United States Department of Agriculture | Forest Service | Southwestern Region | 517 Gold Avenue SW. Albuquerque, NM 87102-0084

Reply to: 4060

Date: AUG 2 1990

Subject: Tesuque Watershed Proposal Research Natural Area

To: Forest Supervisor, Santa Fe National Forest

Enclosed is a report by Reggie Fletcher on the Research Natural Area Task Group's findings regarding the potential of the Tesuque Watershed for designation as a Research Natural Area.

This report will be forwarded to the Research Natural Committee upon receipt of Forest input. No recommendations will proceed until that time.

Reggie Fletcher

REGGIE FLETCHER
Regional Ecologist

Enclosure

cc:
Earl Aldon, RMS Albuquerque

TESUQUE WATERSHED RESEARCH NATURAL AREA POTENTIAL
AUGUST 1, 1990

At the request of th Forest Supervisor, on July 27 and 28, 1989, several areas on the Santa Fe National Forest were investigated for Research Naatural Area (RNA) potential by Earl Aldon, George Garcia, Reggie Fletcher, and Jerry Elson acting as representatives of the Research Natural Area Task Group.

Among the sites visited were several in the vicinity of the Santa Fe Ski Basin and the upper Tesuque watershed. The localities are identified on the enclosed map as Area A,B,C,D and E and Sites 3,4 and 5. Several of these localities were identified in the Santa Fe Forest Plan as having possible RNA potential due to an extensive history of scientific study. A listing of research publications from studies conducted in the Tesuque watershed area is enclosed.

Also enclosed is the April 11, 1989, request from the Santa Fe Forest Supervisor to the Regional Forester identifying the localities to be investigated. The Tesuque watershed locations investigated were modified to include actual sites used for study to fulfil the intent of the original request presented on pages 45 and 46 in the Santa Fe Forest Plan.

None of the localities were by themselves sufficiently large or unique to merit designation as an RNA. The Objectives and Policy section of the Forest Service Manual (FSM 4000) for RNA's is enclosed. However, although all participants had been in the Tesuque watershed a number of times none of us had viewed the watershed in the light of its unique research potential. What we found was unexpected.

Much of the success of past research in the Tesuque watershed was due to its integrity. Several wiers are in place to measure various portions of the watershed. These wiers are still in fairly good condition with some usable without repair. This contributes significantly to the research potential of the watershed. While we first looked at sections of the watershed its importance only came to light when we put the pieces together as a single unit.

The RNA potential for the watershed centers around two themes. First, the watershed burned in a holocaustic fire near the turn of the century. The inherent productivity of the soils in the watershed is low which has been reflected in the slow rate of succession toward confier forest. Sections of the watershed remain as a dry, windswept meadow, pure aspen, mixed aspen with returning conifers and as pure mixed-conifer and spruce-fir stands. This slow rate of succession with varied composition provides a unique opportunity to study long term fire succession.

The second theme relates to the position of the watershed both in elevation and in its proximity to Santa Fe. This provides an ideal opportunity to study effects of air pollution in the Southwest. An interagency conference on global climate change was held June 1 and 2 of this year in Albuquerque. At that conference it was proposed that a consortium be formed to use the entire Rio

Grande Basin as a baseline from which to study effects of clmate change. While the pieces of this effort have yet to come together, it appears the USGS has submitted a proposal to re-instrument the Tesuque watershed.

Maps delineating several RNA alternatives are enclosed. While the failure to designate the watershed or portions thereof as an RNA should not in any way be considered catastrophic, the RNA potential of at least alternative one is considered unique for the Southwest in several ways. These are: 1) The watershed's high elevation position in close proximity to a large population center coupled with a large mountain mass which makes it of greater study value than the San Francisco Peaks near Flagstaff. 2) The opportunity for fire succession studies with variations from burned old-growth to open slopes. 3) Wiered watershed sections with recorded histories. 4) A long-standing history of research activities.

A brief discussion of the mapped alternatives follows. Alternative one is preferred. This alternative includes the upper Big Tesuque watershed and all of the studied sites in that watershed. It includes the full range of communities and successional stages present. The spruce-fir stand along the east rim is an excellent example of old growth and exhibits at least two major fire events. This alternative includes at least two wiers with a recorded history.

Alternative two includes all of the fire successional study opportunities but drops the weir adjacent to Rte 101.

