SUMMARY

United States
Department of
Agriculture

Forest
Service

Dixie
National
Forest

Environmental Impact Statement

FINAL

for the

DIXIE NATIONAL FOREST

LAND AND RESOURCE MANAGEMENT PLAN

INTRODUCTION

The Final Environmental Impact Statement (FEIS) discusses the eight alternatives developed in preparation of the proposed Land and Resource Management Plan (Forest Plan) for the Dixie National Forest. Alternative B-Composite is the proposed action and the discussion provides a brief description of the Forest Plan. The environment to be affected and the environmental consequences of implementing each alternative are also discussed.

CHAPTER 1 - PURPOSE AND NEED

The Dixie National Forest manages lands located in Southwestern Utah. The planning area covers 1,967,129 acres. National Forest lands are located in four separate areas:

- -The Pine Valley Mountains
- -The Markagunt Plateau
- -The Paunsaugunt Plateau
- -The Aquarius plateau and Boulder Mountains

Planning is conducted under the authority of the Multiple Use-Sustained Yield Act of 1960, and the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended by the National Forest Management Act of 1976. Assessment of the environmental consequences of the alternatives considered in the development of the Forest Plan is done in conformance with the National Environmental Policy Act of 1969 and implementing regulations (40 CFR 1500 - 1508).

The scope of the issues and concerns to be addressed in the Forest Plan and Final EIS were identified from comments solicited through individual and group contacts, written responses, and from National Forest personnel. The comments were analyzed and condensed into 14 planning issues as summarized below:

1. To what degree should the Dixie NF place a greater emphasis on fire management?

2. How much of an increased demand on Forest Resources should be anticipated?

3. To what degree should the Dixie NF consider economic and social stability of communities dependent on Dixie NF resources?

4. To what extent should the Dixie NF accelerate the harvest of overmature timber to reduce mortality losses?

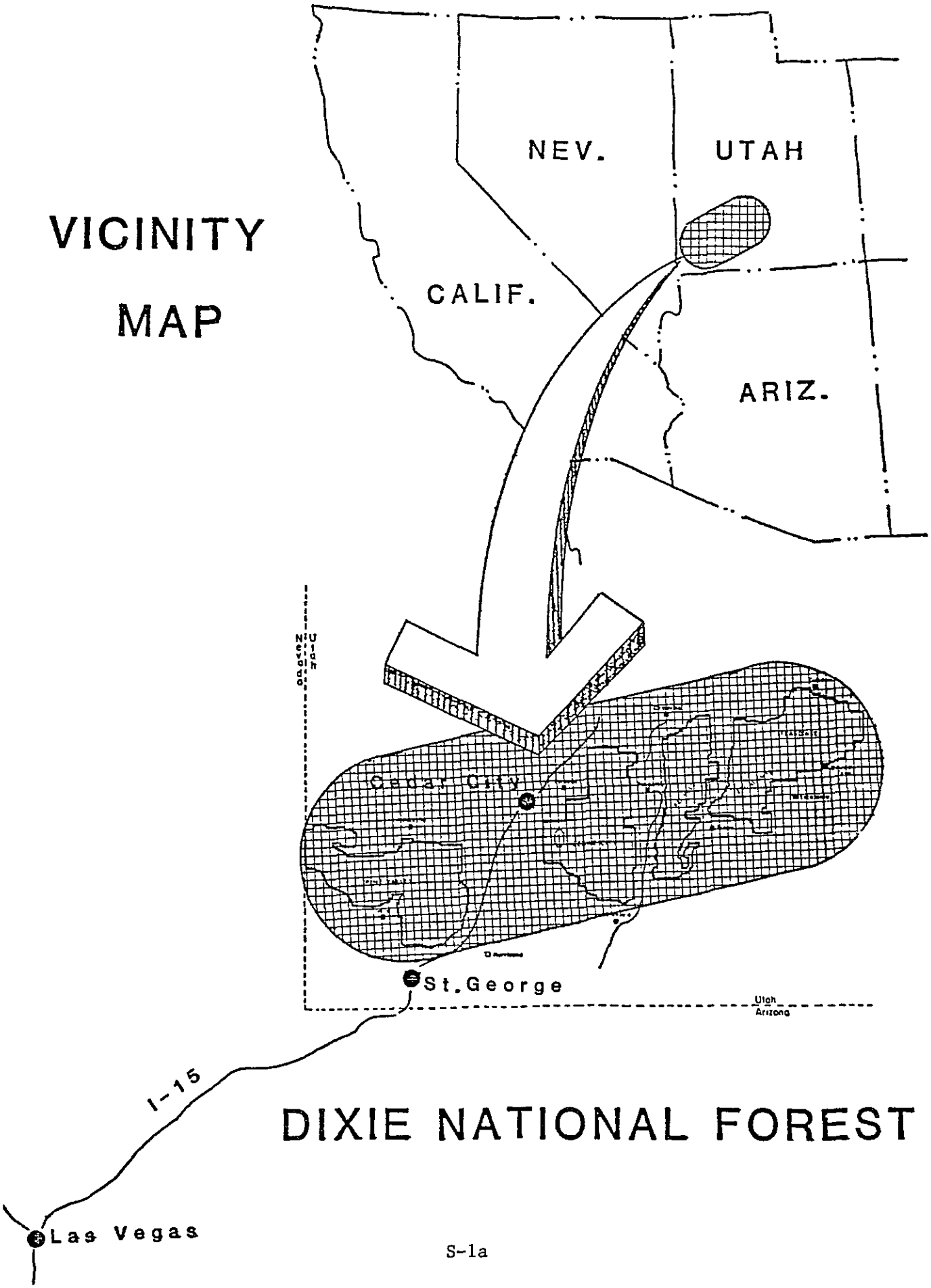
5. To what extent should the Dixie NF emphasize wildlife management?

