public of information collected on the conditions and resources on Santa Fe National Forest as well as progress toward achieving the goals and objectives as stated in the Santa Fe National Forest Plan. This report differs from previous years in that it includes more discussion on the types of information collected for each resource area and how it is used to determine the status of resource conditions. Specifically, the section on Inventories and Assessments discusses key assessments that were done in FY 2004 as well as the ongoing process of building and maintaining the Forest's Geographic Information Systems (GIS) database. There is also a section with summaries of monitoring for each major resource area. This section discusses all of the monitoring done in a specific resource area, its scope, and how that information is used. The Table of Monitoring Activities is a catalogue of all the individual monitoring activities completed in FY 2004 on Santa Fe National Forest Lands. Additionally, three projects (Santa Fe watershed, Valle Grande Grassbank, and Jemez Natural Recreation Area) are discussed in detail as FY 2004 monitoring highlights to help describe how monitoring activities in several resource areas are brought together to help inform management decisions for a specific area or project. Last is the evaluation of monitoring results. This section focuses on the lessons learned from monitoring, weaknesses, strengths and improvements, progress toward desired condition, and public involvement.

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## PURPOSE AND RELEVANCE

The purpose of this annual monitoring report is to inform the Forest Supervisor and the public of information and data collected to inform on the progress toward achieving the goals, objectives, and standards and guidelines as stated in the Santa Fe National Forest Plan. As such, this plan contains information on the parameters and monitoring methods used as well as information collected at the Forest and District level. Data gathered through various monitoring methods are analyzed to determine whether management practices are resulting in progress toward meeting Forest goals and objectives, and whether the measurements taken and the methods used are useful toward making this determination.

### Forest Plan Background & Amendments

The Forest Plan and associated EIS were first published as drafts in 1982, as finals in 1983, and then were withdrawn in order to address appeal issues regarding timber harvesting and wild and scenic rivers. Once appeal issues were resolved, these documents were approved and published in final form in July of 1987.

Preliminary Forest staff recommendations for updating the Forest Plan were developed in 1996-98 and are contained in the fiscal year 1999 Monitoring & Evaluation Report. Those recommendations are still valid, although we recognize that additional changes should be made such as incorporating new direction from National Fire Plan and associated policies for managing fire use.

The following amendments were made to the 1987 Forest Plan:

- Amendment #1- Changed timber sale schedule (8/88)
- Amendment #2- Added management direction for recommended Wild and Scenic Rivers (1/89)
- Amendment #3- Changed timber sale schedule (5/89)
- Amendment #4- Added Pajarito Peak electronic site (2/90)
- Amendment #5- Adjusted management area boundaries between area "C" and "Q" (10/92)
- Amendment #6- Incorporated Region-wide amendment for managing Mexican spotted owl habitat, northern goshawk habitat, old growth and livestock grazing (5/96)
- Amendment #7- Allowed deviation from visual quality requirements for El Cajate Mine (12/96)
- Amendment #8- Modified Management Area J direction for Gallinas Municipal Watershed (10/97)
- Amendment #9\*- Added new management area and associated direction for managing the East Fork of the Jemez Wild and Scenic River corridor (08/02)
- Amendment #10\*- Added new management area and associated direction for managing the Jemez National Recreation Area (01/03)
- Amendment #11\*- Pecos Wild and Scenic River: new standards and guidelines + Management Plan (07/03)
- Amendment #12\* - Managing Special Species Habitat (12/04)

### Forest Plan Revision Schedule

Revision of the Forest Plan was originally scheduled for 1999 (Five-Year Forest Plan Review and Monitoring Report, USFS, 1993). However, the Southwestern Region modified the Forest Plan revision schedule while forest planning regulations (36 CFR 219) were being updated. The updated regulations were printed in the Federal Register (<http://www.fs.fed.us/emc/nfma/includes/rule%20.pdf>) on January 5, 2005. The Santa Fe National Forest is currently scheduled to begin Forest Plan revision in 2007.

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\* Replacement pages for these amendments have not yet been added to the Forest Plan

## DATA COLLECTION AND ANALYSIS

Monitoring for the Santa Fe National Forest occurs for different purposes and at different scales. It is important for the reader to understand that many different methods of data collection occur, because this has a direct effect on how that information is conveyed, analyzed, and what it can tell us about Forest resource conditions.

### TYPES OF MONITORING AND DATA COLLECTION

There are four primary types of monitoring and data collection that are considered when monitoring under the Forest Plan. Often times, all four types of data are collected to help us plan and understand the impacts of management actions for a specific resource. The four monitoring types include the following:

**Implementation Monitoring:** Considers information and measurements to determine if projects and plans are implemented as designed. Most implementation monitoring occurs at the project level, and includes general information about the final results of the project.

**Effectiveness Monitoring:** Tells us whether or not plans, projects, or activities have results that help meet stated goals and objectives. Effectiveness monitoring is one of the key principles behind adaptive management, and is focused on the ‘on-the-ground’ result of a specific action. Effectiveness monitoring is the primary monitoring type used in this report.

**Validation Monitoring:** Helps determine if the initial data, assumptions, and parameters used in the development of the plan are correct, or if there is a better way to meet established Goals and Objectives and Desired Conditions.

**Resource Condition Monitoring:** Provides information that assists in the determination of existing social, ecological, and economic resource conditions and trends.

In addition to the four types of data collected, there are also two scales that can be distinguished at which data collection occurs.

**Project-level Monitoring:** Much of the monitoring on for the Santa Fe National Forest completed is specifically focused on project implementation. This type of monitoring often focuses on answering questions such as,

- “Has the project been completed to established standards?”
- “Have the objectives of the project been met?”
- “Was the project effective toward meeting established resource and management goals?”
- “What was the project cost?”

This type of monitoring is most often completed on a project-by-project basis. As a result, this information can be difficult to collect and analyze at the Forest level.

**Resource Monitoring:** Resource monitoring commonly occurs at a scale much larger than the project level, but may include data collection in an area as small as a short stream segment to data collection for a specific resource that occurs at the Forest level. Inventories are a common type of resource monitoring.

These monitoring types and scales are all essential for us to understand the impacts of management activities, projects, and actions taken. Furthermore, they are essential for providing the basic understandings that enable us to work with the public to address management concerns and progress toward the agency’s mission of social, economic, and ecological sustainability.

## STATUS OF INVENTORIES AND ASSESSMENTS

### Southwest Forest Assessment Project

The Southwest Forest Assessment Project is a cost-share agreement with The Nature Conservancy to assess current data and empirical information to build characterizations of southwestern ecosystems and models of change for the 11 National Forests in the Forest Service Southwest Region. Specifically, this project will result in characterization of the historic range of variation for select Potential Natural Vegetation Types throughout the Southwest. Additionally, Vegetation Dynamics Development Tool models will be developed as a scenario management tool to help managers and planners understand changes in vegetation states given different management activities. The results of this assessment project should be available by the end of FY 2006, and it is expected that they will be used for Forest plan revision efforts.

### Geographical Information Systems

During fiscal year 2004, we continued to build the Santa Fe National Forest's Geographic Information System (GIS) database for environmental planning analysis work (see Appendix 1 for a listing of all GIS layers). GIS data for heritage resources, vegetation treatments, invasive species, fire history, and roads and trails are updated annually. Other GIS data for soils, range allotments/pastures and improvements, existing vegetation coverage, sensitive species, lands acquisitions and boundary adjustments, minerals, and streams and rivers are updated on a periodic basis, which is often greater than one year.

For each of these layers, the Santa Fe National Forest is continuously working to reduce error in its GIS data by reviewing check plots and updating the data accordingly for increased precision and accuracy. Additionally, the Forest continued participation in the national Inventory and Monitoring Program Plan by using tools to assess the status of our GIS data and related databases towards national standardization.

The INFRA database continued to be updated and linked with existing GIS databases including buildings, water systems, developed recreation sites, administrative sites, wastewater systems, dams, and range structures. Inventory continued on deferred maintenance inspections and costs for those items listed in the previous sentence plus roads, trails, bridges, major culverts, and archaeological sites. The Santa Fe National Forest also continued as a pilot forest for the Mobile Range Application, which incorporates GIS, Global Position System (GPS), INFRA, and Natural Resources Information System (NRIS) applications into a mobile pocket computer that could be taken into the field. In 2004, this program became operational.

### Roads Analysis Process

Fiscal year 2004 also included the continuation of the Santa Fe National Forest Roads Analysis Process (RAP) at multiple scales. This process determines conditions, issues, and needs for all roads on the forest via an assessment of all road types.

- **Forest-wide RAP:** This process was completed in early FY 2004. The process systematically assessed road management objectives, values (access needs), and risks (resource impacts) associated with maintenance level 3, 4 and 5 roads (higher level roads designed to accommodate passenger car travel).
- **Watershed-scale RAP:** RAPs for level 1 and 2 roads on Coyote and Cuba Ranger District are complete, and the Española Ranger District is expected to be completed in 2006.

### Landscape-scale (watershed) Assessment

Landscape-scale assessments are studies of 5<sup>th</sup> code watersheds that occur at least partially within the boundaries of the Forest. They include a comprehensive assessment of existing conditions as related to desired conditions described in the Forest Plan. The purpose of the assessment is to describe watershed conditions in relation to

patterns of land use, and describe areas in need of treatment for prioritization of ecosystem restoration activities. Specific resource areas covered in detail include hydrology, erosion process, water quality, vegetation, wildlife species and habitat, recreation, heritage resources, and livestock grazing. The analysis follows steps provided in Part 2 of the Ecosystem Analysis at the Watershed Scale: Federal Guide for Watershed Analysis – Version 2.2.

In FY 2003 there were four Landscape-scale assessments. Three more were studied in FY 2004, and reports were completed in 2005:

- Rio del Oso – Rio Chama Watershed
- Upper Jemez River Watershed
- Middle Jemez River Watershed

### **Visitor Use and Satisfaction Study**

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- National Visitor Use Monitoring: Results from the 246 surveys taken over 2002 and 2003 on visitor use and satisfaction on the Santa Fe National Forest have been written in a report and made available at: [http://www.fs.fed.us/recreation/programs/nvum/reports/year4/R3\\_F10\\_santafe\\_final.htm](http://www.fs.fed.us/recreation/programs/nvum/reports/year4/R3_F10_santafe_final.htm)

## RESOURCE AREA SUMMARIES

Below are summaries to describe the monitoring accomplished for specific key resource areas on the Santa Fe National Forest. These summaries discuss the scope and breadth of monitoring in each area, and include some monitoring results from FY 2004. The Table of Monitoring Activities (in the section below) captures all of the specific monitoring activities accomplished in FY 2004.

### **FIRE AND FUELS MANAGEMENT**

In FY 2004, the Santa Fe National Forest treated 14,265 acres of hazardous fuels reduction and contained approximately 98 percent of 137 fires started on the Forest during initial attack. In addition, fire personnel monitored fire and fuels conditions daily, regularly met with communities to promote the FireWise Program, and committed resources to mitigate the effects of catastrophic wildfire in wildland urban interface (WUI) areas.

Fire and fuels management includes comprehensive monitoring to ensure the safety, accuracy, and effectiveness of fire management activities. Monitoring for the fire and fuels management program can be broken down into climatic and condition monitoring, fire prevention, project implementation and effectiveness, incident and resource status, fire frequency, and post-fire monitoring. Additionally, the Forest also participates in fire-based research, such as ongoing fire history studies by the University of Arizona in the Jemez Mountains.

Monitoring of climate and fuel conditions focuses on climate parameters, fuel conditions (live and dead moistures), and the combination of these two factors to affect fire behavior. Climatic conditions are monitored at both short and long-term time scales. Short-term climate monitoring includes daily data collection of precipitation and weather (wind direction/speed, temperature, relative humidity, energy release component, etc) information. This information assists fire managers predict potential fire behavior, and is directly used for prescribed burning, wildland fire use, and incident-related decisions. Long-term climate monitoring includes measuring the effects of seasonal weather and drought on live and dead fuel moistures, which is done forest-wide at predetermined sites.

Fire prevention monitoring is also an integral part of the fire management program. The Forest Service monitors the causes of fire ignitions to better understand the effectiveness of external fire education programs (e.g. Smokey Bear). The Santa Fe National Forest keeps records on open houses and public meetings held through the FireWise program, which helps communities better understand and plan for the dangers of wildfire. Furthermore, fire managers analyzed and identified WUI areas to determine risk (high, moderate and low) and prioritize treatment areas based on this information. In Ranger Districts with particularly high values at risk, WUI defensible space is monitored (pre-attack plans, community fire protection plans) to reduce risk for human life and property in the case of a wildfire.

Project implementation, unit cost efficiency and effectiveness monitoring is completed for fuels treatment projects. This includes monitoring to ensure that on-the-ground activities occur according to burn plans for prescribed fire or for project descriptions for mechanical treatments (mastication, thinning, and piling). For fuels reduction projects where the treatment includes prescribed burns, effectiveness monitoring often measures the amounts of fuels loadings (tons/acre, stems/acre, fire regime and condition class) before and after treatment. Additionally, information on consumption rates,



acres treated, costs/acre, and smoke emissions is also recorded in project files. Fuels treatment projects including mechanical treatments, information about acreage treated, basal area, terrain, and costs are recorded in project files. Much of this information is also collected in NFORS (National Fire Plan Operation and Reporting System), which is a web-based reporting system used Forest Service-wide. The information on the number and effects of hazardous fuels treatments is crucial to our understanding of the ecological role of fire in ecosystems of northern New Mexico, and our ability to use fire and mechanical treatments for restoration and ecological purposes.

Incident(s) and resource status monitoring is an ongoing process to maintain information about equipment and personnel during or in case of wildland fire. During wildfires, information about equipment, personnel, and their costs are continuously tracked and updated as events progress. This information is updated daily into an information database at the Supervisor's Office of the Santa Fe National Forest. Also, information on other agency and zone (multi-agency, regionally-based) resources is collected to ensure that there is easily accessible information on the status of initial, extended attack fire fighting equipment and personnel. This information is tracked on a daily basis during the fire season to ensure quick and effective suppression of wildland fires.