Alternative three segments the watershed into two pieces. It attempts to retain the study sites and one weir but looses the major portion of the aspen component as well as the weir along Rte 101. It is not known whether the Washington Office would approve designation of an RNA in two pieces.

Alternative four is also a segmented version. Only a small strip along the eastern ridge and the small weired drainage are included. While this alternative attempts to include some of the more important sites its utility is questionable. Little of the fire succession opportunities would be available and potential edge effects are considerable.

Alternative five is an optional additive area to any of the above choices but would be particularly valuable if alternatives 3 or 4 are selected. This is a small weired drainage consisting primarily of aspen.

If Forest personnel select other than Alternative one, further investigations as to utility of the selected alternative need to be made. There is some RNA potential in all of the presented alternatives. However, in some alternatives this potential may be too reduced for designation approval.

Reggie Fletcher
Regional Ecologist

United States Department of Agriculture | Forest Service | Santa Fe National Forest

Reply To: 4000 Date: April 11, 1989

Subject: Research Natural Area Proposals

To: Regional Forester, Southwestern Region

During the Land Management Planning process a coalition of environmental organizations proposed to us several areas which they felt would make good Research Natural Areas. I have enclosed their proposals for your consideration. The committment I made to the environmental coalition is that we would submit their proposals to the Regional Research Natural Area committee for review and consideration of appropriate candidates to be included into the Reasearch Natural Area system.

Jon L. Burnstead

for MAYNARD T. ROST
Forest Supervisor
Santa Fe National Forest

enc.

RESEARCH NATURAL AREAS

The Preferred Alternative would designate two research natural areas -- Canada Bonita RNA and Mesita de los Ladrones RNA -- in addition to the existing Monument Canyon RNA. We support these nominations, which are excellent samples of mountain meadow (Thurber fescue type) and of Juniper Savanna. However, they do not come close to covering needs described in the 1983 Regional Guide, and the Guide in turn does not cover all the major community types in northern New Mexico forests. We think that all major types, and as many minor habitats as practicable, should be represented in the RNA system to provide a catalogued genetic reservoir, and to concentrate research in well-described areas. We propose the following, additional to Bonita and Ladrones:

1. Little Tesuque RNA, for pinon-juniper. On the north side of N.M. 475 (Aspen Basin Road) in T17N R10E Section 3, at 8000 to 8400 feet elevation, this plot was selected by James Gosz, and has been monitored since 1972. It is already designated by the Forest -- RNA designation is only a formality -- but, we think, an important formality, since the designation will give clearer protection and will attract additional researchers.

2. Pacheco RNA, for aspen and aspen-spruce succession. On the east side of N.M. 475 a mile southwest of Aspen Basin, in T18N R11E Sections 17-18, at 10,200-10,800 feet elevation, this is another of James Gosz' plots, and remarks under #1 apply to it. This plot will be useful in monitoring for any future acid rain effects.

3. Tesuque Peak RNA, for ridge-top spruce and bristlecone pine. Extends along the crest of the Santa Fe Mountains from south of the Tesuque Peak radio towers to include a spruce-covered knob and a saddle with a grove of mature bristlecone pine. This includes two small plots of J. Gosz', to which the above remarks apply.

4. White Pine RNA, for a nearly pure stand of southwestern white pine. Such stands have been reported in T17N R13E Section 11 and in T18N R14E Section 20-29, both of which are in out-of-the-way corners of the Gallinas Creek drainage northwest of Las Vegas. Unlike the community types named above, this one is unusual, and may be limited to Santa Fe National forest. The tree species, however, is widespread. On both counts, such a natural area will be of

considerable research interest. We have not yet been able to delineate this RNA; depending on which site is chosen it might run from 300 to 600 acres.

5. Pecos Baldy RNA, for alpine and timberline vegetation and for the unnamed subalpine lake at the foot of the south face of the mountain; boundaries should include the west part of the crest down to and including the lake. The area is in T20N R12E Section 34. Although most of the Forest's alpine area is protected by wilderness designation, additional status as an RNA will pinpoint an area for detailed, cumulative studies, and will preclude any trail-building or other development. Unlike East Pecos Baldy, this western ridge is infrequently visited by hikers. It is intensively used by bighorns. The south face of the ridge is a mosaic of subalpine and alpine community types, ideal for study of shifts through time. The lake is the only known home of an undescribed subspecies of the tiger salamander complex.

