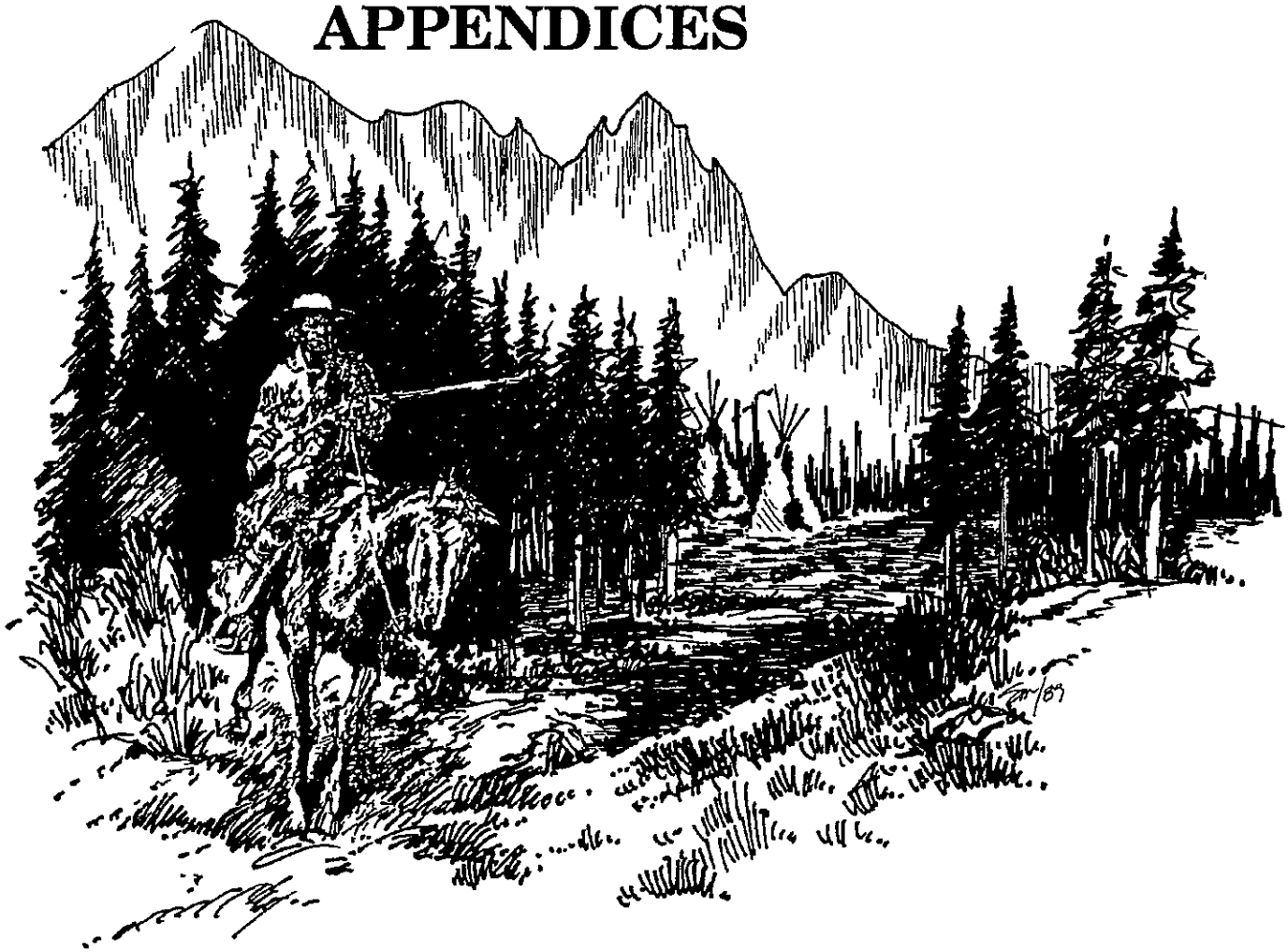
United States
Department of
Agriculture

Forest Service

BRIDGER-TETON NATIONAL FOREST

FINAL ENVIRONMENTAL IMPACT STATEMENT

APPENDICES



APPENDIX A

ISSUES

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OVERVIEW

The purpose of Appendix A is to detail, examine, and analyze the major public issues that have been identified in the formulation of the Forest Plan and Draft and Final Environmental Impact Statements. To help people understand how issues are organized and used to guide forest planning, the planning questions used in the preparation of the draft documents and brief statements of the issues used in both Draft and Final documents are displayed according to the Problem Statements shown in FEIS Chapter 1. A discussion of Forest Service responses to issues is also presented.

PLANNING QUESTIONS

At the start of the planning process, 16 major "Planning Questions" and key elements were identified as the primary concerns of the proposed Forest Plan. They were stated as follows:

1. How should mineral and energy resource exploration and development be managed in relation to other resource values on the Forest?

2. How should the Forest manage timber resources and harvest levels in relationship to other resource values?

3. How should the transportation system on the Forest be planned, developed, and managed?

4. How should the Forest manage dispersed recreation?

5. How can the Forest meet increasing public demand for small forest products - posts, poles, house logs, firewood, and Christmas trees?

6. How can the Forest best resolve conflicts in the Bridger, Teton, and Gros Ventre Wildernesses?

7. How should the Forest manage fire and fuels to enhance multiple use values?

8. To what extent should the Forest maintain or improve wildlife habitat?

9. How should the Forest manage its water resource development potentials?

10. How should the Forest handle the increasing demand for developed recreation?

11. How should the aquatic and riparian habitat on the Forest be managed in order to maintain or improve quality?

12. How should resource management and use be adjusted to assure the maintenance of a high quality water supply on the Forest?

13. How should Threatened and Endangered (T&E) species be managed relative to other resource uses and legal requirements?

14. Should private lands or partial interest in such lands be acquired? Should Federal lands be made available for exclusive special land uses within the Forest?

15. How will the Forest manage forage resource opportunities for production of livestock relative to other important uses?

16. What roadless areas on the Forest should be recommended to Congress for wilderness designation or managed for use as non-wilderness?

These general management concerns were used as directional guides during the public involvement phase of the planning process. As anticipated, many of the planning questions and associated elements developed as important issues surrounding the Forest Plan and DEIS, while other concerns proved less important in the publics' evaluation.

PLANNING PROBLEMS AND THE ISSUES

The Issues are presented according to the Problem Topic described in FEIS Chapter 1 and the Planning Questions displayed in the Draft Land and Resource Management Plan and Environmental Impact Statement. Issues usually became part of the problem and challenge statements and then, later, influenced or anticipated goal and objective setting.

Problem Topic 1 Community economics and jobs from the Forest--competition for scarce resources.

These issues are related to Planning Questions 3, 4, 5, 8, 9, 10, 12, and 15.

- The timber volume available for harvesting should be enough to maintain the economic viability of the local timber industry.

- The timber supply from the B-T should address national demands for timber.

- The Forest has the potential to meet future demands for wood products including sawtimber, house logs, posts, poles, fuelwood, landscaping plants and Christmas trees.

- If a sawmill is forced to close because of lack of adequate timber supply, the Forest Service should assist with finding an alternate industry to move into a community to maintain economic stability.

- Leasing should be continued to maintain the local employment sectors that are tied to the oil and gas industry.

- Leasing activities should be increased to meet the National demand for oil and gas products.

- Domestic oil and gas production is declining and U.S. dependence on imports could increase to 50 percent of need by the year 2000.

- Grazing levels should be high enough to maintain or enhance the local ranching industry.

- Any activity on the National Forest should preserve the existing high quality of the water reserve.

- The big game wildlife species and their habitats need to be maintained at sufficient levels to ensure a viable outfitting and guide industry.

- Historical elk migration routes should be reestablished to enhance the outfitting/guide industry.

- The acreage of land classified as Primitive or Semi-Primitive should be maintained to provide those types of experiences that draw people to this area.

- Due to the potential water shortage in the southwestern United States, the B-T should increase water production.

Problem Topic 2 Personal recreation, enjoyment, play, and subsistence on the Forest.

These issues are related Planning Questions 3, 4, 5, 6, 8, 9, 10 and 14.

- Declining land base for some recreation opportunities

- Poor condition of developed recreation facilities

- Many of the dispersed recreation opportunities are being managed to less than standard service level.

- Projected use could lead to conflicts between various recreation opportunities (e.g. motorized vs. non-motorized and mountain bikes vs. backpackers).

- Development of private land adjacent to heavily travelled highways and roads within the Forest could have an adverse effect on the visual quality of the area.

Problem Topic 3 Threatened, Endangered, and Sensitive Species

These issues are related to Planning Questions 8, 11, 12, and 13.

- Number of bears in the Greater Yellowstone Grizzly Population has declined significantly since 1967.

- Excessive human-caused mortality of female grizzlies.

- Reduction in suitability of grizzly bear habitat, due to adverse habitat alteration, will prevent recovery.

- Displacement of bears by human activity.

- Reduction in suitable habitat of bald eagles.

- Displacement of eagles by human activities.

- Human-caused mortality of eagles.

- Reestablishment of the gray wolf in Greater Yellowstone area.

- Reestablishment of the peregrine falcon.

- Reestablishment of the whooping crane.

- Maintenance of the Kendall Warm Springs Dace.

- Establishment of the Kendall Warm Springs Dace into other warm springs.

- Opposed to the reestablishment of the wolf due to its effect on livestock and recreational hunting.

- Do as much as possible to save Threatened, Endangered, and Sensitive Species from extinction.

- People's activities can be carried out without a detrimental effect on Threatened, Endangered, or Sensitive Species.

- Reduction of recreational use of the Snake River, due to recovery of the bald eagle.

- Lack of information on Sensitive plant species.

- Complete Botanical Surveys to determine locations of Threatened, Endangered and Sensitive plant species.

- Develop management/monitoring plans for Threatened, Endangered and Sensitive species.

Problem Topic 4 Use of natural resource products and impacts of change in forest communities.

These are related to Planning Questions 2, 7, 8, 11, 12, and 15:

- The analysis of lands for timber suitability must take into consideration soil stability, regeneration of cut-over areas, and the potential to develop new harvesting technology.

- Opportunities to manage vegetation other than by harvesting, such as prescribed burning, should be considered.

- The cost effectiveness of timber sales must be evaluated and used in the decision making process.

- Extensive mortality in many tree species on the Forest is occurring, due to old age and insect and disease infestations.

- Existing over-mature stands of trees offer limited silvicultural opportunities to meet resource objectives.

- Silvicultural prescriptions in addition to clearcutting should be considered which will help achieve soils, scenic quality, recreation, wildlife, and other resource objectives.

- Increased harvesting of timber and associated road needs could decrease the scenic values in the area.

- Increased harvesting of timber and associated road needs could decrease the satisfaction of users seeking more primitive recreation opportunities.

- Increased harvesting of timber and associated road needs could negatively affect wildlife, such as elk migration, old growth forest dependent wildlife, and threatened and endangered species.

- Increased harvesting of timber and associated road needs could decrease hunter satisfaction and negatively impact the outfitting and guiding businesses.

- Timber sales need to be adequately administered by the Forest Service to ensure that resource values are being protected.

- Domestic oil and gas production is declining, and U.S. dependence on imports could increase to 50 percent of need by the year 2000.

- Oil and gas-field development may disrupt significant scenic and wildlife resources important to the tourist/outfitter based economy of the Forest.

- Oil and gas activities can cause increased erosion and stream sedimentation.

- Timber removal and oil and gas activity can result in roads being built in roadless areas of the Forest. Such roading is viewed as inappropriate by many of the Forest's publics.

- Extractive development will reduce the acreage in semiprimitive and primitive areas, converting them to roaded settings.

- Lands made available for oil and gas activity need appropriate lease stipulation protection so as to encourage energy activities while protecting or reducing adverse effects on the other resources of the Forest.

- Oil and gas activity is viewed as a threat to the integrity of the Greater Yellowstone Area, and in particular, the probable impacts on the grizzly bear and its survival.

- Heavy recreation use is endangering physical and social environments in wilderness.

- Recreational enjoyment and the condition of such basic resources as soils, water, and riparian areas in the

forest are being jeopardized by too many people trying to use the same sites, trails, and facilities.

PRINCIPAL ISSUES

The following issues are the primary focus of the vast majority of the controversy and debate surrounding the Forest Plan. They were used to develop the Planning Problem Statements displayed in FEIS Chapter 1.

Many were defined at the beginning of the planning process, some during the development of the draft documents, and others from the public comments received on the draft documents. Most are very complex, and most are so interrelated that it is virtually impossible to detail one without overlapping several others. However, the attempt has been made to deal with each issue as thoroughly as possible, even to the extent of identifying where overlapping occurs, and to present them in as unbiased and comprehensive a manner as possible. The issues have not been prioritized or arranged by any ranking system for presentation, and the order of their appearance in Appendix A has no significance.

UNION PASS

The Union Pass Road is located in Management Areas 71 and 72. There are some rights-of-way problems with the existing location, and it currently causes unacceptable erosion and impacts on water quality. There are a number of publics interested in this road for a variety of reasons, many of which are in direct conflict with one another.

For instance, the management of the road is of importance to the timber industry in that its current state is such that use of the road for log hauling is limited to a very short season, and light use. Timber-related traffic on this road is particularly important for the potential consumers in Dubois, Wyoming. An improved road would add the Upper Green River and the Wyoming Range as potential areas of supply for such mills (see SPECIAL AREAS issue). As a result, Dubois timber interests feel an improved road that allows log hauling is imperative to the maintenance of that industry (see COMMUNITY STABILITY RELATIVE TO TIMBER SUPPLY issue). Additional support for improving the road comes from publics interested in facilitating roaded recreational opportunities, and in improving access to that part of the Forest for exploration and development of minerals and energy resources. Many people in the Town of Dubois, for instance, would like to have the road improved to possibly increase the tourist activity in their Town to help diversify their economy. There are publics both for and against improving the road in the light of the regional transportation network; some cite improvement as a positive

economic factor, while others see it in a more negative light.

On the other hand, there are publics with the opinion that the consequences of an improved road would be unacceptable for a number of reasons. Among these publics are interests supporting "natural values," primarily individuals involved in outfitter and guide operations, local ranchers and landowners, and environmental groups. They point out that improvement of the road would have detrimental effects on wildlife habitat, dispersed recreation quality in the area, soil stability due to increased erosion, and water quality which would in turn degrade the fisheries in the area. Additionally, an improved road would likely result in a shorter hunting season in that area and the existing grazing system would be impacted as well. Further social and economic impacts would be felt in the Green River area in terms of effects on current ways of life, and questions concerning private property and rights-of-way. One private landowner, for instance, from whom the Forest Service would need a right-of-way to upgrade the road in some of the alternative routes, is opposed to having logging trucks driving through his property. Snowmobile interests are against a road that would be plowed in winter. There also exists a perception among some publics that an improved road would open up areas for large clearcutting type harvests, like the historic harvests in adjacent areas. Finally, there are interests who support closure and even destruction of the road for reasons sited above, and in the interest of preserving the wilderness qualities of the "Greater Yellowstone Area" (see RECOGNITION OF SPECIAL AREAS VALUES issue).

Relocation of the road is another facet of the issue under debate, and there is no complete agreement on where a relocation should go, or if there should even be one. A 5-County Council of Governments is working on resolving the issue with Forest Service participation.

OIL AND GAS

There is little or no new oil and gas leasing going on on the forest. The status of current leasing NEPA documents is such that public pressure has resulted in demands that a complete Environmental Impact Statement be conducted for each lease site prior to operations. The result is great costs in time and money, and considerable frustration for the industries. The oil and gas industries and supporting publics feel that future planning direction should encumber as little as possible the potential to lease, explore, and develop. This is needed to determine if there are significant oil and gas resources on the Forest. From their

perspective, it is necessary to develop those reserves that prove economically feasible in order to reduce national dependence on foreign resources, enhance the National and State economy, and provide jobs (see COMMUNITY STABILITY RELATIVE TO OIL AND GAS issue). There is also a strong feeling among these publics that Forest Service management has strongly favored recreation and wilderness interests to the extent of violating the mandate of multiple use of public lands.

On the other side of the issue are those publics who feel the Forest's most precious national resource is its undeveloped recreation and wildlife resources. Associated with this view are publics that have developed businesses and lifestyles that are related to these qualities (see COMMUNITY STABILITY RELATIVE TO RECREATION/WILDLIFE RESOURCES issue). Their feeling is that oil and gas exploration and development activities pose a significant threat to their way of life and wildlife and wilderness resources in general.

In addition, there are publics who feel such activities in the Forest's sensitive habitat will significantly threaten water quality and soil stability (raising the prospect of No Surface Occupancy stipulations), and threatened and endangered species. An area of particular conflict is the Situation 1 Grizzly Habitat. Oil and gas interests feel they should be allowed to conduct resource exploration in this area, citing that there has never been an incident of this activity conflicting with the grizzly. Furthermore, if recreation is allowed in the area, so should their industry. However, conservationist interests feel very strongly that no energy development should take place in what they perceive as a highly sensitive habitat (see T&E SPECIES issue). Publics depending upon dispersed recreation activities, in particular the outfitter and guide industry, likewise feel that further oil and gas development would be an unacceptable disruption of their livelihood and recreation/wildlife values in general. Additionally, those interests supporting the "Greater Yellowstone Area" are concerned that energy-related activities would degrade and disturb this nationally important "ecosystem." All of these interests suggest that, if leasing and associated activities are allowed, they include very strict regulations ensuring the protection of these values.

Incorporated into this issue are national aspects associated with oil and gas leasing laws and legal rights. For example, is the right to develop included in a lease? Can and will the agencies deny an application to drill if environmental effects are too great? As a result of the rights granted to the lessee, can threatened and endangered species or other values be adequately protected? Which

agency is really responsible for managing this resource on National Forest System lands is also in question, for although the Forest Service manages the surface, all below-ground resources are managed by the Bureau of Land Management.

To further complicate this issue is the Energy Security Act of June 30, 1980. This act states that "It is the intent of the Congress that the Secretary of Agriculture shall process applications for leases of National Forest System lands and for permits to explore, drill, and develop resources on land leased from the Forest Service, notwithstanding the current status of any plan being prepared under section 6 of the Forest and Rangeland Renewable Resources Planning Act of 1974." This creates a conflict in that according to the National Forest Management Act, it states that, "Plans developed in accordance with this section shall ... form one integrated plan for each unit of the National Forest System..." The Forest Plan is to incorporate all the resources, including minerals, into one plan. However, if leasing, exploration, and development activities occur during the preparation of the Forest Plan, it is possible that certain options could be foreclosed from consideration.

How leasing should be managed in lands adjacent to the Grand Teton and Yellowstone National Parks is also a point of debate. An element of this question is, should leases be restricted in areas where exploration or development would be visible from Park lands, and if so, how restricted?

Another aspect of this issue has to do with whether or not leasing should be allowed in certain areas. If it should be allowed, what kinds of stipulations should be applied? For instance, should leasing activities be allowed on slopes greater than 70 percent? If so, what kinds of stipulations should such leases carry?

COMMUNITY STABILITY
AND TIMBER SUPPLY

Issues on the Forest related to timber supply are very emotionally charged, and directly concern hundreds of local residents whose livelihoods are dependent upon the timber industry. Significant local economies associated with this industry depend upon the Forest for their timber supply. These publics relate that if supply is not increased, or at least maintained at current levels, their livelihood is in jeopardy. They argue that the economic diversity and expansion needed to compensate for potential losses in jobs and revenue if local mills were to close is not promising. It is perceived that the area simply doesn't have an attraction for other industries beyond those already developed. The majority of this concern comes from Star

Valley and the Fremont County (Dubois) area. A large amount of concern has been expressed in Fremont County, in particular, where a closure of the Louisiana-Pacific mill in Dubois has had a detrimental effect upon a majority of the businesses in that town, and have serious repercussions felt as far as Riverton and Lander (see CONFLICTS RELATED TO TIMBER SUPPLY issue and refer to Appendix G of the FEIS).

On the other side, there are local and national publics that are concerned with the effects of historic harvesting on fish and wildlife, and recreation values. Recreation and outfitter industries in particular maintain that the Forest can no longer reasonably support the level of timber requested by the timber industries, and that areas of likely future timber sales are too sensitive and would be better utilized for their wilderness and esthetic values (see RECOGNITION OF SPECIAL AREAS VALUES and COMMUNITY STABILITY RELATIVE TO RECREATION/WILDLIFE RESOURCES issues).

COMMUNITY STABILITY
AND RECREATION/
WILDLIFE RESOURCES

Central to this issue is concern for the social and economic atmosphere of the Jackson and Pinedale community areas. This issue is almost a reverse of the above, in that the same areas that are needed for timber supply in the foregoing issue are important in this case for the community dependency associated with recreation and wildlife industries. The same harvest levels that are perceived as necessary for the continued livelihood of communities dependent on timber supply are perceived as detriments to the livelihoods of communities depending upon recreation and outfitter and guide industries (see COMMUNITY STABILITY RELATIVE TO TIMBER SUPPLY issue).

For example, the roading and harvesting associated with supplying timber from these lands provide increased access and environmental conditions that do not favor many recreation activities. Historic semiprimitive and primitive experiences change to roaded experiences in an environment in which man's presence is obvious. Hunting quality changes and often seasons are shortened and hunting permits restricted, all of which threaten industries associated with recreation and the outfitters. Also included is concern over the impacts energy exploration and development will have on recreation quality and wildlife habitat (see CONFLICTS RELATED TO OIL AND GAS LEASING issue).

On the other hand, there are those publics who would like to see an increase in roaded recreation opportunities (see MANAGEMENT OF THE TRANSPORTATION SYSTEM and MANAGEMENT OF RECREATION OPPORTUNITIES issues).

COMMUNITY STABILITY
AND OIL AND GAS

Afton, Kemmerer, Big Piney, and Rock Springs, Wyoming all have, or have had, significant dependency on the exploration and development of local energy resources. The State of Wyoming also receives a significant portion of its revenues from oil and gas activities. In fact, primarily because of revenue from oil and gas and locatable mineral royalties, etc., the State does not need a State income tax. As a result, there are publics who feel the Plan should not place very many restrictions on this activity, in fear that their economic opportunities will be diminished. This fear is particularly felt during the "bust" periods of the industry's boom-bust cycle.

Others point out that historically this industry has not provided economic stability, and that the likelihood of energy development providing significant revenue to the communities in the forest area is not high. By way of support they point out that the vast majority of exploratory wells drilled in the Forest have been non-productive, indicating that economically viable stores of oil and gas simply do not exist in this area. They argue that the real stability is reflected in local recreation and agricultural opportunities, which should be emphasized over oil and gas development.

TIMBER SUPPLY
CONFLICTS

Timber industry oriented publics feel the Forest has a potential to supply their needs for trees without significantly affecting other values. Associated with this argument for existing or higher levels of timber supply is a feeling from some publics that timber ought to be harvested rather than allowed to die of disease or burn. Included is the assertion that with "proper" management, any negative impacts of harvesting can be mitigated; therefore, there are no real impacts to other resources, and that with such a large Forest there ought to be enough room to meet everyone's needs. These interests maintain that the mandate of multiple use requires that consumptive timber use be given equal treatment with environmental and recreation use.

They further point out that harvesting is far preferable to prescribed burning, from both an economic and esthetic perspective. Many of the trees on the Forest are mature or dying of old age or insect infestation, and timber interests argue that sustained or increased harvest levels could easily be met by harvesting these trees alone. Timber harvest allows for reforestation practices and thus a

healthier, more diverse forest. There is also the highly related issue of the timber mills and jobs associated with timber supply (see COMMUNITY STABILITY RELATIVE TO TIMBER SUPPLY issue).

On the other side, there are those publics and industries associated with recreation and wildlife resources who feel the ability to mitigate the impacts of harvest at historic levels, or with an increase, have not been demonstrated. Many of the harvest methods, particularly clearcutting, are viewed as undesirable practices which destroy wildlife habitat and alter recreational experiences. The outfitter and guide industry in particular is against timber harvests at current levels, perceiving harvesting and the associated roads as threatening their livelihood (see COMMUNITY STABILITY RELATIVE TO RECREATION/WILDLIFE VALUES issue). These interests also argue that the Forest simply does not have large enough stands of harvestable timber to support the size of sales needed by the timber industry. There is also great concern that timber sales would take place in areas perceived as "sensitive" areas which would be better used for their recreational and wilderness resources (see RECOGNITION OF SPECIAL AREAS VALUES issue). For instance, the effects of timber harvest on the natural values of the "Greater Yellowstone Area" are viewed by some as a national issue.

Also included in this issue are arguments on both sides concerning the economic sensibility of "below cost" timber sales. One side argues that it is a waste of taxpayers' money and that the Forest Service is "subsidizing" the timber industry. They feel it is bad enough some of the other resources may be damaged by harvesting activities, but to also do so at a loss to the government is adding insult to injury. The other side argues that while some of the timber sales may be "below cost" from an accounting standpoint (even this is subject to debate depending upon what costs and receipts are counted), the sales provide enough non-quantifiable benefits to justify the costs. An example is the associated employment and community stability. So while timber sales may not be justifiable from an accounting standpoint, they may be justifiable from an economic standpoint.

Another aspect of this issue has to do with the silvicultural prescriptions used to harvest timber. Historically, this Forest has emphasized clearcutting in lodgepole pine stands. Part of the rationale for this included efforts to control insect infestations. Clearcutting is also considered to be the best method to use in lodgepole pine stands from a regeneration standpoint, and lodgepole pine is the primary species that the larger mills in the area prefer. However, because of the impacts from

clearcutting practices and the associated roads, many people feel that there should be an increased effort to manage the timber stands using small timber sales, small timber operators, and silvicultural practices other than clearcutting.

Reforestation and the suitability base are other aspects of this issue. Some members of the public have pointed out that the Forest Service has harvested areas which now show no signs of regeneration, and feel that some sales planned in the future may have similar problems. It is also felt by many that the suitability base from which the Allowable Sale Quantities are calculated is inaccurate. Some feel that there are lands that are unstable from a soils standpoint, but were included in the base. Others believe that some of the lands taken out of the base should be included, because technology may change in the future to the point that harvesting activities could occur without seriously impacting the soil resource (see the CONFLICTS OVER ANALYTICAL PROCESS/RESULTS issue).

TRANSPORTATION SYSTEM

Some aspects of this issue are related to the commodity versus amenity aspects mentioned in issues above. The primary example is that roads are needed to access timber supplies and to drill for oil and gas exploration, but their existence changes recreation experiences, affects wildlife habitat, as well as impacting soil and water resources.

Publics generally supporting road construction and improvement maintain that once a road is built to provide access to a timber sale or mineral development, it should remain open so as not to lose the investment of construction. The roads also provide access for the harvesting of firewood and post and poles, and provide a transportation network for motorized recreationists into areas that would otherwise to accessible only to dispersed uses. These interests point out that in the light of an aging national population, the motorized experience could become increasingly important.

On the other side are publics that point to the numerous impacts roads can have on the existing forest environment, such as the destruction of wildlife habitat, the breakdown of soil stability, increased erosion, and the degradation of water quality and subsequent impacts on fisheries. They argue that roads also destroy the primitive recreation experience, which in turn affects the outfitter and guide industry and other businesses tied to the wilderness environment. Private landowners frequently express opposition to road building or improvement because the

increased traffic impacts their preferred lifestyles. Many of the solutions to the debate between these two sides revolves around the possibility of seasonal road closure, road obliteration, and road improvement.

There are several other elements related to this issue as well. One question focuses on snowmobile use, which is of considerable concern to a large segment of publics. Many feel that snowmobile use should not be controlled, or that more snowmobile trails ought to be built to accommodate the increasing demands, while others are concerned that uncontrolled or expanded use could hurt wildlife winter range. The same arguments are expressed concerning the use of ORV's in the forest.

There is the question of rights-of-way across private property to allow public use of National Forest System lands in some specific areas on the Forest (see the MANAGEMENT OF THE UNION PASS ROAD issue), and questions concerning the emphasis on maintenance of existing structures. Finally, there is concern over the deterioration of the forest's road and trail network.

WATER SUPPLY AND QUALITY

Concern over water and related soil stability are often cited as reasons for limiting roading, livestock use, timber harvesting, and oil and gas exploration/development. On the other hand, timber harvesting has been cited as an opportunity for increasing water supply, which is a major problem in the Colorado River System. With "proper" mitigation measures, the negative effects can be avoided in application of timber harvest and oil and gas activities. Also, associated with potential oil and gas development is concern over acid rain.

WILDLIFE AND FISH MANAGEMENT

It has often been expressed by numerous publics during this planning process, that the Forest's wildlife resource is unique within the National Forest system. Those that view it as the forest's most important value, feel that all other resource uses ought to be allowed only if they maintain, at the very least, their habitat and populations. Associated with this concern is a significant recreation industry, particularly the outfitters and guides, which is dependent upon a high level of wildlife populations, the hunter/success ratio, the quality of the associated recreation opportunities, and the length of hunting seasons.

Others, however, feel that the concern over wildlife should not override the opportunity to provide jobs and supply commodities in the timber, oil and gas, and livestock industries (see those issues related to COMMUNITY STABILITY). Most of the publics with these feelings believe that adverse effects can be minimized with the application of mitigation measures applied to their use. Rather than the exclusion of their use, they feel that with the size of this Forest, there is "room for everybody."

Another facet of this issue deals with elk migration routes. Historically, the majority of the elk herds that summer in the southeastern part of Yellowstone National Park migrated to the National Elk Refuge through the area referred to as the Mt. Leidy Highlands. However, because of management activities that have occurred there in the past, along with increased hunting pressures, the majority of the elk herds now migrate through Grand Teton National Park. This has created management problems for Grand Teton National Park (which is now the only National Park that allows a limited hunting season), and the Wyoming Game and Fish whose management options are limited within National Parks. Both of these agencies would like to see the historical migration routes re-established.

Also included in this issue is concern for some specific areas such as critical grizzly habitat, winter range, calving areas, the management and protection of threatened and endangered species, and elk winter feed grounds (see MANAGEMENT OF T&E SPECIES issue).

With respect to the fisheries resource on the Forest, a new issue has recently emerged from some of the publics who would like to see the Forest do what it can to encourage an increase in the outfitting/guide fishing industries. This could create more competition over already fiercely debated resources.

RECREATION

Some publics feel that the supply of recreation opportunities on the forest is sufficient considering it proximity to the national parks and wilderness areas, and the industries that have developed relative to those opportunities. Others disagree, maintaining that there is a need for more opportunities in the developed recreation area, such as expanded ski areas, more snowmobile trails, and more campgrounds. There is also concern for the loss of existing dispersed recreational opportunities, including non-consumptive outfitter and guide operations, due to commodities development. There is an additional concern for the lack of sufficient maintenance of existing developed facilities.

Included in this issue is the conflict over how much roaded or non-roaded recreation opportunity is right or necessary. Thus the issue is strongly tied to the use and development of other resources such as timber and oil and gas (see CONFLICTS RELATED TO TIMBER SUPPLY and CONFLICTS RELATED TO OIL AND GAS LEASING issues). The debate over control of snowmobile and off-road vehicle use is also included, as is the effectiveness of mitigation measures regarding commodity development, such as road closures and obliteration (see MANAGEMENT OF THE TRANSPORTATION SYSTEM issue).

THREATENED AND ENDANGERED SPECIES

There are a number of animal species on the Threatened and Endangered list with habitat on the Bridger-Teton National Forest. Each of these species constitutes a special managerial challenge, particularly when the area of their habitat is also perceived as important for other resource use. With all of these species, the conflict centers around the importance of doing as much as possible to save these species from extinction as opposed to the position that man's activities can be carried out in habitat areas without a detrimental effect on the wildlife.

The animal which has received the greatest public interest is the grizzly bear. Numbering only a few thousand, there are publics who maintain that preserving the grizzly habitat on this Forest is of vital, national importance. They maintain that areas designated as grizzly habitat should be totally restricted from commodity use, so as not to disturb their delicate environment. On the other side are publics, primarily those supporting the oil and gas and timber industries, who maintain that timber harvesting and energy and mineral exploration and development can be conducted in grizzly areas without coming into conflict with the bears. They point out that instead of oil and gas activities disturbing grizzlies, recreationists are the greatest hazard to the animals. They further point out that restricting areas designated as grizzly habitat from such activities would cut off vast portions of land which they perceive as important to their industries.

Another area of debate concerns the gray wolf. There have been a number of unconfirmed sightings of wolves in certain areas of the Forest, and a resulting debate has occurred over whether they should be treated as critical habitat areas. Another debate centers around whether or not the Forest should even encourage the reintroduction of wolves at all.

Other T&E species on the Forest include the wood frog, bald eagle, great gray owl, osprey, peregrine falcon, trumpeter swan, whooping crane, Kendall dace, spotted bat, and wolverine. Each of these have similar debates concerning the preservation of their habitat versus commodities development; i.e., oil, gas and minerals activities, timbering, road construction, recreational activities, and livestock grazing.

SPECIAL AREAS

Included in this issue is a feeling from many environmentally oriented publics, and those publics involved in the recreation/wildlife industries, that this Forest includes some very unique areas. These include areas such as the Mt. Leidy Highlands, grizzly habitat areas, the area surrounding the Teton Science School, the Upper Green River area, Commissary Ridge, the Palisades and Shoal Creek Wilderness Study Areas, the "Greater Yellowstone Area," and many of the other large, unroaded areas in general. Publics championing these areas point out their unique or desirable qualities, such as their natural beauty, unspoiled environment, wildlife, and fragile ecosystems. They adamantly express that the uses of these "nationally important" areas should not include significant, or perhaps no timbering or oil and gas leasing activities.

On the other hand, most of these areas are important for continuation of past timbering levels and may include a potential for oil and gas resource development. Publics concerned over local economies point out that these areas are vital for the maintenance and creation of jobs. Some argue that commodity uses in these areas cannot be conducted without significantly impacting other resources (see the issues related to COMMUNITY STABILITY, CONFLICTS RELATED TO TIMBER SUPPLY, and CONFLICTS RELATED TO OIL AND GAS LEASING issues). Others argue that if consumptive and non-consumptive recreation and wildlife activities are allowed in these areas, multiple use mandates that commodity uses be allowed as well. They further maintain that commodity uses can be accomplished without seriously impacting the other resources.

GRAZING

Livestock grazing is viewed by some publics (especially those with a livelihood associated with local ranching) as an important use of the forest. They feel grazing should be either maintained at existing levels or increased and that predation be controlled. Others are concerned, however, about the effects livestock may have on water quality, riparian areas, fish and wildlife habitat, and, in some instances, conflict with recreation or wilderness values.

They are also concerned about the effect that predator control has on wildlife and the environment.

ANALYSIS

This issue covers a number of items inherent in the resource inventories and analytical processes. From the environmentalist and conservationist standpoint, are feelings that the timber inventory is too optimistic, timber values and managed stand yields are too high, the reflection of soil stability is not accurate, recreation values are conservative, and the way the model reflects roads and related costs is inaccurate.

From the timber and oil and gas industry standpoint, the analysis does not allow for identification of the costs of minimum management requirements and the FORPLAN model discriminates against their values if other resource values are included in its optimization capabilities. In direct opposition to the environmentalist position, they are concerned that timber values are not high enough to reflect future potential market situation, that recreation and wildlife values are too high, that water ought to be a "joint production function" with timber in the model, and that the soil, wildlife, and water minimum management requirements are too constraining on their activities.

RESPONSE TO THE ISSUES

Response to issues in the forest planning process takes several forms. One response involves changes in planning or analysis procedure to satisfy public desires for more, better, or better-displayed information. Another response involves the creation of goals and objectives for managing the forest The goals and objectives are intended to direct the solution of important natural resource management problems pointed out first as issues during the scoping process then organized and discussed as Problem Statements. Another response is the creation of standards and guidelines that govern activities on the forest and limit the effects of one resource use on another.

Changes in planning process or procedures are detailed in part in FEIS Appendix B. Other planning-process changes are displayed in the Planning Records at the Forest Supervisor's Office in Jackson, Wyoming.

These Problem and Challenge statements were shared repeatedly with interested people over a one-year period to assure that the statements represented the issues. Copies of the developing final Forest Plan were mailed to people across the country who responded to Planning Update newsletters notifying them of draft review material availability. Informal comments

on the developing draft materials were solicited at meetings with groups and individuals. Changes were made as people suggested ways to better the discussions.

The Problem and Challenge Statements in FEIS Chapter 1 were matched with a set of forest management Goals and Objectives, detailed in Chapter 4 of the Forest Plan. The Goals and Objectives were established with a "if we accomplish these Goals and Objectives, we will have solved the problems and met the challenges" motive. Again, the Goals, Objectives, and the motive for establishing them were reviewed with the public over a 10-month period to assure that the reviewing publics felt goal and objective accomplishment would provide reasonable response to the issues. Changes were made in many of the objectives in response to the informal public comments, coming to the forest from publics near and far.

In response to the direction provided by the Goals and Objectives, forest-wide Standards and Guidelines and Desired Future Condition statements were prepared. These directives create the land and resource management conditions that accomplish the goals and objectives. Chapter 4 of the Forest Plan details the Standards, Guidelines, and Desired Future Conditions. Again, these were reviewed extensively with interested people to assure that the standards, guidelines, and Desired Future Conditions were responsive to the issues they had raised.

The standards and guidelines are grouped by resource. Each resource is introduced by a management emphasis or policy statement and a list of the objectives accomplished by following the Standards and Guidelines that follow. Similarly, the Desired Future Condition statements contain land and resource management direction in the form of Management Prescriptions, covering all resources. Each Management Prescription is accompanied by a management emphasis or policy statement and a list of the objectives that would be accomplished on those lands designated to attain the Desired Future Condition.

Areas and locations of Desired Future Condition vary by alternative and comprise, in their varying intensities and amounts, the overall management emphasis or philosophy of each alternative. Chapter 2 of the FEIS details how the different alternatives accomplish the objectives, and, thereby, address the issues.

Readers can follow their issues from brief descriptions in Chapter 3 to the Problem and Challenge statements at the end of Chapter 2. Goals and Objectives found in Chapter 4 respond to the Problems and Challenges and are linked to Standards and Guidelines and multi-resource Management Prescriptions.

Readers can then see how the standards, guidelines, and Management Prescriptions were used to develop the alternatives displayed in the FEIS. Each alternative has a map that displays where Management Prescriptions are to be applied to achieve Desired Future Conditions. FEIS Chapters 2 and 4 describe the effects of such applications, contrasting the alternatives, in part, by displaying differences in objectives accomplished.

For readers not readily finding their issues in Forest Plan Chapter 3, Appendix D of the FEIS provides more detail on issues, relating specific issues and Forest Service responses to Forest Plan and EIS text. Appendix D is arranged by subject.

Help with answers to planning process or analysis questions may be found in FEIS Appendix B.

APPENDIX B

DESCRIPTION OF THE ANALYSIS PROCEDURE

APPENDIX B:
DESCRIPTION OF THE ANALYSIS PROCEDURE

SECTION 1: INTRODUCTION

A. GENERAL PLANNING PROBLEMS

The National Forest Management Act of 1976 (NFMA) charges the Forest Service with the responsibility of forming one integrated Land and Resource Management Plan for each unit of the National Forest System. This Plan is to determine how best to meet public needs and desires within the capability of the land to produce goods and services. The Bridger-Teton National Forest's capability to produce goods and services is affected by competition among uses and by special situations such as sensitive soils, steep slopes, and large blocks of undeveloped forestland.

Public views differ concerning the relative importance of producing commodities, like timber or livestock forage, and providing amenities such as dispersed recreation opportunities or wildlife habitat. The primary Forest planning goal is to provide the information needed by decisionmakers to determine the mix of goods and services that will maximize net public benefits. Net public benefits are defined as the overall long-term value to the nation of all outputs and positive effects (benefits), less all associated inputs and negative effects (costs), whether they can be quantitatively valued or not. Net public benefits include priced outputs such as timber board feet and animal unit months, and non-priced items such as visual quality, wildlife habitat diversity, water quality, and a variety of recreation opportunities.

The National Forest Management Act (NFMA) and the regulations developed under NFMA (36 CFR 219) provide the analytical framework for developing a Forest Plan. The planning problem is a very complex one. Analytical techniques to reduce the complexity and magnitude of the problem were available to the interdisciplinary planning team. They are described in this Appendix.

B. THE PLANNING PROCESS

This analytical framework includes the 10-step planning process as outlined in NFMA regulations. The 10-step planning process created a new outlook and a new technology for National Forest land management Processes which were used to make individual resource decisions are now combined to make integrated management decisions. In addition, new mathematical modeling techniques are used to assist in land allocation decisions, including identifying the most cost-efficient pattern of land management. Following is a list of the 10 steps:

1. Identification of purpose and need.
2. Development of planning criteria.
3. Inventory data and information collection.
4 Analysis of the management situation.
5. Formulation of alternatives.

6. Estimated effects of alternatives.
7. Evaluation of alternatives.
8. Preferred alternative recommendation.
9. Plan approval.
10. Monitoring and evaluation.

All 10 steps are briefly described below. Steps 3, 4, 5, and 6 are analytical steps. These are the only steps explained in this Appendix. Steps 1, 2, 7, and 8 are procedural steps and are also described in Chapters I, II, IV, and in Appendix A of the DEIS. Steps 9 and 10 are execution steps and are described in the proposed Forest Plan.

1. Identification of Purpose and Need. Through public participation including contacts with other Federal agencies, State and local governments, the Forest Interdisciplinary Team identified public issues, management concerns, and resource opportunities (ICOs). This information was then used to develop Problem Statements and Forest Challenge Statements.

2. Development of Planning Criteria. The Forest Management Team and Interdisciplinary Team developed a series of goals and objectives that would need to be met in order to address the Problems Statements and Forest Challenge Statements. Criteria based on the identified ICOs, Problem Statements, and Forest Challenge Statements, directed the collection and use of inventory data; the analysis of the management situation; and the design, formulation, and evaluation of alternatives.

3. Inventory Data and Information Collection. The Interdisciplinary Team determined what inventory data was needed. Most data requirements concerned resource capabilities, demands, or benefits and costs. Existing data was mainly used, with some supplemental information developed to fill information gaps.

4. Analysis of the Management Situation. The analysis of the management situation process determined the Forest's capability to provide the goods and services (supply) to meet public needs and desires (demand). A FORPLAN linear programming model was used to determine the maximum present net value (PNV) the Forest can generate; project the current management program; evaluate the feasibility of meeting RPA production goals; and define the feasible parameters (benchmarks) for production of resources such as timber. These benchmarks provided a basis for formulating a broad range of reasonable alternatives. This information was compiled in a document entitled "The Analysis of the Management Situation" (AMS), which may be reviewed at the Forest Supervisor's Office in Jackson, Wyoming.

5. Formulation of Alternatives. The alternatives were formulated according to AMS benchmarks, ICOs, Problem Statements, Forest Challenge Statements and specified direction which required:

(a) Formulating a range of feasible resource outputs and expenditure levels;
(b) An analysis of opportunity costs, environmental trade-offs, and effects on present net value;
(c) Different ways to address the major ICOs, Problem Statements, and Forest Challenge Statements;
(d) Alternatives that will use RPA resource values;

(e) The most cost-efficient management prescriptions needed to meet the objectives of each alternative will be used;
(f) One alternative will display the outputs, costs, and benefits of the existing plans and direction over time (No Action Alternative);
(g) At least one alternative will emphasize commodity production and another will emphasize amenity (non-market) production.

6. Estimation of Effects of Alternatives. The physical, biological, social, and economic effects of implementing each alternative were estimated and analyzed. The process showed how each alternative meets the goals and objectives needed to meet the Forest Challenge Statements, responds to ICOs, and compares to the other alternatives. The output levels, benefits, and costs were simulated with the Version II FORPLAN model.

The analyses included direct effects, indirect effects, cumulative effects, conflict with other existing governmental agencies or land use plans, historical and cultural resources, energy and transportation corridor effects, mitigation measures to meet legal standards, and other environmental effects.

7. Evaluation of Alternatives. Using the previously selected planning criteria, the Interdisciplinary Team analyzed the significant physical, biological, economic, and social effects of each of the 6 alternatives considered in detail. The analysis included present net value, social and economic effects, outputs of goods and services, and overall condition of environmental resources. The analysis systematically documented each step of the process.

8. Preferred Alternative Recommendation. Using the analysis described in Planning Step 7, the Forest Supervisor recommended a Preferred Alternative to the Regional Forester. The Preferred Alternative is identified in Chapter II of this Final Environmental Impact Statement (FEIS) and is displayed in the accompanying Forest Plan.

9. Plan Approval. After the issuance of the Final Environmental Impact Statement/Forest Plan (FEIS/Plan), the Regional Forester will review the FEIS/Plan and will either approve or disapprove it in accordance with 36 CFR 219.10(c). If the Plan is approved, a Record of Decision (ROD) will be issued in accordance with NEPA requirements (40 CFR 1505.2). In addition to the NEPA requirements, the ROD will include a summary comparing the selected alternative with any environmentally preferred alternatives and any other alternatives with a higher present net value.

10. Monitoring and Implementation. A Monitoring Plan is included in Chapter V of the Forest Plan. It includes the actions, effects, or resources to be monitored; the frequency of measurement; the expected precision and reliability of the monitoring process; the monitoring schedule; and the allowed variation limits. Implementation will be evaluated at intervals established by the Monitoring Plan to determine how well Plan objectives are being met, and how closely management standards and guidelines are being followed. Based on this evaluation, the Interdisciplinary Team may recommend to the Forest Supervisor changes in management direction and revisions and amendments to the Forest Plan.

SECTION 2: THE FOREST PLANNING MODEL (FORPLAN)

A. OVERVIEW

Forest Planning model (FORPLAN) is the linear programming (LP) model used in the development and evaluation of benchmarks and alternatives. FORPLAN is a third-generation configuration of a series of LP models developed by the Forest Service to aid in resource management planning. Timber Resource Allocation Model (Timber RAM) and Multiple Use Sustained Yield Calculation (MUSYC), two predecessors, are single resource models designed to evaluate timber allocation problems. FORPLAN, on the other hand, is designed to evaluate problems involving "multi-resource" outputs. In general, linear programming is a mathematical optimization technique which assigns values to decision variables and thus simultaneously satisfies a set of linear constraints and maximizes or minimizes a linear objective function. Linear programming has been applied to a diverse set of problems involving the allocation of scarce resources in an optimal manner. In the FORPLAN resource allocation model, management practices (the decision variables) are allocated to areas of land (Analysis Areas) in a manner which maximizes present net value (the objective function) while satisfying certain conditions such as minimum or maximum levels of some Forest products (constraints).

A brief description of the major components of the FORPLAN model follows.

Analysis Areas

As formulated by the Bridger-Teton National Forest, Analysis Areas represent noncontiguous areas of land. Analysis Areas are scattered areas of land possessing similar characteristics such as geographic location, soil stability, vegetative type, or some combinations thereof. This type of aggregation groups areas with uniform response functions in biological and/or financial terms.

In the model, Analysis Areas form the basic units on which management decisions are made. A hierarchy of Analysis Area identifiers categorizes these land units and provides a structure for formulating or describing resource allocation problems through the use of constraints and objective functions. Such a hierarchy is essential to specify the production possibilities on the Forest correctly.

Coordinated Allocation Zones

A layer of contiguous areas was included in the inventory of the Forest to better coordinate the allocation and scheduling of Management Prescriptions to Analysis Areas. These were input as Coordinated Allocation Zones (CAZs) in the Version II FORPLAN model. This feature allows representation of yield and cost information that is a function of the juxtaposition of Management Prescriptions over the broad area.

Management Prescriptions

Multiple-use Management Prescriptions represent a set of management practices or activities and their associated Standards and Guidelines. They are designed to produce a certain Desired Future Condition over time. Each prescription contains components of a production function for jointly produced outputs. Different Analysis Areas will be under the same Management Prescription; however, different output levels, costs, and benefits will occur due to the differences between Analysis Areas. Management Prescriptions are identified within the FORPLAN data set as "Management Emphases". Timing and scheduling options are an integral part of each prescription, these are identified in FORPLAN as "Management Intensities". Since the Bridger-Teton National Forest used Coordinated Allocation Zones, prescription packages are structured as "Coordinated Allocation Choices" which adds spatial continuity to the analysis.

The Interdisciplinary Team, along with interested publics, assigned different "packages" of management prescriptions to each Coordinated Allocation Zone during the Alternative Design Process. Each "package" of management prescriptions represented a different mix of Desired Future Conditions to meet the emphasis of each alternative.

Activities

Activities represent active or passive management of the land. Further, activities incur costs; hence, represent choices for capital outlays. Activities within the FORPLAN model are fairly specific, such as clearcutting one acre of mature Engelmann spruce using a tractor logging method. Another example involves the number of acres treated in wildlife habitat improvement projects. The activities associated with each management prescription are further defined by the Standards and Guidelines.

Outputs and Environmental Effects

Outputs and environmental effects result from the activities modeled. The mix of outputs is governed by the goals, objectives, standards and guidelines of the management prescriptions. Outputs may be priced directly in the model or included in the model without explicit prices. Outputs and environmental effects are projected through time according to the activities simulated in a given alternative.

Constraints

Constraints are used to ensure that the assignment of practices to Analysis Areas conforms to the emphasis of a particular management prescription. FORPLAN constraints fall into four categories: 1) constraints to make management prescriptions implementable, 2) constraints to ensure conformance to the management requirements (36 CFR 219.27), 3) general timber policy constraints, such as nondeclining yield and harvest of timber stands generally at or beyond culmination of mean annual increment of growth, and 4) discretionary constraints

designed to achieve various levels of output and expenditure levels. The first three categories of constraints define production limits common to most alternatives (exceptions include departure alternatives). The fourth category completes the specification of the production surface for a particular alternative. Specification of the production surface and an objective function are sufficient conditions for the FORPLAN model to achieve an efficient assignment of prescriptions to Analysis Areas.

Objective Function

The objective function guides the linear programming algorithm to an optimal solution. In Forest planning alternatives, the objective function is to "maximize present net value" of all priced outputs. Nonpriced outputs and qualitative environmental effects are portrayed with specified constraint sets. Since constraints must always be satisfied, the objective function will never locate optimal solutions outside the scope of the constraints specified for outputs and environmental effects (whether or not they are priced). For this reason, it is desirable to consider marginal changes in solutions as constraint sets are adjusted. This 'sensitivity analysis' is quite expensive, given the scope of the Forest planning problem, and was performed only where a major issue or concern indicated that the benefits from the additional analysis outweighed the costs of the analysis.

B. ANALYSIS AREA IDENTIFICATION

Analysis areas represent non-contiguous stands of timber with similar characteristics. They are the basic unit in the model for the scheduling of timber harvest. The analysis areas have been determined from the use of the Forest's Geographic Information System (GIS). A four-level hierarchical stratification was used to group similar capability areas. These four levels are:

Level 1 - Community Interest Areas

The Forest has been broken into eight different "interest areas", which primarily reflect differences in transportation systems, and indicate the primary community or area the transportation system originates from. This breakdown serves the purpose of allowing some geographic specificity to the otherwise scattered analysis areas, and aided with the calculation of hauling costs (which were determined by appraising to the closest mill. (For more information, refer to the description on Coordinated Allocation Zones.) The following "Community Interest Areas" (CIA) were used:

- Dubois CIA
- Gros Ventre CIA
- Jackson Hole CIA
- Pinedale CIA
- Greys River CIA
- Afton Front CIA
- Big Piney CIA
- Kemmerer CIA

Level 2 - Vegetation Group

This level contains a combination of different timber species, their average age class, and wildlife considerations. The following classifications were used:

LP - Lodgepole Pine, Sawtimber, Average Age of 160
PP - Lodgepole Pine, Post/Poles, Average Age of 100
C1 - Lodgepole Pine, Older Clearcuts, Average Age of 10
(This includes the clearcuts that are actually around 20 years old, but for the vast majority of these stands, reforestation has been delayed for various reasons and the regenerated stand is only around 10 years old.)
CO - Lodgepole Pine, Recent Clearcuts, Average Age of 0
OS - Spruce/Fir, Old-Growth, Average Age of 170
(The "old-growth" classification is not so much a function of age as it is of stands meeting various wildlife needs.)
SF - Spruce/Fir, Sawtimber, Average Age of 170
SE - Spruce/Fir, Post/Poles, Average Age of 100
OD - Douglas-fir, Old-Growth, Average Age of 160
(The "old-growth" classification is not so much a function of age as it is of stands meeting various wildlife needs.)
DF - Douglas-fir, Sawtimber, Average Age of 160
DP - Douglas-fir, Post/Poles, Average Age of 100
AS - Aspen
NS - Commercial Forest on Lands Not in the Tentatively Suitable Land Base. (See discussion on the tentatively suitable land base within the Constraints Section for more information.)
NC - Non-Commercial Forest Lands
NF - Non-Forested Lands

Level 3 - Soil Groups

This level contains a breakdown of soils with similar characteristics. This provides the opportunity to assign different costs and prescriptions to different timber stands with different soil conditions. The following breakdowns were used:

SM - Soils Classified as Stable or Marginally Stable
MU - Soils Classified as Marginally Unstable
UL - Soils Classified as Unstable or Located within a Landslide

Level 4 - Slope Groups

This level contains a breakdown of different slope classifications. This provides the opportunity to assign different costs and prescriptions to different timber stands with different slope classifications. The following breakdowns were used:

L4 - Slopes Less Than or Equal to 40%
45 - Slopes From 41% to 55%
57 - Slopes From 56% to 70%
(47 - Slopes From 41% to 70%)
G7 - Slopes Greater Than 70%

C. COORDINATED ALLOCATION ZONES

For the Draft Plan and Environmental Impact Statement, the Forest was divided into Habitat Units, which were then combined into the Allocation Zones. In the reanalysis, the Interdisciplinary Team felt the Habitat Units did not adequately represent all the resources and therefore, searched for a classification approach that would improve future management of all resources. After a re-evaluation, and consideration of other ways to divide the forest, the Interdisciplinary Team eventually decided to use PWI (Project Work Inventory) Watersheds. There are 60 separate PWI Watersheds, outside of the three wilderness areas on the Forest.

At first, it seemed desirable to keep all of these watersheds as separate units. However, the Interdisciplinary Team soon determined that the FORPLAN model would be unable to work with the amount of data that would be generated from 60 separate watersheds. Therefore, the Interdisciplinary Team looked at the possibility of combining some watersheds. After reviewing all the specialists needs, the team was able to form 30 Allocation Zones. The Allocation Zones can contain up to five watersheds.

The "Allocation Zones" are referred to throughout the documents as "Management Areas". The term "Management Area" and "Allocation Zone" can be used interchangeably. "Allocation Zone" is primarly a FORPLAN modeling term, and about the only time this term is used is in relation to the FORPLAN model itself. In almost all the other situations, the term "Management Area" is used.

As was discussed earlier, the FORPLAN analysis areas are divided up by "Community Interest Areas". The Community Interest Areas were determined by combining those Allocation Zones that have transportation systems which have a common point of origin. The following table shows the relationship of Community Interest Areas, Allocation Zones (Management Areas), and PWI Watersheds. The Allocation Zone number contains two elements: the first number refers to the Ranger District that administers the area and the second number to the Allocation Zone itself. Each Watershed number shows a similar pattern: the first digit reflects the administering District and the next four the Watershed itself.

Dubois Community Interest Area -

Allocation Zone 45 - Mocassin Basin
- Watershed 40015 - North Fork Fish Creek
- Watershed 40018 - Cottonwood Creek

Allocation Zone 61 - Blackrock
- Watershed 60007 - Pacific Creek
- Watershed 60009 - South Fork Buffalo River
- Watershed 60010 - Blackrock Creek
- Watershed 60011 - Lower Buffalo River

Allocation Zone 62 - Spread Creek
- Watershed 60012 - Spread Creek

Allocation Zone 71 - Union Pass
- Watershed 70014 - South Fork Fish Creek

Gros Ventre Community Interest Area -

Allocation Zone 43 - Ditch Creek
Watershed 40013 - Ditch Creek
Watershed 40022 - Lower Gros Ventre River

Allocation Zone 44 - Slate Creek
Watershed 40020 - Slate Creek

Allocation Zone 46 - Gros Ventre
Watershed 40016 - Bacon Creek
Watershed 40017 - Upper Gros Ventre
Watershed 40019 - Middle Gros Ventre River
Watershed 40021 - Crystal Creek

Jackson Hole Community Interest Area -

Allocation Zone 22 - Cliff Creek
Watershed 20031 - Cliff Creek

Allocation Zone 41 - Jackson Hole South
Watershed 40023 - Wilson
Watershed 40024 - Mosquito Creek
Watershed 40026 - Horse Creek
Watershed 40036 - Fall Creek
Watershed 40038 - Cache Creek

Allocation Zone 42 - Curtis Canyon
Watershed 40025 - Flat Creek

Allocation Zone 47 - Granite Creek
Watershed 40033 - Granite Creek

Allocation Zone 48 - Snake River Canyon
Watershed 30121 - Bailey Creek
Watershed 40037 - Astoria Hot Springs
Watershed 41501 - North Snake River Canyon

Allocation Zone 49 - Willow Creek
Watershed 40034 - Willow Creek
Watershed 40035 - Lower Hoback River

Pinedale Community Interest Area -

Allocation Zone 72 - Upper Green River
Watershed 70102 - Headwaters Green River
Watershed 70103 - Tosi-Wagon Creek
Watershed 70104 - Rock-Gypsum Creek
Watershed 70105 - Beaver Creek
Watershed 70108 - New Fork River

Allocation Zone 73 - Pole Creek
Watershed 70109 - Pine Creek
Watershed 70110 - Pole Creek
Watershed 70111 - Boulder Creek

Allocation Zone 74 - East Fork River
Watershed 70112 - East Fork River

Allocation Zone 75 - Sweetwater
Watershed 70101 - Sweetwater Creek
Watershed 70116 - Little Sandy River
Watershed 70117 - Big Sandy River

Greys River Community Interest Area -

Allocation Zone 31 - Little Greys River
Watershed 30123 - Little Greys River

Allocation Zone 32 - Lower Greys River
Watershed 30124 - Lower Greys River

Allocation Zone 35 - Upper Greys River
Watershed 30122 - Upper Greys River

Afton Front Community Interest Area -

Allocation Zone 33 - Star Valley North
Watershed 30127 - Lower Salt River

Allocation Zone 34 - Star Valley South
Watershed 30125 - Spring Creek
Watershed 30126 - Upper Salt River

Big Piney Community Interest Area -

Allocation Zone 21 - Hoback Basin
Watershed 20028 - Fisherman Creek
Watershed 20029 - Jack Creek
Watershed 20030 - Dell Creek
Watershed 20032 - Shoal Creek

Allocation Zone 23 - Upper Hoback
Watershed 20027 - Hoback Headwaters

Allocation Zone 24 - Horse Creek
Watershed 20105 - Beaver Creek
Watershed 20106 - Horse Creek

Allocation Zone 25 - Cottonwood Creek
Watershed 20107 - Cottonwood Creek

Allocation Zone 26 - Piney Creeks
Watershed 20113 - Piney Creeks

Kemmerer Community Interest Area -

Allocation Zone 11 - Smiths Fork
Watershed 10119 - Smiths Fork River
Watershed 10120 - Thomas Fork River

Allocation Zone 12 - LaBarge Creek
Watershed 10114 - LaBarge Creek
Watershed 10115 - Fontenelle Creek

Allocation Zone 13 - Hams Fork
Watershed 10118 - Hams Fork

D. MANAGEMENT PRESCRIPTIONS

The National Forest Management Act (NFMA) Regulations define management prescriptions as "management practices and intensities selected and scheduled for application to a specific area to attain multiple-use and other goals and objectives (36 CFR 219.3)." In general, the management prescriptions used by the Bridger-Teton in its formulation of the FORPLAN model are designed to achieve a given objective of producing some combination of outputs or some level of resource protection on a given area (Analysis Area).

The Interdisciplinary Team reviewed the public issues and management concerns, used professional judgment, and evaluated existing policy, legislative direction, and research for guidance in developing multiple resource management prescriptions. This set of prescriptions portrays a broad range of management emphasis, intensities, practices, standards, and guidelines. Emphasis statements for management prescriptions respond to questions raised by issues and concerns Management prescriptions consist of an emphasis statement which establishes the purpose of the prescription and a compatible set of management practices which includes the Standards and Guidelines necessary to accomplish the prescription.

Management prescription Standards and Guidelines represent the necessary mitigation and resource coordination measures that are required by existing laws, regulations, and policies. The Interdisciplinary Team wrote forestwide Standards and Guidelines to cover practices common to all prescription and resource situations. All prescriptions are tiered under and conform to these broad direction statements. These forestwide and management prescription Standards and Guidelines can be found in Chapter 4 of the accompanying Forest Plan.

The Interdisciplinary Team developed a set of "Desired Future Conditions" (DFCs) to enable team members to envision the results of management under a given prescription and to assist in developing resource coefficients. These DFCs were intended as guidelines for writing silvicultural prescriptions and other resource management prescriptions. They were also meant to inform the land managers and

other resource specialists as to what the results of implementing the management prescriptions would be in the next 50 years. These Desired Future Conditions can be found in Chapter 4 of the Forest Plan.

The Interdisciplinary Team initially developed a larger set of prescriptions, but as the ID Team and the publics became involved in the "Alternative Design" process, in became apparent that some of the prescriptions were not needed, or were adequately covered in other prescriptions.

For more information on the "Alternative Design" process and how the Management Prescriptions were assigned to the Allocation Zones, refer to the section on Coordinated Allocation Choices.

The following is a list and brief description of the Management Prescriptions, which are defined in more detail in the Forest Plan.

Management Prescription 1A: The prescriptions is a high commodity (timber and range) emphasis prescription in which there are few constraints on timber management practices and wildlife populations will be allowed to fall from present levels to viable populations.

Management Prescription 1B: The prescription is also a high commodity emphasis prescription, yet it calls for sustaining existing wildlife populations levels while allowing hunting use to decrease.

Management Prescription 2A: The prescription has an emphasis on providing primitive recreation opportunities, but still allowing such things as trail bikes, helicopter skiing, and snowmobiling. Timber harvesting is not scheduled and new oil and gas leases will generally be issued with a no-surface occupancy (NSO) stipulation.

Management Prescription 2B: The prescription has an emphasis on providing motorized, semi-primitive recreation opportunities. Timber harvesting is not scheduled. Oil and gas leasing is permitted.

Management Prescription 3: The prescription places on emphasis on river-related recreation opportunities and protecting areas for possible consideration as Wild and Scenic Rivers. Timber harvesting is not scheduled.

Management Prescription 4: The prescription places an emphasis on protecting municipal watersheds. Timber harvesting is not scheduled.

Management Prescriptions 6(A-D): The prescriptions are for Wilderness area management.

Management Prescription 6(S): The prescriptions is for Wilderness Study Area management.

Management Prescription 7A: The prescription has an emphasis on Grizzly Bear habitat with vegetation management through scheduled timber harvests.

Management Prescription 7B: The prescription has an emphasis on Grizzly Bear habitat by maintaining security areas. Timber harvesting activities are not scheduled.

Management Prescription 8: The prescription has an emphasis on providing educational opportunities. Management projects are developed with the cooperation of local schools. Timber harvesting activities are not scheduled for the first decade.

Management Prescriptions 9A/B: The prescriptions place an emphasis on public and private developed recreation sites. Timber harvesting activities are not scheduled.

Management Prescription 10: The prescription places an emphasis on managing a diversity of wildlife habitats through scheduled timber harvest activities.

Management Prescription 12: The prescription has an emphasis on providing security cover for big game animals. Timber harvesting activities are not scheduled.

Management Emphases

The Management Prescriptions described above are used to define the "Management Emphases" in the FORPLAN model. The Management Emphases are further divided up by "Management Intensities". Within the FORPLAN model, the "Management Emphases" and "Management Intensities" are combined to define the silvicultural prescriptions that are applied to the Analysis Areas.

The silvicultural prescriptions used in the model contain all the activities necessary for the planning, sale, and harvest of timber. Different prescriptions were designed to achieve given objectives. They differ in cost, mix, and timing of activities, and in resulting outputs and benefits.

In the FORPLAN model, timber-related activities (except road construction/reconstruction) are keyed to the implementation of the prescription. The cutting of one acre of timber of a certain age ties to a timber yield table to arrive at the volume cut. Per acre or per volume coefficients are in turn used to determine amounts and timing of other activities such as site preparation, reforestation, pre-commercial thins, etc. Costs of the activities are based on the particular prescription chosen and the characteristics of the analysis area.

One Coordinated Allocation Choice can have one or a number of Management Prescriptions within it. (For more information on this relationship, refer to the section dealing with the description of Allocation Choices.) The Management Prescriptions that the FORPLAN model primarily deals with are those that allow scheduled timber harvests. Thus, the Management Prescriptions that become the Management Emphases in the FORPLAN model are:

MP-1A - Maximum Timber Production
MP-1B - Timber Production Emphasis
MP-7A - Grizzly Bear Habitat Management
MP-10 - Wildlife Habitat Management
NS - The other Management Prescriptions that do not have Scheduled Timber Harvests
MN - Minimum Level (The "Do Nothing" option.)

Management Intensities

Each prescription calling for a timber harvest consists of a management emphasis, an intensity for the existing rotation, and an intensity for the regenerated rotation. The possible intensities are described below:

FH/FH - Clearcut Final Harvest in Existing Rotation; Clearcut Final Harvest in Regenerated Rotation.

FH/PC - Clearcut Final Harvest in Existing Rotation; Pre-Commercial Thin and Clearcut Final Harvest in Regenerated Rotation.

FH/CT - Clearcut Final Harvest in Existing Rotation; Pre-Commercial Thin, Commercial Thin, and Clearcut Final Harvest in Regenerated Rotation.

PC/PC - Pre-Commercial Thin and Clearcut Final Harvest in Existing Rotation; Pre-Commercial Thin and Clearcut Final Harvest in Regenerated Rotation.

CT/CT - Pre-Commercial Thin, Commercial Thin, and Clearcut Final Harvest in Existing Rotation; Pre-Commercial Thin, Commercial Thin and Clearcut Final Harvest in Regenerated Rotation.

SW/SW - Shelterwood Final Harvest in Existing Rotation; Shelterwood Final Harvest in Regenerated Rotation.

SW/PC - Shelterwood Final Harvest in Existing Rotation; Pre-Commercial Thin and Shelterwood Final Harvest in Regenerated Rotation.

SW/CT - Shelterwood Final Harvest in Existing Rotation; Pre-Commercial Thin, Commercial Thin, and Shelterwood Final Harvest in Regenerated Rotation.

1W/1W - Pre-Commercial Thin and Shelterwood Final Harvest in Existing Rotation; Pre-Commercial Thin and Shelterwood Final Harvest in Regenerated Rotation.

2W/2W - Pre-Commercial Thin, Commercial Thin, and Shelterwood Final Harvest in Existing Rotation; Pre-Commercial Thin, Commercial Thin and Shelterwood Final Harvest in Regenerated Rotation.

WL/PC - "Wildlife" Final Harvest in Existing Rotation; Pre-Commercial Thin and "Wildlife" Final Harvest in Regenerated Rotation. (See below for a description of a "Wildlife" Final Harvest.)

PC/WL - Pre-Commercial Thin and "Wildlife" Final Harvest in Existing Rotation; Pre-Commercial Thin and "Wildlife" Final Harvest in Regenerated Rotation.

GS/ST - Group Selection or Single Tree Selection

The following information will further define the activities that will occur within these intensities:

- In Management Prescriptions 1A and 1B, final harvests could begin at the age which reaches 95% of the Culmination of the Mean Annual Increment.
- In Management Prescriptions 7A and 10, final harvests could begin at the age which reaches the Culmination of the Mean Annual Increment.
- Pre-Commercial Thins will occur at the age of 20 for Lodgepole Pine and Douglas-fir stands, and at the age of 30 for Spruce/Fir stands.
- Commercial Thins will occur at the age of 50 for Lodgepole Pine stands, at the age of 70 for Douglas-fir stands, and at the age of 90 for Spruce/Fir stands.

- In Management Prescription 1A, the shelterwood harvest pattern for all species is 80% removal in the first entry, and 20% removal in the second entry one decade later.
- In Management Prescription 1B, the shelterwood harvest pattern for all species is 75% removal in the first entry, and 25% removal in the second entry one decade later.
- In Management Prescription 7A, the shelterwood pattern for all species is 60% removal in the first entry, with no additional entries.
- In Management Prescription 10, the shelterwood harvest pattern for all species is 60% removal in the first entry, and 40% removal in the second entry one decade later.
- A "Wildlife" Final Harvest is actually a 3-stage shelterwood. The shelterwood pattern is 15% removal in the first entry, 10% removal in the second entry two decades later, and 75% removal in the third entry which is three decades after the second removal.
- For modeling purposes, the Group Selection/Single Tree entries consist of entries every 20 years with a 120-year rotation for the Douglas-fir and Spruce/Fir stands and entries every 20 years with a 100-year rotation for the Lodgepole Pine stands.
- The Rotation Ages are determined by the Culmination of Mean Annual Increment (CMAI). The following table shows the ages that the CMAI is reached by species and treatment, along with the age that 95% of CMAI is reached:

	CMAI	95% CMAI
Lodgepole Pine		
Final Harvest Only	140	130
Pre-Commercial Thin	100	90
PCT and Commercial Thin	160	130
Spruce/Fir		
Final Harvest Only	130	120
Pre-Commercial Thin	120	100
PCT and Commercial Thin	160	120
Douglas-fir		
Final Harvest Only	130	120
Pre-Commercial Thin	120	90
PCT and Commercial Thin	130	130(*)

* - Actually occurs at an age of 70, but that is when the Commercial Thin occurs.

In Management Prescription 1A, all the possible management intensities are available for the FORPLAN model to choose from except the "Wildlife" Final Harvest option. This is because the "Wildlife" harvesting option is not consistent with the overall objectives of this Management Prescription. In Management Prescription 1B, all the possible management intensities, including the "Wildlife" option, are available for the FORPLAN model.

In Management Prescription 7A, the following management intensities are available for the FORPLAN model to choose from:

In Lodgepole Pine Stands - FH/PC, SW/PC, WL/PC, GS/ST
In Spruce/Fir Stands - WL/PC, GS/ST
In Douglas-fir Stands - SW/PC, GS/ST

In Management Prescription 10, the following management intensities are available for the FORPLAN model to choose from:

In Lodgepole Pine Stands - FH/PC, SW/PC, WL/PC, GS/ST
In Spruce/Fir Stands - WL/PC, GS/ST
In Douglas-fir Stands - FH/PC, SW/PC, WL/PC, GS/ST

These were the only intensities allowed because the emphases of Management Prescriptions 7A and 10 are on utilizing timber harvest to maintain or improve wildlife habitat while meeting the security needs of the grizzly bear and big game species. Shelterwood and selection methods are desired because these methods will allow for the development of multi-storied stands and will maintain the security and hiding cover as long as possible. These are also the best methods of maintaining the Partial Retention visual quality objective.

Generally, clearcutting is not one of the methods used to achieve these objectives, but due to the amount of mortality in the Lodgepole pine stands, it was felt that some clearcutting (actually patch cuts) would be necessary. The "WL/PC" (3-stage shelterwood) intensity is used because it allows for the salvage of high risk and dead trees and improving the genetic composition of the stands, while maintaining the necessary habitat and hiding cover for the grizzly bear. The "WL/PC" intensity was not used in the Douglas-fir stands in MP-7A because a very small acreage of Douglas-fir stands are within grizzly bear habitat, and the 3-stage shelterwood would not be feasible on these sites. The 2-stage shelterwood was not used in the Spruce/Fir stands because it was felt that the amount of volume removed would not facilitate the objectives of maintaining the hiding and security cover for as long as possible.

A pre-commercial thin is used in all the intensities because tests with the PROGNOSIS model show that pre-commercial thins will prolong the amount of time that the stands will provide hiding cover for wildlife.

E. COORDINATED ALLOCATION CHOICES

The Bridger-Teton National Forest has formulated the FORPLAN model a little differently than other National Forests. The difference is most pronounced in the formulation of Allocation Choices. These Allocation Choices were developed during the "Alternative Design" process.

The first step in this process was to define the alternatives that would be developed. Given the emphasis (or "biases for action") of the five alternatives that the Interdisciplinary Team and Management Team decided to re-evaluate between the Draft EIS and the Final EIS, the Interdisciplinary Team started evaluating methods for "designing" these alternatives. (For more information on the five alternatives evaluated, and the other alternatives that were not further evaluated, refer to the section titled "Formulation of Alternatives".) In designing these alternatives, the Interdisciplinary Team needed some "tools" to work with. These "tools" were the Management Prescriptions described previously.

Given these "tools", the Interdisciplinary Team along with interested publics, met at each Ranger District to determine which Management Prescriptions should be used in each watershed to define each of the five alternatives. These "Design

Teams" had many of the GIS products to work with during this process. For instance, the tentatively suitable maps were available which showed the areas with commercial timber potential, a breakdown of the Forest into four different slope classes (<40%, 41%-55%, 56%-70%, and >70%), and a breakdown of the Forest into four different soil classes (Stable/Marginally Stable, Marginally Unstable, Unstable, and Landslides). Other GIS products available were maps of the wildlife resources, the Recreation Opportunity Spectrum (ROS), and the Visual Quality Levels (VQL). Other information used included geologic maps to help the teams evaluate where mineral potentials may be.

After evaluating the resources, public input, and the emphasis of the alternative, lines were drawn on the maps to delineate which management prescriptions should be applied to which acres. These maps were then used to calculate the analysis area acreages within each management prescription in each watershed for each alternative. All together, this information defined the Allocation Choices for the model.

Each Allocation Zone (Management Area) has a potential of 27 Coordinated Allocation Choices available to it. These Allocation Choices are:

1N-1 - Max Timber, Implement Road Package in Period 1
1N-2 - Max Timber, Implement Road Package in Period 2
1N-3 - Max Timber, Implement Road Package in Period 3
2N-1 - High Productivity, Implement Road Package in Period 1
2N-2 - High Productivity, Implement Road Package in Period 2
2N-3 - High Productivity, Implement Road Package in Period 3
2E-1 - High Productivity, No New Road Development
3N-1 - RPA Emphasis, Implement Road Package in Period 1
3N-2 - RPA Emphasis, Implement Road Package in Period 2
3N-3 - RPA Emphasis, Implement Road Package in Period 3
3E-1 - RPA Emphasis, No New Road Development
4N-1 - Current Management, Implement Road Package in Period 1
4N-2 - Current Management, Implement Road Package in Period 2
4N-3 - Current Management, Implement Road Package in Period 3
4E-1 - Current Management, No New Road Development
5N-1 - Issue Resolution, Implement Road Package in Period 1
5N-2 - Issue Resolution, Implement Road Package in Period 2
5N-3 - Issue Resolution, Implement Road Package in Period 3
5E-1 - Issue Resolution, No New Road Development
6N-1 - Recreation/Wildlife, Implement Road Package in Period 1
6N-2 - Recreation/Wildlife, Implement Road Package in Period 2
6N-3 - Recreation/Wildlife, Implement Road Package in Period 3
6E-1 - Recreation/Wildlife, No New Road Development
7N-1 - Preferred, Implement Road Package in Period 1
7N-2 - Preferred, Implement Road Package in Period 2
7N-3 - Preferred, Implement Road Package in Period 3
7E-1 - Preferred, No New Road Development

For more information on Allocation Choices and how they are tied to Management Prescriptions and Analysis Areas, refer to the following section on "FORPLAN Formulation".

F. FORPLAN FORMULATION

The Version II FORPLAN Model was used to simulate possible management alternatives and to optimize different options within each alternative to ensure that the most efficient solution was achieved. To accomplish this, the model was designed to assist in resolution of Forest issues, and remain within the scope of reasonable computer modeling practices. FORPLAN, as it is used on the Bridger-Teton, is primarily a timber harvest scheduling model that allows for the consideration of other resources. Some resources were portrayed in the model; but, they were not included in the PNV objective function. Instead, they were considered in the model through the use of constraints that control the timing, location, and amount of timber harvest.

This type of formulation was used for two primary reasons; lack of confidence in the ability to specify resource relationships on a per acre basis, and the uncertainty associated with nonmarket values. Also, it was the desire of the Interdisciplinary Team to make all resource trade-off decisions as visible as possible. If the FORPLAN model harvested timber, the Team wanted to know it was for timber benefits and not to benefit some other resource. In those cases where timber harvesting benefits other resources, the Team wanted to make sure those benefits were valid and not just an artifact of the modeling process.

Analysis conducted prior to FORPLAN modeling included stratification of the Forest into Capability and Analysis Areas; design or development of Management Prescriptions; the development of the Allocation Choices through the "Alternative Design" process; projection of costs and benefits for practices included in the Management Prescriptions; determination of "road construction packages" for each Allocation Choice; and the calculation of acreages of Analysis Areas that would be accessed by the existing road system and the "road construction packages" For more information on the "road construction packages" refer to the section titled "FORPLAN Outputs and Activities".

Major assumptions used in the analysis described above included:

1. Activities will conform to standards and guidelines.
2. Coordination through Interdisciplinary Team analysis and action will be necessary to mitigate adverse effects for most activities that modify environmental conditions.
3. Demand for all resources outputs is equal to or greater than supply for all resources except recreation. Recreational outputs are valued only to the extent that the output is less than or equal to demand.

The relationship between Alternatives, Allocation Zones, Allocation Choices, Managment Prescriptions, and Analysis Areas, as used in the Bridger-Teton's FORPLAN model is somewhat difficult to follow. The following explanation will hopefully clear up the confusion.

A Version II FORPLAN model is essentially the combination of two differently structured models. One "model" is the timber harvest scheduling model, of which the primary components are Analysis Areas, Management Emphases and Management Intensities. In the other "model", the primary components are the Allocation Zones and the Allocation Choices. Between these two "models" the Analysis Areas and the Allocation Zones define the land area to which the Management Emphases/Management Intensities and Allocation Choices are applied.

As was described previously, the Forest is divided up into 30 Allocation Zones. Ideally, these Allocation Zones would also be the geographic identifiers used in the definition of the Analysis Areas. However, 30 such identifiers would have created a number of unique Analysis Areas that would be too large for the FORPLAN model to handle. Therefore, the 30 Allocation Zones were combined into the eight Community Interest Areas. For instance, the Pinedale Community Interest Area is the combination of Allocation Zones 72, 73, 74, and 75. Within the Pinedale CIA, there are twenty-seven different analysis areas. The following table (Table B-2-1) shows the analysis areas found in the Pinedale CIA and the acreage of each analysis area that can be found within each Allocation Zone.

TABLE B-2-1: ANALYSIS AREAS WITHIN THE PINEDALE CIA

AA#	Description	Total Acres	Acres within each Allocation Zone (AZ) AZ-72	AZ-73	AZ-74	AZ-75
401	LPSML4	90,767	39,676	9,090	13,758	28,243
402	LPSM47	8,297	3,471	1,341	1,498	1,987
403	LPSMG7	494	247	170	65	12
406	LPULL4	1,115	1,071	44	-	-
408	PPSML4	10,002	1,819	522	2,077	5,579
409	PPSM47	527	54	36	382	55
414	COSML4	341	341	-	-	-
420	C1SML4	4,172	3,980	126	-	66
421	C1SM47	63	63	-	-	-
425	C1ULL4	26	26	-	-	-
426	OSSML4	128	118	10	-	-
427	OSSM47	21	21	-	-	-
432	SFSML4	18,058	13,914	1,075	751	2,318
433	SFSM47	1,919	1,630	78	121	90
434	SFSMG7	49	49	-	-	-
437	SFULL4	85	85	-	-	-
439	SESML4	251	251	-	-	-
445	ODSML4	18	-	18	-	-
446	ODSM47	21	-	21	-	-
451	DFSML4	2,919	719	2,200	-	-
452	DFSM47	1,203	420	783	-	-
453	DFSMG7	66	10	56	-	-
456	DFULL4	89	40	49	-	-
464	AS	32,798	15,517	8,372	3,681	5,228
465	NS	361	239	93	4	25
466	NC	14,787	4,963	2,885	759	6,180
467	NF	95,082	68,582	13,438	3,703	9,359
	TOTAL	283,659	157,311	40,407	26,799	59,142

(For definitions of the abreviations in the AA Descriptions, refer to the previous section describing Analysis Areas.)

Once the analysis area information was determined, the next step involved looking at the results of the "Alternative Design" sessions for these Allocation Zones In these "Alternative Design" sessions, the ID Team along with Forest District personnel and members of the public evaluated information contained in the GIS maps and delineated Management Prescription boundaries within each Allocation

Zone for each Alternative. The set of Management Prescriptions laid out for the Current Direction Alternative in Allocation Zone 74 became Allocation Choices 4N-1, 4N-2, 4N-3, and 4E-1 for that particular Allocation Zone. The set of Management Prescriptions laid out for the Issue Consideration Alternative in Allocation Zone 74 became Allocation Choices 5N-1, 5N-2, 5N-3, and 5E-1 for that particular Allocation Zone. (More on the differences between the Allocation Choices that end in N-1, N-2, N-3 and E-1 will follow.)

From the maps that showed the Management Prescription boundaries for each Allocation Choice, the next set of calculations involved determining the acreages of the Analysis Areas that were within each Management Prescription for each Allocation Choice. The following tables (Tables B-2-2 through B-2-4) show these calculations for some of the Allocation Choices in Allocation Zone 74.

TABLE B-2-2: ANALYSIS AREAS IN ALLOCATION ZONE 74
BY MANAGEMENT PRESCRIPTION
FOR ALLOCATION CHOICES 4N-1, 4N-2, 4N-3, AND 4E-1
(Reflecting the Design for the Current Direction Alternative)

		Total	Acres by Management Prescription (MP)			
AA#	Description	Acres	MP-1A	MP-1B	MP-10	MP-NS(*)
401	LPSML4	13,758	-	12,091	637	1,030
402	LPSM47	1,498	-	1,272	61	165
403	LPSMG7	65	-	60	3	2
408	PPSML4	2,077	-	1,742	78	257
409	PPSM47	382	-	359	8	15
432	SFSML4	751	-	751	-	-
433	SFSM47	121	-	121	-	-
464	AS	3,681	-	2,793	29	859
465	NS	4	-	4	-	-
466	NC	759	-	571	85	103
467	NF	3,703	-	2,773	222	708
	TOTAL	26,799	-	22,537	1,123	3,139

* (Within the FORPLAN model, the Management Prescriptions became the Management Emphases and since only Management Prescriptions 1A, 1B and 10 had scheduled timber harvests, they were the only ones necessary to differentiate by analysis area. All others were combined into a "Not-Scheduled" category.) (Note: Management Prescription 7A has scheduled timber harvest activities, but this prescription does not occur in this Allocation Zone.)

TABLE B-2-3: ANALYSIS AREAS IN ALLOCATION ZONE 74
BY MANAGEMENT PRESCRIPTION
FOR ALLOCATION CHOICES 2N-1, 2N-2, 2N-3, AND 2E-1
(Reflecting the Design for the High Productivity Alternative)

AA#	Description	Total Acres	Acres by Management Prescription (MP) MP-1A	MP-1B	MP-10	MP-NS(*)
401	LPSML4	13,758	13,758	-	-	-
402	LPSM47	1,498	1,498	-	-	-
403	LPSMG7	65	65	-	-	-
408	PPSML4	2,077	2,077	-	-	-
409	PPSM47	382	382	-	-	-
432	SFSML4	751	751	-	-	-
433	SFSM47	121	121	-	-	-
464	AS	3,681	3,681	-	-	-
465	NS	4	4	-	-	-
466	NC	759	759	-	-	-
467	NF	3,703	3,555	-	-	148
	TOTAL	26,799	26,651	-	-	148

* (See Table B-2-2.)

TABLE B-2-4: ANALYSIS AREAS IN ALLOCATION ZONE 74
BY MANAGEMENT PRESCRIPTION
FOR ALLOCATION CHOICES 5N-1, 5N-2, 5N-3, AND 5E-1
(Reflecting the Design for the Issue Consideration Alternative)

AA#	Description	Total Acres	Acres by Management Prescription (MP) MP-1A	MP-1B	MP-10	MP-NS(*)
401	LPSML4	13,758	-	1,170	-	12,588
402	LPSM47	1,498	-	31	-	1,467
403	LPSMG7	65	-	-	-	65
408	PPSML4	2,077	-	219	-	1,858
409	PPSM47	382	-	-	-	382
432	SFSML4	751	-	-	-	751
433	SFSM47	121	-	-	-	121
464	AS	3,681	-	64	-	3,617
465	NS	4	-	-	-	4
466	NC	759	-	98	-	661
467	NF	3,703	-	173	-	3,530
	TOTAL	26,799	-	1,755	-	25,044

* (See Table B-2-2.)

The differences between the Allocation Choices that end in N-1, N-2, N-3 and E-1 have to do with the "road construction packages" that are developed for each Allocation Zone in each "Alternative Design". N-1 means that the road package, and the associated analysis acres that will be accessed by those new roads, will begin in the first decade. N-2 means that the road package will not begin until the second decade, and the associated analysis acres that are accessed by those roads will not be available until the second decade. N-3 is the same as N-2 except that the road package will not be available until the third decade. E-1

means that no new roads will be built, and that the only analysis area acreages that will be accessible will be those that are accessible from the existing road system. So for instance, in Allocation Choices 4N-1, 4N-2, and 4N-3, for Allocation Zone 74, the same analysis area acreages will be accessed, and the same road package will be built. However, the decade that the unroaded acres of Management Prescriptions 1B or 10 will become available will vary by up to three decades. The following table (Table B-2-5) shows the analysis area acres for Allocation Choices 4N (includes 4N-1, 4N-2, and 4N-3) and 4E in Allocation Zone 74.