Fire frequency and historical information is collected throughout the Forest as well. Data collection consists of where, when fires start, their cause, and under what conditions. The total number of ignitions is also recorded. This type of information helps fire managers understand how and where to expect fires to start in the Forest. This information is used to validate assumptions made with predictive fire models, and helps augment the understanding between drought effects, weather conditions, and the likelihood of fire frequency. This information is collected at the forest-level and can be used to analyze fire risk.

Lastly, areas impacted by wildland fire events are monitored to understand the effectiveness of rehabilitation, restoration efforts and to ensure compliance and effectiveness of closure measures. Fire events can often lead to damage of natural resources and cause dangerous conditions for the public. Areas on the Forest that need treatment are often closed temporarily for rehabilitation projects. Rehabilitation efforts often include reseeded, the installment of erosion-control devices, and stream modification to prevent flooding and excess sedimentation. These closures and treatments are then monitored to ensure effectiveness. This information is kept in each Ranger District in fire and/or law enforcement files.

## **RANGELAND MANAGEMENT**

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In FY2004 the Santa Fe National Forest administered 73 active grazing allotments, which included a total of 259 grazing permits for 99,070 permitted Animal Unit Months (AUMs). Of the permitted AUMs, 74,378 AUMs were authorized for use in FY 2004 based on resource conditions. Of the 73 active grazing allotments, 41 have signed Allotment Management Plans, 10 of which were signed in FY 2004. Furthermore, FY 2004 Records indicate the 51 of the 73 active allotments were administered to standard. Lastly, analysis of FY 2004 monitoring data showed that 664,287 acres of the 1,446,970 acres (approximately 46%) with vegetation management objectives and within grazing allotments met or were moving toward desired conditions.

Monitoring of rangeland resources encompasses three major components: resource condition monitoring, range improvements and infrastructure monitoring, and compliance monitoring (including utilization). Resource condition monitoring includes data collection of rangeland vegetation and the

effects of grazing on it in key areas and areas such as riparian zones. On some allotments, institutions such as the Range Improvement Task Force from New Mexico State University also collect data on resource conditions. Resource condition monitoring also includes range readiness analysis, which is used to determine an appropriate date for cattle to be allowed onto each allotment.

Other monitoring of rangeland resources includes data collection on range improvement (facilities) and infrastructure, and compliance monitoring. Range improvement and infrastructure monitoring primarily includes checking the status of rangeland fencing, cattle exclosures, and water development infrastructure such as springs, troughs and stock tanks. Compliance monitoring focuses on whether grazing permittees are complying with directions written in annual operating instructions, allotment management plans, and grazing permits. Data collected under compliance monitoring includes information on trespass livestock; confirmation of livestock numbers and rotation schedules; verification of brands, brand cards, and ear tags; and compliance with direction in ecologically sensitive areas (utilization and residual vegetation guidelines).

Monitoring data is primarily collected and documented in the Forest Service INFRA database. Some information such as verification of brand cards and ear tags, however, is documented in District Range Management files. Range data is collected on an annual basis.

Analysis of rangeland management data occurs at many levels. The INFRA database is the primary tool used for analyzing data. The results of analysis are then used for many reports including annual accomplishment reporting and is recorded in annual monitoring reports by allotment, which are made available on the web at: <http://www.fs.fed.us/r3/sfe/rangeland/index.html>.

## **HERITAGE RESOURCES**

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The Santa Fe National Forest is responsible for managing one of the largest collections of heritage resources in the United States. These include archaeological sites from many cultures and time periods plus historical sites remaining from the earliest occupation of the region by Europeans. Monitoring of these heritage resources takes on several forms including inventories and site condition assessments, project clearances and site marking, and project implementation and effectiveness monitoring. In FY 2004, Santa Fe National Forest staff with help from volunteer groups including Site Stewards and Passport in Time volunteers inventoried approximately 5,506 acres for heritage resources.

Inventories and site condition assessments include pedestrian surveys that collect data about the condition, size, location, features, site components, and artifacts of heritage resource sites. This monitoring is completed for listed and eligible National Register sites, Forest-identified high priority sites, as well as for sites that may be affected by nearby projects or wildland fire incidents. Data collection during inventories is collected on standard forms, which include approximately 125 fields for data input on each site. This information is then recorded in the INFRA Heritage Resources database and the appropriate forms are submitted to the State Historic Preservation Office for compliance with the National Historic Preservation Act. Information from inventories and site condition assessments is also used to prioritize deferred maintenance requests for the maintenance and rehabilitation of damaged or priority sites.

Project clearances and site marking are also key components of heritage resource monitoring. Archeological clearances are required for any ground-breaking activity on the forest that could affect

heritage resources. Approximately 195,186 acres were cleared and/or marked for potential impacts to heritage resources due to ground-breaking projects in FY 2004. In some situations, site marking was also performed to ensure the avoidance of impacts to previously identified heritage resources.

Project implementation and effectiveness monitoring occurs regularly for all projects that may impact heritage resources; from prescribed burns to stream restoration projects. Project implementation monitoring ensures that impacts to heritage resources is avoided or minimized. Effectiveness monitoring is used to ensure that mitigation measures taken for protection were effective. For example, erosion control structures installed to prevent impacts to sites after a wildland fire are often monitored to ensure their effectiveness at maintaining site condition.

## **RECREATION**

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Recreation monitoring on the Santa Fe National Forest encompasses monitoring of visitor use, trails condition and inventory, recreation facilities and sites condition, special use permit compliance, fee demo compliance, and area closure compliance.

Beginning in October 2002 to September 2003, the Santa Fe National Forest participated in a National Visitor Use Monitoring survey. In 2004, the results of this effort were summarized and the report is now available at: [http://www.fs.fed.us/recreation/programs/nvum/reports/year4/R3\\_F10\\_santafe\\_final.htm](http://www.fs.fed.us/recreation/programs/nvum/reports/year4/R3_F10_santafe_final.htm). According to the report, there were approximately 1,356,154 visits to the Forest, 64,956 of which included wilderness visits. This makes the Santa Fe National Forest the third most-visited National Forest in New Mexico (counting Apache-Sitgreaves). It should be noted, however, that the Santa Fe National Forest receives more return visits than any other forest in New Mexico.

This report also includes results from visitor satisfaction surveys. Among the findings the report shows that visitors to wilderness areas, developed day use areas, and developed campgrounds were generally most satisfied with employee helpfulness and condition of the environment, but least satisfied with availability of recreation information and adequacy of signage.

In addition to formal use surveys, the Forest monitors the recreational use of Santa Fe National Forest lands through data collection in high-use areas on numbers of large groups, RVs and large trailers, and dispersed camp sites. Information is also gathered through the collection of user fees and monitoring via a trailhead registries on the Pecos-Las Vegas District. Illegal OHV use and unauthorized access in closed areas is also monitored via law enforcement.

Trails are inventoried and monitored for condition by Forest personnel. In FY 2004, the Forest added or updated approximately 237 miles of trails to the forest-wide GIS trail inventory database. Additionally, each ranger district individually assessed maintenance needs and conditions of recreational trails. For example, the Cuba and Coyote Ranger Districts assessed a combined 40 miles of trail in FY 2004. These assessments include monitoring of trail infrastructure components such as culverts, waterbars, retaining walls, and drainage ditches. Most of this data is entered into the INFRA database, or recorded in trail crew logs. Additionally, rehabilitation projects are monitored for implementation and effectiveness of treatments, such as on the Palomas trail or in recently burned areas.

Recreational facilities and sites are also monitored at several levels. Maintenance needs are assessed and recorded on each district. This information is entered into the INFRA database and used to identify

deferred maintenance needs. Also, campsites are often assessed for condition and hazards before they are opened to the public. Campsites are also monitored for use and condition during the summer season. In wilderness areas, campsites are sometimes inventoried, and there is monitoring for fire rings, vegetation impacts, trash, and compliance with leave no trace principles. Lastly, campsite rehabilitation or construction projects are monitored for implementation.

Lastly, the Forest monitors a large variety of recreation-oriented special use permits. Special use permits include terms and conditions set to allow the use of the Forest by guides and outfitters, for special events such as the Caja del Rio Endurance Ride, for summer recreation residences, and for businesses such as the Santa Fe Ski Area. Special use permits are monitored to ensure that terms and conditions written into the permit are complied with. This often includes field-based inspections and the collection of annual data on information such as number of clients, days, fees, use conditions, etc.

## **WILDLIFE AND FISH**

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Data collection for wildlife occurs by the Forest as well as by other entities. For example, the New Mexico Department of Game and Fish does much of the monitoring of game species on Santa Fe National Forest lands. Other information sources such as breeding bird surveys and research studies such as the information collected on small mammals by the Rocky Mountain Research Station in the Santa Fe Municipal Watershed is used to help us measure and understand current trends in wildlife populations and the various effects of prescribed management actions.

Most of the wildlife and fish data collected by the Forest is through the Santa Fe National Forest Fisheries Program or through project-driven inventories. The Fisheries Program (<http://www.fs.fed.us/r3/sfe/fish/index.htm>) collects substantial amounts of data for fish species throughout the Forest, as well as information on their habitats. For example, in FY 2004 the Fisheries program collected data about fish composition and distribution in selected streams throughout the Forest. Additionally, the program measured stream temperatures in 78 miles of stream for 5 months of the year, inventoried over 42 miles of stream, and inventoried riparian areas and lakes in wilderness areas. Other monitoring by the Forest is primarily project-driven. The Forest monitors project areas for management indicator species (MIS) and sensitive species such as Mexican spotted owls and northern goshawks on a project-by-project basis.

Data collected for wildlife purposes are documented in the annual MIS report; the annual Wildlife, Fish, and Rare Plants report, and in 37 different GIS layers with information on sensitive and game species. The annual MIS report includes information on the status and trends of management indicator species identified in the Forest Plan. This information is online and available to the public at <http://www.fs.fed.us/r3/sfe/wildlife/index.html>. The annual Wildlife, Fish, and Rare Plants report includes information about projects and activities that are focused on or may have a significant impact to wildlife and fish species. This report will be made available to the public on the Forest website starting in 2006. Information on what species-specific GIS information is maintained can be found in the spreadsheet of Forest GIS resources in Appendix 1.

Wildlife and fish data is analyzed in two primary areas: the annual MIS report and in project-based NEPA analysis. The MIS report analyzes wildlife data to determine possible wildlife effects of changing plant communities and associated seral habitats. NEPA analysis uses existing data on wildlife and fish to determine the intended effects of a proposed management action or proposed mitigation on a specific

species or its habitat. This analysis is included in the project Environmental Analysis or Environmental Impacts Statement documents.

## **VEGETATION MANAGEMENT**

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Vegetation management includes monitoring of invasive species, vegetation management treatments, timber management projects, and the removal of non-timber forest products. Invasive species monitoring includes the inventory of the occurrence and spread of invasive species on the Forest as well as implementation monitoring of invasive species and noxious weed control projects. Vegetation management monitoring focuses primarily of implementation monitoring of projects as well as data collection on the effectiveness of the applied treatments.

In FY 2004, the Forest sold and removed 6,343 thousand board feet (mbf) of sawtimber and 53 mbf of pulp resulting in approximately \$13,621 in sales to the Forest. This included timber harvesting on 1,096 acres, thinning treatments on 5,051 acres, and reforestation of 137 acres. Monitoring of timber management focuses primarily on compliance and implementation monitoring of timber sales. This includes inspections of contractors to ensure the project is implemented according to established sales contracts. Depending on the project, there can be inspections of harvesting, skid trails, landings, haul roads, and rehabilitation efforts on a daily to bimonthly basis. The Santa Fe National Forest also collects data on the amount of timber products removed, which is collected Forest-wide in quarterly Timber Sale Accounting (TSA) reports and summarized annually. Lastly, data on timber-related treatments on the Forest are summarized by acreage in the SILVA database to determine progress and attainment of management standards.

The Santa Fe National Forest also collects data on non-timber forest products that result from vegetation management treatments. In FY 2004, the Forest permitted collection for 4,782 mbf of firewood, 16 mbf of fenceposts and latillas, 1,160 mbf of houselogs and vigas, and 278 mbf of miscellaneous small-diameter roundwood products. These permits resulted in over \$10,000. Additionally, \$49,000 in Christmas trees and \$22,747 in limbs, boughs, cones and miscellaneous products were sold through collection permits.

Data on non-timber product sales is collected quarterly through TSA reports. This information is also collected in the INFRA database, which records information about the issuance of collection permits on the Forest. Compliance monitoring of collection permits is accomplished selectively throughout the year.

## **ACCESS MANAGEMENT**

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There are 6,521.4 miles of road on lands managed by the Santa Fe National Forest. Of these existing roads, approximately 703.3 miles or 11 percent of these roads received maintenance in FY 2004, and 1,294.3 or 20 percent of road miles met Forest Road Management Objectives. Additionally, 16.6 miles of road were decommissioned during the fiscal year.

Monitoring of roads on the Santa Fe National Forest focuses on inventory and condition monitoring, road maintenance implementation monitoring, and effectiveness monitoring of road decommissioning. Inventory and condition monitoring is done according to the deferred maintenance protocol. This monitoring includes 100 percent of maintenance level 3, 4, and 5 roads within a 5-year period, and a

random sample of maintenance level 1 and 2 roads (between 10 or 20 roads) per year. This information is recorded and maintained in the INFRA database as well as in the Supervisor's Office and Ranger District Access Management files.

Road maintenance implementation monitoring ensures contractor compliance with road reconstruction and maintenance projects. Compliance monitoring is completed on a project-basis as well as annually for Forest Service road maintenance crews. Records are kept in project files as well as road crew daily logs.

Road decommissioning projects are monitored annually to track accomplishments and collect data on condition and evidence of use. Data from road decommissioning projects are stored in INFRA and project files.