6. Mesa Gallina RNA, 200+ year-old white fir with aspen. Rocky Mountain maple and Douglas fir. This 370-acre area is near the Clara Road in T21N R6E Section 30. It was proposed to protect a sample of its habitat type by W.H. Moir in 1974. In the Preferred Alternative the area is in management category E (dispersed recreation, visual, and timber).

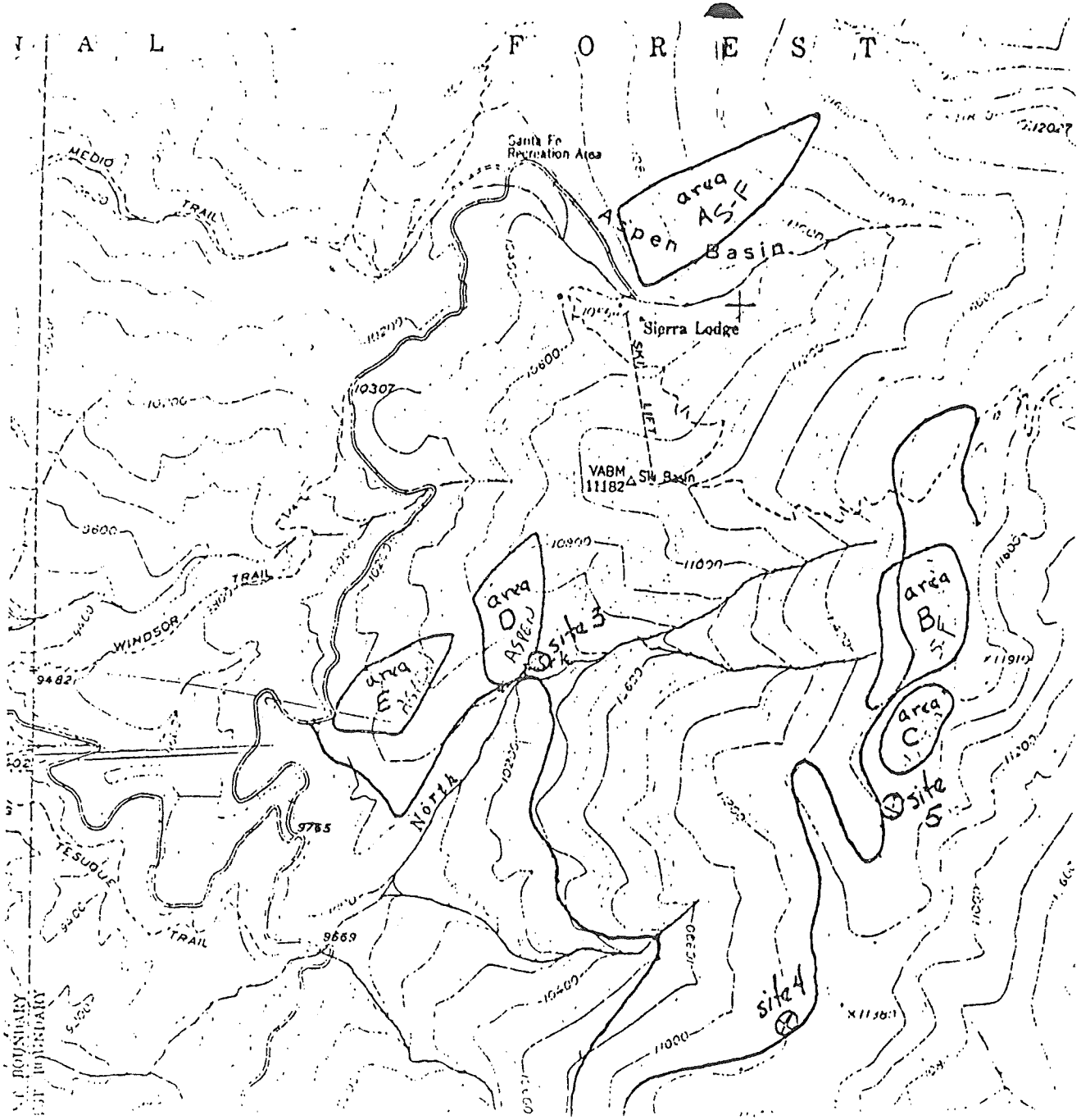
While these six are not all of the research natural areas that we think should be added to the Plan, they are all the ones for which we can now state fairly definite locations.