6. How should the Dixie NF manage its firewood resources?

7. What level of livestock use should be planned for?

8. How should the Dixie NF protect the on-site values of streams, lakes, springs, riparian areas, and their associated fishery values?

VICINITY MAP



DIXIE NATIONAL FOREST

9. How should the Dixie NF coordinate the exploration, leasing, and development of energy and mineral resources, including location of energy transmission corridors, with other resource values?

10. How much emphasis should the Dixie NF place on coordinating or restricting Forest activities in order to maintain or enhance scenic values along major roads, other travel corridors, and areas of outstanding scenic quality?

11. What should the balance be between accommodating increased recreation use and other resource uses?

12. Should the Dixie NF emphasize developed group sites over single family units when considering new recreation site construction?

13. What should be done to separate the recreational activities of conflicting user groups such as cross-country skiers and snowmobilers?

14. How much emphasis should we put on a transportation system that is safe and convenient for public use?

CHAPTER II - ALTERNATIVES CONSIDERED

Eight alternatives for managing the lands and resources of the Forest were evaluated in detail. A brief description of the alternatives follows:

Alternative A Current Program (No Action). This is the alternative that describes the current management direction and budget of the Forest and describes the expected trends of the Forest for the next 50 years.

Alternative B Composite (Proposed Plan). This alternative is a combination of portions of some of the other seven alternatives joined to form a viable alternative. The budget provides for quality work and for facilities adequate for the expected use.

Alternative C Constrained Budget. This alternative describes the activities and outputs of goods and services that could be provided with a budget that is 25 percent less than the Forest's 1982 budget with emphasis basically the same as those in the Current Program Alternative.

Alternative D Current Budget. This alternative is similar to Alternative A except that the budget is slightly lower and is constrained from increasing.

Alternative E Non-Market Emphasis. This alternative emphasizes the amenity values of the Forest, such as: hiking, hunting, scenery, etc., and deemphasize's market values such as wood, grazing, etc. The budget is not limited.

Alternative F Market Emphasis. This alternative emphasizes the market values of the Forest, such as: timber harvesting, livestock grazing, developed recreation, etc. The budget is not limited.

Alternative G 1980 RPA Program. This alternative is responsive to the Dixie's share of the 1980 RPA Program as identified in the Intermountain Regional Guide.

Alternative H High Productivity. The purpose of this alternative is to display the effects of emphasizing high outputs of livestock grazing and timber. Only the minimum environmental values would be protected. The budget is not limited

CHAPTER III - AFFECTED ENVIRONMENT
This chapter describes the current situation of the Forest and its resources

1. Recreation

The Dixie National Forest has unique recreation opportunities. The Forest is adjacent to or surrounds three National Parks and one National Monument. The parks and monument draw people into the area from throughout the United States and from other countries. Once in the area, visitors and local people visit the Forest and use the campground facilities. The recreational opportunities are highly diversified and include camping, picnicking, driving for pleasure, downhill skiing, cross-country skiing, snowmobiling, hiking, hunting, and fishing.

Most of the use of campgrounds and picnic areas is during the summer months and the fall hunting seasons. The current capacity measured in people at one time for camping and picnic areas on the Forest is about 6,000. Demands for these sites is expected to exceed the capacity by about the year 2010.

Brian Head ski area is presently one of the fastest growing ski areas in Utah. It has grown from 33,400 skier visitor days in 1973 to 70,600 in 1983. The area is anticipating growth from nine to eleven lifts during the next few years. The proposed Crystal Mountain development would connect their lifts with Brian Head and increase the Total to 14 lifts.

Dispersed recreation is recreation use away from developed sites. Driving for pleasure is the most popular dispersed activity, followed by camping, fishing, gathering forest products, viewing outstanding scenery, hunting, and hiking. With the increase in fuel and heating costs, gathering fuelwood has increased 115% a year over the last three years. Driving for pleasure is expected to become more popular over the entire Forest. In addition, State Highway 14, and the Boulder-Grover Road are being considered scenic highways by the State. The added publicity will increase their use. Dispersed recreation areas receive intensive use on weekends and holidays, with areas near water being the most popular. Different types of users, such as snowmobilers and cross-country skiers, compete for use of a given recreation area. The most heavily used areas, especially for fuelwood and snow play, are near Cedar City.

The demand for dispersed recreation will not be exceeded across the forest; however, there will be some popular areas that may be revised. Those areas will be monitored and the necessary steps taken to mitigate the conflicts.