## TABLE OF MONITORING ACTIVITIES

The following table summarizes monitoring activities performed during the 2004 Fiscal Year. The four columns consist of:

1. The resource being monitored
2. The type of monitoring action accomplished
3. Description of the monitoring event(s)
4. Ranger district where the monitoring occurred
5. Location of monitoring records or report
6. Frequency of monitoring

List of abbreviations, acronyms, and initials used:

BAER - Burned Area Emergency Response

BLM – Bureau of Land Management

GIS – Geographic Information System

GPS – Global Positioning System

INFRA – Database for integrated inventory of and financial data for its constructed features, including buildings, dams, bridges, water systems, roads, trails, developed recreation, range improvements, administrative sites, heritage sites, general forest areas and others

NEPA – National Environmental Policy Act

NRIS – Natural Resource Information System

RD – Ranger District

RO – Regional Office

SHPO – State Historic Preservation Officer

SO – Forest Supervisor’s Office

TIMS = Timber Information Management System -

WFRP – Wildlife, Fish, and Rare Plants staff

Category	Monitoring Item	Description	Area	Data/report Location	Frequency
<b>Air Quality</b>	Class I air quality monitoring	Air quality monitoring in the San Pedro Parks Wilderness	Cuba, Coyote	<a href="http://vista.cira.colostate.edu/views/Web/Sitebrowser/Sitebrowser.aspx?SiteID=34">http://vista.cira.colostate.edu/views/Web/Sitebrowser/Sitebrowser.aspx?SiteID=34</a>	Weekly
	Class I air quality monitoring	Air quality monitoring in the Pecos Wilderness	Pecos-Las Vegas	<a href="http://vista.cira.colostate.edu/views/Web/Sitebrowser/Sitebrowser.aspx?SiteID=35">http://vista.cira.colostate.edu/views/Web/Sitebrowser/Sitebrowser.aspx?SiteID=35</a>	Weekly

Category	Monitoring Item	Description	Area	Data/report Location	Frequency
	Particulate Matter	Santa Fe Watershed baseline air quality monitoring	Santa Fe watershed	NM Environment Department	Daily during prescribed fire
<b>Climate</b>	Climate	Climate monitoring at 8 Zone Remote Automated Weather Stations (RAWS) – collects temperature, precipitation, relative humidity, winds, and fuel moistures	Zone-wide (includes BIA, state, FS, and NPS lands)	Fire and Aviation Management database	Daily
	Precipitation	SNOTEL snow pack measurement	Cuba, Pecos-Las Vegas	<a href="http://www.wcc.nrcs.usda.gov/snotel/snotel.pl?sitenum=922&amp;state=nm">http://www.wcc.nrcs.usda.gov/snotel/snotel.pl?sitenum=922&amp;state=nm</a>	Daily
	Precipitation	Precipitation monitoring	Coyote	RD files	Daily
	Precipitation	Measuring snow pack; water content	Española	NRCS: Lakewood, CO and Albuquerque offices	Monthly in the winter according to USGS guidelines
<b>Facilities (Non-recreation)</b>	Inspections of non-recreational structures	<ul style="list-style-type: none"> <li>▪ Real property inspections (includes wastewater)</li> <li>▪ Condition surveys for maintenance needs</li> <li>▪ Safety inspection (selected high-risk work areas)</li> </ul>	Forest-wide	INFRA database	Annually
	Inspections of non-recreational structures	Deadman and redtop fire tower inspections	Cuba	RD, Fire files	Annually
	Fuels treatment	Acres treated – measure for both mechanical and prescribed burn treatments and according to WUI or non-WUI areas	Forest-wide	NFPORS	Annually



	Fuels treatment	Effectiveness monitoring - measurement of fuels loading before and after treatment <ul style="list-style-type: none"> <li>- 18 transects and 7 photo plots on the Sebadilla prescribed burn</li> <li>- Preparation and initial measurements Los Alamitos (7 transects) and Laguna Ortiz (5 transects, 5 photo points)</li> </ul>	Pecos-Las Vegas	RD, Fire files, burn plans	Annually for 3 years following treatments
<b>Fire and Fuels</b>	Fuels treatment	Sebadilla project implementation monitoring	Pecos-Las Vegas	RD, Burn Files	Project-based
	Fuels treatment	La Cueva Fuel Break: blocks A,B,C,D and E – Pre-project data collection species, heights, crown ration, diameters	Pecos-Las Vegas	RD, Project files	Project-based
	Fuels treatment	Consumption rates, acreage, costs, and air quality measurements for the Valle II and Santa Fe municipal watershed projects	Española	RD Burn Plans, Prescribed fire files, Santa Fe watershed implementation files	Project-based
	Fuels treatment	Deer Lake and FR 531 mechanical fuel break (130 acres)	Cuba	RD, Fire files	Project-based
	Fuels treatment	Project implementation monitoring for Chaparral WUI prescribed burn and mechanical treatment project (O’Neill, South Ojitos, South Camp, Beta, Alpha, etc. – 1,000 acres)	Cuba	RD, Fire files	Project-based
	Fuels treatment	San Juan Mesa maintenance prescribed burn (7,200 acres) implementation and effectiveness	Jemez	RD, Fire files	Project-based
	Fuels treatment	Jemez Corridor WUI (Lions site) mechanical thinning and chipping (137 acres) implementation monitoring	Jemez	RD, Fire files and Timber contract files	Project-based
	Fuels treatment	Jemez 4 WUI project: Sierra los Piños WUI area and Thompson Ridge site chipping and pile burning (170 acres) implementation monitoring	Jemez	RD, Fire files and Timber contract files	Project-based
	Fuels treatment	Santa Fe municipal watershed mastication implementation and effects monitoring for acreage, basal area, terrain, cost	Española	Santa Fe watershed Implementation Files	Project-based

Fuels treatment	Twin Hills mechanical treatment and hand thinning (100 acres) implementation monitoring	Española	RD, Contract files	Project-based
Fuels treatment	Mesa Camino / Fuertes project implementation (150 acres prescribed burn, 450 acres mechanical)	Coyote	RD, Fire files; NFPORS	Daily compliance inspections
Fuels treatment	Mesa Paleo WUI project implementation monitoring (300 acres mastication)	Coyote	RD, Fire files; NFPORS	Daily compliance inspections
Fuels treatment	Implementation monitoring for Gallina WUI Phase I (200 acres burned, 150 acres mechanical)	Coyote	RD, Fire files; NFPORS	Daily compliance inspections
Condition assessment	Vegetation fuel moisture	Forest-wide	SO and RO, Fire files	Seasonally at select locations throughout the forest
Condition assessment	Fuels loadings and condition class assessment for Sebadilla project	Pecos-Las Vegas	RD, Fire Files, burn plans	Project-based
Condition assessment	Data collection on Fire Regime Condition Class on a project basis	Forest-wide	Project files	Project-based
Condition assessment	Fuels moisture sampling (part of RAWs station)	Forest-wide	SO, Fire files	Daily during fire season
Fire research	Tree core/ring sampling for fire history information	Santa Fe watershed, Jemez Mountains	Jeff Balmat (University of Arizona)	Multi-year research study
Fire research	Fire surrogate plots for research on fuels treatment impacts to soils, wildlife, cost, etc. – 35 acres	Cuba	Carl Edminister (RMRS) – University of Arizona	5-year study
Fire research	Monument Canyon Research Natural Area – fire history, stand density, etc	Jemez	Don Falk (University of Arizona)	Multi-year research study
Fire Frequency	Collected information about where fires are ignited, how they are ignited, size, spread rates, cost of suppression.	Forest-wide	SO, RD Fire files	Incident based
Prevention	WUI defensible space fire hazard monitoring – summer home inspections	Pecos-Las Vegas	RD, Recreation files and Fire files	Annually
Prevention	WUI defensible space monitoring – Deerlake Estates	Cuba	RD, Fire files	Twice a year
Prevention	WUI analysis: prioritization of WUI areas	Forest-wide, Cuba	SO, Fire files	Annually

	Prevention	FireWise participation: meetings and information	Forest-wide	FireWise meeting notes; SO FireWise program files	Ongoing
	Air quality	Particulate matter measurement during prescribed fire	Santa Fe watershed	NMED	Project-based
	Air quality	Smoke concentration compliance monitoring	Forest-wide per project	RD, Fire project files	Project-based
	Fire closures	Fire closure effectiveness monitoring in Cerro Grande fire area	Española	SO, Fire files and closure orders	Varies, depending on public compliance of closure orders
	Fire closures	South of State Highway 126 fire closure compliance monitoring	Cuba		
	Fire closures	Forest closure due to fire danger	Jemez district (except for lower Jemez corridor, Jemez Falls campground, and La Cueva picnic area)		
<b>Heritage Resources</b>	Inventories	Inventoried archeological sites (5,506 acres)	Forest-wide	SO, Heritage files	Annually
	Project Clearances	Project clearance and site marking (195,186 acres)	Forest-wide	SO, Heritage files	Annually
	Research	PhD student research on Jicarilla-Apache heritage sites: settlement and land use information	Española	RD and SO files	Ongoing research
	Research	History of the Anton Chico Hacienda by Site Stewards	Pecos-Las Vegas	RD-Heritage Resource files	Ongoing research – began in 1999
	Site condition assessment	Monitoring of Glorieta Baldy Lookout National Register site	Pecos-Las Vegas	RD/SO-Heritage Resource files	Monthly during summer season (April – October)
	Site condition assessment	Anton Chico Hacienda inventory and stabilization by Passport in Time volunteers	Pecos-Las Vegas	RD-Heritage Resource files	Annually
	Site condition assessment	Monitoring of Hacienda, Glorieta Mesa Rock Art, La Cueva East Rock Shelter, Glorieta Mesa Rock Shelters, and Anton Chico Stone Structures by Site Stewards	Pecos-Las Vegas	RD/SO-Heritage Resource files	Monthly depending on accessibility

Site condition assessment	Gallina sites and Llaves area (8 sites)	Cuba	SO & RD, Heritage Files	Annually with Passport in Time volunteers
Site condition assessment	20 National Register sites	Jemez	SO & RD, Heritage Files	Every two years each site gets monitored
Site condition assessment	Astialakwa and Patowkwa sites (highest priority)	Jemez	SO & RD, Heritage Files	Annual basis with Univ. of Pennsylvania
Site condition assessment	Deferred maintenance assessments: 38 sites on the Jemez RD, 2 sites on Cuba RD	Cuba, Jemez	SO & RD, Heritage Files	Selected sites monitored annually
Site condition assessment	7 Heritage Priority Assets	Jemez	SO & RD, Heritage Files	Annually with the Sierra Club
Site condition assessment	San Juan and Borrego Mesas, Eagle Point, Llaves Valley (20 sites)	Cuba, Jemez	SO & RD, Heritage Files	Annual basis with Site Stewards
Site condition assessment	Site condition/disturbance monitoring: 20 National Register eligible sites, and 1 National Register listed site (Guaje Ridge ruins) in Cerro Grande fire area	Española	RD -Heritage Resource files	20 selected National Register sites assessed annually
Site condition assessment	Site condition monitoring of 10 sites in the Caja del Rio and the Polvadera Mesa area and Garcia Canyon	Española	RD -Heritage Resource files	Done on a monthly basis by Site Stewards
Site condition assessment	Tsi'Pin' monitoring for impacts due to vandalism with Site Stewards	Coyote	RD -Heritage Resource files	Incident-based
Effects monitoring	Viveash wildfire area (10 sites)	Pecos-Las Vegas	RD/SO- Heritage Resource files	Project-based
Effects monitoring	Effects monitoring of Northwest Pasture vegetation thinning treatment project (2 sites)	Pecos-Las Vegas	RD/SO- Heritage Resource files	Project-based
Effects monitoring	Tres Lagunas Pasture area road and corral construction (4 sites)	Pecos-Las Vegas	RD/SO- Heritage Resource files	Project-based
Effects monitoring	Road 18 Timber Sale and Habitat Improvement area thinning and fire activities (1 site)	Pecos-Las Vegas	RD/SO- Heritage Resource files	Project-based
Effects monitoring	Sebadilla Prescribed Burn condition assessment and effects monitoring (11 sites)	Pecos-Las Vegas	RD/SO- Heritage Resource files	Project-based
Effects monitoring	La Cueva fuel treatment project (2 sites)	Pecos-Las Vegas	RD/SO- Heritage Resource files	Project-based

	Effects monitoring	San Juan prescribed burn – monitored 10 sites	Jemez	SO & RD, Heritage Files	Project-based
	Effects monitoring	Rio de las Vacas Respect the Rio restoration project (1 site)	Cuba	SO & RD, Heritage Files	Project-based
	Effects monitoring	Mitigation effectiveness & site protection monitoring for: Forest Road 100, Forest Road 24, and Forest Road 102	Coyote, Española	RD -Heritage Resource files	Project-based
	Effects monitoring	Implementation and effectiveness monitoring: Mesa Poleo WUI II Project, and the Gallina Wildland-Urban Interface II (12 sites)	Coyote	RD -Heritage Resource files	Project-based
	Effects monitoring	Erosion control effectiveness monitoring: 20 National Register eligible sites, and 1 National Register listed site (Guaje Ridge ruins) in Cerro Grande fire area	Española	RD -Heritage Resource files	Project-based
	Effects monitoring	Mitigation effectiveness & site protection monitoring for: Santa Fe Municipal Watershed hand thinning project (5 sites)	Española	RD -Heritage Resource files	Project-based
	Effects monitoring	Mitigation effectiveness & site protection monitoring for FR 416 from Santa Clara salvage (4 heritage sites)	Española	RD -Heritage Resource files	Project-based
	Pre-treatment monitoring	Viveash Fire Salvage Sale site marking (2 sites)	Pecos-Las Vegas	RD -Heritage Resource files	Project-based
	Pre-treatment monitoring	Forest Road 85 maintenance project site marking (15 sites)	Pecos-Las Vegas	RD -Heritage Resource files	Project-based
<b>Water Resources</b>	Habitat condition / waterway function	Stream temperature monitoring: 78 miles & 7 streams	Forest-wide	SO, Fisheries files	Temperature measured every 4 hours from June to October
	Habitat condition / waterway function	Stream inventory: 42 miles total - Polvadera Creek (13.8 mi), Rio Guadalupe (9.8 mi), Rito Perro (1.8 mi), Horsethief Creek (4.6 mi), Panchuela Creek (7.7 mi), and Cave Creek (4.2 mi)	Forest-wide	SO, Fisheries files	Annually at selected sites
	Habitat condition / waterway function	High Lakes Inventory (22 lakes and potholes; 28 acres) - water quality, human use and impacts, effects of air pollution, and survivability of introduced fisheries	Pecos-Las Vegas	SO, Fisheries files	Annually