In addition to research natural areas, we think that a study area ("zoological-botanical special management area"?) should be designated in Pajarito Canyon west of Los Alamos to protect species of special interest, as described in alternative 5 (DEIS p. 134 and Alternative 5 map). This area may not meet RNA standards, but will be a good place for research.

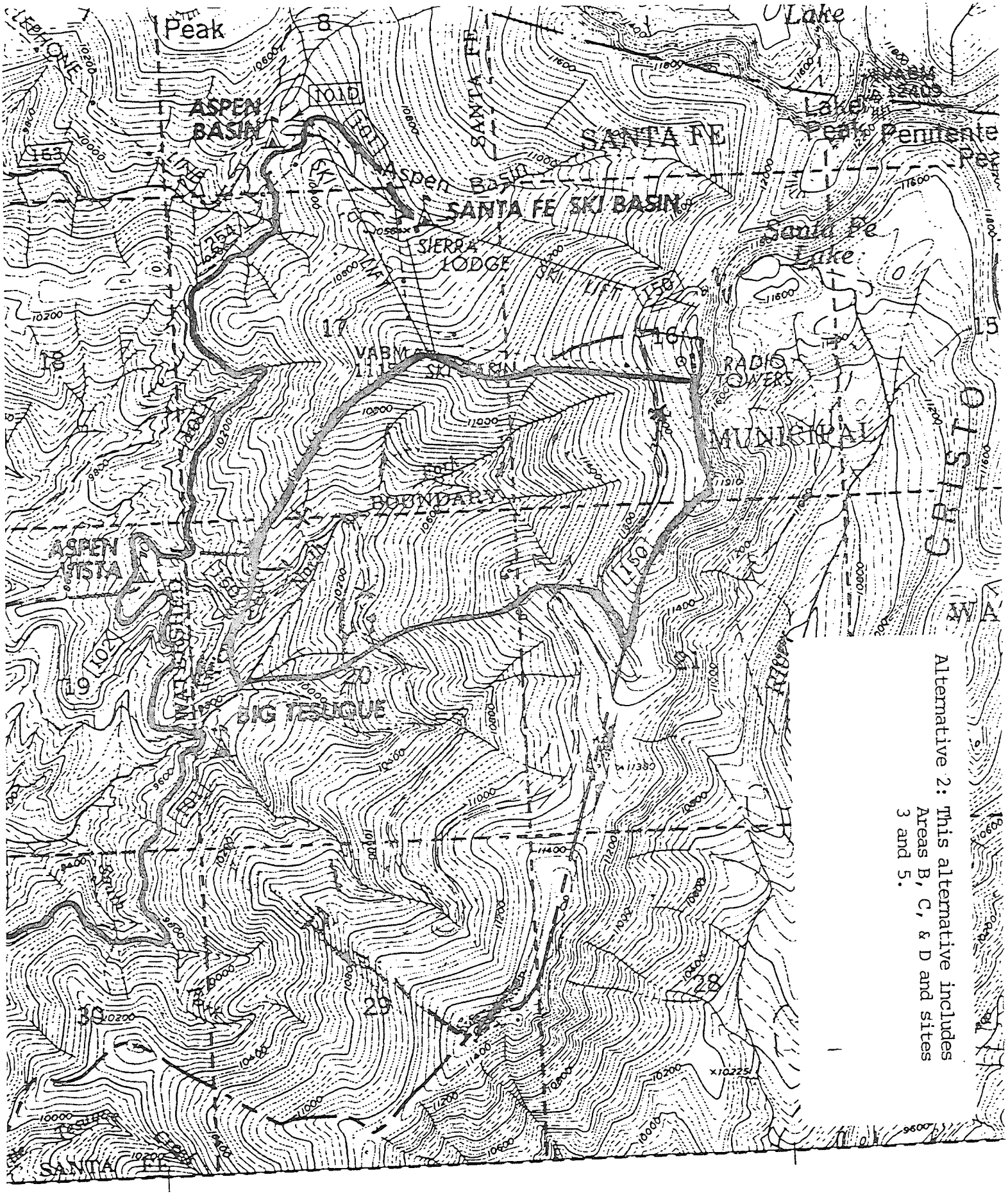
Protection for the Santa Fe Watershed should continue to be strong; the area should continue to be managed mainly for watershed protection.