TABLE B-2-5: ACCESSIBLE ANALYSIS AREAS IN ALLOCATION ZONE 74
BY MANAGEMENT PRESCRIPTION
FOR ALLOCATION CHOICES 4N and 4E

AA#	Description	Total Acres	Acres Accessible by Management Prescription and Road Package Options (N=New, E=Existing) 1B-4N	1B-4E	10-4N	10-4E
401	LPSML4	13,758	12,091	605	637	-
402	LPSM47	1,498	1,272	-	61	-
403	LPSMG7	65	60	-	3	-
408	PPSML4	2,077	1,742	1,742	78	78
409	PPSM47	382	359	359	8	8
432	SFSML4	751	751	-	-	-
433	SFSM47	121	121	-	-	-
464	AS	3,681	3,681	*	29	*
465	NS	4	4	*	-	*
466	NC	759	759	*	85	*
467	NF	3,703	3,555	*	222	*
	TOTAL	26,799	26,651		1,123	

* (Breakdowns between existing roads and new roads were not calculated for these categories.)

Table B-2-5 shows that under the Allocation Choices 4N, all the acres within the Management Prescriptions with scheduled timber harvest will eventually be accessed, but if no new roads are built (Allocation Choice 4E), only a portion of those acres will be available for harvesting prescriptions.

For those resources other than timber, the outputs and activities that occur within Allocation Choices 1N, 2N, 2E, 3N, 3E, 4N, 4E, 5N, 5E, 6N, 6E, 7N, and 7E are determined for each Allocation Zone and are directly entered into FORPLAN as information "unique" to each Allocation Choice.

With the model formulated in this manner, the alternatives are developed by simply constraining the model to only evaluate those Allocation Choices that were specifically designed for that alternative. For instance, the Current Direction Alternative would only have those Allocation Choices that begin with the number "4" to choose from. However, within each Allocation Choice and its "set" of Management Prescriptions, the model still has the flexibility to determine whether or not to build roads, which Analysis Areas should have harvesting activities on them, and what "Management Intensities" should be applied to those Analysis Areas.

The model also has the flexability to evaluate all the possible Allocation Choices under a "Maximize Present Net Value" Benchmark. (Refer to the Section titled "Analysis Prior to Development of Alternatives" for the results of this benchmark.)

G. FORPLAN OUTPUTS AND ACTIVITIES

This section describes the outputs and activities tracked in the FORPLAN model, and briefly how this information was developed. The information is grouped together by resource.

Recreation

The recreation outputs tracked in the model:

W01P - Primitive RVDs
W03N - Semi-Primitive Non-Motorized RVDs
W05M - Semi-Primitive Motorized RVDs
W07R - Roaded Natural RVDs

The outputs were developed by first determining the existing acreages in the different Recreation Opportunity Spectrum (ROS) classifications for each watershed. The existing recreational use (in RVDs - Recreation Visitor Days) for each watershed was also determined. A RVD/acre factor for each ROS class in each watershed was then calculated. Given this information, the road "packages" that were developed for each alternative in each watershed were overlayed on top of the ROS map and ROS acreage changes were calculated for each decade due to the new roads being built. Therefore, there could be a different set of ROS acreages for each decade in each alternative. The RVD/acre factors were then applied to these ROS acreages to estimate the RVD use and the changes in use between decades due to the implementation of a particular course of action. This information was directly entered into the FORPLAN model as data unique to each Allocation Choice.

The recreation-related activities that were directly entered into the FORPLAN model by Allocation Choice were:

AN22 - Recreation Construction/Reconstruction (Sites)
AT22 - Trail Construction/Reconstruction (Miles)

This information was developed by District personnel who reviewed their list of needs and potential recreation development opportunities, and projected those recreation projects that should be implemented by decade for each alternative for each watershed. They also provided an estimate of the costs for each individual project.

Wildlife

The wildlife outputs tracked in the model:

W41B - Big Game WFUDs
W48N - Non-Game WFUDs
W58F - Cold-Water Fishing WFUDs

The big-game wildlife outputs were calculated by taking the Wyoming Game and Fish Hunter Recreation Day objectives for each "herd unit". A "herd unit" would generally occur in a number of watersheds. These hunter-day objectives were then divided by the number of acres in a "herd unit" to develop a WFUD/acre factor. These WFUD (Wildlife/Fish User Day) factors were calculated separately for Elk, Deer and Moose and then used in the appropriate watersheds. From these numbers, other factors were applied which represented what would happen to those objectives under each of the Management Prescriptions. For instance, in Management Prescription 1A, it is estimated that in the first decade of implementation, only 65% of the Big Game WFUD objectives would be met. In the second decade it would drop to 45% and then in the third it would drop to 25%. Conversely in Management Prescription 2A, 100% of the objectives would be met in all of the decades.

These factors were applied to the different acreages of Management Prescriptions that occurred in each watershed and in each alternative and then directly entered into the model as data unique to each Allocation Choice.

The Non-Game WFUDs were calculated by using the assumption that for every Big Game WFUD, there would be one Non-Game WFUD.

The Cold-Water Fishing WFUDs were calculated in a manner similar to the method used to calculate Big Game WFUDs.

The wildlife-related activities that were directly entered into the model as data unique to each Allocation Choice were:

WF21 - Wildlife/Fish Structural Habitat Improvements (Structures)
WF22 - Wildlife/Fish Non-Structural Habitat Improvements (Acres)

The data were determined by evaluating existing projects planned for each watershed and then estimating by alternative if more or fewer projects should be planned, based upon the emphasis of the alternative. The costs associated with each individual project were included.

Range

The only range output tracked in the FORPLAN model is W67R-Grazing AUMs.

The only range activity tracked in the FORPLAN model is DN20-Range Improvement Dollars.

These outputs and costs were directly entered into the model as data unique to each Allocation Choice. The numbers were calculated by the Districts and the Range Staff. First, the existing number of AUMS and the costs of maintaining those AUMS were broken down by watershed. Then given information from the existing Allotment Management Plans and the management emphasis of the Management Prescriptions in each alternative, possible reductions or increases in the amount of permitted AUMs were estimated and costs associated with allowing the increase or decrease were calculated.

Timber

The timber-related outputs tracked in the model are:

XBDC, XCDC - Douglas-fir, Clearcut in MBF and MCF
XBDW, XCDW - Douglas-fir, Shelterwood in MBF and MCF
XBDS, XCDS - Douglas-fir, Selection in MBF and MCF
XBLC, XCLC - Lodgepole Pine, Clearcut in MBF and MCF
XBLW, XCLW - Lodgepole Pine, Shelterwood in MBF and MCF
XBLS, XCLS - Lodgepole Pine, Selection in MBF and MCF
XBSC, XCSC - Spruce/Fir, Clearcut in MBF and MCF
XBSW, XCSW - Spruce/Fir, Shelterwood in MBF and MCF
XBSS, XCSS - Spruce/Fir, Selection in MBF and MCF

These outputs are calculated in the FORPLAN model using timber yield tables developed primarily from the PROGNOSIS model.

Other outputs tracked in the model are X07R-Roundwood Sold, which is simply an output to easily track commercial thinning volumes. The other output tracked is X08F-Fuelwood, which is simply calculated as a percentage of the volume removed from clearcuts and shelterwood harvests. For all species on all timber sales, about 35% of the volume removed is available for firewood cutters. For instance, if 10,000 MCF is removed in a sale, another 3,500 MCF in that sale area would be available for firewood cutters.

The timber-related activities used in FORPLAN are:

E113 - Resource Coordination
E2PL - Site Prep with Planting
E2NR - Site Prep with Natural Regeneration
EE25 - Pre-Commercial Thin on Existing Stands
ER25 - Pre-Commercial Thin on Regenerated Stands
E14I - Sale Preparation - Intermediate Harvests
E12I - Harvest Administration - Intermediate Harvests
E14F - Sale Preparation - Final Harvests
E12F - Harvest Administration - Final Harvests
E128 - Fuelwood Preparation/Administration
PF25 - Fuel Improvements

The acres which Fuel Improvements were applied to were estimated by taking 50% of the acres harvested by clearcut or shelterwood methods. In areas under selection harvests, 8% of the Douglas-fir and Spruce/Fir stands would be be treated, while 10% of the Lodgepole Pine stands would be treated.

Timber Yield Table Development - PROGNOSIS Model

Prognosis Version 5.3 was used to simulate timber yields resulting from different forms of timber management prescribed under the Bridger-Teton Land Management Plan. These are known as managed timber stand yield tables. Base data for this model is composed of timber inventory information from the Targhee, Caribou and Bridger-Teton National Forests.

Numerous forms of management for each tree species had timber yield table predictions completed. After a complete review of the results it was decided that the yield predictions which controlled the stocking to 555 trees per acre prior to age 20 and 400 trees per acre prior to age 30 for Lodgepole pine, 350 trees per acre for Douglas-fir prior to age 20, and 400 trees per acre for Spruce/Fir prior to age 30, produced the most desirable combination of results to obtain the desired elk hiding cover and timber products.

The general adjustments to the PROGNOSIS model to reflect the situation on the Bridger-Teton National forest are explained below:

- There are small non-stockable areas, which are generally one to three acres in size and have not been accounted for in the tree record file or in the mapping of the timber resource data base, an adjustment to the model was made to correct this factor.

- Mortality that can be expected as a result bio-senesence (old age) has been entered for each tree species.

- Data on woods and scaling defect was collected from timber sales harvested from Bridger-Teton National Forest over the past 15 years and was used to convert the gross volume yields made in the PRPGNOSIS predictions to net volume yields.

- Each national forest contains sites with different height growth potential for each tree species. The heights in the PROGNOSIS model were increased to match growth curves compiled from site trees measured at the time the timber inventory was collected on the Bridger-Teton National Forest.

- Small stocking reductions were entered into the model to simulate minor occurances of natural tree mortality that is not density related but could be expected to take place in a natural forest environment.

Water

The only water-related output tracked in the FORPLAN model is X87I-Induced Water in Acre Feet. This output was only calculated in those Allocation Zones that had water flowing into the Green River watershed, which eventually ends up in the Colorado River. The output was calculated by assuming that on the average, 0.5 of an acre-foot of water per year would be induced from an acre that was clearcut for 20 years after the harvest.

No water related activities were tracked.

Minerals

The only minerals-related output tracked in the FORPLAN model is LSAC-Acres Leased. This is simply an output which keeps track of all non-wilderness acres on the Forest that are available for leasing.

Roads

The roading activities tracked in the model:

L22C - Miles of New Road Construction
L23R - Miles of Existing Road Reconstruction
L14C - Road Preconstruction Costs - New Road Construction
L21C - Construction Engineering Costs - New Road Construction
L14R - Road Preconstruction Costs - Road Reconstruction
L21R - Construction Engineering Costs - Road Reconstruction
JL25 - Right-of-Way (ROW) Acquisition

The miles of new road construction and exiting road reconstruction were developed through the use of the GIS maps which has all the existing roads located, and all the potential roads that could be built on the Forest estimated. These roads are broken down into road segments which were divided by "nodes". With this information, the Transportation Planner met with each District and determined which road segments should be built and when they should be built, for every watershed and alternative. From this, the miles of road that would be built were directly entered into the FORPLAN model as data unique to each Allocation Choice

After it was determined which road segments would be built in each decade by alternative and watershed, the information was given to the timber specialists. They then estimated the percentage of each analysis area that would become accessible in each decade. The data was then entered into the FORPLAN model as road accessibility constraints that varied by each Allocation Choice.

H. COMMON CONSTRAINTS

Common constraints include those that provide for management requirements (36 CFR 219.27) defined in the Analysis of the Management Situation, and the constraints applied to all alternatives that respond to specific Forest issues, concerns, and opportunities. For a further discussion of these constraints and their associated trade-offs, see Section 8 of this Appendix. Constraints unique to alternatives are described in Section 7.

Note: After reading the following, the reviewer may feel that there are a large number of constraints that are applied to all the alternatives, and therefore get the impression that the model is excessively constrained. The reason for the relatively large number of constraints has to do with the philosophy employed in the development of the FORPLAN model. On the Bridger-Teton National Forest, extra efforts were made to make the analysis as site-specific as possible for Forest-level planning. The alternatives were developed through "Alternative Design" sessions where the public had an active involvement in the assignment of Management Prescriptions to the ground. Therefore, FORPLAN's role became not one of helping the decision-makers decide which Management Prescriptions should be assigned to which pieces of ground, but rather FORPLAN became an instrument to let the decision-makers and the public know what the consequences were of applying a set of Management Prescriptions to the ground. So the constraints shown below are all needed to estimate the differences between management under one Management Prescription versus another. As the reviewer will find under the Section titled "Formulation of Alternatives", relatively few FORPLAN constraints

were added because the primary difference between alternatives has to do with the amount of acres under the different Management Prescriptions.

Non-Declining Yield Constraint:

Constraint:
All alternatives require the harvest flow over 15 decades to be nondeclining; that is, the harvest volume of any given period is greater than or equal to the preceding periods volume from one period to another.

Rationale:
Provides for a constant supply or upward trend in timber supply over the Planning Horizon. Also needed to comply with the Multiple Use Sustained Yield Act.

Long Term Sustained Yield Link Constraint:

Constraint:
The harvest level of the last harvest period will be less than or equal to long term sustained yield (LTSY).

Rationale:
It is possible that the harvest level may not equal LTSY at the end of the Planning Horizon. The sustained yield link provides a means of linking the cut of the last period to the LTSY level. This assures that the maximum level can be sustained indefinitely.

Ending Inventory Constraint:

Constraint:
Control the amount of inventory volume left at the conclusion of the Planning Horizon.

Rationale:
The ending inventory constraint controls age class distribution through the Planning Horizon to assure that the base harvest schedule concludes with a regulated inventory volume in perpetuity.

Ninety-five Percent of Culmination of Mean Annual Increment Constraint:

Constraint:
Limit final harvest entry periods of timber harvest practices included in management prescriptions.

Rationale:
Minimum harvest rotation age based upon 95 percent CMAI assured that first entry harvest occurs at a point where stand volume growth rate begins to decrease and utilization standards have been met.

Soil/Water Protection Constraints:

Constraints:

- Timber-harvesting activities are not allowed on areas that are classified as having Marginally Unstable soils and are on slopes greater than 55%.

- Timber-harvesting activities are not allowed on areas that are classified as having Unstable soils and are on slopes greater than 40%.

- Timber-harvesting activities are not allowed on areas that are classified as Landslides and are on slopes greater than 40%.

Rationale:

The soil characteristics and steepness of slope combine to create a situation where allowing any timber harvesting activities on these areas would cause irreparable damage to the soil and water resources. (For more information refer to the section titled "Determination of Lands Suited for Management Activities".)

"Sensitive" Area Harvesting Constraints:

Constraints:

- Only selection harvests are allowed on areas that are classified as Stable or Marginally Stable and are on slopes greater than 70%. This is only allowed to occur in Management Prescriptions 1A and 1B.

- Only selection harvests are allowed on areas classified as having Unstable soils and are on slopes of less than 40%. This is only allowed to occur in Management Prescriptions 1A and 1B.

- Only selection harvests are allowed on areas classified as having Landslides and are on slopes of less than 40%. This is only allowed to occur in Management Prescriptions 1A and 1B.

Rationale:

The soil characteristics and steepness of slope combine to make these areas very sensitive to timber harvesting activities, however, harvesting practices such as Selection can occur on these areas without damaging the soil and water resources. This is only allowed to happen in Management Prescriptions 1A and 1B because these prescriptions have a timber production emphasis. Management Prescriptions 7A and 10 have a wildlife emphasis and making an effort to harvest in these sensitive areas is inconsistent with the emphasis of these prescriptions. (For more information, refer to the section titled "Determination of Lands Suited for Management Activities".)

"Old Growth" Harvesting Constraints

Constraint:

In Management Prescriptions 7A and 10, timber stands classified as "Old Growth" are not allowed to be harvested.

Rationale:

Management Prescriptions 7A and 10 place an emphasis on managing wildlife habitat. These "Old Growth" stands have been identified by Wildlife Biologists as stands that need to be protected in order to meet their wildlife objectives. In Management Prescriptions 1A and 1B, however, timber production is the emphasis and therefore, these stands are available for harvesting activities.

Harvest Method Constraints:

Constraints:

- In Management Prescription 1A, no more than 90% of the volume from all species can be harvested by clearcutting.

- In Management Prescription 1B, no more than 60% of the volume from all species can be harvested by clearcutting.

- In Management Prescription 7A, no more than 60% of the Douglas-fir volume can be in shelterwood harvests.

- In Management Prescription 7A, no more than 5% of the Lodgepole Pine volume can be harvested by clearcutting.

- In Management Prescription 7A, no more than 60% of the Spruce/Fir volume can be in shelterwood harvests.

- In Management Prescription 10, no more than 25% of the Douglas-fir volume can be harvested by clearcutting.

- In Management Prescription 10, no more than 25% of the Lodgepole Pine volume can be harvested by clearcutting.

- In Management Prescription 10, no more than 25% of the Spruce/Fir volume can be in shelterwood harvests.

Rationale:

In the development of the different Management Prescriptions, the mix of silvicultural methods were set at levels meant to achieve the related "Desired Future Condition". These "mixes" have been entered into the model as constraints, to help define for the model the differences in managment between, say, a Management Prescription 1B and 10. Of course, actual on-the-ground implementation of these Management Prescriptions will result in a site- and resource-specific mix of harvest methods.

The limit on clearcutting in Management Prescription 1A is to meet visual quality objectives. In Management Prescription 1B, the visual quality objectives are not as flexible as in MP-1A and there is a need

to maintain a higher level of wildlife hiding and security cover than in MP-1A.

In Management Prescription 7A, the emphasis is on utilizing timber harvests to maintain or improve grizzly bear habitat while meeting the security needs of the bear. This is best accomplished through shelterwood and selection methods and a constraint was needed to project that a mix of these practices will be used. (Since shelterwood harvests are generally more economical than selection harvests, a constraint was needed on the amount of volume being harvested by a shelterwood.) Due to the amount of mortality present in the Lodgepole pine stands, a small amount of clearcutting is allowed.

In Management Prescription 10, the emphasis is similar to that of Management Prescription 7A, except that big game species are emphasized instead of the grizzly bear. The constraints on clearcutting are needed to maintain the wildlife hiding and security cover as well as meet the visual quality objectives. The constraint on shelterwood harvest in Spruce/Fir stands is to place an emphasis on the use of single-tree selection and group selection practices in these stands.

"Cut-Over" Constraints:

- Constraints:
  - In Management Prescriptions 1A and 1B, no more than 20% of the suitable acres in these Management Prescriptions can be in a "cut-over" status.
  - In Management Prescriptions 7A and 10, no more than 15% of the suitable acres in these Management Prescriptions can be in a "cut-over" status.

Definitions for "Cut-Over":

The following table shows a comparison by Management Prescription and harvest method the amount of time an acre is in "Cut-Over" status. In some cases, the factor per acre has been reduced from 1.0 (one acre harvested = one acre in "cut-over" status) because following a particular entry, a significant portion of the overstory remains which still provides some cover for wildlife and visual purposes. (I = Period of Implemention, +1 = First period following period of implementation, +2 = Second period following period of implementation.) (Note: For most shelterwood harvests, the period of implementation is the period of the first entry, however, for the 3-stage "Wildlife" shelterwood, the period of implementation for these calculations occurs during the third entry.)

	MP-1A			MP-1B			MP-7A			MP-10		
	I	+1	+2	I	+1	+2	I	+1	+2	I	+1	+2
Clearcut	1.0	1.0	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Shelterwood	1.0	1.0	-	1.0	1.0	1.0	.75	1.0	1.0	.75	1.0	1.0
Selection	.10	-	-	.10	.10	-	.10	.10	-	.10	.10	-

Rationale:

- These constraints are used as 1) surrogates for the 40 acre clearcut constraint, 2) diversity constraints, and 3) constraints to maintain wildlife security and hiding cover.

- In Management Prescription 1A, the constraint is 20% over a two-decade time frame, or 10% per decade. In a totally regulated forest, using area controls and assuming a 100-year rotation, no more than 10% of the area would be cut in any one decade.

- In Management Prescriptions 7A and 10, the constraint is 15% over a three-decade time frame, or 5% per decade. This corresponds with the Standards and Guidelines established for these Management Prescriptions.

- In Management Prescription 1B, the constraint is 20% over a three-decade time period, or almost 7% per decade. This helps to establish a difference between management under Management Prescription 1B and the other prescriptions.

- In Management Prescriptions 1A and 1B, shelterwood harvests are in a complete "cut-over" status after the first entry because of the large amount of volume that is removed in the first entry (80% and 75%). The remaining volume was not enough to provide the cover necessary for wildlife and visual objectives. In Management Prescriptions 7A and 10, the amount of volume left over after the first entry is 40%, which is enough to provide some cover to meet other resource objectives. As can be seen in Management Prescriptions 1A and 1B, there is not a one-to-one relationship between volume cut and "cut-over" status. As such, it was felt that a factor of .75 would better reflect the "cut-over" status than any other factor.

- For acres under Selection harvest, different factors were tested including a factor of 0.0. However, when the selection harvests were not counted against the "cut-over" constraints, the model would assign selection harvesting activities to an acreage that would have been virtually impossible to implement. Therefore, some constraint was needed to bring the acres under selection harvest to something that was practicable both from the Forest Service's standpoint as well as timber industry's standpoint and a factor of .10 seemed to do the best job of this.

"Activity" Constraint:

Constraint:

In Management Prescriptions 7A and 10, no more than 5% of the suitable acres in these Management Prescriptions can have any kind of harvesting activities on them at any one time. (Recognizing that all acres under shelterwood harvest entries do not have the same amount of "activity" on them as acres harvested by clearcutting, and that acres under selection harvest entries do not have the same amount of "activity" on them as acres under shelterwood harvest entries; it was determined to use a per acre factor of 1.0 for acres with clearcutting harvests on them, a factor of .75 for acres with first entry shelterwood harvests, a factor of .50 for acres with second entry shelterwood harvests, and a factor of .50 for acres with selection harvests. Under the "Wildlife" 3-stage shelterwood, a factor of .50 is used for the first two entries and then a factor of .75 is used for the final entry.)

Rationale:

After some preliminary runs, it was determined that the amount of acres being impacted by some type of harvesting activity in Management Prescriptions 7A and 10 was too high for "wildlife" emphasis prescriptions. Therefore, we felt some constraint was needed to keep the amount of "activity" that would be occuring within a particular area to some level that would not detrimentally impact the wildlife within that area. After a review of the Standards and Guidelines for these Management Prescriptions, the constraint of 5% of the area was developed.

I. OBJECTIVE FUNCTION

The objective function is used in FORPLAN to guide the linear program to an optimal solution. Two types of objective functions were used for Benchmark and Alternative FORPLAN runs. The first objective function, used in only two Benchmark runs, was to maximize timber production in the first five decades. These runs were "rolled over" with a maximize PNV objective function to ensure an economically efficient solution. The second objective function used in all other alternatives and benchmarks was to maximize Present Net Value (PNV) for 150 years subject to the constraints applied. An alternative or program is said to be cost efficient if it maximizes PNV subject to achieving specified levels of outputs and inputs (36 CFR 219.3). The Forest complied with the above regulations by maximizing the PNV of priced outputs in FORPLAN. Nonpriced outputs and qualitative environmental factors were portrayed through constraints. This provided the levels of priced outputs in FORPLAN at an "efficient" point, given the objectives of the alternative as reflected in the model.

SECTION 3: DETERMINATION OF LANDS SUITED FOR MANAGEMENT ACTIVITIES

A. LANDS AVAILABLE FOR TIMBER PRODUCTION

The first step in determining timber resource land suitability involves identifying lands available for timber production. This involves identifying which lands fall into one of the following categories.

Lands Withdrawn from Timber Production

Forest land which has been legislatively or administratively withdrawn from timber production by the Secretary of Agriculture or the Chief of the Forest Service is not available. Areas withdrawn from timber production include the Teton Wilderness, Gros Ventre Wilderness, Bridger Wilderness, Palisades Wilderness Study Area, and the Shoal Creek Wilderness Study Area. Total National Forest acreage in this category comprises about 1,391,300 acres.

Non-Forested Land

Non-forested land was identified on the Bridger-Teton National Forest as land that has never supported forests or lands formerly forested where use of timber production is precluded by development for other use. This includes areas used for crops, improved pasture, residential or administrative sites, improved roads of any width and adjoining clearings, powerline clearings of any width, barren, grass, etc. This category comprises about 667,800 acres outside designated wilderness and wilderness study areas. Non-forest land is actually classified as land not suited for timber production.

Those lands that are available for timber production are evaluated for suitability utilizing a three-stage process.

Stage I - Physical Suitability
Stage II - Economic Suitability
Stage III - Goals and Objectives of the Forest Plan Alternative considering multiple use values and effects on timber production.

B. STAGE I - PHYSICAL SUITABILITY

The first test determined if technology was available to ensure timber production, including harvesting, without irreversible resource damage to soil productivity or watershed condition.

Bridger-Teton National Forest lands are placed into one of two catagories of management suitability based on watershed resource characteristics. These catagories are **Tentatively Suited** and **Not Suited** for forest management practices. Management practices include but are not limited to timber production, timber yarding, road construction, and surface occupancy.

Tests for watershed management suitability are based on the currently available technology that will ensure that (Congressional Record, 1976 and Federal Register 1982) irreversible resource damage to soil productivity or watershed condition will not occur for:

1. **Timber production**, including harvest, site preparation, and planting and;

2. **Timber Yarding** when moving a log from the stump to a landing and;

3. **Roads**, including construction, maintenance, closure, and restoration to natural contours can be accomplished. The potential for resource damage to areas outside of the road right-of-way will also be considered and;

4. **Surface Occupancy**, including construction activities and continued onsite activities.

Slope gradient and slope stability are the two of many factors, which best represent the over all management suitability of Bridger-Teton National Forest lands. The Tentatively Suited and Not Suited land areas are identified by land slope and soil stability characteristics shown in the following matrix (Table B-3-1). This matrix identifies categories of land suitability based on land slope and land attributes. Table B-3-2 shows the acreage calculations that are within each of the matrix "cells" shown in Table B-3-1. The acreages are forest-wide, but do not include the wilderness areas or the wilderness study areas.

For some combinations of slope gradient and slope stability, technology is not available to prevent irreversible damage to soil productivity and watershed condition. Therefore, these land areas are classified as Not Suited for management in the foreseeable future. Not Suited lands fall into the combinations of attributes shown to the lower right of the asterisks dividing the matrix.

As land capabilities change, the cost of managing these lands also changes. A cost analysis will be used to determine management feasibility on those lands that are suited for management.

Due to the inherent variation in landscapes and mapping standards, small areas of Not Suited land may be mapped as Tentatively Suitable, and some Tentatively Suitable lands may be mapped as Not Suited. Onsite verification of management suitability will be done for all projects.

Table B-3-1. Bridger-Teton National Forest Land Suitability Matrix

Soil/Land Attribute	Slope Class 1 0-40%	2 41-55%	3 56-70%	4 >70%
1 Stable	TH=Yes HM=All Y=Conventional R=Yes SO=Yes	TH=Yes HM=All Y=Cable R=Yes 1/ SO=Yes 1/	TH=Yes HM=All Y=Cable R=Yes 2/ SO= 2/	TH=Yes 1/ HM=Selection Y=Aerial R=Yes 2/ SO=None
2 Marginally Stable	TH=Yes HM=All Y=Conventional R=Yes SO=Yes	TH=Yes HM=All Y=Cable R=Yes 1/ SO=Yes 1/	TH=Yes HM=All Y=Cable R=Yes 2/ SO= 2/	TH=Yes 1/ HM=Selection Y=Aerial R=Yes 2/ SO=None
3 Marginally Unstable	TH=Yes 1/ HM=All Y=LI R=Yes 1/ SO= 1/	TH=Yes 1/ HM=All Y=Skyline R=Yes 2/ SO=None	*TH=No *HM=N/A *Y=None *R=None *SO=None	TH=No HM=N/A Y=None R=None SO=None
4 Unstable	TH=Yes 2/ HM=Selection Y=LI R=Yes 2/ SO= 2/	*TH=No *HM=N/A *Y=None *R=None *SO=None	TH=No HM=N/A Y=None R=None SO=None	TH=No HM=N/A Y=None R=None SO=None
5 Landslide	TH=Yes 2/ HM=Selection Y=LI R=Yes 2/ SO= 2/	*TH=No *HM=N/A *Y=None *R=None *SO=None	TH=No HM=N/A Y=None R=None SO=None	TH=No HM=N/A Y=None R=None SO=None
Alpine Cirque Basins & Slopes with Snow Avalanche Paths	TH=No Y=None R=None SO=None	TH=No Y=None R=None SO=None	TH=No Y=None R=None SO=None	TH=No Y=None R=None SO=None

Relative amounts of mitigation needed to maintain acceptable watershed condition:

TH = **Timber Harvest Method;** 1/ Some Restrictions, 2/ Many Restrictions
HM = **Harvesting Method**
Y = **Yarding Method;** LI - Low Impact
R = **Roading;** 1/ Some Restrictions, 2/ Many Restrictions
SO = **Surface Occupancy;** 1/ Some Restrictions, 2/ Many Restrictions

Table B-3-2. Acreages Within Bridger-Teton National Forest's Land Suitability Matrix

Soil/Land Attribute	Slope Class 1 (0-40%)		Slope Class 2 (41-55%)		Slope Class 3 (56-70%)		Slope Class 4 (>70%)	
1	LPTS	112,408	LPTS	9,365	LPTS	2,852	LPTS	511
	LPNS	3,124	LPNS	840	LPNS	336	LPNS	182
	LPNC	24,188	LPNC	3,258	LPNC	1,739	LPNC	548
	PPTS	8,271	PPTS	696	PPTS	172	PPTS	36
	PPNS	84	PPNS	19	PPNS	2	PPNS	
	CCTS	23,409	CCTS	392	CCTS	58	CCTS	13
	CCNS	14	CCNS	9	CCNS	1	CCNS	
	SFTS	42,591	SFTS	4,091	SFTS	1,481	SFTS	268
	SFNS	1,306	SFNS	670	SFNS	192	SFNS	52
	SFNC	12,871	SFNC	1,816	SFNC	748	SFNC	204
	SETS	2,046	SETS	48	SETS	4	SETS	
	SENS	40	SENS	3	SENS	4	SENS	
	DFTS	4,208	DFTS	1,190	DFTS	735	DFTS	240
	DFNS	177	DFNS	183	DFNS	91	DFNS	317
	DFNC	3,193	DFNC	2,429	DFNC	2,451	DFNC	1,124
	DPTS	3	DPTS	2	DPTS		DPTS	
Stable	DPNS	7	DPNS	1	DPNS	1		
Soils	ASPEN	28,946	ASPEN	2,781	ASPEN	1,082	ASPEN	278
2	LPTS	110,277	LPTS	15,045	LPTS	5,617	LPTS	1,272
	LPNS	9,086	LPNS	5,978	LPNS	3,968	LPNS	1,104
	LPNC	24,188	LPNC	3,258	LPNC	1,739	LPNC	548
	PPTS	10,780	PPTS	760	PPTS	128	PPTS	36
	PPNS	344	PPNS	141	PPNS	80	PPNS	19
	CCTS	12,736	CCTS	391	CCTS	152	CCTS	13
	CCNS	142	CCNS	83	CCNS	76	CCNS	40
	SFTS	50,330	SFTS	7,176	SFTS	2,355	SFTS	502
	SFNS	7,377	SFNS	5,934	SFNS	4,457	SFNS	1,885
	SFNC	12,175	SFNC	4,851	SFNC	3,407	SFNC	1,574
	SETS	1,882	SETS	30	SETS	4	SETS	
	SENS	21	SENS	3	SENS	2	SENS	
	DFTS	7,847	DFTS	2,894	DFTS	1,853	DFTS	570
	DFNS	1,767	DFNS	1,882	DFNS	1,564	DFNS	749
	DFNC	6,299	DFNC	3,326	DFNC	2,640	DFNC	1,238
Marginally	DPTS		DPTS		DPTS		DPTS	
Stable	DPNS		DPNS		DPNS		DPNS	
Soils	ASPEN	46,250	ASPEN	5,642	ASPEN	1,825	ASPEN	296

Table B-3-2 (Cont.) Acreages Within Bridger-Teton National Forest
Land Suitability Matrix

Soil/Land Attribute	Slope Class 1 0-40%		2 41-55%		3 56-70%		4 >70%	
3	LPTS	44,627	LPTS	11,976	LPTS	3	LPTS	
	LPNS	3,346	LPNS	2,118	LPNS	7,999	LPNS	2,862
	LPNC	11,272	LPNC	7,107	LPNC	6,533	PLNC	3,026
	PPTS	2,476	PPTS	301	PPTS		PPTS	
	PPNS	50	PPNS	9	PPNS	57	PPNS	6
	CCTS	5,561	CCTS	212	CCTS		CCTS	
	CCNS	15	CCNS	12	CCNS	34	CCNS	4
	SFTS	42,067	SFTS	11,097	SFTS		SFTS	
	SFNS	3,192	SFNS	2,299	SFNS	9,433	SFNS	4,119
	SFNC	13,750	SFNC	5,564	SFNC	4,254	SFNC	2,216
	SETS	765	SETS	64	SETS		SETS	
	SENS		SENS	6	SENS	20	SENS	10
	DFTS	12,304	DFTS	6,867	DFTS		DFTS	
	DFNS	933	DFNS	1,438	DFNS	8,354	DFNS	4,279
	DFNC	4,431	DFNC	3,687	DFNC	4,500	DFNC	2,765
Marginally	DPTS	17	DPTS	8	DPTS		DPTS	
Unstable	DPNS	93	DPNS	85	DPNS	35	DPNS	7
Soils	ASPEN	21,566	ASPEN	3,842	ASPEN	1,508	ASPEN	200
4	LPTS	46,989	LPTS		LPTS	1	LPTS	
	LPNS	3,659	LPNS	7,737	LPNS	2,442	LPNS	549
	LPNC	20,895	LPNC	6,042	LPNC	2,401	LPNC	964
	PPTS	1,850	PPTS		PPTS		PPTS	
	PPNS	50	PPNS	245	PPNS	70	PPNS	10
	CCTS	4,167	CCTS		CCTS		CCTS	
	CCNS	106	CCNS	329	CCNS	47	CCNS	12
	SFTS	36,060	SFTS		SFTS		SFTS	
	SFNS	2,136	SFNS	7,725	SFNS	2,930	SFNS	998
	SFNC	11,594	SFNC	2,866	SFNC	1,476	SFNC	733
	SETS		SETS		SETS		SETS	
	SENS	1	SENS	18	SENS	2	SENS	
	DFTS	7,913	DFTS		DFTS		DFTS	
	DFNS	694	DFNS	1,803	DFNS	705	DFNS	227
	DFNC	2,019	DFNC	1,014	DFNC	858	DFNC	442
Unstable	DPTS		DPTS		DPTS		DPTS	
Soils and	DPNS		DPNS		DPNS		DPNS	
Landslides	ASPEN	46,256	ASPEN	5,595	ASPEN	1,172	ASPEN	169

LP = Lodgepole Pine
PP = Post/Poles LP
CC = Clearcut Areas
SF = Spruce/Fir
SE = Post/Pole SF
DF = Douglas-fir
DP = Post/Pole DF

TS = Tentatively Suited
NS = Not Suited (This may include acreages in such things as avalanche paths in "cells" that are to the left of the asterisks in Table B-3-1)
NC = Non-Commercial Timber

Land Suitability Criteria

The following discussion addresses each of the suitability criteria that are used and documents some of the reasons for each of the classes being used.

Slope Classes:

40% -

This slope-class break was used in the Draft Forest Plan. It seems to be a generally accepted slope break based on local experience where land management practices have shown extensive damage to occur when equipment was operated on slopes over 40%. Tractors operating on slopes >40% cause excessive soil displacement because of the low strength of soils on the forest. The relationship between soil damage and slope gradient is exponential, which means small additional increases in slope will lead to large additional increases is damage.

55% -

Resource damage along mountain roads is often related to the height and stability of road-cut-banks. The critical height of a cut is the maximum height at which the slope will remain stable (Grey and Leiser, 1982). An important factor in the critical height is the type of material that is encountered. However, only with relatively clean, coarse, granular material will a 1 1/2:1 slope stand at almost any height (Woods, 1960). Where the soil density is 120 lbs. per cu. ft with a cohesion values of 600 lbs. per sq. ft, the critical height is 28 ft. (Woods, 1960). These values are assumed to be good approximations for the stable and marginally stable soils on the Bridger-Teton National Forest.

Therefore, a finished 12-foot-wide road with a ditch will require an overall width of 16 to 17 feet. Using a balanced cut and fill design, a 1 1/2:1 cut and fill-slope, and a vertical cut height of 30 feet, the resulting land slope is approximately 55% (U.S.D.A. Forest Service, et. al., 1976).

Gardner, et. al. (1978) recommended changing road design to a full bench on slopes >29° (55%) in the Idaho batholith to avoid long, unstable sliver fills that are difficult or impossible to compact. In the Oregon Coast Range Sidle, et. al. (1985) report that the number of road-related landslides has been reduced by using full-bench construction on slopes >26° (49%).

70% -

The slope is generally steeper than the angle of repose for natural materials. The angle of repose is the steepest slope a which a pile of material can stand. For example, the angle of repose is approximately 34° (67%) for dry coarse sand (Wilson, 1968). For planning purposes, the slope break will be at 70%.

Stability Classes:

Risk of Failure (Hazard Level) -

Each soil-map unit is rated for its risk of failure (U.S.D.A. Forest Service 1976; U.S.D.A. Forest Service and U.S.D.A. Soil Conservation Service, 1986) using one of four hazard levels. This rating is based on land characteristics which indicate potential for mass failures along with frequency of actual landslides delineated in the Geological Hazard Inventory.

A **mass failure** hazard rating of stable indicates that evidence of past mass movement is not discernible and land characteristics are not conducive to future mass movement. A marginally stable rating indicates that evidence of past mass movement has not been discerned but there are land characteristics which are conducive to mass movement. A marginally unstable rating indicates that evidence of past mass movement exists but no current movement is discernible. An unstable rating indicates that the site is actively moving and probabilities of increased or additional movement, even without man-caused disturbances, are high.

Land in the unstable and marginally unstable categories will require detailed on-site evaluation prior to starting management practices.

Terrain Evaluation -

Interacting natural conditions affecting mass failure (Sidle, et.al., 1985) are: **Geomorphic** factors of geologic and tectonic setting, slope gradient, slope shape, and weathering of parent materials. **Soil** properties of rate of particle and pore-size distribution that affect internal water movement and soil water holding capacity which are influenced by water input, slope gradient and form, depth to water table, evapotranspiration, and landscape management (e.g., drainage ditches, vegetation management). **Chemical and mineralogical** properties of clays. **Engineering** properties of normal stress on the slip surface (weight), cohesion, internal angle of friction, and pore water pressure. **Hydrology** related to rainfall and/or snowmelt regimes as they contribute to soil water recharge, subsurface flow, and evapotranspiration components of transpiration, interception, and soil surface evaporation. **Vegetation** effects on soil water though effects on transpiration and root system contributions to soil reinforcement and slope stabilization. **Seismicity** triggered mass movement or reactivating unstable areas due to accelerated ground motion

Potential Impacts -

Throughout the Forest, natural slopes are extensively mantled by landslide deposits that range widely both in form and age. Mass-wasting is one of the most active erosion processes on this Forest due to high relief, steep slopes, deformed weak bedrock, high soil-water holding capacities, frequent seismic disturbances and slope undercutting by streams. Landslides occur so frequently that they affect engineering developments and land use. Landslides contribute increased debris to streams, encourage localized

flooding, and can seriously deteriorate water quality (Bailey, 1971).

Landslides:

Varnes (1978) classifies mass movements into five general types: Falls, topples, slides, flows, and spreads as well as complex movements which combine the principal types. These are further subdivided by the kind of material involved; bedrock, debris, and earth. An additional subdivision is based on speed of movement for each type and kind of material.

U.S.D.A. Forest Service Region 4 explicitly recognizes falls, slides, and flows (DeGraff, et. al., 1979). On the Bridger-Teton National Forest, mass movement areas have been identified through the geologic-hazard-inventory process and are identified on the soils maps. The terms mass-movement (regardless of type) and landslides will be used interchangeably because most people refer to all kinds of mass movements as landslides. Identifiable mass movements have the following characteristics.

a. There is a well-defined escarpment at the uppermost elevation where the slide mass has pulled away from the slope, and

b. The surface of the slide mass is irregular and undulating, usually containing springs with wet vegetative pockets too variable in occurrence to quantify, and

c. The surface possesses a readily recognizable toe, or 'snout', rounded in form and coming in contact with the underlying surface at a sharp break in slope, and

d. The slide has not come to rest as defined by its position on the landscape.

Geologic-Hazard (landslide) mapping (DeGraff, et. al., 1979) has been conducted by the U.S.D.A. Forest Service Regional Environmental Geologist and contractors. Identifiable landslides were delineated on color aerial photography (1:15,840) and transferred to a 1:24,000 orthoquad base.

Both recently active landslides and landslides dormant since recession of the last glacial period were delineated. The dormant landslides may be activated, particularly with changes resulting from road building, timber harvest, and burning practices. In general, the greatest potential for new landslides occurs in areas with a history of past movement. Controlling the effects of these activities depends on application of direct methods of slope stabilization or avoidance of areas of known instability.

Alpine Cirque Basins:

a. Source area for debris or snow. Avalanching occurs above tree line, and

b. Avalanche paths or debris chutes occur with a frequency of generally greater that 20 to the mile (265 ft. spacing) across the slope, and

c. The length of these paths and chutes is generally greater than 500 feet.

Snow Avalanche Paths:

Below timber line, active areas are treeless strips, often following a gully. Less active areas may appear as strips of smaller trees, or strips of tress that are of a different species than those outside of the path. Runout zones may be outlined by changes in vegetation (Perla and Martinelli, Jr, 1978).

Forested land areas that are considered not suited for management because of snow avalanche hazard have the following characteristics:

a. Debris chutes and avalanche paths occur with a frequency of generally greater than 12 to the mile (440 ft. spacing) across the slope, and

b. Chutes and avalanche paths are generally greater than 1,000 feet in length.

Slopes steeper than 50° (120%) seldom avalanche because they continuously discharge during each new snowfall. Slopes less than 30° (58%) are unlikely to avalanche (FAO, 1985 and Perla and Martinelli, Jr, 1978). In order to include potential runout zones, the entire area of each soil map unit that indicates the presence of snow avalanches was mapped and these areas were classified as Not Suited for management.

Potential Impacts -

"'The damage caused by avalanches can be summarized as follows: The dislodgement of stones and soil; damage to pastures and forests, to buildings and communication routes, and finally danger to mankind and to animals.' This sentence, written about a century ago by one of the pioneers in the subject matter, Coaz, is still valid. (FAO, 1985)."

Watershed Management Objectives

In managing the land under the principles of the National Forest Management Act and other pertinent laws, resources can be used to the extent that favorable flow conditions and soil capability are maintained. Stewardship management performance standards for maintaining an acceptable watershed condition are based on maintaining or improving favorable conditions of flow and soil and watershed conditions.

Watershed management performance guidelines have been developed for various impacts related to vegetation manipulation and earth moving effects on soil capability and favorable conditions of flow. Complete justification for exceeding the limits of acceptability should be in an EA/EIS format and based on economic evaluation and other analysis techniques.

Watershed Condition:

The definitions listed below are intended to help clarify some of the concepts about watershed condition.

Watershed Condition is a relative description of the health of a watershed as measured against management objectives in terms of the factors which affect favorable conditions of flow and soil capability.

Favorable Conditions of Flow is the behavioral characteristics of a watershed described in terms of its ability to sustain water quality, quantity, and timing necessary to support water dependent ecosystems, instream uses, and downstream needs for water. This includes conditions of the land contributing to water flow as well as the channels that carry the flow to downstream users.

Soil Capability is the inherent capacity of a soil for supporting growth of specified plants, plant communities, or sequence of plant communities.

"'**Cumulative impact**' is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7)."

Acceptable Impacts:

Soil Capability -

Leave a minimum of 80 percent of the total operating area in a condition of acceptable soil productivity potential for trees and other managed vegetation following land management activities. The total operating area includes the permanent transportation system which covers about 4 to 5 percent of the area. (Personal communication with Robert Meurisse, Regional Soil Scientist, Region 6, Portland, Oregon. March 30, 1988.)

Soil conditions and processes known to result in reduced productivity or loss of the productive land surface and the criteria for determining when and where these conditions occur are covered under the Watershed Condition Parameter of Soil Capability.

Favorable Conditions of Flow -

Cumulative impacts of management practices and activities shall will not cause water quality standards to be exceeded nor alter streamflow to the extent of causing detrimental changes in stream channel conditions.

Hydrologic changes in watershed condition and criteria for determining when and where these conditions occur are covered under the Watershed Condition Parameter of Favorable Conditions of Flow.

Definitions

Timber Removal Systems:

Harvesting systems for timber removal can be categorized as conventional and non-conventional with relation to historical usage on the Bridger-Teton N.F. Conventional systems include ground-based crawler tractors and rubber-tired skidders and are primarily limited to slopes of less than 40%, due to stability and environmental effects reasons. Non-conventional systems include horses, mechanical harvesters, fast-track skidders, and cable-logging systems. These systems each have unique advantages that can reduce impact to soils and residual vegetation and allow harvest on slopes steeper than 40%. Additionally, some non-conventional systems have practical skidding distance capability in excess of conventional systems, thereby reducing local roading intensities.

Contractually, timber-removal systems are categorized into separate categories to ensure protection of the soil and water resources and reduce damage to residual vegetation. These categories include conventional, low ground pressure equipment, cable, skyline with partial suspension of the logs, and aerial logging systems.

Conventional Logging Systems:

Crawler tractors -
Advantages of this equipment include availability, versatility, and large-load capability. Disadvantages include slow travel speed (requiring high roading density), impact on sensitive soils, limited usage on steep slopes, and limited manuverability.

Rubber-tired skidders -
Advantages of this equipment include availability, manuverability, and faster travel speeds. Disadvantages include a lower load capability (requiring moderately high roading density), ground compaction (reducing future site productivity), and lack of use on steep slopes (primarily due to stability).

Low Impact Systems:

Horse Logging -
Horses have been used on the Forest to a limited degree for several years. Advantages include lack of noise in recreational use areas, reduced impact in harvest prescriptions where residual trees are to be protected, and in small management areas where other equipment cannot be justified. Disadvantages include low production (requiring very high roading density or limited usage adjacent to

existing roads), and operations only on level ground or moderate slopes from above the road.

Special Accessories -

Conventional tractors and skidders can be equipped with wide tracks or extra-large and dual-tire combinations to reduce impact on ground vegetation and compaction of soils.

Modern Skidders -

Recent developments have created new logging systems with capabilities exceeding those of conventional logging systems. Availability of these systems has been somewhat limited due to prohibitive costs and supplier location.

Fast-tracked Skidder: Advantages of this equipment include high load capability and fast travel speed (allowing wide road spacing and reducing roading needed), low ground impact (reducing damage to soils and residual vegetation), and gradability (allowing usage on steeper slopes). Disadvantages are availability and limited usage on very steep slopes or very sensitive soils.

Clam-bunk Skidders: Advantages of this equipment include relatively low ground pressure and very high load capability (allowing wide road spacing and reduced impact due to limited number of skidder passes). Disadvantages include slightly wider skid trails and limited usage on steep slopes.

Cable Logging Systems:

Cable logging systems were developed for use on steep slopes and on soils incapable of supporting ground-based systems. Cable logging equipment and methodology is widely varied, but can be categorized as either jammer, highlead, or skyline.

Jammer -

This is the most simplest type of cable logging and has been used for timber removal on steep slopes. Jammer operation involves a yarding tower and one primary cable to drag logs uphill on steep slopes. Advantages include use on slopes not suited to ground-based equipment and simplicity of equipment. Disadvantages include very short yarding distances requiring extremely high roading intensities, and impact to soils and residual due to ground drag of logs. Due to limited control, this system is limited to use in clearcut operations.

Highlead -

Historically this is the most common method of cable logging. Operationally more complex than jammer logging, this method involves a yarding tower and two cables. An advantage of this system is the log drag, and resultant impact, is reduced through lift exerted on one end of the log. This system has moderately long yarding capability and can be used for uphill and downhill operations. Disadvantages include relatively high soil and vegetation impact (a troughing effect). This system is limited to clearcut operations.

Skyline -

Skyline is the most modern and most adaptable cable yarding system. Skyline yarding involves from two to four cables, depending on equipment and operations, but all systems involve the use of a wheeled carriage system that is suspended from at least one support cable and transported with or without a load by at least one other cable. Categorically, skyline yarding can be subdivided into ground-lead, partial suspension and full suspension, of the logs being yarded.

Partial Suspension Systems:

Partial Suspension Skyline -

Partial suspension skyline yarding can be used in partial or clearcut operations and entails suspension of one end of the logs while dragging the other end. Disadvantages include some soil impact and loss along the yarding corridor.

Aerial Logging Systems:

Full-Suspension Skyline -

Full-suspension, often referred to as "flying," skyline yarding entails suspension of the log free of the ground and often above adjacent timber during yarding. Advantages include protection of soil and water resources and residual timber during partial cutting operations.

Helicopter -

Helicopters are often used in inaccessible areas, on sensitive soils, when rapid removal is needed, and for implementing very selective harvest prescriptions. Helicopters are cost prohibitive and inefficient at high elevations.

Balloon and Airship -

Other systems that allow full suspension have been used or are in the process of development at this time.

Summary of Stage I Analysis

Irreversible Soil and Watershed Damage:

This step determined if technology was available to ensure timber production, including harvesting, without irreversible resource damage to soil productivity or watershed condition. This stage was completed using the information presented above and displayed in Tables B-3-1 and B-3-2.

No Assurance of Adequate Restocking:

This step determined if there were any forested lands which if placed into timber production could not be adequately restocked. No forested land was defined as not-suited for timber production on the sole basis of an inability to adequately restock the site. Low-productivity timber

sites incapable of producing 20 cubic feet/acre/year characterized by having crown densities less than 25 percent were excluded from timber production. Information is considered inadequate to project responses to timber management on these lands. Responses to management include restocking as well as potential irreversible resource damage to soils productivity, or watershed conditions.

The total acres in these two categories is approximately 452,700. When this figure is subtracted from the net National Forest acreage, along with the lands "Withdrawn from Timber Production" and "Non-Forest" lands, the result is the "Tentatively Suited" land base for timber production. The following table (Table B-3-3) summarizes this information.

TABLE B-3-3:
SUMMARY OF STAGE I TIMBER RESOURCE LAND SUITABILITY
(Acres)

Category	Acres
Net National Forest Acreage	3,392,200
Non-Forest Lands	- 667,800
Irreversible Soil and Watershed Damage	- 452,700
Withdrawn from Timber Production	-1,391,300
Forested Lands Tentatively Suited for Timber Production	880,400

C. STAGE II - ECONOMIC EFFICIENCY

The purpose of the Stage II analysis is to identify for each category of tentatively suited analysis area, the management intensity which results in the largest excess of discounted benefits less discounted costs and compares the direct cost of growing and harvesting trees, to the anticipated returns to the government. It provides useful information in developing and evaluating alternative timber management regimes used in prescriptions. All of the tentatively suited timber land that enters Stage II is passed on to Stage III.

For purposes of analysis, all analysis areas from one Community Interest Area were run through FORPLAN with a Maximize Present Net Value objective function. Only the timber-related data was included in the model, all other resource data was removed. All the Management Emphases and Management Intensities were available for the model to select from, and all the constraints were removed, including Non-Declining Even-Flow.

The timber-related benefits and costs in the model are the same in all the Community Interest Areas except for the hauling cost. The Community Interest Area chosen for this analysis is the Dubois CIA. Some CIAs have higher haul costs, while others have lower haul costs. Since the road costs were not defined on a "per acre" basis and were only represented in FORPLAN as "packages" assigned to Allocation Choices, road costs were not used in this particular analysis. If a particular analysis area combination did not exist in the Dubois CIA, one was added in for this analysis so that all possible combinations were represented. Also, the total acres assigned to each analysis area were changed to 100 acres to remove any possibility of the acreage totals affecting the results.

This analysis shows which Management Emphasis/Management Intensity combinations are the most "economically efficient" for each analysis area, given the values used in the FORPLAN model. Table B-3-4 shows the Analysis Areas, the Management Emphases/Management Intensities selected in the Max PNV run, and the per acre Present Net Values calculated for each Analysis Area.

Table B-3-4 shows that for Lodgepole pine stands, the most economic prescription is the Management Emphasis of MP-7A or MP-10 (wildlife/timber emphasis), with a Management Intensity of FH/PC which is a clearcut followed by a pre-commercial thin, no commercial thins, and a regenerated final harvest of clearcut. The "Wildlife/Timber" Management Emphases are probably more economical than the "Timber" Management Emphases because of the empahsis on getting natural regeneration. In the "Timber" Management Emphases, the clearcuts will be larger, thereby necessitating planting efforts.

For areas with existing clearcuts, it will not pay to have commercial thinning projects, but clearcutting future stands is more economical than other silvicultural methods.

For Spruce/Fir stands and Douglas-fir stands, the most ecomonic prescription is the Management Emphasis of MP-1B, with a Management Intensity of FH/FH which is clearcutting, followed by no pre-commercial thins, no commercial thins, and a regenerated final harvest of clearcut.

Table B-3-4. Stage II Analysis Showing the PNV/Acre of Management Emphasis/Management Intensities With the Highest PNV ($/Acre)

AA	ME	MI	150-yr PNV/Acre	AA	ME	MI	150-yr PNV/Acre
LPSML4	7A/10	FH/PC	.441	LPSM47	7A/10	FH/PC	- .002
LPSMG7	NS	NS	0	LPMUL4	7A/10	FH/PC	.441
LPMU45	7A/10	FH/PC	- .002	LPULL4	1A/1B	GS/ST	.130
PPSML4	7A/10	FH/PC	.158	PPSM47	NS	NS	0
PPSMG7	NS	NS	0	PPMUL4	7A/10	FH/PC	.158
PPMU45	NS	NS	0	PPULL4	1A/1B	GS/ST	.050
COSML4	1B	FH/FH	.002	COSM47	1A	FH/FH	0
COSMG7	NS	NS	0	COMUL4	1B	FH/FH	.002
COMU45	1A	FH/FH	0	COULL4	NS	NS	0
C1SML4	1B	PC/PC	.013	C1SM47	1A	PC/PC	0
C1SMG7	NS	NS	0	C1MUL4	1B	PC/PC	.013
C1MU45	1A	PC/PC	0	C1ULL4	1A/1B	GS/ST	.003
OSSML4	1B	FH/FH	.719	OSSM47	1B	FH/FH	.094
OSSMG7	NS	NS	0	OSMUL4	1B	FH/FH	.719
OSMU45	1B	FH/FH	.094	OSULL4	1A/1B	GS/ST	.235
SFSML4	1B	FH/FH	.719	SFSM47	1B	FH/FH	.087
SFSMG7	NS	NS	0	SFMUL4	1B	FH/FH	.719
SFMU45	1B	FH/FH	.087	SFULL4	1A/1B	GS/ST	.235
SESML4	1B	FH/FH	.196	SESM47	1B	FH/FH	.006
SESMG7	NS	NS	0	SEMUL4	1B	FH/FH	.196
SEMU45	1B	FH/FH	.006	SEULL4	1A/1B	GS/ST	.072
ODSML4	1B	FH/FH	.682	ODSM47	1B	FH/FH	.059
ODSMG7	NS	NS	0	ODMUL4	1B	FH/FH	.682
ODMU45	1B	FH/FH	.059	ODULL4	1A/1B	GS/ST	.187
DFSML4	1B	FH/FH	.682	DFSM47	1B	FH/FH	.059
DFSMG7	NS	NS	0	DFMUL4	1B	FH/FH	.682
DFMU45	1B	FH/FH	.059	DFULL4	1A/1B	GS/ST	.187
DPSML4	1B	FH/FH	.247	DPSM47	1B	FH/FH	- .001
DPSMG7	NS	NS	0	DPMUL4	1B	FH/FH	.247
DPMU45	1B	FH/FH	- .001	DPULL4	1A/1B	GS/ST	.074

AA = Analysis Area
First two letters = Vegetation Groups (LP = Lodgepole Pine, PP = Younger LP Stands, CO = Recent Clearcuts, C1 = Older Clearcuts, OS = Old Growth Spruce/Fir, SF = Spruce/Fir, SE = Younger SF Stands, OD = Old Growth Douglas-fir, DF = Douglas-fir, DP = Younger DF Stands)
Middle two letters = Soil Groups (SM = Stable/Marginally Stable Soils, MU = Marginally Unstable Soils, UL = Unstable Soils or Landslides)
Last two identifiers = Slope Groups (L4 = Less Than 40%, 47 = Between 40% and 70%, G7 = Greater Than 70%)

ME = Management Emphasis (Ties to the Management Prescriptions)

MI = Management Intensity (FH = Final Harvest - Clearcut, PC = Includes a Pre-Commercial Thin, GS/ST = Selection, NS = Not Scheduled)

See Appendix B, Section 2 for more information on Analysis Areas, Management Emphases, and Management Intensities.

For timber stands on unstable soils or landslides, selection harvesting is the only option available. For timber stands on greater than 70% slopes, it is presently uneconomical to harvest.

Table B-3-4 also shows that generally speaking, it is uneconomical to harvest Lodgepole pine on slopes greater than 40%, and on the younger Douglas-fir stands on slopes greater than 40%. The older clearcuts have higher PNVs than more recent clearcuts partly because pre-commercial thins have already taken place and therefore, these costs are not a part of the analysis. Pre-commercial thinning also allows the stands to be harvested at an earlier rotation age.

This analysis shows the relationship between timber scheduling and Present Net Value. Even though the FORPLAN model was run with a Maximize Present Net Value objective function, some analysis areas with negative PNVs had harvesting activities scheduled. By including these acres, but not harvesting them until later decades where the discounting process minimizes their negative impact, this increases the number of acres with higher PNVs that can be harvested in the first few decades.

This analysis was performed by constructing a FORPLAN model that did not consider the costs of major access roads or the benefits and costs associated with resources other than timber. On the other hand, the analysis which identifies the Management Intensities selected in Stage III for the Preferred Alternative considers all these factors. The intensities identified under the Preferred Alternative are the most efficient in achieving the goals specified by the alternative.

D. PHASE III - GOALS AND OBJECTIVES OF THE FOREST PLAN ALTERNATIVE CONSIDERING MULTIPLE USE VALUES AND EFFECTS ON TIMBER PRODUCTION

The timber production goals and objectives for the Forest Plan depend upon the issues, concerns, and opportunities addressed by the alternatives. An alternative which places a higher emphasis on timber production would generally allocate a larger land base to timber production. The exception is when it is more efficient to emphasize timber production on the existing land base or on high productivity sites, rather than expanding the base.

The analysis starts with a fixed land base. If land is tentatively suited for timber production (passes the Stage I test), it is eligible for allocation to a mix of multiple uses including some intensity of timber production. The intensity of production assigned to analysis areas depends upon the objective of the alternatives and the comparative advantage of analysis areas to provide mixes of multiple uses.

Multiple use management prescriptions were developed by the Interdisciplinary Team which included the intensities and activities appropriate in meeting the desired future condition. Tentatively suited lands in DFCs other than 1A, 1B, 7A and 10 were considered not suited for timber production during this stage. The multiple-use objectives of those DFCs were felt by the ID team to preclude scheduled timber harvesting. These intensities and schedules were combined with the productivity of the of the analysis areas to determine the model production coefficients. The model then allocated and scheduled the prescriptions to the analysis areas to achieve the constraints of the model in the most cost-efficient manner. In the FORPLAN model, prescriptions with timber harvesting activities were free to allow a wide range of scheduling and allocation opportunities.

A Forest alternative considers timber production requirements over the entire length of the harvest schedule, not just the first decade. Land that is required to efficiently meet timber production objectives for a Forest alternative for any decade of the Planning Period is suited for timber production. This includes lands required to efficiently meet timber production goals for the RPA Planning Period (50 years) and to efficiently meet sustained yield criteria for the remainder of the harvest period. Tentatively suited lands will only be considered suited for timber production if they are included in the set of lands that are efficient in meeting timber production objectives for the Forest Plan. Each Forest alternative will probably have a different set of suited lands, depending upon the objective of the alternative.

Once an alternative has been selected and adopted as the Forest Plan, land identified as not appropriate in Stage III is combined with the land identified not suited in Stage I and is considered not suited for timber production during the plan period. No scheduled harvest for timber production purposes can occur on these lands. When the Forest Plan is revised, however, this land is again available for consideration to meet future objectives of the Forest alternatives. If social objectives and the Forest conditions have not changed, it will be designated as not suited once again. If conditions have changed, a different set of lands, larger or smaller, may be designated as not suited.

When a plan is revised or there is a significant amendment, this process, beginning with Stage I and continuing through Stage III, must be repeated In other words, land classification decisions in the Forest Plan are subject to review and revision in subsequent revisions of the Plan.

Table B-3-5 shows the results of the Stage III analysis for all the alternatives examined in the EIS.

Table B-3-5
Land Classification by Alternative
(Acres)

Classification	Alternative					
	A	B	C	D	E	F
Total National Forest Lands	3,392,200	Common for All Alternatives				
Technically Not Suited:						
- Not Forested	667,800					
- Irreversible soil and watershed damage 1/	452,700					
- No assurance of adequate restocking	0					
- Withdrawn from timber production:						
-Gros Ventre Wilderness	284,900					
-Bridger Wilderness	413,700					
-Teton Wilderness	583,500					
-Palisades Study Area	76,800					
-Shoal Creek Study Area	32,400					
Tentatively Suited Lands 2/	880,400					
	A	B	C	D	E	F
Not Appropriate for Timber Production 3/	384,500	400,500	532,200	846,700	603,900	601,000
Total Not Suited Forest Land (in thousands of acres)	2,896.3	2,912.3	3,044.0	3,358.5	3,115.7	3,112.8
Total Suited Forest Land	495,900	479,900	348,200	33,700	276,500	279,400

1/ Includes forest lands where information is inadequate to project response to timber management.
2/ Total forest land minus total of categories under Technically Not Suited.
3/ Identified not appropriate for timber production based upon management prescriptions and cost efficiency.

Changes from the DEIS to FEIS in Tentatively Suited Timber Acres

The Bridger-Teton Interdisciplinary Team reevaluated the Forest land base between the Draft and Final Forest Plan. This included improvements in the soils inventory information used in the initial analysis, an update in the inventory of surface disturbing activities through 1987, and an update in the land ownership records. This new information was combined with the information used in the initial analysis and incorporated into the Geographic Information System (GIS). This resulted in the ability to complete the Stage I analysis to a highly detailed level.

NOTE:

Shortly before this Environmental Impact Statement and Forest Plan were ready to be sent to the printer, it was discovered that our GIS data files had some errors in them. When data was transferred from the tapes we received from our contractor onto the Forest's Data General system, the process used inadvertently dropped some data in a random fashion. After a preliminary investigation, it was determined that the majority of the acres dropped were outside of the "Tentatively Suited" land base. Within the Preferred Alternative, for the majority of the Management Areas, acreage changes in the "Tentatively Suited" land base occurred primarily in DFCs that did not allow timber harvesting. The remaining acres in the Preferred Alternative appeared to be relatively insignificant and it was estimated that the inclusion of these acres would not change the first decade ASQ of 12 MMBF (when rounded to the nearest MMBF).

Even though a Geographic Information System can calculate acreages with a great deal of precision, many of the "layers" used to determine the "Tentatively Suited" land base had problems with them from the beginning. For instance, on some areas of the Forest the "DEM" data, which determines the slope breakdowns, had "glitches" in the computerized data and slopes categories could not be determined. For these areas, estimates between categories were calculated by hand and added to the GIS data. Other similar corrections were made and as a result, data displayed directly from GIS reports may not exactly match other data reports.

In the Forest Plan implementation phase, the "Tentatively Suited" acres for each watershed and Management Area will be recalculated and used in the site-specific project analyses. If it is found that these additional acres could significantly increase the ASQ on the Forest, the Forest Plan will be amended. Conversely, if it is found that other assumptions used in the Forest Plan, such as the timber volumes per acre were too high and the ASQ could not be met, a Forest Plan amendment reducing the ASQ would be prepared.

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SECTION 4: ECONOMIC EFFICIENCY ANALYSIS

A. INTRODUCTION

This section describes how the efficiency criterion or Present Net Value (PNV) and Net Public Benefits (NPB) measures described in Chapter II of the Environmental Impact Statement are derived. In recent years, the federal government has become increasingly aware of, and committed to, the economic efficiency of federal actions. The National Forest Management Act (NFMA) Regulations (36 CFR 219) and ensuing Department of Agriculture direction reflect the idea that the Forest Service should consider economic efficiency in developing and choosing Forest Plan alternatives.

NFMA regulations specify that "each alternative shall represent to the extent practicable the most cost efficient combination of management prescriptions examined that can meet the objectives established in the alternatives" (36 CFR 219.12 (F)(8)). An alternative or program is said to be cost efficient if it maximizes PNV subject to achieving specified levels of outputs and inputs (36 CFR 219.3). The Forest complied with the above regulations by maximizing the PNV of priced outputs in FORPLAN. Many nonpriced outputs and qualitative environmental factors were portrayed through constraints. This provided the levels of priced outputs in FORPLAN at an "efficient" point, given the objectives of the alternative as reflected in the model.

Present Net Value (PNV) represents the dollar difference between the discounted value of priced benefits and all Forest costs over the 50-year Planning Horizon. Priced outputs include those outputs with market values (timber, range, and developed recreation) and those with assigned nonmarket prices (dispersed recreation, wilderness use, fishing, and wildlife hunting). Two discount rates, 4 percent and 7-1/8 percent, were used to represent the real cost of money over time.

Each benchmark and alternative was developed in a such a manner that the greatest PNV was produced while meeting the goals and objectives that were emphasized in each benchmark or alternative. This was accomplished by solving FORPLAN with the objective function of maximizing PNV while meeting the specified constraints and designs of each benchmark or alternative. The PNV calculated in FORPLAN is modified by including priced benefits and costs not modeled in FORPLAN. The modified PNV values were used to evaluate the benchmarks and alternatives.

It should be noted that PNV is but one of a variety of factors used to describe a benchmark or alternative. Further, it is a criterion that should not be given too much weight in comparing alternatives. The reason for this is due to such problems as:

1. Not all outputs are explicitly valued; e.g., visual quality, protection of threatened and endangered species, etc. These outputs are often constrained to a specified level and are therefore achieved independent of the PNV calculation.

2. Estimation techniques for valuing goods may not be accurate.

3. Values for nonmarket goods provided by RPA often reflect national averages which may differ significantly from local values.

4. Quality differences between priced nonmarket outputs typically are not valued explicitly; e.g., congestion differentials are often not considered for recreation.

5. Demand curves for priced outputs may not be identified at the Forest level.

Even though Present Net Value should not be weighed heavily when comparing alternatives, discounted benefits and costs may be used in such comparisons.

A goal of the Forest planning process is to maximize Net Public Benefits. Net Public Benefit is the overall value to the nation of all outputs and positive effects (benefits) less all the associated Forest Service inputs and negative effects (costs) of producing priced and nonpriced outputs from National Forest System lands (36CFR 219.3). Thus, Net Public Benefits represent the net value of priced outputs (PNV) plus the net value of nonpriced outputs. Net Public Benefits cannot be expressed as a numeric quantity because they include qualitatively valued nonpriced outputs.

For the decision maker and the public to more easily determine the alternative that comes closest to maximizing Net Public Benefits, a variety of alternatives were simulated. Each represented a unique way to resolve identified issues and concerns. When comparing any two alternatives, the reviewer should be careful to consider each alternative as a whole, and not focus attention on any single factor. Even though each alternative has a different PNV, each alternative is economically efficient given the goals and objectives of that alternative. We cannot, therefore, determine the "goodness" or "badness" of an alternative in an economic sense. Benefits and costs, in addition to many other attributes of alternatives, are useful in making subjective comparisons.

B. *DISCOUNTING*

Two discount rates were used to display the economic consequences of the benchmarks and alternatives. The 4 percent rate approximates the "real" return on corporate long-range investments above the rate of inflation (Row, Kaiser, and Sessions 1981). Inflation is not included in the discount rates, benefits, and costs due to the difficulty of estimating future inflation rates, and because inflation is assumed to equally affect both costs and prices. The 4 percent rate was used to solve FORPLAN in all cases and is also the primary rate used to evaluate benchmarks and alternatives. The second rate, 7-1/8 percent, was also used to determine the PNVs of the benchmarks and alternatives for comparison purposes.

C. TREND ASSUMPTIONS

It is assumed for this analysis that real prices and costs remain constant over the Planning Period. However, for sensitivity analysis timber price trends were

applied to the Preferred Alternative, the results of this analysis are presented in Section VIII of this Appendix.

D. TIMBER DEMAND

None of the available techniques for developing Forest level demand functions has a strong enough theoretical basis that it can be suggested for use in Region 4. As specified by the Washington Office (1920 letter to Regional Forester, "Downward Sloping Demand Curves," February 3, 1981, the demand curve is assumed to be horizontal.

What can be obtained is information dealing with past and current consumption. This data provides information on the amount of timber actually purchased by sawmills and therefore represents an approximation of demand for timber.

1. Local Demand Perspective

Mill Capacities and Demand for Green Sawtimber

Demand for green sawtimber comes from local and regional timber users, primarily the mills in Dubois, WY and Afton, WY which produce lumber related products. Further demand comes from smaller private mills in the Forest zone of influence. The estimated mill capacity for local mills largely dependent upon Bridger-Teton timber supplies are:

Mill	Annual MMBF Capacity
Tri-Con, Afton, WY	40-43
Darwin Wilson, Dubois, WY	5- 5
Small mills (WY)	1- 3
TOTAL mill capacity of local mills:	46-51

Capacity of other mills within reasonable haul distance. These are mills which have bid on timber offered on the Bridger-Teton but are not as dependent on the Forest's timber supply.

Location	Annual MMBF Capacity
Evanston, WY	10-12
Rexburg, ID	45-50
St. Anthony, ID	45-50
Ovid, ID	10-10
TOTAL mill capacity of other mills in zone:	110-122

The mill capacities outlined above represent capacities at full production levels.

Timber Program on the Bridger-Teton National Forest from 1978-1987

Detailed harvest figures for the years 1978-1987 were used to determine average annual harvest volumes of wood products on the forest. Figures are taken from historic cut and sold records for the years stated. Volumes are stated in million board feet (MMBF).

YEAR	LIVE SAWTIMBER	DEAD SAWTIMBER	FUELWOOD COMMERCIAL	OTHER	YEAR TOTAL	PERSONAL USE FUELWOOD
1978	17.9	2.8	0.3	0.8	21.8	-
1979	19.1	3.1	0.6	1.0	23.8	-
1980	16.1	2.1	1.0	1.0	20.8	-
1981	15.6	2.7	1.3	1.1	20.7	-
1982	7.3	1.9	3.0	0.8	13.0	-
1983	31.7	2.5	2.4	0.7	37.3	4.7
1984	15.2	2.0	2.1	0.3	19.6	5 7
1985	2.6	0.8	1.7	0.4	5.5	5.0
1986	25.9	3.9	2.1	0.3	32.2	4.9
1987	11.0	3.0	2.5	0.6	17.1	4.0

Historic Sawtimber Use

None of the mills within the Forest zone of influence are known to be operating at their full production potential due to the existing economic climate and the limited availability of sawtimber (ref: 7/16/88 letter from B.Baker, Louisiana-Pacific). The Louisiana-Pacific mill previously located in Dubois had purchased approximately 7 MMBF annually between 1974 and 1987 from the Bridger-Teton and prior to its closure in 1988 had been operating a single shift which annually processed about 21 to 24 MMBF. The Tri-Con mill in Afton is also working below its full capacity at about 30-32 MMBF yearly. The other large mills within the zone of influence are intermittent buyers and account for relatively little demand from the forest.

Several factors could affect costs and the potential for mills to expand use of their existing capacity. Future trends as projected by the 1985 RPA assessment would support the assumption that costs will decrease which could increase local demand. The new appraisal system in use in the Intermountain Region is also expected to better define local mills willingness to pay and support this demand assumption. On the other side, industry will have to respond to management needs which include the use of cable and suspension systems to access steeper slopes and respond to sale offers involving silvicultural systems other than clearcutting.

No mills depend solely upon the Bridger-Teton for their wood supply although some are more dependent on the Forest than others. Other National Forests support these mills to varying degrees. The Shoshone National Forest plans for about 6 MMBF to be made available to the Dubois mills. The Louisiana-Pacific mill historically depended heavily upon green sawtimber supplies from the Teton division of the Forest. Based upon existing multiple-use and unit plans, the green sawtimber available from the Teton division of the Forest could no longer support the mill's historic dependence. Tri-Con in Afton has purchased about 1 MMBF annually from the Targhee National Forest and about 4-5 MMBF annually from the Caribou National Forest. Increased demand from mills currently depending on

sawtimber from the Targhee is expected during the next decade. The Targhee's timber program is expected to decrease as a result of a decrease in insect related salvage opportunities.

There has been a general decrease in sawtimber sold on the Bridger-Teton National Forest over the last 25 years. Based on Forest cut and sold records from years 1978 to 1987, the Forest annually sold an average of 16 MMBF (16.24) in green sawtimber.

Historic Use of Other Wood Products

Based on Forest cut and sold records from years 1978 to 1987, the Forest annually sold an average of 2 MMBF (2.48) in dead sawtimber, 2 MMBF (1.7) in commercial fuelwood and 1 MMBF (0.7) in posts, poles and other materials. Prior to 1982, personal use firewood was permitted to individuals on a free-use basis. No reliable estimates of volumes actually used are available. Beginning in 1983 personal use firewood was permitted on a charge basis. The past five-year average for personal-use fuelwood is 5 MMBF per year. Personal use fuelwood combined with the commercial wood products other than green sawtimber results in an annual average of 10 MMBF of wood fiber being used.

2. Regional and National Perspectives

1979 RPA Assessment and Regional Guide Objectives

Regional Guide objectives displayed in the draft plan (II-34) reflect a Regional analysis (FEIS) of the 1979 RPA Program Assessment. These Regional objectives range from 36 to 46 MMBF of green sawtimber per year for the Bridger-Teton. The 1979 RPA assessment projected increased demands for wood products and the Regional Guide objectives reflected these projections.

1985 RPA Assessment

This RPA update determined that demand will be less than that projected in the 1979 assessment. The revisions quoted from the FEIS page 1-6 include:

> "Lower projections of long-term demand for softwood lumber, plywood and sawtimber--a response to a downward revision in the demand for housing and an upward revision in base prices for softwood lumber and plywood.
>
> A somewhat smaller reduction in softwood roundwood demand--a response to an upward revision in the demand for fuelwood offsetting part of the downward revision for lumber and plywood."

The revised demand projection is contained on page 1-8 of the FEIS and projects a 74% increase over current harvest levels by the year 2030. (From: America's Renewable Resources: A Supplement to the 1979 Assessment of the Forest and Range Land Situation in the United States, USDA Forest Service, Washington, D.C., 1984).

This assessment revision also states, "The supplies of timber that will be available to meet these demands, assuming a continuation of recent trends in investments in forest management, show slower increases. This will result in rapid increases in the relative prices (net of general inflation or deflation) of timber and timber products as the marketplace brings about an equilibrium between

demands and supplies. The price system may also encourage additional investment above trend levels that could dampen price increases expected with recent management trends."

3. Discussion of Future Green Timber Use

There have been several opinions expressed concerning timber demand. One argument regarding current green sawtimber demand is that if mills remained in operation throughout the past 25 years, the volumes sold (more was offered) must be sufficient to keep them in operation. Although industry has frequently requested additional volumes be made available, they have not bid on these additional volumes when offered due to costs and values involved. In 1987 for example, 16.7 MMBF in green sawtimber was offered and not sold in addition to the 11.0 MMBF in green sawtimber which was actually sold. Historic use considering volumes offered but not purchased serves as an indicator of demand given market conditions. It is recognized that local mills desire additional green sawtimber offered at prices which provide them with a desired profit margin. This desire does not reflect national demand, but relates to a business economic concern. All businesses wish to optimize the use of their existing facilities.

Comments on the draft Forest Plan reflected a demand in the Dubois area of around 21 to 24 MMBF/yr. This demand reflected the continuation of Louisiana-Pacific's single-product mill with one work shift. However, now that Louisiana-Pacific has closed down, the community is in the process of trying to attract a new mill to operate out of Dubois, with a demand for around 3 to 5 MMBF/yr from the Bridger-Teton National Forest. In either case, the demand for wood products has more to do with the economic dependency of the community, rather than demand for the actual wood product.

The 1985 RPA assessment projected a 74% increase at year 2030. This means that demand from a national perspective would increase slowly from the current situation over the next 50 years. Demand on the Bridger-Teton for all wood products would increase from 26 to 45 MMBF/year by the year 2030 based using existing harvest levels as a basis for projections.

The response to this argument emphasizes that for most local sawmills, the National Forests have, for practical purposes, a monopoly on the physical availablity of sawtimber and the price for which it is offered. Mill inefficiencies and the hesitancy to make improvements occured as a result of timber supply limitations and unknowns associated with the wilderness study process and the forest planning process. Based on local mill capacities, demand can be strong given a sawtimber supply at a price the mills are able to pay. Louisiana-Pacific, for instance, estimated that the maximum delivered log cost they could have afforded was in the area of $175 to $225 per thousand board feet. Sales offered which had costs in excess of this account for many of the "no bid" sales. Considering this, the Forest should be able to sell all the sawtimber it is able to offer at a delivered log cost of $175 or less. If the 1985 RPA assumptions hold true, the relative prices of timber products will increase and could encourage additional investments by the timber industry. This would allow sales to sell which do not now meet the mills economic test over the next 5 decades. In addition, during 1988 the Forest implemented a new appraisal system which should result in offered timber prices reflecting the willingness to pay on a local basis better than past methods.

4. Sawtimber Demand Assumption

Based on the historical purchasing pattern and the conditions discussed above, it appears that the market is competitive and the demand function is horizontal (demand equals or exceeds supply). In this aspect, local demand is strong and has the ability to contribute more than it is now to regional and national needs.

5. Discussion of Future Use of Other Wood Products

Other products include commercial firewood, personal use firewood, posts, poles, dead sawtimber and similar products. Demand for these products is from local users and has varied little from year to year over the past decade.

Several publics have voiced concern over the demand and availability of firewood. Availability depends on access opportunities as well as the amount of material. This will vary by each Desired Future Condition with some providing greater opportunities than others. One indication of firewood demand is historic use based on permits sold. The average yearly volume sold of personal use firewood is 4.9 million board feet (MMBF). This has held fairly constant since 1983. In addition to personal firewood use, about 1.7 MMBF has been sold yearly to commercial purchasers who then resell this wood to local users. Again, this volume has fluctuated little since 1978. The yearly average of all firewood sold is 6.6 MMBF.

Another source which provides insight into demand is an energy use study conducted in Teton county in 1980. Following is a summary of firewood use for Teton County in 1980:

1. 77 percent of county residents burn firewood.
2. 74 percent of these residents gather their own firewood from the National Forest.
3. Average household use is 2.4 cords of wood per year.
4. Consumption in 1980 was 10,630 cords (5.3 MMBF) of which 3.9 MMBF came from the National Forest.
5. Firewood use accounts for 7 percent of the county's energy use.

(Source: Energy Use Survey of Teton County Wyoming, 1980)

Demand for other products such as posts, poles, firewood, and dead sawtimber is closely tied to local population levels which are not expected to increase. As such, demand is not expected to increase substantially. It appears that the local demand reflects local consumption needs and contributes little to helping meet regional and national needs. Access to available supplies will likely be the limiting factor.

E. REAL DOLLAR ADJUSTMENTS

All dollars, including prices and costs, are expressed in 1982 dollars. The GNP implicit price deflator index is used to inflate or deflate price and cost data to this common base (FSM 1971.32b).

F. BENEFIT VALUES AND UNIT COSTS USED IN FORPLAN

This section describes the benefit values and any unit costs that were tracked in the FORPLAN model. The information is grouped together by resource.

Recreation

The recreation outputs tracked in the model, along with the values assigned to them are as follows:

W01P - Primitive RVDs	$ 8.97/RVD
W03N - Semi-Primitive Non-Motorized RVDs	$11.53/RVD
W05M - Semi-Primitive Motorized RVDs	$10.58/RVD
W07R - Roaded Natural RVDs	$ 8.17/RVD

The benefit values are from the Final Environmental Impact Statement to the 1985-2030 RPA Program.

Due to the method of calculation for Recreation Visitor Days, which primarily depends upon the amount of new roads that are being built, the Roaded Natural RVDs generallly increase, and the Semi-Primitive and Primitive RVDs generally decrease. Given that this method will soon show an over-supply of Roaded Natural RVDs, it was necessary to develop some demand cut-off points where the FORPLAN model will no longer place a value on those Roaded Natural RVD opportunities that exceed a projected demand.

Efforts to quantify what those cut-off points should be have not been easy. No one can identify a real trend in use that we could continue out into the future, and no real correlation between population and use exists. However, something had to be used because we knew that there would not be the demand for all the additional Roaded Natural opportunities that would result from increased roading activities. A cut-off point using the existing Roaded Natural use did not seem appropriate since there was enough fluctuation between years. Therefore, it was decided to simply use local, regional, and national population projections to estimate a future use of Roaded Natural opportunities. The factors used to make these projections are as follows:

1986-1990	1990-1995	1995-2000	2000-2005	2005-2010	2010-2015
1.04636	1.04288	1.02712	1.02309	1.02349	1.02349

(The documentation for these factors can be found in the Planning Records.)

Based upon the factors presented above, the actual cut-offs for Roaded Natural RVDs are:

Year	RVDs	
1986	625,385	
1990	654,378	(654,400)
2000	700,945	(701,000)
2010	733,975	(734,000)
2020	768,863	(768,900)
2030	805,408	(805,500)

Wildlife

The wildlife outputs, along with the values assigned to them, that were tracked in the model are:

W41B - Big Game WFUDs	$28.52/WFUD
W48N - Non-Game WFUDs	$23.00/WFUD
W58F - Cold-Water Fishing WFUDs	$10.12/WFUD

The benefit values are from the Final Environmental Impact Statement to the 1985-2030 RPA Program.

Range

The only range output tracked in the FORPLAN model is W67R-Grazing AUMs, with a value of $6.58/AUM. This value is from the "Grazing Fee Review and Evaluation - A Report From the Secretary of Agriculture and the Secretary of Interior", February 1986. In this report, appraisers looked at the average prices paid on private leased lands and on competitive or negotiated leased Federal lands and estimated the average "fair market price" of leased AUMs in the Rocky Mountain Area (which includes the Bridger-Teton N.F.) to be $6.84/AUM in 1983 dollars (or $6.58/AUM in 1982 dollars).

Sawtimber

The value assigned to the sawtimber output varies by species and diameter of the product at the time it is harvested. The value used is referred to as the Gross Returns Per MBF (GRPMBF) and was determined through a linear regression analysis of all the timber sales on the Forest from 1972 to 1986. (Please see the Planning Records for more information.) After a series of regression runs, it was determined that the equation that would best estimate high bid values was the following:

H-BID = -52.502 + .389(SPLST) + 3.265(ADBH) - .470(HAUL) -.272(MFHVC)
+.139(PVCC)

where: H-BID = High Bid
SPLST = Selling Price Log Scale
ADBH = Average DBH
HAUL = Hauling Cost
MFHVC = Total Manufacturing Costs plus the Total Logging Costs minus the Specified Road Costs and the Hauling Costs
PVCC = Percent Volume Clearcut.

The average values used in the equation were:
SPLST for Douglas-fir = $356.17/MBF
SPLST for Lodgepole Pine = $318.54/MBF
SPLST for Spruce/Fir = $338.58/MBF
SPLST for all species = $319.79/MBF
ADBH for all species = 13.4 (However, different values were calculated for various diameter classes and entered into the model.

HAUL for the Forest = $41.91/MBF (However, different values were used for each of the eight different Community Interest Areas, which had a range from $18.57/MBF to $55.51/MBF.)
MFHVC for the Forest = $214.19/MBF
PVCC for the Forest = 80.6% (However, for Clearcut harvests a 100% value was used, for Shelterwood harvests a 75% value was used and for Selection harvests a 25% value was used.)

Given the above averages an average "High Bid" value for the Forest can be calculated, which is $48.89/MBF. The total value used in the analysis, however, is GRPMBF which is the "High Bid" plus collections for the Brush Disposal Fund (BDF) and the actual non-effective purchaser road credits (ANEFF). In simplistic terms, the actual non-effective road credits are those dollars that the timber purchaser "contributes" toward the construction of specified roads. The average values for BDF are $5.53/MBF and for ANEFF are $10.92/MBF, which translates into an average forest-wide GRPMBF value of $65.34/MBF. (This is a decrease from the value used in the Draft Environmental Impact Statement, which had an average of $72.96/MBF. This value was based upon a linear regression analysis of all the timber sales from 1972 to 1980.)

The values described are for tractor-logging harvests. In order to determine what the difference would be for cable logging and aerial logging, we ran through a number of appraisals for different sales where everything was kept the same except for the type of logging and compared the differences. Using this method we estimated differences in the High-Bid values for each species and for various diameter classes. These increased costs for cable logging ranged from $79.41/MBF to $39.82/MBF depending upon the species and diameter.

A similar process was used to calculate differences in High-Bid using aerial logging, but since the available data is limited to do much analysis, we used an increased cost of $142.21/MBF for Douglas-fir, $152.87/MBF for Lodgepole Pine, and $155.53 for Spruce/Fir.

Fuelwood

The benefit value attributed to fuelwood was $26.00/MCF. This was calculated by using a value of $3.00/cord, along with the assumption that 2 cords = 1 MBF, and then using the board foot/cubic foot conversion ratio of 4.25.