Habitat condition / waterway function	San Pedro Parks monitoring for Proper Functioning Condition (PFC) in riparian areas in the Rio de las Vacas and Rio Puerco Watersheds (7,000 feet) - focused on habitat, water chemistry, fish composition and distribution, conditions of stream habitat, water quality, and Rio Grande cutthroat trout populations	Cuba	SO, Fisheries files	Annually
Habitat condition / waterway function	Rio de las Vacas PFC monitoring and restoration project implementation: cross sections, longitudinal profiles, pebble counts	Cuba, Jemez	SO, Fisheries files	Annually
Habitat condition / waterway function	Guadalupe watershed (Rio Cebolla) riparian exclosure fencing and reseeded implementation monitoring (part of the Respect the Rio program, restoration component)	Jemez	SO, Fisheries files	Ongoing
Habitat condition / waterway function	Cecilia Creek cross-section, substrate characterization, photo points, and stream classification (2 stations, 5 miles)	Coyote	RD, Watershed files	Annually by Jemez Mountain School District and Forest Service
Habitat condition / waterway function	Rito Resumidero stream classification, stream function evaluation, cross-section, substrate characterization, and photo points (1mile)	Coyote	RD, Watershed and project files	Project-based
Habitat condition / waterway function	Polvadera Creek habitat inventory	Coyote	SO, Fisheries files	Annually
Habitat condition / waterway function	Polvadera Creek restoration project implementation	Coyote	SO, Fisheries files	
Habitat condition / waterway function	PFC monitoring on the Pecos River	Pecos-Las Vegas	SO, fisheries files	Annually

Habitat condition / waterway function	Riparian stream stabilization monitoring after disturbance on Arroyo de los Frijoles (Barranca)	Española	Law Enforcement files and RD files	
Water Quality	Impaired streams and waterway monitoring – includes measurements of stream temperature, sedimentation, nutrients, dissolved oxygen, and pH levels	Forest-wide	NM Environment Department, Surface Water Quality Bureau	7-year rotational basis
Water Quality	Campground drinking water – measurements include bacteria and nitrate samples once a year prior to opening to the public	Forest-wide	NM Environment Department, Drinking Water Bureau	Annually before seasonal opening
Water Quality	Water quality monitoring of municipal drinking water supplies (includes Gallinas, Village of Cuba, Regina, La Jara, etc.) – monitoring of microbacterial content at distribution centers, and contaminants at surface water locations	Forest-wide	NM Environment Department, Drinking Water Bureau	Monthly
Water Quality	Monitoring at the Nacimiento Mine: ground water quality (pH, heavy metal content, etc.)	Cuba	RO and RD, Minerals files	Project-driven
Water Quality	Horseshoe Springs water testing - total coliform	Cuba	RD, Recreation files	Monthly testing until September 2004
Water Quality	Campground drinking water: Clear creek campground total coliform testing	Cuba	RD, Recreation files	Tested monthly since 2002 during the summer season (May - November)
Water Quality	Campground drinking water monitoring	Jemez	RD, Recreation files	Monthly
Water Quality	Fenton Hill administrative site	Jemez	Los Alamos National Laboratory	Monthly
Water Quality	Water quality sampling study in the Santa Fe River to measure water quality parameters	Española	NM Environment Department, part of CWA 319 grant	Monthly
Water Quality	Paired watershed study: Collect water turbidity, non-organic and nutrient content, heavy metals, runoff to determine impact of vegetation treatments	Española	RD, Santa Fe Watershed files	Project-based, City of Santa Fe in Conjunction with Forest Service
Water Quality	Santa Fe Municipal Watershed water intake	Española	City of Santa Fe, Sangre de Cristo Water Division	Monthly

	Water Quality	Test well monitoring (uranium): Santa Fe municipal watershed, Buckman well field, Lower Santa Fe River	Española	City of Santa Fe, Sangre de Cristo Water Division	Annually
	Water Quality	Black Canyon campground test well monitoring – Nitrate and nitrite (annually) and total coliform (monthly during the summer)	Española	NM Environment Department, Drinking Water Quality Bureau and RD, Recreation files	Annually/monthly
	Water Quality	Wells and Coyote administration site water: drinking water compliance monitoring	Coyote	NM Environment Department	Monthly
	Water Quality	Total suspended solids data collection on the Gallinas municipal watershed and Cow Creek watersheds	Pecos-Las Vegas	RD, SO Watershed files	Project-based
	Water Quantity	Cuba, La Jara, & Regina water supply domestic water source flow (treated and sold)	Cuba	NM Environment Department	Continuous
	Water Quantity	Nacimiento Community Ditch flow measurements	Cuba	Jemez Pueblo	Continuous
	Water Quantity	Livestock permittee effluent water use- Caja del Rio livestock permittees	Española	City of Santa Fe, NM Environment Department permit	Annually
	Water Quantity	Stream flow and water quality data: Rio Grande, Chama River, and Jemez River	Coyote, Española, Jemez	<a href="http://waterdata.usgs.gov/nm/nwis/nwis">http://waterdata.usgs.gov/nm/nwis/nwis</a>	Continuous
	Water Quantity	Jemez River gauging station	Jemez	<a href="http://waterdata.usgs.gov/usa/nwis/uv?site_no=08324000">http://waterdata.usgs.gov/usa/nwis/uv?site_no=08324000</a>	Continuous
<b>Soils</b>	Soil condition	Soil condition inventory and compaction study, Resumadero campground (65 acres)	Coyote	RD, Watershed files	Project-driven monitoring
	Soil condition	Monitoring of soil moisture, compaction, and disturbance – Fuertes, Camino Corral, Gallina, and Mesa Poleo I projects	Coyote	RD, Project files	Project-driven monitoring
	Soil condition	Soil condition assessments on 5 range allotments: Ojitos, Pollywog, Gurule, Llaves, Chiquito allotments	Cuba	RD, Range files	Project-driven monitoring



	Erosion	Santa Fe watershed soil erosion monitoring (part of paired watershed study)	Española	RD, Watershed files	Project-driven monitoring, by Santa Fe watershed technical advisory group
	Visitor Use	National Visitor Use Monitoring Surveys	Forest-wide	<a href="http://www.fs.fed.us/recreation/programs/nvu/m/reports/year4/R3_F10_santafe_final.htm">http://www.fs.fed.us/recreation/programs/nvu/m/reports/year4/R3_F10_santafe_final.htm</a>	Report issued in 2004
	Visitor Use	Visitor Satisfaction of San Antonio Hot Springs management	Jemez	RD, Recreation files	Annually
	Visitor Use	Respect the Rio program dispersed campsite monitoring – visitor use and satisfaction including vehicle use, number of people, distance from stream	Cuba, Jemez	Respect the Rio annual report	Annually
	Visitor Use	Measuring OHV use and dumping to Forest areas adjacent to Highway 84, including El Invierno Allotment	Española	RD-Recreation files	Incident basis
	Visitor Use	Illegal OHV use in wilderness and non-wilderness areas, and impacts from use in designated areas	Española	RD-Recreation files	Approximately twice a month
	Visitor Use	Monitoring for campsites on the Rio Chama Wild and Scenic River portion: monitoring for unauthorized new campsites (locations, how many per year)	Coyote	RD-Recreation files	Throughout the summer (May 30– September 30)
	Visitor Use	Day sites and overnight campgrounds on the Rio Chama, Resumidero, and Rio Puerco: number of RVs and large trailers, wastewater dumping, site condition, and number of large groups	Coyote	RD-Recreation files (daily logs)	Throughout the summer (May 30– September 30)
	Visitor Use	Campsites in wilderness areas: location and number, rehabilitation needs	Coyote	RD-Recreation files (daily logs)	Twice a year
	Visitor Use	Dispersed recreation campsite inventory and site condition assessment along Pecos Wild and Scenic River	Pecos-Las Vegas	RD, Recreation files	Every 5 years
	Visitor Use	Dispersed recreation campsite inventory and site condition assessment Pecos Wilderness high mountain lakes	Pecos-Las Vegas	RD, Recreation files	Every 5 years
	Visitor Use	Trailhead registration	Pecos-Las Vegas	RD, Recreation files	Ongoing

Trails	Trail and trail infrastructure condition	Forest-wide	INFRA	Not monitored on an annual basis
Trails	Trail GPS inventory and condition monitoring	Forest-wide	GIS files	One-time trails mapping
Trails	GPS trail inventory: 187 miles	Pecos-Las Vegas	RD, Recreation files	One-time trails mapping
Trails	Trail maintenance records and maintenance needs	Pecos-Las Vegas	RD, trail logs	Annually
Trails	GPS trail inventory: Continental Divide Trail (15 miles)	Coyote	SO, GIS files	One-time trails mapping
Trails	Trail maintenance and condition assessment: Inventory and assessment of culverts, water bars, retaining walls, and drainage ditches (12 miles)	Coyote	INFRA and RD, Recreation files (seasonal crew trail logs)	Annually
Trails	Trail maintenance and condition assessment: Inventory and assessment of culverts, water bars, retaining walls, and drainage ditches (36 miles)	Cuba	INFRA and RD, Recreation files	Annually
Trails	GPS trail inventory: 25 miles	Cuba	SO, GIS files	One-time trails mapping
Trails	Palomas trail rehabilitation before/after photos	Cuba	RD, Watershed files	Project-based
Trails	Jemez National Recreation Area trail condition monitoring: Trail 137 & trail to Spence and San Antonio Hot Springs	Jemez	RD, Recreation files	Annually
Trails	Daily trail crew activities	Española	RD, Recreation work logs	Ongoing throughout the summer season
Trails	Trail condition monitoring: ongoing assessment of trail conditions for recreational use	Española	RD, Recreation files (work logs, photos)	Ongoing throughout the summer season
Trails	Trails rehabilitation effectiveness monitoring on trails impacted by fires or recently rehabilitated	Española	RD, Recreation work logs	Ongoing throughout the summer season
Facilities/sites	Deferred maintenance inventory of all developed recreation sites	Forest-wide	INFRA and RD, Recreation files	Annually
Facilities/sites	Hazard tree monitoring (2 campgrounds and 1 picnic area)	Cuba	RD, Recreation files	Annually
Facilities/sites	Site use and condition monitoring: Includes group areas, campgrounds, picnic areas, and fishing access sites, fee envelopes	Cuba	RD, Recreation files	Weekly during the summer season

<b>Recreation</b>	Facilities/sites	Dispersed site monitoring, and GPS inventory for ranger district area	Cuba	INFRA	One-time event
	Facilities/sites	Cuba Small Sites Reconstruction: Clear Creek and Rio de las Vacas campground construction and Clear Creek picnic area implementation monitoring	Cuba	RD, Recreation files	Project-based
	Facilities/sites	Dispersed site monitoring, and GPS inventory: Rio Guadalupe watershed	Jemez	RD, Recreation files	Ongoing throughout the summer season
	Facilities/sites	Hazard tree monitoring at sites and facilities	Coyote, Española	RD, Recreation files (work logs)	Ongoing throughout the summer season
	Facilities/sites	Facilities condition monitoring – Inspection before opened to the public	Española	RD- Recreation files	Annually
	Facilities/sites	Wilderness campsite monitoring: fire rings, vegetation impacts, trash, compliance with leave no trace principles	Española	RD- Recreation files	Ongoing throughout the summer season
	Facilities/sites	Campsite condition monitoring for Rio Chama Wild and Scenic River	Coyote	INFRA and RD- Recreation files	Annually
	Special Uses	Outfitter/guide permit compliance monitoring - collection of information from permittees on trips, number of clients, days, fees, use conditions, etc.	Coyote, Española, Jemez	RD, recreation files	Ongoing
	Special Uses	Permit compliance monitoring for the Santa Fe ski and associated areas including parking lot, lift line, and fences	Española	RD-Special Use Permit files	Monitored weekly throughout the winter; maintenance during summer
	Special Uses	Special Events and non-commercial group use permit compliance and effects monitoring (e.g. Caja del Rio Endurance Ride, Society for Creative Anachronism, New Mexico Trials Association, etc.)	Española, Jemez	RD, Recreation files	Event-by-event basis
	Special Uses	Outfitter/guide permit compliance inspections (3 permits)	Pecos-Las Vegas	SUDS and RD, Recreation files	Annually, selected permits
	Special Uses	Recreational residence permit compliance and site condition inspections (110 permits)	Pecos-Las Vegas	RD, Recreation files	Annually
	Special Uses	Condition monitoring and permit compliance for outfitter/guide campsites (1 permit)	Cuba	SUDS and RD, Recreation files	Goal is to monitor all permits (20 permits) annually
	Fee Demo	Fee collection receipts	Forest-wide	RD, Recreation files	Ongoing

	Fee Demo	Monitoring of four fee demo campgrounds, 2 fishing access areas, and 1 group picnic site	Jemez	RD, Recreation files	Campground hosts monitor daily, fishing areas monitored weekly
<b>Access Management</b>	Road condition	Road condition monitoring in Cerro Grande closed areas	Española	Española RD Heritage Files	Project-based, by Site Steward volunteers
	Road condition	FR 445 and 416 road condition monitoring due to use by Santa Clara Pueblo in Cerro Grande Area	Española	Española RD Heritage Files	Project-based
	Road condition	Road sign monitoring and inventory	Cuba	RD, Road files	Annually
	Road maintenance	FR 103 deferred maintenance project implementation monitoring	Coyote, Cuba	SO, Engineering files	Project-based
	Road maintenance	FR 269 maintenance needs monitoring	Jemez	SO, Engineering files	Project-based
	Road maintenance	Road maintenance on FR 376	Jemez	SO, Engineering files	Project-based
	Road closure /decommissioning	Effectiveness of road decommissioning for spurs off FR 376, FR 539, and FR 488	Cuba, Jemez	RD, Fisheries program and Law Enforcement	Project-based
	Road closure /decommissioning	Gallinas and Cow Creek watershed road closures (3 miles)	Pecos-Las Vegas	SO, Fisheries files	Project-based
<b>Wildlife and Fish</b>	Endangered, Threatened, Proposed, or regional Sensitive Species	Rio Grande Cutthroat Trout snorkel surveys for population counts at selected sites	Forest-wide	SO, Fisheries files	Annually
	Endangered, Threatened, Proposed, or regional Sensitive Species	Mexican spotted owl occupancy monitoring in the Gallinas Municipal Watershed and Glorieta areas for fuels and range projects	Pecos-Las Vegas	RD, Wildlife files	Project-based