Alpine tundra--one-third of 1% of the forest--is mostly in wilderness but needs additional protection on the most-visited peaks and ridges. Where damage occurs, trails, signs, and closures will become necessary and should be provided for in the Plan.

Sites in the Santa Fe Ski Basin vicinity recommended for RNA consideration due to history of scientific study.



Peak
Lake
ASPEN BASIN
SANTA FE
Lake Peak
Penitente Pe
Aspen Basin
SANTA FE SKI BASIN
SIERRA LODGE
SKI LIFT
Santa Fe Lake
RADIO TOWERS
MUNICIPAL
BOUNDARY
ASPEN VISTA
BIG TESUQUE
Alternative 1: Suggested as preferred in that this alternative includes the entire watershed and Areas B, C, & D as well as sites 3, 4, & 5.
R. 11 E.


Peak
ASPEN BASIN
SANTA FE
SANTA FE SKI BASIN
Aspen Basin
SIERRA LODGE
Lake Peak
Penitente Pe
Santa Fe Lake
RADIO TOWERS
MUNICIPAL
BOUNDARY
ASPEN VISTA
BIG TESUQUE
Alternative 2: This alternative includes Areas B, C, & D and sites 3 and 5.

R. 11 E.

Peak
ASPEN BASIN
SANTA FE
Aspen Basin
SANTA FE SKI BASIN
SIERRA LODGE
SKI LIFT
Lake Peak
Penitente Pe
Santa Fe Lake
VABM 11182
SKI BASIN
RADIO TOWERS
MUNICIPAL
BOUNDARY
ASPEN VISTA
BIG TESUQUE
SANTA FE
R. 11 E.
Alternative 3: This alternative includes Areas B (in part), C and D and sites 3, 4, & 5 but lacks the succession study potential and weir integrity.

Alternative 4: This alternative includes Areas B (in part), C and D and sites 3, 4, & 5 but lacks watershed integrity and includes a considerable amount of edge effect.

Peak
ASPEN BASIN
SANTA FE
Lake Peak
Penitente Pe
SANTA FE SKI BASIN
Aspen Basin
SIERRA LODGE
SKI LIFT
Santa Fe Lake
VABM
11182
SKI BASIN
RADIO TOWERS
MUNICIPAL
BOUNDARY
ASPEN VISTA
BIG TESUQUE
SANTA FE
Alternative 5: This is additive to any of the 4 above and includes a small wiered aspen watershed. It would be especially useful if Alternative 3 or 4 are used.

R. 11 E.

4063 - RESEARCH NATURAL AREAS. Research natural areas are part of a national network of ecological areas designated in perpetuity for research and education and/or to maintain biological diversity on National Forest System lands. Research natural areas are for nonmanipulative research, observation, and study. They also may assist in implementing provisions of special acts, such as the Endangered Species Act and the monitoring provisions of the National Forest Management Act.

4063.01 - Authority. The general provisions of the Organic Administration Act of 1897 (16 USC 551) authorize the Secretary of Agriculture to designate research natural areas. Under regulations at 7 CFR 2.42, the Secretary has delegated this authority to the Chief, who, pursuant to 36 CFR 251.23, selects and establishes research natural areas as part of the continuing land and resource management planning process for National Forest System lands (36 CFR 219.25 and FSM 1922).

4063.02 - Objectives. The objectives of establishing research natural areas are to:

1. Preserve a wide spectrum of pristine representative areas that typify important forest, shrubland, grassland, alpine, aquatic, geological, and similar natural situations that have special or unique characteristics of scientific interest and importance that, in combination, form a national network of ecological areas for research, education, and maintenance of biological diversity.

2. Preserve and maintain genetic diversity.

3. Protect against serious environmental disruptions.

4. Serve as reference areas for the study of succession.

5. Provide onsite and extension educational activities.

6. Serve as baseline areas for measuring long-term ecological changes.

7. Serve as control areas for comparing results from manipulative research.

8. Monitor effects of resource management techniques and practices.

4063.03 - Policy. Research Natural Areas may be used only for research, study, observation, monitoring, and those educational activities that maintain unmodified conditions.