The Forest has approximately 637 miles of trails. The trail inventory lists 175 miles as adequate, 462 miles as inadequate, and 40 miles as planned but not constructed. The majority of the trails were originally constructed for fire

access or livestock distribution. Two trails on the Forest have received National recognition and status. Whipple Trail and Cascade Falls trails have both been designated as National Recreation Trails.

Of the 1,363 archeological sites on the forest three sites have been nominated to the National Register of Historic Places. They are the Mountain Meadows Massacre Site and Pine Valley Chapel and Tithing Office on the Pine Valley Ranger District and the Long Flat Prehistoric Quarry Site on the Cedar City Ranger District.

No research natural areas have been designated at present. However, three potential areas have been identified. These areas are: The timbered Cinder Cone (640 acres), Table Cliff (1,235 acres) and Red Canyon (460 acres). All streams and rivers that meet the criteria for wild and scenic rivers as discussed in (PL 90-542) are located off the Forest. They will not be evaluated in the Forest Plan.

2. Wilderness

There are three designated wilderness areas on the Forest. These are Pine Valley Mountain (50,000 acres), Ashdown George (7,000 acres), and Box-Death Hollow (26,000 acres).

3. Fish and Wildlife

More than 350 species of wildlife and fish inhabit the Dixie National Forest for all or a portion of their life cycle. Consumptive and non consumptive uses of many of these species are an important part of recreation on the Dixie National Forest. There are major deer and Elk herds residing on the Forest. One endangered species resides on the forest year long: the Utah Prairie Dog. The Bald Eagle, another endangered species, is here, but only as a winter migrant.

Demand for fish and wildlife should continue to exceed the supply in the future. The current habitat improvement program includes, among others: willow planting, juniper thinning, aspen treatment, prescribed burning, road closures, stream structures, and lake circulators.

4. Range

The Forest's 104 grazing allotments encompass 685,793 suitable acres. A small band of wild horses also graze on the forest.

Grazing management is shared between the Forest Service and the grazing permittees. The Forest issues grazing permits that specify the type and number of livestock and the season of use.

The Forest produces an estimated 115,000 animal unit months (AUMS) of forage for livestock. Twenty thousand head of cattle and 25,000 head of sheep are permitted on the forest. There is a demand for all the grazing the Forest can provide.

Sixteen percent of the range is in poor condition leaving 84 percent in fair to good condition. Overall range condition is stable or improving in most areas.

Approximately 142,000 acres of depleted rangeland have been reseeded. The seedings provide a large portion of the forage consumed by livestock and big game on the forest.

5. Timber

The net acreage of the Forest is 1,883,676 of which 335,800 acres are classified as available and tentatively suitable for timber production. Commercial timber trees on the Forest include ponderosa pine, Engelmann spruce, Douglas fir, white fir, alpine fir and aspen. Juniper trees have some commercial value as fence posts. Average production for the past nine years has been about 20 million board feet. This figure includes sawtimber, roundwood, and commercial fuelwood.

A charge system for fuelwood for personal use was implemented in1982. In that year about 30,000 cords of fuelwood were harvested. All of the sawtimber from the Forest is purchased and manufactured locally. Several local communities depend largely on forest products for their economic base. Market areas served by local manufacturers include southwest markets and areas as far east as Pennsylvania.

A mountain pine beetle epidemic currently affects about 30,000 acres on the Forest. A harvest program is underway on the Escalante District to reduce the effects of this epidemic. A Western Spruce Budworm outbreak affects another 45,000 acres. Other insect populations apparently remain at endemic levels.

6. Water

The Dixie National Forest manages mountain watersheds to produce clean water and prevent destructive floods while providing for timber production, recreation, grazing, and wildlife. The Forest yields approximately 481 thousand acre-feet of water each year. However, the total water yield is low compared to other Forests in the region, amounting to only about 0.25 inch per acre. Average water yields over 12 area inches occur on only four percent of the Forest. The Dixie National Forest is near equally divided between the Colorado River Basin and the Great Basin in both area and water production.

Intense thunderstorms occurring from July through September account for most of the summer precipitation in southern Utah. These summer storms can produce severe flash flooding in numerous dry washes, alluvial fans, and many perennial streams across the Forest. Few drainage bottoms on the Forest are immune to this type of flooding. Some of the larger streams which originate in the higher elevations of the Forest (e.g., Santa Clara River, Panguitch Creek, Mammoth Creek, and the East Fork of the Sevier River) are subject to more extensive and prolonged flooding during the spring snow melt period. The primary flood hazard areas for this type of flooding are off-Forest in the communities and agricultural lands along the streams.

In southern Utah, the demand for water currently exceeds the existing supply. No slackening in future demand is foreseen. However, the mix of water uses will probably change with agriculture use becoming less important relative to municipal, industrial, and minerals development uses. Any increase in water yield from the Forest, now or in the future, would undoubtedly be utilized by

the surrounding or downstream water ues. However, the opportunities to increase water yield are limited.

7. Minerals

National Forest land is available for mineral exploration and development under applicable laws and regulations. For leasable minerals the Department of Interior leases tracts for development by the mining and oil and gas industries. Saleable minerals are the only type of mineral commodity for which the Forest Service can directly affect the supply by selling common variety mineral materials to individuals and private industry. The Forest has 1,781,779 acres presently available for mineral leasing and 1,773,319 acres available for mining entry. This is 95 percent and 94 percent of the Forest, respectively.