	Endangered, Threatened, Proposed, or regional Sensitive Species	Northern goshawk occupancy monitoring in Gallinas, La Cueva, Rio De la Casa, and Glorieta	Pecos-Las Vegas	RD, Wildlife files	Project-based
	Endangered, Threatened, Proposed, or regional Sensitive Species	Mexican spotted owl monitoring: Forest Road 103 vegetation/fuels project area (1,000 acres)	Cuba	Jemez RD, Wildlife files	Project-based
	Endangered, Threatened, Proposed, or regional Sensitive Species	Mexican spotted owl Golondrino and Trail Creek PACs	Cuba	RD, Wildlife files	Annually for selected PACs
	Endangered, Threatened, Proposed, or regional Sensitive Species	Mexican spotted owl key use area monitoring on five allotments	Cuba	RD, Range files	Project-based
<b>Wildlife and Fish</b>	Endangered, Threatened, Proposed, or regional Sensitive Species	Northern goshawk population surveys in suitable habitat throughout the district	Cuba	So, Wildlife files	Annually
	Endangered, Threatened, Proposed, or regional Sensitive Species	Peregrine falcon monitoring on BMG salvage sales (500 acres)	Cuba	RD, Wildlife files	Project-based

<b>Wildlife and Fish</b>	Endangered, Threatened, Proposed, or regional Sensitive Species	Mexican spotted owl inventory surveys (9 sites, 16,500 acres)	Jemez	RD, Wildlife files and WFRP files	Project-based
	Endangered, Threatened, Proposed, or regional Sensitive Species	Mexican spotted owl monitoring at six protected activity centers (4,000 ac.)	Jemez	RD, Wildlife files	Approximately six MSO sites monitored per year
	Endangered, Threatened, Proposed, or regional Sensitive Species	Mexican spotted owl breeding activity monitoring in San Juan and Pony protected activity centers	Jemez	RD, Wildlife files	Sites vary annually
	Endangered, Threatened, Proposed, or regional Sensitive Species	Mexican spotted owl breeding activity monitoring in protected activity center post-Lakes fire	Jemez	RD, Wildlife files	Annually
	Endangered, Threatened, Proposed, or regional Sensitive Species	Northern goshawk surveys (3 sites, 50 acres)	Jemez	RD, Wildlife files and WFRP files	Project-based
	Endangered, Threatened, Proposed, or regional Sensitive Species	Peregrine falcon suitable breeding habitat sites monitored (2 sites; 1 with NM Dept. of Game & Fish)	Jemez	RD, Wildlife files	Project-based; Annually

Endangered, Threatened, Proposed, or regional Sensitive Species	Peregrine falcon breeding success monitoring	Jemez	NM Dept. of Game & Fish files	Annually
Endangered, Threatened, Proposed, or regional Sensitive Species	Jemez Mountains salamander site monitoring for dead and downed woody debris post-Lakes fire (5 acres)	Jemez	RD, Wildlife files	Project-related
Endangered, Threatened, Proposed, or regional Sensitive Species	Jemez Mountains salamander site monitoring at wildlife and stock water tanks (4 sites; 10 acres)	Jemez	RD, Wildlife files	Project-based
Endangered, Threatened, Proposed, or regional Sensitive Species	Jemez Mountains salamander site monitoring at meadow restoration sites: Oat, Pony, Hay Canyons (25 acres)	Jemez	RD, Wildlife files	Project-based
Endangered, Threatened, Proposed, or regional Sensitive Species	Mexican spotted owl monitoring in the San Pedro Mountain Landscape Area (second year survey)	Coyote, Española	RD, Wildlife files	Annually
Endangered, Threatened, Proposed, or regional Sensitive Species	Mexican spotted owl inventory for the Hyde Park WUI project area	Española	RD, Wildlife files	Project-based

Endangered, Threatened, Proposed, or regional Sensitive Species	Jemez Mountains salamander food availability and surface soil conditions research in the Cerro Grande fire area	Española	By NM Dept. of Game & Fish and Los Alamos National Laboratory	Ongoing research
Non-sensitive species populations	Black bear monitoring near recreation sites	Cuba	NM Dept. of Game & Fish	Annually
Non-sensitive species populations	Elk/deer population monitoring	Cuba	NM Dept. of Game & Fish	Annually
Non-sensitive species populations	Deer population monitoring; effectiveness of predator control program	Cuba	NM Dept. of Game & Fish	Annually
Non-sensitive species populations	Breeding bird surveys: FR 376, FR 126, and FR 144	Jemez	RD, Wildlife files	Annually, with Steve Fettig (Bandelier NM) and Jean Fair (LANL)
Non-sensitive species populations	Black swift population monitoring	Jemez	RD, Wildlife files	Annually by Hart Schwarz (Cibola NF)
Non-sensitive species populations	Bat mist netting survey on the East Fork Jemez	Jemez	RD, Wildlife files and US Fish and Wildlife Service	Periodically by Lyle Lewis, FWS
Non-sensitive species populations	Elk hunt effectiveness monitoring – Unit 6; to address hunter use	Española, Jemez, Cuba, Coyote	NM Dept. of Game & Fish	Project-based
Wildlife habitat/use	Stream mapping for fish composition and distribution (78 miles) - Polvadera Creek, Horsethief Creek, Panchuela Creek, Rio de las Vacas, Rito Anastacio, Rio Puerco, Cave Creek, and Rio Perro	Forest-wide	SO, Fisheries files	Annually
Wildlife habitat/use	Pre- and post vegetation treatment monitoring of small mammals and birds in the Santa Fe municipal watershed	Española	Rocky Mountain Research Station	Project-based



	Wildlife habitat/use	Elk movement monitoring with activated collars from the Caldera through Cerro Grande fire, Los Alamos National Laboratory, and BLM lands	Española	Los Alamos National Laboratory	Annually
	Wildlife habitat/use	Function of earthen tanks on Caja del Rio grazing allotment for wildlife use	Española	NM Dept. of Game & Fish; RD, Habitat Stamp Program files	Project-based
	Wildlife habitat/use	Bean Field tank function monitoring	Española	Wildlife, Fish, and Rare plants report	Project-based
	Wildlife habitat/use	Elk use exclosure effectiveness monitoring on the Cerro Grande Fire	Española	Los Alamos National Laboratory	Project-based
	Wildlife habitat/use	Elk salting effectiveness monitoring	Española	NM Dept. of Game & Fish	Annually
	Wildlife habitat/use	Elk use on grazing allotments – selected allotments	Coyote, Española, Jemez, Cuba	NM Dept. of Game & Fish and RD, Range files	Annually
	Wildlife habitat/use	Field review of the Camino/Corral wildlife habitat improvement project (4000 acres)	Coyote	RD, Project files	Project-basis
	Wildlife habitat/use	Big horn sheep population monitoring	Pecos-Las Vegas, Española	NM Dept. of Game & Fish	Annually by Elise Goldstein
IGC	Utilization and condition monitoring	Valle Grande Grassbank monitoring with NM State University Extension Service	Pecos-Las Vegas	INFRA and RD, Range files	Annually
	Utilization and condition monitoring	Range readiness for entry monitoring: 48 allotments (19 on Cuba, 9 on Jemez, 9 on Española, 10 on Coyote, 19 on Pecos)	Forest-wide	INFRA and RD, Range files	Annual basis on selected allotments
	Utilization and condition monitoring	Key area utilization and condition monitoring: measure pre and post stubble height in key areas (48 allotments: 8 on Jemez – 24 permittees, 19 on Cuba – 39 permittees, 9 on Española - 60 permittees, 10 allotments on Coyote - over 100 permittees [variable], 19 allotments on Pecos-Las Vegas)	Forest-wide	INFRA and RD, Range files	Annually on selected allotments

Utilization and condition monitoring	Range condition monitoring on 43 allotments (10 on Coyote, 9 on Española, 5 on Cuba, 19 on Pecos-Las Vegas)	Forest-wide	INFRA database	Annually
Range improvement / infrastructure monitoring	Range improvement condition and effectiveness monitoring on 36 allotments (11 on Coyote, 9 on Española, 11 on Jemez, 5 on Cuba, 5 on Pecos-Las Vegas): condition of fences and trick tanks	Forest-wide	RD Range files and INFRA database	20% of improvements monitored on an annual basis (except for trick tanks – 100% are monitored)
Range improvement / infrastructure monitoring	Stock tank condition monitoring (~180 stock tanks) – mapping, photo recording, and function analysis	Cuba	INFRA and RD, Range files	100% monitored in 2004, 20% on annual basis
Range improvement / infrastructure monitoring	New range fence inventory (14 miles)	Cuba	INFRA and RD Range files	Selected sites monitored annually
Range improvement / infrastructure monitoring	Inspected 3 corrals	Cuba	INFRA and RD, Range files	Every 5 years
Range improvement / infrastructure monitoring	Water facilities: monitoring of 7 livestock wells and 25+ springs	Cuba	INFRA and RD, Range files	Annually
Range improvement / infrastructure monitoring	Riparian enclosure fence monitoring: 7 enclosures on Cuba, 6 on Coyote, 1 on Española	Cuba, Coyote, Española	INFRA and RD, Range files	Annually
Compliance monitoring	Trespass livestock monitoring : 3 allotments in Cuba, 2 in Coyote, and 5 in Española	Cuba, Coyote, Española	INFRA and RD, Range files	Annually
Compliance monitoring	Grazing standard compliance monitoring in Jemez Natural Recreation Area	Jemez	RD, Range files and INFRA	Twice a year

	Compliance monitoring	Permit compliance (38 allotments: 8 on Jemez, 19 on Cuba, 11 on Coyote, 5 on Pecos-Las Vegas): Pasture rotation, authorized dates, class of animal, confirmation livestock numbers, updated brand cards, and ear tags and brand checks on livestock	Forest-wide	INFRA and RD, Range Files	Annually
	Management Analysis	Watershed/soil/forage production/utilization/wildlife habitat/ and invasive plants data collection for NEPA (5 allotments)	Cuba	NEPA Project files	Project-based
<b>Vegetation Management</b>	Invasive species	Noxious weed population inventory on 19 of the District's 26 allotments	Pecos-Las Vegas	RD, Range files	Annually
	Invasive species	Canada and musk thistle and whitetop mapping (100 acres)	Coyote	SO, GIS layer	Annually
	Invasive species	Noxious weed mapping and inventory: location and species information	Cuba, Jemez	RD, GIS/Range files	Ongoing
	Invasive species	Mechanical control for musk thistle (47 acres) implementation monitoring	Cuba	RD, Project files	Annually
	Invasive species	Noxious weed monitoring and mapping in the Cerro Grande fire area (5,000 acres) <ul style="list-style-type: none"> <li>▪ FR 144 and FR 103 noxious weed treatment (mechanical) effectiveness monitoring</li> <li>▪ American Springs Road noxious weed mapping</li> </ul>	Coyote, Española	Coyote and Española Range files; GIS Corporate database	Project-based
	Vegetation treatment	Cuba Mesa piñon -juniper mechanical thinning project implementation and effectiveness monitoring: production and ground cover data (100 acres)	Cuba	SILVA, INFRA, and RD, Range files	Annually
	Vegetation treatment	Cuba mesa sagebrush treatment implementation and effectiveness monitoring: production, ground cover, wildlife utilization (400 acres)	Cuba	INFRA and RD, Project files	Annually
	Vegetation treatment	Coyote Flats piñon -juniper thinning (80 acres) implementation monitoring	Jemez	RD, Range files	Project-based

Vegetation treatment	Gallinas Watershed/El Porvenir 319 grant coniferous thinning and burn (120 acres) implementation monitoring and effectiveness documentation (photo points)	Pecos-Las Vegas	RD, Project files	Project-based
Timber	Timber products removed (summary of sales)	Forest-wide	Timber Sale Accounting, sold and removed reports	Annually
Timber	Barillas thinning project – Timber stand improvement survey (600 acres)	Pecos-Las Vegas	RD, Project files	Project-based
Timber	Viveash salvage sale inspections (6 sales) – compliance monitoring of skid trails, landings, and rehabilitation (1,000 acres)	Pecos-Las Vegas	TIMS and RD, Project files	Project-based
Timber	Road 18 timber sale contract implementation monitoring (1000 acres) – compliance monitored twice a month for 7 months	Pecos-Las Vegas	TIMS and RD, Project files	Project-based
Timber	School House timber sale administration/harvest inspections (1 sale) – compliance monitoring of skid trails, landings, rehabilitation, and haul roads	Pecos-Las Vegas	RD, Project files, sale inspection sheet	Project-based
Timber	Mesa Camino, Mesa Poleo Phase I WUI, Gallina WUI, and Pinebetosa pre-commercial thinning (1,510 acres) implementation	Coyote	SILVA database	Project-based
Timber	Lakes salvage sale implementation monitoring	Jemez	RD and SO, Timber contract files	Project-based
Timber	Intermediate harvest implementation monitoring on Seven Springs timber sale, Redondo Campground stewardship contract, and Paliza campground (291)	Jemez	SILVA	Project-based
Timber	Cochiti fuel break and Lion fuel break and thinning project implementation monitoring (285 acres)	Jemez	SILVA	Project-based
Timber	Sawtimber offered and sold (2.8 MMBF) – from Seven Springs, Redondo Campground, Paliza, and Sandoval Ridge projects	Jemez	PTSAR and TSA databases	Quarterly
Timber	Cuba Mesa and Deerlake Estates FR 531 fuelbreak, mechanical treatment implementation monitoring (687 acres)	Cuba	SILVA database	Project-based