The selection and establishment of research natural areas within the National Forest System primarily emerges from continuing land and

TESUQUE WATERSHED AREA RESEARCH

NUTRIENT AND HEAVY METAL TRANSPORT CAPABILITIES OF SEDIMENT IN THE SOUTHWESTERN UNITED STATES J.R. GOSZ, C.S. WHITE AND P.F. FFOLLIOTT WATER RESOURCES BULLETIN VOL 16, NO 5 OCT 1980.

IMPACT OF A SKI BASIN ON A MOUNTAIN WATERSHED I: BACTERIOLOGICAL WATER QUALITY C.S. WHITE, J.R. GOSZ AND D.I. MOORE WATER, AIR, AND SOIL POLLUTION 10(1978) 70-79.

IMPACT AOF A SKI BASIN ON A MOUNTAIN WATERSHED II: HEAVY METALS D.I. MOORE, J.R. GOSZ AND C.S. WHITE WATER, AIR, AND SOIL POLLUTION 10(1978) 81-93.

EFFECTS OF A SKI AREA ON THE WATER QUALITY AND INVERTEBRATES OF A MOUNTAIN STREAM M.C. MOLLES, JR. AND J.R. GOSZ WATER, AIR, AND SOIL POLLUTION 14(1980) 187-205.

NUTRIENT BUDGETS FOR UNDISTURBED ECOSYSTEMS ALONG AN ELEVATIONAL GRADIENT IN NEW MEXICO J.R. GOSZ IN: MINERAL CYCLING IN SOUTHEASTERN ECOSYSTEMS. J.B. GENTRY AND M.H. SMITH (EDS.) ERDA SYMPOSIUM SERIES (CONF-704513)

EFFECTS OF SKI AREA DEVELOPMENT AND USE ON STREAM WATER QUALITY OF THE SANTA FE BASIN, NEW MEXICO J.R. GOSZ FOREST SCIENCE VOL 23 NO 2 JUNE 1977.

STRONTIUM ISOTOPE STUDIES OF ATMOSPHERIC IMPUTS TO FORESTED WATERSHEDS IN NEW MEXICO J.R. GOSZ AND D.I. MOORE BIOGEOCHEMISTRY 8:115-134, 1989.

NUTRIENT BUDGET STUDIES FOR FORESTS ALONG AN ELEVATIONAL GRADIENT IN NEW MEXICO J.R. GOSZ ECOLOGY 61(3)1980.

BIOMASS DISTRIBUTION AND PRODUCTION BUDGET FOR A NONAGGRADING FOREST ECOSYSTEM J.R. GOSZ ECOLOGY 61(3)1980.

SEASONAL AND ANNUAL VARIATION IN NITROGEN MINERALIZATION AND NITRIFICATION ALONG AN ELEVATIONAL GRADIENT IN NEW MEXICO J.R. GOSZ AND C.S. WHITE BIOGEOCHEMISTRY 2:281-297(1986).

SEDIMENT CHEMISTRY AS INFLUENCED BY VEGETATIN AND BEDROCK IN THE SOUTHWESTERN UNITED STATES C.S. WHITE AND J.R. GOSZ WATER RESOURCES BULLETIN VOL 19, NO 5 1983.

USING STRONTIUM ISOTOPE RATIOS TO ESTIMATE INPUTS TO ECOSYSTEMS J.R. GOSZ, D.G.BROOKINS, AND D.I. MOORE BIOSCIENCE VOL 33, NO 1 1983.

NON-POINT SOURCE POLLUTION OF WATER BY REVEGETATION: RESEARCH ASSESSMENT AND RESEARCH NEEDS J.R. GOSZ EISENHOWER CONSORTIUM BULLETIN 13 1982.

NITRATE LOSSES FROM DISTURBED ECOSYSTEMS P.M. VITOUSEK, J.R. GOSZ, C.C GRIER, J.M. MELILLO, W.A. REINERS, AND R.L. TODD SCIENCE VOL 204 469-474 1979.

TENTATIVE RESULTS OF 4 YEARS OF RANDOMIZED SEEDING IN THE JEMEZ MOUNTAINS C.G. KEYES, S.T. STOVER, R.D. WILKINS, M. LENTER ENG. EXP. STA. REPORT 79 NMSU FEB. 1973.

JEMEZ ATMOSPHERIC WATER RESOURCES RESEARCH PROJECT FINAL REPORT C.G. KEYES, S.T. STOVER, J.B. LUNSFORD, AND M LENTER ENG. EXP. STA. NMSU JAN. 1974.