All of the legally available land on the Forest is suitable for exploration and development of minerals provided that those activities can be limited by protective lease and permit clauses and requirements to protect other resources. Development of oil and gas and other minerals, may be further restricted by limitations in permits to drill and approved operating plans. Such restrictions can be imposed to protect wildlife, soil, steep slopes, water quality, cultural resources, visual resources and other environmental factors.

Approximately 5000 locatable mining claims exist on the Forest. Assessment work is kept up on many of these, but, there is only minor exploration and development of locatable mineral resources at this time. Because of a depressed market there is little production. About 800 oil and gas leases exist on 75 percent of the Forest. Annually, 100 to 200 new application for oil and gas leases are processed, between 10 to 30 geophysical prospecting permits are issued, and one or two wildcat exploration wells are drilled. Currently, the rate of geophysical prospecting is low, but drilling wildcat wells and leasing is increasing. The Forest has a producing oil field at Upper Valley. This field, developed in 1964, currently has 23 oil wells which produce in excess of 1300 barrels of oil per day.

Carbon dioxide (CO_2) has been discovered on National Forest land in several locations. A well drilled in the Sand Creek drainage, on the Escalante Anticline, in 1983, yielded 124 million cubic feet of CO_2 gas per day at 100 lbs. per square inch. To date, five wells have yielded CO_2 in the same area.

Coal resources extend onto the Forest in four fields. Much of the coal is covered by more than 3000 feet of overburden, making it unavailable. In addition, much of it is of a quantity or quality that makes it uneconomical for industrial development. Commercial opportunities on the Forest exist in the Alton and Kaiparowits fields, where the quality of the coal is generally very good. Interest in coal development has been restricted by lack of market and isolation of the resource.

CHAPTER IV - ENVIRONMENTAL CONSEQUENCES

This chapter describes the effects of implementing the eight Alternatives described in Chapter II.

Direct and Indirect Environmental Effects

Environmental consequences are the anticipated effects of applying management practices to land areas. Consequences vary for each alternative because different mixes of practices produce different levels of resource outputs.

Environmental consequences of implementing the alternatives are described in physical, biological, social, and economic terms. These consequences are both direct and indirect. Direct effects occur at the same time and place as the initial management activity. They may be measured in how they change the predicted activity or output from the present level of activity as measured by the Current Program (No Action) Alternative. Indirect effects often result from the interaction between Forest resources and management activities. They occur either later in time or at a different location, but are nevertheless forseeable.

The following is a comparison of effects on each resource by alternative.

1. Recreation

The Current Program Alternative would maintain the existing site capacity at the current level; however, there is not sufficient funding to keep recreation facilities in satisfactory condition. The projected use will exceed the facilities available around 2002 and then as the site becomes more deteriorated vandalism will also likely increase. The Forest will not be able to maintain the existing facilities with the available full-time employees and other labor programs will be used. Human Resource Programs and volunteers will do sixty to seventy percent of the maintenance. If these programs are not available, use in the developed site will destroy a majority of the facilities by the end of the planning period. As the use increases and developed sites become overcrowded and run down, the recreationists will move out into the popular dispersed areas and many will be over-used.

Cultural resource surveys would be conducted on all management activities that will create ground disturbance.

The Composite Alternative increases the developed sites by 550 individual family units and two large group areas of 500 people each. This will provide sufficient capacity to accommodate the projected use to approximately 2021. Heavy maintenance will be needed to prolong the life of the facilities and preserve the natural resource. Human Resource Programs will complete 20 to 30 percent of the maintenance needs and the remainder will be done by Forest Service personnel. Funds will be allocated for site hardening and reconstruction of 50 sites each decade. The new construction will effect the natural environment but will help concentrate the use in areas that has been designed to handle it and thus save many dispersed areas from over use. Dispersed recreation would continue to increase at 3 to 5 percent annually; however, the capacity for the Forest would not be exceeded by the end of the planning period. Trails and trail heads would be constructed and maintained to control and disperse the use, these would create some disturbances during the construction phase. However, the overall effect of the development would be to protect the environment from the user.

Cultural Resources will be protected and significant properties will be nominated to National Register of Historic Places. A cultural Resources overview will be developed for the Forest.

The Constrained Budget Alternative maintains the site capacity at the current level; however, there is not sufficient funding to keep the facilities in satisfactory condition. The projected use will exceed the capacity by 2003 and then as people become more dissatisfied with the over-crowded and un-kept condition more vandalism would occur. The vandalism and general wear on the existing sites would result in the destruction of the natural resource and the loss of the capital investment. A majority of the maintenance (80-90%) would be done by volunteers or members of Human Resource Programs. If these programs are not available the maintenance would have to rely wholly on Pack it in - Pack it out Programs. There would be no re-construction of the existing facilities or construction of new. Dispersed recreation would occur over the Forest without control. Unplanned roads and trails would likely increase on the Forest creating conflicts with other resources. Popular dispersed sites would be worn out and the number of them would increase.

The cultural resource program will continue to survey projects as they arise. The majority of the money for the surveys will be provided by the initiation of the project either public or private.