Timber	BMG salvage sale implementation monitoring (0.215 MMBF)	Cuba	RD and SO, Timber contract files	Project-based
Timber	Borrego Salvage sales implementation and effectiveness monitoring	Española	TIMS	Project-based
Non-timber forest products	Removed and sold fuelwood, posts, poles, miscellaneous small roundwood, christmas tress, and other small diameter products	Forest-wide	Timber Sale Accounting, sold and removed reports	Annually
Non-timber forest products	Collection permits – price of permit, terms of collection and products to be collected, dates of collection, date of issuance, issuing officer	Forest-wide	INFRA	Annually, ongoing
Non-timber forest products	District wide (mostly Chaparral site) specialized wood product collection permits (0.644 MMBF)	Cuba	PTSAR, TIMS, and INFRA	Annually
Non-timber forest products	Collaborative Forest Restoration project implementation monitoring for Hogan materials (Chaparral site)	Cuba	TIMS and RD, Timber files	Project-based
Non-timber forest products	Permitted firewood collection – 434 cords	Cuba	PTSAR database, Timber Sale Account database, INFRA	Ongoing
Non-timber forest products	Mesa Poleo WUI project specialized wood product collection permits – 0.643 MMBF	Coyote	PTSAR database, Timber Sale Account database	Ongoing
Non-timber forest products	Permitted firewood collection – 479 cords	Coyote	PTSAR database, Timber Sale Account database, INFRA	Ongoing
Non-timber forest products	Permit compliance monitoring – Christmas tree, firewood, boughs, vigas, latillas, and post permits	Cuba, Jemez	TIMS, INFRA	Ongoing
Non-timber forest products	Permitted firewood collection – 1,929 cords	Jemez	PTSAR database, Timber Sale Account database, INFRA	Ongoing
Non-timber forest products	District wide specialized wood product collection permits (1.776 MMBF)	Jemez	PTSAR, TIMS, and INFRA databases	Annually
Non-timber forest products	Permit compliance monitoring- Christmas tree, firewood, cedar posts, wildlings, surface rock collection permits	Coyote, Española	INFRA, RD files, TIMS	Ongoing

	Rehabilitation/restoration	Fuertes Meadow Restoration effectiveness monitoring (photos)	Coyote	Rd, Project files	Project-based
	Rehabilitation/restoration	Grass seeding effectiveness monitoring on the Molina fire and the Borrego fire: frequency plots to determine grass seedling success (Molina only)	Española	RD files, Molina Fire records	Annually
	Rehabilitation/restoration	Ojitos sagebrush mowing implementation and effectiveness monitoring	Coyote	RD, Project files	Annually
	Endangered, Threatened, Proposed, or regional Sensitive Species	Arizona willow plants checked for vigor and exclosure protection effectiveness in San Pedro Parks Wilderness	Cuba, Coyote	SO, Fisheries files	Annually, part of San Pedro Parks Wilderness monitoring
	Endangered, Threatened, Proposed, or regional Sensitive Species	Arizona willow and Rocky Mountain bristlecone pine documentation	Pecos-Las Vegas	SO, Fisheries files	Annually, part of Pecos Wilderness high lakes inventory
<b>Minerals</b>	Permit compliance / effects monitoring	Monitoring of active mines and wells: 45 wells and 7 mines	Forest-wide	Cuba RD, Mineral files	Quarterly
	Saleable minerals site monitoring	Rock collection permit sales monitoring	Forest-wide	RD, Minerals files and SUDS database	Annually
	Mine reclamation	Surface inspection of recently closed mines	Forest-wide	Cuba RD, Mineral files	Annually
	Mine reclamation	Mine reclamation effectiveness and water quality monitoring: Nacimiento and Las Conchas mines	Cuba, Jemez	Cuba RD, Mineral files	Annually
<b>Non-recreation Special Use Permits</b>	Utilities	Permit compliance and hazard monitoring for power and phone lines (5 permits)	Pecos-Las Vegas	RD, Fire files	Annually
	Utilities	Permit compliance and effects monitoring for electric utility structures: Glorieta Mesa and Black Mountain sites	Pecos-Las Vegas	RD, Fire files	Annually

<b>Non-recreation Special Use Permits</b>	Utilities	Los Alamos water tank construction and permit compliance monitoring	Española	RD, Recreation files	Project-based
	Utilities	Permit compliance for powerlines and electric utility structures: Tesuque Radio Company and State structures	Española	RD, Recreation files	Annually
	Special Uses	Permit compliance monitoring for FR 103 gas pipeline	Cuba	RD, Recreation files	Goal is to monitor annually
	Special Uses	Permit compliance monitoring for Phelps Dodge borrow site permit	Pecos-Las Vegas	RD, Non-recreation special use files	Project-based
	Road easements and special use permits	Permit compliance monitoring for maintenance needs on private roads (2 permits)	Pecos-Las Vegas	RD, Non-recreation special use files	Ongoing
	Road easements and special use permits	Condition and permit compliance for FR 10 Copar and Utility Block haul road use	Jemez	SO, Roads files	Annually
<b>Volunteer/ Education</b>	Education	Monitoring of program participants, activities, public contacts, and participating schools and organizations	Forest-wide	SO, Fisheries files	Annually
	Education	Respect the Rio Program (education component): interpretive campfire program attendance, contact ranger program contacts, interpretive sign placement, and other accomplishment monitoring	Cuba, Jemez	SO, Fisheries files	Annually
	Education	Leave no Trace training: number of trainers, masters, courses, and contacts for each forest	Region 3	Coyote RD, Recreation files	Annually
	Volunteer agreements	Volunteer agreement forms: cost savings data, accomplishments -	Forest-wide	RD, Recreation files	Annually
	Volunteer activity	Events with volunteer participation and ongoing volunteer efforts	Española	RD, trail crew work logs	Ongoing
	Special Events	National Public Lands Day- participants and quantity of trash collected	Española	RD, Recreation files	Annually
	Special Events	Kids Fishing Day – participants	Cuba, Jemez	SO, Fisheries files	Annually
	Special Events	Culture Day – Jemez Mountain School: number of participants	Coyote	SO, FireWise program files	Annually

	Work-time monitoring	Volunteer and partner project work-time monitoring	Forest-wide	SO, Personnel files	Annually
<b>Insect/ Disease Management</b>	Inventory	Insect/disease activity monitoring and inventory – aerial detection survey for insect damage (aerial survey map and report)	Forest-wide	RO and SO GIS files	Annually
	Evaluation	Post-treatment evaluation of bark beetle prevention spraying at Paliza family and group campgrounds	Jemez	RO, Forest Management files	Project-based
	Evaluation	Pre-treatment evaluation of Jemez Falls bark beetle prevention project	Jemez	RO, Forest Management files	Project-based
	Evaluation	Insect and disease evaluation of silvicultural management stand in Tecolote watershed	Pecos-Las Vegas	RO, Forest Management files	Project-based
	Evaluation	Pre-treatment insect and disease vulnerability evaluation for the Rendija Canyon thinning project	Española	RO, Forest Management files	Project-based
	Evaluation	Post-treatment evaluation to determine the level of mortality among the standing (leave) trees and bark beetle prevention in the Santa Fe municipal watershed	Española	RO, Forest Management files	Project-based
	Treatment	Pinebetosa mechanical dwarf mistletoe control (197 acres) project implementation and survey	Coyote	SILVA	Project-based
	Treatment	Paliza and Redondo campgrounds stewardship contract bark beetle control implementation monitoring (146acres)	Jemez	SILVA database	Project-based
	Treatment	Redondo stewardship contract (100 acres) implementation monitoring	Jemez	RD and SO, Timber contract files	Project-based
<b>Law Enforcement</b>	Illegal activities	Methamphetamine lab clean-up on the Cuba Mesa	Cuba	RO, Law Enforcement files	Incident-based
	Illegal activities	Monitoring of illegal trash dumping and illegal outfitters	Coyote	SO, Law Enforcement files	Ongoing



## FY 2004 MONITORING HIGHLIGHTS

In addition to periodic, annual, and project-based monitoring the Santa Fe National Forest, there are specific areas that the Forest focuses monitoring efforts on to better understand the effects of management actions and work more effectively toward maintaining management goals.

### SANTA FE WATERSHED

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The Santa Fe municipal watershed includes 17,520 acres of forested land, 15,493 acres of which is managed by the Santa Fe National Forest. Due to the high potential for catastrophic wildfire in the watershed and its expected impacts on drinking water quality for the residents of Santa Fe, the Forest completed an Environmental Impact Statement in 2001 for a five to ten year thinning project to reduce wildland fire risk in 7,260 acres of the non-designated wilderness areas of the watershed. This project was formed as a partnership between the Santa Fe National Forest, and the City of Santa Fe, with important support provided by the Santa Fe Watershed Association.

Currently, approximately two-thirds of the forest treatments have been completed, with the majority of this work occurring in FY 2004. Data collection has primarily consisted of baseline monitoring and compliance monitoring. Post-treatment monitoring data collection has begun and is expected to continue for several more years.

The Santa Fe municipal watershed project area is likely the most studied area on the entire Santa Fe National Forest. As a result of the decision to conduct these treatments, a number of monitoring items have been implemented so that results will provide for quality control and adaptive management.

Baseline data was collected at selected sites in the watershed before implementation of the project first began in 2002. Since that time, numerous specialized studies have been initiated as a response to EIS monitoring requirements. Two key studies are a paired watershed study and a small mammals study conducted by the Rocky Mountain Research Station, both of which continued into FY 2004.

The paired watershed study compares and contrasts watershed conditions in two watersheds (one that receives treatment and one that is left untreated) to help determine the effects of thinning to watershed health. The study monitors parameters such as soil erosion, water turbidity, and water yield. Though this study has not yet yielded results, there has been collection of its first year of post-treatment data in FY04.

The small mammal study monitors the effects of fuels reduction treatments on resident small mammals, arthropods, and birds, as well as vegetation response to treatments. This study is in its third year, and though the data do not suggest that the thinning treatments have a *significant* effect on wildlife, initial results show that mammal and arthropod numbers have slightly increased, populations of birds have increased/decreased according to species' habitat needs.

Other monitoring efforts during FY 2004 in the watershed included implementation monitoring of thinning treatments applied by contractors and Forest fire crews, and the study of these treatments on watershed parameters such as water quality, riparian health, fish populations, and the geomorphology of

the Santa Fe River. Results from studying the effects of these treatments show that there has been an occasional exceedance of stream temperature standards, but not at a level to present a hazard to resident fish populations. Additionally, it was noted that reservoir operations cause fluctuations on riparian health parameters that may mask the effects of ongoing fuels treatments. Stream gauges and precipitation monitors were added in 2004 to collect data and further the analysis of the impacts of fuels treatments.

In addition to monitoring fuels treatments in the Santa Fe municipal watershed and studying the effects of these treatments, FY 2004 included validation monitoring to determine the legitimacy of assumptions used in fire behavior models. In late 2003, a summer lightning fire ignited several dozen fires in the Santa Fe National Forest. The behavior of these fires was recorded and later used to test the fire behavior model used for the Santa Fe watershed to determine the accuracy of fire predictions. Although the fire models did not perfectly predict fire behavior, they proved to be remarkably accurate.

Another study (not directly related to the monitoring required by the EIS) is being conducted by the University of Arizona Tree Ring Lab, which expects to gain further information about fire history in the Santa Fe municipal watershed. The study began in 2004, and a report is anticipated in about a year.

To read more about monitoring efforts in the Santa Fe municipal watershed, please access the following report entitled, "Monitoring Forest Treatments in the Santa Fe Municipal Watershed: Final 319 Grant Report, September 2004." This report can be found at:

[http://www.santafewatershed.org/documents/tag/2004\\_Final\\_319.pdf](http://www.santafewatershed.org/documents/tag/2004_Final_319.pdf).

### **ROWE MESA GRASSBANK**

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Monitoring is the cornerstone of the Rowe Mesa Grassbank. Since grassbanks are based on the premise of exchanging grassbank forage for conservation benefits on nearby lands, both the grassbank and the allotments of participating ranchers must be monitored. This monitoring does not just include the measurement of ecological aspects, but data collection on social and economic elements as well.

The Rowe Mesa Grassbank monitoring program has been evolving considerably over the last several years. In 1998 when the grassbank began, the initial focus was to monitor forest and grassland prescribed burn treatments to ensure that the benefits from treatments were comparable to the benefits of forage made available to participating ranchers. This process mainly involved verifying the number of acres treated along with ecological data collected from transects using the Jornada Experimental Station line-point intercept method. Unfortunately, it was found that this approach was very costly and not flexible enough to meet the needs of the annual treatment fluctuations on the grassbank.

Although some aspects of the Jornada Experimental Station line-point intercept monitoring method will continue, in FY 2004 the Rowe Mesa Grassbank under the direction of the Quivira Coalition and the Forest initiated a series of monitoring efforts to provide a baseline of information against which to monitor change in the future. In the spring of 2004, Natural Resource Options, Inc. conducted an ecological site inventory and production monitoring for the Grassbank property. This data and monitoring framework has provided the foundation for an ongoing production-monitoring program using 18 monitoring plots twice a year (late spring and early fall). It is expected that a Grazing Response

Index to provide short-term indicators for grazing management planning will be completed by October 2005.

In addition to the quantitative ecological site inventory and production monitoring on the Grassbank, there was a complimentary survey in 2004 to produce a qualitative assessment of land health using the Jornada Qualitative Land Health Protocol ([http://usda-ars.nmsu.edu/Monit\\_Assess/monitoring.htm](http://usda-ars.nmsu.edu/Monit_Assess/monitoring.htm)). From this qualitative survey and aerial photos, a GIS-based assessment will be completed once every five years to capture major trends in the landscape.

Implementation of social and economic monitoring is also rapidly evolving. In FY 2004, an extensive phone survey of Rowe Mesa Grassbank users over the last seven years was conducted to identify concerns and user satisfaction. The results of this project were presented at the 2005 Society of Range Management Annual Meeting, and are being used to continuously improve management on the grassbank.

**JEMEZ NATIONAL RECREATION AREA**

On October 12, 1993 the Congress established the Jemez National Recreation Area (JNRA). It was developed to “conserve, protect, and restore the recreational, ecological, cultural, religious, and wildlife resource values for which the JNRA was designated”, as required by the JNRA Act. It comprises 57,650 acres, which includes approximately 9,350 acres of private lands. It is estimated that nearly 1.6 million people visit the JNRA each year.

The JNRA Management Plan and Forest Plan amendment provide the programmatic goals, standards and guidelines (management direction) for administering the JRNA. The JNRA management plan also includes a monitoring plan specific for monitoring and assessing resource conditions and management activities within the JNRA boundaries. This monitoring plan focuses on the five values noted in the purpose and need of the JNRA Act: the recreational, ecological, cultural, religious, and wildlife resource values.