Timber Costs

The timber-related activities and costs used in FORPLAN are:

E113 - Resource Coordination	$ 32.98/MCF
E2PL - Site Prep with Planting	$350.88/Acre
E2NR - Site Prep with Natural Regeneration	$ 78.60/Acre
EE25 - Pre-Commercial Thin on Existing Stands	$105.00/Acre
ER25 - Pre-Commercial Thin on Regenerated Stands	$105.00/Acre
E14I - Sale Preparation - Intermediate Harvests	$ 33.40/MCF
E12I - Harvest Administration - Intermediate Harvests	$ 22.37/MCF

E14F - Sale Preparation - Final Harvests	- Clearcut	$ 26.59/MCF
	- Shelterwood	$ 33.24/MCF
	- Selection	$ 33.24/MCF
E12F - Harvest Administration - Final Harvests		$ 17.90/MCF
E128 - Fuelwood Preparation/Administration		$ 25.53/MCF
PF25 - Fuel Improvements		$ 14.72/Acre

This cost data was determined from Forest and Regional records. It only includes the actual costs to get the job accomplished "on the ground". They do not include "overhead" costs.

The following table shows the breakdown of percentage of acres that will be planted (%PL) versus those that will have natural regeneration (%NR) by Management Prescription, species, and harvest method:

	MP-1A		MP-1B		MP-7A		MP-10	
	%PL	%NR	%PL	%NR	%PL	%NR	%PL	%NR
Douglas-fir - Clearcut	90	10	10	90	0	100	10	90
Douglas-fir - Shelterwood	0	100	0	100	0	100	0	100
Douglas-fir - Selection	0	100	0	100	0	100	0	100
Lodgepole Pine - Clearcut	90	10	30	70	0	100	30	70
Lodgepole Pine - Shelterwood	0	100	0	100	0	100	0	100
Lodgepole Pine - Selection	0	100	0	100	0	100	0	100
Spruce/Fir - Clearcut	90	10	10	90	0	100	10	90
Spruce/Fir - Shelterwood	0	100	0	100	0	100	0	100
Spruce/Fir - Selection	0	100	0	100	0	100	0	100

Water

After a thorough review of the current research on water yields and their values, we were able to determine that in clearcut areas a value of approximately $6.00 per acre harvested could be attributed as a water benefit from harvesting timber and this could only be applied in those drainages that end up in the Colorado River System. A value of $12.00/acre-foot was used in the model ($6.00 per acre harvested with 1/2 an acre-foot being produced per acre).

Minerals

The only benefit value tracked in FORPLAN is the value of $24.00/acre leased. This value was derived by looking at data from all Federal lands within the State of Wyoming for the past ten years. From this data, an average royalty value was determined by dividing the total royalties received in the State of Wyoming by the total producing acreage in the State. This came out to be a value of $108.68/acre (in 1982 dollars). Then it was determined that the producing acreage is about 12% of the total acreage under lease, which then translates into a royalty value of $13.00/acre leased ($108.68 x 12%). A rental value of $1.25/acre leased was included ($1.50/acre in current-year dollars). Then a bonus value per acre leased was determined by looking at the leases bought in the State of Wyoming in 1988. The total lease bonus dollars were divided by the total acres that had new leases purchased on them both through competitive bidding and noncompetitive purchase. This came out to be a value of $10.00/acre leased. The total of these three values was rounded off to equal the $24 00/acre leased value used in FORPLAN.

Roads

The roading activities and costs tracked in the model are:

L22C - Miles of New Road Construction
- The cost/mile ranged from $14,800/mile to $37,526/mile (see below)

L23R - Miles of Existing Road Reconstruction
- $4,500/mile

L14C - Road Preconstruction Costs - New Road Construction
- $7,500/mile

L21C - Construction Engineering Costs - New Road Construction
- $2,500/mile

L14R - Road Preconstruction Costs - Road Reconstruction
- $2,000/mile

L21R - Construction Engineering Costs - Road Reconstruction
- $2,000/mile

JL25 - Right-of-Way Acquisition
- The total costs per Allocation Zone were used. For those Allocation Zones where ROW's were needed the total ranged from $5,000 to $147,840.

The road costs were developed through the use of the GIS maps which have all the existing roads located, and all the potential roads that could be built on the Forest estimated. These roads are broken down into road segments which were divided by "nodes". For each road segment, the GIS system calculated the number of miles that segment crossed through slopes in different categories and different soil types. Using average road building costs that vary by slope category and the type of soils, a road cost was developed for each and every road segment on the Forest. Therefore, the road costs per mile vary depending upon the type of country each segment crosses.

The following road costs (in 1982 dollars) by soil and slope categories were used to determine the average road cost for each roading segment:

- Construction on Stable/Marginally Stable soils and slopes under 55% = $14,800/mile
- Construction on Stable/Marginally Stable soils and slopes over 55% = $45,800/mile
- Construction on Marginally Unstable soils and slopes under 55% = $25,700/mile
- Construction on Unstable soils or active landslides and on slopes under 40% = $44,600/mile
- Construction on Marginally Unstable soils and slopes over 55%, and on Unstable soils or active landslides and slopes over 40% were not considered due to the unacceptable risks of failure.

G. BENEFIT VALUES AND COSTS USED IN THE MTVEST MODEL

The MTVEST model was used to calculate total Present Net Value (PNV) for the Forest's benchmarks and alternatives since the FORPLAN model did not contain all of the costs such as general administration, protection, various operation and maintenance costs, etc. Various outputs such as salvage timber, dead firewood, and post/poles were also not included. Therefore, MTVEST was used to capture all of the quantifiable benefits and costs produced by the different benchmarks and alternatives. In addition to using the benefit values and costs described in the previous section, the following values and costs were used:

Wilderness Value

Wilderness RVDs were estimated outside of the FORPLAN model. The value applied to these outputs was $11.50/RVD. (This value is from the Final Environmental Impact Statement to the 1985-2030 RPA Program.)

Sawtimber Value

All sawtimber values used in MTVEST were taken directly from the FORPLAN runs.

Salvage Value

A value of $22.00/MBF was used in MTVEST. This value was determined from a review of salvage sale records over the past five years and converted into 1982 dollars.

Roundwood Value

A value of $30.00/MBF was used in MTVEST. This value was derived from a review of post/pole sales over the past five years which had an average value of $0.35/tree. Using the factor of 10 BF/tree or 100 trees/MBF, this equals $35.00/MBF or approximately $30.00/MBF in 1982 dollars.

Mineral Values

The mineral values used in MTVEST were the same as those described in the previous section except the bonus value of $10.00/acre leased was only applied for the first year in each decade, while the rental value of $1.25 and the royalty value of $13.00 were applied as values per acre per year for the 50-year planning horizon.

Costs Used in MTVEST

The costs used in MTVEST were taken directly from the total budgets calculated for each benchmark and alternative.

H. RECEIPT AND RETURN TO TREASURY CALCULATIONS

The MTVEST model was also used to calculate the Present Net Value of the "Cash Flows" (or receipts) as well as the Returns to Treasury.

Recreation

The cash value of recreational use on the Forest was determined by looking at the Annual Collection Statement, National Forest Fund, FY 1988. This showed that around $395,200 (in 1982 dollars) came from primarily the ski areas on the Forest. This value was used in all the benchmarks and alternatives, all decades, since it is not anticipated that a change in forest management would significantly alter the use of the ski areas.

There is also a cash value associated with developed recreation. So again using the Annual Collection Statement, about $9,000 were collected from admission and user fee designated areas. This was divided by the current number of developed recreation RVDs to equal about $0.023/Developed RVD (in 1982 dollars).

Range

The cash value associated with grazing use is the grazing fee. A review of the 1986 Grazing Fee Review and Evaluation shows that the average grazing fee from 1979 to 1985 was approximately $1.80/AUM. The value used for determining Returns to Treasury, however, was $0.90/AUM since half of the grazing fee goes to the U.S. Treasury, while the other half is returned to the Region and National Forests for range project work.

Timber

The values from the FORPLAN models were used to determine both the receipts (cash value) and the Returns to Treasury.

Minerals

The values described previously as "benefits" were also used to determine the "cash value". These values were not, however, used to determine the Returns To Treasury and then the corresponding 25% Fund. This is because the lease bonus payments, the rental payments, and the royalty payments are all paid to the Bureau of Land Management. Therefore, they are "cash values" to the U.S. Government, but are not included in the base calculations for the 25% Fund (which is what the Returns to Treasury figure represents). Essentially the only mineral receipts that are included in the Returns to Treasury calculations are from sales of such mineral materials as sand, gravel, etc.

The 1988 Annual Collection Statement showed approximately $9,500 from Minerals. Since the some of the alternatives have different mineral programs and emphases, it was felt that the total acres leased would also reflect the emphasis on the other mineral programs on the forest. Therefore, the $9,500 was divided by the number of acres available for leasing in the "Current Direction" alternative. The resulting factor was $0.0045/acre leased (in 1982 dollars).

Land Use and Power

The 1988 Annual Collection Statement also showed approximately $15,700 (in 1982 dollars) under the categories of "Land Use" and "Power". This value was included in the Returns to Treasury calculations for all the benchmarks and alternatives.

SECTION 5: SOCIO-ECONOMIC AND SOCIAL IMPACT ANALYSIS

A. OVERVIEW

Socio-economic Impact Assessment In Land Management Planning

The Forest Service has a long history of concern for the economic well-being of those communities located on and about the managed land. The concern is contained in language that speaks of impacts to local communities and community stability.

Public involvement and the formation of management issues and concerns reflects a Forest Service sensitivity to management-affected publics. Politically, it only makes good sense for the Forest Service to strive for good neighbor status among those local constituencies for which Forest management practice is most visible.

To assure that community economic health is credibly considered, Forest managers need reliable and community-specific information as to the economic impact of land management decisions. A management action that imposes hardship on some cannot be said to improve public well-being unless associated gains are sufficient to outweigh hardships.

One approach would be to caste winners and losers as particular individuals. In practice, win-loss information to the individual is not only technically infeasible, but would be unwelcomed by most managers who would then be charged with visibly favoring the interests of some against the interests of others. An acceptable second-best is to consider management action gains and losses in terms of community employment. A given management action might increase employment at some communities, decrease employment at others. For adoption, the merits of the action, including employment gains, must then be deemed sufficient to outweigh the hardship imposed on those communities suffering employment losses.

A community-level economic impact approach was undertaken by the Bridger-Teton National Forest and used in developing the Preferred Alternative in the Forest Plan. The first step in determining community employment impacts is to determine those communities that are linked to, or dependent on, Forest outputs. The collection of all such communities constitutes the Forest's zone of influence.

Community employment is linked to Forest outputs when community industries are linked to Forest outputs. In most cases, sawmills, livestock operations, and a collection of recreation/wildlife related industries constitute the Forest-dependent industries.

Total employment associated with Forest outputs is determined when community industries linked to Forest-linked industries are determined.

It is not sufficient to determine only community to Forest-linked employment. Communities trade with one another so a change in employment at one community may transmit a change to another community. It was necessary, therefore, to evaluate important intercommunity links as well as Forest-to-community links.

The network of all community and intercommunity employment, linked to Forest outputs, is cast as a set of community and intercommunity multipliers. A change in Forest outputs that affects one community industry can be transformed into employment changes at other communities through the indicated application of multipliers.

B. SUMMARY OF FOREST-COMMUNITY RELATIONSHIPS

The following is a summary of a report prepared for the Bridger-Teton National Forest by three members of the faculty at the Universtiy of Wyoming, Dr. Robert R. Fletcher, Dr. David T. Taylor, and Jeanette M. Oster. For the complete report, refer to the Planning Records at the Supervisor's Office.

INTRODUCTION

The study area encompasses the four northwest Wyoming Counties of Fremont, Lincoln, Sublette and Teton which are contiguous to the Bridger-Teton National Forest. All of these counties rely heavily on natural resources for their economic base. However, there is a great deal of diversity in the types of resources that drive each county's economy. For example, while the Fremont County economy has been heavily dependent upon extractive energy resources in oil, gas, iron ore, and uranium, northern Lincoln County has relied primarily on agriculture and forestry for economic stability. Sublette County's economy is fueled by livestock production and oil and gas exploration while Teton County depends mostly on tourism for economic stimulis.

To varying degrees, all of these counties depend on the national forest for timber, livestock grazing, and recreation opportunities as part of their economic base. Relatively low agricultural prices and instability in the oil and mining industries in recent years, have prompted most all of the communities in the study area to place increased emphasis on tourism and recreation as a means of economic growth. Consequently, in the future, forest resources may take on an even greater importance from an economic standpoint for many communities in the study area.

PROCEDURES

The procedure for this report was to utilize the best available secondary data to estimate the economic impacts of selected business activities on local communities that rely on the Bridger-Teton Forest for at least part of their resource base. County input/output (I/O) models were used as the basis for estimating impacts from the timber/lumber, livestock grazing, outfitting, hunting, snowmobiling, and tourism industries. The best available data for other recreational use are based on an earlier study of recreation and tourism in the Teton County economy.

METHODOLOGY

Input/output models are tools for analyzing certain kinds of community impacts. Specifically, this tool estimates the interactions between various sectors of an economy and the effect of each sector on the total economy.

The sale of a dollar's worth of goods or services generates income for a business or an individual and the local economy. The business or individual returns part of that dollar to the income stream of the economy by paying for expenses. Some of this money goes to other individuals or business within the local economy. Part of the dollar may go to others who reside outside the economy being studied and at that point these "leakages" have no further influence on the local income stream. The larger the proportion of the original dollar that can be kept in the local economy, the larger will be the total effect of the initial sale. The cycle continues until all of the initial expenditure leaves the local economy.

The I/O model traces these expenditure patterns for each sector through the total economy. One of the end results of the model is a final demand or output multiplier. The final demand multiplier for a given sector is the original dollar received from final demand (usually exports) plus the summation of the amounts of that dollar that remain in the economy each time it changes. For example, a final demand multiplier of 2.0 says that the original dollar turned over enough times with some of it remaining in the economy until another one dollar of local income was generated. The initial one dollar and the generated one dollar make up the 2.0 multiplier. Throughout this report the term output multiplier is used synonymous with final demand multiplier.

Another product of the I/O model is the income multipler. An income multiplier measures the change in household income of a particular sector. An income multiplier of 2.5 for a sector means that if household incomes increased by one dollar in that sector, household income in the total economy would increase by $2.50. The initial one dollar of income is counted in the $2.50. What the income multiplier does not tell is how much output must be increased to bring about that initial one dollar change in household income of a particular sector

The interpretation for the employment multipliers is similar to that for the income multipliers. An increase of one employee in one sector will usually be accompanied by expanded employment in other sectors. A multiplier indicates how much total employment is expected to expand with an increase of one full-time equivalent (FTE) worker in a given sector.

A brief explanation and a word of caution on interpretation and extrapolation of the results of I/O models is required at the outset. County I/O models provide a good descriptive tool for looking at the interrelations within the local economy. However, they are static in nature and only explain the relationships that exist at a specific time. The transactions tables used as the basis for the I/O depict the community much the same as a balance sheet depicts an individual firm as of a given date.

Within certain limits these models can be used to estimate the impacts associated with structural changes in the economy. They can be very useful in identifying limiting resources for a new firm or industry moving into an area. These models are also useful in estimating the impacts of firm closures or decrease in production. However, caution is required as there is no direct estimation of the

time frame it takes for a community to make adjustments to sizable expansion or contraction of a given industry. Levels of unemployment, underemployment and excess capacity are also not considered as components of economic change in the short run. I/O is considered to be a valuable tool to describe the existing conditions and an excellent guide in conjunction with other economic analyses in evaluating the economic impacts of change. It is important for the person interpreting these models to have a good understanding of the local economy and to utilize local people and primary data to the extent possible.

MODEL DEVELOPMENT

Dr. John McKean developed the 22 Wyoming county models used as a basis for this study with funding through the Wyoming Water Research Center. These models are currently being revised for the agricultural sectors under contract with the Wyoming Department of Agriculture. Agriculture sectors are being changed from SIC code definition to an enterprise basis. An eating, drinking, and lodging sector was also included in the four county models used for this report to reflect expenditures from tourism and recreation.

Teton was the only county not covered by McKean's study. To estimate economic impacts on Teton County, an existing primary data model developed in 1977 was updated using the Forest Service's 1982 IMPLAN model for Teton County.

RESULTS

The results of the study are reported on a county basis. This was necessary as most of the secondary data required to develop I/O models are reported by counties. The levels of interactions between communities make it meaningless to estimate different levels of impacts on income and employment between communities without collecting primary data.

Primary data were collected for the timber/lumber industry in Fremont and Lincoln counties for a study in cooperation with the Wyoming State Forestry Department and the Wyoming Department of Agriculture to measure the impact of timber sales on local communities. These unpublished data were used to develop a timber/lumber sector in these two county models and estimate the impacts of income and employment by community.

The stated purpose of this report was to develop a procedure for estimating the potential impacts on selected Wyoming communities, in terms of income and employment, of management alternatives proposed for the Bridger-Teton National Forest. Four county I/O models were developed and adjusted using IMPLAN and other data sources to estimate the economic interrelations. These models, in conjuction with other published data, were used to estimate the direct and total impact of: 1) output or sales; 2) employment; and 3) income, for one unit of a defined activity.

IMPACTS OF BRIDGER-TETON FOREST RESOURCES ON FREMONT COUNTY

Fremont County has the most diverse economy of any Wyoming county bordering the Bridger-Teton Forest. The county has experienced a downturn in economic activity since the early 1980's due to loss of the iron ore mine at South Pass, reduction in the world demand for uranium and reduced prices for oil and gas. Fremont County communities of Lander, Riverton and Dubois were identified by the U S Forest Service as being potential impact communities for alternative management decisions made on the Bridger-Teton Forest.

TIMBER/LUMBER

The timber industry has received considerable attention the past year due to the closure by a major company of two mills in Riverton and Dubois. The direct and indirect changes in employment and household income resulting from changes in the timber industry were estimated on a county basis and allocated to communities. The total value of output or production from the lumber/timber sector was estimated to be $8,708,910 in 1984. Based on an output multiplier of 2.35 the timber/lumber sector generated 20.5 million dollars of total economic activity within Fremont County.

In 1984 there were an estimated 123 full-time equivalent (FTE) workers directly employed by business engaged in producing timber and lumber products. This included individuals engaged in commercial post, pole and firewood sales. Some of the larger companies contracted for road construction, logging service and hauling that provided jobs but indirect to the company payroll. Table B-5-1 displays the direct and total effects of employment for the three major population centers in Fremont County and for the county as a whole.

TABLE B-5-1. Direct and total employment effects of the timber/lumber industry on Fremont County and selected communities.

Employment	Units	Lander	Riverton	Dubois	County
Direct Effects	FTEs	30.0	23.0	70.0	123.0
Total Effects	FTEs	59.4	45.6	138.7	243.7

Personal income is defined as excluding rents, royalties, dividends and interest. The timber sector directly impacted household income by more than $0.22 for each one dollar change in lumber exports from Fremont County. Table B-5-2 displays the direct and total income effects of the timber/lumber industry on the three major population centers in Fremont County and for the county as a whole.

TABLE B-5-2. Direct and total income effects of the timber/lumber industry on Fremont County and selected communities.

Income	Lander	Riverton	Dubois	Fremont County
Direct Effects	$1,319,160	$1,292,000	$6,097,750	$8,708,910
Total Effects	$3,160,177	$3,095,113	$14,607,757	$20,863,047

LIVESTOCK GRAZING

Historically, livestock production has been an important and stable sector in the Fremont County economy. Grazing on public lands has been important to the range beef and sheep producers in many areas of Wyoming including Fremont County. Many ranch units were developed on the basis of public lands providing summer pasture. This allowed private and other leased lands to be used for early spring, fall and winter feed production. A significant change in any factor affecting the balance of a ranching operation will have an impact on other components. The combination of low prices and increased interest rates agriculture experienced in the early 1980's caused many ranchers to reduce livestock numbers. Consequently some grazing allotments on public lands have either been underutilized or in some cases not used at all.

Average sales or cash receipts per animal unit (AU) produced on ranches in western Wyoming were approximately $200 in 1984. An earlier study on the impact of public lands policy in Big Horn County indicated 0.6 of an AU in livestock production would be lost for each animal unit month (AUM) decrease in allotment for grazing on public lands. This estimate is based on the assumption of reallocating existing resources only. It does not account for additional resources or changes in production practices. It is however, realistic to assume the total impact on the county for a 12 AUM reduction in grazing on public lands will exceed the 12 AUMs or one AU reduction in livestock production within the county.

Using the $200 cash receipts per AU and assuming all AUMs are of equal value, the direct impact of each AUM is $16.67 to the livestock industry. The output multiplier for livestock is 2.013816. Therefore the total impact on the Fremont County economy is $33.57 ($16.67 x 2.013816) for each AUM change in grazing on public lands. These are minimum impact estimates as the total AUM will in all likelihood exceed one to one.

EMPLOYMENT

The employment requried to produce $100,000 of output from the livestock sector was 1.52 FTEs in 1984. Each FTE employee in the livestock sector produced an average output of $65,789. At a $200 value per AU this equals 328.95 AUs per FTE. In terms of AUMs of grazing, 3,947 (328.95 AU x 12) AUMs grazing on public lands would, on the average, generate the sales to employ one full-time person in the livestock sector. The employment multiplier for livestock is 1.92. Therefore a total 1.92 jobs are impacted by a 3,947 AUM change in grazing allocated on public lands. Looking at both the direct, indirect and induced

effects of employment, it is shown that each 2,056 (3,947 divided by 1.92) AUMs grazing support one full-time job in Fremont County.

INCOME

Personal income directly generated from each AU is calculated by using the $200 average sales price times the livestock-households coefficient of .13 in Appendix table FR-2. In 1984 each AU produced $26.00 of direct personal income or ($26 x 2.742) total income to the local economy. Relatively low prices and high production costs in 1984 provided a rather small proportion of the total sales to households in the form of direct personal income. This, in turn, was the basis for the large income multiplier.

EFFECT OF LIVESTOCK PRICE CHANGES 1984 - 1987

Cash receipts per head for cattle and calves in Wyoming increased by 30 percent between 1984 and 1987. During this same time frame, prices paid by farmers and ranchers for production expenses inhired wages and returns to operators.

A 30 percent increase in prices or average cash receipts of $260 per AU in 1987, compared with $200 in 1984, provides additional receipts of $60 per AU. It was estimated that direct effect on households increased from .130 or $26 per AU in 1984 to .20 and $52 per AU in 1987. This would still leave $34 ($60-$26) for additional expenditures or debt reduction. This seems realistic due to a decrease in interest paid on imported capital and depletion of personal savings and investment required by some livestock operators in 1984.

Calculations of personal income for clarification follows:

Income from the livestock sector, 1984

Cash receipts per animal unit	$200.00
Percentage of direct income to households	x .130
Personal income per animal unit	$ 26.00
Income multiplier for livestock sector	x 2.742
Total income to the local economy (includes the $26)	=$ 71.29

Effect of a $60 per AU Change in Livestock Prices, 1987

Cash receipts per animal unit	$260.00
Percentage of direct income to households	x .200
Personal income per animal unit	$ 52.00
Income multiplier = direct, indirect and induced .461292 diveded by direct income 20	x 2.214
Total income to the local economy (includes the $52.00)	$115.13
Change in Direct income 1984-1987 ($52-$26)	$ 26.00
Change in Total income for the local community 1984-1987 ($115.13 - $71.29) =	$ 43.84

OUTFITTING

The outfitting industry relies heavily upon public lands for campsites and hunting areas. Expenditures and expenditure patterns for outfitted big game hunters (OBGH) were developed for Teton County and updated and expanded to Fremont County from unpublished data collected for the statewide study on the economic impact of outfitting in Wyoming. The typical OBGH utilizing services of an outfitter hunts 8.1 days in the area and spends $2,639 locally. The outfitter fees account for $1,967 with $672 being spent for other goods and services.

It is easier to assess the total impact of outfitting by using a OBGHD as a basis for analysis. The OBGH spends $248.82 per day with the outfitter. The OBGH also spends an additional $82.96 per day with other local business. The total direct expenditures of $325.78 generate additional indirect and induced economic activity of $183.73 for each day the OBGH remains in the area.

EMPLOYMENT

The Teton County study indicated approximately 139.5 hunter days were required to support one FTE of employment for outfitters. Using the employment multiplier for the service sector of 1.32375, it would require 105.4 hunter days to support one FTE of employment in Fremont County.

INCOME

Each OBGHD contributes $90.69 directly to the personal income of people employed in Fremont County. The total impact on personal income is $172.03.

RESIDENT HUNTERS

Resident Wyoming hunters also depend upon public lands for campsites and hunting areas. Expenditures and expenditure patterns for resident big game hunters in Fremont County were based on a 1985 Montana study of outfitted and non-outfitted big game hunters. Since hunting expenditures by county residents are merely a transfer of existing dollars within the local economy, only hunting expenditures by Wyoming residents from outside the county represent a net gain to the local economy from an input/output perspective. Expenditures by these non-local, resident hunters are assumed to be similar to those of the non-outfitted hunters reported in the Montana study. Average individual expenditures in the area were estimated to be $72.44 per day in 1985. These direct expenditures by the non-local resident hunters generates additional indirect and induced economic activity of $51.26 for each day in the area.

EMPLOYMENT

Approximately 400.6 hunter days are required to support one FTE of direct employment in the county. Using a weighted employment multiplier of 1.30876, it would require 306.0 hunter days to support one FTE of total employment in the county.

INCOME

It is estimated that 53.3% of the indirect and induced effect generated by a hunter day goes to households. Thus, a non-local resident hunter day contributes a total of $27.35 to the personal income of people employed in Fremont County.

SNOWMOBILING

The 1985 Wyoming State Comprehensive Outdoor Recreation Plan (SCORP) estimates that, 14.4% of the Wyoming adult population participates in snowmobiling. This figure indicates that snowmobiling is second only to downhill skiing in terms of winter recreation participation rates. The Wyoming Recreation Commission estimates that 25% of all Wyoming snowmobilers are non-residents, accounting for 143,325 participation days in the 1985-86 season. Snowmobilers depend upon the availability of public lands for trails. Completion of the Continental Divide Snowmobiling Trail should substantially increase the importance of this type of winter recreation in the northwest Wyoming.

Expenditures and expenditure patterns for non-resident snowmobilers were taken from a statewide study of the snowmobiling industry by the Wyoming Recreation Commission. For the 1985-86 season, the typical non-resident snowmobiling party consisted of 6.71 people and stayed an average of 5.10 days. Average individual expenditures in the area were $332.63 per outing or $65.24 per day. The direct expenditures by the snowmobilers generates additional indirect and induced economic activity of $53.02 for each day the recreationist stays in the area.

EMPLOYMENT

Approximately 501 snowmobiling days are required to support one FTE of direct employment in the county. Using a weighted employment multiplier of 1.239319, it would requrie 404.4 snowmobiling days to support one FTE of total employment in the county.

INCOME

It is estimated that 54.9% of the indirect and induced effect generated by a snowmobiling day goes to households. Thus a snowmobiling day contributes a total of $29.11 to the personal income of people employed in Fremont County.

TOURISM

Tourism is a basic sector in the Fremont County economy. Tourism has received increased emphasis as a method of economic development in recent years. Unfortunately secondary data on expenditures by general visitors to the county is not available. Because of this unpublished expenditure data for 1985 summer visitors to the Jackson Hole area was used as a proxy to estimate the distribution and impact of tourism on the Fremont County economy. The direct expenditure per summer visitor day was estimated to be $37.60 in 1985. These direct expenditures generated an additional $27.76 in indirect and induced economic activity in the local economy.

EMPLOYMENT

Approximately 691.3 summer visitor days are required to support one FTE of direct employment in the county. Using a weighted average employment multiplier of 1.244045, it would require 555.7 summer visitor days to support one FTE of total employment in the county.

INCOME

It is estimated that 54.5% of the indirect and induced effect generated by a summer visitor day goes to households. Thus a summer visitor day contributes a total of $15.14 to the personal income of people employed in Fremont County.

IMPACTS OF BRIDGER-TETON FOREST RESOURCES ON LINCOLN COUNTY

Lincoln County consists of two distinct geographic areas representing two different economies. The Star Valley area in the northern part of the county has the largest concentration of dairy producers in Wyoming. The economy is heavily depent upon agriculture, timber from the national forest, small manufacturing and related service industries. The southern part of the county relies heavily on extractive resources. Natural gas, oil, coal, generation of electrical power and range livestock are the basic industries found in this area of the county.

TIMBER/LUMBER

The timber industry is an important source of employment and income for residents in the Afton area. A decrease in the availability of timber has precluded sawmills from operating at full capacity in recent years. Current production of sawed lumber is estimated at 40 million board feet (MMBF) per year with existing facilities capable of producing over 90 MMBF at full capacity. All estimates for Lincoln County are on an annual basis as data for specific previous years were not available due to changes in ownership of firms.

The annual value of output or production from the lumber/timber sector is estimated at $9,849,500. This includes the value of lumber products and the sale of electricity generated from by-products. The output multiplier for the timber/lumber sector is 2.5 for Lincoln County. Applying the output multiplier to the $9,849.50 results in estimation of the total impact on the Lincoln County economy to be 24.6 million dollars.

EMPLOYMENT

There are approximately 160 full-time equivalent (FTE) workers employed and self-employed on an annual basis producing timber and lumber products in Lincoln County. Contracting for logs delivered to sawmills contributes to an employment multiplier of 2.08 indicating the timber industry accounts for a total employment of 333 FTE's in Lincoln County.

Direct employment by the lumber industry impacts the Afton community where the sawmills are located. However, there is a small indirect effect of employment located in South Lincoln County attributable to rail shipment of finished

lumber. The distribution of total employment is estimated to be 326.5 to Afton and 6.5 to Kemmerer.

INCOME

The total income effect is computed by multiplying the total direct income of $2,206,288 ($9,849,500 x .224) times the income multiplier of 2.434 estimating the total income effect to be $5,370,105 (2,206,298 x 2.434). As with employment, approximately 98 percent of total income, or $5,262,700 is in Afton community. This leaves a relatively small amount of approximately $107,405 going to households in the Kemmerer area.

LIVESTOCK GRAZING

Using the value of $200 in cash receipts per AU and assuming all AUMs are of equal value, the direct impact of each AUM is $16.67 to the livestock industry. The output multiplier for livestock is 2.635046. Therefore the total impact on the Lincoln County economy is $43.93 ($16.67 x 2.635046) for each AUM change in grazing on public lands. These are minimum impact estimates as the total AUM reduction will in all likelihood exceed one to one.

EMPLOYMENT

The employment requried to produce $100,000 of output from the livestock sector was 1.52 FTEs in 1984. Each FTE employee in the livestock sector produced an average output of $65,789. At a $200 value per AU this equals 328.95 AU per FTE. In terms of AUMs of grazing, 3,947 (328.95 AU x 12 AUMs) grazing on public lands would, on the average, generate the sales to employ one full-time person in the livestock sector. The employment multiplier for livestock is 2.595618. Therefore a total 2.60 jobs are impacted by a 3,947 AUM change in grazing allocated on public lands. Looking at both the direct, indirect and induced effects of employment, it is shown that 1,521 (3,947 divided by 2.59518) AUMs grazing support one full-time job in Lincoln County.

INCOME

Personal income directly generated from each AU is calculated by using the $200 average sales price times the livestock-households coefficient of .06. In 1984 each AU produced $12.00 of direct personal income or ($12 x 5.833) $70.00 total income to the local economy. Relatively low prices and high production costs in 1984 provided a rather small proportion of the total sales to households in the form of direct personal income. This, in turn, was the basis for the large income multiplier.

EFFECT OF LIVESTOCK PRICE CHANGES 1984-87

Using a 30 percent increase in prices or average cash receipts of $260 per AU in 1987, compared with $200 in 1984, provides additional receipts of $60 per AU. It was estimated that direct effect on households increased from .060 or $12 per AU in 1984 to .20 and $52 per AU in 1987. This would still leave $20 ($60-40) for additional expenditures or debt reduction. This seems realistic due to a

decrease in interest paid on imported capital and depletion of personal savings and investment.

OUTFITTING

The outfitting industry relies heavily upon public lands for campsites and hunting areas. Expenditures patterns for outfitted big game hunters (OBGH) were developed for Teton County and updated and expanded to Lincoln County from unpublished data collected for the statewide study on the economic impact of outfitting in Wyoming.

The OBGH spends $242.82 per day with the outfitter. The OBGH also spends an additional $82.96 per day with other local businesses. The total direct expenditures of $325.78 generate additional indirect and induced economic activity of $165.35 for each day the OGBH remains in the area.

EMPLOYMENT

The Teton County study indicated approximately 139.5 hunter days were required to support one FTE of employment for outfitters. Using the employment multiplier for the service sector at 1.179715, it would require 118.2 hunter days to support one FTE of employment in Lincoln County.

INCOME

Each OBGHD contributes $90.69 directly to personal income of people employed in Lincoln County and the total impact on personal income is $152.83.

RESIDENT HUNTERS

It is estimated that the direct expenditures of $72.44 by the non-local, resident hunters generates additional indirect and induced economic activity of $42.90 for each day in the area.

EMPLOYMENT

Approximately 400.6 hunter days are required to support one FTE of direct employment in the county. Using a weighted employment multiplier of 1.333145, it would require 300.5 hunter days to support one FTE of total employment in the county.

INCOME

It is estimated that 45.9% of the indirect and induced effect generated by a hunter day goes to households. Thus, a non-local resident hunter day contributes a total of $19.69 to the personal income of people employed in Lincoln County.

SNOWMOBILING

The direct expenditures by snowmobilers of $65.24 generate additional indirect and induced economic activity of $36.11 for each day the recreationist stays in the area.

EMPLOYMENT

Approximately 501 snowmobiling days are required to support one FTE of direct employment in the county. Using a weighted employment multiplier of 1.165645, it would require 429.7 snowmobiling days to support one FTE of total employment in the county.

INCOME

It is estimated that 52.3% of the indirect and induced effect generated by a snowmobiling day goes to households. Thus a snowmobiling day contributes a total of $18.90 to the personal income of people employed in Lincoln County.

TOURISM

Tourism is a basic sector in the Lincoln County economy. Tourism has received increased emphasis as a method of economic development in recent years. Unfortunately secondary data on expenditures by general visitors to the county is not available. Because of this, unpublished expenditure data for 1985 to the Jackson Hole area was used as a proxy to estimate the distribution and impact of tourism on the Lincoln County economy. The direct expenditure per summer visitor day was estimated to be $37.60 in 1985. These direct expenditures generated an additional $19.29 in indirect and induced economic activity in the local economy.

EMPLOYMENT

Direct expenditures for a summer visitor day indicate that approximately 691.3 summer visitor days are required to support one FTE of direct employment in the county. Using a weighted average employment multiplier of 1.174104, it would require 588.8 summer visitor days to support one FTE of total emploment in the county.

INCOME

It is estimated that 52.0% of the indirect and induced effect generated by a summer visitor day goes to households. Thus a summer visitor day contributes a total of $10.03 to the personal income of people employed in Lincoln County.

IMPACTS OF BRIDGER-TETON FOREST RESOURCES ON SUBLETTE COUNTY

Sublette County's economy, like much of Wyoming, was developed around livestock production. However, oil and natural gas production, concentrated primarily in the southern end of the county, accounts for the largest sector in value of production and revenues for local government. The county economy has remained rather stable over time with the exception of boom periods related to oil and gas exploration and development.

TIMBER/LUMBER

There are several small family operations in Sublette County engaged in the harvest of timber for saw lumber, posts and poles and limited commercial firewood. Most of the production is sold locally through wholesale and retail outlets and customer cut-to-order lumber. Since a considerable amount of the logs and lumber produced in the county is marketed by the producing company through their own outlet with varying degrees of value-added, it is difficult to identify the actual cost of production.

The value of production at the mills is estimated to be $840,000 annually generating 24 FTE's of direct employment. Since the timber/lumber industry is not included as a separate sector in the Sublette County I/O model, multipliers are not available. There is less contract labor involved with timber harvest in Sublette than in either Fremont or Lincoln counties. Therefore, you would expect to have smaller employment and income multipliers than those developed for the other counties.

Most of the Sublette County timber industry impacts the Pinedale economy. It is estimated that approximately one-sixth of the production or $140,000 would be attributed to Big Piney.

LIVESTOCK GRAZING

Using the value of $200 cash receipts per AU and assuming all AUMs are of equal value, the direct impact of each AUM is $16.67 to the livestock industry. The output multiplier for livestock is 2.639183. Therefore the toal impact on the Sublette County economy is $43.99 ($16.67 x 2.639193) for each AUM change in grazing on public lands. These are minimum impact estimates as the total AUM reduction will in all likelihood exceed one to one.

EMPLOYMENT

The employment required to produce $100,000 of output from the livestock sector was 1.52 FTEs in 1984. Each FTE employee in the livestock sector produced an average output of $65,789. At a $200 value per AU this equals 328.95 AUs per FTE. In terms of AUMs of grazing, 3,947 (328.95 AU x 12 AUMs) grazing on public lands would, on the average, generate the sales to employ one full-time person in the livestock sector. The employment multiplier for livestock is 2.722854. Therefore a total of 2.72 jobs are impacted by a 3,947 AUM change in grazing allocated on public lands. Looking at both the direct, indirect and induced effects of employment, it is shown that 1,450 (3,947 divided by 2.722854) AUMs grazing support one full-time job in Sublette County.

INCOME

Personal income directly generated from each AU is calculated by multiplying the $200 average sales price by the livestock-households coefficient of .06. In 1984 each AU produced $12.00 of direct personal income or ($12 x 6.065) $72.78 total income to the local economy.

The results for this county model are a good example of how using multipliers in isolation can be misleading. Relatively low prices for livestock and high production costs in 1984 provided a rather small proportion of the total sales to households in the form of direct personal income. This, in turn, was the basis for the larger income multiplier. A price increase in beef cattle would disproportionately increase direct income to households and consequently reduce the multiplier.

EFFECT OF LIVESTOCK PRICE CHANGES 1984-1987

Using a 30 percent increase in prices or average cash receipts of $260 per AU in 1987, compared with $200 in 1984, provides additional receipts of $60 per AU. It was estimated that direct effect on households increased from .06 or $12 per AU in 1984 to .20 and $52 per AU in 1987. This would still leave $20 ($60 - $40) for additional expenditures or debt reduction. This seems realistic due to a decrease in interest paid on imported capital and depletion of personal savings and investment.

OUTFITTING

The OBGH spends $242.82 per day with the outfitter. The OBGH also spends an additional $82.96 per day with other local businesses. The total direct expenditures of $325.78 generate additional indirect and induced economic activity of $151.61 for each day the OBGH remains in the area.

EMPLOYMENT

The Teton County study indicated approximately 139.5 hunter days were required to support one FTE of employment for outfitters. Using the employment multiplier for the service sector of 1.155783, it would require 120.7 hunter days to support one FTE of employment in Sublette County.

INCOME

Each OBGHD contributes $90.69 directly to personal income of people employment in Fremont County. The total impact on personal income is estimated to be $155.79

RESIDENT HUNTERS

Expenditures by non-local, resident hunters are assumed to be similar to those of the non-outfitted hunters reported in the Montana study. This study estimated average individual expenditures to be $72.44 per day in 1985. The additional indirect and induced economic activity is estimated to be $40.01 for each day in the area.

EMPLOYMENT

Approximately 400.6 hunter days are required to support one FTE of direct employment in the county. Using a weighted employment multiplier of 1.265756, it would require 316.4 hunter days to support one FTE of total employment in Sublette County.

INCOME

It is estimated that 53.8% of the indirect and induced effect generated by a hunter day goes to households. Thus, a non-local, resident hunter day contributes a total of $21.54 to the personal income of people employed in Sublette County.

SNOWMOBILING

It has been estimated that the average individual expenditures per outing is $332.53, or $65.24 per day. These direct expenditures by the snowmobilers generates an additional indirect and induced economic activity of $40.77 for each day the recreationist stays in the area.

EMPLOYMENT

Approximately 501 snowmobiling days are required to support one FTE of direct employment in the county. Using a weighted employment multiplier of 1.201374, it would require 417.1 snowmobiling days to support one FTE of total employment in the county.

INCOME

It is estimated that 53.0% of the indirect and induced effect generated by a snowmobiling day goes to households. Thus a snowmobiling day contributes a total of $21.61 to the personal income of people employed in Sublette County.

TOURISM

Tourism is a basic sector in the Sublette County economy. Tourism has received increased emphasis as a method of economic development in recent years. Unfortunately secondary data on expenditures by general visitors to the county is not available. Because of this unpublished expenditure data for 1985 summer visitors to the Jackson Hole area was used as a proxy to estimate the distribution and impact of tourism on the Sublette County economy. The direct expenditure per summer visitor day was estimated to be $37.60 in 1985. These direct expenditures generated an additional $21.68 in indirect and induced economic activity in the local economy. The impact or economic contribution of a summer visitor day was $59.28.

EMPLOYMENT

Approximately 691.3 summer visitor days are required to support one FTE of direct employment in the county. Using a weighted average employment multiplier of 1.207430, it would require 572.7 summer visitor days to support one FTE of total employment in the county.

INCOME

It is estimated that 52.9% of the indirect and induced effect generated by a summer visitor day goes to households. Thus a summer visitor day contributes a total of $11.48 to the personal income of people employed in Sublette County.

IMPACTS OF BRIDGER-TETON FOREST RESOURCES ON TETON COUNTY

Teton County and the Jackson Hole area rely heavily on tourism and recreation for their economic base. As a gateway to Teton and Yellowstone National Parks, Jackson has long been a haven for summer travelers. With only 3.7 percent of the land in private ownership, the area is heavily dependent upon the national parks and national forest lands as a resource base. A study on recreation and tourism in the Jackson Hole area showed 80% of local expenditures were directly related to visitors. An increase in the number of winter visitors over the past decade has greatly reduced the seasonality of employment and helped stabilize the economy.

Although agriculture is becoming a smaller proportion of the Teton County economy, it continues to have a stabilizing influence on the area. Beef cattle are the major source of agricultural income in Teton County. With the small percentage of privately owned land in the county, ranches are heavily dependent upon grazing on public lands.

TETON COUNTY MODEL

Teton County was the only county not included in McKean's County Input-Output Models for the State of Wyoming . The development of a new model which will essentially update IMPLAN's 1977 primary data model for the county is in the planning stage. This will require collecting additional data and will not be available until mid-1989. The direct requirements coefficients from the 1977 model best reflect the interactions of the local economy to any known alternatives. The total transactions have increased due to inflation and the increased number of visitors to the Jackson Hole area, but this does not necessarily imply a structural change in the economy.

TIMBER/LUMBER

The timber industry in Teton County is rather small in terms of total dollar sales as there are no major sawmill or commercial timber operations. Timber production in Teton County is represented by small operators and individuals engaged in cutting commercial firewood and posts and poles. The total value of production was estimated at $300,00 providing seasonal employment for over 60 people. This is a labor intensive business with approximately two-thirds of the value of production going to households.

LIVESTOCK GRAZING

Using the value of $200 cash receipts per AU and assuming all AUMs are of equal value, the direct impact of each AUM is $16.67 to the livestock industry. The

output multiplier for agriculture is 1.552782. Therefore the total impact on the Teton County economy is $25.88 ($16.67 x 1.552782) for each AUM change in grazing on public lands. These are minimum impact estimates as the total AUM reduction will in all likelihood exceed one to one.

EMPLOYMENT

The employment required to produce $100,000 of output from the agriculture sector was 1.81 FTE's in 1984. Each FTE employee in the agriculture sector produced an average output of $55,249. At a $200 value per AU this equals 276.25 AUs per FTE. In terms of AUMs of grazing, 3,315 (276.25 AU x 12 AUMs) grazing on public lands would, on the average, generate the sales to employ one full-time person in the livestock sector. The employment multiplier for agriculture is 1 459487 Therefore a total of 1.46 jobs are impacted by a 3,315 AUM change in grazing allocated on public lands. Looking at both the direct, indirect and induced effects of employment, it is shown that 2,271 (3,315 divided by 1.459487) AUMs grazing support one full-time job in Teton County.

INCOME

Personal income directly generated from each AU is calculated by using the $200 average sales price times the agriculture-households coefficient of .122. In 1984 each AU produced $24.40 of direct personal income or ($24.40 x 1.676) $40.89 total income to the local economy. Relatively low prices and high production costs in 1984 provided a rather small proportion of the total sales to households in the form of direct personal income.

EFFECT OF LIVESTOCK PRICE CHANGES 1984-1987

Using a 30 percent increase in prices or aveage cash receipts of $260 per AU in 1987, compared with $200 in 1984, provides additional receipts of $60 per AU. It was estimated that direct effect on households increased from .122 or $24.40 per AU in 1984 to .20 and $52 per AU in 1987. This would still leave $35.60 ($60.00 - $24.40) for additional expenditures or debt reduction. This seems realistic due to a decrease in interest paid on imported capital and depletion of personal savings and investment requried by some livestock operators in 1984.

OUTFITTING

The outfitting industry relies heavily upon public lands for campsites and hunting areas. Expenditures and expenditure patterns for big game hunters were developed for Teton County and updated from unpublished data collected for the statewide study on the economic impact of outfitting in Wyoming. The typical outfitted big game hunter utilizing the services of an outfitter hunts 8.1 days in the area and spends $2,639 locally. The outfitter fees account for $1,967 with $672 being spent for other goods and services.

It is easier to assess the total impact of outfitting by using a OBGHD as a basis for analysis. This translates into the hunter spending $242.82 per day with the outfitter and an additional $82.96 per day with other local businessess. The total direct expenditures of $325.78 generate additional indirect and induced economic activity of $154.25 for each day the hunter remains in the area.

EMPLOYMENT

The Teton County study indicated approximately 139.5 hunter days were required to support one FTE of employment for outfitters. Using the employment multiplier for the service sector of 1.17, it would require 119.2 (139.5 divided by 1.17) hunter days to support one FTE of employment in the county.

INCOME

Each hunter day contributes $90.69 directly to personal income of people employed in Teton County. The total impact on personal income is $142.28.

RESIDENT HUNTERS

Expenditures and expenditure patterns for resident, big game hunters in Teton County were based on a 1985 Montana study of outfitted and non-outfitted big game hunters. Since hunting expenditures by county residents are merely a transfer of existing dollars within the local economy, only hunting expenditures by Wyoming residents from outside the county represent a net gain to the local economy from an input/output perspective. Expenditures by these non-local, resident hunters are assumed to be similar to those of the non-outfitted hunters reported in the Montana study. Average individual expenditures in the area were estimated to be $72.44 per day in 1985.

These direct expenditures by the non-local, resident hunters generates additional indirect and induced economic activity of $34.45 for each day in the area.

EMPLOYMENT

Approximately 400.6 hunter days are required to support one FTE of direct employment in the county. Using a weighted employment multiplier of 1.28694, it would require 311.3 hunter days to support one FTE of total employment in the county.

INCOME

It is estimated that 49.3% of the indirect and induced effect generated by a hunter day goes to households. Thus, a resident hunter day contributes a total of $16.98 to the personal income of people employed in Teton County.

SNOWMOBILING

Average individual expenditures for snowmobilers have been estimated to be $332.53 per outing or $65.24 per day. These direct expenditures generate an additional indirect and induced economic activity of $36.90 for each day the recreationist stays in the area.

EMPLOYMENT

Approximately 501 snowmobiling days are required to support one FTE of direct employment in the county. Using a weighted employment multiplier of 1.223794, it

would require 409.3 snowmobiling days to support one man-year of total employment in the county.

INCOME

It is estimated that 48.5% of the indirect and induced effect generated by a snowmobiling day goes to households. Thus a snowmobiling day contributes a total of $17.90 to the personal income of people employed in Teton County.

TOURISM

Tourism is a basic sector in the Teton County economy. Unpublished expenditure data for summer and winter visitors to the Jackson were used to estimate the distribution and impact of tourism in the county. The direct expenditures of summer visitors were estimated to be $37.60 per day in 1985. These direct expenditures generated an additional $18.98 in indirect and induced economic activity in the local economy.

Winter visitors, although fewer in number, tend to stay in the area longer and spend more money. The average length of stay for winter visiors was 5.8 days while the summer visitor spent 3.3 days in the Jackson Hole area in 1985. The direct expenditures for winter visitors were estimated to be $77.91 per day in 1985-86. These direct expenditures generated an additional $51.34 in indirect and induced economic activity in the local economy.

EMPLOYMENT

Approximately 691.3 summer visitor days are required to support one FTE of direct employment in the county. Using a weighted average employment multiplier of 1.219699, it takes 566.6 summer visitor days to support one FTE of total employment in the county.

For winter visitors it requires approximately 327.2 winter visitor days to support one FTE of direct employment in the county. Using a weighted average employment multiplier of 1.231287, it takes 265.8 winter days to support one FTE of total employment.

INCOME

It is estimated that 48.5% of the indirect and induced effect generated by a summer visitor day goes to households. Thus a summer visitor day contributes a total of $9.20 to the personal income of people employed in Teton County.

For winter visitors, it is estimated that 48.4% of the indirect and induced effect generated by a winter visitor day goes to households. Thus a winter visitor day contributes a total of $24.84 to the personal income of people employed in the area.

C. COMMUNITY MULTIPLIERS

The basis of community effects assessment is a set of community-level employment and income multipliers. Community multipliers indicate total community employment and income linked to Forest outputs. For example, timber multipliers indicate total jobs per MMBF, range multipliers indicate jobs per MAUM, recreation multipliers indicate jobs per MRVD, etc.

Community multipliers are formed from two essential elements. The first indicates community business sales associated with direct Forest-linked industries. For a particular Forest-linked industry (e.g., a sawmill), directly linked business sales are those of the Forest-linked industry and its community-located suppliers. The second element of the community multiplier is a measure of overall community business activity. This measure might be termed the propensity of business to purchase locally. It indicates the average community business sales associated with a dollar of revenue at the average community business.

The multipliers shown in Table B-5-3 are in a sense "averages" that can be used for comparison purposes. However, the actual employment and income determinations were estimated by assigning outputs to the individual communities and running this data through the input-output models developed for each of the four counties by Fletcher and Taylor at the University of Wyoming.

Table B-5-3 Multipliers for estimating the economic impact of Bridger-Teton National Forest resources on the communities within the four County Zone of Influence.

Resource	Units	Value per unit in Fremont County	Value per unit in Lincoln County	Value per unit in Sublette County	Value per unit in Teton County
SAWED LUMBER ($ 1987)	MMBF (Lg Scl)				
Direct Output	$'s	348,356	383,807	326,108	No
Total Output (Sales)	$'s	818,289	961,646	477,682	sawed lumber
Direct Employ	FTEs	5.82	6.42	11.30	information
Total Employ.	FTEs	11.53	13.39	17.57	for
Direct Income	$'s	78,338	86,140	158,973	Teton
Total Income	$'s	187,667	209,678	213,346	County
POST/POLE & FUELWOOD ($ 1987)	MMBF (Lg Scl)				
Direct Output	$'s	129,921	129,621	129,921	129,921
Total Output (Sales)	$'s	216,764	209,946	200,873	219,681
Direct Employ	FTEs	6.60	6.60	6.60	6.60
Total Employ	FTEs	8.74	7.79	7.63	7.72
Direct Income	$'s	78,840	78,840	78,840	78,840
Total Income	$'s	111,156	104,500	104,104	101,913
GRAZING ($ 1987)	AUMs				
Direct Output	$'s	21.67	21.67	21.67	21 67
Total Output (Sales)	$'s	43.64	62.67	62.41	36.93
Direct Employ	FTEs	0.000329	0.000329	0.000329	0 000302
Total Employ.	FTEs	0.000630	0.000892	0.000931	0.000465
Direct Income	$'s	4.33	4.33	4.33	4.33
Total Income	$'s	7.72	11.66	11.44	6 43
SNOWMOBILING ($1985)	User Days				
Direct Output	$'s	65.24	65.24	65.24	65 24
Total Output (Sales)	$'s	118.26	101.35	106.01	102.14
Direct Employ	FTEs	0.001996	0.001996	0.001996	0.001996
Total Employ.	FTEs	0.002473	0.002327	0.002398	0.002443
Direct Income	$'s	19.93	13.89	15.36	13.28
Total Income	$'s	29.11	18.90	21.61	17.90

FTE = Full Time Equivalents
User Days are on a 24-hour basis

Table B-5-3 (Cont.) Multipliers for estimating the economic impact of Bridger-Teton National Forest resources on the communities within the four County Zone of Influence.

Resource	Units	Value per unit in Fremont County	Value per unit in Lincoln County	Value per unit in Sublette County	Value per unit in Teton County
OUTFIT/GUIDES ($ 1985)	Hunter Days				
Direct Output	$'s	325.78	325.78	325.78	325.78
Total Output (Sales)	$'s	509.48	491.13	477.39	480.03
Direct Employ.	FTEs	0.007168	0.007168	0.007168	0.007168
Total Employ.	FTEs	0.009482	0.008460	0.008285	0.008389
Direct Income	$'s	90.69	90.69	90.69	90.69
Total Income	$'s	172.03	153.83	155.79	142.28
RESIDENT HUNT. ($ 1985)	Hunter Days				
Direct Output	$'s	72.44	72.44	72.44	72.44
Total Output (Sales)	$'s	123.70	115.34	112.45	106.89
Direct Employ.	FTEs	0.002496	0.002496	0.002496	0.002496
Total Employ.	FTEs	0.003268	0.003328	0.003161	0.003212
Direct Income	$'s	18.42	13.39	15.49	12.83
Total Income	$'s	27.35	19.69	21.54	16.98
SUMMER VISITOR ($ 1985)	Visitor Days				
Direct Output	$'s	37.60	37.60	37.60	37.60
Total Ouput (Sales)	$'s	65.36	56.89	59.28	56.58
Direct Employ.	FTEs	0.001447	0.001446	0.001446	0.001446
Total Employ.	FTEs	0.001799	0.001698	0.001746	0.001765
Direct Income	$'s	10.28	7.32	8.14	6.82
Total Income	$'s	15.14	10.03	11.48	9.20
WINTER VISITOR ($ 1985)	Visitor Days	No winter visitor information for Fremont County	No winter visitor information for Lincoln County	No winter visitor information for Sublette County	
Direct Output	$'s				77.91
Total Output (Sales)	$'s				129.25
Direct Employ.	FTEs				0.003056
Total Employ.	FTEs				0.003762
Direct Income	$'s				18.40
Total Income	$'s				24.84

FTE = Full Time Equivalents
Hunter Days and Visitor Days are on a 24-hour basis

D. ASSIGNMENT OF FOREST OUTPUTS TO INDIVIDUAL COMMUNITIES

From the manager's perspective, the object of an economic model is to forecast the impact of land management actions. As a forecasting device, the approached developed by Fletcher and Taylor at the University of Wyoming suffers from all the limitations associated with static input-output theory. Input-output based forecasts typically specify a change in one portion of the model (for example, sawmill output) then track model conditioned changes in other parts of the model--total community employment, for example. The whole exercise is contingent upon technology and interindustry trade remaining as it was during the model year. Limitations aside, input-output analysis has a long history, and approaches with proven superior predictive ability are nonexistent.

The forecasted community effects of a Forest alternative indicate those changes in employment and income associated with the outputs of the alternative, as compared to the outputs of the Forest's current management. To determine these effects, forecasted current management outputs are subtracted from forecasted alternative outputs. The difference indicates the change in Forest outputs from adopting the alternative as opposed to maintaining the Forest's current management.

Forecasted community employment and income changes are estimated by first disaggregating Forest outputs to the individual communities. This disaggregation was accomplished by the Forest ID Team, who looked at the outputs projected from FORPLAN. For all the outputs except timber, FORPLAN provided the ID Team with projections for each Allocation Zone. Generally, since Allocation Zones could be aggregated together into the Community Interest Areas, the total outputs for each Community Interest Area were assigned to that particular community. For some outputs, however, the ID Team had to evaluate the outputs by each Allocation Zone and assign all or portions of the outputs to different communities. For example, the wildlife-related outputs within the Dubois Community Interest Area could not be all assigned to the community of Dubois since many of the hunters who hunt in this area actually operate out of Jackson.

The timber outputs were projected in FORPLAN by Community Interest Area. The process involved in assigning the outputs to the different communities involved first looking at the local mill capacity and assigning volume from within that particular community's "interest area". If any volume exceeded the local capacity, it was then assigned to the closest community which had a large sawmill operation.

When completed for all Forest alternatives, a set of community and alternative-specific tables provides the Forest manager with a community gain-loss picture needed for informed decision-making.

E. ANALYSIS INFORMATION

As was mentioned previously, the employment and income effects by alternative were estimated by disaggregating the Forest outputs to the individual communities. This information was then entered into the four county input-output models developed by Fletcher and Taylor at the University of Wyoming.

Tables B-5-4 through B-5-21 portray the timber, range, wildlife and recreation associated community impacts of the alternatives. Also included are tables which compare the changes in employment and income with the Current Direction Alternative (Alternative C). It is assumed that since the Current Direction Alternative represents a continuation of existing management on the Forest, it also represents the existing employment and income situation. Therefore, any increase or decrease from the Current Direction Alternative will indicate a potential increase or decrease from the existing employment and income situation.

To indicate the general impact of the alternatives on the local communities, impacts were only computed for the first decade. It was felt that there were too many unknowns to attempt to project community impacts for any decade past the first one. The Forest Plan itself will change after 10-15 years, and the structures of the individual communities will also change.

The effects shown for the communities of Lander and Riverton are primarily the result of indirect effects from direct impacts on the community of Dubois, since many people in Dubois travel to these communities to purchase major items. There is also a link between Big Piney and Pinedale with Pinedale providing many services for people living in the Big Piney area.

TABLE B-5-4: Employment and Income Impacts on Various Communities From Sawtimber Production
(in Full-Time Equivalents and Thousand Dollars for the First Decade)

Community	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Jackson						
Direct Employment	0	0	0	0	0	0
Total Employment	0	0	0	0	0	0
Direct Income	0	0	0	0	0	0
Total Income	0	0	0	0	0	0
Afton						
Direct Employment	170	115	70	1	54	51
Total Employment	354	239	146	1	112	105
Direct Income	1977	1337	819	8	628	590
Total Income	4813	3255	1993	18	1528	1435
Kemmerer						
Direct Employment	0	1	3	1	0	5
Total Employment	1	2	7	1	0	10
Direct Income	4	14	37	8	2	57
Total Income	11	33	91	18	3	137
Big Piney						
Direct Employment	0	0	0	0	0	0
Total Employment	0	0	0	0	0	0
Direct Income	0	0	0	0	0	0
Total Income	0	0	0	0	0	0
Pinedale						
Direct Employment	113	113	17	0	18	6
Total Employment	150	150	22	0	24	8
Direct Income	1383	1383	202	0	217	72
Total Income	1581	1581	230	0	291	97
Dubois						
Direct Employment	195	107	23	0	13	15
Total Employment	244	134	28	0	16	19
Direct Income	2277	1250	265	4	147	175
Total Income	3453	1895	402	6	223	265
Riverton						
Direct Employment						
Total Employment	73	40	9	0	4	5
Direct Income						
Total Income	1035	568	120	2	67	79
Lander						
Direct Employment						
Total Employment	68	38	8	0	5	6
Direct Income						
Total Income	967	530	112	2	63	75

TABLE B-5-5: Employment and Income Changes on Various Communities From Sawtimber Production Compared to the Current Direction Alternative (in Full-Time Equivalents and Thousand Dollars for the First Decade)

Community	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Jackson						
Direct Employment	0	0	0	0	0	0
Total Employment	0	0	0	0	0	0
Direct Income	0	0	0	0	0	0
Total Income	0	0	0	0	0	0
Afton						
Direct Employment	+100	+45	0	-69	-16	-19
Total Employment	+208	+93	0	-145	-34	-41
Direct Income	+1158	+518	0	-811	-191	-229
Total Income	+2820	+1262	0	-1975	-465	-558
Kemmerer						
Direct Employment	-3	-2	0	-2	-3	+2
Total Employment	-6	-5	0	-6	-7	+3
Direct Income	-33	-23	0	-29	-35	+20
Total Income	-80	-58	0	-73	-88	+46
Big Piney						
Direct Employment	0	0	0	0	0	0
Total Employment	0	0	0	0	0	0
Direct Income	0	0	0	0	0	0
Total Income	0	0	0	0	0	0
Pinedale						
Direct Employment	+96	+96	0	-17	+1	-11
Total Employment	+128	+128	0	-22	+2	-14
Direct Income	+1181	+1181	0	-202	+15	-130
Total Income	+1351	+4351	0	-230	+61	-133
Dubois						
Direct Employment	+172	+84	0	-23	-10	-8
Total Employment	+216	+106	0	-28	-12	-9
Direct Income	+2012	+985	0	-261	-118	-90
Total Income	+3051	+1493	0	-396	-179	-137
Riverton						
Direct Employment						
Total Employment	+64	+31	0	-9	-5	-4
Direct Income						
Total Income	+915	+438	0	-118	-53	-41
Lander						
Direct Employment						
Total Employment	+60	+30	0	-8	-3	-2
Direct Income						
Total Income	+855	+418	0	-110	-49	-37

TABLE B-5-6: Employment and Income Impacts on Various Communities From Post/Poles and Fuelwood Harvests (in Full-Time Equivalents and Thousand Dollars for the First Decade)

Community	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Jackson						
Direct Employment	40	26	22	1	5	7
Total Employment	47	30	26	1	6	9
Direct Income	413	265	229	10	52	76
Total Income	534	343	296	13	67	97
Afton						
Direct Employment	42	35	21	0	28	19
Total Employment	50	41	24	0	33	23
Direct Income	438	362	215	0	293	198
Total Income	581	480	284	0	389	263
Kemmerer						
Direct Employment	0	1	5	6	0	6
Total Employment	1	1	5	8	0	8
Direct Income	4	11	47	66	2	66
Total Income	5	15	62	87	3	87
Big Piney						
Direct Employment	22	5	17	0	8	10
Total Employment	23	5	18	0	8	11
Direct Income	225	48	175	0	81	102
Total Income	273	58	214	0	98	124
Pinedale						
Direct Employment	33	33	7	0	7	2
Total Employment	36	36	7	0	7	2
Direct Income	343	343	68	0	70	23
Total Income	427	427	84	0	93	30
Dubois						
Direct Employment	67	37	5	1	4	5
Total Employment	73	40	5	1	5	6
Direct Income	697	381	47	10	46	53
Total Income	804	439	54	12	53	61
Riverton						
Direct Employment						
Total Employment	8	5	1	0	1	1
Direct Income						
Total Income	92	50	6	2	6	7
Lander						
Direct Employment						
Total Employment	8	4	1	0	1	1
Direct Income						
Total Income	86	47	6	1	6	8

TABLE B-5-7: Employment and Income Changes on Various Communities From Post/Poles and Fuelwood Harvests Compared to the Current Direction Alternative (in Full-Time Equivalents and Thousand Dollars for the First Decade)

Community	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Jackson						
Direct Employment	+18	+4	0	-21	-17	-15
Total Employment	+21	+4	0	-25	-20	-17
Direct Income	+184	+36	0	-219	-177	-153
Total Income	+238	+47	0	-283	-229	-199
Afton						
Direct Employment	+21	+14	0	-21	+7	-2
Total Employment	+26	+17	0	-24	+10	-2
Direct Income	+233	+147	0	-215	+78	-17
Total Income	+297	+196	0	-284	+105	-21
Kemmerer						
Direct Employment	-5	-4	0	+1	-5	+1
Total Employment	-4	-4	0	+3	-5	+3
Direct Income	-43	-36	0	+19	-45	+19
Total Income	-57	-47	0	+25	-59	+25
Big Piney						
Direct Employment	+5	-12	0	-17	-9	-7
Total Employment	+5	-13	0	-18	-10	-7
Direct Income	+50	-127	0	-175	-94	-73
Total Income	+59	-156	0	-214	-116	-90
Pinedale						
Direct Employment	+26	+26	0	-7	0	-5
Total Employment	+29	+29	0	-7	0	-5
Direct Income	+275	+275	0	-68	+2	-45
Total Income	+343	+343	0	-84	+9	-54
Dubois						
Direct Employment	+62	+32	0	-4	-1	0
Total Employment	+78	+35	0	-4	0	+1
Direct Income	+650	+334	0	-37	-1	+6
Total Income	+750	+385	0	-42	-1	+7
Riverton						
Direct Employment						
Total Employment	+7	+4	0	-1	0	0
Direct Income						
Total Income	+86	+44	0	-4	0	+1
Lander						
Direct Employment						
Total Employment	+7	+3	0	-1	0	0
Direct Income						
Total Income	+80	+41	0	-5	0	+2

TABLE B-5-8: Employment and Income Impacts on Various Communities From Grazing Activities
(*in Full-Time Equivalents and Thousand Dollars for the First Decade*)

Community	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Jackson						
Direct Employment	13	13	13	13	13	13
Total Employment	20	20	20	20	20	20
Direct Income	162	162	161	160	161	161
Total Income	240	240	239	238	239	239
Afton						
Direct Employment	10	10	10	10	10	10
Total Employment	27	27	27	27	27	27
Direct Income	113	113	112	112	112	112
Total Income	303	303	303	303	303	303
Kemmerer						
Direct Employment	9	9	9	9	9	9
Total Employment	24	24	24	24	24	24
Direct Income	101	101	100	100	100	100
Total Income	271	271	270	270	270	270
Big Piney						
Direct Employment	20	20	20	20	20	20
Total Employment	35	35	35	35	35	35
Direct Income	230	230	230	230	230	230
Total Income	377	377	377	377	377	377
Pinedale						
Direct Employment	25	25	25	25	25	25
Total Employment	53	53	52	52	52	52
Direct Income	290	290	290	290	290	290
Total Income	562	562	560	560	560	560
Dubois						
Direct Employment	6	6	6	6	6	6
Total Employment	7	7	7	7	7	7
Direct Income	63	63	63	63	63	63
Total Income	72	72	72	72	72	72
Riverton						
Direct Employment						
Total Employment	2	2	2	2	2	2
Direct Income						
Total Income	21	21	20	20	20	20
Lander						
Direct Employment						
Total Employment	2	2	2	2	2	2
Direct Income						
Total Income	19	19	19	19	19	19

TABLE B-5-9: Employment and Income Changes on Various Communities From Grazing Activities Compared to the Current Direction Alternative (in Full-Time Equivalents and Thousand Dollars for the First Decade)

Community	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Jackson						
Direct Employment	0	0	0	0	0	0
Total Employment	0	0	0	0	0	0
Direct Income	+1	+1	0	-1	0	0
Total Income	+1	+1	0	-1	0	0
Afton						
Direct Employment	0	0	0	0	0	0
Total Employment	0	0	0	0	0	0
Direct Income	+1	+1	0	0	0	0
Total Income	0	0	0	0	0	0
Kemmerer						
Direct Employment	0	0	0	0	0	0
Total Employment	0	0	0	0	0	0
Direct Income	+1	+1	0	0	0	0
Total Income	+1	+1	0	0	0	0
Big Piney						
Direct Employment	0	0	0	0	0	0
Total Employment	0	0	0	0	0	0
Direct Income	0	0	0	0	0	0
Total Income	0	0	0	0	0	0
Pinedale						
Direct Employment	0	0	0	0	0	0
Total Employment	+1	+1	0	0	0	0
Direct Income	0	0	0	0	0	0
Total Income	+2	+2	0	0	0	0
Dubois						
Direct Employment	0	0	0	0	0	0
Total Employment	0	0	0	0	0	0
Direct Income	0	0	0	0	0	0
Total Income	0	0	0	0	0	0
Riverton						
Direct Employment						
Total Employment	0	0	0	0	0	0
Direct Income						
Total Income	+1	+1	0	0	0	0
Lander						
Direct Employment						
Total Employment	0	0	0	0	0	0
Direct Income						
Total Income	0	0	0	0	0	0

TABLE B-5-10: Employment and Income Impacts on Various Communities From Non-Resident Hunters and Outfitting/Guide Clients (in Full-Time Equivalents and Thousand Dollars for the First Decade)

Community	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Jackson						
Direct Employment	22	23	23	28	25	24
Total Employment	26	27	27	33	29	28
Direct Income	251	258	259	321	285	271
Total Income	395	405	406	504	448	425
Afton						
Direct Employment	8	8	8	11	9	9
Total Employment	10	10	10	13	11	11
Direct Income	93	93	93	122	104	105
Total Income	158	158	158	207	178	178
Kemmerer						
Direct Employment	7	7	7	9	8	8
Total Employment	8	8	8	10	9	9
Direct Income	76	76	77	97	87	87
Total Income	130	130	130	165	148	148
Big Piney						
Direct Employment	5	5	6	7	6	6
Total Employment	6	6	6	8	6	7
Direct Income	60	60	65	82	65	73
Total Income	95	95	101	128	104	115
Pinedale						
Direct Employment	15	15	15	17	16	16
Total Employment	16	16	17	18	18	17
Direct Income	166	167	172	189	182	180
Total Income	270	270	280	307	295	292
Dubois						
Direct Employment	3	3	3	4	3	3
Total Employment	3	3	3	4	3	3
Direct Income	32	35	32	39	35	35
Total Income	50	54	51	62	54	54
Riverton						
Direct Employment						
Total Employment	0	0	0	0	0	0
Direct Income						
Total Income	5	6	5	7	6	6
Lander						
Direct Employment						
Total Employment	0	0	0	0	0	0
Direct Income						
Total Income	5	5	5	6	5	5

TABLE B-5-11: Employment and Income Changes on Various Communities From Non-Resident Hunters and Outfitting/Guide Clients Compared to the Current Direction Alternative (in Full-Time Equivalents and Thousand Dollars for the First Decade)

Community	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Jackson						
Direct Employment	-1	0	0	+5	+2	+1
Total Employment	-1	0	0	+6	+2	+1
Direct Income	-8	-1	0	+62	+26	+12
Total Income	-11	-1	0	+98	+42	+19
Afton						
Direct Employment	0	0	0	+3	+1	+1
Total Employment	0	0	0	+3	+1	+1
Direct Income	0	0	0	+29	+11	+12
Total Income	0	0	0	+49	+20	+20
Kemmerer						
Direct Employment	0	0	0	+2	+1	+1
Total Employment	0	0	0	+2	+1	+1
Direct Income	+1	+1	0	+20	+10	+10
Total Income	0	0	0	+35	+18	+18
Big Piney						
Direct Employment	-1	-1	0	+1	0	0
Total Employment	0	0	0	+2	0	+1
Direct Income	-5	-5	0	+17	0	+8
Total Income	-6	-6	0	+27	+3	+14
Pinedale						
Direct Employment	0	0	0	+2	+1	+1
Total Employment	-1	-1	0	+1	+1	0
Direct Income	-6	-5	0	+17	+10	+8
Total Income	-10	-10	0	+27	+15	+12
Dubois						
Direct Employment	0	0	0	+1	0	0
Total Employment	0	0	0	+1	0	0
Direct Income	0	+3	0	+7	+3	+3
Total Income	-1	+3	0	+11	+3	+3
Riverton						
Direct Employment						
Total Employment	0	0	0	0	0	0
Direct Income						
Total Income	0	+1	0	+2	+1	+1
Lander						
Direct Employment						
Total Employment	0	0	0	0	0	0
Direct Income						
Total Income	0	0	0	+1	0	0

TABLE B-5-12: Employment and Income Impacts on Various Communities *From Resident Hunters* (in Full-Time Equivalents and Thousand Dollars for the First Decade)

Community	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Jackson						
Direct Employment	27	27	27	34	30	29
Total Employment	34	35	35	44	39	37
Direct Income	122	126	126	157	140	132
Total Income	161	166	167	207	185	174
Afton						
Direct Employment	11	11	11	15	13	13
Total Employment	15	15	15	20	17	17
Direct Income	55	55	55	73	62	62
Total Income	81	81	81	106	91	91
Kemmerer						
Direct Employment	9	9	9	12	11	11
Total Employment	13	13	13	16	14	14
Direct Income	45	45	46	57	51	51
Total Income	66	66	66	84	75	75
Big Piney						
Direct Employment	7	7	8	10	8	9
Total Employment	8	8	9	11	9	10
Direct Income	41	41	44	56	45	49
Total Income	50	50	54	67	55	61
Pinedale						
Direct Employment	21	21	22	24	23	23
Total Employment	25	25	26	28	27	27
Direct Income	118	118	123	135	129	128
Total Income	151	151	156	171	164	163
Dubois						
Direct Employment	8	8	8	9	8	8
Total Employment	8	9	8	10	9	9
Direct Income	49	53	50	62	53	53
Total Income	61	65	61	75	65	65
Riverton						
Direct Employment						
Total Employment	1	1	1	1	1	1
Direct Income						
Total Income	6	7	6	8	7	7
Lander						
Direct Employment						
Total Employment	1	1	1	1	1	1
Direct Income						
Total Income	6	6	6	8	6	6

TABLE B-5-13: Employment and Income Changes on Various Communities From Resident Hunters Compared to the Current Direction Alternative (in Full-Time Equivalents and Thousand Dollars for the First Decade)

Community	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Jackson						
Direct Employment	0	0	0	+7	+3	+2
Total Employment	-1	0	0	+9	+4	+2
Direct Income	-4	0	0	+31	+14	+6
Total Income	-6	-1	0	+40	+18	+7
Afton						
Direct Employment	0	0	0	+4	+2	+2
Total Employment	0	0	0	+5	+2	+2
Direct Income	0	0	0	+18	+7	+7
Total Income	0	0	0	+25	+10	+10
Kemmerer						
Direct Employment	0	0	0	+3	+2	+2
Total Employment	0	0	0	+3	+1	+1
Direct Income	-1	-1	0	+11	+5	+5
Total Income	0	0	0	+18	+9	+9
Big Piney						
Direct Employment	-1	-1	0	+2	0	+1
Total Employment	-1	-1	0	+2	0	+1
Direct Income	-3	-3	0	+12	+1	+5
Total Income	-4	-4	0	+13	+1	+7
Pinedale						
Direct Employment	-1	-1	0	+2	+1	+1
Total Employment	-1	-1	0	+2	+1	+1
Direct Income	-5	-5	0	+12	+6	+5
Total Income	-5	-5	0	+15	+8	+7
Dubois						
Direct Employment	0	0	0	+1	0	0
Total Employment	0	+1	0	+2	+1	+1
Direct Income	-1	+3	0	+12	+3	+3
Total Income	0	+4	0	+14	+4	+4
Riverton						
Direct Employment						
Total Employment	0	0	0	0	0	0
Direct Income						
Total Income	0	+1	0	+2	+1	+1
Lander						
Direct Employment						
Total Employment	0	0	0	0	0	0
Direct Income						
Total Income	0	0	0	+2	0	0

TABLE B-5-14: Employment and Income Impacts on Various Communities From Wilderness Visitors (in Full-Time Equivalents and Thousand Dollars for the First Decade)

Community	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Jackson						
Direct Employment	81	81	77	74	74	74
Total Employment	99	99	94	91	91	91
Direct Income	342	342	327	314	314	314
Total Income	462	462	441	424	424	424
Afton						
Direct Employment	--	--	--	--	--	--
Total Employment	--	--	--	--	--	--
Direct Income	--	--	--	--	--	--
Total Income	--	--	--	--	--	--
Kemmerer						
Direct Employment	--	--	--	--	--	--
Total Employment	--	--	--	--	--	--
Direct Income	--	--	--	--	--	--
Total Income	--	--	--	--	--	--
Big Piney						
Direct Employment	--	--	--	--	--	--
Total Employment	--	--	--	--	--	--
Direct Income	--	--	--	--	--	--
Total Income	--	--	--	--	--	--
Pinedale						
Direct Employment	146	146	140	134	134	134
Total Employment	164	164	157	150	150	150
Direct Income	736	736	704	676	676	676
Total Income	965	965	923	886	886	886
Dubois						
Direct Employment	39	39	37	35	35	35
Total Employment	48	41	39	38	38	38
Direct Income	245	245	234	225	225	225
Total Income	309	309	295	283	283	283
Riverton						
Direct Employment						
Total Employment	4	4	3	3	3	3
Direct Income						
Total Income	27	27	26	25	25	25
Lander						
Direct Employment						
Total Employment	3	3	3	3	3	3
Direct Income						
Total Income	25	25	24	23	23	23

TABLE B-5-15: Employment and Income Changes on Various Communities From Wilderness Visitors Compared to the Current Direction Alternative (in Full-Time Equivalents and Thousand Dollars for the First Decade)

Community	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Jackson						
Direct Employment	+4	+4	0	-3	-3	-3
Total Employment	+5	+5	0	-3	-3	-3
Direct Income	+15	+15	0	-13	-13	-13
Total Income	+21	+21	0	-17	-17	-17
Afton						
Direct Employment	--	--	--	--	--	--
Total Employment	--	--	--	--	--	--
Direct Income	--	--	--	--	--	--
Total Income	--	--	--	--	--	--
Kemmerer						
Direct Employment	--	--	--	--	--	--
Total Employment	--	--	--	--	--	--
Direct Income	--	--	--	--	--	--
Total Income	--	--	--	--	--	--
Big Piney						
Direct Employment	--	--	--	--	--	--
Total Employment	--	--	--	--	--	--
Direct Income	--	--	--	--	--	--
Total Income	--	--	--	--	--	--
Pinedale						
Direct Employment	+6	+6	0	-6	-6	-6
Total Employment	+7	+7	0	-7	-7	-7
Direct Income	+32	+32	0	-28	-28	-28
Total Income	+42	+42	0	-37	-37	-37
Dubois						
Direct Employment	+2	+2	0	-2	-2	-2
Total Employment	+9	+2	0	-1	-1	-1
Direct Income	+11	+11	0	-9	-9	-9
Total Income	+14	+14	0	-12	-12	-12
Riverton						
Direct Employment						
Total Employment	+1	+1	0	0	0	0
Direct Income						
Total Income	+1	+1	0	-1	-1	-1
Lander						
Direct Employment						
Total Employment	0	0	0	0	0	0
Direct Income						
Total Income	+1	+1	0	-1	-1	-1

TABLE B-5-16: Employment and Income Impacts on Various Communities From Summer Visitors
(in Full-Time Equivalents and Thousand Dollars for the First Decade)

Community	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Jackson						
Direct Employment	288	288	288	293	290	288
Total Employment	352	351	351	357	354	352
Direct Income	1220	1217	1217	1238	1226	1220
Total Income	1645	1641	1642	1670	1655	1646
Afton						
Direct Employment	93	94	93	95	94	94
Total Employment	109	110	109	111	111	111
Direct Income	422	426	421	430	427	428
Total Income	579	584	577	589	586	587
Kemmerer						
Direct Employment	95	95	95	97	96	96
Total Employment	111	111	111	113	112	113
Direct Income	430	430	430	438	434	436
Total Income	589	589	589	600	595	598
Big Piney						
Direct Employment	107	107	107	109	108	108
Total Employment	116	116	117	118	117	118
Direct Income	540	540	542	550	543	547
Total Income	685	685	687	697	690	694
Pinedale						
Direct Employment	98	98	97	98	98	94
Total Employment	110	110	108	110	109	110
Direct Income	495	495	487	496	492	496
Total Income	648	649	639	649	645	650
Dubois						
Direct Employment	45	46	45	47	46	45
Total Employment	48	49	48	50	49	48
Direct Income	290	291	289	297	291	287
Total Income	365	366	364	374	367	361
Riverton						
Direct Employment						
Total Employment	4	4	4	4	4	4
Direct Income						
Total Income	32	32	32	33	32	31
Lander						
Direct Employment						
Total Employment	4	4	4	4	4	4
Direct Income						
Total Income	30	30	30	30	30	30

TABLE B-5-17: Employment and Income Changes on Various Communities From Summer Visitors Compared to the Current Direction Alternative (in Full-Time Equivalents and Thousand Dollars for the First Decade)

Community	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Jackson						
Direct Employment	0	0	0	+5	+2	0
Total Employment	+1	0	0	+6	+3	+1
Direct Income	+3	0	0	+21	+9	+3
Total Income	+3	-1	0	+28	+13	+4
Afton						
Direct Employment	0	+1	0	+2	+1	+1
Total Employment	0	+1	0	+2	+2	+2
Direct Income	+1	+5	0	+9	+6	+7
Total Income	+2	+7	0	+12	+9	+10
Kemmerer						
Direct Employment	0	0	0	+2	+1	+1
Total Employment	0	0	0	+2	+1	+2
Direct Income	0	0	0	+8	+4	+6
Total Income	0	0	0	+11	+6	+9
Big Piney						
Direct Employment	0	0	0	+2	+1	+1
Total Employment	-1	-1	0	+1	0	+1
Direct Income	-2	-2	0	+8	+1	+5
Total Income	-2	-2	0	+10	+3	+7
Pinedale						
Direct Employment	+1	+1	0	+1	+1	-3
Total Employment	+2	+2	0	+2	+1	+2
Direct Income	+8	+8	0	+9	+5	+9
Total Income	+9	+10	0	+10	+6	+11
Dubois						
Direct Employment	0	+1	0	+2	+1	0
Total Employment	0	+1	0	+2	+1	0
Direct Income	+1	+2	0	+8	+2	-2
Total Income	+1	+2	0	+10	+3	-3
Riverton						
Direct Employment						
Total Employment	0	0	0	0	0	0
Direct Income						
Total Income	0	0	0	+1	0	-1
Lander						
Direct Employment						
Total Employment	0	0	0	0	0	0
Direct Income						
Total Income	0	0	0	0	0	0

TABLE B-5-18: Employment and Income Impacts on Various Communities From Snowmobile Users
(in Full-Time Equivalents and Thousand Dollars for the First Decade)

Community	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Jackson						
Direct Employment	15	15	15	15	15	15
Total Employment	19	19	19	19	19	19
Direct Income	91	91	91	91	91	91
Total Income	123	123	123	123	123	123
Afton						
Direct Employment	18	18	18	18	18	18
Total Employment	21	21	21	20	21	21
Direct Income	111	112	110	109	110	111
Total Income	151	152	150	149	151	151
Kemmerer						
Direct Employment	2	2	2	2	2	3
Total Employment	3	3	3	3	3	3
Direct Income	15	15	15	15	15	15
Total Income	21	21	21	21	21	21
Big Piney						
Direct Employment	15	15	15	15	15	15
Total Employment	16	16	16	16	16	16
Direct Income	103	103	103	103	103	103
Total Income	131	131	131	131	131	131
Pinedale						
Direct Employment	9	9	8	8	8	8
Total Employment	10	10	9	9	9	9
Direct Income	59	59	58	58	58	58
Total Income	78	78	75	75	75	75
Dubois						
Direct Employment	11	11	11	11	11	11
Total Employment	12	12	12	12	12	12
Direct Income	99	99	99	99	99	99
Total Income	124	124	124	124	124	124
Riverton						
Direct Employment						
Total Employment	1	1	1	1	1	1
Direct Income						
Total Income	11	11	11	11	11	11
Lander						
Direct Employment						
Total Employment	1	1	1	1	1	1
Direct Income						
Total Income	10	10	10	10	10	10

TABLE B-5-19: Employment and Income Changes on Various Communities From Snowmobile Users Compared to the Current Direction Alternative (in Full-Time Equivalents and Thousand Dollars for the First Decade)

Community	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Jackson						
Direct Employment	0	0	0	0	0	0
Total Employment	0	0	0	0	0	0
Direct Income	0	0	0	0	0	0
Total Income	0	0	0	0	0	0
Afton						
Direct Employment	0	0	0	0	0	0
Total Employment	0	0	0	-1	0	0
Direct Income	+1	+2	0	-1	0	+1
Total Income	+1	+2	0	-1	+1	+1
Kemmerer						
Direct Employment	0	0	0	0	0	+1
Total Employment	0	0	0	0	0	0
Direct Income	0	0	0	0	0	0
Total Income	0	0	0	0	0	0
Big Piney						
Direct Employment	0	0	0	0	0	0
Total Employment	0	0	0	0	0	0
Direct Income	0	0	0	0	0	0
Total Income	0	0	0	0	0	0
Pinedale						
Direct Employment	+1	+1	0	0	0	0
Total Employment	+1	+1	0	0	0	0
Direct Income	+1	+1	0	0	0	0
Total Income	+3	+3	0	0	0	0
Dubois						
Direct Employment	0	0	0	0	0	0
Total Employment	0	0	0	0	0	0
Direct Income	0	0	0	0	0	0
Total Income	0	0	0	0	0	0
Riverton						
Direct Employment						
Total Employment	0	0	0	0	0	0
Direct Income						
Total Income	0	0	0	0	0	0
Lander						
Direct Employment						
Total Employment	0	0	0	0	0	0
Direct Income						
Total Income	0	0	0	0	0	0

TABLE B-5-20: Employment and Income Impacts on Various Communities From Winter Visitors
(in Full-Time Equivalents and Thousand Dollars for the First Decade)

Community	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Jackson						
Direct Employment	78	78	78	78	78	78
Total Employment	96	96	96	96	96	96
Direct Income	525	525	525	525	525	525
Total Income	709	709	709	709	709	709
Afton						
Direct Employment	--	--	--	--	--	--
Total Employment	--	--	--	--	--	--
Direct Income	--	--	--	--	--	--
Total Income	--	--	--	--	--	--
Kemmerer						
Direct Employment	--	--	--	--	--	--
Total Employment	--	--	--	--	--	--
Direct Income	--	--	--	--	--	--
Total Income	--	--	--	--	--	--
Big Piney						
Direct Employment	--	--	--	--	--	--
Total Employment	--	--	--	--	--	--
Direct Income	--	--	--	--	--	--
Total Income	--	--	--	--	--	--
Pinedale						
Direct Employment	--	--	--	--	--	--
Total Employment	--	--	--	--	--	--
Direct Income	--	--	--	--	--	--
Total Income	--	--	--	--	--	--
Dubois						
Direct Employment	--	--	--	--	--	--
Total Employment	--	--	--	--	--	--
Direct Income	--	--	--	--	--	--
Total Income	--	--	--	--	--	--
Riverton						
Direct Employment						
Total Employment	--	--	--	--	--	--
Direct Income						
Total Income	--	--	--	--	--	--
Lander						
Direct Employment						
Total Employment	--	--	--	--	--	--
Direct Income						
Total Income	--	--	--	--	--	--

TABLE B-5-21: Employment and Income Changes on Various Communities From Winter Visitors Compared to the Current Direction Alternative (in Full-Time Equivalents and Thousand Dollars for the First Decade)

Community	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Jackson						
Direct Employment	0	0	0	0	0	0
Total Employment	0	0	0	0	0	0
Direct Income	0	0	0	0	0	0
Total Income	0	0	0	0	0	0
Afton						
Direct Employment	--	--	--	--	--	--
Total Employment	--	--	--	--	--	--
Direct Income	--	--	--	--	--	--
Total Income	--	--	--	--	--	--
Kemmerer						
Direct Employment	--	--	--	--	--	--
Total Employment	--	--	--	--	--	--
Direct Income	--	--	--	--	--	--
Total Income	--	--	--	--	--	--
Big Piney						
Direct Employment	--	--	--	--	--	--
Total Employment	--	--	--	--	--	--
Direct Income	--	--	--	--	--	--
Total Income	--	--	--	--	--	--
Pinedale						
Direct Employment	--	--	--	--	--	--
Total Employment	--	--	--	--	--	--
Direct Income	--	--	--	--	--	--
Total Income	--	--	--	--	--	--
Dubois						
Direct Employment	--	--	--	--	--	--
Total Employment	--	--	--	--	--	--
Direct Income	--	--	--	--	--	--
Total Income	--	--	--	--	--	--
Riverton						
Direct Employment						
Total Employment	--	--	--	--	--	--
Direct Income						
Total Income	--	--	--	--	--	--
Lander						
Direct Employment						
Total Employment	--	--	--	--	--	--
Direct Income						
Total Income	--	--	--	--	--	--

Economic Impacts to State and Federal Governments From the Minerals Industry

Since there is a high level of uncertainty as to the amount of oil and gas activity that will occur on the Forest in the future, efforts to attempt to estimate changes in mineral-related employment between alternatives is extremely speculative. But an effort needs to be made to show the impacts that the mineral industry has on the local communities, the State of Wyoming, and the Federal Government.