The Current Budget Alternative also maintains the existing site capacity. Projected use will exceed the capacity of the facilities by 2005 and over-crowding will occur after that time. The over-crowding will shorten the life of the facilities, and decrease the satisfaction of the campers and create resource damage and law-enforcement problems. Human Resource Programs and volunteers would be relied on to do 70 to 80 percent of the necessary maintenance. Ten percent of the sites would be closed each year of some of the natural vegetation to become re-established; however closing of these sites would put more pressure on the sites remaining open. There would be three units re-constructed each year; however, this is only two percent of the total needed. As the sites become deteriorated so would the vegetation around the sites and the users would move into the dispersed areas.

Cultural resource efforts would be to continue at or below the present level.

The Non-Market Alternative would construct one hundred and fifty new units, and re-construct 377 existing units. This would provide the necessary facilities to meet the projected need until 2020. Recreation funding would be available to do 60 to 70 percent of the needed maintenance, the remaining 30 to 40 percent would be done by Human Resource Programs. The re-habilitation and hardening of existing units and the construction of 150 new units would have an immediate effect on the physical environment; however, the overall result would be the protection of the Forest wide environment from over use. This alternative would also construct 17 new trail heads to accommodate dispersed recreation. The new construction would disrupt the physical environment, but would help to disperse the use. The over-all effect of the trail heads and trail re-construction would be to disperse the use over a larger area thus preventing over-use in the more popular areas.

Cultural resources activities would increase over present levels.

The Market Alternative would construct 560 new units, two large group areas and re-construct 720 units. This would provide the necessary facilities to meet the projected needs until 2023. Recreation funding will be available to do 80 to 90 percent of the maintenance, the remaining 10 to 20 percent would be done with Human Resource Programs or volunteers. This Alternative will have the greatest immediate effect on the Forest because of the construction; however, the availability of the recreation facilities would help mitigate the wear on over-used facilities and the mis-use of dispersed areas. Dispersed recreation would be allowed to occur in a sporadic pattern across the Forest. Trails will not be maintained or re-constructed and will eventually disappear. Some of the more popular areas would become worn out and the natural resource would be lost. The number of people driving for pleasure would decrease as the Forest environment became less desirable. The Cultural Resource Program will expand to facilitate the increased work load. Seasonal employees would be hired to complete work load created by expansion in the Timber, Range and Recreation programs.

The RPA 1980 Alternative proposes to re-construct and harden 344 units and construct 27 new units by the year 2000. The site hardening is approximately 15 percent of the total needed to keep up with depreciation. The hardening would help to keep people in designated area, thus, preserving the vegetation around the existing sites. The projected use for developed sites would be accommodated until the year 2005, after this time much of the over-use would likely occur off the Forest or in dispersed areas on the Forest. The quality of the recreation experience in the developed sites would be diminished and law enforcement problems would develop. Ten percent of the existing trails on the Forest would be maintained to help accommodate the dispersed recreation. No new trails would be constructed. Human Resource Programs will be necessary to do 40 to 50 percent of the maintenance. Cultural resource activities would increase over present levels.

The High Productivity Alternative proposes to harden 3 sites per year. This is approximately 2 percent of the facilities that would be depreciated each year due to use. The continued use of the facilities after they have been used to their fullest would result in the loss of the original capital investment. The existing trail system would not be maintained and new road construction would replace some of the trails with roads. This would change the recreation use pattern on the Forest. Recreation use will be accommodated until 2005, however, site deterioration due to low maintenance will greatly decrease the aesthetic quality of the site. Human Resource Programs will be necessary to do 50 to 60 percent of the maintenance.

A comparison of alternatives indicates that the Market Emphasis (F) is the only alternative that would meet a portion of the projected demand in the fifth decade. Constrained budget and high productivity maintain the existing capacity. Current program and current budget lose a portion of the capacity over the present due to loss of facilities. The Composite, Non-Market and RPA Alternatives all expand existing facilities, but would not meet the projected demand during the last decade of the planning period.

The Current Program, Constrained Budget, Current Budget, and High Productivity Alternatives, which do not provide the needed facilities in the public sector, would increase the demand on the private sector. The Composite Action Alternative would maintain existing recreational special uses except for the

Brian Head and Crystal Mountain ski areas. Crystal Mountain would be permitted to develop and Brian Head would expand to join with it. The Composite Alternative would provide for expansion of the existing ski area to its potential capacity. Crystal Mountain would be allowed to develop and expand after master plan approval. Visual quality on the Forest in some areas would receive high priority. These areas are along major travel corridors between National Parks and Monuments and travel corridors leading to high use recreation areas and private property within the Forest developed into cabin sites. The Current Program, Composite, Non-Market and Market Alternatives place the most emphasis on maintenance of the visual resources. The Constrained Budget and Current Budget Alternatives have funding constraints which limit the rehabilitation of the visual resource. The RPA 1980 and High Productivity Alternatives emphasize market items and the amenities such as visual resources are not emphasized.

2. Wilderness

Under all alternatives, the Pine Valley Mountains, Ashdown Gorge, and Box-Death Hollow Wildernesses would be managed to protect the wilderness values. In addition the Forest has a total of 555,390 acres of land that met the minimum requirements for wilderness. At least 90 percent of these acres would maintain their present qualities through the first planning decade.