The JNRA monitoring plan includes the following elements:

	<b>Units</b>	<b>Data Source</b>	<b>Intent</b>	<b>Frequency</b>
<b>Recreation</b>				
Spence and McCauley springs	Number of visitors Number of citations Cars in parking area	Field Inspections Law enforcement patrols Correspondence	Collect base line data for future use in NEPA analysis related to Spring use	Monthly during peak use (Memorial Day to Labor Day) and ongoing patrols
Off Road Vehicle Use	Number of citations	Law enforcement and Level II patrols	Ensure compliance with Travel Area designations	Ongoing patrols

	<b>Units</b>	<b>Data Source</b>	<b>Intent</b>	<b>Frequency</b>
Dispersed Use	Number of visitors Cars parking off road Amount of trash (bags) Number and location of campfire rings	Field Inspections Visitor contacts	Collect baseline data for future use on Respect the Rio project along the Guadalupe and Lake Fork Corridor	Weekly during peak use (Memorial Day to Labor Day)
Developed Facilities	Campgrounds, fishing access areas, and picnic areas	Field inspections Campground hosts	Assure that sites are not hazardous to public health and safety	Weekly during peak use (Memorial Day to Labor Day)
<b>Ecological</b>				
Riparian	Amount per acre invasive plants (salt cedar, Russian olive, etc)  Sampling points along river corridors	GIS layers Field inspections Range Reports  Field Sampling	Assure improvement is continuing – effectiveness of ongoing riparian enhancement projects in Lower Jemez and Rio Guadalupe. Control the spread of invasive, non-native species into other riparian areas  Measure riparian health, species composition and diversity, age class, plant vigor, and percent cover	Annually  Project specific basis
Soil and Water Quality	Selected water quality parameters	NMED in cooperation with Forest Service State 305 b report	Monitor water quality of streams	NMED monitors every 5-7 years
<b>Cultural</b>				

	<b>Units</b>	<b>Data Source</b>	<b>Intent</b>	<b>Frequency</b>
Archaeological sites	Sites	Field Inspection	Assure protection of National Register listed or eligible sites	Annually for listed sites, project specific basis for eligible sites
Grazing	Utilization	Field inspection	Ensure do not exceed established use level	Annually – end of grazing period
	Stubble Height	Field inspection	Ensure sufficient residual forage to support bank stability	Annually – end growing season
	Range Condition Readiness	Field inspection	Ensure plants are not grazed in critical growing periods.	Annually – beginning of grazing period
	Range Facilities	Field inspection INFRA	Proper functioning	Every two years
	Range Condition and Trend	Range analysis PU studies Utilization records	Grazing capacity and trend – compare actual and planned outputs	Every five years
	Permittee Compliance	Field inspection	Monitor compliance with annual operating instructions	Monthly
<b>Religious</b>				
Traditional use – Pueblo	Archaeology sites and landscapes	Archaeological Surveys, Ethnographic Data	Ensure protection of religious and cultural sites	On-going & project specific
			Provide access to sites for traditional cultural and customary uses	As requested
<b>Wildlife</b>				

	<b>Units</b>	<b>Data Source</b>	<b>Intent</b>	<b>Frequency</b>
Management Indicator Species	Acres	Breeding bird surveys State Game and Fish Field Inspections USDA FS Wildlife, fish and rare plant management system (WFRP)	Assure MIS habitat maintenance	Annually
Fish Habitat– Rio Grande Cutthroat trout	Stream length – mouth to headwaters	Field inspections Stream habitat inventory INRIS	Collect data on habitat to determine current condition and trend for future management of the area	Every five to ten years

Much of the monitoring requirements in the above monitoring plan are integrated as a part of existing monitoring activities on the Santa Fe National Forest. For example, MIS data is evaluated annually and a report is made available online at: <http://www.fs.fed.us/r3/sfe/wildlife/index.html>. This annual evaluation and report meets the requirements of the JNRA monitoring plan.

The most significant difference between JNRA monitoring and monitoring on other parts of the Forest lies in the area of recreation. Much of the same data is collected; however, the JNRA monitoring occurs at a greater frequency than in other areas of the Forest. For example, dispersed recreation campsites and developed sites are monitored weekly during peak use in the JNRA, whereas other areas of the forest monitors monthly or seasonally.

## EVALUATION OF MONITORING RESULTS

### 1. Key Findings from Monitoring

#### Fire and Fuels

- Mastication treatments can be effective and less expensive than traditional methods of reducing hazardous fuels with minimal impacts to soil compaction.
- In WUI areas hand pile and burn slash treatments can be controlled better than broadcast burning, however, burning piles can negatively affect soils.
- Spring burning results in less erosion than fall treatments, but appear to result in more re-growth of invasive weeds.
- FireWise events such as ‘chipping days’ have been met with significant community participation and support.

## Heritage Resources

- A total of 236 sites were monitored during FY 2004, much of this monitoring included assistance from Passport in Time volunteers and Site Stewards.
- In response to 2003 findings that monitoring was not gathering specific information about cattle related impacts to heritage sites, monitoring requirements are now being written into grazing permit re-issuance clearance reports.
- Shortcomings identified in 2003 regarding mitigation measures for prescribed burns have not been effectively addressed in some instances.

## Water Resources

- Analysis of temperature measurements found that there is a wide variation of effects related to localized conditions ranging from stream drying to maintaining temperatures for trout survival.
- Impairment status of the Jemez River watershed is primarily due to impacts from recreation. Restoration efforts including improving water flow, replanting of native vegetation, road decommissioning, alteration of dispersed campsites, and riparian vehicle and cattle exclosures have proven effective according to available data.
- Several restoration projects to re-introduce large woody debris into stream systems have proven effective toward improving stream habitat, reducing siltation, and in some instances altering stream flow toward more historic patterns.
- The education component of the Respect the Rio program has been largely successful: over 4,000 forest users have been reached through the contact ranger or interpretive campfire program, 14 interpretive signs have been developed and strategically placed on the Forest, and several other media forms have been developed to reach forest users.

## Recreation

- The Santa Fe National Forest is the 3<sup>rd</sup> most-visited forest in New Mexico, behind the Cibola and Apache-Sitgreaves National Forests.
- The typical visitor had visited the Forest almost 40 times throughout the year, which is over ten times the frequency of repeated visits by visitors to either the Cibola or Apache-Sitgreaves National Forests.
- Visitors to the Forest are generally most satisfied with the helpfulness of Forest employees and the condition of the environment.
- Visitors are least satisfied with the availability of information for the Forest and the adequacy of signage
- The use of buck and pole fencing can be an effective method for controlling the negative impacts of recreational use near riparian areas. This method was implemented on FR 376 and proved very successful toward facilitating trail rehabilitation and other stream restoration projects.
- The use of off-highway vehicles and RVs for camping is increasing in almost all areas of the Forest.

## Range Management

- The standardization of data collection and input into the INFRA database has saved significant time and allowed for more accuracy for response to Freedom of Information Act requests, accomplishment reporting, and data analysis.
- 46 percent of allotments with vegetation management objectives and within grazing allotments met or were moving toward desired conditions.

- Approximately the same number of allotments as last year (FY 2003) underwent range readiness assessments, stubble height measurements, and utilization measurements; however, there was a significant increase in the monitoring of range infrastructure and improvements.
- Livestock trespass decreased significantly from FY 2003.

## **2. Monitoring Strengths & Improvements Made**

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- Documentation of range monitoring has increased. Specifically, comprehensive use of the INFRA database and the GIS integration of range monitoring results has enabled better evaluation of current conditions, more comprehensive management planning, and allowed for more accurate and precise upward reporting.
- Monitoring on the Santa Fe municipal watershed continues has begun to show results in FY 2004. Although it is still unclear as to exactly what information is needed to effectively manage the watershed, current ongoing monitoring and research seems to be providing enough information for short- and long-term analysis of management activities in the watershed.
- FY 2004 changes in monitoring on the Rowe Mesa Grassbank have provided a foundation of information on existing conditions against which future monitoring data can be compared to assess management impacts.
- The stream monitoring/inventory staff has proven especially effective toward systematically collecting stream habitat, water quality, and fish population data. Additionally their efforts in 2004 resulted in significant increases in public participation with the Respect the Rio program and have resulted in a decrease in recreational and grazing impacts to stream habitat at selected sites.
- Use of Site Stewards and Passport in Time volunteers continues to allow the heritage resources program to succeed with demanding monitoring requirements, and prevention of impacts to historical sites as a result of management activities.
- The development and maintenance of all GIS layers on the Forest has continually strengthened the information base from which forest management analysis and decisions are made.
- Fire and fuels monitoring continues to be one of the most systematic and informative monitoring systems in place on the Forest. Specifically, information collected throughout the Forest on weather, fuels, and fire conditions is regularly used for fire risk analysis and decision-making.

## **3. Monitoring Weaknesses or Barriers**

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- Many of the Chapter 5 resource monitoring elements in the current Forest Plan are no longer relevant due to changing management priorities or where data are required from databases that no longer exist. Forest Plan revision is scheduled to begin in 2007.
- Collaboration as a public participation function is relatively new to the agency. The processes and measures for monitoring collaborative efforts for FireWise, Respect the Rio, and other programs are in varying stages of development or refinement to meet the various program goals and objectives.
- Monitoring is difficult to implement if there is insufficient or a lack of funding or personnel. This has resulted in adjustments to monitoring critical elements, such as T&E species, or incomplete monitoring of some projects.
- In some instances, populating databases with data collected in the field is delayed.
- Methods of monitoring may be different among and within resource areas such as recreation, wildlife and fish, and water resources. For example
  - Recreation data is collected at each ranger district separately and as a result, there may be differences in the degree of what information is recorded, how often, and under what circumstances.



- Wildlife and Fish data is collected by the New Mexico Department of Game and Fish, Santa Fe National Forest, Los Alamos National Laboratory, Fish and Wildlife Service, and in some cases Forest Service Region 3 personnel. The GIS database and the annual MIS Report aggregate data collection from each of these organizations for specific species, but this data remain dispersed for several other game species. Additionally, most data collection for sensitive species is project-based.
- Water resource information is collected by a number of organizations including municipal water associations, the Surface Water Bureau and Drinking Water Quality Bureau of the State of New Mexico, the Santa Fe National Forest, U.S. Geological Service, and Los Alamos National Laboratory. Furthermore this data is regularly collected and analyzed at different temporal and spatial scales for various regular reports required for separate purposes (i.e. Safe Drinking Water Quality Act, Clean Water Act, project-based mitigation requirements).

#### **4. Progress toward Desired Conditions**

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In FY 2004 the Santa Fe National Forest continued to make progress toward desired conditions in the following areas:

##### **Fire and Fuels**

Continuing to reduce fuel loads and protect WUI areas and watershed values.

- In FY 2004, the Santa Fe National Forest thinned 14,265 acres; over 60 percent of which was done in WUI areas
- Prevention activities such as FireWise meetings and defensible space assessments have continued to increase in number with local communities

##### **Range Management**

In the area of Range Management, there are 51 approved allotment management plans, 10 of which were approved in FY 2004.

- 51 of the 73 allotment management plans were administered to standard

##### **Recreation**

Recreational trails, dispersed sites, and developed sites have continued to be inventoried and monitored to ensure adequate conditions

- 237 miles were added to the GIS trail inventory
- According to visitor surveys, visitors to wilderness areas, developed day use areas, and developed overnight areas were adequately satisfied with employee helpfulness and condition of the environment, but least satisfied with availability of recreation information and signage

##### **Heritage Resources**

Heritage resources were monitored throughout the year to collect data on existing cultural sites and prevent damage from management activities

- 5,506 acres were inventoried
- 195,186 acres were monitored for project clearances

## Access Management

Existing roads in the Forest continued to be maintained to standard and decommissioned to decrease erosion and forest fragmentation and protect water quality

- 703 miles of road received maintenance work
- Forest Road Management Objectives were met on 1,294 miles of road
- 17 miles of road was decommissioned

## Wildlife and Fish

Sensitive species surveys and other wildlife data was collected throughout the forest to ensure the protection of wildlife habitat and avoidance of impacts

- 30 Mexican spotted owl surveys and inventories were completed
- 3 peregrine falcon occupancy surveys and one breeding success survey was completed
- Northern goshawk surveys were completed on a project-bases throughout the Forest
- 6 Jemez Mountains salamander surveys were completed

## 7. Public Involvement

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FY 2004 included a marked increase in public involvement in a number of areas:

- At least 61 heritage sites were monitored and/or assessed with the assistance of Site Stewards, Passport in Time, or Sierra Club volunteers. Most of these sites were monitored annually; however, at least 10 of them were monitored by Site Stewards on a monthly basis.
- Over 4,000 people were involved in the Respect the Rio program, which involved fish population snorkel counts, the contact ranger program, interpretive campfire programs, and other restoration activities. Even more people were reached through the proactive multi-media campaign that included interpretive signs near problem areas, the Respect the Rio website, newspaper articles, a native fish aquarium, and handouts distributed through local restaurants.
- Several volunteers continued their participation in helping map, clear, and maintain trails.
- Hundreds of local residents participated in annual Forest events such as Culture Day, Kids Fishing Day, National Public Lands Day, and leave no trace trainings.
- Monitoring by state agencies, municipalities, university students, other federal agencies, and local volunteers helped the Forest maintain and grow its monitoring program in a number of areas including wildlife and fish, water quality, heritage resources, and fire and fuels.
- Range permittees helped monitor range resources on a number of occasions to supplement annual Forest Service monitoring and further protect resources.
- Campground hosts effectively monitored the use and compliance of developed recreation sites.
- The ongoing collaboration with planning, implementation, and monitoring of the Santa Fe Municipal Watershed Project has continued throughout FY 2004.
- Monitoring and management of the Rowe Mesa Grassbank has continued throughout FY 2004 as an innovative partnership-based range management project.