Many of the benefits to the Federal Government from the minerals industry can be found in other economic effects discussions of this Appendix and in the Environmental Impact Statement. One benefit that was not included is the cumulative taxes paid to the State and Federal Governments from the acres being leased on Federal lands within the State of Wyoming.

Over the past 10-years (1978-1987) the mineral industry in Wyoming has paid an average of $255,245,392.00 per year (in 1982 dollars) in taxes to the State and Federal governments from producing acreages on Federal lands. This converts into $97.63/producing acre or $11.39/leased acre.

Historically, the amount of dollars received by the State of Wyoming from the minerals industry (operating on all ownerships) has been in such amounts that the State of Wyoming has not deemed it necessary to have State Income Taxes. However, in recent years the minerals industry has been going through a depressed market cycle. A continuation of the decrease in State revenues from the minerals industry could severely impacts the State's operating budget. If these reductions occur over a long period of time, the State may have no choice but to incorporate a State Income Tax, in which case every person who lives in Wyoming would be impacted.

Forest Planning Impacts on the Minerals Industry

The impacts from the minerals industry are difficult to estimate. It is known that the industry can have extremely positive impacts on a community by bringing in employment, contributing to the local tax base in such amounts as to build new schools and other public facilities, increasing housing availability, etc. It can also have some extremely detrimental effects, particularly after building up a community during a "boom" cycle and then having to lay-off workers during a "bust" cycle.

Due to the "boom-bust" nature of the industry and the uncertainty of when and where exploration and development activities will occur, no attempt was made to determine a difference between alternatives in terms of employment and income. It can be pointed out, however, that Alternatives A, B, and C place relatively few restrictions on where the minerals industry can operate, so these alternatives would be preferred by the minerals industry. Alternative F has more restrictions, followed by Alternative E. Alternative D, has a significant amount of acreage that is not available for surface occupancy by the oil and gas industry and as such, this alternative could foreclose many opportunities for this industry.

In an effort to provide some information for those interested publics who would like to make estimates on the employment and income effects of the various alternatives using their own assumptions, the following employment and income multipliers can be used. These multipliers in Table B-5-22 are based upon a $1,000,000 expenditure within a community and can be used for exploration or development scenarios.

TABLE B-5-22. Multipliers for estimating the economic impact of direct expenditures from the Oil and Gas sector within the four County Zone of Influence.

Resource	Units	Value per unit in Fremont County	Value per unit in Lincoln County	Value per unit in Sublette County	Value per unit in Teton County
OIL AND GAS ($ 1984)	Million Dollars				
Direct Output	$'s	1,000,000	1,000,000	1,000,000	No
Total Output (Sales)	$'s	1,489,908	1,338,290	1,326,104	oil and gas sector
Direct Employ.	FTEs	2.399	2.399	2.399	information
Total Employ.	FTEs	6.908	5.306	5.549	for
Direct Income	$'s	58,804	46,847	47,049	Teton
Total Income	$'s	140,246	94,931	92,035	County

FTE = Full Time Equivalent

Effects on Indians, Racial Minorities, and Women

Forest policy and management practices encourage equal use and employment opportunities for everyone. The Forest considers employment candidates without discrimination for any non-merit reason such as race, color, religion, sex, national origin, politics, marital status, physical handicap, age, or membership or nonmembership in an employee organization. The Forest is available for use by Indians, other racial minorities, low income groups, senior citizens, women, physically handicapped persons, and other minority groups. This policy would continue under any of the alternatives. Management emphasis under the Affirmative Action Program would be about the same for each alternative. Increased job opportunities would likely occur in Alternatives A and B.

SECTION 6: ANALYSIS PRIOR TO DEVELOPMENT OF ALTERNATIVES

A. *INTRODUCTION*

Prior to developing alternatives the Forest conducted an "Analysis of the Management Situation" to determine its ability to supply goods and services in response to society's demands.

The Analysis of the Management Situation (AMS) determined resource supply potentials by establishing minimum and maximum production levels called benchmarks. Production capabilities were determined for single resources, as well as for sets of multiple resource outputs produced in the most cost-efficient way. This analysis established the benchmark levels required by national planning direction. Those benchmarks served as references from which the costs and effects of various objectives and constraints used in developing alternatives were evaluated.

The benchmark analysis was performed prior to the formulation of alternatives and used the FORPLAN model. The purpose of the benchmark analysis was fourfold:

1. Estimate the schedule of management activities, resource outputs; effects, discounted benefits and costs, and PNV of the benchmarks.

2. Define the resource production levels associated with maximizing single resource outputs.

3. Analyze the implications of legal and policy constraints.

4. Comply with the analysis of management requirements of 36 CFR 219.27.

In order to fulfill these requirements, the Forest developed three types of benchmarks. These are:

1. Maximize Present Net Value Benchmarks - The objective function maximizes present net value for the Forest and displays the associated resource outputs.

2. Resource Benchmarks - The objective function maximizes output potentials for timber production, and range. These benchmarks maximize PNV subject to meeting maximum resource output objectives.

3. Minimum Level Benchmark - Defines the minimum outputs associated with *custodial management of the Forest and the unavoidable costs and benefits of* public ownership.

B. DEVELOPMENT OF MANAGEMENT REQUIREMENTS (MR)

Overview

NFMA management requirements in 36 CFR 219.27 are as follows:

a. Provide for rights-of-way and corridors.
b. Conserve soil and water resources.
c. Minimize hazards from flood, wind, wildfire, erosion, and other natural physical forces.
d. Reduce hazards from pest organisms.
e. Protect riparian zones.
f. Provide plant and wildlife diversity.
g. Provide fish and wildlife habitat to maintain viable populations of all natural vertebrate species, well distributed in the planning area.
h. Adhere to multiple use laws.
i. Protect threatened and endangered species habitat.
j. Develop road construction standards.
k. Revegetate temporary roads.
l. Maintain air quality.
m. Reforest in 5 years.
n. Limit openings to 40 acres.

The methods used to meet these management requirements include:

Developing Standards and Guidelines and appropriate practices for Management Prescriptions.

Assigning Management Prescriptions to the appropriate acreages.

Applying access, absolute, and inventory constraints to Analysis Areas or groups of Analysis Areas in FORPLAN.

Each of the management requirements and their vehicle for incorporation are listed below.

Conserve Soil and Water Resource

Soil - Management activities will not significantly impair the long-term productivity of the soil resource. This requirement is in response to several acts of legislation, including: Multiple-Use Sustained-Yield Act (MUSYA), Resources Planning Act (RPA), and National Forest Management Act (NFMA). This requirement is included in all Management Prescriptions through their accompanying Standards and Guidelines.

Watershed/Fish - The affect of management on water quality is addressed in terms of the affect on fish habitat. The MR provides habitat to maintain viable fish populations well distributed in the planning area. This requirement is based upon NFMA regulations 36 CFR 219.19 and 219.27(a)(6). This requirement is included in all Management Prescriptions through their accompanying Standards and Guidelines.

For modeling purposes, this MR is represented through the definition of the Analysis Areas. See Section 3, "Determination of Lands Suited for Management Activities" for more information. This section also contains a table showing those acres that were removed from consideration because of this management requirement.

Minimize Hazards From Flood, Wind, Wildfire, Erosion, or Other Natural Physical Forces

The soil and water MR discussed previously outlines the Standards, Guidelines, and constraints needed to minimize hazards from flood and erosion.

Wind can cause unnecessary damage to residual trees in timber sale areas if improper silvicultural systems are applied. Prescribing silviculturally sound systems by working group minimizes this hazard. In most cases, more than one system is allowed to assure proper field application.

Fire protection objectives are to protect life and property throughout the Forest and to provide the fire protection required to meet the MRs identified here.

Reduce Hazards From Pest Organisms

Trees and forage on the Forest are susceptible to mountain pine beetle, spruce budworm, dwarf mistletoe, and other pest organisms. Rather than let the natural process create favorable conditions for these pest organisms, several different management practices were considered to help prevent hazards from pest organisms. This requirement is included in all Management Prescriptions through their accompanying Standards and Guidelines.

Protect Riparian Zones

Silvicultural systems; timber harvest timing, intensity, amount, location, and size of unit; logging system, road density, and road design; fuel treatment and site preparation; and grazing systems and practices can affect riparian zones.

The requirement is to manage riparian areas to protect riparian-dependent resources such as fish, water quality, maintenance of natural channels, and certain vegetative and wildlife communities, while producing other resource outputs at levels compatible with the riparian values. This MR is based upon the application of Executive Orders dealing with floodplains and wetlands and NFMA regulations 36 CFR 219.27(a). This requirement is included in all Management Prescriptions through their accompanying Standards and Guidelines.

Provide Plant and Animal Diversity

Since animal diversity depends on plant diversity, attention is focused on horizontal plant diversity which refers to the number of acres in each successional stage, such as shrubs, immature timber and old-growth. Old-growth is considered the most sensitive successional stage on the Bridger-Teton National Forest. This MR is provided for through the application of multiple-use Management Prescriptions and their accompanying Standards and Guidelines. It is also provided for through the use of "cut-over" constraints in FORPLAN and restrictions on the amount of Old-growth that can be harvested.

Provide Fish and Wildlife Habitat to Maintain Viable Populations

Fish Populations: (See Conserve Soil and Water Resource.)

Wildlife Populations: Wildlife including non-game species as well as big game species are provided for through the application of multiple-use Management Prescriptions and their accompanying Standards and Guidelines. They are also provided through the use of "cut-over" constraints in FORPLAN. Wildlife species are dependent upon plant community diversity (described above), and maintaining an adequate range of successional stages is one of the components needed to maintain minimum viable populations.

Consistency with Multiple Use Laws

Various laws direct the Secretary of Agriculture to administer National Forests for multiple uses such as outdoor recreation, range, timber, watershed, wildlife, fish, and minerals. The Secretary also administers the development and use of renewable surface resources.

The Forest planning and environmental analysis requires that processes formerly used to make individual resource decisions be combined into integrated management decisions.

The riparian zone, diversity, and fish and wildlife MRs ensure that minimum levels of these resources will be maintained. The reforestation MR provides for maintenance of a sustained yield of timber without impairment to the productivity of the land.

Protect Threatened and Endangered Species Habitat

The MRs for Threatened and Endangered species provide for the protection of their habitat which does not jeopardize the continued existence or adversely modify or destroy critical habitat for listed species. All ground disturbing activities will be reviewed to ensure recognition of listed species and their habitat needs. This requirement is also included in all Management Prescriptions and their accompanying Standards and Guidelines.

Providing for Utility and Transportation Rights-of-Way and Corridor

Land-disturbing activities such as timber harvest, land clearing, road construction, pipeline trenches, and holes for power poles occur when providing rights-of-way. Standards and Guidelines assure that the needs of utility and transportation rights-of-way and corridors are met and are compatible with the forest objectives.

Road Construction Standards

Access roads are necessary for efficient timber harvest, but road construction affects the soil, water, visual, and riparian resources. Safe road conditions for public use are necessary. The variables considered to establish road standards are road density per square mile and road design requirements.

The adverse effects of a minimum standard road on sites with Marginally Unstable soils with slopes greater than 55% or on Unstable soils with slopes greater than

40% or on Landslides with slopes greater than 40% are not environmentally acceptable. Increasing the standard to require full bench construction versus cut and fill dramatically increases costs. Refer to the section titled "Determination of Lands Suited for Management Activities" for more information.

The application of MRs for road construction standards are contained in several areas that are the same for all alternatives and benchmarks. Those areas are:

(1) Forestwide Standards and Guidelines, and management direction.
(2) Management Prescriptions and their accompanying Standards and Guidelines.
(3) Best Management Practices (BMP) Handbook.

Minimum road design considered type of road, clearing width, width of road, grades, and drainage requirements.

Clearing width was established at the top of the road cut and the toe of the road fill. No major difference in costs occurs between collector and local roads for clearing. Steeper slopes require larger clearing width and increased costs.

Mitigating measures will be applied to newly constructed roads and road maintenance to help maintain water quality and reduce damage to stream fisheries by limiting the amount of sediment that enters the streams. Some measures are applied to all roads, while others are for specific sections such as within riparian zones or within sediment-contributing areas adjacent to active channels. The sediment mitigating guidelines for roads are on file in the Planning Records at the Supervisor's Office in Jackson, Wyoming.

Revegetating Temporary Roads

Short temporary roads are sometimes needed to transport logs efficiently ; however, they can affect soil and water resources. The road density for the Forest's transportation system and log skid distances preclude the maintenance of temporary roads in most cases. The minimum requirement is to re-establish forage or grass cover by seeding.

Maintaining Air Quality

This requirement was handled outside of FORPLAN. The Regional Guide directs the Forest to work through cooperative agreements with the States to manage smoke emissions. Scheduling the time and number of prescribed burns was not attempted within the scope of this Forestwide planning process, however all project planning relating to prescribed burning will be done in cooperation with the State of Wyoming.

Reforestation

Reforestation requirements can be found within the Management Prescriptions and their accompanying Standards and Guidelines. In the past, the Bridger-Teton National Forest has placed on emphasis on using the clearcut harvest method followed by site preparation and planting. The Forest, however, is now working on changing that emphasis and favoring silvicultural prescriptions that will enhance the prospect of natural regeneration. The Forest is still required to have a reforested stand within 5 years after harvest, and sites with natural

regeneration will be monitored. If natural regeneration appears to be failing, then the sites will be planted.

Limit Openings to Forty Acres

The maximum size of openings will be 40 acres, with provisions for specific exceptions. This MR is in accordance with direction given in NFMA and the Intermountain Region Guide. This requirement is modeled in FORPLAN through the "cut-over" constraint in which no more than 10% of the suitable acres can be in a "cut-over" condition.

C. BENCHMARKS

Eight benchmarks have been either reanalyzed or created between the Draft EIS and the Final EIS. Benchmarks are used to define the production potentials and economic relationships of the Forest. The efficient schedule of management activities, resource outputs, environmental effects, and economic consequences to meet the purpose of each benchmark were estimated. The following describes the purpose of each benchmark, as well as the major objectives and constraints. Constraints are a linear programming technique to examine resource considerations or opportunities for resource restrictions or mitigation measures between various resources.

The timber harvest flows can affect the amount of timber harvested and the economic efficiency of the timber program. Two types of timber flows were examined, (1) non-declining yield even-flow (NDEF) and (2) a plus 10 percent and minus 10 percent upper and lower bound (Departure).

The resources considered in the present net value (PNV) objective function determine the outputs and activities scheduled. Two PNV benchmarks were examined, one included all resources for which a "willingness-to-pay" value could be estimated (includes both market and non-market resources), the other benchmark only included those resources that have a market value (resources that are actually traded in the market place).

One additional benchmark has been developed to look at the possibility of managing the forest under all uneven-aged silvicultural prescriptions.

Benchmarks were not constrained by budget and generally used a maximization of PNV as the objective function to obtain an economically efficient solution.

Benchmark 1 (Maximum Timber - NDEF): Maximize timber with non-declining even-flow constraint; rotations based on CMAI; MRs were applied.

Purpose:

To determine the biological potential of the Forest to produce timber while meeting the minimum legal requirements.

Objective Function:

Maximize Timber over 5 decades, then "rollover" to a Maximize PNV objective function.

Constraints:

1. All management requirements are applied.
2. NDEF constraint is applied.
3. Allocation Choices specifically designed to attain the maximum amount of timber production were used.

Benchmark 2 (Maximum Timber - Departure): Maximize timber without a non-declining even-flow constraint; rotations based on CMAI; MRs were applied.

Purpose:

To determine the biological potential of the Forest to produce timber while meeting the minimum legal requirements, but allowing the harvesting schedule to increase or decrease by up to 10 percent each decade.

Objective Function:

Maximize Timber over 5 decades, then "rollover" to a Maximize PNV objective function.

Constraints:

1. All management requirements are applied.
2. Sequential Upper and Lower Bounds Harvest Constraint of 10% Deviation
3. Allocation Choices specifically designed to attain the maximum amount of timber production were used.

Benchmark 3 (Maximize PNV - Market and Assigned Values): Maximize Present Net Value using Market and Assigned Values.

Purpose:

To determine the most "economically efficient" mix of resource outputs and land use designations when all resources are valued.

Objective Function:

Maximize Present Net Value over 15 decades.

Constraints:

1. All management requirements are applied.
2. NDEF constraint is applied.
3. All resources that are valued are included in the objective function.

Allocation Choices Available:

For the first attempted run of this benchmark, the "Max Timber" Allocation Choices were not considered. This is because these Allocation Choices were only put together to allow the model to calculate the maximum biological potential of the forest to produce timber. The other resource information was simply copied from the High Productivity alternative designs. Therefore the "Max Timber" Allocation Choices do not have same level of resource information and as such should not be allowed to compete with the other Allocation Choices in an analysis of this kind.

The results of this attempt was that the costs to run the model with essentially all the Allocation Choices available turned out to be exorbitant. In order to cut down on the costs of this particular analysis,

the Allocation Choice options were cut in half by not allowing the model to evaluate roading packages that would not be implemented until the second or third decade. The model could still evaluate the option of building roads or not building roads within each of the Allocation Choice "designs".

Benchmark 4 (Maximize PNV - Market Values Only): Maximize Present Net Value using only Market Values.

Purpose:

To determine the most "economically efficient" mix of resource outputs and land use designations when only those costs and benefits associated with the timber program are considered.

Objective Function:

Maximize Present Net Value over 15 decades.

Constraints:

1. All management requirements are applied.
2. NDEF constraint is applied.
3. Only those activities and outputs associated with the timber program are included in the objective function.

Allocation Choices Available:

(See write-up for Benchmark 3.)

Benchmark 5 (Maximum Range): Maximize the grazing production on the Forest.

Purpose:

To determine the maximum potential of the Forest to produce grazing outputs, without damaging the soil and water resources.

Objective Function:

An updated FORPLAN run was not made for this benchmark. In the Draft Environmental Impact Statement, this benchmark was determined, and there were no new issues raised between the Draft and the Final to warrant a reanalysis of this benchmark.

Results:

The Max Range Benchmark, as found in the Draft EIS, determined the following permitted grazing outputs could be obtained annually on the Bridger-Teton National Forest:

Decade	MAUMs
1	269.1
2	275.6
3	283.2
4	291.3
5	300.3

Benchmark 6 (Minimum Level): Minimum level management. Resource constraints are not applied.

Purpose:
To determine the resource production levels that would result from custodial management of the Forest.

Objective Function:
FORPLAN was not used to determine this benchmark.

Benchmark 7 (Current Direction): Maximize PNV using market and assigned values under current management direction. This is the benchmark required in 36 CFR 219.12(e)(2).

Purpose:
To determine the mix of resource outputs produced on the Forest if the direction contained in existing management and resource plans were continued.

Objective Function:
Maximize Present Net Value over 15 Decades.

Constraints:
This benchmark is the same as Alternative C - Current Direction.

Benchmark 8 (Uneven-Aged Management): Manage the Forest using only uneven-aged silvicultural prescriptions.

Purpose:
To evaluate the possibility of managing the Forest by only using uneven-aged silvicultural prescriptions.

Objective Function:
Maximize Present Net Value over 15 Decades.

Constraints:
1. All management requirements are applied.
2. NDEF constraint is applied.
3. All resources that are valued are included in the objective function.
4. Only selection silvicultural prescriptions are allowed.

Allocation Choices Available:
In an effort to evaluate the possibility of using only uneven-aged management practices, but still keep the costs of analysis down to a reasonable level, it was decided to simply use the Allocation Choices selected in the Max PNV - Assigned Values Benchmark.

The following Tables B-6-1 to B-6-6 show the outputs, activities, benefits and costs of the benchmarks.

TABLE B-6-1 BENCHMARK 1 MAX TIMBER - NDEF

Output/Activity	Units of Measure	Decade 1	2	3	4	5	10	15
Recreation		----------Units Per Year----------						
Primitive	MRVD	49 8	36 7	20.9	12 1	9 9		
Semi-Primitive Non-Motorized		83 7	79 2	73.2	65 0	65 7		
Semi-Primitive Motorized		241.3	230.7	213.3	152 1	152 1		
Roaded Natural		723 0	895.8	1084 7	1309 3	1324 5		
Recreation Const /Reconst.	Site	2 9	2 3	3 1	1 2	0 6		
	M$	80.2	102.8	102.9	17 5	10 2		
Trail Const /Reconst.	Miles	11.0	10.9	12 9	4.9	2.7		
	M$	89.1	87.6	105 3	41 2	23 5		
Wilderness								
Wilderness Use	MRVDs	340 0	340.0	340.0	340 0	340.0		
Wildlife/Fish								
Big Game User Days	MWFUDs	83.6	74 9	61.3	51 8	47 3		
Non-Game User Days		76 2	67.5	53 9	44 4	39 9		
Fishing User Days		52.5	67 3	81.8	103 7	114 7		
W/F Structural Habitat Improv	Struct	60 0	60.0	60 0	60.0	60 0		
	M$	65.9	65 9	65 9	65 9	65 9		
W/F Non-Struct Habitat Improv	Acres	444	444	444	444	444		
	M$	63.7	63.7	63 7	63 7	63 7		
Range								
Permitted Use	MAUMs	254 5	255.7	257.1	258 6	260 3		
Range Improvements	M$	78.8	55.0	57 5	35 9	36 0		
Timber								
Allowable Sale Quantity	MMCF	24 06	24.06	24.06	24 06	24 06	24 06	24 06
	MMBF	116.13	119.08	115 00	117 82	115 33	83 78	104 53
Salvage	MMCF	9 02	9.26	8.94	9.18	8 97	6 52	8 13
	MMBF	40 60	41 65	40 25	41 30	40 36	29 33	36 58
Roundwood	MMCF	0.77	0.79	0 77	0 79	0 77	0 56	0 70
	MMBF	3 48	3.57	3.45	3 53	3 46	2 51	3 14
Fuelwood (Green)	MMCF	5 66	8 02	5 31	7 97	5 14	6 78	2 44
	MMBF	25.47	36.09	23.90	35 87	23 13	30 51	10 98
Fuelwood (Dead)	MMCF	0 25	0.25	0 26	0 25	0 25	0 24	0 24
	MMBF	1.14	1 12	1.17	1.12	1 12	1 10	1 10
Total Timber Sale Program	MMCF	39.76	42.38	39.34	42 25	39 19	38 16	35 57
	MMBF	186 82	201.51	183 77	199 64	183 40	147 23	156 33
Resource Coordination	M$	793 4	793 4	793.4	793.4	793 4	793 4	793 4
Planting	Acres	70	5338	---	2283	---	961	74
	M$	24 5	1873 0	---	800 9	---	337 3	26 0
Natural Regeneration	Acres	9961	8083	9428	11371	11949	5916	7421
	M$	783 0	635 3	741 0	893 7	939 2	465 0	583 3
Thinning (TSI)	Acres	500	500	8363	2606	14968	5354	7389
	M$	52.5	52 5	878 2	273 6	1571 6	562 2	775 9
Sale Prep/Administration	M$	1228 9	1105.5	1230.3	1176 1	1230 3	1210 0	1233 1
Fuelwood Prep/Administration	M$	144.5	204.8	135 5	203.5	131 1	173 0	62 3
Fuels Improvement	Acres	5016	6710	4714	6827	5974	3439	3748
	M$	73 8	98.8	69.4	100 5	89 9	50 6	55 2
Water								
Induced Water (from Colorado River Drainages)	Ac.Ft.	387.7	11538.2	11150.5	12680.7	12680 7	9939 1	2786 3

TABLE B-6-1 (Cont.)

Output/Activity	Units of Measure	Decade 1	2	3	4	5	10	15
Transportation								
Road Construction	Miles	52 8	54.5	53 4	19 5	5 1		
	M$	1135.6	1210.7	1125 7	383 0	139.0		
Road Reconstruction	Miles	2.9	5 0	3.4	0 7	---		
	M$	13 0	22 3	15.4	3 0	---		
Preconst /Const Engineering	M$	537 8	562 8	545 9	197 1	50 5		
ROW Acquisition	M$	7 1	2.3	18 9	1 6	---		
BENEFITS (in Thous. of 1982 Dollars)								
Recreation								
Primitive		446.7	329.2	187.5	108.5	88.8		
Semi-Primitive Non-Motorized		965.1	913 2	844 0	749.5	757.5		
Semi-Primitive Motorized		2553.0	2440 8	2256.7	1609 2	1609.2		
Roaded Natural		5346 4	5727.2	5996 8	6281 9	6580 9		
Wilderness		3910.0	3910.0	3910 0	3910 0	3910 0		
Wildlife/Fish								
Big Game		2384 3	2136 1	1748.3	1477 3	1349 0		
Non-Game		1752 6	1552.5	1239 7	1021 2	917 7		
Fishing		531.3	681.1	827 8	1049.4	1160 8		
Range		1674.6	1682 5	1691.7	1701.6	1712 8		
Timber								
Sawtimber		7302.3	8933.4	7511 8	8591 4	8000 4		
Salvage		893.2	916 3	885.5	908.6	887 9		
Roundwood		104.4	107.1	105.5	105.9	103 8		
Fuelwood		153.7	215.0	144.8	213 7	140 1		
Water		4.6	138 5	133 8	152 2	152 2		
Minerals		30876 7	30876 7	30876 7	30876 7	30876 7		
COSTS (in Thous of 1982 Dollars)								
Recreation		1900 9	2002 1	2042 5	1647 4	1685 4		
Wilderness		500.7	496.4	524.0	357 1	359 8		
Wildlife/Fish		414.6	414.6	414.6	414 6	414 6		
Range		1022.6	983 0	987.1	978.3	951 1		
Timber		6645.4	9266 9	7876.1	8406.8	9242 0		
Soil/Water		870.6	640.3	594.5	571 6	571 6		
Minerals		575.7	507 8	513 8	512 9	513 1		
Roads/Facilities		1123.7	1123.7	1123.7	1123.7	1123 7		
Other		3658.0	3638.6	367 73	3632 2	3629 7		
Total Forest Budget		116712.2	19073 4	17753 0	17644 6	18491 0		
Purchaser Credit Roads		2810.3	2992.6	2811 4	971 7	315 9		
Returns to Treasury		9110 8	10830.1	9305.3	10480.0	9794 5		

TABLE B-6-2. BENCHMARK 2: MAX TIMBER - DEPARTURE

Output/Activity	Units of Measure	Decade 1	2	3	4	5	10	15
Recreation		----------Units Per Year----------						
Primitive	MRVD	50.4	37.8	21 6	12 4	9 9		
Semi-Primitive Non-Motorized		82 4	76 3	70 8	65 1	65.7		
Semi-Primitive Motorized		247 2	234 5	211 4	156 2	152 1		
Roaded Natural		714.4	899 6	1100 2	1304 8	1324 5		
Recreation Const /Reconst	Site	3.1	2 9	2.7	1.0	0 4		
	M$	98 3	121.4	77 9	11 9	3 9		
Trail Const./Reconst	Miles	10.9	12.7	13 0	4 3	1 4		
	M$	89 7	103.7	106 2	35 1	11 9		
Wilderness								
Wilderness Use	MRVDs	340.0	340.0	340 0	340 0	340 0		
Wildlife/Fish								
Big Game User Days	MWFUDs	83 6	75.7	61 2	50 9	47.3		
Non-Game User Days		76.2	68.3	53.8	43 5	39 9		
Fishing User Days		42.5	66 5	82 1	103 4	115 5		
W/F Structural Habitat Improv.	Struct.	60 0	60.0	60.0	60 0	60 0		
	M$	65.9	65.9	65 9	65 9	65 9		
W/F Non-Struct Habitat Improv	Acres	444	444	444	444	444		
	M$	63 7	63 7	63 7	63 7	63 7		
Range								
Permitted Use	MAUMs	254.5	255 6	257 4	258 9	260 6		
Range Improvements	M$	126 0	126 0	126.0	126 0	126 0		
Timber								
Allowable Sale Quantity	MMCF	24.61	26.28	28 91	26 49	23 84	19 56	30 74
	MMBF	119.20	129.69	139.07	130 43	113 86	73 36	130 19
Salvage	MMCF	9.26	10.11	10 81	10 11	8 87	5 70	10 11
	MMBF	41.65	45 50	48 65	45 50	39 90	25 66	45 50
Roundwood	MMCF	0 79	0 86	0.93	0 87	0 76	0 49	0 87
	MMBF	3.57	3 89	4.17	3.91	3 42	2 20	3 91
Fuelwood (Green)	MMCF	5.4	8 0	6 5	7 9	4 5	4 1	4 4
	MMBF	24 30	36.00	29 15	35.55	20 25	18 45	19 80
Fuelwood (Dead)	MMCF	0.25	0.25	0 26	0.25	0 25	0 24	0 24
	MMBF	1.14	1 112	1 17	1.12	1 12	1 10	1 10
Total Timber Sale Program	MMCF	40 31	45.50	47.41	45 62	38 22	30 09	46 36
	MMBF	189.86	216.20	222 31	216 51	178 55	120 77	200 50
Resource Coordination	M$	811 6	866 7	953.3	873 5	786 2	645 0	1013 9
Planting	Acres	5358	5601	6360	2370	920	1736	1987
	M$	1880.0	1965.3	2231.5	831.4	322.9	608 9	697 3
Natural Regeneration	Acres	10009	8551	4040	1948	5604	3077	6898
	M$	786 7	672.1	317.5	153 1	440 5	241 8	542 2
Thinning (TSI)	Acres	300	300	6790	5319	11972	1363	7017
	M$	31 5	31 5	712 9	558.5	1257 1	143 1	736 8
Sale Prep/Administration	M$	1258.5	1219.6	1353.8	1203 9	1165 1	948 2	1057 6
Fuelwood Prep/Administration	M$	138 9	203 1	167 2	202.4	116 1	105 4	112 4
Fuels Improvement	Acres	5005	6954	4820	4154	3987	2406	4443
	M$	73.7	102.4	71.0	61 1	58 7	35 4	65 4
Water								
Induced Water (from Colorado River Drainages)	Ac.Ft	---	11573.8	30075 5	32841 3	27504 0		

TABLE B-6-2 (Cont)

Output/Activity	Units of Measure	Decade 1	2	3	4	5	10	15
Transportation								
Road Construction	Miles	47.3	70.2	50.2	12.2	5 4		
	M$	969.6	1504 7	1113 3	256 3	150 2		
Road Reconstruction	Miles	2.8	5.1	3 4	0 5	0 1		
	M$	12 6	22 9	15.5	2 4	0 2		
Preconst /Const. Engineering	M$	482 6	719.4	1233 4	123 8	54 6		
ROW Acquisition	M$	6.7	4 1	18 7	0.3	---		
BENEFITS (in Thous. of 1982 Dollars)								
Recreation								
Primitive		452.1	339.1	193.8	111 2	88 8		
Semi-Primitive Non-Motorized		950.1	879.7	816.3	750.6	757 5		
Semi-Primitive Motorized		2615 4	2481.0	2236.6	1652 6	1609 2		
Roaded Natural		5346.4	5727.2	5996.8	6281 9	6580 9		
Wilderness		3910.0	3910.0	3910.0	3910 0	3910 0		
Wildlife/Fish								
Big Game		2384 3	2159 0	1745 4	1451.7	1349 0		
Non-Game		1752 6	1570.9	1237.4	1000 5	917 7		
Fishing		430.1	673.0	830.9	1046 4	1168 9		
Range		1674.6	1681.8	1693 7	1703 6	1714 7		
Timber								
Sawtimber		7788.5	9486.8	9683.4	9855 3	7061 6		
Salvage		916.3	1001.0	1070.3	1001 0	877 8		
Roundwood		107.1	116.7	125.1	117 3	102 6		
Fuelwood		146.9	214 5	175 8	211.9	123 5		
Water		12 0	138.8	361.0	394.1	330 0		
Minerals		30876.7	30876.7	30876.7	30876 7	30876 7		
COSTS (in Thous of 1982 Dollars)								
Recreation		1966 7	2090 9	1975 4	1632 1	1609 4		
Wilderness		500.8	494.4	524.1	357 1	359 7		
Wildlife/Fish		414.6	414.6	414 6	414 6	414 6		
Range		925.6	914 0	937 3	917 3	917 3		
Timber		9771.9	9934 8	11423.8	7870 5	8346 4		
Soil/Water		870.4	640.5	594.6	571 7	571 7		
Minerals		575.8	507 9	513 9	513 0	513 2		
Roads/Facilities		1123.7	1123.7	1123 7	1123 7	1123 7		
Other		3658.5	3639.2	3681.6	3632 1	3620 5		
Total Forest Budget		19808.9	19762 0	21189 0	17032 1	17360 2		
Purchaser Credit Roads		2441.0	3744.6	3936.5	637 4	341 6		
Returns to Treasury		9616.0	11477 3	11714 6	11846 3	8828 0		

TABLE B-6-3 BENCHMARK 3 MAX PRESENT NET VALUE (ASSIGNED VALUES)

Output/Activity	Units of Measure	Decade 1	2	3	4	5	10	15
Recreation		----------Units Per Year----------						
Primitive	MRVD	50 8	48.0	47.8	47 8	47 8		
Semi-Primitive Non-Motorized		83 4	79.7	80.6	80 6	80.6		
Semi-Primitive Motorized		249.0	256.7	269.9	269 9	269 9		
Roaded Natural		696.4	765 7	805 5	805 5	805 5		
Recreation Const /Reconst	Site	6 3	4 3	2 8				
	M$	285 5	144 0	46.2				
Trail Const /Reconst	Miles	15 6	16.1	14.1				
	M$	128.3	132 3	114 2				
Wilderness								
Wilderness Use	MRVDs	340.0	340.0	340.0	340.0	340 0		
Wildlife/Fish								
Big Game User Days	MWFUDs	89.2	85 6	82 7	82 7	82 7		
Non-Game User Days		80 8	78 2	75 3	75 3	75 3		
Fishing User Days		53 1	64.8	72 8	84.7	92 7		
W/F Structural Habitat Improv	Struct	69.0	69 0	69 0	69 0	69 0		
	M$	75.7	75 7	75 7	75 7	75 7		
W/F Non-Struct Habitat Improv	Acres	511	511	511	511	511		
	M$	73 2	73.2	73 2	73 2	73 2		
Range								
Permitted Use	MAUMs	254 6	255 7	257 0	258 3	259 5		
Range Improvements	M$	126 0	126.0	126 0	126 0	126 0		
Timber								
Allowable Sale Quantity	MMCF	10.7	10 7	12 0	12 0	12 0	12 0	19 2
	MMBF	52 1	52 4	59 2	57 0	57 6	46 2	93 8
Salvage	MMCF	4 1	4 1	4 6	4.4	4 5	3 6	7 3
	MMBF	18 2	18.3	20 7	20 0	20 1	16 2	32 8
Roundwood	MMCF	0.3	0 3	0 4	0 4	0 4	0 3	0 6
	MMBF	1 6	1 6	1 8	1 7	1 7	1 4	2 8
Fuelwood (Green)	MMCF	2 3	2 4	2 5	2 8	2 4	2 5	3 8
	MMBF	10 4	10 8	11 3	12 6	10 8	11 3	17 1
Fuelwood (Dead)	MMCF	0.3	0 2	0 2	0 2	0 2	0 2	0 2
	MMBF	1 2	1 1	1 1	1 1	1 1	1 1	1 1
Total Timber Sale Program	MMCF	17 7	17.7	19 7	19 8	19 5	18 6	31 1
	MMBF	83 5	84 2	94 1	92 4	91 3	76 2	147 6
Resource Coordination	M$	352 5	352 5	394 3	394 3	394 3	394 3	634 4
Planting	Acres	121	584	859	488	626	483	783
	M$	42 6	205.0	301.3	171 2	219 8	169 5	274 8
Natural Regeneration	Acres	3828	4040	3133	3998	4063	2666	3119
	M$	300 9	317 6	246 2	314 3	319 4	209 6	245 2
Thinning (TSI)	Acres	---	---	957	1804	1497	1745	2071
	M$	---	---	100 5	189 4	157 2	183 2	217 4
Sale Prep/Administration	M$	522 5	508 6	570 9	574 9	578 2	587 7	921 2
Fuelwood Prep/Administration	M$	59 8	62 5	64 9	71 3	62 0	63 0	97 5
Fuels Improvement	Acres	1,975	2,312	1 996	2 243	2 345	1 575	1 951
	M$	29 1	34.0	29 4	33 0	34 5	23 2	28 7
Water								
Induced Water (from Colorado River Drainages)	Ac.Ft	6,054	11,206	9,847	12,354	14 363	4,957	9 855

TABLE B-6-3 (Cont)

Output/Activity	Units of Measure	Decade 1	2	3	4	5	10	15
Transportation								
Road Construction	Miles	39 6	11.7	11 1				
	M$	750 6	241.5	285.6				
Preconst /Const. Engineering	M$	418 4	123.1	118.5				
Road Reconstruction	Miles	6 3	1 7	2 3				
	M$	28.3	7 5	10 3				
ROW Acquisition	M$	2.6	1 3					
BENEFITS (in Thous of 1982 Dollars)								
Recreation								
Primitive		455 7	430 6	428 8	428 8	428 8		
Semi-Primitive Non-Motorized		961.6	918.9	929.3	929 3	929 3		
Semi-Primitive Motorized		2634.4	2715.9	2855.5	2855 5	2855 5		
Roaded Natural		5346.4	5727.2	5996.8	6281 9	6580 9		
Wilderness		3910 0	3910.0	3910 0	3910 0	3910 0		
Wildlife/Fish								
Big Game		2544.0	2441.3	2358 6	2358.6	2358 6		
Non-Game		1858 4	1798.6	1731.9	1731 9	1731 9		
Fishing		537 4	655 8	736 7	857 2	938 1		
Range		1675 3	1682.5	1691 1	1699 6	1707 5		
Timber								
Sawtimber		3740.8	3777 0	4573 2	3886 8	3827 5		
Salvage		400 4	402.6	455.4	440 0	442 2		
Roundwood		48 0	48.0	54 0	51 0	51 0		
Fuelwood		67 6	67.6	70 2	78 0	67 6		
Water		72 6	134 5	118 2	148 2	172 3		
Minerals		30876.7	30876 7	30876.7	30876 7	30876 7		
COSTS (in Thous of 1982 Dollars)								
Recreation		2649 6	2327 9	2085 1	1810 5	1827 8		
Wilderness		485 1	482 7	526 0	370 7	364 0		
Wildlife/Fish		470 2	470 2	470 2	470 2	470 2		
Range		925 9	925 9	925 9	865 9	866 1		
Timber		2583.0	2865.7	3285 4	3338 8	3442 2		
Soil/Water		735 7	508.8	485 9	463 0	463 0		
Minerals		515 2	496 3	502 3	501 3	501 6		
Roads/Facilities		886.7	906 6	962 5	973 2	985 3		
Other		2775 1	2755 8	2798 2	2748 7	985 3		
Total Forest Budget		12026.5	11739.9	12041.5	11542 3	11666 2		
Purchaser Credit Roads		1995 4	620 0	690 6				
Returns to Treasury		4914 0	4953 8	5813 1	5117 5	5051 4		

TABLE B-6-4 BENCHMARK 4 MAX PRESENT NET VALUE (MARKET VALUES)

Output/Activity	Units of Measure	Decade 1	2	3	4	5	10	15
Recreation		----------Units Per Year----------						
Primitive	MRVD	40 7	23 6	21.2	21 2	21 2		
Semi-Primitive Non-Motorized		80.1	68.9	69 7	69.7	69 7		
Semi-Primitive Motorized		222 4	164.5	174.8	174 8	174 8		
Roaded Natural		822 8	1,190.9	1,257.6	1,257 6	1,257 6		
Recreation Const /Reconst.	Site	4 9	3.2	2 4				
	M$	207 6	77.0	35 7				
Trail Const./Reconst	Miles	15 5	14 6	12 8				
	M$	126 0	118.2	104 1				
Wilderness								
Wilderness Use	MRVDs	340 0	340 0	340 0	340 0	340 0		
Wildlife/Fish								
Big Game User Days	MWFUDs	83 7	68 7	55.5	55 5	55 5		
Non-Game User Days		76 3	61 3	48 1	48 1	48 1		
Fishing User Days		52.5	73.8	88 7	110.6	121 7		
W/F Structural Habitat Improv	Struct	67 0	67 0	67 0	67 0	67 0		
	M$	73 3	73 3	73 3	73 3	73 3		
W/F Non-Struct Habitat Improv	Acres	495	495	495	495	495		
	M$	70 9	70 9	70 9	70 9	70 9		
Range								
Permitted Use	MAUMs	254 6	256 1	257.8	259 5	261 2		
Range Improvements	M$	143 0	35 9	35 9	36 0	36 1		
Timber								
Allowable Sale Quantity	MMCF	19 7	19.7	19.7	19 7	19 7	19 7	30 6
	MMBF	96 2	96 3	97 3	94 6	94 2	79 0	147 0
Salvage	MMCF	7.5	7.5	7 6	7.4	7 3	6 1	11 4
	MMBF	33 7	33.7	34 1	33 1	33 0	27 7	51 5
Roundwood	MMCF	0 6	0 6	0 6	0 6	0 6	0 5	1 0
	MMBF	2 9	2.9	2 9	2 8	2 8	2 4	4 4
Fuelwood (Green)	MMCF	5 3	4 4	5 0	4 2	4 8	3 9	7 2
	MMBF	23 9	19 8	22 5	18 9	21 6	17 6	32 4
Fuelwood (Dead)	MMCF	0 3	0 3	0 2	0 2	0 2	0 2	0 2
	MMBF	1 3	0 3	0 2	0 2	0 2	0 2	0 2
Total Timber Sale Program	MMCF	33 4	32 5	33 1	32 1	32 6	30 4	50 4
	MMBF	158.0	153 9	157.9	150 5	152 7	127 8	236 4
Resource Coordination	M$	650 9	650 9	650 9	650 9	650 9	650 9	1009 5
Planting	Acres	1,262	3,676	1,221	6,698	2,986	4,205	2 033
	M$	443.0	1,290.0	428.0	2,350 0	1 048 0	1 475 0	713 0
Natural Regeneration	Acres	7,616	10259	7,555	8,990	7 282	7 737	7,018
	M$	598.6	806.3	593 8	706 6	572 4	608 1	551 6
Thinning (TSI)	Acres			1,606				
	M$			169 0				
Sale Prep/Administration	M$	985 2	958.0	982.7	955 1	985 7	961 1	1 512 4
Fuelwood Prep/Administration	M$	134 8	113 1	126 8	108 0	122 2	99 3	183 5
Fuels Improvement	Acres	3,871 2	5,313 2	3,838 5	4,829 7	3 790 4	4 078 9	3,610 5
	M$	57 0	78 2	56 5	71 1	55 8	60 0	53 1
Water								
Induced Water (from Colorado River Drainages)	Ac Ft	3,350 4	9,888.2	6,583 5	8,473 4	9,301 1		

TABLE B-6-4 (Cont)

Output/Activity	Units of Measure	Decade 1	2	3	4	5	10	15
Transportation								
Road Construction	Miles	110 5	36.3	20 6				
	M$	2,274 3	755.4	524 9				
Preconst /Const Engineering	M$	1132 4	368 4	213 9				
Road Reconstruction	Miles	7 9	1.6	2.3				
	M$	35 5	7 1	10 3				
ROW Acquisition	M$	23 1	3 0	3 7				
BENEFITS (in Thous. of 1982 Dollars)								
Recreation								
Primitive		365.1	211 7	190 2	190 2	190 2		
Semi-Primitive Non-Motorized		923 6	794 4	803 6	803 6	803 6		
Semi-Primitive Motorized		2353 0	1740 4	1849 4	1849 4	1849 4		
Roaded Natural		5346 4	5727.2	5996 8	6281.9	6580 9		
Wilderness		3910.0	3910 0	3910.0	3910 0	3910 0		
Wildlife/Fish								
Big Game		2387.1	1959.3	1582 9	1582 9	1582 9		
Non-Game		1754.9	1409.9	1106 3	1106 3	1106 3		
Fishing		531 3	746 9	897.6	1119 3	1231 6		
Range		1675 3	1685 1	1696.3	1707 5	1718 7		
Timber								
Sawtimber		7063 0	6671 7	7286 8	6515 1	6424 4		
Salvage		741 4	741.4	750 2	728 2	726 0		
Roundwood		87 0	87 0	87 0	84 0	84 0		
Fuelwood		145 6	122 2	135 2	114 4	130 0		
Water		40.2	118 7	79.0	101 6	111 6		
Minerals		30876.7	30876 7	30876 7	30876 7	30876 7		
COSTS (in Thous. of 1982 Dollars)								
Recreation		2271 2	1915.8	1832.1	1553 6	1616 3		
Wilderness		485 1	482 7	526.0	370 7	364 0		
Wildlife/Fish		475 9	475 9	475 9	475 9	475 9		
Range		928.2	928 2	928 2	928 2	5928 2		
Timber		7957 2	7703.1	8049 6	9249 0	6836 1		
Soil/Water		870 4	640 5	594 6	571 7	571 7		
Minerals		544 9	474 3	480 3	479 4	479 4		
Roads/Facilities		1123.7	1123 7	1123 7	1123 7	1123 7		
Other		3122 5	3103 2	3145 6	3096 1	3093 4		
Total Forest Budget		17779 1	16847.4	17156 0	17837 4	15478 0		
Purchaser Credit Roads		5736.3	1884 7	1248.5				
Returns to Treasury		8693 9	8280 2	8919 0	8103 3	8027 8		

TABLE B-6-5. BENCHMARK 6. MINIMUM LEVEL

Output/Activity	Units of Measure	Decade 1	2	3	4	5	10	15
Recreation		----------Units Per Year----------						
Primitive	MRVD	53 3	42.6	32.0	21 3	10 7		
Semi-Primitive Non-Motorized		86 5	69.2	51 9	34.6	17 3		
Semi-Primitive Motorized		233.5	161 1	88.7	67 7	46 7		
Roaded Natural		650.3	477.4	304.3	217.3	130 1		
Recreation Const./Reconst	Site							
	M$							
Trail Const /Reconst	Miles							
	M$							
Wilderness								
Wilderness Use	MRVDs	310 0	248 0	186 0	124 0	62.0		
Wildlife/Fish								
Big Game User Days	MWFUDs	94.2	75 4	56 5	37 7	18 8		
Non-Game User Days		87 6	70.1	52.6	35 0	17 5		
Fishing User Days		47 3	37.8	28 4	18.9	9.5		
W/F Structural Habitat Improv.	Struct							
	M$							
W/F Non-Struct. Habitat Improv.	Acres							
	M$							
Range								
Permitted Use	MAUMs							
Range Improvements	M$							
Timber								
Allowable Sale Quantity	MMCF							
	MMBF							
Salvage	MMCF							
	MMBF							
Roundwood	MMCF							
	MMBF							
Fuelwood (Green)	MMCF							
	MMBF							
Fuelwood (Dead)	MMCF							
	MMBF							
Total Timber Sale Program	MMCF							
	MMBF							
Resource Coordination	M$							
Planting	Acres							
	M$							
Natural Regeneration	Acres							
	M$							
Thinning (TSI)	Acres							
	M$							
Sale Prep/Administration	M$							
Fuelwood Prep/Administration	M$							
Fuels Improvement	Acres							
	M$							
Water								
Induced Water	Ac.Ft.							
(from Colorado River Drainages)								

TABLE B-6-5 (Cont.)

Output/Activity	Units of Measure	Decade 1	2	3	4	5	10	15
Transportation								
Road Construction	Miles							
	M$							
Preconst./Const. Engineering	M$							
Road Reconstruction	Miles							
	M$							
ROW Acquisition	M$							
BENEFITS (in Thous. of 1982 Dollars)								
Recreation								
Primitive		478.1	382 1	287 0	191 1	96 0		
Semi-Primitive Non-Motorized		997 3	797 9	598 4	398.9	199 5		
Semi-Primitive Motorized		2470 4	1704 4	938 4	716 3	494 1		
Roaded Natural		5313 0	3900.4	2486.1	1775 3	1062 9		
Wilderness		3565.0	2852.0	2139 0	1426 0	713 0		
Wildlife/Fish								
Big Game		2686.6	2150.4	1611 4	1075.2	536.2		
Non-Game		2014.8	1612.3	1209.8	805.0	402 5		
Fishing		478 7	382 5	287 4	191 3	96 1		
Range		0	0	0	0	0		
Timber								
Sawtimber		0	0	0	0	0		
Salvage		0	0	0	0	0		
Roundwood		0	0	0	0	0		
Fuelwood		0	0	0	0	0		
Water		0	0	0	0	0		
Minerals		30876 7	30876 7	30876 7	30876 7	30876 7		
COSTS (in Thous. of 1982 Dollars)								
Recreation		184.3	184.3	184.3	184 3	184 3		
Wilderness		30 4	30 4	30.4	30 4	30 4		
Wildlife/Fish		30.2	30 2	30 2	30 2	30 2		
Range		176 0	176.0	176 0	176 0	176 0		
Timber		7.3	7.3	7 3	7 3	7 3		
Soil/Water		9.1	9 1	9 1	9 1	9 1		
Minerals		89 4	89 4	89 4	89 4	89 4		
Roads/Facilities		346 4	346 4	346 4	346 4	346 4		
Other		1386 1	1386.1	1386 1	1386 1	1386 1		
Total Forest Budget		2259.2	2259.2	2259 2	2259 2	2259 2		
Purchaser Credit Roads								
Returns to Treasury		427 9	425.6	423.4	422 5	421 6		

TABLE B-6-6 BENCHMARK 8 SELECTION HARVEST

Output/Activity	Units of Measure	Decade 1	2	3	4	5	10	15
Recreation		----------Units Per Year----------						
Primitive	MRVD	51 1	48 6	48 5	48.5	48 5		
Semi-Primitive Non-Motorized		83.6	82 4	78.8	78 8	78 8		
Semi-Primitive Motorized		248.1	253.4	263.4	263 3	263 3		
Roaded Natural		682.5	732.2	768.9	768 9	768 9		
Recreation Const./Reconst	Site	63.0	43.0	28.0				
	M$	287.1	144.1	47.8				
Trail Const./Reconst.	Miles	15.7	16.3	14.3				
	M$	128.6	133.4	115 6				
Wilderness								
Wilderness Use	MRVDs	340 0	340 0	340.0	340.0	340 0		
Wildlife/Fish								
Big Game User Days	MWFUDs	89.2	87 4	86 0	86.0	86 0		
Non-Game User Days		71 8	80.0	78 6	78 6	78 6		
Fishing User Days		53.1	62 7	69 4	79 5	86 8		
W/F Structural Habitat Improv.	Struct	69.0	69 0	69.0	69 0	69.0		
	M$	75.7	75 7	75.7	75 7	75 7		
W/F Non-Struct Habitat Improv	Acres	511	511	511	511	511		
	M$	73.2	73 2	73.2	73 2	73 2		
Range								
Permitted Use	MAUMs	254 6	255.7	257 0	258 3	259.5		
Range Improvements	M$	126 0	126 0	126 0	126 0	126 0		
Timber								
Allowable Sale Quantity	MMCF	6 6	6.6	7 6	7 6	8 0	10 7	16 7
	MMBF	31 89	31.73	37 06	36 70	39.17	47 9	70 07
Salvage	MMCF	--	--	--	--	--	--	--
	MMBF	--	--	--	--	--	--	--
Roundwood	MMCF	--	--	--	--	--	--	--
	MMBF	--	--	--	--	--	--	--
Fuelwood (Green)	MMCF	--	--	--	--	--	--	--
	MMBF	--	--	--	--	--	--	--
Fuelwood (Dead)	MMCF	--	--	--	--	--	--	--
	MMBF	--	--	--	--	--	--	--
Total Timber Sale Program	MMCF	6 6	6.6	7.6	7 6	8 0	10 7	16 7
	MMBF	31 89	31.89	37 06	36 70	39 17	47 94	70 07
Resource Coordination	M$	216 9	216 9	249 5	249 9	264 4	353 1	551 1
Planting	Acres	--	--	---	--	--	--	--
	M$	--	--	--	--	--	--	--
Natural Regeneration	Acres	2,279	2,392	2,437	2,536	2 446	3,193	4 876
	M$	179.1	188 0	191 5	199 4	192 2	251 0	383 3
Thinning (TSI)	Acres			1,458	2,637	2,101	2 856	2,475
	M$			153 1	276 9	220 6	299 9	259 9
Sale Prep/Administration	M$	336 3	336.3	386 9	387 5	409.9	547 6	846 5
Fuelwood Prep/Administration	M$	--	--	--	--	--	--	--
Fuels Improvement	Acres	11	12	12	13	12	16	15
	M$	2	2	.2	2	2	2	4
Water								
Induced Water	Ac.Ft							
(from Colorado River Drainages)								

TABLE B-6-6 (Cont.)

Output/Activity	Units of Measure	Decade 1	2	3	4	5	10	15
Transportation								
Road Construction	Miles	25.6	8 2	6 9	--	--		
	M$	437.0	176 4	151 6	--	--		
Preconst /Const Engineering	M$	278.1	87 5	77 3	--	--		
Road Reconstruction	Miles	6 4	1 6	2 3	--	--		
	M$	28 8	7 1	10 3	--	--		
ROW Acquisition	M$	3.3		1 6	--	--		
BENEFITS (in Thous. of 1982 Dollars)								
Recreation								
Primitive		458 4	435.9	435.0	435 0	435 0		
Semi-Primitive Non-Motorized		963 9	950.1	908.6	908 6	908 6		
Semi-Primitive Motorized		2624 9	2681.0	2786.8	2785 7	2785 7		
Roaded Natural		5346.4	5727 2	5996.8	6281 9	6281 9		
Wilderness		3910 0	3910.0	3910 0	3910 0	3910 0		
Wildlife/Fish								
Big Game		2544 0	2492 6	2452 7	2452.7	2452 7		
Non-Game		1651.4	1840 0	1807 8	1807.8	1807 8		
Fishing		537.4	634 5	702 3	804 5	878 4		
Range		1675.3	1682 5	1691 1	1699 6	1707 5		
Timber								
Sawtimber		1978 8	1934 3	2572 0	2242 4	2827 7		
Salvage		0	0	0	0	0		
Roundwood		0	0	0	0	0		
Fuelwood		0	0	0	0	0		
Water		0	0	0	0	0		
Minerals		30876 7	30876 7	30876 7	30876 7	30876 7		
COSTS (in Thous of 1982 Dollars)								
Recreation		2629 3	2302 4	2068 3	1776 4	1776 4		
Wilderness		500 8	496.4	524 1	357 1	360 5		
Wildlife/Fish		470 2	470.2	470.2	470 2	470 2		
Range		892 0	892 0	892.0	892 0	892 0		
Timber		1541 1	1501.5	1886.9	2118 9	2072 6		
Soil/Water		649 6	406 2	383 3	371 8	371 8		
Minerals		625.8	563 9	569 9	568 9	569 2		
Roads/Facilities		795.3	795 3	795 3	795 3	795 3		
Other		3187 8	3188 5	3198 5	3171 4	3160 7		
Total Forest Budget		11291 9	10616.4	10788 5	10522 0	10468 7		
Purchaser Credit Roads		1239 6	474.3	398.7				
Returns to Treasury		2636.0	2592 9	3232 2	2904 0	3490 4		

D. DISCUSSION OF BENCHMARKS

Analysis of the various benchmark runs identifies capabilities for the Forest to resolve issues and concerns. The benchmarks provide an analysis of resource trade-offs and capabilities by considering management requirements and policy decisions. They confirm the range of resource outputs available for alternative formulation. The following write-ups discuss some of the results of the benchmarks and key trade-offs.

Comparison of Max Timber - NDEF and Max Timber - Departure

Under the Max Timber - Non-Declining Even-Flow (NDEF) benchmark, the Allowable Sale Quantity is at 24.06 MMCF/year and the volume in MMBF ranges between 115 and 119 for the first five decades. The volume drops off to 84 MMBF in the tenth decade because of the unavailability of larger diameter timber stands in the older age classes. This means that additional acres have to be harvested with lower board foot/cubic foot ratios in order to achieve the 24 MMCF harvest volume.

Under the Max Timber - Departure benchmark, the volume in MMBF ranges between 114 and 139 for the first five decades. The first decade volume increases from 116 MMBF (24.1 MMCF) in the Max Timber - NDEF benchmark to 119 MMBF (24.6 MMCF). The maximum board foot volume attained increases from 119 MMBF in Decade 2 with the NDEF constraint, to 139 MMBF in Decade 3 in the Max Timber - Departure benchmark. The volume in the tenth decade drops to 73 MMBF in the Max Timber - Departure benchmark compared to 84 MMBF if the NDEF constraint is included.

The total amount of new roads built over the first five decades is essentially the same between the two benchmards. However, the Max Timber - Departure benchmark builds 166 less miles per year in the first decade, and 127 less miles per year in the fourth decade, but 294 more miles per year in the second decade.

Due to the amount of road construction and harvesting activities, the differences between the benchmarks of their impacts on the other resources is relatively small.

Comparison of Max PNV - Assigned Values and Max PNV - Market Values Only

The Max PNV - Assigned benchmark has a first decade Allowable Sale Quantity of 52 MMBF compared with the first decade volume of 96 MMBF in the Max PNV - Market benchmark. The amount of new road construction is significantly different with 40 miles per year being built in the first decade of the Max PNV - Assigned benchmark compared to 111 miles per year in the Max PNV- Market benchmark.

In the Max PNV - Assigned benchmark, the Primitive and Semi-Primitive Non-Motorized recreation opportunities decrease slightly over time and the Semi-Primitive Motorized and Roaded Natural opportunities increase slightly over time. In the Max PNV - Market benchmark, the Primitive recreation opportunities are reduced by 50% over time, and the Semi-Primitive Non-Motorized and Motorized opportunities show some significant decreases. The Roaded Natural opportunities

increase substantially and exceed the projected Roaded Natural use in all the decades.

Both benchmarks show decreases in the amount of Big Game User Days and increases in the amount of Fishing User Days. The increase in Fishing User Days is tied to the increased access that the roading systems will provide. The decreases in the Big Game User Days are greater, however, in the Max PNV - Market benchmark and the increases in Fishing User Days are also greater than the Max PNV - Assigned benchmark.

Allocation Choice Selection for the two Max PNV Benchmarks

As was discussed earlier in Section 2, the Allocation Choices were developed by the ID Team and members of the public by assigning Management Prescription boundaries to different acres depending upon the emphasis of the alternative being "designed". This "design process" was not done for the benchmarks (except for Max Timber) on purpose so that benchmarks such as Maximize Present Net Value with Assigned and Market Values could evaluate all the "Alternative Designs" at once and provide the decisison-makers with the information as to which "mix" of "designs" would provide the highest present net value. The following table (Table B-6-7) shows which Allocation Choices were selected for the two Maximize Present Net Value Benchmarks.

TABLE B-6-7: ALLOCATION CHOICES ASSIGNED TO COORDINATED ALLOCATION ZONES FOR THE MAX PNV BENCHMARKS

Allocation Zone	Max PNV-Assigned	Max PNV-Market	Allocation Zone	Max PNV-Assigned	Max PNV-Market
45	CRN-N	CRN-N	74	RPA-E	RPA-N
61	HPD-E	HPD-N	75	RPA-N/E	RPA-N
62	RPA-N/E	RPA-N	31	RPA-E	RPA-N
71	RPA-N/E	RPA-N	32	HPD-N	HPD-N
43	RWL-E	HPD-N	35	CRN-N	HPD-N
44	PRF-E	RPA-N	33	HPD-E	RPA-N
46	HPD-E	HPD-E	34	RPA-N/E	RPA-N
22	CRN-N	HPD-N	21	PRF-E	HPD-E
41	HPD-E	HPD-N	23	HPD-E	HPD-N
42	HPD-E	HPD-N	24	HPD-E	HPD-N
47	RPA-E	RPA-N	25	HPD-E	HPD-N
48	ISC-E	HPD-N	26	CRN-E	HPD-N
49	ISC-E	RPA-N	11	ISC-E	RPA-N
72	RPA-N	RPA-N	12	HPD-N/E	HPD-N
73	RPA-E	RPA-N	13	HPD-E	HPD-N

Abbreviations:

HPD = High Productivity
RPA = Resources Planning Act
CRN = Current Direction
ISC = Issue Consideration
RWL = Recreation/Wildlife
PRF = Preferred

N = Build New Roads
E = Only Use Existing Roads
N/E = New Roads were only built on a portion of the Allocation Zone.

Discussion of the Minimum Level Benchmark

Under the Minimum Level benchmark, it was assumed that due to the lack of maintenance of trails and camp sites, the access into the backcounty would be increasingly difficult until only the most adventuresome would go into the backcountry. Therefore, it was estimated that the dispersed recreation use would decrease by 20% each decade until it leveled off at 20% of existing use.

For developed recreation use, it was assumed that after 20 years most of the existing developed sites would have deteriorated to the point that they would have to be closed down for safety reasons. After that, only about 20% of the existing developed use would continue.

For the hunters and fishermen, it was also assumed that due to the lack of maintenance of roads, trails and camp sites, the access into the backcounty would be increasingly difficult. Therefore, like the dispersed recreation use, it was estimated that the use would decrease by about 20% each decade until it leveled off at 20% of existing use.

There would be no planned timber sales and since there would not be the personnel to manage the range resource on the Forest, livestock grazing on the Forest would not be allowed.

Since the Bureau of Land Management is the government agency responsible for managing the subsurface mineral rights on National Forest System lands, the Forest Service under a Minimum Level benchmark would not have the personnel to evaluate and recommend changes in leasing proposals.

Discussion of the Uneven-Aged Management Benchmark

Under the Uneven-Aged benchmark, the first and second decade volumes would be around 32 MMBF, increasing to around 37 MMBF in the next two decades and then 39 MMBF in the fifth decade. In the first decade, around 26 miles per year of new road construction would be needed.

The impacts on the other resources would be relativley small with slight decreases occurring in the Primitive and Semi-Primitive Non-Motorized recreation opportunities and slight increases in the Semi-Primitive Motorized and Roaded Natural opportunities.

The Big Game User Days would decrease sightly over time because of the increased access, but the Fishing User Days would increase.

This benchmark was not considered further as an alternative because in the other alternatives, uneven-aged silvicultural systems are used and contribute significantly toward the Allowable Sale Quantity volumes. Furthermore, under this benchmark, the amount of acres with selection harvests range from around 12,600 to 13,600 acres per year. It is not felt that this is practical from either a management standpoint or from the local timber purchasers standpoint.

SECTION 7: DEVELOPMENT OF THE ALTERNATIVES

A. INTRODUCTION

The Forest's Interdisciplinary (ID) Team developed an array of Forest Plan alternatives to respond to the problem statements and forest challenge statements developed from public issues, management concerns, and opportunities. Different alternatives have different purposes; for example, one alternative may manage for more timber production, while other alternatives may manage for more recreation, or other combinations of uses.

This section describes the alternative development process. It also discusses the alternatives eliminated from further study and those considered in detail in the FEIS.

B. LEGAL REQUIREMENTS TO DEVELOP ALTERNATIVES

In Forest planning, an alternative is a combination of resource objectives, outputs, and limitations that achieves a certain management philosophy or goal. Many combinations are possible in formulating a reasonable range of alternatives for evaluation as potential Forest Plans. The alternatives described in this section were formulated in response to comments from the public, management concerns, and legislative acts noted below.

Regulations stated in the National Environmental Policy Act (NEPA) and the National Forest Management Act (NFMA) provide direction for formulating alternatives. NEPA (40 CFR 1502.14) requires that the alternatives section of any Environmental Impact Statement should:

- Rigorously explore and objectively evaluate all reasonable alternatives, and for the alternatives that were eliminated, briefly discuss the reasons why they were eliminated;
- Devote substantial treatment to each alternative considered in detail including the Preferred Alternative, so that reviewers may evaluate their comparative merits;
- Include a "No Action" Alternative;
- Identify the Preferred Alternative or Alternatives; and
- Include appropriate mitigation measures not already included in the proposed action or other alternatives.

The Forest Service NEPA Procedures Handbook (FSH 1909.15, section 12.5) requires that a reasonable range of alternatives be fully and impartially developed ensuring that the range of alternatives does not prematurely close options that might protect, restore, or enhance the physical, social, economic, and biological environment.

NFMA regulations (36 CFR 219.12(f)) require the following considerations for formulation of alternatives:

- The primary goal in formulating alternatives is to provide an adequate base for identifying the alternative that maximizes net public benefits, consistent with resource integration and management requirements stated in 36 CFR 219.13 through 219.27.

- Alternatives shall reflect a range of resource outputs and levels of expenditures.

- Alternatives shall provide different ways to address and respond to the major public issues, management concerns, and resource opportunities identified during this planning process.

- At least one alternative shall respond to and incorporate the 1980 RPA program displayed in the Intermountain Region Guide.

- At least one alternative shall reflect the present volume of goods and level of service and the most likely amount of goods and services expected to be provided in the future if present direction continues.

- Each alternative shall represent the most cost-efficient combination of management prescriptions examined that can meet the objectives established in the alternatives.

- Formulation of alternatives begins with estimating demand and determining the potential to resolve public issues and management concerns (36 CFR 219.12 (e) (3) and (4)).

The NFMA regulations (36 CFR 219.12 (f) (9)) require that each alternative state:

- The condition and use that would result from long-term application of the alternative;

- The goods and services to be produced, and the timing and flow of these resource outputs together with associated costs and benefits;

- Standards and Guidelines for resource management; and

- The purpose of the proposed management direction.

Guidelines for Implementation from the office of the Chief of the Forest Service in Washington, DC, dated October 14, 1981, require that an array of alternatives of the following types be considered:

- One that responds to and incorporates the 1980 RPA program goals and objectives displayed in the Regional Plan. This alternative shows how best to meet the Forest's share of the 1980 RPA program;

- One that presents the current program (no-action alternative), which is the level of goods and services expected to be provided if current management direction continues and if current budget is updated for changing costs over time;

- One that considers market opportunity outputs and emphasizes outputs that have the potential to produce income to the Government;

- One that considers nonmarket opportunity outputs and emphasizes the nonmarket outputs and amenity values; and

- Other alternatives that respond to public issues, management concerns, and resource opportunities and reflect a broad range of resource outputs and levels of expenditure.

C. GENERATING AN ARRAY OF ALTERNATIVES

Goal

The goal of Forest planning is to maximize net public benefits (NPB). The term net public benefits refers to the long-term value of all the Forest's positive effects (benefits) minus all the costs and negative effects. NPB are measured in terms of both quantities and qualities. Maximizing the NBP that can be derived from the Forest is a goal consistent with the principles of multiple use and sustained yield.

Process

The Analysis of the Management Situation (AMS) provided information about the Forest's land capability, its ability to supply benefits, and the projected demand for those benefits (as well as the relationship of all of these to the issues and concerns). As part of Planning Process Step 5 (see Section I, The Planning Process in this Appendix) the Forest planning team took this information and developed a wide range of reasonable alternatives, using the eight steps outlined below. For a detailed analysis of each step, refer to the document shown in parenthesis after each step.

1. Identify issues, concerns, and opportunities (ICOs), with help from the public and Forest staff (FEIS, Appendix A).

2. Determine how to address the ICOs (FEIS, Appendix A).

3. Gather data necessary for the analysis (FEIS, Appendix B).

4. Develop Forestwide Standards and Guidelines and Management Area Direction with specific Standards and Guidelines (Forest Plan, Chapter IV).

5. Develop yield and economic tables for benchmark analysis (FEIS, Appendix B).

6. Create goals and resource objectives that address the ICOs and legal constraints (FEIS, Chapter I).

7. Determine outputs, activities, and costs necessary to implement each alternative (FEIS, Chapter II).

8. Evaluate results and determine if adequate range has been developed (FEIS, Chapter II).

Analytical Models

After collecting sufficient data, the planning team simulated Forest situations, relationships, and causes and effects by using various analytical models. A model is a simplified representation of some situation in the real world, for example, the effect of the economy on the number of jobs. A model may be a computer program or a simple mathematical formula. It can help predict the results of management actions ("What would happen if...?") and show the future conditions of a resource. Using analytical models, the planning team examined the possible "future" created by each alternative.

A computer model called FORPLAN, Version II, was the major tool used. FORPLAN simulates an alternative by assigning the most efficient management practices to land areas and resources in order to achieve the goals of the alternative. Resources covered in the FORPLAN model include certain components of timber, range, wildlife, recreation, and roads. Other sections of this Appendix provide a more comprehensive discussion of the FORPLAN model.

Other items are covered by other analytical models, such as effects on the local communities (Input/Output), and impacts of roads and timber harvesting on elk (ELk Habitat Effectiveness Model).

Other items were covered by other methods, such as professional judgment of resource specialists and application of laws and regulations. More information is available in this Appendix and in the Planning Record, in the Supervisor's Office in Jackson, Wyoming.

The ID Team incorporated cost-efficiency into the planning process in several different areas. Cost-efficient prescriptions were developed. The ID Team developed different alternatives and identified the necessary limitations to address specific objectives, issues, and concerns. Timber intensities were examined to assure that the most cost-efficient intensities were incorporated into prescriptions. Management practice assignments, combined with the necessary limitations, were analyzed by FORPLAN to identify an optional solution which maximizes present net value (PNV) and achieves specific resource objectives in the most economically efficient manner. With varying objectives, each alternative produces a different combination of priced and nonpriced outputs. The feasibility of each alternative was analyzed using the FORPLAN model where all resource objectives (constraints) must be satisfied before an optional solution is identified.

During the analysis of the management situation (AMS), resource supply potentials were determined by establishing minimum and maximum production levels called benchmarks. The benchmark analysis used the FORPLAN model where production capabilities were determined for single resources, as well as for a set of multiple resource outputs that maximize PNV. This analysis established the benchmark levels required by national planning direction. Those benchmarks served as a reference from which the costs and effects of various objectives and constraints used in developing alternatives were evaluated.

Selected benchmarks were used to define upper and lower limits for the production of each resource. The ID Team considered supply potential and minimum levels of output (upper and lower limits), and evaluated public input to establish the range of resource output levels within which alternative resource objectives were assigned.

The FORPLAN model was used to estimate the outputs and costs for each alternative by reflecting the emphasis of the alternative through a given "design" of Management Prescriptions. Some additional constraints were needed to develop the alternatives. The additional constraints applied to each alternative are discussed in detail in this section. Results of the FORPLAN analysis for each alternative were evaluated to ensure conformance with laws, policies, and guidelines.

Following public comment on the development of the Issues, Concerns, and Opportunities (later called Problem Statements and Forest Challenge Statements), the Analysis of the Management Situation (AMS) benchmarks showed that the Forest had the capability to respond to each issue. Some Forest Challenges were addressed by a measurable output, such as volume of timber, wildlife populations, or forage production. Others were described by a state or condition of parts of the Forest, such as undisturbed areas, or providing habitat diversity for wildlife. Standards and guidelines address Forest Challenges by providing for management activities, such as off-road vehicle controls or pesticide use for insect control. The issues often had conflicting or complementary relationships with each other. For example, increased timber harvest may decrease water quality, yet, increase wildlife habitat.

The outputs displayed in the Forest planning process were selected by the ID Team, with guidance from the Regional Office and in conformance with the RPA program. Except for RPA outputs, the major reason for displaying outputs was to assist in the resolution of issues and concerns.

Each alternative has the capability to respond to each Problem Statement, Forest Challenge and Objective. Each alternative responds to each objective to varying degrees. One alternative may fully meet one objective, completely miss another objective, and prtially meet other objectives.

Appendix A of the FEIS describes the process used to develop the Problem Statements, Forest Challenge Statements and Objectives. The evaluation of some of the issues raised by the public showed that they could not be answered within the scope of the Forest Plan and were referred to the appropriate individual or agency for action.

Common Constraints

Common constraints are constraints which apply in all alternatives. Refer to Section 2 of this Appendix for common constraints that provide for management requirements (MRs) as defined in the 36 CFR 219.27.

D. ALTERNATIVES CONSIDERED BUT ELIMINATED

During the formulation of the Array of Alternatives, the Interdisciplinary Team created several alternatives in addition to those described in FEIS Chapter II, "Alternatives Considered in Detail". A discussion of the eliminated alternatives follows.

Water Augmentation Emphasis for Colorado River System

In response to concern on future water demands, alternatives that emphasized augmenting water quantity were considered. In particular, since commitments in the Colorado River System appear in excess of supply, an alternative was considered that maximized water in the Green River Watershed, a tributary of the Colorado River. This alternative, however, was not considered further because of the following reasons:

- The elk and other big game species would be reduced below the viable population level. The same is true for old-growth dependent species.
- It would have a severe impact on the hunting guide businesses.
- Native trout populations would be reduced to the point that a greatly expanded fish planting program would be required.
- Roaded recreation opportunitites would be increased, but there would be losses in primitive recreation and adverse impacts on the visual resource.
- There would be some deterioration of stream bank conditions due to higher flows and the sediment load would be increased in the Upper Green River.

Special Area Classification

Periodically, the idea of a special designation for the area surrounding Jackson Hole, often referred to as part of the "Yellowstone Ecosystem", surfaces. This idea normally takes the form of a National Recreation Area or other specific land designation such as "resource Conservation Area" or "Wildlife Management Area". The objectives are to require management practices to maintain or improve wildlife habitat and recreation uses, while limiting commodity uses.

Two very sensitive areas are generally included in this topic. They are an area referred to as the Mt. Leidy Highlands (Upper Gros Ventre and Spread Creek), and the Upper Green River.

No specific land use classifications are included as an alternative for analysis. However, the application of Management Prescriptions is used in various alternatives to meet the concern for special emphasis areas. Management Prescriptions 2A, 2B, 3, 7A, 7B, 10, and 12 were specifically designed to meet many of the concerns for these areas. Therefore, the ID Team determined that a separate alternative to specifically consider some form of "Special" classification was not necessary to adequately address the issues and concerns.

Pure Uneven-Aged Management Alternative

This alternative is now being treated as a benchmark. See the discussion for Benchmark 8 on why it is not considered further as an alternative.

No Oil and Gas Leasing Alternative

Oil and gas leasing of the Forest is a major issue. Some publics may feel that the Forest is so important for other resources, such as recreation and wildlife, no leasing should occur forest-wide. As a response, it could be proposed that an alternative with no leasing ought to be developed and displayed along with other alternatives.

In considering this subject, the planning team felt that detailed analysis of such as alternative was not necessary because:

- There is currently an oil and gas field development in process (Riley Ridge) with a high potential for expansion of development in adjacent areas. It would not be reasonable to consider no leasing in these areas where field development or current leases are already active.

- A good share of the Forest includes areas defined as part of the "Overthrust Belt", which is a geologic structure with high potential for oil and gas. The currently feasible method to identify this potential is exploration drilling associated with leasing. Considering the national need to better quantify oil and gas, mass exclusion from leasing does not seem reasonable.

- There are methods other than massive withdrawal from leasing to address concern for resources that may be damaged by activities that result from leasing. These are incorporated into the Management Prescriptions and alternatives considered in detail. They include: (a) specific lease stipulations, such as no surface occupancy, to assure protection of sensitive areas where geologic potential is favorable, but other environmental factors limit the feasibility of exploration or development activities; (b) limited no leasing where conditions indicate exploration and development are not feasible considering the "Desired Future Conditions" of the Management Prescriptions or the emphasis of the alternative.

Departure of the Preferred Alternative

This alternative was not considered further because for many areas on the forest, the amount of harvesting that has occurred in the past has essentially meant that these areas are already in a departure condition. For example, in Management Areas 61 (Blackrock), 62 (Spread Creek) and 71 (Union Pass) the amount of cutover areas in those Management Prescriptions that allow scheduled timber harvest activities meets or exceeds 20% of the total tentatively suitable base. The 20% figure is significant because acres are in a cutover condition for at least 2 decades and if a forest were totally regulated with a 100-year rotation, only 10% per decade would be harvested.

Given that many areas have already "departed", the impacts on the other resources from a continuation of this practice would not be compatible with the emphasis of the Preferred Alternative.

An examination of 36 CFR 219.16 also helps to explain why a departure from nondeclining flow was not considered further. 36 CFR 219.16(a)(3) states the conditions when a departure should be evaluated. They are:

1) "None of the other alternatives considered provides a sale schedule that achieves the assigned goals of the RPA Program". Both Alterantives A and B meet this condition.

2) "High mortality losses from any cause can be significantly reduced or prevented or forest age-class distribution can be improved, thereby facilitating future sustained-yield management". While it is true that a departure would help reduce mortality losses, it is questionable as to how much it would help when the total acreage suitable for harvesting activities in the Preferred Alternative is less than 10% of the total acres on the Forest.

3) "Implementation of the corresponding base sale schedule would cause a substantial adverse impact upon a community in the economic area in which the forest is located". This would have been true before the closure of the Louisiana-Pacific mill in Dubois. With the current situation, however, the Preferred Alternative will meet the local communities needs.

4) "It is reasonable to expect that overall multiple-use objectives would otherwise be better attained". As was explained previously, in many portions of the forest, a "departure" has already occurred. What is needed is a "resting" period of about 2 decades before these areas will provide the wildlife cover necessary to allow an increase in harvesting activities.

Reduced Livestock Grazing

One of the reasons to consider a reduced livestock grazing alternative is that the range inventory shows a significant amount of the suitable livestock grazing lands in either a "poor" forage condition or having a downward ecological trend. Currently all of these acres are under an active management program associated with existing allotment management plans to improve conditions. Experience has indicated that managed use is generally the best way to improve condition, rather than complete absence of use. Managed use will prepare seed bed and scatter seed, thus speeding up the trend toward improvement.

Another reason to consider reduction in livestock use is conflict with other uses such as recreation, wildlife, and watershed. Historically, these conflicts have been dealt with to the degree that domestic grazing conflicts, while recognized as an issue in this planning process, were not considered by the publics as a major item. Grazing of critical big game winter areas was closed or reduced between 1916 and 1924 (East Refuge, Gros Ventre. Roaring Fork, etc.). Other less critical areas have also been closed as a result of phasing out livestock operations (Horse Creek, Blair Creek, Darby Mountain). Most elk are artifically

fed during winter months, and other big game species generally winter off the Forest. No summer range forage problems have been identified. It is, however, recognized that some localized areas of resource conflicts do still exist. These problems can best be dealt with through the Allotment Management Planning process, tiering to resource objectives established by the Forest Plan.

It can also be argued that without a wide range in grazing use among alternatives, a proper range of alternatives does not exist. However, given that no major issues have arisen on the range management practices of the Bridger-Teton National Forest, there was no real reason to develop a wide range of alternatives.

E. ALTERNATIVES ELIMINATED AFTER THE DEIS

Five alternatives displayed in the DEIS were eliminated from further study in the FEIS. They include:

- Alternative 1 (High Productivity) and Alternative 2 (Market Opportunities) were eliminated from further study and reanalyzed as one alternative (Alternative A - High Productivity) since these two alternatives addressed the same set of issues.

- Alternative 5 (Current Budget) was eliminated because it lacked public interest and was virtually the same as Alternative 4 (Current Program). Alternative 4 is now called Alternative C - Current Direction).

- Alternative 6 (Geographic Mix) was eliminated because the majority of the publics objected to the notion that the Teton division of the Forest should be managed primarily for recreation/wildlife resources and the Bridger division should be managed primarily for commodity resources. The public response was that the Bridger division can't maintain the timber industry by itself and the recreation/wildlife resources were just as important on the Bridger division as they were on the Teton division.

- Alternative 7 (Wildlife Habitat Diversity) was eliminated because after further evaluation, it was determined that the emphasis of extensively managing the vegetation on the forest, with the associated increase in road construction, effectively cancelled out the potential beneficial wildlife impacts of creating that amount of vegetative diversity.

- Alternative 8 (Low Market Opportunities) and Alternative 9 (Non-Market Opportunities) were eliminated from further study and reanalyzed as one alternative (Alternative D - Recreation/Wildlife Emphasis) since these two alternatives addressed the same issues.

The goals of these alternatives are addressed in the other alternatives that are considered in further detail. Rather than being repetitive, the ID Team chose to concentrate on the alternatives that truly address the public issues. By limiting the number of alternatives while still maintaining the array of alternatives, the team was able to perform a better analysis and more completely understand the resource tradeoffs.

F. ALTERNATIVES CONSIDERED IN DETAIL BETWEEN THE DRAFT AND FINAL EIS

One additional alternative was considered in the FEIS which was not included in the DEIS. This alternative is Alternative F.

- Alternative F is a modification of Alternative D, the preferred alternative in the DEIS. Alternative F addresses public and other agencies comments on the DEIS along with the consensus developed during public meetings that were held between the DEIS and FEIS.

G. ALTERNATIVES CONSIDERED IN DETAIL

All the alternatives were developed through a series of FORPLAN runs. The following describes each run made to develop a alternative, why a new run was needed and the trade-offs between each run. (Note: The PNVs displayed in this section are the PNVs calculated in the FORPLAN model. As the reviewer will find described in Section 4, the FORPLAN model only contains portions of the total benefits and costs found in a particular alternative.)

All alternatives were run on a Maximize Present Net Value for 15 decades objective function.

Alternative A - High Productivity

Goal -

Alternative A emphasizes Forest outputs that produce returns to the U.S. Treasury, such as timber, range, and developed recreation.

Run #1 -

For the first run, only the constraints described in Section 2 were in the model and the only Allocation Choices allowed were those that reflected the mix of Management Prescriptions that were developed in the "Design" for this alternative.

This run had a first decade harvest volume of 68.2 MMBF/year and a PNV of $446,931,000. However, four Management Areas had two different road packages assigned to them. These "splits" in Allocation Choices cause problems in attempting to "lay the solutions out on the ground". Therefore, these splits had to be corrected so that only one road package was assigned to each Management Area.

Run #2 -

This run had the road package splits corrected with the result of slight increase in the first decade harvest volume to 69.9 MMBF/year and a PNV decrease of $78,000 to $446,853,000.

Alternative B - Resources Planning Act Targets

Goals -

The primary emphasis of this alternative is to meet the 1980 RPA targets for timber, range and developed recreation.

Run #1 -

For the first run, only the constraints described in Section 2 were in the model and the only Allocation Choices allowed were those that reflected the mix of Management Prescriptions that were developed in the "Design" for this alternative.

This run had a first decade harvest volume of 46.7 MMBF/year and a PNV of $441,330,000. However, three Management Areas had two different road packages assigned to them. These "splits" in Allocation Choices cause problems in attempting to "lay the solutions out on the ground". Therefore, these splits had to be corrected so that only one road package was assigned to each Management Area.

Run #2 -

This run had the road package splits corrected with the result of slight increase in the first decade harvest volume to 47.9 MMBF/year and a PNV decrease of $130,000 to $441,200,000.

Alternative C - Current Direction

Goal -

Alternative C will maintain the level of goods and services that were actually provided during the past ten years (1978-1987).

Run #1 -

For the first run, only the constraints described in Section 2 were in the model and the only Allocation Choices allowed were those that reflected the mix of Management Prescriptions that were developed in the "Design" for this alternative.

This run had a first decade harvest volume of 31.2 MMBF/year and a PNV of $435,804,000. The timber volume from this first run, however, was higher than either the volume identified in the old Timber Management Plan or the volume actually sold over the past 10 years.

Run #2 -

For the second run, the harvest volume for the first 5 decades was constrained to not exceed the Timber Management Plan level of 25.0 MMBF/year.

The results of this run were that the first decade had a harvest volume of 24.2 MMBF/year and the PNV decreased $10,699,000 to $425,105,000.

Run #3 -

For the third run, the harvest volume for the first 5 decades was constrained to not exceed the average volume that has actually been sold over the past 10 years of 17.0 MMBF/year. This was the volume level used to define the Current Direction Alternative.

The results of this run were that the first decade had a harvest volume of 16.7 MMBF/year and the PNV decreased another $5,558,000 to $419,547,000.