3. Wildlife and Fish

Under all alternatives the habitat of threatened or endangered species will be managed so that present population levels will be maintained or increased. The 1980 RPA, Non-Market, and Composite Alternatives provide for the greatest increases in big-game populations and fish production. This is directly related to their high levels of habitat improvement. The least increase in big game numbers occurs in the High Productivity and Market Emphasis Alternatives because it permits only modest habitat improvement and there would be considerable habitat disturbance from timber harvest and road construction and use. Under all alternatives, aquatic habitat capability is expected to gradually decline due to eutrophication of Panguitch Lake. There would be a slight decrease in big-game and fish production under the Constrained Budget Alternative while the Current Budget Alternative will lead to a slight decrease in big-game while maintaining fish production.

Minimum viable populations (MVP) of all Management Indicator Species (MIS) would be exceeded through the planning period under all alternatives.

The only alternative that closely approaches maximum potential populations is the Non-Market Alternative. With the exception of pounds of fish and elk numbers, estimated maximum potential populations (assuming proper distribution) of all MIS would be reached by 2030. Maximum potential populations of resident trout, Bonneville cutthroat trout and macroinvertebrates would not be reached under any alternative. The Non-Market Alternative, which has the highest outputs of wildlife and fish user days, is a reflection of near maximum wildlife populations resulting from an intensive habitat improvement program and deemphasis of market outputs which have the potential of adversely affecting wildlife habitats. Numbers of wildlife and fish user days (WFUDS) are considerably lower under all other alternatives.

Fisheries outputs do not follow the same trend as wildlife outputs under all alternatives. The highest fisheries outputs would still be produced by the Non-Market Alternative followed by the Composite Alternative with the second highest level of outputs. Outputs from the RPA 1980 Alternative would be slightly higher than present outputs. The High Productivity Alternative would have the lowest fisheries outputs with Current Program, Constrained Budget, Current Budget, and Market Alternatives also producing decreased fisheries outputs.

The difference between fisheries and wildlife outputs of the various alternatives is based on the fact that aquatic habitat is more sensitive to impacts from increased resource activity than is terrestrial habitat. Both aquatic and terrestrial habitat can be improved through improvement projects, but aquatic habitat can be degraded more rapidly by other resource activities under high commodity output alternatives.

4. Range

Under the Current Program, the Composite, and the Current Budget, animal unit month (AUM) outputs would remain constant at 115,000 AUMS annually. Under the Constrained Budget, AUM outputs would start at 110,000 in 1990 and gradually drop to 100,000 by 2030.

The Non-Market would have constant outputs of 90,000 AUMS annually throughout the planning period. Outputs under the RPA 1980, Market and High Productivity would gradually increase throughout the planning period. Under the Market Alternative, we would be producing about 119,000 AUMS annually by 1990 and 123,000 by 2030. Under RPA 1980 Alternative, we would produce 117,000 in 1990 increasing to 119,000 in 2030. Under the High Productivity Alternative, we would be producing 122,000 AUMS by 1990, increasing to 139,000 AUMS by 2030.

With the exception of High Productivity, all alternatives provide for current use by wild horses (350 AUMS) annually. Under High Productivity, these 350/AUMS would be committed to livestock and no provision would be made for wild horse use.

Riparian areas would be adversely impacted by the high output alternatives (RPA 1980, High Productivity, and Market) because of increase grazing in these areas. Riparian area practices and grazing pressure would continue at current levels under Current Program and Composite Alternatives. Under these alternative, funds would be available on at least an occasional basis for rehabilitation of selected riparian areas. It is not likely that the Constrained Budget or the Current Budget Alternatives would contain any funding for riparian area rehabilitation.

Decreased AUM outputs as prescribed in the Constrained Budget and Non-Market Alternatives would reduce grazing pressure on riparian areas somewhat. Cattle prefer riparian areas, however, and under the Constrained Budget Alternative, where funding for grazing administration would be limited, riparian areas might receive heavier use than under the high output alternatives. Under the Non-Market Alternative, deteriorated riparian areas would be protected from overgrazing by exclusion from the areas, by herding, by changing the class of livestock, or by a combination of these methods.

5. Timber

The High Productivity Alternative provides for harvesting an average of 31.5 MMBF per year during the 50-year planning period. This is the largest harvest provided by any alternative. All other alternatives reduce annual harvest below the High Productivity Alternative harvest level. The lowest annual average harvest of sawtimer would be the Constrained Budget (23.5 MMBF) and Non-Market Alternatives (19.9 MMBF). The Composite and Current Program Alternatives would maintain a harvest level similar to historical levels for the first decade before dropping in the latter 4 decades of the planning period.

Alternatives harvesting greater amounts of timber in the early decades will be consistent with industry needs and will meet objectives associated with desired future conditions of the Forest from a timber management perspective sooner than alternatives harvesting lesser amounts, but will not be without some impacts on other resources.

All alternatives considered in detail depend on an increased harvest of hardwoods (aspen) volume to maintain timber output levels and maintain a healthy aspen component on the Forest, as well as, economic stability in areas heavily dependent upon Dixie National Forest timber. For each alternative an increase in aspen volume offered for sale occurs after the first decade and continues through the fourth decade. This is also an increase over present aspen harvest. Costs of aspen management are low but so are product values assuming present market conditions. Additionally, no substantial market presently exists near the Forest to utilize the aspen resource. The reliability of harvest projections beyond the first decade hinge on the development of a market for aspen. Some industry interest has been expressed in the Dixie aspen resource and aspen products have been successfully marketed in other areas.