**APPENDIX 1: Geographical Information Systems (GIS) Layers**

Monitoring Category	GIS Layer	Core*	Related DB	Status
<b>FIRE</b>	<b>Fire Aviation Hazards</b>			<b>From Feb 2004, military &amp; others</b>
	Fire Dispatch Zones			
	Fire Fuel Models			Incomplete & needs updating/verification
	Fire Fuels Treatments/Rx Burn	Natl	FACTS	Draft. Being created/updated in 2005
	Fire Helicopter Dipsites			
	<b>Fire Helicopter Dipsites</b>			<b>Forestwide</b>
	Fire History/Occurrence (points)	Natl	FIRESTAT	1980s - 2004
	Fire History/Occurrence (polys)	Natl	FIRESTAT	Updated through 2003
	Fire Management Units (FMU)	Natl	NFMAS	Still being updated as of 3/05
	Fire Planning Areas (FPA)	Natl	NFMAS	Still being updated as of 3/05
	Fire Military Training Routes for aerial hazard map			From 2003 - Can be updated every 28 days.
	Fire Regime Condition Class			DRAFT Jemez Mountains, from TNC
	<b>Fire Regime Condition Class</b>			<b>DRAFT Jemez Mountains, from TNC</b>
	Fire Severity			Fire severity from misc. fires that did a severity map - combined forestwide
	Fire Structures & Driveways			Points from CFFs and polys from Sandoval & Los Alamos Counties; points from Mora & Santa Fe Counties under /fsfiles/ref/library/gis/forest/county
Fire WUIs - USFW Approved			Complete (being updated in 2005)	
<b>HERITAGE</b>	Archaeological sites, surveys, mgt area I	Natl	INFRA	SENSITIVE
	Heritage Resource Survey Areas	Natl/Reg	INFRA	Complete - and continuously updated
	Heritage Sites (lines, pts, polys)	Natl	INFRA	Needs to be pulled from state DB
<b>WATER</b>	<b>Water - assemblage of useful hydro layers</b>			<b>ArcMap layer file assembled by Danielle Montes to make it easier to find available hydro layers (riparian, waterbodies, etc.)</b>
	Waterbodies			Stocktanks eastside
	<b>Water Curvature (concave = neg, convex = pos, flat ~ 0)</b>			<b>From 10 meter DEM</b>
	Water Evaporation (annual)			From UNM, 1:500,000+ scale
	Water Floodplains			From TEU query
	Water NMED 303d & 305b Impaired Lakes/Reservoirs			From NMED (2004), entire state of NM
	Water NMED 303d & 305b Impaired Reaches			From NMED (2004), entire state of NM
	Water NMED Benthic Sites			

	Water NMED Category 4a Impaired Reaches			From NMED (2004), entire state of NM
	Water NMED fish monitoring sites			
	Water NMED Surveyed Reaches			
	Water NMED water qual monitor. Sites			Less detailed
	Water NMED water qual monitor. Sites			More detailed but not complete
	Water Points	Natl	NRIS	Needs updating/verification
	Water Precipitation, 1961 - 1990			From OSU, 1:500,000 scale, PRISM model
	Water Precipitation, Historical 1931 - 1960 (annual)			From UNM, 1:500,000 scale
	Water Riparian Areas			From Wayne Robbies TEU Query & buffered perennial streams 100 ft
	Water Riparian Vegetation Pecos & Rio Grande			From National Wetlands Inventory - draft as of 9/04
	<b>Water Stream-Road-TEU erosion prone areas analysis</b>			<b>Contact Danielle Diehl for specific questions</b>
	Water Streams, 100k			100k layer
	Water Streams, 24k	Natl/Reg	NRIS	Complete, now with names, classes
	Water TEU, Wetsoils all year			TEU Query
	Water Wells			From University of NM
	Watersheds, HUC 4s and 5s	Natl	NRIS	Delivered by RO 12/02
				DRAFT
<b>RECREATION</b>	<b>Rec. NVUM (natl visitor use monitoring)</b>		<b>NRIS</b>	<b>Zip codes where visitors to SFNF came from, based on 2003 surveys</b>
	Rec. Opportunity Spectrum			Needs verification/updating (SPNM updated 2004)
	Rec. Scenic Integrity Classes		NRIS	Not done (VQO west in GIS)
	Rec. semi-primitive non-motorized (SPNM) areas			Needs verification/updating (SPNM updated 2004)
	<b>Rec. Sites linked to Infra</b>			<b>Linked to Infra GC Dev Rec Sites table</b>
	Rec. Sites, Developed	Natl	INFRA	Complete
	<b>Rec. Sites, Developed</b>			<b>Symbolized by feature type</b>
	Rec. Sites, Dispersed			Working on w/Districts (Coyote done)
	Rec. Trails	Natl/Reg	INFRA	Continually updating w/ GPS; some discrepancies with Infra need to be fixed
	<b>Rec. Trails</b>			<b>Live link to Infra ii_trail_linear_events table</b>
	Rec. Wilderness Areas	Natl/Reg	INFRA	Needs surveyed boundaries updated, waiting for Chris Chavez
	<b>Riparian areas queried from TEU layer</b>			<b>Wayne Robbies TUE query</b>
<b>ROADS</b>	Roads RAP - forestwide levels 3&4			For the most part final as of Jan. 2005
	Roads RAP - districts			Coyote, Cuba, Espanola draft as of Jan. 2005
	Roads Existing, plus live link to Infra database	Natl/Reg	INFRA	Cleaning up in 2004 and needs INFRA link

		Roads linked to Infra			Live link to infra table for maintenance level, etc.
		Units/Survey	Natl/Reg	NRIS	Complete
<b>WILDLIFE</b>	Wildlife Bald Eagle Overwintering Areas	Natl	NRIS Fauna	Fauna FEATURES	
	Wildlife Black Swift Nesting Areas	Natl	NRIS Fauna	Nest sites are not entered into Fauna (biologists' consensus)	
	Wildlife Features, Current (various species)	Natl	NRIS Fauna	PACs, PFAs, habitat, conservation areas, overwintering areas, etc.; Fauna FEATURES	
	Wildlife Features, Historic (various species)	Natl	NRIS Fauna	Management Territories, decommissioned PACs, Fauna Historic Features	
	Wildlife Game Management Units			2004 statewide hunting units	
	Wildlife Goshawk Mgt Areas (PFAs)	Natl	NRIS Fauna	Fauna FEATURES	
	Wildlife Goshawk GFAs	Natl	NRIS Fauna	Not added to Fauna, maybe obsolete	
	Wildlife Goshawk Call Pts/Rtes	Natl	NRIS Fauna	Call points and routes	
	Wildlife Goshawk Surveys	Natl	NRIS Fauna	Some in Fauna SURVEYS polygons, too many survey points to add individually	
	Wildlife Goshawk Observations	Natl	NRIS Fauna	Observations associated with nest sites not entered into Fauna; Fauna OBSERVATIONS	
	Wildlife Goshawk Nests	Natl	NRIS Fauna	Nest sites are not entered into Fauna (biologists' consensus)	
	Wildlife Jemez Salamander Surveys	Natl	NRIS Fauna	Fauna SURVEYS polygons, too many points to add individually	
	Wildlife Jemez Salamander Observations	Natl	NRIS Fauna	Too many points to add individually into Fauna OBSERVATIONS	
	Wildlife Jemez Salamander Conservation Areas	Natl	NRIS Fauna	Fauna FEATURES	
	Wildlife Jemez Salamander Occupied Stands	Natl	NRIS Fauna	Too many polygons to add individually to Fauna FEATURES	
	Wildlife Management Indicator Species (MIS)	Natl	NRIS Fauna	Fauna does not accept multi-species info.	
	Wildlife Migratory Birds			Important Bird Areas (IBA's), overwintering areas (fauna does not accept multi-spp info)	
	Wildlife MSO Surveys	Natl	NRIS Fauna	Surveys (2001 - 2004); Fauna SURVEYS	
	Wildlife MSO Nests	Natl	NRIS Fauna	OBSERVATIONS except associated with nest sites not entered into Fauna (biologists' consensus)	
	Wildlife MSO Observations	Natl	NRIS Fauna	OBSERVATIONS except associated with nest sites not entered into Fauna (biologists' consensus)	
	Wildlife MSO Critical Habitat	Natl	NRIS Fauna	Fauna FEATURES	
	Wildlife MSO Protected Habitat			Too many polygons to add individually to Fauna FEATURES	
	Wildlife MSO Habitat Model			From Terry Johnson, based on 30m DEM and precip	
Wildlife MSO Management Areas (PACs)	Natl	NRIS Fauna	Fauna FEATURES		
Wildlife NM Meadow Jumping Mouse	Natl	NRIS Fauna	Too many polygons to add individually into Fauna FEATURES		

	Wildlife Observations (various species)	Natl	NRIS Fauna	Large data set, 33k+ records
	Wildlife Pine Marten Surveys	Natl	NRIS Fauna	Fauna SURVEYS
	Wildlife Pine Marten Observations	Natl	NRIS Fauna	Fauna OBSERVATIONS
	Wildlife Peregrine Falcon Habitat (sens zones A-D)	Natl	NRIS Fauna	May change, do not add to Fauna at this time (5/05)
	Wildlife Peregrine Falcon Proposed Habitat			Not done
	Wildlife Peregrine Falcon Management Areas	Natl	NRIS Fauna	Habitat (sensitive zones A-D); Fauna FEATURES
	Wildlife Raptors Observations	Natl	NRIS Fauna	non-TES observations: flam owl, golden eagle, great horned owl, long ear owl, pygmy owl, sawwhet owl, screech owl; Fauna OBSERVATIONS
	Wildlife Rio Grande Cutthroat Trout	Natl	NRIS WATER	surveys, stream occupancy, stream features
	Wildlife Southwestern Willow Flycatcher	Natl	NRIS Fauna	Fauna SURVEYS
	Wildlife Surveys various species	Natl	NRIS Fauna	Fauna SURVEYS
	Wildlife TES Plant Species	Natl	NRIS TES	observations: arizona willow, fleabane, holy ghost ipomopsis, bunchberry dogwood
	Burro Territory			Fauna FEATURES
<b>RANGE</b>	Range Allotments and Pastures	Natl/Reg	INFRA	Complete - except need updates from Espanola
	Range Capacity			Generated from TEU, etc.
	Range Improvements	Natl	INFRA	SOGIS & Districts working on
	Range Invasive Plants (nox. weeds)		NRIS	Sites collected in 2002 - 2004
	Range Key Areas		INFRA	Still need Espanola's
<b>VEGETATION</b>	<b>Forestry Existing Veg Types</b>			<b>Shaded by vegetation type</b>
	Forestry Existing Vegetation	Natl/Reg	NRIS	Needs clean up of duplicates and missing stands...
	<b>Forestry Live link to FSVeg</b>			<b>Live link to FSVeg NRW Measurement Settings Table</b>
	Forestry Old Growth - Designated			Areas from 1987-1992 NEPA assessment that ID'd potential areas to manage for OG
	Forestry Old Growth - Possible			RSAC/Jessica/Lisa effort using remote sensing to ID possible OG areas. NOT GROUND TRUTHED
	Forestry Old Growth in Surveyed Stands			Based on Regis Cassidy's RMRIS query, revised for FSVeg tables; only available in stands that have had a stage 2 stand survey
	Forestry Pest Damage			1998 - 2004 GIS layers from aerial detection
	Forestry Potential Natural Veg			Needs verification and source info
	<b>Forestry Stage 2 Stand Exam Info (VSS/habitat struc, mistletoe, insect damage, board feet, tree size, stand age...)</b>			<b>EV_BASE GIS layer has a "live link" to RMRIS_RMSTAND_POLY_SUM Oracle table (last updated 11/03)</b>

	Forestry Vegetation Classification			From 1997 Landsat Imagery, westside only
	Forestry Vegetation Stand Structure 5 & 6			Only VSS 5 & 6 in stage 2 surveyed stands available
	Treatments		NRIS	Draft. Being created/updated in 2005
<b>MINERALS</b>	Minerals Mines Sites		INFRA	Abandoned and active (also in GNIS)
	Minerals Mines, Abandoned		INFRA	Complete
	Minerals Oil-Gas Dev., Wells		INFRA	Some in CFFs
	Minerals Oil-Gas Lease Areas		INFRA	Complete
<b>LANDS</b>	Lands Admin Unit (forest, district bdy)	Natl	ALP	Complete, but needs conversion to ALP
	Lands Geopolitical Units (county, state, BIA, etc.)	Natl	ALP	Needs GIS work to migrate to national standard for 24k layer, but 100k available
	Lands Land Grants			
	Lands Ownership	Natl	ALP	Complete
	Lands PLSS (township/range/section)	Natl	ALP	Needs GIS work to migrate to national standard
	Lands Special Mgt. Areas	Natl/Reg	ALP	Needs updating
	Lands Utilities (power lines, elec. Sites...)			Needs updating for eastside. Westside from Jemez Co-op. Base data from CFFs.
<b>GEOLOGY</b>	Geology			1:500k from USGS/NMBM
	Geology - paleontologic sites (pts)			Collected from UNM; accuracy varies greatly; should be available summer FY05
	Geology - volcanic vents			1:500k from USGS/NMBM
	Geomorphic Monitoring Sites			From NMED query, April 2004
<b>MANAGEMENT AREAS</b>	Planning Ecosystem Mgt Areas			Complete
	Planning Inventoried Roadless Areas			Complete
	Planning Mangement Areas	Reg		Complete, but need Chris Chavez to update some boundaries (e.g. wilderness, WSR, NRA)
<b>GIS</b>	<b>GIS Ref 100k Quads</b>			
	GIS Ref 1935 Air Photo			Flown in 1935, roughly georeferenced
	<b>GIS Ref 24k Quads</b>			<b>Also available with hillshade</b>
	GIS Ref 24k softcopy quads/DRGs			Complete - most updated in 2002
	GIS Ref 24k softcopy quads MOSAIC			Mosaiced for east and west sides
	GIS Ref administrative sites		INFRA	Complete
	<b>GIS Ref Color shaded relief</b>			<b>Using 30 meter DEM</b>
	GIS Ref Contours, 40ft			Used 30 meter DEM
	GIS Ref Digital Elevation Model	Natl		Complete (10 & 30 meter)
	GIS Ref Digital Ortho Quads (DOQs)			Complete Flown 1996 - 1997, 1 meter
	GIS Ref Digital Ortho Quads - MOSAIC			East, west, and central mosaics
	<b>GIS Ref DOQs</b>			<b>Forestwide 1996-1997 Orthophotos</b>

GIS Ref Forest Service Shield			Shapefile shaded green and yellow
GIS Ref Forest Visitor Maps (E&W) with hillshade			
GIS Ref Satellite Imagery			2000 - 2002 images
GIS Ref SBS scanned visitor map			Forest Visitor Maps, east and west
GIS Ref Towers			Lookouts, radio & cell towers, etc.
GIS Ref Zip Codes			From 2000