The distribution of the harvest volume between Community Interest Areas was as follows (in MBF/year):

CIA 1 - 285.8	CIA 2 - 1574.2	CIA 3 - 1915.1	CIA 4 - 5787.3
CIA 5 - 2865.8	CIA 6 - 764.3	CIA 7 - 3532.2	CIA 8 16.6

These distributions did not match the Forests historical distribution, so it was felt that it would be desirable to put in a few constraints to get this distribution closer to what has happened in the past.

Run #4 -

For the fourth run, the constraints were the same as in Run #3. Additional constraints were added to force the distribution between CIAs to more closely resemble the historical distribution. These constraints were only applied in the first decade, and CIA 1 was constrained to not be less than 2000 MBF/year, CIA 4 was constrained to not exceed 2000 MBF/year and CIA 8 was constrained to not be less than 1000 MBF/year.

The results of this run were that the first decade had a harvest volume of 16.7 MMBF/year and the PNV decreased another $656,000 to $418,891,000.

The distribution of the harvest volume between Community Interest Areas was as follows (in MBF/year):

CIA 1 - 2000.0	CIA 2 - 1847.3	CIA 3 - 2089.3	CIA 4 - 2000.0
CIA 5 - 3559.1	CIA 6 - 680.2	CIA 7 - 3532.2	CIA 8 1000.0

This distribution was acceptable, but 2 of the Management Areas had more than one roading package assigned to them, so these "splits" had to be corrected.

Run #5 -

This run had the same set of constraints as Run #4, and the only difference was that the road package "splits" were corrected.

The results of this run were that the first decade harvest volume increased slightly to 16.8 MMBF/year and the PNV decreased $300,000 to $418,591,000.

The distribution of the harvest volume between Community Interest Areas was as follows (in MBF/year):

CIA 1 - 2000.0	CIA 2 - 1819.5	CIA 3 - 2089.3	CIA 4 - 1456.4
CIA 5 - 3909.3	CIA 6 - 706.6	CIA 7 - 3784.8	CIA 8 1000.0

Alternative E - Issue Consideration

Goal -

Alternative E emphasizes a mix of market and nonmarket outputs affecting the Forest's Zone of Influence (the area most affected by Forest management activities). A balanced mix of outputs is emphasized so that timber, range, and recreation/wildlife employment would show small to modest changes.

Run #1 -

For the first run, only the constraints described in Section 2 were in the model and the only Allocation Choices allowed were those that reflected the mix of Management Prescriptions that were developed in the "Design" for this alternative.

This run turned out to be infeasible because of the "cutover" constraints in the MP-7A/10 areas in CIA 1, the MP-10 areas in CIA 2, the MP-10 areas in CIA 5, and the MP-1B areas in CIA 8.

Run #2 -

For the second run, the infeasibilities were corrected by the first looking at the total tentatively suitable acres within each Management Prescription in each Allocation Zone (Management Area) for which an infeasibility occurred and determining the percent that was already in a cutover status. This resulted in the following information (TS = Tentatively Suited Acres, CUT = Acres Currently in Cutover Status):

	MP-1B			MP-7A			MP-10		
CIA-1	TS	CUT	%	TS	CUT	%	TS	CUT	%
MA-45				10228	494	4.8	11521	477	4.1
MA-61				5575	919	16.5	5378	1007	18.7
MA-62				16850	3066	18.2	16956	4336	25.6
MA-71				-	-	-	33898	7363	21.7
CIA-2									
MA-43							2960	242	8.2
MA-44							-	-	-
MA-46							6614	367	5.5
CIA-5									
MA-31							-	-	-
MA-32							18910	2030	10.7
MA-35							-	-	-
CIA-8									
MA-11	-	-	-						
MA-12	1135	78	6.8						
MA-13	4099	1155	28.2						

In the model, there are "General Relational Constraints" which are in the model by CIA and Management Prescription. These constraints are that no more than 20% of the suitable acres in MP-1A/1B can be in a cutover status and no more than 15% of the suitable acres in MP-7A/10. For those areas where infeasibilities occurred, these constraints were relaxed and "Absolute

Constraints" were inserted. The "Absolute Constraints" were entered in as a maximum amount of acres in a cutover status that could be increased over the existing acres over the next two decades. These "Absolute Constraints" were calculated as follows:

In CIA 1, since Management Areas 61, 62, and 71 exceed the allowable 15% in cutover, no additional acres could be allowed. However, in MA-45, there is still some room to move. Therefore, by taking 15% of the 10,228 acres in MP-7A that could be harvested, a maximum cutover acreage becomes 1,534 acres, of which 494 acres already exist, so an additional 1,040 acres would be allowed in MP-7A. In MP-10, the additional acres allowed was calculated by taking 15% of the 11,521 acres that could be harvested which equals 1,728 acres, minus the 477 acres that are already in cutover status, equals 1,252 additional acres that could go into cutover status.

In CIA 2, the total tentatively suitable acres in MP-10 is 9,574, of which 15% equals 1,436, minus the 609 acres already in cutover status, equals 827 additional acres that could go into cutover status.

In CIA 5, the total tentatively suitable acres in MP-10 is 18,910, of which 15% equals 2,837, minus the 2,030 acres already in cutover status, equals 807 additional acres that could go into cutover status.

In CIA 8, since MA-13 already exceeds the allowable 20% in cutover, no additional acres could be allowed. However, there is still some room in MA-12. Therefore, by taking 20% of the 5,234 acres in MP-1B that could be harvested, a maximum cutover acreage becomes 227 acres, of which 78 acres already exist, so an additional 149 acres would be allowed.

The results of this run were that the first decade had a harvest volume of 12.9 MMBF/year and a PNV of $414,497,000. This run also had three Management Areas that had more than one roading package assigned to it.

Run #3 -

For the third run, the constraints were the same as in Run #2, except that the road package "splits" were fixed.

The results of this run were that the first decade harvest volume was reduced to 12.1 MMBF/year and the PNV decreased $108,000 to $414,389,000.

Alternative D - Recreation/Wildlife Emphasis

Goal -

Alternative D places an emphasis on providing non-motorized recreation opportunities, providing security for the wildlife population and increasing hunting opportunities.

Run #1 -

For the first run, the constraints described in Section 2 were in the model and the only Allocation Choices allowed were those that reflected the mix of Management Prescriptions that were developed in the "Design" for this alternative.

Given the experience with infeasibilities in developing the Issue Consideration alternative, the percent of cutover acres for those areas that did allow harvesting were checked before running the model. The only areas in this alternative that allowed scheduled timber harvesting were some MP-7A areas in CIA 1 and some MP-10 areas in CIA 8.

In CIA 1, MA-61 was 17.1% cutover and MA-62 was 26.2% cutover. For the total CIA, 33,131 acres are available for harvesting, of which 7,780 acres are already in cutover status, which is 23.5%. This would mean that no additional acres should be allowed in cutover status for the next 20 years. However, some harvesting could be accomplished, such as through selection harvests, which would not create cutover conditions. Therefore, in order to give the model some room to work, a constraint was placed in that no more than 20 additional acres (for a total of 7,800 acres in cutover status) would be allowed.

In CIA 8, MA-13 has 4,790 acres available for timber harvesting, but 1,510 acres or 31.5% are already in a cutover condition. MA-12 has 9,604 acres available for timber harvesting, but 1,450 acres or 15.1% are already in a cutover condition. MA-11 has 1,448 acres of which no acres are currently in a cutover condition. Therefore, by taking 15% of 1,448, which equals 217 (rounded off to 220) acres that would be allowed to go into a cutover condition over the next 20 years.

The results of this run were acceptable from all aspects, including the absence of road package "splits", so no further runs were made for this alternative.

Alternative F - Preferred Alternative

Goal -

Alternative F emphasizes a mix of market and nonmarket outputs affecting the Forest's Zone of Influence (the area most affected by Forest management activities). A balanced mix of outputs is based upon site-specific trade-offs between competing interests to find the mix that will best meet the needs of those publics concerned about specific areas.

Run #1 -

For the first run, only the constraints described in Section 2 were in the model and the only Allocation Choices allowed were those that reflected the mix of Management Prescriptions that were developed in the "Design" for this alternative.

This run turned out to be infeasible because of the "cutover" constraints in the MP-7A/10 areas in CIA 1, the MP-10 areas in CIA 5, and the MP-1B areas in CIA 8.

Run #2 -

For the second run, the infeasibilities were corrected by the first looking at the total tentatively suitable acres within each Management Prescription in each Allocation Zone (Management Area) for which an infeasibility occurred and determining the percent that was already in a cutover status. This resulted in the following information (TS = Tentatively Suited Acres, CUT = Acres Currently in Cutover Status):

	MP-1B			MP-7A			MP-10		
CIA-1	TS	CUT	%	TS	CUT	%	TS	CUT	%
MA-45				7250	455	6	17074	799	5
MA-61				5575	919	16	5378	1007	19
MA-62				16276	3066	19	17360	4336	25
MA-71				-	-	-	30772	7409	24
CIA-5									
MA-31							-	-	-
MA-32							18497	1977	11
MA-35							-	-	-
CIA-8									
MA-11	-	-	-						
MA-12	1081	78	7						
MA-13	4099	1155	28						

For those areas where infeasibilities occurred, the "General Relational" constraints were relaxed and "Absolute Constraints" were inserted. The "Absolute Constraints" were entered in as a maximum amount of acres in a cutover status that could be increased over the existing acres for the next two decades. These "Absolute Constraints" were calculated as follows:

In CIA 1, since Management Areas 61, 62, and 71 exceed the allowable 15% in cutover, no additional acres could be allowed. However, in MA-45, there is still some room to move. Therefore, by taking 15% of the 7,250

acres in MP-7A that could be harvested, a maximum cutover acreage becomes 1,088 acres, of which 455 acres already exist, so an additional 633 (635) acres would be allowed in MP-7A. In MP-10, the additional acres allowed was calculated by taking 15% of the 17,074 acres that could be harvested which equals 2,561 acres, minus the 799 acres that are already in cutover status, equals 1,762 (1765) additional acres that could go into cutover status.

In CIA 5, the total tentatively suitable acres in MP-10 is 18,497, of which 15% equals 2,775, minus the 1,977 acres already in cutover status, equals 798 (800) additional acres that could go into cutover status.

In CIA 8, since MA-13 already exceeds the allowable 20% in cutover, no additional acres could be allowed. However, there is still some room in MA-12. Therefore, by taking 20% of the 1,081 acres in MP-1B that could be harvested, a maximum cutover acreage becomes 216 acres, of which 78 acres already exist, so an additional 138 (140) acres would be allowed.

The results of this run were that the first decade had a harvest volume of 11.5 MMBF/year and a PNV of $410,071,000.

Run #3 -

For the third run, the constraints were the same as in Run #2, except that constraints were added to correct some of the extreme fluctuations between decades in two of the CIAs. In Run #2, the following harvest volumes (in MBF/yr) are displayed for the first five decades for CIA 5 and CIA 7:

	Decade (MBF/yr)				
	1	2	3	4	5
CIA 5	5722.6	2432.1	3474.2	7784.6	7635.0
CIA 7	1251.5	3543.3	10829.4	7054.5	5733.1

It was felt that this fluctuation was too great for a number of reasons, among them being stability to local communities and adverse impacts on wildlife in those decades with higher than average harvest levels. Given that the cutover constraints were impacting the first two decades, it was decided to simply find the average of the first two decades and enter that in as a minimum volume constraint that had to be met for the first five decades. The average used was 4000 MBF/year for CIA 5 and 2250 MBF/year for CIA 7.

The other CIA volumes fluctuated somewhat, but not nearly as great as in CIA 5 and CIA 7.

The results of adding in these constraints were that the first decade harvest volume remained at 11.5 MMBF/year and the PNV decreased by $22,000 to $410,049,000. The harvest volumes for all the CIAs were:

	Decade (MBF/yr)				
	1	2	3	4	5
CIA 1	2023.5	2343.1	2215.9	2187.9	2349.8
CIA 2	-	-	149.3	158.1	157.4
CIA 3	-	157.3	828.0	648.4	827.8
CIA 4	2325.8	1979.1	2113.3	2045.3	2486.9
CIA 5	4234.3	4000.0	4000.0	7135.0	7083.9
CIA 6	288.0	294.5	281.9	278.2	286.4
CIA 7	2250.0	2404.8	9902.9	7963.6	5996.9
CIA 8	70.0	58.0	241.1	143.2	218.6

Run #4 -

For the fourth run, the constraints were the same as in Run #3, except that the objective function was changed to Maximize Timber for the First Decade. This was done to find out the volumes that could be harvested if economics were not a factor.

The result of this run was that the first decade harvest volume increased to 20.4 MMBF/year and the PNV decreased by $67,169,000 to $342,880,000. The harvest volumes for all the CIAs were:

	Decade (MBF/yr)				
	1	2	3	4	5
CIA 1	3190.1	2399.6	2251.0	2052.4	4449.6
CIA 2	293.2	125.2	182.5	95.3	226.8
CIA 3	984.6	671.1	516.4	452.8	630.1
CIA 4	2918.0	2951.1	1367.4	2464.3	2503.0
CIA 5	4000.0	5458.5	6829.6	4731.1	4484.8
CIA 6	621.3	645.7	555.9	414.0	495.7
CIA 7	5660.5	6200.8	6238.5	10996.2	7766.0
CIA 8	2713.3	2090.7	2474.6	2333.0	2550.0

Run #5 -

For the fifth run, the constraints were the same as in Run #3 and Run #4, the objective function went back to Maximizing Present Net Value for 15 decades, and the following constraints were added in:

- In CIA 1, a constraint was put in to harvest at least 2000 MBF/year for the first five decades. This was consistent with the volumes that the previous runs had calculated.

- In CIA 2, a constraint was put in to harvest at least 100 MBF/year for the first five decades. This relatively small volume was entered in to ensure that at least a minimal timber program would occur in this area to accomplish such objectives as increasing vegetative diversity.

- In CIA 3, a constraint was put in to harvest at least 400 MBF/year for the first five decades. Like CIA 2, this relatively small volume was entered in to ensure that at least a minimal timber program would occur

in this area to meet various objectives. It was greater than the volume in CIA 2 because according to Run #4, the opportunities were greater.

- In CIA 4, a constraint was put in to harvest no more than 1500 MBF/year for the first five decades. This constraint was entered in as a "max" because even though it was "economical" to harvest more, the majority of the volume was coming out of the Upper Green River area which has been extremely controversial in the past. Furthermore, in the public "design" sessions for this alternative, compromises in this area were worked out under the assumption that the harvest volume would not be more than around 1500 MBF/year.

- In CIA 5, the original constraint was changed to harvest at least 3500 MBF/year for the first five decades. This constraint decreased from the previous 4000 MBF/year because in Run #4, it appeared that since the volume for the first decade was right at 4000 MBF, the model wanted to go below that level. So the constraint was lowered to give the model that flexibility.

- In CIA 7, the original constraint for this area remained because of same reasons it was used in previous runs. It was changed slightly to 2300 MBF/year, simply to round all the constraints to the nearest 100 MBF.

- In CIA 8, a constraint was entered in to harvest at least 1500 MBF/year for the first five decades. This constraint was entered in because recent timber sales that have just been sold in this area will be harvesting this approximate amount for the next few years. The District also has a number of wildlife related projects planned for the future and this volume amount would give them that flexibility.

In addition to the volume constraints, a couple of roading options had to be corrected.

- In the previous runs, CIA 1 would have some roading packages assigned to some of the Management Areas, but MA-45 would not be one of them. However, as we know from the constraints developed for Run #2, MA-45 is the only place that harvesting can occur. (The constraints are entered in on a CIA basis, and therefore the model does not know that the available acres are only in MA-45.) Furthermore, if harvesting is to occur in MA-45, new roads will need to be built because the acres accessed by the existing road system have already been harvested beyond the 15% limit. (In MP-7A, there are 2,842 acres of tentatively suitable lands accessible from the existing road system, of which 455 acres are in a cutover condition, or 16%. In MP-10, there are 4,372 acres of tentatively suitable lands accessible from the existing road system, of which 799 acres are in a cutover condition, or 18%.) Therefore, for MA-45, the roading option was forced into being implemented the first decade.

- In MA-72, a "quirk" in the model was discovered. In the previous runs, roads would be built into this area, but usually the implementation would not begin until the second decade. The model was indicating that around 2000 MBF/year could be harvested in the first decade, but no new roads would be built until the second decade. In looking at the cutover

acres in MA-72, it was discovered that the tentatively suitable acres are all in MP-10 and totaled 52,181, of which 4,075 or 8% are in a cutover condition. However, the tentatively suitable acres accessible from the existing road system totals 18,950 of which 4,075 or 21% are in a cutover condition. Therefore, if any harvesting in this area is to occur in the first decade, new roads will have to be built in the first decade.

The results of adding in these constraints were that the first decade harvest volume increased slightly to 11.7 MMBF/year and the PNV decreased by $1,342,000 (compared to Run #3) to $408,707,000. The harvest volumes for all the CIAs were:

	Decade (MBF/yr)				
	1	2	3	4	5
CIA 1	2445.2	2449.1	2676.4	2648.2	2841.4
CIA 2	100.0	100.0	100.0	100.0	246.0
CIA 3	400.0	407.5	400.0	459.7	601.2
CIA 4	521.0	642.4	1102.2	1028.5	1289.9
CIA 5	4256.8	3999.0	3500.0	7198.4	7751.6
CIA 6	176.6	195.9	187.5	200.1	194.9
CIA 7	2300.0	2406.6	11071.4	7195.8	5562.2
CIA 8	1500.0	1500.0	2284.5	2457.0	2026.7

Run #6 -

In the previous runs, a couple of Management Areas had some incorrect acreage calculations in the data set. These acreages were corrected and a run was made that was identical to the one described in Run #5 to see if the acreage corrections would change any of the previous solutions.

The results of this new run showed a slight difference from Run #5. The first decade harvest volume remained at 11.7 MMBF/year, but the PNV increased by $480,000 to $409,187,000. The harvest volumes for all the CIAs were:

	Decade (MBF/yr)				
	1	2	3	4	5
CIA 1	2403.0	2392.1	2627.6	2571.7	2786.8
CIA 2	100.0	100.0	100.0	100.0	245.5
CIA 3	400.0	407.5	400.0	459.7	601.2
CIA 4	514.3	649.4	1119.2	1020.8	1301.5
CIA 5	4327.8	3899.3	3500.0	7417.0	7568.1
CIA 6	174.6	197.2	188.0	204.0	195.4
CIA 7	2300.0	2569.1	11154.7	7017.2	5914.8
CIA 8	1500.0	1500.0	2222.7	2484.1	1971.8

This run had two Management Areas that had two roading packages assigned to them, so these "splits" had to be corrected. Additionally, CIA 8 turned out to be another situation where the volumes harvested and the timing of the road package implementation did not match. Specifically MA-12 needed to have some roads built in the first decade to match the volumes coming out of that area in the first decade.

Run #7 -

For this last run, the constraints were the same as in Run #6, and the roading problems described above were corrected.

The results of this run was that the first decade harvest volume remained at 11.7 MMBF/year but the PNV decreased by $406,000 to $408,781,000. The harvest volumes for all the CIAs were:

	Decade (MBF/yr)				
	1	2	3	4	5
CIA 1	2386.4	2401.1	2656.6	2585.0	2816.0
CIA 2	100.0	100.0	100.0	100.0	245.5
CIA 3	400.0	407.5	400.0	459.7	601.2
CIA 4	516.2	647.4	1114.4	1022.9	1298.2
CIA 5	4312.8	3913.4	3500.0	7458.9	7453.3
CIA 6	177.8	193.0	172.1	188.1	179.0
CIA 7	2300.0	2508.9	11466.7	6841.4	6294.6
CIA 8	1500.0	1500.0	1927.0	2596.4	1715.7

The following Tables B-7-1 through B-7-6 show the outputs, activities, benefits and costs of all the alternatives.

TABLE B-7-1 ALTERNATIVE A - HIGH PRODUCTIVITY

Output/Activity	Units of Measure	Decade 1	2	3	4	5	10	15
Recreation		----------Units Per Year----------						
Primitive	MRVD	52 9	52.5	47 5	41 4	40 7		
Semi-Primitive Non-Motorized		84 1	80.5	82 5	81 4	79 3		
Semi-Primitive Motorized		249 1	262.3	265 8	234 4	238 9		
Roaded Natural		654.4	701.0	734 0	768 9	805 5		
Recreation Const /Reconst.	Site	3.8	2.8	3 2	0 3	0 1		
	M$	159.5	63.0	81 7	12 0	0 4		
Trail Const /Reconst	Miles	11.9	11 7	13 8	2 7	2 2		
	M$	99.5	97 1	112 3	20 7	17 0		
Wilderness								
Wilderness Use	MRVDs	340.0	340 0	340 0	340 0	340 0		
Wildlife/Fish								
Big Game User Days	MWFUDs	83 6	80 2	76.5	72 8	69 6		
Non-Game User Days		76 2	72 8	69 1	65 4	62 2		
Fishing User Days		52 5	61 7	69 2	83 1	90 8		
W/F Structural Habitat Improv	Struct.	59	59	59	59	59		
	M$	63 8	63.8	63 8	63 8	63 8		
W/F Non-Struct Habitat Improv	Acres	431	431	431	431	431		
	M$	61 9	61.9	61 9	61 9	61 9		
Range								
Permitted Use	MAUMs	254.6	255 7	257 2	259 0	260 6		
Range Improvements	M$	126.0	126.0	126 0	126 0	126 0		
Timber								
Allowable Sale Quantity	MMCF	14.33	14.33	15.07	15.07	15 07	15 07	23 21
	MMBF	69 88	70 05	74 04	71 91	72 42	57 46	108 91
Salvage	MMCF	2 33	2 34	2 47	2 40	2 41	1 92	3 36
	MMBF	10 48	10 51	11 11	10 79	10 86	8 62	16 34
Roundwood	MMCF	0 47	0 47	0 45	0 48	0 48	0 38	0 73
	MMBF	2 10	2 10	2 03	2 16	2 17	1 72	3 27
Fuelwood (Green)	MMCF	3 82	4 07	3.75	3 96	3 61	3 65	5 37
	MMBF	17 19	18 32	16 88	17.82	16 25	16 43	24 17
Fuelwood (Dead)	MMCF	0.25	0.25	0 26	0 25	0 25	0 24	0 24
	MMBF	1.14	1.12	1 17	1 12	1 12	1 10	1 10
Total Timber Sale Program	MMCF	21.20	21.46	22 00	22 16	21 82	21 26	33 18
	MMBF	100.79	102 10	105 23	103 80	102 82	85 33	153 79
Resource Coordination	M$	472 7	472.7	497 1	497 1	497 1	497 1	765 4
Planting	Acres	1662	2034	734	115	655	1575	1079
	M$	583 0	713 6	257 5	40 5	230 0	552 5	378 7
Natural Regeneration	Acres	3666	4691	5669	7694	7234	3300	4532
	M$	288 2	368 7	445 6	604 7	568 6	259 4	356 2
Thinning (TSI)	Acres	500	500	1239	3274	2518	1610	2665
	M$	52 5	52 5	130 1	343 7	264 4	169 0	279 8
Sale Prep/Administration	M$	693.1	684 8	750.4	761 7	753 5	711 6	1138 5
Fuelwood Prep/Administration	M$	97.5	104.0	95.9	101 1	92 1	93 1	137 2
Fuels Improvement	Acres	2664	3362	3202	3905	3945	2437	2806
	M$	39.2	49.5	47 1	57 5	58 1	35 9	41 3
Water								
Induced Water (from Colorado River Drainage	Ac Ft	9124.4	20298 3	15168 0	4436 8	3804 3		

TABLE B-7-1 (Cont)

Output/Activity	Units of Measure	Decade 1	2	3	4	5	10	15
Transportation								
Road Construction	Miles	22 5	12.7	40 8	13 3	9 0		
	M$	386 7	245 9	900 3	316 4	222 2		
Road Reconstruction	Miles	6 7	1 0	3 0	0 6	0 7		
	M$	30 3	4.3	13 4	2 7	2 9		
Preconst /Const Engineering	M$	248 3	130.1	418 8	135 4	92 3		
ROW Acquisition	M$	---	---	12 6	---	0 9		
BENEFITS (in Thous of 1982 Dollars)								
Recreation								
Primitive		474 5	470.9	426 1	371 4	365 1		
Semi-Primitive Non-Motorized		969 7	928.2	951 2	938 5	914 3		
Semi-Primitive Motorized		2,635.5	2,775.1	2,812.2	2,480 0	2,527 6		
Roaded Natural		5,346.4	5,727.2	5,996 8	6,281 9	6 580 9		
Wilderness		3,910.0	3,910.0	3,910 0	3,910 0	3,910 0		
Wildlife/Fish								
Big Game		2,384 3	2,287.3	2,181 8	2 076 3	1,985 0		
Non-Game		1,752.6	1,674.4	1,589 3	1,504 2	1,430 6		
Fishing		531 3	624.4	700 3	841 0	918 9		
Range		1,675 3	1,682.5	1,692 4	1,704 2	1,714 7		
Timber								
Sawtimber		5,054 4	4,984.1	5,513 8	4,972 6	5,015 8		
Salvage		230.6	231.2	244 4	237 4	238 9		
Roundwood		63.0	63.0	60 9	64 8	65 1		
Fuelwood		105 8	112 3	104 3	109 5	100 4		
Water		109 4	243 6	182 0	53 3	45 6		
Minerals		30,812 6	30,812 6	30,812 6	30 812 6	30 812 6		
COSTS (in Thous of 1982 Dollars)								
Recreation		2187 8	1941 5	2065.4	1721.1	1729.6		
Wilderness		500.8	496.4	524.1	357.1	360 5		
Wildlife/Fish		403.4	403 4	403.4	403.4	403 4		
Range		1062 0	942 6	995.8	951 5	951 8		
Timber		4329 0	4698 7	4399.6	4687 4	4807 6		
Soil/Water		835 3	640 5	594.7	571 8	571 8		
Minerals		572 7	500 6	500 6	500 6	500 6		
Roads/Facilities		992 1	1006 8	1058 4	1072 4	1091 0		
Other		3 542 4	3523.1	3560 6	3522 0	3513 4		
Total Forest Budget		14425 5	14425 5	14102 6	13787 3	13929 7		
Purchaser Credit Roads		1108 8	633.8	2220 6	757 3	528 8		
Returns to Treasury		6,111.1	6,049.3	6,584 0	6,046 4	6 083 8		

TABLE B-7-2. ALTERNATIVE B - RPA

Output/Activity	Units of Measure	Decade 1	2	3	4	5	10	15
Recreation		----------Units Per Year----------						
Primitive	MRVD	52 8	52.6	45.6	37 6	37 0		
Semi-Primitive Non-Motorized		84 3	80.8	87.1	87 8	85 8		
Semi-Primitive Motorized		246 3	262.0	262.3	235 0	239 3		
Roaded Natural		654 4	701 0	734 0	768 9	805 5		
Recreation Const./Reconst.	Site	3 4	2.8	3.4	0.5	0 3		
	M$	85.2	44.2	151.4	33.8	4 9		
Trail Const /Reconst.	Miles	11.1	11.0	13.9	3 4	2 9		
	M$	90.9	89 6	113.3	28 2	24 5		
Wilderness								
Wilderness Use	MRVDs	340 0	340.0	340 0	340 0	340 0		
Wildlife/Fish								
Big Game User Days	MWFUDs	84.8	82.2	80.0	77 2	75 7		
Non-Game User Days		77.4	74.8	72.6	69 8	68 3		
Fishing User Days		52.5	61 3	68.6	83 4	94 6		
W/F Structural Habitat Improv.	Struct	102 0	102 0	102 0	102 0	102 0		
	M$	110 6	110.6	110 6	110 6	110 6		
W/F Non-Struct Habitat Improv.	Acres	747	747	747	747	747		
	M$	107.0	107.0	107.0	107.0	107 0		
Range								
Permitted Use	MAUMs	254.5	255 6	257.2	258 9	260 6		
Range Improvements	M$	126.0	126.0	126 0	126 0	126 0		
Timber								
Allowable Sale Quantity	MMCF	9.51	9.51	13.51	13.51	13 51	13 51	22 23
	MMBF	46 37	46.35	66.89	64 23	66 17	52 94	105 76
Salvage	MMCF	1.55	1 55	2.23	2 14	2 21	1 76	3 53
	MMBF	6 96	6 95	10 03	9 63	9 93	7 94	15 86
Roundwood	MMCF	0 31	0 31	0 45	0 43	0 44	0 35	0 48
	MMBF	1 39	1.39	2 01	1 93	1 99	1 59	2 14
Fuelwood (Green)	MMCF	2.46	1.82	3 09	2.97	2 94	2 74	4 81
	MMBF	11 07	8.19	13.91	13 37	13 23	12 33	21 65
Fuelwood (Dead)	MMCF	0.25	0 25	0.26	0 25	0 25	0 24	0 24
	MMBF	1.13	1 12	1 18	1 12	1 12	1 10	1 10
Total Timber Sale Program	MMCF	14 08	13 44	19 54	19 30	19 35	18 60	31 29
	MMBF	66 92	64.00	94 02	90.28	92 44	75 90	146 51
Resource Coordination	M$	313.6	313.6	445.6	445 6	445 6	445 6	733 0
Planting	Acres	186	190	250	538	544	294	273
	M$	65.2	66.6	87.8	188 8	190 9	103 2	95 7
Natural Regeneration	Acres	3239	3588	4330	4733	4053	3109	4185
	M$	254 6	282.0	340 4	372 0	318 6	244 3	328 9
Thinning (TSI)	Acres	500	500	677	1819	1365	2196	1537
	M$	52 5	52.5	71 1	191 0	143 3	230 5	161 4
Sale Prep/Administration	M$	450 0	457 4	648.5	646 0	639 3	657 0	1067 0
Fuelwood Prep/Administration	M$	62.7	46 5	79.0	75 7	74 9	70 0	122 8
Fuels Improvement	Acres	1712	1889	2290	2636	2299	1702	2229
	M$	25.2	27 8	33 7	38 8	33 8	25 0	32 8
Water								
Induced Water (from Colorado River Drainages)	Ac.Ft	7097.0	8901.1	8704 6	14872 8	10232 3		

TABLE B-7-2 (Cont)

Output/Activity	Units of Measure	Decade 1	2	3	4	5	10	15
Transportation								
Road Construction	Miles	18.1	12.7	40 3	13 3	9 2		
	M$	303.0	254.8	876 6	313 9	224 9		
Road Reconstruction	Miles	6.4	1 3	3 0	0 5	0 5		
	M$	28 9	5 9	13 3	2 4	2 3		
Preconst /Const. Engineering	M$	203 4	131 9	412 8	134 8	94 1		
ROW Acquisition	M$	---	0.5	16.6	---	0 9		
BENEFITS (in Thous. of 1982 Dollars)								
Recreation								
Primitive		473.6	471.8	409.0	337.3	331.9		
Semi-Primitive Non-Motorized		972.0	931.6	1,004.3	1,012.3	989.3		
Semi-Primitive Motorized		2,605.9	2,772.0	2,775 1	2,486 3	2,531 8		
Roaded Natural		5,346.4	5,727.2	5,996.8	6,281 9	6,580 9		
Wilderness		3,910.0	3,910.0	3,910 0	3,910 0	3,910 0		
Wildlife/Fish								
Big Game		2,418.5	2,344.3	2,281 6	2 201 7	2 159 0		
Non-Game		1,780.2	1,720.4	1,669 8	1 605 4	1,570 9		
Fishing		531.3	620.4	694.2	844 0	957 4		
Range		3,449.0	3,196.8	5,117.8	4,455 6	4,043 6		
Timber								
Sawtimber		3,449.0	3,196.8	5,117 8	4,455 6	4,043 6		
Salvage		153.1	152.9	220 7	211 9	218 5		
Roundwood		41.7	41.7	60 3	57 9	59 7		
Fuelwood		70.5	53 8	87 1	83 7	82 9		
Water		85.2	106 8	104 4	178 4	122 8		
Minerals		30,812.6	30,812.6	30,812 6	30,812 6	30 812 6		
COSTS (in Thous of 1982 Dollars)								
Recreation		2024.0	1958 5	2164 3	1749 8	1747 4		
Wilderness		500.8	496.4	524 1	357 1	360 5		
Wildlife/Fish		668.9	668.9	668 9	668 9	668 9		
Range		1059.8	944 6	998 8	952 8	953 0		
Timber		2904.1	2967.5	4090 5	4490 0	4299 4		
Soil/Water		735.7	508.8	485 9	463 0	463 0		
Minerals		575.7	508.3	514 3	513 3	513 6		
Roads/Facilities		886.7	906.6	962 5	973 2	985 3		
Other		3511.4	3495.2	3516 3	3535 2	3523 2		
Total Forest Budget		12867 1	12454.8	13925 6	13703 3	13514 3		
Purchaser Credit Roads		892 1	654.4	837 7	755 1	535 4		
Returns to Treasury		4,371.5	4,103.0	6,146 3	5,470 9	5,068 3		

TABLE B-7-3 ALTERNATIVE C - CURRENT DIRECTION

Output/Activity	Units of Measure	Decade 1	2	3	4	5	10	15
Recreation		----------Units Per Year----------						
Primitive	MRVD	53 3	52.7	49 8	46.8	46 7		
Semi-Primitive Non-Motorized		85.5	83 4	79.7	75 0	74 5		
Semi-Primitive Motorized		237.4	246 8	254 3	243 8	242 3		
Roaded Natural		651.4	701 0	734 0	768 9	805 5		
Recreation Const./Reconst	Site	5.4	4 7	4.2	0 7	0 2		
	M$	212 0	141.7	94 1	22.6	6 5		
Trail Const./Reconst	Miles	27 4	23 7	20 6	1 8	0 7		
	M$	198 0	182 1	171 1	16 1	5.9		
Wilderness								
Wilderness Use	MRVDs	324 0	324 0	324.0	324 0	324.0		
Wildlife/Fish								
Big Game User Days	MWFUDs	85.8	85.6	84 8	84 0	83 3		
Non-Game User Days		78.4	78.2	77 4	76 6	75 9		
Fishing User Days		52 5	59.0	65 1	74 8	81 6		
W/F Structural Habitat Improv	Struct	96 0	96 0	96 0	96 0	96 0		
	M$	104 3	104 3	104 3	104 3	104 3		
W/F Non-Struct Habitat Improv	Acres	704	704	704	704	704		
	M$	100 9	100.9	100 9	100 9	100 9		
Range								
Permitted Use	MAUMs	253 7	253 5	254 0	254 3	254 8		
Range Improvements	M$	126.0	126 0	126.0	126 0	126 0		
Timber								
Allowable Sale Quantity	MMCF	3 42	3.42	3.42	3 42	3 46	10 03	14 67
	MMBF	16 77	17.00	17 00	17 00	17 00	42 30	64 52
Salvage	MMCF	1 30	1.32	1 32	1 32	1 32	3 29	5 02
	MMBF	5 87	5 95	5 95	5 95	5 95	14 80	22 58
Roundwood	MMCF	0.11	0 11	0 11	0 11	0 11	0 28	0 43
	MMBF	0.50	0.51	0.51	0 51	0 51	1 27	1 94
Fuelwood (Green)	MMCF	0.87	0 89	0 75	0.70	0 02	1 92	3 02
	MMBF	3 92	4.01	3 38	3 15	0 09	8 64	13 59
Fuelwood (Dead)	MMCF	0 24	0.25	0 25	0 25	0 25	0 24	0 24
	MMBF	1 10	1.12	1 13	1 12	1 11	1 10	1 10
Total Timber Sale Program	MMCF	5.94	5 99	5 85	5 80	5 16	15 76	23 38
	MMBF	28.16	28 59	27.97	27 73	24 66	68 11	103 73
Resource Coordination	M$	112 9	112.9	112.9	112 9	114 1	330 8	483 7
Planting	Acres	86	123	56	61	---	437	386
	M$	30 2	43.2	19 5	21 5	---	153 4	135 4
Natural Regeneration	Acres	1131	1184	1095	1127	1135	3033	5421
	M$	88.9	93 0	86 0	88 6	89 2	238 4	426 1
Thinning (TSI)	Acres	500	500	121	279	323	1879	2127
	M$	52.5	52 5	12.7	29 3	33 9	197 3	223 4
Sale Prep/Administration	M$	162.5	161.5	163.0	163 6	176 9	478 7	689 3
Fuelwood Prep/Administration	M$	22 3	22.7	19 0	17 9	0.6	48 9	77 0
Fuels Improvement	Acres	608	654	575	594	567	1735	2904
	M$	9.0	9.6	8 5	8 7	8 4	25 5	42 7
Water								
Induced Water (from Colorado River Drainages)	Ac.Ft.	1916 0	5130.7	4003 3	1388 7	600 1		

TABLE B-7-3 (Cont.)

Output/Activity	Units of Measure	Decade 1	2	3	4	5	10	15
Transportation								
Road Construction	Miles	1.1	12 0	16.7	10 0	5 3		
	M$	18.2	196 2	348.9	274 7	118 5		
Road Reconstruction	Miles	6.0	0 9	3 1	0 4	0 4		
	M$	27 1	4 1	13.8	2 0	2 0		
Preconst /Const Engineering	M$	32.3	123 2	177.3	101 7	54 9		
ROW Acquisition	M$	---	---	---	---	0 8		
BENEFITS (in Thous. of 1982 Dollars)								
Recreation								
Primitive		478.1	472 7	446 7	419 8	418 9		
Semi-Primitive Non-Motorized		985.8	961.6	918.9	864 7	859 0		
Semi-Primitive Motorized		2,511.7	2,611 1	2,690.4	2,579 4	2,563.5		
Roaded Natural		5,321.9	5,727.2	5,996.8	6,281.9	6,580.9		
Wilderness		3,726.0	3,726.0	3,726.0	3 726 0	3.726 0		
Wildlife/Fish								
Big Game		2,447.0	2,441.3	2,418 5	2,395 7	2,375 7		
Non-Game		1,803 2	1,798.6	1 780 2	1,761 8	1,745 7		
Fishing		531 3	597.1	658 8	757 0	825 8		
Range		1,669 3	1,668.0	1,671 3	1,673 3	1,676 6		
Timber								
Sawtimber		1,278 4	1,300.5	1,419 3	1,446.9	1,222 5		
Salvage		129 1	130.9	130 9	130 9	130 9		
Roundwood		15 0	15.3	15.3	15.3	15 3		
Fuelwood		28 9	29.6	26 0	24.7	7 0		
Water		23 0	61.6	48 0	16.7	7 2		
Minerals		30,876 7	30,876.7	30,876 7	30,876 7	30,876 7		
COSTS (in Thous of 1982 Dollars)								
Recreation		2,502 6	2,350 0	2,248 7	1,817 7	1 800 3		
Wilderness		680 4	651.4	631.3	348.7	330 2		
Wildlife/Fish		632 7	632 7	632 7	632 7	632 7		
Range		1080 1	974.0	961.5	950 6	1286 6		
Timber		995 5	1024.8	908 4	945 9	950 1		
Soil/Water		626.3	483.1	460.2	448.7	448 7		
Minerals		575 0	507.4	513 2	512 3	512 5		
Roads/Facilities		764 6	765.5	785 1	792 8	796 2		
Other		3,132 7	3,134.2	3,143 4	3,116 3	3,105 6		
Total Forest Budget		10989 9	10523.1	10284 5	9565 7	9862 9		
Purchaser Credit Roads		129 4	539.1	899 8	630 6	292 1		
Returns to Treasury		2,107 7	2,132.9	2,248 9	2,275 6	2,034 2		

TABLE B-7-4. ALTERNATIVE D - RECREATION/WILDLIFE

Output/Activity	Units of Measure	Decade 1	2	3	4	5	10	15
Recreation		----------Units Per Year----------						
Primitive	MRVD	53 3	53.3	53.3	53 3	53 3		
Semi-Primitive Non-Motorized		86.5	86 5	86.4	86 4	86 4		
Semi-Primitive Motorized		233 5	233.5	233 5	233 5	233 5		
Roaded Natural		650 3	650.3	650.5	650 8	650 8		
Recreation Const /Reconst	Site	10.1	8.7	9 6	0 5	0 1		
	M$	332 0	306.2	205 9	10 6	3 3		
Trail Const /Reconst	Miles	60 1	51.1	36 0	1 1	0 5		
	M$	426 1	360.3	305 3	9 6	4 3		
Wilderness								
Wilderness Use	MRVDs	310 0	310.0	310 0	310 0	310 0		
Wildlife/Fish								
Big Game User Days	MWFUDs	104.7	109.8	112 7	113.0	113 2		
Non-Game User Days		97 3	102.4	105.3	105 6	105 8		
Fishing User Days		52 6	74 6	81 3	91.0	97 9		
W/F Structural Habitat Improv	Struct	109 0	109 0	109 0	109 0	109 0		
	M$	65 4	65 4	65 4	65 4	65 4		
W/F Non-Struct Habitat Improv	Acres	1032	1032	1032	1032	1032		
	M$	148.1	148 1	148 1	148 1	148 1		
Range								
Permitted Use	MAUMs	253.5	252 8	252.3	251 8	251 3		
Range Improvements	M$	126.0	126.0	126 0	126.0	126 0		
Timber								
Allowable Sale Quantity	MMCF	0 05	0.05	0 23	0.23	0 23	0 70	0 89
	MMBF	0.26	0 26	1.14	1 14	1 15	3 27	3 99
Salvage	MMCF	0 02	0.02	0 09	0 09	0.09	0 25	0 31
	MMBF	0 09	0.09	0.40	0 40	0 40	1 14	1 40
Roundwood	MMCF	0 002	0.002	0.002	0 002	0 002	0 02	0 03
	MMBF	0 01	0 01	0 01	0 01	0 01	0 10	0 12
Fuelwood (Green)	MMCF	0 01	0 01	0 04	0 03	0 03	0 18	0 23
	MMBF	0 05	0.05	0 18	0 14	0 14	0 81	1 04
Fuelwood (Dead)	MMCF	0.24	0 24	0 24	0 24	0 24	0 24	0 24
	MMBF	1 10	1.10	1.10	1 10	1 10	1 10	1 10
Total Timber Sale Program	MMCF	0.322	0 322	0 602	0592	0 592	1 39	1 70
	MMBF	1 51	1.51	2.83	2.79	2 80	6 42	7 65
Resource Coordination	M$	1 7	1.7	7 6	7 6	7 6	23 2	29 4
Planting	Acres	0 1	4	1	1	41	---	41
	M$	0 1	0 2	0 4	0 4	0 4	---	14 4
Natural Regeneration	Acres	34	21	105	88	79	359	463
	M$	2.7	1 7	8 2	6 9	6 2	28 2	36 4
Thinning (TSI)	Acres	---	---	9	16	64	187	298
	M$	---	---	0 9	1 7	6 7	19 6	31 3
Sale Prep/Administration	M$	2.6	2 6	11 7	11 7	11.7	32 9	42 5
Fuelwood Prep/Administration	M$	0 2	0.1	0.9	0 7	0.6	4 7	5 8
Fuels Improvement	Acres	17	11	53	45	40	180	252
	M$	0.2	0.2	0.8	0 7	0 6	2 6	3 7
Water								
Induced Water (from Colorado River Drainages)	Ac Ft	7 0	19.0	33 0	42.0	42 0		

TABLE B-7-4 (Cont)

Output/Activity	Units of Measure	Decade 1	2	3	4	5	10	15
Transportation								
Road Construction	Miles	---	---	---	0.5	0.6		
	M$	---	---	---	12.6	13 5		
Road Reconstruction	Miles	---	---	0.3	---	0 1		
	M$	---	---	1 3	---	0 5		
Preconst./Const. Engineering	M$	---	---	1.0	1.0	6 5		
ROW Acquisition	M$	---	---	---	---	---		
BENEFITS (in Thous. of 1982 Dollars)								
Recreation								
Primitive		478.1	478 1	478 1	478 1	478 1		
Semi-Primitive Non-Motorized		997.3	997.3	996 2	996.2	996 2		
Semi-Primitive Motorized		2,470 4	2,470.4	2,470.4	2,470.4	2,470 4		
Roaded Natural		5,313 0	5,313.0	5,314.6	5,317 0	5,317 0		
Wilderness		3,565.0	3,565 0	3,565 0	3,565.0	3,565 0		
Wildlife/Fish								
Big Game		2,986.0	3,131.5	3,214.2	3,222.8	3,228.5		
Non-Game		2,237.9	2,355.2	2,421.9	2,428.8	2,428 8		
Fishing		532 3	755.0	822.8	920 9	990 7		
Range		1,668 0	1,663.4	1,660 1	1,656 8	1,653 6		
Timber								
Sawtimber		20 0	19.6	89.4	88 9	97 6		
Salvage		2.0	2 0	8 8	8 8	8 8		
Roundwood		.3	.3	.3	.3	3		
Fuelwood		6.5	6.5	7.3	7.0	7 0		
Water		.1	2	.4	5	5		
Minerals		19,934.8	19,934.8	19,934.8	19,934 8	19,934 8		
COSTS (in Thous of 1982 Dollars)								
Recreation		3374.1	2905.2	2679 3	1965 3	1947.0		
Wilderness		1096 2	974.9	876 0	336 9	327 3		
Wildlife/Fish		950.6	950.6	950 6	950 6	950 6		
Range		1156 5	979.9	984.6	980 9	980 6		
Timber		18.6	17 1	64 1	63 4	70 2		
Soil/Water		486 7	329 7	318.3	309.1	309 1		
Minerals		399 8	364.3	368.7	368 0	368 2		
Roads/Facilities		718.6	718 6	718 6	718.6	718 6		
Other		3,117 0	3,123.8	3,121.4	3,082.0	3,082 7		
Total Forest Budget		11318.1	10364 1	10081 6	8774 8	8754 3		
Purchaser Credit Roads		0.0	0.0	3 9	0 0	34 2		
Returns to Treasury		681 7	680.6	757.6	756 3	764 6		

TABLE B-7-5. ALTERNATIVE E - ISSUE CONSIDERATION

Output/Activity	Units of Measure	Decade 1	2	3	4	5	10	15
Recreation		----------Units Per Year----------						
Primitive	MRVD	53.3	52 4	51 2	50 5	50 4		
Semi-Primitive Non-Motorized		85.3	89.6	90.2	87 7	87 6		
Semi-Primitive Motorized		237.4	251.1	264 6	257.0	254 0		
Roaded Natural		654.4	679 9	734 0	768 9	772 4		
Recreation Const /Reconst	Site	8.7	8.0	6.7	5 6	4 0		
	M$	286 0	213.5	249 8	38 8	9 2		
Trail Const /Reconst	Miles	42.9	42 4	42 5	8 8	4 9		
	M$	317 1	310.2	321.0	69 3	38.8		
Wilderness								
Wilderness Use	MRVDs	310.0	310 0	310 0	310 0	310 0		
Wildlife/Fish								
Big Game User Days	MWFUDs	93 4	93 7	94.2	94.6	94 7		
Non-Game User Days		86.0	86.4	86 8	87 2	87 3		
Fishing User Days		52.9	60.9	67.9	78 9	85 3		
W/F Structural Habitat Improv.	Struct.	184	184	184	184	184		
	M$	199.9	199.9	199.9	199 9	199 9		
W/F Non-Struct Habitat Improv	Acres	1399	1399	1399	1399	1399		
	M$	197 7	197.7	197 7	197 7	197 7		
Range								
Permitted Use	MAUMs	253 7	253.3	253 2	253 0	252 9		
Range Improvements	M$	126 0	126 0	126 0	126 0	126 0		
Timber								
Allowable Sale Quantity	MMCF	2 49	2.49	4.67	4 67	4 67	6 72	11 6
	MMBF	12 12	12 04	23 02	23.14	22 05	27 55	52 7
Salvage	MMCF	0.94	0.94	1.79	1 80	1 72	2 14	4 1
	MMBF	4 24	4.21	8.06	8 10	7 72	9 64	18 4
Roundwood	MMCF	0.08	0 08	0 15	0 15	0 15	0 18	0 3
	MMBF	0.36	0.36	0.69	0 69	0 66	0 83	1 5
Fuelwood (Green)	MMCF	0 50	0 30	0 95	0 95	0 78	1 21	2 8
	MMBF	2 25	1 35	4 28	4 28	3 51	5 45	12 8
Fuelwood (Dead)	MMCF	0.24	0.24	0 25	0 24	0 25	0 24	0 2
	MMBF	1 10	1 11	1.13	1 10	1 11	1 10	1 1
Total Timber Sale Program	MMCF	4 25	4 05	7 81	7 81	7 57	10 49	19 2
	MMBF	20 07	19.07	37.18	37 31	35 05	44 57	86 7
Resource Coordination	M$	82 0	82.0	154.0	154 0	154 0	221 7	384 1
Planting	Acres	42	21	72	79	76	125	206
	M$	14.6	7.3	25.1	27 9	26 6	43 9	72 1
Natural Regeneration	Acres	897	1047	1638	1581	1468	1977	3956
	M$	70.5	82.3	128 7	124 3	115 4	155 4	311 0
Thinning (TSI)	Acres	300	300	403	851	973	1150	2410
	M$	31 5	31 5	42 3	89 4	102 2	120 8	253 1
Sale Prep/Administration	M$	120 2	125 5	225 8	224 5	231 1	322 5	565 1
Fuelwood Prep/Administration	M$	12 7	7.7	24.2	24 3	19 9	30 8	73 0
Fuels Improvement	Acres	470	534	855	830	772	1051	2081
	M$	6.9	7.9	12 6	12 2	11 4	15 5	30 6
Water								
Induced Water (from Colorado River Drainages)	Ac Ft	485 5	878 8	3311.3	5214 1	2908 2		

TABLE B-7-5 (Cont.)

Output/Activity	Units of Measure	Decade 1	2	3	4	5	10	15
Transportation								
Road Construction	Miles	2 5	9.1	13.9	7 1	3 8		
	M$	58.1	189.3	335.4	150 9	67 4		
Road Reconstruction	Miles	3.0	0 8	2.4	0 2	0 4		
	M$	13.6	3.7	10 8	0 8	1 6		
Preconst /Const. Engineering	M$	35.1	93.3	147 5	71 9	39 2		
ROW Acquisition	M$	---	3 8	1 0	2 1	---		
BENEFITS (in Thous of 1982 Dollars)								
Recreation								
Primitive		478 1	470 0	459.3	453 0	452 1		
Semi-Primitive Non-Motorized		983 5	1,033.1	1040.0	1,011 2	1,010 0		
Semi-Primitive Motorized		2,511.7	2,656 6	2,799.5	2,719 1	2,687 3		
Roaded Natural		5,346.4	5,554 8	5,996.8	6,281 9	6,310 5		
Wilderness		3,565.0	3,565 0	3,565 0	3 565 0	3,565 0		
Wildlife/Fish								
Big Game		2,663.8	2,672.3	2,686.6	2,698.0	2,700 8		
Non-Game		1,978.0	1,978.2	1,996.4	2,005 6	2,007 9		
Fishing		535.3	616.3	687.1	798 5	863 2		
Range		1,669.3	1,666 7	1,666.1	1,664 7	1 664.1		
Timber								
Sawtimber		870 7	810 7	1,709 9	1,745 7	1,473 4		
Salvage		93 3	92 6	177 3	178 2	254 5		
Roundwood		10 8	10.8	20 7	20 7	29 7		
Fuelwood		19.2	14.0	31.2	30 9	26 8		
Water		5.9	10.6	39.7	62 5	34 9		
Minerals		26,594.5	26,594 5	26,594.5	26,594 5	26,594 5		
COSTS (in Thous. of 1982 Dollars)								
Recreation		3,133.9	3,205 6	3,169.1	2,180 6	2,045 6		
Wilderness		904.9	892.8	912 5	453 8	398 1		
Wildlife/Fish		1255.4	1255.4	1255 4	1255 4	1255 4		
Range		1063 4	967 8	987 2	952 0	951 9		
Timber		718 3	746 4	1305 0	1377 2	1374 1		
Soil/Water		626.4	408 7	408.7	374 3	374 3		
Minerals		839.0	616 4	621 9	621 0	621 2		
Roads/Facilities		774 9	765 8	779 9	786.0	788 3		
Other		3,149 8	3,146.3	3,181 1	3,132 4	3,123 5		
Total Forest Budget		12466.0	12005.2	12620.8	11132 7	10932 4		
Purchaser Credit Roads		177.9	477.2	822 8	372 8	180 2		
Returns to Treasury		1,649 0	1,583.2	2,594 6	2,631 0	2,345 2		

TABLE B-7-6 ALTERNATIVE F - PREFERRED

Output/Activity	Units of Measure	Decade 1	2	3	4	5	10	15
Recreation		----------Units Per Year----------						
Primitive	MRVD	51 3	48 9	48 0	47 1	47 0		
Semi-Primitive Non-Motorized		85.4	83.3	88 7	87 8	87 3		
Semi-Primitive Motorized		236.7	252.1	264 3	258 3	257 2		
Roaded Natural		654 4	701.0	734.0	758 7	762 9		
Recreation Const /Reconst.	Site	9 0	7.9	6.4	1 7	4 4		
	M$	310 5	210 5	210 3	55 5	13 5		
Trail Const./Reconst.	Miles	43 2	35 2	41 9	15 7	5 6		
	M$	317.5	276.2	324 4	93 4	44 9		
Wilderness								
Wilderness Use	MRVDs	310 0	310.0	310 0	310 0	310 0		
Wildlife/Fish								
Big Game User Days	MWFUDs	92 3	93 1	93 7	94 2	94 6		
Non-Game User Days		84 9	85 7	86 3	86 8	87 2		
Fishing User Days		52.5	61 7	68 3	79 1	85 7		
W/F Structural Habitat Improv	Struct	184.0	184 0	184 0	184 0	184 0		
	M$	199.9	199.9	199 9	199 9	199 9		
W/F Non-Struct Habitat Improv	Acres	1399	1399	1399	1399	1399		
	M$	197 7	197 7	197 7	197 7	197 7		
Range								
Permitted Use	MAUMs	253.7	253 3	253 2	253 0	252 9		
Range Improvements	M$	110 0	110 0	110 0	110 0	110 0		
Timber								
Allowable Sale Quantity	MMCF	2 39	2 39	4 31	4 31	4 31	6 74	11 82
	MMBF	11 69	11 67	21.34	21 25	20 60	28 43	53 90
Salvage	MMCF	.91	91	1 66	1 65	1 60	2 21	4 19
	MMBF	4 09	4.08	7 47	7 44	7 21	9 95	18 87
Roundwood	MMCF	.08	.08	13	13	13	20	36
	MMBF	.35	.35	64	64	61	85	1 62
Fuelwood (Green)	MMCF	0 44	0.24	0.79	0 87	0 64	0 96	2 87
	MMBF	1 98	1 08	3.56	3 92	2 88	4 32	12 92
Fuelwood (Dead)	MMCF	25	24	25	24	24	24	24
	MMBF	1 12	1 11	1 13	1 11	1 10	1 10	1 10
Total Timber Sale Program	MMCF	4 07	3 86	7 14	7 20	6 92	10 35	19 48
	MMBF	19 23	18.29	34 14	34 36	32 40	44 65	88 41
Resource Coordination	M$	103 5	41 6	53 2	35 5	35 4	9 9	5 9
Planting	Acres	35	19	62	83	47	208	347
	M$	12 2	6 6	21 8	29 0	16 4	72 9	121 7
Natural Regeneration	Acres	930	1065	1491	1587	1354	2106	3951
	M$	73.1	83.7	117 2	124 7	106 4	165 6	310 5
Thinning (TSI)	Acres	300	300	357	682	889	1054	2108
	M$	31 5	31 5	37 5	71 6	93 3	110 7	221 4
Sale Prep/Administration	M$	116 9	120 3	209 0	207 7	214 1	536 1	565 2
Fuelwood Prep/Administration	M$	11 2	6 2	20 1	22 1	16 3	24 6	73 2
Fuels Improvement	Acres	482	542	777	835	700	1157	2149
	M$	7.1	8 0	11 4	12 3	10 3	17 0	31 6
Water								
Induced Water (from Colorado River Drainages)	Ac.Ft	613 8	800 8	2680.6	4307 9	2481 1		

TABLE B-7-6 (Cont.)

Output/Activity	Units of Measure	Decade 1	2	3	4	5	10	15
Transportation								
Road Construction	Miles	10 2	8.0	15 4	3 6	2 3		
	M$	196 2	159 7	382 3	73 1	53 0		
Road Reconstruction	Miles	3.2	0 8	2 4	0 2	0 2		
	M$	14 4	3 8	10 7	0 8	1 1		
Preconst /Const. Engineering	M$	112 9	83.4	162 0	37 2	24 2		
ROW Acquisition	M$	---	3.8	---	2 1	---		
BENEFITS (in Thous of 1982 Dollars)								
Recreation								
Primitive		460 2	438 6	430 6	422 5	421 6		
Semi-Primitive Non-Motorized		984 7	960.4	1,022 7	1,012 3	1,006 6		
Semi-Primitive Motorized		2,504 3	2,667.2	2,796 3	2,732 8	2 721 2		
Roaded Natural		5 346 4	5,727.2	5,996 8	6,198 6	6,232 9		
Wilderness		3,565 0	3,565.0	3,565 0	3 565 0	3,565 0		
Wildlife/Fish								
Big Game		2,632 4	2,655 2	2,672 3	2,686 6	2,698 0		
Non-Game		1,952 7	1,971 1	1,984 9	1,996 4	2,005 6		
Fishing		531.3	624.4	691 2	806 6	867 3		
Range		1,669.3	1,666 7	1,666 1	1,664 7	1,664 1		
Timber								
Sawtimber		847 3	821 7	1,581 9	1,586 5	1,407 2		
Salvage		90 0	89 8	164 3	163 7	158 6		
Roundwood		10 5	10 5	19 2	19 2	18 3		
Fuelwood		17.9	12 5	27 0	28 9	22 9		
Water		7.3	9 6	32 2	51 7	29 8		
Minerals		29,139.7	29,139 7	29,139 7	29,139 7	29 139 7		
COSTS (in Thous of 1982 Dollars)								
Recreation		3,027.4	2,966 0	3,185 1	2,326 4	2,146 2		
Wilderness		783.4	770 2	789.9	445.8	390 1		
Wildlife/Fish		1234.9	1234 9	1234 9	1234 9	1234 9		
Range		890 2	884 9	893 2	879 9	879 9		
Timber		662 2	687 9	1064 9	1149 9	1175 8		
Soil/Water		598 1	406.2	383 3	371 8	371 8		
Minerals		839 0	616 4	621 9	621 0	621 2		
Roads/Facilities		778 2	769 9	787 7	789 6	790 8		
Other		3,121 1	3,117.6	3,156.3	3,103 7	3,094 8		
Total Forest Budget		11934 5	11454 7	12117.2	10705 5	10732 2		
Purchaser Credit Roads		539.0	411 5	925 0	185 2	130 4		
Returns to Treasury		1,621 5	1,590 5	2,448 7	2,454 6	2 263 2		

SECTION 8: SENSITIVITY ANALYSIS

A. OVERVIEW

This section evaluates the significance of various constraints used in the FORPLAN model as well as other assumptions used in the analysis such as the absense of price trends, the use of non-market values, and the determination of the timber values.

B. PROCESS FOR EVALUATING SIGNIFICANT CONSTRAINTS

Management objectives of benchmarks and alternatives were achieved by constraining FORPLAN as described in previous Sections. The cost-efficiency trade-offs of individual objectives can be determined by comparing the PNV of a FORPLAN solution which meets the objective and one which does not. The change in PNV is the cost efficiency trade-off of achieving a specific objective if both solutions have cost-efficient prescriptions, both solutions maximize PNV, and the constraints are cost-efficient. The cost-efficiency trade-off was not determined for individual alternative objectives because of the prohibitive costs of analyzing every constraint used to develop alternatives. But, by comparing alternatives, the economic trade-offs of the groups of objectives which have the most significant impact on PNV can be determined. These cost-efficiency trade-offs can then be compared to environmental and social consequences to help decision makers identify the alternative which maximizes net public benefits.

A major factor in the economic trade-off analysis is the order in which the objectives are analyzed. For example, the economic trade-off of meeting hypothetical management objectives X and Y can be determined by comparing FORPLAN solutions with various combinations of the two objectives. The change in PNV due to meeting only X may be $5 million, and the change due to meeting only Y may be $11 million. However, the change due to meeting both X and Y will probably be less than $16 million. In addition, the cost of meeting objective X in one alternative will not necessarily be the same as meeting the same objective in another alternative. Therefore, the economic trade-offs discussed in this section are only relevant to the actual alternative where the objectives were analyzed.

The following sensitivity analyses were performed to determine the economic trade-offs of the primary set of constraints used to develop the benchmarks and alternatives. All sensitivity tests were performed on the Preferred and High Productivity Alternatives to give the reviewer a better understanding of the impacts of the constraints.

C. THE "BASE" FORPLAN RUNS FOR THE PREFERRED AND HIGH PRODUCTIVITY ALTERNATIVES

Tables B-8-1 and B-8-2 summarize some of the key outputs from the FORPLAN runs with the constraints used to develop the Preferred and High Productivity Alternatives. This information provides the "base" that the sensitivity runs will be compared against. In order to get a get a better evaluation of the effects of the individual constraints, these "base" runs are from the first alternative FORPLAN runs which contain "splits" in some of the Allocation Choices. The "base" run for the Preferred Alternative also does not include any of the constraints used in the final FORPLAN run to provide a better distribution of the harvest volumes between the Community Interest Areas.

It should be noted that the outputs shown in all the tables in Section 8 do not inlcude outputs from the wilderness areas and the wilderness study areas. The PNV figures also only represent the PNV caclulated with the outputs and costs actually in the FORPLAN model and does not represent the total PNV figure.

It should also be noted that the FORPLAN runs in the sensitivity analyses were not rerun to correct any Allocation Zone "splits".

TABLE B-8-1: Preferred Alternative "Base" FORPLAN Run

	Decade				
	1	2	3	4	5
Total Volume - MMBF/Yr.	11.5	11.5	21.8	21.9	21.0
Acres Clearcut/Yr.	316.8	114.5	549.4	601.1	361.8
Acres Shelterwood/Yr.	313.3	426.1	494.4	516.7	567.5
Acres Selection/Yr.	1791.6	2683.9	3283.2	2948.3	3306.1
Miles Road Const./Yr.	2.5	8.4	16.0	6.7	2.6
Miles Road Recon./Yr.	3.0	1.0	2.4	0.2	0.2
PRIM MRVDs/Yr.	53.3	52.4	51.3	50.8	50.7
SPNM MRVDs/Yr.	85.5	85.7	93.0	90.9	90.4
SPMT MRVDs/Yr.	237.4	250.3	257.5	248.9	246.8
RDNT MRVDs/Yr.	655.7	682.2	734.0	765.1	769.4
Big Game MWFUD/Yr.	71.2	71.6	72.1	72.9	73.3
Fishing MWFUD/Yr.	39.4	41.9	44.6	48.8	50.8
Grazing MAUMs/Yr.	230.1	229.7	229.6	229.4	229.3

	Decade 1 Volume (MBF/Yr.)									
	DF-CC	DF-SW	DF-SL	LP-CC	LP-SW	LP-SL	SF-CC	SF-SW	SF-SL	Total
CIA-1	---	302.8	---	---	276.2	---	---	---	---	1910.6
CIA-2	---	---	---	---	---	---	---	---	---	0
CIA-3	---	---	---	---	---	---	---	---	---	0
CIA-4	---	---	---	655.9	1344.8	---	---	---	223.7	2224.4
CIA-5	101.7	17.7	---	---	346.8	1173.7	3104.8	---	988.6	5733.2
CIA-6	117.8	164.6	---	---	---	---	---	---	---	282.3
CIA-7	502.0	---	17.5	---	---	---	---	---	777.4	1297.0
CIA-8	---	---	---	---	---	---	55.7	---	---	55.7

Suitable Acres - 271,946
Present Net Value (M$) - 410,525

TABLE B-8-2: High Productivity Alternative "Base" FORPLAN Run

	Decade 1	2	3	4	5
Total Volume - MMBF/Yr.	68.2	68.6	72.2	70.6	70.4
Acres Clearcut/Yr.	1887.5	2343.9	934.8	344.1	667.9
Acres Shelterwood/Yr.	2067.9	3406.5	3936.0	6168.1	5775.9
Acres Selection/Yr.	6681.4	4168.6	7824.0	5573.9	8132.4
Miles Road Const./Yr.	20.5	13.3	37.1	14.3	9.0
Miles Road Recon./Yr.	6.6	1.0	3.0	0.7	0.6
PRIM MRVDs/Yr.	53.0	52.5	49.4	45.3	44.5
SPNM MRVDs/Yr.	84.2	81.4	83.4	82.3	80.2
SPMT MRVDs/Yr.	248.3	261.2	265.8	236.0	240.5
RDNT MRVDs/Yr.	671.3	701.0	763.1	918.7	941.3
Big Game MWFUD/Yr.	62.5	59.3	55.5	51.9	49.0
Fishing MWFUD/Yr.	39.4	42.8	45.9	52.7	55.8
Grazing MAUMs/Yr.	230.1	231.1	232.7	234.4	236.1

Decade 1 Volume (MBF/Yr.)

	DF-CC	DF-SW	DF-SL	LP-CC	LP-SW	LP-SL	SF-CC	SF-SW	SF-SL	Total
CIA-1	361.9	590.0	38.5	43.6	130.7	1506.2	1897.2	3123.2	993.3	8684.6
CIA-2	--	337.0	23.8	--	1216.6	--	--	2806.7	169.3	4553.3
CIA-3	--	3376.3	49.5	--	--	384.9	--	214.9	456.1	4481.8
CIA-4	2267.4	--	18.6	--	--	9276.0	17075.7	--	5.1	28642.8
CIA-5	--	615.7	90.0	--	--	813.6	--	8628.5	1639.3	11787.1
CIA-6	--	735.7	150.5	--	562.3	74.0	--	1166.1	46.3	2735.0
CIA-7	1501.2	--	170.2	--	--	44.4	4479.8	--	1035.8	7231.4
CIA-8	--	--	13.2	--	--	76.7	--	--	40.1	129.9

Suitable Acres - 485,164
Present Net Value (M$) - 446,931

D. THE USE OF NON-MARKET VALUES

Many people have objected to the use of "willingness-to-pay" values on those outputs that the Forest Service does not receive actual receipts for. It is often claimed that the use of these values "biases" the analysis. One analysis that shows the effect of the use of these values can be seen by comparing the Max PNV (Assigned Values) Benchmark with the Max PNV (Market Only Values) Benchmark. However, another analysis is desirable which shows the effect of the use of these values on the Preferred Alternative and the High Productivity Alternative.

Like the difference between the two Max PNV Benchmarks, these tests were accomplished by changing the objective function to one which calculates the PNV by only using the timber program benefits and costs.

Table B-8-3 shows that for the Preferred Alternative, the first decade harvest volume increased from 11.5 MMBF/year to 15.3 MMBF/year with significant increased in the amount of acres being harvested by shelterwood systems. The miles of new road construction are about the same in the first decade, but there is a significant increase in the third decade from 16 miles/year to 26 miles/year.

The PNV decreased $12,216,000 from $410,525,000 to $398,309,000.

TABLE B-8-3: PREFERRED ALTERNATIVE WITH A MAX PNV - MARKET VALUES ONLY OBJECTIVE FUNCTION

	Decade 1	2	3	4	5
Total Volume - MMBF/Yr.	15.3	15.2	23.5	23.8	22.6
Acres Clearcut/Yr.	375.5	288.5	478.6	621.6	251.6
Acres Shelterwood/Yr.	602.9	994.8	600.4	568.2	778.5
Acres Selection/Yr.	2053.2	1751.6	4267.3	2972.0	4281.9
Miles Road Const./Yr.	3.0	3.0	25.9	10.4	8.7
Miles Road Recon./Yr.	0.9	0.6	4.0	0.7	0.6
PRIM MRVDs/Yr.	53.2	52.9	51.1	47.8	47.2
SPNM MRVDs/Yr.	85.8	84.6	84.1	85.9	89.9
SPMT MRVDs/Yr.	235.7	239.0	232.1	225.2	228.2
RDNT MRVDs/Yr.	653.7	661.8	711.0	797.8	827.8
Big Game MWFUD/Yr.	71.2	71.6	72.1	75.0	76.9
Fishing MWFUD/Yr.	39.4	41.2	43.4	53.5	57.3
Grazing MAUMs/Yr.	230.1	218.9	218.9	218.5	218.3

Decade 1 Volume (MBF/Yr.)

	DF-CC	DF-SW	DF-SL	LP-CC	LP-SW	LP-SL	SF-CC	SF-SW	SF-SL	Total
CIA-1	---	360.6	1.5	---	---	---	---	---	1401.1	1763.1
CIA-2	---	---	---	---	---	---	---	---	75.2	75.2
CIA-3	---	464.8	---	---	---	---	---	---	261.9	726.7
CIA-4	---	---	---	---	2014.4	---	---	---	254.8	2731.3
CIA-5	80.9	---	---	169.4	---	1004.9	3753.1	67.5	696.3	5772.1
CIA-6	249.6	---	---	307.9	---	---	---	---	---	557.5
CIA-7	60.7	103.1	31.6	296.2	---	618.9	---	---	599.1	1709.5
CIA-8	---	38.8	---	---	1692.1	92.3	---	---	149.2	1972.3

Suitable Acres - 316,142
Present Net Value (M$) - 398,309

Table B-8-4 shows that for the High Productivity Alternative, the first decade volume increased from 68.2 MMBF/year to 94.6 MMBF/year. The miles of new roads being constructed show a corresponding increase.

The acres harvested by the clearcutting method decreased significantly, while the acres harvested by shelterwood and selection methods increased substantially. This is because without considering the other resources, it becomes more "economical" to build new roads and with the "cutover" constraints in place, the model can schedule more volume by going to the shelterwood and selection harvest methods.

The PNV shows a decrease of $105,365,000 from $446,931,000 to $341,566,000.

TABLE B-8-4: HIGH PRODUCTIVITY ALTERNATIVE WITH A MAX PNV - MARKET VALUES ONLY OBJECTIVE FUNCTION

	Decade 1	2	3	4	5
Total Volume - MMBF/Yr.	94.6	94.9	101.6	99.8	99.0
Acres Clearcut/Yr.	115.4	647.6	220.2	444.4	175.6
Acres Shelterwood/Yr.	6414.4	10134.5	8459.2	9125.3	8752.6
Acres Selection/Yr.	7604.0	8170.2	9948.1	9288.1	10529.1
Miles Road Const./Yr.	35.1	37.7	78.3	21.9	12.2
Miles Road Recon./Yr.	2.2	1.9	6.2	1.0	.7
PRIM MRVDs/Yr.	50.8	44.6	28.9	13.0	9.9
SPNM MRVDs/Yr.	85.7	80.6	75.1	68.2	65.7
SPMT MRVDs/Yr.	246.7	234.0	210.2	159.5	152.1
RDNT MRVDs/Yr.	691.9	809.5	982.3	1261.5	1324.5
Big Game MWFUD/Yr.	62.5	55.1	44.5	33.7	26.2
Fishing MWFUD/Yr.	39.4	46.3	54.0	69.7	77.3
Grazing MAUMs/Yr.	230.0	231.2	232.6	234.1	235.8

Decade 1 Volume (MBF/Yr.)

	DF-CC	DF-SW	DF-SL	LP-CC	LP-SW	LP-SL	SF-CC	SF-SW	SF-SL	Total
CIA-1	262.4	434.0	28.1	43.6	130.7	2118.6	1375.5	4608.1	977.9	9978.9
CIA-2	---	---	---	---	---	---	---	---	---	---
CIA-3	---	4163.0	79.2	---	---	1006.7	---	6183.0	53.0	11484.9
CIA-4	---	1845.2	19.2	---	5526.5	8495.4	---	14786.7	5.5	30678.6
CIA-5	---	418.3	56.1	---	48.6	3427.6	---	7805.6	1321.7	13077.8
CIA-6	---	2062.3	438.2	---	680.9	70.9	---	1268.3	63.7	4584.3
CIA-7	---	339.1	57.2	---	---	---	---	15418.0	1149.4	16963.7
CIA-8	---	116.4	---	---	5944.7	109.6	---	1696.6	6.8	7874.0

Suitable Acres - 668,041
Present Net Value (M$) - 341,566

E. HARVEST METHOD CONSTRAINTS

These constraints are described in Section 2 and are constraints to limit the percent of volume harvested by clearcutting, shelterwood, etc. These constraints are used to help define the differences between Management Prescriptions and were estimates of the mixes of methods used on the ground to achieve a particular "Desired Future Condition".

Table B-8-5 shows that in the Preferred Alternative, the first decade harvest volume only increased slightly from 11.5 MMBF/year to 11.9 MMBF/year. The miles of new road construction are essentially the same. The acres clearcut increase substantially while the acres harvested by shelterwood methods drop to almost nothing. The acres harvested by selection harvests are cut by more than 50% in the first decade, but are very similar in the third and fifth decades.

The PNV increases only $1,525,000 from $410,525,000 to $412,050,000.

TABLE B-8-5: PREFERRED ALTERNATIVE WITH THE HARVEST METHOD CONSTRAINTS REMOVED

	Decade 1	2	3	4	5
Total Volume - MMBF/Yr.	11.9	11.8	25.0	25.2	24.0
Acres Clearcut/Yr.	692.6	433.2	1053.1	1189.2	886.9
Acres Shelterwood/Yr.	0.5	0.9	19.1	1.2	1.2
Acres Selection/Yr.	874.8	2196.0	3250.8	2229.1	3273.7
Miles Road Const./Yr.	2.9	7.5	18.9	5.7	4.0
Miles Road Recon./Yr.	2.9	0.9	2.7	0.1	0.2
PRIM MRVDs/Yr.	53.3	52.4	51.1	50.6	50.5
SPNM MRVDs/Yr.	85.5	85.7	92.5	91.4	90.7
SPMT MRVDs/Yr.	23.7	25.0	25.8	25.1	24.8
RDNT MRVDs/Yr.	65.7	68.2	73.4	76.9	77.3
Big Game MWFUD/Yr.	71.2	71.6	72.1	73.1	73.6
Fishing MWFUD/Yr.	39.4	41.9	44.6	49.3	51.6
Grazing MAUMs/Yr.	230.1	229.7	229.6	229.4	229.3

Decade 1 Volume (MBF/Yr.)

	DF-CC	DF-SW	DF-SL	LP-CC	LP-SW	LP-SL	SF-CC	SF-SW	SF-SL	Total
CIA-1	502.5	1.3	---	400.7	2.7	---	---	---	1261.2	2168.4
CIA-2	---	---	---	---	---	---	---	---	---	0
CIA-3	---	---	---	---	---	---	---	---	---	0
CIA-4	---	---	---	1827.6	---	---	---	---	121.9	1949.6
CIA-5	131.2	---	---	426.1	---	---	3484.7	---	577.8	4619.8
CIA-6	345.2	---	---	---	---	---	---	---	---	345.2
CIA-7	669.3	---	17.5	---	---	---	1568.4	---	197.2	2452.3
CIA-8	182.6	---	---	---	---	---	166.9	---	---	349.5

Suitable Acres - 278,721
Present Net Value (M$) - 412,050

Table B-8-6 shows that in the High Productivity Alternative, the harvest method constraints had very little effect on the total volume harvested and on the miles of new roads being built. The acres harvested by the different methods also show relatively little change, as well as the distribution between the Community Interest Areas.

The PNV only increases $381,000 from $446,931,000 to $447,312,000.

TABLE B-8-6: HIGH PRODUCTIVITY ALTERNATIVE WITH THE HARVEST METHOD CONSTRAINTS REMOVED

	Decade 1	2	3	4	5
Total Volume - MMBF/Yr.	14.0	14.0	14.9	14.9	14.9
Acres Clearcut/Yr.	2096.5	2607.7	1001.2	512.4	1492.6
Acres Shelterwood/Yr.	2953.9	3861.7	6077.0	4739.8	4394.3
Acres Selection/Yr.	6205.5	4330.3	7145.4	5891.6	7458.6
Miles Road Const./Yr.	20.8	12.2	38.9	14.5	9.0
Miles Road Recon./Yr.	6.5	1.2	2.9	.7	.7
PRIM MRVDs/Yr.	53.0	52.5	49.1	44.6	43.9
SPNM MRVDs/Yr.	84.2	81.2	82.3	81.1	79.0
SPMT MRVDs/Yr.	248.0	261.0	265.7	236.5	241.0
RDNT MRVDs/Yr.	671.0	701.0	762.4	918.4	941.0
Big Game MWFUD/Yr.	62.5	59.4	55.8	52.1	49.0
Fishing MWFUD/Yr.	39.4	42.8	45.8	52.6	55.8
Grazing MAUMs/Yr.	230.1	231.1	232.5	234.2	235.9

Decade 1 Volume (MBF/Yr.)

	DF-CC	DF-SW	DF-SL	LP-CC	LP-SW	LP-SL	SF-CC	SF-SW	SF-SL	Total
CIA-1	471.0	767.8	50.2	236.7	.6	1237.5	4761.2	1395.3	1029.8	9950.2
CIA-2	---	337.0	23.8	---	1216.6	---	---	2806.7	169.3	4553.3
CIA-3	---	3376.3	49.5	---	---	290.5	---	269.1	433.6	4418.9
CIA-4	2258.2	---	18.5	---	---	9165.4	16900.2	---	5.0	28347.3
CIA-5	---	561.3	80.9	---	---	---	---	8489.9	1567.3	10701.3
CIA-6	---	735.7	150.5	---	562.3	74.0	---	1166.1	46.3	2735.0
CIA-7	1501.2	---	170.2	---	---	158.0	4581.1	---	1025.5	7436.0
CIA-8	---	---	13.2	---	---	76.7	---	---	40.1	129.9

Suitable Acres - 487,465
Present Net Value (M$) - 447,312

F. WILDLIFE ACTIVITY CONSTRAINTS

These constraints were used to ensure that in the wildlife-emphasis prescriptions, MP-7A and MP-10, no more than 5% of the acres suitable for timber harvesting would have activities on them at any one time. In that the High Productivity Alternative had a very small amount of acreage in Management Prescriptions 7A or 10, a sensitivity test was not run for this alternative. Table B-8-7 shows the effects of removing this constraint in the Preferred Alternative.

The impact of removing this constraint is that the first decade harvest volume increased from 11.5 MMBF/year to 16.1 MMBF/year and the acres under clearcut and selection harvest methods significantly increased while the acres under shelterwood harvest systems decreased dramatically. The outputs shown for Big Game WFUDs show little change. This is because these outputs were entered by Allocation Choice and roading option. Since these items were essentially the same between the two runs, no real defference is shown in the model.

The PNV increased $7,905,000 from $410,525,000 to $418,430,000.

TABLE B-8-7: PREFERRED ALTERNATVE WITH THE WILDLIFE ACTIVITY CONSTRAINTS REMOVED

	Decade 1	2	3	4	5
Total Volume - MMBF/Yr.	16.1	15.9	40.7	39.8	39.9
Acres Clearcut/Yr.	412.3	147.4	957.3	707.9	583.2
Acres Shelterwood/Yr.	26.5	26.8	181.6	959.9	836.5
Acres Selection/Yr.	3878.9	5093.7	8572.5	7660.4	8732.0
Miles Road Const./Yr.	3.9	11.9	19.4	7.7	1.4
Miles Road Recon./Yr.	2.7	1.3	2.4	0.2	0.2
PRIM MRVDs/Yr.	52.9	52.0	49.7	47.7	47.7
SPNM MRVDs/Yr.	85.8	85.6	89.9	86.9	87.0
SPMT MRVDs/Yr.	237.0	247.6	257.9	256.3	255.9
RDNT MRVDs/Yr.	657.4	693.7	740.1	768.9	770.3
Big Game MWFUD/Yr.	71.2	71.6	72.3	73.4	73.9
Fishing MWFUD/Yr.	39.4	42.2	45.5	50.1	52.1
Grazing MAUMs/Yr.	230.1	229.7	229.6	229.4	229.3

Decade 1 Volume (MBF/Yr.)

	DF-CC	DF-SW	DF-SL	LP-CC	LP-SW	LP-SL	SF-CC	SF-SW	SF-SL	Total
CIA-1	---	---	---	---	---	1363.8	---	---	2281.4	3645.2
CIA-2	---	---	---	---	---	---	---	---	---	0
CIA-3	---	---	---	---	---	---	---	---	797.6	797.6
CIA-4	---	---	---	---	---	---	---	---	---	0
CIA-5	101.7	17.7	---	454.9	---	1685.0	3231.2	---	1252.5	6742.9
CIA-6	78.3	189.9	27.4	---	---	214.8	---	---	95.5	605.8
CIA-7	458.1	---	17.5	---	---	509.1	1684.0	---	1224.9	3793.6
CIA-8	---	---	---	---	---	365.4	---	---	107.5	472.9

Suitable Acres - 296,405
Present Net Value (M$) - 418,430

G. CUTOVER CONSTRAINTS - INCREASED

The "cutover" constraints are described in Section 2 and were used as surrogates for a number of Management Requirements. The constraints were that no more than 20% of the suitable acres in Management Prescriptions 1A and 1B could be in a "cutover" condition and no more than 15% of the suitable acres in Management Prescriptions 7A and 10 could be in a "cutover" condition. For this sensitivity analysis, the percentages of allowed cutover were increased to 30% for Management Prescriptions 1A and 1B and 20% for Management Prescriptions 7A and 10.

Table B-8-8 shows that in the Preferred Alternative, the "cutover" constraints have a very significant impact on the FORPLAN solution. The first decade volume increased from 11.5 MMBF/year to 19.7 MMBF/year. The acres harvested by the different methods all show corresponding increases, but the miles of new road construction show relatively little change.

The PNV increases $6,638,000 from $410,525,000 to $417,163,000.

TABLE B-8-8: PREFERRED ALTERNATIVE WITH THE CUTOVER CONSTRAINTS INCREASED TO 30% AND 20%

	Decade 1	2	3	4	5
Total Volume - MMBF/Yr.	19.7	19.6	24.8	24.2	24.1
Acres Clearcut/Yr.	610.1	557.1	715.3	775.1	704.7
Acres Shelterwood/Yr.	652.3	1069.0	879.3	860.9	819.0
Acres Selection/Yr.	2027.6	1765.1	2319.3	2535.0	2335.3
Miles Road Const./Yr.	2.7	10.8	17.1	3.7	2.9
Miles Road Recon./Yr.	3.3	0.9	2.4	0.1	0.2
PRIM MRVDs/Yr.	53.3	51.1	48.8	48.5	48.5
SPNM MRVDs/Yr.	85.5	85.6	89.6	88.6	88.1
SPMT MRVDs/Yr.	237.3	250.7	261.8	258.4	256.4
RDNT MRVDs/Yr.	656.9	685.8	734.0	753.7	756.1
Big Game MWFUD/Yr.	71.2	71.5	72.0	72.7	73.1
Fishing MWFUD/Yr.	39.4	41.6	44.5	48.3	50.2
Grazing MAUMs/Yr.	230.1	229.7	229.6	229.4	229.3

Decade 1 Volume (MBF/Yr.)

	DF-CC	DF-SW	DF-SL	LP-CC	LP-SW	LP-SL	SF-CC	SF-SW	SF-SL	Total
CIA-1	---	302.8	---	---	1402.9	---	---	---	1099.0	2804.7
CIA-2	---	45.9	---	---	---	---	---	---	68.3	114.2
CIA-3	---	210.3	---	---	---	---	---	---	215.2	425.6
CIA-4	---	---	---	979.5	1188.7	---	---	---	228.6	2396.8
CIA-5	107.7	17.7	---	---	475.5	960.0	5200.6	1792.1	577.8	9125.3
CIA-6	49.6	120.1	---	---	---	---	---	---	---	169.7
CIA-7	681.2	---	19.3	---	---	1199.7	1849.7	---	490.6	4240.5
CIA-8	---	---	---	119.1	---	300.6	---	---	---	419.6

Suitable Acres - 275,986
Present Net Value (M$) - 417,163

Table B-8-9 shows that in the High Productivity Alternative, the cutover constraints have an impact, but not as great as in the Preferred Alternative. The first decade volume increases from 68.2 MMBF/year to 76.9 MMBF/year. The miles of new road construction decreases in the first decade from 20.5 miles/year to 16.3 miles/year, but make up for it in the third decade where the miles built increase from 37.1 miles/year to 47.5 miles/year.

The acres harvested by clearcut and shelterwood harvest methods generally increase, while the acres harvested by the selection method decreases dramatically.

The PNV increased $6,019,000 from $446,931,000 to $452,950,000.

TABLE B-8-9: HIGH PRODUCTIVITY ALTERNATIVE WITH THE CUTOVER CONSTRAINTS INCREASED TO 30% AND 20%

	Decade 1	2	3	4	5
Total Volume - MMBF/Yr.	76.9	76.4	77.5	75.5	75.2
Acres Clearcut/Yr.	2217.0	929.5	1686.0	524.1	203.3
Acres Shelterwood/Yr.	3504.9	7552.4	6624.1	6787.0	8448.4
Acres Selection/Yr.	2177.5	2546.7	3100.0	3710.7	3334.1
Miles Road Const./Yr.	16.3	9.2	47.5	16.0	8.2
Miles Road Recon./Yr.	6.5	1.2	3.1	.5	.5
PRIM MRVDs/Yr.	53.1	52.7	46.7	39.7	39.0
SPNM MRVDs/Yr.	84.3	81.5	81.8	77.6	76.0
SPMT MRVDs/Yr.	24.3	25.2	26.2	23.7	23.9
RDNT MRVDs/Yr.	668.9	701.0	772.9	933.8	949.6
Big Game MWFUD/Yr.	62.5	59.1	55.3	51.6	48.2
Fishing MWFUD/Yr.	39.4	43.1	46.0	53.2	56.2
Grazing MAUMs/Yr.	230.1	230.7	231.6	233.3	235.0

Decade 1 Volume (MBF/Yr.)