The economic implications of timber sale receipts which do not recover timber-related costs (below cost sales) are of National concern. To address this concern the following table (Table S-1) displays for each alternative that portion of the first decade allowable sale quantities (ASQ) that exceeds the first decade quantity defined in the Max Present Net Value (PNV) Benchmark. This identification does not mean there will be below cost sales within the plan period, but as harvest levels exceed the economically optimum level of 5.0 MMBF (Max PNV Benchmark) the probability of a below cost sales increases.

Table S-1

Alternative	ASQ*	Change in ASQ from Max PNV Benchmark
Max PNV Benchmark	5.0	0
A - Current Program	26.4	21.4
B - Composite (Preferred)	26.4	21.4
C - Constrained Budget	22.4	17.4
D - Current Budget	27.0	22.0
E - Non-Market Emphasis	21.5	16.5
F - Market Emphasis	28.7	23.7
G - RPA 80	32.8	27.8
H - High Productivity	33.7	28.7

*Allowable sale quantity in MMBF

6. Water and Soil

Water quality will meet State standards under all alternatives. Watershed improvement projects would occur at a moderate pace under High Productivity, Market Emphasis, and the Current Program Alternatives. Under RPA 1980, Non-Market and the Composite Alternatives, improvements would be completed quickly and effectively.

Under all alternatives, watersheds would be protected as a result of coordination with city, county, and state agencies.

Water yield would increase only slightly as the result of timber harvest and other agencies' cloud seeding programs under all alternatives.

In some watersheds, present water yields have increased over natural yields as a result of past timber harvest. Additional increases in water yield will remain low because limited opportunities to manipulate water yield.

The greatest amount of acres maintaining long term soil productivity would occur under the Non-Market, Composite, and Current Program Alternatives. The Constrained Budget, Market, RPA-80, and High Productivity Alternatives would have the greatest amount of acres of declining watershed condition.

On the average, for the planning period, the Non-Market and Constrained Budget Alternatives would have the least amount of increased on-site soil erosion over natural levels while the RPA-80 and High Productivity Alternatives would have the greatest increase.

7. Minerals

The number of acres disturbed by leasable mineral activities (leasables include coal, oil, gas, phosphate, sodium, potassium, oil shale, sulphur, and geothermal steam) are expected to increase each year under all alternatives due to exploration. The number of cases processed under each alternative provides a relative measure of the difference in impacts between alternatives. The greatest number of cases processed are under the Market Alternative. The least number are under the Constrained Budget Alternative.

Mineral activity on mining claims, which involve hardrock minerals that are mined and processed for the recovery of metals, is not expected to vary significantly between alternatives. Hardrock mineral exploration and production is governed by existing laws and regulations. These laws and regulations will apply to all alternatives. Amount of hardrock activity is difficult to predict but is expected to increase gradually throughout the planning period as world demand increases and other sources are exhausted.

8. Lands

Corridors, and/or widows (a linear strip of land identified for present or future location of utility rights-of-way) are provided for under all alternatives.

The principle consequences of utility corridor construction are adverse impacts on soils, water, geology, and scenery. Other problems include inconvenience to the public, construction difficulty, and management of ORV use.

9. Facilities

Building and administrative site repair and maintenance would be limited to health, safety, and energy items in the Current Budget and Constrained Budget Alternatives. The other alternatives provide preventative maintenance, replacement, and repair programs.

Under the Market and Non-Market Alternatives, the collector and local roads will be maintained and reconstructed to a standard suitable to support resource management programs they generate. The RPA 1980, Composite, High Productivity, and Current Program Alternatives will develop and maintain an efficient, safe, and environmentally sound collector and local road system. The Current Budget and Constrained Budget Alternatives will lead to the deterioration of roads.

Mileage of annual road maintenance decreases in the Current Budget and Constrained Budget Alternatives. Market and Non-Market Alternatives have the greatest increase in road maintenance. The Composite Alternative provides for adequate road maintenance.

Bridges will deteriorate and require premature replacement under the Current Budget and Constrained Budget Alternatives. The rest will contain programs for preventative maintenance and repair that will significantly lengthen bridge life and decrease replacement costs.

Fire Protection

A cost effective fire suppression capability based on Level II fire analysis, is maintained under all alternatives. This analysis is aimed at maintaining a fire program that minimizes the sum of suppression and resource costs for all alternatives. Forest direction is to select suppression strategies that minimize costs and resource damages.

Most fuels treatment (removing fuels to reduce fire hazard) will be accomplished primarily through the fuelwood program and/or the use of prescribed fire. The amount needed will be directly related to the volume of timber harvested and the acres made accessible by roads for timber sales. Since the Constrained Budget and Non-Market Alternatives reduce fuels at the lowest rate, they would provide the greatest potential for a large destructive fire in natural fuels.

Economic Effects

The Dixie National Forest is required to consider economic efficiency as a basic principle of planning in the formulation of alternatives, in estimating effects of alternatives, and in evaluating those alternatives.