	DF-CC	DF-SW	DF-SL	LP-CC	LP-SW	LP-SL	SF-CC	SF-SW	SF-SL	Total
CIA-1	507.8	773.3	54.4	26.4	9661.2	---	4355.0	3426.7	1096.3	19901.1
CIA-2	---	337.0	23.8	---	---	---	---	2806.7	169.3	3336.7
CIA-3	---	3376.3	49.5	---	---	---	---	4054.4	29.2	7509.4
CIA-4	1794.1	---	14.3	---	---	---	8073.9	---	2.3	9884.6
CIA-5	---	644.6	94.9	---	---	---	---	8893.7	1725.1	11358.3
CIA-6	---	2349.8	454.7	---	1124.6	122.6	---	1574.3	81.0	5706.8
CIA-7	1501.2	---	170.2	---	---	---	13099.5	---	1162.6	15933.4
CIA-8	160.0	---	13.2	---	---	---	3064.1	---	40.1	3277.3

Suitable Acres - 495,959
Present Net Value (M$) - 452,950

H. CUTOVER CONSTRAINTS - DECREASED

As was described above, the cutover constraints were 20% for Management Prescriptions 1A and 1B and 15% for Management Prescriptions 7A and 10. These constraints appear to have significant impacts on the FORPLAN solutions and another test was performed to see what would happen if the percentages were reduced. For this sensitivity analysis, the respective percentages were changed to 15% and 10%.

Table B-8-10 shows that in the Preferred Alternative, the first decade harvest volume drops from 11.5 MMBF/year to 5.5 MMBF/year. The decrease is not as great in the fifth decade where it drops from 21.0 MMBF/year to 18.5 MMBF/year. The acres harvested by the clearcutting method decrease significantly. The acres harvested by the shelterwood systems also decrease in the first two decades, but are relatively similar in the third and fifth decades. The acres under selection harvests decrease in the first two decades, but increase in the remaining decades. The amount of new road construction is essentially the same.

The PNV decreased $5,801,000 from $410,525,000 to $404,724,000.

TABLE B-8-10: PREFERRED ALTERNATIVE WITH THE CUTOVER CONSTRAINTS REDUCED TO 15% AND 10%

	Decade 1	2	3	4	5
Total Volume - MMBF/Yr.	5.5	5.5	19.5	19.6	18.5
Acres Clearcut/Yr.	92.1	11.9	289.9	506.4	82.2
Acres Shelterwood/Yr.	250.1	88.6	489.0	405.0	478.8
Acres Selection/Yr.	1250.7	1820.1	4270.6	3012.5	4279.7
Miles Road Const./Yr.	2.5	9.9	17.3	6.7	2.5
Miles Road Recon./Yr.	3.4	1.1	2.9	0.2	0
PRIM MRVDs/Yr.	53.3	52.4	50.9	50.0	50.0
SPNM MRVDs/Yr.	85.5	85.6	92.3	89.8	89.5
SPMT MRVDs/Yr.	237.4	249.6	257.3	251.9	250.8
RDNT MRVDs/Yr.	655.7	685.3	734.0	762.3	764.6
Big Game MWFUD/Yr.	71.2	71.6	72.2	73.5	74.2
Fishing MWFUD/Yr.	39.4	41.8	44.9	49.5	51.7
Grazing MAUMs/Yr.	230.1	229.7	229.6	229.4	229.3

	Decade 1 Volume (MBF/Yr.)									
	DF-CC	DF-SW	DF-SL	LP-CC	LP-SW	LP-SL	SF-CC	SF-SW	SF-SL	Total
CIA-1	---	175.1	---	---	---	---	---	240.4	1148.3	1563.7
CIA-2	---	---	---	---	---	---	---	---	77.0	77.0
CIA-3	117.5	354.4	---	---	---	---	---	---	101.6	573.6
CIA-4	---	---	---	---	---	---	---	---	263.4	263.4
CIA-5	---	---	---	---	---	---	990.7	125.9	1212.1	2328.7
CIA-6	109.4	151.2	---	---	---	---	---	---	---	260.6
CIA-7	---	---	---	---	---	---	---	---	261.4	261.4
CIA-8	---	---	---	---	---	---	127.2	---	50.4	177.6

Suitable Acres - 275,419
Present Net Value (M$) - 404,724

Table B-8-11 shows that in the High Productivity Alternative, the first decade volume drops significantly from 68.2 MMBF/year to 45.6 MMBF/year. In the second decades, however, the volumes are essentially the same and in the remaining decades, the volume is reduced by approximately 2 MMBF/year. In the first decade, the amount of acres clearcut decrease, but not as great as the decrease in the acres harvested by shleterwood systems. The acres under selection harvests show an increase. In the fifth decade, the acres harvested by clearcut and selection methods show an increase but the acres harvested by shelterwood systems have significantly decreased.

The total miles of new road construction over the first five decades is essentially the same, but the miles built in the first decade have decreased from 20.5 miles/year to 16.2 miles/year.

The PNV decreased $9,460,000 from $446,931,000 to $437,471,000.

TABLE B-8-11: HIGH PRODUCTIVITY ALTERNATIVE WITH THE CUTOVER CONSTRAINTS REDUCED TO 15% AND 10%

	Decade 1	2	3	4	5
Total Volume - MMBF/Yr.	45.6	68.8	69.3	68.5	68.3
Acres Clearcut/Yr.	1129.2	1801.3	1521.7	1680.6	1572.7
Acres Shelterwood/Yr.	738.7	2247.1	2595.7	2637.7	2459.5
Acres Selection/Yr.	8115.6	7430.0	9870.9	7846.9	10136.9
Miles Road Const./Yr.	16.2	17.2	40.1	12.3	7.2
Miles Road Recon./Yr.	6.6	1.4	2.7	.6	.6
PRIM MRVDs/Yr.	53.0	52.5	45.0	37.2	36.8
SPNM MRVDs/Yr.	84.5	82.7	84.1	81.8	79.6
SPMT MRVDs/Yr.	24.7	26.0	26.4	24.2	24.7
RDNT MRVDs/Yr.	668.2	701.0	776.4	896.2	920.0
Big Game MWFUD/Yr.	62.5	59.6	55.3	50.8	47.8
Fishing MWFUD/Yr.	39.4	42.1	45.5	52.4	56.1
Grazing MAUMs/Yr.	230.1	230.9	232.6	234.3	236.0

Decade 1 Volume (MBF/Yr.)

	DF-CC	DF-SW	DF-SL	LP-CC	LP-SW	LP-SL	SF-CC	SF-SW	SF-SL	Total
CIA-1	172.4	---	126.2	55.7	167.2	---	---	---	1003.8	1352.9
CIA-2	---	337.0	23.8	---	---	875.7	---	987.1	169.3	2392.8
CIA-3	---	1643.0	49.5	---	---	842.2	---	---	950.2	3484.8
CIA-4	2126.3	---	17.3	---	---	7699.3	14391.2	---	4.3	24238.4
CIA-5	---	644.1	94.9	---	---	4472.7	---	2629.8	1686.6	9528.1
CIA-6	---	713.3	149.3	---	---	202.2	---	11424.0	45.0	2252.3
CIA-7	---	---	170.2	---	---	---	---	---	2183.7	2353.9
CIA-8	---	---	---	---	---	---	---	---	---	---

Suitable Acres - 477,854
Present Net Value (M$) - 437,471

I. CUTOVER STATUS CONSTRAINTS

Closely tied to the total cutover constraint analysis is the number of decades an area is in a "cutover" status. The number of decades differs by Management Prescription and harvest method (see Section 2), but generally an acre harvested is in a "cutover" classification for 2 decades in Management Prescription 1A and 3 decades in the other Management Prescriptions. For this analysis, the length of time has been reduced to a one decade length of time for MP-1A and two decades for the other prescriptions. In order to compare the effects of this change, the percentages used in this analysis were the original 20% for MP-1A and MP-1B and 15% for MP-7A and MP-10.

Table B-8-12 shows that in the Preferred Alternative, the reduction of the length of time an acre harvested in is "cutover" status has a significant effect on the FORPLAN solution. The first decade volume increased from 11.5 MMBF/year to 17.0 MMBF/year and in the second decade, the volume increased from 11.5 MMBF/year to 24.5 MMBF/year where it levels off for the remaining decades.

The acres harvested by shelterwood systems increase substantially, while the acres harvested by clearcutting also show increases. The acres harvested by selection methods show significant decreases.

The total miles of new road construction over the five decades are essentially the same.

The PNV increased $5,891,000 from $410,525,000 to 416,416,000.

TABLE B-8-12: PREFERRED ALTERNATIVE WITH THE DECADES IN CUTOVER STATUS REDUCED

	Decade				
	1	2	3	4	5
Total Volume - MMBF/Yr.	17.0	24.5	24.9	24.5	24.6
Acres Clearcut/Yr.	502.3	765.6	711.4	714.4	712.7
Acres Shelterwood/Yr.	578.7	1540.6	1287.6	1211.9	1165.6
Acres Selection/Yr.	1997.6	630.7	2278.9	1089.5	2452.5
Miles Road Const./Yr.	2.5	11.1	18.3	3.9	3.2
Miles Road Recon./Yr.	3.1	0.8	2.6	0.2	0.2
PRIM MRVDs/Yr.	53.3	51.1	48.5	48.1	48.1
SPNM MRVDs/Yr.	85.5	85.6	89.6	88.3	87.8
SPMT MRVDs/Yr.	237.4	250.7	262.0	259.6	258.0
RDNT MRVDs/Yr.	655.7	684.5	734.0	755.5	757.8
Big Game MWFUD/Yr.	71.2	71.5	72.0	72.9	73.4
Fishing MWFUD/Yr.	39.4	41.5	44.4	48.8	50.9
Grazing MAUMs/Yr.	230.1	229.7	229.6	229.4	229.3

Decade 1 Volume (MBF/Yr.)

	DF-CC	DF-SW	DF-SL	LP-CC	LP-SW	LP-SL	SF-CC	SF-SW	SF-SL	Total
CIA-1	---	302.8	---	18.8	1805.3	---	---	---	912.1	3039.1
CIA-2	---	---	---	---	---	---	---	---	---	0
CIA-3	---	---	---	---	---	---	---	---	120.0	120.0
CIA-4	---	---	---	1131.7	1458.2	---	---	---	---	2589.9
CIA-5	101.7	17.7	---	---	346.8	1577.6	3792.6	---	389.8	6804.0
CIA-6	---	159.8	---	---	---	---	---	---	---	159.8
CIA-7	626.7	25.6	17.5	---	142.8	938.3	1568.4	---	408.6	3727.8
CIA-8	---	---	---	---	---	365.4	---	---	186.5	551.9

Suitable Acres - 280,984
Present Net Value (M$) - 416,416

Table B-8-13 shows that in the High Productivity Alternative, the reduction of the length of time an acre harvested in is "cutover" status also has a significant effect on the FORPLAN solution. The first decade volume increased from 68.2 MMBF/year to 77.3 MMBF/year and in the fifth decade, the volume increased from 70.4 MMBF/year to 75.5 MMBF/year.

The acres harvested by shelterwood systems increased substiantially, while the acres harvested by selection methods decreased substiantially. There are no trends with the acres clearcut since some decades it shows an increase, while in other decades it shows a decrease.

The total miles of new road construction over the five decades increases by only 3.5 miles/year.

The PNV increased $6,368,000 from $446,931,000 to $453,299,000.

TABLE B-8-13: HIGH PRODUCTIVITY ALTERNATIVE WITH THE DECADES IN CUTOVER STATUS REDUCED

	Decade 1	2	3	4	5
Total Volume - MMBF/Yr.	77.3	76.8	77.9	75.9	75.5
Acres Clearcut/Yr.	2268.1	592.3	1885.5	580.7	448.4
Acres Shelterwood/Yr.	3489.7	7974.3	6706.4	6513.0	8224.4
Acres Selection/Yr.	2162.1	2678.7	3160.3	3606.2	3378.9
Miles Road Const./Yr.	13.6	10.6	48.8	16.6	8.1
Miles Road Recon./Yr.	6.4	1.4	3.0	.5	.5
PRIM MRVDs/Yr.	53.2	52.7	46.7	39.7	38.9
SPNM MRVDs/Yr.	84.4	82.0	80.9	76.1	74.8
SPMT MRVDs/Yr.	242.2	248.6	262.9	238.9	240.8
RDNT MRVDs/Yr.	668.2	701.0	781.4	943.4	956.3
Big Game MWFUD/Yr.	62.5	59.2	55.4	51.5	48.3
Fishing MWFUD/Yr.	39.4	42.9	45.9	53.0	56.3
Grazing MAUMs/Yr.	230.1	230.5	231.4	233.1	234.8

Decade 1 Volume (MBF/Yr.)

	DF-CC	DF-SW	DF-SL	LP-CC	LP-SW	LP-SL	SF-CC	SF-SW	SF-SL	Total
CIA-1	471.0	770.1	50.2	34.7	7810.5	87.3	4140.8	2643.5	1071.9	17080.1
CIA-2	---	337.0	23.8	---	---	---	---	2806.7	169.3	3336.7
CIA-3	---	3376.3	49.5	---	---	---	---	2805.0	29.2	6259.9
CIA-4	1638.3	---	12.9	---	---	---	5110.7	---	1.4	6763.3
CIA-5	---	645.0	94.9	---	2769.2	---	---	8987.2	1748.2	14244.5
CIA-6	---	2445.8	459.1	---	---	---	---	1655.8	86.3	4647.1
CIA-7	1501.2	---	170.2	---	---	---	17165.9	---	1156.1	19993.4
CIA-8	160.0	---	13.2	---	1582.8	---	3151.4	---	40.1	4947.4

Suitable Acres - 495,791
Present Net Value (M$) - 453,299

J. THE USE OF PRICE TRENDS

The policy for Region 4 is to not use timber price trends in the FORPLAN analysis. However, this policy is a controversial one, so in an attempt to determine the implications of this policy on the Bridger-Teton National Forest, price trends of a 1% annual increase were tested.

Table B-8-14 shows that for the Preferred Alternative, the price trends had very little effect on changing the FORPLAN solution.

The PNV increased only $400,000 from $410,525,000 to $410,925,000.

TABLE B-8-14: PREFERRED ALTERNATIVE WITH A 1% ANNUAL TIMBER PRICE TREND

	Decade 1	2	3	4	5
Total Volume - MMBF/Yr.	11.5	11.5	21.8	21.9	21.1
Acres Clearcut/Yr.	316.6	114.8	549.3	601.7	364.4
Acres Shelterwood/Yr.	312.2	425.7	500.3	522.7	573.5
Acres Selection/Yr.	1801.1	2687.2	3274.8	2938.6	3297.7
Miles Road Const./Yr.	2.5	8.4	16.0	6.7	2.6
Miles Road Recon./Yr.	3.0	1.0	2.4	0.2	0.2
PRIM MRVDs/Yr.	53.3	52.4	51.3	50.8	50.7
SPNM MRVDs/Yr.	85.5	85.7	93.0	90.9	90.4
SPMT MRVDs/Yr.	237.4	250.3	257.5	248.9	246.8
RDNT MRVDs/Yr.	655.7	682.2	734.0	765.1	769.4
Big Game MWFUD/Yr.	43.3	43.3	43.3	43.3	43.3
Fishing MWFUD/Yr.	39.4	41.9	44.6	48.8	50.8
Grazing MAUMs/Yr.	230.1	229.7	229.6	229.4	229.3

Decade 1 Volume (MBF/Yr.)

	DF-CC	DF-SW	DF-SL	LP-CC	LP-SW	LP-SL	SF-CC	SF-SW	SF-SL	Total
CIA-1	---	302.8	---	---	276.2	---	---	---	1331.6	1910.6
CIA-2	---	---	---	---	---	---	---	---	---	0
CIA-3	---	---	---	---	---	---	---	---	---	0
CIA-4	---	---	---	655.9	1344.8	---	---	---	223.7	2224.4
CIA-5	101.7	17.7	---	---	346.8	1169.1	3104.8	---	993.3	5733.4
CIA-6	128.1	156.2	---	---	---	---	---	---	---	284.4
CIA-7	488.8	---	17.5	---	---	---	---	---	802.6	1308.9
CIA-8	---	---	---	---	---	---	55.7	---	---	55.7

Suitable Acres - 271,981
Present Net Value (M$) - 410,925

Table B-8-15 shows that in the High Productivity Alternative, the total volume harvested increased by approximately 2 MMBF/year in all the decades. The acres harvested by the different methods also show relatively little change and the total miles of new road construction increase slightly.

The PNV increased $1,620,000 from $446,931,000 to $448,551,000.

TABLE B-8-15: HIGH PRODUCTIVITY ALTERNATIVE WITH A 1% ANNUAL TIMBER PRICE TREND

	Decade 1	2	3	4	5
Total Volume - MMBF/Yr.	15.2	15.2	18.5	18.5	23.4
Acres Clearcut/Yr.	1986.2	2387.0	1023.8	563.1	933.2
Acres Shelterwood/Yr.	2171.1	3490.1	3995.7	5962.8	5422.1
Acres Selection/Yr.	6568.1	4857.2	7801.5	6372.8	8103.7
Miles Road Const./Yr.	23.2	11.5	42.4	14.1	8.8
Miles Road Recon./Yr.	6.7	.9	3.0	.6	.7
PRIM MRVDs/Yr.	53.0	52.5	46.9	40.4	39.7
SPNM MRVDs/Yr.	84.1	80.6	82.4	81.2	79.1
SPMT MRVDs/Yr.	249.1	262.3	265.6	235.2	239.7
RDNT MRVDs/Yr.	627.7	701.0	769.7	928.2	950.8
Big Game MWFUD/Yr.	62.5	59.1	55.3	51.6	48.2
Fishing MWFUD/Yr.	39.4	43.1	46.1	53.4	56.4
Grazing MAUMs/Yr.	230.1	231.2	232.7	234.4	236.1

Decade 1 Volume (MBF/Yr.)

	DF-CC	DF-SW	DF-SL	LP-CC	LP-SW	LP-SL	SF-CC	SF-SW	SF-SL	Total
CIA-1	361.9	593.9	38.6	43.6	130.7	173.6	189.7	404.6	101.1	9858.5
CIA-2	---	337.0	23.8	---	101.7	---	---	2806.7	169.3	4353.3
CIA-3	---	3376.3	49.5	---	---	384.9	---	214.9	456.1	4481.8
CIA-4	2333.8	---	19.2	---	345.1	8746.2	18338.8	---	5.5	29788.6
CIA-5	---	644.1	94.9	---	---	601.7	---	8738.0	1686.6	11765.3
CIA-6	---	735.7	150.5	---	562.3	74.0	---	1166.1	46.3	2735.0
CIA-7	1501.2	---	170.2	---	---	198.4	4617.1	---	1021.9	7508.7
CIA-8	---	---	13.2	---	---	78.3	---	---	40.1	131.6

Suitable Acres - 499,873
Present Net Value (M$) - 448,551

K. TIMBER VALUES

In the development of the timber values, a regression analysis was performed using the data from timber sales from 1972 to 1986. Many individuals have suggested that it is not appropriate to include data from sales before 1982. In an effort to test the sensitivity of these values, the timber values were recalculated using the timber data from 1982 to 1986.

New regression analyses were tested using only timber data from 1982 to 1986, but none of these analyses were statistically significant. Therefore, in order to determine some timber values that could be used to test the significance of the timber values used, the original regression equation described in Section 4 was used. However, instead of inserting the average values from the 1972 to 1986 timber sales into the equation, the average values from only the 1982 to 1986 timber sales were used.

A comparison of the average values used in the regression equation are shown below (in 1982 dollars):

	1972-1986 Avg.	1982-1986 Avg.
Selling Price-LS for Douglas-fir	$356.17/MBF	$311.45/MBF
Selling Price-LS for Lodgepole Pine	$318.54/MBF	$315.33/MBF
Selling Price-LS for Spruce/Fir	$338.56/MBF	$322.90/MBF
Manufacturing/Logging Costs	$214.19/MBF	$227.71/MBF
Brush Disposal Fund	$5.53/MBF	$3.15/MBF
Non-Effective Purchaser Road Credits	$10.92/MBF	$8.86/MBF

Table B-8-16 shows that in the Preferred Alternative, the use of these timber values reduces the volume harvested in each decade by approximately 3 MMBF/year. The acres harvested by the different methods all show corresponding decreases. The miles of new road construction are essentially the same in the first, second and fourth decade, but decreases in the fifth decade and drops from 16.0 miles/year to 10.6 miles/year in the third decade.

The PNV decreased $5,105,000 from $410,525,000 to $405,420,000.

TABLE B-8-16: PREFERRED ALTERNATIVE USING 1982-1986 AVERAGE TIMBER VALUES

	Decade 1	2	3	4	5
Total Volume - MMBF/Yr.	8.2	8.1	18.8	18.8	18.1
Acres Clearcut/Yr.	213.0	68.6	475.9	509.9	294.0
Acres Shelterwood/Yr.	152.5	303.3	384.5	462.1	538.8
Acres Selection/Yr.	1488.4	1929.3	2971.0	2404.0	2972.3
Miles Road Const./Yr.	2.5	8.9	10.6	6.2	0.6
Miles Road Recon./Yr.	3.6	1.0	2.1	0.2	0
PRIM MRVDs/Yr.	53.3	52.4	51.1	50.7	50.6
SPNM MRVDs/Yr.	85.5	85.7	94.4	92.9	92.9
SPMT MRVDs/Yr.	237.4	250.0	257.6	252.7	252.1
RDNT MRVDs/Yr.	655.7	683.3	734.0	753.4	755.0
Big Game MWFUD/Yr.	71.2	71.7	72.3	73.0	73.3
Fishing MWFUD/Yr.	39.4	42.0	45.0	47.9	49.3
Grazing MAUMs/Yr.	230.1	229.7	229.6	229.4	229.3

Decade 1 Volume (MBF/Yr.)

	DF-CC	DF-SW	DF-SL	LP-CC	LP-SW	LP-SL	SF-CC	SF-SW	SF-SL	Total
CIA-1	---	302.8	---	---	125.4	---	---	---	1403.5	1831.7
CIA-2	---	---	---	---	---	---	---	---	---	0
CIA-3	---	---	---	---	---	---	---	---	---	0
CIA-4	---	---	---	157.4	---	---	---	---	592.1	749.5
CIA-5	---	17.7	---	---	346.8	868.3	2814.7	318.3	645.6	5011.4
CIA-6	166.6	179.3	---	---	---	---	---	---	---	345.9
CIA-7	---	---	---	---	---	---	---	---	236.6	236.6
CIA-8	---	---	---	---	---	---	---	---	---	0

Suitable Acres - 249,492
Present Net Value (M$) - 405,420

Table B-8-17 shows that in the High Productivity Alternative, the first decade volume decreased from 68.2 MMBF/year to 52.2 MMBF/year when the reduced timber values were used. In the fifth decade, the harvest volume decreased from 70.4 MMBF/year to 57.3 MMBF/year. Generally, there were corresponding decreases in the amount of acres harvested by the different methods. The total miles of new road construction also decreased by about 40%.

The PNV decreased $20,346,000 from $446,931,000 to $426,585,000.

TABLE B-8-17: HIGH PRODUCTIVITY ALTERNATIVE USING 1982-1986 AVERAGE TIMBER VALUES

	Decade				
	1	2	3	4	5
Total Volume - MMBF/Yr.	52.2	58.7	58.7	57.3	57.3
Acres Clearcut/Yr.	1727.4	2391.9	671.3	254.9	128.1
Acres Shelterwood/Yr.	1172.7	2398.8	3491.8	5758.0	5776.3
Acres Selection/Yr.	5164.1	1688.2	5975.6	2267.2	6099.8
Miles Road Const./Yr.	15.4	4.9	23.3	8.3	4.5
Miles Road Recon./Yr.	6.9	1.4	3.2	.2	.3
PRIM MRVDs/Yr.	53.0	52.5	50.3	47.8	47.5
SPNM MRVDs/Yr.	84.6	81.7	80.0	79.2	77.2
SPMT MRVDs/Yr.	246.0	253.1	254.9	239.5	244.1
RDNT MRVDs/Yr.	666.9	701.0	734.0	814.4	835.5
Big Game MWFUD/Yr.	62.5	60.5	58.4	56.3	54.1
Fishing MWFUD/Yr.	39.4	41.4	42.8	46.8	48.2
Grazing MAUMs/Yr.	230.1	231.3	232.7	234.5	236.2

	Decade 1 Volume (MBF/Yr.)									
	DF-CC	DF-SW	DF-SL	LP-CC	LP-SW	LP-SL	SF-CC	SF-SW	SF-SL	Total
CIA-1	5.9	17.6	74.7	98.2	294.5	---	438.0	---	464.5	1393.3
CIA-2	---	---	23.8	---	---	---	---	2806.7	169.3	2999.7
CIA-3	---	---	49.5	---	---	470.7	---	4216.8	29.2	4766.2
CIA-4	2286.2	---	18.8	1205.7	---	7938.5	17432.1	---	5.2	28886.4
CIA-5	---	---	94.9	---	---	718.7	---	3892.3	1389.1	6094.9
CIA-6	---	732.7	150.4	---	558.0	73.4	---	1162.9	46.1	2723.4
CIA-7	---	---	170.2	---	---	---	3850.0	---	118.1	5201.5
CIA-8	---	---	13.2	---	---	76.7	---	---	40.1	129.9

Suitable Acres - 394,950
Present Net Value (M$) - 426,585

L. ROAD COSTS

The roads costs used in the analysis for the Draft Environmental Impact Statement were a source of many public comments and one of the reasons for the decision to rebuild the FORPLAN model. A great amount of effort has been put into the estimation of road costs and the amount of roads needed to access timber on the Bridger-Teton National Forest.

With the amount of attention that road costs have received in the past, it was felt that it would be desirable to see if reduced road costs would bring more acres into the suitable base. For this sensitivity analysis, all new construction road costs were reduced by 25%.

Table B-8-18 shows that in the Preferred Alternative, the reduced road costs had very little impact on the FORPLAN solution. The harvest volumes only increased slightly, with the biggest increase occurring in the third decade from 21.8 MMBF/year to 22.1 MMBF/year. The acreages harvested by the different methods show relatively little changes. The suitable timber base only increased by 8,236 acres from 271,946 to 280,182.

The miles of new road costruction are essentially the same in all the decades except in the second decade where it increases from 8.4 miles/year to 11.3 miles/year.

The PNV increased $877,000 from $410,525,000 to $411,402,000.

TABLE B-8-18: PREFERRED ALTERNATIVE WITH ROAD COSTS REDUCED BY 25%

	Decade				
	1	2	3	4	5
Total Volume - MMBF/Yr.	11.6	11.6	22.1	22.1	21.2
Acres Clearcut/Yr.	311.5	112.2	551.5	601.5	361.2
Acres Shelterwood/Yr.	298.7	391.1	485.7	528.0	564.9
Acres Selection/Yr.	1905.7	2823.7	3370.4	3012.7	3393.3
Miles Road Const./Yr.	2.7	11.3	16.2	6.8	2.5
Miles Road Recon./Yr.	3.0	1.1	2.3	0.2	0.2
PRIM MRVDs/Yr.	53.2	51.4	49.4	48.9	48.8
SPNM MRVDs/Yr.	85.6	85.6	89.7	88.5	88.0
SPMT MRVDs/Yr.	237.3	250.2	260.5	250.9	248.8
RDNT MRVDs/Yr.	656.0	686.3	734.0	768.9	773.2
Big Game MWFUD/Yr.	71.2	71.5	72.2	73.0	73.4
Fishing MWFUD/Yr.	39.4	41.6	44.8	49.0	50.9
Grazing MAUMs/Yr.	230.1	229.7	229.6	229.4	229.3

Decade 1 Volume (MBF/Yr.)

	DF-CC	DF-SW	DF-SL	LP-CC	LP-SW	LP-SL	SF-CC	SF-SW	SF-SL	Total
CIA-1	---	302.8	---	---	190.4	---	---	---	1610.4	2103.5
CIA-2	---	---	---	---	---	---	---	---	---	0
CIA-3	---	---	---	---	---	---	---	---	---	0
CIA-4	---	---	---	637.8	1376.1	---	---	---	226.3	2240.1
CIA-5	101.7	17.7	---	---	346.8	1153.3	3069.0	---	985.7	5674.1
CIA-6	111.0	104.9	---	---	---	---	---	---	---	215.9
CIA-7	488.8	---	17.5	---	---	---	---	---	802.6	1308.9
CIA-8	---	---	---	---	---	---	55.7	---	---	55.7

Suitable Acres - 280,182
Present Net Value (M$) - 411,402

Table B-8-19 shows that for the High Productivity Alternative, the total volumes for each decade only increased by about 2.5 MMBF/year when the road costs were reduced by 25%. There were only slight changes in the amount of acres harvested by the different methods. The suitable timber base did increase 16,664 acres from 485,164 to 501,828.

The miles of new road construction are essentially the same, with a total increase over the five decades of around 6 miles/year.

The PNV increased $2,313,000 from $446,931,000 to $449,244,000.

TABLE B-8-19: HIGH PRODUCTIVITY ALTERNATIVE WITH ROAD COSTS REDUCED BY 25%

	Decade				
	1	2	3	4	5
Total Volume - MMBF/Yr.	70.9	71.0	75.0	73.1	72.9
Acres Clearcut/Yr.	1992.9	2365.7	1069.3	563.8	730.8
Acres Shelterwood/Yr.	2192.3	3532.7	3977.5	5929.9	5712.2
Acres Selection/Yr.	6543.9	4968.4	7789.5	6484.9	5712.2
Miles Road Const./Yr.	23.2	11.5	43.2	13.9	8.6
Miles Road Recon./Yr.	6.7	.9	3.0	.6	.7
PRIM MRVDs/Yr.	53.0	52.5	46.4	39.5	38.8
SPNM MRVDs/Yr.	84.1	80.6	82.3	81.0	78.8
SPMT MRVDs/Yr.	249.1	262.3	265.3	235.5	240.1
RDNT MRVDs/Yr.	672.7	701.0	771.4	928.2	950.8
Big Game MWFUD/Yr.	624.9	590.7	553.1	515.5	481.1
Fishing MWFUD/Yr.	394.2	430.6	461.3	534.6	565.2
Grazing MAUMs/Yr.	230.1	231.2	232.7	234.4	236.1

	Decade 1 Volume (MBF/Yr.)									
	DF-CC	DF-SW	DF-SL	LP-CC	LP-SW	LP-SL	SF-CC	SF-SW	SF-SL	Total
CIA-1	361.9	593.9	38.6	43.6	130.7	1735.7	1897.2	4045.8	1011.1	9858.5
CIA-2	---	337.0	23.8	---	888.0	---	---	2806.7	169.3	4224.7
CIA-3	---	3376.3	49.5	---	---	384.9	---	214.9	456.1	4481.8
CIA-4	2333.8	---	19.2	---	695.1	8612.0	18338.8	---	5.5	30004.4
CIA-5	---	644.1	94.9	---	---	573.4	---	8738.0	1686.6	11737.0
CIA-6	---	735.7	150.5	---	562.3	74.0	---	1166.1	46.3	2735.0
CIA-7	1501.2	---	170.2	---	---	310.0	4716.6	---	1011.8	7709.8
CIA-8	---	---	13.2	---	---	76.7	---	---	40.1	129.9

Suitable Acres - 501,828
Present Net Value (M$) - 449,244

SECTION 9: TRADEOFF ANALYSIS

A. OVERVIEW

The benchmarks and alternatives each achieve a different set of objectives. The efficiency tradeoffs of meeting different sets of objectives can be estimated by comparing the Present Net Values (PNV) of the benchmarks and alternatives. The change in PNV is a measure of the efficiency tradeoff of achieving a different set of objectives. These efficiency tradeoffs, however, were not estimated for individual objectives because to the prohibitive costs of analyzing every constraint or objective used to develop the benchmarks and alternatives.

By comparing whole alternatives, the economic tradeoffs of the groups of objectives which have the most significant impact on PNV can be estimated. These tradeoffs can then be compared to environmental and social consequences to help identify the alternative which maximizes net public benefits.

It should be noted, however, studies indicate that, "Trade-offs cannot be reliably computed from the differences between land management alternatives. Trade-offs may be overstated when inputs such as land are manipulated instead of outputs. A similar overstatement of trade-offs may occur when a sufficiently wide range of management regimes is not provided to the model. Since trade-off analysis is only as good as the fundamental production relationships on which it is based, misleading trade-offs can result for alternatives producing a mix of outputs outside the historical experience and supporting data." (Connaughton and Fight. Applying Trade-off Analysis To National Forest Planning. Journal of Forestry. November 1984. p 680-683)

The discussion in this section focuses on the estimated economic tradeoffs in terms of priced outputs. Resource outputs, socioeconomic effects, and environmental effects are discussed in Chapter 4 of the FEIS.

B. PRESENT NET VALUE COMPARISONS

Present Net Value (PNV) is an index commonly used to measure net priced benefits associated with alternatives. It is calculated by subtracting estimated budget costs from benefits, with future dollar estimates discounted to the present.

Each alternative was developed so as to maximize Present Net Value while achieving the goals and objectives of that alternative. The tables and discussions in this section will allow the reader to judge the worth of estimated expenditures relative to the goods and services packaged into each alternative.

One measure of the cost of an alternative is the discounted cost which represents the equivalent payment required by the government to implement an alternative. Table B-9-1 displays the discounted costs, discounted benefits, and PNV in order of increasing costs for benchmarks and alternatives. By comparing the benefits and costs of an alternative or benchmark with the Minimum Level benchmark, the estimated economic consequences of the additional expenditures can be compared to the additional benefit values.

TABLE B-9-1: Discounted Costs, Benefits, and Present Net Value
Ranked According to Least Cost
(1982 M Dollars) (4% Discount Rate)

Selected Benchmarks	PVC	Changes In PVC	PVB	Changes In PVB	PNV	Changes In PNV
Min Level	48,533	--	950,825	--	902,292	--
Uneven Mgt	245,328	+196,795	1,154,410	+203,585	909,082	+6,790
Max PNV-A	276,143	+227,610	1,207,473	+256,648	931,330	+29,038
Max Timber	431,212	+382,679	1,278,989	+328,164	847,777	-54,515
Max Timber-Dep	435,600	+387,067	1,242,603	+291,778	807,003	-95,289
Max PNV-M	474,072	+425,539	1,298,880	+348,055	824,808	-77,484
Alternatives						
D	222,714	+174,181	878,390	-72,435	655,676	-246,616
C	234,292	+185,759	1,133,239	+182,414	898,947	-3,345
F	261,121	+212,588	1,096,850	+146,025	835,729	-66,563
E	268,260	+219,727	1,043,968	+93,143	775,708	-126,584
B	297,972	+249,439	1,193,184	+242,359	895,212	-7,080
A	328,245	+279,712	1,220,703	+269,878	892,458	-9,834

Another comparison is the change in PNV between alternatives. The maximum net value of the Forest is defined by the Maximum PNV - Assigned Values benchmark at $931.33 million. The difference between $931.33 million and the PNV of an alternative represents a possible foregone investment opportunity to the government of implementing that alternative. Table B-9-2 displays the discounted costs, benefits, and PNV by benchmark and alternative in order of decreasing PNV. By comparing each benchmark or alternative with the Max PNV - Assigned Values benchmark, these so-called "opportunity costs" can be estimated.

TABLE B-9-2: Discounted Costs, Benefits, and Present Net Value
Ranked According to Highest Present Net Value
(1982 M Dollars) (4% Discount Rate)

Selected Benchmarks	PNV	Changes In PNV	PVB	Changes In PVB	PVC	Changes In PVC
Max PNV-A	931,330	--	1,207,473	--	276,143	--
Uneven Mgt	909,082	-22,248	1,154,410	-53,063	245,328	-30,815
Min Level	902,292	-29,038	950,825	-256,648	48,533	-227,610
Max Timber	847,777	-83,553	1,278,989	+71,516	431,212	+155,069
Max Timber-Dep	824,808	-106,522	1,298,880	+91,407	474,072	+197,929
Max PNV-M	807,003	-124,327	1,242,603	+35,130	435,600	+159,457
Alternatives						
C	898,947	-32,383	1,133,239	-74,234	234,292	-41,851
B	895,212	-36,118	1,193,184	-14,289	297,972	+21,829
A	892,458	-38,872	1,220,703	+13,230	328,245	+52,102
F	835,729	-95,601	1,096,850	-110,623	261,121	-15,022
E	775,708	-155,622	1,043,968	-163,505	268,260	-7,883
D	655,676	-275,654	878,390	-329,083	222,714	-53,429

Each alternative presents a balanced mix of goods, uses and services, which would be provided if that alternative were implemented. However, each alternative emphasizes certain goals at the expense of others. For example, an alternative may provide more timber harvest at the expense of hunting opportunities.

By committing the Forest to a certain management direction, any alternative would cause the Forest to forego some resource opportunities in order to achieve optimum benefits from other resources.

When evaluating tradeoffs, the use of Present Net Value is often misunderstood. In each alternative PNV was maximized in an attempt to ensure that the alternatives would be efficient in their use of tax dollars and land. Since each alternative uses resources efficiently to accomplish different sets of goals and objectives, PNV is thought by some to be a useful summary measure to be weighed against environmental, community, and other social goals in choosing a preferred alternative. Others do not believe that PNV can serve this role, but do believe that receipts and costs are relevant indicators, and can be used in comparing alternatives when coupled with indicators for such goals and objectives as supporting the economies of local communities, protecting endangered species, and providing pleasing visual qualities. The following tables and discussions are meant to provide information for both schools of thought.

Tables B-9-3 and B-9-4 show the Present Net Value, Present Value of Benefits by different outputs and Present Value of Costs by various categories for the benchmarks and alternatives using 4% and 7-1/8% discount rates.

Tables B-9-5 and B-9-6 show the Present Net Receipts, Present Value of Receipts by different outputs and Present Value of Costs by various categories for the benchmarks and alternatives using 4% and 7-1/8% discount rates.

Table B-9-3

Present Net Value and Priced Outputs

Ranked According to Highest Present Net Value

(1982 M Dollars) (4% Discount Rate)

				PV Benefits By Resource					PV Costs By Major Cost Catagories					
Selected Benchmarks	PNV	PV Benefits	PV Costs	Timber/ Water Benefits	Recreatn/ Wildrness Benefits	Wildlife & Fish Benefits	Range Benefits	Mineral Benefits	Timber Costs	Road Costs	Recreatn/ Wildrness Costs	Wildlife & Fish Costs	Range Costs	Other Costs
Max PNV-A	931,330	1,207,473	276,143	95,695	212,164	105,629	36,202	671,366	62 979	22,138	49,580	10,101	19,639	101,637
				2,425	83,995						10,069			
Uneven Mgt	909,082	1,154,410	245,328	46,554	210,970	105,323	36 202	671,366	36 512	14,129	49,041	10,101	19,162	106,159
				0	83,995						10,224			
Min Level	902,292	950,825	48 533	0	139,064	83,164	0	671,366	157	0	3,959	649	3,781	39,334
				0	57,231						653			
Mx Timber	847,777	1,278,989	431,212	196,289	198,601	90,595	36,213	671,366	170,469	52,562	40,916	8,907	21,388	126,747
				1,930	83,995						10,222			
Mx Tmbr-Dep	824,808	1,298,880	474,072	214,634	199,085	89,838	36,225	671,366	209 766	57,060	41,521	8,907	19,836	126,759
				3,737	83,995						10,223			
Max PNV-M	807,003	1,242,602	435,600	168,577	190,796	89,884	36,274	671,366	171,224	61,475	42,317	10,223	19,894	120,398
				1,711	83,995						10,069			
Alternatives														
C	898,947	1,133,239	234,292	32,123	209,153	103,915	35,883	671,366	21,023	9,405	49,086	13,592	21,640	106,691
				756	80,043						12,855			
B	895,212	1,193,184	297,972	88,778	211,118	100,783	36,220	669,974	73 449	16,715	42,487	14 369	21,462	119,266
				2,316	83,995						10,224			
A	892,458	1,220,703	328,245	118,321	211,151	97,924	36,231	669,974	96,988	23,473	43,255	8 666	21,452	124,187
				3,107	83,995						10,224			
F	835,729	1,096,850	261,121	26,800	210,450	113,192	35,814	633,599	17,944	10,734	62,041	26,528	19,633	108,969
				411	76,584						15,272			
E	775,708	1,043,968	268,260	28,121	210,774	113,951	35,814	578,256	20,512	8,340	63,624	26,969	21,571	109,827
				468	76,584						17,417			
D	655,676	878,390	222,714	1,235	198,914	132,473	35,726	433,452	759	72	61,408	20,421	22,504	98,679
				6	76,584						18,871			

Table B-9-4

Present Net Value and Priced Outputs

Ranked According to Highest Present Net Value

(1982 M Dollars) (7-1/8% Discount Rate)

				PV Benefits By Resource					PV Costs By Major Cost Catagories					
Selected Benchmarks	PNV	PV Benefits	PV Costs	Timber/ Water Benefits	Recreatn/ Wildrness Benefits	Wildlife & Fish Benefits	Range Benefits	Mineral Benefits	Timber Costs	Road Costs	Recreatn/ Wildrness Costs	Wildlife & Fish Costs	Range Costs	Other Costs
Min Level	596,748	627 460	30,712	0	99 661	58 522	0	429,004	99	0	2,505	411	2,393	24,891
				0	40,273						413			
Max PNV-A	586,645	765,255	178,610	59,819	132,175	66,845	22,863	429 004	38,400	17,333	32,782	6,392	12,507	64,693
				1,396	53,153						6,503			
Uneven Mgt	572,580	731,222	158,642	28 403	131,756	66,043	22,863	429,004	22,171	11 027	32,468	6,392	12,126	67,814
				0	53,153						6,644			
Max Timber	540,934	814,402	273,468	122,805	126,258	59,360	22,864	429,004	104,436	36,102	26,125	5,636	13,628	80,889
				958	53,153						6,642			
Mx Tmbr-Dep	521 414	825,750	304,336	133,640	126,654	58,726	22,868	429,004	134,005	37,863	26,731	5,636	12,558	80,900
				1,705	53,153						6,643			
Max PNV-M	504,607	792,379	287,772	107,364	120,434	58,553	22,894	429,004	108,088	48,888	27,923	6,469	12,604	77,297
				977	53,153						6,503			
Alternatives														
C	569,510	719,183	149,673	20,179	130,648	65 521	22,699	429,004	13,418	5,075	32,116	8,601	13,928	67,925
				480	50,652						8,610			
B	568,092	755,377	187,285	53,954	132,019	63,905	22,865	428,114	43,825	10,916	33,810	9,093	13,752	75,889
				1,367	53,153						5,916			
A	566,840	775,428	208,588	74,670	132,152	62,457	22,873	428,114	60,803	14 797	28,042	5,484	13,754	79,064
				2,009	53,153						6,644			
F	527,041	693,896	166,855	15,502	131,226	70,962	22,672	404,870	10,465	7,065	40,203	16,787	12,435	69,760
				201	48,463						10,140			
E	488,816	659,849	171,033	16,131	131,327	71,530	22,672	369,507	11,776	4,781	41,585	17,066	13,837	70,342
				219	48,463						11,646			
D	411,942	556,893	144,951	631	125,871	82,320	22,629	276,976	391	22	41,109	12,923	14,564	62,871
				3	48,463						13,071			

Table B-9-5

Present Value of Cash Flows

Ranked According to Highest Present Net Value

(1982 M Dollars) (4% Discount Rate)

				PV Receipts by Resource				PV Costs By Major Cost Catagories					
Selected Benchmarks	Present Net Receipts	PV Receipts	PV Costs	Timber Receipts	Rec Receipts	Range Receipts	Mineral Receipts	Timber Costs	Road Costs	Recreaton & Wldnes Costs	Wildlife & Fish Costs	Range Costs	Other Costs
Max PNV-A	509,492	785,635	276,143	95,692	8,674	9,903	671,366	62,979	22,138	59,649	10,101	19,639	101,637
Uneven Mgt	491,168	736,496	245,328	46,554	8,673	9 903	671,366	36 512	14,129	59,265	10,101	19,162	106,159
Min Level	631,439	679,972	48,533	0	8,606	0	671,366	157	0	4,612	649	3,781	39,334
Max Timber	455,012	886,224	431,212	196,289	8,663	9,906	671,366	170,469	52,562	51,138	8,907	21,388	126,747
Mx Tmbr-Dep	430,502	904,574	474,072	214,634	8,664	9,910	671,366	209,766	57,060	51,744	8,907	19,836	126,759
Max PNV-M	422,922	858,522	435,600	168 577	8,656	9,923	671,366	171,224	61,475	52,386	10,223	19,894	120,398
Alternatives													
C	487,683	721,975	234,292	32,123	8,670	9,816	671,366	21,023	9,405	61,941	13,592	21,640	106,691
B	479,360	777,332	297,972	88,778	8,672	9,908	669,974	73,449	16,715	52,711	14,369	21,462	119,266
A	478,634	806,879	328,245	118,321	8,673	9,911	669,974	96,988	23,473	53,479	8,666	21,452	124,187
F	417,746	678,867	261,121	26,800	8,671	9,797	633,599	17,944	10,734	77,313	26,528	19,633	108,969
E	356,384	624,844	268,260	28,121	8,670	9,797	578,256	20,512	8,340	81,041	26,969	21,571	109,827
D	230,405	453,119	222,714	1,235	8,659	9,773	433,452	759	72	80,279	20,421	22,504	98,679

Table B-9-6

Present Value of Cash Flows

Ranked According to Highest Present Net Value

(1982 M Dollars) (7-1/8% Discount Rate)

				PV Receipts by Resource				PV Costs By Major Cost Catagories					
Selected Benchmarks	Present Net Receipts	PV Receipts	PV Costs	Timber Receipts	Rec Receipts	Range Receipts	Mineral Receipts	Timber Costs	Road Costs	Recreaton & Wldnes Costs	Wildlife & Fish Costs	Range Costs	Other Costs
Min Level	403,748	434,460	30 712	0	5,456	0	429,004	99	0	2,918	411	2,393	24,891
Max PNV-A	321,954	500,564	178,610	59,819	5,487	6,254	429,004	38 400	17,333	39,285	6,392	12,507	64,693
Uneven Mgt	301,505	469,147	158,642	28,403	5,486	6,254	429,004	22,171	11,027	39,112	6,392	12,126	67,814
Max Timber	290,078	563,546	273,468	122,805	5,482	6,255	429,004	104,436	36,102	32,767	5,636	13,628	80,889
Mx Tmbr-Dep	270,047	574,383	304,336	133,640	5,483	6,256	429,004	134,005	37,863	33,374	5,636	12,558	80,900
Max PNV-M	260,336	548,108	287,772	107,364	5,477	6,263	429,004	108,088	48,888	34,426	6,469	12,604	77,297
Alternatives													
C	311,204	460,877	149,673	20,179	5,485	6,209	429,004	13,418	5,075	40,726	8,601	13,928	67,925
B	306,524	493,809	187,285	53,954	5,486	6,255	428,114	43,825	10,916	33,810	9,093	13,752	75,889
A	305,940	514,528	208,588	74,670	5,487	6,257	428,114	60,803	14,797	34,686	5,484	13,754	79,064
F	265,204	432,059	166,855	15,502	5,485	6,202	404,870	10,465	7,065	50,343	16,787	12,435	69,790
E	226,292	397,325	171,033	16,131	5,485	6,202	369,507	11,776	4,781	53,231	17,066	13,837	70,342
D	144,325	289,276	144,951	631	5,479	6,190	276,976	391	22	54,180	12,923	14,564	62,871

C. TRADEOFF COMPARISONS

The following tradeoff comparison discusses the differences in the production of priced benefits and their associated costs that lead to the differences in PNV. The dollar figures for "Opportunity Costs" show the dollar differences between each benchmark or alternative and the Maximum PNV - Assigned Values benchmark. The narratives discuss the reasons for the differences and present some outputs that cannot be given dollar values. The benchmarks and alternatives are listed in order of decreasing PNV, starting with the Maximum PNV - Assigned Values benchmark, which has an opportunity cost of $0 when compared against itself. (PNV = Present Net Value, PVB = Present Value Benefits, PVC = Present Value Costs)

MAXIMUM PNV - ASSIGNED VALUES BENCHMARK

PNV = $930,330M Opportunity Cost = 0

PVB = $1,207,473M PVC = $276,143M

The Max PNV Benchmark would meet management requirements for resource protection, preclude timber management from existing Wilderness, and harvest a relatively high level of timber. Community stability would be enhanced. The recreation and wildlife benefits are relatively high given the amount of timber being harvested. The budget is one which does not place an emphasis on those items that do not return quantifiable benefits.

BENCHMARKS

UNEVEN-AGED MANAGEMENT BENCHMARK

PNV = $909,082M Opportunity Cost = $22,248M

PVB = $1,154,410M PVC = $245,328M

This benchmark has the second highest PNV of all the benchmarks. This is primarily due to the relatively high amount of recreation and wildlife benefits and a moderate budget that does not allocate monies to improving the "qualitative" aspects of the Forest.

MINIMUM LEVEL BENCHMARK

PNV = $902,292M Opportunity Cost = $29,038M

PVB = $950,825M PVC = $48,533M

This benchmark has a relatively high PNV because the budget has been reduced to that level needed to simply keep the National Forest System lands in public ownership. Many of the benefits, however, will continue for at least the first

two decades. The mineral benefits also contribute heavily toward the total benefits, with very little investment needed from the Forest Service.

MAXIMUM TIMBER - NDEF BENCHMARK

PNV = $847,777M Opportunity Cost = $83,553M

PVB = $1,278,989M PVC = $431,212M

This benchmark has the second highest level of benefits of any benchmark or alternative, but it also has the third highest costs of any benchmark or alternative. Most of the costs are associated with the timber program, while many of the other programs such as recreation and wildlife have a relatively low level of expenditures.

MAXIMUM TIMBER - DEPARTURE BENCHMARK

PNV = $824,808M Opportunity Cost = $106,522M

PVB = $1,298,880M PVC = $474,072M

This benchmark has the highest total benefits and highest total costs of any of the benchmarks or alternatives. This is primarily due to the large volumes of timber being harvested. The additional costs needed to access and harvest the volume above that in the Max Timber - NDEF benchmark exceed the additional benefits gained. The recreation benefits have decreased, but are still somewhat high because of the increased Roaded Natural recreation opportunities. The wildlife benefits are the lowest of any benchmark except for Minimum Level.

MAXIMUM PNV - MARKET VALUES ONLY BENCHMARK

PNV = $807,003M Opportunity Cost = $124,327M

PVB = $1,242,602M PVC = $435,600M

This benchmark has the lowest PNV of the benchmarks, partially because of the relatively low amount of recreation and wildlife benefits. The total costs are also among the highest of any benchmark or alternative, primarily because of the high level of timber harvest.

ALTERNATIVE C (CURRENT DIRECTION)

PNV = $898,947M Opportunity Cost = $32,383M

PVB = $1,133,239M PVC = $234,292M

Alternative C has the highest PNV of all the alternatives. This is primarily because it has the second lowest level of costs of the alternatives and it has the highest level of mineral-related benefits (since under current management, all acres available for leasing are also suitable for leasing).

The timber harvest level in this alternative was constrained to the 17 MMBF level for the first 5 decades whereas in the other alternatives, the harvest level generally increased in the third decade. This has the effect of reducing both the timber-related benefits as well as costs compared to most of the other alternatives.

This alternative also has a budget that does not allocate monies to improving the "qualitative" aspects of the Forest.

ALTERNATIVE B (RPA TARGETS)

PNV = $895,212M Opportunity Cost = $36,118M

PVB = $1,193,184M PVC = $297,972M

Alternative B has the second highest PNV of all the alternatives. This is primarily due to the high amount of benefits from the minerals and timber resources, an increase in Roaded Natural opportunities, and a moderate budget that does not allocate monies to improving the "qualitative" aspects of the Forest.

ALTERNATIVE A (HIGH PRODUCTIVITY)

PNV = $892,458M Opportunity Cost = $38,872M

PVB = $1,220,703M PVC = $328,245M

The decrease in PNV is primarily due to the additional roads and timber-related costs necessary to achieve the level of harvest in this Alternative. The decrease in wildlife benefits is also a factor.

Even though this Alternative will decrease the Primitive and Semi-Primitive opportunities on the Forest, these decreases are gradual and are not readily apparent until after 20-30 years when the additional road construction start to significantly impact these areas. The Wilderness areas will also be managed with a majority of the acres in Desired Future Conditions that allow for a relatively high "user-density".

ALTERNATIVE F (PREFERRED ALTERNATIVE)

PNV = $835,729M Opportunity Cost = $95,601M

PVB = $1,096,850M PVC = $261,121M

The decrease in PNV stems primarily from the decrease in mineral-related benefits. Even though recreation use is an emphasis of this alternative, the recreation benefits have decreased. This is primarily due to the emphasis to reduce the overcrowding in the Wilderness areas and manage more acres that will provide higher levels of solitude.

The total costs of this alternative are relatively high because there is an emphasis to increase and improve recreational facilities, and fund more wildlife-related vegetative management projects with wildlife monies.

Another reason for the decrease in PNV has to do with the relative increase in timber-related roading. This is due to the decision to enter timber stands that are more expensive to harvest than other stands found on the Forest, in order to provide a minimal timber supply to communities such as Dubois.

ALTERNATIVE E (ISSUE CONSIDERATION)

PNV = $775,708M Opportunity Cost = $155,622M

PVB = $1,043,968M PVC = $268,260M

The primary reason for the difference in Present Net Value between this alternative and Alternative F has to do with the decreased mineral-related benefits.

ALTERNATIVE D (RECREATION/WILDLIFE EMPHASIS)

PNV = $655,676M Opportunity Cost = $275,654M

PVB = $878,390M PVC = $222,714M

This Alternative has the lowest PNV primarily because of the number of acres that are not available for leasing. If the number of acres available for leasing were essentially the same as the other alternatives, this Alternative would have one of the higher PNVs. The benefits derived from removing acres from leasing have to do with such things as increased solitude, wildlife habitat being maintained, and the value derived by many people from the simple knowledge that they know an area will never be leased. All these benefits are next to impossible to quantify.

This Alternative has the highest level of wildlife/fish benefits, but the lowest level of recreation benefits. This is because, like Alternatives E and F, the recreation emphasis is on providing quality recreational experiences in both the Wilderness areas and outside of the Wilderness areas. This is opposed to other Alternatives where the emphasis is more toward simply providing recreation opportunities.

D. COMPARISON OF THE MAX PNV - ASSIGNED VALUES BENCHMARK BETWEEN THE FINAL AND DRAFT ENVIRONMENTAL IMPACT STATEMENTS

The reader may note that the Max PNV - Assigned Values Benchmark has a significantly higher harvest level than the one found in the Draft Environmental Impact Statement. This primarily has to do with the method in which the roading costs were modeled. In the FORPLAN model for the Draft, road mileage factors per acre harvested were calculated. When the model would determine the benefits and costs of harvesting a particular acre, the roading cost estimates were including in determining if it was economical to harvest that particular acre.

For the Final Environmental Impact Statement, a different approach was used to model roading costs. In the revised FORPLAN model, roading "packages" were determined with the aid of the Geographic Information System. Within each watershed, the existing road system was delineated and the timbered acres accessible from the existing road were calculated. These acres received no new roading costs for accessing them. For those acres not accessible from the existing road system, road segements necessary to provide access were mapped out and their costs calculated based upon the soil and slopes the road segment was located on. Combinations of these road segments made up road "packages" that varied by watershed and alternative. The FORPLAN model would then have the choice of only harvesting acres that can be accessed by existing road systems, or building a system of new roads to provide access to additional acres. Once these road systems were in place, usually within a 30-year time frame, no additional roads were necessary. So from an economic standpoint, the model would build the roads if the total discounted net timber benefits (excluding roads) from the planning horizon would meet or exceed the up front costs of building a road system for that area within the next 30-years or so.

Whether the total net timber benefits would eventually pay for the road system or not would depend greatly upon the Standards and Guidelines specific to the Desired Future Conditions the road would be built in. For instance, if the road would be built in areas with a Desired Future Condition 10, the requirements for the amount of cutover acres allowed at any one time would usually prohibit the amount of acres that could be harvested and hence, there would not be enough timber available to pay for the road costs over time.

On the other hand, if the road would be built in areas with a Desired Future Condition 1B, the requirements for the amount of cutover acres allowed are more relaxed and often times there would be enough timber available to eventually pay for the road. In these cases, the initial timber sales over the first 20-30 years may be "below-cost" timber sales, but over time the benefits from the future timber sales will eventually pay for the road.

So for those Alternatives such as E and F, where the majority of the suitable timber is located within Desired Future Condition 10, it does not pay to build very many new roads. However, for Alternatives such as A and B, where the majority of the suitable timber is located within Desired Future Condition 1B or even 1A, the Standards and Guidelines are relaxed to the point that enough timber can be harvest within a given area to eventually pay for the roads. This also explains why in the Max PNV Benchmarks, where the model is given the choice to enter an area under a Desired Future Condition of 10 or one of 1B, it will usually choose the 1B.

SECTION 10: MONITORING AND IMPLEMENTATION

A. MONITORING

At intervals established in the Forest Plan, management practices will be evaluated to determine how well objectives have been met, how accurate efforts and cost projections are, and how closely management standards and guidelines have been applied. The results of monitoring and evaluation may be used to analyze the management situation during review and revision of the Forest Plan in future years. (See Chapter 5 of the Forest Plan.)

The Forest planning data base will provide a means by which changes in resource production rates, differences in inventory data, etc., can be measured and will also be used to monitor implementation activities.

B. PLAN IMPLEMENTATION PROGRAMS

The data base provides biological and physical data that will help develop subsequent programs for plan implementation. As more information is available, the data base will be updated and improved.

APPENDIX C

EFFECTS ON ROADLESS AREAS

APPENDIX C
EFFECTS ON ROADLESS AREAS

OVERVIEW

A map accompanies this FEIS that displays roadless areas of the forest that might be roaded under the Preferred Alternative.

Some roadless areas included in review and evaluation have been acted upon by Congress. The Wyoming Wilderness Act of 1984 provided for the following inclusions in the National Wilderness Preservation System:

Gros Ventre - 284,900 acres
Teton Corridor Addition to the Teton Wilderness - 28,200 acres
Silver Creek Addition to the Bridger Wilderness - 14,800 acres
New Fork Lake Addition to the Bridger Wilderness - 21,000 acres

As of 1984, the Wildernesses and Wilderness Study Areas include 1,391,300 acres of the forest: Teton Wilderness - 583,500, Gros Ventre Wilderness - 284,900, Bridger Wilderness - 413,700. In addition, the Palisades Wilderness Study Area contains 76,800 acres and the Shoal Creek Wilderness Study Area contains 32,400 acres. The Palisades WSA is shared by the Bridger-Teton and Targhee National Forests.

ROADLESS AREA REVIEWS

Prior to the designation of the Wildernesses, roadless areas were evaluated for potential inclusion in Wilderness during the Roadless Area Review and Evaluation I and II processes, and further evaluated, with roadless boundaries altered to reflect all roadless acreage (not limited to that studied during prior roadless area evaluations), in 1983.

There were 19 roadless areas included on the Bridger-Teton Forest inventory during the 1979 Roadless Area Review and Evaluation (RARE II). Of these, the following have been completely or partly included in the Wilderness System, as a result of the 1984 Wyoming Wilderness Act:

Teton Corridor	Added to the Teton Wilderness
Gros Ventre Mountains	Partly included in the Gros Ventre Wilderness and Shoal Creek Wilderness Study Area
Munger Mountain	Partly included in the Palisades WSA
West Slope Wind Rivers	Partly added to the Bridger Wilderness

The remaining roadless areas, as mapped and identified in the 1983 re-evaluation, will be managed for various non-Wilderness purposes under each of the Forest Plan alternatives. Forest Plan Chapter 4 describes the Desired Future Conditions (DFCs) to be achieved and directs the reader to the land and resource management objectives being accomplished through achievement of the DFCs.

For purposes of the Appendix C discussion, estimates of effects on roadless areas are drawn from the descriptions of possible activities shown in the Cumulative Effects discussion by Community Interest Area in FEIS Chapter 4.

The 1984 Wyoming Wilderness Act requires that Wilderness Study Areas and roadless areas remaining undeveloped are to be studied for possible Wilderness designation during the next scheduled revision of the Bridger-Teton Forest Plan. The first revision is scheduled for 10 to 15 years from the plan implementation date. Therefore, the 50-year effects estimates displayed for roadless areas under each alternative are for anlaysis and comparison purposes only, and are not a firm decision for development or change.

In Alternative A, all roadless areas will be managed to attain Desired Future Condition (DFC) 1A to maximize revenue to the government from commodity resources. Although alteration of the roadless character of most areas will be minor during decade 1, at the end of the 50-year planning horizon much of the forest will be roaded, including parts of many of the roadless areas.

The affect of implementing Alternative B is that most of the roadless areas are managed to achieve DFCs 10 and 1B under this alternative. The primitive settings of roadless areas would be significantly altered over the 50-year planning horizon.

Under Alternative C, much of the roadless acreage would be altered to a roaded condition. Development intensity would vary by roadless area: most areas are meant to achieve DFCs 1B and 10; a few are to attain DFC 1A, and parts of others are to attain DFC 12, where the roadless character would be largely retained.

Under Alternative D, some development of roadless areas would occur, but it would be limited to areas where DFC 10 has been established. This alternative would have the least long-term effect on the roadless resource. There would be

no change in the roadless acreage during decade 1. Most of the roadless areas would be managed to achieve DFC 12, which would result in little change in the remote, semiprimitive setting. Others would be managed to achieve DFCs 2A, 2B, and 7B. All of these DFCs provide settings for semiprimitive recreation, and allow for the continuation of existing uses and current recreational settings. In Community Interest Area 6, much of the roadless area is meant to attain DFC 4 which would retain its roadless character as part of the protection of watersheds.

Under Alternative E, most of the roadless areas on the forest would be managed to achieve DFCs 10 and 12. Some would be managed to achieve DFC 2A, mostly on the crests of mountain ranges. Roadless areas in the upper Green River include small areas to be managed to achieve DFC 1B. There would be little change in most roadless areas during decade 1. Moderate change would occur over the 50-year planning horizon in those roadless areas to be managed to achieve DFC 10 and 1B. Decade 1 changes are limited to MA 72, 32, and 35, in the upper Green River and Greys River areas. Affected roadless areas are 3012, 3010, 3002, 3007, and 3005 (see table on the following page). As in Alternative D, the watershed areas in Community Interest Area 6 would be largely managed to achieve DFC 4, resulting in retention of the roadless character of area 3002.

Under Alternative F (the Preferred and selected Alternative for the approved Forest Plan), timber harvesting is scheduled in DFC 10. Oil and gas or other mineral activity may occur in roadless areas not formally withdrawn from entry. Mining is not a scheduled activity in the Forest Plan; therefore, the timing of possible entries is not known. Acres affected are not known for the first planning period (10 years). The acres will be determined during plan implementation and will involve following NEPA process, including public involvement.

Under Alternative F, decade 1 changes are limited to MA 72, 32, and 35, in the upper Green River and Greys River areas. Affected roadless areas are 3012, 3010, 3002, 3007, and 3005. Other roadless areas would be affected in later decades. As with Alternative E, many of the roadless areas would be managed to achieve DFCs 10 and 12. The major differences between Alternatives E and F are: fewer areas of DFC 2A in F (these are managed to achieve DFC 12), and reduced area of DFC 4 on the Salt River Front. None of the RARE II areas are to be managed to achieve DFC 1B in Alternative F; those 1B areas prescribed in Alternative E for the upper Green River would be managed to achieve DFC 10 in Alternative F.

The following is a list of roadless areas included in the RARE II inventory, and the DFC under which each will be managed by forest plan alternatives:

ROADLESS AREAS AND THE DFC TO BE ACHIEVED UNDER THE ALTERNATIVES

NUMBER	NAME OF AREA	ALT A	ALT. B	ALT. C	ALT. D	ALT E	ALT F
3010	Gros Ventre Mtns *	1A	1B,10	1B	2A,2B,12	10	10
3009	Munger Mtn.	10	1B,10	12	12	12	12
3008	Monument Ridge	1A	10	1B	12	10,12	10,12
3007	Grayback Ridge	1A	1B,10	1B,12,10,3	2A,12,3	10,12,2A,1B,3	10,12,2A,1B,3
3002	Salt River Range	1A	1B,10	10,1B	4,2A,12	4,12,2A	10,12,4,2A
3005	S Wyoming Range	1A	1B,10	12	2A	12,2A	12,2A
3901	Gannett Hills - Spring Creek	1A	1B	10,1A	12,10	10,12	10,12
3001	Lake Alice - Commissary Ridge	1A	10,1B	1A	2A,12,10	10,12,2A	10,12,2A
3001A	Nugent Park - Hams Fork Ridge	1A	1B,10	1A	12,2B	10	10
3904	West Slope Winds	1A,9A	1B	1B,12	12,2A,2B	12,2A,2B,10	12,2A,2B,10
3012	Mosquito Lake - Seven Lakes	1A	1B	10,1B,12	12,2B,2A	10,12,2A	10,2A
3014	Pacific Creek - Blackrock Creek	10	10,1B	2A,7B,12	7B,12,2A	7B,12,2A,3	7B,12,2A,3
3013	Spread Creek - Gros Ventre River	1A,1B,10	1B,10	10,1B,7A	12,2A,2B,7A, 7B,3	10,7A,7B,12,8, 2A,2B,1B	12,10,7A,7B,8,2A,2B
3903	Phillips Ridge	1A,9B	2B,1B, 10,9B	12,1B	2A,2B,12	2A,2B,9A,9B, 10,12	2A,9A,9B,2B,10,12
3011	Little Sheep Mtn.	1A	1B	1B,3,12	12,3	10,1B,12,2B	10,3
3003	Riley Ridge	1A	1B,10	1B	12,2B	10	10
3004	North Mountain	1A	1B	1B	12	10,1B	10,1B
3006	Little Cottonwood	1A	1B,10	1B	12,2B	10	10

* These DFCs apply to parts of the area that have not been included in 1984 legislation, which placed most of this roadless area in Wilderness or Wilderness Study status.

Table summary. Although the change in roadless character is expected to be minor during the first decade of Forest Plan implementation, the long-term implementation of policy emphasized by each Alternative would have the following effects:

Alternative A -- All of the roadless areas not affected by the Wyoming Wilderness Act would be scheduled for development, including roading, timber harvest, oil and gas exploration and development, and recreation developments. There would be no management direction to retain the roadless values in these areas, and at the end of the planning horizon (50 years), all of the roadless areas on the forest would be essentially roaded.

Alternative B -- All of the roadless areas not affected by the Wyoming Wilderness Act would be scheduled for some degree of development, including roading, timber harvest, oil and gas exploration and development, and recreation developments. There would be less intense roading and timber harvest in many areas than under Alternative A, but there would be no management direction to retain the roadless values in these areas. By the end of the planning horizon, most of the roadless areas would be roaded. The primary difference between Alternatives A and B is intensity: under Alternative B, there would be more roaded, natural-appearing settings, and under Alternative A, there would be more strongly modified settings. Both alternatives would have a similar effect on the roadless resource.

Alternative C -- Most of the roadless areas not affected by the Wyoming Wilderness Act would be scheduled for development, including roading, timber harvest, oil and gas exploration and development, and recreation developments. There is direction to retain roadless values in parts of some of the roadless areas, including Grayback Ridge, South Wyoming Range, West Slope of the Wind Rivers, and Mosquito Lakes - Seven Lakes (3007, 3005, 3904, 3012). Other roadless areas would be essentially roaded and developed by the end of the planning horizon.

Alternative D -- None of the roadless areas would be scheduled for development. Scheduled timber harvest would occur in parts of two (3901 and 3001), unscheduled timber removal could occur in others if needed to enhance recreation or wildlife values. Energy exploration would occur with varying restrictions applied on an area-by-area basis. Some of the roadless areas would not be available for oil and gas leasing; others would be protected through use of No-Surface-Occupancy stipulations. At the end of the 50-year planning horizon, most of the roadless areas would be essentially unaltered from their present condition.

Alternatives E and F -- Most of the roadless areas not affected by the Wyoming Wilderness Act would be scheduled for partial development, including timber harvest, oil and gas exploration and development, and recreation developments. Scheduled timber harvest would occur in all roadless areas except 5, but much of it would affect relatively little acreage within them. Parts of some RARE II areas would be protected from surface disturbance by energy exploration through no lease or No-Surface-Occupancy stipulations: these include parts of Grayback Ridge, Salt River Range, South Wyoming Range, Lake Alice - Commissary Ridge, West Slope Winds, Mosquito Lake - Seven lakes, and Pacific Creek - Blackrock Creek (3007, 3002, 3005, 3001, 3904, 3012, 3014). At the end of the 50-year planning horizon, there would be moderate alteration of some of the roadless areas, where DFC 10 and 1B are established. Roadless areas to be managed to achieve DFCs 2A, 2B, 12, 4, and 7B would remain unroaded.

APPENDIX D

OIL AND GAS LEASE FORM

AND

OIL AND GAS LEASE STIPULATIONS

APPENDIX D

OIL AND GAS LEASE FORM

OIL AND GAS LEASE STIPULATIONS

This Appendix contains:

- The Standard Lease Form (Form 3100-11),

- The stipulation for lands of the National Forest System Under Jurisdiction of the Department of Agriculture,

- The uniform stipulation formats, and

- The format for the application of stipulations uniquely needed to implement the direction in the Bridger-Teton Plan for leasing lands within the Bridger-Teton National Forest.

Appendix D, coupled with the direction found in the Implementation section of the Forest Plan Chapter 5, serves to assist the District Ranger in responding to requests made by the Bureau of Land Management for consent regarding oil and gas leasing proposals for National Forest lands.

LEASE FORM

OFFER TO LEASE AND LEASE FOR OIL AND GAS (BLM Form 3100-11): This lease form is used for all oil and gas leases issued by the Bureau of Land Management.

(NOTE: This form is available at the Forest Supervisor's Office in Jackson, Wyoming.)

STIPULATIONS

The lease stipulations have been divided into the following categories:

1. STIPULATION FOR LANDS OF THE NATIONAL FOREST SYSTEM UNDER JURISDICTION OF THE DEPARTMENT OF AGRICULTURE

2. UNIFORM STIPULATIONS

3. COURT ORDERED OR ADMINISTRATIVELY REQUIRED STIPULATIONS

"STANDARD" LEASE STIPULATION

STIPULATION FOR LANDS OF THE NATIONAL FOREST SYSTEM UNDER JURISDICTION OF THE DEPARTMENT OF AGRICULTURE: This is the "standard" stipulation required by the Secretary of Agriculture for inclusion in all mineral licenses, permits, and leases involving National Forest System lands issued by the Bureau of Land Management.

STIPULATION FOR LANDS OF THE NATIONAL FOREST SYSTEM
UNDER JURISDICTION OF DEPARTMENT OF AGRICULTURE

The licensee/permittee/lessee must comply with all the rules and regulations of the Secretary of Agriculture set forth at Title 36, Chapter II, of the Code of Federal Regulations governing the use and management of the National Forest System (NFS) when not inconsistent with the rights granted by the Secretary of the Interior in the license/prospecting permit/lease. The Secretary of Agriculture's rules and regulations must be complied with for (1) all use and occupancy of the NFS prior to approval of a permit/operation plan by the Secretary of the Interior, (2) uses of all existing improvements, such as Forest development roads, within and outside the area licensed, permitted or leased by the Secretary of the Interior, and (3) use and occupancy of the NFS not authorized by a permit/operating plan approved by the Secretary of the Interior.

All matters related to this stipulation are to be addressed

to: Forest Supervisor
Bridger-Teton National Forest
at: 340 North Cache
Box 1888
Jackson, WY 83001

telephone: (307) 733-2752

who is the authorized representative of the Secretary of Agriculture.

_____
Signature of Licensee/Permittee/Lessee

UNIFORM STIPULATION FORMATS

Uniform stipulation formats were developed by the Bureau of Land Management and the Forest Service to accommodate the wide variety of resources encountered on federal lands. The stipulations are categorized as to how they modify the lease rights rather than by the resource to be protected.

The uniform formats for and a brief description of the No-Surface-Occupancy Stipulation, the Timing-Limitation Stipulation, and the Controlled-Surface-Use Stipulation are presented below. These will be filled in as needed to meet the direction in the Forest Plan.

NO-SURFACE-OCCUPANCY STIPULATION (NSO): Prohibits use or occupancy of the land surface for fluid mineral exploration or development to protect specific resource values. The No-Surface-Occupancy Stipulation is intended for use only when other stipulations are determined insufficient to adequately protect the public interest.

NO SURFACE OCCUPANCY STIPULATION

No surface occupancy or use is allowed on the lands described below (legal subdivision or other description):

For the purpose of:

Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820.)

TIMING-LIMITATION STIPULATION: Prohibits surface use during specified time periods to protect identified resource values. This stipulation does not apply to operation and maintenance of production facilities unless the finding of analysis demonstrate the continued need for such mitigation and that less stringent, project-specific mitigation measures would be insufficient.

TIMING-LIMITATION STIPULATION
No surface use is allowed during the following time period(s). This stipulation does not apply to operation and maintenance of production facilities:
On the lands described below:
For the purpose of (reasons):
Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 or FS Manual 1950 and 2820.)

CONTROLLED-SURFACE-USE STIPULATION: Allows use and occupancy on all or portions of the lease year-round (unless restricted by another stipulation), but because of special values or resource concerns, lease activities must be strictly controlled. The Controlled-Surface-Use Stipulation is used for operating guidance and is not a substitute for the No-Surface-Occupancy or Timing-Limitation Stipulations.

CONTROLLED-SURFACE-USE STIPULATION

Surface occupancy or use is subject to the following special operating constraints:

On the lands described below:

For the purpose of:

Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820.)

APPLICATIONS

Included below are some of the ways that the uniform stipulations will be used to protect the resources on the Bridger-Teton National Forest as directed in the Forest Plan. These are not the only applications of these stips that will be used, just those that meet unique situtations.

APPLICATION OF THE NO-SURFACE-OCCUPANCY STIPULATION

FOR THE PROTECTION OF FREMONT LAKE:

NO-SURFACE-OCCUPANCY STIPULATION

No surface occupancy or use is allowed on the lands

or its outlet. Directional drilling is not allowed.

For the purpose of: To protect the integrity of Fremont Lake and its watershed.

Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820.)

FOR THE PROTECTION OF NEW FORK, WILLOW, HALF MOON, BURNT, AND BOULDER LAKES:

NO-SURFACE-OCCUPANCY STIPULATION

No surface occupancy or use is allowed on the lands described below (legal subdivision or other description):

Within 1,000 feet of the shoreline of (New Fork Lake, Willow Lake, Half Moon Lake, Burnt Lake, Boulder Lake) or its outlets. Directional drilling is authorized.

For the purpose of: To protect the integrity of the Lake and protect water quality.

Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820.)

FOR THE PROTECTION OF STEEP SLOPES AND UNSTABLE SOILS

NO-SURFACE-OCCUPANCY STIPULATION

No surface occupancy or use is allowed on the lands described below (legal subdivision or other description):

On slopes in excess of 40 percent or on technically unsuitable soils.

For the purpose of: Protecting steep slopes and unstable soils.

Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820.)

FOR THE PROTECTION OF THE GRIZZLY BEAR AND ITS HABITAT:

NO-SURFACE-OCCUPANCY STIPULATION

No surface occupancy or use is allowed on the lands described below (legal subdivision or other description):

For the purpose of: Providing for the continued viability of the grizzly bear population and protection of its habitat upon delisting as a threatened species under the Endangered Species Act of 1973 and to avoid relisting the bear as a threatened or endangered species.

Any change to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820.)

The Authorized Officer will not waive or in any manner modify this stipulation unless the Authorized Officer determines that the proposed operations will not have a significant adverse effect on the grizzly bear population and its habitat or be inconsistent with standards set forth in the Grizzly Bear Recovery Plan, Interagency Grizzly Bear Guidelines, the applicable land and resource management plan, and any future amendment of these documents in effect on the date when the lessee submits the operating proposal.

Requests for waiver, exception, or modification of this stipulation, must be accompanied by the lessee/ operator's surface use proposal which describes in specific detail the measures that will be undertaken to protect the bear and maintain or improve habitat effectiveness. Such measures shall include, but are not limited to, a plan to reclaim and restore the bears' habitat upon abandonment and the coordination of the timing, spacing, and sequence of activities. The Authorized Officer will ensure that the analysis of the proposal will be documented in a site-specific environmental assessment or, if necessary, an environmental impact statement. The assessment or statement will analyze both the singular and cumulative effects on the grizzly bear and its habitat of the proposal (including access) together with the existing situation and other reasonably forseeable actions whether or not proposed to be undertaken by the lessee. Upon completion of the analysis, modifications to the lessee/operator's proposal or additional protective measures may be required or, if it is determined that unacceptable impacts will occur, approval may be denied by the Authorized Officer. The lessee, by accepting this stipulation, understands that operations may never be approved on the leasehold and beneficial use or enjoyment of this lease may never be realized.

APPLICATION OF THE
TIMING-LIMITATION
STIPULATION

FOR THE PROTECTION OF THE JACKSON ELK HERD AND ITS CRUCIAL WINTER RANGE

TIMING-LIMITATION STIPULATION

No surface use is allowed during the following time period(s). This stipulation does not apply to operation and maintenance of production facilities:

November 15 to April 30.

On the lands described below:

For the purpose of (reasons): Providing continued viability of the Jackson Elk Herd and protection of its crucial winter range habitat in the Jackson Hole, Wyoming area, and to prevent its harassment while the elk occupy the range.

Preplanning will be essential to assure that all approved activities (i.e., construction, drilling, workover, and heavy maintenance) occur when the Jackson Elk Herd are not using the crucial winter range. The Forest Service may require time to observe and study wintering elk on a proposed activity site to develop mitigating measures, and operating standards and access routes.

If it is determined that the proposed activities cannot be conducted in a manner that will maintain or enhance the carrying capacity of the winter range, alternatives will be proposed or the proposal will be denied.

Development and production facilities will require the same careful planning and will be limited to centralized locations.

Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 or FS Manual 1950 and 2820.)

COURT-ORDERED OR
ADMINISTRATIVELY
REQUIRED STIPULATIONS

FOR THE PROTECTION OF THE PALISADES WILDERNESS STUDY AREA:

The April 11, 1984, Order of the United States District Court for the District of Columbia in Sierra Club v. Peterson, Civil No. 81-1230, directed that the following stipulation be included in all leases issued for lands within the Palisades Further Planning Area (Designated as the Palisades Wilderness Study Area by the Wyoming Wilderness Act of 1984.)

CONDITIONAL-NO-SURFACE-OCCUPANCY STIPULATION

The lessee agrees not to occupy or use the surface of the leased lands which are within the boundary of the Palisades RARE II Further Planning Area except for certain limited uses as permitted in writing by an authorized officer of the surface management agency. This stipulation, at a later date, may be modified, supplemented, eliminated, or remain unchanged. Alteration of this stipulation will be conditional upon the preparation of a site-specific environmental assessment or, if required, an environmental statement. In the event this stipulation is eliminated, it will be replaced by a Coordinated Exploration Stipulation and other special stipulations as required to protect the surface resources.

FOR COORDINATED-EXPLORATION WITHIN THE PALISADES WILDERNESS STUDY AREA

The Coordinated-Exploration Stipulation is required by the Conditional-No-Surface-Occupancy for application to leases within the Palisades RARE II Further Planning Area (Palisades Wilderness Study Area) in the event that the Conditional No Surface Occupancy Stipulation is eliminated from leases in the Area.

COORDINATED-EXPLORATION STIPULATION

All or portions of the lands covered by this lease are within the Palisades Further Planning Area, an area of critical environmental concern. Therefore, the lessee agrees that:

1. In order to protect the special resource values, drilling on the subject lease will be authorized only under a plan of operation approved pursuant to the Mineral Leasing Act of February 25, 1920, 41 Stat. 437, as amended, 30 U.S.C. 181 et seq. and;

2. All plans of operation will contain a provision vesting in the Secretary, USDI, or his duly authorized representative(s) control over the rate of drilling and development including in particular the spacing of wells and such other conditions as may be deemed necessary, for the protection of the Palisades Further Planning Area.

FOR THE PROTECTION OF THE JACKSON HOLE AREA

The following stipulation is required by the Secretary of the Interior Krug Memorandum of August 15, 1947, for inclusion in oil and gas leases issued for lands south of the 11th Standard Parallel in the Teton National Forest.

Jackson Hole Area Oil and Gas Lease Stipulation

The lands embraced in this lease being within the area designated in the memorandum of August 15, 1947, by the Secretary of the Interior ("Oil and Gas Leases in the Jackson Hole, Wyoming Area"; Federal Register, August 30, 1947, page 5859), which specifies the general conditions under which the unitized development of the oil and gas resources is authorized, the lessee hereby agrees:

(1) To drill only such wells on the leased land as may be authorized by the Secretary of the Interior under an approved unit plan; to drill no well within 1250 feet of any public road on or adjacent to the leased land without the consent of the Secretary of the Interior first had and obtained; to refrain from defacing, injuring, or

destroying trees, shrubs, or natural features, or removing same outside of the authorized work limits or pipeline and road rights-of-way as established pursuant to, or revised in accordance with, the unit plan. After designation of the authorized work limits by the Secretary of the Interior or his representatives, lessee shall mark such limits by some acceptable visual means. The location of camps, storage, parking of equipment, and storage of materials shall be confined within the authorized work limits. Sludge or other waste by-products from drilling or operations shall be so confined or disposed of that they do not destroy scenic or wildlife or pollute streams.

(2) To remove at the termination of drilling operations, all camps and buildings not essential to a continuing operation of any well, and to fill all sump holes, ditches, and other excavations, remove or cover all debris, and to restore the sites to a neat and presentable condition appropriate to the surrounding landscape, and, upon any partial or total relinquishment, cancellation, or expiration of this lease as to that part of the leased land to which his rights have terminated, so far as reasonably possible, to restore the surface of the leased land to its former condition to the extent deemed necessary by the Secretary of the Interior and the Regional Forester, U.S. Forest Service, Ogden, Utah, or their authorized representatives.

(3) To keep to an absolute minimum the number of access, tote roads, and other travelways necessary to conduct the lessee's operations, the location of which shall be designated by the Supervisor prior to the time of their construction. Access to existing public highways shall be determined by the Supervisor at such points on the highways with due regard for sight distance restrictions, safety, or scenic considerations. The location, alignment and cross section of all roads constructed for the convenience of lessee's operations, shall be such that after discontinuance of use, they can be obliterated and the area over which they traverse can be restored to its original condition. All types of roads constructed for operational uses shall, at the termination of these uses, be obliterated where required and the area over which they traversed restored in such a manner that revegetation will be encouraged. All roads constructed for operational purposes are to be considered as private roads and the erection of signs, locked gates, or other devices that may be required, at the discretion of the Supervisor, to discourage or prevent their use by the public shall be constructed and maintained by the lessee.

(4) To protect the scenic and aesthetic values of

roadsides, waterfronts, and recreation area zones as far as possible consistent with the authorized use in connection with construction, operation, and maintenance facilities.

(5) To conduct operations in a manner that will offer the least possible disturbance to wildlife on or adjacent to the leased land; to exercise no methods of control or interference with such wildlife without authority first obtained from the authorized representative of the Secretary of the Interior and/or the State Game and Fish Commission; to make no claim against the Government or the State on account of damage by such wildlife to improvements placed on the leased land.

(6) To observe and comply with all State and Federal laws and regulations relating to wildlife and to take such action as is necessary to assure observation and compliance with these laws and regulations by lessee's employees and agents.

As to any land within the Cache Creek Municipal Watershed, the lease will contain the following additional stipulation:

(7) To comply with plans heretofore made through agreement with the Forest Service and the Town Council of Jackson, Wyoming, for the protection from pollution of the municipal water during the term of this lease or any extension thereof.

APPENDIX E

DESIRED FUTURE CONDITIONS

APPENDIX E
DESIRED FUTURE CONDITIONS

OVERVIEW

Chapter 4 of the Bridger-Teton Land and Resource Management Plan contains a description of Desired Future Conditions 1B, 2A, 2B, 3, 4, 6A-D, 6S, 7A, 7B, 8, 9A, 9B, 10 and 12. Each of these Desired Future Conditions was used in the preparation of the Preferred Alternative.

Desired Future Condition 1A was not used to prepare the Preferred Alternative, but was used in Alternatives A, B, and C. The Desired Future Conditions are displayed in Appendix E to allow reviewers the opportunity to compare the balance, management emphasis, and range of possible opportunities inherent in the Alternatives.

The Forest Plan contains Forest- and Wilderness-wide Standards and Guidelines that apply to the forest in addition to DFC policies.

DESIRED FUTURE CONDITION 1A

Maximum Resource Development

Theme: An area managed for timber harvest, oil, gas, and other commercial activities with many roads and minor-but-adequate emphasis on other resources.

Experience: Overall, you find strong human presence as part of commercial timber production. Most of the forest area incorporating timber, or gas and oil exploration and development is linked with an extensive road system.

If you are driving a sedan vehicle, you can reach most areas of the forest. The main road system is gravel-surfaced, with gentle grades, and some high cut-and-fill slopes. You often meet logging trucks and other vehicles hauling timber products.

As you drive along, dense stands of young trees are visible. Timber stands are mostly free of insects and disease and show few dead or dying trees. You occasionally observe timber harvest, heavy equipment in operation, and log hauling. You frequently see large (40 acre) newly created openings interspersed with groups of trees. The trees vary in height from seedlings in newly planted areas to trees 40- to 50-feet tall. You may also find openings greater than 40 acres. You may see tree stumps, disturbed soil, scattered slash, and occasional log piles. You hear noise from trucks, bulldozers, tractors, and gasoline-powered chainsaws.

Yet, within the area, 12 percent or more of the existing old-growth forest is kept to provide enough habitat for some old-growth-dependent species. Firewood is available from slash piles, designated aspen areas, and logs decked for that purpose.

You often notice narrow unsurfaced branch roads. Seasonally, some roads are closed by gates. However, others are left open to provide public access. You may see areas that are fenced to prevent damage to growing trees. If you were to turn your sedan onto the lower-standard branch roads, you might find the vehicle scraping parts of the road. Many such roads are limited to high-clearance and traction vehicles such as a pickup truck. Branch roads are rough and traction poor when wet. Snow may block roads from early fall through late spring. Logging operations may completely obstruct passage in some areas. How far away you can see something like an approaching vehicle or an obstruction, called your "sight distance", is restricted. Passing other vehicles may be difficult except in built turnouts. From a high-elevation vantage point, a road pattern and "patchy" forested areas are obvious to you.

Traveling off-road, you should expect to cross a road about every one-half mile depending on terrain and timber stand or mineral locations. Many areas of uncut old, tall timber, grassy meadows, mixed trees and shrubs are accessible. You may hear noise from nearby timber-harvest activities.

If you watch for wildlife, you find that such mature or old-growth-dependent species as the marten, red-breasted nuthatch, and the goshawk have been replaced by other species in many areas. Such species as the snowshoe hare and mountain bluebird are adapted to younger stands of trees with seedling-to-pole-sized trees. Big-game numbers are expected to decrease because of human activity and reduced wildlife security. Over several years, the Wyoming Game and Fish Commission may have reduced the numbers of hunters in the area. You may find that outfitted hunting is not available.

Access to many fishing areas will have improved, but overall quality will have declined because of greater fishing pressure. The Wyoming Game and Fish Department may have had to apply such restrictions as catch and release or slot limits to retain fish numbers and size.

During the summer and fall, you encounter sheep or cattle and notice signs of intensive management practices, such as burning, spraying, seeding, fences, cattle guards, water developments, and gates. You may find large flocks of sheep on sidehills and ridgetops some cattle within streamside riparian areas and on adjacent slopes. Away from the streams, you see scattered, small- to medium-sized groups of

livestock. You may find traffic delays when livestock are being moved.

Your main recreation experience is motorized. Your solitude experiences are minimal. Opportunities for snowmobile, motorcycle, or mountain bike travel occur mainly on the road system.

Mineral and energy development roads are gravel-surfaced, similar to the main roads elsewhere. Access to energy development sites may be controlled. In oil development areas, you might see pumping equipment, storage tanks, and a safety and flow-regulation device called a "Christmas tree". Gas-field visitors might see "Christmas trees", compressors, and dehydration units. Occasionally, noise is heard as a result of pump jacks, heavy equipment, and compressors.

PRESCRIPTION

Management Prescription 1A

MANAGEMENT EMPHASIS - Management emphasis is on scheduled wood-fiber and other commodity outputs. Land and Resource Management Objectives addressed and, in part, met by achieving this Desired Future Condition include: 1.1(a-e,i,j), 1.2(a-f), 1.4(a), 2.4(a,b), 2.5(a,b), and 4.2(a-c).

Resource Prescriptions

RECREATION - Roaded recreation opportunities compatible with timber and minerals development are available. Recreation activities suitable for this area include dispersed, road-oriented uses such as firewood gathering, roadside camping and day use, off-highway vehicle use, hunting, and winter sports.

VISUAL QUALITY - The Visual Quality Objective is generally Modification.

FISHERIES AND WILDLIFE - Habitat is maintained for viable populations of management indicator species and for all other existing vertebrate wildlife and fish species.

VEGETATION-Range - Rangeland is managed to maintain or enhance range and watershed condition while providing forage for livestock.

VEGETATION-Timber - A full range of biologically appropriate silvicultural practices is used to emphasize production and use of sawtimber and other wood by-products. Timber harvest is scheduled.

Silvicultural System Guideline - Clearcut and shelterwood methods should be emphasized on existing and future managed

stands. The remaining stands may be treated using other appropriate silvicultural systems.

Silvicultural System Standards - as indicated:

Forest Cover Type	Rotation Age	Desired dbh at Rotation
lodgepole pine	100	10-12"
spruce/fir	110	11-15"
Douglas-fir	90	11-15"

Intermediate Treatment Guideline - All methods are permitted. Those that most economically produce sawlog-sized trees of desired dbh at rotation age should be applied. Stands should be protected from wood-fiber-production losses caused by insects and diseases.

Forest Cover Type	Stand Age at Thinning (yrs)	Desired Trees Per Acre
lodgepole pine	15-20	550
	25-30	400
spruce/fir	25-30	400
Douglas-fir	15-20	350

Site Preparation Guideline - Methods should favor meeting reforestation standards as soon as possible after final harvest.

Reforestation Guideline - Plantations should be protected from rodent and livestock damage.

Reforestation Standards - A harvested unit will be considered restocked when the following minimum standards by forest cover type and site productivity are met. The standards will be met within 5 years of final harvest.

Forest Cover Type	Site Productivity (cu.ft./acre/yr)	Trees per Acre	Percent of area Stocked	Percent Species Composition
lodgepole	20-49	150	70	LP 60
	50+	195	70	LP 60
spruce/fir	20-49	150	70	ES 60
	50+	195	70	ES 60
Douglas-fir	20-49	145	70	DF 70
	50+	200	70	DF 70

Desired Stocking Guideline - These stocking levels should be met:

Forest Cover Type	Trees per Acre	Percent of area Stocked	Percent Species Composition	Tree Height (ft)
lodgepole Pine	400	80	LP 60	2.5
spruce/Fir	400	80	ES 60	2.0
Douglas-fir	350	80	DF 70	1.5

Created Opening Duration Standard - A created opening will be closed when reforestation standard is met and the average stand tree height within the cut-over area is 4 feet.

Created Opening Dispersion Guideline - No more than 20 percent of the suitable timber base under this management prescription should be in a created-opening condition over a three-decade period.

Created Openings Size Guideline - Average should be 40 acres.

Utilization Guideline - Harvest and treatment residues may be made available for firewood and other products in a manner compatible with site preparation and reforestation requirements. Designated aspen areas may be made available for firewood.

Timber Sale Cost-Efficiency Standard - Commercial wood-product sales will be appraised and offered at prices which recover the costs of the associated sale preparation, administration, essential reforestation, and roading. Where roads are developed to meet multiple-resource objectives, costs will be apportioned to the benefitting resources. Road costs include construction, operation and maintenance. Road costs ae amortized over the useful life of the road.

Aspen Management Guideline - Aspen should be managed for its value as livestock forage and fuelwood.

MINERALS - Minerals or energy exploration and development are encouraged. Lease stipulations emphasize mineral commodity outputs, while meeting some other resource objectives.

ACCESS-Roads - The area requires an extensive road system with few road closures to provide efficient commodity removal. Most arterial, collector and local roads are open to commercial and public traffic.

Road Improvement and New-Road-Building Guideline - Timber and mineral roads will be built to whatever standard and density is the most economical to provide needed access.

Road Improvement and New-Road-Building Standard - Forest development roads will be constructed and maintained to standards appropriate for Traffic Service Levels A through D.

Road Management Standard - Over the life of the plan, the average Open Road Density is 4 miles per square mile of standard or equivalent road with 1- to 5-year variations of 1.5 to 5.

ACCESS-Trails - Trails are provided primarily for a variety of motorized use.

Trail System Guideline - Motorized trails should be developed primarily using local roads and trails not being actively used for commodity recovery.

Standard Level Guideline - The standard maintenance level should be that needed to protect soil and water values, and to provide for user safety appropriate to the trail's difficulty level.

Trail Density Guideline - No limit should be imposed on the numbers of miles of trail per square mile of area. Closed roads may be considered as a part of the trail system.

Encounters Per Day Guideline - No limit should be imposed on numbers of encounters per day along the trail system.

PROTECTION-Fire - Fire management emphasizes preservation and enhancement of timber and rangeland values scheduled for current use. A full range of suppression techniques is used.

Prescribed Fire Guideline - Prescribed fire should be used to favor reducing fuel loadings, improving livestock forage conditions on primary rangelands, and improving site conditions to increase wood fiber production.

Fire Protection Standard - Wildfires will be suppressed using control strategies during the normal fire season. Pre and post-fire season strategies could include containment, confinement or surveillance.

Fuels Guideline - Fuel conditions should be maintained that permit fire suppression forces to meet fire protection objectives for the area under historic weather conditions.

Fuels Standards - Activity fuels will be reduced or otherwise treated so the potential fireline intensities will not exceed 400 BTU/Sec/Ft. on 90 percent of the days during the regular fire season, OR continuous fuels concentrations exceeding the above standard will be broken up into manageable units with fire breaks, OR additional protection will be provided for areas exceeding the above standards when such protection will not be required for more than five years.

DESIRED FUTURE CONDITION 1B

Substantial Commodity Resource Development with Moderate Accommodation of Other Resources

Theme: An area managed for timber harvest, oil and gas, and other commercial activities with many roads and moderate to occasionally substantial emphasis on other resources.

Experience: Overall, you notice many signs of people as a part of commercial timber harvest. Yet, you cannot drive to as many areas as you can in more intensively managed parts of the forest.

As you drive, you notice an extensive roading system and timber harvest activity in some areas. The main road system is gravel-surfaced and well maintained, with gentle grades and potentially high cut-and-fill slopes well suited for sedan travel. You may see timber harvest equipment at roadside and meet logging truck traffic along the roadway. Driving a sedan, you can travel about two-thirds of the main road system. About one-third of the main road system is closed seasonally for wildlife security or roadway protection.

You notice frequent lower-standard branch roads with native surfaces. Most of the lower-standard roads are closed seasonally to vehicle access. About two-thirds of the closed roads are blocked seasonally by gates, and about one-third blocked year-round by semi-permanent barricades and also reseeded. Some branch roads remain open for public access and Forest Service purposes.

Hiking off-road, you find a road about every one-half mile. Down some barricaded roads, stream channels seem natural because of removal of bridges and culverts. Down other gated roads, recent vehicle travel may be seen. You may hear sounds of nearby timber harvesting.

The forest is a mosaic of tree groups of different ages and heights. Yet, older, taller trees dominate the landscape. Some recently cut areas show tree stumps, slash, and disturbed soil. Other recently cut areas still have a partial canopy of older trees. Older cut areas show tree saplings, poles, or young trees up to 45 feet tall and have a less disturbed appearing forest floor. Scattered dead trees are seen in openings and in older tree stands.

Firewood is available from dead trees, designated aspen areas, slash, and logs decked for this purpose. Occasionally, you find large patches of old-growth trees of many heights.

If you watch for wildlife, you find that such mature- or old-growth-dependent species as the marten, red breasted

nuthatch, and goshawk have been replaced by other animals like the snowshoe hare and mountain bluebird. Resident elk have remained at the same numbers for many years. Due to human activity and reduced wildlife security, some elk and other big game have been displaced to areas with greater security. Over time, big-game seasons may have been shortened or restricted. Because of the setting, outfitted hunting may not be as common as it is in less-developed areas. Resident trophy elk, deer, and moose may be limited.

If you go fishing, you find adequate supplies of fish, but improved access to some streams and lakes may have resulted in more people coming there over time. Seasonal limits on fishing some waters may have been needed to preserve quality sport-fishing opportunities. Some restrictions may have been applied over the years such as catch-and-release or slot limits to maintain statewide average fish numbers, size, and fishing success rates.

During the summer and fall, you encounter sheep or cattle and notice signs of intensive management practices, such as burning, spraying, seeding, fences, cattleguards, water developments, and gates. You meet relatively large flocks of sheep on sidehills and ridgetops some cattle within streamside riparian areas and on nearby slopes. Away from the streams, you see scattered small- to medium-sized groups of livestock. You may find traffic delays when livestock are being moved.

You find such non-motorized activities as hiking and biking along roads closed to vehicle traffic. Some roads and nearby areas are available for year-around snowmobile, motorcycle, and 4-wheel drive vehicle use.

Mineral or gas and oil development roads are gravel-surfaced, similar to main roads elsewhere on the forest. Access to energy development sites may be controlled. In oil development areas, you might see pumping equipment, storage tanks, and a safety and flow regulation device called a "Christmas tree". Gas fields reveal "Christmas trees", compressors, and dehydration units. Occasionally, you can hear noise from pumpjacks, heavy equipment, and compressors.

PRESCRIPTION

Management Prescription 1B

MANAGEMENT EMPHASIS - Management emphasis is on scheduled wood-fiber production and use, on livestock production, and on other commodity outputs. Land and Resource Management Objectives addressed and, in part, met by achieving this Desired Future Condition include: 1.1(a-e,i,j), 1.2(a-f), 1.4(a), 2.1(a,b), 2.4(a,b), 2.5(a-c), and 4.2(a-c).

Resource Prescriptions

RECREATION - Recreation is managed to provide Roaded Natural appearing opportunities in roaded areas, and Semi-Primitive opportunities in other areas. Roaded recreation opportunities are compatible with timber, livestock grazing, and minerals development. Recreation activities suitable for this area include dispersed, road-oriented uses such as firewood gathering, roadside camping and day use, off-highway vehicle use on open routes, hunting, and winter sports. Use of closed roads for semi-primitive forms of recreation such as horseback riding and hiking is suitable.

VISUAL QUALITY - The Visual Quality Objective is generally Partial Retention or Modification. In sensitive foreground areas, more restrictive Visual Quality Objectives apply.

FISHERIES AND WILDLIFE - Habitat is provided for existing populations of game and fish, but hunter-success and recreation-day objectives identified by the Wyoming Game and Fish Department may decrease. A use-attainability study may be needed for a specific stream segment to determine if fishery-beneficial use is being protected to an adequate level.

Big Game Habitat Guidelines - Sufficient habitat should be provided to maintain desired populations and distribution of big game species. For example:

Elk Calving Areas - About 30 percent of the brush/grassland (rangeland type) should be maintained in a brush/forb type, emphasizing the aspen or conifer/brush ecotone,

Mule Deer Winter Ranges - About 75 percent of the brush/grassland (rangeland type) should be maintained in a brush type with about 55 percent in a mature age class,

Moose Winter Ranges - About 75 percent of the brush/grassland (rangeland type, e.g. serviceberry, mountain mahogany) should be maintained in a brush type with About 30 percent in a mature age class. About 95

percent of the willow/grass range should be maintained in a willow type.

Elk Winter Ranges - About 50 percent of the brush/grassland should be maintained in a brush type with about 30 percent in a mature age class.

Bighorn Sheep Winter Ranges - About 75 percent of the brush/grassland type should be maintained in grass.

VEGETATION-Range - Rangeland is managed to maintain & enhance range and watershed condition while providing forage for livestock and wildlife.

VEGETATION-Timber - A full range of biologically appropriate silvicultural practices is used to emphasize production and use of sawtimber and other wood by-products. Timber harvest is scheduled.

Silvicultural System Guideline - Clearcut and shelterwood methods should be emphasized on existing and future managed stands. The remaining stands may be treated using other appropriate silvicultural systems.

Silvicultural System Standards - *as indicated:*

Forest Cover Type	Rotation Age	Desired dbh at Rotation
lodgepole pine	100	10-12"
spruce and fir	110	11-15"
Douglas-fir	90	11-15"

Intermediate Treatment Guideline - All methods are permitted. Those which most economically produce sawlog-sized trees of desired dbh at rotation age should be applied. Stands should be protected from wood-fiber-production losses caused by insects or diseases.

Desired Stocking Guideline - Managed stands should have tree stocking control to provide timber production and big game hiding cover.

Forest Cover Type	Stand Age at Thinning (yrs)	Desired Trees Per Acre
lodgepole pine	15-20	550
	25-30	400
spruce and fir	25-30	400
Douglas-fir	15-20	350

Site Preparation Guideline - Methods should be applied that *favor meeting reforestation standards as soon as possible* after final harvest.

Reforestation Guideline - Plantations should be protected from rodent and livestock damage.

Reforestation Standards - A harvested unit will be considered restocked when the following minimum standards by forest cover type and site productivity are met. These standards will be met within 5 years of final harvest:

Forest Cover	Site Productivity (cu.ft./acre/yr)	Trees per Acre	Percent of area Stocked	Percent Species Composition
lodgepole pine	20-49	150	70	LP 60
	50+	195	70	LP 60
spruce/fir	20-49	150	70	ES 60
	50+	195	70	ES 60
Douglas-fir	20-49	145	70	DF 70
	50+	200	70	DF 70

If natural regeneration fails to meet these standards, then trees will be planted.

Created Opening Duration Standard - A created opening will be closed when reforestation standard is met and the area begins to take on the appearance of a young forest represented by either 95 percent of the trees in the cut-over area exceeding 10 feet in height, OR regeneration provides elk hiding cover from a horizontal ground point of view.

Created Openings Size Guideline - Maximum opening should be 40 acres with an average of 25 acres.

Created Opening Dispersion Guideline - No more than 20 percent of the suitable timber base under this management prescription should be in a created-opening condition over a three-decade period.

Utilization Guideline - Harvest and treatment residues should be made available for firewood and other products in a manner compatible with site preparation and restocking requirements. Designated aspen areas should be made available for firewood.

Timber Sale Cost-Efficiency Guideline - Commercial wood-product sales should only be offered when benefits are equal to or exceed costs. Benefits and costs to be considered in cost efficiency analysis of commercial wood-product sales should be:

Benefits - involve monetary receipts from the sale of the products, social and economic benefits associated with providing wood fiber for public use, and benefits from providing habitat needed to support big game population objectives, and

Costs - consist of sale preparation, administration, essential reforestation, and roading. Where roads are

developed to meet multiple-resource objectives, costs will be apportioned to the benefitting resources. Road costs include construction, operation, and maintenance. Road costs are amortized over the useful life of the road.

Aspen Management Guideline - Aspen should be managed for its value as wildlife habitat, (and for providing seasonal colors) emphasizing browse and cover for big-game species.

MINERALS - Minerals or energy exploration and development is encouraged. Lease stipulations emphasize mineral commodity production, while meeting some other resource objectives.

ACCESS-Roads - Management of the area requires an extensive road system with some seasonal and long-term road closures. Most vehicle access is limited to arterial and collector roads. Seasonally, local roads may be accessible. Some roads remain open to vehicles, and the main roads are maintained for passage of all vehicles.

Road Improvement and New-Road-Building Standard - Forest development roads will be built and maintained to standards appropriate for Traffic Service Levels B through D.

Road Management Standard - Over the life of the plan, the average Open Road Density is 1.5 miles per square mile of standard or equivalent road with 1- to 5-year variations of .75 to 1.75.

ACCESS-Trails - Trails are provided for motorized and non-motorized use appropriate to the recreation setting.

Trail System Guideline - Motorized trails should be developed primarily using local roads and trails not being actively used for commodity recovery. Existing Forest development trails designated for non-motorized use should be maintained.

Standard Maintenance Level Guideline - The standard maintenance level should be that needed to protect soil and water values, and to provide for user safety and user convenience appropriate to the trail's difficulty level.

Trail Density Guideline - No limit should be imposed on the numbers of miles of trail per square mile of area. Closed roads may be considered as a part of the trail system.

Encounters Per Day Guideline - No limit should be imposed on numbers of encounters per day along the trail system.

PROTECTION-Fire - Fire management emphasizes preservation and enhancement of timber and range values scheduled for

current use. A full range of suppression techniques is used.

Prescribed Fire Guideline - Prescribed fire should be used to favor reducing fuel loadings, improving livestock forage conditions on primary range, and improving site conditions to increase wood fiber production.

Fire Protection Standard - Wildfires will be suppressed using control strategies during the normal fire season. Pre- and post-fire season strategies may include containment, confinement, or surveillance.

Fuels Guideline - Fuel conditions should be maintained that permit fire suppression forces to meet fire protection objectives for the area under historic weather conditions.

Fuels Standards - Activity fuels will be reduced or otherwise treated so the potential fireline intensities will not exceed 400 BTU/Sec/Ft. on 90 percent of the days during the regular fire season, OR continuous fuels concentrations exceeding the above standard will be broken up into manageable units with breaks, OR additional protection will be provided for areas exceeding the above standards when such protection will not be required for more than five years.

DESIRED FUTURE CONDITION 2A

Non-Motorized Recreation Areas

Theme: An unroaded area managed to give a quiet, almost primitive recreation experience.

Experience: Overall, you find few, if any, signs of people as you hike through the area.

Because much of the area is accessible by trails or cross-country, you find no roads. All-terrain-vehicles and motorcycles cannot use the area. Encounters with other people diminish as you move away from nearby roads and trailheads. Generally, you experience a backcountry setting with a high likelihood of solitude. However, you may meet large groups occasionally.

Trails allow easy passage by hikers, horses, llamas, and mountain bikes. You may find oversnow vehicles, helicopters for skiing, stock tanks or fences, seismic exploration, or predator control devices in some areas. Otherwise, the forest presents a natural appearance. Some areas show recent wildfires. Other areas show stands with many dead trees. Firewood is available for camping, but is not available generally for home use.

As you look for wildlife, you find that habitat for such old-growth-dependent wildlife as the marten is approaching the maximum level that could be available. Habitat for big game is less than the best, but resident elk numbers have remained stable over many years. As a result of the lack of resource development, big-game hunting seasons are generally longer than elsewhere on the Bridger-Teton and less restrictive. You are likely to find outfitted hunting available. Resident trophy elk, deer, and moose are generally more available than in other parts of the forest where substantial timber or mineral development is taking place.

If you go fishing and hike into a remote area, you may find that access is difficult and takes quite a bit of time. Better fishing is generally available to you if you are willing to travel longer distances. Fish supplies are abundant except for popular areas where some restrictions may have been applied.

You find some sheep, cattle, and pack animals throughout the area. Recent livestock grazing is evident in some areas but not in others. You may see range improvements such as fencing and stock tanks.

PRESCRIPTION

Management Prescription 2A.

MANAGEMENT EMPHASIS - Management emphasis is to maintain or enhance Primitive and Semi-Primitive Non-Motorized dispersed recreation opportunities. Land and Resource Management Objectives addressed and, in part, met by achieving this Desired Future Condition include: 1.1(f-i), 2.1(a,b), 2.2(c,d), 2.3(a), 4.4(b), 4.5(a,b), and 4.6(b).

Resource Prescriptions

RECREATION - Manage the physical and social setting to provide Primitive and Semi-Primitive, Non-motorized opportunities.

Helicopter Use Guideline - Helicopters for skiing and geophysical exploration should use designated non-motorized areas.

Off-Highway vehicle Standard - Off-highway vehicles (OHVs) will not use the area. Oversnow, motorized vehicles may be allowed to use designated trails and dispersed use areas.

Campsite Guideline - High-impact campsites should be restored to meet Frissel Condition Class 3. In some locations, designated campsites may be established, not to exceed Development Level 1.

Education Guideline - Visitor education and no-trace guidelines should be used to minimize social and physical impacts to the area.

Signing Guideline - Signing may be used for user safety, education, convenience, and interpretation.

Group Size Standard - Group sizes larger than those allowed in Wilderness areas will be allowed. The social setting will be managed as Semi-Primitive Non-motorized.

VISUAL QUALITY - The Visual Quality Objective for this area is Retention. Structures, trails, and signs will be visually evident, and repeat the form, line, color and texture found in the characteristic natural landscape.

FISHERIES AND WILDLIFE - Habitat is managed to achieve the game and fish populations, harvest levels, success and recreation day objectives identified by the Wyoming Game and Fish Department and agreed to by the Forest Service.

Habitat Diversity Guideline - Diverse of fish and wildlife habitat types should be maintained in each watershed to provide sufficient habitat to meet Wyoming Game and Fish Department population objectives and distribution of native

wildlife including non-game, small game, big game, fish, and Threatened and Endangered species.

VEGETATION-Range - Rangeland is managed to maintain and enhance range and wateshed condition while providing forage for livestock and wildlife.

VEGETATION-Timber - Only silvicultural practices necessary to meet specific recreation objectives are be used. Timber harvest is not scheduled. Few, if any, opportunities to use wood fiber for firewood and other products exist.

Silvicultural System Guideline - Single-tree selection and group selection systems should be favored for application to conifer forest types to meet specific recreation objectives.

Intermediate Treatment Guideline - Sanitation and salvage treatments should only be applied when needed to meet specific recreation objectives.

Site Preparation Guideline - None are permitted.

Aspen Management Guideline - Aspen should be managed for its' value as wildlife habitat and for its seasonal colors and scenic value.

MINERALS - Development of leasable mineral resources is normally not allowed or, if allowed, done from sites outside the area except for existing leases. Surface exploration and development under existing leases and claims is authorized, subject to existing lease terms. Seismic activities can be authorized with helicopter access permitted. The area is not withdrawn to locatable mineral entry.

Lease Stipulation Standard - For available areas, leases will be issued with No-Surface-Occupancy stipulations.

ACCESS-Roads - Roads are only built for exploration or development of existing oil and gas leases or to access validated mining claims.

New Road Building Guideline - Roads should be built to the minimum standard needed to provide safe access.

Road Management Standards - Exploration and development roads will be managed as temporary roads and will be returned to Elimination Class 4 standards when use ends.

Motorized Access Guideline - Motorized vehicles and equipment may be permitted on a case-by-case basis to maintain or build range improvements needed to meet allotment objectives.

ACCESS-Trails - Management of the area requires a trail system for exclusively non-motorized travel.

Access Guideline - Adequate access and trail systems should accommodate and disperse use without encouraging concentrated use. Winter-sport trails should avoid areas of high avalanche hazard.

Trail System Guideline - Non-motorized trails should be developed providing experiences at all levels of difficulty.

Trail System Standard - Motorized trails will not be developed except for designated snow trails.

Standard Maintenance Level Guideline - The standard maintenance level should be that needed to protect soil and water values and to provide for user safety and user convenience appropriate to the trail's difficulty level.

Trail Density Guideline - Over the life of the plan, an average of no more than 1 mile of trail per square mile of area should be attained.

Encounters Per Day Guideline - Parties encountered per day during peak recreational use seasons should average 12 per day, varying from 6 to 15 depending on conditions.

PROTECTION-Fire - Fire management emphasizes a natural-appearing landscape.

Fire Protection Standard - Wildfires will be suppressed using strategies that keep fireline intensities below 400 BTU/Sec/Ft.

DESIRED FUTURE
CONDITION 2B

Motorized Recreation Areas

Theme: An area managed to give a motorized recreation experience.

Experience: Overall, you find few signs of people away from roads. If you hike through the area, you see little or no evidence of logging, oil and gas equipment, or other development.

Some popular, established roads are open and you reach or pass through the area on them. Such roads are mainly gravel surfaced and well maintained with gentle grades. They allow unrestricted two-way traffic. You may find a few roads as you hike along trails or across country.

Many trails are available to you if you are riding an all-terrain vehicle or a motorcycle. When you drive your car, you frequently meet other vehicles along the roads. If you go hiking, you meet other people at trailheads. People encounters diminish as you move away from roads and trailheads.

Trails are designed and maintained to allow easy passage by people, horses, and vehicles. So, you find occasional-to-frequent encounters with motorized trailbikes, jeeps, and other off-highway vehicles in some areas.

The forest appears to be mature. Some areas show recent wildfires. Other areas show stands with many dead trees. Firewood is available for camping, and is generally available for home use.

As you look for wildlife, you find that habitat for such old-growth-dependent wildlife as the marten is close to the maximum amount available there. Habitat for big game is than best, but resident elk numbers have remained stable for some time. Because of little disturbance in much of the area, big-game hunting seasons are generally longer than in other parts of the Bridger-Teton and less restrictive. You are likely to find outfitted hunting here. Resident trophy elk, deer, and moose are generally more available than in other parts of the forest where substantial timber or mineral development is taking place.

If you go fishing and hike into a remote area, you may find that access is difficult and takes quite a bit of time. Better fishing is generally available to you if you are willing to travel longer distances. Fish supplies are abundant except for popular areas where some restrictions may have been applied.

You find some sheep, cattle, and pack animals throughout the area. Recent livestock grazing is evident in some areas but not in others. You may see range improvements such as fencing and stock tanks.

PRESCRIPTION

Management Prescription 2B.

MANAGEMENT EMPHASIS - Management emphasis is to maintain or enhance dispersed recreation opportunities including Semi-Primitive Motorized and Roaded Natural. Opportunities for dispersed, motorized recreation are maintained and enhanced. Such areas are suitable for non-motorized uses, such as hiking, but they are not emphasized. Land and Resource Management Objectives addressed and, in part, met by achieving this Desired Future Condition include: 1.1(f), 1.2(c,d), 2.1(a,b), 2.4(a,b), 2.5(a-d), 4.1(b), 4.4(a-c), and 4.5(a).

Resource Prescriptions

RECREATION - Management provides Roaded Natural and Semi-Primitive Motorized opportunities, and meets ROS setting criteria for Semi-Primitive Motorized class in backcountry areas.

Campsite Guideline - High-impact campsites should be restored to meet Frissel Condition Class 3. In some locations, designated campsites may be established, not to exceed Development Level 2.

Education Standard - Visitor education, especially the "Tread Lightly" program, will be used to minimize social and physical impacts to the area.

VISUAL QUALITY - The Visual Quality Objective is Retention.

FISHERIES AND WILDLIFE - Habitat is managed to achieve the game and fish populations, harvest levels, success and recreation day objectives identified by the Wyoming Game and Fish Department and agreed to by the Forest Service.

VEGETATION-Range - Rangeland is managed to maintain and enhance range and wateshed condition while providing forage for livestock and wildlife.

VEGETATION-Timber - Silvicultural practices are used to meet specific recreation and big-game habitat objectives. Timber harvest is not scheduled. Vegetation management practices provide opportunities to use wood fiber for firewood and other products.

Silvicultural System Guideline - All are available, but only to meet specific recreation and big game objectives.

Selection, shelterwood, and other methods should be favored to meet big-game habitat objectives which generally maintain a mature-forest appearance.

Intermediate Treatment Guideline - Sanitation in stands should be applied when epidemic conditions are present or imminent and threaten meeting resource objectives within or adjacent to the Management Area. All others should be available but only to meet specific recreation or big-game objectives.

Site Preparation Guideline - All should be available but only to meet specific recreation or big-game objectives.

Aspen Management Guideline - Aspen should be managed for its' value as wildlife habitat and for its scenic value and fall colors.

MINERALS - Energy exploration and development under existing leases is authorized with requirements to meet other surface management objectives. The area is available for locatable mineral entry and leasing.

Lease Stipulation Standard - Oil and gas leases issued in areas classified as Primitive, Semi-Primitive Non-motorized, and Semi-Primitive Motorized will contain a No-Surface-Occupancy stipulation. New leases will be issued in Roaded Natural areas under general forest direction.

ACCESS-Roads - Management of the area requires roads that are designated for use by motorized off-highway vehicles.

Road Improvement and New Road Building Standards - Forest development roads will be built and maintained to standards appropriate for Traffic Service Levels B through D. New road building will be kept to the minimum standard and density necessary to achieve resource objectives, predominately roaded recreation.

ACCESS-Trails - Trails are provided for a variety of motorized uses.

Trail System Guideline - Motorized trails should be developed to provide all levels of difficulty, using existing roads and trails where possible. Use should be dispersed rather than concentrated.

Trail System Standard - New non-motorized trails will not be developed.

Standard Maintenance Level Guidelines - The standard maintenance level should be that needed to protect soil and water values and to provide user safety and user convenience appropriate to the trails difficulty.

Trail Density Guideline - Over the life of the Forest Plan, an average of no more than 1 mile of trail per square mile of area should be attained.

Encounters Per Day Guideline - Parties encountered per day during peak recreational use seasons should average 12 per day, varying from 6 to 15 depending on conditions.

PROTECTION-Fire - Fire management emphasizes a slightly modified landscape.

Fire Protection Standard - Wildfires will be suppressed using strategies that keep fireline intensities below 400 BTU/Sec/Ft.

DESIRED FUTURE CONDITION 3

River Recreation

Theme: An area managed to give river-and-scenic-recreation experiences.

Experience: Overall, you find little obvious sign of people away from public facilities. You see little evidence of development as you walk through the area or float the river. You see that old-growth forest is approaching maximum levels of acres with the result that some loss of shrubs and other forage species has happened.

Driving a vehicle, you travel primarily on major highways and improved forest roads that follow the river courses. In some areas, access to the river from the road is abundant and convenient, with many places to launch craft or fish. Other river segments are less easily reached by roads, with only a few access points.

Some areas show signs of recent wildfires. Other areas show stands with many dead trees. You find almost no signs of timber harvest.

Along and in the river, you see and experience all kinds of water-related recreation: river floating, boating, and fishing. Near the river, you may see picnicking, camping, and hiking. You may find such facilities as boat-launch ramps, picnic tables, and toilets at river-access points.

Bald eagles and osprey may be present.

You can fish the rivers and streams by standing on the streambanks, wading, or floating in a boat or raft. You may find that some spots have too many people trying to fish. Such restrictions as catch-and-release or slot limits may have been applied.

You may find some sheep, cattle, and pack animals throughout the area. Recent livestock grazing is evident in some areas but not in others.

If you use off-highway vehicles, you are limited to a few low-standard roads.

PRESCRIPTION

Management Prescription 3.

MANAGEMENT EMPHASIS - River segments outside of Wilderness that have been determined eligible for potential addition to the National Wild and Scenic River system are protected from activities that could diminish or change the free-flowing characteristic, water quality, or the scenic, recreational, fish and wildlife, and other values which make the river eligible for designation as a Scenic or Recreation River

(for further information, please see the Wild and Scenic River Act). River segments that are eligible for "Wild" classification are not included in DFC 3: the presence of existing roads and developments near rivers within this prescription preclude their consideration for Wild Rivers. Several segments on the forest are eligible for Wild River classification, and these are in DFC 6 (Wilderness). Other recreational experiences and commodities are provided from river segments not eligible. If any portion of this area contains grizzly bear habitat, no surface-disturbing activities can occur there until the grizzly bear cumulative effects model can be run to help determine potential affects on the bear.

Land and Resource Management Objectives addressed and, in part, met by achieving this Desired Future Condition include: 1.1(d,e), 2.1(a,b), 2.2(a,b), 2.3(a,b), 3.2(b-f), 4.2(b), 4.3(c), 4.4(a-c), 4.6(b), and 4.7(b).

Resource Prescriptions

WILD AND SCENIC RIVERS - River segments that have been found eligible for inclusion in the Wild and Scenic Rivers System, as Scenic or Recreation Rivers, are managed to protect or enhance their scenic and recreational values. Resource development which would diminish the free-flowing characteristic, water quality, or scenic, recreational, fish and wildlife, and other values of eligible segments will be prohibited.

Facility Improvement Standard - Where facilities exist in eligible river corriders, improvements to roads, trails, facilities, and structures will be designed to protect and enhance scenic and recreation values.

RECREATION - Roaded Natural-appearing recreation opportunities are provided in areas of existing system roads and at major river-access points. All other areas will provide Semi-Primitive or Primitive opportunities.

Facilities Guideline - Where roads and developed recreation exist, facilities should be provided to enhance existing opportunities. These may include launch ramps, interpretive facilities, campsites and picnic areas, toilets, and parking areas. New developments will be designed to meet visual quality objectives.

Development Location Guideline - Developments should be confined to launch and fishing access points, to allow a natural appearing setting for recreationists on the river.

River Experience Standard - In Semi-Primitive and Primitive settings, rivers will be managed to meet social and physical criteria appropriate to each ROS class.

River Permits Standard - On rivers where permits are allowed but not currently issued, only annual permits will be issued for commercial recreation services until intensity and frequency have been determined. On the same rivers, no permits will be issued for outfitted recreational floating until intensity and frequency have been determined and decisions made about allocations among commercial and non-commercial users.

Motorized Vehicle Standard - Motorized vehicles will be allowed in parking areas and on designated roads and trails only.

VISUAL QUALITY - The Visual Quality Objectives for this area are Retention and Partial Retention. Partial Retention is generally applied to localized recreation developments that are visually evident.

FISHERIES AND WILDLIFE - Habitat is managed to help meet the game fish populations, harvest levels, success, and recreation-day objectives and to fully achieve the fish populations, harvest levels, success, and recreation-day objectives identified by the Wyoming Game and Fish Department and agreed to by the Forest Service. Cumulative effects analysis is performed for all development proposed within grizzly bear habitat.

Big Game Habitat Guideline - Sufficient habitat should be provided to maintain desired populations and distribution of big game species. For example:

Elk Calving Areas - About 30 percent of the brush/grassland (rangeland type) should be maintained in a brush/forb type, emphasizing the aspen or conifer/brush ecotone,

Mule Deer Winter Ranges - About 75 percent of the brush/grassland (rangeland type) should be maintained in a brush type with about 55 percent in a mature age class,

Moose Winter Ranges - About 75 percent of the brush/grassland (rangeland type, e.g. serviceberry, mountain mahogany) should be maintained in a brush type with About 30 percent in a mature age class. About 95 percent of the willow/grass range should be maintained in a willow type.

Elk Winter Ranges - About 50 percent of the brush/grassland should be maintained in a brush type with about 30 percent in a mature age class.

Bighorn Sheep Winter Ranges - About 75 percent of the brush/grassland type should be maintained in grass.

Diversity of Wildlife Habitat Guideline - Diverse wildlife habitat types should be maintained within each watershed. Sufficient habitat should be provided to maintain Wyoming Game and Fish Department population objectives and distribution of native wildlife including non-game, small game, big game, fish, threatened, endangered, and sensitive species.

VEGETATION-Range - Rangeland is managed to maintain and enhance range and watershed condition while providing forage for livestock and wildlife.

VEGETATION-Timber - Primarily uneven-aged silvicultural practices are used to preserve and enhance river-oriented recreation experiences and wildlife values. Timber harvest is not scheduled, but can be used to enhance recreation sites and visual quality. Examples of how tree removal can be used include development or expansion of existing recreation facilities, removal of trees that pose a hazard, and daylighting of roads and parking areas where mud and snow persist. Vegetation management practices provide limited opportunities to obtain firewood and other products.

Silvicultural System Guideline - Single-tree selection and group selection methods should be applied to forest conifer types favoring development of all-aged stands to meet specific wildlife habitat and river-oriented recreation objectives.

Intermediate Treatment Guideline - Improvement cuts should be applied only to meet specific wildlife and river-oriented recreation objectives. Sanitation should be applied when epidemic conditions are present or imminent and threaten meeting resource objectives within or adjacent to the management area.

Site Preparation Guideline - None are permitted.

Aspen Management Guideline - Aspen should be managed for its' value as wildlife habitat and and for its fall colors and scenic values.

MINERALS - The area is available for mineral or energy exploration and development subject to their surface management requirements.

Lease Stipulation Standard - Leases will be issued with the No-Surface-Occupancy stipulation on all areas.

River Status Guideline - Subject to existing rights, segments of rivers eligible for Wild, Scenic, or Recreation

status may be recommended for withdrawal from mineral entry.

ACCESS-Roads - Management of the area requires periodic local roads providing river access.

Road Improvement and New Road Building Standards - Forest development roads will be built and maintained to standards appropriate for Traffic Service Levels B through D. New road building will be kept to the minimum standard and density necessary to achieve resource objectives, predominately river access.

Road Management Standards - Over the life of the Forest Plan, the average open road density will be 1 mile per square mile of standard or equivalent road with 1- to 5-year variations of .25 to 1.25. Temporary roads will be returned to Elimination Class 3 or 4 standards.

ACCESS-Trails - Hiking trails are provided.

Trail System Guideline - Hiking trails of easiest difficulty should be developed that access points of interest along rivers and streams.

Standard Maintenance Level Guideline - The standard maintenance level should be that needed to protect soil and water values and to provide for user safety and user convenience appropriate to the trail's difficulty level.

Trail Density Guideline - Over the life of the plan, an average of no more than 1 mile of trail per square mile of area should be attained.

Encounters Per Day Guideline - Parties encountered per day during peak recreational use seasons should average 12 per day, varying from 6 to 15 depending on conditions.

PROTECTION-Fire - Fire management emphasizes preservation of fish and wildlife values and river-oriented recreation opportunities.

Fire Protection Standards - Wildfires will be suppressed using primarily containment and control strategies during the normal fire season. Pre- and post-season period strategies could include containment, confinement, and surveillance.

Fuels Guidelines - Hazardous fuels in the form of native vegetation will be cleared from around buildings and facilities. For further information, please see Wildfire Protection: A Guide for Home Owners and Developers, Wildfire Hazard and Residential Development, Utah and California.

DESIRED FUTURE CONDITION 4

Special Emphasis Area for Municipal Water Supply

Theme: An area managed to protect municipal water supplies.

Experience: Overall, you find few signs of people away from roads. You see little evidence of development as you walk through the area. You see that old-growth forest is approaching maximum levels of acres with the result that some loss of shrubs and other forage species has happened.

If you are driving, your vehicle is restricted to only a few road systems. Many of these road systems are unsuited to travel by sedan. The exceptions are a few popular, established roads that may access or pass through the area. Traveling the main roadway, you see dispersed low-standard branch roads.

Some areas show signs of recent wildfires. Other areas show stands with many dead trees. Infrequently, you find signs of timber harvest.

If you take a closer look at the road system, you find a limited number of two-track roads winding through the timber. Two-track roads are most appropriate for four-wheel-drive vehicles. If you go hiking, you will meet two-track roads infrequently.

You may find big-game habitat in less-than-best condition in some areas, but you also find other open areas that provide better seasonal forage. You may find that resident and migratory elk numbers have increased over time because of the closure of roads and reduced disturbance by humans. So, you may enjoy longer and less-limited big-game hunting seasons than in other areas with many open roads. You may find outfitted hunting available here. Resident trophy elk, deer, and moose are generally available.

If you go fishing and hike into a remote area, you may find that access is difficult and takes quite a bit of time. Better fishing is generally available to you if you are willing to travel longer distances. Fish supplies are abundant except for popular areas where some restrictions may have been applied.

Cattle and sheep are excluded from critical water-supply areas, but you may find sheep and cattle visible in other areas.

Recreational use of off-highway vehicles is limited to the road system.

If you seek a primitive hiking or camping experience, you can find it mainly at higher elevations.

PRESCRIPTION

Management Prescription 4.

MANAGEMENT EMPHASIS - Management emphasis is to protect or improve the quality of municipal water supplies. Land and Resource Management Objectives addressed and, in part, met by achieving this Desired Future Condition include: 1.1(d-i), 1.3(a,b), 2.1(a,b), 2.3(a), 2.5(a,b,d), 4.1(b), 4.2(b), 4.4(a-c), and 4.7(b).

Resource Prescriptions

RECREATION - Roaded Natural opportunities are provided in areas of existing system roads. All other areas, provide Semi-Primitive or Primitive recreation opportunities. Recreation use is managed to retain 1988 levels and is limited to existing facilities.

VISUAL QUALITY - The Visual Quality Objectives are Retention and Partial Retention.

FISHERIES AND WILDLIFE - Habitat may be provided for existing populations of game and fish, harvest levels, success, and recreation-day objectives identified by the Wyoming Game and Fish Department and agreed to by the Forest Service.

VEGETATION-Range - Range is managed to maintain and enhance range and watershed condition while providing forage for livestock and wildlife.

Water Quality Protection Standard - Livestock will be removed or numbers reduced in areas where municipal water quality is endangered.

VEGETATION-Timber - Silvicultural practices emphasize protecting and improving soil and water values. Timber harvest is not scheduled. Vegetation management practices provide limited opportunities to obtain firewood and other products.

Silvicultural System Guideline - All systems should be available as required to improve or protect water quality. Methods may be applied to meet wildlife habitat objectives only when water quality is not degraded.

Intermediate Treatment Guidelines - All treatments should be available but used only when water quality is either protected or improved. Sanitation should be applied in stands when epidemic conditions are present or imminent and threaten meeting resource objectives within or adjacent to the Management Area.

Site Preparation Guideline - All methods should be available but used only when water quality is either protected or improved.

Aspen Management Guideline - Manage aspen for its' value as wildlife habitat and to provide fall colors, while emphasizing browse and cover for big-game species and maintaining soil and water values.

MINERALS - New oil and gas leasing is allowed. Exploration and development under existing leases is authorized but is constrained to meet water supply and quality needs and other resource objectives. All of the area is withdrawn from locatable mineral entry and phosphate leasing.

Oil and Gas Leasing Standard - New oil and gas leases will be issued with a No-Surface-Occupancy stipulation.

ACCESS-Roads - Management of the area for water quality protection requires a range of actions from limiting vehicle access on local roads to road closure for locations off of arterial or collector roads.

Road Improvement and New Road Building Standard - Forest development roads will be built and maintained to standards appropriate for Traffic Service Levels B through D. New road building will be kept to the minimum standard and density necessary to achieve resource objectives, *predominately water quality protection.*

Road Management Standard - Over the life of the Forest Plan, the average open road density will be 1 mile per square mile of standard or equivalent road with 1- to 5-year variations of .25 to 1.25.

ACCESS-Trails - Forest development trails existing in 1988 continue to be maintained and used.

Trail System Guideline - Types and locations of use existing in 1988 should be continued as long as soil and water values are maintained.

Trail System Standard - New trail systems will not be developed.

Standard Maintenance Level Guideline - The standard maintenance level should be that needed to protect soil and water values, provide for user safety and user convenience appropriate to the trail's difficulty level.

Trail Density Guideline - Over the life of the plan, an average of no more than .5 mile of trail per square mile of area should be attained.

Encounters Per Day Guideline - Parties encountered per day during peak recreational use seasons should be a maximum of 2.

PROTECTION-Fire - Fire management emphasizes preservation of soil and water values. A full range of suppression techniques is used.

Fire Protection Standard - Wildfires will be suppressed using primarily contain and control strategies during the normal fire season. Pre- and post-season period strategies may include containment, confinement, and surveillance.

Fuels Guideline - Fuel conditions should be maintained that permit fire suppression forces to meet fire protection objectives for the area under historic weather conditions.

Fuels Standards - Activity fuels will be reduced or otherwise treated so the potential fireline intensities will not exceed 400 BTU/Sec/Ft. on 90 percent of the days during the regular fire season, or continuous fuels concentrations exceeding the above standard will be broken up into manageable units with fire breaks, OR additional protection will be provided for areas exceeding the above standards when such protection will not be required for more than five years.

DESIRED FUTURE
CONDITION 6(A-D,S) Wilderness, Study Areas, and Wild Rivers

Theme: A mostly pristine area where the presence of people is rarely or never noticed.

Experience: In the National Forest Wilderness, you find almost no signs of people away from trails or camping areas. The Wilderness shows you the natural processes of plants and animals living and dying. You see that old-growth forest is approaching maximum levels of acres with the result that some loss of shrubs and other forage species has happened. You may find areas of the forest where recent burns or blowdowns dominate the landscape.

You find big-game habitat in less-than-best condition in some areas. Hunters find that resident and migratory elk numbers are high because they are rarely disturbed. Big-game hunting seasons are longer and less restricted than in other areas of the Forest that have many open roads. You can usually find outfitted hunting available. Resident trophy elk, deer, and moose are generally available.

If you go fishing and hike into a remote area, you may find that access is difficult and takes quite a bit of time. Better fishing is generally available to you if you are willing to travel longer distances. Fish are abundant except for popular areas where some restrictions may have been applied.

You may find some sheep, cattle in some areas, and pack animals throughout the Wilderness. Recent livestock grazing is evident in some areas but not in others.

Those seeking a primitive experience will find it here.

Mineral and energy development is not permitted except where allowed under prior rights or through Congressional direction as in the Palisades Wilderness Study Area.

PRESCRIPTION Management Prescription 6A.

MANAGEMENT EMPHASIS - Management emphasis is for the protection and perpetuation of pristine bio-physical conditions, and a high degree of solitude with essentially no perceptible evidence of human use. Natural biological processes are not adversely or artificially changed over time by human use. Land and Resource Management Objectives addressed and, in part, met by achieving this Desired Future Condition include: 1.1(h), 2.1(a,b), 3.1(a,b), 3.2(a-h), 4.5(a,b), and 4.6(a).

Resource Prescriptions

RECREATION - Little evidence of human use or presence exists. Primitive recreation opportunities are available.

VISUAL QUALITY - The Visual Quality Objective is Preservation. Only natural processes are appropriate. Evidence of human activities, including trails, signs, and obvious campsites is minimized.

FISHERIES AND WILDLIFE - Animal populations and distribution are affected by natural processes. Management of habitat is not permitted except to meet recovery level for Threatened and Endangered species as required by the Endangered Species Act.

VEGETATION-Range - Livestock grazing is not permitted. Pack and saddle stock grazing is permitted.

ACCESS-Trails - All travel is cross-country.

Trail Standard - All user-created trails will be physically closed with native materials and allowed to rehabilitate and no new trails will be built. There are no system trails within this prescription.

Signing Standard - All existing signs will be removed and no new ones installed.

Encounters Per Day Guideline - Parties encountered per day during peak recreational use seasons should not exceed a maximum of 2.

PRESCRIPTION

Management Prescription 6B.

MANAGEMENT EMPHASIS - Management emphasis is to provide for the protection and perpetuation of natural bio-physical conditions and a high degree of solitude for visitors but with some perceptible evidence of past human use. Land and Resource Management Objectives addressed and, in part, met by achieving this Desired Future Condition include: 1.1(e,h), 2.1(a,b), 3.1(a), 3.2(d-h), 4.5(a,b), and 4.6(a).

Resource Prescriptions

RECREATION - On-site regulation of recreation use is minimal.

Campsite Restoration Guideline - Restore campsites in Frissel Condition Classes 3, 4, and 5, to meet Class 2 or better.

VISUAL QUALITY - The Visual Quality Objective is Preservation.

FISHERIES AND WILDLIFE - Animal populations and distribution are affected by natural processes. Management of habitat is not permitted except to meet recovery level for Threatened and Endangered species as required by the Endangered Species Act.

VEGETATION-Range - Rangeland is managed to maintain and enhance range and watershed condition while providing forage for livestock and wildlife.

Vacant Allotment Guideline - Vacant allotments will be restocked only to meet resource-management needs.

ACCESS-Trail - Travel is cross-country or by low-density trail system.

Trail Construction Standard - Trails will be built or improved only when needed to meet Wilderness objectives.

Trail Location Guidelines - Main trails should be rerouted away from lakes. Vegetation screens should be maintained between the trail and lake or stream. Spur trails providing access to lakes or streams may be built.

Trail Density Guideline - Over the life of the Forest Plan, an average of no more than 0.2 mile of trail per square mile of area should be attained.

Encounters Per Day Guideline - Parties encountered per day during peak recreational use seasons should not exceed a maximum of 5.

Trail Condition Standard - Trail tread width will not exceed 24 inches. Multiple "braided" trails that develop will be obliterated and relocated so that there is only one tread.

Sign Placement Standard - To provide for user safety, directional signs without distances indicated and showing only major destinations will be located only at major intersections. The number of signs will be minimized and all other existing signs will be removed.

Signing Materials Standard - Signs will be built of wood with routed lettering and left unfinished. Signs will be mounted on round, unfinished posts.

Bridge Construction Standard - Bridges will be built and maintained to protect soil and streambanks only where no safe opportunity exists to cross a stream during periods of normal water flow. Bridges will be built of native

materials and require primitive skills and construction techniques.

PRESCRIPTION

Management Prescription 6C.

MANAGEMENT EMPHASIS - Management emphasis is to provide for the protection and perpetuation of essentially natural bio-physical conditions. Solitude, a low level of encounters with other users, and little evidence of past use are important. Land and Resource Management Objectives addressed and, in part, met by achieving this Desired Future Condition include: 1.1(e,h), 2.1(a,b), 3.1(a), 3.2(d-h), 4.5(a,b), and 4.6(a).

Resource Prescriptions

RECREATION - Concentrated use areas show evidence of repeated, but acceptable levels of use.

Campsite Restoration Standards - Campsites will be managed to maintain Frissell Condition Class of 3 or better. Non-permitted campsites in Classes 4 or 5 will be restored and naturalized. Permitted campsites will be managed to minimize visual impact and comply with the Standards for Class 3.

Visual Quality - The Visual Quality Objective is Preservation.

Fisheries and Wildlife - Animal populations and distribution are affected by natural processes. Management of habitat is not permitted except to meet recovery level for Threatened and Endangered species as required by the Endangered Species Act.

VEGETATION-Range - Rangeland is managed to maintain and enhance range and watershed condition while providing forage for livestock and wildlife.

Vacant Allotment Standard - Vacant allotments will be restocked only to meet resource-management needs.

Forage Management Practices Standards - Grazing management will control livestock numbers so that livestock use will be within grazing capacity. Distribution will be achieved through riding, herding, or salting. Improvements will be minimal and built only to the extent needed to cost-effectively maintain stewardship of the range. Improvements will be built with native material when possible.

ACCESS-Trails - Travel is primarily along system trails.

Signing Placement Standards - To provide for user safety, directional signs without showing distances and indicating only major destinations will be placed only at major intersections. All other signs will be removed. Administrative signs such as "closed to camping" will be appropriate.

Sign Materials Standard - Signs will be built of wood with routed lettering and left unfinished. Signs will be mounted on round unfinished wood posts.

Trail Density Guideline - Over the life of the Forest Plan, an average of no more than 1 mile of trail per square mile of area should be attained.

Encounters Per Day Guideline - Parties encountered per day during peak recreational use seasons should average 12, varying from 6 to 15 depending upon conditions.

Trail Construction Standard - Trails, bridges, and drainage structures will be built or improved as needed to prevent soil and water damage and to accommodate recreation use.

Bridge Construction Standard - Bridges will be built only where no safe opportunity exists to cross a stream during periods of normal water flow. Bridges will be built with native materials, using primitive skills and construction techniques.

Trail Condition Standard - Trail tread width will generally not exceed 24 inches. Multiple, "braided" trails that develop will be obliterated and relocated so there is only one tread.

Portal Information Standard - Trail portal information and facilities (bulletin boards and detailed signs) will be located outside the wilderness.

PRESCRIPTION

Management Prescription 6D.

MANAGEMENT EMPHASIS - Management emphasis is to provide for the protection and perpetuation of essentially natural bio-physical conditions inside Wilderness boundaries which are adjacent to and accessed from heavily used developed recreation sites. Management is directed towards providing a natural physical setting and Semi-Primitive Non-motorized social setting. Land and Resource Management Objectives addressed and, in part, met by achieving this Desired Future Condition include: 1.1(f,h,i), 2.1(a,b), 3.1(a), 3.2(d-h), 4.5(a,b), and 4.6(a).

Resource Prescriptions

RECREATION - Solitude and low level of encounters with other users, or evidence of past human use are not an essential part of the social setting.

VISUAL QUALITY - The Visual Quality Objective is Preservation.

FISHERIES AND WILDLIFE - Animal populations and distribution are affected by natural processes. Management of habitat is not permitted except to meet recovery level for Threatened and Endangered species as required by the Endangered Species Act.

VEGETATION-Range - Range is managed to maintain and enhance range and watershed condition while providing forage for livestock and wildlife.

Vacant Allotment Standard - Vacant allotments will be restocked only to meet resource-management needs.

Forage Management Practices Standards - Grazing management will control livestock numbers so that livestock use is within grazing capacity. Distribution will be achieved through riding, herding, or salting. Improvements will be minimal and built only to the extent needed to cost-effectively maintain stewardship of the range. Improvements will be built with native materials when possible.

ACCESS-Trails - Travel on trails includes large numbers of day-users traveling short distances into the Wilderness.

Trail Density Guideline - Over the life of the Forest Plan, an average of no more than 2 miles of trail per square mile of area should be attained.

Encounters Per Day Guideline - Parties encountered per day during peak recreational use seasons should not exceed 20.

Trail Construction Standard - Trails and bridges will be built or improved to accommodate heavy use.

Trail Condition Standard - Trail tread width may exceed 24 inches. Multiple "braided" trails that develop will be obliterated and relocated so there is only one tread.

Portal Information Standard - Trail portal information and facilities (bulletin boards, detailed signing) will be located outside the Wilderness.

Boundary Posting Standard - Boundary signs will be located on all entrance trails.

PRESCRIPTION

Management Prescription 6S.

MANAGEMENT EMPHASIS - The Wyoming Wilderness Act designated two areas on the Bridger-Teton National Forest for wilderness study: Shoal Creek and Palisades. The Wilderness Study Areas (WSAs) will be managed to protect long-term wilderness attributes. Existing uses of the WSAs, such as snowmobiling and mountain biking, will be allowed to continue. No management activities will be allowed that will jeopardize the eligibility of the WSAs for future Congressional designation as Wilderness.

Land and Resource Management Objectives addressed and, in part, met by achieving the Wilderness Study Area Desired Future Condition include: 1.1(d,e), 2.3(a), and 4.6(a,b).

MINERALS - Oil and gas leasing and development is allowed in the Palisades WSA but not in the Shoal Creek WSA.

Energy Development Standard - The Conditional No-Surface-Occupancy stipulation, specified in Sierra Club v. Peterson, applies to the Palisades Wilderness Study Area.

DESIRED FUTURE CONDITION 7A

Grizzly Bear Habitat Recovery Through Scheduld Timber Harvest

Theme: An area managed to provide forage and security for the recovery of grizzly bears, allowing for some resource development and roads.

Experience: In many locations, you find signs of people, but not as many as are found in other, more developed areas. Roads, timber harvest, and fire-blackened areas are the most obvious signs. You find a limited road system in some areas. You also find most roads permanently closed by barriers, or seasonally closed by gates, to provide grizzly bear security. If you walk down one of the closed roads, you notice the road surface has been reseeded with forage plants. These plants are preferred by the grizzly bear.

Outside harvest areas, travel is limited to only a few main road systems and these are often unsuitable for sedan travel. The exception are popular, established roads that access or pass through the area. Traveling these roads by pickup truck, you see dispersed low-standard branch roads most of which have been closed off by barricade and then reseeded. Some of the lower-standard roads are gated and opened seasonally. You see timber-harvest activity infrequently.

If you are hiking, you may find closed trails in areas important to grizzly bear security.

The forest is a mixture of young and, more frequently, old trees. As you pass by, you see stands of young trees and recently cut or burned areas. The forest also contains scattered large trees with young spruce and fir growing underneath. Selected Douglas-fir, spruce, and fir are being managed to provide one-third- to one-square-mile stands composed of trees of all ages. Inside these stands, you get the feeling that you are standing under a forest canopy made up of three or more layers.

Old-growth stands are distributed across the landscape as old-growth "islands" within the forest. Twelve percent or more of the original old-growth forest in the area has been retained to provide for wildlife. If you walk through the forest, you will notice that some old-growth stands are about one to two miles apart and connected by mature stands of trees following streams, creeks, and rivers. Firewood from dead trees is generally plentiful.

If you are watching for wildlife, you notice that mature or old-growth-dependent species such as the marten, red breasted nuthatch, and goshawk are present throughout that

portion of the forest that remains as mature or old-growth trees. You see such species as the snowshoe hare and mountain bluebird in openings around seedling to pole-sized trees.

You may find big-game habitat in less-than-best condition, but, in some areas, big game can find improved seasonal forage. If you are hunting, you find that resident and migratory elk numbers have been increasing over the years because roads have been closed and human disturbance reduced. So, you may discover that big-game hunting seasons are longer and less restricted than in those areas with many open roads. You usually find outfitted hunting available. Resident trophy elk, deer, and moose are generally available.

For areas where grizzly bear recovery and recreation activities might conflict, you may find fishing restricted. Fish are abundant except for popular areas where some restrictions may have been applied.

You may find some cattle and pack animals throughout the area. Recent livestock grazing is evident in some areas but not in others. You may encounter traffic delays while livestock are being moved.

You find that mineral or oil and gas exploration and development are limited by regulations for bear recovery. Any development requires closed roads, tight security, and seasonal human-access restrictions.

PRESCRIPTION

Management Prescription 7A.

MANAGEMENT EMPHASIS - Management emphasis is on enhancement of habitat and maintenance of recovered grizzly bear populations. Habitat improvement practices such as fire or silvicultural practices and human activities are managed to provide the habitat needed to meet the management emphasis. No surface-disturbing activities can occur until the grizzly bear cumulative effects model can be run to help determine potential affects on the bear.

Land and Resource Management Objectives addressed and, in part, met by achieving this Desired Future Condition include: 1.1(a-j), 1.2(a-f), 2.1(a), 3.1(a,b), 4.2(a,c), 4.4(a-c), and 4.7(d).

Resource Prescriptions

RECREATION - Recreation opportunities are limited to favor grizzly bear security. Food, garbage, and game meat is stored such that it is unavailable to bears. Roaded recreation continues on most established routes that pass

through the area. Developed facilities are not appropriate in this area.

Recreation Use Guideline - Recreation use should be restricted as needed to meet grizzly bear habitat objectives.

VISUAL QUALITY - The Visual Quality Objectives are Retention and Partial Retention.

FISHERIES AND WILDLIFE - Long-term grizzly habitat management provides for vegetation diversity, approximates natural conditions, and includes all stages of forested environment from old growth to grass and forb stages. Thus, seasonal production of grizzly foods and cover and denning habitat is provided. Habitat is managed to achieve the game and fish populations, harvest levels, success and recreation day objectives identified by the Wyoming Game and Fish Department and agreed to by the Forest Service. Cumulative effects analysis is performed for all development proposals within grizzly bear habitat.

Sight Distance Guidelines - In forested areas, hiding cover 2 to 4 sight distances wide (one sight distance is 200 feet) should be maintained on at least 80 percent of the perimeter of all natural openings, along at least 75 percent of the edge of arterial and collector roads, and along 60 percent of streams and rivers. Cover should be evenly distributed across the watershed.

Hiding and Security Cover Guideline - In areas dominated by other than forested ecosystems, hiding and security cover should be maintained as follows:

% of Unit Forested	% of Forested Area In Cover
35-50	at least 50%
20-34	at least 60%
less than 20	at least 75%

Management Activity Guideline - All management activities should be concentrated within the shortest period of time and confined to the smallest possible area.

Tree Thinning Guideline - Where tree regeneration is present alongside roads and adjacent to open stands, meadows, natural openings, and unstocked created openings, and the regeneration is serving as a screen, the edge of the screen should not be thinned to a spacing any greater than one where big game can be seen one sight distance away.

Dead and Down Large Woody Material Guideline - Dead-and-down spruce and fir should be retained on logged sites to provide wildlife habitat.

Dead and Down Large Woody Material Standards - Where available on site, four or more decomposition class 1 and 2 logs will be retained per acre on logged sites. Down logs will be at least 12 inches in diameter at the large end and 20 feet in length. Two or more brush piles about 10 feet across and 7 feet high per acre may be retained. Dead-and-down woody material will not exceed an average depth of 18 inches. An average of 2 dead or cull-leaning trees per acre during the mature stage will be sought. To be acceptable, leaning trees will be greater than 8 inches in diameter and 40 feet in length, and will be lodged in adjacent trees.

Forest Stand and Opening Interspersion Guidelines - Forest stands of an adequate size and distribution to provide hiding cover, thermal cover, and security cover needed to conceal the movement of big game should be maintained. Allowed openings should not exceed 600 feet in width. Allowed openings should be interspersed with cover patches 26 to 60 acres in size and 1200 feet to 1800 feet in width and length. Emphasis should be on retaining 75 percent of the cover patches in the 60 acre or larger size class. To facilitate big game movement, corridors of forest cover 600 feet to 1200 feet in width should be retained between patches of cover. Distances between cover patches along a cover corridor should not exceed 1200 feet.

Big Game Habitat Guideline - Sufficient habitat should be provided to maintain desired populations and distribution of big game species. For example:

> Elk Calving Areas - About 30 percent of the brush/grassland (rangeland type) should be maintained in a brush/forb type, emphasizing the aspen or conifer/brush ecotone,
>
> Moose Winter Ranges - About 75 percent of the brush/grassland (rangeland type, e.g. serviceberry, mountain mahogany) should be maintained in a brush type with About 30 percent in a mature age class. About 95 percent of the willow/grass range should be maintained in a willow type.
>
> Elk Winter Ranges - About 50 percent of the brush/grassland should be maintained in a brush type with about 30 percent in a mature age class.

Created Opening Guidelines - Created forest openings may adjoin meadows if no more than one-fifth of the periphery of the meadow edge is affected. Size, shape, and arrangement of created openings should vary to fit naturally into existing landscapes. Created openings should not exceed 600 feet in width unless site-specific analysis identifies the

need for larger openings for grizzly bear habitat management purposes. Created openings should be interspersed with cover patches at least 60 acres in size.

Vegetation Diversity Guidelines - Vegetative diversity should be maximized to the extent that it approximates natural conditions and includes all successional stages. A minimum of 10 percent of the following size/age classes should be sought: old growth, mature, young, pole/sapling, shrub/seedling, grass/forb. The percentages should be established more specifically using on-site information and cumulative effects modeling.

VEGETATION-Range - Rangeland vegetation is managed to provide needed vegetative composition and species interspersion in key grizzly foraging areas.

VEGETATION-Timber - Silvicultural practices are used to preserve and enhance grizzly bear habitat values. Timber harvest is scheduled. Vegetation management practices provide limited opportunities to obtain firewood and other products.

Silvicultural System Guideline - Other than in designated old-growth areas, all systems should be available but used only for achieving desired grizzly bear habitat conditions. The following species and systems should be favored: blue spruce, Engelmann spruce, Douglas-fir, whitebark pine and aspen species, shelterwood methods in existing and regenerated lodgepole pine stands, and group selection and shelterwood methods in existing and regenerated Douglas-fir, spruce and fir stands.

Silvicultural System Standard - as indicated:

Forest Cover	Rotation Age	Desired dbh at Rotation
lodgepole pine	100	9-11"
spruce and fir	120	12-16"
Douglas-fir	120	15-17"

Intermediate Treatment Guidelines - Sanitation should be applied in stands when epidemic conditions are present or imminent and threaten meeting resource objectives within or adjacent to the Management Area. All others treatments should be available but only for achieving desired grizzly bear habitat conditions.

Desired Stocking Guideline - Managed stands should have stocking control to provide grizzly bear hiding cover. Thinning should be done before crown competition and canopy closure occur:

Forest Cover Type	Stand Age at Thinning (yrs)	Desired Trees Per Acre
lodgepole pine	10-15	400
spruce and fir	20-25	400
Douglas-fir	10-15	350

Site Preparation Guideline - All preparation methods should be available but used only for achieving desired grizzly habitat conditions based on vegetation habitat type.

Reforestation Standards - A harvested unit will be considered restocked when the following minimum Standards by forest cover type, regardless of site productivity, are met. Meet these Standards within 5 years of final harvest. Exception: When needed to meet specific grizzly bear habitat needs such as maintaining a grass/forb stage, created openings may be retained permanently.

Forest Cover Type	Trees per Acre	Percent of area Stocked	Percent Species Composition
lodgepole pine	400	80	LP 60
spruce and fir	400	80	ES 60
Douglas-fir	350	80	DF 70

If natural regeneration fails to meet these standards, trees will be planted.

Created Opening Duration Standard - A created opening will be considered closed when it meets the reforestation standards, and the area begins to take on the appearance of a young forest rather than a restocked opening, and the site begins to take on the appearance of the adjoining characteristic landscape represented by an average tree height of 20 feet or when regeneration provides grizzly bear hiding cover from an elevated-ground view point.

Created Openings Size Standards - Size, shape, and spacing of treatment units will be designed to meet escape-cover considerations and resemble natural openings. Maximum size will be 10 acres with an expected average of 5 acres.

Created Opening Dispersion Guideline - No more than 15 percent of the suitable timber base should be in a created opening condition over a three-decade period.

Utilization Guideline - Harvest and treatment residues should be made available for firewood and other products in a manner compatible with grizzly bear objectives, site preparation, and reforestation requirements. Designated aspen areas should be made available for firewood.

Timber Sale Cost-Efficiency Standard - Commercial wood-product sales will only be offered when benefits are equal to or exceed costs. Benefits and costs to be considered in cost efficiency analysis of commercial wood-product sales are:

Benefits - consist of meeting specified grizzly bear habitat needs, monetary receipts gained from the sale of wood products, and associated social and economic values.

Costs - consist of sale preparation, administration, essential reforestation, roading, and impacts to selected management indicator species from timber harvesting activities. Where roads are developed to meet multiple-resource objectives, costs will be apportioned to the benefitting resources. Road costs include construction, operation, and maintenance. Road costs are amortized over the useful life of the road.

Aspen Management Guideline - Manage aspen for its' value as grizzly bear habitat including consideration of cover and browse for big-game species.

MINERALS - The area is available for mineral or energy exploration and development. New leases will be issued with the appropriate Threatened and Endangered stipulations to ensure grizzly bear recovery and compatibility with other resource objectives.

Oil and Gas Lease Standard - Oil and gas leases will be issued with a Timing and Controlled-Surface-Use stipulations and with No-Surface-Occupancy stipulation that anticipates the delisting of the grizzly bear.

ACCESS-Roads - Management of the area requires a limited road system providing access for some public and commodity uses. Most vehicle access is limited to arterial and collector roads with closure of most local roads for grizzly bear security.

Road Improvement and New Road Building Standards - Forest development roads will be built and maintained to standards appropriate for Traffic Service Levels B through D. New road building will be kept to the minimum standard and density needed to achieve resource objectives. Timber and mineral roads will be built to a standard and density that is less than economic optimum for commodities in consideration of grizzly bear habitat and security.

Road Management Standards - Over the life of the Forest Plan, average open road density will be 0.75 miles per square mile of standard or equivalent road with 1- to 5-year

variations of 0 to 1 miles per square mile. Temporary roads will be returned to Elimination Class 3 or 4 standards.

ACCESS-Trails - Trail use is not encouraged. Trails are managed to be compatible with meeting grizzly bear objectives.

Trail Use Standard - 1988 use levels will not be exceeded.

Standard Maintenance Level Guideline - The standard maintenance level should be that needed to protect soil and water values, to provide for user safety appropriate to the trail's difficulty level, and to meet grizzly bear management concerns.

Trail Density Guideline - Over the life of the Forest Plan, an average of no more than 0.5 mile of trail per square mile of area should be attained.

Encounters Per Day Guideline - Parties encountered per day during peak recreational use seasons should be a maximum of 10.

PROTECTION-Fire - Fire management emphasizes preservation and enhancement of grizzly bear food, cover, and security habitat.

Prescribed Fire Guideline - Prescribed fire should be used to favor producing desired grizzly bear and wildlife forage with consideration for reducing fuel loadings.

Fire Protection Standard - Wildfires will be suppressed using strategies that will keep fireline intensities below 400 BTU per second per foot.

Fuels Guideline - Fuel conditions should be maintained which permit fire suppression forces to meet fire protection objectives for the area under historic weather conditions.

DESIRED FUTURE CONDITION 7B

Grizzly Bear Habitat Recovery

Theme: A mainly primitive area with few roads and limited human access, managed to provide food and security for grizzly bears.

Experience: Overall, you find few, if any, signs of people. In a few areas, you may see burns and limited evidence of timber harvest.

As you drive along, you find yourself limited to only a few major road systems. You readily see that most of these roads system are in poor condition for sedan travel due to low construction standards and a lack of regular road maintenance. The exceptions you find are popular, established roads that access or pass through the area. Traveling along the main roads, you notice few branch roads. You see some two-track roads winding through the timber. If you are hiking you encounter two-track roads infrequently.

You see and hear little or no timber-harvest activity. You find that firewood from dead trees is abundant where you can get to it.

You see that the forest appears to be mature. You see scattered stands of young trees, occasional small areas showing recent cutting, and, more prominently, an extensive forest of scattered large trees with young spruce and fir growing underneath. Twelve percent or more of the existing old-growth forest has been retained to provide for old-growth dependent animals.

Some areas show recent wildfires. Other areas show timber stands with many dead trees.

You find that such mature or old-growth-dependent animals as the marten, red breasted nuthatch, and goshawk are present throughout areas of mature or old-growth trees. In areas cut or burned, you find that the mature or old-growth dependent species have been replaced other animals such as the snowshoe hare and mountain bluebird which are adapted to openings around seedlings to pole-sized trees.

You find that habitat for big game is in less than best condition, but big game can find improved seasonal forage. You find that resident and migratory elk numbers have increased over time because of road closures and reduced disturbance by people. Big-game hunting seasons may be longer and less restrictive than in other areas with many open roads. You may find outfitted hunting available.

Resident trophy elk, deer, and moose are generally available.

If you go fishing and hike into a remote area, you may find that access is difficult and takes quite a bit of time. Better fishing is generally available to you if you are willing to travel longer distances. Fish are abundant except for popular areas where some restrictions may have been applied. Needs for habitat and security for the grizzly bear may restrict your fishing access in places where recreational use and grizzly bear use might conflict.

You find some cattle and pack animals throughout the area. Recent livestock grazing is evident in some areas but not in others. You may see range improvements such as fencing and stock tanks. You may encounter traffic delays when livestock are being moved.

Mineral or oil and gas exploration and development are limited by regulations for bear recovery. Any development requires closed roads, tight security, and seasonal human-access restrictions.

PRESCRIPTION

Management Prescription 7B.

MANAGEMENT EMPHASIS - Management emphasis is on enhancement of habitat and maintenance of recovered grizzly bear populations. Habitat improvement practices such as fire or silvicultural practices and human activities are managed to provide the habitat needed by the grizzly bear. No surface-disturbing activities can occur until the grizzly bear cumulative effects model can be run to help determine potential affects on the bear.

Land and Resource Management Objectives addressed and, in part, met by achieving this Desired Future Condition include: 1.1(d-i), 2.1(a), 3.1(a,b), 4.2(b,c), 4.4(a-c), and 4.7(d).

Resource Prescriptions

RECREATION - Recreation opportunities are limited to favor grizzly bear security. Food, garbage, and game meat are stored such that they are unavailable to bears. Roaded recreation occurs on most established routes that pass through the area.

VISUAL QUALITY - The Visual Quality Objectives are Retention and Partial Retention.

FISHERIES AND WILDLIFE - Long-term grizzly habitat management provides for vegetative diversity, approximates natural conditions, and includes all stages of forested environment from old growth to grass and forb stages. Thus,

seasonal production of grizzly foods and cover and denning habitat is provided. Habitat is managed to achieve the game and fish populations, harvest levels, success, and recreation-day objectives identified by the Wyoming Game and Fish Department and agreed to by the Forest Service. Cumulative effects analysis is performed on all development proposals within grizzly bear habitat.

Sight Distance Guidelines - In forested areas, hiding cover should be maintained 2 to 4 sight distances wide (one sight distance is 200 feet) on at least 80 percent of the perimeter of all natural openings, along at least 75 percent of the edge of arterial and collector roads, and along 60 percent of streams and rivers. Cover should be evenly distributed across the watershed.

Hiding and Security Cover Guideline - In areas dominated by other than forested ecosystems, hiding and security cover should be maintained as follows:

% of Unit Forested	% of Forested Area In Cover
35-50	at least 50%
20-34	at least 60%
less than 20	at least 75%

Management Activity Guideline - All management activities should be concentrated within the shortest period of time and confined to the smallest possible area.

Tree Thinning Guideline - Where existing tree regeneration is present alongside roads and adjacent to open stands, meadows, natural openings, and unstocked created openings, and the regeneration is serving as a screen, the edge of the screen should not be thinned to a spacing any greater than one where big game can be seen one sight distance away.

Dead and Down Large Woody Material Guideline - Dead-and-down spruce and fir should be retained on logged sites to provide wildlife habitat.

Dead and Down Large Woody Material Standards - Where available on site, four or more decomposition class 1 and 2 logs will be retained per acre on logged sites. Down logs will be at least 12 inches in diameter at the large end and 20 feet in length. Two or more brush piles about 10 feet across and 7 feet high per acre may be retained. Dead-and-down woody material will not exceed an average depth of 18 inches. An average of 2 dead or cull-leaning trees per acre during the mature stage will be sought. To be acceptable, leaning trees will be greater than 8 inches in diameter and 40 feet in length, and will be lodged in adjacent trees.

Forest Stand and Opening Interspersion Guideline - Forest stands of an adequate size and distribution to provide hiding cover, thermal cover, and security cover needed to conceal the movement of big game should be maintained. Allowed openings should not exceed 600 feet in width. Allowed openings should be interspersed with cover patches 26 to 60 acres in size and 1200 feet to 1800 feet in width and length. Emphasis should be on retaining 75 percent of the cover patches in the 60 acre or larger size class. To facilitate big game movement, corridors of forest cover 600 feet to 1200 feet in width should be retained between patches of cover. Distances between cover patches along a cover corridor should not exceed 1200 feet.

Big Game Habitat Guideline - Sufficient habitat should be provided to maintain desired populations and distribution of big-game species. For example:

> Elk Calving Areas - About 30 percent of the brush/grassland (rangeland type) should be maintained in a brush/forb type, emphasizing the aspen or conifer/brush ecotone,
>
> Moose Winter Ranges - About 75 percent of the brush/grassland (rangeland type, e.g. serviceberry, mountain mahogany) should be maintained in a brush type with About 30 percent in a mature age class. About 95 percent of the willow/grass range should be maintained in a willow type.
>
> Elk Winter Ranges - About 50 percent of the brush/grassland should be maintained in a brush type with about 30 percent in a mature age class.

Created Opening Guidelines - Created forest openings may adjoin meadows if no more than one-fifth of the periphery of the meadow edge is affected. Size, shape, and arrangement of created openings should vary to fit naturally into existing landscapes. Created openings should not exceed 600 feet in width unless site-specific analysis identifies the need for larger openings for grizzly bear habitat management purposes. Created openings should be interspersed with cover patches at least 60 acres in size.

Vegetation Diversity Guidelines - Vegetative diversity should be maximized to the extent that it approximates natural conditions and includes all successional stages. A minimum of 10 percent of the following size/age classes should be sought: old growth, mature, young, pole/sapling, shrub/seedling, grass/forb. The percentages should be established more specifically using on-site information and cumulative effects modeling.

VEGETATION-Range - Rangeland vegetation is managed to provide needed vegetative composition and species interspersion in key grizzly foraging areas.

VEGETATION-Timber - Only silvicultural practices which preserve and enhance grizzly bear habitat values are used. Timber harvest is not scheduled. Few, if any, opportunities exist to obtain firewood and other products.

Aspen Management Guideline - Aspen should be managed for its value as grizzly bear habitat including cover and browse for big-game species.

MINERALS - The area is available for mineral or energy exploration and development. New leases are issued with appropriate Threatened and Endangered stipulations to ensure grizzly bear recovery and compatibility with other resource objectives.

Oil and Gas Lease Standard - Oil and gas leases will be issued with Timing and Controlled-Surface-Use stipulations and with a No-Surface-Occupancy stipulation that anticipates the delisting of the grizzly bear. The Controlled-Surface-Use Stipulation requires mitigation activities for the effects of roading, exploration, and development on wildlife. Activities will be directed first at onsite effects, then at effects within the contiguous herd unit, and finally at effects within other herd units.

ACCESS-Roads - Management of the area for grizzly bear security requires few open roads. Some historical access is provided through the area with most other roads closed.

Road Improvement and New Road Building Standards - Forest development roads will be built and maintained to standards appropriate for Traffic Service Levels B through D. New road building will be kept to the minimum standard and density needed to achieve resource objectives, predominately for grizzly bear habitat and security.

Road Management Standards - Over the life of the Forest Plan, the average open road density will be 0.25 miles per square mile of standard or equivalent road with 1- to 5-year variations of 0 to 0.5 miles per square mile. Temporary roads will be returned to Elimination Class 3 or 4 Standards.

ACCESS-Trails - Trail use is not encouraged. Trails are managed to be compatible with meeting grizzly bear objectives.

Trail Use Standard - 1988 use levels will not be exceeded.

Standard Maintenance Level Guideline - The standard maintenance level should be that needed to protect soil and water values, to provide for user safety appropriate to the trail's difficulty level, and to meet grizzly bear management concerns.

Trail Density Guideline - Over the life of the Forest Plan, an average of no more than 0.5 mile of trail per square mile of area should be attained.

Encounters Per Day Guideline - Parties encountered per day during peak recreational use seasons should be a maximum of 10.

PROTECTION-Fire - Fire management emphasizes preservation and enhancement of grizzly bear food, cover, and security habitat.

Prescribed Fire Guideline - Prescribed fire should be used to favor producing desired grizzly bear and wildlife forage with consideration for maintaining adequate security habitat.

Fire Protection Standard - Wildfires will be suppressed using strategies that will keep fireline intensities below 400 BTU/Sec./Ft.

DESIRED FUTURE CONDITION 8

Environmental Education About Integrated Multiple Use

Theme: An area managed to provide conservation and environmental education, involving the study of natural resources and the practice of forest management.

Experience: As you pass through the area, you find some signs of people, but not to the extent you might see in more intensively developed areas. People's effect on the environment is evident by the presence of roads, timber-harvest disturbance, and field-study camps and plots.

You find a road system through parts of the area with many roads permanently closed by barriers or seasonally closed by gates. The closed roads have been generally reseeded with grass and forbs. You may find slash barriers across some of the roads to reduce recreation use and disturbance in important wildlife habitat.

You find that vehicle travel outside of timber-harvest areas is limited to only a few major road systems. Many roads are unsuitable for travel by sedan. You find that the exceptions are popular, established roads that access or pass through the area. If you travel the main roads by pickup truck, you see dispersed low-standard branch roads and many are closed off by barricade and reseeded. You might see and hear timber harvest activity.

Some timber harvest may occur during the summer, fall, and winter and involve the use of trucks, bulldozers, horses, and gasoline-powered chainsaws. The forest appears as a mixture of young and, more frequently, old trees. You find that twelve percent or more of the existing old-growth forest has been kept to provide habitat for old-growth-dependent animals. Firewood is available from dead trees, slash piles, and logs decked for that purpose.

If you are watching for wildlife, you may find that such mature or old-growth-dependent species as the marten, red breasted nuthatch, and goshawk have been replaced in some areas by other animals such as snowshoe hare and mountain bluebird in openings around seedling to pole-size trees. Resident elk habitat has been kept at 1988 levels. Due to human activity and reduced security, some elk and other big game may be displaced to areas with less activity greater security.

You may find that big-game hunting seasons have been shortened or limited over time, depending on hunter access and likely pressure on the animals. You may find outfitted hunting available. Resident trophy elk, deer, and moose are probably limited.

Access to many fishing areas will change due to new road access and closure of some existing roads. If you go fishing and hike into a remote area, you may find that access is difficult and takes quite a bit of time. Better fishing is generally available to you if you are willing to travel longer distances. Fish are abundant except for popular areas where some restrictions may have been applied. You may find that restrictions have been applied such as catch-and-release or slot limits.

You may find some sheep, cattle, and pack animals throughout the area. Recent livestock grazing is evident in some areas but not in others. You may encounter traffic delays while livestock are being moved.

Mineral or gas and oil development roads are gravel-surfaced, similar to main roads elsewhere on the forest. Access to energy development sites may be controlled. In oil development areas, you might see pumping equipment, storage tanks, and a safety and flow regulation device called a "Christmas tree". Gas fields reveal "Christmas trees", compressors, and dehydration units. Occasionally, you can hear noise from pumpjacks, heavy equipment, and compressors.

PRESCRIPTION Management Prescription 8.

MANAGEMENT EMPHASIS Management emphasis is on environmental education. Understanding of how lands and resources are managed and change with management activities are emphasized.

Land and Resource Management Objectives addressed and, in part, met by achieving this Desired Future Condition include: 1.1(c-i), 1.2(a-e), 2.1(a,b), 2.3(a), 2.4(a,b), 2.5(a-d), 2.8(a), 3.2(e,h), 3.3(a,b), 4.2(a,c,d), 4.3(a-c), 4.4(a-c), 4.5(a,b), 4.7(a-d), and 4.9(a).

Resource Prescriptions

ENVIRONMENTAL EDUCATION - Environmental education provides maximum numbers of opportunities for resource-management-related learning experiences throughout the area. Emphasis will be on experiential learning activities.

Research Standard - Areas will be provided and managed for studying multiple-resource management and associated activities over short- and long-term periods. Research projects may be evident to visitors. Short- and long-term projects will be encouraged that are compatible with the natural environment and on-going resource activities.

Exclosure Size Standard - Exclosure areas for education study plots will be limited to one acre. All structures used for educational purposes will be designed to have no adverse impact on wildlife. Larger exclosures may be considered on a case-by-case basis.

Safety Standard - Safety hazards associated with educational activities will be identified and the hazards corrected or signed.

RECREATION - A Roaded Natural recreation setting is provided along existing roads. All other areas provide Semi-Primitive or Primitive recreation opportunities.

VISUAL QUALITY - The Visual Quality Objectives are Retention, Partial Rentention, and Modification.

FISHERIES AND WILDLIFE - Wildlife and fish management maintains habitats to meet the Wyoming Game and Fish population objectives, harvest levels, and hunter-success objectives. Management emphasis is on providing habitat to maintain resident elk habitat, migration corridors, calving areas, moose summer and winter range, and fisheries. Additional information about habitat needs is established through field research.

Sight Distance Guidelines - In forested areas, hiding cover 2 to 4 sight distances wide (one sight distance is 200 feet) should be retained on at least 80 percent of the perimeter of all natural openings, along at least 75 percent of the edge of arterial and collector roads, and along 60 percent of streams and rivers. Cover should be evenly distributed across the watershed.

Hiding and Security Cover Guideline - In areas dominated by other than forested ecosystems, hiding and security cover should be maintained as follows:

% of Unit Forested	% of Forested Area In Cover
35-50	at least 50%
20-34	at least 60%
less than 20	at least 75%

Management Activity Guideline - All management activities should be concentrated to within the shortest period of time and to the smallest possible area.

Tree Thinning Guideline - Where tree regeneration is present alongside roads and adjacent to open stands, meadows, natural openings, and unstocked created openings, and the regeneration is serving as a screen, the edge of the screen should not be thinned to a spacing any greater than one where big game can be seen one sight distance away.

Dead and Down Large Woody Material Guideline - Dead-and-down spruce and fir material should be retained on logged sites to provide wildlife habitat.

Dead and Down Large Woody Material Standard - Where available on site, four or more decomposition class 1 and 2 logs will be retained per acre on logged sites. Down logs will be at least 12 inches in diameter at the large end and 20 feet in length. Two or more brush piles about 10 feet across and 7 feet high per acre may be retained. Dead-and-down woody material will not exceed an average depth of 18 inches. An average of 2 dead or cull-leaning trees per acre during the mature stage will be sought. To be acceptable, leaning trees will be greater than 8 inches in diameter and 40 feet in length, and will be lodged in adjacent trees.