The main criterion in economic efficiency analysis is present net value (PNV). It is defined as discounted benefits less discounted costs, for those outputs to which monetary values can be assigned. All alternatives examined in that manner were found to be economically efficient.

For comparison, two discount rates were used-four percent, and seven and one eighth percent. The highest PNV with a four percent and seven percent discount is the Composite Alternative. It is followed by the Current Program, Non-Market, Current Budget, Market, Constrained Budget, High Productivity, and RPA 1980 Alternatives.

The planning process recognized that a general relationship exists among the various economic values for Forest resources. The economic values include:

- Actual cash receipts which the Forest collects from the sale of wood, forage, developed recreation, and the use of land.

- Explicitly valued resources for which the Forest receives no cash, but for which an economic value exists, such as, dispersed recreation ($3.00 a recreation visitor day).

- Implicitly valued resources for which no economic value exists, but which can effect resources with explicit values. For example, scenic beauty and wildlife habitat are resources without an economic value, but the amount of them or their quality have an effect on the amount of dispersed recreation use.

In addition to the relationship that exists between the economic values and the resource output patterns, all of which can be identified and described there are speculative and currently unquantified economic values for resources with the potential to be significant, such as, the value of undiscovered mineral and energy deposits.

Further, an intangible value called Net Public Benefit (NPB) enters into any economic analysis in reviewing alternatives. It is defined as the overall value to the nation of all benefits less all associated inputs and costs, regardless if they can be quantitatively valued. It means that some outputs which have no monetary values will be part of the decision making process because of their intrinsic values to people. Examples of such benefits include public safety, concern for future generations and diversity of resources. Such NPB values may cause a decision to be made that varies from a decision based solely on PNV.

Social Effects

Because the Dixie National Forest is in several separate land areas, the economic and social impact of the resources associated with it are fragmented.

The Forest is required to examine impacts to employment, income and population changes in proportion to their significance. The objective of the impact analysis is to compare the socio-economic variables for future conditions in the wood production, ranching, recreation and related industries for all alternatives considered. There were no significant social impacts in any of the eight alternatives considered. However, it is recognized that the planning process primarily examines impacts on communities and masks the impact on individuals. All alternatives after the first decade could have negative effects on individuals associated with the timber industries in some communities.

Two separate payments are made by the Federal Government to the States and Counties each year based on lands administered by the Forest Service or based on Forest Service management actions.

First, Payments in Lieu of Taxes are made based on acres of land in Federal ownership. This is to compensate the States for taxes lost as a result of Federal lands not on State tax rolls. The amount paid is constant between alternatives and is based on Congressional appropriations.

Second, the 25 percent fund provides that a portion of all Forest receipts from timber, grazing, special uses, minerals, and recreation be returned to the counties where they were earned. The funds are to be used for roads and schools. The High Productivity Alternative provides the highest return. In order, the remaining alternatives are: Market, RPA 1980, Composite, Current Program, Current Budget, Non-Market, and Constrained Budget.

Irreversible or Irretrievable Commitments of Resources

An irreversible commitment of resources is one that results from actions altering an area such that it is prevented from returning to its natural condition for an extended period of time, or one that utilizes non-renewable resources, such as cultural resources and minerals. Examples are extraction of oil, natural gas, and gravel.

The key to irreversible consequences in all management actions for the Dixie National Forest is the amount of soil lost because of project activity. Road and building construction creates most impact on soil and vegetative resources.

Irretrievable commitments of resources include lost production or lost use of renewable resources due to different combinations of management practices for each alternative. The opportunity to use the resource is foregone during the period of time it is committed to other uses or periods of non-use.

Adverse Environmental Effects that Cannot Be Avoided

Implementation of any of the alternatives will result in some adverse environmental effects that cannot be avoided. However, the application of the constraints (standards and guidelines) is intended to limit the extent and duration of these effects.

Management prescriptions were designed to provide outputs, goods, and services within the constraints of maintaining the sustained yield of recreation, water, timber, forage, and wildlife without impairing the long-term productivity of the land.

Mitigation measures included in the management area prescriptions in Chapter IV of the Forest Land and Resource Management Plan are intended to minimize the adverse unavoidable effects. There are, however, some adverse effects that cannot be avoided in any of the alternatives. Some of these are summarized as follows:

- unavoidable vegetation loss, and soil compaction from construction and reconstruction activity.
- visual character changes of the Forest scene from management activities including timber harvesting and recreation special uses, and mineral and energy development.
- short-term displacement of wildlife during logging.
- temporary and local reduction of air quality from dust raised by logging.

The intensity of these adverse effects may be mitigated to acceptable levels, but they cannot be avoided entirely.

Short-Term and Long-Term Productivity

Management of the Forest is a complex venture pitting the present demand for goods and services against the need to maintain long-term productivity of the resource base. The proposed action and alternatives to it all meet the requirement of the Multiple Use-Sustained Yield Act of 1960 to provide for the "achievement and maintenance in perpetuity of a high level annual or periodic output of the various renewable resources of the National Forests without impairment of the productivity of the land." The long-term productivity of the land is maintained or improved in all alternatives while producing outputs, goods, and services throughout the planning period.

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