Forest Stand and Opening Interspersion Guideline - Forest stands of an adequate size and distribution to provide hiding cover, thermal cover, and security cover needed to conceal the movement of big game should be maintained. Allowed openings should not exceed 1200 feet in width. Allowed openings should be interspersed with cover patches 26 to 60 acres in size and 1200 feet to 1800 feet in width and length. Emphasis should be on retaining 75 percent of the cover patches in the 60 acre or larger size class. To facilitate big game movement, corridors of forest cover 600 feet to 1200 feet in width should be retained between patches of cover. Distances between cover patches along a cover corridor should not exceed 1200 feet.

Big Game Habitat Guideline - Sufficient habitat should be provided to maintain desired populations and distribution of big game species. For example:

> Elk Calving Areas - About 30 percent of the brush/grassland (rangeland type) should be maintained in a brush/forb type, emphasizing the aspen or conifer/brush ecotone,
>
> Moose Winter Ranges - About 75 percent of the brush/grassland (rangeland type, e.g. serviceberry, mountain mahogany) should be maintained in a brush type with About 30 percent in a mature age class. About 95 percent of the willow/grass range should be maintained in a willow type.
>
> Elk Winter Ranges - About 50 percent of the brush/grassland should be maintained in a brush type with about 30 percent in a mature age class.

Created Opening Guidelines - Created forest openings may adjoin meadows if no more than one-fifth of the periphery of

the meadow edge is affected. Size, shape, and arrangement of created openings should vary to fit naturally into existing landscapes. Created openings should not exceed 1200 feet in width unless site-specific analysis identifies the need for larger openings. Created openings should be interspersed with cover patches at least 60 acres in size.

VEGETATION-Range - Range is managed for livestock and wildlife production and the retention of riparian values.

VEGETATION-Timber - Silvicultural practices are used to support environmental education activities. Timber opportunities are managed as a not-suited, non-interchangeable component of the timber program. Utilization of wood fiber for firewood and other products is encouraged in ways compatible with maintaining educational values.

Silvicultural System Guidelines - Other than for areas of designated old-growth, all systems should be permitted. The following species and practices should be favored: blue spruce, Engelmann spruce, Douglas-fir, and aspen tree species, shelterwood and clearcutting methods in existing and regenerated lodgepole pine stands, methods favoring the development of an all-aged structure in existing and regenerated spruce and fir stands, and shelterwood and clearcutting methods in existing and regenerated Douglas-fir stands.

Where favored methods cannot be used in existing over-mature conifer stands due to windfall risks, lack of adequate regeneration and other similar stand conditions, methods should be applied that are appropriate to the site-specific conditions.

Silvicultural System Standards - as indicated:

Forest Cover Type	Rotation Age	Desired dbh at Rotation
lodgepole pine	100	9-11"
spruce and fir	120	12-16"
Douglas-fir	120	15-17"

Intermediate Treatment Guideline - To the extent wildlife objectives can be met, sanitation and salvage should be applied to reduce potential tree mortality caused from insects and diseases. Sanitation should be applied in stands when epidemic conditions are present or imminent and threaten meeting resource objectives within or adjacent to the Management Area. All other methods should be available but only to meet habitat objectives.

Desired Stocking Guideline - Managed stands should have tree stocking control for big gamme management. Thinning should happen before crown competition and canopy closure occur.

Forest Cover Type	Stand Age at Thinning (yrs)	Desired Trees Per Acre
lodgepole pine	10-15	400
spruce and fir	20-25	400
Douglas-fir	10-15	350

Site Preparation Guideline - All methods should be available but only as required to meet environmental education and big-game habitat needs.

Reforestation Standard - A harvested unit will be considered restocked when the following minimum standards by forest cover type, regardless of site productivity, are met:

Forest Cover Type	Trees per Acre	Percent of area Stocked	Percent Species Composition
lodgepole pine	400	80	LP 60
spruce and fir	400	80	ES 60
Douglas-fir	350	80	DF 70

Created Opening Duration Standard - A created opening will be closed when it meets reforestation standards, and it begins to take on the appearance of a young forest rather than a restocked opening, and it takes on the appearance of the adjoining characteristic landscape represented by an average tree height of 20 feet or regeneration provides elk hiding cover from an elevated ground view point.

Created Opening Size Standard - Maximum size will be 25 acres with an expected average of 15 acres. Clearcuts in Douglas-fir will not exceed 10 acres in size.

Utilization Guidelines - Harvest and treatment residues should be made available for firewood and other products in a manner compatible with environmental education needs, wildlife objectives, site preparation, and reforestation requirements. Designated aspen areas should be made available for firewood.

Not Suited, Non-interchangeable Component Standard - Cumulative effects analysis and site-specific project analyses must be completed prior to scheduling timber opportunities.

Aspen Management Guideline - Aspen should be managed for its value as wildlife habitat and for providing seasonal colors while emphasizing its' value as habitat for selected management indicator species.

MINERALS - The area is available for mineral or energy exploration and development. New leases are issued with the

appropriate stipulations to ensure compatibility with other resource objectives.

ACCESS-Roads - Management of the area requires a moderate road system to provide commodity, research, and public access. Most travel is limited to arterial and collector roads with seasonal or long-term closure of many local roads for wildlife security.

Road Improvement and New Road Building Standard - Forest development roads will be built and maintained to standards appropriate for Traffic Service Levels B through D.

Road Management Standards - Over the life of the Forest Plan, the average open road density will be 1 mile per square mile of standard or equivalent road with 1- to 5-year variations of .25 to 1.25 miles per square mile. Temporary roads will be returned to Elimination Class 3 or 4 Standards.

ACCESS-Trails - Trails are provided for a variety of uses consistent with meeting environmental education objectives.

Trail System Guideline - Motorized and non-motorized trails should be developed in locations and to difficulty levels appropriate to meeting environmental education objectives and to accommodate existing recreation use.

Standard Maintenance Level Guideline - The standard maintenance level should be that needed to protect soil and water values and to provide for user safety and user convenience appropriate to the trail's difficulty level.

Trail Density Guideline - Over the life of the Forest Plan, an average of no more than 1 mile of recreational trail per square mile of area should be attained. No limit should be imposed on trails used for educational purposes.

Encounters Per Day Guideline - Parties encountered per day during peak recreational use seasons should average 12, varying from 6 to 15 depending on conditions. No limit should be imposed on numbers of parties in the area for educational purposes.

PROTECTION-Fire - Fire management emphasizes preservation and enhancement of management indicator species habitat, particularly hiding cover for big game. A full range of suppression techniques is used.

Fire Protection Standard - Wildfires will be suppressed using control strategies during the normal fire season. Pre- and post-season period strategies may include containment, confinement, and surveillance.

Fuels Guideline - Fuel conditions should be maintained that permit fire suppression forces to meet fire protection objectives for the area under historic weather conditions.

Fuels Standards - Activity fuels will be reduced or otherwise treated so the potential fireline intensities will not exceed 400 BTU per second foot on 90 percent of the days during the regular fire season, or continuous fuels concentrations exceeding the above standard will be broken up into manageable units with fire breaks, or additional protection will be provided for areas exceeding the above standards when such protection will not be required for more than five years.

DESIRED FUTURE CONDITION 9A

Developed and Administrative Sites

Theme: An area managed for campgrounds, other noncommercial areas, and Forest Service administrative sites, including related roads and sites.

Experience: Overall, you find many signs of people. You see little or no evidence of resource development except for recreation. Picnic tables, roads, buildings, and camping spots are obvious to you. You often hear sounds of vehicles and other human activity. Signs indicate to you that the use of off-highway vehicles is not allowed except to enter and depart the site on roads.

You can gather firewood camping, but you cannot gather it for home use.

Access to fishing may be rather easy if the facility is near a stream or river, but the fishing may be less satisfactory than in more remote areas.

You will not find cattle within the campgrounds, but they may be visible nearby.

PRESCRIPTION

Management Prescription 9A.

MANAGEMENT EMPHASIS - The management emphasis is on existing and proposed developed recreation sites and Forest Service administrative sites (e.g., campgrounds, picnic grounds, trailheads, visitor information centers, water-related recreation facilities and concentrated use areas in Roaded Natural areas).

Land and Resource Management objectives addressed and, in part, met by achieving this Desired Future Condition include: 2.2(a,b).

Resource Prescriptions

RECREATION - Developed recreation is the focus, but management includes campgrounds, picnic areas, and Forest Service administrative sites.

Site Development Standards - Recreation sites will be developed according to the following Standards:

1) In new recreation sites and improved sites, provide at least one unit for use by the physically challenged,

2) Design at least 25 percent of the units in new sites and improved sites to accommodate two or more families,

3) Where alternatives exist, choose sites where recreational facilities can be designed to be accessed by the physically challenged, and

4) Fences around developed facilities, using native materials.

Occupancy Standards - Stays in campgrounds will be limited to 16 days or less. Use will be limited to no more than 2 vehicles per family unit, unless posted as a multi-family unit.

Variable Fee Guideline - Higher fees should be considered for multi-family and more popular units within campgrounds.

Campground and Picnic Area Service Level Guideline - Campground and picnic areas which have an average seasonal use level of 40 percent or higher should be managed at the Standard Service Level. Those from 40-20 percent should be managed at a Less-Than-Standard Service Level. Those less than 20 percent may require closure of individual sites first and then, if needed, the closure of the entire facility.

Site Development Guideline -Developed sites should be built, improved and maintained in accordance with the established Recreation Opportunity Spectrum (ROS) classification for the Management Area and the development standards.

Site Development Standards - as indicated:

ROS Class	Recreaction Development Level
Primitive	None
Semi-Primitive Mon-motorized	Not to exceed 1
Semi-Primitive Motorized	Not to exceed 2
Roaded Natural	Not to exceed 3
Roaded	Not to exceed 4

Vegetation Management Guideline - Vegetative management plans should be prepared for each developed site to define a program for maintaining the desired vegetative mix and character and to provide for public safety.

VISUAL QUALITY - The Visual Quality Objectives are Retention or Partial Retention. Facilities are often evident, but harmonize and blend with the natural setting.

FISHERIES AND WILDLIFE - Habitat management is not intended to achieve the game and fish populations, harvest levels,

success, and recreation-day objectives identified by the Wyoming Game and Fish Department.

VEGETATION-Range - Grazing is allowed seasonally for vegetative management purposes.

VEGETATION-Timber - Only vegetation management practices which preserve or enhance recreation values are used. Timber harvest is not scheduled. Vegetation management practices provide limited opportunities to obtain firewood and other products.

Silvicultural System Guideline - All systems should be available but only as required to meet specific recreation objectives.

Intermediate Treatment Guideline - All treatments should be available but only as required to meet specific recreation objectives.

Site Preparation Guideline - All methods should be available but only as required to meet specific recreation objectives.

Reforestation Guidelines - Desired stocking levels should be guided by the desired vegetative condition associated with specific recreation objectives. Introduction of tested and adapted plants may be done to meet landscape architecture objectives.

Aspen Management Guideline - Aspen should be managed for its value in providing seasonal colors.

MINERALS - The area is available for new energy leasing but is not available for other mineral entry. Exploration and development under existing leases is constrained to meet the objectives of this prescription Desired Future Condition.

Lease Stipulation Standard - Leases will be issued with a No-Surface-Occupancy stipulation.

Locatable Minerals Standard - All developed and proposed recreation sites will be protected from locatable mineral entry.

FACILITIES - Forest Service operated facilities are safe or they are closed.

Facility Maintenance Guideline - Developed public sector sites should be maintained to have a minimum usable life of 25 years. An average site capacity of 300 persons-at-one-time PAOT should be improved or rehabilitated each year to be consistent with this average usable life. Priority should be given to rehabilitation of sites with

highest levels of use among those sites having facilities in poorest condition.

Reconstruction Standard - Facilities will be replaced when rehabilitation costs become 50 percent or more of replacement costs.

Facility Safety Standards - Safe drinking water standards must be met at facilities with water systems. Facilities will be designed and maintained to meet structural and utility safety requirements.

ACCESS-Trails - Trails are provided for the convenience of people using developed sites.

Trail Density Guideline - Short trails providing access to facilities and opportunities for interpretation should be developed to whatever density is needed.

Encounters Per Day Guideline - No limit should exist on the number of parties encountered per day.

PROTECTION-Fire - Fire management emphasizes protection of developed facilities and related site values. A full range of suppression techniques is used.

Prescribed Fire Guideline - Prescribed fire should be used to reduce fuel loadings and accomplish vegetation manipulation objectives.

Fire Protection Standard - Wildfires will be suppressed using control strategies.

Fuels Near Facilities Standard - Hazardous fuels will be cleared from around buildings and facilities within administrative sites, campgrounds, and other developed sites. (for further information, please see Wildfire Protection: A Guide for Home Owners and Developers, Wildfire Hazard and Residential Development, Utah and California).

Fuels Standard - Natural fuels will be reduced or otherwise treated so the potential fireline intensities will not exceed 100 BTU per second foot on 90 percent of the days during the regular fire season.

DESIRED FUTURE CONDITION 9B

Special Use Recreation Areas

Theme: An area managed for permitted, private recreation homes, permittees, and others offering services to the public, including related roads and sites.

Experience: Overall, you find many signs of people. But, you see little or no evidence of resource development other than recreation. Cabins and buildings used by permittees are visible but blend into the surroundings. Roads are generally gravelled, but may be paved in higher-use areas. Off-highway vehicle use is limited to entry and departure routes.

In some locations, you see extensive development associated with ski areas: hotels, buildings, ski lifts, gondolas, and sno-cat equipment. In the winter, such areas are often quite crowded with roads clogged and many pedestrians in the area.

PRESCRIPTION

Management Prescription 9B.

MANAGEMENT EMPHASIS - Management emphasis is on summer home groups, concession operations, ski areas, lodges, and group camps, and other privately operated sites on National Forest System lands and retention of selected sites for future opportunities.

Land and Resource Management Objectives addressed and, in part, met by achieving this Desired Future Condition include: 1.1(g) and 2.2(a,b).

Resource Prescriptions

RECREATION - Opportunities for privately owned facilities are continued.

Recreation Residence Standards - No new recreation residence tracts will be established. No new residences will be permitted on vacant lots in existing tracts, except for up to 12 lots in the Sylvan Bay tract for permittees who may be displaced from the Fremont Lake South Shore tract.

Recreation Residence Landscape Guidelines - Natural vegetation should be favored around facilities. However, mowing natural vegetation around facilities may be allowed.

Recreation Residence Design Standards - Recreation residences will be no larger than 1500 square feet, excluding outdoor porches. Existing buildings that are larger are permitted, but, measured together, new additions on old structures will not exceed the standard. One story

or 20 feet will be the maximum allowed height for new recreation residences or additions.

Privately Owned Facility Standards - A similar architectural theme will be followed for all structures within a development. All permittees will prepare a Master Plan before any site developments occur. Vegetation management plans will be developed for each special use area to define a program for maintaining a desired vegetative mix and character. Operation and possible expansion of existing recreation special use facilities will be authorized when needed to meet public demand. An analysis and future use determination of each facility will be completed before the preparation of the revised Forest Plan.

VISUAL QUALITY - The Visual Quality Objectives are Partial Retention and Modification. Facilities are often dominant, but harmonize and blend with the natural setting.

FISHERIES AND WILDLIFE - Habitat management is not intended to meet State wildlife population, recreation-day, or harvest objectives.

VEGETATION-Range - Grazing is allowed seasonally for vegetative management purposes.

VEGETATION-Timber - Only silvicultural practices which preserve or enhance recreation values are used. Timber harvest is not scheduled. Vegetation management practices provide limited opportunities to obtain firewood and other products.

Silvicultural System Guideline - All systems should be available but only as required to meet specific recreation objectives.

Intermediate Treatment Guideline - All methods should be available but only as required to meet specific recreation objectives.

Site Preparation Guideline - All techniques should be available but only as required to meet specific recreation objectives.

Reforestation Standard - Desired stocking levels will be guided by the desired vegetative condition associated with specific recreation objectives.

Aspen Management Guideline - Aspen should be managed for its value in providing seasonal colors.

MINERALS - The area is available for new energy leasing but may not be available for other mineral entry. Exploration

and development under existing leases is constrained to meet the objectives of this Desired Future Condition.

Lease Stipulation Standard - Leases will be issued with a No-Surface-Occupancy stipulation.

Locatable Minerals Standard - All developed and proposed recreation sites will be protected from locatable mineral entry.

FACILITIES - Forest Service operated facilities are safe or they are closed.

Facility Safety Standard - Safe drinking water standards must be met at facilities with water systems. Facilities will be designed and maintained to meet structural and utility safety requirements.

ACCESS-Trails - Trails are permitted in and around sites.

Trail Density Guideline - Short trails providing access to homesites or facilities and opportunities for interpretation should be developed to whatever density is needed.

Encounters Per Day Guideline - No limit should exist on the number of parties encountered per day.

PROTECTION-Fire - Fire management emphasizes protection of private permitted developments. Permittees are responsible for fuels management. A full range of suppression techniques is used.

Prescribed Fire Guideline - Prescribed fire should be used to reduce fuel loadings and accomplish vegetation manipulation objectives.

Fire Protection Standards - Wildfires will normally be suppressed using control strategies during the normal fire season. Pre- and post-season period strategies could include containment, confinement, and surveillance. Access to special use recreational sites will allow for safe ingress and egress during wildfire suppression.

Fuels Guideline - Hazardous fuels should be cleared from around permitted facilities and dwellings (for further information, please see Wildfire Protection: A Guide for Home Owners and Developers, Wildfire Hazard and Residential Development, Utah and California).

Fuels Standards - Around buildings and facilities, natural fuels will be reduced or otherwise treated so potential fireline intensities will not exceed 100/BTU per second foot on 90 percent of the days during the regular season, and in other areas, natural fuels will be reduced or otherwise

treated so that potential fireline intensities will not exceed 400/BTU per second foot on 90 percent of the days during the regular fire season, OR continuous fuel concentration exceeding the above standards will be broken up into manageable units with firebreaks, OR additional protection will be provided for areas exceeding the above standards when such protection will not be required for more than 5 years.

DESIRED FUTURE CONDITION 10

Simultaneous Development of Resources, Opportunities for Human Experiences, and Support for Big Game and a Wide Variety of Wildlife Species

Theme: An area managed to allow for some resource development and roads while having no adverse and some beneficial effects on wildlife.

Experience: In timber-harvest locations, you find many signs of people, but not to the extent found in more intensively developed areas. Elsewhere, only few signs exist.

If you are driving, you notice a identifiable roading system in some areas and a less obvious system elsewhere. Many roads are permanently closed by barriers or seasonally closed by gates. If you walk along some closed roads, you may see that they have been reseeded with grass and forbs. Vehicle travel, outside of harvest areas, is restricted to only a few main road systems. You find that many of these road systems are unsuited for travel by sedan. The exceptions are popular, established roads that access or pass through the area.

You may notice timber-harvest activity in some locations during the summer, fall, and winter involving the use of trucks, bulldozers, horses, and gasoline-powered chainsaws. The forest appears as a mixture of young and, more frequently, old timber stands. As you move through the area, you see stands of young trees and recently cut or burned areas. You notice that the forest also contains scattered large trees with young spruce and fir growing underneath.

Selected Douglas-fir, spruce and fir trees are managed to provide large (one-third to one-square-mile) stands containing seedlings to old-growth trees. In these areas, you get the feeling of standing under a forest canopy made up of three or more layers.

The amount of old-growth forest has been reduced somewhat over time, but twelve percent or more of the existing old-growth forest has been retained to provide for old-growth-dependent animals. You find that the old-growth stands remaining are distributed across the landscape as old-growth "islands" within the overall forested area. Some old-growth stands useful for wildlife security and migration are about one to two miles apart and connected by mature stands of trees following streams, creeks, and rivers.

Some areas show signs of recent wildfires. Other areas show stands with many dead trees. Firewood is available from

dead trees, designated aspen areas, slash piles, and logs decked for that purpose.

If you look for wildlife, you discover many different species. You find that such mature or old-growth dependent species as the marten, red breasted nuthatch, and goshawk have been replaced in some areas by other animals such as snowshoe hares and mountain bluebirds that live around openings with seedling to pole-size trees. Resident and migratory elk numbers have increased over time. Due to human activity and reduced security in some areas, some elk and other big game are displaced to areas having greater habitat security during hunting season. Big-game hunting seasons have remained the same over time or even improved to longer and less restricted ones for some areas. You find that outfitted hunting is available.

If you have an off-highway vehicle, you find limited areas dedicated to year-round off-highway vehicle use and other areas set aside for primitive hiking and camping.

Access to many fishing areas will change due to new road access and closure of some existing roads. If you go fishing and hike into a remote area, you may find that access is difficult and takes quite a bit of time. Better fishing is generally available to you if you are willing to travel longer distances. Fish are abundant except for popular areas where some restrictions may have been applied. You may find that restrictions have been applied such as catch-and-release or slot limits.

You may find some sheep, cattle, and pack animals throughout the area. Recent livestock grazing is evident in some areas but not in others. You may encounter traffic delays while livestock are being moved.

Mineral or gas and oil development roads are gravel-surfaced, similar to main roads elsewhere on the forest. Access to energy development sites may be controlled. In oil development areas, you might see pumping equipment, storage tanks, and a safety and flow regulation device called a "Christmas tree". Gas fields reveal "Christmas trees", compressors, and dehydration units. Occasionally, you can hear noise from pumpjacks, heavy equipment, and compressors.

PRESCRIPTION

Management Prescription 10.

MANAGEMENT EMPHASIS - Management emphasis is to provide long- and short-term habitat to meet the needs of wildlife managed in balance with timber harvest, grazing, and minerals development. All surface-disturbing activities are designed to have no affect or beneficial effects on wildlife. If any portion of this area contains grizzly bear habitat, no surface-disturbing activities can occur there until the grizzly bear cumulative effects model can be run to help determine potential affects on grizzly bear.

Land and Resource Management Objectives addressed and, in part, met by achieving this Desired Future Condition include: 1.1(a-j), 1.2(a-f), 2.1(a,b), 2.3(a), 2.4(a,b), 2.5(a-d), 4.1(a,b), 4.2(a,c,d), 4.3(a-c), 4.4(a-c), and 4.7(a-d).

Resource Prescriptions

RECREATION - Existing roaded recreation opportunities continue where they do not interfere with the objectives for this area. Areas of both Semi-Primitive Motorized and Semi-Primitive Non-motorized are provided.

VISUAL QUALITY - The Visual Quality Objectives are Retention, Partial Retention, and Modification.

FISHERIES AND WILDLIFE - Groups of species are emphasized, such as early or late-succession-dependent species, in order to increase species richness or diversity. Habitat is managed to achieve the game and fish populations, harvest levels, success, and recreation-day objectives identified by the Wyoming Game and Fish Department and agreed to by the Forest Service.

Sight Distance Guidelines - In forested areas, hiding cover 2-4 sight distances wide (one sight distance is 200 feet) should be maintained on at least 80 percent of the perimeter of all natural openings, along at least 75 percent of the edge of arterial and collector roads, and along 60 percent of streams and rivers. Cover should be evenly distributed across the watershed.

Hiding and Security Cover Guideline - In areas dominated by other than forested ecosystems, hiding and security cover should be maintained as follows:

% of Unit Forested	% of Forested Area In Cover
35-50	at least 50%
20-34	at least 60%
less than 20	at least 75%

Management Activity Guideline - All management activities should be concentrated to within the shortest period of time and to the smallest possible area at a time.

Tree Thinning Guideline - Where tree regeneration is present alongside roads and adjacent to open stands, meadows, natural openings, and unstocked created openings, and the regeneration is serving as a screen, the edge of the screen should not be thinned to a spacing any greater than one where big game can be seen one sight distance away.

Dead and Down Large Woody Material Guideline - Dead-and-down spruce and fir material should be retained on logged sites to provide wildlife habitat.

Dead and Down Large Woody Material Standard - Where available on site, four or more decomposition class 1 and 2 logs will be retained per acre on logged sites. Down logs will be at least 12 inches in diameter at the large end and 20 feet in length. Two or more brush piles about 10 feet across and 7 feet high per acre may be retained. Dead-and-down woody material will not exceed an average depth of 18 inches. An average of 2 dead or cull-leaning trees per acre during the mature stage will be sought. To be acceptable, leaning trees will be greater than 8 inches in diameter and 40 feet in length, and will be lodged in adjacent trees.

Forest Stand and Opening Interspersion Guideline - Forest stands of an adequate size and distribution to provide hiding cover, thermal cover, and security cover needed to conceal the movement of big game should be maintained. Allowed openings should not exceed 1200 feet in width. Allowed openings should be interspersed with cover patches 26 to 60 acres in size and 1200 feet to 1800 feet in width and length. Emphasis should be on retaining 75 percent of the cover patches in the 60 acre or larger size class. To facilitate big game movement, corridors of forest cover 600 feet to 1200 feet in width should be retained between patches of cover. Distances between cover patches along a cover corridor should not exceed 1200 feet.

Big Game Habitat Guideline - Sufficient habitat should be provided to maintain desired populations and distribution of big game species. For example:

> Elk Calving Area - maintain about 30 percent of the brush/grassland (rangeland type) in a brush/forb type, emphasizing maintenance of the aspen or conifer/brush ecotone.
>
> Moose Winter Range - maintain about 75 percent of the brush/grassland (rangeland type, e.g.

serviceberry, mountain mahogany) in a brush type with About 30 percent in a mature age class. Maintain About 95 percent of the willow/grass range in a willow type.

Elk Winter Range - maintain about 50 percent of the brush/grassland in a brush type with About 30 percent in a mature age class.

Bighorn Winter Range - maintain about 75 percent of the brush/grassland type in grass.

Created Opening Guidelines - Created forest openings may adjoin meadows if no more than one-fifth of the periphery of the meadow edge is affected. Size, shape, and arrangement of created openings should vary to fit naturally into existing landscapes. Created openings should not exceed 1200 feet in width unless site-specific analysis identifies the need for larger openings for wildlife habitat management purposes. Created openings should be interspersed with cover patches at least 60 acres in size.

VEGETATION-Range - Range is managed to maintain or enhance range and watershed condition while providing forage for livestock and wildlife.

VEGETATION-Timber - Silvicultural practices including scheduled timber harvest emphasize achieving desired wildlife habitat conditions while developing long-term, overall big-game hiding cover values. Utilization of firewood and other products is encouraged in ways compatible with maintaining wildlife values.

Silvicultural System Guidelines - Other than for areas of designated old growth, all systems should be permitted. The following species and practices should be favored: blue spruce, Engelmann spruce, Douglas-fir, and aspen tree species, shelterwood and clearcutting methods in existing and regenerated lodgepole pine stands, methods favoring the development of an all-aged structure in existing and regenerated spruce and fir stands, and shelterwood and clearcutting methods in existing and regenerated Douglas-fir stands.

Where favored methods cannot be used in existing over-mature conifer stands due to windfall risks, lack of adequate regeneration and other similar stand conditions, methods should be applied that are appropriate to the site-specific conditions.

Silvicultural System Standards - as indicated:

Forest Cover Type	Rotation Age	Desired dbh at Rotation
lodgepole pine	100	9-11"
spruce and fir	120	12-16"
Douglas-fir	120	15-17"

Intermediate Treatment Guideline - To the extent wildlife objectives can be met, sanitation and salvage should be applied to reduce potential tree mortality caused from insects and diseases. Sanitation should be applied in stands when epidemic conditions are present or imminent and threaten meeting resource objectives within or adjacent to the management area. All other methods should be available but only to meet habitat objectives.

Desired Stocking Guideline - Managed stands should have tree stocking control to have big-game hiding cover. Thinning should happen before crown competition and canopy closure occur.

Forest Cover Type	Stand Age at Thinning (yrs)	Desired Trees Per Acre
lodgepole pine	10-15	550
	25-30	400
spruce and fir	20-25	400
Douglas-fir	10-15	350

Site Preparation Guideline - All methods should be available but only as required to meet wildlife habitat needs.

Reforestation Standard - A harvested unit will be considered restocked when the following minimum standards by forest cover type, regardless of site productivity, are met:

Forest Cover Type	Trees per Acre	Percent of area Stocked	Percent Species Composition
lodgepole pine	400	80	LP 60
spruce and fir	400	80	ES 60
Douglas-fir	350	80	DF 70

Created Opening Duration Standard - A created opening will be closed when it meets reforestation standards, and it begins to take on the appearance of a young forest rather than a restocked opening, and it takes on the appearance of the adjoining characteristic landscape represented by an average tree height of 20 feet or regeneration provides elk hiding cover from an elevated ground view point.

Created Opening Size Standard - Maximum size will be 25 acres with an expected average of 15 acres. Clearcuts in Douglas-fir will not exceed 10 acres in size.

Created Opening Dispersion Guideline - No more than 15 percent of the suitable timber base should be in a created opening condition over a three-decade period.

Utilization Guidelines - Harvest and treatment residues should be made available for firewood and other products in a manner compatible with wildlife objectives, site preparation, and reforestation requirements. Designated aspen areas should be made available for firewood.

Timber Sale Cost-Efficiency Guideline - Commercial wood-product sales will only be offered when benefits are equal to or exceed costs. Benefits and costs to be considered in cost efficiency analysis of commercial wood-product sales are:

> Benefits - consist of those associated with providing habitat to support selected management indicator species. These include monetary receipts gained from the sale of wood products, and the associated social and economic benefits.
>
> Costs - consist of sale preparation, administration, essential reforestation, roading, and impacts to selected management indicator species from timber-harvesting activities. Where roads are developed to meet multiple-resource objectives, costs will be apportioned to the benefitting resources. Road costs include construction, operation and maintenance. Road costs are amortized over the useful life of the road.

Aspen Management Guideline - Aspen should be managed for its value as wildlife habitat and for providing seasonal colors while emphasizing its value as habitat for selected management indicator species.

MINERALS - The area is available for minerals location, sale or energy leasing, exploration, and development. New leases are issued with the appropriate stipulations to require compatibility with other resource objectives.

ACCESS-Roads - Management of the area requires a moderate road system to provide commodity and public access. Most travel is limited to arterial and collector roads with seasonal or long-term closure of many local roads for wildlife security.

Road Improvement and New-Road-Building Standard - Forest development roads will be built and maintained to Standards appropriate for Traffic Service Levels B through D.

Road Management Standards - Over the life of the Forest Plan, the average open road density will be 1 mile per square mile of standard or equivalent road with 1- to 5-year variations of 0.25 to 1.25 miles of road per square mile. Temporary roads will be returned to Elimination Class 3 or 4 Standards.

ACCESS-Trails - Non-motorized and motorized trails for a variety of users are managed consistent with the recreation setting and compatible with wildlife objectives.

Trail System Guideline - Motorized and non-motorized trails should be developed to provide a full range of difficulty levels where compatible with meeting wildlife objectives. Existing roads and trails should be used where possible.

Standard Maintenance Level Guideline - The standard maintenance level should be that needed to protect soil and water values, and to provide for user safety and user convenience appropriate to the trail's difficulty level.

Trail Density Guideline - Over the life of the Forest Plan, an average of no more than 1 mile of trail per square mile of area, including closed roads, should be attained.

Encounters Per Day Guideline - Parties encountered per day should be limited to an average of 12, varying from 6 to 15 depending on conditions.

PROTECTION-Fire - Fire management emphasizes preservation and enhancement of habitat. A full range of suppression techniques is used.

Fire Protection Standard - Wildfires will be suppressed using strategies that will keep fireline intensities below 400 BTU per second per foot. Wildfires will be suppressed using control strategies when they threaten plantations.

Fuels Guideline - Fuel conditions should be maintained that permit fire suppression forces to meet fire protection objectives for the area under historic weather conditions.

Fuels Standards - Activity fuels will be reduced or otherwise treated so the potential fireline intensities will not exceed 400 BTU per second per foot on 90 percent of the days during the regular fire season, OR continuous fuels concentrations exceeding the above standard will be broken up into manageable units with fire breaks, OR additional protection will be provided for areas exceeding the above standards when such protection will not be required for more than five years.

DESIRED FUTURE CONDITION 12

Backcountry Big Game Hunting, Dispersed Recreation, and Wildlife Security Areas.

Theme: An area managed for high-quality wildlife habitat and escape cover, big-game hunting opportunities, and dispersed recreation activities.

Experience: Overall, you find few signs of people away from existing roads. You see little evidence of timber harvest as you walk through the area. Old-growth is at near-maximum levels of acres and some loss of shrubs and other forage is taking place. You see stands of young trees, burns from past fires, and many of the dense forested areas becoming more open as older and diseased trees die.

If you are driving your car or truck, you will find yourself limited to only a few major road systems. You find some popular, established roads open because they access or pass through the area. These roads will be gravel surfaced and well maintained with gentle grades. They will allow unrestricted two-way traffic.

Most other road systems will be unsuited to travel by sedan. Traveling these systems by pickup truck, you see dispersed low-standard branch roads. About half of branch roads will have been closed off by barricade and revegetated.

If you take a closer look at the road system, you see a limited number of two-track roads winding through the timber. With other than four-wheel-drive vehicles or off-highway vehicles, travel on these roads is difficult or impossible. If you are hiking cross-country, you find two-track roads infrequently.

You find habitat for big game in less-than-best condition in some areas, but burns and some cut areas provide improved seasonal forage. Some areas will show recent wildfires. Other areas will show stands with many dead trees.

Hunters find that resident and migratory elk numbers have been increasing because of the closure of area roads and reduced disturbance. Big-game hunting seasons have gotten longer and less restrictive over time than in those areas containing open roads. You find that outfitted hunting is available. Resident trophy elk, deer, and moose are generally more available.

Access to many fishing areas will change due to new road access and closure of some existing roads. If you go fishing and hike into a remote area, you may find that access is difficult and takes quite a bit of time. Better

fishing is generally available to you if you are willing to travel longer distances. Fish are abundant except for popular areas where some restrictions may have been applied. You may find that restrictions have been applied such as catch-and-release or slot limits.

You may find some sheep, cattle, and pack animals throughout the area. Livestock are not permitted on crucial big game winter ranges closed to grazing. Livestock grazing is permitted on other big game ranges if it does not conflict wildlife needs. You can see evidence of recent livestock grazing in some areas but not in others. You may encounter traffic delays while livestock are being moved.

If you have an off-highway vehicle, you notice that use is limited to the open road and trail system. Winter range has seasonal restrictions on other recreational activities. If you are seeking a primitive hiking or camping experience, you find it generally at higher elevations.

Mineral and energy development may be restricted by season. Energy exploration roads may be closed. Mineral or gas and oil development roads are gravel-surfaced, similar to main roads elsewhere on the forest. Access to energy development sites may be controlled. In oil development areas, you might see pumping equipment, storage tanks, and a safety and flow regulation device called a "Christmas tree". Gas fields reveal "Christmas trees", compressors, and dehydration units. Occasionally, you can hear noise from pumpjacks, heavy equipment, and compressors.

PRESCRIPTION

Management Prescription 12

MANAGEMENT EMPHASIS - Management emphasis is on providing such important habitat for big game as winter ranges, feedgrounds, calving areas, and security areas. Management provides for habitat capability and escape cover, and maintained Semi-Primitive Non-motorized opportunities that emphasize big-game hunting activities. If any portion of this area contains grizzly bear habitat, no surface-disturbing activities can occur there until the grizzly bear cumulative effects model can be run to help determine potential affects on the bear.

Land and Resource Management Objectives addressed and, in part, met by achieving this Desired Future Condition include: 1.1(e-j), 1.2(c-e), 2.1(a,b), 2.3(a), 2.5(a-d), 4.1(a,b), 4.2(b,d), 4.4(a-c), 4.5(a,b), and 4.7(a-d).

Resource Prescriptions

RECREATION - Recreation and other human activities are managed to meet needs of big-game species.

Recreation Opportunity Guidelines - Existing roaded recreation opportunities should be allowed to continue where they do not interfere with objectives for this area. Areas of Semi-Primitive recreation should be provided for both motorized and non-motorized use. Existing and future road systems should be managed to retain backcountry areas that are large and remote enough to provide Semi-Primitive recreation.

VISUAL QUALITY - The Visual Quality Objectives are Retention and Partial Retention.

FISHERIES AND WILDLIFE - Habitat will be managed to help meet the game populations, harvest levels, success, and recreation-day objectives, and to fully achieve the fish populations, harvest levels, success, and recreation-day objectives identified by the Wyoming Game and Fish Department and agreed to by the Forest Service.

Sight Distance Guidelines - In forested areas, hiding cover 2-4 sight distances wide (one sight distance is 200 feet) should be maintained on at least 80 percent of the perimeter of all natural openings, along at least 75 percent of the edge of arterial and collector roads, and along 60 percent of streams and rivers. Cover should be evenly distributed across the watershed.

Hiding and Security Cover Guideline - In areas dominated by other than forested ecosystems, hiding and security cover should be maintained as follows:

% of Unit Forested	% of Forested Area In Cover
35-50	at least 50%
20-34	at least 60%
less than 20	at least 75%

Management Activity Guideline - All management activities should be concentrated to within the shortest period of time and to the smallest possible area.

Tree Thinning Guideline - Where tree regeneration is present alongside roads and adjacent to open stands, meadows, natural openings, and unstocked created openings, and the regeneration is serving as a screen, the edge of the screen should not be thinned to a spacing any greater than one where big game can be seen one sight distance away.

Dead and Down Large Woody Material Guideline - Dead-and-down spruce and fir material should be retained on logged sites to provide wildlife habitat.

Dead and Down Large Woody Material Standards - Where available on site, four or more decomposition class 1 and 2 logs will be retained per acre on logged sites. Down logs will be at least 12 inches in diameter at the large end and 20 feet in length. Two or more brush piles about 10 feet across and 7 feet high per acre may be retained. Dead-and-down woody material will not exceed an average depth of 18 inches. An average of 2 dead or cull-leaning trees per acre during the mature stage will be sought. To be acceptable, leaning trees will be greater than 8 inches in diameter and 40 feet in length, and will be lodged in adjacent trees.

Forest Stand and Opening Interspersion Guideline - Where available on site, forest stands of an adequate size and distribution to provide hiding cover, thermal cover, and security cover needed to conceal movement of big game should be maintained. Allowed openings should not exceed 600 feet in width. Allowed openings should be interspersed with cover patches 26 to 60 acres in size and 1200 feet to 1800 feet in width and length. Emphasis should be on retaining 75 percent of the cover patches in the 60 acre or larger size class. To facilitate big game movement, corridors of forest cover 600 feet to 1200 feet in width should be retained between patches of cover. Distances between cover patches along a cover corridor should not exceed 1200 feet.

Big Game Habitat Guideline - Sufficient habitat should be provided to maintain desired populations and distribution of big game species. For example:

Elk Calving Area - maintain about 30 percent of the brush/grassland (rangeland type) in a brush/forb type, emphasizing maintenance of the aspen or conifer/brush ecotone.

Moose Winter Range - maintain about 75 percent of the brush/grassland (rangeland type, e.g. serviceberry, mountain mahogany) in a brush type with about 30 percent in a mature age class. Maintain About 95 percent of the willow/grass range in a willow type.

Elk Winter Range - maintain about 50 percent of the brush/grassland in a brush type with About 30 percent in a mature age class.

Bighorn Winter Range - maintain about 75 percent of the brush/grassland type in grass.

Created Opening Guidelines - Created forest openings may adjoin meadows if no more than one-fifth of the periphery of the meadow edge is affected. Size, shape, and arrangement of created openings should vary to fit naturally into existing landscapes. Created openings should not exceed 600 feet in width unless site specific analysis identifies the need for larger openings for wildlife habitat management purposes. Created openings should be interspersed with cover patches at least 60 acres in size.

VEGETATION-Range - Range is managed to maintain and enhance range and watershed condition while providing forage for livestock and wildlife, particularly big-game.

VEGETATION-Timber - Silvicultural practices emphasize preserving and enhancing critical big-game habitat values. Timber harvest is not scheduled. Vegetation management practices provide opportunities to obtain firewood and other products.

Silvicultural System Guidelines - Other than for designated old-growth, all systems should be available but only as required to achieve big-game habitat objectives. To provide security habitat, methods should be applied that favor the development of an all-aged structure in existing and regenerated conifer stands, and where favored methods can not be used in existing over-mature conifer stands due to windfall risks, lack of adequate regeneration, and other similar stand conditions methods appropriate to the site-specific conditions should be applied.

Intermediate Treatment Guideline - Sanitation should be applied in stands when epidemic conditions are present or imminent and threaten meeting resource objectives within or adjacent to the Management Area. All other treatments should be available but only as required to meet critical big-game habitat needs including hiding cover.

Desired Stocking Guideline - Managed stands should have tree stocking control to have big game hiding cover. Thinning should happen before crown competition and canopy closure occur.

Forest Cover Type	Stand Age at Thinning (yrs)	Desired Trees Per Acre
lodgepole pine	10-15	400
spruce and fir	20-25	400
Douglas-fir	10-15	350

Site Preparation Guideline - All methods should be available but only as required to meet big-game habitat needs.

Created Opening Duration Standard A created opening will be considered closed when it meets reforestation standards, and

the area begins to take on the appearance of a young forest rather than a restocked opening, And it takes on the appearance of the adjoining characteristic landscape represented by an average tree height of 20 feet or regeneration provides elk hiding cover from an elevated ground view point.

Aspen Management Guideline - Aspen should be managed for its value as wildlife habitat and for providing seasonal colors while emphasizing browse and cover for big-game species.

MINERALS - Minerals or energy exploration and development of existing leases is allowed. Energy development areas meet habitat capability and escape cover. Although some energy development projects do not meet Semi-Primitive opportunity classifications, every effort is made to make them compatible. Exploration and development methods and practices that minimize road building, noise, and other game disturbance will be encouraged.

Lease Stipulation Standard - New oil and gas leases will be issued with Timing, Limitation, and Controlled-Surface-Use Stipulations. The later requires mitigation activities for the effects of roading, exploration, and development on wildlife. Activities will be directed first at onsite effects, then at effects within the contiguous herd unit, and finally at effects within other herd units.

ACCESS-Roads - Management of the area requires a limited amount of open roads for public access and some commodity removal. Most travel is limited to arterial and collector roads with long-term closure of most local roads for wildlife security.

Road Improvement Standard - Existing forest development roads needing improvement to meet transportation, resource or safety requirements will be designed and improved to standards appropriate for Traffic Service Levels B through D.

New-Road-Building Standards - Forest development roads will be designed and built to standards appropriate for Traffic Service Level D. Traffic Service Level B or C roads may be allowed where proper mitigation is assured. Mitigation will conform to requirements set by the Forest Service, at times calling for the return of additional roads to Closure Class 3 or 4 Standards or use other mitigation measures to meet open road density or area closure standards.

Road Management Standards - Over the life of the Forest Plan, the average open road density will be 0.25 miles per square mile of standard or equivalent road with 1- to 5-year variations of 0 to 0.5 miles of road per square mile. Temporary roads will be returned to Closure 4 Standards.

ACCESS-Trails - Primarily non-motorized trails are offered to a variety of users and managed consistent with the recreation setting and compatible with wildlife objectives.

Trail System Guideline - Non-motorized trails should be developed providing a full range of difficulty levels where compatible with meeting wildlife objectives. Existing roads and trails should be used where possible. Motorized trails may be provided.

Standard Maintenance Level Guideline - The standard maintenance level should be that needed to protect soil and water values and to provide for user safety and user convenience appropriate to the trail's difficulty level.

Trail Density Guideline - Over the life of the Forest Plan, an average of no more than 1 mile of trail per square mile of area should be attained.

Encounters Per Day Guideline - Parties encountered per day should be limited to an average of 12, varying from 6 to 15 depending on conditions.

PROTECTION-Fire - Fire management emphasizes preservation and enhancement of habitat, particularly through prescribed fire. A full range of suppression techniques is used.

Fire Protection Standard - Wildfires will be suppressed using control strategies during the normal fire season. Pre- and post-season period strategies will include containment, confinement, and surveillance.

Fuels Standards - Activity fuels will be reduced or otherwise treated so the potential fireline intensities will not exceed 400 BTU per second foot on 90 percent of the days during the regular fire season, OR continuous fuels concentrations exceeding the above standard will be broken up into manageable units with fire breaks, or additional protection will be provided for areas exceeding the above standards when such protection will not be required for more than five years.

APPENDIX F

WILD AND SCENIC RIVERS ELIGIBILITY ASSESSMENT

APPENDIX F

WILD AND SCENIC RIVERS ELIGIBILITY ASSESSMENT

An assessment as to eligibility for inclusion in the Wild and Scenic Rivers program is required for free-flowing rivers on the Forest by Public Law 90-542 Section 5(d) which states, "In all planning for the use and development of water and related land resources consideration shall be given by all Federal agencies involved to potential wild, scenic, and recreational rivers areas..."

Initial identification of these rivers was completed by the Heritage Conservation and Resource Service in their National Rivers inventory. The following application of criteria and determination of classification potential documents the required review during the Forest Planning process. The criteria used Table F-1 are defined in detail in the "Guidelines for Evaluating Wild, Scenic, and Recreation River Areas Proposed for Inclusion in the National Wild and Scenic Rivers System" under Section 2, PL 90-542.

Table F-1
Wild And Scenic Rivers Criteria

River Or Stream	Criteria
Green River	Free-Flowing Natural - No impoundments or other unnatural alterations of significant nature to disqualify. Length - 30 miles within the National Forest. Water Volume - There is sufficient volume to permit full enjoyment of water-related outdoor recreation activities generally associated with comparable rivers. Outstandingly Remarkable Values - This river has significant historic identity; outstanding scenic values, unique wildlife habitat values, and offers a unique recreation opportunity. Water Quality - Water quality is sufficient to allow contact recreation. Conclusions - This river qualifies and will be considered for potential designation in the alternatives. The qualification potential likely extends past the National Forest boundary. Future study should consider the downstream portion as well as the portion within the National Forest.

River Or Stream	Criteria
Gros Ventre River	Free-Flowing Natural - No impoundments or other unnatural alterations of significant nature to disqualify. Length - 25 miles within the National Forest. Water Volume - There is sufficient volume to permit full enjoyment of water-related outdoor recreation activities generally associated with comparable rivers. Outstandingly Remarkable Values - Has outstanding geologic, scenic, recreation, wildlife and historic values. Water Quality - Water quality is sufficient to allow contact recreation. Conclusions - This river qualifies and will be considered for potential designation in the alternatives.
Greys and Little Greys River	Free-Flowing Natural - No impoundments or other unnatural alterations of significant nature to disqualify. Length - 74 miles within the National Forest. Water Volume - There is sufficient volume to permit full enjoyment of water-related outdoor recreation activities generally associated with comparable rivers. Outstandingly Remarkable Values - Has outstanding scenic, recreation, and wildlife values. Water Quality - Water quality is sufficient to allow contact recreation. Conclusions - This river qualifies and will be considered for potential designation in the alternatives.

River Or Stream	Criteria
Buffalo River	Free-Flowing Natural - No impoundments or other unnatural alterations of significant nature to disqualify. Length - 68 miles within the National Forest (15 outside wilderness, 53 within Teton Wilderness). Water Volume - There is sufficient volume to permit full enjoyment of water-related outdoor recreation activities generally associated with comparable rivers. Outstandingly Remarkable Values - Has outstanding scenic, recreation, and wildlife values. Water Quality - Water quality is sufficient to allow contact recreation. Conclusions - This river qualifies and will be considered for potential designation in the alternatives. This stream extends into Grand Teton National Park. Intensive future study should consider downstream potential as well.
Yellowstone and Thorofare Rivers	Free-Flowing Natural - No impoundments or other unnatural alterations of significant nature to disqualify. Length - 37 miles within the National Forest boundary (all within Teton Wilderness). Water Volume - There is sufficient volume to permit full enjoyment of water-related outdoor recreation activities generally associated with comparable rivers. Outstandingly Remarkable Values - Has outstanding scenic, recreation, and wildlife values. Water Quality - Water quality is sufficient to allow contact recreation. Conclusions - This river qualifies and will be considered for potential designation. The stream and its designation potential extend into Yellowstone National Park. Intensive future study should consider this portion as well.

River Or Stream	Criteria
Hoback River and Granite Creek	Free-Flowing Natural - No impoundments or other unnatural alterations of significant nature to disqualify. Length - 35 miles in the National Forest, excluding private ownership. Water Volume - There is sufficient volume to permit full enjoyment of water-related outdoor recreation activities generally associated with comparable rivers. Outstandingly Remarkable Values - Has outstanding scenic, geologic, recreation, historic, and wildlife values. Water Quality - Water quality is sufficient to allow contact recreation. Conclusions - This river qualifies and will be considered for potential designation in the alternatives.
Big Sandy Creek	Free-Flowing Natural - The portion within National Forest boundary is free-flowing. Length - 10 miles within the National Forest. Water Volume - Volume does not allow for a wide spectrum of recreation opportunities when compared to rivers in the system and other qualifying rivers. Outstandingly Remarkable Values - Stream is not outstanding when compared to rivers in the area or streams already in the system or qualifying as potential. Water Quality - Water quality is sufficient to allow contact recreation. Conclusions - Length, water volume and values indicate disqualification. This stream extends into BLM lands. Coordination indicates BLM portion also disqualifies.

River Or Stream	Criteria
Boulder Creek	Free-Flowing Natural - Free-flowing. Length - 16 miles within the National Forest, all within wilderness. Water Volume - Volume does not allow for a wide spectrum of recreation opportunities when compared to rivers already in the system and other qualifying rivers. Outstandingly Remarkable Values - Stream is not outstanding when compared to rivers already in the system or qualifying as potential. Water Quality - Water quality is sufficient to allow contact recreation. Conclusions - Length, water volume and values indicate disqualification.
Fontenelle Creek	Free-Flowing Natural - Free-flowing for the portion within the National Forest. Length - 15 miles within the National Forest. Water Volume - Volume does not allow for a wide spectrum of recreation opportunities when compared to rivers already in the system and other qualifying rivers. Outstandingly Remarkable Values - Stream is not outstanding when compared to rivers already in the system or qualifying as potential. Water Quality - Water quality is sufficient to allow contact recreation. Conclusions - Length, water volume, and values indicate disqualification. This stream extends into BLM lands. Coordination indicates BLM portion also disqualifies.

River Or Stream	Criteria
Hams Fork Creek	Free-Flowing Natural - Free-flowing for the portion within the National Forest. Length - 15 miles within the National Forest. Water Volume - Volume does not allow for a wide spectrum of recreation opportunities when compared to rivers already in the system and other qualifying rivers. Outstandingly Remarkable Values - Stream is not outstanding when compared to rivers already in the system or qualifying as potential. Water Quality - Water quality is sufficient to allow contact recreation. Conclusions - Length, water volume, and values indicate disqualification. This stream extends into BLM lands. Coordination indicates BLM portion also disqualifies.
New Fork River	Free-Flowing Natural - Free-flowing. Length - Only 10 miles. Water Volume - Volume does not allow for a wide spectrum of recreation opportunities when compared to rivers already in the system and other qualifying rivers. Outstandingly Remarkable Values - Stream is not outstanding when compared to rivers already in the system or qualifying as potential. Water Quality - Water quality is sufficient to allow contact recreation. Conclusions - Length, water volume, and values indicate disqualification.

River Or Stream	Criteria
Pine Creek	Free-Flowing Natural - Free-flowing. Length - Only 10 miles. Water Volume - Volume does not allow for a wide spectrum of recreation opportunities when compared to rivers already in the system and other qualifying rivers. Outstandingly Remarkable Values - Stream is not outstanding when compared to rivers already in the system or qualifying as potential. Water Quality - Water quality is sufficient to allow contact recreation. Conclusions - Length, water volume, and values indicate disqualification.
Pacific Creek	Free-Flowing Natural - Free-flowing. Length - Total length of 25 miles, including tributaries, could marginally qualify. Water Volume - Volume does not allow for a wide spectrum of recreation opportunities when compared to rivers already in the system and other qualifying rivers. Outstandingly Remarkable Values - Stream is not outstanding when compared to rivers already in the system or qualifying as potential. Water Quality - Water quality is sufficient to allow contact recreation. Conclusions - Length, water volume, and values indicate disqualification. This stream extends into Grand Teton National Park. Coordination indicates the Park's portion is of questionable qualification.

TABLE F-2
Classification Potential of Qualifying Rivers

Rivers or Streams	Classification Potential
Gros Ventre	Characteristics - Largely primitive and undeveloped. No substantial evidence of human activity, especially in upper 12 miles. Some evidence of past ongoing timber harvest and oil and gas exploration activities in lower 13 river miles. A limited amount of domestic livestock grazing and hay production. In the lower 13 miles, few existing roads reach and bridge river; upper 12 miles accessible only by trails. Potential - Scenic River potential for lower 13 miles. Wild River potential for upper 12 miles.
Buffalo Fork	Characteristics - Free of impoundments. Shoreline is largely primitive and undeveloped. Scattered dwellings and ranches in lower 17 miles. Lower 17 miles accesible in places by roads, and river portion in wilderness accessible only by trail. Potential - Scenic River potential for portion outside wilderness (lower 17 miles). Wild River potential for that portion within the wilderness.
Upper Green River	Characteristics - Free of impoundments, presence of a few inconspicuous structures, some of cultural value. Livestock graze area during summer months. Roads occasionally reach or bridge river. Potential - Scenic River potential.
Hoback/Granite River	Characteristics - Some diversions exist. River flows through some residential developments. Road parallels river and crosses occasionally. Potential - Recreation River potential.
Greys/Little Greys River	Characteristic - Some riprap exists to protect road structure. Livestock grazing occurs during summer months. Some evidence of past and present timber harvest. Roads occasionally reach or bridge river. Potential - Scenic River potential.
Yellowstone/Thorofare	Characteristics - Entirely within Teton Wilderness and free of impoundments. Potential - Wild River potential.

APPENDIX G

STATUS OF BIOLOGICAL ASSESSMENT FOR FOREST PLAN THREATENED AND ENDANGERED SPECIES

APPENDIX G

STATUS OF THE FOREST PLAN'S BIOLOGICAL ASSESSMENT FOR THREATENED AND ENDANGERED SPECIES

OVERVIEW

A Biological Assessment for threatened and endangered species was completed in February 1989. This Assessment analyzed the effects of proposed Forest Plan activities (timber sales, oil and gas leasing, recreation activities, wildlife and fish habitat improvements, livestock grazing...) on the following species and their habitats: 1) black-footed ferret, 2) grizzly bear, 3) bald eagle, 4) peregrine falcon, 5) whooping crane, 6) Kendall Warm Springs dace, 7) Colorado squawfish, and 8) humpback chub.

A "No Effect" determination was made for the following species: 1) black-footed ferret, 2) grizzly bear, 3) bald eagle, 4) peregrine falcon, 5) whooping crane, and 6) Kendall Warm Springs dace. In all cases Forest-wide standards, guidelines and management prescriptions will be applied to prevent adverse impacts to these species or their habitats. In addition, appropriate recovery guidelines will be followed.

A "May Affect" determination was made for the Colorado squawfish and the humpback chub. This is based on predicting water depletions from the Colorado River Basin (Green River Drainage) from the oil and gas leasing allowed by the Forest Plan. A "jeopardy" opinion by the U.S. Fish and Wildlife Service can be avoided by determining that there are no other feasible alternatives and that the applicant/leasee agrees to a one-time conservation contribution to be applied equally for aquisition of water rights to meet the instream flow needs of the endangered fishes and other recovery activities for the endangered fishes.

Informal communications with the U. S. Fish and Wildlife Service (Threatened and Endangered Species Coordinator, Cheyenne) were maintained throughout the formulation of the Biological Assessment. The Wyoming Game and Fish Department was also periodically contacted throughout this process. Formal Section 7 Consultation (Endangered Species Act of 1973, as amended) with the U. S. Fish and Wildlife Service was initiated on March 23, 1989 by the Intermountain Regional Office (Ogden, Utah).

Preliminary conversations with the U. S. Fish and Wildlife Service indicate that they fully concur with the "No Effect" determinations for the black-footed ferret, grizzly bear, bald eagle, peregrine falcon, whooping crane, and Kendall Warm Springs dace. They indicate that they will either concur with the "May Affect" for the Colorado squawfish and humpback chub (and delay the requirement for Conservation Contributions until specific projects are identified) or they will issue a "No Effect" decision on these 2 fish species.

A Biological Opinion by the U. S. Fish and Wildlife Service was completed in August, 1989. The complete Biological Assessment, along with the Biological Opinion is available upon request.

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

BRIDGER-TETON NATIONAL FOREST

ALTERNATIVE A

High Productivity - Emphasizes forest products and experiences that produce returns to the U.S. Treasury, such as timber and range.

LAND & RESOURCE MANAGEMENT PLAN
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WYOMING

WIND RIVER AND SIXTH PRINCIPAL MERIDIANS

SEPTEMBER 1989

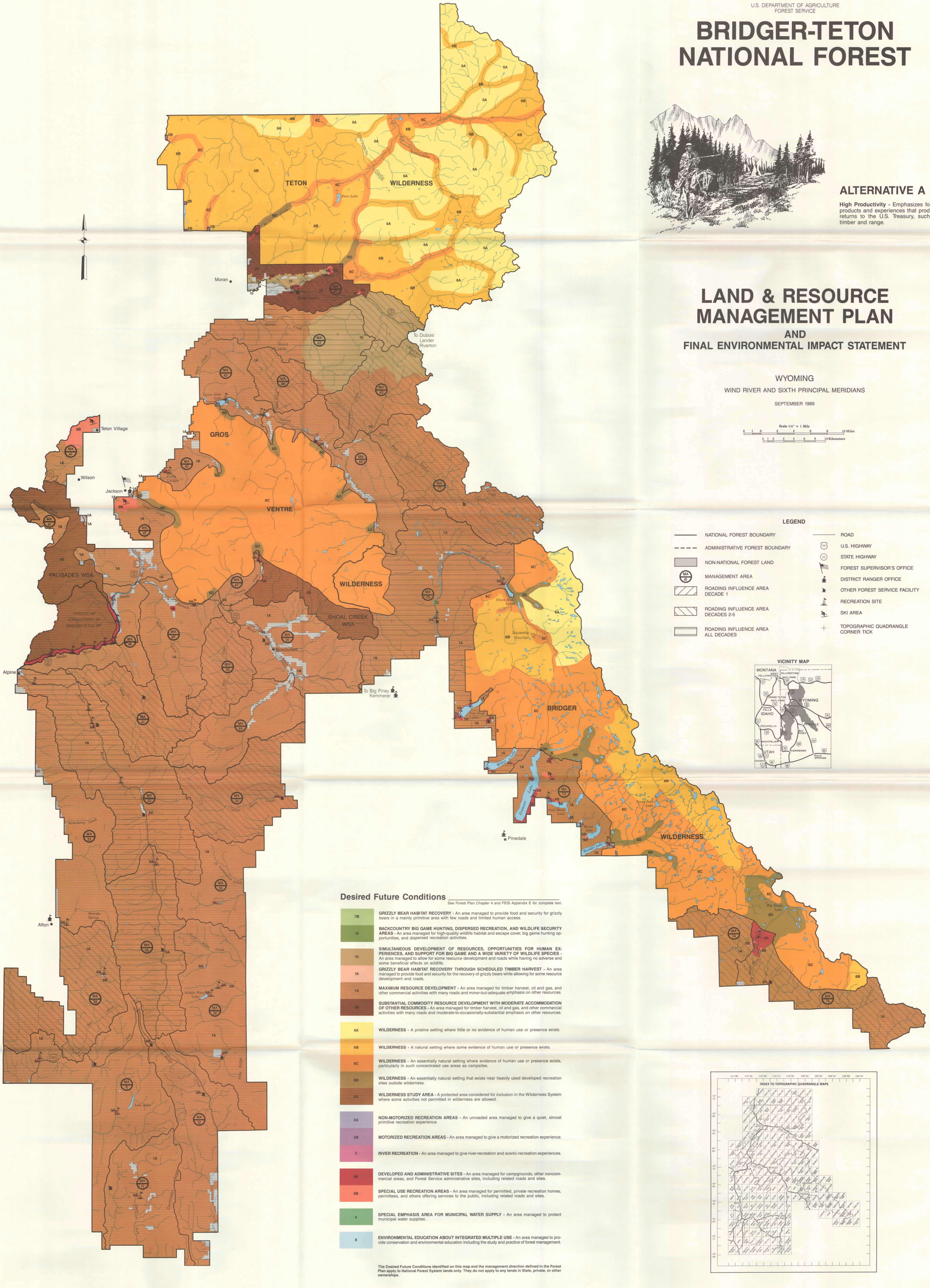
Scale 1/4" = 1 Mile

2 1 0 2 4 6 8 10 Miles

2 1 0 2 4 6 8 10 Kilometers

LEGEND

▬	NATIONAL FOREST BOUNDARY	—	ROAD
- - -	ADMINISTRATIVE FOREST BOUNDARY	191	U.S. HIGHWAY
▩	NON-NATIONAL FOREST LAND	22	STATE HIGHWAY
MA 41	MANAGEMENT AREA	⚑	FOREST SUPERVISOR'S OFFICE
▨	ROADING INFLUENCE AREA DECADE 1	⌂	DISTRICT RANGER OFFICE
▧	ROADING INFLUENCE AREA DECADES 2-5	⚑	OTHER FOREST SERVICE FACILITY
▤	ROADING INFLUENCE AREA ALL DECADES	⛺	RECREATION SITE
		⛷	SKI AREA
		+	TOPOGRAPHIC QUADRANGLE CORNER TICK



Desired Future Conditions

See Forest Plan Chapter 4 and FEIS Appendix E for complete text.

7B	**GRIZZLY BEAR HABITAT RECOVERY -** An area managed to provide food and security for grizzly bears in a mainly primitive area with few roads and limited human access.
12	**BACKCOUNTRY BIG GAME HUNTING, DISPERSED RECREATION, AND WILDLIFE SECURITY AREAS -** An area managed for high-quality wildlife habitat and escape cover, big game hunting opportunities, and dispersed recreation activities.
10	**SIMULTANEOUS DEVELOPMENT OF RESOURCES, OPPORTUNITIES FOR HUMAN EXPERIENCES, AND SUPPORT FOR BIG GAME AND A WIDE VARIETY OF WILDLIFE SPECIES -** An area managed to allow for some resource development and roads while having no adverse and some beneficial effects on wildlife.
7A	**GRIZZLY BEAR HABITAT RECOVERY THROUGH SCHEDULED TIMBER HARVEST -** An area managed to provide food and security for the recovery of grizzly bears while allowing for some resource development and roads.
1A	**MAXIMUM RESOURCE DEVELOPMENT -** An area managed for timber harvest, oil and gas, and other commercial activities with many roads and minor-but-adequate emphasis on other resources.
1B	**SUBSTANTIAL COMMODITY RESOURCE DEVELOPMENT WITH MODERATE ACCOMMODATION OF OTHER RESOURCES -** An area managed for timber harvest, oil and gas, and other commercial activities with many roads and moderate-to-occasionally-substantial emphasis on other resources.
6A	**WILDERNESS -** A pristine setting where little or no evidence of human use or presence exists.
6B	**WILDERNESS -** A natural setting where some evidence of human use or presence exists.
6C	**WILDERNESS -** An essentially natural setting where evidence of human use or presence exists, particularly in such concentrated use areas as campsites.
6D	**WILDERNESS -** An essentially natural setting that exists near heavily used developed recreation sites outside wilderness.
6S	**WILDERNESS STUDY AREA -** A protected area considered for inclusion in the Wilderness System where some activities not permitted in wilderness are allowed.
2A	**NON-MOTORIZED RECREATION AREAS -** An unroaded area managed to give a quiet, almost primitive recreation experience.
2B	**MOTORIZED RECREATION AREAS -** An area managed to give a motorized recreation experience.
3	**RIVER RECREATION -** An area managed to give river-recreation and scenic-recreation experiences.
9A	**DEVELOPED AND ADMINISTRATIVE SITES -** An area managed for campgrounds, other noncommercial areas, and Forest Service administrative sites, including related roads and sites.
9B	**SPECIAL USE RECREATION AREAS -** An area managed for permitted, private recreation homes, permittees, and others offering services to the public, including related roads and sites.
4	**SPECIAL EMPHASIS AREA FOR MUNICIPAL WATER SUPPLY -** An area managed to protect municipal water supplies.
8	**ENVIRONMENTAL EDUCATION ABOUT INTEGRATED MULTIPLE USE -** An area managed to provide conservation and environmental education including the study and practice of forest management.

The Desired Future Conditions identified on this map and the management direction defined in the Forest Plan apply to National Forest System lands only. They do not apply to any lands in State, private, or other ownerships.

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

BRIDGER-TETON NATIONAL FOREST

ALTERNATIVE B

Resources Planning Act (RPA) Targets - Emphasizes meeting the 1980 RPA targets for timber, range, and developed recreation.

LAND & RESOURCE MANAGEMENT PLAN
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WYOMING

WIND RIVER AND SIXTH PRINCIPAL MERIDIANS

SEPTEMBER 1989

Scale 1/4" = 1 Mile

2 1 0 2 4 6 8 10 Miles

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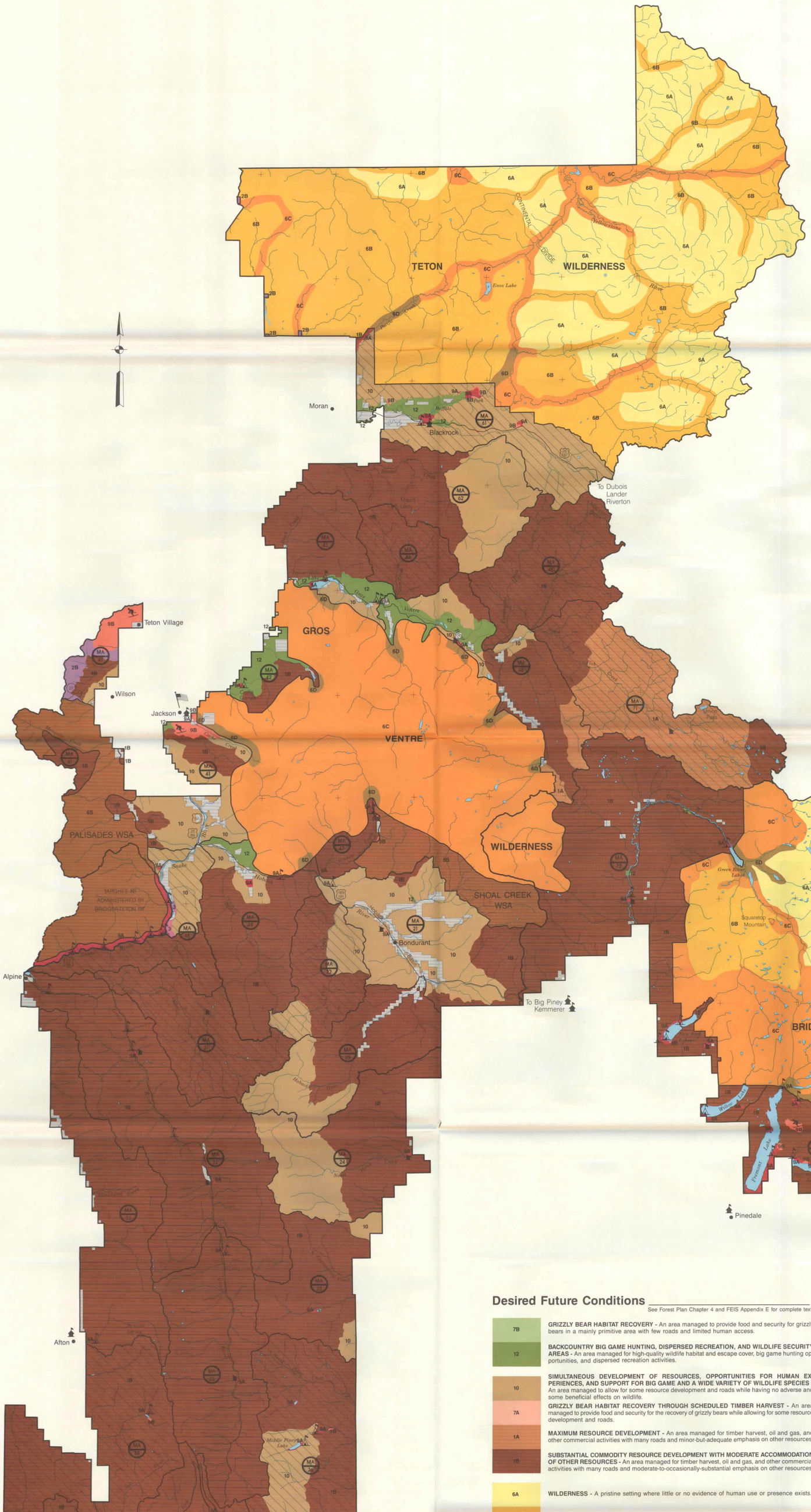
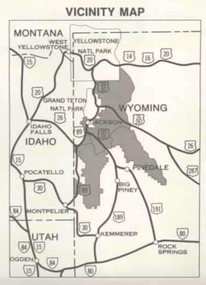


LEGEND

- NATIONAL FOREST BOUNDARY
- ADMINISTRATIVE FOREST BOUNDARY
- NON-NATIONAL FOREST LAND
- MANAGEMENT AREA
- ROADING INFLUENCE AREA DECADE 1
- ROADING INFLUENCE AREA DECADES 2-5
- ROADING INFLUENCE AREA ALL DECADES
- ROAD
- U.S. HIGHWAY
- STATE HIGHWAY
- FOREST SUPERVISOR'S OFFICE
- DISTRICT RANGER OFFICE
- OTHER FOREST SERVICE FACILITY
- RECREATION SITE
- SKI AREA
- TOPOGRAPHIC QUADRANGLE CORNER TICK

VICINITY MAP



Desired Future Conditions

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- **7B** — **GRIZZLY BEAR HABITAT RECOVERY -** An area managed to provide food and security for grizzly bears in a mainly primitive area with few roads and limited human access.
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- **6D** — **WILDERNESS -** An essentially natural setting that exists near heavily used developed recreation sites outside wilderness.
- **6S** — **WILDERNESS STUDY AREA -** A protected area considered for inclusion in the Wilderness System where some activities not permitted in wilderness are allowed.
- **2A** — **NON-MOTORIZED RECREATION AREAS -** An unroaded area managed to give a quiet, almost primitive recreation experience.
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- **8** — **ENVIRONMENTAL EDUCATION ABOUT INTEGRATED MULTIPLE USE -** An area managed to provide conservation and environmental education including the study and practice of forest management.

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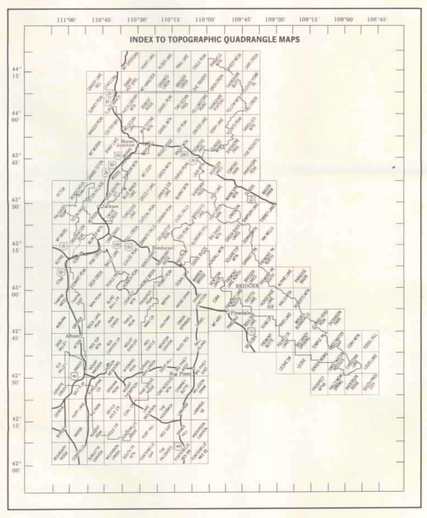

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

BRIDGER-TETON NATIONAL FOREST

ALTERNATIVE C

Current Management - Emphasizes continuing to provide the level of opportunities actually made available during the past ten years (1978-1987). It is the "No-Action Alternative" required by the National Environmental Policy Act.

LAND & RESOURCE MANAGEMENT PLAN
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WYOMING

WIND RIVER AND SIXTH PRINCIPAL MERIDIANS

SEPTEMBER 1989

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LEGEND

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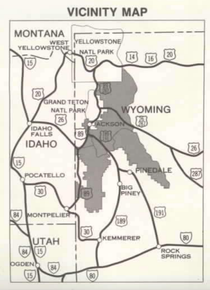

Desired Future Conditions

See Forest Plan Chapter 4 and FEIS Appendix E for complete text.

- **7B / 12** — **GRIZZLY BEAR HABITAT RECOVERY - BACKCOUNTRY BIG GAME HUNTING, DISPERSED RECREATION, AND WILDLIFE SECURITY AREAS -** An area managed for high-quality wildlife habitat and escape cover, big game hunting opportunities, and dispersed recreation activities.
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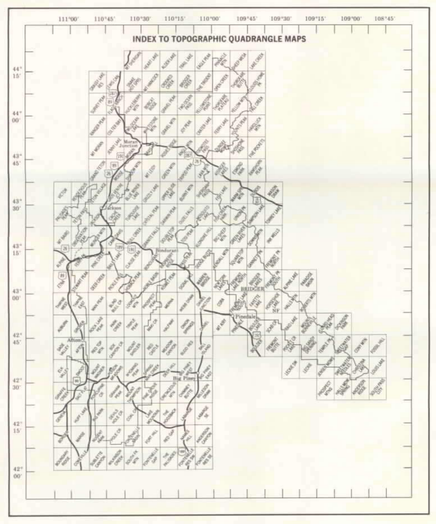
INDEX TO TOPOGRAPHIC QUADRANGLE MAPS



U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

BRIDGER-TETON NATIONAL FOREST

ALTERNATIVE D

Dispersed Recreation/Wildlife Emphasis - Emphasizes non-motorized and motorized backcountry recreation opportunities, security for wildlife populations, and increased hunting opportunities.

LAND & RESOURCE MANAGEMENT PLAN
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WYOMING

WIND RIVER AND SIXTH PRINCIPAL MERIDIANS

SEPTEMBER 1989

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- RECREATION SITE
- SKI AREA
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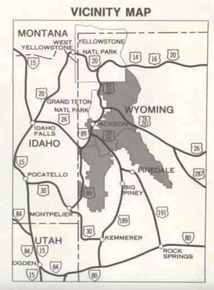
VICINITY MAP



Desired Future Conditions

See Forest Plan Chapter 4 and FEIS Appendix E for complete text.

- **7B** — **GRIZZLY BEAR HABITAT RECOVERY -** An area managed to provide food and security for grizzly bears in a mainly primitive area with few roads and limited human access.
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U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

BRIDGER-TETON NATIONAL FOREST

ALTERNATIVE E

Issue Consideration - Emphasizes a mix of market and nonmarket opportunities affecting the forest's Zone of Influence (the area most influenced by forest management activities). A mix of opportunities would be emphasized so that timber, range, recreation and wildlife employment would show small to modest changes.

LAND & RESOURCE MANAGEMENT PLAN
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WYOMING

WIND RIVER AND SIXTH PRINCIPAL MERIDIANS

SEPTEMBER 1989

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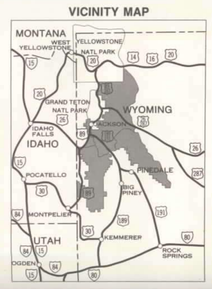
VICINITY MAP



Desired Future Conditions

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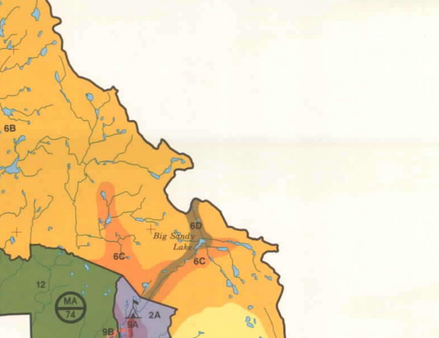

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

BRIDGER-TETON NATIONAL FOREST

ALTERNATIVE F

Preferred Alternative - Emphasizes market and nonmarket opportunities affecting the forest's Zone of Influence (the area most influenced by forest management activities). A mix of opportunities is based upon site-specific trade-offs between competing interests to find the mix that will best meet the needs of those publics concerned about specific areas and achieve high net public benefit.

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WYOMING

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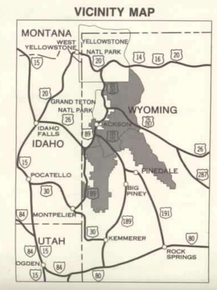

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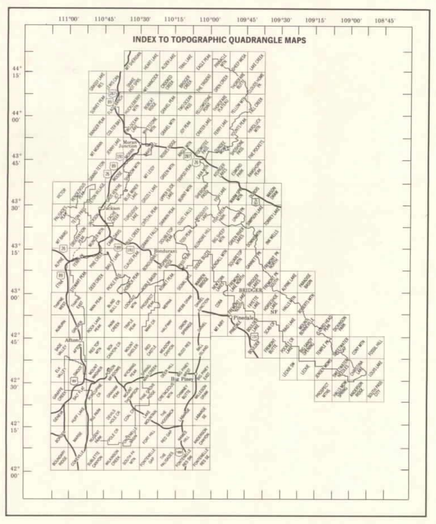
INDEX TO TOPOGRAPHIC QUADRANGLE MAPS



U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

BRIDGER-TETON NATIONAL FOREST

OIL AND GAS LEASE STIPULATIONS

Under the Forest Plan (Alternative F in the EIS), some areas of the forest are determined suitable for leasing. Although all suitable areas are not likely to be leased, this map shows where lease stipulations would be applied based on Forest Plan direction. Stipulations are used to protect forest resources and more stipulations may be applied before leases are issued.

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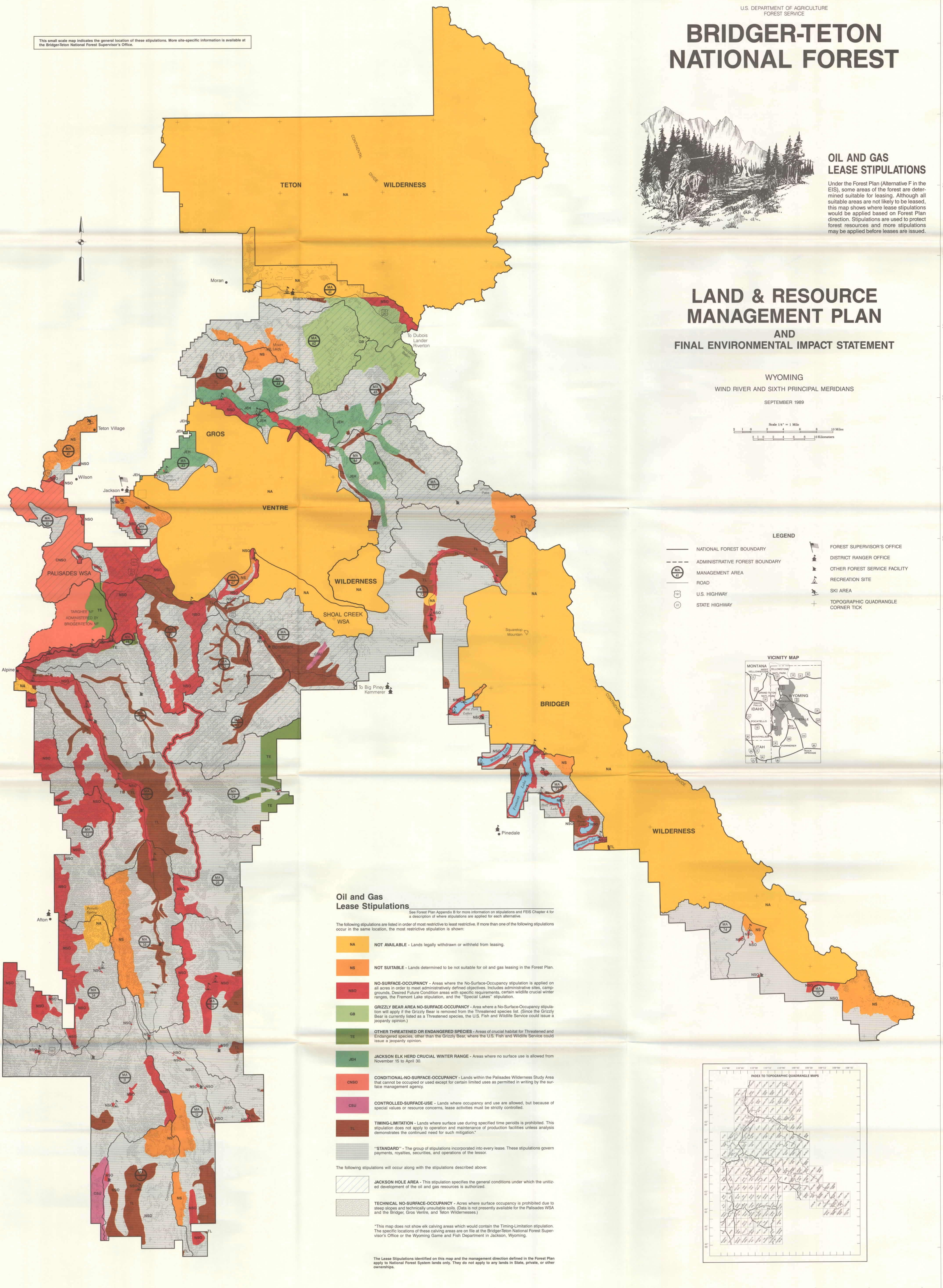
This small scale map indicates the general location of these stipulations. More site-specific information is available at the Bridger-Teton National Forest Supervisor's Office.



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VICINITY MAP

Oil and Gas Lease Stipulations

See Forest Plan Appendix B for more information on stipulations and FEIS Chapter 4 for a description of where stipulations are applied for each alternative.

The following stipulations are listed in order of most restrictive to least restrictive. If more than one of the following stipulations occur in the same location, the most restrictive stipulation is shown:

NA — **NOT AVAILABLE -** Lands legally withdrawn or withheld from leasing.

NS — **NOT SUITABLE -** Lands determined to be not suitable for oil and gas leasing in the Forest Plan.

NSO — **NO-SURFACE-OCCUPANCY -** Areas where the No-Surface-Occupancy stipulation is applied on all acres in order to meet administratively defined objectives. Includes administrative sites, campgrounds, Desired Future Condition areas with specific requirements, certain wildlife crucial winter ranges, the Fremont Lake stipulation, and the "Special Lakes" stipulation.

GB — **GRIZZLY BEAR AREA NO-SURFACE-OCCUPANCY -** Area where a No-Surface-Occupancy stipulation will apply if the Grizzly Bear is removed from the Threatened species list. (Since the Grizzly Bear is currently listed as a Threatened species, the U.S. Fish and Wildlife Service could issue a jeopardy opinion.)

TE — **OTHER THREATENED OR ENDANGERED SPECIES -** Areas of crucial habitat for Threatened and Endangered species, other than the Grizzly Bear, where the U.S. Fish and Wildlife Service could issue a jeopardy opinion.

JEH — **JACKSON ELK HERD CRUCIAL WINTER RANGE -** Areas where no surface use is allowed from November 15 to April 30.

CNSO — **CONDITIONAL-NO-SURFACE-OCCUPANCY -** Lands within the Palisades Wilderness Study Area that cannot be occupied or used except for certain limited uses as permitted in writing by the surface management agency.

CSU — **CONTROLLED-SURFACE-USE -** Lands where occupancy and use are allowed, but because of special values or resource concerns, lease activities must be strictly controlled.

TL — **TIMING-LIMITATION -** Lands where surface use during specified time periods is prohibited. This stipulation does not apply to operation and maintenance of production facilities unless analysis demonstrates the continued need for such mitigation.*

"STANDARD" - The group of stipulations incorporated into every lease. These stipulations govern payments, royalties, securities, and operations of the lessor.

The following stipulations will occur along with the stipulations described above:

JACKSON HOLE AREA - This stipulation specifies the general conditions under which the unitized development of the oil and gas resources is authorized.

TECHNICAL NO-SURFACE-OCCUPANCY - Acres where surface occupancy is prohibited due to steep slopes and technically unsuitable soils. (Data is not presently available for the Palisades WSA and the Bridger, Gros Ventre, and Teton Wildernesses.)

*This map does not show elk calving areas which would contain the Timing-Limitation stipulation. The specific locations of these calving areas are on file at the Bridger-Teton National Forest Supervisor's Office or the Wyoming Game and Fish Department in Jackson, Wyoming.

The Lease Stipulations identified on this map and the management direction defined in the Forest Plan apply to National Forest System lands only. They do not apply to any lands in State, private, or other ownerships.

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

BRIDGER-TETON NATIONAL FOREST

POTENTIAL ROADLESS AREA IMPACTS

Under the Forest Plan (Alternative F in the EIS), roading activities may occur in some of the inventoried Roadless Areas on the forest. This map shows the location of the areas identified in the 1984 re-evaluation of the Roadless Area Review and Evaluation II (RARE II) and the areas where potential roading activities may occur during the next 50 years.

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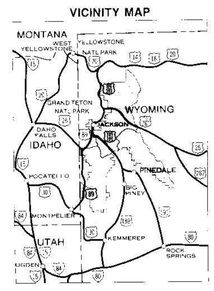

Potential Roadless Area Impacts Related to the Preferred Alternative

See FEIS Appendix C for more information on the effects of different alternatives on each roadless area.

AREAS CLASSIFIED AS ROADED - Areas outside of the roadless area inventory.

03009 **ROADLESS AREAS** - Roadless areas identified in the 1984 re-evaluation of the RARE II inventory.

WILDERNESSES OR WILDERNESS STUDY AREAS - Includes the Bridger, Gros Ventre, and Teton Wildernesses, and the Palisades and Shoal Creek Wilderness Study Areas.

NON-NATIONAL FOREST SYSTEM LAND - Lands in State, private, or other ownerships that are within the National Forest boundary.

ROADING INFLUENCE AREA (DECADES 1-5) - Areas identified in the Forest Plan where roading may occur in some portion of the area starting in Decade 1. Additional roading may occur sometime in Decades 2-5. (See FEIS Chapter 4 for more information on proposed roading activities for all alternatives.)

ROADING INFLUENCE AREA (DECADES 2-5) - Areas identified in the Forest Plan where roading may occur in some portion of the area sometime in Decades 2-5.

INDEX TO TOPOGRAPHIC QUADRANGLE MAPS